

Kincardine Court, Manchester

Drainage & SuDs Strategy

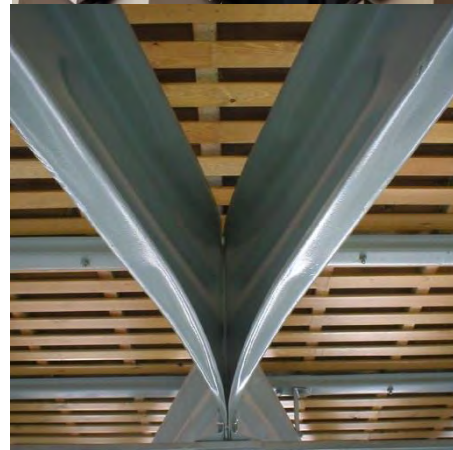
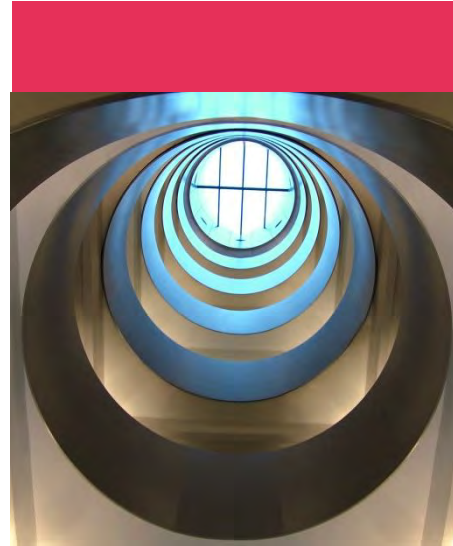
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Site Address: Kincardine Court, Kincardine Road, Manchester, M13 9JA



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Control Sheet

Rev	Description	Issued by	Checked	Date
V01	Issued for Comments (Outline Drainage Strategy)	ATL	ATL	05/07/2021
V02	Updated to current design for Planning Condition Submission	CG	CG	01/06/2021

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1.0 Introduction

1.1 Project Background

- 1.1.1 Curtins was appointed by Unite Group PLC to provide a Drainage and SuDs Strategy for a proposed development located at Kincardine Court, Kincardine Road, Manchester, M13 9JA.
- 1.1.2 The proposed development encompasses a full planning application for the erection of a part 4, part 5, part 6 storey extension comprising 92 student apartments (use class sui generis), with associated communal space, cycle parking, recycling and refuse bin storage and associated plant on land at Kincardine Court, Kincardine Road Manchester.
- 1.1.3 The development has been approved for planning, subject to Planning Conditions. (Planning Reference 124472/FO/2019)
- 1.1.4 This report was initially prepared to satisfy the requirements of Planning Condition 5. However, the report has been updated to provide construction information to submit for Planning Condition 9.
- 1.1.5 The Flood Risk Assessment referenced 072071-CUR-00-XX-RP-C-92002 Rev V03 should be referred to for details in relation to Flood Risk.

1.2 Proposed Development

- 1.2.1 The development is expected to comprise of an extension to the existing student accommodation made up of the following:
 - 92 Student Bedrooms/ Studios
 - Shared kitchen facilities
 - Common room & study room
 - Bin store
 - Associated Plant and servicing areas.External Areas Including:
 - An amended courtyard area
 - New hardstanding adjacent to the proposed building
 - Cycle store with 35 cycle spaces
 - Extension of existing masonry wall forming security line
 - Replacement of external gates to car park
 - Proposed brick water tank room
 - Reconfiguration of car parking spaces and provision of removable bollards.
- 1.2.2 The Proposed Site Layout and Floor Plans are enclosed in *Appendix A*.

2.0 Existing Drainage

2.1 Existing Watercourses and Other Waterbodies

- 2.1.1 No above ground watercourses have been identified within the proposed site or immediately adjacent to the site.
- 2.1.2 The River Medlock is located approximately 540m to the North of the site. The River Medlock is classified as a main river at this location.
- 2.1.3 The Rochdale Canal is located approximately 950m to the Northwest of the site.
- 2.1.4 The (culverted) Corn Brook which is an ordinary watercourse is situated approximately 220m to the Southeast of the site.

2.2 Existing Drainage

- 2.2.1 The public sewer records have been obtained for the development site, and are enclosed in *Appendix B*.
- 2.2.2 A CCTV drainage survey was undertaken in February 2021, and a further survey undertaken in June 2020.
- 2.2.3 A review of the public sewer records and indicate that the following public sewers are located within the site boundary:
 - A 375mm diameter combined sewer which runs along to the South-Eastern boundary of the site. This sewer flows from North-East to South-West and upsizes to a 450mm diameter sewer at Manhole Ref. 8901. The existing site drainage connects to the sewer at this manhole. The sewer runs to manhole Ref. 8902 in the Southwest corner of the site, before exiting the site.
 - A 225mm diameter combined sewer located within the existing carpark of the site. This sewer flows Southeast from Manhole Ref 8906 towards the 375mm diameter combined sewer at Manhole Ref 9901. Manholes 8906 & 9901 cannot be seen at the surface and are assumed to be buried. This branch has been identified via a gully connection to the main line. On-site works are required to locate these manholes
- 2.2.4 The public sewer records also indicate that the following public sewers are located within the vicinity of the site:
 - A 150mm diameter combined sewer located to the North of the site in between the site boundary and the surrounding residential dwellings. This sewer flows from South West to North East.

- A 525mm diameter combined sewer located to the West of the site; on the other side of Kincardine Road, parallel to the highway. This sewer flows from South-West to North-East and upsizes to a 600mm diameter sewer further downstream.
- A 225mm and a 450mm diameter combined sewer flow from South-East to North-West and connects to the 375/450mm diameter combined sewer located just within the South-East site boundary.
- A foul water inspection chamber is shown to be located just outside the Northern boundary of the site. This is referenced on the United Utilities plans as public; however, United Utilities have confirmed that this is a private inspection chamber.
- A foul water inspection chamber is shown to be located in the centre of the site, adjacent to the existing building. This is referenced on the United Utilities plans as public; however, United Utilities have confirmed that this is a private inspection chamber.

2.2.5 There are further public sewers identified on the public sewer records within the wider vicinity of the site, but these are not considered relevant to the scheme.

2.2.6 The CCTV surveys identified a series of drains within the site, serving the existing building and external areas. The on-site drainage is a combined system, and, as noted in 2.2.3, connects to the sewer at manhole ref. 8901. The existing drainage varies from 100-225mm diameter.

2.2.7 The majority of the existing drainage is to be retained as existing. Some drains serving external areas will be abandoned/ removed as the drainage to these areas are to be reconfigured.

2.2.8 There are some sections of drainage that will require diverting, as they will clash with the proposed foundation layout.

2.2.9 Drains to be removed/ diverted are shown on drawing 500991-CUR-ZZ-00-DR-C-9500, which is available in Appendix E.

3.0 Drainage Strategy

3.1 Proposed Foul Water Drainage

- 3.1.1 A partially separate foul and surface water system is proposed on site. This is defined based on existing combined drainage from existing areas being retained as combined with new foul connecting to the existing combined drainage.
- 3.1.2 The peak flow rate for the development has been calculated based on the Discharge Unit method for calculating domestic foul discharge. The total peak flow from the site is estimated at approximately 11.4 l/s based on 92 bedrooms plus communal areas. These calculations have estimated the number and type of appliances, and the final peak foul flow rates should be confirmed by the M&E Designer.
- 3.1.3 A pre-development enquiry has been submitted to United Utilities, they have responded, and confirmed that the foul flows can be discharged to the public sewer network at an unrestricted rate.
- 3.1.4 The foul drainage has been split into two networks.
- 3.1.5 Foul Network A is located to the South of the proposed building and connects to the existing drainage at existing manhole 3A. This manhole is identified as a buried manhole, and it is intended to rebuild this manhole as part of the works.
- 3.1.6 Network A has been agreed under a Section 106 Agreement with United Utilities UU Approval reference EC5647. United Utilities correspondence is included in *Appendix B*.
- 3.1.7 Foul Network B is located to the North of the proposed building and connects to the diverted existing drainage at proposed manholes FWA1 to FWA13.
- 3.1.8 Network B has been agreed under a Section 106 Agreement with United Utilities. (Combined connection with surface water) UU Approval reference EC5647. United Utilities correspondence is included in *Appendix B*.
- 3.1.9 A copy of the United Utilities correspondence is included in *Appendix B*
- 3.1.10 The proposed drainage strategy is enclosed in *Appendix E*.

3.2 Proposed Surface Water Drainage

- 3.2.1 Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated for up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments and services.
- 3.2.2 In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.

Infiltration

- 3.2.3 The Site Investigation indicates that the superficial deposits on the site consist of Glacial Till (sandy). The bedrock is made up of the Triassic Chester Formation (Sandstone).
- 3.2.4 The BGS GeoReport specifies that it is likely that the groundwater table is likely to be between 3-5m below the existing ground level on the site. The Site Investigation did not encounter any groundwater as part of the on-site investigations or groundwater monitoring.
- 3.2.5 The Site Investigations shows the presence of made ground to maximum depth of 1.90m.
- 3.2.6 The BGS GeoReport confirms that infiltration may be compatible on site and are unlikely to cause ground stability problems.
- 3.2.7 The site is not located within a Groundwater Source Protection Zone.
- 3.2.8 Infiltration devices, in accordance with Building Regulations, are not permitted within 5m of a structure. Also, these devices are not generally permitted within 5m of the public highway. The layout of the site dictates that any structure would need to be located within the car park area to the east of the site.
- 3.2.9 There is an existing Public Combined Sewer within the car park. It is not suitable to have infiltration features within the easement of the public sewer.
- 3.2.10 Given the constraints created by the location of the building, Public Sewer and Public Highway, it is considered that to discharge via infiltration is not feasible.

Watercourse

- 3.2.11 The Corn Brook and River Medlock are the nearest watercourses to the site and are located approximately 220m to the South-East and 560m to the North of the site respectively. To drain to either of these watercourses would not be feasible due to the distance from the site and the potential requirement to cross third party land.

Surface Water Sewer

- 3.2.12 There are no dedicated surface water public sewers in the vicinity of the site. Therefore, the connection to a surface water sewer is not a viable option.

Combined Water sewer

- 3.2.13 There are various existing combined public sewers within, and in the vicinity of the site. It is assumed that the existing site discharges to the existing combined sewer network at various locations. It is therefore assumed that discharge to the public sewer network will be a viable option, with existing connections being utilised where possible.
- 3.2.14 Table 1 summarises the options for surface water disposal.

Table 1: Surface Water Disposal

Surface Water Disposal	Potential	Description
Infiltration	X	Due to the constraints created by the site layout, Public Sewer & Public Highway, discharge via infiltration is considered unviable.
Watercourse	X	Th nearest watercourse is the River Medlock, 560m from the site. To discharge at this location will be unviable.
Surface Water Public Sewer	X	There are no dedicated surface water public sewers in the vicinity of the site. Therefore, this is assumed to be unviable.
Combined Public Sewer	✓	It is assumed that discharge to the combined public sewer system will be a viable solution and existing outfalls are to be utilised where suitable.

3.2.15 It is proposed to connect he to the combined public sewer within the site.

3.2.16 As the current site has previously been developed, brownfield run-off rates were used to calculate the proposed discharge restrictions.

3.2.17 The development area taken into account for drainage calculations is 0.10 Ha. This covers the area of the building extension, and the central courtyard. Surveys indicate that the existing car park is served by a single gully, and a large proportion of the area will flow to the Public Highway, this area has been discounted as part of the existing drainage flows.

3.2.18 The Brownfield flow rates are estimated as follows:

- 1 year = 10.4 l/s,
- 30 year = 28.6 l/s
- 100 year = 35.9 l/s

3.2.19 The existing drainage modelling results are enclosed in *Appendix D*.

3.2.20 Proposed discharge rates are required to be reduced by up to 50% of existing discharge. Therefore, proposed flow rates are assumed to discharge at a maximum of:

- 5.4 l/s for the 1 in 1-year event,
- 14.3 l/s for the 1 in 30-year event and
- 17.9 l/s for the 1 in 100-year event + 20% climate change.

- 3.2.21 A pre-development enquiry has been submitted to United Utilities, and they have responded, indicating that the maximum discharge from the site that United Utilities will accept is 5 l/s.
- 3.2.22 A copy of the United Utilities correspondence is included in *Appendix B*.
- 3.2.23 The drainage strategy has therefore been designed to reduce the discharge from the site to a maximum of 5 l/s for all storm events.
- 3.2.24 The existing car park falls mean that any flooding that occurs in the 100-year return period, with 40% climate change, will flow off the site and onto the public highway. Therefore, the system has been designed to not flood during the 100-year event, with 40% climate change allowance.
- 3.2.25 The existing drainage modelling results are enclosed in *Appendix F*.
- 3.2.26 The volumes of attenuation required is 48m³, based on attenuating the 1 in 100-Year Storm Event with 40% climate change allowance. The attenuation storage is provided by an underground cellular attenuation tank within the car park area.
- 3.2.27 The proposed drainage modelling results are enclosed in *Appendix E*.
- 3.2.28 Surface water run-off from impermeable areas at risk of contamination should receive water quality treatment. Roof drainage is considered very low hazard and residential car parks low risk, in terms of contamination. Residential Figure 1 illustrates the pollution hazard indices for different land use classifications from The CIRIA SuDS Manual C753 (2015).

Figure 1: Pollution Hazard indices for land use classification (Table 26.2 the CIRIA SuDS manual 2015)

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

3.2.29 Figure 2 illustrates the SuDS Component mitigation indices from The CIRIA SuDS Manual C753 (2015).

Figure 2: Indicative SuDS mitigation indices (Table 26.3 the CIRIA SuDS manual 2015)

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters				
Type of SuDS component	Mitigation indices¹			
	TSS	Metals	Hydrocarbons	
Filter strip	0.4	0.4	0.5	
Filter drain	0.4 ²	0.4	0.4	
Swale	0.5	0.6	0.6	
Bioretention system	0.8	0.8	0.8	
Permeable pavement	0.7	0.6	0.7	
Detention basin	0.5	0.5	0.6	
Pond ⁴	0.7 ³	0.7	0.5	
Wetland	0.8 ³	0.8	0.8	
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.			

Notes

- 1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.
- 2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.
- 3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.
- 4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.
- 5 See **Chapter 14** for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: <http://tinyurl.com/qf7yuj7>
- 6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

- 3.2.30 The selection of treatment should ensure that the SuDS mitigation component index (Figure 2) exceeds the pollution hazard index (Figure 1). Where two stages of treatment are required, the second stage of treatment should account for reduced performance due to lower inflows; therefore 0.5 (mitigation index) should be used.
- 3.2.31 The only amendments to the external surfacing will be within the courtyard area. Therefore, it is considered that there is limited scope to introduce surface SuDS features to provide water quality treatment.
- 3.2.32 The proposals are roof drainage, pedestrian areas, and a small car park area. Therefore, the site is considered a low pollution risk. A Filter Chamber product by Naylor is located upstream of the connection to the public combined sewer.
- 3.2.33 The surface water connection has been agreed under a Section 106 Agreement with United Utilities. (Combined connection with Foul Network B) UU Approval reference EC5647. United Utilities correspondence is included in *Appendix B*.
- 3.2.34 The proposed drainage strategy plan is enclosed in *Appendix E*.

3.2.35 The final design of the drainage networks shall be in accordance with the legislation set by the Environment Agency, Manchester City Council and United Utilities.

4.0 Maintenance

- 4.1.1 This section is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details. Where proprietary products are specified, the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.
- 4.1.2 The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.
- 4.1.3 The surface water network has been designed to accommodate the 1 in 100-year storm rainfall event plus an allowance for climate change particular to the requirements of the site. It may be that the exceedance flows above the 1 in 30-year storm rainfall event are stored within the site partially above ground, on non-habitable external landscaping, parking or other space. As the flows are generally being attenuated on site and within SuDS features there will be a period of time after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs appropriate action should be taken as noted in this section.

4.2 Components

- 4.2.1 The following components have been included within the drainage design for the proposed development:
- Inspection, Manhole and Catchpit Chambers
 - Pipes
 - Drainage Channels and Gullies
 - Attenuation Tank
 - Flow Control Unit
 - Filter Chamber
- 4.2.2 The maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.
- 4.2.3 Maintenance of the drainage network will be the responsibility of an on-site facilities management team.
- 4.2.4 It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event.
- 4.2.5 Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

- 4.2.6 Long-term management practices include monthly sweeping of external paved areas. The sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilised during storm events and transported to the drainage system.
- 4.2.7 During the winter months, drainage features such as gullies and channels should be cleared of ice, snow, debris or litter
- 4.2.8 Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the filter drains and the upstream/downstream chambers.

4.3 Inspection, Manhole and Catchpit Chambers

- 4.3.1 The locations of the Inspection Chambers, Manholes are indicated on Curtins drainage drawing 500991-CUR-ZZ-00-DR-C-9500.
- 4.3.2 Access points have been located at the head of each run, at a change in direction and at a change of pipe size in accordance with Building Regulations Part H.
- 4.3.3 The appropriate health and safety equipment must be used when accessing manholes. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the Maintenance Manager prior to any access.

4.4 Pipes

- 4.4.1 The locations of the drainage pipes are indicated on Curtins drainage drawing 500991-CUR-ZZ-00-DR-C-9500.
- 4.4.2 Pipes are proprietary products, and the materials can vary across the site and as such where used the manufacture's recommendations should be followed. Regardless of the product used the pipes will be fully compliant with the Curtins drainage specification.
- 4.4.3 Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleaning where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.
- 4.4.4 Access for maintenance is provided through access chambers and manholes.
- 4.4.5 Regular inspection and maintenance are important to identify areas which may have been obstructed/clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection should be provided as post construction CCTV survey.	N/A
Regular maintenance\ inspection	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Check and remove large vegetation growth near pipe runs.	Monthly or as required
Remedial Action	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.

4.5 Drainage Channels and Gullies

- 4.5.1 The locations of the drainage channels and gullies are indicated on Curtins drainage drawing 500991-CUR-ZZ-00-DR-C-9500.
- 4.5.2 Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned through the use of a high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.

- 4.5.3 Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers are allowed to move within their frame, this may cause damage to the frame or seating.
- 4.5.4 Sediment\material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the car park channels.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection including channel outlet boxes.	Half yearly and after large storms.
Regular maintenance\ inspection	Litter and debris removal	Monthly or as required.
	Check and remove large vegetation growth near channel runs.	Monthly or as required
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	3-monthly, 48 hours after large storms.
Remedial Action	Inspect access/outlet boxes and rod through poorly performing channels and outlets as initial remediation.	As required.

4.6 Attenuation Tanks

- 4.6.1 The locations of the attenuation tanks are indicated on Curtin's drainage drawing 500991-CUR-ZZ-00-DR-C-9500.
- 4.6.2 The attenuation tanks are currently specified as geocellular units, which are wrapped in a geotextile blanket and are intended for storage of surface water run-off from the site up to and including the 1 in 100-year plus 30% climate change event to reduce the rate of run-off into the downstream network and to minimise flood risk.
- 4.6.3 The geocellular units and geotextile are proprietary products and therefore manufacturer's recommendations should also be taken into consideration.
- 4.6.4 The geocellular units proposed are Polystorm PSM1 & PSM4 units by Polypipe.
- 4.6.5 Access for maintenance has been provided by an access shaft located on the tank and from the manhole chambers downstream of the tank.
- 4.6.6 Regular inspection and maintenance are important for the effective operation of attenuation tanks as designed. As the feature is buried, a regular inspection regime is very important to ensure the correction functionality of the surface water drainage network.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets, outlets and overflows for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly

	Remove sediment from pre-treatment structures.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets, outlets and overflows.	As required.

4.7 Flow Control Units

- 4.7.1 The locations of the smart filter are indicated on Curtin's drainage drawing 500991-CUR-ZZ-00-DR-C-9500..
- 4.7.2 The flow control units are intended for flood control and flow restriction.
- 4.7.3 The flow controls are specified as Hydro-brake and are proprietary products; therefore, manufacturer's recommendations should also be taken into consideration.
- 4.7.4 The product reference for the flow control unit in manhole SW7 is Hydro-brake Optimum MD-SHE-0095-5000-1750-5000.
- 4.7.5 Access for maintenance has been provided by locating within manhole chambers.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly

	Remove sediment from pre-treatment structures and flow control chambers.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets.	As required.

4.8 Filter Chamber

- 4.8.1 The locations of the filter chamber are indicated on Curtin's drainage drawing 500991-CUR-ZZ-00-DR-C-9500..
- 4.8.2 The smart filters are intended for a second or third stage treatment for water quality.
- 4.8.3 The Smart Filters are specified as Naylor Smart Filter and are proprietary products and therefore manufacturer's recommendations should also be taken into consideration.
- 4.8.4 The product number for the smart filter chambers is SF03.1A Naylor Smart Filter Chamber.
- 4.8.5 Access for maintenance has been provided by locating within manhole chambers.
- 4.8.6 Sediment\material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the chamber containing smart filters.

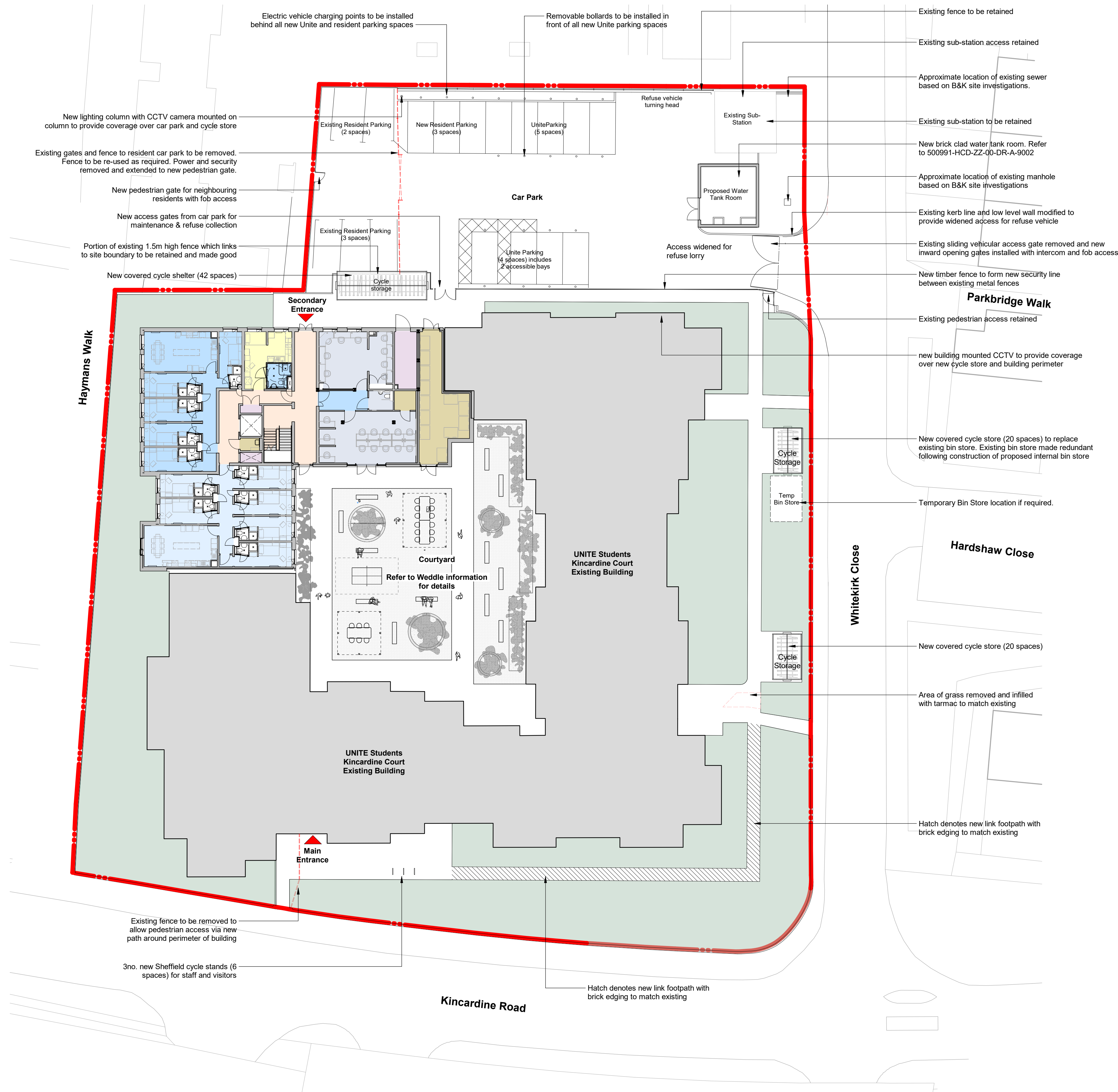
Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets and outlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.

Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures and filter chambers.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets/outlets.	As required.

Appendix A

Proposed Site Layout

Proposed Floor Plans



NOTES

DO NOT SCALE FROM THIS DRAWING.
VERIFY ALL DIMENSIONS AND SETTING OUT ON SITE.
NOTIFY ANY DISCREPANCIES TO THE ARCHITECT.
FOR STRUCTURAL INFORMATION, REFER TO
STRUCTURAL ENGINEER'S DRAWINGS.
FOR M&E INFORMATION, REFER TO M&E ENGINEER'S
AND SUB-CONTRACTORS' DRAWINGS.
FOR HEALTH & SAFETY INFORMATION, REFER TO
HEALTH & SAFETY RISK ASSESSMENTS.

0 m 5 10 15 20
1:200

Key

--- UNITE Ownership Site
--- Boundary based on
confirmation by UNITE
and K2 Consultancy.

REVISION P06 BY DJV CHECKED - DATE: 17/05/2022
Cycle storage provision revised. Courtyard landscape proposal added. Furniture layout added to proposed build. New path shown hatched. Proposed low wall between building and car park omitted. Annotation generally updated

REVISION P05 BY DHB CHECKED - DATE: 05/11/2021
Water Tank Room size and position revised. Building layout updated.

REVISION P04 BY NH CHECKED: APS DATE: 04/08/2021
Cycle storage provision updated as to Planning approval. Vehicle tracking from Curtins placed onto car park plan. Drawing numbering convention changed in line with B&K standard.

REVISION P03 BY NH CHECKED: APS DATE: 26/07/2021
Existing fence line behind cycle store anotation added for clarity. Linking path around building from the main entrance to link with existing path adjacent to Whitekirk Close. Fence adjacent to Main Entrance now removed once other items are completed. Temporary Bin Store added and small patch of grass removed and infilled with tarmac. Cycle parking notes revised. 5no. cycle parking hoops placed adjacent to the main entrance, as required as part of Planning.

REVISION P02 BY NH CHECKED: NH DATE: 23/07/2021
Site boundary line added to drawing. Site boundary line now showing existing resident car parking as part of UNITE Ownership. Fence line retained around carpark to maintain secure line. Resident's pedestrian gate added to rear end of car park. Bollards removed from additional resident's car parking spaces. Water Tank Room moved 3m from main sewer line to ensure clearance of easement zone.

REVISION P01 BY NH CHECKED: APS DATE: 01/07/2021
First issue.

SUBMITTAL

S3 | FOR REVIEW & COMMENT

CLIENT

UNITE STUDENTS & Bowmer & Kirkland

PROJECT

Kincardine Court Manchester

TITLE

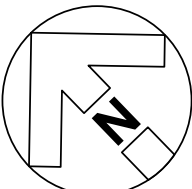
GA Site Plan

Hadfield Cawkwell Davidson

Broomgrove Lodge, 13 Broomgrove Rd, Sheffield, S10 2LZ T 0114 266 8181 www.hcd.co.uk

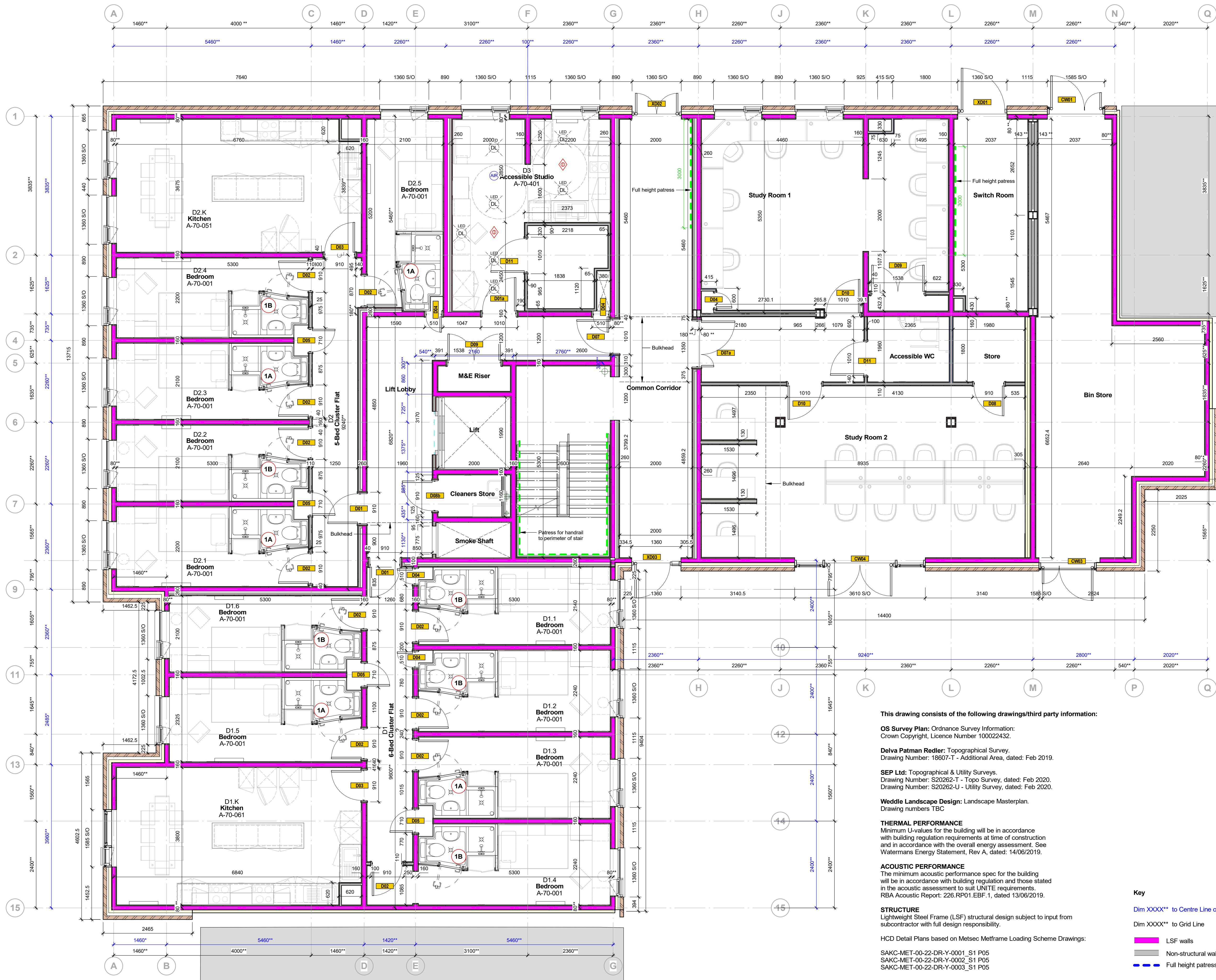
HCD PROJECT NO 2017-044	SCALE 1 : 200 @ A1	REV. P06
PROJECT NO 500991	ORGANISATION HCD ZZ 00 DR	ROLE - NUMBER A-9001

C:\temp\17044-HCD-A0-ZZ-MS-A-20-001_Building_W521_dan_vesder.rvt | © HCD



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NOTIFY ANY DISCREPANCIES TO THE ARCHITECT.
FOR STRUCTURAL INFORMATION, REFER TO
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FOR M&E INFORMATION, REFER TO M&E ENGINEER'S
AND SUB-CONTRACTORS' DRAWINGS.
FOR HEALTH & SAFETY INFORMATION, REFER TO
HEALTH & SAFETY RISK ASSESSMENTS.

