Appendix G

Connection Manhole Details

Connection Manhole Method Statement

Connection Manhole Risk Assessment

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S22	METHOD STATEMENT

CONTRACT:	Hammerstone Road	CONTRACT NO:	232	DATE:	30.10.23.

METHOD STATEMENT No.	014	REV.	B
TITLE	Connection Manholes	LOCATION	MH S06 and MH S08
START DATE	30.10.23.	DURATION	36 weeks overall duration

ACCEPTANCE

1. All operatives to wear appropriate PPE for task ahead.
2. If unsure of any aspect of the works, cease works and seek advice from your supervisor, if systems of work change, then RAMS to be updated in accordance with the change.
3. All operatives to have read, understood and signed the method statement.

DESCRIPTION AND METHODOLOGY OF WORKS

Prior to Works

1. Operatives' inductions will be booked in on the M-Site System by the Adana Manager the previous day.
2. Operatives will complete the online pre-enrolment prior to arriving on site.
3. Morgan Sindall site induction will be attended for Adana personnel before any works commence.
4. Working hours will be 7.30 until 17.00.
5. Barriers will be in place outside to segregate the works area.
6. Permit to Excavate will be in place for any excavation works.
7. Area will be CAT scanned and any services exposed by hand.
8. Daily Risk Assessments / Briefings will be carried out by the manager/ supervisor at the start of each day.
9. PPE will be Boots, Vest, Hardhat, Gloves and Glasses as standard.
10. Every Three weeks, our Safety Officer will carry out an on- site safety report.

Access, Deliveries and Storage

11. Access to Site will be via the Morgan Sindall traffic route through the MCC car park.
12. All deliveries will be co-ordinated with Morgan Sindall and the MCC Gate Man at the morning briefing.
13. We will form a compound / Lay down area as per agreed Location Plan
14. Material storage area will be segregated with Barriers.
15. Deliveries will be always supervised by a competent Banks man (entering, unloading and leaving).
16. All deliveries where people must enter the back of the wagon must have edge protection set up. No operatives are to climb onto the back of a delivery wagon without edge protection.
17. Some materials or items will be off loaded with a Hiab before offloading can commence, a copy of the drivers Hiab certificate, will be available in his cab.
18. Where deliveries are to be offloaded with the excavator, lifting plan will be read and understood by all involved.
19. When loading materials into excavations, operatives must remain out of the excavation, until the materials are within 500mm of the bottom of the excavation.
20. Work and Storage areas will be thoroughly tidied as required and at the end of each shift.

Site Contacts:

[redacted]

General Rules

1) Permit to dig obtained and cat scan of area to be carried out prior to breaking ground by Trained operatives.
2) If excavations are deemed to bit at risk of containing asbestos, a Watching Brief will be present (trained in asbestos awareness) to comply with the Asbestos Management Plan.
3) Any known services to be exposed by hand or with Vac Ex, no excavation within 500mm of known or identified services.
4) Excavation inspections carried out daily prior to commencing.
5) Safe start briefing to be carried out daily.
6) Excavations will be segregated with double clipped Herras fencing with warning signs.
7) No operatives are to be below materials being lifted or lowered by the excavator.
8) Stop blocks must be used where wheeled plant or vehicles are within 2m of the trench.
9) Excavations will only be entered by a fixed of propritry access.
10) Any entering of excavations will be carried out to the rescue plan below.
11) All trench shoring including the construction of proprietry systems will be used by operatives familiar with Groundforce Systems.
12) Trench boxes and manhole boxes will be constructed to design in a designated and segregated area and the carried to work face by excavator as required.
13) Confined spaces will only be entered by trained operatives with full Gas Detection and emergency escape kit.
14) All safety apparatus will be calibrated, with certificates stored in the Adana files.
15) Where Edge protection cannot be used, any operative working at the side of the excavation must be wearing a harness, connected to a solid fixing capable of holding or weighing a minimum of 250KG
16) This Method statement will be read in conjunction with the Excavator Lifting plan for the excavator carrying out the works.

Live Services: The areas we are working could well have very shallow existing services.

1) Service drawings will be reviewed by Supervisor, Engineer and site team prior to commencing works in each area.
2) The services will be marked by the site engineer but, this is only a guidance and may not be the true location.
3) The CAT scan and generator will be used to further determine the location of the known service.
4) Any street light columns or other utility pits nearby will be opened and investigated to determine other services which may not be on the drawings.
5) All services known or, picked up in further surveying, will be marked on the ground.
6) We will then expose any services within our excavations by hand by operatives wearing fireproof overalls and with insulated tools.
7) Overhead services will be pointed out to all workers involved along with a tool box talk. will
8) Where hardstanding's are above and, we cannot excavate by hand, we will break the surface by mechanical mans but a minimum of 500mm from the location, either side of the line of location.
9) We will remove the hard standings and excavate further down to form two pits either side of the service.
10) Hand dig will then continue sideways from inside the pit, until the service is exposed.
11) Once exposed, the Adana Manager and Morgan Sindall Manager will be invited to inspect.
12) At this point works will be held until the Managers advise further.

Removal of Hard Standings (Some of our excavations will require the removal of existing tarmac and concrete)

1. Permit to excavate must always be in place even when only cutting and removing surfaces.
2. Area must always be segregated with barriers or herras with signage in place.
3. When cutting, full dust suppression must be in place either vaccumn or water.
4. Dust must be reviewed constantly during works.
5. Anybody working directly at the point of works must wear dust masks and goggles.
6. During cutting, breaking and peckering, a mandatory hearing protection zone will be set up.
7. In this zone, ear defenders must be worn by everybody.

Addendum 1 Minimal Traces of Asbestos found to be in the ground.

1. Manager / Engineer to advise on areas where asbestos traces are thought to be present.
2. Traces are within the ground so are not Airbourne however, testing of the air will be carried out during works as a check.
3. Operatives in direct contact with the material will wear paper suits, / wet suits, wellies, and half face masks.
4. At the end of works including prior to breaks and entering the welfare area, the PPE will be cleaned down using the jetwash at the container.
5. A watching brief, with asbestos awareness training will be in attendance with excavation works to look out for any visible amounts of asbestos.
6. If any visible amounts are found, works will be stopped until they can be removed safely by a specialist contractor.
7. No cross contamination of muck into the welfare or office area.
8. Operatives will then remove the PPE and store at the designated area provided at the container.
9. Operatives to take extra care cleaning hands and face prior to eating or leaving site.
10. When returning to the works, the operatives will put their PPE on again.
11. Any damaged PPE or PPE that cannot be cleaned to be replaced before returning to site.
12. Muck being transported will be loaded onto the dumper via the excavator. If the excavated material is dry, we will dampen down with the jetwash.
13. Dumper will only be half filled when transporting hazardous muck to further avoid spillage.
14. Muck storage areas will be fenced off and covered over with visqueen at the end of each shift or during rain.
15. At the end of each shift, all plant will be decontaminated with the jet wash.
16. Work Area will be dampened down and cleaned at the end of each shift or as required.

Sequence of Works for Manholes

1. Location of culvert and connecting manhole will be set out by the engineer.
2. Engineer will give assumed level of the top of the culvert.
3. Excavator will excavate the first 1m of dig to the plan of the proprietary manhole box to be used
4. Proprietary manhole box will built at an agree location and then lifted over and installed in the excavation.
5. Excavation will continue with the manhole box being pushed deeper, as the excavation within, continues.
6. As we approach a level of 1m from top of pipe, hand digging will be introduced to prevent damage to the brick culvert.
7. Proprietary access system will be installed, and the excavation will be treated as a confined space: with operatives having full escape kit and lanyards attached to a davit arm system attached to the top of the manhole box.
8. Dewatering system will be set up as below section
9. **Confined space Permit obtained from Morgan Sindall and Confined space RAMS refereed to**

10. Operative will excavate 500mm slip trench across the footprint of the box and then, the excavator will be used to reduce the surround.
11. This will continue until the operative finds the top of the culvert.
12. Once found, the top and sides of the brick culvert will be exposed by hand
13. The excavator bucket can be used to load with excavated material and remove from the box.
14. Brickwork will be broken using handheld breakers until the top half of the culvert is removed to the dimensions of the new manhole.
15. Extra care will be taken to avoid bricks falling into the culvert although and fallen debris will be removed from the channel when safe to do so.
16. There is no requirement for over pumping as the channel of the culvert is to remain in place however, we will review the weather forecast to avoid carrying out the works when the culvert is at its fullest.
17. We will excavate the sides of the culvert down to underside, to the full width of the new manhole and then fill with concrete to the bottom half of the culvert (underside of inlet pipes) this will form the manhole base.
18. Once the bottom base is cured, we will continue to install the inlet pipe stubs and form the full manhole base including benching of the channels.
19. We will then install the concrete rings, any accessories and then the cover slab.
20. The manhole will then be surrounded and backfilled, as the manhole box is pulled out of the ground.

EMERGENCY PROCEDURE

- Operatives working in trenches will be attached by Harness and Lanyard to the davit arm system if, there are no obstructions above his working area such as services and struts.
- If there are obstructions above, then the operative can disconnect as long as a second operative (also wearing a harness) is present to connect him if required.
- If an operative is required to be removed from the trench due to illness or an incident, then the following procedure will be implemented: If the operative can be made safe and secure in the trench until the emergency services can attend then the operative will remain in the trench. Should the operative be required to be removed from the trench immediately then the operative will be lifted with the aid of the davit arm and then moved to a position of safety by a number of operatives at the top of the excavation.
- If this cannot be done with the davit arm, then the harness will be attached to the lifting point on the excavator and under the direction of the top man the excavator will be used to carefully lift the operative from the trench. Should the emergency services be in attendance then the operative will be placed on a stretcher and the excavator used to lift the stretcher from the trench. All lifting equipment will have a 6-month dated test certificate.

Dewatering Ground:

Silt Mitigation

- Any groundwater to be discharged from site will be done so via a silt trap water treatment system (Silt Buster Tank in our case)
- The Silt Buster Water Treatment System will be set up at a location agreed with Morgan Sindall
- The outflow will be connected to a surface water location, such as a gulley or manhole, agreed with Morgan Sindall.
- Any dewatering or over pumping pumps must be discharged into the tank.
- Silt buster tank will be inspected at the start and end of each shift as part of our daily plant inspections.
- Tank will be emptied as per manufacturers guidelines.
- Silt will be carted off site by the muck away contractor.
- Any waste transfer documents will be presented to Morgan Sindall prior to works and, at the end of the project.

Over pumping

- We will try to carry out connection works in drier conditions however, over pumping may still be required to bypass any existing flow.
- Pump supplier will be invited to site to look at works and, determine the size of the pump required.
- Pump will either be 110V or powered by HVO dependant on size.

- The pump will be set up at an access point upstream from the connection or dry working area.
- Outlet pipe connected to the Silt buster and from there, into an access point downstream from the connection or dry working area.
- A bund will be installed at the inlet to the connection or dry working area to stop incoming water while works are carried out.
- Pump will be an automatic (gravitational pump) which will only activate when water fills up.
- The pump will be powered by a generator so that it can be left on overnight.
- The pump system will be checked at the start and end of each shift as part of our daily plant inspections.

Dry Work Area

- To remove groundwater and keep a dry working area, we will use submersible pumps.
- A small sump (circa 300 x 300 x 300mm) will be hand excavated in the bottom of the excavation to allow water to pond there.
- The submersible pump will be sat into the sump.
- Where sumps cannot be formed such as on concrete manhole, we use puddle pumps.
- These pumps will be either connected toa 6kva generator or local 110v supply.
- The pump will pump water out of the area via a 50mm flexible outlay hose laid out over the ground and connected into the silt buster.

Working with Mobile Plant and remaining in the Safety Zones:

• Movement of plant on site, outside of segregated wok zones, to be controlled by trained and competent banksman
• Planned and known Plant movements to be made aware to operatives at daily safe start and any specific pedestrian exclusion zones identified and communicated. Appropriate on-site exclusion zones to be implemented around operational machines/excavators at all times and managed and maintained by plant banksman and supervisor
• Plant to be operated by trained and competent operatives
• Loose fitting jackets shall be taken off by the machine operator and hung safely to the rear of the cab but so as not to obscure visibility or interfere with any machine controls BEFORE the machine or plant engine is switched on.
• Keys must never be left in the ignition when not seated in plant.
• Loose fitting clothing must not be worn by machine operators when in the cab. If large coats are worn these should be 'bomber style jackets.' The sleeves and midriff should be elasticated or tight fitting, and the jacket should remain zipped up to prevent potential interference with controls.
• There must be no banksman or other personnel within the slewing or operational area of the machine when the operator is first accessing his cab and starting the machine/positioning himself.
• Machine banksmen and other working personnel must always remain at a safe distance (out of the slew reach of the machine) from operating plant and it must be ensured that their movements are clearly known to the operator.
• If anyone requires entering the working area, they must signal the plant operator beforehand and confirm acknowledgement by the driver. If there is anyone in the working area of the plant the excavator must be stopped, and the dead man's handle engaged.
• If anyone is required to work near to the excavator, a position of safety must be established prior to operations commencing. Positive confirmation that the operative is in this location must be established before any plant movements are undertaken.
• Always turn off the engine and remove the keys from the cab before leaving the machine.
• Plant to have warning beacons and horns in good working order and pre use checks recorded

Plant

1. The excavator will contain a plant file with copies of certificates for the excavator, roller and dumper
2. Each day inspections will be carried out, by the excavator driver for each of this plant and the check sheet filled in and signed. The sheets will be kept in the plant file until the end of the week, and then handed to the Adana Site Manager.
3. A copy of the permit to excavate will be kept in the plant file, in the excavator cab at all times.
4. A fuel bowser will be used to store fuel, a spill kit must be kept on the side of the bowser and a drip tray must be beneath the hose while any refuelling of plant takes place.
5. COSHH Cage will be sat on a plant nappy.

6. Fuel storage to be locked at all times.
7. The COSHH sheet for diesel and petrol will be read and understood before any refuelling takes place.
8. Any smaller plant for mixing, cutting, breaking and drilling will be fully certified with copies kept in the site stores.
9. Only competent operatives will use each item of plant.
10. The HAVs trigger time for any items of plant must be adhered to and, any operative using plant must record their personnel trigger times on the HAVs Record Sheet

LIST OF MATERIALS TO BE USED

6F2, MOT Type 1, Drainage Materials, Ducting Materials, Concrete, COSHH Materials as below

COSHH Register		
Assessment Number	**Product**	**Use**
001	Gas Oil	Fuelling large plant
002	Ready Mix Concrete	Slabs, Surrounds, Foundations
003	Unleaded Petrol	Fuelling small plant
004	2 Stroke	Fuelling small plant
005	Pipe Grease	Lubricating Pipes and ducts
006	Cement / Mortar	Brickwork / Ironworks / General Mixing

LIST OF ANY SUBCONTRACTORS TO BE USED	***Method Statement approved***		***Method Statement attached***	
	YES	**NO**	**YES**	**NO**

EQUIPMENT TO BE USED	**YES**	**NO**	**EQUIPMENT TO BE USED**	**YES**	**NO**
LIFTING	✓		**NON MECHANICAL HAND TOOLS**	✓	
MECHANICAL HOIST		✓	**MECHANICAL TOOLS**	✓	
MEWP		✓	**EXCAVATION SHORING**	✓	
LADDER	✓		**TASK LIGHTING**		✓
HOIST		✓	**CAT**	✓	
TEST EQUIPMENT	✓		**VENTILATION / EXTRACTION EQUIPTMENT**	✓	✓
TASK LIGHTING	✓		**LIFTING ACCESSORIES**		✓
SCAFFOLDING		✓	**MECHANICAL PLANT (*State Below)***	✓	
PUMPS	✓				

			Excavator, Dumper, Roller		

RISK ASSESSMENTS					
HAZARD IDENTIFICATION	**YES**	**NO**	**HAZARD IDENTIFICATION**	**YES**	**NO**
SLIPS AND TRIPS	✓		COSHH	✓	
MANUAL HANDLING	✓		**NOISE**	✓	
HAND TOOLS	✓		**WORK AT HEIGHT**	✓	
EXCAVATIONS	✓		**DUST/FUMES**	✓	
MACHINERY/LIFTING EQUIPMENT		✓	**LIGHTING**		✓
FIRE	✓		**3RD PARTY CONTRACTOR**	✓	
FALL OF MATERIAL	✓		**ENVIROMENTAL**	✓	
ELECTRICAL		✓	**HEATING**		✓
WHO MIGHT BE HARMED					
	YES	**NO**		**YES**	**NO**
OWN PERSONNEL	✓		**OFFICE STAFF/VISITORS**	✓	
OTHER CONTRACTORS	✓		**MEMBERS OF THE PUBLIC**		✓
PROPOSED CONTROL MEASURES TO REDUCE RISKS					

1) *Risk Assessments*
2) *Toolbox talks*
3) *Site inductions*
4) *Workers to be competent and hold an up to date CSCS card*
5) *Mandatory site PPE to be worn at all times:*

PPE REQUIRED					
	YES	**NO**		**YES**	**NO**
SAFETY HELMET	✓		**EYE PROTECTION (LEP)**	✓	
PROTECTIVE FOOTWEAR	✓		**EYE PROTECTION (IMPACT RESISTANT)**	✓	
HIGH VISIBILITY CLOTHING	✓		**FACE RESPIRATOR**		✓
GLOVES	✓		**BODY HARNESS**		✓
HEARING PROTECTION	✓		**OTHER** *(state)*	Asbestos PPE, Suits and half face mask	

PERMITS REQUIRED					
	YES	**NO**		**YES**	**NO**

HOTWORKS	✓		**RISER SHAFTS**		✓
CRANE / HIAB CHECK LIST		✓	**LOAD**		✓
EXCAVATION	✓				
CONFINED SPACE ENTRY	✓		OTHER *(state)*		

TRAINING CERTIFICATES REQUIRED (*Adana Matrix Available)*					
	YES	**NO**		**YES**	**NO**
CSCS CARDS	✓		**MEWP (IPAF 1a,1b,3a,3b,PAV)**		✓
SCAFFOLD		✓	**MOBILE TOWER ACCESS (*Pasma)***		✓
TELEHANDLER		✓	**VEHICLE MARSHALL**	✓	
DUMPER	✓		**ABRASIVE WHEELS**	✓	
ROLLER	✓		**HIAB**		✓
EXCAVATOR	✓		**STREET WORKS**		✓
CONFINED SPACES	✓		**SLINGER/SIGNALLER**	✓	
CARTRIDGE OPERATED TOOLS	✓		**OTHER *(state)***	Asbestos awareness	

EMERGENCY ARRANGEMENTS			
FIRST AID MEASURES REQUIRED		**RESCUE/SECURITY MEASURES REQUIRED**	
NAME OF FIRST AIDER ON SITE: Neil Kirton Morgan Sindall		Call 999 for emergency services contact the local accident and emergency: Manchester Royal Infirmary Tel: 0161 276 1234 Oxford Road Manchester Greater Manchester M13 9WL	
RESCUE		**SPILLAGE/ENVIROMENTAL CONTROL REQUIREMENTS**	**(✓)**
BY WHOM	EMEGENCY SERVICES ADANA PERSONNEL PRINCIPAL CONTRACTOR	**PLANT NAPPIES**	✓
		SPILL KITS	✓
HOW	EG: VIA THE SITE MAIN ENTRANCE	**DRIP TRAYS/NAPPIES AT REFUELING AREAS**	✓
		BUNDED FUEL BOWSERS	✓
		BUNDED COSHH CAGES	✓

AMMENDMENT TO CURRENT SYSTEMS			
DATE	**YES/NO**	**AMMENDMENTS**	**M.S**

	TRAFFIC ROUTES	EMERGENCY ARRANGEMENTS	EXISITNG SYSTEMS OF WORK	OTHER		REV
27.11.23.			✓		Asbestos Addendum	Rev A
27.11.23.		✓			Manhole EX06 Confined space	Rev A
07.05.24.		✓	✓		Ladder to Connection Manhole	Rev B
30.05.25.			✓		Further detail of manhole connections	Rev C

NAME		DATE
Neil Kirton	[redacted]	**07.05.24.**

INFORMATION CONTROL			
METHOD STATEMENT WRITTEN BY:	Neil Kirton, Site Manager, Adana Construction	[redacted]	
METHOD STATEMENT CHECKED BY:	Keir Hardie, Contracts Manager		
METHOD STATEMENT REVIEW DATE		**REVISION No**	

Risk Assessment

Risk Assessment reference:	**014 rev B**	**Activity:**	**Connection Manholes**
Work Area / Location:	MH S06 and MH S08		
Name of assessor:	Neil Kirton	**Worker Participant:**	Hesham Kahlil
Date Assessed	07.05.2024	**Review Date**	09.11.2024.

