

**ADVISORY**

Etec Contract Services Limited  
Wythenshawe Park  
Manchester  
Sustainable Drainage Statement

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Manchester  
Sustainable Drainage Statement

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## 1. INTRODUCTION

- 1.1 A Sustainable Drainage Statement (SDS) sets out the principles of drainage design for a development and summarises the reasoning behind the chosen design. This includes consideration of national and local guidance, justification of specific flow rates, volumes of attenuated storage, as well as the appropriate level of treatment to be provided to surface water runoff.
- 1.2 This SDS has been produced by BWB Consulting on behalf of Etec Contract Services Limited in respect of a site located within Wythenshawe Park, approximately 2.5km north-west of Wythenshawe and 8.5km south of Manchester city centre.
- 1.3 The proposals are for the redevelopment of existing sport facilities to include construction of a new pavilion to provide shower/change facilities, a café, and GP clinic; relocation of the existing modular change and shipping containers, provision of 2x AGPS, and 1x MUGA; demolition of the existing weightlifting building; extension of the car park; widening of the access road and provision of a pedestrian access.
- 1.4 A Flood Risk Assessment has been produced for the site (reference 244550-BWB-ZZ-XX-T-W-0001\_FRA) and this SDS accompanies this overarching document.
- 1.5 This SDS is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.
- 1.6 A proposed site development plan is included as **Appendix 1**.
- 1.7 The location of the site is illustrated within **Figure 1.1**, with contextual information provided within **Table 1.1**.
- 1.8 The application boundary is split into two parcels, the "Main Site", which forms the majority of the proposed development, and an area designated to be used for Biodiversity Net Gain (BNG). The BNG area will not include any impermeable surface and will not require any drainage infrastructure; therefore, this report focuses solely on the Main Site, hereafter referred to as "the site".

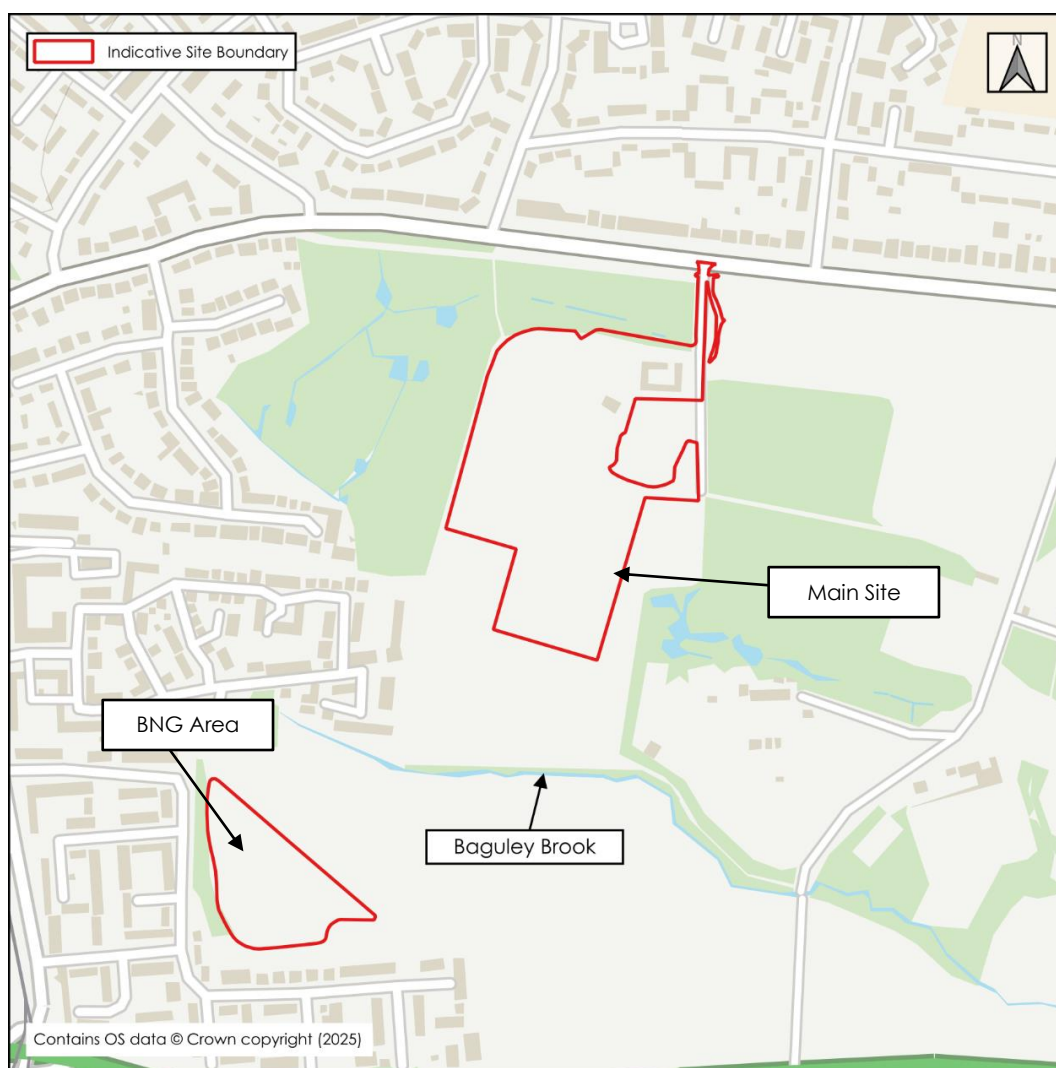


**Figure 1.1: Site Location**

**Table 1.1: Site Details**

|                            |                                             |
|----------------------------|---------------------------------------------|
| Site Name                  | Wythenshawe Park                            |
| Location                   | Manchester                                  |
| NGR (approx.)              | SJ810898                                    |
| Application Site Area (ha) | 6.1 (approx.)                               |
| Development Area (ha)      | 4.8 (approx.)                               |
| Development Type           | Sports Facilities                           |
| Lead Local Flood Authority | Manchester City Council                     |
| Local Planning Authority   | Manchester City Council                     |
| Environment Agency Area    | Greater Manchester, Merseyside and Cheshire |
| Sewerage Undertaker        | United Utilities                            |

## Sustainable Drainage Guidance

- 1.9 Sustainable Drainage Systems (SuDS) aim to reduce the impact of development by replicating the natural runoff regime in a sustainable, cost-effective manner whilst protecting water quality and reducing pollution. The four key objectives of SuDS design are to achieve improvements in water quantity, water quality, amenity provision and biodiversity.
- 1.10 Greater Manchester Combined Authority has developed a 'Sustainable Drainage Design Guide'<sup>1</sup> which has been considered as part of this report.
- 1.11 Predicted future changes in peak rainfall intensity caused by climate change are provided by the EA. Table 2 from the EA's 'Flood risk assessments: climate change allowances'<sup>2</sup>, included as **Table 1.2** shows the anticipated changes in peak rainfall intensity for the Site.

**Table 1.2: Peak Rainfall Climate Change Allowances for the Upper Mersey Management Catchment**

| Upper Mersey Management Catchment Allowance          | Total Potential Change Anticipated for the '2050s' (Lifetime up to 2060) | Total Potential Change Anticipated for the '2070s' (2061 to 2125) |
|------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1 in 30-Year (3.3% Annual Exceedance) Rainfall Event |                                                                          |                                                                   |
| Upper End                                            | 35%                                                                      | 40%                                                               |
| Central                                              | 20%                                                                      | 30%                                                               |
| 1 in 100-Year (1% Annual Exceedance) Rainfall Event  |                                                                          |                                                                   |
| Upper End                                            | 40%                                                                      | 45%                                                               |
| Central                                              | 25%                                                                      | 30%                                                               |

- 1.12 Given the Proposed Development, a climate change allowance of 45% has been made for the 1 in 100-year return period.
- 1.13 Local guidance has been considered in conjunction with the Non-statutory Technical Standards for Sustainable Drainage Systems<sup>3</sup> and The SuDS Manual<sup>4</sup> as part of the following document.

<sup>1</sup> Sustainable Drainage Design Guide (GMCA, December 2024)

<sup>2</sup> <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

<sup>3</sup> Non-Statutory Technical Standards for Sustainable Drainage Systems, DEFRA (2015)

<sup>4</sup> The SuDS Manual, CIRIA (2015)

## 2. EXISTING CONDITIONS

- 2.1 The site is located within Wythenshawe Park, approximately 2.5km north-west of Wythenshawe and 8.5km south of Manchester city centre. The site is bound to the north by Wythenshawe Road (B5167), to the east by parkland, to the south by the Baguley Brook, and to the west by woodland and residential development.
- 2.2 The site is approximately 6.1ha and comprises grassland, an athletics track, a bike pump track, a club house, car parking and sports pitches. Access to the site is via Wythenshawe Road (B5167) to the north. The existing impermeable are associated with the site access, car park and club house is approximately 0.565ha (0.510ha for the existing car park and clubhouse and 0.055ha for the existing access road).
- 2.3 The Baguley Brook, a designated EA Main River, is located adjacent to the southern boundary and flows in a westerly and north-westerly direction past the site. The watercourse is understood to ultimately discharge to the Bridgewater Canal, located approximately 3km north-west of the site.
- 2.4 As discussed within the accompanying FRA (244550-BWB-ZZ-XX-T-W-0001\_FRA) a portion of the proposed development is identified to be at risk of flooding attributed to the Baguley Brook, in the 1 in 100-year plus climate change event. The impacted development is considered to be 'Water Compatible' and therefore, the site is considered to be at a low risk of flooding from Main Rivers. The site is also found to be at a low risk of flooding from all other sources including surface water, ordinary watercourses, sewers & drainage infrastructure, groundwater, canals and reservoirs.
- 2.5 Ordnance Survey (OS) Mapping also identifies an Unnamed Ordinary Watercourse (UOW) located on the northern boundary of the site. This flows in an westerly direction along the site's northern boundary.
- 2.6 A topographical survey of the Site is included as **Appendix 2**. The topographical survey shows ground levels to generally fall from a high point in the north east of the site in a northerly and southerly direction, falling from a high point of appropriately 34.0mAOD, to low points of approximately 31.5mAOD and 31.6mAOD in the north and south, respectively.
- 2.7 The local sewerage undertaker is United Utilities; a copy of their asset plans are included as **Appendix 3**. The records shows a 2200mm diameter public combined sewer to flow through the site in a north easterly direction. A 525mm diameter public surface water sewer is also shown to originate within the site and flow in a south westerly direction where it outfalls to the Baguley Brook. No depth information was provided for these assets. A 450mm diameter culverted watercourse is shown to cross the existing site access to the north.

- 2.8 A Utility and CCTV Survey was undertaken by Solum Surveying Ltd in March 2025 (reference: 13898, rev 0), which is included as **Appendix 4**. The survey shows the existing club house and car park are served by private surface water and foul water drainage infrastructure. The car park and pump track are shown to drain to the UOW to the north, while the rest of the site drains to the United Utilities sewer in the south of the site. The discharge from the pump track is restricted via a flow control, with storage volume provided by a cellular storage tank.
- 2.9 British Geological Survey (BGS) mapping shows the site is entirely underlain by bedrock deposits of Tarporley Siltstone Formation (Siltstone, Mudstone and Sandstone). Superficial deposits consisting of Glaciofluvial Sheet Deposits (Sand and Gravel) are mapped across the majority of the site, with an area of Till (Diamicton) present within the east of the site. Phase 1 and Phase 2 Geo-Environmental Assessments were completed by BWB Consulting in April 2025 (references: WPK-BWB-EGT-XX-RP-LE-0001 and WPK-BWB-EGT-XX-RP-LE-0002). As part of the Phase 2 investigation, 11 boreholes were taken across the site to a maximum depth of 5.45m bgl. Groundwater was encountered within six of the boreholes at depths ranging between 0.80m and 2.00m bgl. It is noted that groundwater was only encountered where Glaciofluvial Sand was found to be present.
- 2.10 Groundwater was subsequently monitored within three boreholes where the proposed club house is to be located. During the post-investigation groundwater monitoring, groundwater was recorded at levels ranging between 0.60m and 0.78m bgl. The groundwater levels are considered likely to be associated with perched water within the granular soils. No soakaway drainage testing has been undertaken at the site. However, due to the presence of clay soils below 1.0m a shallow soakaway drainage solution is unlikely to be a viable option.
- 2.11 The existing drainage regime of the impermeable portions of the site is for the existing car park and pump track to drain via the existing private drainage system to the existing UOW located to the north of the site, with the athletics track and surrounding hard standing to drain to the south to Baguley Brook via the existing private surface water system, as illustrated on the CCTV drainage survey in **Appendix 4**. The permeable portions of the site are anticipated to drain via overland flow in accordance with the existing topography to the south into Baguley Brook.

### Existing Runoff Rates

- 2.12 The contributing runoff rates from the 0.55ha of drained impermeable surfaces within the site have been estimated using the Rational method, as described within **Figure 2.1**. The results are presented within **Table 2.1**, with the supporting calculations, undertaken by Quorum Consulting Engineers presented as **Appendix 5**.

$$Q = 2.78 \times A_p \times i$$

Where:  
*Q* = runoff rate (l/s)  
*A<sub>p</sub>* = impermeable area (ha)  
*i* = rainfall intensity (mm/hr)

**Figure 2.1: Rational Method**

**Table 2.1: Existing Runoff Rates from the Site**

| Return Period (Yrs.)            | Average Rainfall Intensity (mm/hr) | Runoff Rate from Impermeable Surfaces (l/s) |
|---------------------------------|------------------------------------|---------------------------------------------|
| Existing Car Park (0.51ha)      |                                    |                                             |
| 2                               | 29.6                               | 42.0                                        |
| 30                              | 75.1                               | 106.5                                       |
| 100                             | 95.2                               | 135.0                                       |
| Existing Access Track (0.055ha) |                                    |                                             |
| 2                               | 29.6                               | 4.5                                         |
| 30                              | 75.1                               | 11.5                                        |
| 100                             | 95.2                               | 14.6                                        |

- 2.13 An assessment of the existing surface water runoff rates per hectare from the permeable surfaces has been undertaken and is summarised within **Table 2.2**. Calculations are included within **Appendix 6**.
- 2.14 The runoff rates have been estimated using the IH124 method, with appropriate prorated adjustments for a site of less than 50ha, as recommended in Interim Code of Practice for Sustainable Drainage<sup>5</sup>. This was undertaken using the HR Wallingford 'Greenfield Runoff Rate estimation' tool, which makes the necessary adjustments for small sites automatically.

<sup>5</sup> The National SUDS Working Group (2004), Interim Code of Practice for Sustainable Drainage

**Table 2.2: Existing Runoff Rate from the Site**

| Return Period (Yrs.)         | Runoff Rate (l/s/ha) |
|------------------------------|----------------------|
| 1                            | 1.9                  |
| Mean Annual Flow Rate (QBAR) | 2.2                  |
| 30                           | 3.1                  |
| 100                          | 4.6                  |

### 3. SURFACE WATER DRAINAGE STRATEGY

- 3.1 The proposals are for the redevelopment of existing sport facilities to include construction of a new pavilion to provide shower/change facilities, a café, and GP clinic; relocation of the existing modular change and shipping containers, provision of 2x AGPS, and 1x MUGA; demolition of the existing weightlifting building; extension of the car park; widening of the access road and provision of a pedestrian access.
- 3.2 The drainage design and supporting hydraulic calculations have been undertaken by Quorum Consulting Engineers and are presented as **Appendix 7** and **Appendix 8**, respectively.

#### Drainage Hierarchy

- 3.3 The Planning Policy Guidance<sup>6</sup> and the SuDS Manual<sup>7</sup> identify that surface water runoff from a development should be disposed of as high up the following hierarchy as reasonably practicable:
- i. into the ground (infiltration);
  - ii. to a surface water body;
  - iii. to a surface water sewer, highway drain, or another drainage system;
  - iv. to a combined sewer.
- 3.4 The aim of this approach is to manage surface water runoff close to where it falls and mimic natural drainage as closely as possible.
- 3.5 Due to the unfavourable underlying ground conditions and groundwater levels, disposal of surface water via infiltration is not feasible in this instance.
- 3.6 As there are existing drainage connections within the site, on the northern and southern boundaries, it is proposed to reuse these for the proposed drainage. Both the southern and the northern connections subsequently outfall to the Baguley Brook to the south of the site or the UOW to the north of the site respectively. Due to level constraints for the access road widening, it is proposed that surface water from this area will connect to the existing 450mm diameter culverted watercourse that crosses the site access.
- 3.7 Based on the above, the following outfall locations will be utilised:
- Site access road = 450mm diameter culverted watercourse beneath site access;
  - New Pavillion, pump track and car park = UOW to the north; and
  - Sports pitches and athletics track = 375mm diameter private sewer to the south into Baguley Brook.

<sup>6</sup> Planning Practice Guidance, <http://planningguidance.planningportal.gov.uk/>.

<sup>7</sup> The SuDS Manual (C753). CIRIA 2015.

- 3.8 It is proposed that the existing 100mm diameter pipe to the UOW will be upgraded to a 375mm diameter pipe to facilitate the connection of the new pavilion and car park to the existing system in place. The existing pump track drainage will be incorporated into the drain drainage system, as shown on the Quorum drawings presented in **Appendix 7**.
- 3.9 A pre development enquiry was submitted to United Utilities to confirm whether they would accept a connection to the public sewer to the south of the site. Their response, included as **Appendix 9**, states that 'United Utilities will consider a connection to the 525mm diameter public surface water sewer within the proposed site, United Utilities request that any agreed rate does not exceed 15l/s.'

### Peak Flow Control

- 3.10 Flows from the development will be limited through the use of vortex flow controls. The proposed maximum discharge rates from each drainage system are as follows:
- Access Track = 7.3l/s
  - Pavilion, Pump Track and Car Park = 60.9l/s
  - Sports Pitches = 3l/s
- 3.11 The sports pitch flow control will be limited to a fixed rate; however, the flow control for the Access Track and Pavilion, Pump Track and Car Park systems will have a linear discharge profile, as follows:
- Access Track system:
    - 1 in 2-year critical event – 1.6l/s;
    - 1 in 30-year critical event – 1.9l/s; and
    - 1 in 100-year + 45% critical event – 7.1l/s.
  - Pavilion, Pump Track and Car Park System:
    - 1 in 2-year critical event – 14.2l/s;
    - 1 in 30-year critical event – 19.6l/s; and
    - 1 in 100-year + 45% critical event – 60.9l/s.
- 3.12 The combined proposed discharge rate from the proposed development is compared against the existing discharge rate from the current site within **Table 3.1**.

**Table 3.1: Existing & Proposed Runoff Rates**

| Return Period (Yr.) | Existing Runoff Rate (l/s) | Proposed Discharge Rate (l/s) | Betterment on existing discharge rate (l/s // %) |
|---------------------|----------------------------|-------------------------------|--------------------------------------------------|
| 2                   | 46.5                       | 18.8                          | -27.7l/s<br>60% betterment                       |
| 30                  | 118.0                      | 24.5                          | -93.5l/s<br>79% betterment                       |
| 100                 | 149.6                      | 71.0                          | -78.6l/s<br>53% betterment                       |
| 100 + 45%           | -                          |                               | (minimum)                                        |

- 3.13 This approach fulfils the necessary peak runoff control criteria and will result in a minimum 50% betterment to the existing scenario at the site whereby the existing hard surfaced areas freely drain to the nearby UOW and public sewer at unrestricted rates, excluding the existing pump track.

### Drainage Strategy

- 3.14 As the development proposals require a restricted runoff rate, it will be necessary to provide attenuated storage to balance the excess volume in a safe manner within the site. The surface water storage should be located within the site in a position where it can receive runoff from the development and discharge from the site by gravity. Sufficient storage for events up to the 1 in 100-year storm with an allowance for climate change will be provided.
- 3.15 The attenuation for the proposed development will consist of attenuation tanks for the access road, new pavilion, pump track and car park, and the gravel subbase for the sports pitches will be used to attenuate flows from the pitches. Refer to the Quorum drawings and calculations in **Appendix 7** and **Appendix 8** for the total attenuation requirements associated with the drainage design.
- 3.16 Tree pits are proposed within the car park to provide amenity and treatment value to the drainage system.

### Residual Risk and Designing for Exceedance

- 3.17 To protect against extreme events in exceedance of the drainage infrastructure, the external levels of the development should be profiled to direct water away from vulnerable infrastructure and towards the nearest drainage point or watercourse, in line with the current scenario.
- 3.18 In addition to the volume of storage provided within the main attenuation, there will be capacity within the upstream pipes and manholes which has not been accounted for at this stage and a further level of redundancy to the network will therefore be provided.

- 3.19 The levels in the northern car park should be designed such that any exceedance flooding from the cellular storage tank could be managed within the kerb lines.

## 4. MAINTENANCE

- 4.1 A management company will be appointed to maintain the SuDS features, including vegetation maintenance, trash screen clearing and regular outfall inspections.
- 4.2 Requirements for ongoing maintenance of the drainage network should form part of the Operation and Maintenance manual for the site and should be undertaken by the site management. Any specialist or proprietary products that are specified at detailed design should have a manufacturer specific maintenance regime which should be included within the document. Specialist input will be required to ensure the effective ongoing operation of the sports pitches.
- 4.3 It is envisaged that the Operation and Maintenance manual will be developed at the detailed design stage, however some examples are included for the proposed SuDS below in **Table 4.1** and **Table 4.2**.

**Table 4.1: The SuDS Manual Typical Maintenance Schedule for Storage Tanks**

| Maintenance Schedule | Typical Frequency                   | Required Action                                                                                                                                                                                                                                          |
|----------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Regular Maintenance  | Monthly for 3 months, then annually | <ul style="list-style-type: none"> <li>Inspect and identify any areas that are not operating correctly. If required, take remedial action.</li> </ul>                                                                                                    |
|                      | Monthly                             | <ul style="list-style-type: none"> <li>Remove debris from the catchment surface (where it may cause risks to performance)</li> </ul>                                                                                                                     |
|                      | Annually                            | <ul style="list-style-type: none"> <li>For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.</li> </ul> |
|                      | Annually or as required             | <ul style="list-style-type: none"> <li>Remove sediment from pre-treatment structures and/or internal forebays</li> </ul>                                                                                                                                 |
| Remedial Action      | As required                         | <ul style="list-style-type: none"> <li>Repair/rehabilitate inlets, outlet, overflows and vents.</li> </ul>                                                                                                                                               |
| Monitoring           | Annually                            | <ul style="list-style-type: none"> <li>Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.</li> </ul>                                                                            |
|                      | Every 5 years or as required        | <ul style="list-style-type: none"> <li>Survey inside of tank for sediment build-up and remove if necessary.</li> </ul>                                                                                                                                   |

**Table 4.2: The SuDS Manual Typical Maintenance Schedule for Tree Pits**

| Maintenance Schedule   | Typical Frequency                     | Required Action                                                                                                                  |
|------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Regular Maintenance    | Monthly (or as required)              | <ul style="list-style-type: none"> <li>Remove litter and debris.</li> </ul>                                                      |
|                        | Monthly (at start, then as required). | <ul style="list-style-type: none"> <li>Manage other vegetation and remove nuisance plants.</li> </ul>                            |
|                        | Inspect monthly                       | <ul style="list-style-type: none"> <li>Inspect inlets and outlets.</li> </ul>                                                    |
| Occasional Maintenance | Annually                              | <ul style="list-style-type: none"> <li>Check tree health and manage tree appropriately.</li> </ul>                               |
|                        | As required (in periods of drought)   | <ul style="list-style-type: none"> <li>Water the trees.</li> </ul>                                                               |
|                        | Annually, or as required              | <ul style="list-style-type: none"> <li>Remove silt build-up from inlets and surface and replace mulch as necessary.</li> </ul>   |
| Monitoring             | Half yearly                           | <ul style="list-style-type: none"> <li>Inspect silt accumulation rates and establish appropriate removal frequencies.</li> </ul> |

## **5. FOUL WATER DRAINAGE**

- 5.1 It is proposed to drain used water from the development separately to surface water. An illustrative foul water layout is shown on the Quorum drainage strategy, included as **Appendix 7**.
- 5.2 United Utilities are the sewer operator for the area. A copy of their asset records is included in **Appendix 3**. A 2200mm combined sewer runs through the site in a north easterly direction.
- 5.3 The CCTV survey (**Appendix 4**) also shows a network of private foul sewers within the site. These are expected to drain to the 2200mm sewer within the site.
- 5.4 It is proposed to reuse the existing foul connection from the site for the proposed foul sewers. The invert level at the point of connection is such that a gravity solution should be viable.
- 5.5 A Pre Development Enquiry was submitted to United Utilities in order to establish whether the public network has capacity for the flows from the development. Their response, included an **Appendix 9**, states that 'Foul flow from this site will be allowed to drain into the public combined sewer system'.

## 6. SUMMARY

- 6.1 This statement and supporting appendices demonstrate that the drainage design for the development will comply with the relevant local and national standards, specifically the hierarchy of discharge, runoff rate and volume criterion.
- 6.2 This SDS is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

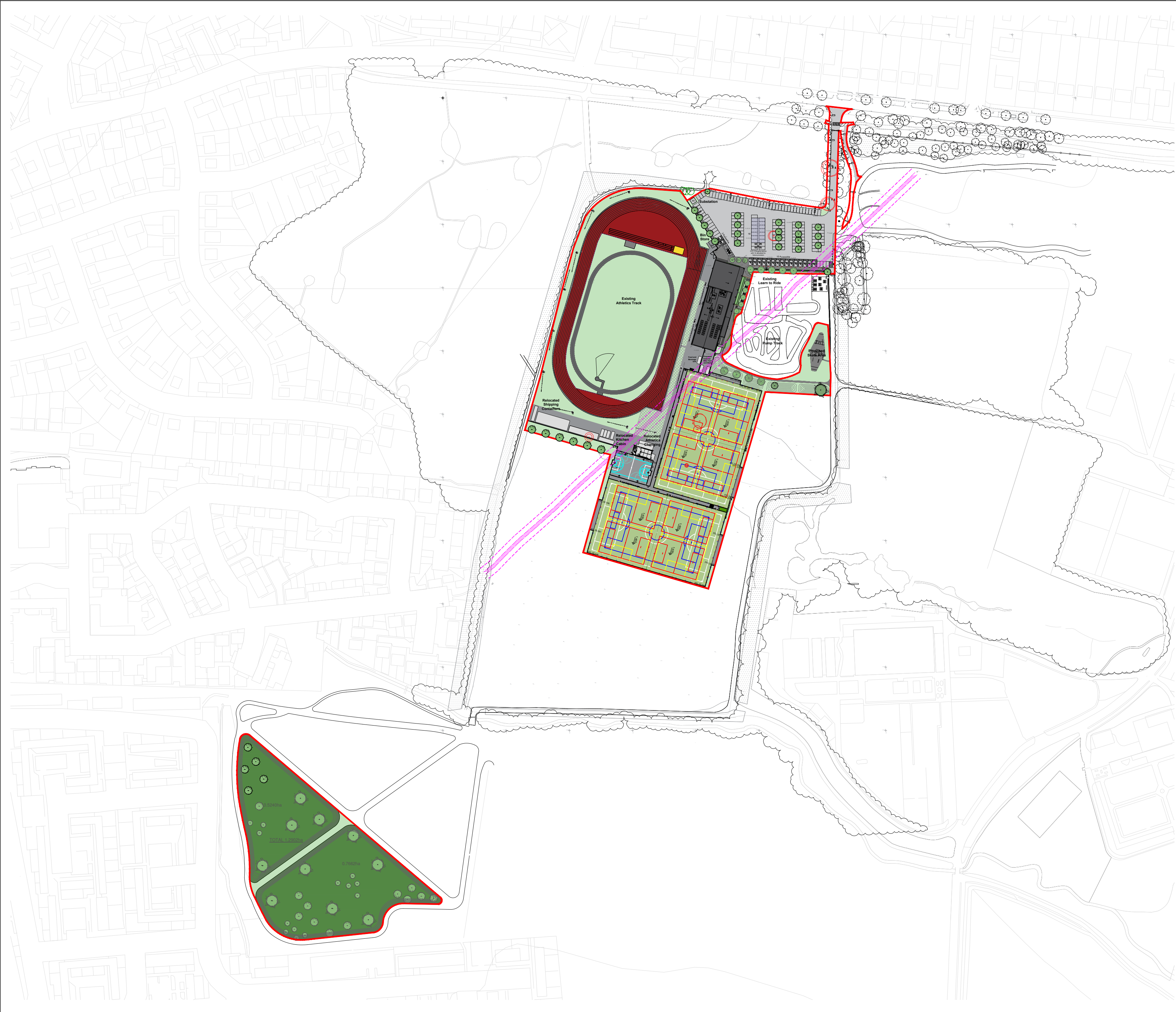
**Table 6.1: Sustainable Drainage Statement Summary**

|                            |                    | Existing Site | Proposed Development                   |
|----------------------------|--------------------|---------------|----------------------------------------|
| Site Area (Ha)             |                    | 6.1 (Approx.) |                                        |
| Development Area (Ha)      |                    | 4.8 (Approx.) |                                        |
| Impermeable Area (Ha)      |                    | 0.565         | 0.78                                   |
| Outfall Location           |                    | Sewers        | Sewers and culverted watercourse       |
| Peak Runoff Rate (l/s)     | 1 in 2-Year        | 46.5          | 18.8 (60% betterment)                  |
|                            | 1 in 30-Year       | 118.0         | 24.5 (79% betterment)                  |
|                            | 1 in 100-Year      | 149.6         | 71.0 (53% betterment)                  |
|                            | 1 in 100-Year + CC | -             |                                        |
| SuDS Features              |                    | -             | Geo-cellular Storage Tank<br>Tree Pits |
| Maintenance Responsibility |                    | -             | Management Company                     |

- 6.3 It is envisaged that the final drainage strategy will be determined during the detailed design stage, as the development layout is finalised.

## ***APPENDICES***

## **Appendix 1: Proposed Site Plan**



RESPONSIBILITY IS NOT ACCEPTED FOR OTHERS SCALING DIRECTLY FROM THIS DRAWING. DO NOT SCALE FROM THIS DRAWING, USE WRITTEN DIMENSIONS ONLY.

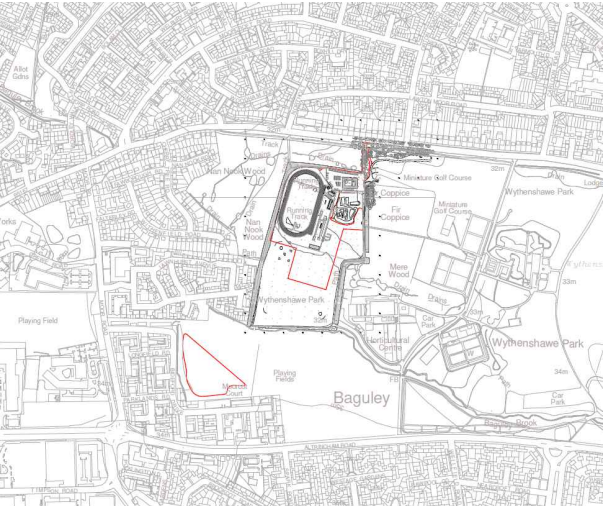
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1:2000  
ORIGINAL SHEET SIZE **A2**

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KEY PLAN



**Notes:**  
The site drawing is based on a combination of Ordnance Survey mapping and topographical survey. The initial topographical survey was carried out by BrightSurv Ltd in May 2023 and was updated in February 2025 to include the access road entrance. A further update to the topographical survey was completed in July 2025, extending coverage to the North-East of the site along Wythenshawe Road.

The location of the foul water main sewer is based on a traced survey undertaken by Solum Surveying Ltd. A 5 metre easement measured from the centerline of the sewer, has been indicated in accordance with the requirements of United Utilities.

Updated for planning submission

| P12 | NN    | 23.09.25 | MR      | 23.09.25 | RB       | 23.09.25 |
|-----|-------|----------|---------|----------|----------|----------|
| REV | DRAWN | DATE     | CHECKED | DATE     | APPROVED | DATE     |



NPS Leeds Ltd  
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CLIENT  
**Manchester City Council**

PROJECT  
**Wythenshawe Park Sports Hub**

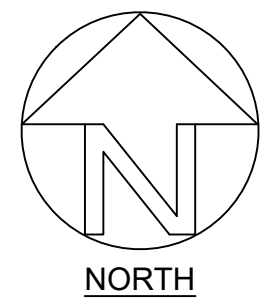
TITLE  
**Proposed Site Plan**

SCALE DISCIPLINE PROJECT NUMBER  
1:2000 Architect 118165

DRAWING NUMBER  
**NPS-XX-00-D-A-0803**

|                          |                                     |                                                  |                          |
|--------------------------|-------------------------------------|--------------------------------------------------|--------------------------|
| STATUS CODE<br><b>S1</b> | PURPOSE OF ISSUE<br><b>Planning</b> | Drawn by<br><b>NN</b><br>Checked by<br><b>MR</b> | Approved by<br><b>RB</b> |
|--------------------------|-------------------------------------|--------------------------------------------------|--------------------------|

## **Appendix 2: Topographical Survey**



GENERAL NOTES

This drawing is to be read and printed in full colour.

SURVEY NOTES

1. This plan should only be used for its original purpose. Brightsurv Ltd accepts no responsibility if supplied to any other party than the original client.
2. Certain areas of the site may have been inaccessible due to dense vegetation, vehicles etc on site at the time of survey, therefore not all services may be identified on the survey drawing.
3. Information Shown outside of the site boundary has been taken from Ordnance Survey records and would need verification to be relied upon.
4. The spread of vegetation shown is approximate only. Where canopy spread is critical then this shall be regularly checked. Generally only trees with a spread greater than 2.0m will be shown on the drawing.
5. Where the identity of a service is shown this is based on a visual id only. Where specific identification is required then additional survey work shall be undertaken.
6. Dimensions shown are in millimetres and levels in metres unless indicated.