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1:50



- REVISION C05 BY: DJV CHECKED: DATE: 11/05/2022
Set-out dimension for accessible studio bathroom door added
- REVISION C04 BY: DJV CHECKED: DATE: 14/03/2022
Common area furniture layout updated. MVHR added to 5 bed kitchen
- REVISION C03 BY: DJV CHECKED: DATE: 24/02/2022
Study booth partitions and bulkhead added to common room. Bedroom D1.4 entrance door revised. External door XD02 revised
- REVISION C02 BY: DJV CHECKED: DATE: 10/02/2022
Brickwork set-out dimensions revised at GL-A / GL-13
- REVISION C01 BY: DJV CHECKED: DATE: 27/01/2022
Kitchen layouts revised to reflect post-graduate spec. Patress indicated to staircase, main entrance and switch room. Position of wall between common room / corridor revised and position of door D10 & D11 revised. Boxing-out within switch room added. Cleaners store layout revised. Drawing issued for construction.
- REVISION P05 BY: DJV CHECKED: DATE: 14/12/2021
Furniture layout added to common/study rooms. Internal glazing omitted from common room. Access door added to services riser in Study Room. Boxing around dry riser inlet added to study room. Cleaners Store door reference revised. LSF omitted between lift shaft & corridor and smoke shaft & corridor
- REVISION P04 BY: DJV CHECKED: DATE: 15/10/2021
Flat entrance door to Accessible studio revised. Partitions in common area revised to accommodate columns and X-bracing
- REVISION P03 BY: DJV CHECKED: DATE: 01/10/2021
Layout revised to common room and adjacent study room, store room and accessible wc. Flat & room references added. bathroom pod references added, internal & external door references added. Room D2.5 & D3 riser access doors added.
- REVISION P02 BY: DHB CHECKED: DATE: 27/08/2021
Stair and lift core revised to suit Kone requirements and accommodate disabled refuge.
- REVISION P01 BY: NH CHECKED: APS DATE: 20/07/2021
First issue.

SUBMITTAL
A | FOR CONSTRUCTION

CLIENT



PROJECT
**Kincardine Court
Manchester**

TITLE

Detail Floor Plan - Level 00

Hedfield Cawkwell Davidson				
Broomgrove Lodge, 13 Broomgrove Rd, Sheffield, S10 2LZ T 0114 266 8181 www.hcd.co.uk				
HCD PROJECT NO	SCALE	REV	C05	
2017-044	1:50 @ A1			
PROJECT NO	ORIGINATOR	VOLUME	LEVEL	TYPE
500991	HCD	ZZ	00	DR
				NO. & NAME
				A-2000

This drawing consists of the following drawings/third party information:

OS Survey Plan: Ordnance Survey Information:
Crown Copyright, Licence Number 100022432.

Delva Patman Redler: Topographical Survey.
Drawing Number: 18607-T - Additional Area, dated: Feb 2019.

SEP Ltd: Topographical & Utility Surveys.
Drawing Number: S20262-T - Topo Survey, dated: Feb 2020.
Drawing Number: S20262-U - Utility Survey, dated: Feb 2020.

Weddle Landscape Design: Landscape Masterplan.
Drawing numbers TBC

THERMAL PERFORMANCE
Minimum U-values for the building will be in accordance with building regulation requirements at time of construction and in accordance with the overall energy assessment. See Watermans Energy Statement, Rev A, dated: 14/06/2019.

ACOUSTIC PERFORMANCE
The minimum acoustic performance spec for the building will be in accordance with building regulation and those stated in the acoustic assessment to suit UNITE requirements. RBA Acoustic Report: 226.RP01.EBF.1, dated 13/06/2019.

STRUCTURE
Lightweight Steel Frame (LSF) structural design subject to input from subcontractor with full design responsibility.

HCD Detail Plans based on Metsec Metframe Loading Scheme Drawings:

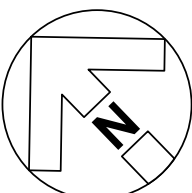
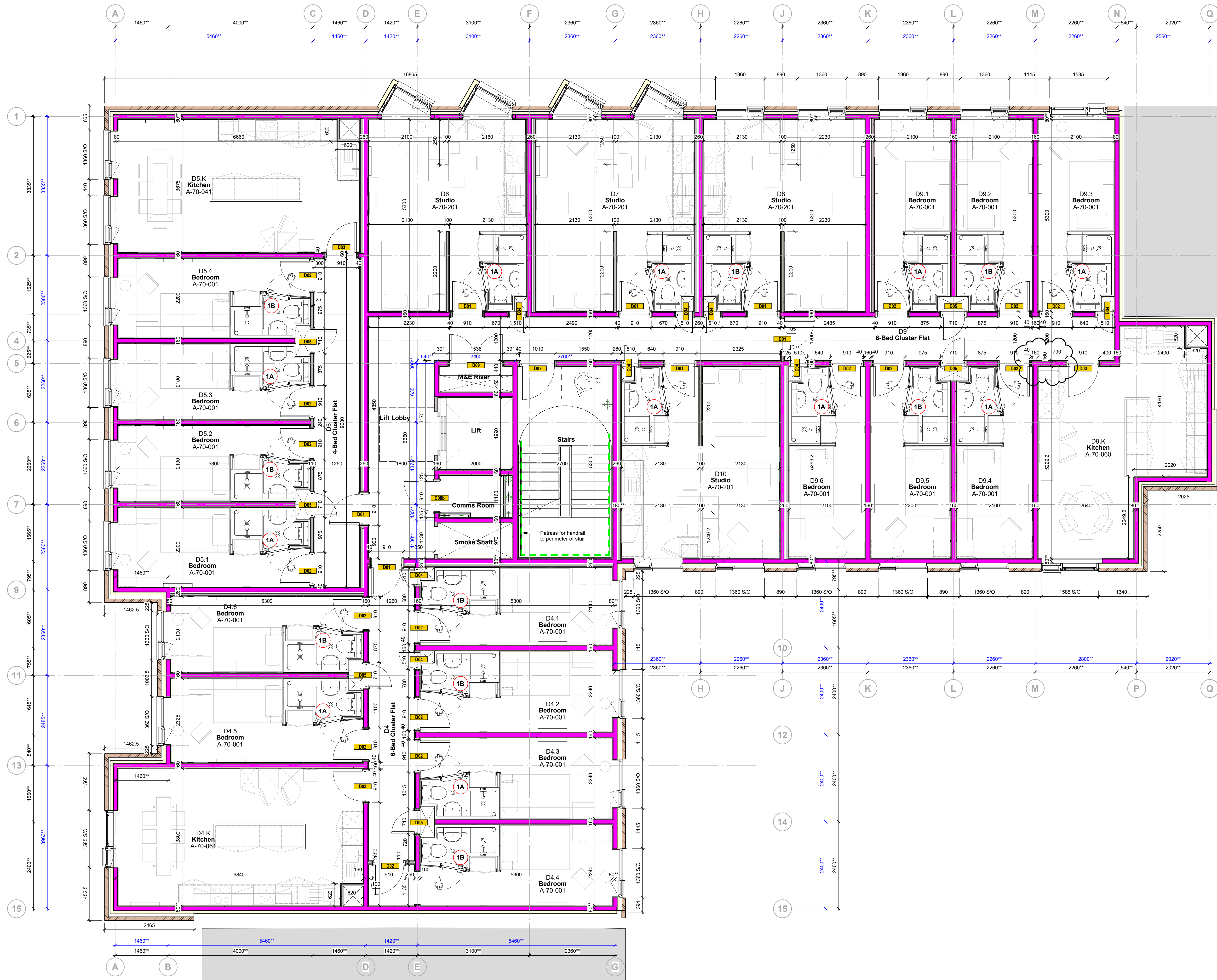
SAKC-MET-00-22-DR-Y-0001_S1 P05
SAKC-MET-00-22-DR-Y-0002_S1 P05
SAKC-MET-00-22-DR-Y-0003_S1 P05

Key

Dim XXXX** to Centre Line of LSF

Dim XXXX** to Grid Line

- LSF walls
- Non-structural walls
- Full height patress



DO NOT SCALE FROM THIS DRAWING. VERIFY ALL DIMENSIONS AND SETTING OUT ON SITE. NOTIFY ANY DISCREPANCIES TO THE ARCHITECT. FOR STRUCTURAL INFORMATION, REFER TO STRUCTURAL ENGINEER'S DRAWINGS. FOR M&E INFORMATION, REFER TO M&E ENGINEER'S AND SUB-CONTRACTORS' DRAWINGS. FOR HEALTH & SAFETY INFORMATION, REFER TO HEALTH & SAFETY RISK ASSESSMENTS.

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1:50

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OS Survey Plan: Ordnance Survey Information: Crown Copyright, Licence Number 100022432.

Delva Patman Redler: Topographical Survey. Drawing Number: 18607-T - Additional Area, dated: Feb 2019.

SEP Ltd: Topographical & Utility Surveys. Drawing Number: S20262-T - Topo Survey, dated: Feb 2020. Drawing Number: S20262-U - Utility Survey, dated: Feb 2020.

Weddie Landscape Design: Landscape Masterplan. Drawing numbers TBC

THERMAL PERFORMANCE
Minimum U-values for the building will be in accordance with building regulation requirements at time of construction and in accordance with the overall energy assessment. See Watermans Energy Statement, Rev A, dated: 14/06/2019.

ACOUSTIC PERFORMANCE
The minimum acoustic performance spec for the building will be in accordance with building regulation and those stated in the acoustic assessment to suit UNITE requirements. RBA Acoustic Report: 226.RP01.EBF.1, dated 13/06/2019.

STRUCTURE
Lightweight Steel Frame (LSF) structural design subject to input from subcontractor with full design responsibility.

HCD Detail Plans based on Metsec Metframe Loading Scheme Drawings:

SAKC-MET-00-22-DR-Y-0001_S1 P05
SAKC-MET-00-22-DR-Y-0002_S1 P05
SAKC-MET-00-22-DR-Y-0003_S1 P05

Key

- Dim XXXX** to Centre Line of LSF
- Dim XXXX** to Grid Line
- LSF walls
- Non-structural walls
- Full height patress

REVISION C03 BY: DJV CHECKED: DATE: 14/03/2022

Space for additional drain provided next to MVHR in non-standard 6 bed kitchen

REVISION C02 BY: DJV CHECKED: DATE: 24/02/2022

Bedroom D4.4 entrance door revised

REVISION C01 BY: DJV CHECKED: DATE: 27/01/2022

Kitchen layouts revised to reflect post-graduate spec. Patress indicated to staircase. Comms room layout revised. Drawing issued for construction.

REVISION P04 BY: DJV CHECKED: DATE: 14/12/2021

Cleaners Store door reference revised. LSF omitted between lift shaft & corridor and smoke shaft & corridor

REVISION P03 BY: DJV CHECKED: DATE: 01/10/2021

Flat and room references added, bathroom pod references added, internal door references added.

REVISION P02 BY: DHB CHECKED: DATE: 27/08/2021

Stair and lift core revised to suit Kone requirements and accommodate disabled refuge.

REVISION P01 BY: NH CHECKED: APS DATE: 20/07/2021

First issue.

SUBMITTAL

A | FOR CONSTRUCTION

CLIENT



PROJECT

Kincardine Court Manchester

TITLE

Detail Floor Plan - Level 01

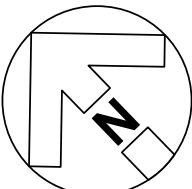
Hadfield Cawkwell Davidson

Broomgrove Lodge, 13 Broomgrove Rd, Sheffield, S10 2LZ T 0114 266 8181 www.hcd.co.uk

HCD PROJECT NO: 2017-044 SCALE: As indicated @ A1 REV: C03

PROJECT NO: 500991 ORIGINATOR: HCD ZZ 01 DR: A-2001

C:\temp\17044-HCD-A0-ZZ-MS-A-20-01_Building_W521_dan.vender.rvt | © HCD



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AND SUB-CONTRACTORS' DRAWINGS.
FOR HEALTH & SAFETY INFORMATION, REFER TO
HEALTH & SAFETY RISK ASSESSMENTS.

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1:50

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OS Survey Plan: Ordnance Survey Information:
Crown Copyright, Licence Number 100022432.

Delva Patman Redler: Topographical Survey.
Drawing Number: 18607-T - Additional Area, dated: Feb 2019.

SEP Ltd: Topographical & Utility Surveys.
Drawing Number: S20262-T - Topo Survey, dated: Feb 2020.
Drawing Number: S20262-U - Utility Survey, dated: Feb 2020.

Weddie Landscape Design: Landscape Masterplan.
Drawing numbers TBC

THERMAL PERFORMANCE
Minimum U-values for the building will be in accordance with building regulation requirements at time of construction and in accordance with the overall energy assessment. See Watermans Energy Statement, Rev A, dated: 14/06/2019.

ACOUSTIC PERFORMANCE
The minimum acoustic performance spec for the building will be in accordance with building regulation and those stated in the acoustic assessment to suit UNITE requirements. RBA Acoustic Report: 226.RP01.EBF.1, dated 13/06/2019.

STRUCTURE
Lightweight Steel Frame (LSF) structural design subject to input from subcontractor with full design responsibility.

HCD Detail Plans based on Metsec Metframe Loading Scheme Drawings:

SAKC-MET-00-22-DR-Y-0001_S1 P05
SAKC-MET-00-22-DR-Y-0002_S1 P05
SAKC-MET-00-22-DR-Y-0003_S1 P05

Key

Dim XXXX** to Centre Line of LSF

Dim XXXX** to Grid Line

LSF walls
Non-structural walls
Full height patress

REVISION C03 BY: DJV CHECKED: DATE: 14/03/2022

Space for additional drain provided next to MVHR in non-standard 6 bed kitchen

REVISION C02 BY: DJV CHECKED: DATE: 24/02/2022

Bedroom D11.4 entrance door revised

REVISION C01 BY: DJV CHECKED: DATE: 27/01/2022

Kitchen layouts revised to reflect post-graduate spec. Patress indicated to staircase. Store room layout revised. Drawing issued for construction.

REVISION P04 BY: DJV CHECKED: DATE: 14/12/2021

Cleaners Store door reference revised. LSF omitted between lift shaft & corridor and smoke shaft & corridor

REVISION P03 BY: DJV CHECKED: DATE: 01/10/2021

Flat and room references added, bathroom pod references added, internal door references added.

REVISION P02 BY: DHB CHECKED: DATE: 27/08/2021

Stair and lift core revised to suit Kone requirements and accommodate disabled refuge.

REVISION P01 BY: NH CHECKED: APS DATE: 20/07/2021

First issue.

SUBMITTAL

A | FOR CONSTRUCTION

CLIENT

UNITE STUDENTS **Bowmer & Kirkland**

PROJECT

Kincardine Court Manchester

TITLE

Detail Floor Plan - Level 02

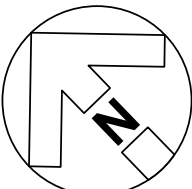
Hadfield Cawkwell Davidson

Broomgrove Lodge, 13 Broomgrove Rd, Sheffield, S10 2LZ T 0114 266 8181 www.hcd.co.uk

HCD PROJECT NO. 2017-044 SCALE As indicated @ A1 REV. C03

PROJECT NO. 500991 ORIGINATOR HCD ZZ 02 DR TYPE A-2002

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FOR STRUCTURAL INFORMATION, REFER TO
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FOR M&E INFORMATION, REFER TO M&E ENGINEER'S
AND SUB-CONTRACTORS' DRAWINGS.
FOR HEALTH & SAFETY INFORMATION, REFER TO
HEALTH & SAFETY RISK ASSESSMENTS.

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1:50

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OS Survey Plan: Ordnance Survey Information:
Crown Copyright, Licence Number 100022432.

Delva Patman Redler: Topographical Survey.
Drawing Number: 18607-T - Additional Area, dated: Feb 2019.

SEP Ltd: Topographical & Utility Surveys.
Drawing Number: S20262-T - Topo Survey, dated: Feb 2020.
Drawing Number: S20262-U - Utility Survey, dated: Feb 2020.

Weddie Landscape Design: Landscape Masterplan.
Drawing numbers TBC

THERMAL PERFORMANCE

Minimum U-values for the building will be in accordance with building regulation requirements at time of construction and in accordance with the overall energy assessment. See Watermans Energy Statement, Rev A, dated: 14/06/2019.

ACOUSTIC PERFORMANCE

The minimum acoustic performance spec for the building will be in accordance with building regulation and those stated in the acoustic assessment to suit UNITE requirements. RBA Acoustic Report: 226.RP01.EBF.1, dated 13/06/2019.

STRUCTURE

Lightweight Steel Frame (LSF) structural design subject to input from subcontractor with full design responsibility.

HCD Detail Plans based on Metsec Metframe Loading Scheme Drawings:

SAKC-MET-00-22-DR-Y-0001_S1 P05
SAKC-MET-00-22-DR-Y-0002_S1 P05
SAKC-MET-00-22-DR-Y-0003_S1 P05

REVISION C03 BY: DJV CHECKED: - DATE: 14/03/2022
MVHR added to 5 bed kitchen. Concrete plynths omitted from plant room

REVISION C02 BY: DJV CHECKED: - DATE: 24/02/2022
Bedroom D25.4 entrance door revised

REVISION C01 BY: DJV CHECKED: - DATE: 27/01/2022
Kitchen layouts revised to reflect post-graduate spec. Door XD10 handed. Patress indicated to staircase and plant room. Store room layout revised. Drawing issued for construction.

REVISION P06 BY: DJV CHECKED: - DATE: 14/12/2021
Cleaners Store door reference revised. LSF omitted between lift shaft & corridor and smoke shaft & corridor. Internal plant room access door added. Roof access lobby door reference revised

REVISION P05 BY: DJV CHECKED: - DATE: 22/11/2021
Metsec floor and wall information shown on plan. Equipment access door from roof added to plant room

REVISION P04 BY: DHB CHECKED: - DATE: 12/11/2021
Roof access lobby added.

REVISION P03 BY: DJV CHECKED: - DATE: 01/10/2021
Flat & room references added, bathroom pod references added, internal & external door references added.

REVISION P02 BY: DHB CHECKED: - DATE: 27/08/2021
Stair and lift core revised to suit Kone requirements and accommodate disabled refuge.

REVISION P01 BY: NH CHECKED: APS DATE: 20/07/2021
First issue.

SUBMITTAL

A | FOR CONSTRUCTION

CLIENT



**Kincardine Court
Manchester**

TITLE

Detail Floor Plan - Level 04

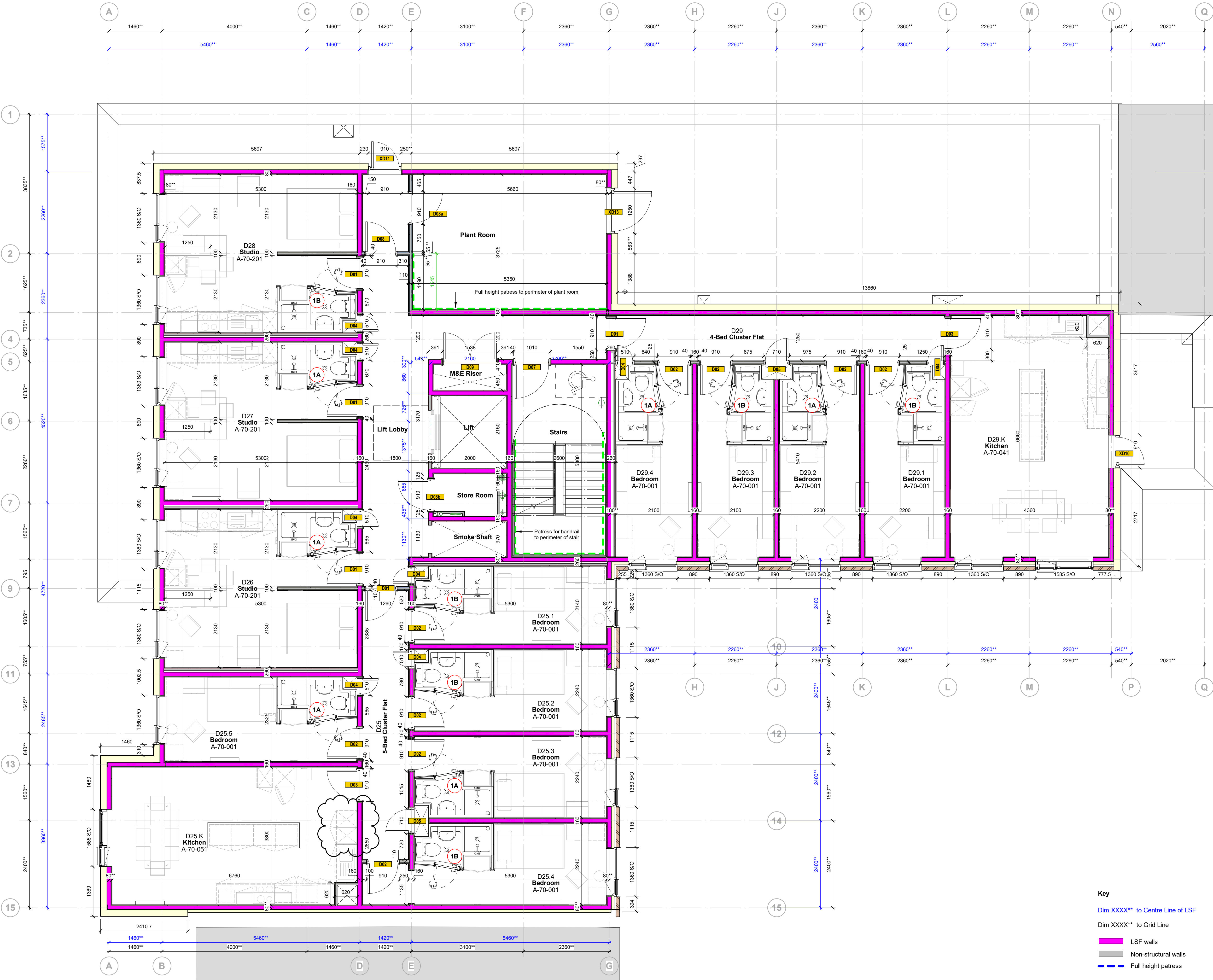


Broomgrove Lodge, 13 Broomgrove Rd, Sheffield, S10 2LZ T 0114 266 8181 www.hcd.co.uk

HCD PROJECT NO. 2017-044 SCALE As indicated @ A1 REV. C03

PROJECT NO. 500991 ORIGINATOR HCD ZZ 04 DR TYPE A-2004

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Key

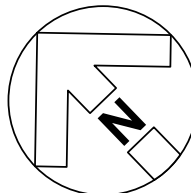
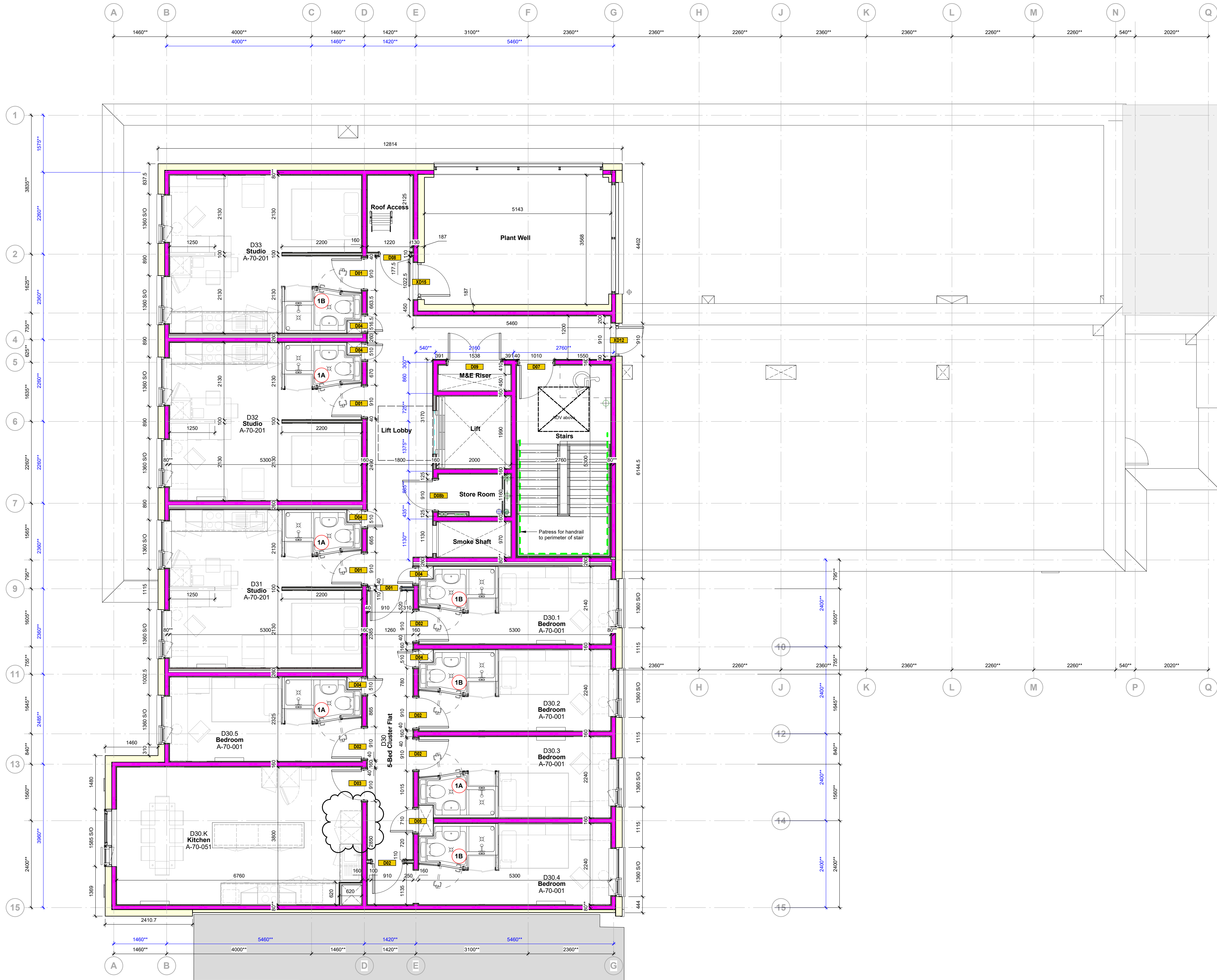
Dim XXXX** to Centre Line of LSF

Dim XXXX** to Grid Line

LSF walls

Non-structural walls

Full height patress



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AND SUB-CONTRACTORS' DRAWINGS.
FOR HEALTH & SAFETY INFORMATION, REFER TO
HEALTH & SAFETY RISK ASSESSMENTS.

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1:50

This drawing consists of the following drawings/third party information:

OS Survey Plan: Ordnance Survey Information:
Crown Copyright, Licence Number 100022432.

Delva Patman Redler: Topographical Survey.
Drawing Number: 18607-T - Additional Area, dated: Feb 2019.

SEP Ltd: Topographical & Utility Surveys.
Drawing Number: S20262-T - Topo Survey, dated: Feb 2020.
Drawing Number: S20262-U - Utility Survey, dated: Feb 2020.

Weddie Landscape Design: Landscape Masterplan.
Drawing numbers TBC

THERMAL PERFORMANCE

Minimum U-values for the building will be in accordance with building regulation requirements at time of construction and in accordance with the overall energy assessment. See Watermans Energy Statement, Rev A, dated: 14/06/2019.

ACOUSTIC PERFORMANCE

The minimum acoustic performance spec for the building will be in accordance with building regulation and those stated in the acoustic assessment to suit UNITE requirements. RBA Acoustic Report: 226.RP01.EBF.1, dated 13/06/2019.

STRUCTURE

Lightweight Steel Frame (LSF) structural design subject to input from subcontractor with full design responsibility.

HCD Detail Plans based on Metsec Metframe Loading Scheme Drawings:

SAKC-MET-00-22-DR-Y-0001_S1 P05
SAKC-MET-00-22-DR-Y-0002_S1 P05
SAKC-MET-00-22-DR-Y-0003_S1 P05

Key

Dim XXXX** to Centre Line of LSF

Dim XXXX** to Grid Line

LSF walls
Non-structural walls
Full height patress

REVISION C03 BY: DJV CHECKED: DATE: 14/03/2022

MVHR added to 5 bed kitchen

REVISION C02 BY: DJV CHECKED: DATE: 24/02/2022

Bedroom D30.4 entrance door revised

REVISION C01 BY: DJV CHECKED: DATE: 27/01/2022

Kitchen layout revised to reflect post-graduate spec. Patress indicated to staircase. Cleaners store layout revised. Drawing issued for construction.

REVISION P04 BY: DJV CHECKED: DATE: 14/12/2021

Cleaners Store door reference revised. LSF omitted between lift shaft & corridor and smoke shaft & corridor. Plant well access door reference revised. Position of stair AOV revised. Roof access ladder position revised

REVISION P03 BY: DJV CHECKED: DATE: 01/10/2021

Flat & room references added, bathroom pod references added, internal & external door references added.

REVISION P02 BY: DHB CHECKED: DATE: 27/08/2021

Stair and lift core revised to suit Kone requirements and accommodate disabled refuge.

REVISION P01 BY: NH CHECKED: APS DATE: 20/07/2021

First issue.

SUBMITTAL

A | FOR CONSTRUCTION

CLIENT



PROJECT

**Kincardine Court
Manchester**

TITLE

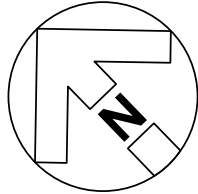
Detail Floor Plan - Level 05

Hadfield Cawkwell Davidson
Broomgrove Lodge, 13 Broomgrove Rd, Sheffield, S10 2LZ T 0114 266 8181 www.hcd.co.uk

HCD PROJECT NO. 2017-044 SCALE As indicated @ A1 REV. C03

PROJECT NO. 500991 ORIGINATOR HCD ZZ 05 DR TYPE A-2005

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This drawing consists of the following drawings/third party information:

OS Survey Plan: Ordnance Survey Information:
Crown Copyright, Licence Number 100022432.

Delva Patman Redler: Topographical Survey.
Drawing Number: 18607-T - Additional Area, dated: Feb 2019.

SEP Ltd: Topographical & Utility Surveys.
Drawing Number: S20262-T - Topo Survey, dated: Feb 2020.
Drawing Number: S20262-U - Utility Survey, dated: Feb 2020.