Likelihood of Hazardous Event:	1 = Very unlikely	2 = Unlikely	3 = Likely	4 = Very likely	5 = Almost certain
Severity of Consequence:	1 = Minor delay	2 = Minor injury / ill health	3 = Up to 7 day injury / ill health loss	4 = Over 7 day injury / ill health loss	5 = Fatality

Likelihood x Severity = Risk Factor			**Risk Rating**	
1 – 8 Low	9-15 **Medium**	16-25 **High**	**1 – 8** = Low	**Review at least every 2 years**
			9 – 15 = Medium	**Additional controls as reasonably practicable. Review regularly**
			16 – 25 = High	**Activity Not Permitted Additional control measures Required**

HAZARD	**HAZARDOUS EVENT**		**Level of Risk** Before control measures				**RISK CONTROLS** (What action is necessary?)	**Level of Risk** With control measures			
	Who might be harmed?	How might they be harmed? (Most likely outcome NOT worst possible case)	**Likelihood** (1-5)	**Severity of Consequence** (1-5)	**Risk Factor**	**Risk Rating (L, M, H)**		**Likelihood** (1-5)	**Severity of Consequence** (1-5)	**Risk Factor**	**Residual Risk Rating**
Mobile Plant and Vehicles	Operatives, Public	Collision, crushing	3	4	12	M	Plant and Vehicles to be always banked –Daily plant checks and maintenance recorded. Exclusion zones in place around mobile plant Segregation between walkways and plant routes, Only trained and competent operatives to operate mobile pant. Site speed limits adhered to	1	4	4	L
Excavations	Operatives	Falling into excavation. Collapse of excavation	4	4	16	H	Excavations to be fenced off using crowd barriers or Herras Daily excavation inspections. Strictly no entering an excavation unless the sides are stepped with adequate access and egress (steps or tied ladder)	2	4	8	L
Falls on level	Operatives	Tripping over material or uneven ground	4	3	12	M	Housekeeping and leveling off of work area Bandings to be placed directly in skips Operatives to use site walkways, Any openings in the slab must be barriered off at all times or covered with ply	2	3	6	L
Dust	Operatives, Public	Breathing dust	4	3	12	M	Dust suppression with any cutting / hoover with circ saws and grinders, Cutting Tent / Zone set up Dampening down of dry stone if required. Face fit tested operatives and FFP3 masks used.	1	1	1	L
Environmental	Public	Silt getting into the drainage system	4	4	16	H	Use of a silt buster with all discharged water	1	1	1	L

Risk Assessment

HAZARD	HAZARDOUS EVENT		Level of Risk Before control measures				RISK CONTROLS (What action is necessary?)	Level of Risk With control measures			
	Who might be harmed?	How might they be harmed? (Most likely outcome NOT worst possible case)	Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Risk Rating (L, M, H)		Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Residual Risk Rating
Environmental fuel spillage	Operatives, Public	Spillages	3	4	12	M	Drip trays, nappies and spill kits with all plant and bowsers, refueling method statement.	2	1	2	L
Enviro Concrete	Public	Concrete contamination	3	3	9	M	Concrete wash out skip used. Visqueen to prevent spillages, Tidiness following pours	2	1	2	L
HAVs	Operatives	Damage to nerves / white finger	3	3	9	M	HAVs awareness and monitoring and control sheets completed daily	1	3	3	L
Manual Handling	Operatives	Strain Injury	4	3	12	M	Excavator to lift all concrete items Manual handing training All operatives fit and well and to report and injuries prior to works	1	2	2	L
COSHH materials	Operatives	Concrete (irritant) Fuel (Fire/ environment)	3	3	9	M	Operatives to read and understand the COSHH for each substance used Wearing of correct PPE COSHH storage cage for fuel	1	2	2	L
Fall of Materials	Operatives	Materials falling into excavation hitting operatives	3	4	12	M	Materials stored away from excavation Operatives to stay out of excavation until excavator has lowered materials below shoulder height	1	2	2	L
Noise	Operatives	Hearing Damage	4	4	16	H	Ear defenders to be worn when working close to pecker on excavator. Ear defenders worn as PPE when using Petrol / mechanical tools Ear defenders worn while driving piles	1	1	1	L
Hot Works	Operatives, Public	Fire / Burns	2	3	6	L	Cutting mesh to be done in secluded area away from flammable materials Hot works permit system	1	1	1	L
Buried Services	Operatives	Cable Strike Electrocution Gas / Explosion	4	5	15	H	Use of VAC Excavation around suspected services Permit to Excavate System in Place, CAT scan area prior to excavation, Trial Holes, method statement for exposing buried services No mechanical excavation within 500mm of known or detected services.	1	5	5	L
Hygiene	E,O	Disease and Contamination	3	4	12	M	Maximum use to be made of all waste disposable facilities. All work areas to be cleared on completion of work daily. All welfare facilities to be kept in a clean and tidy condition. Appropriate PPE to be used at all times (long gloves all skin covered). Personnel hygiene Wash hands at all times before eating, drinking or smoking Hot water to be available at all times Extra care with live drains	1	2	2	L

Risk Assessment

HAZARD	HAZARDOUS EVENT		Level of Risk Before control measures				RISK CONTROLS (What action is necessary?)	Level of Risk With control measures			
	Who might be harmed?	How might they be harmed? (Most likely outcome NOT worst possible case)	Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Risk Rating (L, M, H)		Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Residual Risk Rating
Traces of Asbestos within the ground	Operatives	Cross contamination	3	4	12	M	Operatives in direct contact with the material will wear paper suits, / wet suits, wellies, and half face masks. At the end of works including prior to breaks and entering the welfare area, the PPE will be cleaned down using the jetwash at the container. No cross contamination of muck into the welfare or office area. Operatives will then remove the PPE and store at the designated area provided at the container. Operatives to take extra care cleaning hands and face prior to eating or leaving site. Any damaged PPE or PPE that cannot be cleaned to be replaced before returning to site. Muck being transported will be loaded onto the dumper via the excavator. If the excavated material is dry, we will dampen down with the jetwash. Dumper will only be half filled when transporting hazardous muck to further avoid spillage. Muck storage areas will be fenced off and covered over with visqueen at the end of each shift or during rain. At the end of each shift, all plant will be decontaminated with the jet wash. Work Area will be dampened down and cleaned at the end of each shift or as required.	2	4	8	L
Traces of Asbestos within the ground	Operatives	Breathing in Asbestos	2	5	10	M	Air testing to be carried out by Main Contractor A watching brief, with asbestos awareness training will be in attendance with excavation works to look out for any visible amounts of asbestos. If any visible amounts are found, works will be stopped until they can be removed safely by a specialist contractor Muck being transported will be loaded onto the dumper via the excavator. If the excavated material is dry, we will dampen down with the jetwash Muck storage areas will be fenced off and covered over with visqueen at the end of each shift or during rain. At the end of each shift, all plant will be decontaminated with the jet wash. Work Area will be dampened down and cleaned at the end of each shift or as required.	1	5	5	L
Lifting / Fall of material	Operatives	Crushing	3	5	15	M	Trained Slingers on lifting operations Lifting plan and SWL adhered too Certified Lifting accessories (6 monthly) Weekly lifting accessory inspections	1	5	5	L

Risk Assessment

HAZARD	HAZARDOUS EVENT		Level of Risk Before control measures				RISK CONTROLS (What action is necessary?)	Level of Risk With control measures			
	Who might be harmed?	How might they be harmed? (Most likely outcome NOT worst possible case)	Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Risk Rating (L, M, H)		Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Residual Risk Rating
Wind / Materials	All	Materials Blowing	2	4	8	L	All Sheeting and Voidform to be weighted down with Herras Blocks or paving as laid	1	4	4	L
Joinery Works and Tools	Operatives	Injuries using tools	3	3	9	M	Operatives deemed to be competent and familiar with their tools	2	3	6	L
Collapse Of Excavations and existing Structures	Site Operatives Plant Operators	Fatality Major Injury	5	5	25	H	• Ground conditions to be assessed before works commence • Temporary works drawings to be carried out and approved for any trench box, sheet piling works. • Do not park or travel plant close to edge of excavation, barriers and stop blocks installed at minimum 1m from edge of excavation • Stockpiled materials to be kept away from excavations so it does not create a surcharge. Any live surcharges from adjacent structures or vehicle routes to be taken into account in the design. • Structural engineers to provide loading for any existing structures/vehicle routes so it can be allowed for in design • Excavations to be visually checked at the start of each day and logged weekly. • Pumps to be available to prevent water from destabilizing any temporary works structure or sides of excavations, if heavy rain occurs the area is to be monitored regularly. • Excavations to be installed so batter is at safe angle of repose, nominally 45 degrees, or steps incorporated into the sides, size of step dependent on ground type, where it is loose ground generally choose battered scenario.	1	5	5	L
Access and Egress	Site Operatives Other Site users	Minor Injury	3	4	12	M	• Safe access installed into all excavations • Primary method of access is to install universal excavation steps with handrails, ensuring steps are secured and wont slip/move. • Steps can be formed into the sides of the excavation were universal steps are not practical to install, ensure steps are firm and free of loose materials, use concrete blinding if ground is loose. • Handrail to be installed to the formed steps • Access into cofferdams in excavation stage to be via safe ladder access platforms and a tied ladder, were access is tight a secure ladder can be used with a gated access. • Trench boxes to use safe ladder access platforms incorporated into trench box system. • Lighting to be provided where required to all access and egress areas.	1	4	4	L

Risk Assessment

HAZARD	HAZARDOUS EVENT		Level of Risk Before control measures				RISK CONTROLS (What action is necessary?)	Level of Risk With control measures			
	Who might be harmed?	How might they be harmed? (Most likely outcome NOT worst possible case)	Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Risk Rating (L, M, H)		Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Residual Risk Rating
Confined space entry works	Operatives entering confined spaces	fatality	4	5	20	H	• Fully trained, certified and competent persons to carry out confined space works in accordance with their training. • If works are high risk, then operatives to have additional High Risk confined spaces training. A separate RA to be completed for these works. • Top man to be present at all times with confined space works. • Confined space permit obtained before works commence. • Air monitoring to be undertaken using a calibrated/certified 4 in 1 gas detectors, confined space should be left for 10 minutes to ventilate before starting gas monitoring. • Gas monitors should always be or near the operative working in the confined space. • A calibrate/certified 10-minute escape kit to be used and kept down in the confined space with operative. • Any works entering manholes should be done via a tripod, winch and harness, all apparatus to be calibrated and certified and used in accordance with manufacturers guidance. Area should be barriered of and manhole lid opening should have temporary protection when lid is removed and operatives are not working. • Good access will be in place provided, (see access and egress) • Ensure plant engines are not kept running when close to tops of excavations to prevent Co2 from entering excavations. • When breaking into live sewers, Confined space procedures to be adhered to. • Were possible eliminate the need to enter confined space, look for alternative methods, when building manholes these could have benching installed with only the 1st ring installed on no biscuit to assist with ventilation and more working space. Also consider removing biscuit or rings when requiring to enter manhole after it is built where practicable. • No smoking or use of any other sources of ignition to be used within a confined space. • For any cutting, dust must be monitored as per RAMs with full suppression used	1	5	5	L

Risk Assessment

HAZARD	HAZARDOUS EVENT		Level of Risk Before control measures				RISK CONTROLS (What action is necessary?)	Level of Risk With control measures			
	Who might be harmed?	How might they be harmed? (Most likely outcome NOT worst possible case)	Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Risk Rating (L, M, H)		Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Residual Risk Rating
Adverse Weather	Operatives working in excavations Plant operators	Major injury	3	4	12	M	• Pumps to be set up to prevent water from destabilizing the temporary works structure and sides of the excavations, if heavy rain occurs then monitory to be done regularly to check stability. Also monitor water levels in trench and if pumps cannot cope then operatives are to cease works • If a continued dry period of weather occurs the temporary works and excavations to be monitored for signs of ground dehydration. • If conditions are windy ensure all loose materials are secure	2	4	8	L
Unauthorized entry into excavations Falls from height	Other site users Public	Major injury	2	4	8	M	• Excavations to be barriered of with warning signage erected • Deep excavations to have Heras fencing erected and clipped together or scaffold handrail installed around the work area. • Trench boxes to have handrails installed to the top of the box or the box is to be left 1m above ground level • Sheet piles to be left 1m above ground level where possible or handrail system fitted to the top of the sheet piles.	2	4	8	M
Collapse of persons Rescue plan	Operatives within excavation	Fatality Major injury	2	4	8	M	• When working in trench boxes, sheet piled areas trenches operative in the trench to wear a harness with a fixed length lanyard/inertia reel connected to the top of the shoring system, the lanyard is to be long enough for the operative to work but incase of an emergency or collapse due to asphyxiation an excavator can connect to the operative's lanyard without the need to enter the excavation. If practicable The davit arm system could also be used which connects to the operative fixed lanyard to winch the persons out. If the operative suffers a fall or break and it is safe to enter the excavation, then the top man to call for assistance, IP to be made comfortable and can then be brought out using the machine or davit to the harness or rescue stretcher using the crane excavator. • Ensure clear route for emergency services • Shallower trenches will have steps into excavations for emergency services to access and reach IP. • Operatives working in manholes to have a rescue tripod, winch and harness with top man in attendance at all times.	1	4	4	L

Risk Assessment

HAZARD	HAZARDOUS EVENT		Level of Risk Before control measures				RISK CONTROLS (What action is necessary?)	Level of Risk With control measures			
	Who might be harmed?	How might they be harmed? (Most likely outcome NOT worst possible case)	Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Risk Rating (L, M, H)		Likelihood (1-5)	Severity of Consequence (1-5)	Risk Factor	Residual Risk Rating
Working Inside manholes	Confined space operatives Other site operatives	Major Injury Asphyxiation, flood	3	5	15	M	• Where possible bench manholes and any other associated works when the first ring is only installed with no biscuit which ensures better access, ventilation and working space. • Operatives to never be directly under materials which are being lowered into manhole, if chamber is large enough ensure they are stood to one side, good communication with top man. • Ensure materials that are lowered into manhole are adequately secured. • Always ensure when manhole lids are removed that they are temporarily covered or lid replaced when operatives are not in work area. • Ensure sufficient lighting to carry out the works • Overpumping and dewatering to form Dry working areas	1	5	5	L
							•				
Leptospirosis Ground contamination	Site operatives	Flu like symptons	3	4	12	M	• Ensure good welfare facilities available with clean hot water. • Barrier creams available • Operatives to ensure good hygiene and wash before eating, drinking, smoking and leaving site • Ensure PPE is provided and there are enough replacements for changing dirty items • Where Practicable disinfectant areas before works commence • If a cut or abrasion occurs, remove PPE and wash immediately, tend to cut/abrasion and replace PPE. • Keep any open sores out of the water or wear Impervious PPE. • If Flu like symptoms occur, seek medical attention, if leptospirosis is contracted then inform your employer.	1	4	4	L

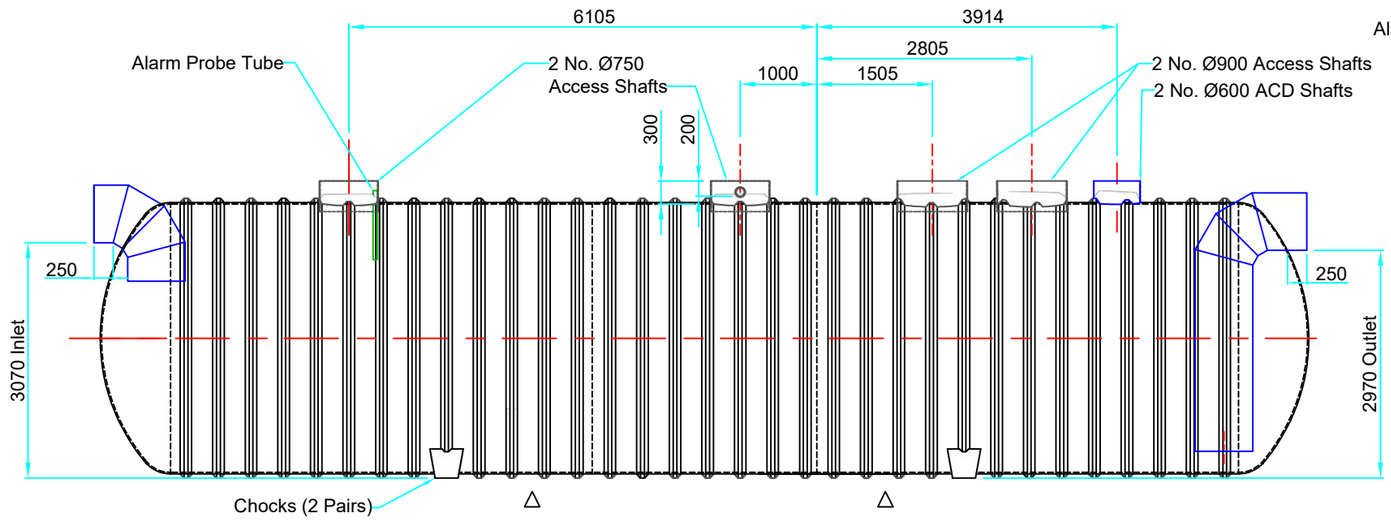
Appendix H

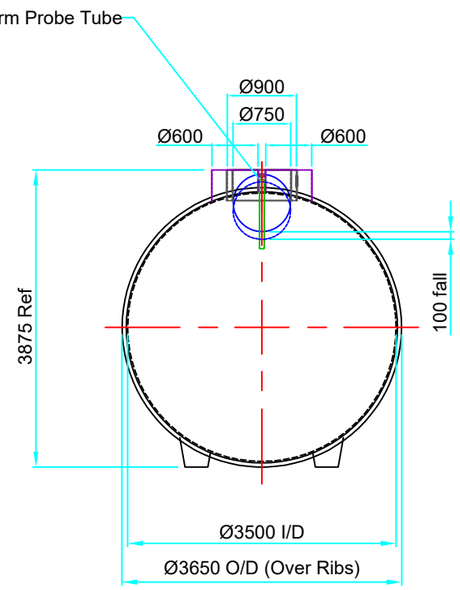
Petrol Interceptor Details

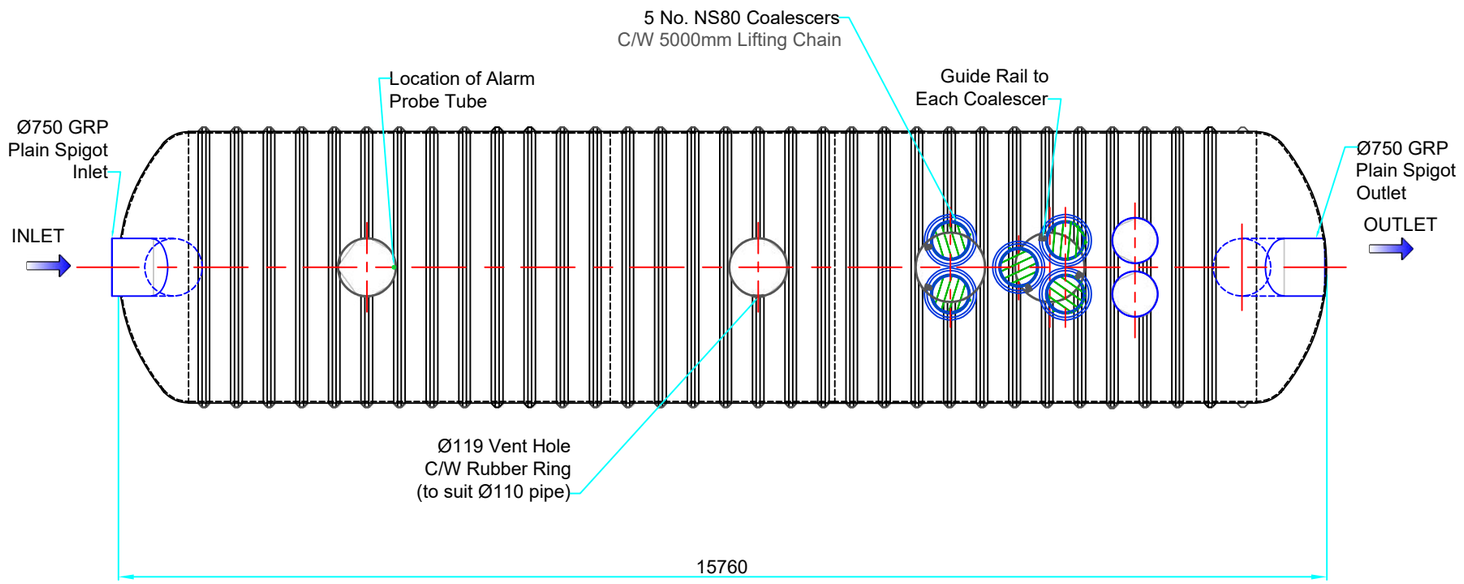
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SERIAL No.	32749	Date		Approved By (Print)		Signed	

CUSTOMER APPROVAL SIGN OFF







ORIENTATION: A
INLET: Ø750 GRP Plain Spigot
OUTLET: Ø750 GRP Plain Spigot

NOTE:-
This Tank is to be supplied with:
2 No. Ø600 Access Shaft Extensions - 2000mm High
2 No. Ø750 Access Shaft Extensions - 2000mm High
1 No. Ø900 Access Shaft Extension - 2000mm High
C/W 2 No. Coalescer Guide Rail Top Brackets,
1No. Chain Hook
1 No. Ø900 Access Shaft Extension - 2000mm High
C/W 3 No. Coalescer Guide Rail Top Brackets,
1No. Chain Hook
5 No. Ø25 Guide Rail Extension 2000mm Long
5 No. Lifting Chains 5000mm Long

Key to Symbols: △ Lifting Point | Hold- down strap rib locations where mechanical anchoring is required | Manufacturing Joint | ◯ BoQ's reference no.

	22.08.24	A	Issued For APPROVAL	RR
Distribution	Date	Rev	Issued only for purpose indicated:	BY:

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SPEL PRODUCTS

DIMENSIONS ARE SUBJECT TO DIMENSIONAL TOLERANCES. If critical, check physically prior to installation

Water table & Burial Depth:
The customer must check tank specification is compatible with ground water table level (in winter) and burial depth. If in doubt refer to SPEL Data Manual Section 7 or contact SPEL Products Sales or Technical Department

Title: SPEL 500 Series Puraceptor Model P400/1CSC Orientation (A)

Contract: Travis Perkins (Manchester)
NWCH Harmmerstone, Gorton,
Manchester, M18 8EQ
Order No.: T00061553

Gross Capacity 144,500 Ltrs
Tank Specification STANDARD
Laminate Specification GP

All sizes in mm
If in doubt ASK!

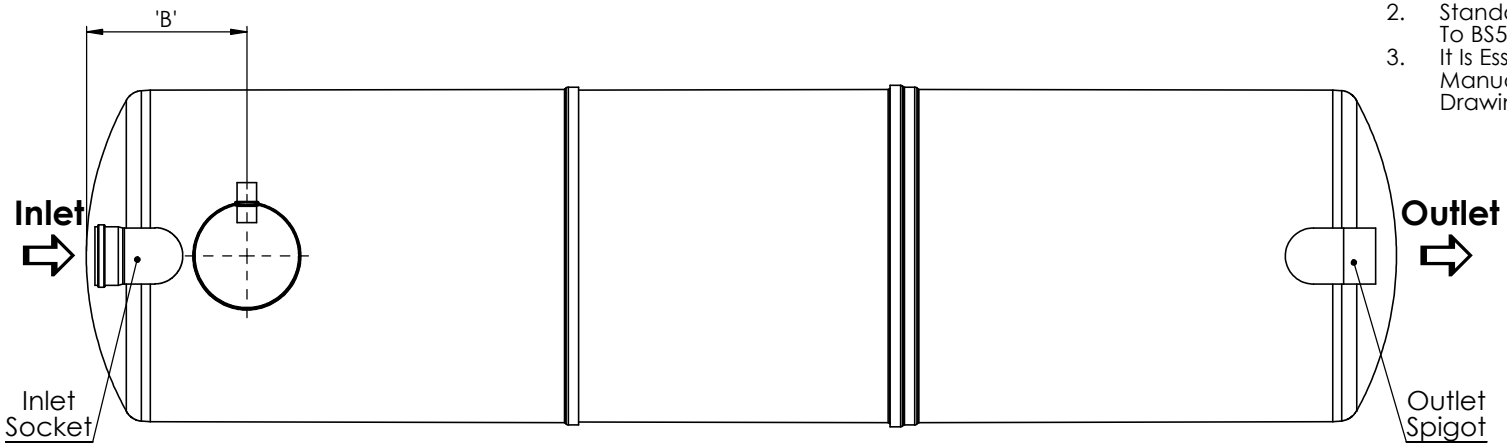
SPEL Life in Water
Lancaster Road, Shrewsbury
Shropshire, SY1 3NQ, England
Telephone: +44 (0)1743 445200
www.spelproducts.co.uk

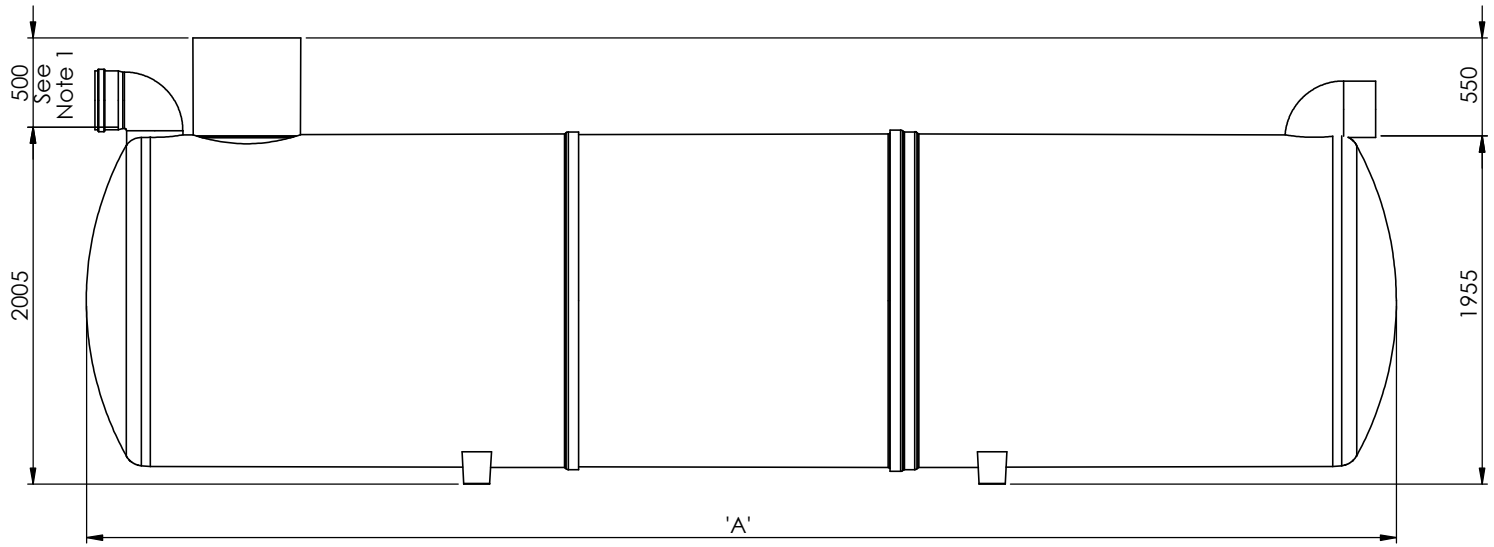
Drawn	RR
Checked	SRB
Date	22.08.24
Scale	1:80 Sheet A3

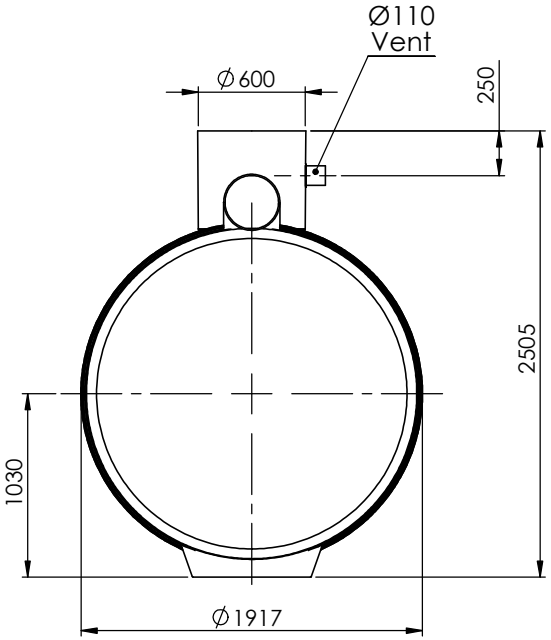
TANK SERIAL No. 32749
INTERNAL ORDER No. 23142/007
Revision A

Notes: -

1. Units Can Be Provided With Extension Shafts In 0.5m Increments.
2. Standard Inlet/ Outlet Pipes Are PVCu Underground Drainage To BS5481, Other Pipe Sizes And Types Available.
3. It Is Essential That This Drawing Is Read In Conjunction With The Manual (Supplied With Unit) Giving Installation Details. This Drawing Should Be Used For Dimensional Information Only.