Levels Levels relate to GPS observations.

| LEGEND KEY        |                         |               |                    |
|-------------------|-------------------------|---------------|--------------------|
| AV                | Air Valve               | FL            | Floor Level        |
| B                 | Bollard                 | FLt           | Flood Light        |
| BH                | Borehole                | FW            | Foul Water         |
| BL                | Bed Level               | G             | Gully              |
| BS                | Bus Stop                | GV            | Gas Valve          |
| BT                | BT Cover                | HL            | Height             |
| BW                | Brick Wall              | IC            | Inspection Chamber |
| CATV              | Cable TV Cover          | IL            | Invert Level       |
| C/B               | Close Boarded           | IR            | Iron Railing       |
| CL                | Chain Link              | KO            | Kerb Outlet        |
| CL                | Cover Level             | LP            | Lamp Post          |
| Col.              | Column                  | MH            | Manhole            |
| C/RW              | Concrete Retaining Wall | Mkr           | Marker Post        |
| C/W               | Concrete Wall           | NP            | Name Plate         |
| C/Pt              | Catch Pit               | O/H           | Overhead           |
| D/PC              | Damp Proof Course       | P             | Post               |
| Dr                | Drain                   | PI            | Pipe               |
| EL                | Eaves Level             | P/R           | Post & Rail        |
| ER                | Earth Rod               | P/W           | Post & Wire        |
| EP                | Electricity Pole        | PL            | Parapet Level      |
| FH                | Fire Hydrant            | RE            | Rodding Eye        |
|                   |                         | RL            | Ridge Level        |
|                   |                         | RS            | Road Sign          |
|                   |                         | RWP           | Rainwater Pipe     |
|                   |                         | St            | Stump              |
|                   |                         | SL            | Soft Level         |
|                   |                         | SV            | Stop Valve         |
|                   |                         | SVP           | Soil & Vent Pipe   |
|                   |                         | SW            | Surface Water      |
|                   |                         | SW            | Stone Wall         |
|                   |                         | THL           | Threshold Level    |
|                   |                         | TL            | Traffic Light      |
|                   |                         | TP            | Telegraph Pole     |
|                   |                         | U/S           | Underside          |
|                   |                         | UTL           | Unable To Lift     |
|                   |                         | VP            | Vent Pipe          |
|                   |                         | WL            | Water Level        |
|                   |                         | WM            | Water Meter        |
|                   |                         | WO            | Wash Out           |
|                   |                         | WT            | Water Tap          |
|                   |                         |               |                    |
| Building          |                         | Tree Canopy   |                    |
| Vegetation        |                         | Fence         |                    |
| Control Station : |                         | Boundary      |                    |
| Bush/Shrub        |                         | Contours      |                    |
| Tree              |                         | OH Telecom    |                    |
| Tree (Multi-Bole) |                         | OH Electric   |                    |
| Gate              |                         | Foul Water    |                    |
|                   |                         | Surface Water |                    |

**Brightsurv Ltd.**

9 Thickwillow  
Godmanchester  
PE29 2LR

Contact: Richard@brightsurv.co.uk  
Tel: 07843 411 341

|             |                 |             |        |             |     |          |          |
|-------------|-----------------|-------------|--------|-------------|-----|----------|----------|
| Scale at A0 | 1:500           | Drawn by    | RB     | Checked by  | RB  | Date     | May 2023 |
| Status      | For Information | Project ref | BRI694 | Drawing no. | T01 | Revision |          |

Client Football Foundation

Project Wythenshawe Park  
Manchester

Title Topographical Survey

### **Appendix 3: United Utilities Sewer Records**

**Solum Surveying Limited**

The Old Stables  
The Old Stables, Solum Surveying Limited  
Berkeley, Gloucestershire  
GL13 9LE

FAO:

**How to contact us:**

United Utilities Water Limited  
Property Searches  
Haweswater House  
Lingley Mere Business Park  
Great Sankey  
Warrington  
WA5 3LP

Telephone: 0370 7510101

E-mail: [propertysearches@uuplc.co.uk](mailto:propertysearches@uuplc.co.uk)

Your Ref: 13898  
Our Ref: UUPS-ORD-634955  
Date: 02/03/2025

Dear Sirs

**Location: NORTHERN MOOR MEDICAL PRACTICE 216 WYTHENSHAW ROAD, MANCHESTER, M23 0PH**

I acknowledge with thanks your request dated 25/02/2025 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack  
Property Searches Manager

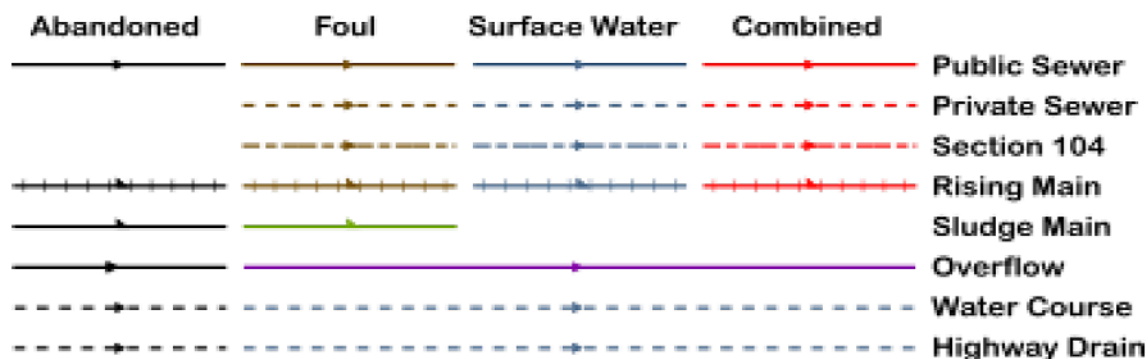
## TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

### TERMS AND CONDITIONS:

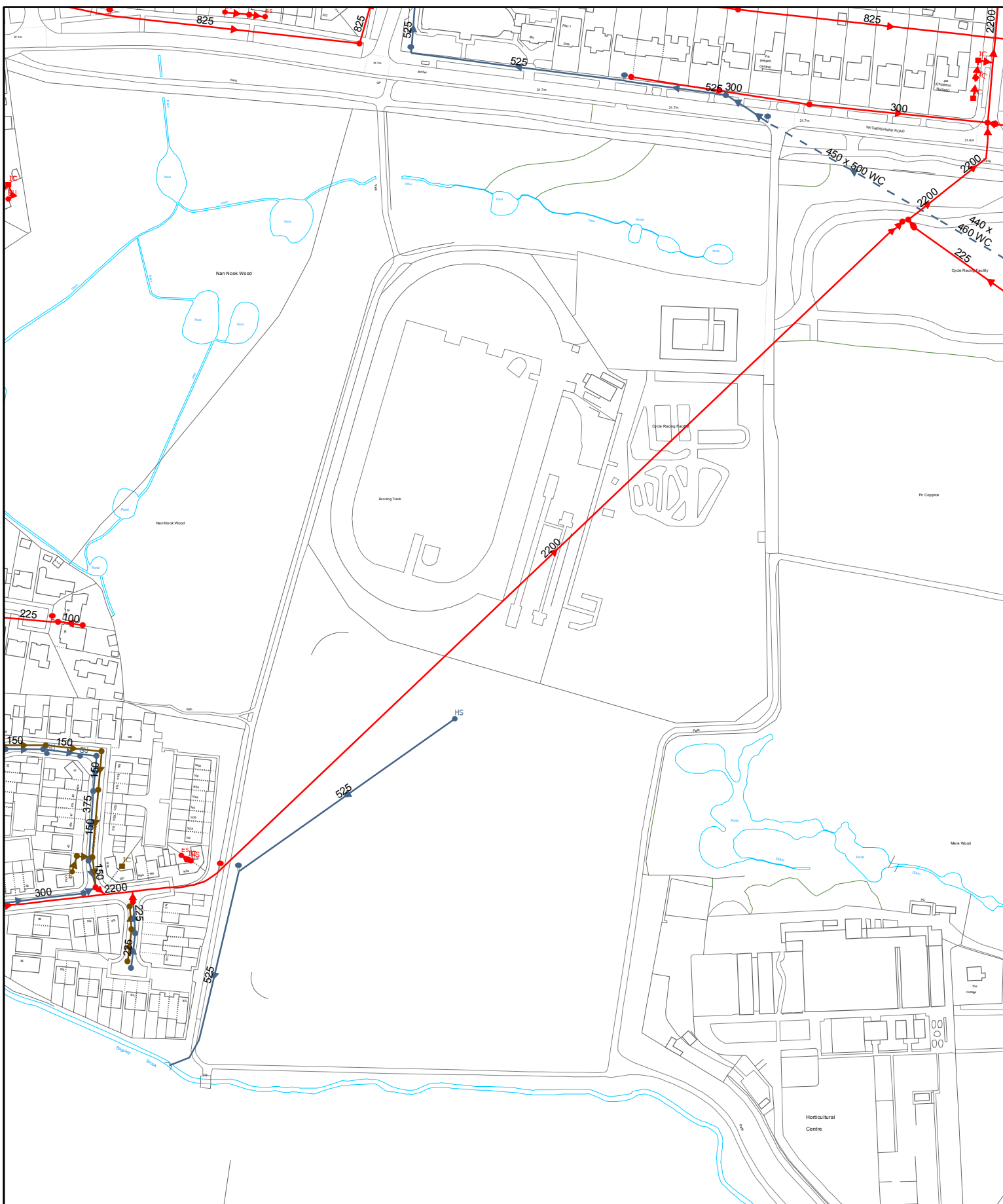
- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

## Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul  
**blue** – surface water **purple** - overflow

|                         |                                     |
|-------------------------|-------------------------------------|
| <b>Manhole</b>          | <b>Side Entry Manhole</b>           |
| <b>Head of System</b>   | <b>Outfall</b>                      |
| <b>Extent of Survey</b> | <b>Screen Chamber</b>               |
| <b>Rodding Eye</b>      | <b>Inspection Chamber</b>           |
| <b>Inlet</b>            | <b>Bifurcation Chamber</b>          |
| <b>Discharge Point</b>  | <b>Lamp Hole</b>                    |
| <b>Vortex</b>           | <b>T Junction / Saddle</b>          |
| <b>Penstock</b>         | <b>Catchpit</b>                     |
| <b>Washout Chamber</b>  | <b>Valve Chamber</b>                |
| <b>Valve</b>            | <b>Vent Column</b>                  |
| <b>Air Valve</b>        | <b>Vortex Chamber</b>               |
| <b>Non Return Valve</b> | <b>Penstock Chamber</b>             |
| <b>Soakaway</b>         | <b>Network Storage Tank</b>         |
| <b>Gully</b>            | <b>Sewer Overflow</b>               |
| <b>Cascade</b>          | <b>Ww Treatment Works</b>           |
| <b>Flow Meter</b>       | <b>Ww Pumping Station</b>           |
| <b>Hatch Box</b>        | <b>Septic Tank</b>                  |
| <b>Oil Interceptor</b>  | <b>Control Kiosk</b>                |
| <b>Summit</b>           | <b>DNM Network Monitoring Point</b> |
| <b>Drop Shaft</b>       | <b>Change of Characteristic</b>     |
| <b>Orifice Plate</b>    |                                     |



Date: 02/03/2025

Printed By:  
Property Searches

## Extract from Map of Public Sewers

NORTHERN MOOR MEDICAL PRACTICE 216  
WYTHENSHAW ROAD, MANCHESTER, M23 0PH



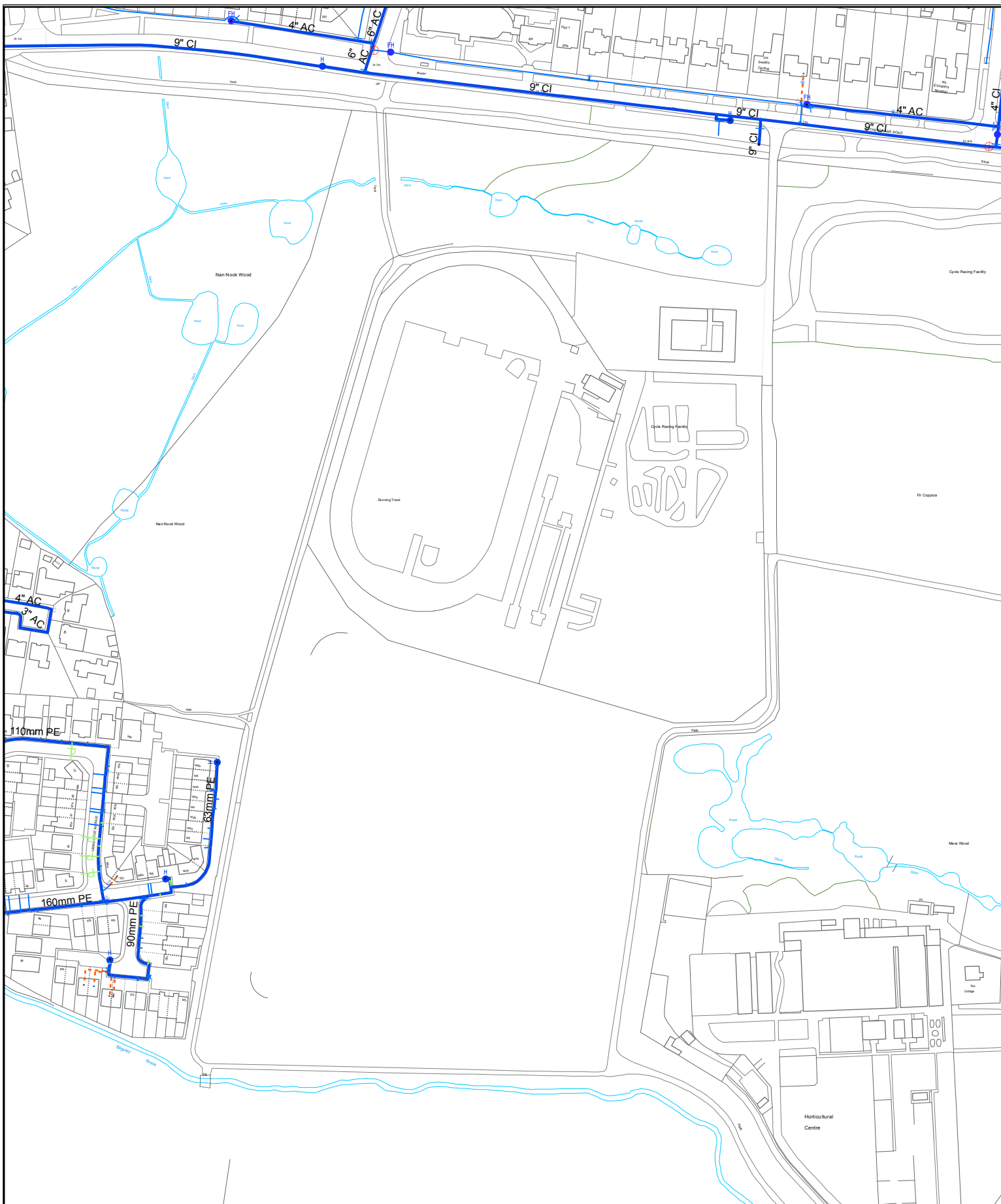
The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water PLC will not accept any liability for any damage caused by the actual positions being different from those shown.

© United Utilities Water PLC 2025. The plan is based upon the Ordnance Survey Map with the sanction of the Controller of H.M. Stationery Office, Crown copyright 0000813445 and United Utilities Water PLC copyrights are reserved. Unauthorised reproduction will infringe these copyrights.

## Clean Water Symbolology

| Proposed | Abandoned | Live |                           |
|----------|-----------|------|---------------------------|
|          |           |      | Distribution Main         |
|          |           |      | Trunk Main                |
|          |           |      | Comms Pipe                |
|          |           |      | Private Pipe              |
|          |           |      | Concessionary Service     |
|          |           |      | Raw Water                 |
|          |           |      | LDTM Raw Water            |
|          |           |      | LDTM Treated Water        |
|          |           |      | Air Valve                 |
|          |           |      | AC Valve, open            |
|          |           |      | AC Valve, closed          |
|          |           |      | CC Valve, open            |
|          |           |      | CC Valve, closed          |
|          |           |      | Non Return Valve          |
|          |           |      | Pressure Management Valve |
|          |           |      | OMS Valve                 |
|          |           |      | Stop Tap                  |
|          |           |      | Flow Meter                |
|          |           |      | Domestic Meter            |
|          |           |      | Commercial Meter          |
|          |           |      | Pump                      |
|          |           |      | Hydrant                   |
|          |           |      | Fire Hydrant              |
|          |           |      | Anode                     |
|          |           |      | Chlorination Point        |
|          |           |      | De-chlorination Point     |
|          |           |      | Strainer Point            |
|          |           |      | Access Point              |
|          |           |      | Hatch Box                 |
|          |           |      | IP Point                  |
|          |           |      | Sampling Station          |
|          |           |      | Logger Box                |
|          |           |      | Bore Hole                 |
|          |           |      | Inlet Point               |
|          |           |      | Bulk Supply Point         |
|          |           |      | End Cap                   |
|          |           |      | Site Termination          |
|          |           |      | Change of Characteristic  |
|          |           |      | Condition Report          |
|          |           |      | <u>Property Types</u>     |
|          |           |      | Water Tower               |
|          |           |      | Valve House               |
|          |           |      | Booster Pumping Station   |
|          |           |      | Intake Pumping Station    |
|          |           |      | Water Treatment Works     |
|          |           |      | Supply Reservoir          |
|          |           |      | Service Reservoir         |
|          |           |      | Impounding Reservoir      |
|          |           |      | Pipe Bridge               |

Symbology for proposed assets is the same as above, but shown in **green**  
 Symbology for abandoned assets is the same as above, but shown in **black**



Date: 02/03/2025

Printed By:  
Property Searches

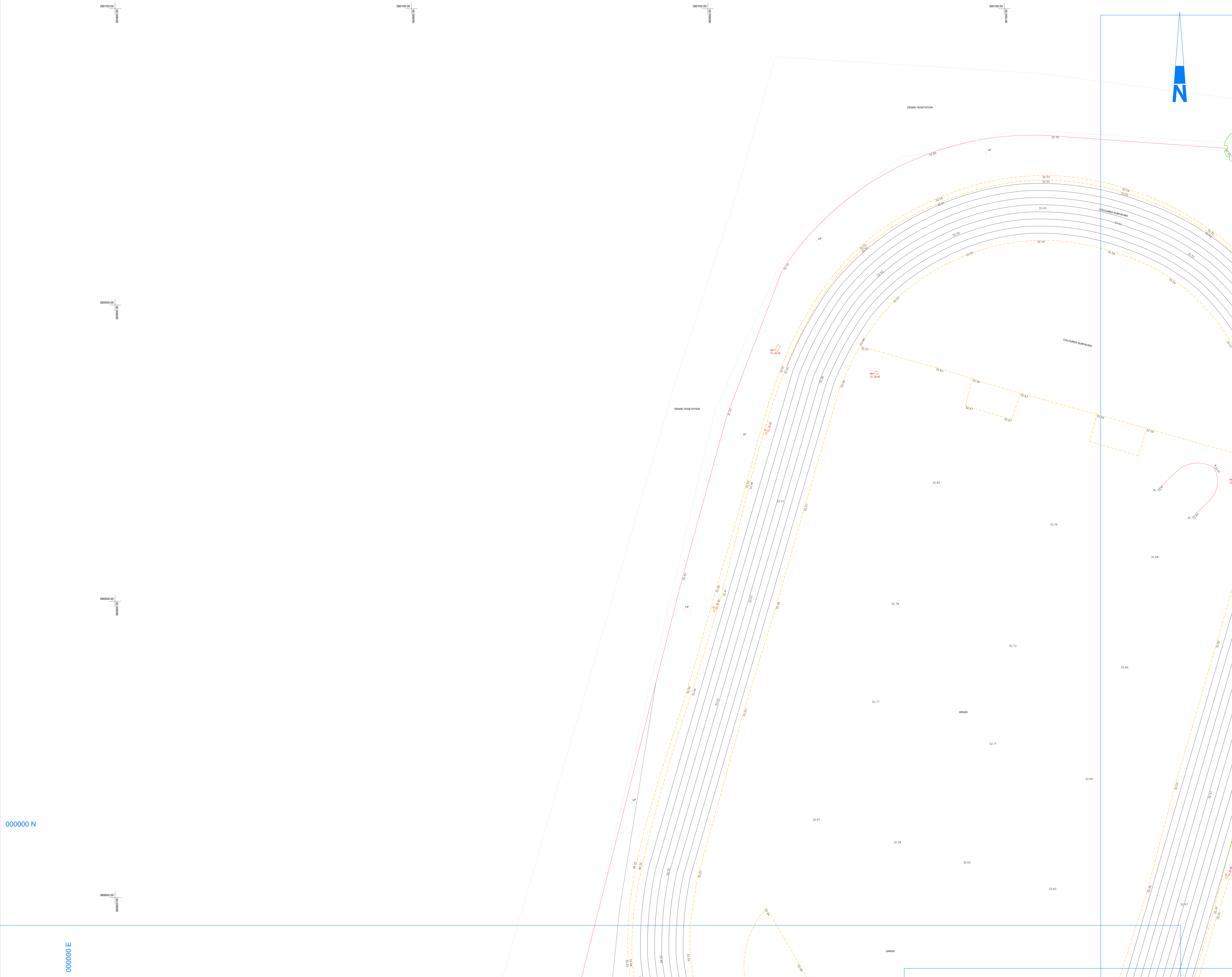
## Extract from Map Of Water Mains

NORTHERN MOOR MEDICAL PRACTICE 216  
WYTHENSHAW ROAD, MANCHESTER, M23 0PH



The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water PLC will not accept any liability for any damage caused by the actual positions being different from those shown.

#### **Appendix 4: CCTV Survey**



Notes :

- GRID AND LEVELS BASED ON OSGB36 NATIONAL DATUM, DERIVED FROM THE NATIONAL GPS NETWORK.
- DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
- ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS UNLESS PROVEN THROUGH TRACING TECHNIQUES.
- BASE FILE SUPPLIED BY THIRD PARTY AND SOLUM NOT VERIFIED SUPPLIED DATA / CHANGE ALL INFO TO 150 COLOUR ONCE COMPLETE AND SPELL CHECKED.

UTILITY DISCLAIMER

Electromagnetic techniques have been used in the location of underground services along with the aid of ground penetrating radar. The results are not infallible and trial excavations should be carried out to confirm service identification, position and depths. The completeness of underground services can not be guaranteed.

Solum Surveying will not confirm if a service is alive or dead. This must be undertaken by the service provider. As such all services will be treated as live. This drawing may not include all public services that cross the site. Therefore recommend that a full desktop study is undertaken to provide all service drawings and used in conjunction with this utility survey.

Private service pipe/connections and cables in highways may not be shown, but the presence should be anticipated.

Additional below ground structures or obstructions not shown on this drawing may be present. Review historical records/plans and any as built drawings. Excavations in the vicinity should be treated with extreme caution following the HSE documents on avoiding underground services.

Note that the ground conditions, proximity of other utilities, materials and method of construction have an influence on the ability and quality of the data collected onsite. Along with areas being accessible at time of survey. Inaccessible areas may contain access/marsh covers that may affect the survey area.

TSA Standards - "Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate".

UTILITY LINE TYPE KEY

|                    |                             |
|--------------------|-----------------------------|
| BT B1 (PAS128)     | HEATING PIPES B1 (PAS128)   |
| BT B2 (PAS128)     | HEATING PIPES B2 (PAS128)   |
| BT B3 (PAS128)     | HEATING PIPES B3 (PAS128)   |
| BT B4 (PAS128)     | HEATING PIPES B4 (PAS128)   |
| CATV B1 (PAS128)   | HEATING PIPES B5 (PAS128)   |
| CATV B2 (PAS128)   | HEATING PIPES B6 (PAS128)   |
| CATV B3 (PAS128)   | HEATING PIPES B7 (PAS128)   |
| CATV B4 (PAS128)   | HEATING PIPES B8 (PAS128)   |
| CATV B5 (PAS128)   | HEATING PIPES B9 (PAS128)   |
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| CATV B16 (PAS128)  | HEATING PIPES B20 (PAS128)  |
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| CATV B22 (PAS128)  | HEATING PIPES B26 (PAS128)  |
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| CATV B42 (PAS128)  | HEATING PIPES B46 (PAS128)  |
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| CATV B52 (PAS128)  | HEATING PIPES B56 (PAS128)  |
| CATV B53 (PAS128)  | HEATING PIPES B57 (PAS128)  |
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| CATV B70 (PAS128)  | HEATING PIPES B74 (PAS128)  |
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| CATV B72 (PAS128)  | HEATING PIPES B76 (PAS128)  |
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| CATV B75 (PAS128)  | HEATING PIPES B79 (PAS128)  |
| CATV B76 (PAS128)  | HEATING PIPES B80 (PAS128)  |
| CATV B77 (PAS128)  | HEATING PIPES B81 (PAS128)  |
| CATV B78 (PAS128)  | HEATING PIPES B82 (PAS128)  |
| CATV B79 (PAS128)  | HEATING PIPES B83 (PAS128)  |
| CATV B80 (PAS128)  | HEATING PIPES B84 (PAS128)  |
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| CATV B89 (PAS128)  | HEATING PIPES B93 (PAS128)  |
| CATV B90 (PAS128)  | HEATING PIPES B94 (PAS128)  |
| CATV B91 (PAS128)  | HEATING PIPES B95 (PAS128)  |
| CATV B92 (PAS128)  | HEATING PIPES B96 (PAS128)  |
| CATV B93 (PAS128)  | HEATING PIPES B97 (PAS128)  |
| CATV B94 (PAS128)  | HEATING PIPES B98 (PAS128)  |
| CATV B95 (PAS128)  | HEATING PIPES B99 (PAS128)  |
| CATV B96 (PAS128)  | HEATING PIPES B100 (PAS128) |
| CATV B97 (PAS128)  | HEATING PIPES B101 (PAS128) |
| CATV B98 (PAS128)  | HEATING PIPES B102 (PAS128) |
| CATV B99 (PAS128)  | HEATING PIPES B103 (PAS128) |
| CATV B100 (PAS128) | HEATING PIPES B104 (PAS128) |
| CATV B101 (PAS128) | HEATING PIPES B105 (PAS128) |
| CATV B102 (PAS128) | HEATING PIPES B106 (PAS128) |
| CATV B103 (PAS128) | HEATING PIPES B107 (PAS128) |
| CATV B104 (PAS128) | HEATING PIPES B108 (PAS128) |
| CATV B105 (PAS128) | HEATING PIPES B109 (PAS128) |
| CATV B106 (PAS128) | HEATING PIPES B110 (PAS128) |
| CATV B107 (PAS128) | HEATING PIPES B111 (PAS128) |
| CATV B108 (PAS128) | HEATING PIPES B112 (PAS128) |
| CATV B109 (PAS128) | HEATING PIPES B113 (PAS128) |
| CATV B110 (PAS128) | HEATING PIPES B114 (PAS128) |
| CATV B111 (PAS128) | HEATING PIPES B115 (PAS128) |
| CATV B112 (PAS128) | HEATING PIPES B116 (PAS128) |
| CATV B113 (PAS128) | HEATING PIPES B117 (PAS128) |
| CATV B114 (PAS128) | HEATING PIPES B118 (PAS128) |
| CATV B115 (PAS128) | HEATING PIPES B119 (PAS128) |
| CATV B116 (PAS128) | HEATING PIPES B120 (PAS128) |
| CATV B117 (PAS128) | HEATING PIPES B121 (PAS128) |
| CATV B118 (PAS128) | HEATING PIPES B122 (PAS128) |
| CATV B119 (PAS128) | HEATING PIPES B123 (PAS128) |
| CATV B120 (PAS128) | HEATING PIPES B124 (PAS128) |
| CATV B121 (PAS128) | HEATING PIPES B125 (PAS128) |
| CATV B122 (PAS128) | HEATING PIPES B126 (PAS128) |
| CATV B123 (PAS128) | HEATING PIPES B127 (PAS128) |
| CATV B124 (PAS128) | HEATING PIPES B128 (PAS128) |
| CATV B125 (PAS128) | HEATING PIPES B129 (PAS128) |
| CATV B126 (PAS128) | HEATING PIPES B130 (PAS128) |
| CATV B127 (PAS128) | HEATING PIPES B131 (PAS128) |
| CATV B128 (PAS128) | HEATING PIPES B132 (PAS128) |
| CATV B129 (PAS128) | HEATING PIPES B133 (PAS128) |
| CATV B130 (PAS128) | HEATING PIPES B134 (PAS128) |
| CATV B131 (PAS128) | HEATING PIPES B135 (PAS128) |
| CATV B132 (PAS128) | HEATING PIPES B136 (PAS128) |
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| CATV B138 (PAS128) | HEATING PIPES B142 (PAS128) |
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| CATV B140 (PAS128) | HEATING PIPES B144 (PAS128) |
| CATV B141 (PAS128) | HEATING PIPES B145 (PAS128) |
| CATV B142 (PAS128) | HEATING PIPES B146 (PAS128) |
| CATV B143 (PAS128) | HEATING PIPES B147 (PAS128) |
| CATV B144 (PAS128) | HEATING PIPES B148 (PAS128) |
| CATV B145 (PAS128) | HEATING PIPES B149 (PAS128) |
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| CATV B147 (PAS128) | HEATING PIPES B151 (PAS128) |
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| CATV B155 (PAS128) | HEATING PIPES B159 (PAS128) |
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| CATV B159 (PAS128) | HEATING PIPES B163 (PAS128) |
| CATV B160 (PAS128) | HEATING PIPES B164 (PAS128) |
| CATV B161 (PAS128) | HEATING PIPES B165 (PAS128) |
| CATV B162 (PAS128) | HEATING PIPES B166 (PAS128) |
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| CATV B221 (PAS128) | HEATING PIPES B225 (PAS128) |
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| CATV B223 (PAS128) | HEATING PIPES B227 (PAS128) |
| CATV B224 (PAS128) | HEATING PIPES B228 (PAS128) |
| CATV B225 (PAS128) | HEATING PIPES B229 (PAS128) |
| CATV B226 (PAS128) | HEATING PIPES B230 (PAS128) |
| CATV B227 (PAS128) | HEATING PIPES B231 (PAS128) |
| CATV B228 (PAS128) | HEATING PIPES B232 (PAS128) |
| CATV B229 (PAS128) | HEATING PIPES B233 (PAS128) |
| CATV B230 (PAS128) | HEATING PIPES B234 (PAS128) |
| CATV B231 (PAS128) | HEATING PIPES B235 (PAS128) |
| CATV B232 (PAS128) | HEATING PIPES B236 (PAS128) |
| CATV B233 (PAS128) | HEATING PIPES B237 (PAS128) |
| CATV B234 (PAS128) | HEATING PIPES B238 (PAS128) |
| CATV B235 (PAS128) | HEATING PIPES B239 (PAS128) |
| CATV B236 (PAS128) | HEATING PIPES B240 (PAS128) |
| CATV B237 (PAS128) | HEATING PIPES B241 (PAS128) |
| CATV B238 (PAS128) | HEATING PIPES B242 (PAS128) |
| CATV B239 (PAS128) | HEATING PIPES B243 (PAS128) |
| CATV B240 (PAS128) | HEATING PIPES B244 (PAS128) |
| CATV B241 (PAS128) | HEATING PIPES B245 (PAS128) |
| CATV B242 (PAS128) | HEATING PIPES B246 (PAS128) |
| CATV B243 (PAS128) | HEATING PIPES B247 (PAS128) |
| CATV B244 (PAS128) | HEATING PIPES B248 (PAS128) |
| CATV B245 (PAS128) | HEATING PIPES B249 (PAS128) |
| CATV B246 (PAS128) | HEATING PIPES B250 (PAS128) |
| CATV B247 (PAS128) | HEATING PIPES B251 (PAS128) |
| CATV B248 (PAS128) | HEATING PIPES B252 (PAS128) |
| CATV B249 (PAS128) | HEATING PIPES B253 (PAS128) |
| CATV B250 (PAS128) | HEATING PIPES B254 (PAS128) |
| CATV B251 (PAS128) | HEATING PIPES B255 (PAS128) |
| CATV B252 (PAS128) | HEATING PIPES B256 (PAS128) |
| CATV B253 (PAS128) | HEATING PIPES B257 (PAS128) |
| CATV B254 (PAS128) | HEATING PIPES B258 (PAS128) |
| CATV B255 (PAS128) | HEATING PIPES B259 (PAS128) |
| CATV B256 (PAS128) | HEATING PIPES B260 (PAS128) |
| CATV B257 (PAS128) | HEATING PIPES B261 (PAS128) |
| CATV B258 (PAS128) | HEATING PIPES B262 (PAS128) |
| CATV B259 (PAS128) | HEATING PIPES B263 (PAS128) |
| CATV B260 (PAS128) | HEATING PIPES B264 (PAS128) |
| CATV B261 (PAS128) | HEATING PIPES B265 (PAS128) |
| CATV B262 (PAS128) | HEATING PIPES B266 (PAS128) |
| CATV B263 (PAS128) | HEATING PIPES B267 (PAS128) |
| CATV B264 (PAS128) | HEATING PIPES B268 (PAS128) |
| CATV B265 (PAS128) | HEATING PIPES B269 (PAS128) |
| CATV B266 (PAS128) | HEATING PIPES B270 (PAS128) |
| CATV B267 (PAS128) | HEATING PIPES B271 (PAS128) |
| CATV B268 (PAS128) | HEATING PIPES B272 (PAS128) |
| CATV B269 (PAS128) | HEATING PIPES B273 (PAS128) |
| CATV B270 (PAS128) | HEATING PIPES B274 (PAS128) |
| CATV B271 (PAS128) | HEATING PIPES B275 (PAS128) |
| CATV B272 (PAS128) | HEATING PIPES B276 (PAS128) |
| CATV B273 (PAS128) | HEATING PIPES B277 (PAS128) |
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| CATV B275 (PAS128) | HEATING PIPES B279 (PAS128) |
| CATV B276 (PAS128) | HEATING PIPES B280 (PAS128) |
| CATV B277 (PAS128) | HEATING PIPES B281 (PAS128) |
| CATV B278 (PAS128) | HEATING PIPES B282 (PAS128) |
| CATV B279 (PAS128) | HEATING PIPES B283 (PAS128) |
| CATV B280 (PAS128) | HEATING PIPES B284 (PAS128) |
| CATV B281 (PAS128) | HEATING PIPES B285 (PAS128) |
| CATV B282 (PAS128) | HEATING PIPES B286 (PAS128) |
| CATV B283 (PAS128) | HEATING PIPES B287 (PAS128) |
| CATV B284 (PAS128) | HEATING PIPES B288 (PAS128) |
| CATV B285 (PAS128) | HEATING PIPES B289 (PAS128) |
| CATV B286 (PAS128) | HEATING PIPES B290 (PAS128) |
| CATV B287 (PAS128) | HEATING PIPES B291 (PAS128) |
| CATV B288 (PAS128) | HEATING PIPES B292 (PAS128) |
| CATV B289 (PAS128) | HEATING PIPES B293 (PAS128) |
| CATV B290 (PAS128) | HEATING PIPES B294 (PAS128) |
| CATV B291 (PAS128) | HEATING PIPES B295 (PAS128) |
| CATV B292 (PAS128) | HEATING PIPES B296 (PAS128) |
| CATV B293 (PAS128) | HEATING PIPES B297 (PAS128) |
| CATV B294 (PAS128) | HEATING PIPES B298 (PAS128) |
| CATV B295 (PAS128) | HEATING PIPES B299 (PAS128) |
| CATV B296 (PAS128) | HEATING PIPES B300 (PAS128) |
| CATV B297 (PAS128) | HEATING PIPES B301 (PAS128) |
| CATV B298 (PAS128) | HEATING PIPES B302 (PAS128) |
| CATV B299 (PAS128) | HEATING PIPES B303 (PAS128) |
| CATV B300 (PAS128) | HEATING PIPES B304 (PAS128) |
| CATV B301 (PAS128) | HEATING PIPES B305 (PAS128) |
| CATV B302 (PAS128) | HEATING PIPES B306 (PAS128) |
| CATV B303 (PAS128  |                             |



Notes :

- GRID AND LEVELS BASED ON OSG836 NATIONAL DATUM, DERIVED FROM THE NATIONAL GPS NETWORK.
- DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
- ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS UNLESS PROVEN THROUGH TRACING TECHNIQUES.
- BASE FILE (TOPO / OS) UNDERTAKEN BY SOLUM SURVEYING.
- CHANGE ALL INFO TO 150 COLOUR ONCE COMPLETE AND SPELL CHECKED.

UTILITY DISCLAIMER:

Electromagnetic techniques have been used in the location of underground services along with the aid of ground penetrating radar. The results are not infallible and trial excavations should be carried out to confirm service identification, position and depth. The completeness of underground services can not be guaranteed.

Solum Surveying will not confirm if a service is alive or dead. This must be undertaken by the service provider. As such all services will be treated as live. This drawing may not include all public services that cross the site. Therefore recommend that a full desktop study is undertaken to provide all service drawings and used in conjunction with this utility survey.

Private service pipe/connections and cables in highways may not be shown, but the presence should be anticipated.

Additional below ground structures or obstructions not shown on this drawing may be present. Review historical records/plans and any as built drawings. Excavations in the vicinity should be treated with extreme caution following the HSE documents on avoiding underground services.

Note the that ground conditions, proximity of other utilities, materials and method of construction have an influence on the ability and quality of the data collected onsite. Along with areas being accessible at time of survey. Inaccessible areas may contain access/market covers that may affect the survey area.

TSA Standards "Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate".

UTILITY LINE TYPE KEY

|                          |                           |
|--------------------------|---------------------------|
| BT B1 (PAS128)           | HEATING PIPES B1 (PAS128) |
| BT B2 (PAS128)           | HEATING PIPES B2 (PAS128) |
| BT B3 (PAS128)           | HEATING PIPES B3 (PAS128) |
| BT B4 (PAS128)           | HEATING PIPES B4 (PAS128) |
| CVTV B1 (PAS128)         | CVTV B1 (PAS128)          |
| CVTV B2 (PAS128)         | CVTV B2 (PAS128)          |
| CVTV B3 (PAS128)         | CVTV B3 (PAS128)          |
| CVTV B4 (PAS128)         | CVTV B4 (PAS128)          |
| COMMS B1 (PAS128)        | COMMS B1 (PAS128)         |
| COMMS B2 (PAS128)        | COMMS B2 (PAS128)         |
| COMMS B3 (PAS128)        | COMMS B3 (PAS128)         |
| COMMS B4 (PAS128)        | COMMS B4 (PAS128)         |
| FUELCOL B1 (PAS128)      | FUELCOL B1 (PAS128)       |
| FUELCOL B2 (PAS128)      | FUELCOL B2 (PAS128)       |
| FUELCOL B3 (PAS128)      | FUELCOL B3 (PAS128)       |
| FUELCOL B4 (PAS128)      | FUELCOL B4 (PAS128)       |
| GAUGE LINES B1 (PAS128)  | GAUGE LINES B1 (PAS128)   |
| GAUGE LINES B2 (PAS128)  | GAUGE LINES B2 (PAS128)   |
| GAUGE LINES B3 (PAS128)  | GAUGE LINES B3 (PAS128)   |
| GAUGE LINES B4 (PAS128)  | GAUGE LINES B4 (PAS128)   |
| GENERIC PIPE B1 (PAS128) | GENERIC PIPE B1 (PAS128)  |
| GENERIC PIPE B2 (PAS128) | GENERIC PIPE B2 (PAS128)  |
| GENERIC PIPE B3 (PAS128) | GENERIC PIPE B3 (PAS128)  |
| GENERIC PIPE B4 (PAS128) | GENERIC PIPE B4 (PAS128)  |
| OFFSET FUEL B1 (PAS128)  | OFFSET FUEL B1 (PAS128)   |
| OFFSET FUEL B2 (PAS128)  | OFFSET FUEL B2 (PAS128)   |
| OFFSET FUEL B3 (PAS128)  | OFFSET FUEL B3 (PAS128)   |
| OFFSET FUEL B4 (PAS128)  | OFFSET FUEL B4 (PAS128)   |
| STORM SEWER              | STORM SEWER               |
| TRAFFIC B1 (PAS128)      | TRAFFIC B1 (PAS128)       |
| TRAFFIC B2 (PAS128)      | TRAFFIC B2 (PAS128)       |
| TRAFFIC B3 (PAS128)      | TRAFFIC B3 (PAS128)       |
| TRAFFIC B4 (PAS128)      | TRAFFIC B4 (PAS128)       |
| UNKNOWN B1 (PAS128)      | UNKNOWN B1 (PAS128)       |
| UNKNOWN B2 (PAS128)      | UNKNOWN B2 (PAS128)       |
| UNKNOWN B3 (PAS128)      | UNKNOWN B3 (PAS128)       |
| UNKNOWN B4 (PAS128)      | UNKNOWN B4 (PAS128)       |
| VENT PIPE B1 (PAS128)    | VENT PIPE B1 (PAS128)     |
| VENT PIPE B2 (PAS128)    | VENT PIPE B2 (PAS128)     |
| VENT PIPE B3 (PAS128)    | VENT PIPE B3 (PAS128)     |
| VENT PIPE B4 (PAS128)    | VENT PIPE B4 (PAS128)     |

DRAINAGE CCTV REFERENCE

(x) Indicates Pipe Reference  
(1) CCTV Report Item Number

ABBREVIATIONS

|                         |                   |              |                |                 |               |                       |                      |               |                  |               |           |                    |                  |               |                      |               |                             |                      |                     |                      |                 |                      |                |               |                  |                      |                 |                |                     |                         |                  |                  |                   |                    |                       |                      |                       |                      |                              |               |                 |                 |
|-------------------------|-------------------|--------------|----------------|-----------------|---------------|-----------------------|----------------------|---------------|------------------|---------------|-----------|--------------------|------------------|---------------|----------------------|---------------|-----------------------------|----------------------|---------------------|----------------------|-----------------|----------------------|----------------|---------------|------------------|----------------------|-----------------|----------------|---------------------|-------------------------|------------------|------------------|-------------------|--------------------|-----------------------|----------------------|-----------------------|----------------------|------------------------------|---------------|-----------------|-----------------|
| Acoustic Connection: AC | Assumed Route: AR | Backdrop: BD | Base Level: BL | Cover Level: CL | Cable/Net: CN | Drainage Channel: DCH | Electricity Pole: EP | Earth Rod: ER | Fire Hydrant: FH | Gas Valve: GV | Gully: GY | Internal Depth: ID | Invert Level: IL | Gas Riser: GR | Inspection Cover: IC | Lamp Post: LP | No Further Information: NFI | Off Survey Area: OFA | Pipe To Ground: PTG | Pipe To Surface: PTS | Rodding Eye: RE | Rain Water Pipe: RWP | Soil Level: SL | Soil Pipe: SP | Soft Height: SOF | Survey Abandoned: SA | Water Riser: WR | Stop Valve: SV | Soil Vent Pipe: SVP | Taken From Records: TFR | Top Of Tank: TOT | Top Of Pipe: TOP | Traffic Light: TL | Telegraph Pole: TP | Unable to Locate: UTL | Unable to Route: UTR | Unable to Survey: UTS | Unable to Trace: UTT | Unable to Trace Further: UTF | Vent Pipe: VP | Water Level: WL | Cable Riser: CR |
|-------------------------|-------------------|--------------|----------------|-----------------|---------------|-----------------------|----------------------|---------------|------------------|---------------|-----------|--------------------|------------------|---------------|----------------------|---------------|-----------------------------|----------------------|---------------------|----------------------|-----------------|----------------------|----------------|---------------|------------------|----------------------|-----------------|----------------|---------------------|-------------------------|------------------|------------------|-------------------|--------------------|-----------------------|----------------------|-----------------------|----------------------|------------------------------|---------------|-----------------|-----------------|

PAS UTILITY CLASSIFICATION

| Quality | Description                                                                        |
|---------|------------------------------------------------------------------------------------|
| BA      | Service verified in an open excavation or inside an inspection chamber             |
| B1      | Horizontal and vertical location within +/-150mm accuracy                          |
| B2      | Horizontal and vertical location within +/-250mm accuracy                          |
| B3      | Horizontal location only using one geophysical technique. Poor / No Depth response |
| B4      | Service is expected to exist, assumed or taken from records                        |
| B1P/B2P | Service verified using post processed GPR Data.                                    |

SHEET LAYOUT

1

Drawing Revision

| No | Date     | Description          |
|----|----------|----------------------|
| R0 | ??/??/?? | SITE SURVEY COMPLETE |
| R1 |          |                      |
| R2 |          |                      |
| R3 |          |                      |
| R4 |          |                      |

Site Utility Notes :

- STAT / AS-BUILT PLANS HAVE BEEN REVIEWED AND ADDED WHERE APPLICABLE. DESKTOP STUDY MUST BE REVIEWED IN ACCORDANCE WITH THIS PLAN PRIOR TO ANY GROUND WORKS.
- STAT / AS-BUILT PLANS NOT BEEN PROVIDED PRIOR TO SITE SURVEY. WE RECOMMEND DESKTOP STUDY UNDERTAKEN PRIOR TO ANY GROUND WORKS.
- ALL REPORTS TO BE READ IN CONJUNCTION WITH THIS PLAN.
- SURVEY DATA HAS BEEN OVERLAIN ONTO AN OS TILE (A TOPO) SUPPLIED BY THE CLIENT / SOLUM SURVEYING.