Weddle Landscape Design: Landscape Masterplan.
Drawing numbers TBC

Minimum U-values for the building will be in accordance with building regulation requirements at time of construction and in accordance with the overall energy assessment. See Watermans Energy Statement, Rev A, dated: 14/06/2019.

The minimum acoustic performance spec for the building will be in accordance with building regulation and those stated in the acoustic assessment to suit UNITE requirements.
RBA Acoustic Report: 226.RP01.EBF.1, dated 13/06/2019.

Lightweight Steel Frame (LSF) structural design subject to input from subcontractor with full design responsibility.

HCD Detail Plans based on Metsec Metframe Loading Scheme Drawings:

SAKC-MET-00-22-DR-Y-0001_S1 P05
SAKC-MET-00-22-DR-Y-0002_S1 P05
SAKC-MET-00-22-DR-Y-0003_S1 P05

Dim XXXX** to Centre Line of LSF

Dim XXXX** to Grid Line

- LSF walls
 Non-structural walls
 Full height patress

REVISION: C02 BY: DJV CHECKED: - DATE: 19/04/2022

Stair AOV set-out dimensions revised

REVISION: C01 BY: DJV CHECKED: - DATE: 27/01/2022

Drawing issued for construction

REVISION: P04 BY: DJV CHECKED: - DATE: 14/12/2021

Plant room access hatch omitted. Stair AOV position revised.
Corridor AOV position and size revised

REVISION: P03 BY: DJV CHECKED: - DATE: 12/11/2021

Stair AOV and corridor AOV size and position revised. Personell access hatch position revised. Parapet to junction with existing building introduced. Lower levels shown indicatively.

REVISION: P02 BY: DHB CHECKED: - DATE: 27/08/2021

Lift core over-run revised to suit Kone requirements.

REVISION: P01 BY: NH CHECKED: APS DATE: 20/07/2021

First issue.

SUITABILITY

A | FOR CONSTRUCTION



PROJECT _____

**Kincardine Court
Manchester**

TITLE

Detail Floor Plan - Level 06

Hadfield Cawkwell Davidson

Broomgrove Lodge, 13 Broomgrove Rd, Sheffield, S10 2LZ T 0114 266 8181 www.hcd.co.uk

HCD PROJECT NO. 2017-044	SCALE As indicated @ A1	REV. C02
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PROJECT NO.	ORIGINATOR	VOLUME	LEVEL	TYPE	ROLE + NUMBER
500991	HCD	ZZ	06	DR	A-2006

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Appendix B

United Utilities Public Sewer Records *ref: UUPS-ORD-89235*

Correspondence from United Utilities

Curtins Consulting Ltd

**51-55
Tithebarn Street,
Liverpool,
L2 2SB**

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

**Your Ref: Kincardine Court
Our Ref: UUPS-ORD-89235
Date: 08/03/2019**

Dear Sirs

Location: Kincardine Court 20 Kincardine Road, Manchester, M13 9JA

I acknowledge with thanks your request dated 07/03/2019 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,



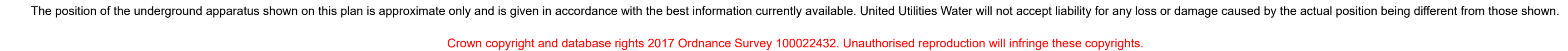
Karen McCormack
Property Searches Manager

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.



7102 39.82 CO 33.77 630 BR 24-33939 1 in 81

Andy Losty

From: Dodd, Matthew <Matthew.Dodd@uuplc.co.uk>
Sent: 10 April 2019 11:30
To: Andy Losty
Cc: Wastewater Developer Services
Subject: RE: Kincardine Court, Manchester. Pre-Development Enquiry 4200025247 Due date 12/04/2019

Follow Up Flag: Follow up
Flag Status: Completed

Good Morning

We have carried out an assessment of your application which is based on the information provided; this pre development advice will be valid for 12 months

Foul

Foul will be allowed to drain to the public combined sewer network at an unrestricted rate.

Surface Water

Surface water from this site must drain to soak away or some other form of infiltration system but if ground conditions confirm that this is not a viable solution all surface water can drain to the combined sewer network at a maximum pass forward flow of 5 l/s.

Connection Application

Although we may discuss and agree discharge points & rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below

<http://www.unitedutilities.com/connecting-public-sewer.aspx>

Please be aware that on site drainage must be designed in accordance with Building Regulations, National Planning Policy, and local flood authority guidelines, we would recommend that you speak and make suitable agreements with the relevant statutory bodies.

Please note, if you intend to put forward your wastewater assets for adoption by United Utilities, the proposed detail design will be subject to a technical appraisal by an Adoption Engineer as we need to be sure that the proposals meets the requirements of Sewers for adoption and United Utilities Asset Standards. The proposed design should give consideration to long term operability and give United Utilities a cost effective proposal for the life of the assets. Therefore, further to this enquiry should you wish to progress a Section 104 agreement, we strongly recommend that no construction commences until the detailed drainage design, submitted as part of the Section 104 agreement, has been assessed and accepted in writing by United Utilities. Any works carried out prior to the technical assessment being approved is done entirely at the developers own risk and could be subject to change.

Regards

Matthew Dodd
Assistant Developer Engineer
Developer Services and Planning

If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

From: Andy Losty [<mailto:Andy.Losty@curtins.com>]
Sent: 31 March 2019 08:01
To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Subject: Kincardine Court, Manchester. Pre-Development Enquiry

Dear Sirs

Please find attached a Pre-Development Application for an extension at the Unite Students Kincardine Court site in Manchester.

Also attached are:

- Site Location Plan
- Proposed Site Plan

The proposed discharge from the site is subject to a 50% reduction from the pre-development flows, in line with Manchester City Council's planning requirements.

The existing site drainage details are not known. However, a simplified model has been used to estimate existing surface water flows.

The existing flows have been estimated at:

- 1-year 7.8 l/s
- 30-year 20.4 l/s
- 100-year 24.7 l/s

Therefore, the proposed reduced discharge rates are:

- 1-year 3.9 l/s
- 30-year 10.2 l/s
- 100-year 12.4 l/s

I look forward to hearing from you. If you need any further information, please do not hesitate to contact me.

Regards

Andy Losty
Project Engineer
T. 0161 236 2394
andy.losty@curtins.com

Merchant Exchange
17-19 Whitworth Street West
Manchester M1 5WG



EMGateway3.uuplc.co.uk made the following annotations

The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries

S106 Part 1 'Application to connect to a public sewer' Approval Notice



		ec5647				
Applicant details						
Applicant name	Andrew Losty					
Applicant address (including postcode)	Curtins Merchant Exchange 17-19 Whitworth Street West Manchester M1 5WG					
Applicant email	andy.losty@curtins.com					
Site details: The site / property which is proposed for connection to the public sewer						
	Kincardine Court Kincardine Road Manchester, M13 9SY					
APPROVED						
Your application for connection to the public sewer has been approved, to be made via a new connection:						
To a private drain	☐	You may appoint your contractor and advise your appointed building control body (who should inspect the work). United Utilities should be advised when this work is complete.				
Direct to the public sewer	☒	Further action required You may now appoint an appropriately qualified contractor. Your appointed contractor is responsible for obtaining authorisation to work on a public sewer. (The S106 Part 2 application form ' Request for permission to work on a public sewer ' is available on our website; unitedutilities.com).				
Mode of connection approved	Junction					
Sewer connection type	Foul	☐	Surface water	☐	Combined	☒
This approval is valid for 12 months from the date below. This approval does not grant access to third party land, permission should be sought if required between applicant and land owner If the new connection renders access unsafe or is otherwise detrimental to the manhole or sewer, a new/upgraded manhole will be requested.						
Comments						
I have approved a junction connection for this site. We are unable to approve a saddle as this will affect the structural integrity of the sewer. Approval for the 225mm combined connection to the existing 375mm combined sewer in Whitekirk Close via a junction attenuation indicate with a flow control restricted to 5l/s The preformed junction should be a 'Y' type laid in the direction of flow. 'T' type junctions are not acceptable. Please see details included in the Sewer Connection Pack. PLEASE NOTE COMMENTS FROM DEVELOPER ENGINEER GRAHAM PERRY IN RELATION TO CONDITION 4 IN YOUR PLANNING DECISION NOTICE - Further to our review of the submitted documents, Drawing 500991 CUR ZZ 00 DR C 9500 C02- Dated 09/11/21, United Utilities recommends that condition 4 is not discharged. Although the principle strategy, where surface water is restricted to 5 l/s is acceptable, the proposed attenuation tank is sited within 3m of the existing public sewer and this could impose loading onto the sewer which could cause failure and access to operate the existing sewer will be impeded. If you have any queries in relation to the tank please speak with Graham Perry For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist it could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.						

Connections may be made to private lateral drains or to existing neighbouring drain. A part 1 approval does not give permission to access third party land. The applicant must seek permission from the relevant land owner.



Appendix C

Topographical Survey

CCTV Survey Plan

Excavation in the vicinity of services shown should be carried out with due diligence (Ref. HSG47).



File Name: S20263-U.dwg

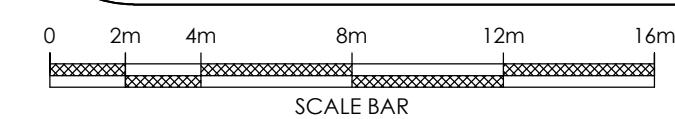
EOT	END OF TRACE	A - Verification
OSA	OUT OF SURVEY AREA	
UTL	UNABLE TO LIFT	B1 - Horizontal/Vertical location using multiple techniques
UTS	UNABLE TO SCHEDULE	B2 - Horizontal/Vertical location using a single technique
UTL	UNABLE TO TRACE	
S/L	SIGNAL LOSS	B3 - Horizontal location using a single technique
BLK	BLOCKED	
NTH	NO FURTHER CPR CONTACTS	B4 - Assumed route
BD	BACKDROP PIPE	
NVP	NO VISIBLE PIPE	C - Site Reconnaissance
UTL	TOP OF FURIE	
UTL	EOT SYMBOL	D - Desktop utility records search
U	BORHOLE	

NOTES:
All levels relate to O.S (Newlyn) Datum. Established using network RTK. Survey plotted on a plane local grid, orientated to National Grid.

This Underground Utilities survey was conducted in compliance with the BSI PAS128:2014 standards. Services in types display text indicating first an abbreviation of the services' function (eg. EL = Electric Cable) followed by the Quality Level to which that service was located (eg. B4 = Assumed route).

Quality Level descriptions shown in the above legend are for reference purposes only and are not intended as detailed descriptions.
For full information on Quality Levels, please consult the
BSI PAS128:2014 standards document.

Lines annotated as GPR indicate a series of consistent subsurface anomalies located using the Ground Penetrating Radar and should be considered as Quality Level B2. The nature of these anomalies could not be determined by non-invasive means. GPR lines that were identifiable as a service are shown as their respective service.



REV	DATE	DESCRIPTION
-----	------	-------------



Client
K2 Consultancy Ltd
3 City Place
Beehive Ring Road
Crawley
Gatwick
RH6 0PA

Project Title
CCTV Survey of Land at:
Kincardine Court
Kincardine Road
Manchester
M13 9JA
Sheet 1 of 1

Surveyed SEP		Drawn J.Cherry		Checked SEP	
Scale 1:200	Date Feb 20	Drawing Ref. S20263-U		No. 01	Size A1

Appendix D

Existing Drainage Calculation Results

Curtins Consulting Ltd		Page 1
. . .		
Date 04/07/2021 14:12	Designed by losty_a	
File Proposed Drainage 21.07....	Checked by	
Innovyze	Network 2019.1	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.359
Region	England and Wales	Cv (Summer)	1.000
M5-60 (mm)	18.000	Cv (Winter)	1.000

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
EX1.000	EX8	30 Summer	1	+0%	1/15 Summer				37.680
EX1.001	EX7	30 Summer	1	+0%	1/15 Summer				37.663
EX1.002	EX14	1440 Winter	1	+0%	100/15 Summer				37.684
EX1.003	EX15	30 Summer	1	+0%	100/15 Summer				37.600

PN	US/MH Name	Depth (m)	Surcharged Volume (m³)	Flooded Flow / Cap. (l/s)	Pipe Flow (l/s)	Overflow (l/s)	Status	Level
								Exceeded
EX1.000	EX8	0.055	0.000	0.23	10.6		SURCHARGED	
EX1.001	EX7	0.168	0.000	0.21	10.6		SURCHARGED	
EX1.002	EX14	-0.099	0.000	0.04	1.7		OK	
EX1.003	EX15	-0.133	0.000	0.35	10.4		OK	

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Curtins Consulting Ltd						Page 2	
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.							
Date 04/07/2021 14:12				Designed by losty_a			
File Proposed Drainage 21.07....				Checked by			
Innovyze				Network 2019.1			
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>							
<u>Simulation Criteria</u>							
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000	
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000	
Hot Start Level (mm)		0		Inlet Coeffiecient		0.800	
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000	
Foul Sewage per hectare (l/s)		0.000					
Number of Input Hydrographs		0		Number of Offline Controls		0	
Number of Online Controls		0		Number of Storage Structures		0	
				Number of Time/Area Diagrams		0	
				Number of Real Time Controls		0	
<u>Synthetic Rainfall Details</u>							
Rainfall Model		FSR		Ratio R		0.359	
Region England and Wales		Cv (Summer)		1.000			
M5-60 (mm)		18.000		Cv (Winter)		1.000	
Margin for Flood Risk Warning (mm)		300.0		DVD Status		OFF	
Analysis Timestep		Fine		Inertia Status		OFF	
DTS Status		ON					
Profile(s)				Summer and Winter			
Duration(s) (mins)		15, 30, 60, 120, 240, 360, 480, 960, 1440					
Return Period(s) (years)		1, 30, 100					
Climate Change (%)		0, 0, 0					
</							

Curtins Consulting Ltd						Page 3	
.							
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.							
Date 04/07/2021 14:12				Designed by losty_a			
File Proposed Drainage 21.07....				Checked by			
Innovyze				Network 2019.1			
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>							
<u>Simulation Criteria</u>							
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000	
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000	
Hot Start Level (mm)		0		Inlet Coefficient		0.800	
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000	
Foul Sewage per hectare (l/s)		0.000					
Number of Input Hydrographs		0		Number of Offline Controls		0	
Number of Online Controls		0		Number of Storage Structures		0	
				Number of Time/Area Diagrams		0	
				Number of Real Time Controls		0	
<u>Synthetic Rainfall Details</u>							
Rainfall Model		FSR		Ratio R		0.359	
Region England and Wales		Cv (Summer)		1.000			
M5-60 (mm)		18.000		Cv (Winter)		1.000	
Margin for Flood Risk Warning (mm)		300.0		DVD Status		OFF	
Analysis Timestep		Fine		Inertia Status		OFF	
DTS Status		ON					
Profile(s)				Summer and Winter			
Duration(s) (mins)		15, 30, 60, 120, 240, 360, 480, 960, 1440					
Return Period(s) (years)		1, 30, 100					
Climate Change (%)		0, 0, 0					

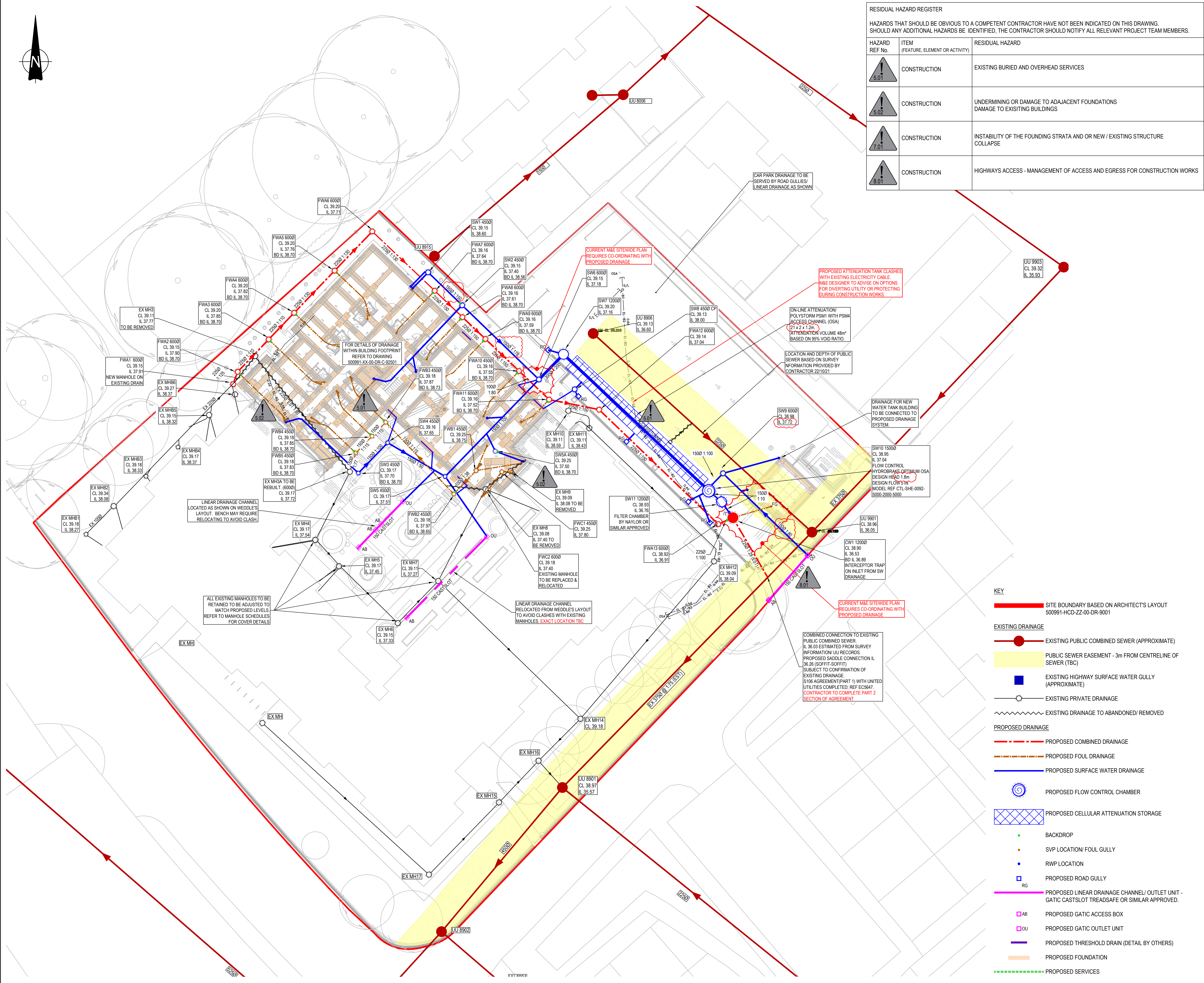
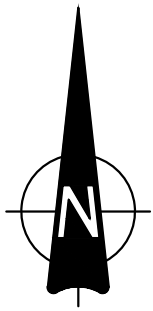
Appendix E

Proposed Drainage Strategy

Overland Flood Plan

Drainage Details

Proposed Drainage Calculations Results



RESIDUAL HAZARD REGISTER		
HAZARDS THAT SHOULD BE OBVIOUS TO A COMPETENT CONTRACTOR HAVE NOT BEEN INDICATED ON THIS DRAWING. SHOULD ANY ADDITIONAL HAZARDS BE IDENTIFIED, THE CONTRACTOR SHOULD NOTIFY ALL RELEVANT PROJECT TEAM MEMBERS.		
HAZARD REF No.	ITEM (FEATURE, ELEMENT OR ACTIVITY)	RESIDUAL HAZARD
5.01	CONSTRUCTION	EXISTING BURIED AND OVERHEAD SERVICES
5.02	CONSTRUCTION	UNDERMINING OR DAMAGE TO ADJACENT FOUNDATIONS DAMAGE TO EXISTING BUILDINGS
7.01	CONSTRUCTION	INSTABILITY OF THE FOUNDING STRATA AND OR NEW / EXISTING STRUCTURE COLLAPSE
8.01	CONSTRUCTION	HIGHWAYS ACCESS - MANAGEMENT OF ACCESS AND EGRESS FOR CONSTRUCTION WORKS

GENERAL NOTES:

FOR DRAINAGE NOTES REFER TO DRAWING 500991-CUR-XX-00-DR-C-92530

DESIGN PHILOSOPHY

SURFACE WATER

EXISTING SW FLOW RATES:
1-YEAR 10.4 l/s
30-YEAR 28.6 l/s
100-YEAR 35.9 l/s
FLOW RATES BASED ON PROPOSED DEVELOPABLE AREA OF 0.18 Ha;
CALCULATED USING A MODEL OF THE EXISTING DRAINAGE NETWORK IN MICRODRAINAGE

SOURCE CONTROL:
PROPOSED DISCHARGE RATES SET AT 5 l/s FOR ALL STORM EVENTS IN ACCORDANCE WITH UNITED UTILITIES REQUIREMENTS;
DRAINAGE MODELS INCLUDE FOR A SURCHARGED OUTFALL LEVEL OF 37.410

STORAGE REQUIREMENT:
48m³ BASED ON CAUSEWAY FLOW DESIGN MODEL. DESIGNED TO HAVE NO FLOODING FOR THE 1:100-YEAR STORM + 40% CLIMATE CHANGE ALLOWANCE.

INFILTRATION:
SITE INVESTIGATION INDICATES THAT THE SUB-STRATA MAY BE SUITABLE FOR INFILTRATION. HOWEVER, DUE TO THE PROPOSED & EXISTING BUILDING LAYOUT, AND ALSO THE EXISTING PUBLIC SEWER UNDER THE CAR PARK, THERE IS INSUFFICIENT SPACE TO LOCATE INFILTRATION FEATURES.

FOUL DRAINAGE

LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED. TBC FOLLOWING FURTHER DESIGN AND SURVEY WORK.

PEAK FOUL FLOWS ESTIMATED USING DISCHARGE UNIT METHOD BASED ON M&E ENGINEER'S ABOVE GROUND DRAINAGE DESIGN:
NETWORK A: 8.9 l/s
NETWORK B: 7.5 l/s

DRAWING REFERENCES

TOPOGRAPHICAL SURVEY (DPR) RECEIVED 07.03.19
18607-T-ADDITIONAL AREA REV A1

ARCHITECT (HCD)
500991-HCD-ZZ-00-DR-A-9001 REV P05 SITE PLAN GA
500991-HCD-ZZ-00-DR-A-0300 REV P03 SITE SETTING OUT PLAN
500991-HCD-ZZ-00-DR-A-2300 REV C01 SLAB SETTING OUT LEVEL 00
500991-HCD-ZZ-00-DR-A-9002 REV C02 WATER TANK ROOM

M&E (AMEON)
500991-AME-ZZ-XX-DR-M-5201 REV C01 LEVEL 00 AGD LAYOUT
500991-AME-ZZ-XX-DR-M-5230 REV C01 AGD SCHEMATIC SHEET 1
500991-AME-ZZ-XX-DR-M-5231 REV C01 AGD SCHEMATIC SHEET 2
500991-AME-ZZ-XX-DR-M-5232 REV C01 RAINWATER SCHEMATIC
500991-AME-ZZ-XX-DR-N-9020 REV C01 SITE WIDE EXTERNAL M&E SERVICES LAYOUT

LANDSCAPE ARCHITECT (WEDDLES)
1280-WLD-00-XX-DR-L-0001 REV-A LANDSCAPE GA PLAN

FOUNDATION LAYOUT (CURTINS)
500991-CUR-XX-00-FN-DR-S-16001 REV C02 FOUNDATION LAYOUT

CCTV SURVEYS:
S20263 CCTV SURVEY BY SEP DATED FEB 2020
ADDITIONAL SURVEY BY TEAM DRAINAGE DATED JUNE 2021

EXISTING PUBLIC SEWERS
PUBLIC SEWER LOCATIONS DERIVED FROM PDF OVERLAY OF UNITED UTILITIES PUBLIC SEWER PLANS. RECEIVED 08.03.19

C06	AMENDED IN LINE WITH LLFA COMMENTS	08.03.22	ATL	ATL
C05	ATTENUATION TANK DETAILS AMENDED, DRAINAGE AMENDED TO SUIT ON-SITE CHANGES	08.02.22	ATL	CG
C04	DRAINAGE AMENDED TO SUIT REVISED EXISTING DRAINAGE LEVELS	23.12.21	ATL	ATL
C03	DRAINAGE AMENDED TO ACCEPT EXISTING COMBINED DRAINAGE	10.12.21	ATL	CG
C02	UPDATED IN LINE WITH DESIGN TEAM COMMENTS	09.11.21	ATL	ATL
C01	CONSTRUCTION ISSUE	20.09.21	ATL	MW
Rev:	Description:	Date:	By:	Chkd:

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
0161 235 2394
manchester@curtins.com
www.curtins.com