Unit	Working Capacity	DIM 'A'	DIM 'B'	Inlet/ Outlet STD. Size	Approx Weight (kg)		Fall Across The Unit
					Empty	Full	
W1/ 150	15000	5780	900	300	620	15620	50
W1/ 190	19000	7355		300	750	19750	50

Please Check with Kingspan Environmental For The Latest Issue Of This Drawing

Issue	Date	Drawn by	Approved by	Description
02	30/10/14	L.Steward		CC1179 - Re-drawn In Solidworks/ Change To New Ø1.8 Cases

Material : Various	Tolerance (unless stated) : n/a
Finish : n/a	Thickness : n/a
Weight : n/a	Surface Area : n/a m²
Modelled By :	

Drawing : DS0855P

W1/150 - W1/190 Washdown & Silt Separators. (1-Stage)

All Dimensions In mm

Scale: Do Not Scale

Third Angle Projection

R:\Drawing Data\02 - Sales Drawings\DS\DS - 08\DS0855P W1 150 - W1 190 Washdown & Silt Separator (1 Stage)

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Kingspan Environmental

Outlook

RE: RE: Hammerstone Washdown & silt separator

[redacted]

2 attachments (237 KB)
012582 GL0025P-02 Wash Down & Silt Separators.pdf; DS0855P-02 W1 150 - W1 190 Washdown & Silt Separators (1 Stage).pdf;

Hi Andy,

Thanks for the enquiry.

Please see the attached.

Regards
Pooja

[redacted] **pen attachments unless you recognise the sender and know the content is safe.**

Good Morning

We are working on a scheme at a depot in Manchester, and my colleague received the below e-mail.

This scheme has been on hold, and has come back online this year.

I was looking at your website, and could not fins any details regarding the W1/150 Washdown Seperator below.

I would be grateful if you could provide updated details for this. (including tank and installation details).

Thanks in advance for your assistance.

Regards

Andy Losty
Project Civil Engineer

[redacted]

From: accivilssales
Sent:
To: Marta Wolska
Cc: accivilssales
Subject: Re: RE: Hammerstone Washdown & silt separator

Hi Marta,

Thanks for your inquiry.

We will advise our W1-150 **(46-60 Cars or 31-45 Lorries)**on the basis of 55 vehicles per day washing.

Please see the below table and see if this is what you are looking for.

Model Ref	Total Capacity (Ltrs)	Max.rec. Silt (Ltrs)	Max. Flow Rate (L/S)	Length (MM)	Diameter (MM)	Access Shaft Di-ameter (MM)	Base Inlet Invert (MM)	Base To Outlet Invert (MM)	Stan-dard Fall Across (MM)	Min Inlet Invert (MM)	Standar Pipewor Diamete (MM)
W1/010	1000	500	3	1123	1225	460	1150	1100	50	500	160
W1/020	2000	1000	5	2074	1225	460	1150	1100	50	500	160
W1/030	3000	1500	8	2952	1225	460	1150	1100	50	500	160
W1/040	4000	2000	11	3898	1225	460	1150	1100	50	500	160
W1/060	6000	3000	16	4530	1440	600	1360	1310	50	500	160
W1/080	8000	4000	22	3200	2020	600	2005	1955	50	500	160
W1/100	10000	5000	27	3915	2020	600	2005	1955	50	500	160
W1/120	12000	6000	33	4640	2020	600	2005	1955	50	500	160
W1/150	15000	7500	41	5435	2075	600	1940	1890	50	500	160
W1/190	19000	9500	52	6865	2075	600	1940	1890	50	500	160

Regards
Pooja

Pooja Aggarwal

Commercial Support & Sales – Surface Water Management

Kingspan

Kingspan Water & Energy Ltd.
College Road North, Aston Clinton | Aylesbury | Buckinghamshire | HP22 5EW
[redacted]
www.kingspanwaterandenergy.com

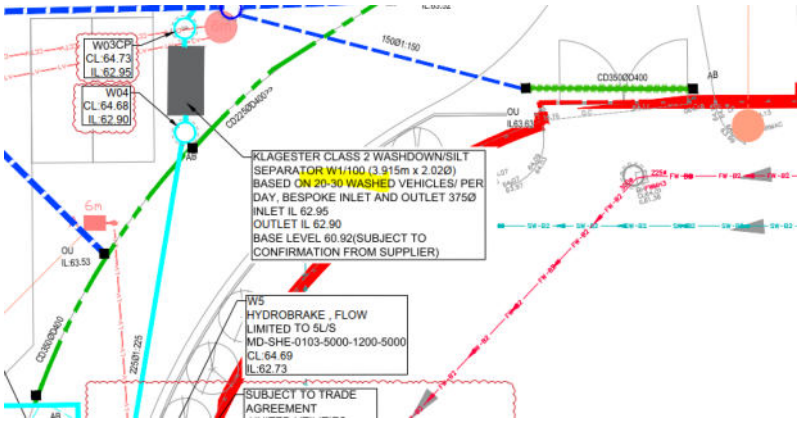


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[redacted]

Dear Sir/ Madam
Currently for our site we have proposed W1/100.
We have just received confirmation form the Client that 55 vehicle will be washed per day. 3.25l/s and maximum discharge volume per day 29.4m3
Could you please advise which washdown separator will be the most suitable?



[redacted]

Subject: RE: Trade Effluent Licence - Hammerstone

Hi Joel,

After getting the Wash Down requirements from Emma and the Flow rates from the proposed equipment I have been able to Calculate the following (the workings as per the attached spread sheet) on top of the information provided in the history of this email.

Maximum volume to be discharged (m^3 per 24 hours) = 29.4m3
Maximum rate of discharge (litres per second) = 3.25 ltrs/sec

Please come back to me if you need any further calculation, but can we now submit this application?

Best regards

Phil Williams BSc (Civil Engineering)
Senior Design Manager
Construction

[redacted]

MORGAN SINDALL

Morgan Sindall Construction & Infrastructure Ltd
6th Floor, Anchorage 2
Salford Quays, Manchester, M50 3YW
T 0161 874 1000 **F** 0161 874 1001

[redacted]

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From: Williams, Philip (MS)
Sent: 08 February 2023 14:42

[redacted]

Hi Joel,

Sorry I cannot provide any more information than my previous email.

Please speak to Lindsay or the end users for the rest of the information together with the Wet signature.

I can only provide the information relating to the Construction of the Wash Down Area, not how it will be used.

We are however desperate to get this issued as we need the Permit to start the construction.

Best regards

Phil Williams BSc (Civil Engineering)
Senior Design Manager

[redacted]

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[redacted]

Subject: RE: Trade Effluent Licence - Hammerstone

Hi Philip,

Many thanks for coming back again. I do however need all the info that you can provide completing on the G02 form along with a wet signature from an authorised contact (Section 12). I can then get It submitted to UU along with the supporting plan.

Apologies if this seems pedantic it's just if I don't have a hard signed copy from the customer that I can pass on in support it will just delay the process anyway when I am asked for one as it is a requirement for these applications.

Kind Regards

Joel

[redacted]

Subject: RE: Trade Effluent Licence - Hammerstone

Hi Joel,

Further to my email below, find below the information we can provide, but also some of the items we can't provide.

5.5 Volume of Trade Effluent
We cannot provide the volumes for Trade Effluent as this is down to the End User and the following needs to be established

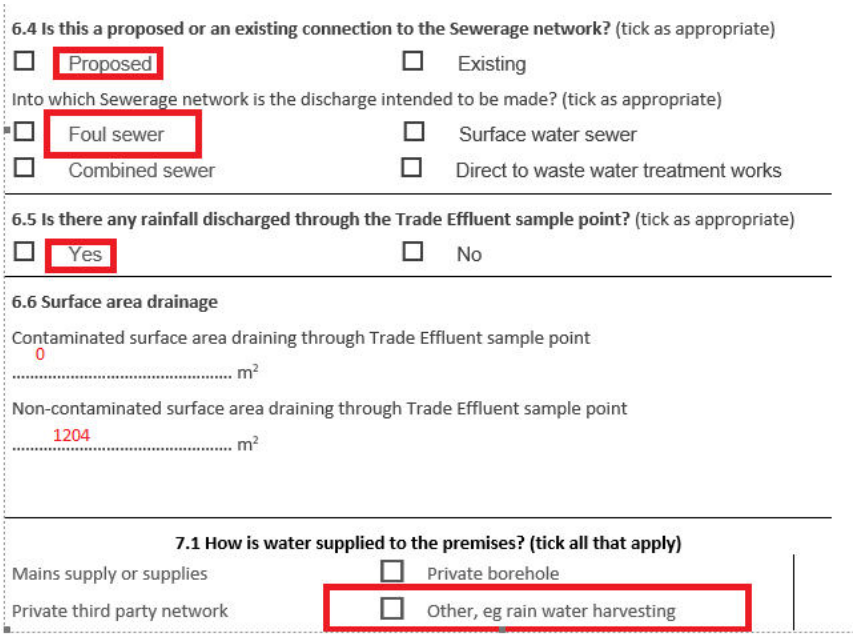
- Number of vehicles washed in the same time
- Number of vehicles washed per day
- Water consumption to wash one vehicle

6.2 Drainage Plan
As previously provided, I have attached the Current Drainage Plan with the Washdown Drainage coloured Cyan.
There are a couple of issues

- The other drainage systems on this drawing may be getting changed or omitted as we resolve budget constraints
- The drainage from the Wash Down Area collects the On-site Surface Water from the same area

Please let me know if or/and how you want the drawing revised

6.3 Connection to sewer location
Hammerstone Road



Please keep me updated with the progress of the submission, as we need to submit a Section 106 to start these works

Best regards

Phil Williams BSc (Civil Engineering)
Senior Design Manager
Construction

[redacted]

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Salford Quays, Manchester, M50 3YW
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[redacted]

Subject: RE: Trade Effluent Licence - Hammerstone

Thanks Joel,

I will discuss with Marta, our Civil Engineer, but on 1st review we can provide responses for the following –

5.5 Volume of Trade Effluent

Maximum volume to be discharged (m^3 per 24 hours)	.....
Maximum rate of discharge (litres per second)	.....

Maximum volume to be discharged (m^3 per 24 hours)	.....
Maximum rate of discharge (litres per second)	.....

Proposed starting date for discharge (or approximate starting date for an existing discharge)

6.1 Sample Point Location
The sample point must be such that it will provide a sample of the Trade Effluent discharged to the public sewer without domestic sewage contamination, and provide safe and reasonable access at all times
Provide a description of the location of the sample point (and X-Y coordinates if known):

Location .....

6.2 Drainage Plan

Failure to supply a suitable draining plan will result in a rejection of your application.

Enclose a drainage drawing for the premises with the following marked on the plan:

- **The location of the sample point**
- **Point of entry into the Sewerage system, appropriately coloured as follows**

Red – Sewer network **Blue – On-site surface water**

Green – Trade Effluent **Brown – Domestic Waste**

6.3 Connection to sewer location

Provide the name of the street (or other identifying description) where the connection to the sewer is located

.....

6.4 Is this a proposed or an existing connection to the Sewerage network? (tick as appropriate)

☐ Proposed ☐ Existing

Into which Sewerage network is the discharge intended to be made? (tick as appropriate)

☐ Foul sewer ☐ Surface water sewer

☐ Combined sewer ☐ Direct to waste water treatment works

6.5 Is there any rainfall discharged through the Trade Effluent sample point? (tick as appropriate)

☐ Yes ☐ No

6.6 Surface area drainage

Contaminated surface area draining through Trade Effluent sample point

..... m^2

Non-contaminated surface area draining through Trade Effluent sample point

..... m^2

7.1 How is water supplied to the premises? (tick all that apply)

Mains supply or supplies ☐ Private borehole

Private third party network ☐ Other, eg rain water harvesting

Other abstraction

After discussion, I will come back to you with a formal response.

Cheers

Best regards

Phil Williams BSc (Civil Engineering)
Senior Design Manager

[redacted]

MORGAN SINDALL

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6th Floor, Anchorage 2
Salford Quays, Manchester, M50 3YW
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[redacted]

RE: Trade Effluent Licence - Hammerstone

Hi Phil.

Many thanks for the update and great to see we now have an understanding of how to progress.

I attach a copy of the G02 TE discharge application, if this can be completed with as much detail as possible I will then formally submit to UU for review and approval via the bi-lateral process. I appreciate some of the requested information may have been provided in separate exchanges but this needs to now be formally completed and returned to us with the relevant supporting detail.

I look forward to receipt back and getting this in for us.

Kind Regards

Joel

[redacted]

Trade Effluent Licence - Hammerstone

Dear all,

Matthew Lowe from UU called me last week. (Thanks for the call Matthew) and we discussed the proposed Washdown and the flow restriction of 5litre/sec we are installing as part of our contract.

On discussion, Mathew informed me that “Wave” will need to make a “G02” application. As I understand it – a new application, as the proposed Washdown has an outfall to a different public drain and the flow rates differ from the current Permit.

For everyone’s information, I have attached our current proposed layout and drainage design for this area which shows-

- Grit Traps - A Washdown/ Silt Separator based on 20-30 vehicles per
- A Hydro Brake – To limit the flow to 5 ltrs/sec, which has the associated chambers/manholes and attenuation tanks

Please bear in mind that we cannot start works in this area until we have this Permit, as it is required for our Section 106 application (An agreement to allow discharge to a Public Sewer), so your earliest action will be appreciated.

If anyone requires any further construction information or design calculations, please let me know by return.

Cheers

Best regards

Phil Williams BSc (Civil Engineering)
Senior Design Manager
Construction
[redacted]

MORGAN SINDALL

Morgan Sindall Construction & Infrastructure Ltd
6th Floor, Anchorage 2
Salford Quays, Manchester, M50 3YW
T 0161 874 1000 **F** 0161 874 1001
morgansindall.com

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Merchant Exchange
17-19 Whitworth Street West
Manchester, M1 5WG
curtins.com

Curtins Building a better future

Appendix I

Linear Drainage Channel Details

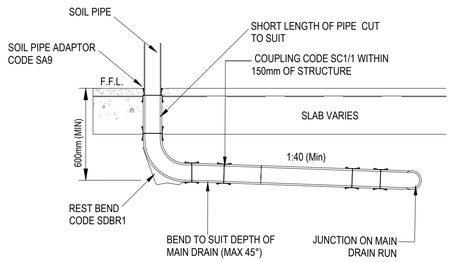
Linear Drainage Channel DOP

In-situ Channel Details

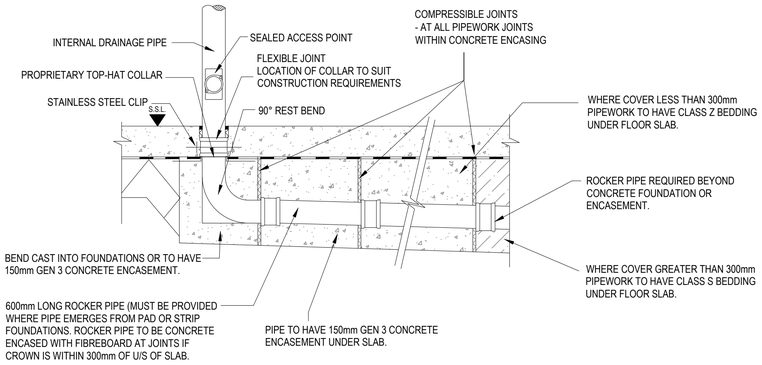
Copyright © 2025 Curtins Consulting Ltd

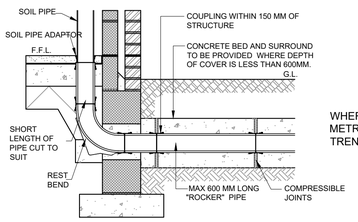
GENERAL NOTES:

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 MILLIMETRES UNLESS NOTED OTHERWISE.
4. FOR GENERAL NOTES REFER TO DRAWING.

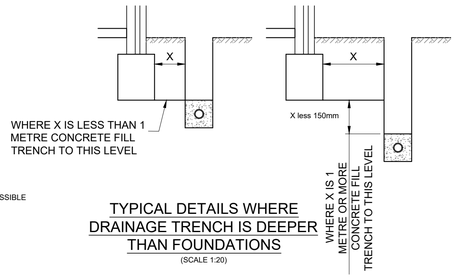


TYPICAL SVP CONNECTION TO MAIN RUN

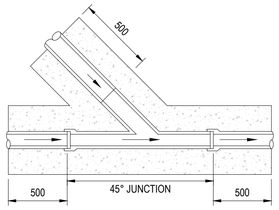




SOIL & VENT PIPE / STUB STACK / W.C. CONNECTION DETAIL
(SCALE 1:20)

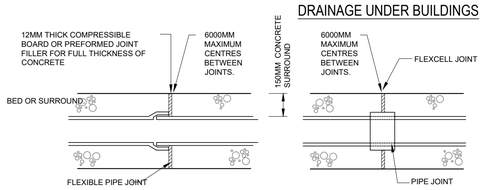


TYPICAL DETAILS WHERE DRAINAGE TRENCH IS DEEPER THAN FOUNDATIONS
(SCALE 1:20)

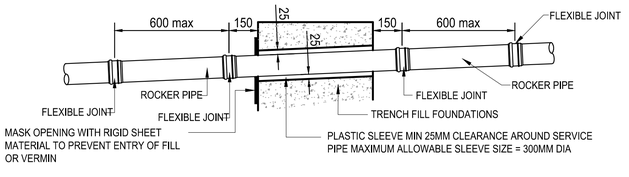


TYPICAL SADDLE CONNECTION

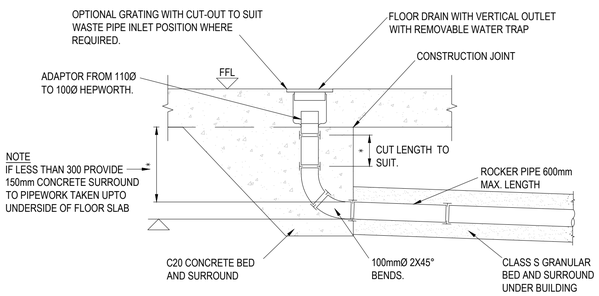
DRAINAGE UNDER BUILDINGS



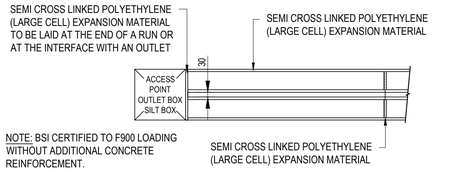
EXPANSION JOINT FOR CONCRETE BED AND SURROUND
(SCALE 1:20)



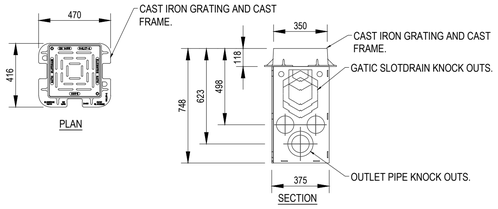
PIPES PASSING THROUGH GROUND BEAM
SCALE 1:20



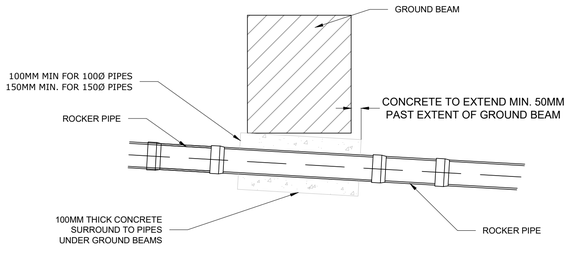
INTERNAL FLOOR DRAIN



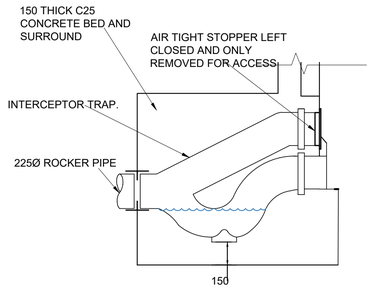
GATIC PLAN DETAIL



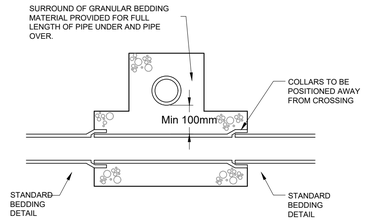
GATIC SLOTDRAIN 350mm OUTLET UNIT SECTION AND PLAN DETAILS NTS



TYPICAL PIPE DETAIL UNDER GROUND BEAMS
(SCALE 1:20)



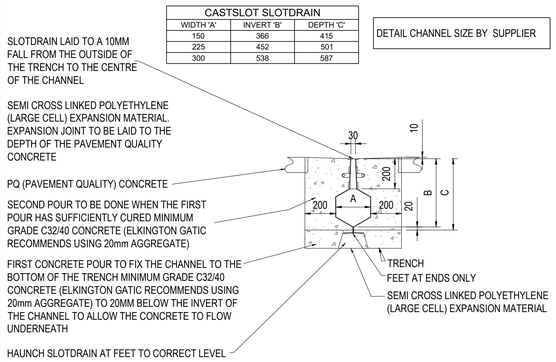
INTERCEPTOR TRAP



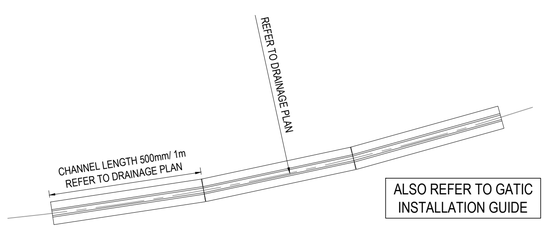
PIPE CROSSINGS DETAIL
(SCALE 1:20)