CHANGE ALL INFO TO 150 COLOUR ONCE COMPLETE AND SPELL CHECKED.

Solum Surveying Ltd

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GL13 9LE

chartered  
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registered by  
RICS

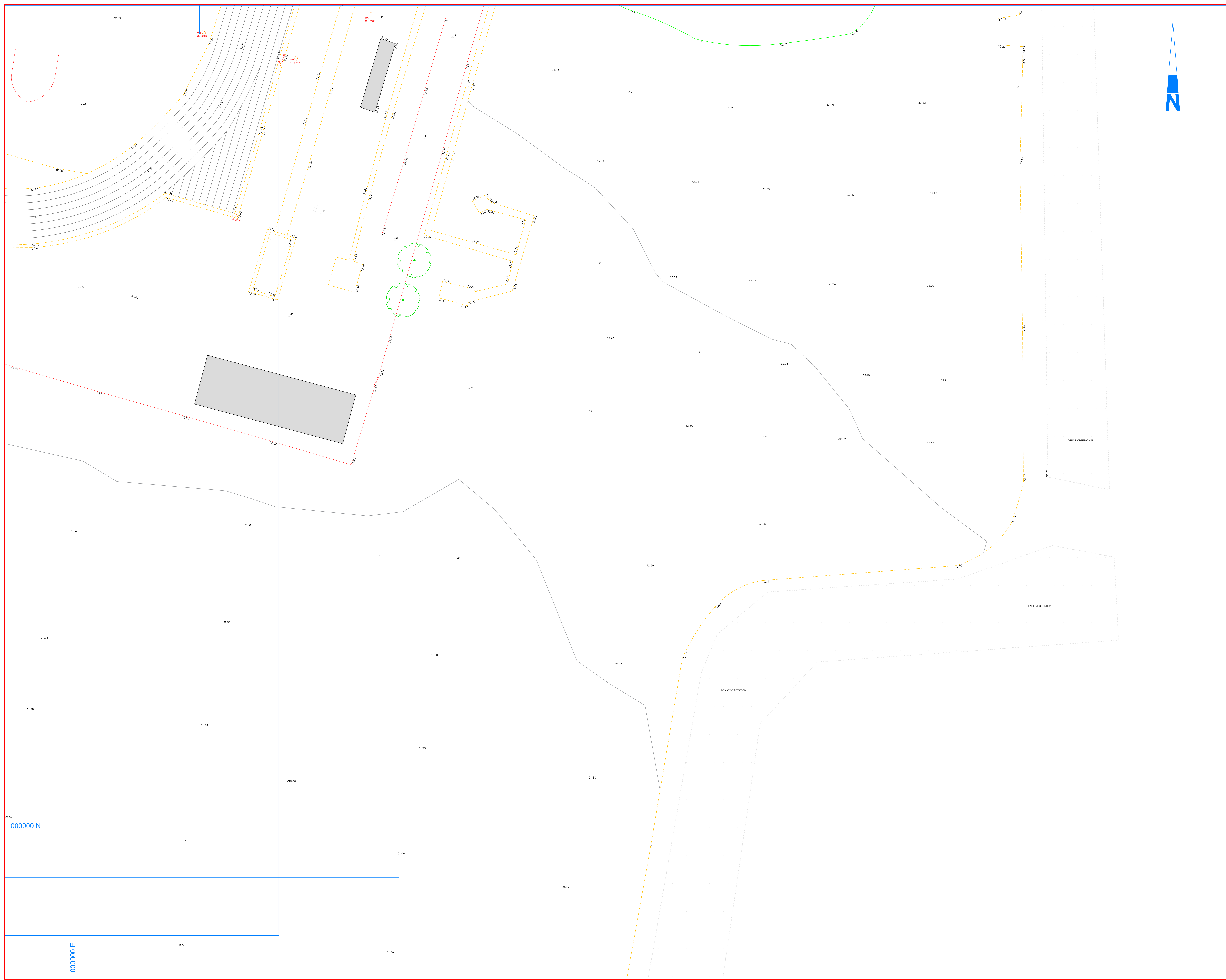
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Drainage CCTV - PAS128 Utility Survey ??

|                 |            |                        |                   |
|-----------------|------------|------------------------|-------------------|
| Scale           | Sheet Size | 1 of 1                 | ALSO SEE DRAWING: |
| 1:???           | A0         | Drawing Date: ??/??/24 | ??                |
| Project Number: | ???        | Rev: ??                | CHECKED BY: ??    |
|                 |            | Drawn By: ??           |                   |





Notes :

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UTILITY LINE TYPE KEY

|                          |                           |
|--------------------------|---------------------------|
| BT B1 (PAS128)           | HEATING PIPES B1 (PAS128) |
| BT B2 (PAS128)           | HEATING PIPES B2 (PAS128) |
| BT B3 (PAS128)           | HEATING PIPES B3 (PAS128) |
| BT B4 (PAS128)           | HEATING PIPES B4 (PAS128) |
| CVTV B1 (PAS128)         | CVTV B1 (PAS128)          |
| CVTV B2 (PAS128)         | CVTV B2 (PAS128)          |
| CVTV B3 (PAS128)         | CVTV B3 (PAS128)          |
| CVTV B4 (PAS128)         | CVTV B4 (PAS128)          |
| COMMS B1 (PAS128)        | COMMS B1 (PAS128)         |
| COMMS B2 (PAS128)        | COMMS B2 (PAS128)         |
| COMMS B3 (PAS128)        | COMMS B3 (PAS128)         |
| COMMS B4 (PAS128)        | COMMS B4 (PAS128)         |
| FUELCIL B1 (PAS128)      | FUELCIL B1 (PAS128)       |
| FUELCIL B2 (PAS128)      | FUELCIL B2 (PAS128)       |
| FUELCIL B3 (PAS128)      | FUELCIL B3 (PAS128)       |
| FUELCIL B4 (PAS128)      | FUELCIL B4 (PAS128)       |
| FOLK SEWER               | STORM SEWER               |
| GAUGE LINES B1 (PAS128)  | GAUGE LINES B1 (PAS128)   |
| GAUGE LINES B2 (PAS128)  | GAUGE LINES B2 (PAS128)   |
| GAUGE LINES B3 (PAS128)  | GAUGE LINES B3 (PAS128)   |
| GAUGE LINES B4 (PAS128)  | GAUGE LINES B4 (PAS128)   |
| GAS B1 (PAS128)          | GAS B1 (PAS128)           |
| GAS B2 (PAS128)          | GAS B2 (PAS128)           |
| GAS B3 (PAS128)          | GAS B3 (PAS128)           |
| GAS B4 (PAS128)          | GAS B4 (PAS128)           |
| GENERIC PIPE B1 (PAS128) | GENERIC PIPE B1 (PAS128)  |
| GENERIC PIPE B2 (PAS128) | GENERIC PIPE B2 (PAS128)  |
| GENERIC PIPE B3 (PAS128) | GENERIC PIPE B3 (PAS128)  |
| GENERIC PIPE B4 (PAS128) | GENERIC PIPE B4 (PAS128)  |
| OFFSET FUEL B1 (PAS128)  | OFFSET FUEL B1 (PAS128)   |
| OFFSET FUEL B2 (PAS128)  | OFFSET FUEL B2 (PAS128)   |
| OFFSET FUEL B3 (PAS128)  | OFFSET FUEL B3 (PAS128)   |
| OFFSET FUEL B4 (PAS128)  | OFFSET FUEL B4 (PAS128)   |
| WATER B1 (PAS128)        | WATER B1 (PAS128)         |
| WATER B2 (PAS128)        | WATER B2 (PAS128)         |
| WATER B3 (PAS128)        | WATER B3 (PAS128)         |
| WATER B4 (PAS128)        | WATER B4 (PAS128)         |
| GRB B1 (PAS128)          | GRB B1 (PAS128)           |
| GRB B2 (PAS128)          | GRB B2 (PAS128)           |
| GRB B3 (PAS128)          | GRB B3 (PAS128)           |
| GRB B4 (PAS128)          | GRB B4 (PAS128)           |

ABBREVIATIONS

|                     |     |                        |     |                         |     |
|---------------------|-----|------------------------|-----|-------------------------|-----|
| Acoustic Connection | AC  | Inspection Cover       | IC  | Stop Valve              | SV  |
| Assumed Route       | AR  | Lamp Post              | LP  | Soil Vent Pipe          | SVP |
| Backdrop            | BD  | Manhole                | MH  | Taken From Records      | TRF |
| Base Level          | BL  | No Further Information | NFI | Top Of Tank             | TOT |
| Cover Level         | CL  | Off Survey Area        | OFA | Top Of Pipe             | TOP |
| Cablenet            | CP  | Pipe To Ground         | PTG | Traffic Light           | TL  |
| Drainage Channel    | DCH | Pipe To Surface        | PTS | Telegraph Pole          | TP  |
| Electricity Pole    | EP  | Pipe Riser             | PR  | Unable to Locate        | UTL |
| Earth Rod           | ER  | Routing Eye            | RE  | Unable to Route         | UTR |
| Fire Hydrant        | FH  | Rain Water Pipe        | RWP | Unable to Survey        | UTS |
| Gas Valve           | GV  | Soil Level             | SL  | Unable to Trace         | UTT |
| Gully               | GUY | Soil Pipe              | SP  | Unable to Trace Further | UTF |
| Internal Depth      | ID  | Soft Height            | SOF | Vent Pipe               | VP  |
| Invert Level        | IL  | Survey Abandoned       | SA  | Water Level             | WL  |
| Gas Riser           | GR  | Water Riser            | WR  | Cable Riser             | CR  |

Drainage CCTV REFERENCE

(x) Indicates Pipe Reference  
(1) CCTV Report Item Number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

PAS UTILITY CLASSIFICATION

| Quality | Description                                                                        |
|---------|------------------------------------------------------------------------------------|
| BA      | Service verified in an open excavation or inside an inspection chamber             |
| B1      | Horizontal and vertical location within +/-150mm accuracy                          |
| B2      | Horizontal and vertical location within +/-250mm accuracy                          |
| B3      | Horizontal location only using one geophysical technique. Poor / No Depth response |
| B4      | Service is expected to exist, assumed or taken from records                        |
| B1P/B2P | Service verified using post processed GPR Data.                                    |

SHEET LAYOUT

1

Drawing Revision

| No | Date     | Description          |
|----|----------|----------------------|
| R0 | ??/??/?? | SITE SURVEY COMPLETE |
| R1 |          |                      |
| R2 |          |                      |
| R3 |          |                      |
| R4 |          |                      |

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**Solum Surveying Ltd**

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tel: 01454 413592  
email: info@solumsurveying.com

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Pines, Courtyard  
Stone  
Berkshire  
GL13 9LE

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Drainage CCTV - PAS128 Utility Survey ??

Scale 1:??? Sheet Size A0 1 of 1 ALSO SEE DRAWING: ??

Project Number: ??? Drawing Date: ??/??/24 ??

Rev: R? Surveyed By: ?? CHECKED BY: ??

Drawn By: ??

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UTILITY LINE TYPE KEY

UTILITY LINE TYPE KEY

[illegible]

### DRAINAGE CCTV REFERENCE

(x) Indicates Pipe Reference  
(1) CCTV Report Item Number

| ABBREVIATIONS       |     |                        |     |                         |      |
|---------------------|-----|------------------------|-----|-------------------------|------|
| Acoustic Connection | AC  | Inspection Cover       | IC  | Shp Valve               | SV   |
| Assumed Route       | AR  | Lamp Post              | LP  | Sol Vert Pipe           | SVP  |
| Backdrop            | BD  | Manhole                | MH  | Taken From Records      | TR   |
| Base Level          | BL  | No Further Information | NI  | Top Of Tank             | TOT  |
| Cover Level         | CL  | CR Survey Area         | CA  | Top Of Pipe             | TOP  |
| Catchpit            | CP  | Pipe To Ground         | PTG | Traffic Light           | TL   |
| Drainage Channel    | DCH | Pipe To Surface        | PTS | Telegraph Pole          | TP   |
| Electricity Pole    | EP  | Pipe Riser             | PR  | Unable to Locate        | UTL  |
| Earth Road          | ER  | Road Pipe              | RP  | Unable to Locate        | UTL  |
| Fire Hydrant        | FH  | Rain Water Pipe        | RWP | Unable to Locate        | UTL  |
| Gas Valve           | GV  | SI Level               | SL  | Unable to Trace         | UTT  |
| Gully               | GU  | Sol Pipe               | SP  | Unable to Trace Further | UTTF |
| Internal Depth      | ID  | Soil Depth             | SOF | Unknown                 | UN   |
| Internal Level      | IL  | Survey Abandoned       | SA  | Water Level             | WL   |
| Gas Riser           | GR  | Water Riser            | WR  | Cable Riser             | CR   |

## PAS UTILITY CLASSIFICATION

| Quality        | Description                                                                        |
|----------------|------------------------------------------------------------------------------------|
| B <sub>A</sub> | Service verified in an open excavation or inside an inspection chamber             |
| B <sub>1</sub> | Horizontal and vertical location within +/-150mm accuracy                          |
| B <sub>2</sub> | Horizontal and vertical location within +/-250mm accuracy                          |
| B <sub>3</sub> | Horizontal location only using one geophysical technique. Poor / No Depth response |
| B <sub>4</sub> | Service is expected to exist, assumed or taken from records                        |
| B1P/B2P        | Service verified using post processed GPR Data.                                    |

## SHEET LAYOUT

1

(NOT TO SCALE)

## Drawing Revisor

| No | Date     | Description          |
|----|----------|----------------------|
| R0 | ??/??/?? | SITE SURVEY COMPLETE |
| R1 |          |                      |
| R2 |          |                      |
| R3 |          |                      |
| R4 |          |                      |

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tel: 01454 413592  
email: info@solumsurveying.co.uk  
The Old Stables  
Pines Courtyard  
Stone  
Berkeley  
GL13 9LE



## CLIENT

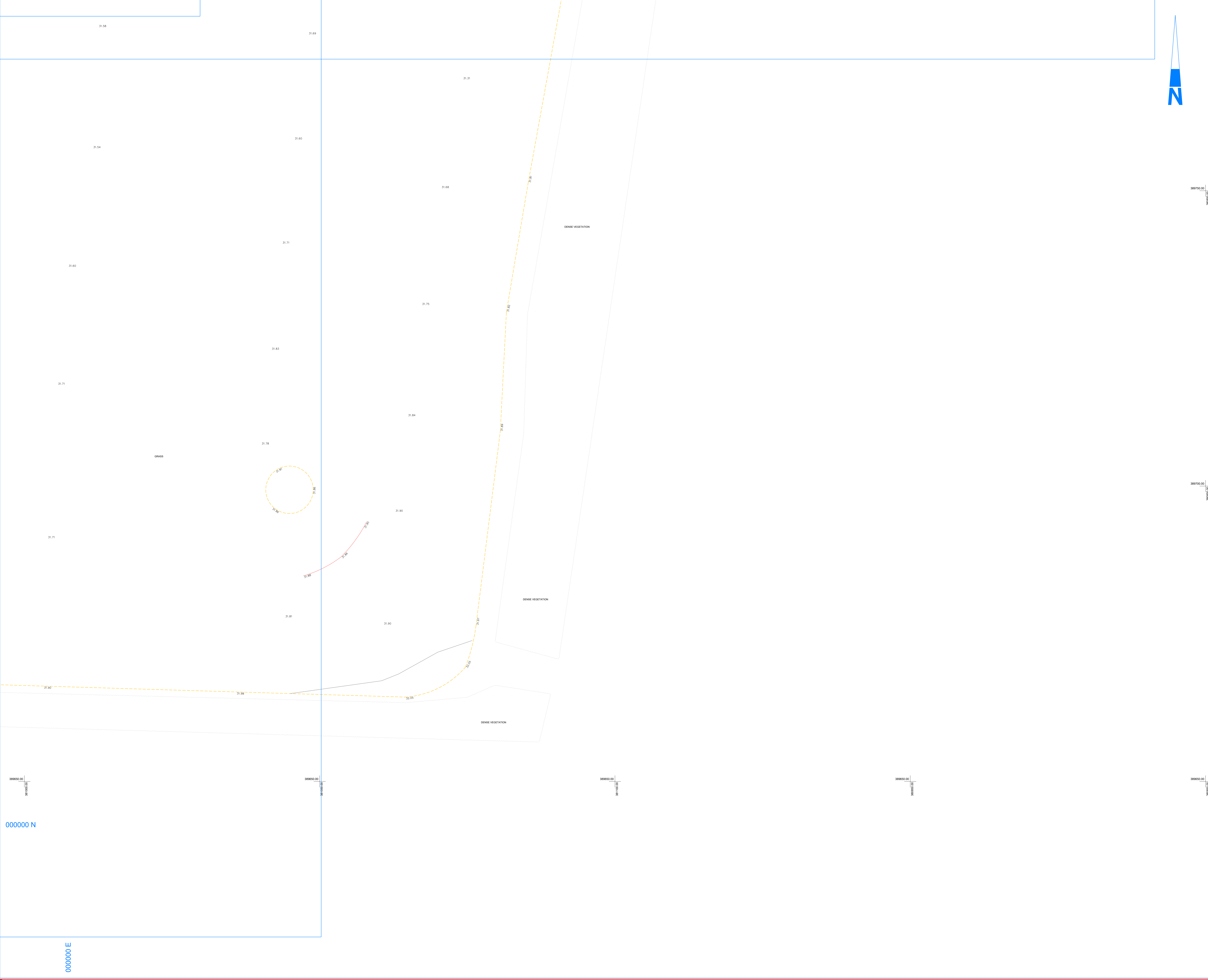
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Drainage CCTV - PAS128 Utility Survey ??

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|-------------------------|-------------------|---------------------------------|-------------------|
| Scale<br>1:???          | Sheet Size:<br>A0 | 1 of 1                          | ALSO SEE DRAWING: |
|                         |                   | Drawing Date: ??/??/24          | ??                |
| Project Number:<br>???? | Rev:<br>R?        | Surveyed By: ??<br>Drawn By: ?? | CHECKED BY:<br>?? |



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|                          |                           |
|--------------------------|---------------------------|
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| BT B2 (PAS128)           | HEATING PIPES B2 (PAS128) |
| BT B3 (PAS128)           | HEATING PIPES B3 (PAS128) |
| BT B4 (PAS128)           | HEATING PIPES B4 (PAS128) |
| CV B1 (PAS128)           | HEATING PIPES B1 (PAS128) |
| CV B2 (PAS128)           | HEATING PIPES B2 (PAS128) |
| CV B3 (PAS128)           | HEATING PIPES B3 (PAS128) |
| CV B4 (PAS128)           | HEATING PIPES B4 (PAS128) |
| CCTV B1 (PAS128)         | POWER B1 (PAS128)         |
| CCTV B2 (PAS128)         | POWER B2 (PAS128)         |
| CCTV B3 (PAS128)         | POWER B3 (PAS128)         |
| CCTV B4 (PAS128)         | POWER B4 (PAS128)         |
| COMMS B1 (PAS128)        | SERVICE DUCT B1 (PAS128)  |
| COMMS B2 (PAS128)        | SERVICE DUCT B2 (PAS128)  |
| COMMS B3 (PAS128)        | SERVICE DUCT B3 (PAS128)  |
| COMMS B4 (PAS128)        | SERVICE DUCT B4 (PAS128)  |
| FUELCIL B1 (PAS128)      | STORM SEWER               |
| FUELCIL B2 (PAS128)      | STORM SEWER               |
| FUELCIL B3 (PAS128)      | STORM SEWER               |
| FUELCIL B4 (PAS128)      | STORM SEWER               |
| GAUGE LINES B1 (PAS128)  | UNKNOWN B1 (PAS128)       |
| GAUGE LINES B2 (PAS128)  | UNKNOWN B2 (PAS128)       |
| GAUGE LINES B3 (PAS128)  | UNKNOWN B3 (PAS128)       |
| GAUGE LINES B4 (PAS128)  | UNKNOWN B4 (PAS128)       |
| GAS B1 (PAS128)          | VENT PIPE B1 (PAS128)     |
| GAS B2 (PAS128)          | VENT PIPE B2 (PAS128)     |
| GAS B3 (PAS128)          | VENT PIPE B3 (PAS128)     |
| GAS B4 (PAS128)          | VENT PIPE B4 (PAS128)     |
| GENERIC PIPE B1 (PAS128) | WATER B1 (PAS128)         |
| GENERIC PIPE B2 (PAS128) | WATER B2 (PAS128)         |
| GENERIC PIPE B3 (PAS128) | WATER B3 (PAS128)         |
| GENERIC PIPE B4 (PAS128) | WATER B4 (PAS128)         |
| OFFSET FUEL B1 (PAS128)  | GPR B1 (PAS128)           |
| OFFSET FUEL B2 (PAS128)  | GPR B2 (PAS128)           |
| OFFSET FUEL B3 (PAS128)  | GPR B3 (PAS128)           |
| OFFSET FUEL B4 (PAS128)  | GPR B4 (PAS128)           |

DRAINAGE CCTV REFERENCE

(x) Indicates Pipe Reference  
(1) CCTV Report Item Number

ABBREVIATIONS

|                     |     |                        |     |                         |     |
|---------------------|-----|------------------------|-----|-------------------------|-----|
| Acoustic Connection | AC  | Inspection Cover       | IC  | Stop Valve              | BV  |
| Assumed Route       | AR  | Lamp Post              | LP  | Soil Vent Pipe          | SV  |
| Backdrop            | BD  | Manhole                | MH  | Taken From Records      | TFR |
| Base Level          | BL  | No Further Information | NFI | Top Of Tank             | TOT |
| Cover Level         | CL  | Off Survey Area        | OFA | Top Of Pipe             | TOP |
| Cablenet            | CP  | Pipe To Ground         | PTG | Traffic Light           | TL  |
| Drainage Channel    | DCH | Pipe To Surface        | PTS | Telegraph Pole          | TP  |
| Electricity Pole    | EP  | Pipe Riser             | PR  | Unable to Locate        | UTL |
| Earth Road          | ER  | Roading Eye            | RE  | Unable to Route         | UTR |
| Fire Hydrant        | FH  | Rain Water Pipe        | RWP | Unable to Survey        | UTS |
| Gas Valve           | GV  | Soil Level             | SL  | Unable to Trace         | UTT |
| Gully               | GUY | Soil Pipe              | SP  | Unable to Trace Further | UTF |
| Internal Depth      | ID  | Soft Height            | SOF | Vent Pipe               | VP  |
| Invert Level        | IL  | Survey Abandoned       | SA  | Water Level             | WL  |
| Gas Riser           | GR  | Water Riser            | WR  | Cable Riser             | CR  |

| PAS UTILITY CLASSIFICATION |                                                                                    |
|----------------------------|------------------------------------------------------------------------------------|
| Quality                    | Description                                                                        |
| BA                         | Service verified in an open excavation or inside an inspection chamber             |
| B1                         | Horizontal and vertical location within +/-150mm accuracy                          |
| B2                         | Horizontal and vertical location within +/-250mm accuracy                          |
| B3                         | Horizontal location only using one geophysical technique. Poor / No Depth response |
| B4                         | Service is expected to exist, assumed or taken from records                        |
| B1P/B2P                    | Service verified using post processed GPR Data.                                    |

SHEET LAYOUT

1

(NOT TO SCALE)

| Drawing Revision |         |                      |
|------------------|---------|----------------------|
| No               | Date    | Description          |
| R0               | ??????? | SITE SURVEY COMPLETE |
| R1               |         |                      |
| R2               |         |                      |
| R3               |         |                      |
| R4               |         |                      |

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Drainage CCTV - PAS128 Utility Survey ??

|                 |            |                        |                   |
|-----------------|------------|------------------------|-------------------|
| Scale           | Sheet Size | 1 of 1                 | ALSO SEE DRAWING: |
| 1:???           | A0         | Drawing Date: ??/??/24 | ??                |
| Project Number: | Rev:       | Surveyed By: ??        | CHECKED BY:       |
| ????            | R?         | Drawn By: ??           | ??                |

## **Appendix 5: Quorum Existing Runoff Rate Calculations**

## EXISTING SURFACE WATER

Existing site information:

|                    |        |                |
|--------------------|--------|----------------|
| Site Boundary Area | 5101   | m <sup>2</sup> |
| Developable Area   | 0.5101 | ha             |
| Impermeable Area   | 0.5101 | ha             |

Modified Rational Method Equation:

$$Q_n = 2.78 CiA$$

where:

$C$  Runoff Coefficient = 1 (in this case 1 as using impermeable area)  
 $i_n$  Rainfall Intensity for  $n$  return period (mm/hr)

$A$  Impermeable Area (Ha)  
 $Q_n$  Runoff for  $n$  return period (l/s)

Rainfall Intensity:

The rainfall intensities for various return periods were extracted from FLOW hydraulic modelling software for the 15 min duration.

|           |              |
|-----------|--------------|
| $i_1$     | 29.6 mm/hr   |
| $i_{30}$  | 75.108 mm/hr |
| $i_{100}$ | 95.22 mm/hr  |

Existing Surface Water Runoff:

Therefore:

|           |      |   | $C$ |   | $i_n$ |   | $A$    |   | $Q_n$             |
|-----------|------|---|-----|---|-------|---|--------|---|-------------------|
| $Q_1$     | 2.78 | x | 1   | x | 29.6  | x | 0.5101 | = | <b>41.98</b> l/s  |
| $Q_{30}$  | 2.78 | x | 1   | x | 75.1  | x | 0.5101 | = | <b>106.51</b> l/s |
| $Q_{100}$ | 2.78 | x | 1   | x | 95.2  | x | 0.5101 | = | <b>135.03</b> l/s |

| Rainfall                 |                        |                           |                           |                        |                           |
|--------------------------|------------------------|---------------------------|---------------------------|------------------------|---------------------------|
| Event                    | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event                     | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
| 2 year 15 minute summer  | 104.606                | 29.600                    | 30 year 15 minute winter  | 186.269                | 75.108                    |
| 2 year 15 minute winter  | 73.408                 | 29.600                    | 100 year 15 minute summer | 336.516                | 95.222                    |
| 30 year 15 minute summer | 265.433                | 75.108                    | 100 year 15 minute winter | 236.152                | 95.222                    |

**EXISTING SURFACE WATER**2504820 - Wythenshawe Park Hub**ARDENT**  
CONSULTING ENGINEERS**Existing site information:**

Site Boundary Area            550    m<sup>2</sup>  
 Developable Area            0.055    ha  
 Impermeable Area            0.0550    ha

|                   |           |
|-------------------|-----------|
| no of MHs in road | 3         |
| imp area per MH   | 0.0183333 |

**Modified Rational Method Equation:**

$$Q_n = 2.78 CiA$$

where:

$C$             *Runoff Coefficient* =            1 (in this case 1 as using impermeable area)  
 $i_n$             *Rainfall Intensity for n return period (mm/hr)*

$A$             *Impermeable Area (Ha)*  
 $Q_n$             *Runoff for n return period (l/s)*

**Rainfall Intensity:**

The rainfall intensities for various return periods were extracted from FLOW hydraulic modelling software for the 15 min duration.

$i_1$             29.6 mm/hr  
 $i_{30}$             75.108 mm/hr  
 $i_{100}$             95.22 mm/hr

**Existing Surface Water Runoff:**

Therefore:

|           |      |   | $C$ |   | $i_n$ |   | $A$   |   | $Q_n$        |            |
|-----------|------|---|-----|---|-------|---|-------|---|--------------|------------|
| $Q_1$     | 2.78 | x | 1   | x | 29.6  | x | 0.055 | = | <b>4.53</b>  | <b>l/s</b> |
| $Q_{30}$  | 2.78 | x | 1   | x | 75.1  | x | 0.055 | = | <b>11.48</b> | <b>l/s</b> |
| $Q_{100}$ | 2.78 | x | 1   | x | 95.2  | x | 0.055 | = | <b>14.56</b> | <b>l/s</b> |

**50% Brownfield**

|         |
|---------|
| 2.3 l/s |
| 5.7 l/s |
| 7.3 l/s |

| Rainfall                 |                        |                           |                           |                        |                           |
|--------------------------|------------------------|---------------------------|---------------------------|------------------------|---------------------------|
| Event                    | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event                     | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
| 2 year 15 minute summer  | 104.606                | 29.600                    | 30 year 15 minute winter  | 186.269                | 75.108                    |
| 2 year 15 minute winter  | 73.408                 | 29.600                    | 100 year 15 minute summer | 336.516                | 95.222                    |
| 30 year 15 minute summer | 265.433                | 75.108                    | 100 year 15 minute winter | 236.152                | 95.222                    |

## **Appendix 6: Greenfield Runoff Rate**

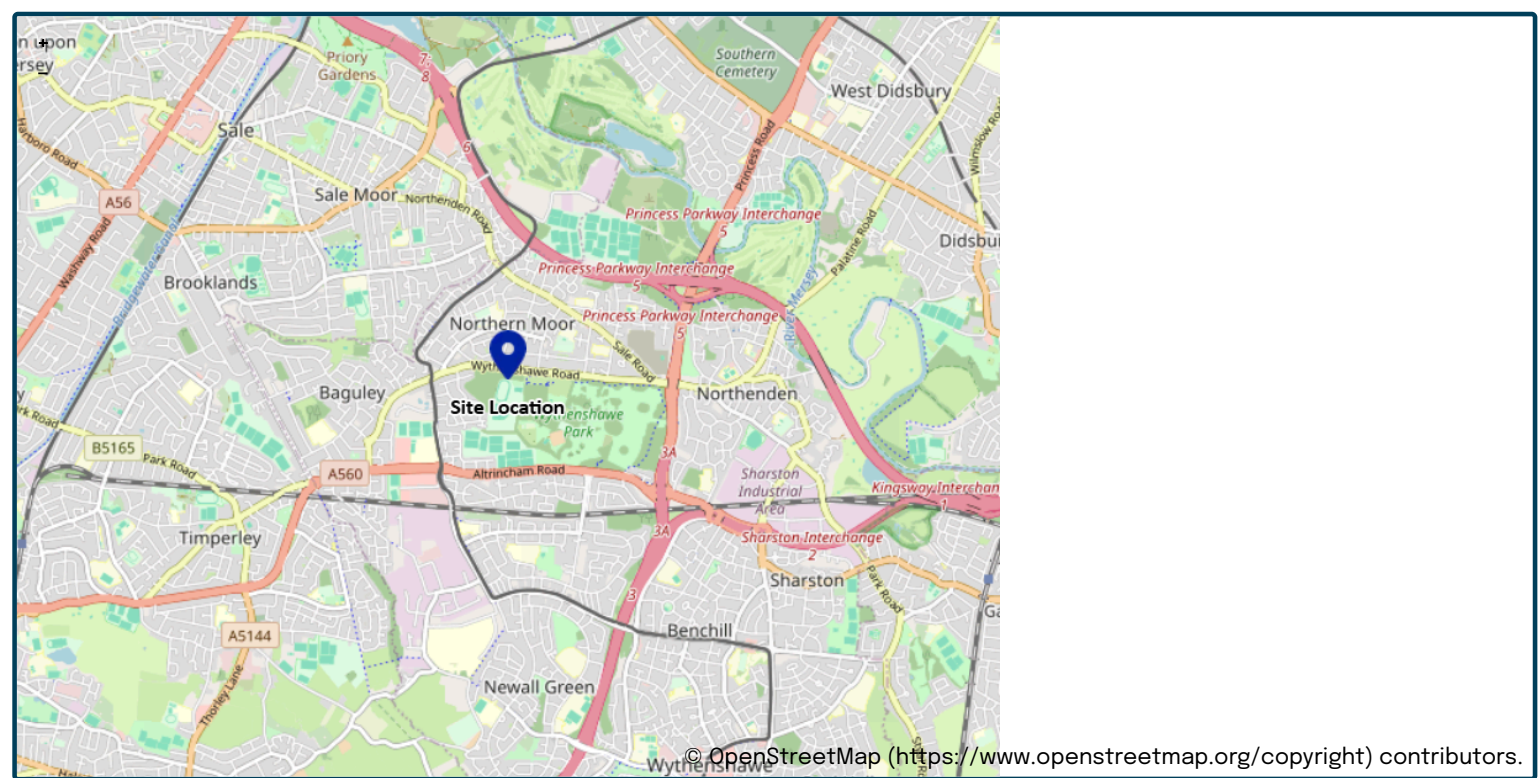
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

## Project details

|               |                       |
|---------------|-----------------------|
| Date          | <div>03/07/2025</div> |
| Calculated by | <div></div>           |
| Reference     | <div></div>           |
| Model version | <div>2.0.1</div>      |

## Location

|               |             |
|---------------|-------------|
| Site name     | <div></div> |
| Site location | <div></div> |



|               |                   |
|---------------|-------------------|
| Site easting  | <div>381035</div> |
| Site northing | <div>389906</div> |

## Site details

|                      |                            |
|----------------------|----------------------------|
| Total site area (ha) | <div>1</div> <div>ha</div> |
|----------------------|----------------------------|

# Greenfield runoff

## Method

|        |       |
|--------|-------|
| Method | IH124 |
|--------|-------|

## IH124

|                            |                                             |     |                                  |
|----------------------------|---------------------------------------------|-----|----------------------------------|
|                            | <u>My value</u>                             |     | <u>Map value</u>                 |
| SAAR (mm)                  | <input type="text" value="827"/>            | mm  | <input type="text" value="827"/> |
| How should SPR be derived? | <input type="text" value="WRAP soil type"/> |     |                                  |
| WRAP soil type             | <input type="text" value="2"/>              |     | <input type="text" value="2"/>   |
| SPR                        | <input type="text" value="0.3"/>            |     |                                  |
| QBar (IH124) (l/s)         | <input type="text" value="2.2"/>            | l/s |                                  |

## Growth curve factors

|                        |                                   |  |                                 |
|------------------------|-----------------------------------|--|---------------------------------|
|                        | <u>My value</u>                   |  | <u>Map value</u>                |
| Hydrological region    | <input type="text" value="10"/>   |  | <input type="text" value="10"/> |
| 1 year growth factor   | <input type="text" value="0.87"/> |  |                                 |
| 2 year growth factor   | <input type="text" value="0.93"/> |  |                                 |
| 10 year growth factor  | <input type="text" value="1.38"/> |  |                                 |
| 30 year growth factor  | <input type="text" value="1.7"/>  |  |                                 |
| 100 year growth factor | <input type="text" value="2.08"/> |  |                                 |
| 200 year growth factor | <input type="text" value="2.37"/> |  |                                 |

## Results

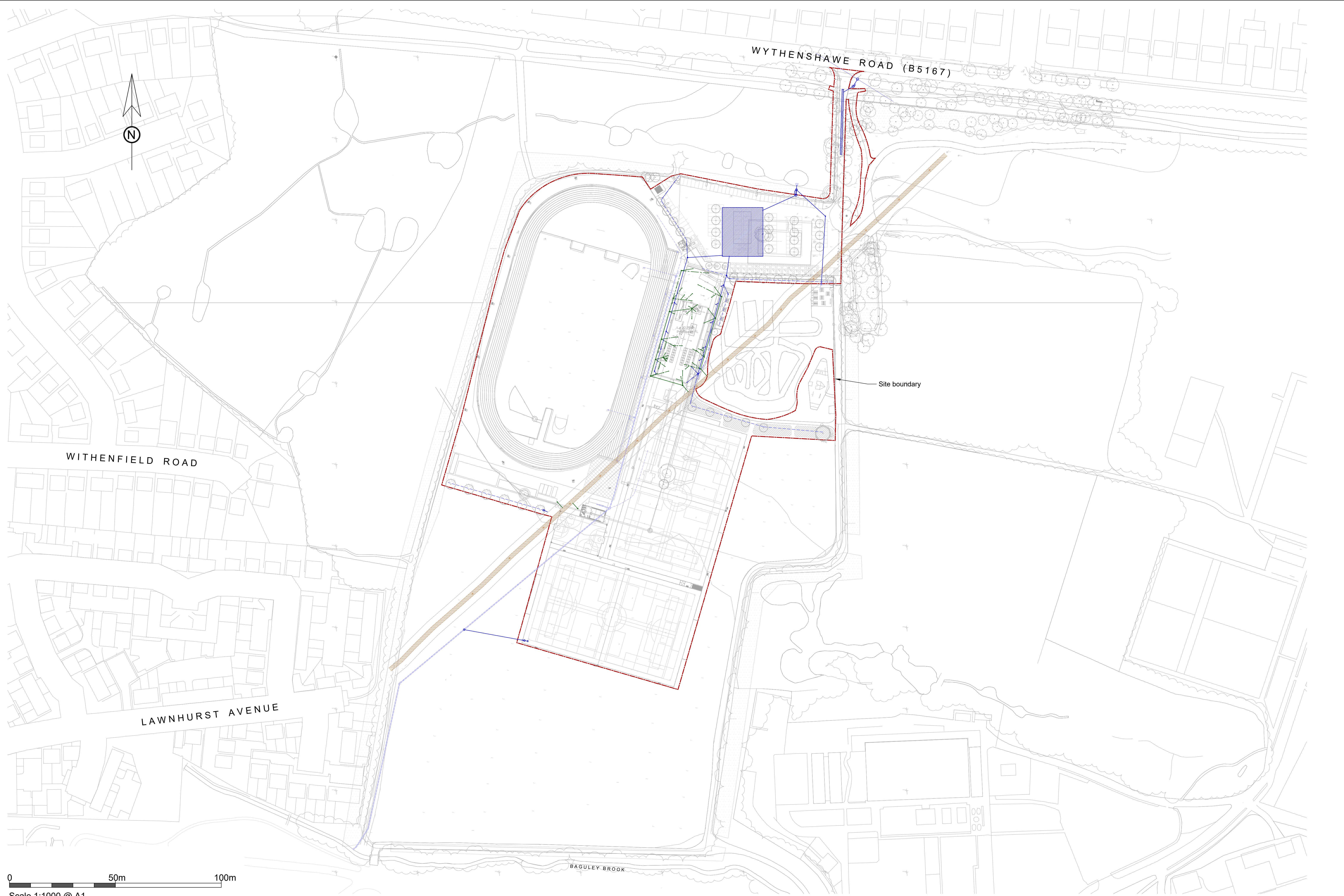
|                           |                                  |     |
|---------------------------|----------------------------------|-----|
| Method                    | IH124                            |     |
| Flow rate 1 year (l/s)    | <input type="text" value="1.9"/> | l/s |
| Flow rate 2 year (l/s)    | <input type="text" value="2.1"/> | l/s |
| Flow rate 10 years (l/s)  | <input type="text" value="3.1"/> | l/s |
| Flow rate 30 years (l/s)  | <input type="text" value="3.8"/> | l/s |
| Flow rate 100 years (l/s) | <input type="text" value="4.6"/> | l/s |
| Flow rate 200 years (l/s) | <input type="text" value="5.2"/> | l/s |

### Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.1) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com/) (<https://www.uksuds.com/>).

The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

## **Appendix 7: Quorum Consulting Engineers Drainage Design Drawings**



0 50m 100m  
Scale 1:1000 @ A1



Office 45, Sony UK Technology Centre,  
Pencoed Technology Park, Pencoed, CF35 5HZ  
Tel: 01446 774493  
Email: info@qapm.com

**General Notes**  
Do not scale from this drawing. Dimensions must be checked on site. All works to comply with current Building Regulations.  
All site works must be to the current drawing revision. Drawing is copyright of Quorum Project Management Ltd.  
All levels to be verified by contractor on site. Any concerns by the contractor to be raised with the engineer prior to any installation/fabrication works.  
The drawing information must be read in conjunction with all relevant scheme drawings, specification and/or schedules referred to or not.  
The contractor is responsible to insure that all work is in compliance with current Building Regulations and or other relevant legislation  
Dimensions on this drawing are not to be used for construction purposes.