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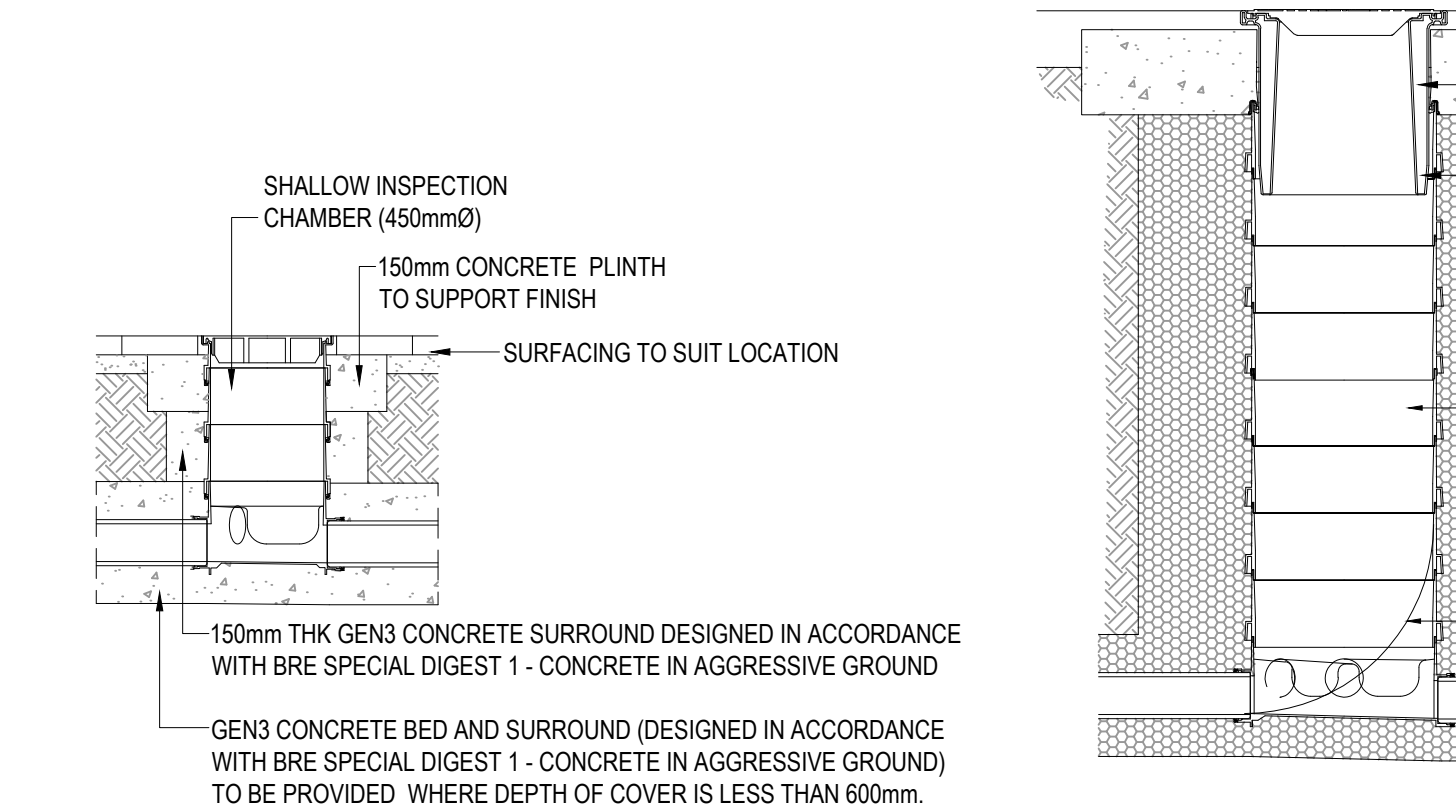
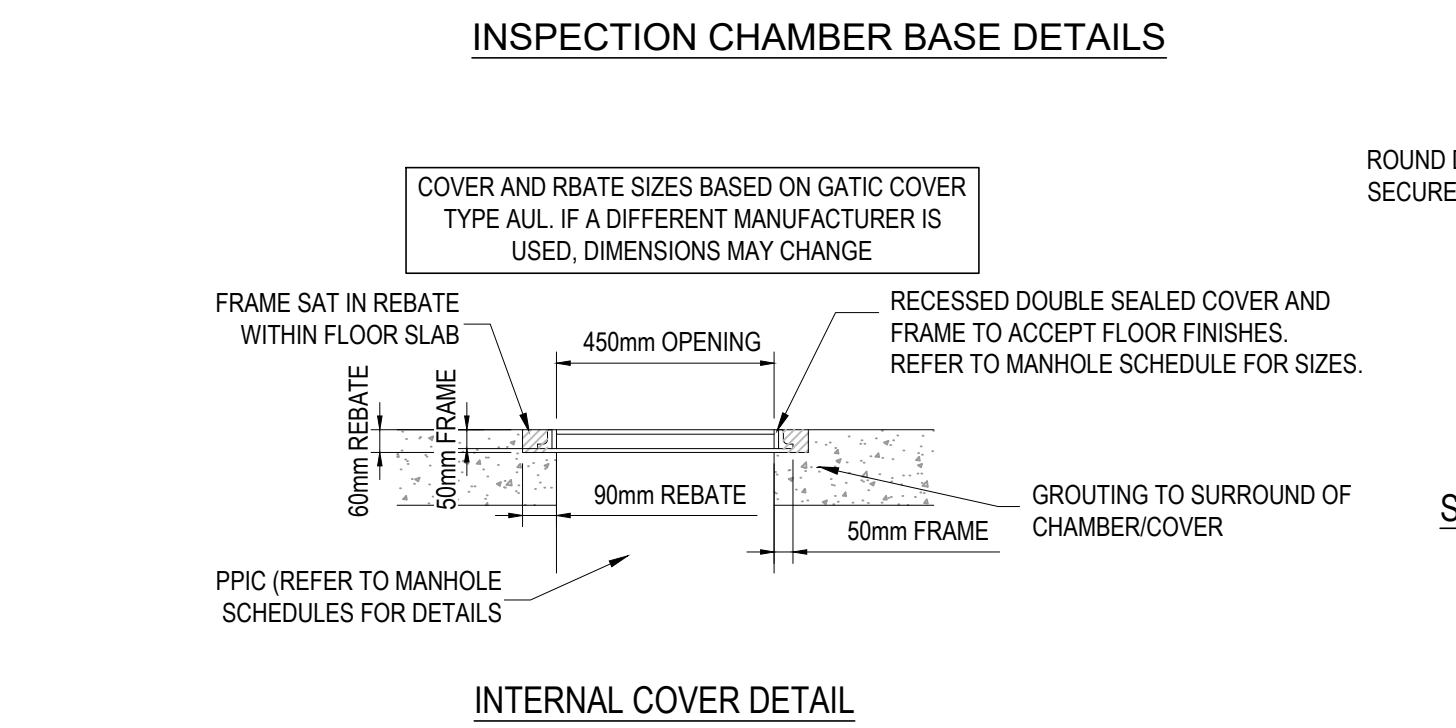
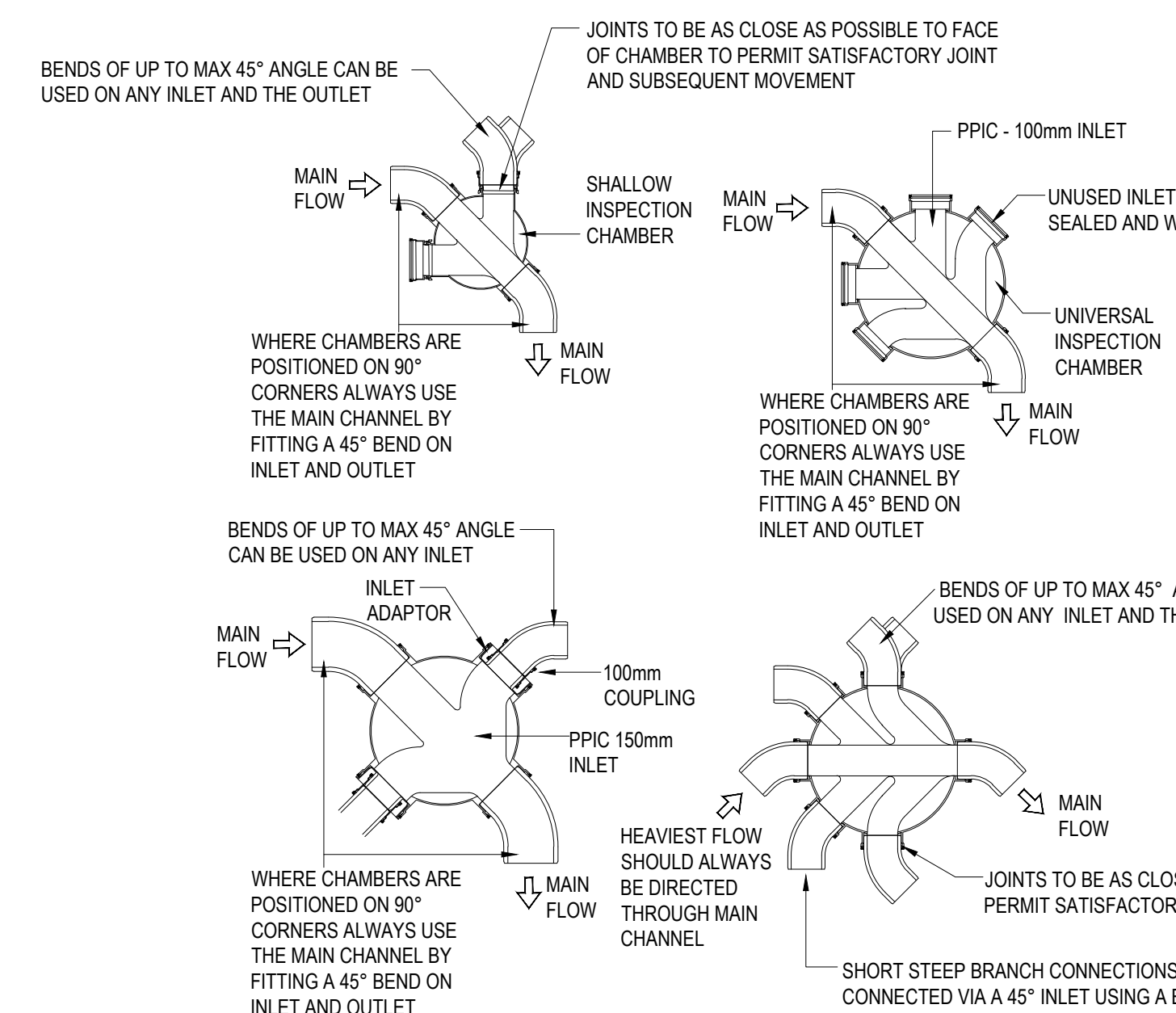
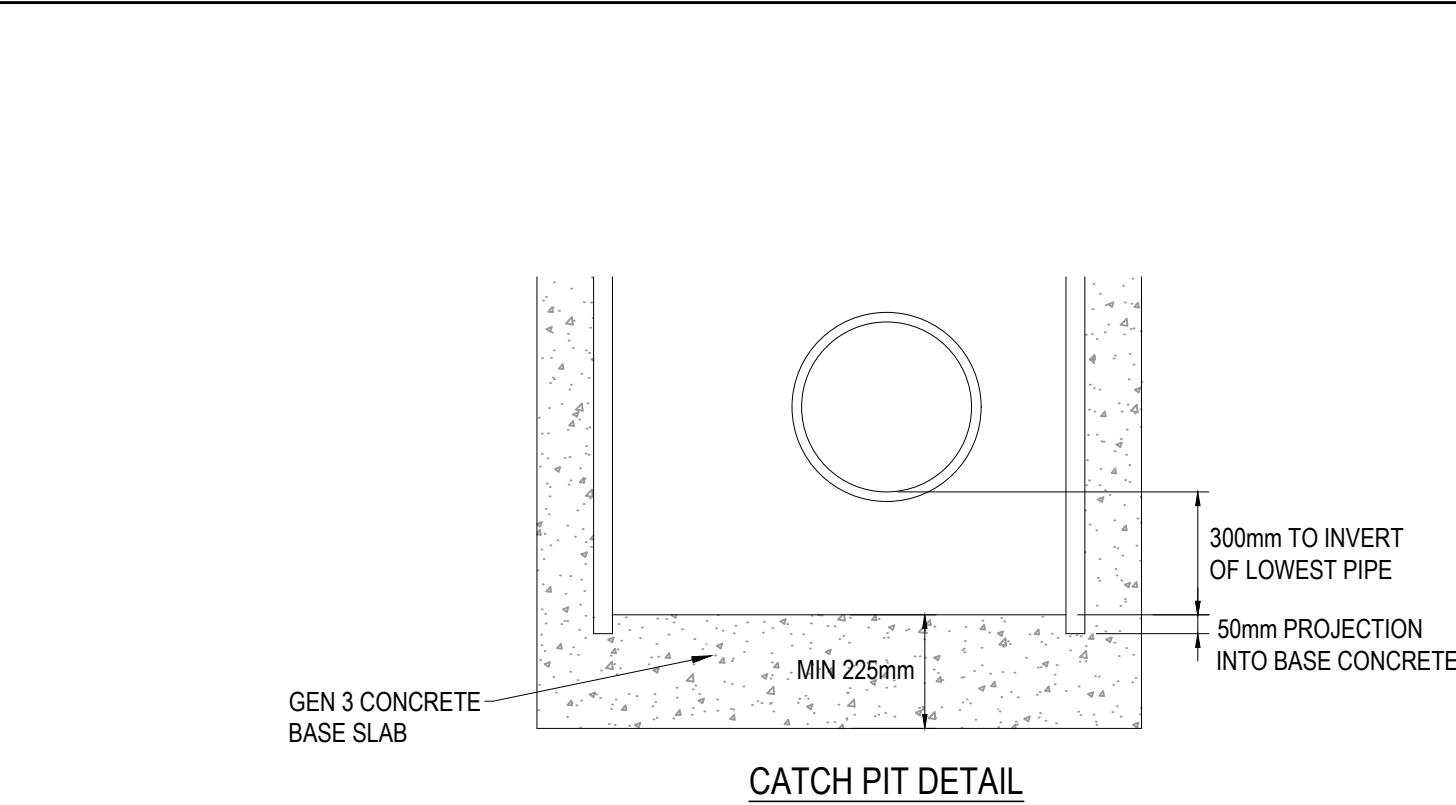
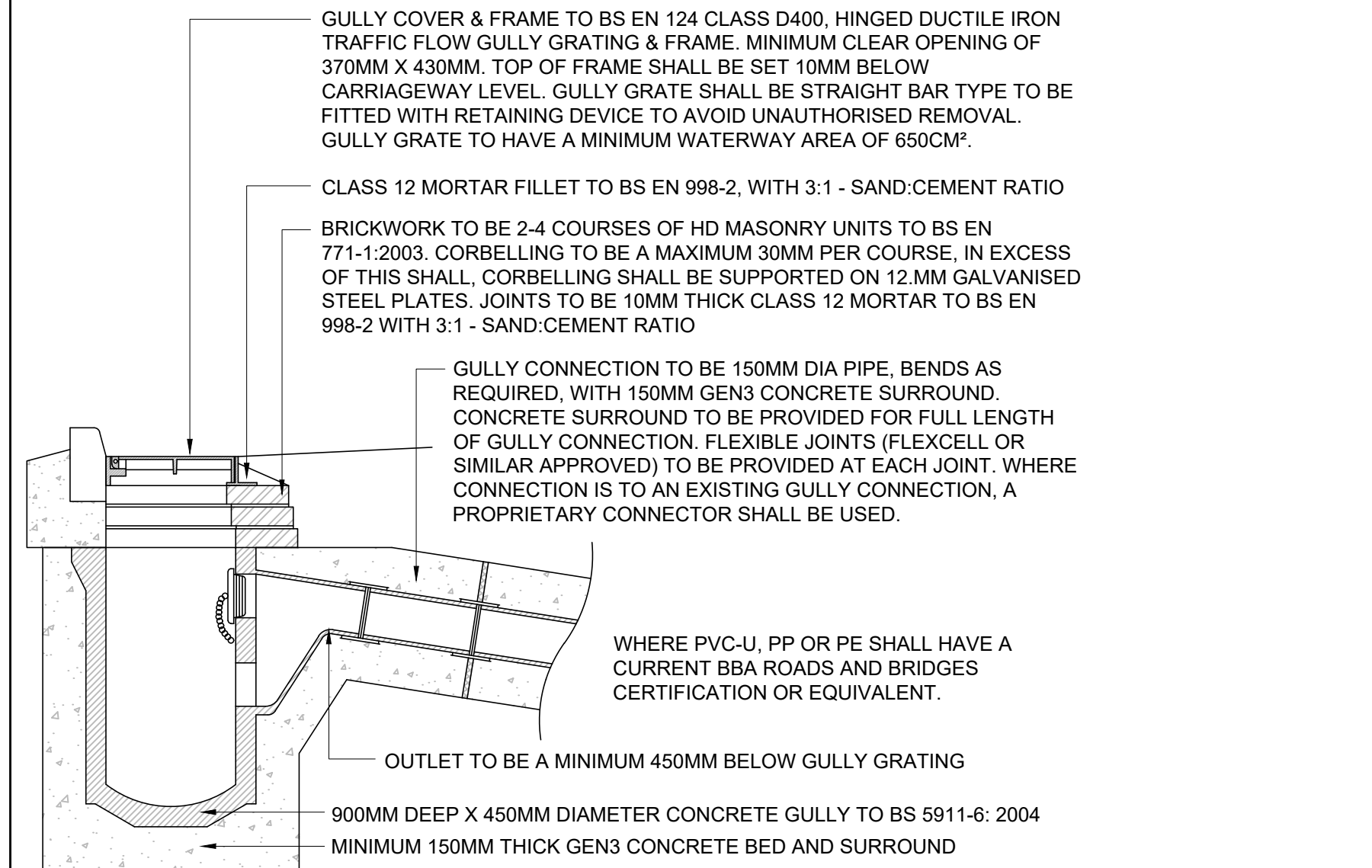
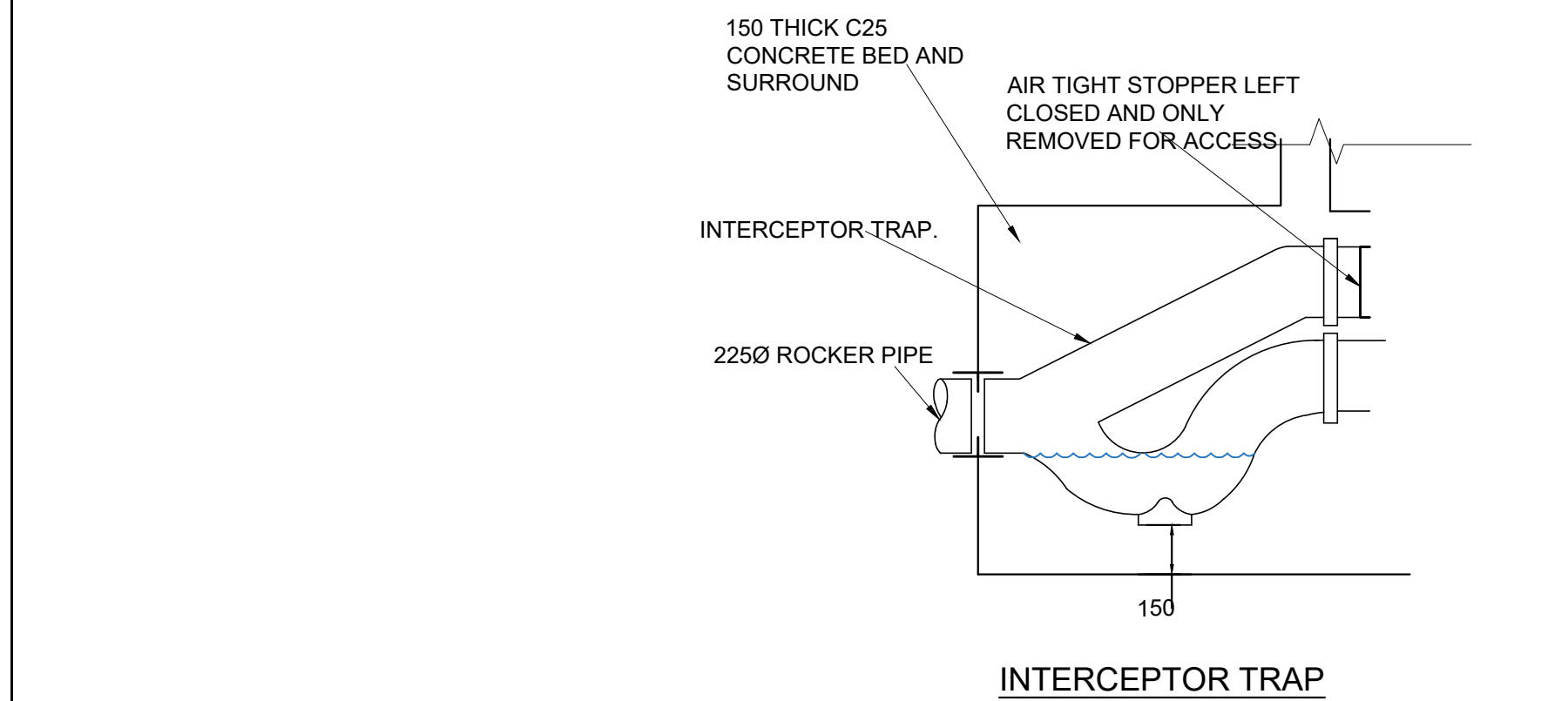
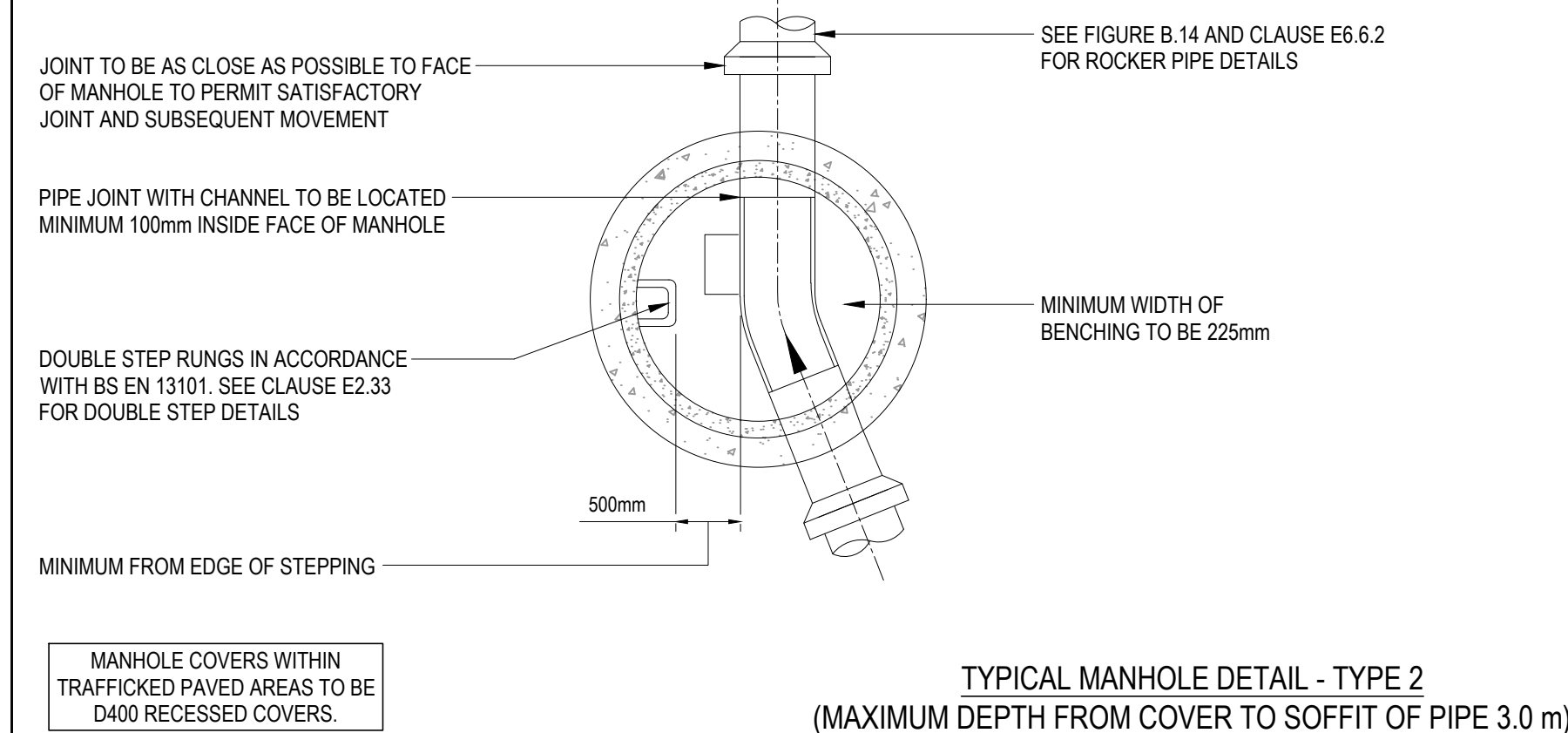
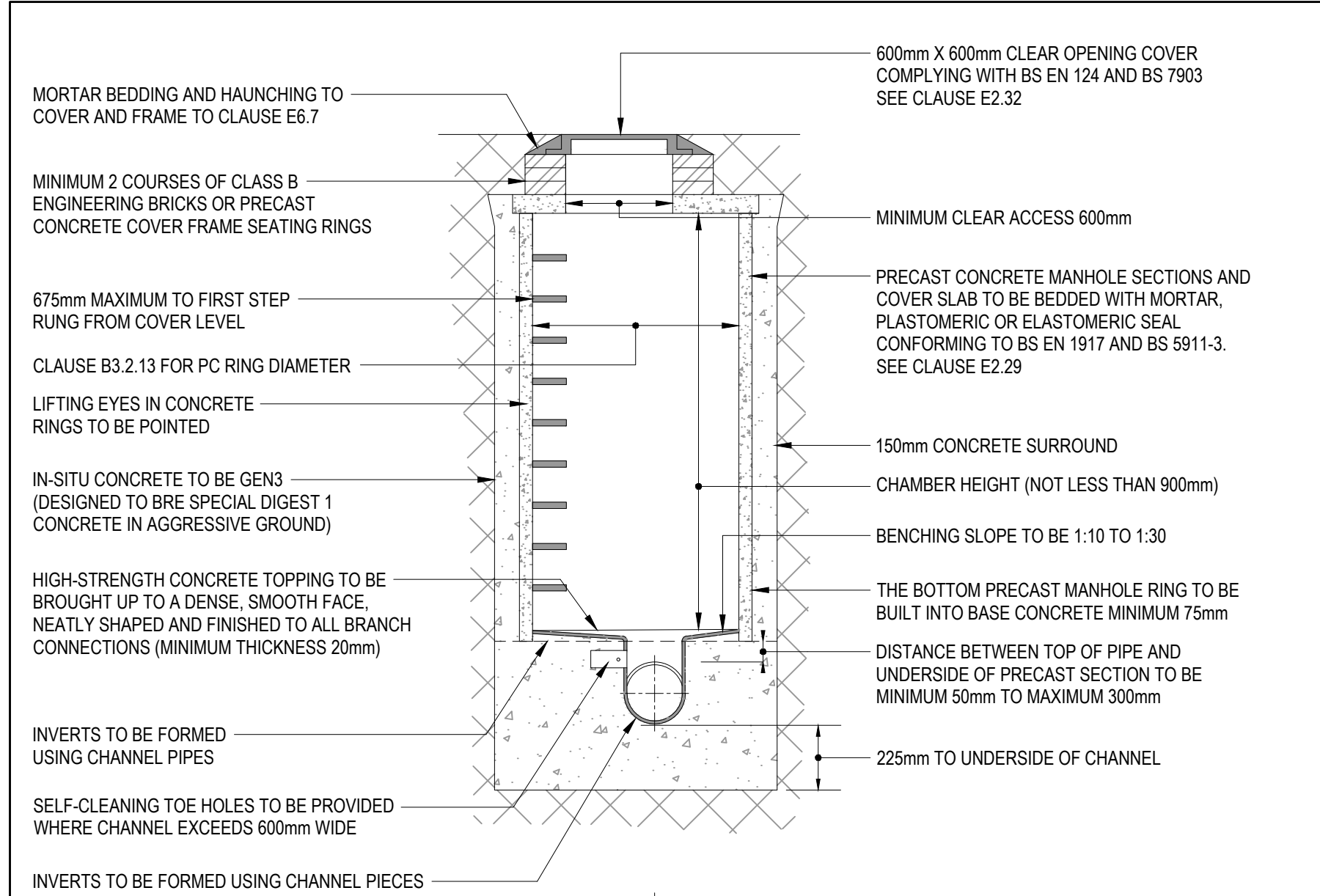
Status: **CONSTRUCTION**

Project: **KINCARDINE COURT**

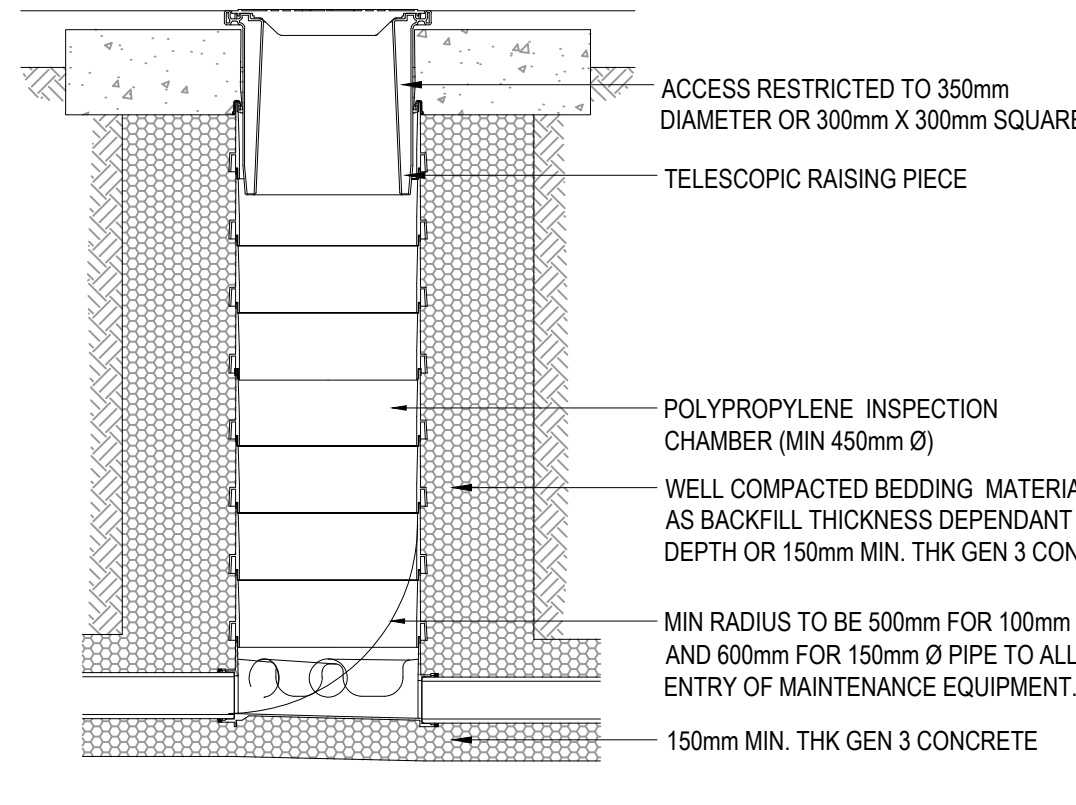
Orig Title: **PROPOSED DRAINAGE LAYOUT**

Size:	Date:	Drawn By:	Designed By:	Checked By:			
A1	20/09/21	ATL	ATL	MW			
Scale: 1:200							
Project No:	Originator:	Volume:	Level:	Type:	Role:	Category / Number:	Rev:
500991 - CUR - ZZ - 00 - DR - C -		9500 - CC					

- KEY**
- EXISTING DRAINAGE**
- SITE BOUNDARY BASED ON ARCHITECT'S LAYOUT 500991-HCD-ZZ-00-DR-9001
 - EXISTING PUBLIC COMBINED SEWER (APPROXIMATE)
 - PUBLIC SEWER EASEMENT - 3m FROM CENTRELINE OF SEWER (TBC)
 - EXISTING HIGHWAY SURFACE WATER GULLY (APPROXIMATE)
 - EXISTING PRIVATE DRAINAGE
 - EXISTING DRAINAGE TO ABANDONED/ REMOVED
- PROPOSED DRAINAGE**
- PROPOSED COMBINED DRAINAGE
 - PROPOSED FOUL DRAINAGE
 - PROPOSED SURFACE WATER DRAINAGE
 - PROPOSED FLOW CONTROL CHAMBER
 - PROPOSED CELLULAR ATTENUATION STORAGE
 - BACKDROP
 - SVP LOCATION/ FOUL GULLY
 - RWP LOCATION
 - PROPOSED ROAD GULLY
 - PROPOSED LINEAR DRAINAGE CHANNEL/ OUTLET UNIT - GATIC CASTSLOT TREADSAFE OR SIMILAR APPROVED.
 - PROPOSED GATIC ACCESS BOX
 - PROPOSED GATIC OUTLET UNIT
 - PROPOSED THRESHOLD DRAIN (DETAIL BY OTHERS)
 - PROPOSED FOUNDATION
 - PROPOSED SERVICES