CASTSLOT SLOTDRAIN		
WIDTH 'A'	INVERT 'B'	DEPTH 'C'
150	366	415
225	452	501
300	538	587

DETAIL CHANNEL SIZE BY SUPPLIER



GATIC CASTLOST TREADSAFE CONCRETE INSTALLATION



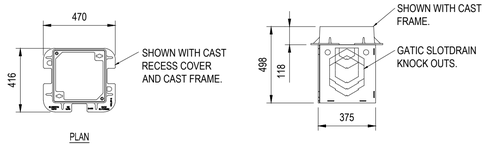
ALSO REFER TO GATIC INSTALLATION GUIDE

GATIC CASTSLOT TREADSAFE INSTALLATION TO RADII

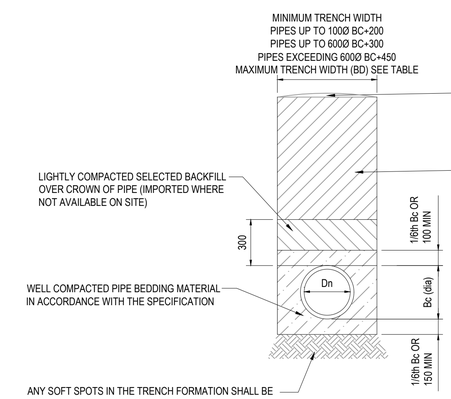
Gatic CastSlot, UltraSlot & PaveSlot Minimum External Radius											
Channel Width	Channel Length	1mm Gap	2mm Gap	3mm Gap	4mm Gap	5mm Gap	6mm Gap	7mm Gap	8mm Gap	9mm Gap	10mm Gap
100	3m	320.9m	160.5m	107.0m	80.3m	64.2m	53.5m	45.9m	40.2m	35.7m	32.1m
100	1m	107.0m	53.6m	35.7m	26.8m	21.5m	17.9m	15.4m	13.5m	12.0m	10.8m
100	500mm	53.6m	26.8m	17.9m	13.5m	10.8m	9.0m	7.7m	6.8m	6.0m	5.4m
150	3m	471.6m	235.9m	157.3m	118.0m	94.4m	78.7m	67.5m	59.1m	52.5m	47.3m
150	1m	157.3m	78.7m	52.5m	39.4m	31.6m	26.3m	22.6m	19.8m	17.6m	15.9m
150	500mm	78.7m	39.4m	26.3m	19.8m	15.9m	13.3m	11.4m	10.0m	8.9m	8.0m

Gatic CastSlot, UltraSlot & PaveSlot Minimum Internal Radius											
Channel Width	Channel Length	1mm Gap	2mm Gap	3mm Gap	4mm Gap	5mm Gap	6mm Gap	7mm Gap	8mm Gap	9mm Gap	10mm Gap
100	3m	320.8m	160.4m	106.9m	80.2m	64.1m	53.4m	45.8m	40.0m	35.6m	32.0m
100	1m	106.9m	53.5m	35.6m	26.7m	21.4m	17.8m	15.3m	13.3m	11.9m	10.7m
100	500mm	53.5m	26.7m	17.8m	13.4m	10.7m	8.9m	7.6m	6.7m	5.9m	5.3m
150	3m	471.5m	235.7m	157.1m	117.8m	94.3m	78.5m	67.3m	58.9m	52.3m	47.1m
150	1m	157.2m	78.6m	52.4m	39.3m	31.4m	26.2m	22.4m	19.6m	17.4m	15.7m
150	500mm	78.6m	39.3m	26.2m	19.6m	15.7m	13.1m	11.2m	9.8m	8.7m	7.9m

TABLE EXTRACTS FROM GATIC INSTALLATION GUIDE



350 ACCESS BOX SECTION AND PLAN DETAILS NTS



CLASS S - 360° GRANULAR SURROUND PIPE BEDDING DETAIL

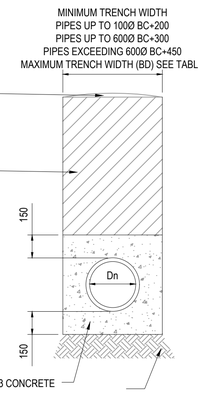
SOFT LANDSCAPE AREAS
IN SOFT LANDSCAPING AREAS TRENCH FILL ABOVE PIPES IS TO BE MOUNDED TO A MAXIMUM DEPTH OF 50MM TO ALLOW FOR FUTURE SETTLEMENT.

HARDSTANDING AREAS
SHW TYPE 1 GRANULAR MATERIAL
SOFT LANDSCAPE AREAS
SELECTED BACKFILL MATERIAL UP TO UNDERSIDE OF TOP-SOIL

THE FLEXIBLE JOINTS IN THE PIPES SHALL BE MAINTAINED AT THE END OF EACH PIPE WITH COMPRESSIBLE SHEET CUT ACCURATELY TO FIT THE PIPE PROFILE TO BREAK THE CONCRETE SURROUND

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

MAXIMUM TRENCH WIDTH



CLASS Z - CONCRETE BED AND SURROUND PIPE BEDDING DETAIL
COVER < 900mm IN VEHICULAR LOADING AND OPEN FIELD.
COVER <600mm ELSEWHERE EXCEPT UNDER BUILDINGS.

Rev:	Description:	Date:	By:	Chkd:
C02	STAGE 5 ISSUE	24.09.24	JC	ATL
P05	UPDATED IN LINE WITH COMMENTS	13.02.24	ATL	MW
P04	UPDATED FOR NEW TENDER	02.02.24	ATL	MW
C01	CONSTRUCTION ISSUE	23/09/22	ATL	MW
P03	STAGE 4 ISSUE	09/04/21	MW	MW
P02	STAGE 3 ISSUE	04/11/20	MW	MW
P01	STAGE 3 ISSUE	29/01/19	MW	CG

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manchester@curtins.com
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Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham

Status: STAGE 5

Project: HAMMERSTONE ROAD DEPOT

Drg Title: DRAINAGE DETAILS SHEET 2

Project No:	Size:	Date:	Drawn By:	Designed By:	Checked By:
068065	A1	29/01/19	MW	MW	CG
	Scale: 1:20				

Project Code: Originator: Zone: Level: Type: Discipline: Category / Number: Rev:

HRD - CUR - XX - ZZ - DR - C - 92521 -C02

\\ma-fs-1\Projects\068001 - 068000\068065 - Hammerstone Road Depot\CAD\5 4 Production\4B Models & Drawings_Civil-C\C-AD1SD

Declaration of Performance
Gatic CastSlot Treadsafe

CE

QA Document Number:	ED0025 REV. 1
Manufacturer's Address:	Gatic Poulton Close, Dover, Kent, CT17 0UF Telephone: +44 (0) 1304 203545 Fax: +44 (0) 1304 215001 Web: www.gatic.com
Intended Use:	Gatic CastSlot Treadsafe - For the catchment and drainage of surface water in areas for pedestrian and/or vehicular traffic.
Product Range:	CAT00001, CAT00002, CAT00003, CAT00004, CAT00005, CAT00006, CAT00007, CAT00008 CAT00009, CAT00010, CAT00011, CAT00012, CAT00013, CAT00014, CAT00015, CAT00016 CAT00017, CAT00018, CAT00019, CAT00020, CAT00021, CAT00022, CAT00023, CAT00024
System of Attestation of performance:	System 3
Notified Body:	NB 0086 - BSi Product Services
Type Test Report No.:	285/4618749
1. Water Tightness - Jointing of Drainage Channels:	No Leakage
2. Load Bearing Capacity - Deflection Under Load:	
Maximum Load	F900*
Permanent Set	NPD
3. Durablity:	NPD
Material:	1.5/2.5/3mm Thick mild steel sheet grade 'DX51D' (Pre-Galvanised) Continuously hot dipped galvanised 'Z275' minimised spangled, passivated to 'BS EN 10346 : 2009' [DX51D+Z275-M-A-C] (Fe P02 G Z275 MA C).
Applied Standard:	EN 1433:2002 + A1 2005

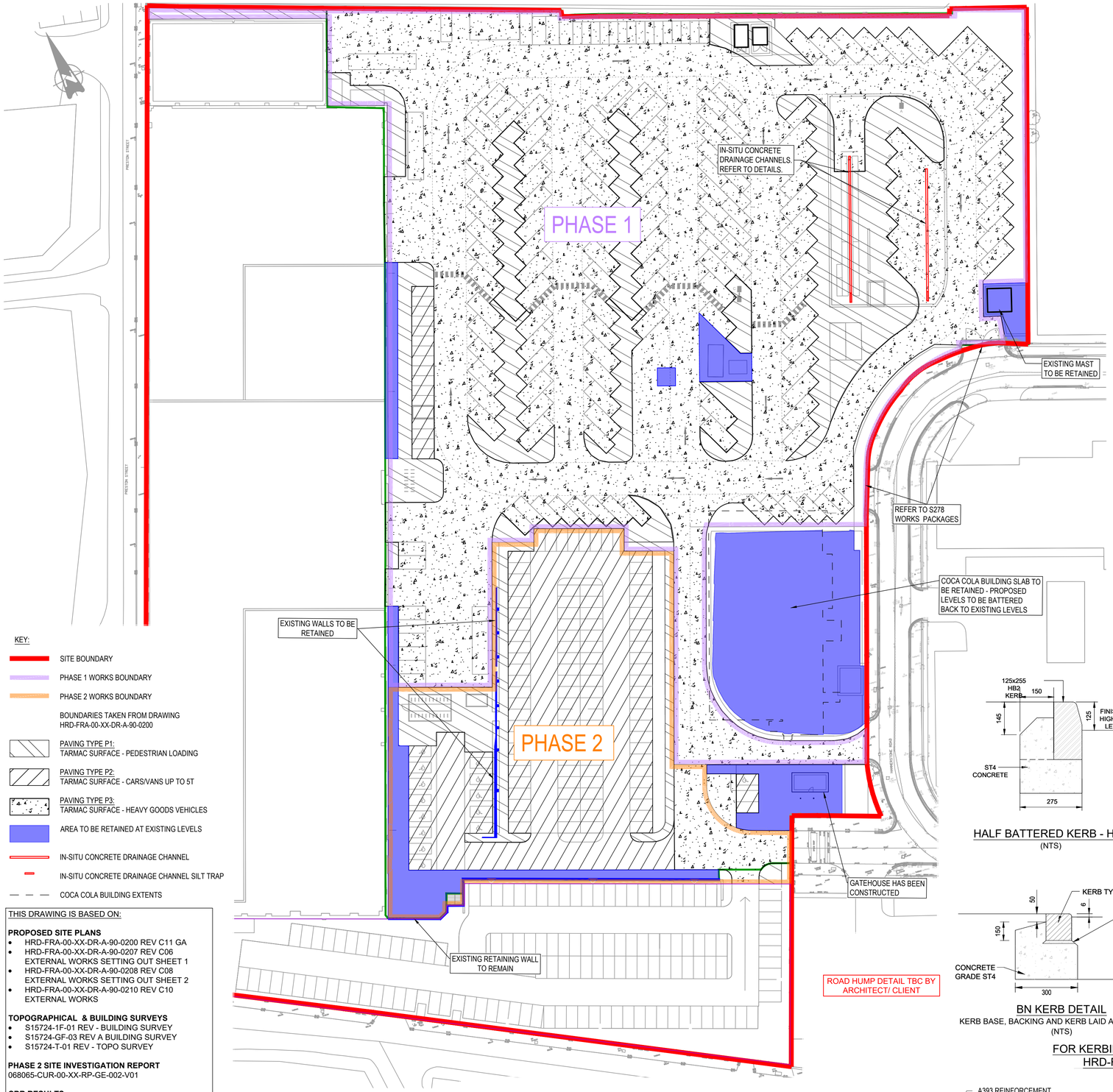
This declaration herewith confirms that the described manufactured items comply with the relevant parts of BS EN 1433:2002 + A1 2005 for linear drainage channels in areas for pedestrian and/or vehicular traffic for the catchment and drainage of surface water, *when installed in compliance with the manufacturers installation instructions.

[redacted]

Simon Bradbeer - RD&I Director - Gatic - Poulton Close - Dover - Kent - CT17 0UF

Date: 24/10/2016

FM593418 EMS593419



KEY:

- SITE BOUNDARY
- PHASE 1 WORKS BOUNDARY
- PHASE 2 WORKS BOUNDARY

BOUNDARIES TAKEN FROM DRAWING HRD-FRA-00-XX-DR-A-90-0200

- PAVING TYPE P1: TARMAC SURFACE - PEDESTRIAN LOADING
- PAVING TYPE P2: TARMAC SURFACE - CARS/VANS UP TO 5T
- PAVING TYPE P3: TARMAC SURFACE - HEAVY GOODS VEHICLES
- AREA TO BE RETAINED AT EXISTING LEVELS
- IN-SITU CONCRETE DRAINAGE CHANNEL
- IN-SITU CONCRETE DRAINAGE CHANNEL SILT TRAP
- COCA COLA BUILDING EXTENTS

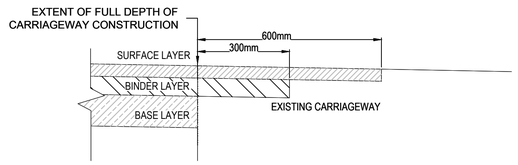
THIS DRAWING IS BASED ON:

PROPOSED SITE PLANS
- HRD-FRA-00-XX-DR-A-90-0200 REV C11 GA
- HRD-FRA-00-XX-DR-A-90-0207 REV C06 EXTERNAL WORKS SETTING OUT SHEET 1
- HRD-FRA-00-XX-DR-A-90-0208 REV C08 EXTERNAL WORKS SETTING OUT SHEET 2
- HRD-FRA-00-XX-DR-A-90-0210 REV C10 EXTERNAL WORKS

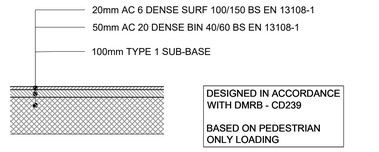
TOPOGRAPHICAL & BUILDING SURVEYS
- S15724-1F-01 REV - BUILDING SURVEY
- S15724-GF-03 REV A BUILDING SURVEY
- S15724-T-01 REV - TOPO SURVEY

PHASE 2 SITE INVESTIGATION REPORT
068065-CUR-00-XX-RP-GE-002-V01

CBR RESULTS
785148.R01(00) - PLATE LOADING TEST REPORT



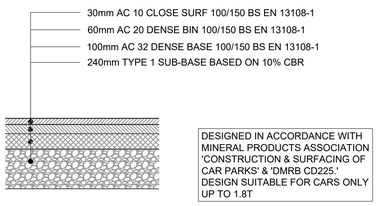
TIE-IN BETWEEN PROPOSED & EXISTING CARRIAGEWAY



DESIGNED IN ACCORDANCE WITH DMRB - CD239

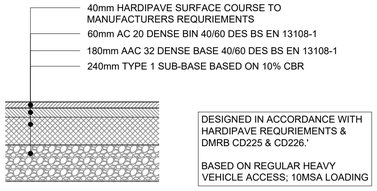
BASED ON PEDESTRIAN ONLY LOADING

PAVING TYPE P1:
TARMAC SURFACE - PEDESTRIAN LOADING



DESIGNED IN ACCORDANCE WITH MINERAL PRODUCTS ASSOCIATION 'CONSTRUCTION & SURFACING OF CAR PARKS' & 'DMRB CD225.' DESIGN SUITABLE FOR CARS ONLY UP TO 1.8T

PAVING TYPE P2:
TARMAC SURFACE - CARS/VANS UP TO 5T



DESIGNED IN ACCORDANCE WITH HARDIPAVE REQURIEMENTS & DMRB CD225 & CD226.'

BASED ON REGULAR HEAVY VEHICLE ACCESS; 10MSA LOADING

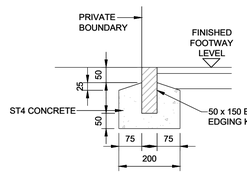
PAVING TYPE P3:
TARMAC SURFACE - HEAVY GOODS VEHICLES

TABLE 1: ALTERNATIVE PAVEMENT FOUNDATION THICKNESSES FOR VARYING CBR VALUES
APPLIES PAVING TYPE P2 & P3 (ALTERNATIVE OPTION) ONLY

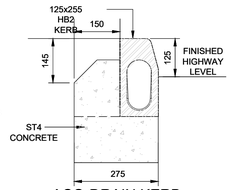
CBR VALUE	SUB-BASE ONLY THICKNESS	SUB-BASE ON CAPPING	
		SUB-BASE	CAPPING
5%	280mm	200mm	250mm
10%	240mm	150mm	200mm
15% & ABOVE	200mm	150mm	150mm

VALUES IN TABLE 1 ARE DERIVED FROM FIGURES 3.18 & 3.20 OF CD225. REFER TO DRAWING HRD-CUR-XX-00-DR-C-98-000 FOR CBR TEST RESULT LOCATIONS & VALUES.

HALF BATTERED KERB - HB2
(NTS)

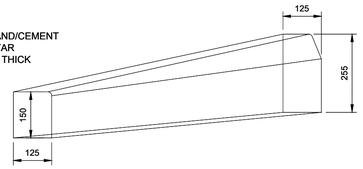


EK - EDGING KERB DETAIL
(NTS)



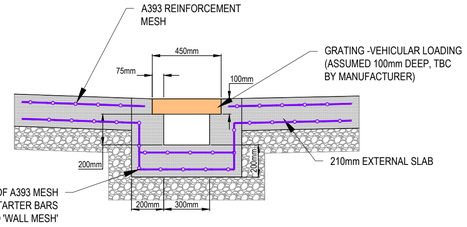
ACO-DRAIN KERB
(NTS)

BN KERB DETAIL
KERB BASE, BACKING AND KERB LAID AT SAME TIME
(NTS)

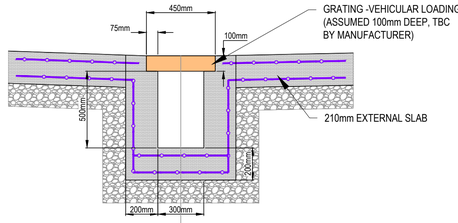


TRANSITION KERB (HB- BN) - TK1
(NTS)

FOR KERBING LOCATIONS REFER TO DRAWING HRD-FRA-00-XX-DR-A-90-0207 & 0208



IN-SITU CONCRETE DRAINAGE CHANNEL



IN-SITU CONCRETE DRAINAGE CHANNEL SUMP UNIT SECTION

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 WORKS AND MATERIALS TO BE IN ACCORDANCE WITH CURRENT BRITISH STANDARDS AND BUILDING REGULATIONS.
4. THE LANDSCAPE ARCHITECT'S DRAWING HAS BEEN USED AS A BASE FOR THIS PLAN. PLEASE REFER TO THE LATEST LANDSCAPING LAYOUT.
5. REFER TO LANDSCAPE ARCHITECTS SPECIFICATION FOR SURFACE FINISHES.
6. KERBING REQUIREMENTS/DETAILS TO BE CONFIRMED BY LANDSCAPE ARCHITECT.
7. REFER TO LANDSCAPE ARCHITECTS SPECIFICATION FOR JOINTING MATERIAL. CONSIDERATION REQUIRED OF COMPATIBILITY OF JOINTING AND BEDDING MATERIAL AND WHETHER SUB-SURFACE DRAINAGE IS REQUIRED.
8. ALL SUB-BASES AND CAPPING LAYERS TO BE GRADED AND COMPACTED IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SFHW).
9. ALL PAVEMENT CONSTRUCTIONS ARE BASED ON AN ASSUMED CBR VALUE OF 5%. TO BE CONFIRMED BY INSITU TESTING AT FORMATION.
10. IT IS RECOMMENDED THAT CBR TESTS ARE CARRIED OUT TO CONFIRM AND SUB-BASE ADJUSTED IN ACCORDANCE WITH THE CAPPING AND SUB-BASE THICKNESS TABLE.
11. CBR TEST PROCEDURE IS DETAILED WITHIN DMRB IAN73/06 AND BS 1377-4.
12. MEASURED CBR VALUE TO BE AT FORMATION LEVEL AND TO BE A 'SOAKED' CONDITION.
13. ANY VARIATIONS IN GROUND CONDITIONS SHOULD BE NOTIFIED TO THE ENGINEER PRIOR TO CONSTRUCTION.
14. THE CONSTRUCTION DEPTHS GIVEN ARE THE MINIMUM REQUIRED (COMPACTED).
15. THE CONSTRUCTION DEPTHS GIVEN ASSUME FORMATION IS NON-FROST SUSCEPTIBLE.
16. WHERE FORMATION IS FROST SUSCEPTIBLE PROVIDE CAPPING MATERIAL TO GIVE A MINIMUM 450mm OVERALL CONSTRUCTION THICKNESS.
17. THE CONSTRUCTIONS GIVEN ARE FOR PRIVATE AREAS ONLY AND NOT FOR ADOPTABLE AREAS.
18. IN AREAS WHERE LEVELS ARE TO BE RAISED, ACCEPTABLE FILL MATERIAL IS TO BE USED TO THE UNDERSIDE OF THE PROPOSED CONSTRUCTION MAKE UP.
19. NO REGULATING OR FILL MATERIAL HAS BEEN INCLUDED IN CONSTRUCTION BUILD UP. CONTRACTOR TO INCLUDE FOR REGULATING/FILL MATERIAL IN THEIR RATES.
20. IN AREAS WHERE LEVELS ARE TO BE LOWERED, EXISTING CONSTRUCTION IS TO BE REMOVED (FULL DEPTH).
21. CONSTRUCTION OF CONCRETE SURFACES SUBJECT TO CASTING IN APPROPRIATE BAY SIZES / LENGTHS.
22. CONTRACTOR TO ALLOW FOR CONTRACTION JOINTING WITHIN CONCRETE AREAS.
23. TYPE 1 SUB-BASE IN ACCORDANCE WITH SFHW.
24. CAPPING MATERIAL TO BE 6F1, 6F2 OR 6F5 MATERIAL IN ACCORDANCE WITH SFHW 600 SERIES.