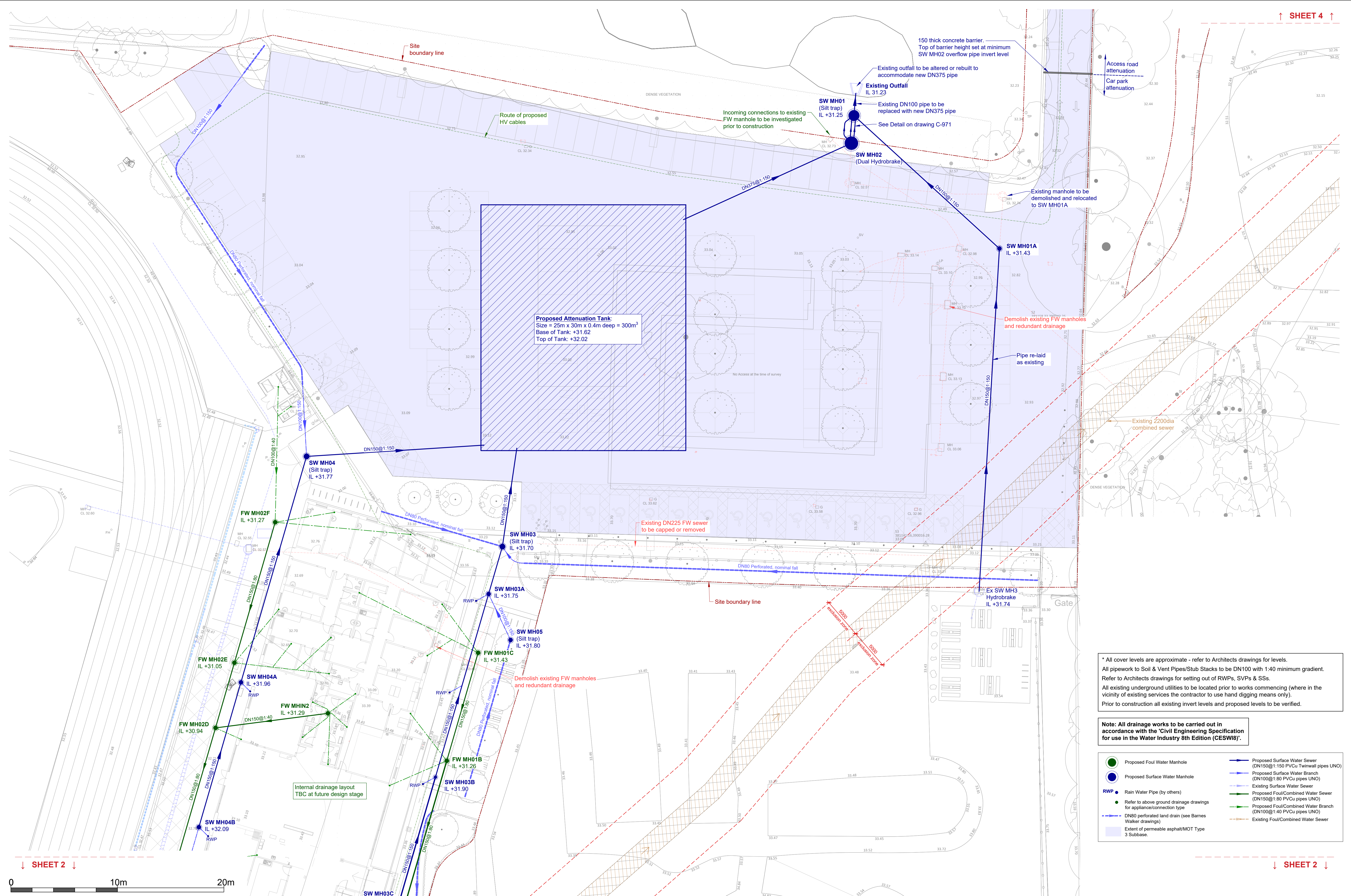
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|------|------------|--------------------|
| T04  | 29/10/2025 | STAGE 4 UPDATES    |
| T03  | 01/10/2025 | STAGE 4 UPDATES    |
| T02  | 22/09/2025 | STAGE 4 UPDATES    |
| T01  | 08/09/2025 | ISSUED FOR STAGE 4 |
| Rev. | Date       | Description        |

|         |                                                               |
|---------|---------------------------------------------------------------|
| Drawing | DRAINAGE SITE PLAN                                            |
| Project | WYTHENSHAWE SPORTS HUB, WYTHENSHAWE ROAD, MANCHESTER, M23 0BD |

|             |           |
|-------------|-----------|
| Project No. | PM2419-25 |
| Scale       | 1:1000@A1 |
| Date        | JUL 2025  |

|             |              |
|-------------|--------------|
| Drawing No. | QPM-DR-C-900 |
| Drawn by    | MB           |
| Chkd by     | PCH          |

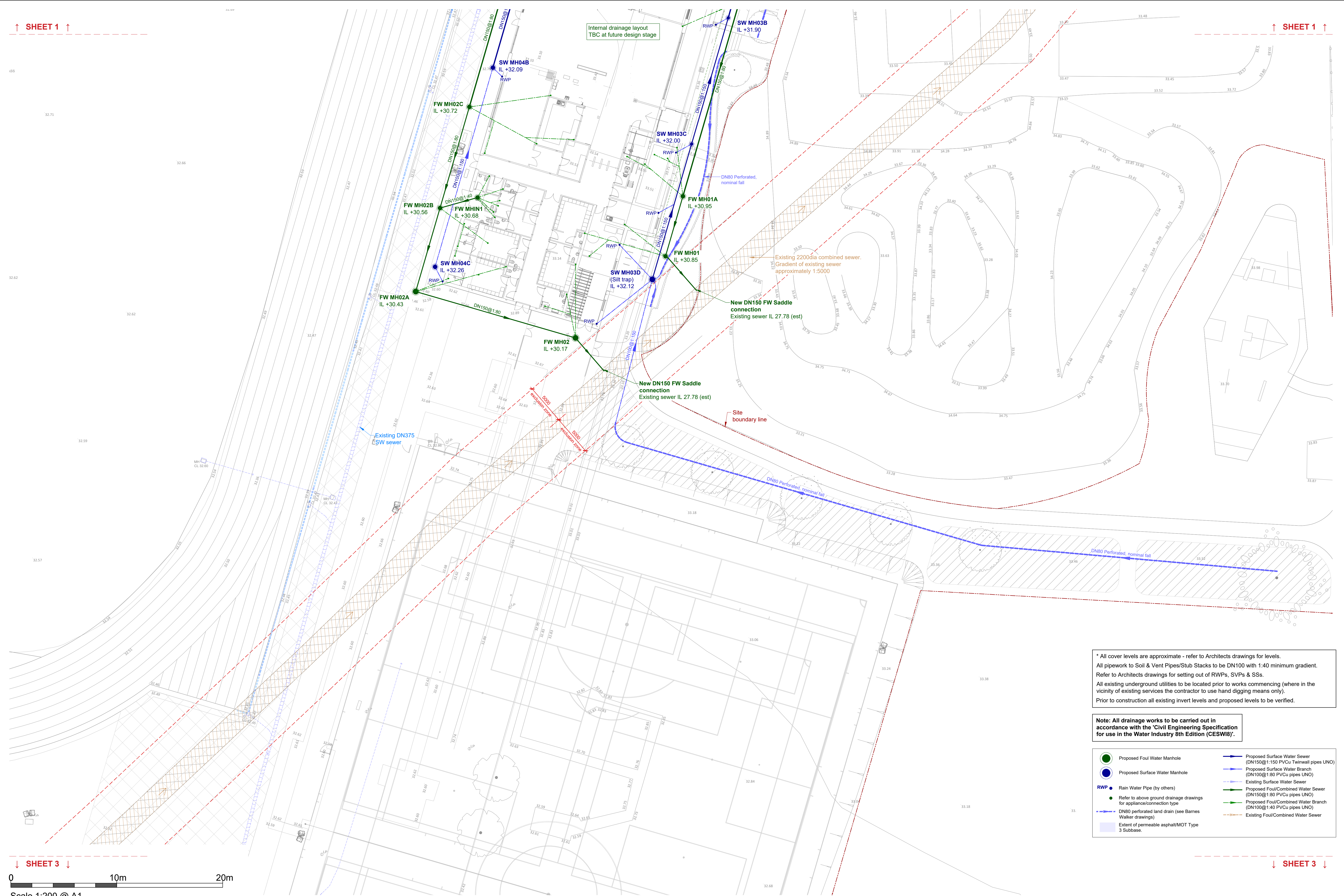
|        |         |
|--------|---------|
| Rev.   | T04     |
| Status | STAGE 4 |



\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RVPs, SVPs & SSSs.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESWI8)'.

- Proposed Foul Water Manhole
- Proposed Surface Water Manhole
- RWP Rain Water Pipe (by others)
- Refer to above ground drainage drawings for appliance/connection type
- DN80 perforated land drain (see Barnes Walker drawings)
- Extent of permeable asphalt/MOT Type 3 Subbase
- Proposed Surface Water Sewer (DN150@1:150 PVCu Twinwall pipes UNO)
- Proposed Surface Water Branch (DN100@1:80 PVCu pipes UNO)
- Existing Surface Water Sewer
- Proposed Foul/Combined Water Sewer (DN150@1:80 PVCu pipes UNO)
- Proposed Foul/Combined Water Branch (DN100@1:40 PVCu pipes UNO)
- Existing Foul/Combined Water Sewer



\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RVPs, SVPs & SSs.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

**Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESW18)'.**

- |  |                                                                       |  |                                                                    |
|--|-----------------------------------------------------------------------|--|--------------------------------------------------------------------|
|  | Proposed Foul Water Manhole                                           |  | Proposed Surface Water Sewer (DN150@1:150 PVCu Twinwall pipes UNO) |
|  | Proposed Surface Water Manhole                                        |  | Proposed Surface Water Branch (DN100@1:80 PVCu pipes UNO)          |
|  | Rain Water Pipe (by others)                                           |  | Existing Surface Water Sewer                                       |
|  | Refer to above ground drainage drawings for appliance/connection type |  | Proposed Foul/Combined Water Sewer (DN150@1:80 PVCu pipes UNO)     |
|  | DN80 perforated land drain (see Barnes Walker drawings)               |  | Proposed Foul/Combined Water Branch (DN100@1:40 PVCu pipes UNO)    |
|  | Extent of permeable asphalt/MOT Type 3 Subbase.                       |  | Existing Foul/Combined Water Sewer                                 |



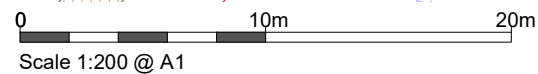
Office 45, Sony UK Technology Centre,  
Pencoed Technology Park, Pencoed, CF35 5HZ  
Tel: 01446 774493  
Email: info@qapm.com

Do not scale from this drawing. Dimensions must be checked on site. All works to comply with current Building Regulations.  
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Dimensions on this drawing are not to be used for construction purposes.

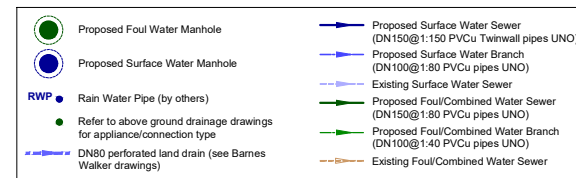
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| T03  | 01/10/2025 | STAGE 4 UPDATES    |
| T02  | 22/09/2025 | STAGE 4 UPDATES    |
| T01  | 08/09/2025 | ISSUED FOR STAGE 4 |
| Rev. | Date       | Description        |

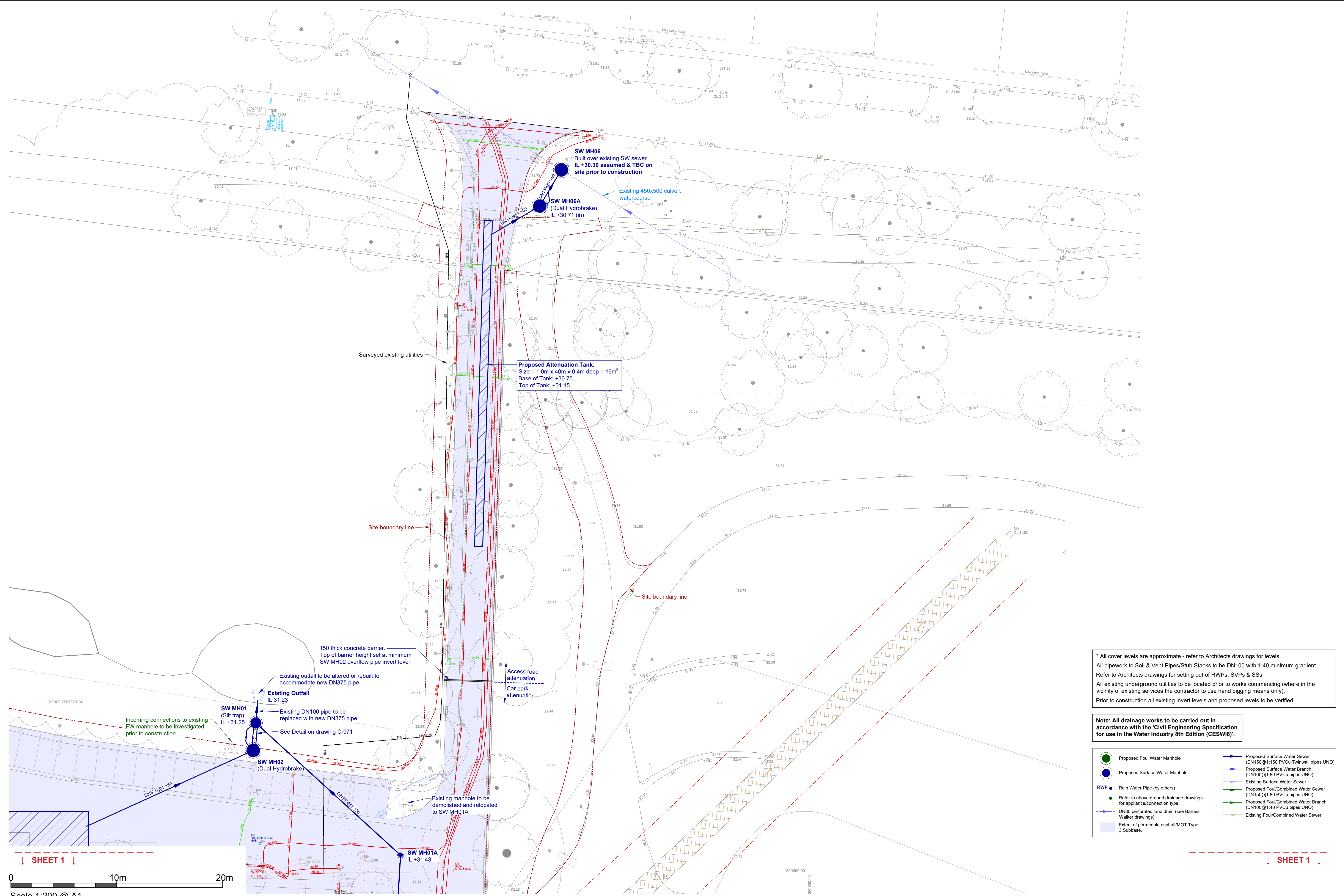
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| Drawing | DRAINAGE PLAN - SHEET 2                                     |
| Project | WYTHENSHAW SPORTS HUB, WYTHENSHAW ROAD, MANCHESTER, M23 0BD |

|             |           |             |              |        |         |
|-------------|-----------|-------------|--------------|--------|---------|
| Project No. | PM2419-25 | Drawing No. | QPM-DR-C-951 | Rev.   | T04     |
| Scale       | 1:200@A1  | Drawn by    | MB           | Status | STAGE 4 |
| Date        | MAY 2025  | Chkd by     | PCH          |        |         |



**Note:** All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESWI8)'.





\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RWP's, SV's & SS's.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

**Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESW18)'.**

- Proposed Foul Water Manhole

Proposed Surface Water Manhole

RWP

Refer to above ground drainage drawings for appliance/connection type

DN80 perforated land drain (see Barnes Walker drawings)

Extent of permeable asphalt/MOT Type 3 Subbase.

Proposed Surface Water Sewer (DN150@1:150 PVCu Twinwall pipes UNO)

Proposed Surface Water Branch (DN100@1:80 PVCu pipes UNO)

Existing Surface Water Sewer (DN150@1:80 PVCu pipes UNO)

Proposed Foul/Combined Water Sewer (DN150@1:80 PVCu pipes UNO)

Proposed Foul/Combined Water Branch (DN100@1:40 PVCu pipes UNO)

Existing Foul/Combined Water Sewer
- Office 45, Sony UK Technology Centre,  
Pencoed Technology Park, Pencoed, CF35 5HZ  
Tel: 01446 774493  
Email: info@qapm.com

General Notes

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|------|------------|--------------------|
| T02  | 29/10/2025 | STAGE 4 UPDATES    |
| T01  | 01/10/2025 | ISSUED FOR STAGE 4 |
| Rev. | Date       | Description        |

Drawing

DRAINAGE PLAN - SHEET 4  
ACCESS ROAD

Project

WYTHENSHAW SPORTS HUB, WYTHEN-SHAW ROAD, MANCHESTER, M23 0BD

Project No.

PM2419-25

Drawing No.

QPM-DR-C-953

Rev.

T02

Scale

1:200@A1

Drawn by

MB

Date

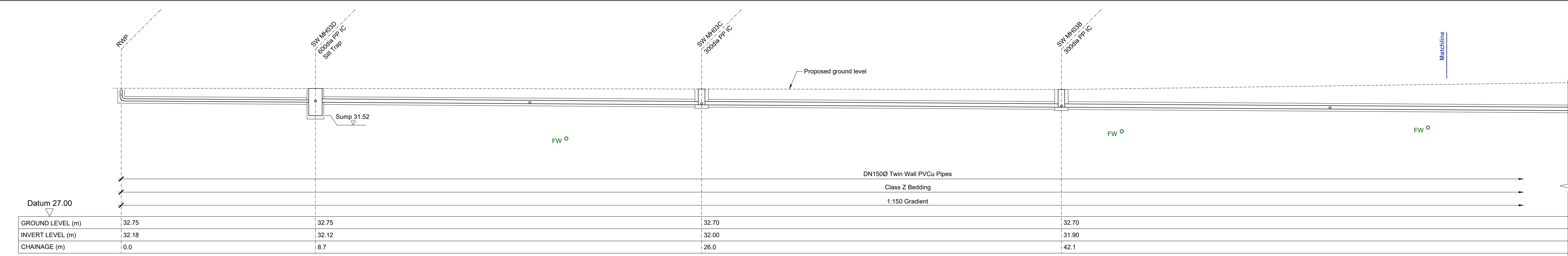
OCT 2025

Chkd by

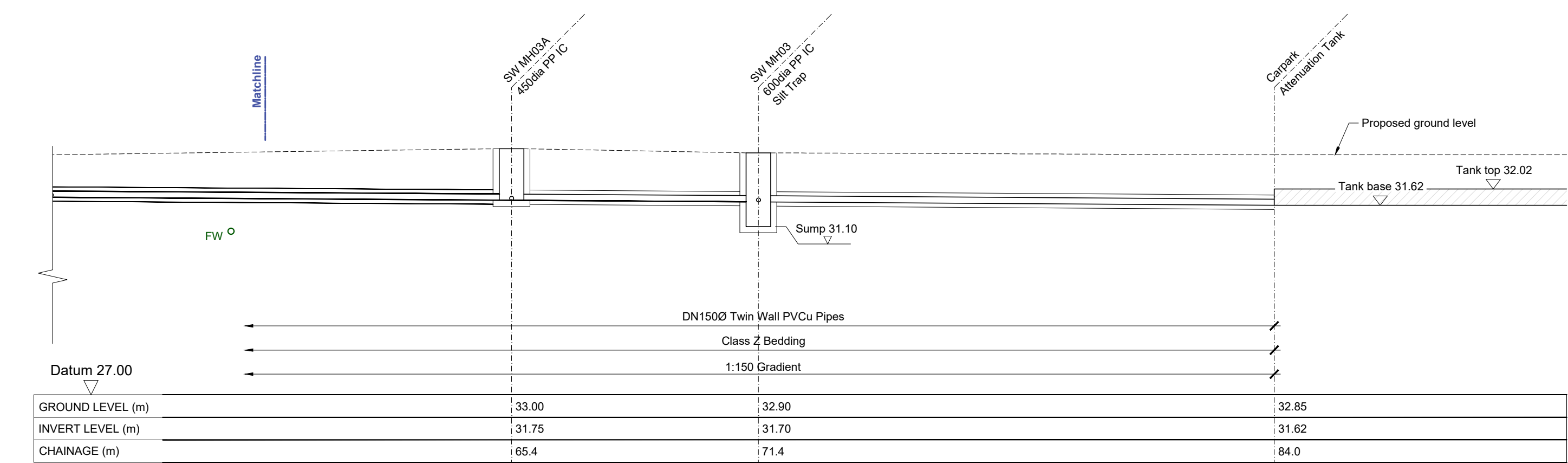
PCH

Status

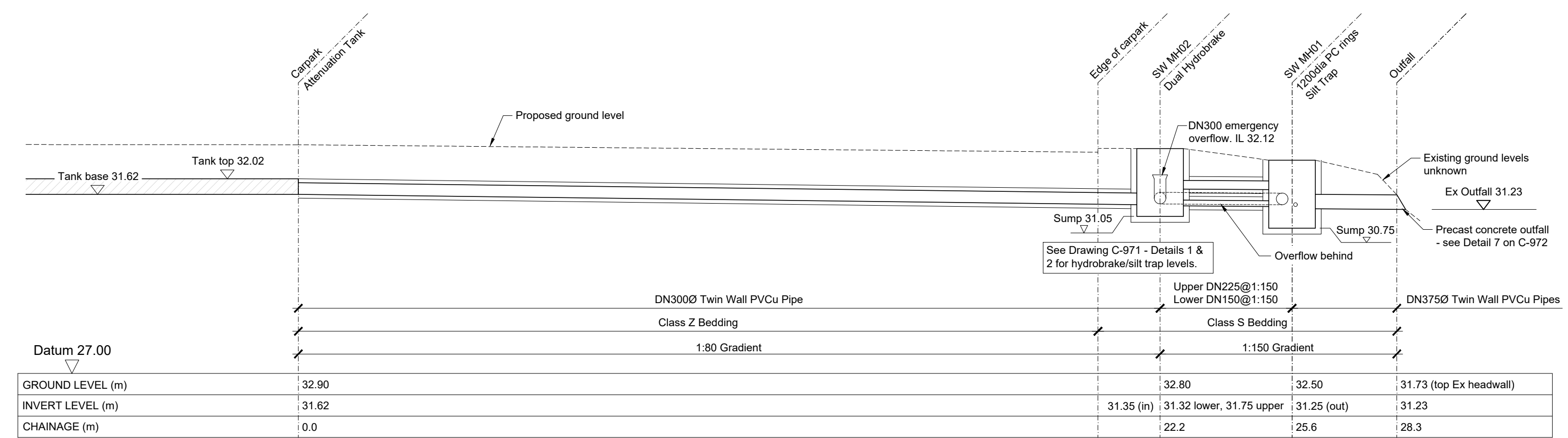
STAGE 4



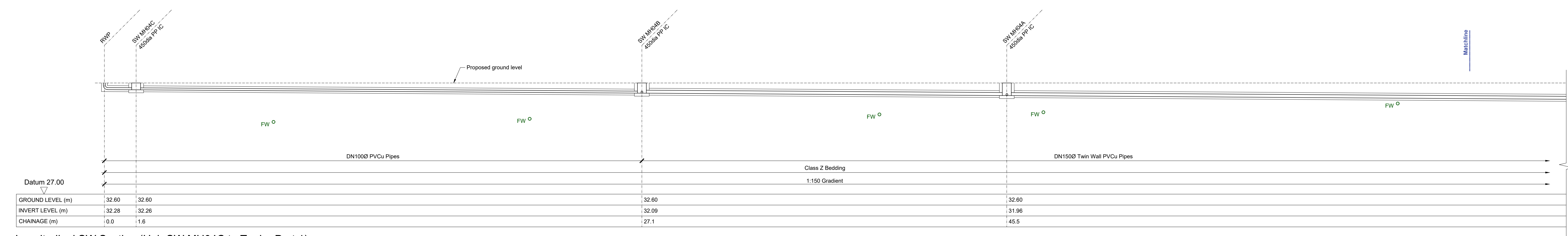
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Scale 1:100



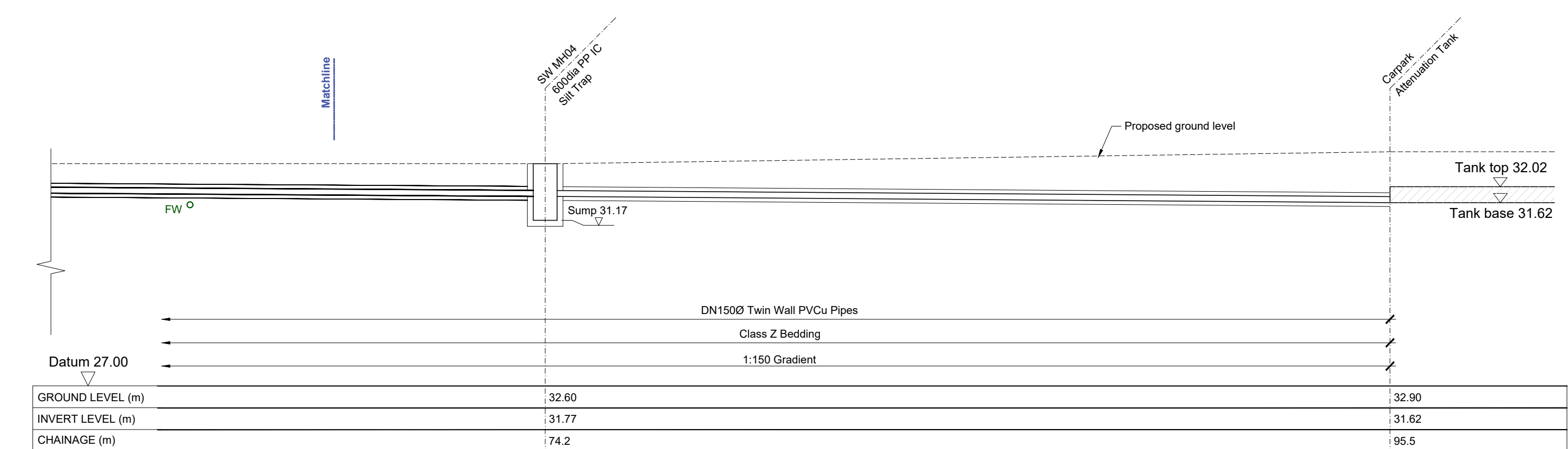
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Scale 1:100



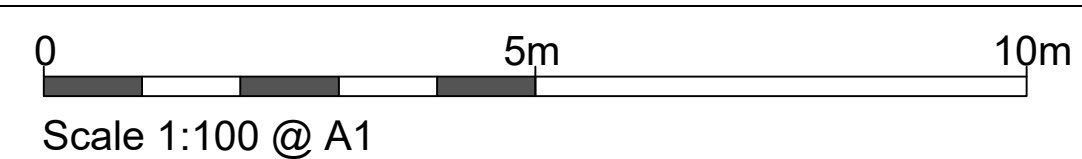
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Scale 1:100



Longitudinal SW Section (Hub SW MH04C to Tank - Part 1)  
Scale 1:100

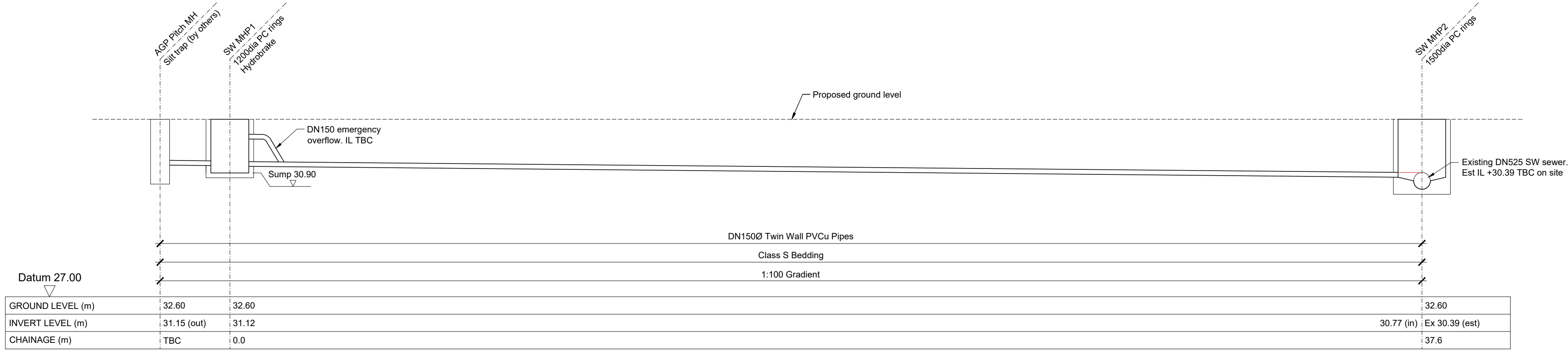


Longitudinal SW Section (Hub SW MH04C to Tank - Part 2)  
Scale 1:100

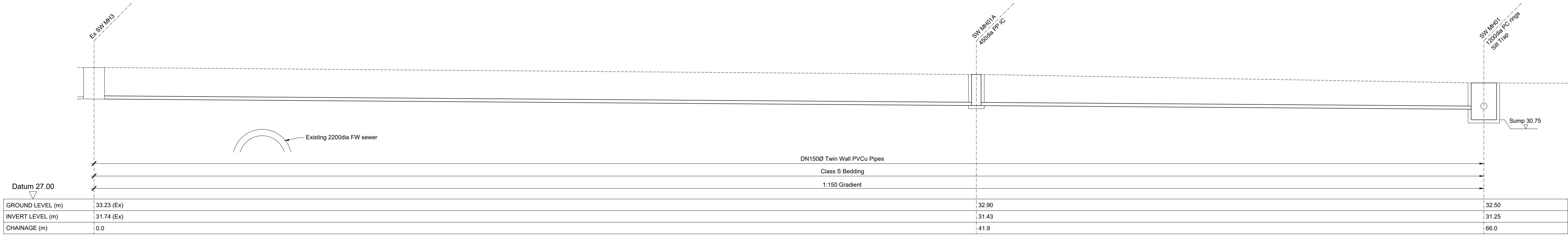


\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RWP's, SVP's & SS's.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

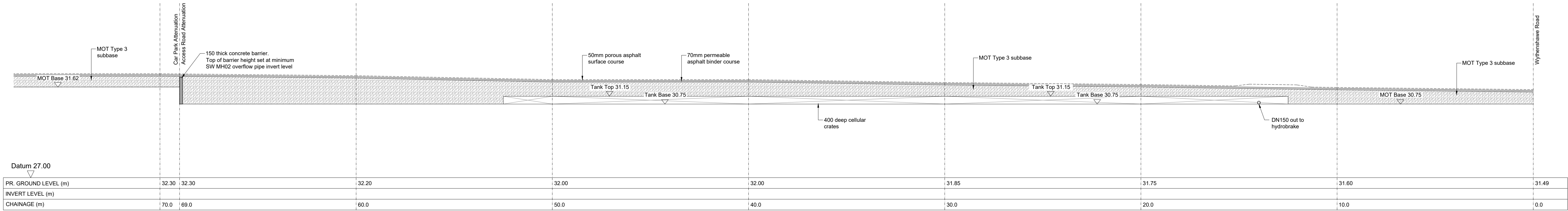
**Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESW18)'.**



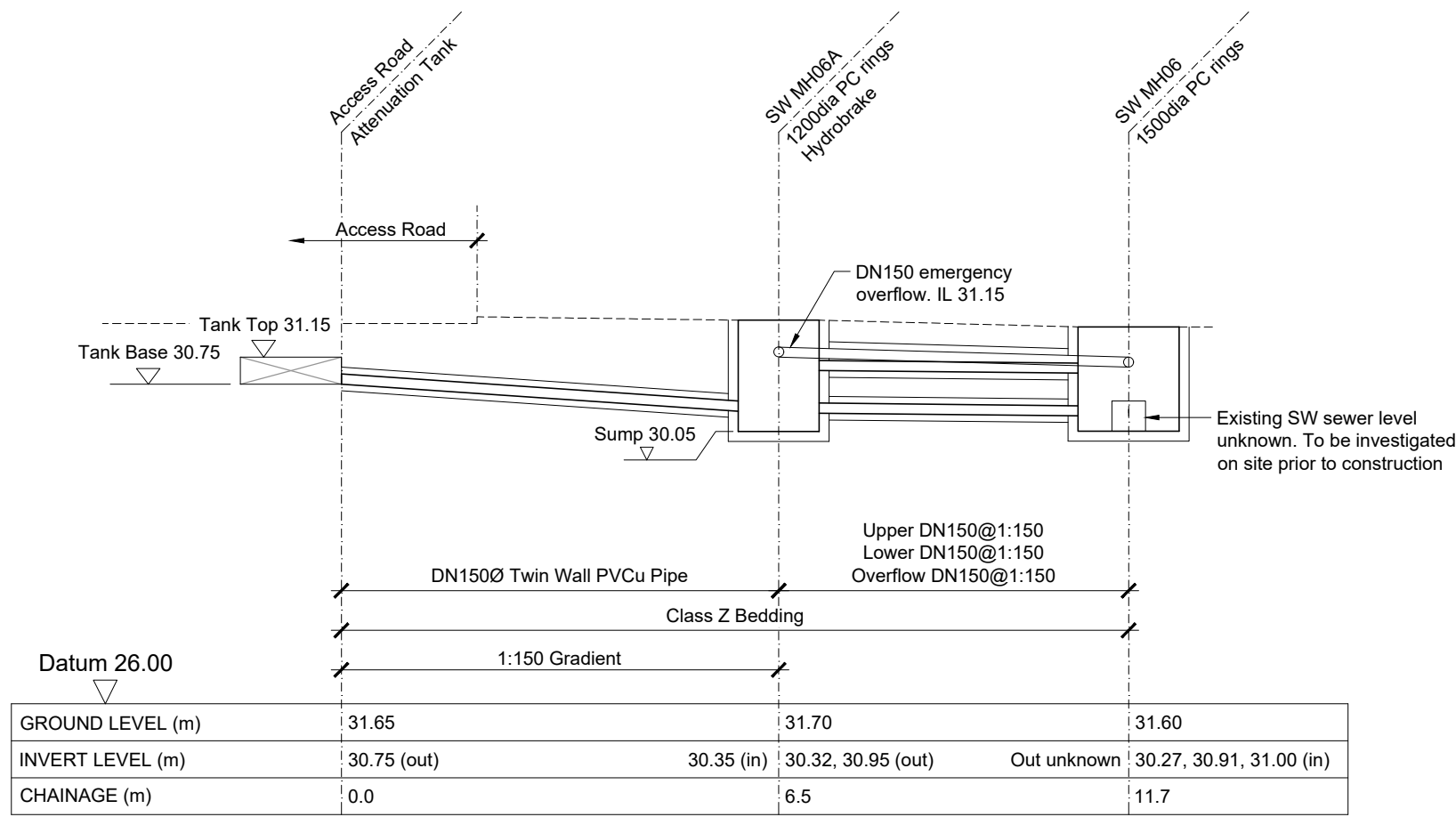
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Scale 1:100



Longitudinal SW Section (Existing SW MH3 to SW MH01)  
Scale 1:100



Longitudinal Section Through Access Road Drainage  
Scale 1:100

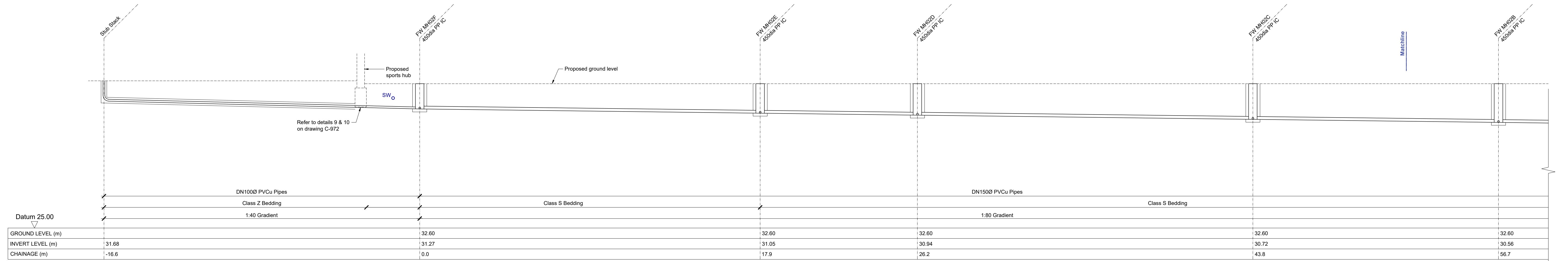


Longitudinal SW Section (Access Road Attenuation to Ex SW Sewer)  
Scale 1:100

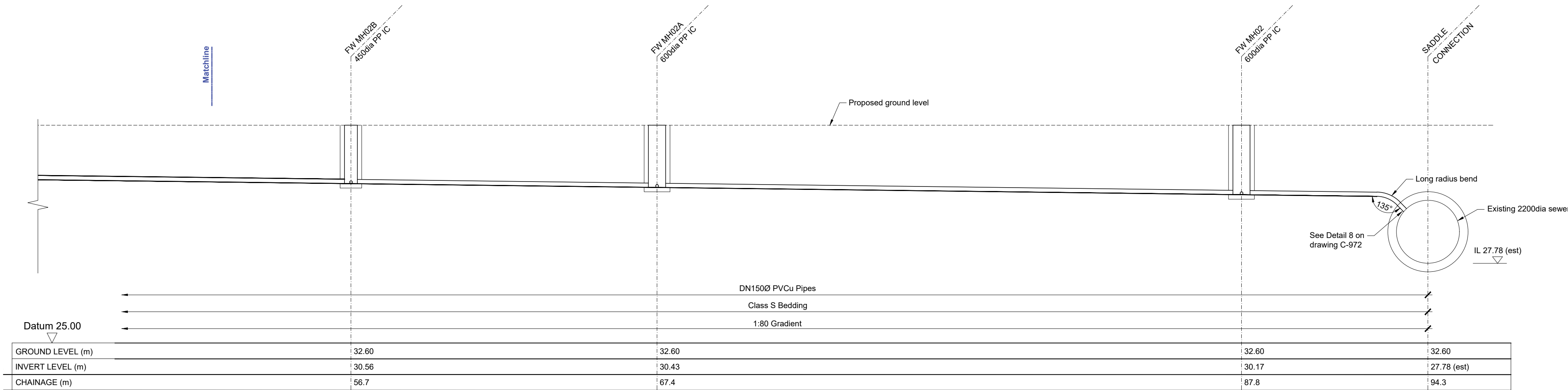
0 5m 10m  
Scale 1:100 @ A1

\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RWP's, SVP's & SS's.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESWI8)'.