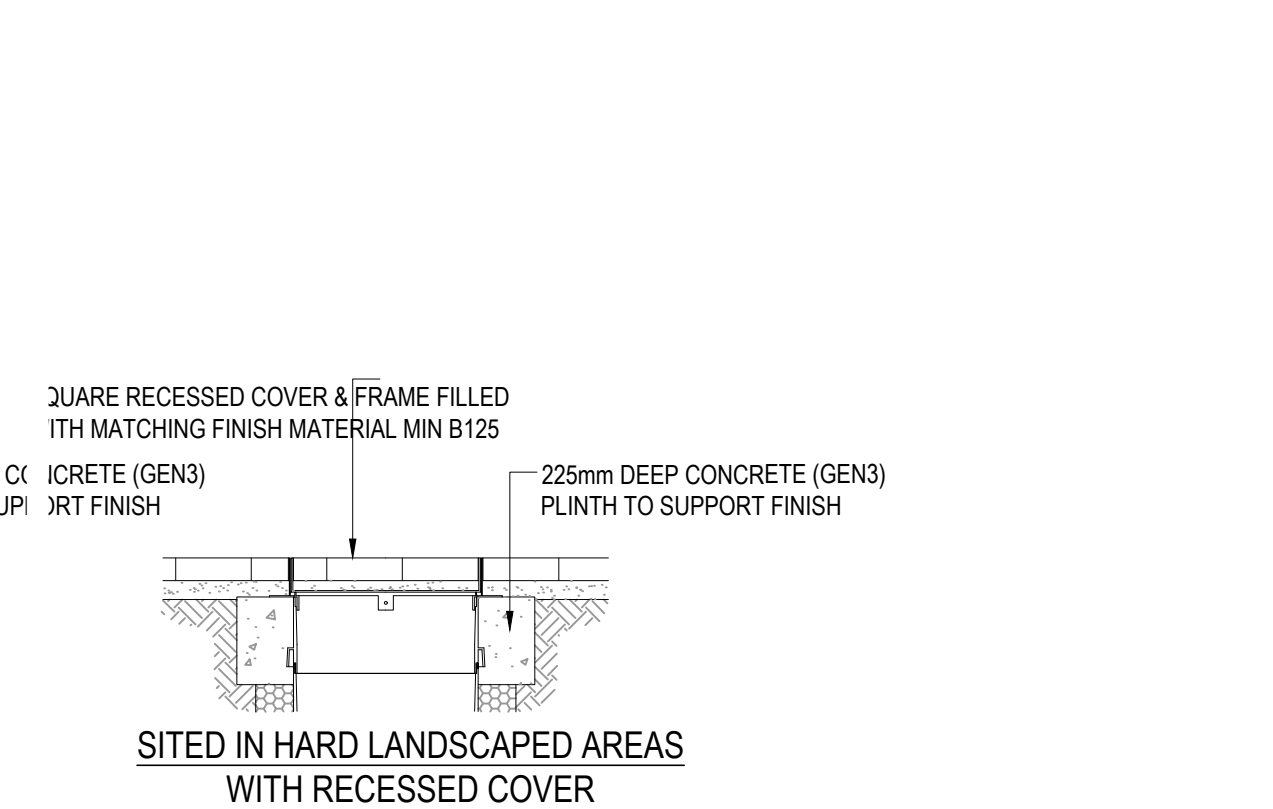
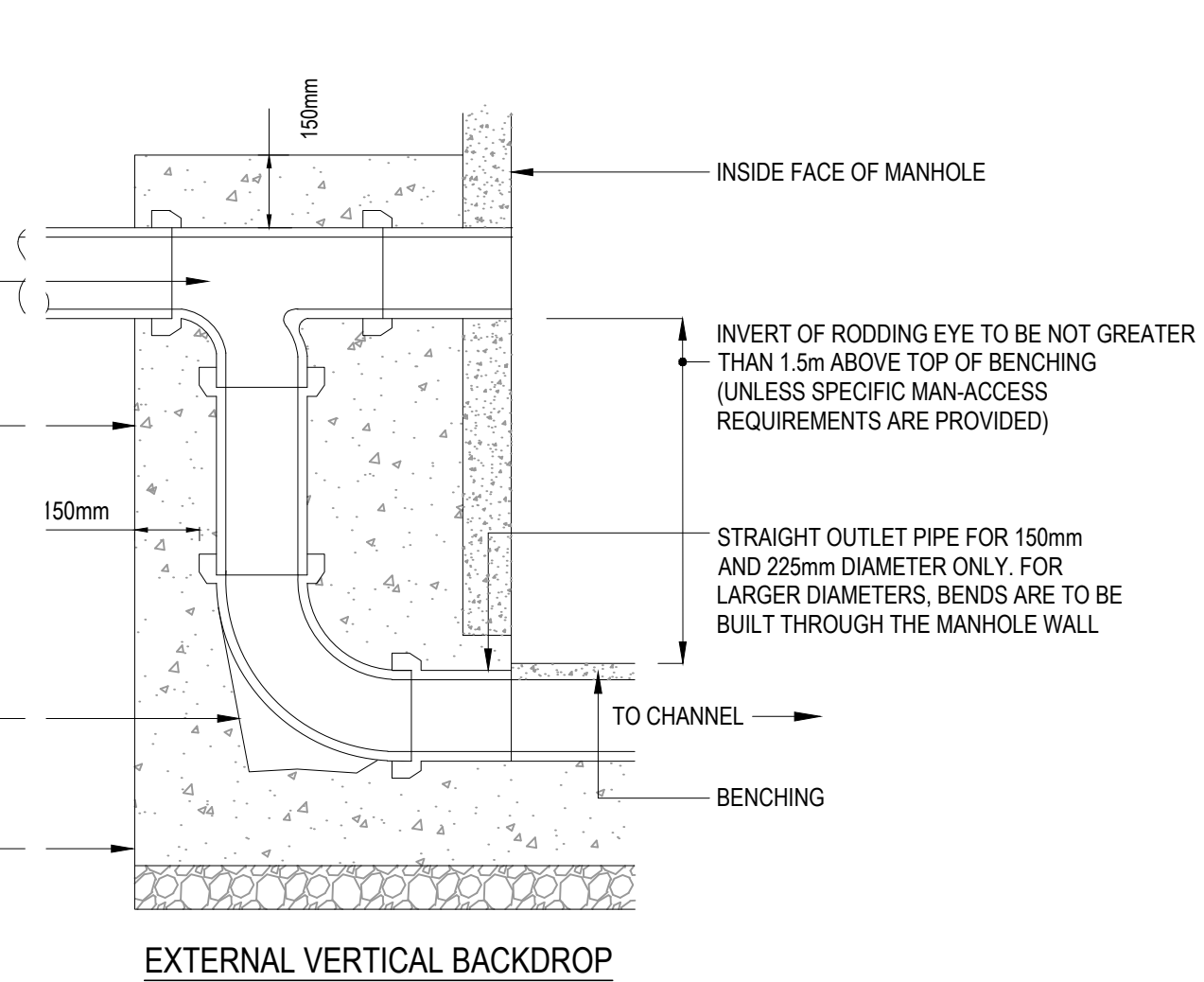
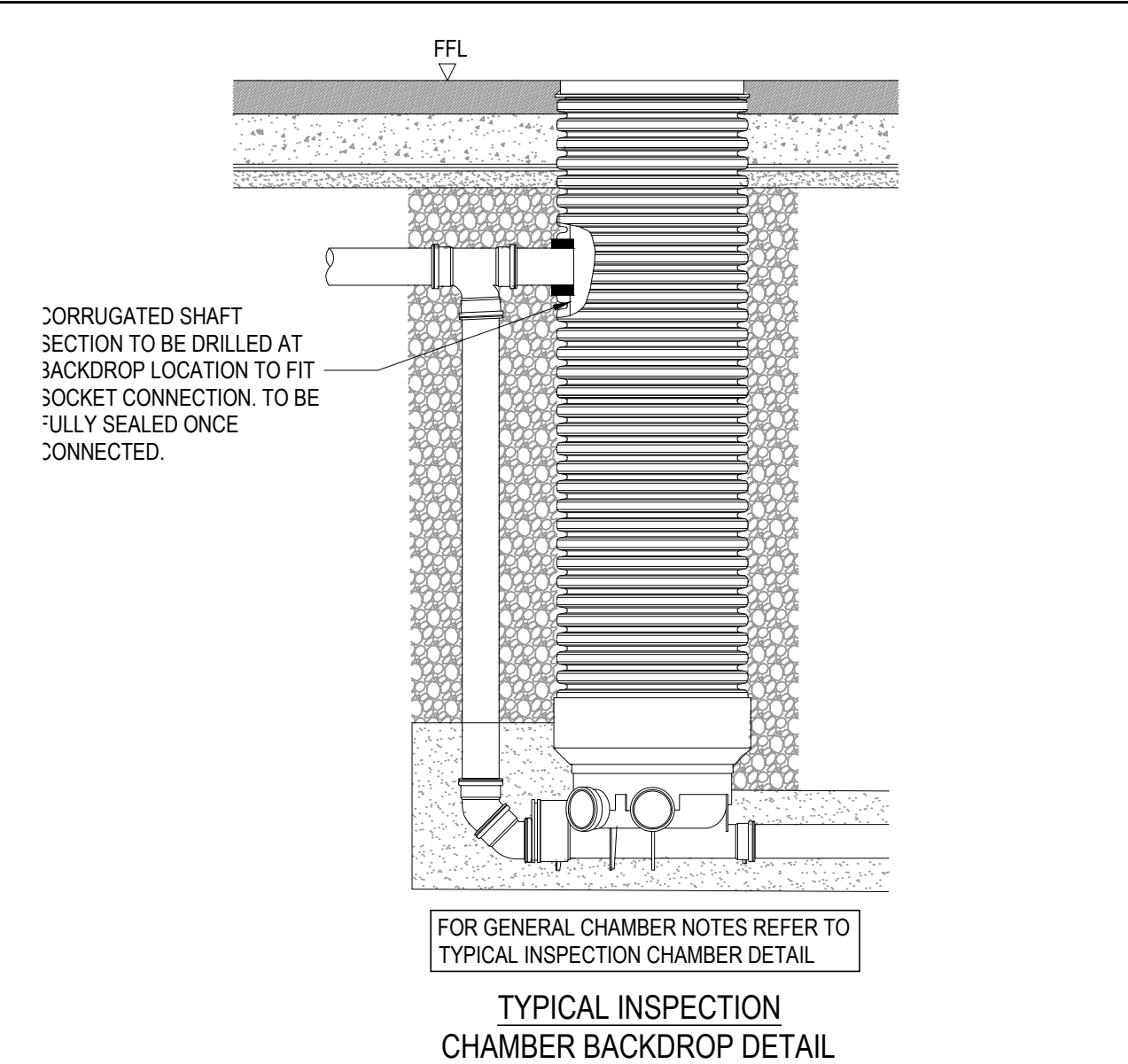


SHALLOW INSPECTION CHAMBER
MAX DEPTH 0.6m

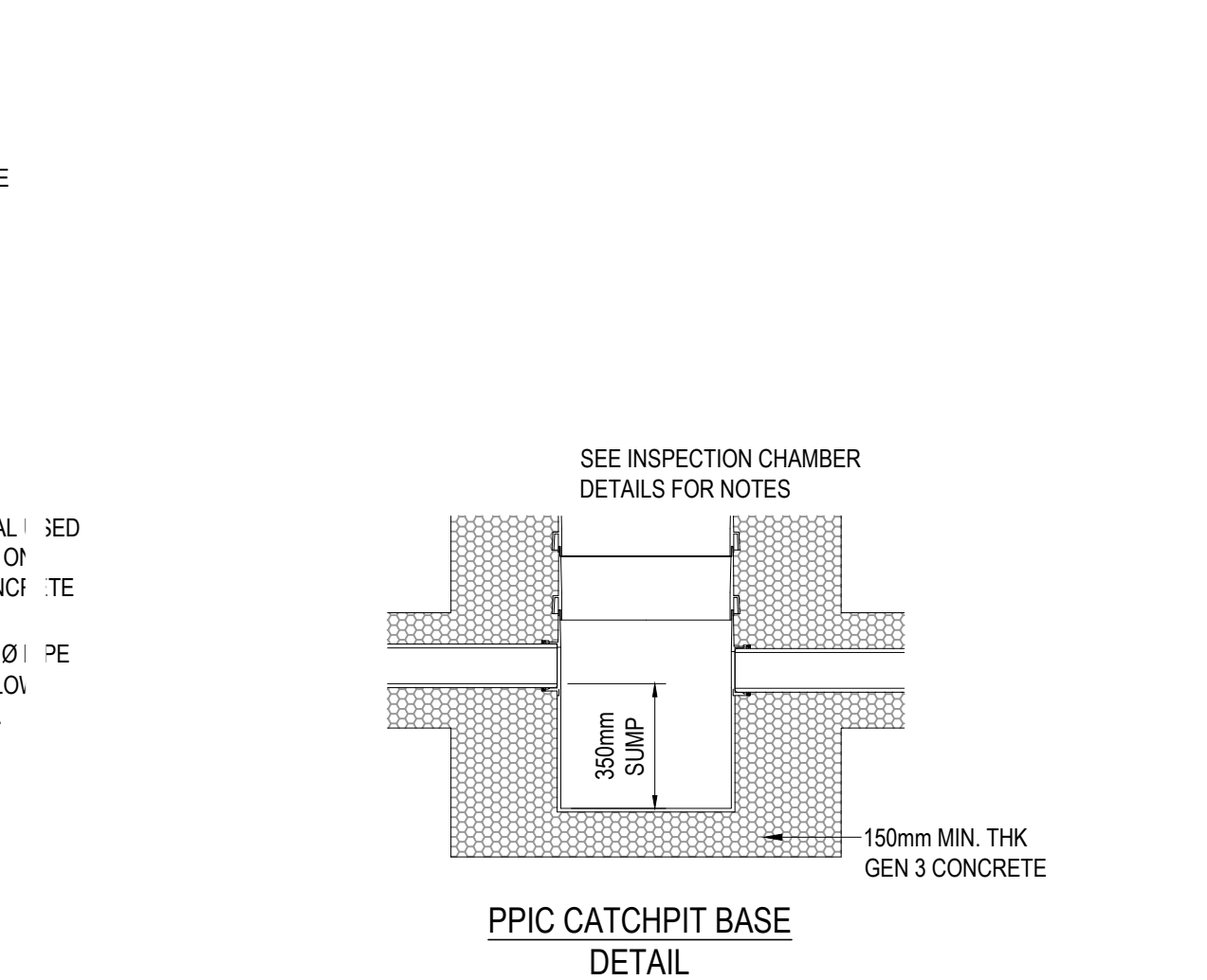


DEEP INSPECTION CHAMBER
DEPTHS BETWEEN 1.2m AND 3.0m

TYPICAL INSPECTION CHAMBER DETAILS - PPIC



TYPICAL INSPECTION CHAMBER COVER DETAILS



PPIC CATCHPIT BASE
DETAIL

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.

2. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

9. FOR FULL DRAINAGE NOTES REFER TO DWG 072071-CUR-XX-00-DR-C-90001

C03	DRAWING NUMBER CORRECTED	23/12/21	ATL	ATL
C02	UPDATED IN LINE WITH DESIGN TEAM COMMENTS	09/11/21	ATL	ATL
C01	CONSTRUCTION ISSUE	20.09.21	ATL	MW
P02	ISSUED FOR DISCHARGE OF CONDITION	05.07.21	ATL	ATL
P01	STAGE 2 ISSUE	21.02.20	ATL	CD
Rev:	Description:	Date:	By:	Chkd:

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Status:

CONSTRUCTION

Project:

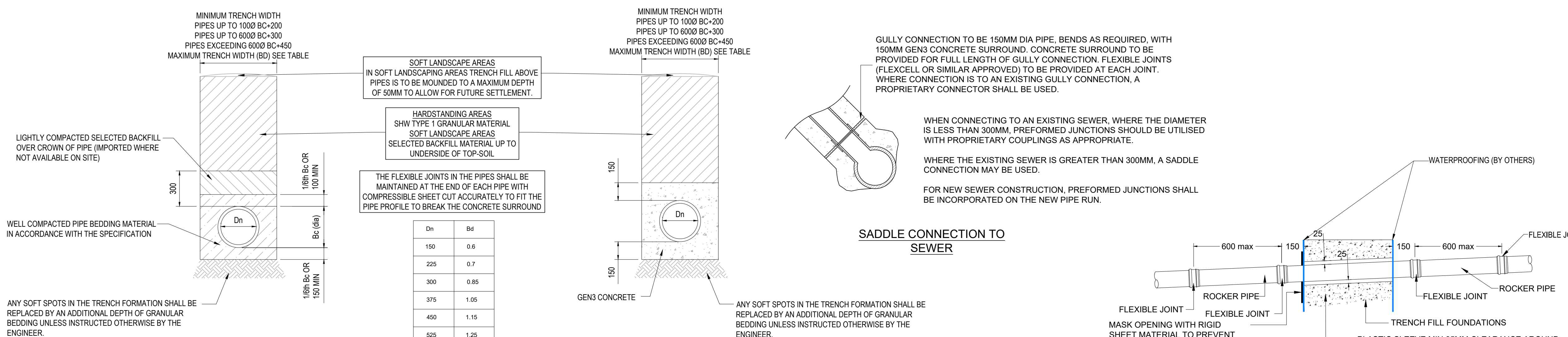
KINCARDINE COURT

Orig Title:

TYPICAL DRAINAGE DETAILS
SHEET 1

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	21.02.20	ATL	ATL	CD
Scale:	NTS			
Project No:	Originator:	Zone:	Level:	Type:
500991 - CUR - ZZ - 00 - DR - D -				

9520 -C03



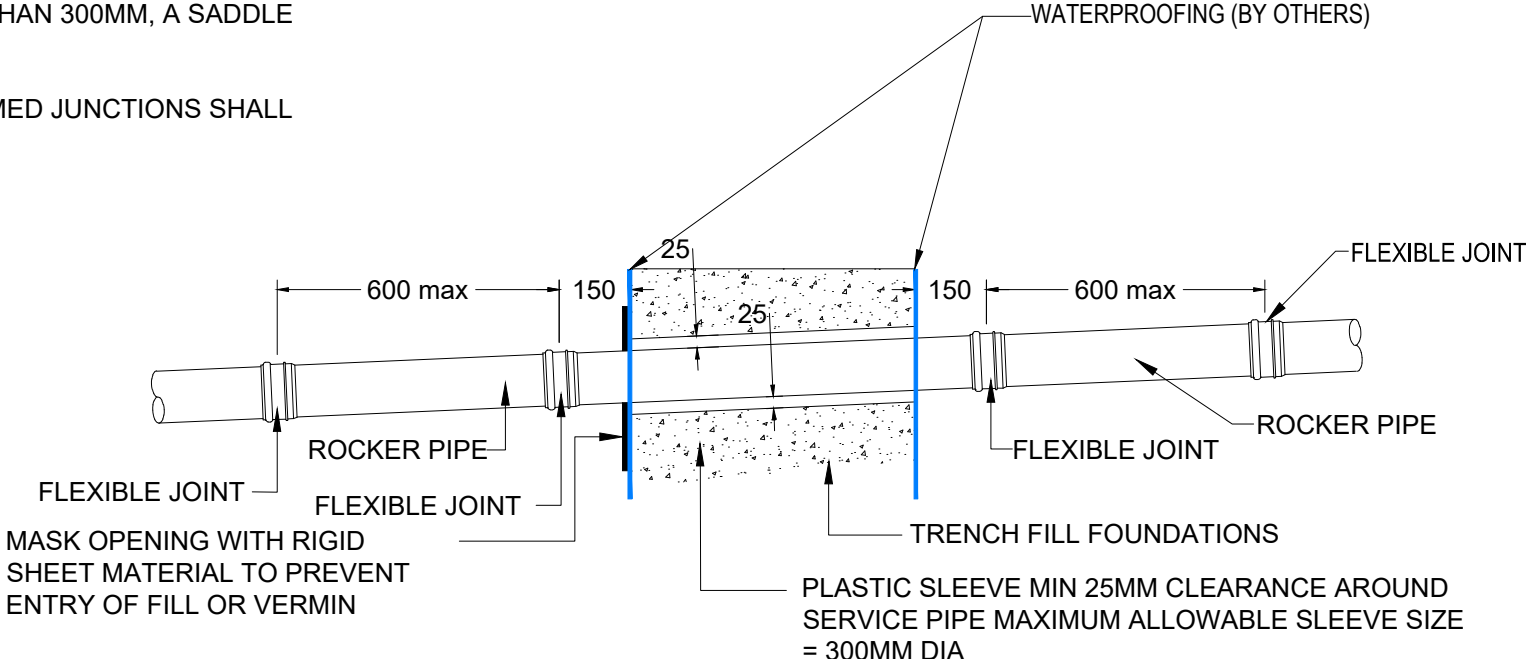
Dn	Bd
150	0.6
225	0.7
300	0.85
375	1.05
450	1.15
525	1.25
600	1.35
675	1.45
750	1.50

SADDLE CONNECTION TO SEWER

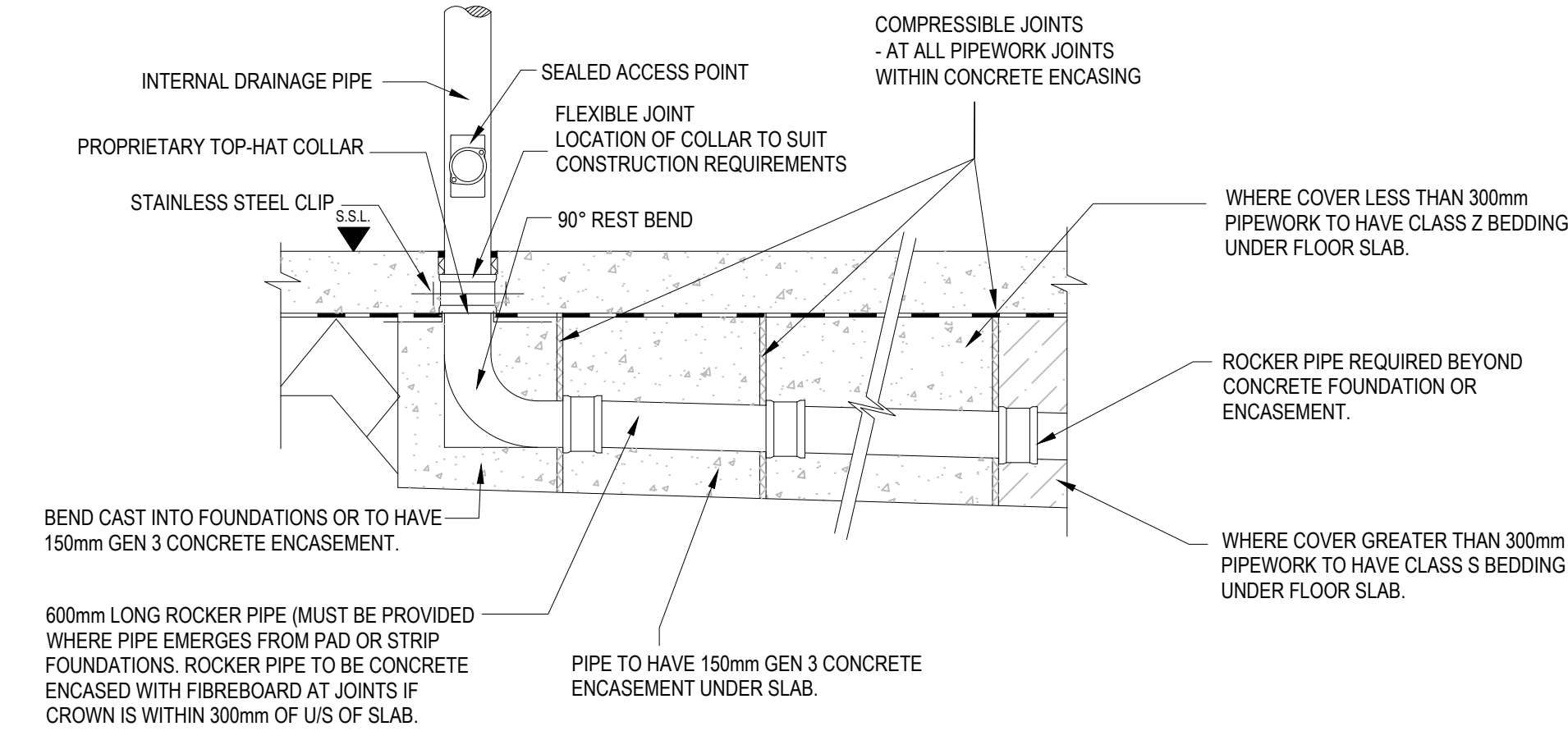
WHEN CONNECTING TO AN EXISTING SEWER, WHERE THE DIAMETER IS LESS THAN 300MM, PREFORMED JUNCTIONS SHOULD BE UTILISED WITH PROPRIETARY COUPLINGS AS APPROPRIATE.

WHERE THE EXISTING SEWER IS GREATER THAN 300MM, A SADDLE CONNECTION MAY BE USED.

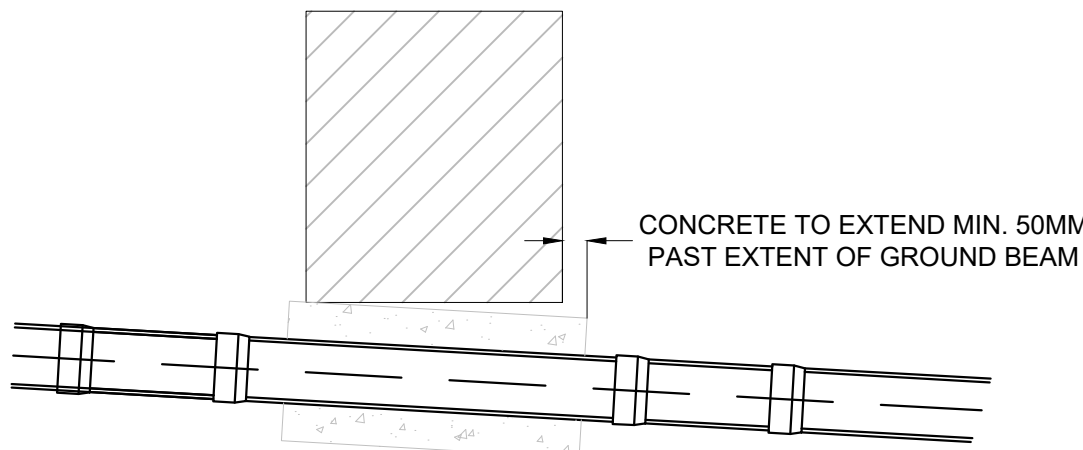
FOR NEW SEWER CONSTRUCTION, PREFORMED JUNCTIONS SHALL BE INCORPORATED ON THE NEW PIPE RUN.