Rev:	Description:	Date:	By:	Chkd:
C03	UPDATED TO SUIT LATEST SITE LAYOUT	20.09.24	JC	ATL
P12	UPDATED IN LINE WITH COMMENTS/ UPDATED SITE LAYOUT	04.04.24	KS	ATL
P11	UPDATED FOR NEW TENDER	19/01/24	ATL	MW
C02	TIE IN DETAILS ADDED	25.11.22	ATL	MW
C01	CONSTRUCTION ISSUE	23.09.22	ATL	MW
P10	UPDATED SITE PLAN	05.07.22	LK	MW
P09	UPDATED IN LINE WITH REVISED ARCHITECT'S SITE PLAN	03.08.21	ATL	MW
P08	UPDATED IN LINE WITH ARCHITECT'S COMMENTS 27.04.21	28.04.21	ATL	MW
P07	DRAWING NUMBER CHANGE	15/04/21	ATL	ATL
P06	STAGE 4 UPDATE: LAYOUT UPDATED	13.04.21	ATL	MW

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Status: STAGE 5

Project: HAMMERSTONE ROAD

Drg Title: EXTERNAL SURFACES

Project No.	Size:	Date:	Drawn By:	Designed By:	Checked By:
068065	A1	29.01.19	MW	MW	CG
	Scale: 1:500				

Project Code: Originator: Zone: Level: Type: Discipline: Category / Number: Rev:

HRD - CUR - XX - 00 - DR - C - 94-700 -C03

\\ms-fs-1\Projects\068001 - 068000\068065 - Hammerstone Road Depot\0MS 4 Production\4B Models & Drawings_Civil-CUR\

Appendix J

Drainage Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
RE PP1	0.054	5.00	64.228	1050		388217.969	396792.564	0.728
BEND PP2	0.015	5.00	64.190			388222.636	396809.328	0.806
BEND PP3	0.017	5.00	64.173			388227.222	396811.236	0.822
BEND PP4	0.010	5.00	64.201			388228.707	396816.433	0.886
BEND PP5	0.036	5.00	64.226			388227.505	396819.384	0.932
BEND PP6	0.012	5.00	64.224			388230.577	396830.686	1.008
S13b			64.240	1500		388233.850	396833.005	1.051
S13a			64.950	600		388235.913	396840.504	2.150
OU-11	0.080	5.00	64.306	350	350	388236.173	396848.221	0.846
S13			64.740	1500		388215.386	396857.536	2.200
OU-12	0.140	5.00	64.076	350	350	388166.406	396933.001	1.000
OU-13	0.126	5.00	64.031	350	350	388160.291	396909.984	1.000
S14			64.109	1500		388161.619	396906.443	1.449
OU-14	0.061	5.00	64.083	350	350	388154.700	396888.867	1.000
JUN-02			64.198			388157.755	396886.834	1.595
OU-15	0.087	5.00	64.232	350	350	388134.099	396812.930	1.000
S15	0.020	5.00	64.337	1500		388139.128	396813.380	1.155
OU-16	0.054	5.00	64.189	350	350	388143.485	396846.718	0.891
JUN-03			64.298			388148.482	396847.344	1.468
OU-17	0.067	5.00	64.136	350	350	388149.095	396867.801	1.000
S16			64.268	1500		388153.752	396866.521	1.788
OU-18	0.020	5.00	64.610	350	350	388162.166	396859.305	1.000
JUN-04			64.663			388169.376	396866.553	2.309
OU-08	0.017	5.00	64.159	350	350	388224.815	396784.079	1.000
S07	0.011	5.00	64.477	600		388214.211	396778.207	1.047
OU-01	0.003	5.00	64.420	350	350	388204.601	396773.900	1.000
S08			64.403	600		388202.250	396781.488	1.350
S09			64.460	1500		388202.428	396789.026	1.605
OU-02	0.068	5.00	64.063	350	350	388193.388	396777.976	1.000
S01			64.107	600		388191.358	396781.014	1.129
OU-07	0.040	5.00	64.345	350	350	388197.166	396791.687	1.350
S10			64.430	600		388195.512	396791.365	1.694
OU-04	0.130	5.00	64.093	350	350	388149.305	396788.915	1.000
OU-03	0.055	5.00	64.252	350	350	388164.599	396784.686	1.000
S03			64.291	1500		388166.728	396786.723	1.343
S04			64.433	1500		388171.539	396798.394	2.061
OU-05	0.060	5.00	64.417	350	350	388157.495	396819.066	1.000
OU-06	0.030	5.00	64.592	350	350	388173.489	396817.213	1.000
S05			64.659	1500		388177.568	396820.189	2.512
S11	0.013	5.00	64.531	450		388196.518	396814.994	0.731

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
S12	0.013	5.00	64.676	450		388200.834	396830.772	0.700
S17A			64.822	1500		388181.897	396835.980	2.722
S17			64.680	1500		388188.257	396867.644	2.930
OU-19	0.081	5.00	64.800	350	350	388256.281	396929.299	1.000
S18			64.560	1500		388236.014	396932.498	1.245
OU-20	0.073	5.00	64.507	350	350	388223.207	396917.885	1.000
OU-21	0.060	5.00	64.564	350	350	388239.483	396908.335	1.000
S19			64.480	1500		388230.077	396910.923	1.255
KO-01	0.033	5.00	64.202	350	350	388262.984	396869.222	0.790
OU-22	0.047	5.00	64.496	350	350	388265.455	396876.733	0.881
S20			64.730	1500		388261.407	396877.847	1.569
OU-23	0.060	5.00	64.573	350	350	388229.757	396871.909	1.000
OU-24	0.060	5.00	64.528	350	350	388234.487	396890.122	1.000
JUN S22A			64.576			388229.800	396886.545	1.634
OU-26	0.073	5.00	64.279	350	350	388215.721	396889.840	0.817
OU-25	0.073	5.00	64.312	350	350	388211.947	396875.699	0.805
S22			64.330	1500		388213.557	396891.015	1.580
OU-27	0.090	5.00	64.473	350	350	388192.039	396926.186	1.350
S23			64.499	600		388189.987	396910.486	1.843
OU-28	0.118	5.00	64.457	350	350	388185.887	396903.148	1.000
JUN-05			64.483			388187.729	396902.281	1.861
OU-29	0.061	5.00	64.500	350	350	388181.023	396884.928	1.000
S24			64.597	1500		388182.786	396884.320	2.050
OU-30	0.052	5.00	64.198	350	350	388203.533	396881.236	1.350
S25			64.637	1500		388191.349	396882.020	2.730
S26			64.660	1500		388188.359	396874.610	2.994
PI			64.577	600		388181.875	396876.751	3.007
S27			64.754	1800		388170.636	396879.830	3.499
TANK			64.540			388177.005	396903.633	3.370
JUN S17A			64.652			388200.818	396862.879	2.215
S28			64.536	1500		388179.853	396906.968	3.384
S29			64.553	1800		388191.433	396939.763	4.003
JUN S13C			64.475			388222.564	396851.580	1.848

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
12.000	RE PP1	BEND PP2	17.402	0.600	63.500	63.384	0.116	150.0	225	5.27	50.0
12.001	BEND PP2	BEND PP3	4.967	0.600	63.384	63.351	0.033	150.0	225	5.35	50.0
12.002	BEND PP3	BEND PP4	5.405	0.600	63.351	63.315	0.036	150.0	225	5.43	50.0
12.003	BEND PP4	BEND PP5	3.186	0.600	63.315	63.294	0.021	150.0	225	5.48	50.0
12.004	BEND PP5	BEND PP6	11.712	0.600	63.294	63.216	0.078	150.0	225	5.67	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
12.000	1.065	42.3	13.7	0.503	0.581	0.054	0.0	87	0.950
12.001	1.065	42.3	17.5	0.581	0.597	0.069	0.0	101	1.015
12.002	1.065	42.3	21.8	0.597	0.661	0.086	0.0	115	1.073
12.003	1.065	42.3	24.3	0.661	0.707	0.096	0.0	123	1.102
12.004	1.065	42.3	33.4	0.707	0.783	0.132	0.0	151	1.176

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
12.005	BEND PP6	S13b	4.011	0.600	63.216	63.189	0.027	150.0	225	5.73	50.0
12.006	S13b	S13a	7.777	0.600	63.189	62.800	0.389	20.0	225	5.77	50.0
13.000	OU-11	JUN S13C	14.017	0.600	63.460	62.702	0.758	18.5	150	5.10	50.0
12.009	S13	JUN S17A	15.517	0.600	62.540	62.437	0.103	150.0	300	6.30	50.0
16.000	OU-12	S14	26.986	0.600	63.076	62.960	0.116	232.6	225	5.53	50.0
17.000	OU-13	S14	3.782	0.600	63.031	62.960	0.071	53.3	225	5.04	50.0
16.001	S14	JUN-02	19.986	0.600	62.660	62.603	0.057	350.0	450	5.84	50.0
18.000	OU-14	JUN-02	3.670	0.600	63.083	62.903	0.180	20.4	225	5.02	50.0
16.002	JUN-02	S16	20.704	0.600	62.603	62.480	0.123	168.3	450	6.06	50.0
19.000	OU-15	S15	5.049	0.600	63.232	63.182	0.050	100.0	300	5.05	50.0
19.001	S15	JUN-03	35.229	0.600	63.182	62.830	0.352	100.0	300	5.43	50.0
20.000	OU-16	JUN-03	5.036	0.600	63.298	62.980	0.318	15.8	150	5.03	50.0
19.002	JUN-03	S16	19.888	0.600	62.830	62.631	0.199	100.0	300	5.64	50.0
21.000	OU-17	S16	4.830	0.600	63.136	63.104	0.032	150.0	225	5.08	50.0
16.003	S16	JUN-04	15.624	0.600	62.480	62.369	0.111	140.7	450	6.21	50.0
22.000	OU-18	JUN-04	10.223	0.600	63.610	62.676	0.934	10.9	150	5.06	50.0
16.004	JUN-04	S17	18.912	0.600	62.354	62.160	0.194	97.5	450	6.36	50.0
1.000	OU-08	S09	22.927	0.600	63.159	62.930	0.229	100.0	150	5.38	50.0
2.000	S07	S08	12.403	0.600	63.430	63.128	0.302	41.1	150	5.13	50.0
3.000	OU-01	S08	7.944	0.600	63.420	63.053	0.367	21.6	225	5.05	50.0
2.001	S08	S09	7.540	0.600	63.053	62.978	0.075	100.0	225	5.23	50.0
1.001	S09	S10	7.301	0.600	62.855	62.811	0.044	167.0	225	5.50	50.0
4.000	OU-02	S01	3.654	0.600	63.063	62.978	0.085	43.0	300	5.03	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
12.005	1.065	42.3	36.4	0.783	0.826	0.144	0.0	161	1.193
12.006	2.939	116.9	36.4	0.826	1.925	0.144	0.0	86	2.599
13.000	2.353	41.6	20.2	0.696	1.623	0.080	0.0	74	2.334
12.009	1.281	90.6	71.8	1.900	1.915	0.284	0.0	202	1.416
16.000	0.853	33.9	35.4	0.775	0.924	0.140	0.0	196	0.962
17.000	1.796	71.4	31.9	0.775	0.924	0.126	0.0	105	1.744
16.001	1.081	171.9	67.3	0.999	1.145	0.266	0.0	196	1.018
18.000	2.911	115.7	15.4	0.775	1.070	0.061	0.0	55	2.034
16.002	1.564	248.7	82.7	1.145	1.338	0.327	0.0	178	1.411
19.000	1.572	111.1	22.0	0.700	0.855	0.087	0.0	90	1.231
19.001	1.572	111.1	27.1	0.855	1.168	0.107	0.0	100	1.304
20.000	2.544	44.9	13.7	0.741	1.168	0.054	0.0	57	2.234
19.002	1.572	111.1	40.7	1.168	1.337	0.161	0.0	126	1.455
21.000	1.065	42.3	16.9	0.775	0.939	0.067	0.0	99	1.007
16.003	1.712	272.2	140.4	1.338	1.844	0.555	0.0	229	1.724
22.000	3.062	54.1	5.1	0.850	1.837	0.020	0.0	31	1.923
16.004	2.059	327.5	145.5	1.859	2.070	0.575	0.0	210	1.999
1.000	1.005	17.8	4.3	0.850	1.380	0.017	0.0	50	0.828
2.000	1.575	27.8	2.8	0.897	1.125	0.011	0.0	32	1.009
3.000	2.824	112.3	0.8	0.775	1.125	0.003	0.0	14	0.823
2.001	1.307	52.0	3.5	1.125	1.257	0.014	0.0	40	0.756
1.001	1.009	40.1	7.8	1.380	1.394	0.031	0.0	67	0.786
4.000	2.404	170.0	17.2	0.700	0.829	0.068	0.0	64	1.563

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
4.001	S01	S10	11.153	0.600	62.978	62.736	0.242	46.1	300	5.11	50.0
5.000	OU-07	S10	1.685	0.600	62.995	62.886	0.109	15.5	150	5.01	50.0
1.002	S10	S04	24.982	0.600	62.736	62.522	0.214	116.7	300	5.79	50.0
6.000	OU-04	S04	24.170	0.600	63.093	62.597	0.496	48.7	225	5.21	50.0
7.000	OU-03	S03	2.947	0.600	63.252	62.948	0.304	9.7	150	5.02	50.0
7.001	S03	S04	12.624	0.600	62.948	62.672	0.276	45.7	150	5.16	50.0
1.003	S04	S05	22.614	0.600	62.372	62.297	0.075	300.0	450	6.11	50.0
8.000	OU-05	S05	20.104	0.600	63.417	63.000	0.417	48.2	225	5.18	50.0
10.000	OU-06	S05	5.049	0.600	63.592	63.000	0.592	8.5	150	5.02	50.0
1.004_1	S05	S17A	16.374	0.600	62.147	62.100	0.047	350.0	600	6.32	50.0
1.004	S11	S05	9.581	0.600	63.800	63.000	0.800	12.0	150	5.05	50.0
11.000	S12	S17A	19.640	0.600	63.976	62.450	1.526	12.9	150	5.12	50.0
1.005	S17A	S17	32.296	0.600	62.100	62.000	0.100	323.0	600	6.72	50.0
1.006	S17	S26	6.967	0.600	61.750	61.735	0.015	450.0	600	6.82	50.0
23.000	OU-19	S18	20.518	0.600	63.800	63.390	0.410	50.0	225	5.18	50.0
23.001	S18	S19	22.377	0.600	63.315	63.225	0.090	250.0	300	5.56	50.0
24.000	OU-20	S19	9.781	0.600	63.507	63.300	0.207	47.3	150	5.11	50.0
25.000	OU-21	S19	9.756	0.600	63.564	63.300	0.264	37.0	225	5.08	50.0
23.002	S19	S22	25.870	0.600	63.230	63.127	0.103	250.0	300	6.00	50.0
26.000	KO-01	S20	8.768	0.600	63.412	63.237	0.175	50.0	225	5.08	50.0
27.000	OU-22	S20	4.198	0.600	63.615	63.236	0.379	11.1	150	5.02	50.0
26.001	S20	JUN S22A	32.782	0.600	63.161	62.942	0.219	150.0	225	5.59	50.0
14.000	OU-23	S13	20.325	0.600	63.573	63.370	0.203	100.0	225	5.26	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
4.001	2.322	164.1	17.2	0.829	1.394	0.068	0.0	65	1.524
5.000	2.575	45.5	10.1	1.200	1.394	0.040	0.0	48	2.073
1.002	1.454	102.8	35.2	1.394	1.611	0.139	0.0	121	1.322
6.000	1.878	74.7	32.9	0.775	1.611	0.130	0.0	104	1.818
7.000	3.255	57.5	13.9	0.850	1.193	0.055	0.0	50	2.688
7.001	1.491	26.4	13.9	1.193	1.611	0.055	0.0	78	1.513
1.003	1.168	185.8	82.0	1.611	1.912	0.324	0.0	209	1.132
8.000	1.888	75.1	15.2	0.775	1.434	0.060	0.0	68	1.484
10.000	3.471	61.3	7.6	0.850	1.509	0.030	0.0	35	2.369
1.004_1	1.296	366.3	108.0	1.912	2.122	0.427	0.0	222	1.134
1.004	2.927	51.7	3.3	0.581	1.509	0.013	0.0	25	1.641
11.000	2.823	49.9	3.3	0.550	2.222	0.013	0.0	26	1.605
1.005	1.349	381.5	111.3	2.122	2.080	0.440	0.0	221	1.178
1.006	1.141	322.7	347.1	2.330	2.325	1.372	0.0	600	1.151
23.000	1.854	73.7	20.5	0.775	0.945	0.081	0.0	81	1.597
23.001	0.990	70.0	20.5	0.945	0.955	0.081	0.0	111	0.863
24.000	1.467	25.9	18.5	0.850	1.030	0.073	0.0	93	1.590
25.000	2.159	85.8	15.2	0.775	0.955	0.060	0.0	64	1.637
23.002	0.990	70.0	54.1	0.950	0.903	0.214	0.0	199	1.089
26.000	1.854	73.7	8.3	0.565	1.268	0.033	0.0	51	1.234
27.000	3.044	53.8	11.9	0.731	1.344	0.047	0.0	48	2.451
26.001	1.065	42.3	20.2	1.344	1.409	0.080	0.0	109	1.053
14.000	1.307	52.0	15.2	0.775	1.145	0.060	0.0	83	1.137

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
28.000	OU-24	JUN S22A	5.896	0.600	63.528	62.942	0.586	10.1	225	5.02	50.0
26.002	JUN S22A	S22	16.847	0.600	62.942	62.830	0.112	150.0	225	5.86	50.0
29.000	OU-26	S22	2.462	0.600	63.462	63.273	0.189	13.0	225	5.01	50.0
15.000	OU-25	JUN S17A	16.977	0.600	63.507	62.587	0.920	18.5	150	5.12	50.0
23.003	S22	S25	23.960	0.600	62.750	62.205	0.545	44.0	450	6.13	50.0
30.000	OU-27	S23	15.834	0.600	63.123	62.731	0.392	40.4	225	5.13	50.0
30.001	S23	JUN-05	8.510	0.600	62.656	62.622	0.034	250.0	300	5.27	50.0
31.000	OU-28	JUN-05	2.036	0.600	63.457	62.697	0.760	2.7	225	5.00	50.0
30.002	JUN-05	S24	18.629	0.600	62.622	62.547	0.075	250.0	300	5.58	50.0
32.000	OU-29	S24	1.865	0.600	63.500	63.481	0.019	100.0	150	5.03	50.0
30.003	S24	S25	8.867	0.600	62.547	62.207	0.340	26.1	300	5.63	50.0
33.000	OU-30	S25	12.209	0.600	62.848	62.780	0.068	179.5	150	5.27	50.0
23.004	S25	S26	7.991	0.600	61.907	61.666	0.241	33.2	600	6.16	50.0
1.007	S26	PI	6.828	0.600	61.666	61.651	0.015	450.0	600	6.92	50.0
1.009	PI	S27	5.432	0.600	61.570	61.554	0.016	339.5	600	6.99	50.0
1.010	S27	TANK	21.145	0.600	61.255	61.170	0.085	248.8	375	7.30	50.0
1.011	TANK	S28	2.452	0.600	61.170	61.161	0.009	272.4	375	7.34	50.0
12.010	JUN S17A	S17	13.434	0.600	62.437	62.160	0.277	48.5	300	6.40	50.0
1.012	S28	S29	37.587	0.600	61.152	60.550	0.602	62.4	300	7.65	50.0
12.007	S13a	JUN S13C	17.346	0.600	62.800	62.627	0.173	100.0	225	6.00	50.0
12.008	JUN S13C	S13	9.327	0.600	62.627	62.540	0.087	107.2	300	6.10	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
28.000	4.149	165.0	15.2	0.775	1.409	0.060	0.0	46	2.624
26.002	1.065	42.3	35.4	1.409	1.275	0.140	0.0	158	1.188
29.000	3.644	144.9	18.5	0.592	0.832	0.073	0.0	54	2.524
15.000	2.355	41.6	18.5	0.655	1.915	0.073	0.0	70	2.287
23.003	3.071	488.4	108.0	1.130	1.982	0.427	0.0	143	2.486
30.000	2.064	82.1	22.8	1.125	1.543	0.090	0.0	80	1.768
30.001	0.990	70.0	22.8	1.543	1.561	0.090	0.0	117	0.887
31.000	8.053	320.2	29.9	0.775	1.561	0.118	0.0	46	5.098
30.002	0.990	70.0	52.6	1.561	1.750	0.208	0.0	195	1.083
32.000	1.005	17.8	15.4	0.850	0.966	0.061	0.0	108	1.129
30.003	3.091	218.5	68.1	1.750	2.130	0.269	0.0	115	2.739
33.000	0.747	13.2	13.2	1.200	1.707	0.052	0.0	123	0.849
23.004	4.238	1198.3	189.2	2.130	2.394	0.748	0.0	160	3.135
1.007	1.141	322.7	536.3	2.394	2.326	2.120	0.0	600	1.151
1.009	1.316	372.0	536.3	2.407	2.600	2.120	0.0	600	1.327
1.010	1.144	379.0	536.3	3.124	2.995	2.120	0.0	375	1.159
1.011	1.093	120.7	536.3	2.995	3.000	2.120	0.0	375	1.107
12.010	2.263	159.9	90.3	1.915	2.220	0.357	0.0	161	2.329
1.012	1.993	140.9	536.3	3.084	3.703	2.120	0.0	300	2.018
12.007	1.307	52.0	36.4	1.925	1.623	0.144	0.0	139	1.412
12.008	1.518	107.3	56.7	1.548	1.900	0.224	0.0	155	1.538

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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)
12.000	17.402	150.0	225	1 STANDARD	64.228	63.500	0.503	64.190	63.384	0.581
12.001	4.967	150.0	225	1 STANDARD	64.190	63.384	0.581	64.173	63.351	0.597
12.002	5.405	150.0	225	1 STANDARD	64.173	63.351	0.597	64.201	63.315	0.661
12.003	3.186	150.0	225	1 STANDARD	64.201	63.315	0.661	64.226	63.294	0.707
12.004	11.712	150.0	225	1 STANDARD	64.226	63.294	0.707	64.224	63.216	0.783
12.005	4.011	150.0	225	1 STANDARD	64.224	63.216	0.783	64.240	63.189	0.826
12.006	7.777	20.0	225	1 STANDARD	64.240	63.189	0.826	64.950	62.800	1.925
13.000	14.017	18.5	150	1 STANDARD	64.306	63.460	0.696	64.475	62.702	1.623
12.009	15.517	150.0	300	1 STANDARD	64.740	62.540	1.900	64.652	62.437	1.915
16.000	26.986	232.6	225	1 STANDARD	64.076	63.076	0.775	64.109	62.960	0.924
17.000	3.782	53.3	225	1 STANDARD	64.031	63.031	0.775	64.109	62.960	0.924
16.001	19.986	350.0	450	1 STANDARD	64.109	62.660	0.999	64.198	62.603	1.145
18.000	3.670	20.4	225	1 STANDARD	64.083	63.083	0.775	64.198	62.903	1.070
16.002	20.704	168.3	450	1 STANDARD	64.198	62.603	1.145	64.268	62.480	1.338
19.000	5.049	100.0	300	1 STANDARD	64.232	63.232	0.700	64.337	63.182	0.855
19.001	35.229	100.0	300	1 STANDARD	64.337	63.182	0.855	64.298	62.830	1.168
20.000	5.036	15.8	150	1 STANDARD	64.189	63.298	0.741	64.298	62.980	1.168
19.002	19.888	100.0	300	1 STANDARD	64.298	62.830	1.168	64.268	62.631	1.337
21.000	4.830	150.0	225	1 STANDARD	64.136	63.136	0.775	64.268	63.104	0.939
16.003	15.624	140.7	450	1 STANDARD	64.268	62.480	1.338	64.663	62.369	1.844
22.000	10.223	10.9	150	1 STANDARD	64.610	63.610	0.850	64.663	62.676	1.837
16.004	18.912	97.5	450	1 STANDARD	64.663	62.354	1.859	64.680	62.160	2.070
1.000	22.927	100.0	150	1 STANDARD	64.159	63.159	0.850	64.460	62.930	1.380
2.000	12.403	41.1	150	1 STANDARD	64.477	63.430	0.897	64.403	63.128	1.125

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
12.000	RE PP1	1050		Manhole	1 STANDARD	BEND PP2		Junction	
12.001	BEND PP2			Junction		BEND PP3		Junction	
12.002	BEND PP3			Junction		BEND PP4		Junction	
12.003	BEND PP4			Junction		BEND PP5		Junction	
12.004	BEND PP5			Junction		BEND PP6		Junction	
12.005	BEND PP6			Junction		S13b	1500	Manhole	1 STANDARD
12.006	S13b	1500		Manhole	1 STANDARD	S13a	600	Manhole	1 STANDARD
13.000	OU-11	350	350	Manhole	1 STANDARD	JUN S13C		Junction	
12.009	S13	1500		Manhole	1 STANDARD	JUN S17A		Junction	
16.000	OU-12	350	350	Manhole	1 STANDARD	S14	1500	Manhole	1 STANDARD
17.000	OU-13	350	350	Manhole	1 STANDARD	S14	1500	Manhole	1 STANDARD
16.001	S14	1500		Manhole	1 STANDARD	JUN-02		Junction	
18.000	OU-14	350	350	Manhole	1 STANDARD	JUN-02		Junction	
16.002	JUN-02			Junction		S16	1500	Manhole	1 STANDARD
19.000	OU-15	350	350	Manhole	1 STANDARD	S15	1500	Manhole	1 STANDARD
19.001	S15	1500		Manhole	1 STANDARD	JUN-03		Junction	
20.000	OU-16	350	350	Manhole	1 STANDARD	JUN-03		Junction	
19.002	JUN-03			Junction		S16	1500	Manhole	1 STANDARD
21.000	OU-17	350	350	Manhole	1 STANDARD	S16	1500	Manhole	1 STANDARD
16.003	S16	1500		Manhole	1 STANDARD	JUN-04		Junction	
22.000	OU-18	350	350	Manhole	1 STANDARD	JUN-04		Junction	
16.004	JUN-04			Junction		S17	1500	Manhole	1 STANDARD
1.000	OU-08	350	350	Manhole	1 STANDARD	S09	1500	Manhole	1 STANDARD
2.000	S07	600		Manhole	1 STANDARD	S08	600	Manhole	1 STANDARD