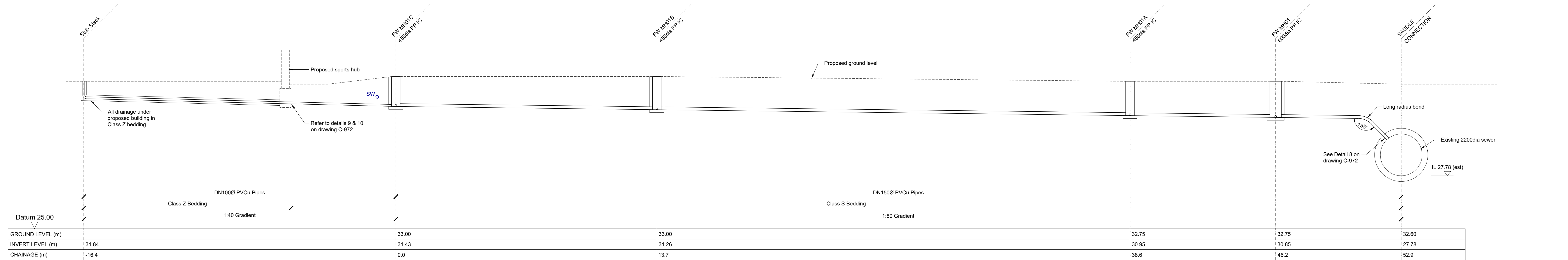
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Scale 1:100



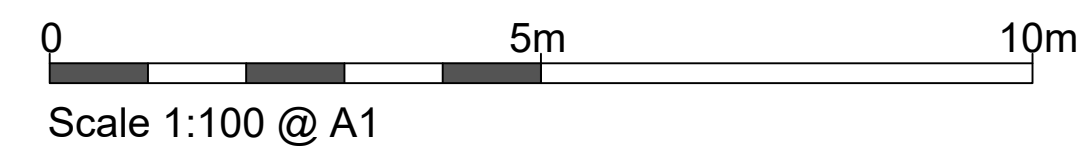
Longitudinal FW Section (Hub FW MH02F to Saddle Connection - Part 2)  
Scale 1:100

\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RWP's, SVP's & SS's.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

**Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESW18)'.**



Longitudinal FW Section (Hub FW MH03D to Saddle Connection)  
Scale 1:100



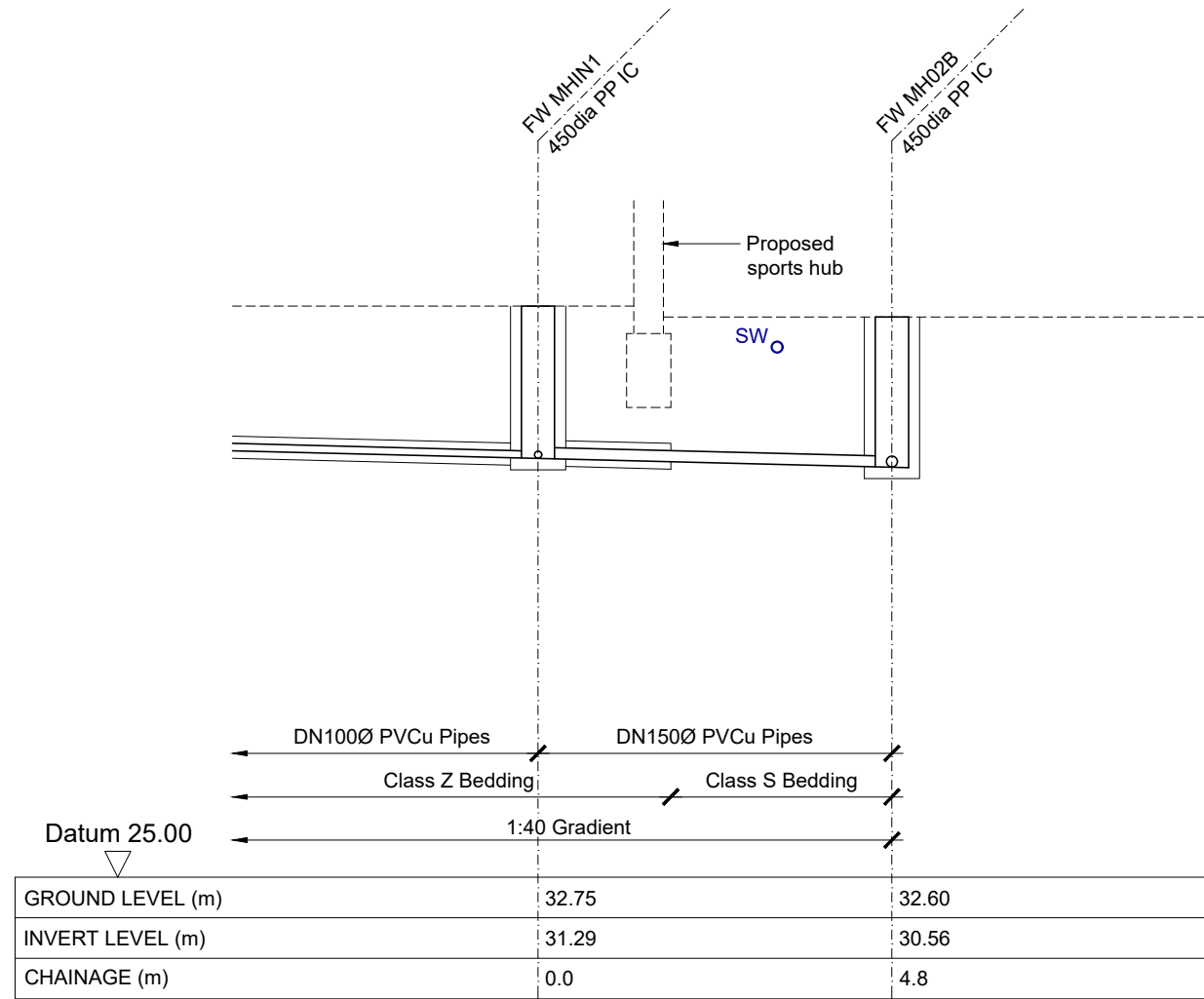
Office 45, Sony UK Technology Centre,  
Pencoed Technology Park, Pencoed, CF35 5HZ  
Tel: 01446 774493  
Email: info@qapm.com

Do not scale from this drawing. Dimensions must be checked on site. All works to comply with current Building Regulations.  
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Dimensions on this drawing are not to be used for construction purposes.

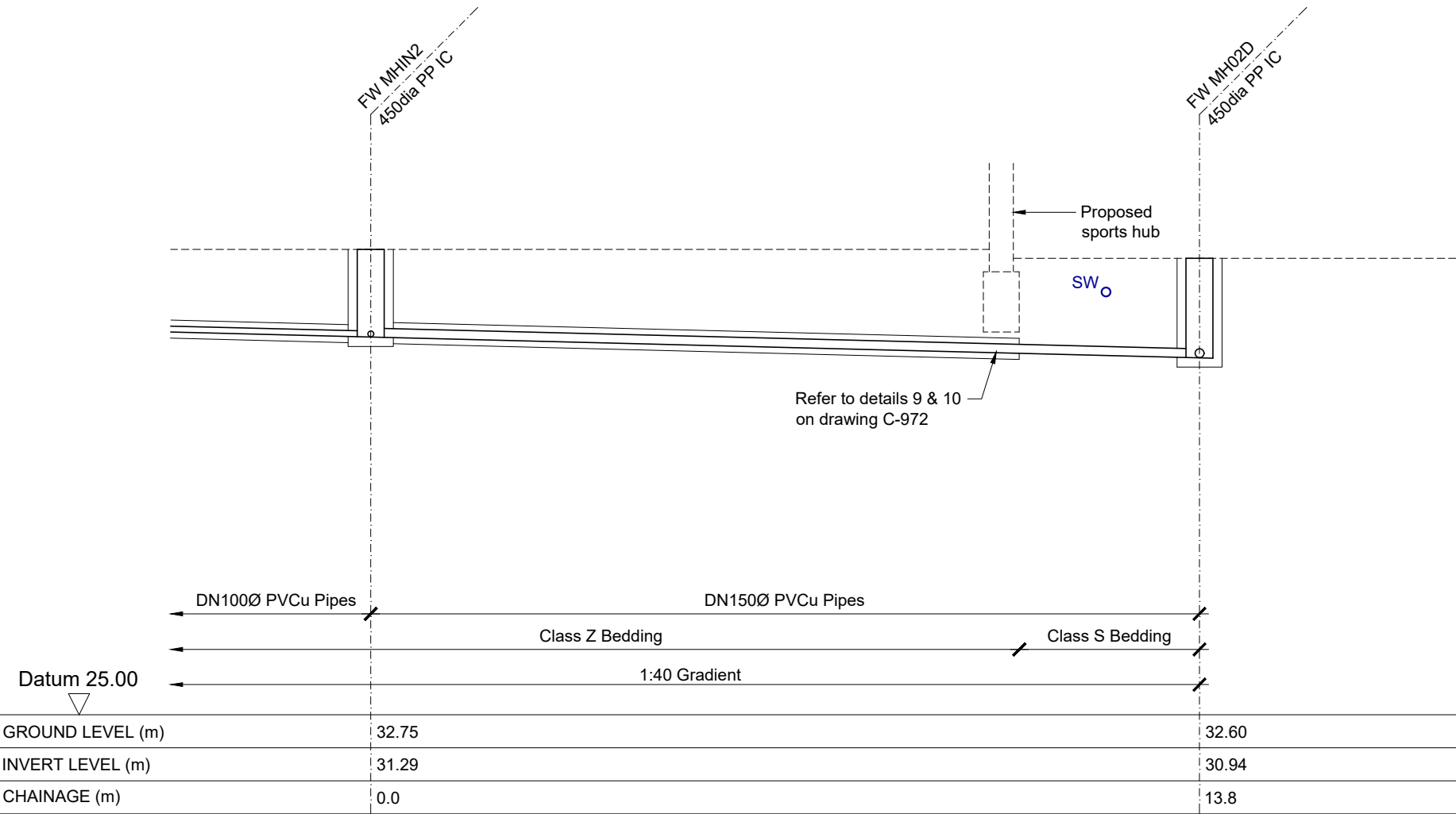
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| T03  | 01/10/2025 | STAGE 4 UPDATES    |
| T02  | 22/09/2025 | STAGE 4 UPDATES    |
| T01  | 08/09/2025 | ISSUED FOR STAGE 4 |
| Rev. | Date       | Description        |

|         |                                                             |
|---------|-------------------------------------------------------------|
| Drawing | DRAINAGE LONG SECTIONS - FOUL WATER SHEET 1                 |
| Project | WYTHENSHAW SPORTS HUB, WYTHENSHAW ROAD, MANCHESTER, M23 0BD |

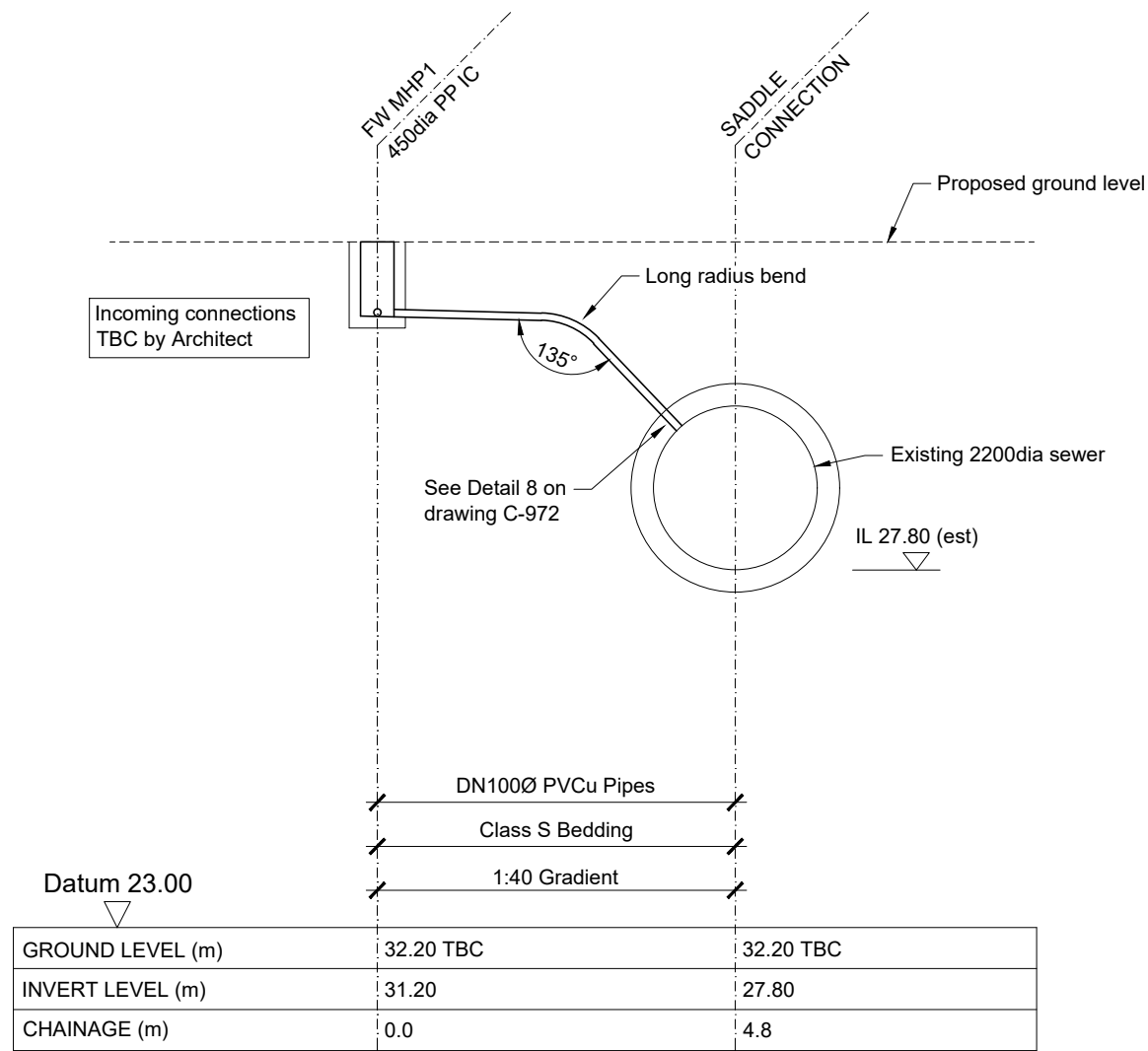
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| Scale       | 1:100@A1  | Drawn by    | MB           | Status | STAGE 4 |
| Date        | MAY 2025  | Chkd by     | PCH          |        |         |



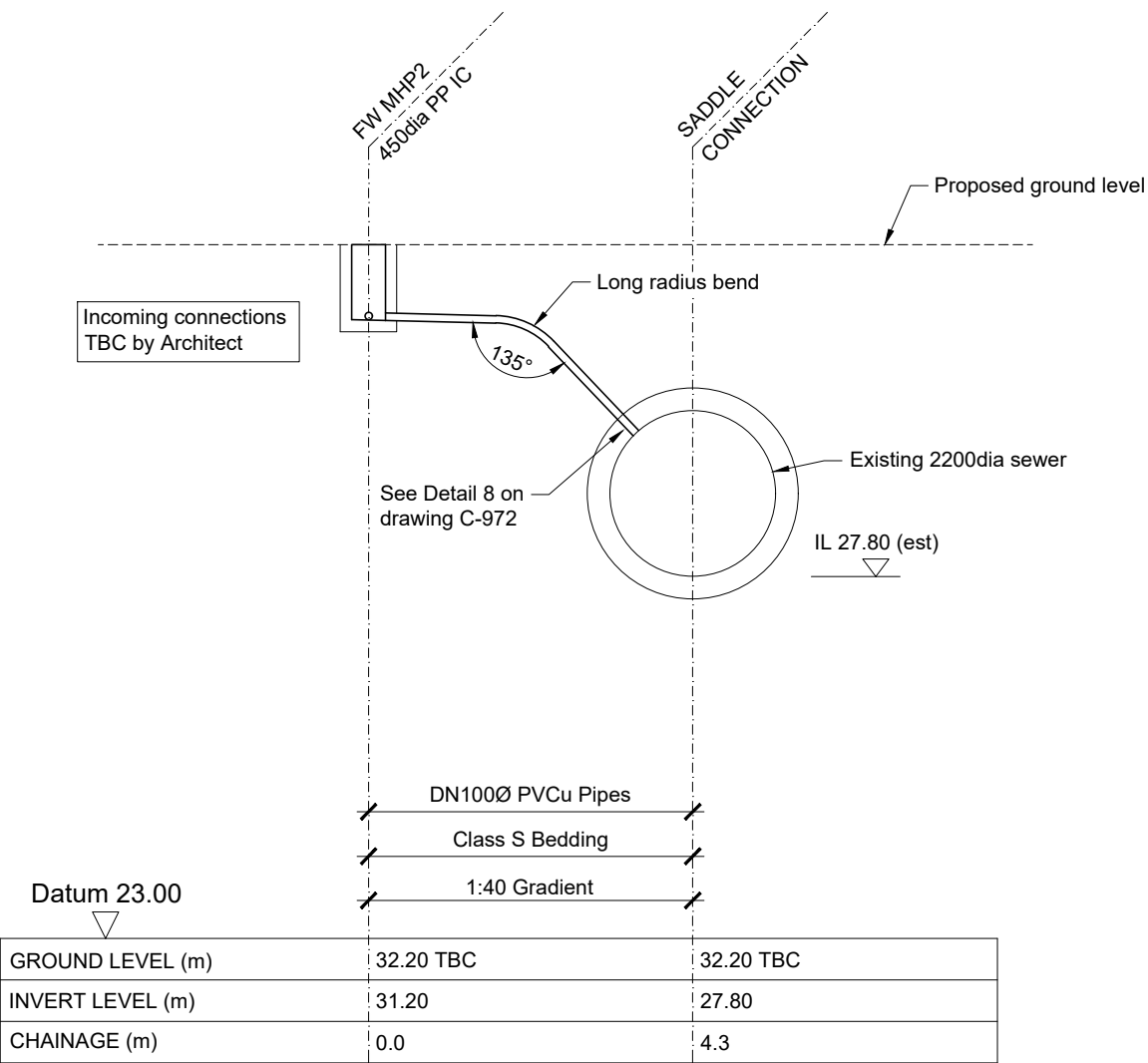
Longitudinal FW Section (FW MHIN1 to FW MH02B)  
Scale 1:100



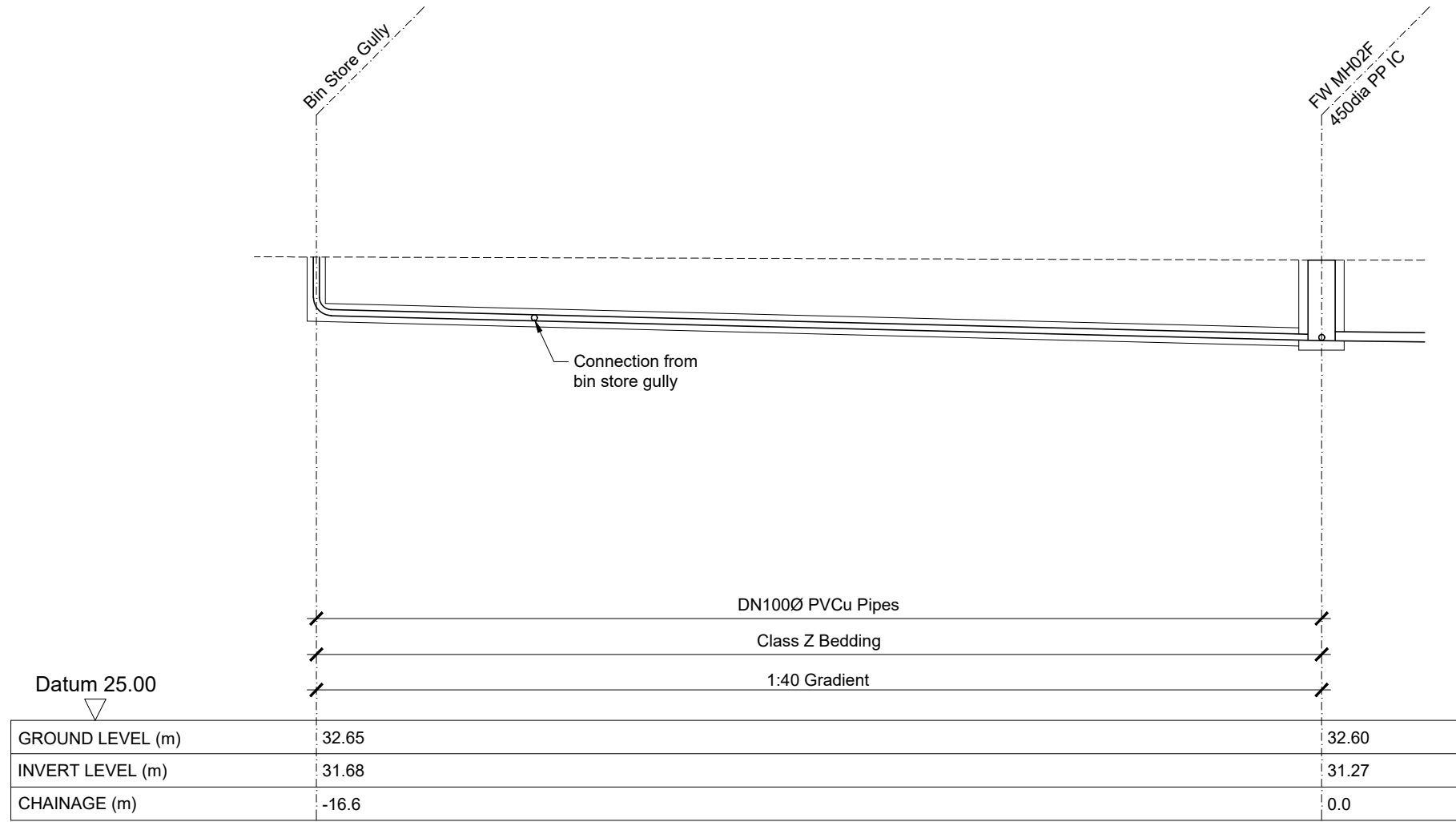
Longitudinal FW Section (FW MHIN2 to FW MH02D)  
Scale 1:100



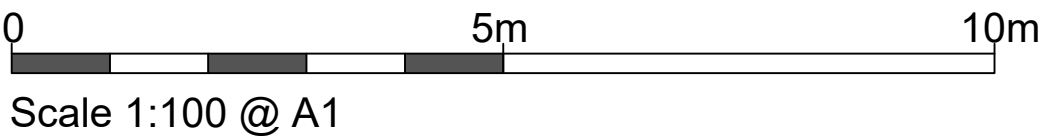
Longitudinal FW Section (FW Pitches MHP1 to New Saddle Connection)  
Scale 1:100



Longitudinal FW Section (FW Pitches MHP2 to New Saddle Connection)  
Scale 1:100



Longitudinal FW Section (Hub FW MH02F to Bin Store Gullys)  
Scale 1:100



\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RWP's, SVP's & SS's.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

**Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESWI8)'.**

Surface Water Manhole Schedule

| MANHOLE REF. NO. | MANHOLE TYPE                                          | SHAPE MIN.                            | COVER & FRAME                                | LOCATION   | FUTURE COVER LEVEL (AOD) | INVERT LEVEL (AOD)                                                                                                                      | PIPE SIZE                                          | SKETCH PLAN |
|------------------|-------------------------------------------------------|---------------------------------------|----------------------------------------------|------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------|
| SW MH01          | Detail 1<br>(see drawing C-971)                       | 1200Ø PC rings with catchpit          | Class C250 Ductile Iron 600x600              | E =<br>N = | *+32.50m                 | 1 = +31.25m (out)<br>2 = +31.30m (in)<br>3 = +31.30m (in)<br>4 = +31.73m (in)<br>5 = +31.35m (in)<br>+30.75m (sump)                     | DN375<br>DN150<br>DN150<br>DN225<br>DN300          |             |
| SW MH01A         | Detail 2<br>(see drawing C-972)                       | 450Ø Circular - Plastic               | Class D400 Ductile Iron Reducing ring        | E =<br>N = | *+32.90m                 | 1 = +31.43m (out)<br>2 = +31.43m (in)                                                                                                   | DN100<br>DN100                                     |             |
| SW MH02          | Detail 2<br>(see drawing C-971)<br>Hydrobrake         | 1500Ø PC rings with catchpit          | Class C250 Ductile Iron 600x600 Vented cover | E =<br>N = | *+32.80m                 | 1 = +31.32m (out)<br>2 = +31.75m (out)<br>3 = +31.35m (in)<br>4 = +32.12m (overflow)<br>+31.05m (sump)                                  | DN150<br>DN225<br>DN300<br>DN300                   |             |
| SW MH03          | Detail 5<br>(see drawing C-972)                       | 600Ø Circular - Plastic with catchpit | Class C250 Reducing ring                     | E =<br>N = | *+32.90m                 | 1 = +31.70m (out)<br>2 = +31.70m (in)<br>3 = +31.70m (in)<br>4 = +31.70m (in)<br>+31.10m (sump)                                         | DN150<br>DN100<br>DN100<br>DN100                   |             |
| SW MH03A         | Detail 2<br>(see drawing C-972)                       | 450Ø Circular - Plastic               | Class C250                                   | E =<br>N = | *+33.00m                 | 1 = +31.75m (out)<br>2 = +31.75m (in)<br>3 = +31.75m (in)<br>4 = +31.75m (in)                                                           | DN150<br>DN100<br>DN100<br>DN100                   |             |
| SW MH03B         | Detail 1<br>(see drawing C-972)                       | 300Ø Circular - Plastic               | Class C250                                   | E =<br>N = | *+32.70m                 | 1 = +31.90m (out)<br>2 = +31.90m (in)<br>3 = +31.90m (in)                                                                               | DN150<br>DN150<br>DN100                            |             |
| SW MH03C         | Detail 1<br>(see drawing C-972)                       | 300Ø Circular - Plastic               | Class C250                                   | E =<br>N = | *+32.70m                 | 1 = +32.00m (out)<br>2 = +32.00m (in)<br>3 = +32.00m (in)                                                                               | DN150<br>DN150<br>DN100                            |             |
| SW MH03D         | Detail 5<br>(see drawing C-972)                       | 600Ø Circular - Plastic with catchpit | Class C250 Reducing ring                     | E =<br>N = | *+32.75m                 | 1 = +32.12m (out)<br>2 = +32.12m (in)<br>3 = +32.12m (in)<br>4 = +32.12m (in)<br>5 = +32.12m (in)<br>6 = +32.12m (in)<br>+31.52m (sump) | DN150<br>DN100<br>DN100<br>DN100<br>DN100<br>DN100 |             |
| SW MH04          | Detail 5<br>(see drawing C-972)                       | 600Ø Circular - Plastic with catchpit | Class D400 Ductile Iron Reducing ring        | E =<br>N = | *+32.60m                 | 1 = +31.77m (out)<br>2 = +31.77m (in)<br>3 = +31.77m (in)<br>+31.17m (sump)                                                             | DN150<br>DN150<br>DN100                            |             |
| SW MH04A         | Detail 1<br>(see drawing C-972)                       | 450Ø Circular - Plastic               | Class C250                                   | E =<br>N = | *+32.60m                 | 1 = +31.96m (out)<br>2 = +31.96m (in)<br>3 = +31.96m (in)                                                                               | DN150<br>DN100<br>DN150                            |             |
| SW MH04B         | Detail 1<br>(see drawing C-972)                       | 450Ø Circular - Plastic               | Class C250                                   | E =<br>N = | *+32.60m                 | 1 = +32.09m (out)<br>2 = +32.09m (in)<br>3 = +32.09m (in)                                                                               | DN150<br>DN100<br>DN100                            |             |
| SW MH04C         | Detail 1<br>(see drawing C-972)                       | 450Ø Circular - Plastic               | Class C250                                   | E =<br>N = | *+32.60m                 | 1 = +32.26m (out)<br>2 = +32.26m (in)                                                                                                   | DN100<br>DN100                                     |             |
| SW MH05          | Detail 5<br>(see drawing C-972)                       | 600Ø Circular - Plastic with catchpit | Class B125 Reducing ring                     | E =<br>N = | *+33.35m                 | 1 = +31.80m (out)<br>2 = +31.80m (in)                                                                                                   | DN100<br>DN100                                     |             |
| SW MH06          | Detail 3<br>(see drawing C-971)                       | 1500Ø PC rings                        | Class C250 Ductile Iron 600x600              | E =<br>N = | *+31.60m                 | 1 = +30.20m (out) TBC<br>2 = +30.20m (in) TBC<br>3 = +31.00m (in)<br>4 = +30.91m (in)<br>5 = +30.27m (in)<br><b>All levels TBC</b>      | 450x500<br>450x500<br>DN150<br>DN150<br>DN150      |             |
| SW MH06A         | Detail 4<br>(see drawing C-971)<br>Hydrobrake         | 1200Ø PC rings with catchpit          | Class C250 Ductile Iron 600x600 Vented cover | E =<br>N = | *+31.70m                 | 1 = +30.32m (out)<br>2 = +30.95m (out)<br>3 = +31.15m (overflow)<br>4 = +30.35m (in)<br>+30.05 (sump)<br><b>All levels TBC</b>          | DN150<br>DN150<br>DN150<br>DN150                   |             |
| SW MHP1          | Detail 2 similar<br>(see drawing C-971)<br>Hydrobrake | 1200Ø PC rings with catchpit          | Class C250 Ductile Iron 600x600              | E =<br>N = | *+32.60m                 | 1 = +31.10m (out)<br>2 = +31.12m (in)<br>+30.90m (sump)                                                                                 | DN150<br>DN150                                     |             |
| SW MHP2          | Detail 4 similar<br>(see drawing C-971)               | 1500Ø PC rings with catchpit          | Class C250 Ductile Iron 600x600              | E =<br>N = | *+32.60m                 | 1 = +30.77m ex (out)<br>2 = +30.77m ex (in)<br>3 = +30.77m (in)                                                                         | DN525<br>DN525<br>DN150                            |             |
| SW MHP3          | Detail 5<br>(see drawing C-972)                       | 600Ø Circular - Plastic with catchpit | Class C250                                   | E =<br>N = | *+32.00m                 | 1 = +TBC (out)<br>2 = +TBC (in)                                                                                                         | DN100<br>DN80                                      |             |

\* All cover levels are approximate - refer to Architect/Landscape drawings.

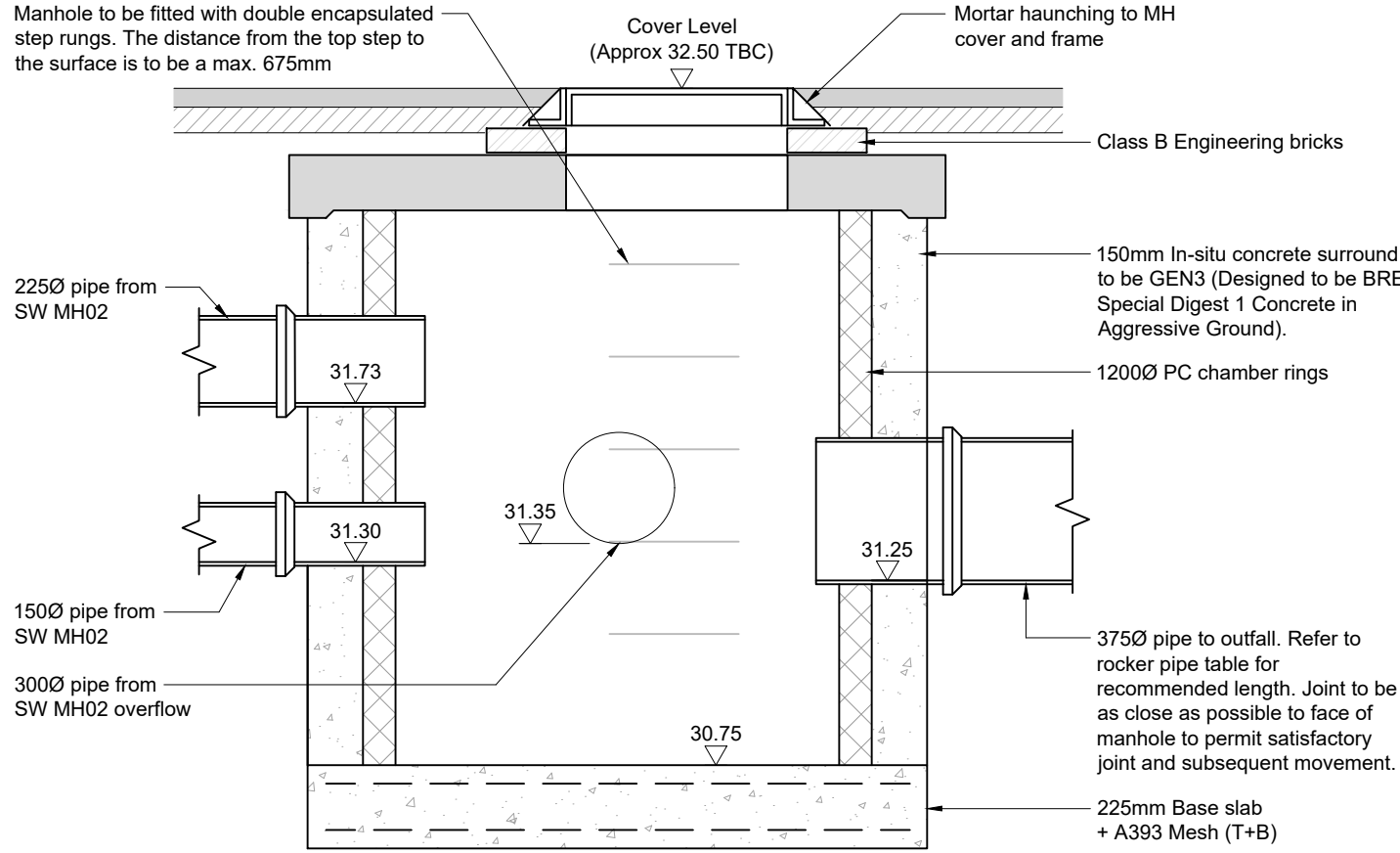
Foul Water Manhole Schedule

| MANHOLE REF. NO. | MANHOLE TYPE                    | SHAPE MIN.              | COVER & FRAME                   | LOCATION   | FUTURE COVER LEVEL (AOD) | INVERT LEVEL (AOD)                                                                                                    | PIPE SIZE                                          | SKETCH PLAN |
|------------------|---------------------------------|-------------------------|---------------------------------|------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------|
| FW MH01          | Detail 2<br>(see drawing C-972) | 600Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+32.75m                 | 1 = +30.85m (out)<br>2 = +30.85m (in)<br>3 = +30.85m (in)<br>4 = +30.85m (in)                                         | DN150<br>DN100<br>DN100<br>DN150                   |             |
| FW MH01A         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+32.75m                 | 1 = +30.95m (out)<br>2 = +30.95m (in)<br>3 = +30.95m (in)<br>4 = +30.95m (in)                                         | DN150<br>DN100<br>DN100<br>DN150                   |             |
| FW MH01B         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+33.00m                 | 1 = +31.26m (out)<br>2 = +31.26m (in)<br>3 = +31.26m (in)<br>4 = +31.26m (in)                                         | DN150<br>DN100<br>DN100<br>DN150                   |             |
| FW MH01C         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Class B125 Reducing ring        | E =<br>N = | *+33.00m                 | 1 = +31.43m (out)<br>2 = +31.43m (in)<br>3 = +31.43m (in)                                                             | DN150<br>DN100<br>DN100                            |             |
| FW MH02          | Detail 2<br>(see drawing C-972) | 600Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+32.60m                 | 1 = +30.17m (out)<br>2 = +30.17m (in)<br>3 = +30.17m (in)<br>4 = +30.17m (in)                                         | DN150<br>DN150<br>DN100<br>DN100                   |             |
| FW MH02A         | Detail 2<br>(see drawing C-972) | 600Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+32.60m                 | 1 = +30.43m (out)<br>2 = +30.43m (in)<br>3 = +30.43m (in)<br>4 = +30.43m (in)                                         | DN150<br>DN150<br>DN100<br>DN100                   |             |
| FW MH02B         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+32.60m                 | 1 = +30.56m (out)<br>2 = +30.56m (in)<br>3 = +30.56m (in)<br>4 = +30.56m (in)                                         | DN150<br>DN150<br>DN100<br>DN100                   |             |
| FW MH02C         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+32.60m                 | 1 = +30.72m (out)<br>2 = +30.72m (in)<br>3 = +30.72m (in)<br>4 = +30.72m (in)                                         | DN150<br>DN150<br>DN100<br>DN100                   |             |
| FW MH02D         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+32.60m                 | 1 = +30.94m (out)<br>2 = +30.94m (in)<br>3 = +30.94m (in)<br>4 = +30.94m (in)                                         | DN150<br>DN150<br>DN150<br>DN100                   |             |
| FW MH02E         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+32.60m                 | 1 = +31.05m (out)<br>2 = +31.05m (in)<br>3 = +31.05m (in)<br>4 = +31.05m (in)                                         | DN150<br>DN100<br>DN100<br>DN100                   |             |
| FW MH02F         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Class C250 Reducing ring        | E =<br>N = | *+32.60m                 | 1 = +31.27m (out)<br>2 = +31.27m (in)<br>3 = +31.27m (in)<br>4 = +31.27m (in)                                         | DN150<br>DN100<br>DN100<br>DN100                   |             |
| FW MHP1          | Detail 1<br>(see drawing C-972) | 450Ø Circular - Plastic | Class C250                      | E =<br>N = | *+32.20m                 | 1 = +31.20m (out)<br>2 = +31.20m (in TBC)                                                                             | DN100<br>DN100                                     |             |
| FW MHP2          | Detail 1<br>(see drawing C-972) | 450Ø Circular - Plastic | Class C250                      | E =<br>N = | *+32.20m                 | 1 = +31.26m (out)<br>2 = +31.26m (in TBC)                                                                             | DN100<br>DN100                                     |             |
| FW MHIN1         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Internal recessed double sealed | E =<br>N = | *+33.00m                 | 1 = +30.68m (out)<br>2 = +30.68m (in)<br>3 = +30.68m (in)<br>4 = +30.68m (in)<br>5 = +30.68m (in)<br>6 = +30.68m (in) | DN150<br>DN100<br>DN100<br>DN100<br>DN100<br>DN100 |             |
| FW MHIN2         | Detail 2<br>(see drawing C-972) | 450Ø Circular - Plastic | Internal recessed double sealed | E =<br>N = | *+33.00m                 | 1 = +31.29m (out)<br>2 = +31.29m (in)<br>3 = +31.29m (in)<br>4 = +31.29m (in)<br>5 = +31.29m (in)<br>6 = +31.29m (in) | DN150<br>DN100<br>DN100<br>DN100<br>DN100<br>DN100 |             |

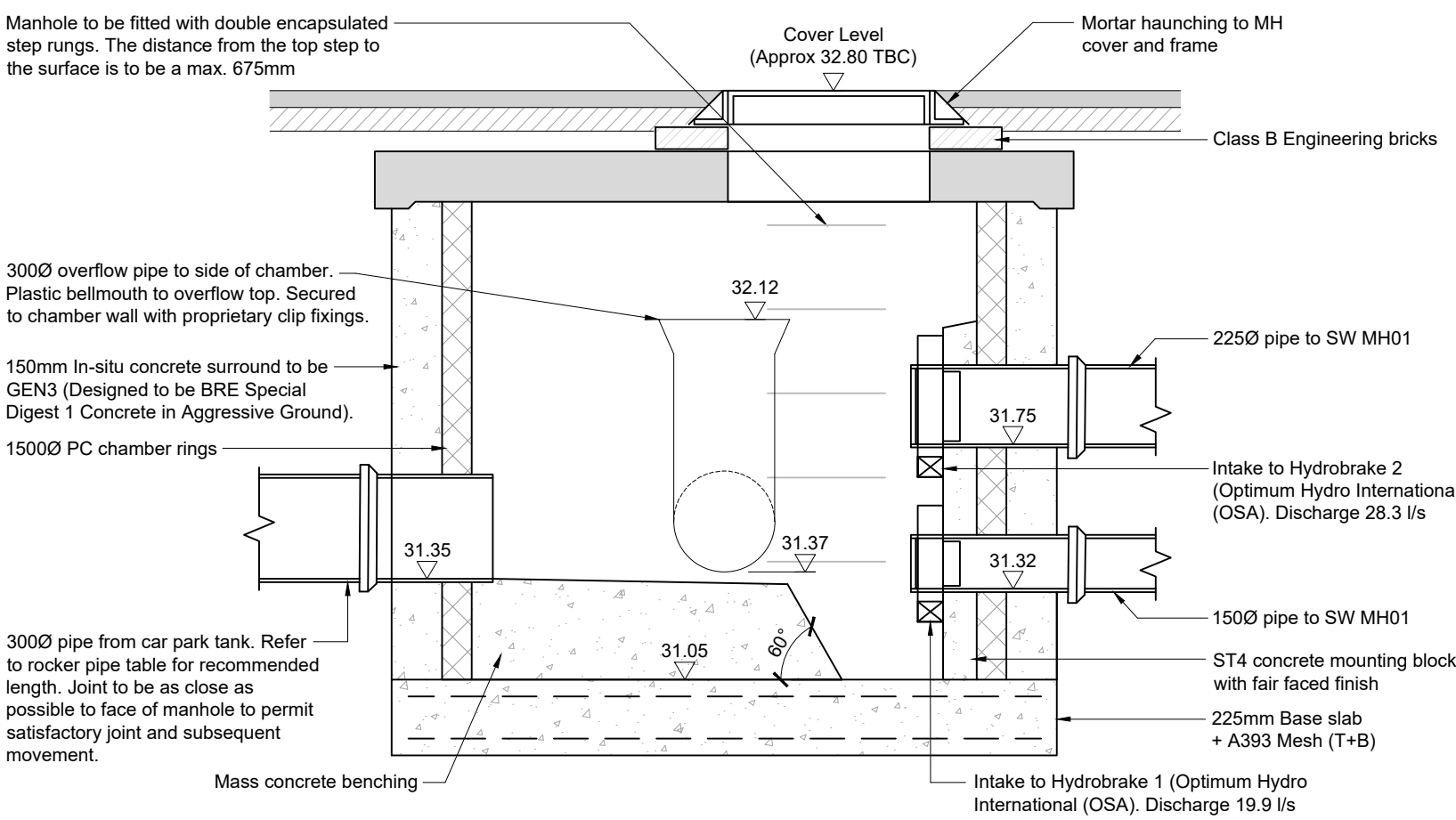
\* All cover levels are approximate - refer to Architect/Landscape drawings.