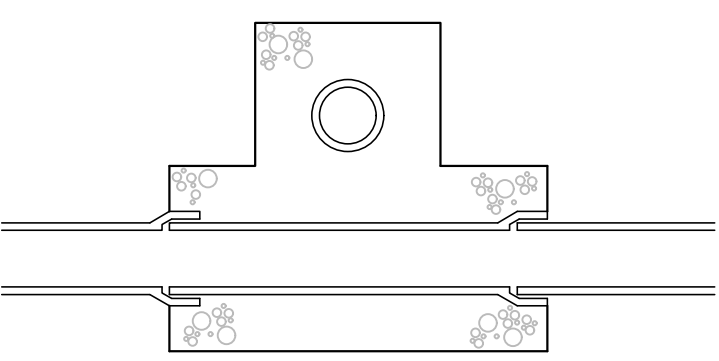
PIPES PASSING THROUGH SLAB THICKENING



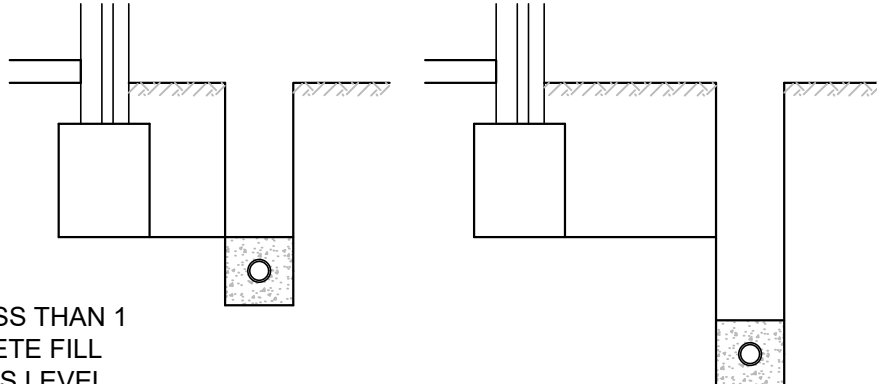
DRAINAGE UNDER BUILDINGS



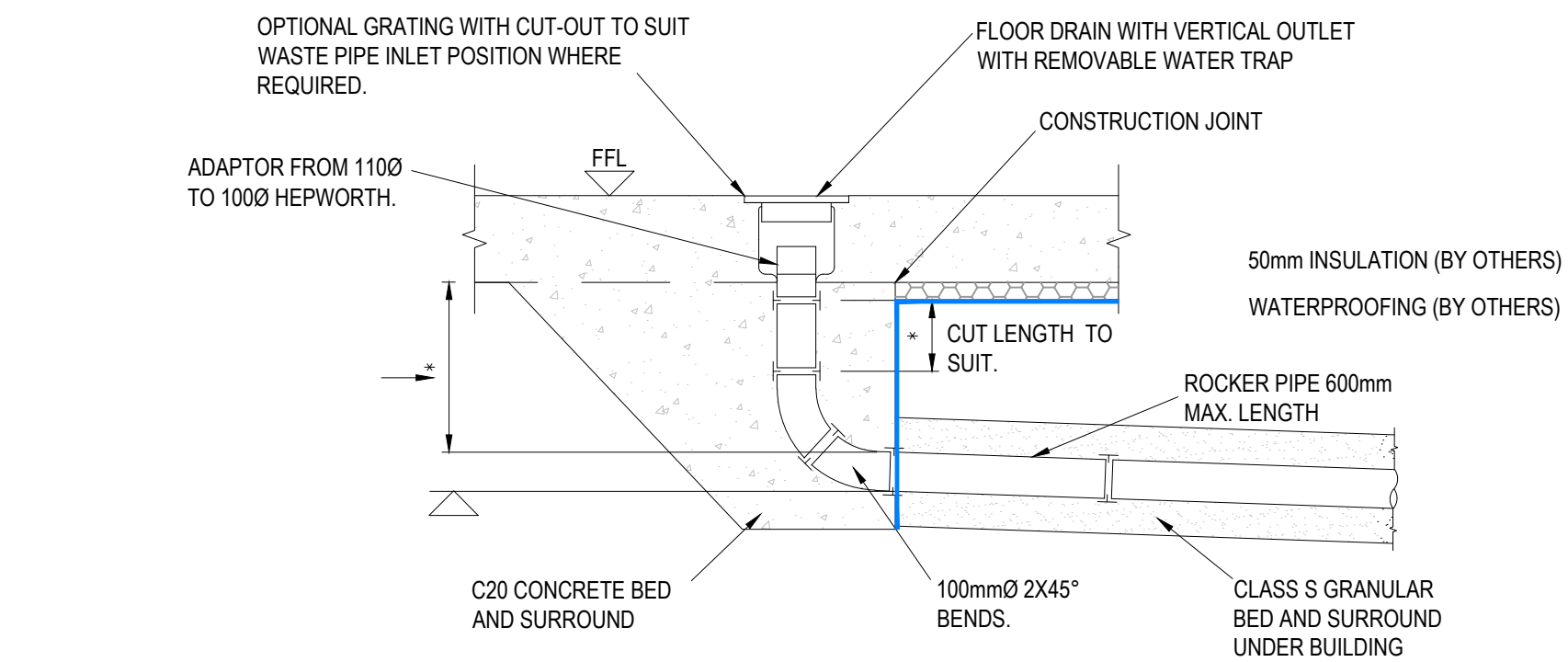
TYPICAL PIPE DETAIL UNDER GROUND BEAMS



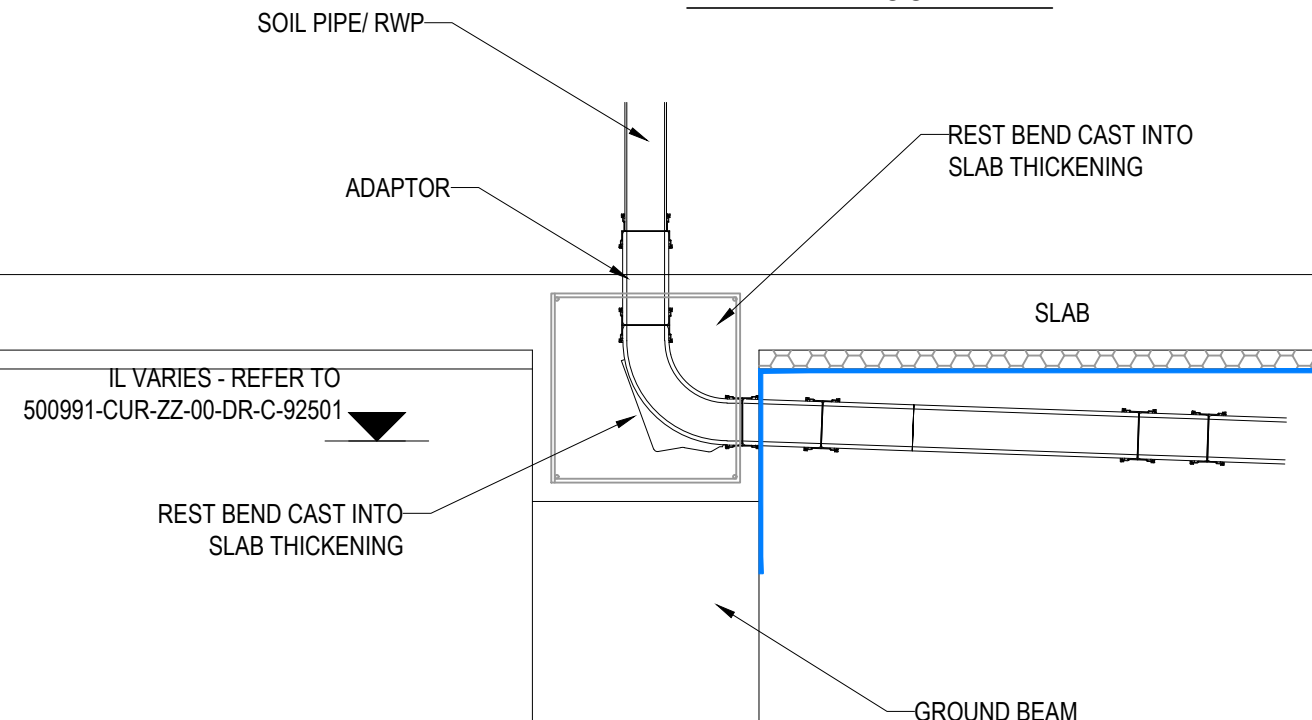
PIPE CROSSINGS DETAIL



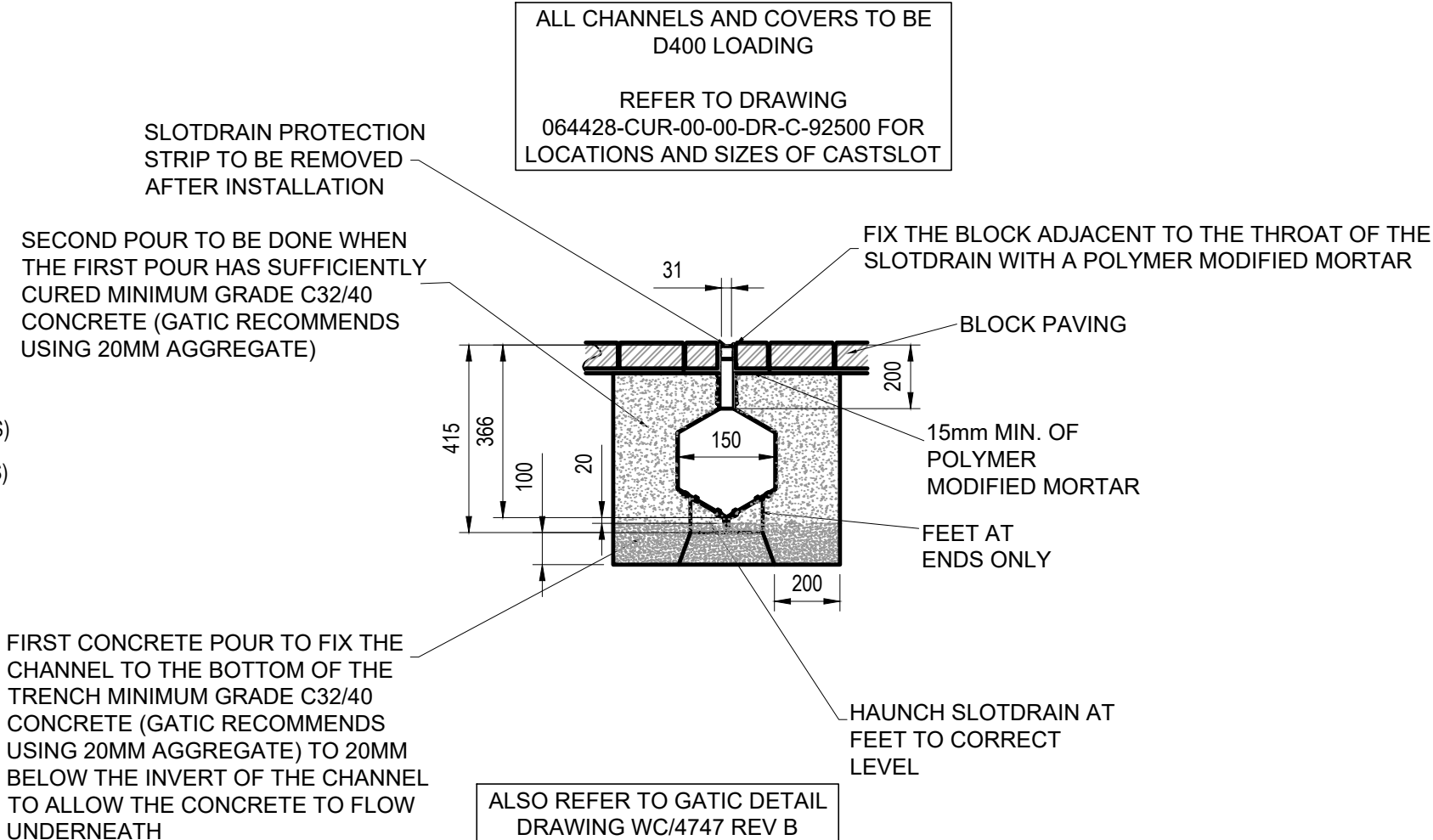
TYPICAL DETAILS WHERE DRAINAGE TRENCH IS DEEPER THAN FOUNDATIONS



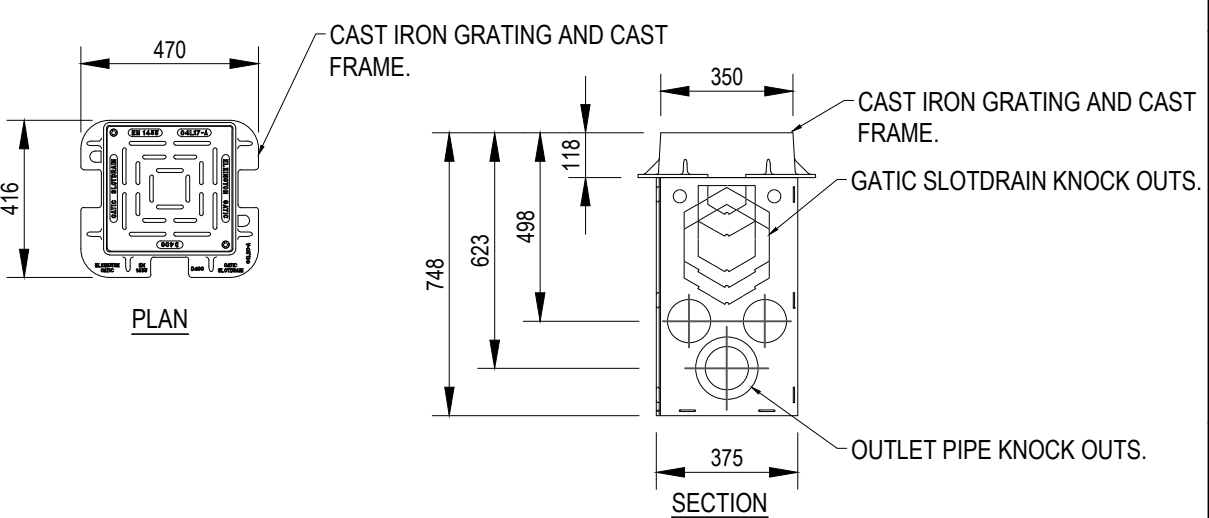
INTERNAL FLOOR DRAIN



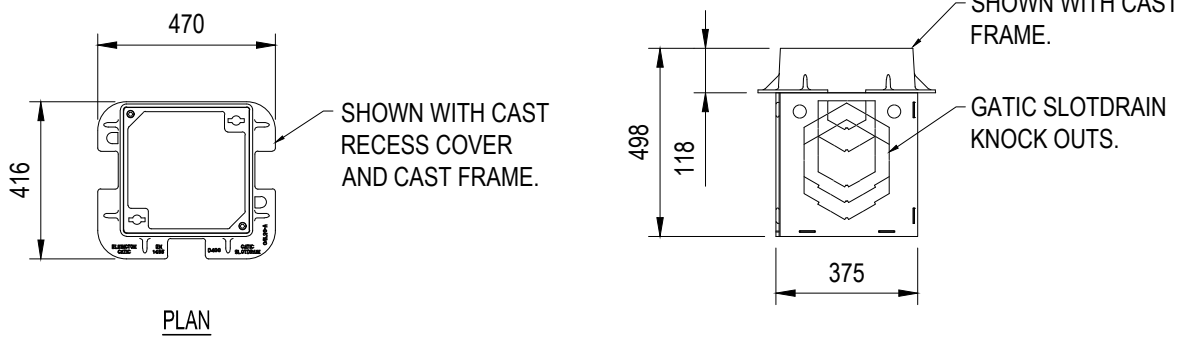
TYPICAL SVP/SS/RWP CONNECTION IN SLAB THICKENING



GATIC SLOT DRAIN 225mm CASTSLOT CONCRETE INSTALLATION



GATIC SLOT DRAIN 350mm OUTLET UNIT SECTION AND PLAN DETAILS



350 ACCESS BOX SECTION AND PLAN DETAILS

GENERAL NOTES:

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C03	DRAWING NUMBER CORRECTED	23/12/21	ATL	ATL
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Status: **CONSTRUCTION**

Project: **KINCARDINE COURT**

Orig Title: **TYPICAL DRAINAGE DETAILS SHEET 2**

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	21.02.20	ATL	ATL	CD

Scale: NTS

Project No:	Originator:	Zone:	Level:	Type:	Discipline:	Category / Number:	Rev:
500991 - CUR - ZZ - 00 - DR - D -	9521	-C03					

CURRENT DESIGN ASSUMPTIONS

DESIGN BASED POLYSTORM (PSM1) UNIT 1000x500x400(D) WITH POLYSTORM INSPECT (PSM4) 1000x500x400(D), BASED ON APPROXIMATE MINIMUM BURIAL DEPTH OF 1.9m.

TANK IS LOCATED IN AN AREA SUBJECT TO OCCASIONAL HEAVY VEHICLE LOADING. DETAILED STRUCTURAL CALCULATIONS REQUIRED TO PROVE TANK HAS SUFFICIENT STRENGTH.

THE MANUFACTURER WILL NEED TO CONFIRM THAT THE TANK HAS SUFFICIENT STRENGTH FOR THIS LOCATION IN ACCORDANCE WITH CIRIA C680.

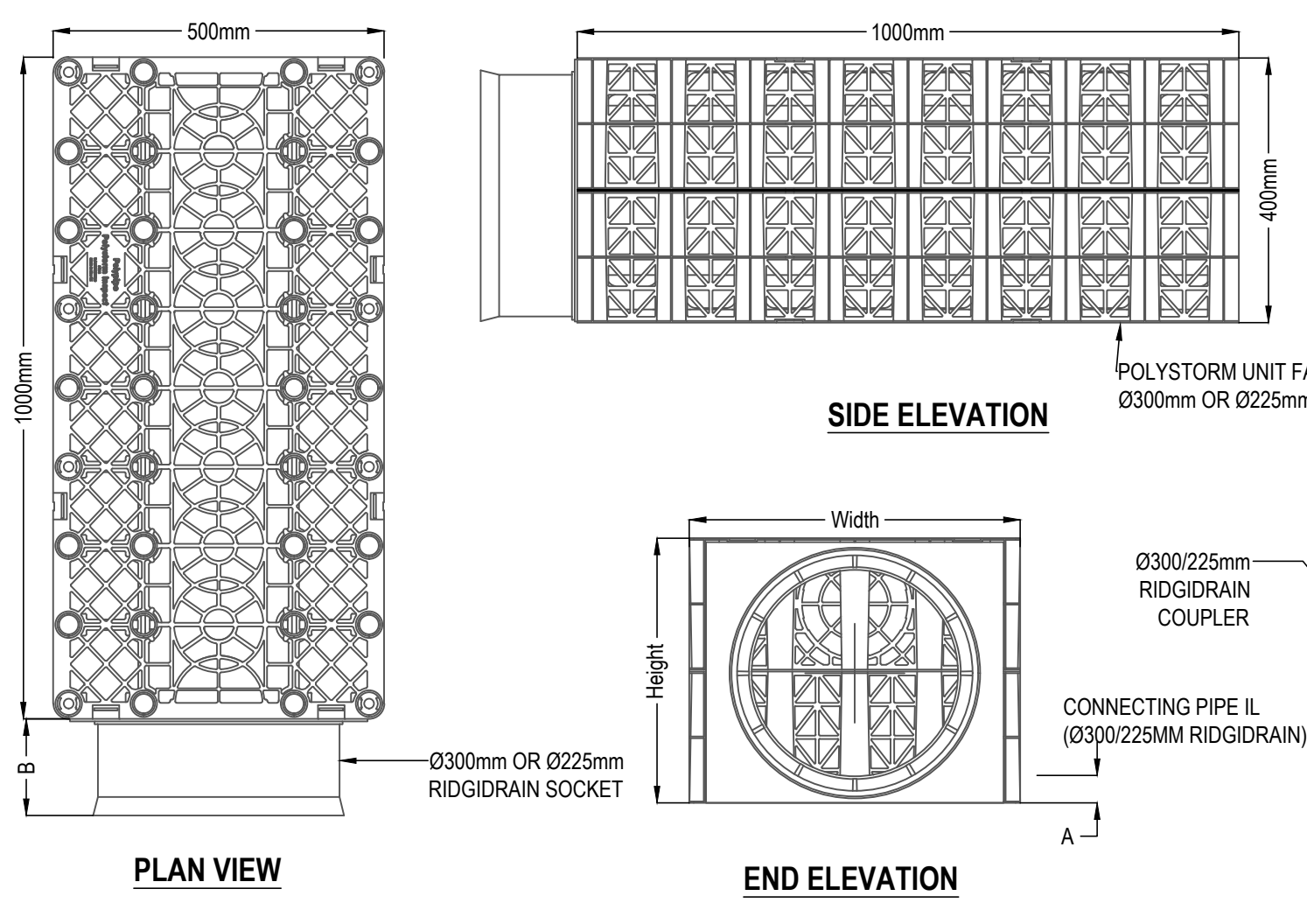
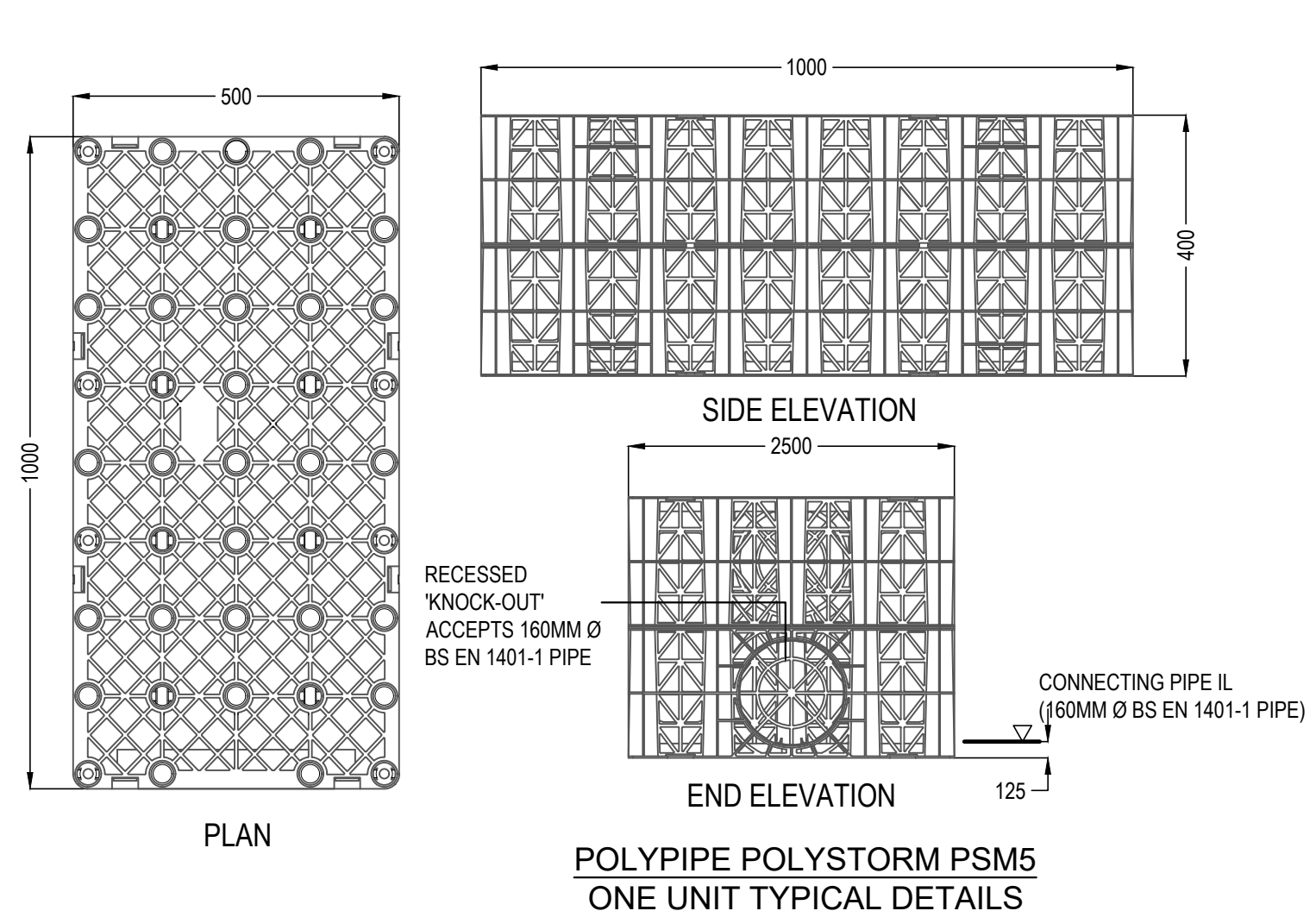
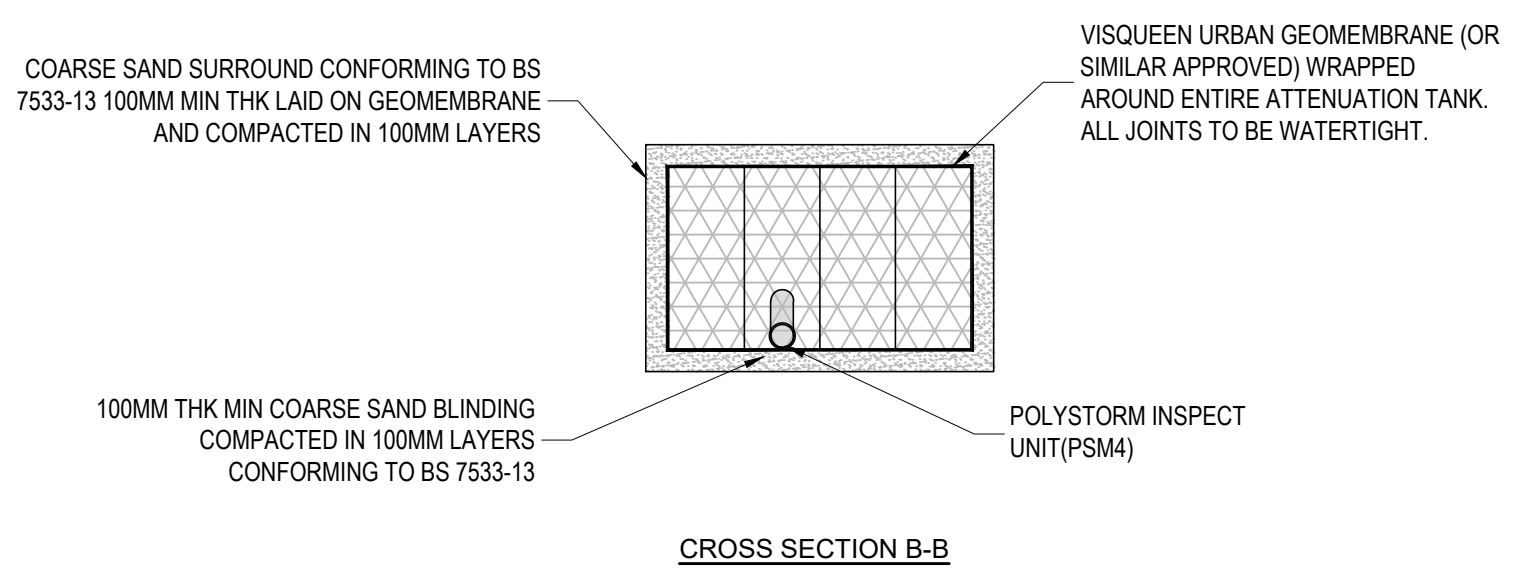
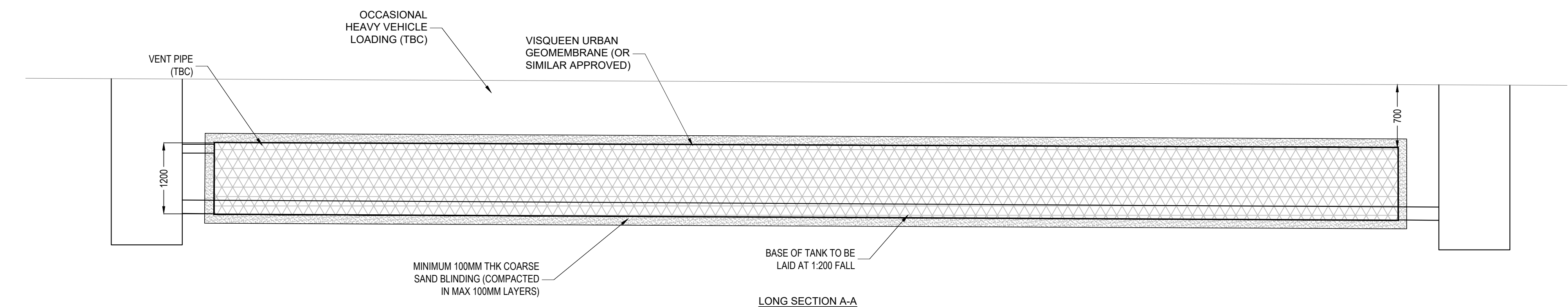
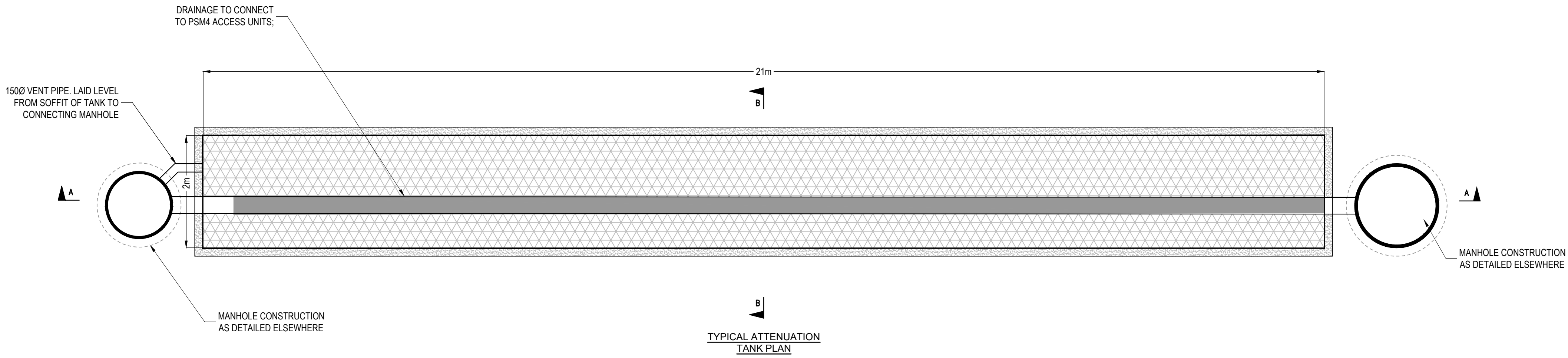
MINIMUM GROUND LEVEL IS APPROX. 39.00, BASED ON EXISTING CAR PARK LEVELS (MIN 730mm APPROX COVER).

INVERT LEVEL OF INLET PIPE 37.15
INVERT LEVEL OF OUTLET PIPE 37.05
BASE OF TANK TO BE LAID AT 1:200 FALL.

DIMENSIONS OF TOTAL UNIT ARE AS SHOWN.
PLAN AREA OF TANK IS 41m²
TOTAL DEPTH OF TANK IS 1200mm.
ATTENUATION VOLUME, BASED ON 95% VOID RATIO IS 48m³

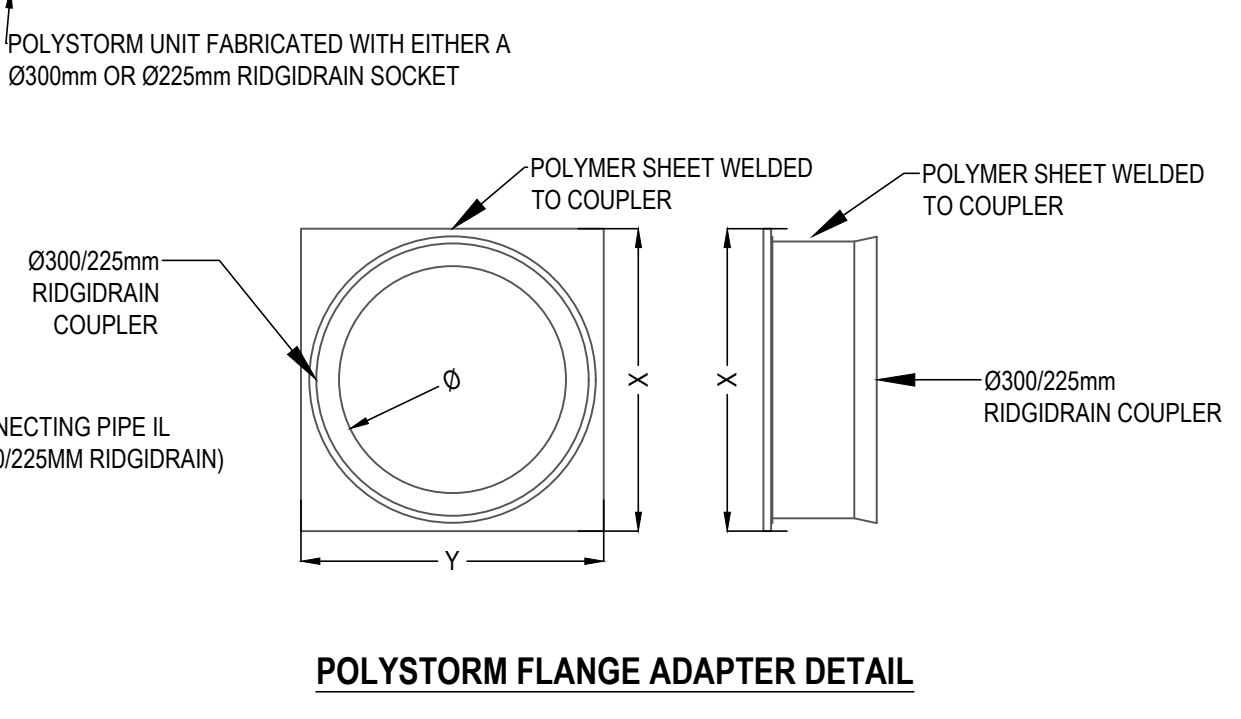
IMPERMEABLE MEMBRANE, BED AND SURROUND TO BE CONFIRMED WITH THE MANUFACTURER.

REFER TO DRAINAGE LAYOUT 500991-CUR-ZZ-00-DR-C-92500 FOR TANK & INLET/OUTLET LOCATIONS.



POLYSTORM FLANGE ADAPTER TABLE			
FLANGE CODE	Ø (mm)	X (mm)	Y (mm)
PSMFA300	300	385	450

* FLANGE ADAPTERS ARE COMPATIBLE WITH THE PSM1, PSM1A, PSM2, PSM3 CELLS.
* CONSIDERATION TO HYDRAULIC PERFORMANCE SHOULD BE TAKEN WHEN USING A FLANGE ADAPTER



- GENERAL NOTES:**
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 - ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 - REFER TO DRAINAGE LAYOUT 072071-CUR-XX-00-DR-C-90001 FOR THE LOCATION OF THE ATTENUATION TANK.
 - ATTENUATION TANK TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
 - WHERE AN ALTERNATIVE ATTENUATION TANK DEVICE IS PREFERRED, IT WILL BE SUBJECT TO REDESIGN TO CONFIRM WHETHER THE SYSTEM HAS CAPACITY.
 - THE DESIGN OF THE TANK SHOULD BE PROVIDED BY THE MANUFACTURER OR SUPPLIER TO ENSURE THE TANK IS SUFFICIENT FOR THE SITE SPECIFIC CRITERIA.
 - THE TANK DESIGN SHOULD INCORPORATE:
 - CRATES SUBJECT TO REGULAR HEAVY VEHICLE LOADING,
 - SUITABLE MAINTENANCE ACCESS; AND
 - VENTING TO PREVENT TRAPPED AIR POCKETS.
 - THE STRENGTH OF THE TANK SHOULD COMPLY WITH CIRIA C680 STRUCTURAL DESIGN OF MODULAR GEOCELLULAR DRAINAGE TANKS.
 - ACCESS FOR MAINTENANCE SHOULD BE IN ACCORDANCE WITH CIRIA GUIDANCE.
 - VENTING TO THE TANK SHOULD BE CONFIRMED BY THE TANK MANUFACTURER. VENTING SHOULD BE LOCATED WITHIN LANDSCAPED AREAS, OR ROUTED BACK TO THE NEAREST MANHOLE ABOVE THE DESIGN WATER LEVEL.
 - CONSTRUCTION AND INSTALLATION OF THE TANK SHOULD BE STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION REQUIREMENTS.
 - THE CURRENT DESIGN OF THE TANK IS BASED ON USE OF ESS PLUVIAL CUBE MODULES, TO ALLOW AN ASSUMPTION OF UNIT SIZES WITHIN THE OVERALL DESIGN. HOWEVER, WHERE AN ALTERNATIVE SYSTEM IS PROPOSED, THE DIMENSIONS OF THE UNITS WILL NEED TO BE CHECKED WITHIN THE DESIGN AND MAY RESULT IN A REDESIGN.
 - THE CONTRACTOR SHALL PROHIBIT THE MOVEMENT OF CONSTRUCTION PLANT ACROSS THE STORAGE TANK AND WHERE NECESSARY PROVIDE ADDITIONAL SUPPORT AND PROTECTION TO THE STRUCTURE. PARTICULARLY POST CONSTRUCTION. TEMPORARY FENCING CAN BE USED TO PROHIBIT TRADE STOCKS, PILLING MATERIALS, HEAVY PLANTS ETC.
 - FOR FULL DRAINAGE NOTES REFER TO DWG072071-CUR-XX-00-DR-C-90001

C05	TANK SIZE AMENDED	08/03/22	ATL	ATL
C04	TANK SIZE AMENDED	21/02/22	ATL	ATL
C03	DRAWING NUMBER CORRECTED	23/12/21	ATL	ATL
C02	UPDATED IN LINE WITH DESIGN TEAM COMMENTS	09/11/21	ATL	ATL
C01	CONSTRUCTION ISSUE	20.09.21	ATL	MW
P02	ISSUED FOR DISCHARGE OF CONDITION	05.07.21	ATL	ATL
P01	STAGE 2 ISSUE	21.02.20	ATL	CD