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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)
3.000	7.944	21.6	225	1 STANDARD	64.420	63.420	0.775	64.403	63.053	1.125
2.001	7.540	100.0	225	1 STANDARD	64.403	63.053	1.125	64.460	62.978	1.257
1.001	7.301	167.0	225	1 STANDARD	64.460	62.855	1.380	64.430	62.811	1.394
4.000	3.654	43.0	300	1 STANDARD	64.063	63.063	0.700	64.107	62.978	0.829
4.001	11.153	46.1	300	1 STANDARD	64.107	62.978	0.829	64.430	62.736	1.394
5.000	1.685	15.5	150	1 STANDARD	64.345	62.995	1.200	64.430	62.886	1.394
1.002	24.982	116.7	300	1 STANDARD	64.430	62.736	1.394	64.433	62.522	1.611
6.000	24.170	48.7	225	1 STANDARD	64.093	63.093	0.775	64.433	62.597	1.611
7.000	2.947	9.7	150	1 STANDARD	64.252	63.252	0.850	64.291	62.948	1.193
7.001	12.624	45.7	150	1 STANDARD	64.291	62.948	1.193	64.433	62.672	1.611
1.003	22.614	300.0	450	1 STANDARD	64.433	62.372	1.611	64.659	62.297	1.912
8.000	20.104	48.2	225	1 STANDARD	64.417	63.417	0.775	64.659	63.000	1.434
10.000	5.049	8.5	150	1 STANDARD	64.592	63.592	0.850	64.659	63.000	1.509
1.004_1	16.374	350.0	600	1 STANDARD	64.659	62.147	1.912	64.822	62.100	2.122
1.004	9.581	12.0	150	1 STANDARD	64.531	63.800	0.581	64.659	63.000	1.509
11.000	19.640	12.9	150	1 STANDARD	64.676	63.976	0.550	64.822	62.450	2.222
1.005	32.296	323.0	600	1 STANDARD	64.822	62.100	2.122	64.680	62.000	2.080
1.006	6.967	450.0	600	1 STANDARD	64.680	61.750	2.330	64.660	61.735	2.325
23.000	20.518	50.0	225	1 STANDARD	64.800	63.800	0.775	64.560	63.390	0.945
23.001	22.377	250.0	300	1 STANDARD	64.560	63.315	0.945	64.480	63.225	0.955
24.000	9.781	47.3	150	1 STANDARD	64.507	63.507	0.850	64.480	63.300	1.030
25.000	9.756	37.0	225	1 STANDARD	64.564	63.564	0.775	64.480	63.300	0.955
23.002	25.870	250.0	300	1 STANDARD	64.480	63.230	0.950	64.330	63.127	0.903
26.000	8.768	50.0	225	1 STANDARD	64.202	63.412	0.565	64.730	63.237	1.268

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	OU-01	350	350	Manhole	1 STANDARD	S08	600	Manhole	1 STANDARD
2.001	S08	600		Manhole	1 STANDARD	S09	1500	Manhole	1 STANDARD
1.001	S09	1500		Manhole	1 STANDARD	S10	600	Manhole	1 STANDARD
4.000	OU-02	350	350	Manhole	1 STANDARD	S01	600	Manhole	1 STANDARD
4.001	S01	600		Manhole	1 STANDARD	S10	600	Manhole	1 STANDARD
5.000	OU-07	350	350	Manhole	1 STANDARD	S10	600	Manhole	1 STANDARD
1.002	S10	600		Manhole	1 STANDARD	S04	1500	Manhole	1 STANDARD
6.000	OU-04	350	350	Manhole	1 STANDARD	S04	1500	Manhole	1 STANDARD
7.000	OU-03	350	350	Manhole	1 STANDARD	S03	1500	Manhole	1 STANDARD
7.001	S03	1500		Manhole	1 STANDARD	S04	1500	Manhole	1 STANDARD
1.003	S04	1500		Manhole	1 STANDARD	S05	1500	Manhole	1 STANDARD
8.000	OU-05	350	350	Manhole	1 STANDARD	S05	1500	Manhole	1 STANDARD
10.000	OU-06	350	350	Manhole	1 STANDARD	S05	1500	Manhole	1 STANDARD
1.004_1	S05	1500		Manhole	1 STANDARD	S17A	1500	Manhole	1 STANDARD
1.004	S11	450		Manhole	1 STANDARD	S05	1500	Manhole	1 STANDARD
11.000	S12	450		Manhole	1 STANDARD	S17A	1500	Manhole	1 STANDARD
1.005	S17A	1500		Manhole	1 STANDARD	S17	1500	Manhole	1 STANDARD
1.006	S17	1500		Manhole	1 STANDARD	S26	1500	Manhole	1 STANDARD
23.000	OU-19	350	350	Manhole	1 STANDARD	S18	1500	Manhole	1 STANDARD
23.001	S18	1500		Manhole	1 STANDARD	S19	1500	Manhole	1 STANDARD
24.000	OU-20	350	350	Manhole	1 STANDARD	S19	1500	Manhole	1 STANDARD
25.000	OU-21	350	350	Manhole	1 STANDARD	S19	1500	Manhole	1 STANDARD
23.002	S19	1500		Manhole	1 STANDARD	S22	1500	Manhole	1 STANDARD
26.000	KO-01	350	350	Manhole	1 STANDARD	S20	1500	Manhole	1 STANDARD

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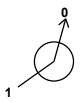
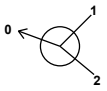
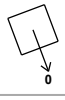
Pipeline Schedule

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)
27.000	4.198	11.1	150	1 STANDARD	64.496	63.615	0.731	64.730	63.236	1.344
26.001	32.782	150.0	225	1 STANDARD	64.730	63.161	1.344	64.576	62.942	1.409
14.000	20.325	100.0	225	1 STANDARD	64.573	63.573	0.775	64.740	63.370	1.145
28.000	5.896	10.1	225	1 STANDARD	64.528	63.528	0.775	64.576	62.942	1.409
26.002	16.847	150.0	225	1 STANDARD	64.576	62.942	1.409	64.330	62.830	1.275
29.000	2.462	13.0	225	1 STANDARD	64.279	63.462	0.592	64.330	63.273	0.832
15.000	16.977	18.5	150	1 STANDARD	64.312	63.507	0.655	64.652	62.587	1.915
23.003	23.960	44.0	450	1 STANDARD	64.330	62.750	1.130	64.637	62.205	1.982
30.000	15.834	40.4	225	1 STANDARD	64.473	63.123	1.125	64.499	62.731	1.543
30.001	8.510	250.0	300	1 STANDARD	64.499	62.656	1.543	64.483	62.622	1.561
31.000	2.036	2.7	225	1 STANDARD	64.457	63.457	0.775	64.483	62.697	1.561
30.002	18.629	250.0	300	1 STANDARD	64.483	62.622	1.561	64.597	62.547	1.750
32.000	1.865	100.0	150	1 STANDARD	64.500	63.500	0.850	64.597	63.481	0.966
30.003	8.867	26.1	300	1 STANDARD	64.597	62.547	1.750	64.637	62.207	2.130
33.000	12.209	179.5	150	1 STANDARD	64.198	62.848	1.200	64.637	62.780	1.707
23.004	7.991	33.2	600	1 STANDARD	64.637	61.907	2.130	64.660	61.666	2.394
1.007	6.828	450.0	600	1 STANDARD	64.660	61.666	2.394	64.577	61.651	2.326
1.009	5.432	339.5	600	1 STANDARD	64.577	61.570	2.407	64.754	61.554	2.600
1.010	21.145	248.8	375	Tank Connection X 3	64.754	61.255	3.124	64.540	61.170	2.995
1.011	2.452	272.4	375	1 STANDARD	64.540	61.170	2.995	64.536	61.161	3.000
12.010	13.434	48.5	300	1 STANDARD	64.652	62.437	1.915	64.680	62.160	2.220
1.012	37.587	62.4	300	1 STANDARD	64.536	61.152	3.084	64.553	60.550	3.703
12.007	17.346	100.0	225	1 STANDARD	64.950	62.800	1.925	64.475	62.627	1.623
12.008	9.327	107.2	300	1 STANDARD	64.475	62.627	1.548	64.740	62.540	1.900

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
27.000	OU-22	350	350	Manhole	1 STANDARD	S20	1500	Manhole	1 STANDARD
26.001	S20	1500		Manhole	1 STANDARD	JUN S22A		Junction	
14.000	OU-23	350	350	Manhole	1 STANDARD	S13	1500	Manhole	1 STANDARD
28.000	OU-24	350	350	Manhole	1 STANDARD	JUN S22A		Junction	
26.002	JUN S22A			Junction		S22	1500	Manhole	1 STANDARD
29.000	OU-26	350	350	Manhole	1 STANDARD	S22	1500	Manhole	1 STANDARD
15.000	OU-25	350	350	Manhole	1 STANDARD	JUN S17A		Junction	
23.003	S22	1500		Manhole	1 STANDARD	S25	1500	Manhole	1 STANDARD
30.000	OU-27	350	350	Manhole	1 STANDARD	S23	600	Manhole	1 STANDARD
30.001	S23	600		Manhole	1 STANDARD	JUN-05		Junction	
31.000	OU-28	350	350	Manhole	1 STANDARD	JUN-05		Junction	
30.002	JUN-05			Junction		S24	1500	Manhole	1 STANDARD
32.000	OU-29	350	350	Manhole	1 STANDARD	S24	1500	Manhole	1 STANDARD
30.003	S24	1500		Manhole	1 STANDARD	S25	1500	Manhole	1 STANDARD
33.000	OU-30	350	350	Manhole	1 STANDARD	S25	1500	Manhole	1 STANDARD
23.004	S25	1500		Manhole	1 STANDARD	S26	1500	Manhole	1 STANDARD
1.007	S26	1500		Manhole	1 STANDARD	PI	600	Manhole	1 STANDARD
1.009	PI	600		Manhole	1 STANDARD	S27	1800	Manhole	1 STANDARD
1.010	S27	1800		Manhole	1 STANDARD	TANK		Junction	
1.011	TANK			Junction		S28	1500	Manhole	1 STANDARD
12.010	JUN S17A			Junction		S17	1500	Manhole	1 STANDARD
1.012	S28	1500		Manhole	1 STANDARD	S29	1800	Manhole	1 STANDARD
12.007	S13a	600		Manhole	1 STANDARD	JUN S13C		Junction	
12.008	JUN S13C			Junction		S13	1500	Manhole	1 STANDARD

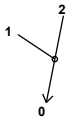
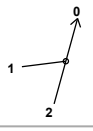
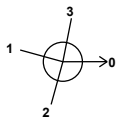
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
RE PP1	388217.969	396792.564	64.228	0.728	1050					
							0	12.000	63.500	225
BEND PP2	388222.636	396809.328	64.190	0.806			1	12.000	63.384	225
										
							0	12.001	63.384	225
BEND PP3	388227.222	396811.236	64.173	0.822			1	12.001	63.351	225
										
							0	12.002	63.351	225
BEND PP4	388228.707	396816.433	64.201	0.886			1	12.002	63.315	225
										
							0	12.003	63.315	225
BEND PP5	388227.505	396819.384	64.226	0.932			1	12.003	63.294	225
										
							0	12.004	63.294	225
BEND PP6	388230.577	396830.686	64.224	1.008			1	12.004	63.216	225
										
							0	12.005	63.216	225
S13b	388233.850	396833.005	64.240	1.051	1500		1	12.005	63.189	225
										
							0	12.006	63.189	225
S13a	388235.913	396840.504	64.950	2.150	600		1	12.006	62.800	225
										
							0	12.007	62.800	225
OU-11	388236.173	396848.221	64.306	0.846	350	350				
							0	13.000	63.460	150
S13	388215.386	396857.536	64.740	2.200	1500		1	14.000	63.370	225
							2	12.008	62.540	300
										
							0	12.009	62.540	300
OU-12	388166.406	396933.001	64.076	1.000	350	350				
							0	16.000	63.076	225
OU-13	388160.291	396909.984	64.031	1.000	350	350				
							0	17.000	63.031	225
S14	388161.619	396906.443	64.109	1.449	1500			1	17.000	62.960	225
								2	16.000	62.960	225
								0	16.001	62.660	450

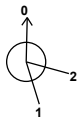
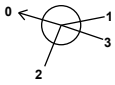
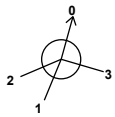
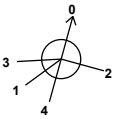
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
OU-14	388154.700	396888.867	64.083	1.000	350	350				
							0	18.000	63.083	225
JUN-02	388157.755	396886.834	64.198	1.595				1	18.000	62.903	225
								2	16.001	62.603	450
							0	16.002	62.603	450
OU-15	388134.099	396812.930	64.232	1.000	350	350				
							0	19.000	63.232	300
S15	388139.128	396813.380	64.337	1.155	1500			1	19.000	63.182	300
							0	19.001	63.182	300
OU-16	388143.485	396846.718	64.189	0.891	350	350				
							0	20.000	63.298	150
JUN-03	388148.482	396847.344	64.298	1.468				1	20.000	62.980	150
								2	19.001	62.830	300
							0	19.002	62.830	300
OU-17	388149.095	396867.801	64.136	1.000	350	350				
							0	21.000	63.136	225
S16	388153.752	396866.521	64.268	1.788	1500			1	21.000	63.104	225
								2	19.002	62.631	300
								3	16.002	62.480	450
							0	16.003	62.480	450
OU-18	388162.166	396859.305	64.610	1.000	350	350				
							0	22.000	63.610	150
JUN-04	388169.376	396866.553	64.663	2.309				1	22.000	62.676	150
								2	16.003	62.369	450
							0	16.004	62.354	450
OU-08	388224.815	396784.079	64.159	1.000	350	350				
							0	1.000	63.159	150
S07	388214.211	396778.207	64.477	1.047	600					
							0	2.000	63.430	150
OU-01	388204.601	396773.900	64.420	1.000	350	350				
							0	3.000	63.420	225

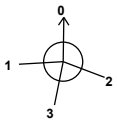
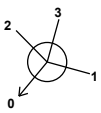
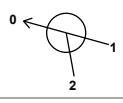
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
S08	388202.250	396781.488	64.403	1.350	600			1 3.000	63.053	225
								2 2.000	63.128	150
								0 2.001	63.053	225
S09	388202.428	396789.026	64.460	1.605	1500			1 2.001	62.978	225
								2 1.000	62.930	150
								0 1.001	62.855	225
OU-02	388193.388	396777.976	64.063	1.000	350	350		0 4.000	63.063	300
S01	388191.358	396781.014	64.107	1.129	600			1 4.000	62.978	300
								0 4.001	62.978	300
OU-07	388197.166	396791.687	64.345	1.350	350	350		0 5.000	62.995	150
S10	388195.512	396791.365	64.430	1.694	600			1 5.000	62.886	150
								2 4.001	62.736	300
								3 1.001	62.811	225
								0 1.002	62.736	300
OU-04	388149.305	396788.915	64.093	1.000	350	350		0 6.000	63.093	225
OU-03	388164.599	396784.686	64.252	1.000	350	350		0 7.000	63.252	150
S03	388166.728	396786.723	64.291	1.343	1500			1 7.000	62.948	150
								0 7.001	62.948	150
S04	388171.539	396798.394	64.433	2.061	1500			1 7.001	62.672	150
								2 6.000	62.597	225
								3 1.002	62.522	300
								0 1.003	62.372	450
OU-05	388157.495	396819.066	64.417	1.000	350	350		0 8.000	63.417	225
OU-06	388173.489	396817.213	64.592	1.000	350	350		0 10.000	63.592	150
S05	388177.568	396820.189	64.659	2.512	1500			1 10.000	63.000	150
								2 1.004	63.000	150
								3 8.000	63.000	225
								4 1.003	62.297	450
								0 1.004_1	62.147	600

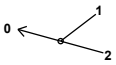
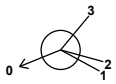
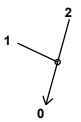
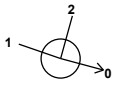
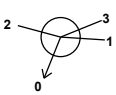
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
S11	388196.518	396814.994	64.531	0.731	450					
							0	1.004	63.800	150
S12	388200.834	396830.772	64.676	0.700	450					
							0	11.000	63.976	150
S17A	388181.897	396835.980	64.822	2.722	1500			1	11.000	62.450	150
								2	1.004_1	62.100	600
							0	1.005	62.100	600
S17	388188.257	396867.644	64.680	2.930	1500			1	16.004	62.160	450
								2	12.010	62.160	300
								3	1.005	62.000	600
							0	1.006	61.750	600
OU-19	388256.281	396929.299	64.800	1.000	350	350				
							0	23.000	63.800	225
S18	388236.014	396932.498	64.560	1.245	1500			1	23.000	63.390	225
							0	23.001	63.315	300
OU-20	388223.207	396917.885	64.507	1.000	350	350				
							0	24.000	63.507	150
OU-21	388239.483	396908.335	64.564	1.000	350	350				
							0	25.000	63.564	225
S19	388230.077	396910.923	64.480	1.255	1500			1	25.000	63.300	225
								2	24.000	63.300	150
								3	23.001	63.225	300
							0	23.002	63.230	300
KO-01	388262.984	396869.222	64.202	0.790	350	350				
							0	26.000	63.412	225
OU-22	388265.455	396876.733	64.496	0.881	350	350				
							0	27.000	63.615	150
S20	388261.407	396877.847	64.730	1.569	1500			1	27.000	63.236	150
								2	26.000	63.237	225
							0	26.001	63.161	225
OU-23	388229.757	396871.909	64.573	1.000	350	350				
							0	14.000	63.573	225

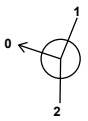
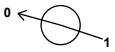
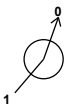
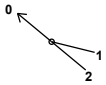
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
OU-24	388234.487	396890.122	64.528	1.000	350	350				
							0	28.000	63.528	225
JUN S22A	388229.800	396886.545	64.576	1.634				1	28.000	62.942	225
								2	26.001	62.942	225
								0	26.002	62.942	225
OU-26	388215.721	396889.840	64.279	0.817	350	350				
							0	29.000	63.462	225
OU-25	388211.947	396875.699	64.312	0.805	350	350				
							0	15.000	63.507	150
S22	388213.557	396891.015	64.330	1.580	1500			1	29.000	63.273	225
								2	26.002	62.830	225
								3	23.002	63.127	300
								0	23.003	62.750	450
OU-27	388192.039	396926.186	64.473	1.350	350	350				
							0	30.000	63.123	225
S23	388189.987	396910.486	64.499	1.843	600			1	30.000	62.731	225
							0	30.001	62.656	300
OU-28	388185.887	396903.148	64.457	1.000	350	350				
							0	31.000	63.457	225
JUN-05	388187.729	396902.281	64.483	1.861				1	31.000	62.697	225
								2	30.001	62.622	300
								0	30.002	62.622	300
OU-29	388181.023	396884.928	64.500	1.000	350	350				
							0	32.000	63.500	150
S24	388182.786	396884.320	64.597	2.050	1500			1	32.000	63.481	150
								2	30.002	62.547	300
								0	30.003	62.547	300
OU-30	388203.533	396881.236	64.198	1.350	350	350				
							0	33.000	62.848	150
S25	388191.349	396882.020	64.637	2.730	1500			1	33.000	62.780	150
								2	30.003	62.207	300
								3	23.003	62.205	450
								0	23.004	61.907	600

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
S26	388188.359	396874.610	64.660	2.994	1500		 1	23.004	61.666	600
							2	1.006	61.735	600
							0	1.007	61.666	600
PI	388181.875	396876.751	64.577	3.007	600		 1	1.007	61.651	600
							0	1.009	61.570	600
S27	388170.636	396879.830	64.754	3.499	1800		 1	1.009	61.554	600
							0	1.010	61.255	375
TANK	388177.005	396903.633	64.540	3.370			 1	1.010	61.170	375
							0	1.011	61.170	375
JUN S17A	388200.818	396862.879	64.652	2.215			 1	15.000	62.587	150
							2	12.009	62.437	300
							0	12.010	62.437	300
S28	388179.853	396906.968	64.536	3.384	1500		 1	1.011	61.161	375
							0	1.012	61.152	300
S29	388191.433	396939.763	64.553	4.003	1800		 1	1.012	60.550	300
JUN S13C	388222.564	396851.580	64.475	1.848			 1	13.000	62.702	150
							2	12.007	62.627	225
							0	12.008	62.627	300

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	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	0.357	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
OU 2	0.055	5.00	64.450	2100	300	388261.594	396886.854	0.300
W01A			64.510	1200		388257.353	396877.714	0.750
OU 1	0.022	5.00	64.356	300	300	388249.680	396887.411	0.356
W01	0.019	5.00	64.309	1200		388244.433	396873.384	1.139
W02			64.570	1200		388242.105	396865.867	1.534
W03		5.00	64.470	600		388251.697	396874.379	1.830
TANK			64.300			388244.104	396860.613	1.716
W04			64.380	600		388243.401	396859.338	1.804
W05			64.490	1200		388239.060	396855.503	2.040
W06			64.462	1200		388238.179	396852.455	2.132
EX BS4			64.375	1200		388237.159	396848.964	2.245

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	OU 2	W01A	10.076	0.600	64.150	63.762	0.388	26.0	150	5.08	50.0
1.001	W01A	W01	13.626	0.600	63.760	63.170	0.590	23.1	150	5.19	50.0
4.000	OU 1	W01	5.241	0.600	64.000	63.170	0.830	6.3	150	5.02	50.0
4.001	W01	W02	8.438	0.600	63.170	63.036	0.134	63.0	225	5.28	50.0
4.002	W02	W05	12.708	0.600	63.036	62.525	0.511	24.9	225	5.36	50.0
6.000	W03	TANK	14.004	0.600	62.640	62.584	0.056	250.1	300	5.24	50.0
6.001	TANK	W04	2.057	0.600	62.584	62.576	0.008	257.1	300	5.27	50.0
6.002	W04	W05	9.200	0.600	62.576	62.450	0.126	73.0	300	5.35	50.0
4.003	W05	W06	3.172	0.600	62.450	62.330	0.120	26.4	150	5.39	50.0
4.004	W06	EX BS4	3.637	0.600	62.330	62.130	0.200	18.2	150	5.41	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.982	35.0	9.9	0.150	0.598	0.055	0.0
1.001	2.104	37.2	9.9	0.600	0.989	0.055	0.0
4.000	4.036	71.3	4.0	0.206	0.989	0.022	0.0
4.001	1.651	65.6	17.3	0.914	1.309	0.096	0.0
4.002	2.634	104.7	17.3	1.309	1.740	0.096	0.0
6.000	0.989	69.9	0.0	1.530	1.416	0.000	0.0
6.001	0.976	69.0	0.0	1.416	1.504	0.000	0.0
6.002	1.842	130.2	0.0	1.504	1.740	0.000	0.0
4.003	1.966	34.7	17.3	1.890	1.982	0.096	0.0
4.004	2.373	41.9	17.3	1.982	2.095	0.096	0.0