\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RWP, SVPs & SSs.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

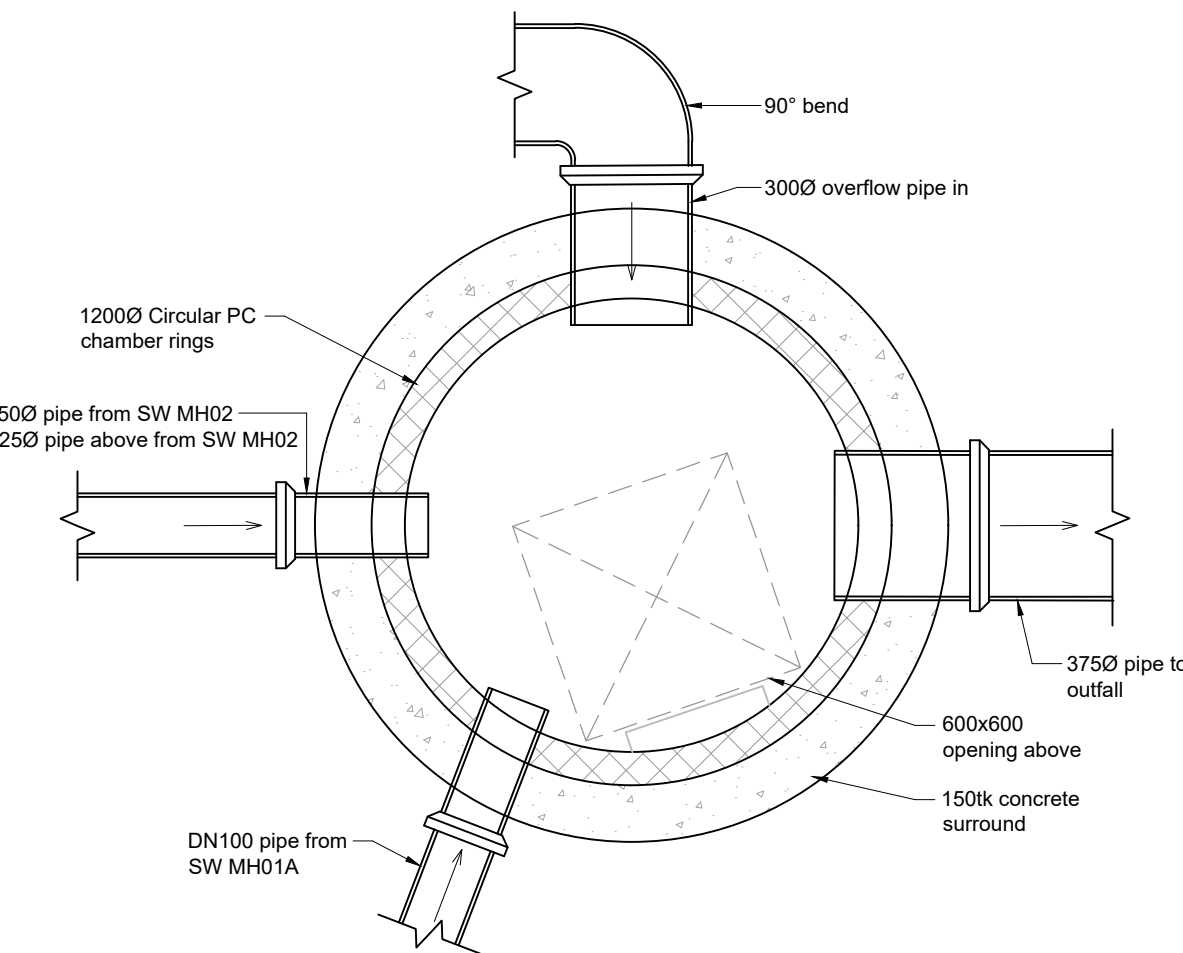
**Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESW18)'.**



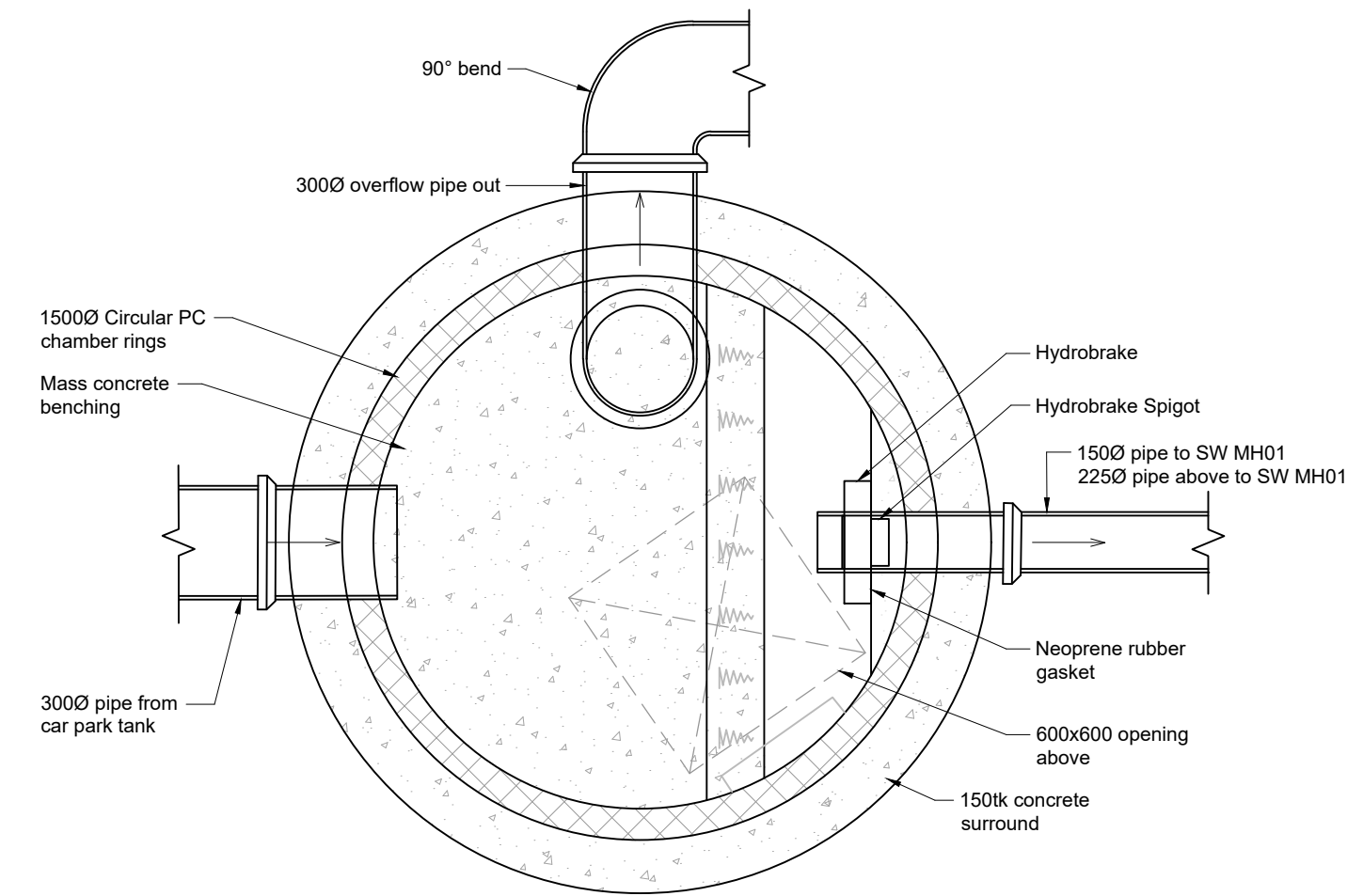
Typical Detail of 1200dia Silt Trap Manhole SW MH01



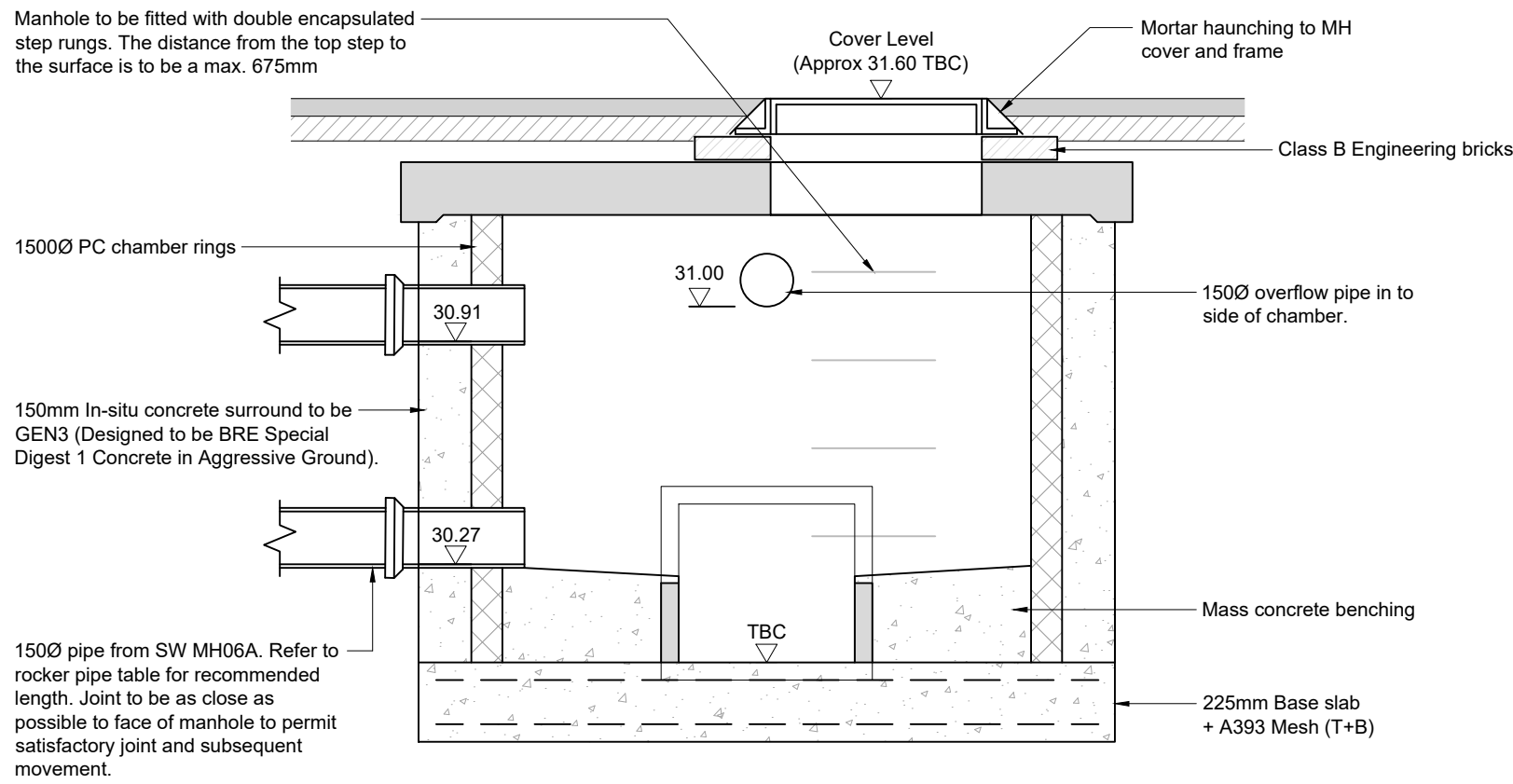
Detail of 1500dia Dual Hydrobrake Manhole SW MH02



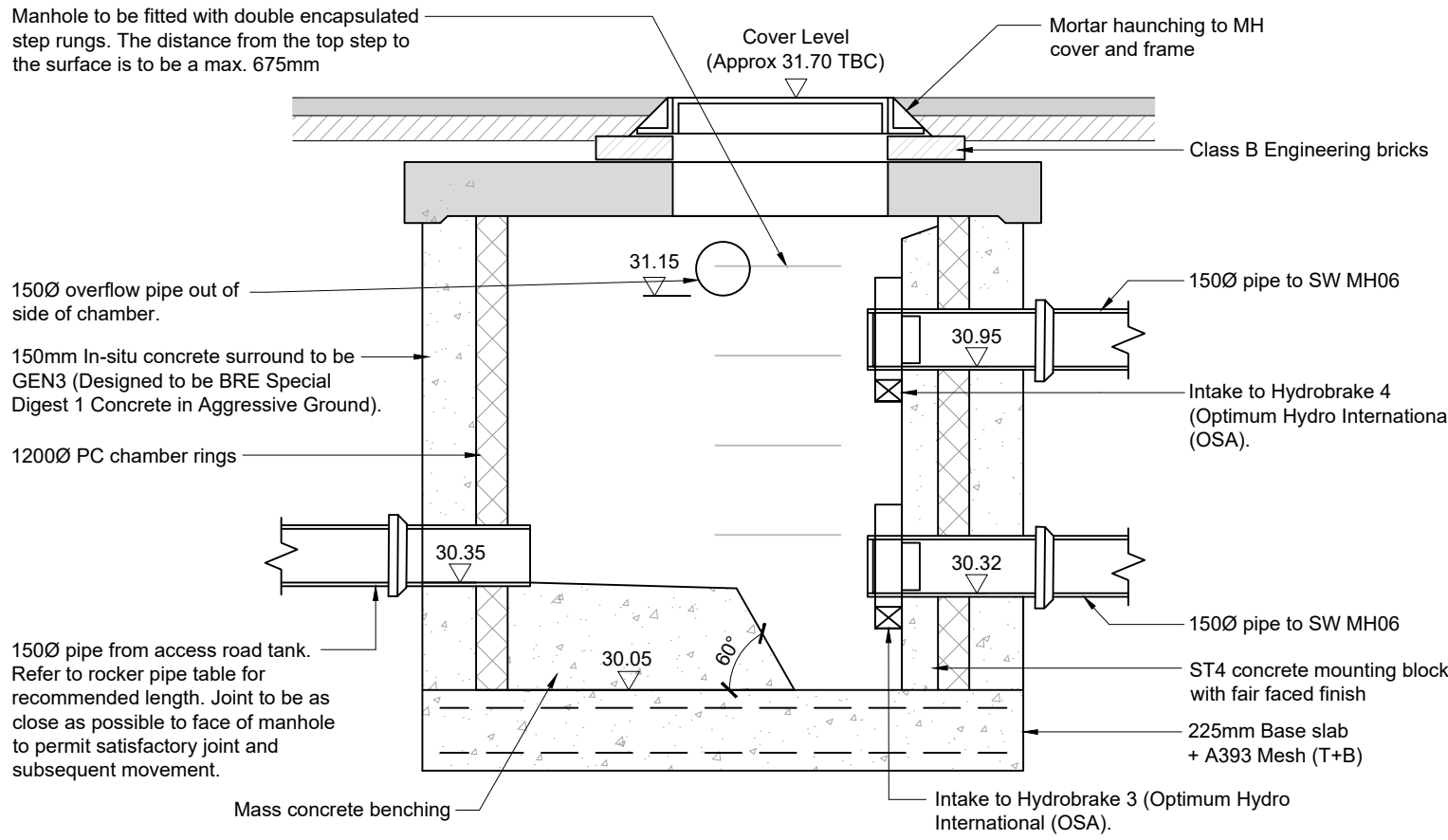
1. Plan of 1200dia Silt Trap Manhole SW MH01



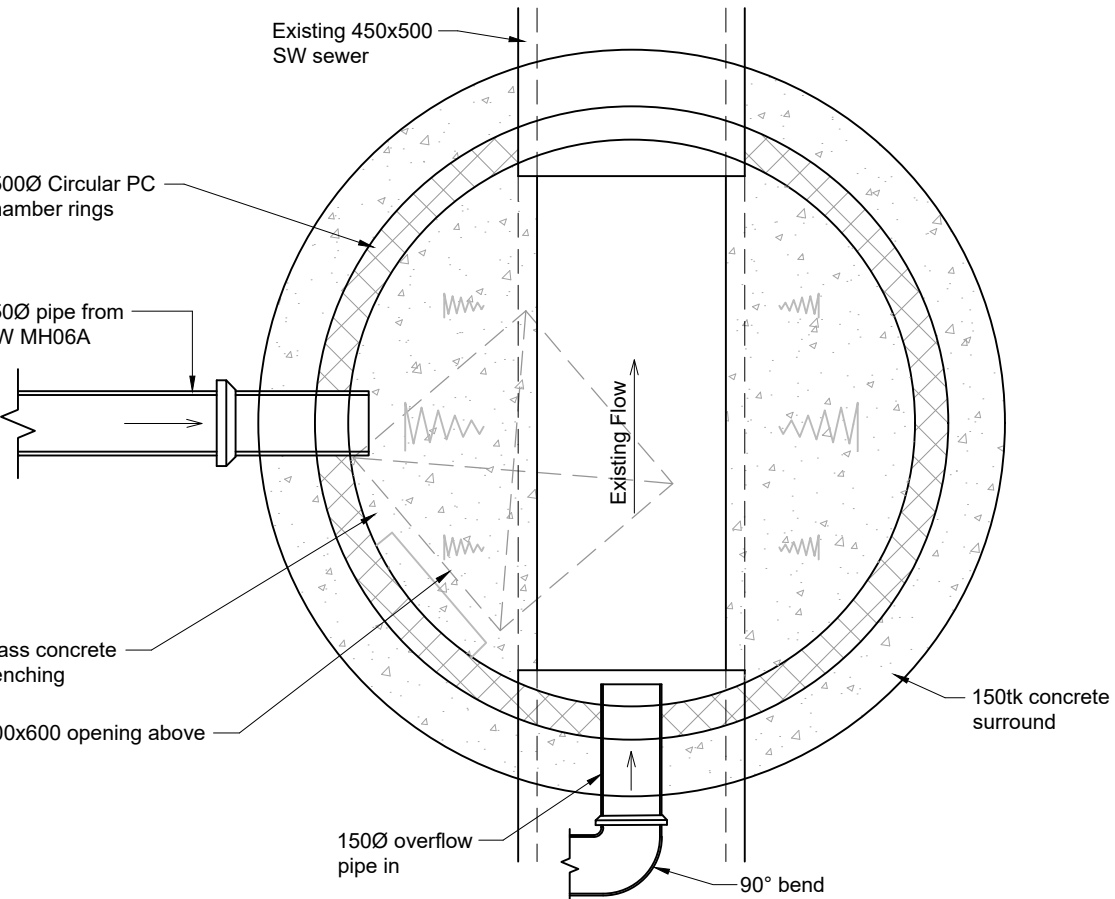
2. Plan of 1500dia Dual Hydrobrake Manhole SW MH02



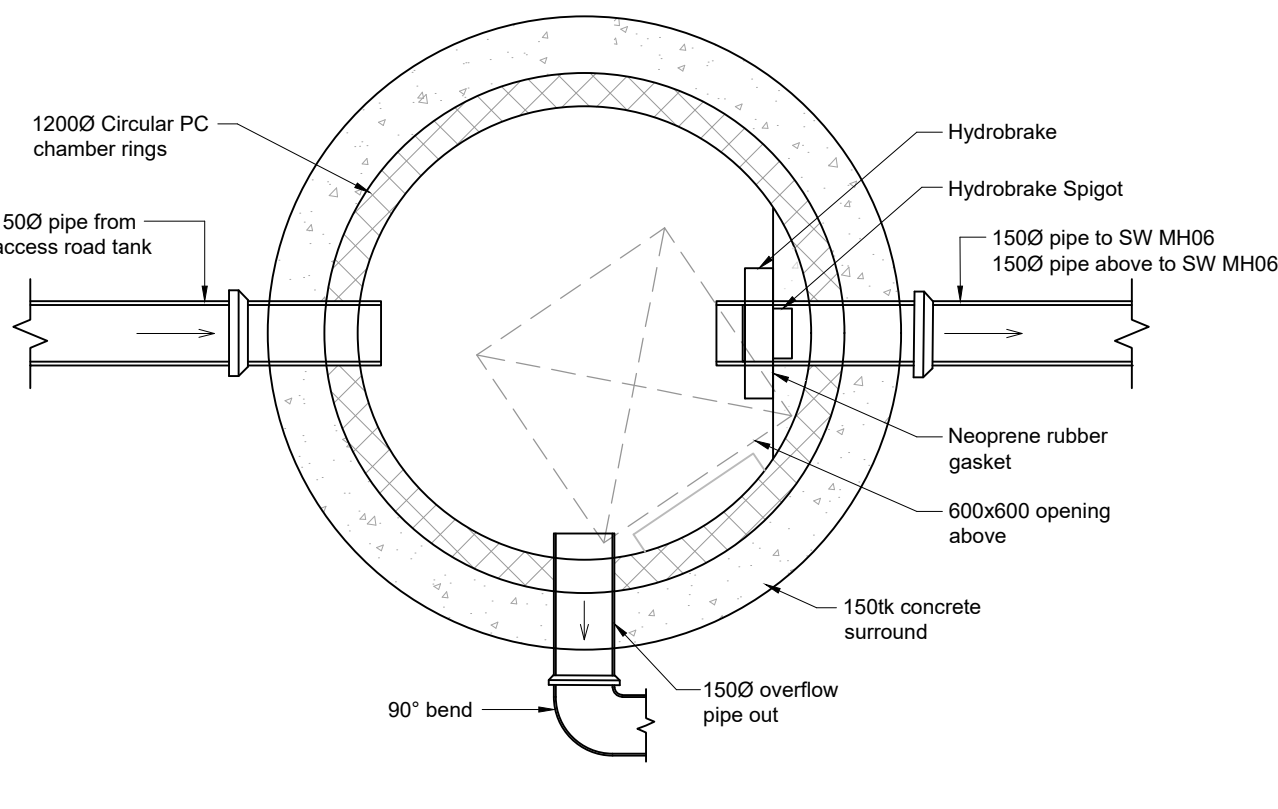
Detail of 1500dia Manhole SW MH06



Detail of 1200dia Dual Hydrobrake Manhole SW MH06A



3. Plan of 1500dia Manhole SW MH06



4. Plan of 1200dia Dual Hydrobrake Manhole SW MH06A

\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RWP, SVPs & SSs.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

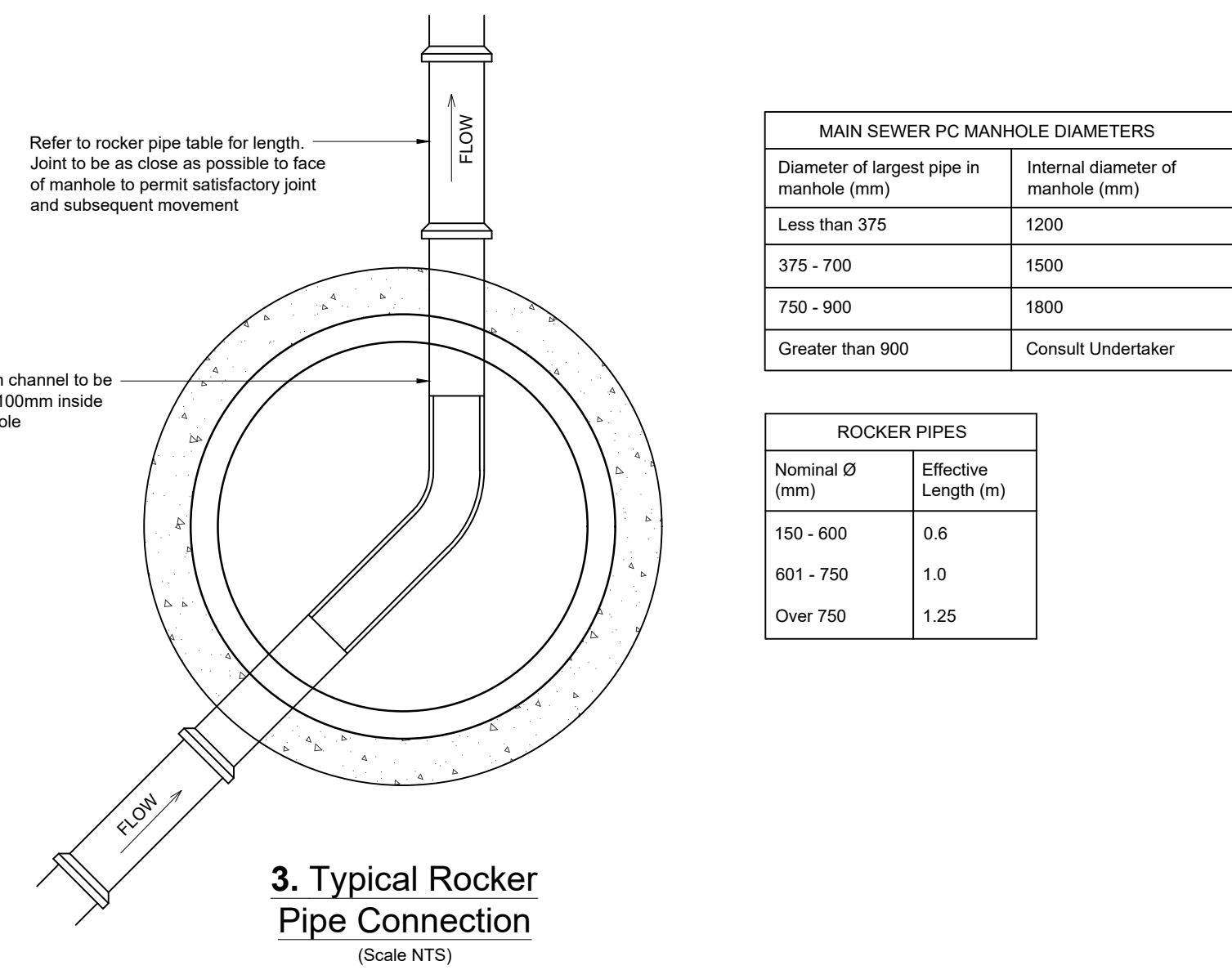
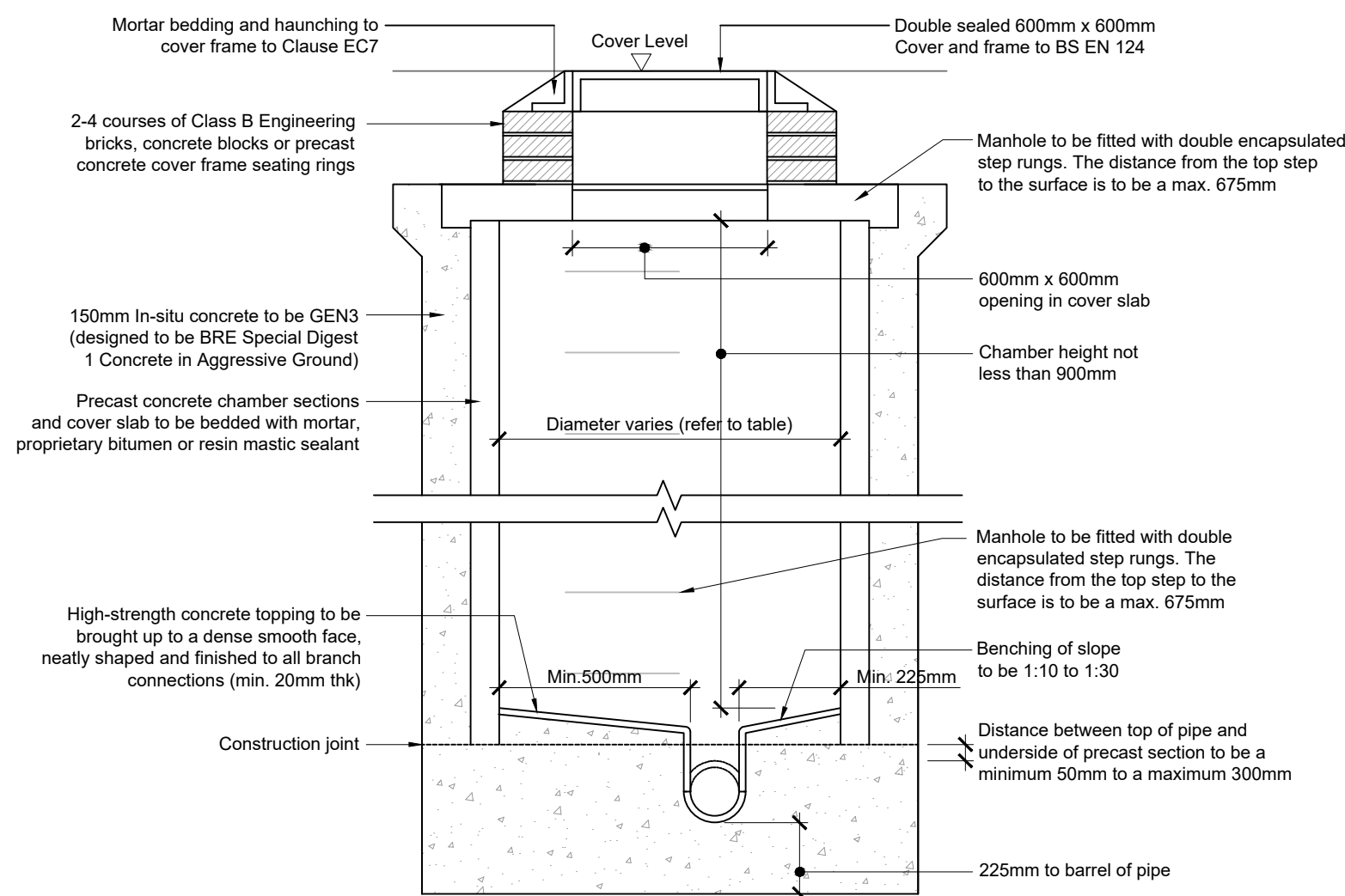
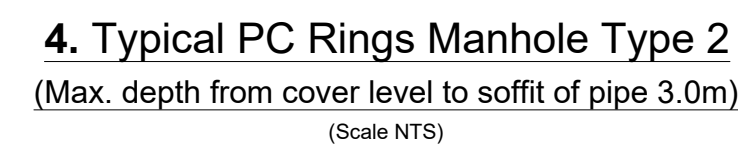
Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESW18)'.

| Rev. | Date       | Description        |
|------|------------|--------------------|
| T03  | 29/10/2025 | STAGE 4 UPDATES    |
| T02  | 01/10/2025 | STAGE 4 UPDATES    |
| T01  | 22/09/2025 | ISSUED FOR STAGE 4 |

Drawing DRAINAGE DETAILS - SHEET 2

Project WYTHENSHAW SPORTS HUB, WYTHEN-SHAW ROAD, MANCHESTER, M23 0BD

| Project No. | PM2419-25 | Drawing No. | QPM-DR-C-971 | Rev.   | T03     |
|-------------|-----------|-------------|--------------|--------|---------|
| Scale       | 1:100@A1  | Drawn by    | MB           | Status | STAGE 4 |
| Date        | MAY 2025  | Chkd by     | PCH          |        |         |

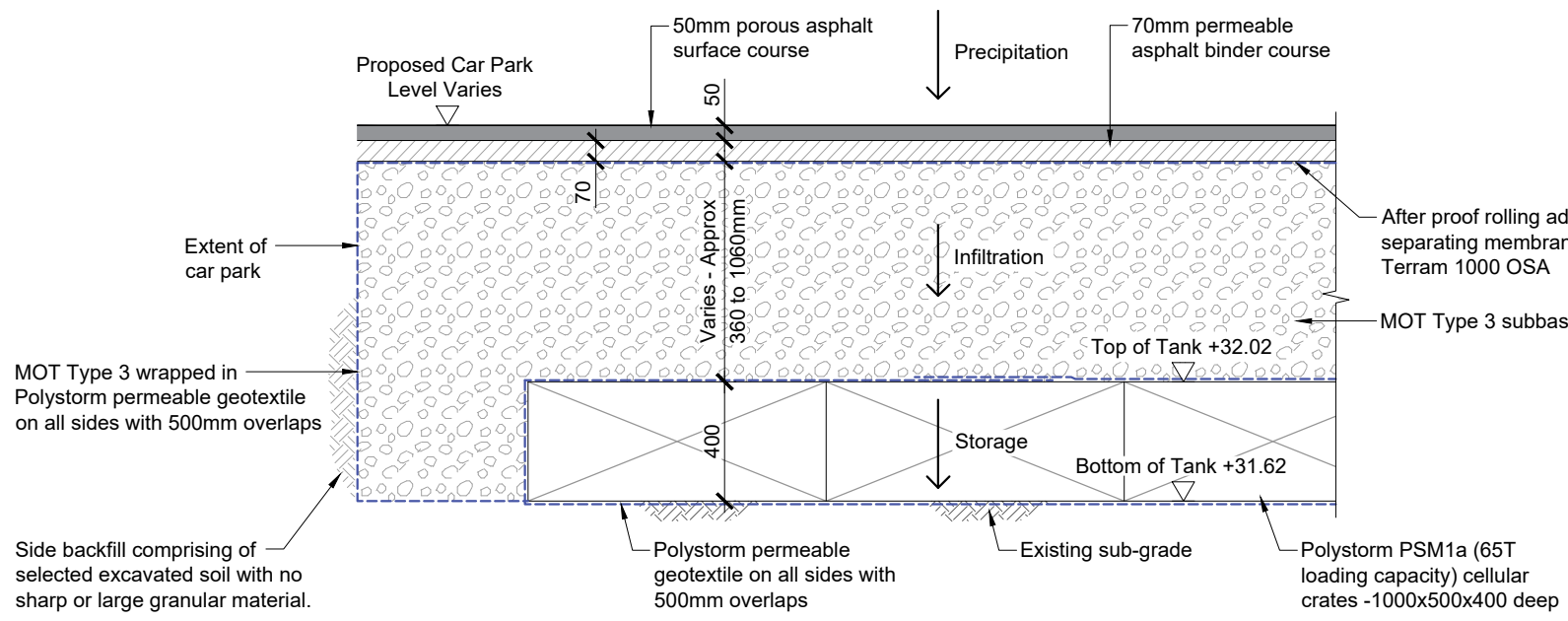


| MAIN SEWER PC MANHOLE DIAMETERS          |                                   |
|------------------------------------------|-----------------------------------|
| Diameter of largest pipe in manhole (mm) | Internal diameter of manhole (mm) |
| Less than 375                            | 1200                              |
| 375 - 700                                | 1500                              |
| 750 - 900                                | 1800                              |
| Greater than 900                         | Consult Undertaker                |