Rev:	Description:	Date:	By:	Chkd:
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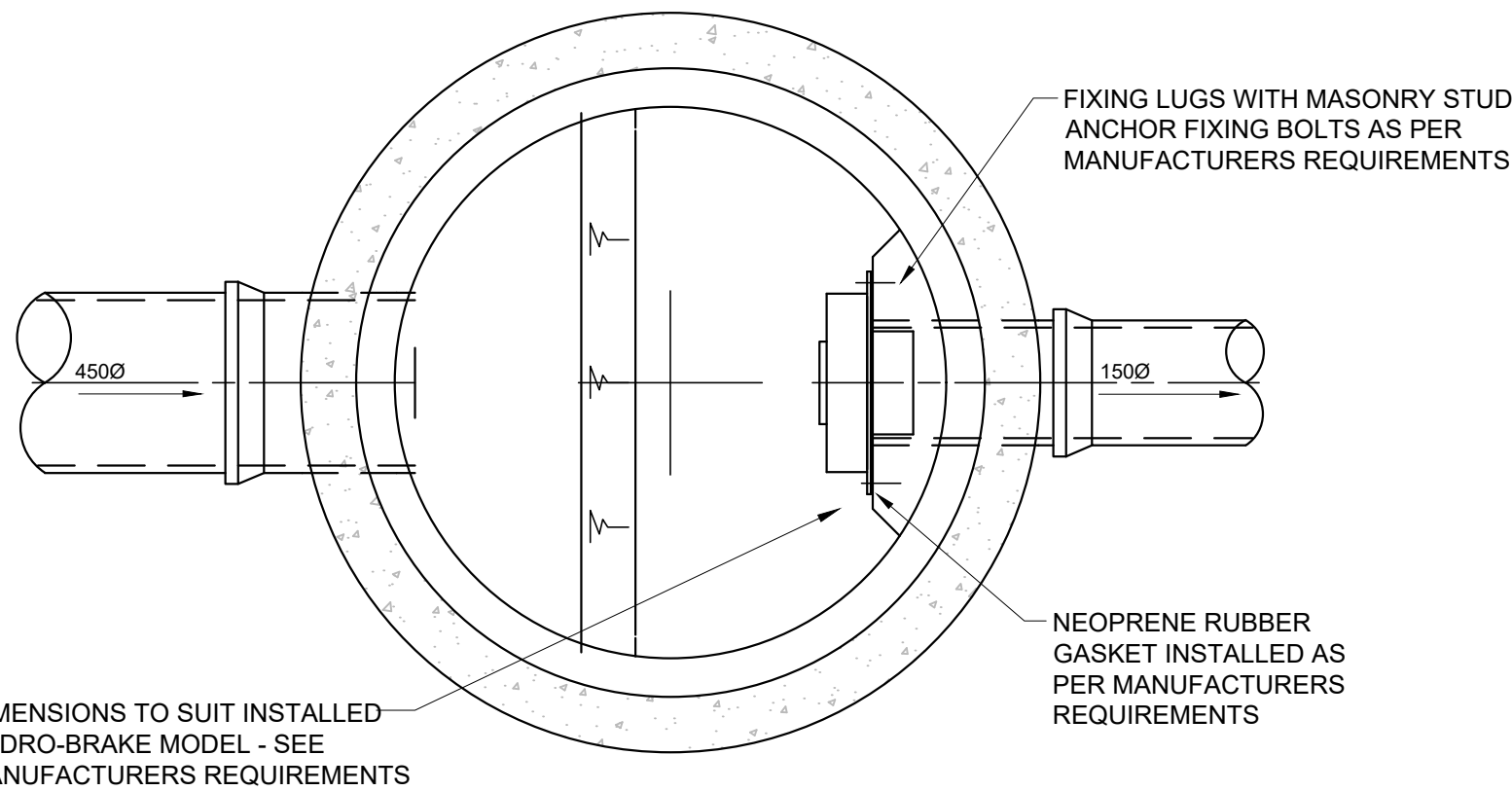
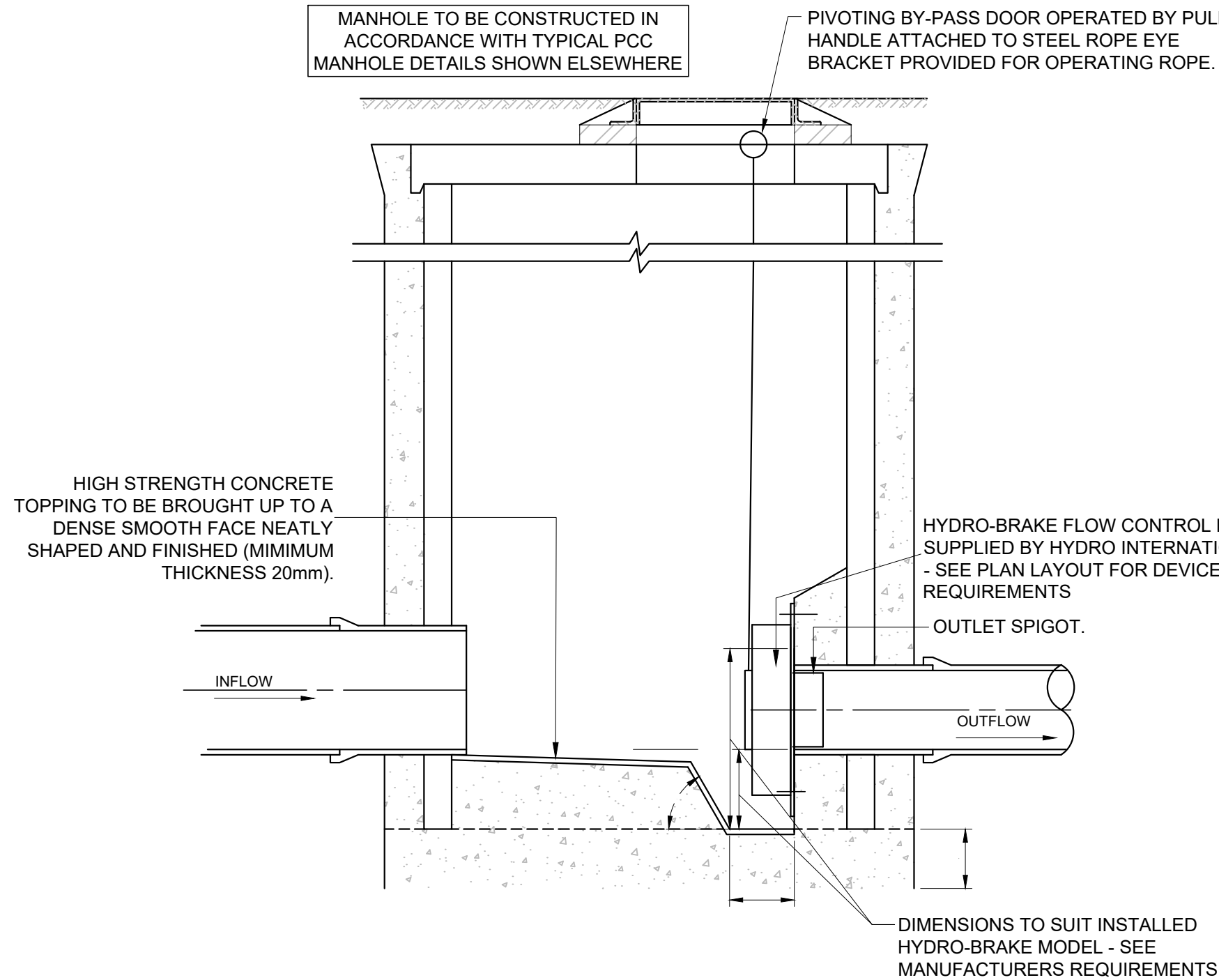
Project: **KINCARDINE COURT**

Orig Title: **TYPICAL DRAINAGE DETAILS SHEET 3**

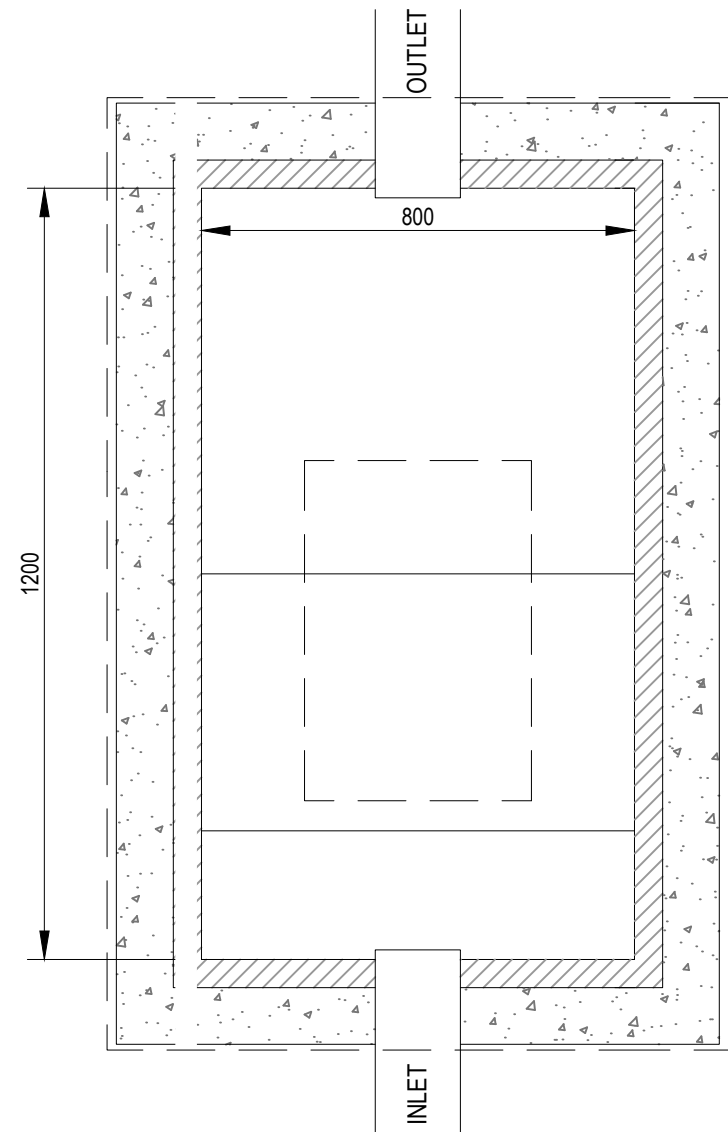
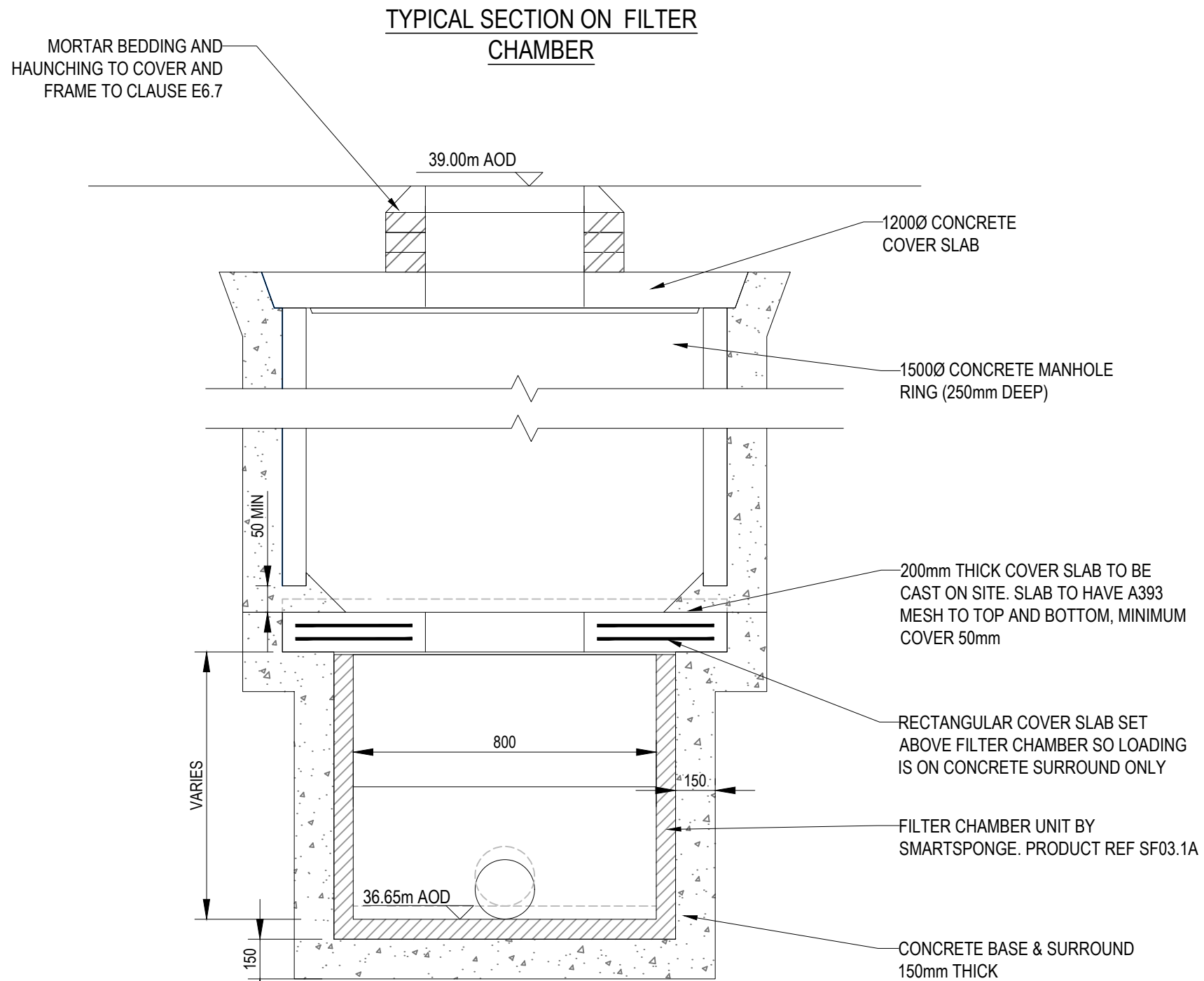
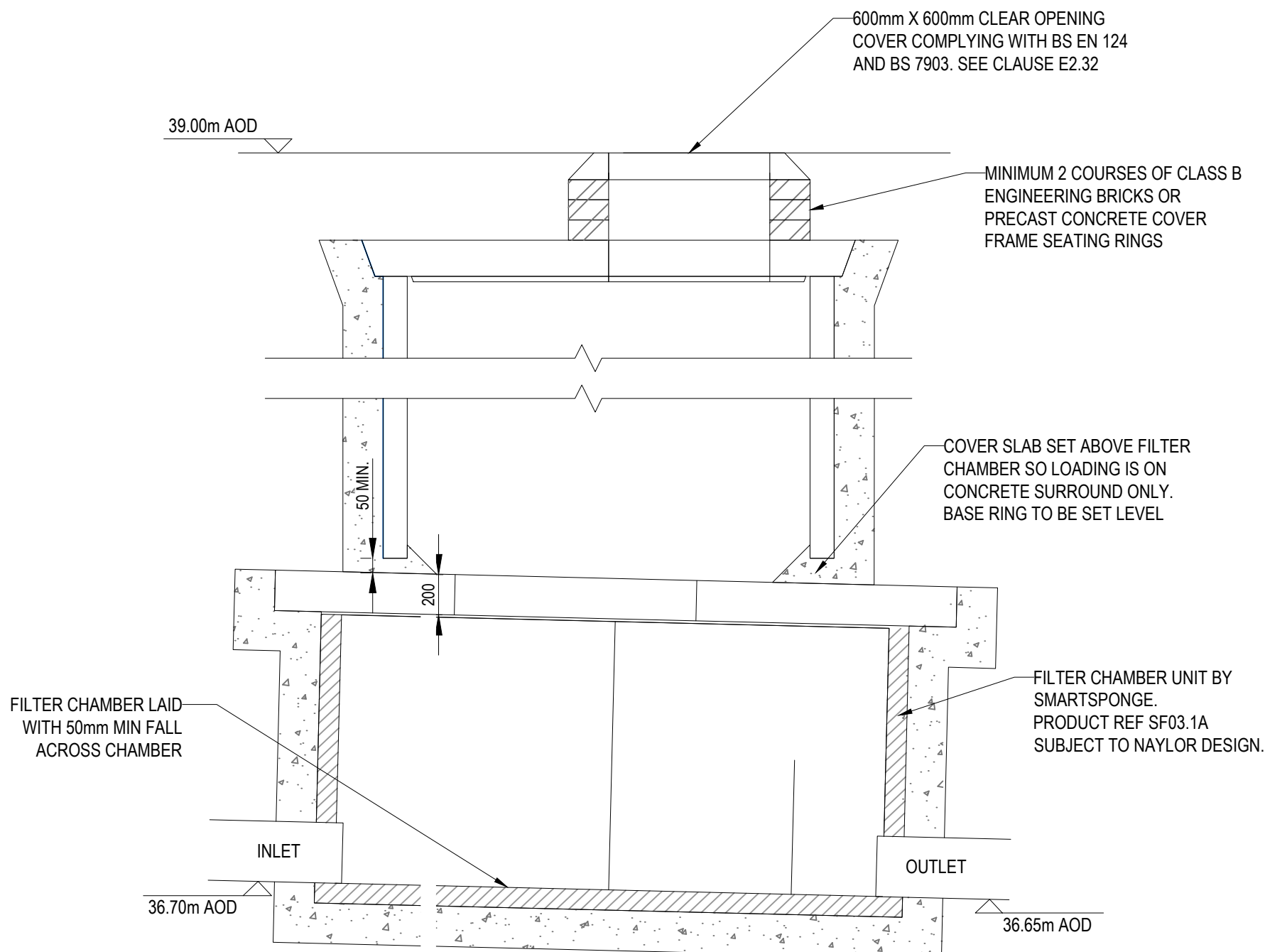
Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	21.02.20	ATL	ATL	CD

Scale:	NTS	Project No:	Originator:	Zone:	Level:	Type:	Discipline:	Category / Number:	Rev:
		500991 - CUR - ZZ - 00 - DR - D -						9522	-C05

\\msbdf\Projects\072071 - Kincardine Court\04-Production\A-Model Drawings\CC04020



FLOW CONTROL MANHOLE (HYDRO-BRAKE) SW7



PLAN ON FILTER CHAMBER

GENERAL NOTES:

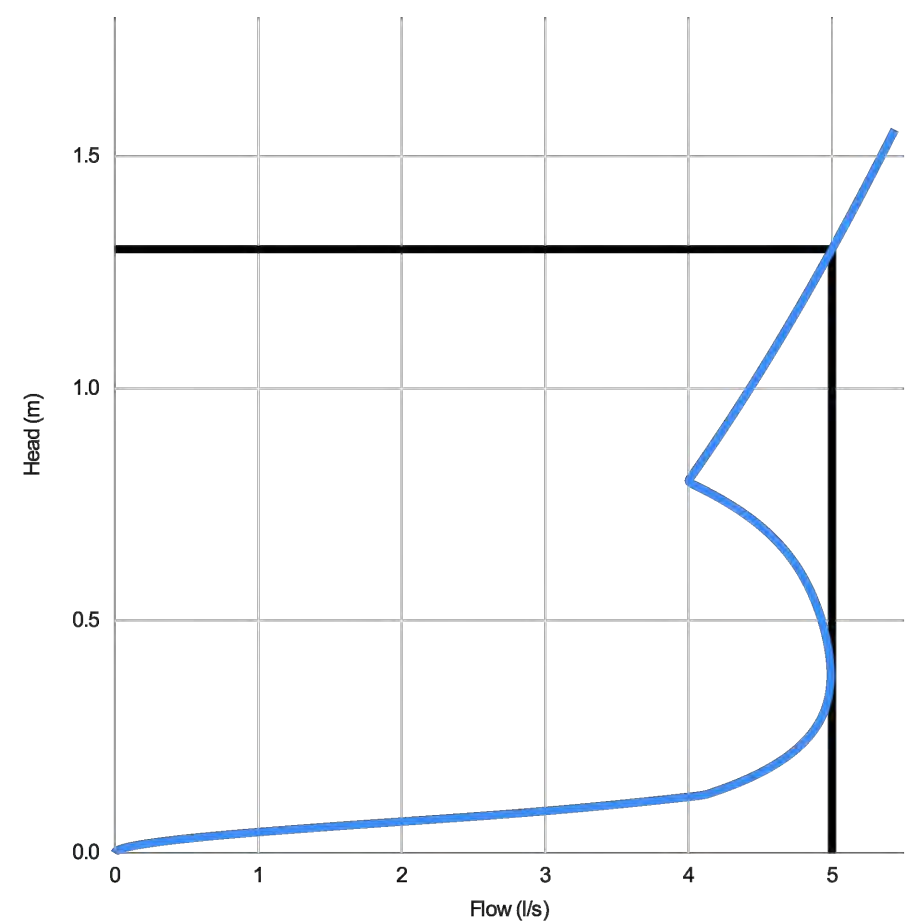
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
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3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
9. FOR FULL DRAINAGE NOTES REFER TO DWG 072071-CUR-XX-00-DR-C-90001

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.300	5.000
Flush-Flo	0.384	4.991
Kick-Flo®	0.798	3.990
Mean Flow		4.374



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Head (m)	Flow (l/s)
0.000	0.000
0.045	1.001
0.090	2.980
0.134	4.206
0.179	4.540
0.224	4.754
0.269	4.885
0.314	4.957
0.359	4.988
0.403	4.989
0.448	4.970
0.493	4.935
0.538	4.886
0.583	4.820
0.628	4.731
0.672	4.611
0.717	4.447
0.762	4.226
0.807	4.010
0.852	4.111
0.897	4.209
0.941	4.305
0.986	4.399
1.031	4.490
1.076	4.579
1.121	4.666
1.166	4.752
1.210	4.836
1.255	4.918
1.300	4.999

DESIGN ADVICE

The head/flow characteristics of this SHE-0101-5000-1300-5000 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

DATE	20/09/2021 22:28
Site	Kincardine Court
DESIGNER	Andrew Losty
Ref	500991



SHE-0101-5000-1300-5000

Hydro-Brake Optimum®

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Technical Specification

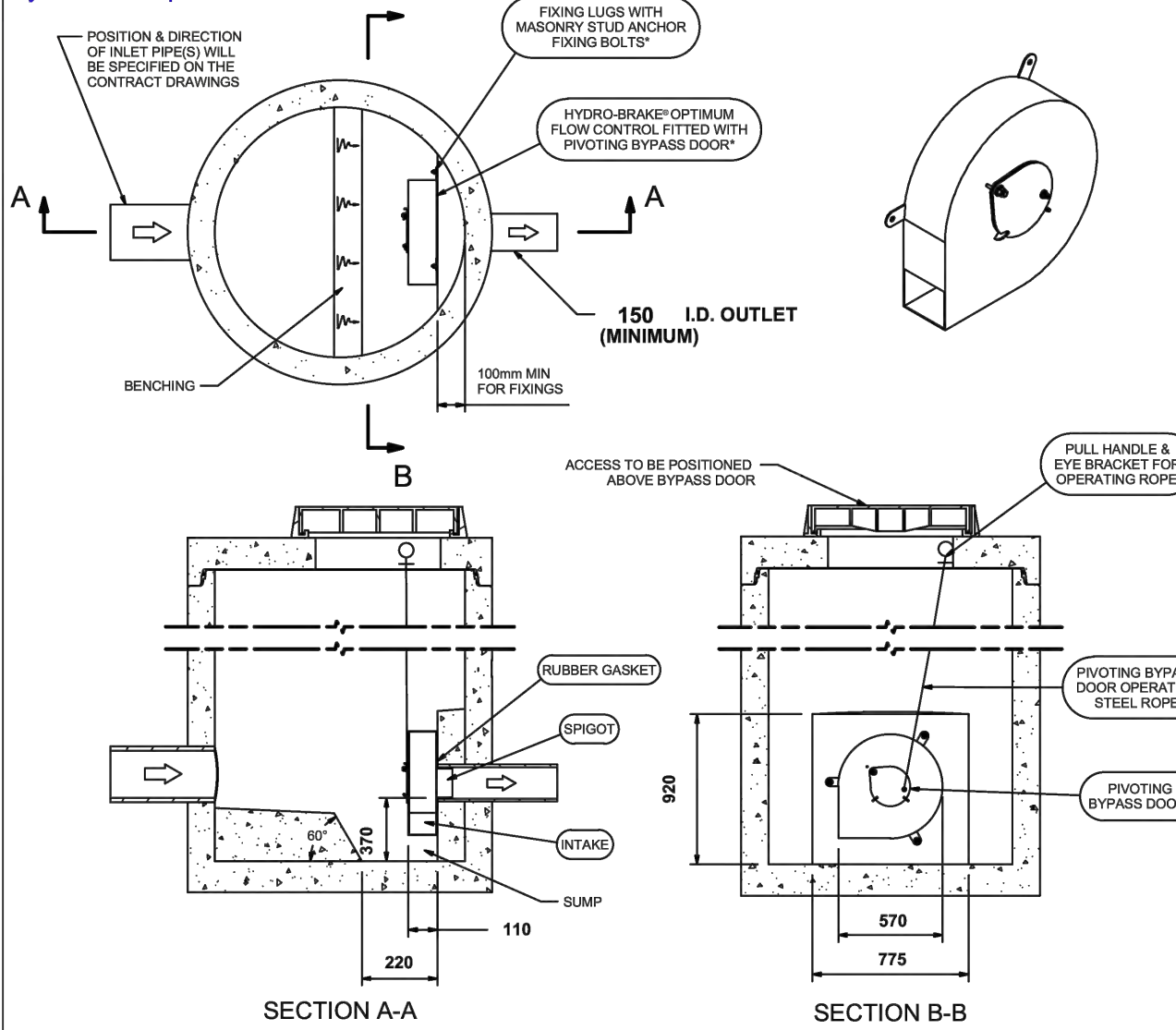
Control Point	Head (m)	Flow (l/s)
Primary Design	1.300	5.000
Flush-Flo™	0.384	4.991
Kick-Flo®	0.798	3.990
Mean Flow		4.374

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Bead blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet



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IMPORTANT: LIMIT OF HYDRO INTERNATIONAL SUPPLY

THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS

FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL

ALL CIVIL AND INSTALLATION WORK BY OTHERS

* WHERE SUPPLIED

HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

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DATE	9/20/2021 10:28 PM
SITE	Kincardine Court
DESIGNER	Andrew Losty
REF	500991

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andy.losty@curtins.com



SHE-0101-5000-1300-5000

Hydro-Brake® Optimum

C03	DRAWING NUMBER CORRECTED	23/12/21	ATL	ATL
C02	UPDATED IN LINE WITH DESIGN TEAM COMMENTS	09/11/21	ATL	ATL
C01	CONSTRUCTION ISSUE	20.09.21	ATL	MW
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Rev:	Description:	Date:	By:	Chkd:



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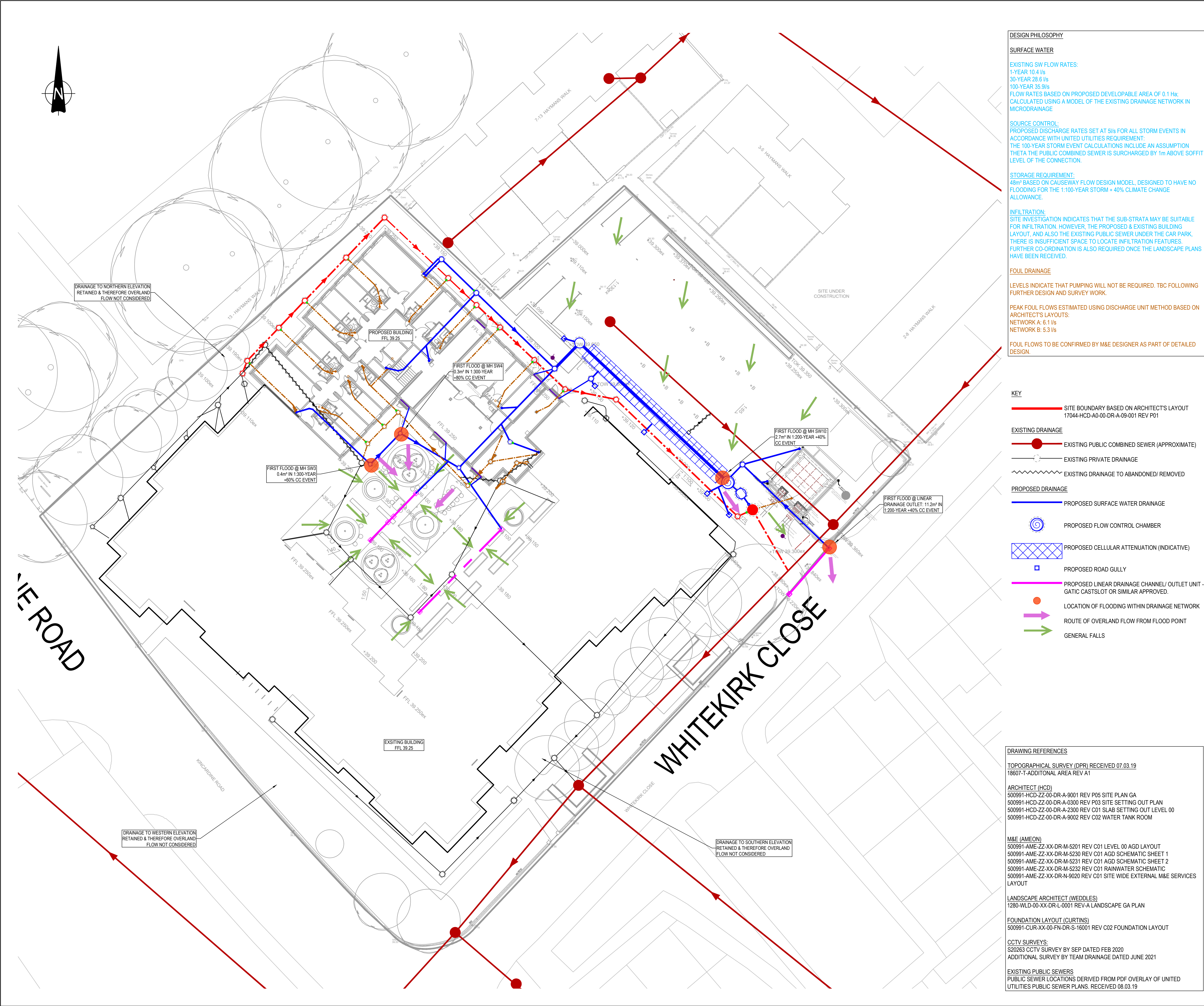
Project:

KINCARDINE COURT

Orig Title:

TYPICAL DRAINAGE DETAILS SHEET 4

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	05.07.21	ATL	ATL	ATL
Scale:	NTS			
Project No:	Originator:	Zone:	Level:	Type: Discipline: Category / Number: Rev:
500991 - CUR - ZZ	- 00	- DR	- D	- 9523 -C03



DESIGN PHILOSOPHY

SURFACE WATER

EXISTING SW FLOW RATES:
1-YEAR 10.4 l/s
30-YEAR 28.6 l/s
100-YEAR 35.9 l/s
FLOW RATES BASED ON PROPOSED DEVELOPABLE AREA OF 0.1 Ha;
CALCULATED USING A MODEL OF THE EXISTING DRAINAGE NETWORK IN MICRODRAINAGE

SOURCE CONTROL:
PROPOSED DISCHARGE RATES SET AT 5 l/s FOR ALL STORM EVENTS IN ACCORDANCE WITH UNITED UTILITIES REQUIREMENT:
THE 100-YEAR STORM EVENT CALCULATIONS INCLUDE AN ASSUMPTION THAT THE PUBLIC COMBINED SEWER IS SURCHARGED BY 1m ABOVE SOFFIT LEVEL OF THE CONNECTION.

STORAGE REQUIREMENT:
48m³ BASED ON CAUSEWAY FLOW DESIGN MODEL, DESIGNED TO HAVE NO FLOODING FOR THE 1:100-YEAR STORM + 40% CLIMATE CHANGE ALLOWANCE.

INFILTRATION:
SITE INVESTIGATION INDICATES THAT THE SUB-STRATA MAY BE SUITABLE FOR INFILTRATION. HOWEVER, THE PROPOSED & EXISTING BUILDING LAYOUT, AND ALSO THE EXISTING PUBLIC SEWER UNDER THE CAR PARK, THERE IS INSUFFICIENT SPACE TO LOCATE INFILTRATION FEATURES. FURTHER CO-ORDINATION IS ALSO REQUIRED ONCE THE LANDSCAPE PLANS HAVE BEEN RECEIVED.

FOUL DRAINAGE

LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED. TBC FOLLOWING FURTHER DESIGN AND SURVEY WORK.

PEAK FOUL FLOWS ESTIMATED USING DISCHARGE UNIT METHOD BASED ON ARCHITECT'S LAYOUTS:
NETWORK A: 6.1 l/s
NETWORK B: 5.3 l/s

FOUL FLOWS TO BE CONFIRMED BY M&E DESIGNER AS PART OF DETAILED DESIGN.