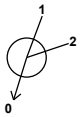
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Pipeline Schedule

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	10.076	26.0	150	1 STANDARD	64.450	64.150	0.150	64.510	63.762	0.598
1.001	13.626	23.1	150	1 STANDARD	64.510	63.760	0.600	64.309	63.170	0.989
4.000	5.241	6.3	150	1 STANDARD	64.356	64.000	0.206	64.309	63.170	0.989
4.001	8.438	63.0	225	1 STANDARD	64.309	63.170	0.914	64.570	63.036	1.309
4.002	12.708	24.9	225	1 STANDARD	64.570	63.036	1.309	64.490	62.525	1.740
6.000	14.004	250.1	300	1 STANDARD	64.470	62.640	1.530	64.300	62.584	1.416
6.001	2.057	257.1	300	1 STANDARD	64.300	62.584	1.416	64.380	62.576	1.504
6.002	9.200	73.0	300	1 STANDARD	64.380	62.576	1.504	64.490	62.450	1.740
4.003	3.172	26.4	150	1 STANDARD	64.490	62.450	1.890	64.462	62.330	1.982
4.004	3.637	18.2	150	1 STANDARD	64.462	62.330	1.982	64.375	62.130	2.095

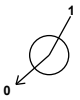
Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	OU 2	2100	300	Manhole	1 STANDARD	W01A	1200	Manhole	1 STANDARD
1.001	W01A	1200		Manhole	1 STANDARD	W01	1200	Manhole	1 STANDARD
4.000	OU 1	300	300	Manhole	1 STANDARD	W01	1200	Manhole	1 STANDARD
4.001	W01	1200		Manhole	1 STANDARD	W02	1200	Manhole	1 STANDARD
4.002	W02	1200		Manhole	1 STANDARD	W05	1200	Manhole	1 STANDARD
6.000	W03	600		Manhole	1 STANDARD	TANK		Junction	
6.001	TANK			Junction		W04	600	Manhole	1 STANDARD
6.002	W04	600		Manhole	1 STANDARD	W05	1200	Manhole	1 STANDARD
4.003	W05	1200		Manhole	1 STANDARD	W06	1200	Manhole	1 STANDARD
4.004	W06	1200		Manhole	1 STANDARD	EX BS4	1200	Manhole	1 STANDARD

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
OU 2	388261.594	396886.854	64.450	0.300	2100	300	 0	1.000	64.150	150
W01A	388257.353	396877.714	64.510	0.750	1200		 1	1.000	63.762	150
							0	1.001	63.760	150
OU 1	388249.680	396887.411	64.356	0.356	300	300	 0	4.000	64.000	150
W01	388244.433	396873.384	64.309	1.139	1200		 1	4.000	63.170	150
							2	1.001	63.170	150
							0	4.001	63.170	225
W02	388242.105	396865.867	64.570	1.534	1200		 1	4.001	63.036	225
							0	4.002	63.036	225
W03	388251.697	396874.379	64.470	1.830	600		 0	6.000	62.640	300

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
TANK	388244.104	396860.613	64.300	1.716			 1	6.000	62.584	300
							0	6.001	62.584	300
W04	388243.401	396859.338	64.380	1.804	600		 1	6.001	62.576	300
							0	6.002	62.576	300
W05	388239.060	396855.503	64.490	2.040	1200		 1	6.002	62.450	300
							2	4.002	62.525	225
							0	4.003	62.450	150
W06	388238.179	396852.455	64.462	2.132	1200		 1	4.003	62.330	150
							0	4.004	62.330	150
EX BS4	388237.159	396848.964	64.375	2.245	1200		 1	4.004	62.130	150

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APPENDIX J3 - DRIANGE MODEL DETAILS & RESULTS
BUILDING DRAINAGE (FLOW CONTROL @ SRH06)

Curtins		Page 1
Merchant Exchange 17-19 Whitworth Street West Manchester, M1 5WG		
Date 01/05/2025 12:51 File Building Drainage 02.02....	Designed by losty_a Checked by	
Innovyze	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for siphon and harvesting

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.357	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for siphon and harvesting

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.200	4-8	0.661	8-12	0.209	12-16	0.008

Total Area Contributing (ha) = 1.079

Total Pipe Volume (m³) = 66.278

Network Design Table for siphon and harvesting

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	45.000#	0.000	0.0	0.247	5.00	0.0	0.600	\/	-4	Pipe/Conduit	
1.001	0.501	1.670	0.3	0.000	0.00	0.0	0.600	o	200	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	44.73	9.34	65.700	0.247	0.0	0.0	0.0	0.17	25.9«	39.9
1.001	44.73	9.34	65.680	0.247	0.0	0.0	0.0	22.35	702.0	39.9

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Network Design Table for siphon and harvesting

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.002	5.390	0.054	99.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	51.315	0.128	400.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.000	15.000#	0.005	3000.0	0.245	5.00	0.0	0.600	\/	-4	Pipe/Conduit	
2.001	0.500#	1.667	0.3	0.000	0.00	0.0	0.600	o	200	Pipe/Conduit	
2.002	5.823	0.058	100.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	29.243	0.073	400.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	35.000#	0.032	1093.8	0.235	5.00	0.0	0.600	\/	-4	Pipe/Conduit	
3.001	0.500#	1.667	0.3	0.000	0.00	0.0	0.600	o	200	Pipe/Conduit	
3.002	6.390#	0.064	99.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	28.825	0.058	497.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	30.000#	0.007	4285.7	0.235	5.00	0.0	0.600	\/	-4	Pipe/Conduit	
4.001	0.500#	1.667	0.3	0.000	0.00	0.0	0.600	o	200	Pipe/Conduit	
4.002	7.509	0.059	127.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	20.000#	0.007	2857.1	0.116	5.00	0.0	0.600	\/	-4	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.002	44.56	9.41	63.206	0.247	0.0	0.0	0.0	1.31	52.0	39.9
1.003	42.61	10.26	62.927	0.247	0.0	0.0	0.0	1.01	160.5	39.9
2.000	50.00	5.78	65.600	0.245	0.0	0.0	0.0	0.32	48.2	44.2
2.001	50.00	5.78	65.580	0.245	0.0	0.0	0.0	22.35	702.1	44.2
2.002	50.00	5.85	63.211	0.245	0.0	0.0	0.0	1.30	51.9	44.2
1.004	41.58	10.74	62.799	0.492	0.0	0.0	0.0	1.01	160.6	73.9
3.000	50.00	6.08	65.500	0.235	0.0	0.0	0.0	0.54	80.9	42.4
3.001	50.00	6.08	65.468	0.235	0.0	0.0	0.0	22.35	702.1	42.4
3.002	50.00	6.16	63.214	0.235	0.0	0.0	0.0	1.31	52.0	42.4
1.005	40.69	11.18	62.576	0.727	0.0	0.0	0.0	1.09	306.9	106.9
4.000	50.00	6.87	65.400	0.235	0.0	0.0	0.0	0.27	40.1«	42.5
4.001	50.00	6.87	65.268	0.235	0.0	0.0	0.0	22.35	702.1	42.5
4.002	50.00	6.98	63.211	0.235	0.0	0.0	0.0	1.16	46.0	42.5
5.000	50.00	6.01	65.700	0.116	0.0	0.0	0.0	0.33	49.5	20.9

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Network Design Table for siphon and harvesting

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.001	0.500#	1.667	0.3	0.000	0.00	0.0	0.600	o	160	Pipe/Conduit	
5.002	7.784	0.058	134.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.003	18.541	0.054	343.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	31.179	0.052	599.6	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.007	7.723	0.026	297.0	0.000	0.00	0.0	0.600	ooo	-1	Pipe/Conduit	
1.008	17.634	0.059	298.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	18.442	1.025	18.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.001	50.00	6.01	65.680	0.116	0.0	0.0	0.0	19.36	389.2	20.9
5.002	50.00	6.13	63.220	0.116	0.0	0.0	0.0	1.13	44.8	20.9
4.003	50.00	7.26	62.898	0.351	0.0	0.0	0.0	1.09	173.6	63.4
1.006	39.82	11.64	62.368	1.079	0.0	0.0	0.0	1.14	501.7	155.1
1.007	39.60	11.76	62.316	1.079	0.0	0.0	0.0	1.09	410.9	155.1
1.008	39.01	12.08	61.471	1.079	0.0	0.0	0.0	0.90	63.9«	155.1
1.009	38.87	12.17	60.920	1.079	0.0	0.0	0.0	3.72	263.2	155.1

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

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Innovyze | Network 2018.1.1

Manhole Schedules for siphon and harvesting

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdro (mm)
Sgutter	66.000	0.300	Junction		1.000	65.700	-4				
Sdp	66.000	0.320	Junction		1.001	65.680	200	1.000	65.700	-4	8
Ssiphon gf	65.000	1.794	Sealed Manhole	225	1.002	63.206	225	1.001	64.010	200	77
SSRH01	64.350	1.423	Open Manhole	1350	1.003	62.927	450	1.002	63.152	225	
Sgutter	66.000	0.400	Junction		2.000	65.600	-4				
Sdp	66.000	0.420	Junction		2.001	65.580	200	2.000	65.595	-4	7
Ssiphon gf	64.313	1.102	Junction		2.002	63.211	225	2.001	63.913	200	67
SSRH02	64.220	1.421	Open Manhole	1350	1.004	62.799	450	1.003	62.799	450	
								2.002	63.153	225	12
Sgutter	66.000	0.500	Junction		3.000	65.500	-4				
Sdp	66.000	0.532	Junction		3.001	65.468	200	3.000	65.468	-4	
Ssiphon gf	64.496	1.282	Junction		3.002	63.214	225	3.001	63.801	200	56
SSRH03	64.260	1.684	Open Manhole	1500	1.005	62.576	600	1.004	62.726	450	
								3.002	63.150	225	19
Sgutter	66.000	0.600	Junction		4.000	65.400	-4				
Sdp	66.000	0.732	Junction		4.001	65.268	200	4.000	65.393	-4	18
Ssiphon gf	64.196	0.985	Junction		4.002	63.211	225	4.001	63.601	200	36
Sgutter	66.000	0.300	Junction		5.000	65.700	-4				
Sdp	66.000	0.320	Junction		5.001	65.680	160	5.000	65.693	-4	11
Ssiphon gf	64.265	1.045	Junction		5.002	63.220	225	5.001	64.013	160	72
SSRH05	64.210	1.312	Open Manhole	1350	4.003	62.898	450	4.002	63.152	225	2
								5.002	63.162	225	3
SSRH04	64.170	1.802	Open Manhole	2100	1.006	62.368	750	1.005	62.518	600	
								4.003	62.844	450	17
SSRH06a	64.500	2.184	Open Manhole	2100	1.007	62.316	-1	1.006	62.316	750	
Stank	64.271	2.800	Open Manhole	100	1.008	61.471	300	1.007	62.290	-1	91
SSRH06	64.630	3.710	Open Manhole	1500	1.009	60.920	300	1.008	61.412	300	49
S	64.301	4.406	Open Manhole	0		OUTFALL		1.009	59.895	300	

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Area Summary for siphon and harvesting

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.247	0.247	0.247
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.245	0.245	0.245
2.001	-	-	100	0.000	0.000	0.000
2.002	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.235	0.235	0.235
3.001	-	-	100	0.000	0.000	0.000
3.002	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.235	0.235	0.235
4.001	-	-	100	0.000	0.000	0.000
4.002	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.116	0.116	0.116
5.001	-	-	100	0.000	0.000	0.000
5.002	-	-	100	0.000	0.000	0.000
4.003	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.079	1.079	1.079

Surcharged Outfall Details for siphon and harvesting

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	S	64.301	59.895	59.300	0	0

Datum (m) 60.050 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
60	1.000	300	1.000	540	1.000	780	1.000	1020	1.000	1260	1.000
120	1.000	360	1.000	600	1.000	840	1.000	1080	1.000	1320	1.000
180	1.000	420	1.000	660	1.000	900	1.000	1140	1.000	1380	1.000
240	1.000	480	1.000	720	1.000	960	1.000	1200	1.000	1440	1.000

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Simulation Criteria for siphon and harvesting

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0	Number of Offline Controls 5	Number of Time/Area Diagrams 0
Number of Online Controls 6	Number of Storage Structures 1	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.357		

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Online Controls for siphon and harvesting

Siphon Manhole: Sdp, DS/PN: 1.001, Volume (m³): 6.8

Invert Level (m) 65.680 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)
0.020	155.5300	0.200	155.5300
0.100	155.5300	0.260	155.5300

Siphon Manhole: Sdp, DS/PN: 2.001, Volume (m³): 2.3

Invert Level (m) 65.580 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)
0.020	155.5300	0.200	155.5300
0.100	155.5300	0.260	155.5300

Siphon Manhole: Sdp, DS/PN: 3.001, Volume (m³): 5.3

Invert Level (m) 65.468 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)
0.020	155.5300	0.200	155.5300
0.100	155.5300	0.260	155.5300

Siphon Manhole: Sdp, DS/PN: 4.001, Volume (m³): 4.5

Invert Level (m) 65.268 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)
0.020	155.5300	0.200	155.5300
0.100	155.5300	0.260	155.5300

Siphon Manhole: Sdp, DS/PN: 5.001, Volume (m³): 3.0

Invert Level (m) 65.680 Cut In Height (m) 0.025 Cut Out Height (m) 0.020

Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)
0.020	77.7300	0.200	77.7300
0.100	77.7300	0.260	77.7300

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Hydro-Brake® Optimum Manhole: SSRH06, DS/PN: 1.009, Volume (m³): 7.7

Unit Reference	MD-SHE-0181-1810-1600-1810
Design Head (m)	1.600
Design Flow (l/s)	18.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	181
Invert Level (m)	61.412
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	18.1	Kick-Flo®	1.021	14.6
Flush-Flo™	0.472	18.1	Mean Flow over Head Range	-	15.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.4	1.200	15.8	3.000	24.4	7.000	36.7
0.200	16.1	1.400	17.0	3.500	26.3	7.500	38.0
0.300	17.5	1.600	18.1	4.000	28.0	8.000	39.2
0.400	18.0	1.800	19.1	4.500	29.7	8.500	40.3
0.500	18.1	2.000	20.1	5.000	31.2	9.000	41.5
0.600	17.9	2.200	21.1	5.500	32.7	9.500	42.6
0.800	17.2	2.400	21.9	6.000	34.1		
1.000	15.0	2.600	22.8	6.500	35.4		

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Offline Controls for siphon and harvesting

Depth/Flow Relationship Manhole: Sdp, DS/PN: 1.001, Loop to PN: 1.002

Invert Level (m) 65.680

Depth (m)	Flow (l/s)
0.020	0.5000

Depth/Flow Relationship Manhole: Sdp, DS/PN: 2.001, Loop to PN: 2.002

Invert Level (m) 65.580

Depth (m)	Flow (l/s)
0.020	0.5000

Depth/Flow Relationship Manhole: Sdp, DS/PN: 3.001, Loop to PN: 3.002

Invert Level (m) 65.468

Depth (m)	Flow (l/s)
0.020	0.5000

Depth/Flow Relationship Manhole: Sdp, DS/PN: 4.001, Loop to PN: 4.002

Invert Level (m) 65.580

Depth (m)	Flow (l/s)
0.020	0.5000

Depth/Flow Relationship Manhole: Sdp, DS/PN: 5.001, Loop to PN: 5.002

Invert Level (m) 65.680

Depth (m)	Flow (l/s)
0.500	0.5000

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Storage Structures for siphon and harvesting

Cellular Storage Manhole: Stank, DS/PN: 1.008

Invert Level (m) 61.471 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	467.0	0.0	1.393	0.0	0.0
1.392	467.0	0.0			

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Summary of Critical Results by Maximum Level (Rank 1) for siphon and harvesting

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Offline Controls	5	Number of Time/Area Diagrams	0
Number of Online Controls	6	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.357
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
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	Sgutter	15 Summer	100	+40%				
1.001	Sdp	15 Summer	100	+40%			1/15 Summer	114
1.002	Ssiphon gf	15 Summer	100	+40%	1/15 Summer			
1.003	SSRH01	15 Summer	100	+40%	100/15 Summer			
2.000	Sgutter	15 Summer	100	+40%	100/15 Summer			
2.001	Sdp	15 Summer	100	+40%			1/15 Summer	114
2.002	Ssiphon gf	15 Summer	100	+40%	1/15 Summer			
1.004	SSRH02	15 Summer	100	+40%	30/15 Summer			
3.000	Sgutter	15 Summer	100	+40%	100/15 Summer			
3.001	Sdp	15 Summer	100	+40%			1/15 Summer	114
3.002	Ssiphon gf	60 Summer	100	+40%	30/15 Summer			
1.005	SSRH03	15 Summer	100	+40%	100/15 Summer			
4.000	Sgutter	15 Summer	100	+40%	100/15 Summer			

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Summary of Critical Results by Maximum Level (Rank 1) for siphon and harvesting

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Sgutter	65.910	-0.050	0.000	2.04		164.1	FLOOD RISK*	
1.001	Sdp	65.744	-0.136	0.000	1.08	0.5	155.5	FLOOD RISK*	
1.002	Ssiphon gf	65.000	1.569	0.000	4.76		156.0	FLOOD RISK*	3
1.003	SSRH01	63.918	0.541	0.000	1.05		152.8	SURCHARGED	
2.000	Sgutter	65.941	0.081	0.000	2.64		163.9	FLOOD RISK*	
2.001	Sdp	65.714	-0.066	0.000	1.08	0.5	155.5	FLOOD RISK*	
2.002	Ssiphon gf	64.113	0.677	0.000	4.54		154.1	FLOOD RISK*	
1.004	SSRH02	63.774	0.525	0.000	2.20		302.2	SURCHARGED	
3.000	Sgutter	65.840	0.080	0.000	2.23		157.9	FLOOD RISK*	
3.001	Sdp	65.496	-0.172	0.000	1.08	0.5	155.1	OK*	
3.002	Ssiphon gf	64.001	0.562	0.000	3.16		112.8	SURCHARGED*	
1.005	SSRH03	63.415	0.239	0.000	1.79		446.0	SURCHARGED	
4.000	Sgutter	65.748	0.088	0.000	2.43		159.3	FLOOD RISK*	

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Summary of Critical Results by Maximum Level (Rank 1) for siphon and harvesting

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
4.001	Sdp	15 Summer	100	+40%				0
4.002	Ssiphon gf	15 Summer	100	+40%	30/15 Summer			
5.000	Sgutter	15 Summer	100	+40%				
5.001	Sdp	1440 Summer	30	+0%			1/15 Summer	114
5.002	Ssiphon gf	15 Summer	100	+40%	30/15 Summer			
4.003	SSRH05	15 Summer	100	+40%	100/15 Summer			
1.006	SSRH04	15 Summer	100	+40%	100/15 Summer			
1.007	SSRH06a	15 Summer	100	+40%	100/15 Summer			
1.008	Stank	240 Winter	100	+40%	30/15 Summer			
1.009	SSRH06	180 Winter	100	+40%	1/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
4.001	Sdp	65.392	-0.076	0.000	1.08	0.0	155.4	OK*	
4.002	Ssiphon gf	63.801	0.365	0.000	4.55		155.6	SURCHARGED*	
5.000	Sgutter	65.905	-0.055	0.000	1.45		77.9	FLOOD RISK*	
5.001	Sdp	65.705	-0.135	0.000	0.04	0.0	3.6	FLOOD RISK*	
5.002	Ssiphon gf	63.747	0.302	0.000	2.28		77.2	SURCHARGED*	
4.003	SSRH05	63.443	0.095	0.000	1.68		232.8	SURCHARGED	
1.006	SSRH04	63.212	0.094	0.000	1.66		651.1	SURCHARGED	
1.007	SSRH06a	62.917	0.201	0.000	2.36		655.9	SURCHARGED	
1.008	Stank	62.830	1.059	0.000	0.51		27.9	SURCHARGED	
1.009	SSRH06	63.052	1.832	0.000	0.08		17.8	SURCHARGED	

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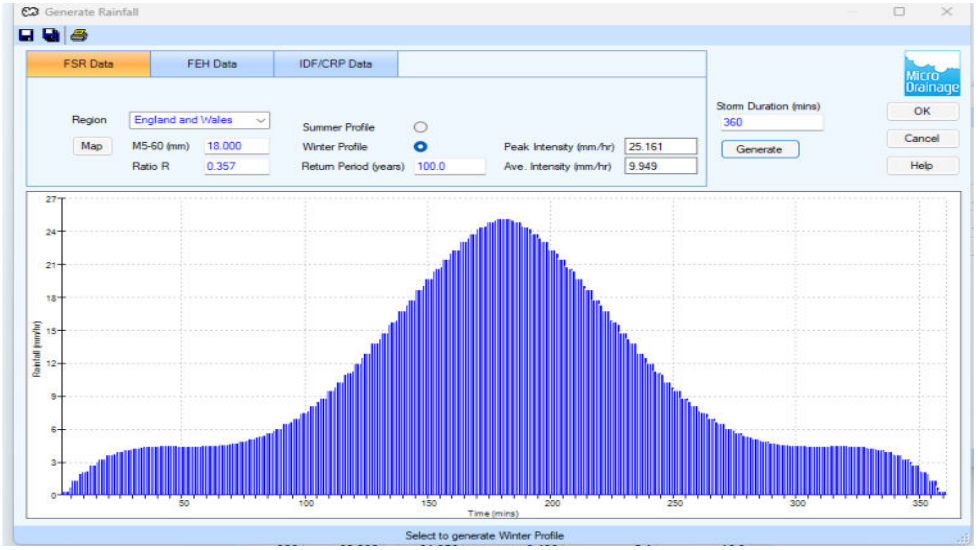
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Curtins

Calculation

Existing Runoff Volumes, 100-Year, 6 Hour Storm Event

Rainfall Data



Total Runoff volume calculated by using average rainfall value over the full site area

		Rainfall (average)		Duration (6 Hour)		Area (m2)		Total Runoff Volume (m3)
Area A1		9.9	x	6	x	2603	=	**154.6**
Area A2		9.9	x	6	x	6420	=	**381.3**
Area A3		9.9	x	6	x	1413	=	**83.9**
Area B1		9.9	x	6	x	12236	=	**726.8**
Area B2		9.9	x	6	x	6889	=	**409.2**
Area B3		9.9	x	6	x	4229	=	**251.2**
Area C		9.9	x	6	x	3749	=	**222.7**
						Total		2229.8

Proposed Drainage
100-Year, 6-Hour Storm Event
Run-off Volumes

Curtins

Main Car Park Drainage – 1132.6m3

100 year | 360 minute winter | Results for 100 year 360 minute winter. 600 minute analysis at 8 minute timestep.