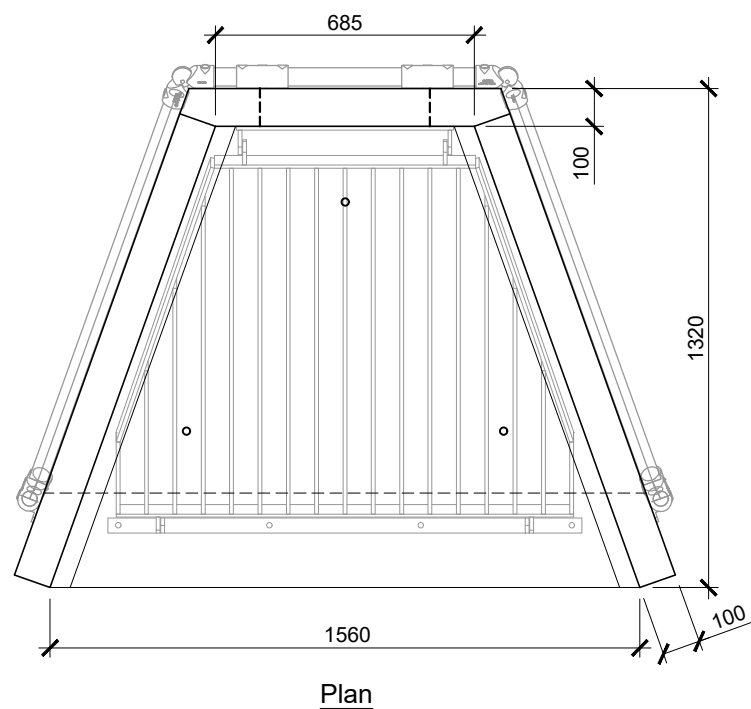
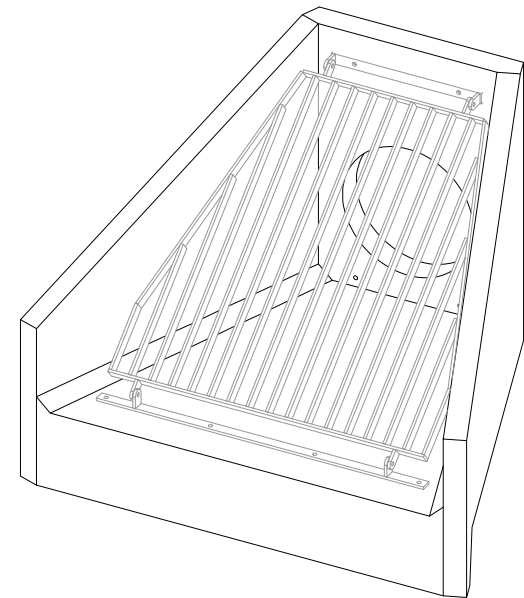
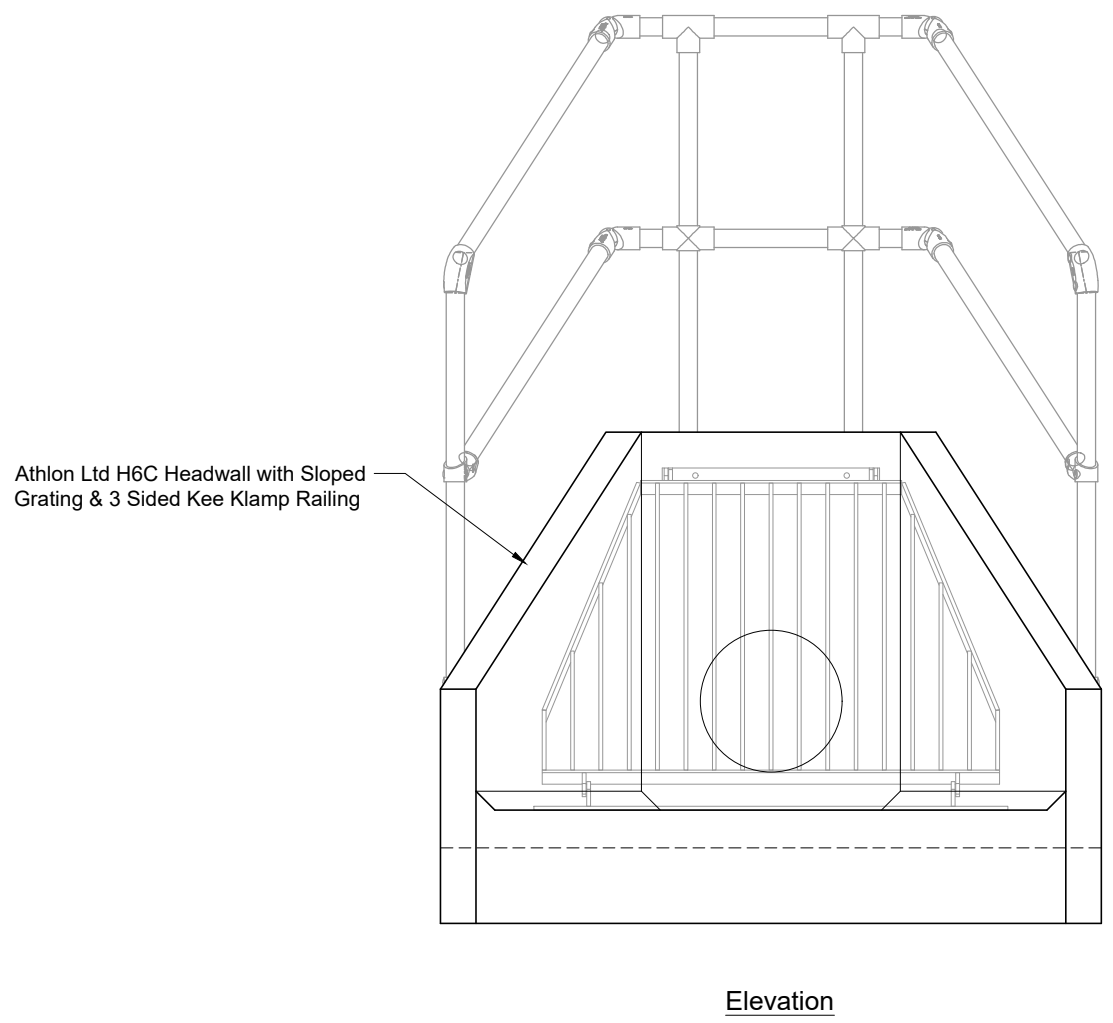
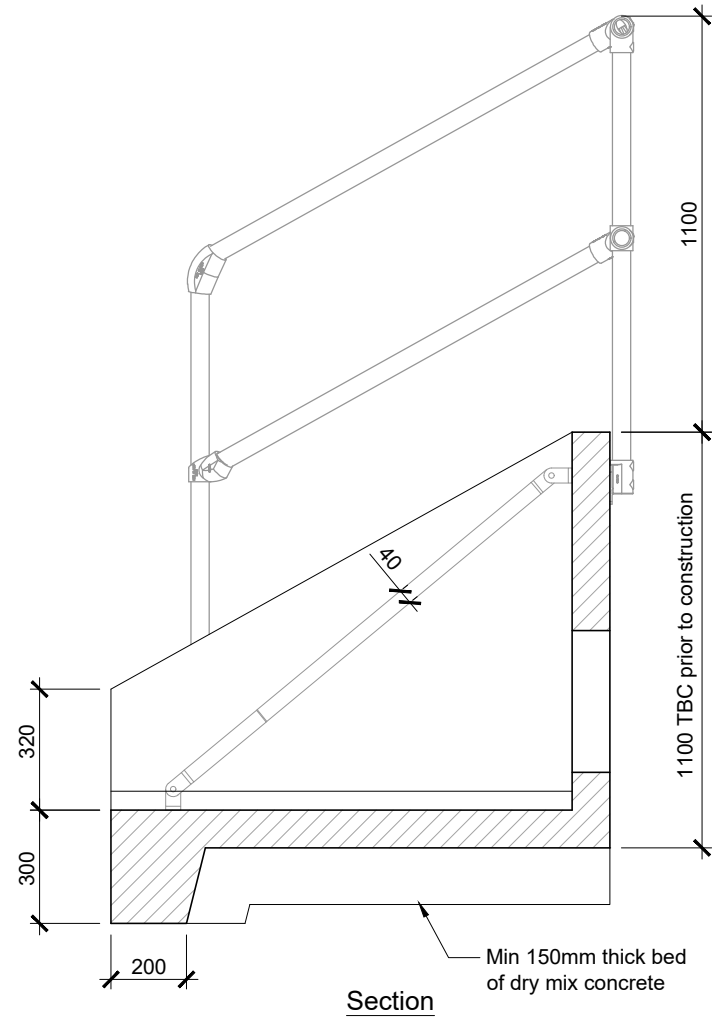
| ROCKER PIPES   |                      |
|----------------|----------------------|
| Nominal Ø (mm) | Effective Length (m) |
| 150 - 600      | 0.6                  |
| 601 - 750      | 1.0                  |
| Over 750       | 1.25                 |

\* All cover levels are approximate - refer to Architects drawings for levels.  
All pipework to Soil & Vent Pipes/Stub Stacks to be DN100 with 1:40 minimum gradient.  
Refer to Architects drawings for setting out of RWP/s, SVP/s & SSs.  
All existing underground utilities to be located prior to works commencing (where in the vicinity of existing services the contractor to use hand digging means only).  
Prior to construction all existing invert levels and proposed levels to be verified.

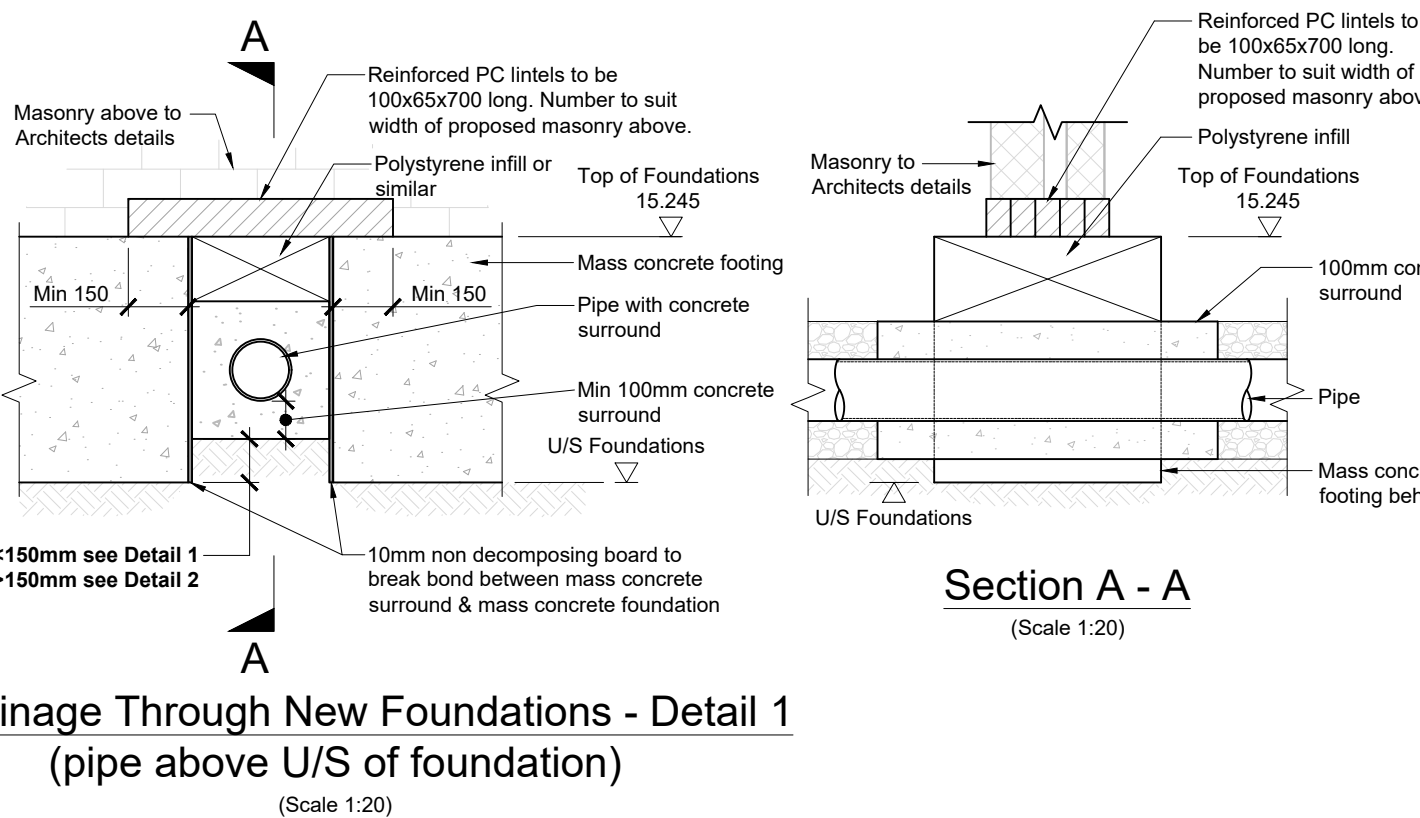
**Note: All drainage works to be carried out in accordance with the 'Civil Engineering Specification for use in the Water Industry 8th Edition (CESWI8)'.**



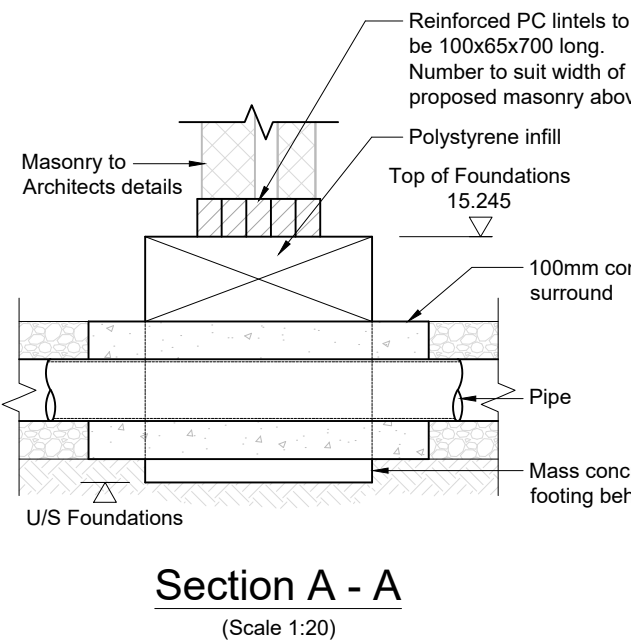
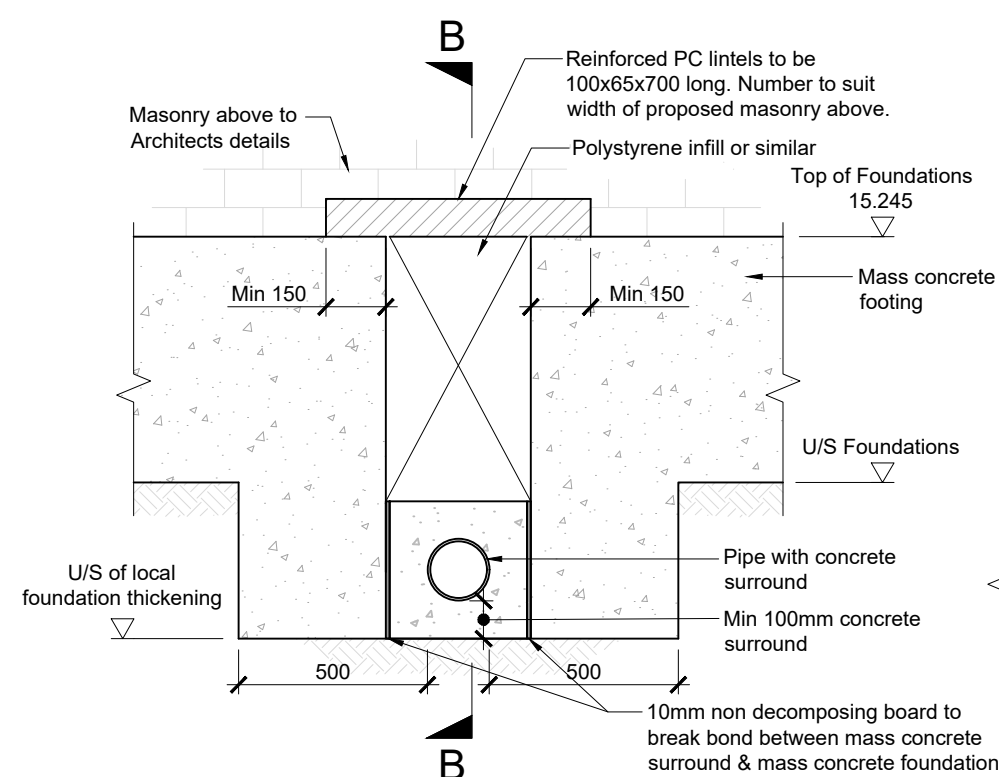
1. Typical Section Through Car Park Tank  
(Scale 1:25)



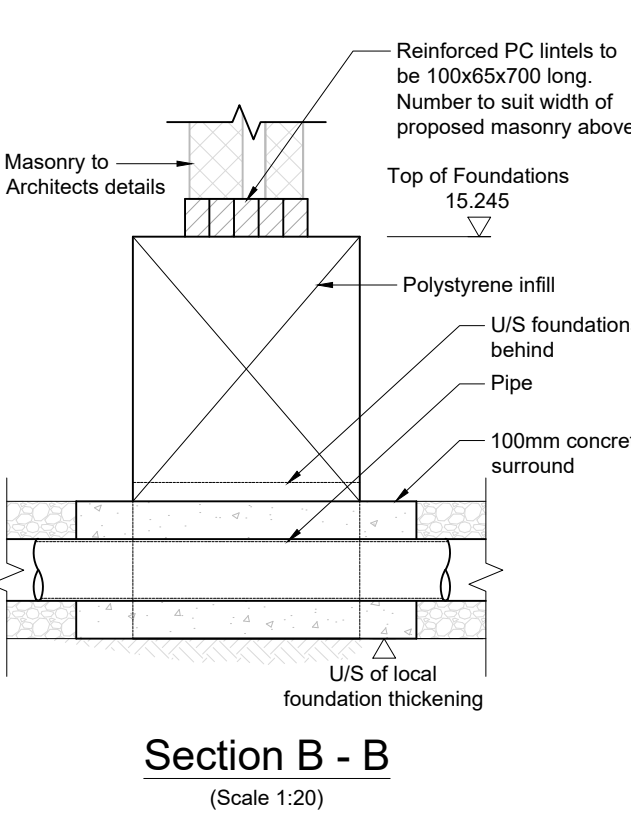
7. Precast Concrete Outfall Detail for DN375 Pipe  
(Scale 1:20)



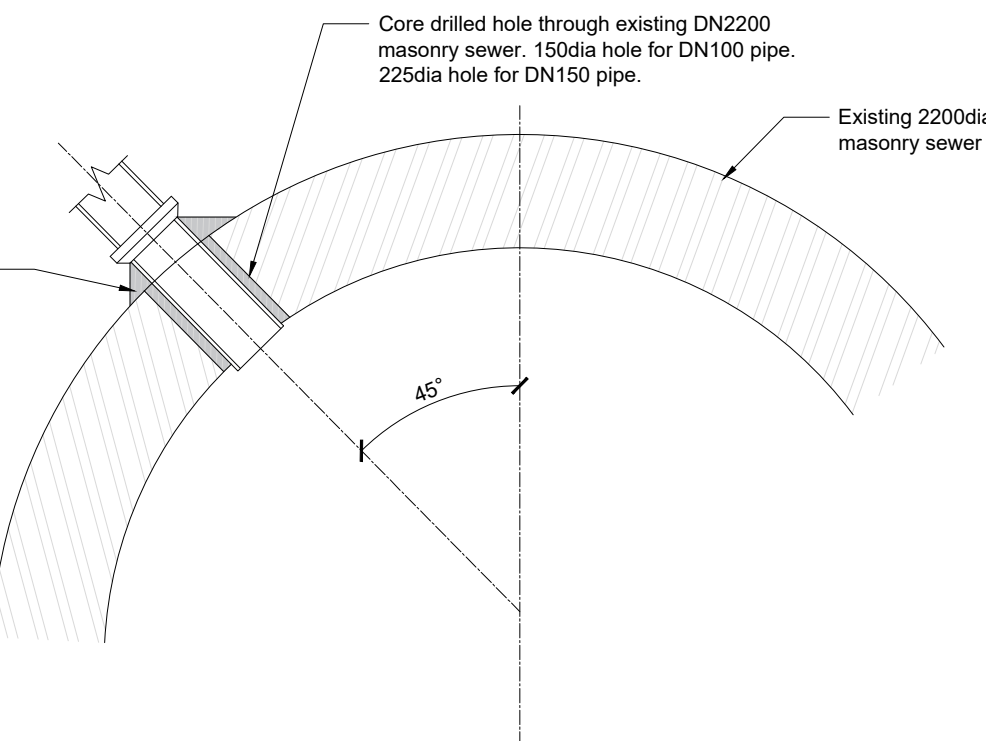
9. Drainage Through New Foundations - Detail 1  
(pipe above U/S of foundation)  
(Scale 1:20)



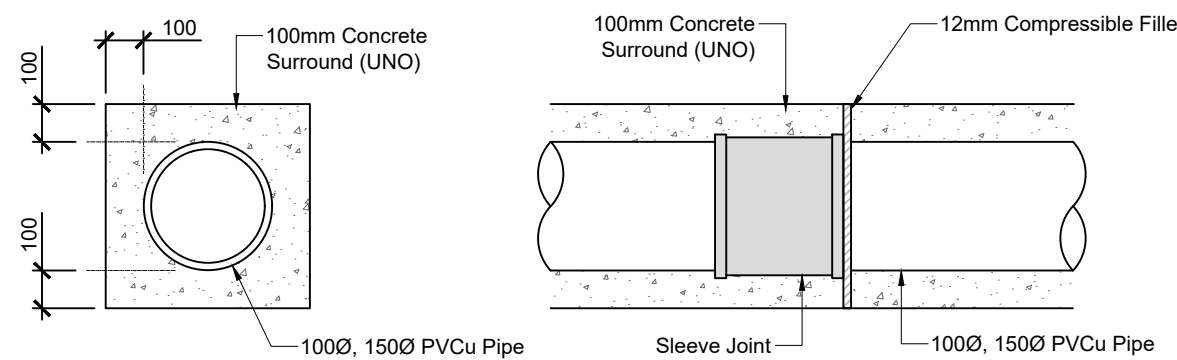
10. Drainage Through New Foundations - Detail 2  
(pipe lower than U/S of foundation)  
(Scale 1:20)



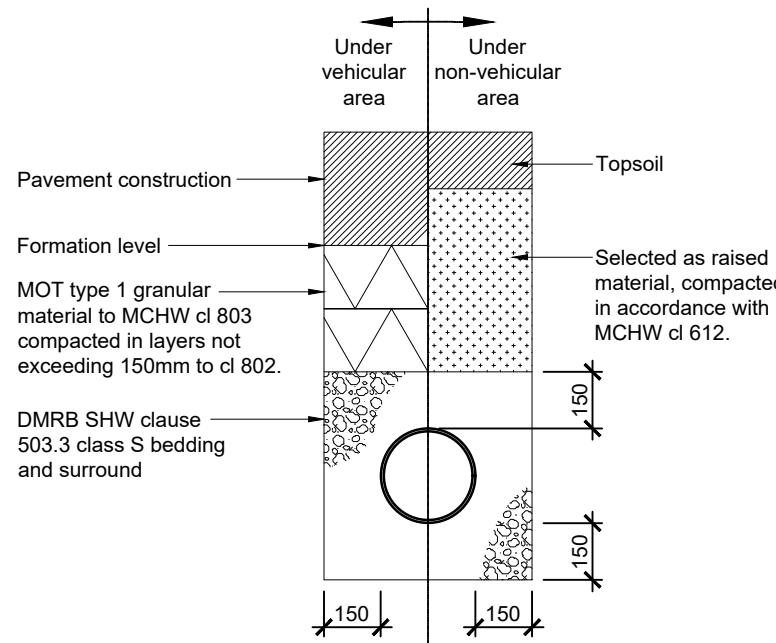
Section B - B  
(Scale 1:20)



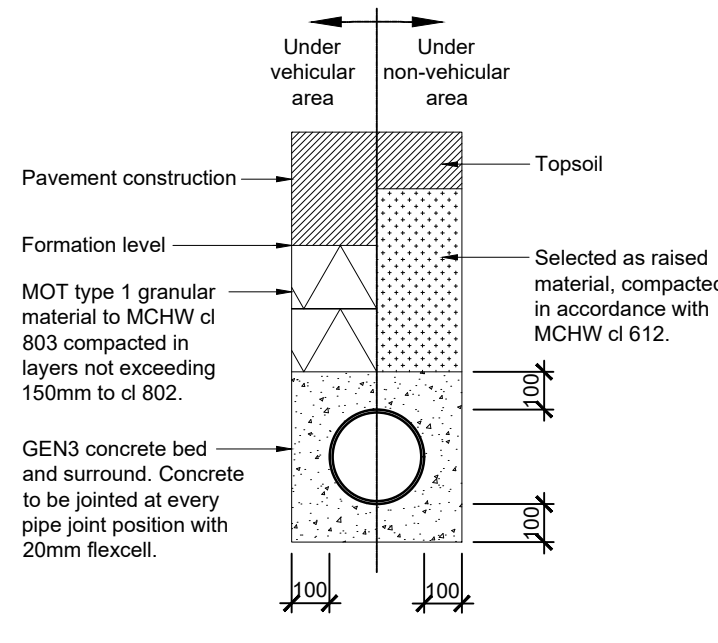
8. Typical Detail of Lateral Connections  
to DN2200 Masonry Sewer  
(Scale 1:20)



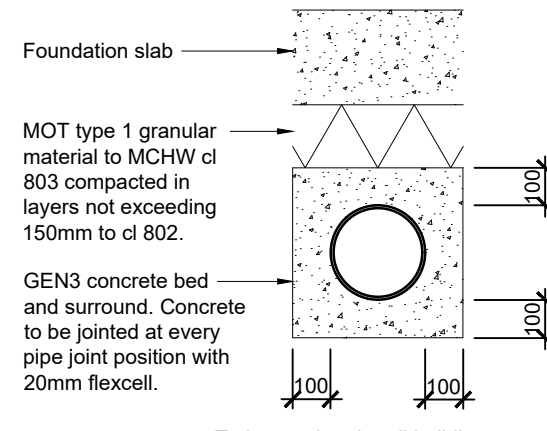
3. Typical Sleeve Joint Detail for Concrete  
Encased Pipes (Type Z bedding)  
(to be provided at all pipe joints)  
(Scale NTS)



4. Class S Granular Pipe  
Bed and Surround  
(Scale NTS)



5. Class Z Concrete Pipe  
Bed and Surround  
(Scale NTS)



6. Class Z Concrete Pipe Bed  
and Surround Under Structure  
(Scale NTS)

0 5m 10m  
Scale 1:100 @ A1

## **Appendix 8: Quorum Consulting Engineers Drainage Design Calculations**

### Design Settings

|                                      |        |                                    |               |
|--------------------------------------|--------|------------------------------------|---------------|
| Rainfall Methodology                 | FEH-22 | Minimum Velocity (m/s)             | 1.00          |
| Return Period (years)                | 100    | Connection Type                    | Level Soffits |
| Additional Flow (%)                  | 0      | Minimum Backdrop Height (m)        | 0.200         |
| CV                                   | 0.750  | Preferred Cover Depth (m)          | 1.200         |
| Time of Entry (mins)                 | 5.00   | Include Intermediate Ground        | ✓             |
| Maximum Time of Concentration (mins) | 30.00  | Enforce best practice design rules | ✓             |
| Maximum Rainfall (mm/hr)             | 50.0   |                                    |               |

### Nodes

| Name       | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|------------|-----------|---------------|-----------------|---------------|-------------|--------------|-----------|
| TANK       | 0.360     | 5.00          | 32.600          | 1350          | -97.257     | 73.523       | 1.136     |
| SWMH04C    | 0.027     | 5.00          | 32.600          | 1200          | -147.101    | -4.244       | 0.440     |
| SWMH04B    | 0.027     | 5.00          | 32.600          | 1200          | -140.106    | 20.222       | 0.610     |
| SWMH04A    | 0.027     | 5.00          | 32.600          | 1200          | -134.943    | 37.824       | 0.733     |
| SWMH04     | 0.027     | 5.00          | 32.600          | 1200          | -126.783    | 65.430       | 0.925     |
| SWMH03C    | 0.027     | 5.00          | 32.750          | 1200          | -120.612    | -5.757       | 0.550     |
| SWMH03B    | 0.027     | 5.00          | 32.700          | 1200          | -115.782    | 10.880       | 0.615     |
| SWMH03A    | 0.027     | 5.00          | 32.700          | 1200          | -111.203    | 26.230       | 0.722     |
| SWMH03     | 0.027     | 5.00          | 32.700          | 1200          | -104.921    | 48.648       | 0.877     |
| SWMH02     | 0.150     | 5.00          | 32.600          | 1350          | -61.388     | 94.718       | 1.280     |
| SWMH01     |           |               | 32.600          | 1350          | -61.081     | 100.046      | 1.340     |
| EX OUTFALL |           |               | 31.730          | 1350          | -60.506     | 106.788      | 0.500     |

### Links

| Name  | US Node | DS Node    | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|-------|---------|------------|------------|-------------|-----------|-----------|----------|-------------|----------|---------------|--------------|
| 1.004 | TANK    | SWMH02     | 41.663     | 0.600       | 31.464    | 31.320    | 0.144    | 289.3       | 375      | 7.38          | 50.0         |
| 1.003 | SWMH04  | TANK       | 30.615     | 0.600       | 31.675    | 31.539    | 0.136    | 225.0       | 225      | 6.72          | 50.0         |
| 1.000 | SWMH04C | SWMH04B    | 25.449     | 0.600       | 32.160    | 31.990    | 0.170    | 150.0       | 225      | 5.40          | 50.0         |
| 1.001 | SWMH04B | SWMH04A    | 18.399     | 0.600       | 31.990    | 31.867    | 0.123    | 150.0       | 225      | 5.69          | 50.0         |
| 1.002 | SWMH04A | SWMH04     | 28.726     | 0.600       | 31.867    | 31.675    | 0.192    | 150.0       | 225      | 6.14          | 50.0         |
| 2.003 | SWMH03  | TANK       | 26.029     | 0.600       | 31.823    | 31.464    | 0.359    | 72.5        | 225      | 6.17          | 50.0         |
| 2.000 | SWMH03C | SWMH03B    | 17.297     | 0.600       | 32.200    | 32.085    | 0.115    | 150.0       | 225      | 5.27          | 50.0         |
| 2.001 | SWMH03B | SWMH03A    | 16.112     | 0.600       | 32.085    | 31.978    | 0.107    | 150.0       | 225      | 5.52          | 50.0         |
| 2.002 | SWMH03A | SWMH03     | 23.271     | 0.600       | 31.978    | 31.823    | 0.155    | 150.0       | 225      | 5.89          | 50.0         |
| 1.005 | SWMH02  | SWMH01     | 5.337      | 0.600       | 31.320    | 31.260    | 0.060    | 88.9        | 375      | 7.43          | 50.0         |
| 1.006 | SWMH01  | EX OUTFALL | 6.766      | 0.600       | 31.260    | 31.230    | 0.030    | 225.5       | 375      | 7.52          | 50.0         |

| Name  | Vel (m/s) | Cap (l/s) | Flow (l/s) | US Depth (m) | DS Depth (m) | Σ Area (ha) | Σ Add Inflow (l/s) | Pro Depth (mm) | Pro Velocity (m/s) |
|-------|-----------|-----------|------------|--------------|--------------|-------------|--------------------|----------------|--------------------|
| 1.004 | 1.060     | 117.1     | 78.1       | 0.761        | 0.905        | 0.576       | 0.0                | 224            | 1.132              |
| 1.003 | 0.867     | 34.5      | 14.6       | 0.700        | 0.836        | 0.108       | 0.0                | 102            | 0.833              |
| 1.000 | 1.065     | 42.3      | 3.7        | 0.215        | 0.385        | 0.027       | 0.0                | 44             | 0.655              |
| 1.001 | 1.065     | 42.3      | 7.3        | 0.385        | 0.508        | 0.054       | 0.0                | 63             | 0.800              |
| 1.002 | 1.065     | 42.3      | 11.0       | 0.508        | 0.700        | 0.081       | 0.0                | 78             | 0.896              |
| 2.003 | 1.537     | 61.1      | 14.6       | 0.652        | 0.911        | 0.108       | 0.0                | 75             | 1.272              |
| 2.000 | 1.065     | 42.3      | 3.7        | 0.325        | 0.390        | 0.027       | 0.0                | 44             | 0.655              |
| 2.001 | 1.065     | 42.3      | 7.3        | 0.390        | 0.497        | 0.054       | 0.0                | 63             | 0.800              |
| 2.002 | 1.065     | 42.3      | 11.0       | 0.497        | 0.652        | 0.081       | 0.0                | 78             | 0.896              |
| 1.005 | 1.922     | 212.2     | 98.4       | 0.905        | 0.965        | 0.726       | 0.0                | 179            | 1.886              |
| 1.006 | 1.202     | 132.8     | 98.4       | 0.965        | 0.125        | 0.726       | 0.0                | 241            | 1.312              |

### Pipeline Schedule

| Link  | Length (m) | Slope (1:X) | Dia (mm) | Link Type | US CL (m) | US IL (m) | US Depth (m) | DS CL (m) | DS IL (m) | DS Depth (m) |
|-------|------------|-------------|----------|-----------|-----------|-----------|--------------|-----------|-----------|--------------|
| 1.004 | 41.663     | 289.3       | 375      | Circular  | 32.600    | 31.464    | 0.761        | 32.600    | 31.320    | 0.905        |
| 1.003 | 30.615     | 225.0       | 225      | Circular  | 32.600    | 31.675    | 0.700        | 32.600    | 31.539    | 0.836        |
| 1.000 | 25.449     | 150.0       | 225      | Circular  | 32.600    | 32.160    | 0.215        | 32.600    | 31.990    | 0.385        |
| 1.001 | 18.399     | 150.0       | 225      | Circular  | 32.600    | 31.990    | 0.385        | 32.600    | 31.867    | 0.508        |
| 1.002 | 28.726     | 150.0       | 225      | Circular  | 32.600    | 31.867    | 0.508        | 32.600    | 31.675    | 0.700        |
| 2.003 | 26.029     | 72.5        | 225      | Circular  | 32.700    | 31.823    | 0.652        | 32.600    | 31.464    | 0.911        |
| 2.000 | 17.297     | 150.0       | 225      | Circular  | 32.750    | 32.200    | 0.325        | 32.700    | 32.085    | 0.390        |
| 2.001 | 16.112     | 150.0       | 225      | Circular  | 32.700    | 32.085    | 0.390        | 32.700    | 31.978    | 0.497        |
| 2.002 | 23.271     | 150.0       | 225      | Circular  | 32.700    | 31.978    | 0.497        | 32.700    | 31.823    | 0.652        |
| 1.005 | 5.337      | 88.9        | 375      | Circular  | 32.600    | 31.320    | 0.905        | 32.600    | 31.260    | 0.965        |
| 1.006 | 6.766      | 225.5       | 375      | Circular  | 32.600    | 31.260    | 0.965        | 31.730    | 31.230    | 0.125        |

| Link  | US Node | Dia (mm) | Node Type | MH Type   | DS Node    | Dia (mm) | Node Type | MH Type   |
|-------|---------|----------|-----------|-----------|------------|----------|-----------|-----------|
| 1.004 | TANK    | 1350     | Manhole   | Adoptable | SWMH02     | 1350     | Manhole   | Adoptable |
| 1.003 | SWMH04  | 1200     | Manhole   | Adoptable | TANK       | 1350     | Manhole   | Adoptable |
| 1.000 | SWMH04C | 1200     | Manhole   | Adoptable | SWMH04B    | 1200     | Manhole   | Adoptable |
| 1.001 | SWMH04B | 1200     | Manhole   | Adoptable | SWMH04A    | 1200     | Manhole   | Adoptable |
| 1.002 | SWMH04A | 1200     | Manhole   | Adoptable | SWMH04     | 1200     | Manhole   | Adoptable |
| 2.003 | SWMH03  | 1200     | Manhole   | Adoptable | TANK       | 1350     | Manhole   | Adoptable |
| 2.000 | SWMH03C | 1200     | Manhole   | Adoptable | SWMH03B    | 1200     | Manhole   | Adoptable |
| 2.001 | SWMH03B | 1200     | Manhole   | Adoptable | SWMH03A    | 1200     | Manhole   | Adoptable |
| 2.002 | SWMH03A | 1200     | Manhole   | Adoptable | SWMH03     | 1200     | Manhole   | Adoptable |
| 1.005 | SWMH02  | 1350     | Manhole   | Adoptable | SWMH01     | 1350     | Manhole   | Adoptable |
| 1.006 | SWMH01  | 1350     | Manhole   | Adoptable | EX OUTFALL | 1350     | Manhole   | Adoptable |

### Manhole Schedule

| Node    | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections                                                                         | Link        | IL (m)                  | Dia (mm)                   |                   |
|---------|-------------|--------------|--------|-----------|----------|-------------------------------------------------------------------------------------|-------------|-------------------------|----------------------------|-------------------|
| TANK    | -97.257     | 73.523       | 32.600 | 1.136     | 1350     |  | 1<br>2<br>0 | 2.003<br>1.003<br>1.004 | 31.464<br>31.539<br>31.464 | 225<br>225<br>375 |
| SWMH04C | -147.101    | -4.244       | 32.600 | 0.440     | 1200     |  | 0           | 1.000                   | 32.160                     | 225               |
| SWMH04B | -140.106    | 20.222       | 32.600 | 0.610     | 1200     |  | 1<br>0      | 1.000<br>1.001          | 31.990<br>31.990           | 225<br>225        |
| SWMH04A | -134.943    | 37.824       | 32.600 | 0.733     | 1200     |  | 1<br>0      | 1.001<br>1.002          | 31.867<br>31.867           | 225<br>225        |
| SWMH04  | -126.783    | 65.430       | 32.600 | 0.925     | 1200     |  | 1<br>0      | 1.002<br>1.002          | 31.675<br>31.675           | 225<br>225        |
| SWMH03C | -120.612    | -5.757       | 32.750 | 0.550     | 1200     |  | 0           | 2.000                   | 32.200                     | 225               |
| SWMH03B | -115.782    | 10.880       | 32.700 | 0.615     | 1200     |  | 1<br>0      | 2.000<br>2.001          | 32.085<br>32.085           | 225<br>225        |
| SWMH03A | -111.203    | 26.230       | 32.700 | 0.722     | 1200     |  | 1<br>0      | 2.001<br>2.002          | 31.978<br>31.978           | 225<br>225        |
| SWMH03  | -104.921    | 48.648       | 32.700 | 0.877     | 1200     |  | 1<br>0      | 2.002<br>2.003          | 31.823<br>31.823           | 225<br>225        |
| SWMH02  | -61.388     | 94.718       | 32.600 | 1.280     | 1350     |  | 1<br>0      | 1.004<br>1.005          | 31.320<br>31.320           | 375<br>375        |

### Manhole Schedule

| Node       | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections                                                                         | Link  | IL (m) | Dia (mm) |
|------------|-------------|--------------|--------|-----------|----------|-------------------------------------------------------------------------------------|-------|--------|----------|
| SWMH01     | -61.081     | 100.046      | 32.600 | 1.340     | 1350     |  1 | 1.005 | 31.260 | 375      |
| EX OUTFALL | -60.506     | 106.788      | 31.730 | 0.500     | 1350     |  1 | 1.006 | 31.230 | 375      |

### Simulation Settings

|                      |          |                            |          |                         |   |
|----------------------|----------|----------------------------|----------|-------------------------|---|
| Rainfall Methodology | FEH-22   | Analysis Speed             | Detailed | Starting Level (m)      |   |
| Rainfall Events      | Singular | Skip Steady State          | x        | Check Discharge Rate(s) | x |
| Summer CV            | 0.750    | Drain Down Time (mins)     | 240      | Check Discharge Volume  | x |
| Winter CV            | 0.840    | Additional Storage (m³/ha) | 20.0     |                         |   |

### Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 2                     | 0                     | 0                     | 0                     |
| 30                    | 0                     | 0                     | 0                     |
| 100                   | 45                    | 0                     | 0                     |

### Node SWMH02 Online Orifice Control

|                          |        |                   |       |                       |       |
|--------------------------|--------|-------------------|-------|-----------------------|-------|
| Flap Valve               | x      | Design Depth (m)  | 0.425 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | ✓      | Design Flow (l/s) | 21.8  |                       |       |
| Invert Level (m)         | 31.320 | Diameter (m)      | 0.132 |                       |       |

### Node SWMH02 Online Orifice Control

|                          |        |                   |       |                       |       |
|--------------------------|--------|-------------------|-------|-----------------------|-------|
| Flap Valve               | x      | Design Depth (m)  | 0.275 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | ✓      | Design Flow (l/s) | 47.6  |                       |       |
| Invert Level (m)         | 31.745 | Diameter (m)      | 0.240 |                       |       |

### Node SWMH02 Online Weir Control

|                          |   |                  |        |                       |       |
|--------------------------|---|------------------|--------|-----------------------|-------|
| Flap Valve               | x | Invert Level (m) | 32.020 | Discharge Coefficient | 0.590 |
| Replaces Downstream Link | ✓ | Width (m)        | 0.150  |                       |       |