- KEY**
- SITE BOUNDARY BASED ON ARCHITECT'S LAYOUT 17044-HCD-A0-00-DR-A-09-001 REV P01
- EXISTING DRAINAGE**
- EXISTING PUBLIC COMBINED SEWER (APPROXIMATE)
 - EXISTING PRIVATE DRAINAGE
 - EXISTING DRAINAGE TO ABANDONED/ REMOVED
- PROPOSED DRAINAGE**
- PROPOSED SURFACE WATER DRAINAGE
 - PROPOSED FLOW CONTROL CHAMBER
 - PROPOSED CELLULAR ATTENUATION (INDICATIVE)
 - PROPOSED ROAD GULLY
 - PROPOSED LINEAR DRAINAGE CHANNEL/ OUTLET UNIT - GATIC CASTSLOT OR SIMILAR APPROVED.
 - LOCATION OF FLOODING WITHIN DRAINAGE NETWORK
 - ROUTE OF OVERLAND FLOW FROM FLOOD POINT
 - GENERAL FALLS

DRAWING REFERENCES

TOPOGRAPHICAL SURVEY (DPR) RECEIVED 07.03.19
18607-T-ADDITIONAL AREA REV A1

ARCHITECT (HCD)
500991-HCD-ZZ-00-DR-A-9001 REV P05 SITE PLAN GA
500991-HCD-ZZ-00-DR-A-0300 REV P03 SITE SETTING OUT PLAN
500991-HCD-ZZ-00-DR-A-2300 REV C01 SLAB SETTING OUT LEVEL 00
500991-HCD-ZZ-00-DR-A-9002 REV C02 WATER TANK ROOM

M&E (AMEON)
500991-AME-ZZ-XX-DR-M-5201 REV C01 LEVEL 00 AGD LAYOUT
500991-AME-ZZ-XX-DR-M-5230 REV C01 AGD SCHEMATIC SHEET 1
500991-AME-ZZ-XX-DR-M-5231 REV C01 AGD SCHEMATIC SHEET 2
500991-AME-ZZ-XX-DR-M-5232 REV C01 RAINWATER SCHEMATIC
500991-AME-ZZ-XX-DR-N-9020 REV C01 SITE WIDE EXTERNAL M&E SERVICES LAYOUT

LANDSCAPE ARCHITECT (WEDDLES)
1280-WLD-00-XX-DR-L-0001 REV-A LANDSCAPE GA PLAN

FOUNDATION LAYOUT (CURTINS)
500991-CUR-XX-00-FN-DR-S-16001 REV C02 FOUNDATION LAYOUT

CCTV SURVEYS:
S20263 CCTV SURVEY BY SEP DATED FEB 2020
ADDITIONAL SURVEY BY TEAM DRAINAGE DATED JUNE 2021

EXISTING PUBLIC SEWERS
PUBLIC SEWER LOCATIONS DERIVED FROM PDF OVERLAY OF UNITED UTILITIES PUBLIC SEWER PLANS. RECEIVED 08.03.19

GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
- ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
- DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDANCE DATUM UNLESS OTHERWISE NOTED.
- WHERE EXISTING DRAINAGE IS BEING USED, ALLOWANCES SHOULD BE MADE TO REMEDIATE THIS DRAINAGE IN LINE WITH AVAILABLE CCTV SURVEY INFORMATION. IF NO SURVEY IS AVAILABLE, IT IS ADVISED TO OBTAIN ONE PRIOR TO COMMENCEMENT OF WORKS.
- ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORK.
- ALL RAINWATER AND FOUL POP UPS LOCATIONS AND SIZES INDICATIVE ONLY AND TO BE CONFIRMED BY THE ARCHITECT AND M&E ENGINEER.
- COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT.
- ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS. THESE ARE TO BE CONFIRMED ONCE A DETAILED CAPACITY CHECK HAS BEEN UNDERTAKEN AT A LATER DESIGN STAGE.
- OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

P06	AMENDED IN LINE WITH LLFA COMMENTS	08.03.22	ATL	ATL
P05	ATTENUATION TANK AMENDED	21/02/22	ATL	ATL
P04	DRAWING NUMBER CORRECTED	23/12/21	ATL	ATL
P03	UPDATED IN LINE WITH UPDATED INFORMATION	09/11/21	ATL	ATL
P02	AMENDED IN LINE WITH UPDATED LA PLAN & LLFA COMMENTS	30/09/21	ATL	ATL
P01	ISSUED FOR DISCHARGE OF CONDITION	05/07/21	ATL	ATL
Rev:	Description:	Date:	By:	Chkd:



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Status: **APPROVAL**

Project: **KINCARDINE COURT**

Orig Title: **OVERLAND FLOW PLAN**

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	05/07/21	ATL	ATL	CG

Scale: 1:200

Project No:	Originator:	Volume:	Level:	Type:	Role:	Category / Number:	Rev:
500991	CUR	ZZ	00	DR	C	9503	P06

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.363	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

1 STANDARD Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1350

1 STANDARD Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
SW1	0.015	5.00	39.150	Manhole	1 STANDARD	450		384864.820	396994.275	0.550
SW2	0.015	5.00	39.150	Manhole	1 STANDARD	450		384868.787	396990.433	1.750
SW3	0.007	5.00	39.170	Manhole	1 STANDARD	450		384856.680	396970.870	1.470
SW4			39.160	Manhole	1 STANDARD	450		384860.105	396974.409	1.509
SW5	0.058	5.00	39.170	Manhole	1 STANDARD	450		384866.793	396970.481	1.674
SW6	0.004	5.00	39.150	Manhole	1 STANDARD	600		384877.730	396981.781	1.971
SW7	0.014	5.00	39.200	Manhole	1 STANDARD	1200		384881.064	396985.226	2.045
ATANK	0.028	5.00	39.050	Junction				384891.908	396974.899	1.970
OU	0.006	5.00	38.900	Manhole	1 STANDARD	350	350	384909.059	396961.282	1.000
SW9	0.004	5.00	38.980	Manhole	1 STANDARD	600		384899.178	396970.847	1.260
SW10	0.024	5.00	38.950	Manhole	1 STANDARD	1500		384897.523	396968.808	1.911
SW11			38.930	Manhole	1 STANDARD	1200		384899.005	396967.522	2.087
CW1			38.900	Manhole	1 STANDARD	1200		384900.324	396965.677	2.284
14_OUT			39.000	Manhole	1 STANDARD			384904.211	396959.009	2.740

Links

US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
SW1	SW2	5.523	0.600	Colebrook-White	38.600	38.563	0.037	150.0	150	1 STANDARD	5.11	45.6
SW2	SW6	12.443	0.600	Colebrook-White	37.400	37.330	0.070	177.8	150	1 STANDARD	5.39	45.5
SW3	SW4	4.925	0.600	Colebrook-White	37.700	37.651	0.049	100.5	150	1 STANDARD	5.08	45.7
SW4	SW5	7.756	0.600	Colebrook-White	37.651	37.496	0.155	50.0	150	1 STANDARD	5.17	45.3
SW5	SW6	15.726	0.600	Colebrook-White	37.505	37.348	0.157	100.0	150	1 STANDARD	5.43	45.4
SW6	SW7	4.794	0.600	Colebrook-White	37.179	37.155	0.024	200.0	300	1 STANDARD	5.51	45.1
SW7	ATANK	14.975	0.600	Colebrook-White	37.155	37.080	0.075	200.0	300	1 STANDARD	5.73	44.3
ATANK	SW10	8.284	0.600	Colebrook-White	37.080	37.039	0.041	200.0	300	1 STANDARD	5.86	43.9
OU	SW9	13.752	0.600	Colebrook-White	37.900	37.728	0.172	80.0	150	1 STANDARD	5.20	45.2
SW9	SW10	2.626	0.600	Colebrook-White	37.720	37.694	0.026	100.0	150	1 STANDARD	5.25	45.0
SW10	SW11	1.962	0.600	Colebrook-White	37.039	36.843	0.196	10.0	150	1 STANDARD	5.87	43.8
SW11	CW1	2.268	0.600	Colebrook-White	36.843	36.616	0.227	10.0	150	1 STANDARD	5.88	43.8
CW1	14_OUT	7.718	0.600	Colebrook-White	36.616	36.260	0.356	21.7	150	1 STANDARD	5.94	43.6

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	SW1	SW2	0.818	14.5	1.9	0.400	0.437	0.400	0.437	0.015	0.0
1.001	SW2	SW6	0.750	13.3	3.7	1.600	1.670	1.600	1.670	0.030	0.0
2.000	SW3	SW4	1.002	17.7	0.9	1.320	1.359	1.320	1.359	0.007	0.0
2.001	SW4	SW5	1.426	25.2	0.9	1.359	1.524	1.359	1.524	0.007	0.0
2.002	SW5	SW6	1.005	17.8	8.0	1.515	1.652	1.515	1.652	0.065	0.0
1.002	SW6	SW7	1.108	78.3	12.1	1.671	1.745	1.671	1.745	0.099	0.0
1.003	SW7	ATANK	1.108	78.3	13.6	1.745	1.670	1.670	1.745	0.113	0.0
1.004	ATANK	SW10	1.108	78.3	16.8	1.670	1.611	1.611	1.670	0.141	0.0
3.000	OU	SW9	1.125	19.9	0.8	0.850	1.102	0.850	1.102	0.006	0.0
3.001	SW9	SW10	1.005	17.8	1.2	1.110	1.106	1.106	1.110	0.010	0.0
1.005	SW10	SW11	3.204	56.6	20.8	1.761	1.937	1.761	1.937	0.175	0.0
1.006	SW11	CW1	3.204	56.6	20.8	1.937	2.134	1.937	2.134	0.175	0.0
1.007	CW1	14_OUT	2.172	38.4	20.7	2.134	2.590	2.134	2.590	0.175	0.0

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	5.523	150.0	150	1 STANDARD	39.150	38.600	0.400	39.150	38.563	0.437
1.001	12.443	177.8	150	1 STANDARD	39.150	37.400	1.600	39.150	37.330	1.670
2.000	4.925	100.5	150	1 STANDARD	39.170	37.700	1.320	39.160	37.651	1.359
2.001	7.756	50.0	150	1 STANDARD	39.160	37.651	1.359	39.170	37.496	1.524
2.002	15.726	100.0	150	1 STANDARD	39.170	37.505	1.515	39.150	37.348	1.652
1.002	4.794	200.0	300	1 STANDARD	39.150	37.179	1.671	39.200	37.155	1.745
1.003	14.975	200.0	300	1 STANDARD	39.200	37.155	1.745	39.050	37.080	1.670

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW1	450		Manhole	1 STANDARD	SW2	450	Manhole	1 STANDARD
1.001	SW2	450		Manhole	1 STANDARD	SW6	600	Manhole	1 STANDARD
2.000	SW3	450		Manhole	1 STANDARD	SW4	450	Manhole	1 STANDARD
2.001	SW4	450		Manhole	1 STANDARD	SW5	450	Manhole	1 STANDARD
2.002	SW5	450		Manhole	1 STANDARD	SW6	600	Manhole	1 STANDARD
1.002	SW6	600		Manhole	1 STANDARD	SW7	1200	Manhole	1 STANDARD
1.003	SW7	1200		Manhole	1 STANDARD	ATANK		Junction	

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	8.284	200.0	300	1 STANDARD	39.050	37.080	1.670	38.950	37.039	1.611
3.000	13.752	80.0	150	1 STANDARD	38.900	37.900	0.850	38.980	37.728	1.102
3.001	2.626	100.0	150	1 STANDARD	38.980	37.720	1.110	38.950	37.694	1.106
1.005	1.962	10.0	150	1 STANDARD	38.950	37.039	1.761	38.930	36.843	1.937
1.006	2.268	10.0	150	1 STANDARD	38.930	36.843	1.937	38.900	36.616	2.134
1.007	7.718	21.7	150	1 STANDARD	38.900	36.616	2.134	39.000	36.260	2.590

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.004	ATANK			Junction		SW10	1500	Manhole	1 STANDARD
3.000	OU	350	350	Manhole	1 STANDARD	SW9	600	Manhole	1 STANDARD
3.001	SW9	600		Manhole	1 STANDARD	SW10	1500	Manhole	1 STANDARD
1.005	SW10	1500		Manhole	1 STANDARD	SW11	1200	Manhole	1 STANDARD
1.006	SW11	1200		Manhole	1 STANDARD	CW1	1200	Manhole	1 STANDARD
1.007	CW1	1200		Manhole	1 STANDARD	14_OUT		Manhole	1 STANDARD

Manhole Schedule

Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
384864.820	396994.275	39.150	0.550	450		Manhole	1 STANDARD		0	1.000	38.600	150	1 STANDARD
384868.787	396990.433	39.150	1.750	450		Manhole	1 STANDARD		1 0	1.000 1.001	38.563 37.400	150 150	1 STANDARD 1 STANDARD
384856.680	396970.870	39.170	1.470	450		Manhole	1 STANDARD		0	2.000	37.700	150	1 STANDARD
384860.105	396974.409	39.160	1.509	450		Manhole	1 STANDARD		1 0	2.000 2.001	37.651 37.651	150 150	1 STANDARD 1 STANDARD
384866.793	396970.481	39.170	1.674	450		Manhole	1 STANDARD		1 0	2.001 2.002	37.496 37.505	150 150	1 STANDARD 1 STANDARD
384877.730	396981.781	39.150	1.971	600		Manhole	1 STANDARD		1 2 0	2.002 1.001 1.002	37.348 37.330 37.179	150 150 300	1 STANDARD 1 STANDARD 1 STANDARD
384881.064	396985.226	39.200	2.045	1200		Manhole	1 STANDARD		1 0	1.002 1.003	37.155 37.155	300 300	1 STANDARD 1 STANDARD
384891.908	396974.899	39.050	1.970			Junction			1 0	1.003 1.004	37.080 37.080	300 300	1 STANDARD 1 STANDARD

Manhole Schedule

	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
	384909.059	396961.282	38.900	1.000	350	350	Manhole	1 STANDARD		0	3.000	37.900	150	1 STANDARD
	384899.178	396970.847	38.980	1.260	600		Manhole	1 STANDARD		1	3.000	37.728	150	1 STANDARD
	384897.523	396968.808	38.950	1.911	1500		Manhole	1 STANDARD		0	3.001	37.720	150	1 STANDARD
										1	3.001	37.694	150	1 STANDARD
										2	1.004	37.039	300	1 STANDARD
										0	1.005	37.039	150	1 STANDARD
	384899.005	396967.522	38.930	2.087	1200		Manhole	1 STANDARD		1	1.005	36.843	150	1 STANDARD
										0	1.006	36.843	150	1 STANDARD
	384900.324	396965.677	38.900	2.284	1200		Manhole	1 STANDARD		1	1.006	36.616	150	1 STANDARD
										0	1.007	36.616	150	1 STANDARD
T	384904.211	396959.009	39.000	2.740			Manhole	1 STANDARD		1	1.007	36.260	150	1 STANDARD

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	18.000	Drain Down Time (mins)	60
Ratio-R	0.363	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

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 %)
1	0	0	0
30	0	0	0
100	20	0	0
100	40	0	0

Node SW10 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	37.039	Product Number	CTL-SHE-0094-5000-1800-5000
Design Depth (m)	1.800	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node ATANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	37.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	42.0	24.0	1.200	42.0	46.4	1.210	0.0	46.4

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Approval Settings

Node Size	✓	Full Bore Velocity	✓
Node Losses	✓	Minimum Full Bore Velocity (m/s)	1.000
Link Size	✓	Maximum Full Bore Velocity (m/s)	3.000
Minimum Diameter (mm)	150	Proportional Velocity	✓
Link Length	✓	Return Period (years)	1
Maximum Length (m)	100.000	Minimum Proportional Velocity (m/s)	0.750
Coordinates	✓	Maximum Proportional Velocity (m/s)	3.000
Accuracy (m)	1.000	Surcharged Depth	✓
Crossings	✓	Return Period (years)	1
Cover Depth	✓	Maximum Surcharged Depth (m)	0.100
Minimum Cover Depth (m)	1.200	Flooding	✓
Maximum Cover Depth (m)	3.000	Return Period (years)	30
Backdrops	✓	Time to Half Empty	x
Minimum Backdrop Height (m)	0.200	Discharge Rates	✓
Maximum Backdrop Height (m)	1.500	Discharge Volume	x

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	95.066	26.900	1 year 960 minute summer	6.500	1.712
1 year 15 minute winter	66.713	26.900	1 year 960 minute winter	4.306	1.712
1 year 30 minute summer	62.653	17.729	1 year 1440 minute summer	4.806	1.288
1 year 30 minute winter	43.967	17.729	1 year 1440 minute winter	3.230	1.288
1 year 60 minute summer	43.047	11.376	30 year 15 minute summer	232.567	65.808
1 year 60 minute winter	28.599	11.376	30 year 15 minute winter	163.205	65.808
1 year 120 minute summer	27.164	7.179	30 year 30 minute summer	153.976	43.570
1 year 120 minute winter	18.047	7.179	30 year 30 minute winter	108.053	43.570
1 year 180 minute summer	21.219	5.460	30 year 60 minute summer	104.640	27.653
1 year 180 minute winter	13.793	5.460	30 year 60 minute winter	69.521	27.653
1 year 240 minute summer	17.002	4.493	30 year 120 minute summer	64.570	17.064
1 year 240 minute winter	11.296	4.493	30 year 120 minute winter	42.899	17.064
1 year 360 minute summer	13.256	3.411	30 year 180 minute summer	49.489	12.735
1 year 360 minute winter	8.617	3.411	30 year 180 minute winter	32.169	12.735
1 year 480 minute summer	10.544	2.786	30 year 240 minute summer	38.987	10.303
1 year 480 minute winter	7.005	2.786	30 year 240 minute winter	25.902	10.303
1 year 600 minute summer	8.707	2.382	30 year 360 minute summer	29.523	7.597
1 year 600 minute winter	5.949	2.382	30 year 360 minute winter	19.191	7.597
1 year 720 minute summer	7.817	2.095	30 year 480 minute summer	23.161	6.121
1 year 720 minute winter	5.254	2.095	30 year 480 minute winter	15.388	6.121

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 600 minute summer	18.912	5.173	100 year +20% CC 960 minute summer	21.153	5.570
30 year 600 minute winter	12.922	5.173	100 year +20% CC 960 minute winter	14.012	5.570
30 year 720 minute summer	16.816	4.507	100 year +20% CC 1440 minute summer	15.152	4.061
30 year 720 minute winter	11.301	4.507	100 year +20% CC 1440 minute winter	10.183	4.061
30 year 960 minute summer	13.761	3.624	100 year +40% CC 15 minute summer	420.399	118.958
30 year 960 minute winter	9.115	3.624	100 year +40% CC 15 minute winter	295.017	118.958
30 year 1440 minute summer	9.930	2.661	100 year +40% CC 30 minute summer	281.068	79.532
30 year 1440 minute winter	6.673	2.661	100 year +40% CC 30 minute winter	197.240	79.532
100 year +20% CC 15 minute summer	360.342	101.964	100 year +40% CC 60 minute summer	192.272	50.812
100 year +20% CC 15 minute winter	252.871	101.964	100 year +40% CC 60 minute winter	127.741	50.812
100 year +20% CC 30 minute summer	240.915	68.171	100 year +40% CC 120 minute summer	118.905	31.423
100 year +20% CC 30 minute winter	169.063	68.171	100 year +40% CC 120 minute winter	78.998	31.423
100 year +20% CC 60 minute summer	164.805	43.553	100 year +40% CC 180 minute summer	90.992	23.415
100 year +20% CC 60 minute winter	109.492	43.553	100 year +40% CC 180 minute winter	59.147	23.415
100 year +20% CC 120 minute summer	101.919	26.934	100 year +40% CC 240 minute summer	71.483	18.891
100 year +20% CC 120 minute winter	67.713	26.934	100 year +40% CC 240 minute winter	47.492	18.891
100 year +20% CC 180 minute summer	77.993	20.070	100 year +40% CC 360 minute summer	53.769	13.837
100 year +20% CC 180 minute winter	50.697	20.070	100 year +40% CC 360 minute winter	34.951	13.837
100 year +20% CC 240 minute summer	61.271	16.192	100 year +40% CC 480 minute summer	42.006	11.101
100 year +20% CC 240 minute winter	40.707	16.192	100 year +40% CC 480 minute winter	27.908	11.101
100 year +20% CC 360 minute summer	46.088	11.860	100 year +40% CC 600 minute summer	34.182	9.350
100 year +20% CC 360 minute winter	29.958	11.860	100 year +40% CC 600 minute winter	23.355	9.350
100 year +20% CC 480 minute summer	36.005	9.515	100 year +40% CC 720 minute summer	30.304	8.122
100 year +20% CC 480 minute winter	23.921	9.515	100 year +40% CC 720 minute winter	20.366	8.122
100 year +20% CC 600 minute summer	29.299	8.014	100 year +40% CC 960 minute summer	24.679	6.498
100 year +20% CC 600 minute winter	20.019	8.014	100 year +40% CC 960 minute winter	16.348	6.498
100 year +20% CC 720 minute summer	25.975	6.962	100 year +40% CC 1440 minute summer	17.677	4.738
100 year +20% CC 720 minute winter	17.457	6.962	100 year +40% CC 1440 minute winter	11.880	4.738

Results for 1 year Critical Storm Duration. Lowest mass balance: 97.23%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW1	10	38.637	0.037	1.8	0.0261	0.0000	OK
15 minute winter	SW2	10	37.454	0.054	3.6	0.0179	0.0000	OK
15 minute winter	SW3	10	37.724	0.024	0.9	0.0061	0.0000	OK
15 minute winter	SW4	11	37.670	0.019	0.9	0.0030	0.0000	OK
15 minute winter	SW5	10	37.578	0.082	7.9	0.0695	0.0000	OK
15 minute winter	SW6	11	37.268	0.089	11.7	0.0287	0.0000	OK
60 minute winter	SW7	46	37.264	0.109	7.5	0.1378	0.0000	OK
60 minute winter	ATANK	46	37.263	0.183	9.3	7.3516	0.0000	OK
15 minute summer	OU	11	37.919	0.019	0.7	0.0047	0.0000	OK
15 minute winter	SW9	11	37.748	0.028	1.2	0.0098	0.0000	OK
60 minute winter	SW10	45	37.264	0.225	4.3	0.4531	0.0000	SURCHARGED
60 minute winter	SW11	46	36.872	0.029	4.0	0.0326	0.0000	OK
60 minute winter	CW1	46	36.650	0.034	4.0	0.0386	0.0000	OK
60 minute winter	14_OUT	46	36.293	0.033	4.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW1	1.000	SW2	1.8	0.541	0.122	0.0181	
15 minute winter	SW2	1.001	SW6	3.5	0.624	0.264	0.0697	
15 minute winter	SW3	2.000	SW4	0.9	0.570	0.049	0.0076	
15 minute winter	SW4	2.001	SW5	0.9	0.166	0.034	0.0429	
15 minute winter	SW5	2.002	SW6	7.7	0.949	0.436	0.1287	
15 minute winter	SW6	1.002	SW7	11.7	0.695	0.150	0.0819	
60 minute winter	SW7	1.003	ATANK	7.5	0.558	0.095	0.5103	
60 minute winter	ATANK	1.004	SW10	3.6	0.161	0.046	0.4212	
15 minute summer	OU	3.000	SW9	0.7	0.523	0.035	0.0183	
15 minute winter	SW9	3.001	SW10	1.2	0.546	0.068	0.0058	
60 minute winter	SW10	1.005	SW11	4.0	1.643	0.071	0.0048	
60 minute winter	SW11	1.006	CW1	4.0	1.496	0.071	0.0061	
60 minute winter	CW1	1.007	14_OUT	4.0	1.371	0.104	0.0226	16.1

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.23%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW1	10	38.661	0.061	4.5	0.0430	0.0000	OK
60 minute winter	SW2	58	37.665	0.265	4.8	0.0873	0.0000	SURCHARGED
15 minute winter	SW3	10	37.737	0.037	2.1	0.0094	0.0000	OK
15 minute winter	SW4	10	37.680	0.029	2.1	0.0046	0.0000	OK
15 minute winter	SW5	11	37.671	0.175	19.5	0.1494	0.0000	SURCHARGED
60 minute winter	SW6	58	37.664	0.485	15.8	0.1567	0.0000	SURCHARGED
60 minute winter	SW7	58	37.664	0.509	16.9	0.6456	0.0000	SURCHARGED
60 minute winter	ATANK	59	37.664	0.584	19.7	23.4524	0.0000	SURCHARGED
15 minute winter	OU	10	37.930	0.030	1.8	0.0074	0.0000	OK
15 minute winter	SW9	10	37.766	0.046	3.0	0.0158	0.0000	OK
60 minute winter	SW10	59	37.664	0.625	5.5	1.2613	0.0000	SURCHARGED
30 minute winter	SW11	21	36.873	0.030	4.4	0.0343	0.0000	OK
30 minute winter	CW1	21	36.652	0.036	4.4	0.0406	0.0000	OK
60 minute winter	14_OUT	36	36.294	0.034	4.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW1	1.000	SW2	4.4	0.691	0.306	0.0354	
60 minute winter	SW2	1.001	SW6	4.9	0.672	0.368	0.2191	
15 minute winter	SW3	2.000	SW4	2.1	0.728	0.117	0.0141	
15 minute winter	SW4	2.001	SW5	2.1	0.186	0.082	0.0775	
15 minute winter	SW5	2.002	SW6	18.7	1.097	1.054	0.2624	
60 minute winter	SW6	1.002	SW7	14.7	0.686	0.188	0.3376	
60 minute winter	SW7	1.003	ATANK	15.1	0.549	0.193	1.0545	
60 minute winter	ATANK	1.004	SW10	4.2	0.100	0.054	0.5834	
15 minute winter	OU	3.000	SW9	1.8	0.595	0.089	0.0411	
15 minute winter	SW9	3.001	SW10	2.9	0.693	0.165	0.0111	
60 minute winter	SW10	1.005	SW11	4.4	1.676	0.078	0.0052	
30 minute winter	SW11	1.006	CW1	4.4	1.530	0.078	0.0065	
30 minute winter	CW1	1.007	14_OUT	4.4	1.405	0.115	0.0242	20.7

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 97.23%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW1	10	38.679	0.079	7.0	0.0559	0.0000	OK
120 minute winter	SW2	116	38.183	0.783	4.6	0.2583	0.0000	SURCHARGED
120 minute winter	SW3	116	38.184	0.484	1.1	0.1229	0.0000	SURCHARGED
120 minute winter	SW4	116	38.184	0.533	1.1	0.0848	0.0000	SURCHARGED
120 minute winter	SW5	116	38.184	0.688	10.0	0.5862	0.0000	SURCHARGED
120 minute winter	SW6	116	38.183	1.004	13.8	0.3242	0.0000	SURCHARGED
120 minute winter	SW7	116	38.183	1.028	15.3	1.3031	0.0000	SURCHARGED
120 minute winter	ATANK	116	38.183	1.103	19.1	44.2872	0.0000	SURCHARGED
120 minute winter	OU	116	38.182	0.282	1.2	0.0686	0.0000	SURCHARGED
120 minute winter	SW9	116	38.183	0.462	1.5	0.1600	0.0000	SURCHARGED
120 minute winter	SW10	116	38.183	1.143	5.3	2.3076	0.0000	SURCHARGED
30 minute summer	SW11	18	36.873	0.030	4.4	0.0343	0.0000	OK
240 minute summer	CW1	120	36.652	0.036	4.4	0.0406	0.0000	OK
240 minute summer	14_OUT	120	36.294	0.034	4.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW1	1.000	SW2	6.9	0.772	0.478	0.0495	
120 minute winter	SW2	1.001	SW6	4.2	0.618	0.314	0.2191	
120 minute winter	SW3	2.000	SW4	1.1	0.605	0.064	0.0867	
120 minute winter	SW4	2.001	SW5	1.1	0.179	0.043	0.1365	
120 minute winter	SW5	2.002	SW6	9.4	0.946	0.532	0.2769	
120 minute winter	SW6	1.002	SW7	13.1	0.571	0.168	0.3376	
120 minute winter	SW7	1.003	ATANK	14.7	0.544	0.187	1.0545	
120 minute winter	ATANK	1.004	SW10	3.7	0.118	0.047	0.5834	
120 minute winter	OU	3.000	SW9	0.9	0.536	0.045	0.2421	
120 minute winter	SW9	3.001	SW10	1.5	0.581	0.087	0.0462	
120 minute winter	SW10	1.005	SW11	4.4	1.676	0.078	0.0051	
30 minute summer	SW11	1.006	CW1	4.4	1.530	0.078	0.0065	
240 minute summer	CW1	1.007	14_OUT	4.4	1.405	0.115	0.0242	58.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.23%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	SW1	114	38.847	0.247	2.7	0.1739	0.0000	SURCHARGED
120 minute winter	SW2	114	38.847	1.447	5.4	0.4775	0.0000	SURCHARGED
120 minute winter	SW3	114	38.849	1.149	1.4	0.2918	0.0000	SURCHARGED
120 minute winter	SW4	114	38.849	1.198	2.3	0.1905	0.0000	SURCHARGED
120 minute winter	SW5	114	38.849	1.353	10.7	1.1527	0.0000	SURCHARGED
120 minute winter	SW6	114	38.847	1.668	15.8	0.5387	0.0000	SURCHARGED
120 minute winter	SW7	114	38.847	1.692	17.9	2.1450	0.0000	SURCHARGED
120 minute winter	ATANK	114	38.847	1.767	23.0	47.3644	0.0000	FLOOD RISK
120 minute winter	OU	114	38.846	0.946	1.9	0.2300	0.0000	FLOOD RISK
120 minute winter	SW9	114	38.846	1.126	1.8	0.3897	0.0000	FLOOD RISK
120 minute winter	SW10	114	38.846	1.807	6.2	3.6473	0.0000	FLOOD RISK
120 minute winter	SW11	114	36.875	0.032	5.0	0.0367	0.0000	OK
120 minute winter	CW1	114	36.654	0.038	5.0	0.0433	0.0000	OK
120 minute winter	14_OUT	114	36.297	0.037	5.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	SW1	1.000	SW2	2.7	0.608	0.187	0.0972	
120 minute winter	SW2	1.001	SW6	4.9	0.616	0.369	0.2191	
120 minute winter	SW3	2.000	SW4	1.2	0.605	0.068	0.0867	
120 minute winter	SW4	2.001	SW5	-2.3	0.185	-0.089	0.1365	
120 minute winter	SW5	2.002	SW6	10.2	0.958	0.577	0.2769	
120 minute winter	SW6	1.002	SW7	15.3	0.558	0.196	0.3376	
120 minute winter	SW7	1.003	ATANK	17.3	0.560	0.221	1.0545	
120 minute winter	ATANK	1.004	SW10	4.9	0.101	0.063	0.5834	
120 minute winter	OU	3.000	SW9	1.1	0.555	0.055	0.2421	
120 minute winter	SW9	3.001	SW10	1.8	0.607	0.102	0.0462	
120 minute winter	SW10	1.005	SW11	5.0	1.720	0.088	0.0057	
120 minute winter	SW11	1.006	CW1	5.0	1.574	0.088	0.0072	
120 minute winter	CW1	1.007	14_OUT	5.0	1.453	0.130	0.0264	41.5

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