### Node TANK Depth/Area Storage Structure

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 31.464 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 0.95 | Time to half empty (mins) | 93     |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|-----------|-----------|---------------|-----------|-----------|---------------|-----------|-----------|---------------|
| 0.000     | 650.0     | 0.0           | 0.400     | 650.0     | 0.0           | 0.401     | 0.0       | 0.0           |

### Rainfall

| Event                    | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|--------------------------|------------------------|---------------------------|
| 2 year 15 minute summer  | 104.606                | 29.600                    |
| 2 year 15 minute winter  | 73.408                 | 29.600                    |
| 2 year 30 minute summer  | 67.146                 | 19.000                    |
| 2 year 30 minute winter  | 47.120                 | 19.000                    |
| 2 year 60 minute summer  | 45.030                 | 11.900                    |
| 2 year 60 minute winter  | 29.917                 | 11.900                    |
| 2 year 120 minute summer | 30.083                 | 7.950                     |
| 2 year 120 minute winter | 19.986                 | 7.950                     |
| 2 year 180 minute summer | 23.860                 | 6.140                     |
| 2 year 180 minute winter | 15.510                 | 6.140                     |
| 2 year 240 minute summer | 19.205                 | 5.075                     |
| 2 year 240 minute winter | 12.759                 | 5.075                     |
| 2 year 360 minute summer | 14.962                 | 3.850                     |
| 2 year 360 minute winter | 9.726                  | 3.850                     |
| 2 year 480 minute summer | 11.868                 | 3.136                     |
| 2 year 480 minute winter | 7.885                  | 3.136                     |

### Rainfall

| Event                               | Peak<br>Intensity<br>(mm/hr) | Average<br>Intensity<br>(mm/hr) |
|-------------------------------------|------------------------------|---------------------------------|
| 2 year 600 minute summer            | 9.752                        | 2.667                           |
| 2 year 600 minute winter            | 6.663                        | 2.667                           |
| 2 year 720 minute summer            | 8.709                        | 2.334                           |
| 2 year 720 minute winter            | 5.853                        | 2.334                           |
| 2 year 960 minute summer            | 7.176                        | 1.890                           |
| 2 year 960 minute winter            | 4.753                        | 1.890                           |
| 2 year 1440 minute summer           | 5.272                        | 1.413                           |
| 2 year 1440 minute winter           | 3.543                        | 1.413                           |
| 30 year 15 minute summer            | 265.433                      | 75.108                          |
| 30 year 15 minute winter            | 186.269                      | 75.108                          |
| 30 year 30 minute summer            | 173.381                      | 49.061                          |
| 30 year 30 minute winter            | 121.671                      | 49.061                          |
| 30 year 60 minute summer            | 116.455                      | 30.776                          |
| 30 year 60 minute winter            | 77.370                       | 30.776                          |
| 30 year 120 minute summer           | 68.599                       | 18.129                          |
| 30 year 120 minute winter           | 45.576                       | 18.129                          |
| 30 year 180 minute summer           | 51.644                       | 13.290                          |
| 30 year 180 minute winter           | 33.570                       | 13.290                          |
| 30 year 240 minute summer           | 40.327                       | 10.657                          |
| 30 year 240 minute winter           | 26.793                       | 10.657                          |
| 30 year 360 minute summer           | 30.319                       | 7.802                           |
| 30 year 360 minute winter           | 19.708                       | 7.802                           |
| 30 year 480 minute summer           | 23.649                       | 6.250                           |
| 30 year 480 minute winter           | 15.712                       | 6.250                           |
| 30 year 600 minute summer           | 19.248                       | 5.265                           |
| 30 year 600 minute winter           | 13.151                       | 5.265                           |
| 30 year 720 minute summer           | 17.087                       | 4.579                           |
| 30 year 720 minute winter           | 11.483                       | 4.579                           |
| 30 year 960 minute summer           | 13.992                       | 3.684                           |
| 30 year 960 minute winter           | 9.269                        | 3.684                           |
| 30 year 1440 minute summer          | 10.147                       | 2.719                           |
| 30 year 1440 minute winter          | 6.819                        | 2.719                           |
| 100 year +45% CC 15 minute summer   | 487.949                      | 138.073                         |
| 100 year +45% CC 15 minute winter   | 342.420                      | 138.073                         |
| 100 year +45% CC 30 minute summer   | 321.892                      | 91.084                          |
| 100 year +45% CC 30 minute winter   | 225.889                      | 91.084                          |
| 100 year +45% CC 60 minute summer   | 217.872                      | 57.577                          |
| 100 year +45% CC 60 minute winter   | 144.749                      | 57.577                          |
| 100 year +45% CC 120 minute summer  | 125.965                      | 33.289                          |
| 100 year +45% CC 120 minute winter  | 83.688                       | 33.289                          |
| 100 year +45% CC 180 minute summer  | 94.323                       | 24.273                          |
| 100 year +45% CC 180 minute winter  | 61.313                       | 24.273                          |
| 100 year +45% CC 240 minute summer  | 73.545                       | 19.436                          |
| 100 year +45% CC 240 minute winter  | 48.861                       | 19.436                          |
| 100 year +45% CC 360 minute summer  | 55.331                       | 14.239                          |
| 100 year +45% CC 360 minute winter  | 35.967                       | 14.239                          |
| 100 year +45% CC 480 minute summer  | 43.395                       | 11.468                          |
| 100 year +45% CC 480 minute winter  | 28.831                       | 11.468                          |
| 100 year +45% CC 600 minute summer  | 35.506                       | 9.712                           |
| 100 year +45% CC 600 minute winter  | 24.260                       | 9.712                           |
| 100 year +45% CC 720 minute summer  | 31.659                       | 8.485                           |
| 100 year +45% CC 720 minute winter  | 21.277                       | 8.485                           |
| 100 year +45% CC 960 minute summer  | 26.040                       | 6.857                           |
| 100 year +45% CC 960 minute winter  | 17.249                       | 6.857                           |
| 100 year +45% CC 1440 minute summer | 18.965                       | 5.083                           |
| 100 year +45% CC 1440 minute winter | 12.746                       | 5.083                           |

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.91%**

| Node Event        | US Node    | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|-------------------|------------|-------------|-----------|-----------|--------------|---------------|------------|--------|
| 180 minute winter | TANK       | 120         | 31.542    | 0.078     | 20.9         | 48.9725       | 0.0000     | OK     |
| 15 minute winter  | SWMH04C    | 10          | 32.203    | 0.043     | 3.6          | 0.1021        | 0.0000     | OK     |
| 15 minute winter  | SWMH04B    | 11          | 32.052    | 0.062     | 7.1          | 0.1260        | 0.0000     | OK     |
| 15 minute winter  | SWMH04A    | 11          | 31.942    | 0.075     | 10.4         | 0.1407        | 0.0000     | OK     |
| 15 minute winter  | SWMH04     | 11          | 31.775    | 0.100     | 13.8         | 0.1712        | 0.0000     | OK     |
| 15 minute winter  | SWMH03C    | 10          | 32.244    | 0.044     | 3.6          | 0.0921        | 0.0000     | OK     |
| 15 minute winter  | SWMH03B    | 11          | 32.148    | 0.063     | 7.1          | 0.1259        | 0.0000     | OK     |
| 15 minute winter  | SWMH03A    | 11          | 32.056    | 0.078     | 10.5         | 0.1465        | 0.0000     | OK     |
| 15 minute winter  | SWMH03     | 10          | 31.908    | 0.085     | 13.9         | 0.1492        | 0.0000     | OK     |
| 180 minute winter | SWMH02     | 120         | 31.537    | 0.217     | 14.2         | 0.8209        | 0.0000     | OK     |
| 180 minute winter | SWMH01     | 120         | 31.348    | 0.088     | 14.2         | 0.1266        | 0.0000     | OK     |
| 180 minute winter | EX OUTFALL | 120         | 31.312    | 0.082     | 14.2         | 0.0000        | 0.0000     | OK     |

| Link Event (Outflow) | US Node | Link    | DS Node    | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|----------------------|---------|---------|------------|---------------|----------------|----------|---------------|--------------------|
| 180 minute winter    | TANK    | 1.004   | SWMH02     | 11.5          | 0.350          | 0.098    | 1.7265        |                    |
| 15 minute winter     | SWMH04C | 1.000   | SWMH04B    | 3.5           | 0.495          | 0.082    | 0.1820        |                    |
| 15 minute winter     | SWMH04B | 1.001   | SWMH04A    | 7.0           | 0.678          | 0.165    | 0.1896        |                    |
| 15 minute winter     | SWMH04A | 1.002   | SWMH04     | 10.4          | 0.739          | 0.246    | 0.4111        |                    |
| 15 minute winter     | SWMH04  | 1.003   | TANK       | 13.3          | 0.815          | 0.386    | 0.5020        |                    |
| 15 minute winter     | SWMH03C | 2.000   | SWMH03B    | 3.5           | 0.492          | 0.083    | 0.1245        |                    |
| 15 minute winter     | SWMH03B | 2.001   | SWMH03A    | 7.0           | 0.661          | 0.165    | 0.1709        |                    |
| 15 minute winter     | SWMH03A | 2.002   | SWMH03     | 10.5          | 0.809          | 0.248    | 0.3025        |                    |
| 15 minute winter     | SWMH03  | 2.003   | TANK       | 14.2          | 1.793          | 0.233    | 0.2229        |                    |
| 180 minute winter    | SWMH02  | Orifice | SWMH01     | 14.2          |                |          |               |                    |
| 15 minute summer     | SWMH02  | Orifice | SWMH01     | 0.0           |                |          |               |                    |
| 15 minute summer     | SWMH02  | Weir    | SWMH01     | 0.0           |                |          |               |                    |
| 180 minute winter    | SWMH01  | 1.006   | EX OUTFALL | 14.2          | 0.757          | 0.107    | 0.1266        | 101.7              |

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.91%**

| Node Event       | US Node    | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|------------------|------------|-------------|-----------|-----------|--------------|---------------|------------|--------|
| 60 minute winter | TANK       | 59          | 31.678    | 0.214     | 109.9        | 133.9921      | 0.0000     | OK     |
| 15 minute winter | SWMH04C    | 10          | 32.230    | 0.070     | 9.2          | 0.1649        | 0.0000     | OK     |
| 15 minute winter | SWMH04B    | 11          | 32.097    | 0.107     | 18.2         | 0.2150        | 0.0000     | OK     |
| 15 minute winter | SWMH04A    | 11          | 31.995    | 0.128     | 26.9         | 0.2400        | 0.0000     | OK     |
| 15 minute winter | SWMH04     | 11          | 31.870    | 0.195     | 35.5         | 0.3345        | 0.0000     | OK     |
| 15 minute winter | SWMH03C    | 10          | 32.270    | 0.070     | 9.2          | 0.1484        | 0.0000     | OK     |
| 15 minute winter | SWMH03B    | 10          | 32.193    | 0.108     | 18.3         | 0.2171        | 0.0000     | OK     |
| 15 minute winter | SWMH03A    | 11          | 32.115    | 0.137     | 27.1         | 0.2582        | 0.0000     | OK     |
| 15 minute winter | SWMH03     | 10          | 31.962    | 0.139     | 35.7         | 0.2426        | 0.0000     | OK     |
| 60 minute winter | SWMH02     | 57          | 31.676    | 0.356     | 26.4         | 1.3438        | 0.0000     | OK     |
| 60 minute winter | SWMH01     | 57          | 31.365    | 0.105     | 19.6         | 0.1503        | 0.0000     | OK     |
| 60 minute winter | EX OUTFALL | 57          | 31.326    | 0.096     | 19.6         | 0.0000        | 0.0000     | OK     |

| Link Event (Outflow) | US Node | Link    | DS Node    | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|----------------------|---------|---------|------------|---------------|----------------|----------|---------------|--------------------|
| 15 minute winter     | TANK    | 1.004   | SWMH02     | -31.9         | -0.555         | -0.273   | 2.7916        |                    |
| 15 minute winter     | SWMH04C | 1.000   | SWMH04B    | 9.0           | 0.624          | 0.213    | 0.3691        |                    |
| 15 minute winter     | SWMH04B | 1.001   | SWMH04A    | 17.9          | 0.853          | 0.422    | 0.3858        |                    |
| 15 minute winter     | SWMH04A | 1.002   | SWMH04     | 26.8          | 0.905          | 0.634    | 0.8617        |                    |
| 15 minute winter     | SWMH04  | 1.003   | TANK       | 34.6          | 1.046          | 1.004    | 1.0094        |                    |
| 15 minute winter     | SWMH03C | 2.000   | SWMH03B    | 9.1           | 0.620          | 0.214    | 0.2542        |                    |
| 15 minute winter     | SWMH03B | 2.001   | SWMH03A    | 17.9          | 0.810          | 0.422    | 0.3554        |                    |
| 15 minute winter     | SWMH03A | 2.002   | SWMH03     | 27.0          | 1.070          | 0.637    | 0.5933        |                    |
| 15 minute winter     | SWMH03  | 2.003   | TANK       | 36.4          | 2.031          | 0.596    | 0.5412        |                    |
| 60 minute winter     | SWMH02  | Orifice | SWMH01     | 19.6          |                |          |               |                    |
| 15 minute summer     | SWMH02  | Orifice | SWMH01     | 0.0           |                |          |               |                    |
| 15 minute summer     | SWMH02  | Weir    | SWMH01     | 0.0           |                |          |               |                    |
| 60 minute winter     | SWMH01  | 1.006   | EX OUTFALL | 19.6          | 0.827          | 0.148    | 0.1604        | 171.2              |

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.91%**

| Node Event           | US Node    | Peak (mins) | Level (m)  | Depth (m)     | Inflow (l/s)   | Node Vol (m³) | Flood (m³)    | Status             |
|----------------------|------------|-------------|------------|---------------|----------------|---------------|---------------|--------------------|
| 60 minute winter     | TANK       | 48          | 31.981     | 0.517         | 215.9          | 251.3254      | 0.0000        | SURCHARGED         |
| 15 minute winter     | SWMH04C    | 12          | 32.388     | 0.228         | 17.0           | 0.5369        | 0.0000        | FLOOD RISK         |
| 15 minute winter     | SWMH04B    | 12          | 32.366     | 0.376         | 31.2           | 0.7574        | 0.0000        | FLOOD RISK         |
| 15 minute winter     | SWMH04A    | 12          | 32.300     | 0.433         | 45.2           | 0.8093        | 0.0000        | FLOOD RISK         |
| 15 minute winter     | SWMH04     | 12          | 32.091     | 0.416         | 54.2           | 0.7130        | 0.0000        | SURCHARGED         |
| 15 minute winter     | SWMH03C    | 11          | 32.329     | 0.129         | 17.0           | 0.2717        | 0.0000        | OK                 |
| 15 minute winter     | SWMH03B    | 11          | 32.311     | 0.226         | 33.8           | 0.4534        | 0.0000        | SURCHARGED         |
| 15 minute winter     | SWMH03A    | 11          | 32.244     | 0.266         | 45.3           | 0.4994        | 0.0000        | SURCHARGED         |
| 15 minute winter     | SWMH03     | 11          | 32.034     | 0.211         | 61.3           | 0.3691        | 0.0000        | OK                 |
| 60 minute winter     | SWMH02     | 48          | 31.958     | 0.638         | 59.6           | 2.4086        | 0.0000        | SURCHARGED         |
| 60 minute winter     | SWMH01     | 48          | 31.459     | 0.199         | 60.6           | 0.2845        | 0.0000        | OK                 |
| 60 minute winter     | EX OUTFALL | 48          | 31.405     | 0.175         | 60.9           | 0.0000        | 0.0000        | OK                 |
| Link Event (Outflow) | US Node    | Link        | DS Node    | Outflow (l/s) | Velocity (m/s) | Flow/Cap      | Link Vol (m³) | Discharge Vol (m³) |
| 15 minute winter     | TANK       | 1.004       | SWMH02     | -70.8         | -0.825         | -0.605        | 4.2174        |                    |
| 15 minute summer     | SWMH04C    | 1.000       | SWMH04B    | 15.9          | 0.699          | 0.375         | 0.9147        |                    |
| 15 minute winter     | SWMH04B    | 1.001       | SWMH04A    | 29.2          | 0.874          | 0.691         | 0.7317        |                    |
| 15 minute winter     | SWMH04A    | 1.002       | SWMH04     | 40.5          | 1.017          | 0.956         | 1.1425        |                    |
| 15 minute winter     | SWMH04     | 1.003       | TANK       | 54.3          | 1.373          | 1.574         | 1.1743        |                    |
| 15 minute winter     | SWMH03C    | 2.000       | SWMH03B    | 16.8          | 0.685          | 0.396         | 0.5465        |                    |
| 15 minute winter     | SWMH03B    | 2.001       | SWMH03A    | 31.1          | 0.853          | 0.734         | 0.6406        |                    |
| 15 minute winter     | SWMH03A    | 2.002       | SWMH03     | 45.6          | 1.189          | 1.076         | 0.9135        |                    |
| 15 minute winter     | SWMH03     | 2.003       | TANK       | 61.6          | 2.110          | 1.008         | 0.9829        |                    |
| 60 minute winter     | SWMH02     | Orifice     | SWMH01     | 25.7          |                |               |               |                    |
| 60 minute winter     | SWMH02     | Orifice     | SWMH01     | 34.9          |                |               |               |                    |
| 15 minute summer     | SWMH02     | Weir        | SWMH01     | 0.0           |                |               |               |                    |
| 60 minute winter     | SWMH01     | 1.006       | EX OUTFALL | 60.9          | 1.110          | 0.458         | 0.3712        | 325.2              |

### Design Settings

|                                      |        |                                    |               |
|--------------------------------------|--------|------------------------------------|---------------|
| Rainfall Methodology                 | FEH-22 | Minimum Velocity (m/s)             | 1.00          |
| Return Period (years)                | 100    | Connection Type                    | Level Soffits |
| Additional Flow (%)                  | 0      | Minimum Backdrop Height (m)        | 0.200         |
| CV                                   | 0.750  | Preferred Cover Depth (m)          | 1.200         |
| Time of Entry (mins)                 | 5.00   | Include Intermediate Ground        | ✓             |
| Maximum Time of Concentration (mins) | 30.00  | Enforce best practice design rules | ✓             |
| Maximum Rainfall (mm/hr)             | 50.0   |                                    |               |

### Nodes

| Name    | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---------|-----------|---------------|-----------------|---------------|-------------|--------------|-----------|
| SWMH06C | 0.018     | 5.00          | 32.300          | 1200          | -132.569    | 17.823       | 1.350     |
| TANK    | 0.019     | 5.00          | 31.600          | 1200          | -131.663    | 45.145       | 0.923     |
| SWMH06B | 0.018     | 5.00          | 31.600          | 1200          | -130.754    | 74.654       | 1.218     |
| SWMH06A |           |               | 31.700          | 1200          | -124.481    | 76.448       | 1.383     |
| SWMH06  |           |               | 31.600          | 1200          | -121.831    | 80.888       | 1.400     |

### Links

| Name  | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|-------|---------|---------|------------|-------------|-----------|-----------|----------|-------------|----------|---------------|--------------|
| 1.000 | SWMH06C | TANK    | 27.337     | 0.600       | 30.950    | 30.677    | 0.273    | 100.0       | 150      | 5.45          | 50.0         |
| 1.001 | TANK    | SWMH06B | 29.523     | 0.600       | 30.677    | 30.382    | 0.295    | 100.0       | 150      | 5.94          | 50.0         |
| 1.002 | SWMH06B | SWMH06A | 6.524      | 0.600       | 30.382    | 30.317    | 0.065    | 100.0       | 150      | 6.05          | 50.0         |
| 1.003 | SWMH06A | SWMH06  | 5.171      | 0.600       | 30.317    | 30.200    | 0.117    | 44.2        | 150      | 6.11          | 50.0         |

| Name  | Vel (m/s) | Cap (l/s) | Flow (l/s) | US Depth (m) | DS Depth (m) | Σ Area (ha) | Σ Add Inflow (l/s) | Pro Depth (mm) | Pro Velocity (m/s) |
|-------|-----------|-----------|------------|--------------|--------------|-------------|--------------------|----------------|--------------------|
| 1.000 | 1.005     | 17.8      | 2.4        | 1.200        | 0.773        | 0.018       | 0.0                | 38             | 0.709              |
| 1.001 | 1.005     | 17.8      | 5.0        | 0.773        | 1.068        | 0.037       | 0.0                | 54             | 0.863              |
| 1.002 | 1.005     | 17.8      | 7.5        | 1.068        | 1.233        | 0.055       | 0.0                | 68             | 0.961              |
| 1.003 | 1.517     | 26.8      | 7.5        | 1.233        | 1.250        | 0.055       | 0.0                | 54             | 1.304              |

### Pipeline Schedule

| Link  | Length (m) | Slope (1:X) | Dia (mm) | Link Type | US CL (m) | US IL (m) | US Depth (m) | DS CL (m) | DS IL (m) | DS Depth (m) |
|-------|------------|-------------|----------|-----------|-----------|-----------|--------------|-----------|-----------|--------------|
| 1.000 | 27.337     | 100.0       | 150      | Circular  | 32.300    | 30.950    | 1.200        | 31.600    | 30.677    | 0.773        |
| 1.001 | 29.523     | 100.0       | 150      | Circular  | 31.600    | 30.677    | 0.773        | 31.600    | 30.382    | 1.068        |
| 1.002 | 6.524      | 100.0       | 150      | Circular  | 31.600    | 30.382    | 1.068        | 31.700    | 30.317    | 1.233        |
| 1.003 | 5.171      | 44.2        | 150      | Circular  | 31.700    | 30.317    | 1.233        | 31.600    | 30.200    | 1.250        |

| Link  | US Node | Dia (mm) | Node Type | MH Type   | DS Node | Dia (mm) | Node Type | MH Type   |
|-------|---------|----------|-----------|-----------|---------|----------|-----------|-----------|
| 1.000 | SWMH06C | 1200     | Manhole   | Adoptable | TANK    | 1200     | Manhole   | Adoptable |
| 1.001 | TANK    | 1200     | Manhole   | Adoptable | SWMH06B | 1200     | Manhole   | Adoptable |
| 1.002 | SWMH06B | 1200     | Manhole   | Adoptable | SWMH06A | 1200     | Manhole   | Adoptable |
| 1.003 | SWMH06A | 1200     | Manhole   | Adoptable | SWMH06  | 1200     | Manhole   | Adoptable |

### Manhole Schedule

| Node    | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections                                                                         | Link  | IL (m) | Dia (mm) |
|---------|-------------|--------------|--------|-----------|----------|-------------------------------------------------------------------------------------|-------|--------|----------|
| SWMH06C | -132.569    | 17.823       | 32.300 | 1.350     | 1200     |  |       |        |          |
|         |             |              |        |           |          | 0                                                                                   | 1.000 | 30.950 | 150      |
| TANK    | -131.663    | 45.145       | 31.600 | 0.923     | 1200     |  | 1     | 1.000  | 30.677   |
|         |             |              |        |           |          | 0                                                                                   | 1.001 | 30.677 | 150      |
| SWMH06B | -130.754    | 74.654       | 31.600 | 1.218     | 1200     |  | 1     | 1.001  | 30.382   |
|         |             |              |        |           |          | 0                                                                                   | 1.002 | 30.382 | 150      |
| SWMH06A | -124.481    | 76.448       | 31.700 | 1.383     | 1200     |  | 1     | 1.002  | 30.317   |
|         |             |              |        |           |          | 0                                                                                   | 1.003 | 30.317 | 150      |

**Manhole Schedule**

| Node   | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections | Link  | IL (m) | Dia (mm) |
|--------|-------------|--------------|--------|-----------|----------|-------------|-------|--------|----------|
| SWMH06 | -121.831    | 80.888       | 31.600 | 1.400     | 1200     | 1           | 1.003 | 30.200 | 150      |

**Simulation Settings**

|                      |          |                                         |          |                         |   |
|----------------------|----------|-----------------------------------------|----------|-------------------------|---|
| Rainfall Methodology | FEH-22   | Analysis Speed                          | Detailed | Starting Level (m)      |   |
| Rainfall Events      | Singular | Skip Steady State                       | x        | Check Discharge Rate(s) | x |
| Summer CV            | 0.750    | Drain Down Time (mins)                  | 240      | Check Discharge Volume  | x |
| Winter CV            | 0.840    | Additional Storage (m <sup>3</sup> /ha) | 20.0     |                         |   |

**Storm Durations**

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 2                     | 0                     | 0                     | 0                     |
| 30                    | 0                     | 0                     | 0                     |
| 100                   | 45                    | 0                     | 0                     |

**Node SWMH06A Online Orifice Control**

|                          |        |                   |       |                       |       |
|--------------------------|--------|-------------------|-------|-----------------------|-------|
| Flap Valve               | x      | Design Depth (m)  | 0.800 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | ✓      | Design Flow (l/s) | 2.3   |                       |       |
| Invert Level (m)         | 30.317 | Diameter (m)      | 0.035 |                       |       |

**Node SWMH06A Online Orifice Control**

|                          |        |                   |       |                       |       |
|--------------------------|--------|-------------------|-------|-----------------------|-------|
| Flap Valve               | x      | Design Depth (m)  | 0.550 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | ✓      | Design Flow (l/s) | 7.3   |                       |       |
| Invert Level (m)         | 30.950 | Diameter (m)      | 0.069 |                       |       |

**Node SWMH06A Online Weir Control**

|                          |   |                  |        |                       |       |
|--------------------------|---|------------------|--------|-----------------------|-------|
| Flap Valve               | x | Invert Level (m) | 31.420 | Discharge Coefficient | 0.590 |
| Replaces Downstream Link | ✓ | Width (m)        | 0.150  |                       |       |

**Node TANK Depth/Area Storage Structure**

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 30.677 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 0.95 | Time to half empty (mins) | 55     |

| Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf Area (m <sup>2</sup> ) |
|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|-----------|------------------------|----------------------------|
| 0.000     | 32.0                   | 32.0                       | 0.400     | 32.0                   | 40.0                       | 0.401     | 0.0                    | 40.0                       |

**Rainfall**

| Event                    | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|--------------------------|------------------------|---------------------------|
| 2 year 15 minute summer  | 104.606                | 29.600                    |
| 2 year 15 minute winter  | 73.408                 | 29.600                    |
| 2 year 30 minute summer  | 67.146                 | 19.000                    |
| 2 year 30 minute winter  | 47.120                 | 19.000                    |
| 2 year 60 minute summer  | 45.030                 | 11.900                    |
| 2 year 60 minute winter  | 29.917                 | 11.900                    |
| 2 year 120 minute summer | 30.083                 | 7.950                     |
| 2 year 120 minute winter | 19.986                 | 7.950                     |
| 2 year 180 minute summer | 23.860                 | 6.140                     |
| 2 year 180 minute winter | 15.510                 | 6.140                     |
| 2 year 240 minute summer | 19.205                 | 5.075                     |
| 2 year 240 minute winter | 12.759                 | 5.075                     |
| 2 year 360 minute summer | 14.962                 | 3.850                     |
| 2 year 360 minute winter | 9.726                  | 3.850                     |
| 2 year 480 minute summer | 11.868                 | 3.136                     |
| 2 year 480 minute winter | 7.885                  | 3.136                     |
| 2 year 600 minute summer | 9.752                  | 2.667                     |
| 2 year 600 minute winter | 6.663                  | 2.667                     |
| 2 year 720 minute summer | 8.709                  | 2.334                     |
| 2 year 720 minute winter | 5.853                  | 2.334                     |

### Rainfall

| Event                               | Peak<br>Intensity<br>(mm/hr) | Average<br>Intensity<br>(mm/hr) |
|-------------------------------------|------------------------------|---------------------------------|
| 2 year 960 minute summer            | 7.176                        | 1.890                           |
| 2 year 960 minute winter            | 4.753                        | 1.890                           |
| 2 year 1440 minute summer           | 5.272                        | 1.413                           |
| 2 year 1440 minute winter           | 3.543                        | 1.413                           |
| 30 year 15 minute summer            | 265.433                      | 75.108                          |
| 30 year 15 minute winter            | 186.269                      | 75.108                          |
| 30 year 30 minute summer            | 173.381                      | 49.061                          |
| 30 year 30 minute winter            | 121.671                      | 49.061                          |
| 30 year 60 minute summer            | 116.455                      | 30.776                          |
| 30 year 60 minute winter            | 77.370                       | 30.776                          |
| 30 year 120 minute summer           | 68.599                       | 18.129                          |
| 30 year 120 minute winter           | 45.576                       | 18.129                          |
| 30 year 180 minute summer           | 51.644                       | 13.290                          |
| 30 year 180 minute winter           | 33.570                       | 13.290                          |
| 30 year 240 minute summer           | 40.327                       | 10.657                          |
| 30 year 240 minute winter           | 26.793                       | 10.657                          |
| 30 year 360 minute summer           | 30.319                       | 7.802                           |
| 30 year 360 minute winter           | 19.708                       | 7.802                           |
| 30 year 480 minute summer           | 23.649                       | 6.250                           |
| 30 year 480 minute winter           | 15.712                       | 6.250                           |
| 30 year 600 minute summer           | 19.248                       | 5.265                           |
| 30 year 600 minute winter           | 13.151                       | 5.265                           |
| 30 year 720 minute summer           | 17.087                       | 4.579                           |
| 30 year 720 minute winter           | 11.483                       | 4.579                           |
| 30 year 960 minute summer           | 13.992                       | 3.684                           |
| 30 year 960 minute winter           | 9.269                        | 3.684                           |
| 30 year 1440 minute summer          | 10.147                       | 2.719                           |
| 30 year 1440 minute winter          | 6.819                        | 2.719                           |
| 100 year +45% CC 15 minute summer   | 487.949                      | 138.073                         |
| 100 year +45% CC 15 minute winter   | 342.420                      | 138.073                         |
| 100 year +45% CC 30 minute summer   | 321.892                      | 91.084                          |
| 100 year +45% CC 30 minute winter   | 225.889                      | 91.084                          |
| 100 year +45% CC 60 minute summer   | 217.872                      | 57.577                          |
| 100 year +45% CC 60 minute winter   | 144.749                      | 57.577                          |
| 100 year +45% CC 120 minute summer  | 125.965                      | 33.289                          |
| 100 year +45% CC 120 minute winter  | 83.688                       | 33.289                          |
| 100 year +45% CC 180 minute summer  | 94.323                       | 24.273                          |
| 100 year +45% CC 180 minute winter  | 61.313                       | 24.273                          |
| 100 year +45% CC 240 minute summer  | 73.545                       | 19.436                          |
| 100 year +45% CC 240 minute winter  | 48.861                       | 19.436                          |
| 100 year +45% CC 360 minute summer  | 55.331                       | 14.239                          |
| 100 year +45% CC 360 minute winter  | 35.967                       | 14.239                          |
| 100 year +45% CC 480 minute summer  | 43.395                       | 11.468                          |
| 100 year +45% CC 480 minute winter  | 28.831                       | 11.468                          |
| 100 year +45% CC 600 minute summer  | 35.506                       | 9.712                           |
| 100 year +45% CC 600 minute winter  | 24.260                       | 9.712                           |
| 100 year +45% CC 720 minute summer  | 31.659                       | 8.485                           |
| 100 year +45% CC 720 minute winter  | 21.277                       | 8.485                           |
| 100 year +45% CC 960 minute summer  | 26.040                       | 6.857                           |
| 100 year +45% CC 960 minute winter  | 17.249                       | 6.857                           |
| 100 year +45% CC 1440 minute summer | 18.965                       | 5.083                           |
| 100 year +45% CC 1440 minute winter | 12.746                       | 5.083                           |

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.89%**

| Node Event           | US Node | Peak (mins) | Level (m) | Depth (m)     | Inflow (l/s)   | Node Vol (m³) | Flood (m³)    | Status             |
|----------------------|---------|-------------|-----------|---------------|----------------|---------------|---------------|--------------------|
| 15 minute winter     | SWMH06C | 10          | 30.990    | 0.040         | 2.4            | 0.0555        | 0.0000        | OK                 |
| 30 minute winter     | TANK    | 25          | 30.717    | 0.040         | 3.7            | 1.2761        | 0.0000        | OK                 |
| 30 minute winter     | SWMH06B | 24          | 30.723    | 0.341         | 4.0            | 0.4866        | 0.0000        | SURCHARGED         |
| 30 minute winter     | SWMH06A | 24          | 30.723    | 0.406         | 2.5            | 0.4590        | 0.0000        | SURCHARGED         |
| 15 minute summer     | SWMH06  | 1           | 30.200    | 0.000         | 1.4            | 0.0000        | 0.0000        | OK                 |
| Link Event (Outflow) | US Node | Link        | DS Node   | Outflow (l/s) | Velocity (m/s) | Flow/Cap      | Link Vol (m³) | Discharge Vol (m³) |
| 15 minute winter     | SWMH06C | 1.000       | TANK      | 2.4           | 0.869          | 0.135         | 0.0883        |                    |
| 15 minute winter     | TANK    | 1.001       | SWMH06B   | 2.6           | 0.246          | 0.147         | 0.3132        |                    |
| 15 minute winter     | SWMH06B | 1.002       | SWMH06A   | 2.8           | 0.421          | 0.156         | 0.1149        |                    |
| 30 minute winter     | SWMH06A | Orifice     | SWMH06    | 1.6           |                |               |               | 4.3                |
| 15 minute summer     | SWMH06A | Orifice     | SWMH06    | 0.0           |                |               |               | 0.0                |
| 15 minute summer     | SWMH06A | Weir        | SWMH06    | 0.0           |                |               |               | 0.0                |

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.89%**

| Node Event           | US Node | Peak (mins) | Level (m) | Depth (m)     | Inflow (l/s)   | Node Vol (m³) | Flood (m³)    | Status             |
|----------------------|---------|-------------|-----------|---------------|----------------|---------------|---------------|--------------------|
| 15 minute winter     | SWMH06C | 10          | 31.013    | 0.063         | 6.2            | 0.0875        | 0.0000        | OK                 |
| 60 minute winter     | TANK    | 51          | 30.896    | 0.219         | 7.9            | 6.9928        | 0.0000        | SURCHARGED         |
| 60 minute winter     | SWMH06B | 50          | 30.894    | 0.512         | 5.1            | 0.7309        | 0.0000        | SURCHARGED         |
| 60 minute winter     | SWMH06A | 52          | 30.893    | 0.576         | 2.6            | 0.6516        | 0.0000        | SURCHARGED         |
| 15 minute summer     | SWMH06  | 1           | 30.200    | 0.000         | 1.8            | 0.0000        | 0.0000        | OK                 |
| Link Event (Outflow) | US Node | Link        | DS Node   | Outflow (l/s) | Velocity (m/s) | Flow/Cap      | Link Vol (m³) | Discharge Vol (m³) |
| 15 minute winter     | SWMH06C | 1.000       | TANK      | 6.2           | 0.985          | 0.347         | 0.2887        |                    |
| 15 minute winter     | TANK    | 1.001       | SWMH06B   | -5.4          | -0.346         | -0.307        | 0.5197        |                    |
| 15 minute summer     | SWMH06B | 1.002       | SWMH06A   | 4.6           | 0.496          | 0.258         | 0.1149        |                    |
| 60 minute winter     | SWMH06A | Orifice     | SWMH06    | 1.9           |                |               |               | 14.2               |
| 15 minute summer     | SWMH06A | Orifice     | SWMH06    | 0.0           |                |               |               | 0.0                |
| 15 minute summer     | SWMH06A | Weir        | SWMH06    | 0.0           |                |               |               | 0.0                |

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.89%**

| Node Event           | US Node | Peak (mins) | Level (m) | Depth (m)     | Inflow (l/s)   | Node Vol (m³) | Flood (m³)    | Status             |
|----------------------|---------|-------------|-----------|---------------|----------------|---------------|---------------|--------------------|
| 60 minute winter     | SWMH06C | 44          | 31.252    | 0.302         | 5.9            | 0.4222        | 0.0000        | SURCHARGED         |
| 60 minute winter     | TANK    | 44          | 31.247    | 0.570         | 14.9           | 13.0542       | 0.0000        | SURCHARGED         |
| 60 minute winter     | SWMH06B | 44          | 31.222    | 0.840         | 8.6            | 1.1980        | 0.0000        | SURCHARGED         |
| 60 minute winter     | SWMH06A | 44          | 31.206    | 0.889         | 7.3            | 1.0056        | 0.0000        | SURCHARGED         |
| 15 minute summer     | SWMH06  | 1           | 30.200    | 0.000         | 2.0            | 0.0000        | 0.0000        | OK                 |
| Link Event (Outflow) | US Node | Link        | DS Node   | Outflow (l/s) | Velocity (m/s) | Flow/Cap      | Link Vol (m³) | Discharge Vol (m³) |
| 15 minute winter     | SWMH06C | 1.000       | TANK      | 11.1          | 1.051          | 0.628         | 0.3820        |                    |
| 15 minute summer     | TANK    | 1.001       | SWMH06B   | -8.1          | -0.464         | -0.455        | 0.5197        |                    |
| 60 minute winter     | SWMH06B | 1.002       | SWMH06A   | 7.3           | 0.476          | 0.410         | 0.1149        |                    |
| 60 minute winter     | SWMH06A | Orifice     | SWMH06    | 2.4           |                |               |               | 20.3               |
| 60 minute winter     | SWMH06A | Orifice     | SWMH06    | 4.7           |                |               |               | 6.2                |
| 15 minute summer     | SWMH06A | Weir        | SWMH06    | 0.0           |                |               |               | 0.0                |

## **Appendix 9: United Utilities Pre-development Enquiry**

United Utilities Grasmere House, 2nd Floor  
Lingley Mere Business Park  
Great Sankey  
Warrington  
WA5 3LP

**Response Date:** 11/04/2025

Dear Louis

## **Pre-Development Enquiry for Wythenshawe Park**

**UU Reference Number: 07269704**

We have assessed your application based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your strategy will need review by other authorities as part of the planning process. We advise conducting necessary site investigations to confirm viability of your proposals.

### **Modelled Flood Risk** [Please see the image on page 3 for details](#)

I can confirm that we have modelled flood risk within the vicinity of the proposed development. There is a modelled potential flood of 7120m<sup>3</sup> in the 1 in 100 year storm at the south west of the site, this is from SJ80898701.

Please note that our modelling data is indicative, and only representative of the 1:100year storm event.

[Please see comment 2 of the attached guidance sheet](#)

### **Asset Protection**

According to our public sewer records, there are public sewers located within your site boundary. This requires an easement of **10m (5m either side of the pipe)**. If you cannot achieve the required clearance, you may wish to consider diverting and or abandoning the public sewer.

[Please see comment 3 of the attached guidance sheet and Working Near Our Pipelines Guidance document](#)

## Foul Water

Foul flow from this site will be allowed to drain into the public combined sewer system.

Our preferred point of discharge would be to the **2200mm Combined sewer located within** your proposed development at an unrestricted rate.

[Please see the images on page 3 for clarification](#)

## Surface Water

Follow the National Planning Policy Guidance drainage hierarchy and provide evidence for discounting higher options before considering public sewer discharge. Consult the Lead Local Flood Authority regarding surface water concerns.

[Please see comment 4 within the guidance sheet](#)

## Infiltration

[Please see comment 4 within the guidance sheet](#)

## Waterbody

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the **open watercourse** located South of the proposed site.

We would encourage you to engage with any third-party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

## Public Sewer

United Utilities will consider a connection to the **525mm** diameter public **surface water sewer** within **the** proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities requests that any agreed rate does not exceed **15l/s**.

**Manhole reference** SJ80898702, **Grid reference** 380888, 389767

[Please see images on page 3 for clarification](#)

## Site Images