US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
S18	184	63.370	0.055	5.2	0.0966	0.0000	OK	23.001	S19	5.2	0.371	0.074	0.3180	
OU-20	184	63.552	0.045	4.6	0.0707	0.0000	OK	24.000	S19	4.6	1.079	0.177	0.0417	
OU-21	184	63.597	0.033	3.8	0.0440	0.0000	OK	25.000	S19	3.8	1.069	0.044	0.0346	
S19	184	63.322	0.097	13.6	0.1713	0.0000	OK	23.002	S22	13.5	0.764	0.194	0.4583	
KO-01	184	63.439	0.027	2.1	0.0257	0.0000	OK	26.000	S20	2.1	0.806	0.028	0.0228	
OU-22	184	63.640	0.025	3.0	0.0302	0.0000	OK	27.000	S20	3.0	1.581	0.056	0.0080	
S20	184	63.213	0.052	5.1	0.0924	0.0000	OK	26.001	JUN S22A	5.1	0.578	0.120	0.2899	
OU-23	184	63.615	0.042	3.8	0.0553	0.0000	OK	14.000	S13	3.8	0.759	0.073	0.1016	
OU-24	184	63.552	0.024	3.8	0.0312	0.0000	OK	28.000	JUN S22A	3.8	0.628	0.023	0.0381	
JUN S22A	184	63.013	0.071	8.9	0.0000	0.0000	OK	26.002	S22	8.9	0.840	0.209	0.1777	
OU-26	184	63.492	0.030	4.6	0.0579	0.0000	OK	29.000	S22	4.6	1.552	0.032	0.0073	
OU-25	184	63.541	0.034	4.6	0.0660	0.0000	OK	15.000	JUN S17A	4.6	1.544	0.110	0.0505	
S22	184	62.824	0.074	27.0	0.1300	0.0000	OK	23.003	S25	27.0	1.646	0.055	1.7283	
OU-27	184	63.164	0.041	5.7	0.0598	0.0000	OK	30.000	S23	5.7	1.174	0.069	0.0769	
S23	184	62.718	0.062	5.7	0.0175	0.0000	OK	30.001	JUN-05	5.7	0.413	0.081	0.1181	
OU-28	184	63.482	0.025	7.5	0.0625	0.0000	OK	31.000	JUN-05	7.5	3.270	0.023	0.0047	
JUN-05	184	62.710	0.088	13.2	0.0000	0.0000	OK	30.002	S24	13.2	1.002	0.188	0.2550	
OU-29	184	63.554	0.054	3.9	0.0726	0.0000	OK	32.000	S24	3.9	0.744	0.220	0.0098	
S24	184	62.607	0.060	17.1	0.1066	0.0000	OK	30.003	S25	17.1	1.759	0.078	0.3476	
OU-30	184	62.901	0.053	3.3	0.0471	0.0000	OK	33.000	S25	3.3	0.611	0.250	0.0658	
S25	224	62.554	0.647	47.4	1.1429	0.0000	SURCHARGED	23.004	S26	48.8	0.634	0.041	2.2509	
S26	224	62.552	0.886	126.8	1.5664	0.0000	SURCHARGED	1.007	PI	123.7	1.082	0.383	1.9233	
PI	232	62.549	0.979	123.7	0.2771	0.0000	SURCHARGED	1.009	S27	125.3	1.075	0.337	1.5301	
S27	232	62.546	1.291	125.3	3.2865	0.0000	SURCHARGED	1.010	TANK	124.9	0.947	0.330	6.9967	
TANK	232	62.543	1.373	124.9	421.1728	0.0000	SURCHARGED	1.011	S28	84.9	0.770	0.704	0.2704	
JUN S17A	240	62.580	0.143	22.6	0.0000	0.0000	OK	12.010	S17	26.7	1.571	0.167	0.6961	
S28	232	62.531	1.379	84.9	2.4358	0.0000	SURCHARGED	1.012	S29	84.9	2.039	0.603	1.5645	1132.6
S29	232	60.716	0.166	84.9	0.0000	0.0000	OK							

Washdown Drainage – 46.3m3

100 year | 360 minute winter | Results for 100 year 360 minute winter. 600 minute analysis at 8 minute timestep.

US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
OU 2	184	64.182	0.032	3.2	0.1356	0.0000	OK	1.000	W01A	3.2	1.213	0.091	0.0265	
W01A	184	63.790	0.030	3.2	0.0337	0.0000	OK	1.001	W01	3.2	0.887	0.086	0.0497	
OU 1	184	64.014	0.014	1.3	0.0187	0.0000	OK	4.000	W01	1.3	0.502	0.018	0.0148	
W01	184	63.218	0.048	5.6	0.0700	0.0000	OK	4.001	W02	5.6	1.114	0.085	0.0426	
W02	184	63.071	0.035	5.6	0.0399	0.0000	OK	4.002	W05	5.6	0.607	0.053	0.2778	
W03	216	62.900	0.260	0.2	0.0736	0.0000	OK	6.000	TANK	-0.2	-0.018	-0.003	0.9471	
TANK	216	62.900	0.316	1.3	5.6073	0.0000	SURCHARGED	6.001	W04	1.7	-0.030	0.025	0.1449	
W04	216	62.900	0.324	1.7	0.0917	0.0000	SURCHARGED	6.002	W05	1.8	-0.035	0.013	0.6479	
W05	216	62.900	0.450	5.6	0.5089	0.0000	SURCHARGED	4.003	W06	4.4	1.263	0.127	0.0111	
W06	216	62.366	0.036	4.4	0.0404	0.0000	OK	4.004	EX BS4	4.4	1.453	0.105	0.0110	46.3
EX BS4	216	62.163	0.033	4.4	0.0000	0.0000	OK							

Lower Ground Car Park Drainage – 407.3m3

360 minute 100 year Winter I+0%
Average Rainfall Intensity 9.949 mm/hr

Time (mins)	US Level (m)	DS Level (m)	Surcharged Depth (m)	Pipe Velocity (m/s)	Pipe Flow (l/s)
1	57.270	57.269	-0.375	0.0	0.0
2	57.270	57.300	-0.375	0.0	0.0
3	57.271	57.332	-0.374	0.0	0.0
4	57.274	57.364	-0.371	0.0	0.0
5	57.278	57.395	-0.367	0.0	0.0
6	57.285	57.427	-0.360	0.0	0.0
7	57.295	57.459	-0.350	0.0	0.0
8	57.310	57.490	-0.335	0.0	0.0
9	57.329	57.522	-0.316	0.0	0.0
10	57.353	57.554	-0.292	0.0	0.0
11	57.377	57.585	-0.268	0.0	0.0
12	57.401	57.617	-0.244	0.0	0.0
13	57.427	57.649	-0.218	0.0	0.0
14	57.455	57.680	-0.190	0.0	0.0
15	57.484	57.712	-0.161	0.0	0.0
16	57.515	57.744	-0.130	0.0	0.0
17	57.548	57.775	-0.097	0.0	0.0
18	57.577	57.807	-0.068	0.0	0.0
19	57.606	57.839	-0.039	0.0	0.0
20	57.637	57.870	-0.008	0.0	0.0
21	57.671	57.902	0.026	0.0	0.0
22	57.711	57.934	0.066	0.0	0.0
23	57.761	57.965	0.116	0.0	0.0
24	57.822	57.997	0.177	0.0	0.0
25	57.886	58.029	0.241	0.0	0.0
26	57.949	58.060	0.304	0.0	0.0
27	58.021	58.092	0.376	0.0	0.0
28	58.098	58.124	0.453	0.0	0.0
29	58.157	58.155	0.512	0.0	0.3
30	58.189	58.187	0.544	0.0	3.0
31	58.221	58.219	0.576	0.0	4.1
32	58.252	58.250	0.607	0.0	4.2
33	58.284	58.282	0.639	0.0	4.3
34	58.316	58.314	0.671	0.0	4.4
35	58.347	58.345	0.702	0.0	4.5
36	58.379	58.377	0.734	0.0	4.5
37	58.411	58.409	0.766	0.0	4.6

Total Volumes: Over Overflow (Spill Flow) 0.000m³ Pipe 407.399m³

Building Drainage – 613m3

360 minute 100 year Winter I+0%
Average Rainfall Intensity 9.949 mm/hr

Time (mins)	US Level (m)	DS Level (m)	Surcharged Depth (m)	Pipe Velocity (m/s)	Pipe Flow (l/s)	Infil. by Cellular Storage (l/s)
1	61.471	60.920	-0.300	0.0	0.0	0.0
2	61.471	60.920	-0.300	0.0	0.0	0.0
3	61.471	60.920	-0.300	0.0	0.0	0.0
4	61.471	60.920	-0.300	0.0	0.0	0.0
5	61.471	60.920	-0.300	0.0	0.0	0.0
6	61.471	60.920	-0.300	0.0	0.0	0.0
7	61.471	60.920	-0.300	0.0	0.0	0.0
8	61.471	60.921	-0.300	0.0	0.0	0.0
9	61.471	60.921	-0.300	0.0	0.0	0.0
10	61.471	60.921	-0.300	0.0	0.0	0.0
11	61.471	60.921	-0.300	0.0	0.0	0.0
12	61.472	60.922	-0.299	0.0	0.0	0.0
13	61.472	60.923	-0.299	0.0	0.0	0.0
14	61.472	60.924	-0.299	0.0	0.0	0.0
15	61.472	60.926	-0.299	0.0	0.0	0.0
16	61.473	60.928	-0.298	0.0	0.1	0.0
17	61.473	60.931	-0.298	0.0	0.1	0.0
18	61.474	60.934	-0.297	0.1	0.1	0.0
19	61.475	60.939	-0.296	0.1	0.1	0.0
20	61.476	60.945	-0.295	0.1	0.2	0.0
21	61.477	60.952	-0.294	0.1	0.2	0.0
22	61.478	60.960	-0.293	0.1	0.2	0.0
23	61.479	60.969	-0.292	0.2	0.3	0.0
24	61.480	60.980	-0.291	0.2	0.3	0.0
25	61.481	60.992	-0.290	0.2	0.4	0.0
26	61.483	61.005	-0.288	0.2	0.4	0.0
27	61.484	61.021	-0.287	0.3	0.5	0.0
28	61.485	61.038	-0.286	0.3	0.5	0.0
29	61.487	61.057	-0.284	0.3	0.6	0.0
30	61.488	61.078	-0.283	0.4	0.6	0.0
31	61.490	61.101	-0.281	0.4	0.7	0.0
32	61.491	61.126	-0.280	0.4	0.7	0.0
33	61.493	61.152	-0.278	0.4	0.8	0.0
34	61.494	61.181	-0.277	0.4	0.8	0.0
35	61.496	61.212	-0.275	0.3	0.9	0.0
36	61.497	61.245	-0.274	0.3	1.0	0.0
37	61.499	61.280	-0.272	0.3	1.0	0.0

Total Volumes: Over Overflow (Spill Flow) 0.000m³ Infiltration 0.000m³ Pipe 613.639m³

Appendix K

Trade Effluent Consent

Water Meter Information

S106 Approval Notice

WATER INDUSTRY ACT 1991

CONSENT TO THE DISCHARGE OF TRADE EFFLUENT

Whereas **Manchester City Council**

(hereinafter called "the Trader") whose Head Office or Registered Office is at

Corporate Estates Team 8th Floor, Town Hall Extension PO Box 532 Manchester M60 2LA

Is the **owner/occupier** of the trade premises at:

Hammerstone Road Depot
Hammerstone Road
Gorton
Manchester
M18 8EQ

and by the Duly made application dated **01 June 2023**

Have applied to UNITED UTILITIES WATER LIMITED (hereinafter called "the Company") for consent to discharge trade effluent from the said trade premises into the sewers.

Under the provisions of the above mentioned Act the discharge of trade effluent in accordance with the said application form would not be lawful without the consent of the Company.

NOW THEREFORE in exercise of the powers conferred upon them by the above Act the Company HEREBY CONSENT to the discharge of trade effluent by the Trader from the said premises into their sewers SUBJECT TO THE FOLLOWING CONDITIONS:

Nature of discharge

1a) Subject to the provisions of conditions 6,7,8 and 9 below the nature or composition of the trade effluent to be discharged under this Consent shall be solely as specified in the said application form and shall consist solely of waste water derived from **commercial and council vehicle washdown facility, for street cleaning vehicles, refuse collection vehicles and normal operational vehicles.**

1b) The trader shall give to the Company prior written notice of any change in the process or the process materials or any other circumstances likely to alter the constituents of the trade effluent as set out in condition 1(a). In such circumstances, no substance of which the Company has not had previous notice, may be discharged unless and until the Company has agreed to accept the substance at a limit imposed by the Company which shall then be deemed to be incorporated in this Consent by agreement and shall not prejudice the right of the Company to serve a Direction earlier than two years from the date of such incorporation.

The Trader shall also give not less than seven days written notice to the Company of any change in the name of the occupier or owner.

Sewer affected

2. The sewer into which the trade effluent may be discharged and the point of discharge is the foul sewer situate at **Hammerstone Road (Manhole Ref: 2801)**.

Connections

3. No connections shall be made to the said sewer without the prior approval of the Company and all such connections shall be constructed and maintained to the satisfaction of the Company at the expense of the Trader.

Maximum volume of discharge

4. The maximum amount of the trade effluent discharged in any one day of twenty four hours shall not exceed **30** m^3 without prior written consent of the Company.

Maximum rate of discharge

5. The highest rate at which the trade effluent may be discharged shall not exceed **4** litre/sec.

Matters to be eliminated prior to discharge to sewers

6. The following matters shall be eliminated from the trade effluent before it is discharged into the sewers of the Company:

a) petroleum spirit;

b) calcium carbide;

c) carbon disulphide;

d) except as provided in paragraph 7 hereof, the prescribed substances listed in Schedule 1 to The Trade Effluents (Prescribed Processes and Substances) Regulations 1989, as amended from time to time, insofar as they are in concentration greater than the background concentration (as defined in the said Regulations);

e) where the trade effluent derives from a prescribed process mentioned in Schedule 2 to the said Regulations, and except as provided in paragraph 7 hereof, asbestos (as defined in the said Regulations) and chloroform in concentration greater than the background concentration (as defined in the said Regulations);

f) organo-halogen compounds including pesticide residues and degreasing agents;

g) any substances which either alone or in combination with each other or with any other matter lawfully present in the said sewers would be likely to;

i) cause a nuisance or produce flammable, harmful or toxic vapours either in the sewers or at the sewage works of the Company;

ii) injure the sewers or interfere with the free flow of their contents or affect prejudicially the treatment and disposal of their contents or have injurious effects on the sewage treatment works to which it is conveyed or upon any treatment plant there;

iii) be dangerous to or cause injury to any person working in the sewers or at the sewage treatment works;

iv) affect prejudicially any watercourse, estuary or coastal water into which the treated effluent will eventually be discharged.

Matters to be limited prior to discharge to sewer

7. The trade effluent shall not contain

a) Arsenic as As in excess of **50** ug/l

b) Chloroform in excess of **100** ug/l

c) Cyanides and cyanogen compounds which produce hydrogen cyanide on acidification in excess of **1** mg/l

d) Separable grease and oil in excess of **100**mg/l

e) Sulphates as SO_4 in excess of **1,000** mg/l

f) Sulphides, hydrosulphides, polysulphides and substances producing hydrogen sulphide on acidification in excess of **1** mg/l

g) Total suspended solids at pH 7.0 and dried at 110º C in excess of **1,000** mg/l

h) Toxic metals in excess of **10,000** ug/l either individually or in total ie Antimony, Beryllium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Tin, Vanadium, Zinc;

Temperature

8. No trade effluent shall be discharged which has a temperature higher than 43.3°C (110°F).

pH value

9. No trade effluent shall be discharged having a pH of less than **6** or greater than **10**

Inspection Chamber

10. a) An inspection chamber or manhole shall be provided and maintained by the Trader in a suitable position in connection with each pipe through which the trade effluent is discharged and shall be so constructed and maintained as to enable a person readily to obtain at any time samples of the trade effluent so discharged, to the approval of the Company.

b) Suitable apparatus for measuring and automatically recording the volume and composition of trade effluent discharged shall be provided and maintained in working order by the Trader in connection with every such pipe, unless otherwise exempted in writing by the Company.

c) If the measuring and recording apparatus as aforesaid ceases to function satisfactorily, then the Company shall have the right to make estimates of the volume and composition of the trade effluent until such time as the said apparatus is again operating to the satisfaction of the Company.

d) Records shall be kept by the Trader of the volume, rate of discharge, nature and composition of the trade effluent discharged to the sewer, together with any records required to be kept by the Trader under the provisions of any Notice of Determination issued by the Secretary of State under Sections 120 and 132 of the Water Industry Act 1991. Such records shall be kept available for inspection at all reasonable times by an authorised officer of the Company and copies shall be sent to the Company on demand.

e) The foregoing provision of this condition shall be deemed to be complied with if other methods of sampling the trade effluent, determining its nature and composition, and measuring and recording the discharge are agreed and confirmed in writing by the Company.

Dated 01 August 2023

Issuing Office Wastewater Services
Lingley Mere Business Park
Lingley Green Avenue
Great Sankey
Warrington
WA5 3LP

Signed [redacted]

WASTEWATER ASSET MANAGER
for and on behalf of United Utilities Water Limited

Your attention is drawn to Section 122 of the Water Industry Act 1991 which provides that any person aggrieved by any conditions attached to this Consent may appeal to the Director General of Water Services.

Outlook

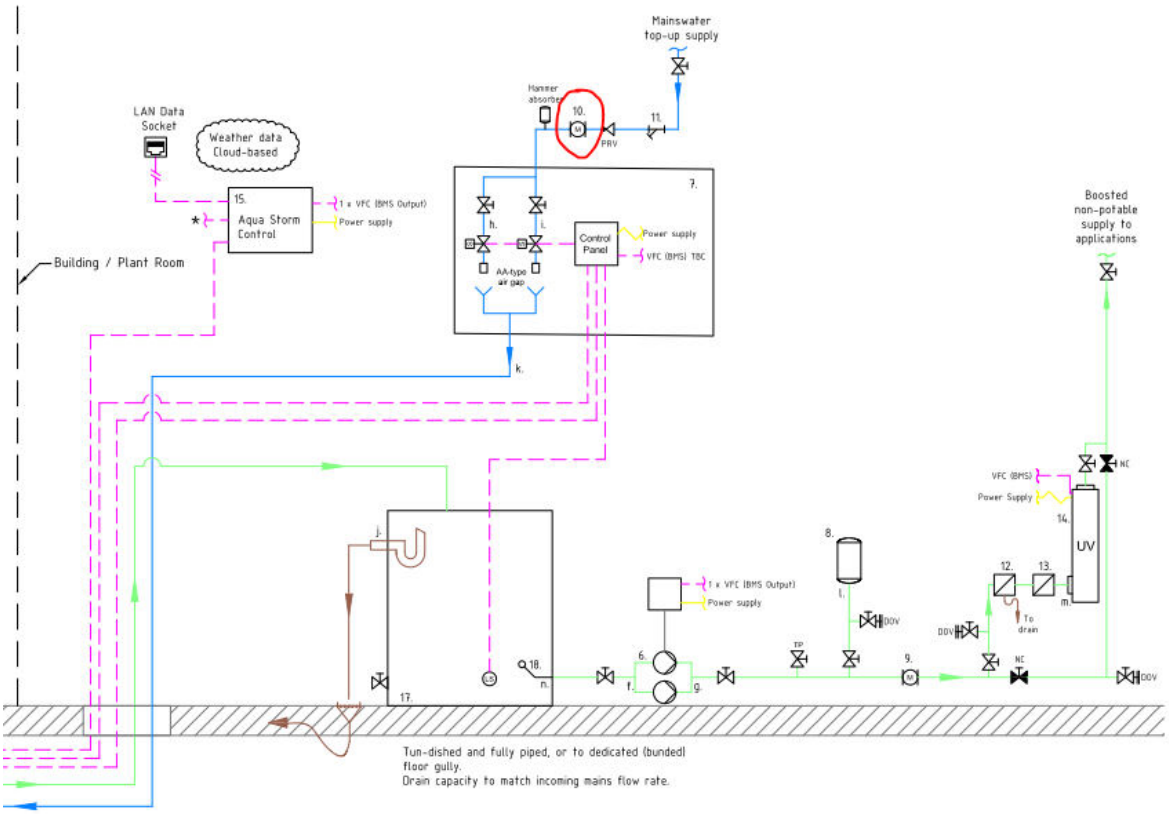
RE: Hammerstone Road - Secondary Water Meter



Hi Dave.

Picking up on some old emails, water to the RW is already dub metered, so no need for an extra one.

For the BMS connection, I will look into this as I don't know how or if this is being connected to the BMS. I need to discuss with Craig what we agreed on for our costs. @Craig Sanders one to discuss.



Cheers

Philip Godfrey

Technical Director

[redacted]

a-beengineering

Click here to watch our company video

www.abeng.co.uk

Citation ISO Certification — Environmental management — ISO 14001: 2015 — REGISTERED
Certificate No:448762024

Citation ISO Certification — Quality management — ISO 9001: 2015 — REGISTERED
Certificate No:450752024

[redacted]

[redacted]

Subject: RE: Hammerstone Road - Secondary Water Meter

Hi Anna,

The below is clear as day now. We will not approach UU with regards to installing a pulsed meter. Instead, we will install a secondary pulsed water meter within our site boundary that monitors the washdown area and is linked to site BMS.

Hi Phil,

I know we have discussed this topic, can you please ensure that we show/install a secondary pulsed water meter on the water supply to the washdown area and monitored by the BMS?

Cheers.

Dave Webb
Building Services Manager
[redacted]
6th Floor, Anchorage 2, Salford Quays, Salford Quays, M50 3YW | 0161 874 1000

MORGAN SINDALL CONSTRUCTION

morgansindallconstruction.com



[redacted]

Hi Dave

Please see below response from our energy officer regarding the LOA. Are you happy to proceed with the amended wording in blue?

Kind regards
Anna

[redacted]; John Burke

Hi Anna

I am happy to sign a LOA for **your** description of works, which is correct, i.e. to install a secondary pulsed meter downstream of the existing water meter (within the site's boundary). However, Morgan Sindall's letter says the existing water meter is to be replaced with a pulsed meter to link to the BMS (copied and pasted in blue below)

As previously explained and verified by the retailer, UU will only permit their own certified data loggers to be installed on their meters, by their contractors and to date, have not been willing to allow a connection to a site BMS system. The content of Mogan Sindall's draft LOA does not seem to reflect this fundamental condition.

Ameon Utilities need to install a secondary pulsed meter, downstream of the UU revenue meter. That meter should be in its own chamber or cabinet, on customer's side and as it is effectively a sub-meter, there should be no requirement for UU permissions.

Dear Sir / Madam,
I hereby authorise Ameon Utilities to work on the behalf of Manchester City Council (MCC) to apply to UU and request for the existing water meter SPID 3002532363W15 to be exchanged for a new BMS compatible water meter.

Your comments please.

Kind regards Lindsay

Lindsay Oldham
Senior Technical Officer (Water)
Energy Management Unit
Corporate Procurement
Corporate Services Department
Manchester City Council
Town Hall Extension
Level 5
Manchester
M60 2LA

[redacted]

Hi Linsday

Hope you're good.

I'm getting in touch regarding the proposed pulsed water meter at Hammerstone – we were emailing about this a little while ago. The Contractor, Morgan Sindall, would like to install a secondary pulsed meter downstream of the existing water meter (within the site's boundary). This is so that the amount of water used for the vehicle washdown area can be monitored on the building's BMS system. They are not doing any work to the existing water meter.

To progress this, Morgan Sindall need a Letter of Authority from the Council, so that their subcontractor, Ameon, can get the appropriate permissions from UU to progress the works. Is this something you can provide?

If so, MS has prepared the letter for the Council to sign – please see attached.

Please let me know if you have any questions.

Kind regards
Anna

Anna Lucas

Senior Project Manager
Major Projects, Capital Programmes, Corporate Core Directive

[redacted]

Working week: Monday - Thursday

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The following notice applies to emails originating in the UK.

Emails are sent on behalf of the relevant Morgan Sindall company below. Each company is registered in England and Wales each with its registered office at Kent House, 14-17 Market Place, London W1W 8AJ and number as shown: Morgan Sindall Group plc (0521970), Morgan Sindall Construction & Infrastructure Ltd. (04273754), Morgan Sindall Engineering Solutions Limited (04969901), Morgan Sindall Property Services Limited (4515196).

For further information on Morgan Sindall Group plc and its subsidiaries visit our website at www.morgansindall.com

++

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

United Utilities Reference Number:	**02926533**
Applicant details	
Applicant name	**Andy Losty**
Applicant address *(including postcode)*	**Curtins Consulting** **Merchant Exchange** **17-19 Whitworth Street West** **Manchester** **M1 5WG**
Applicant email	[redacted]
Site details: The site / property which is proposed for connection to the public sewer	
Site address *(including postcode)*	**Hammerstone Road Depot** **Manchester** **M18 8EQ**

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	**Other - please see comments box**					
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

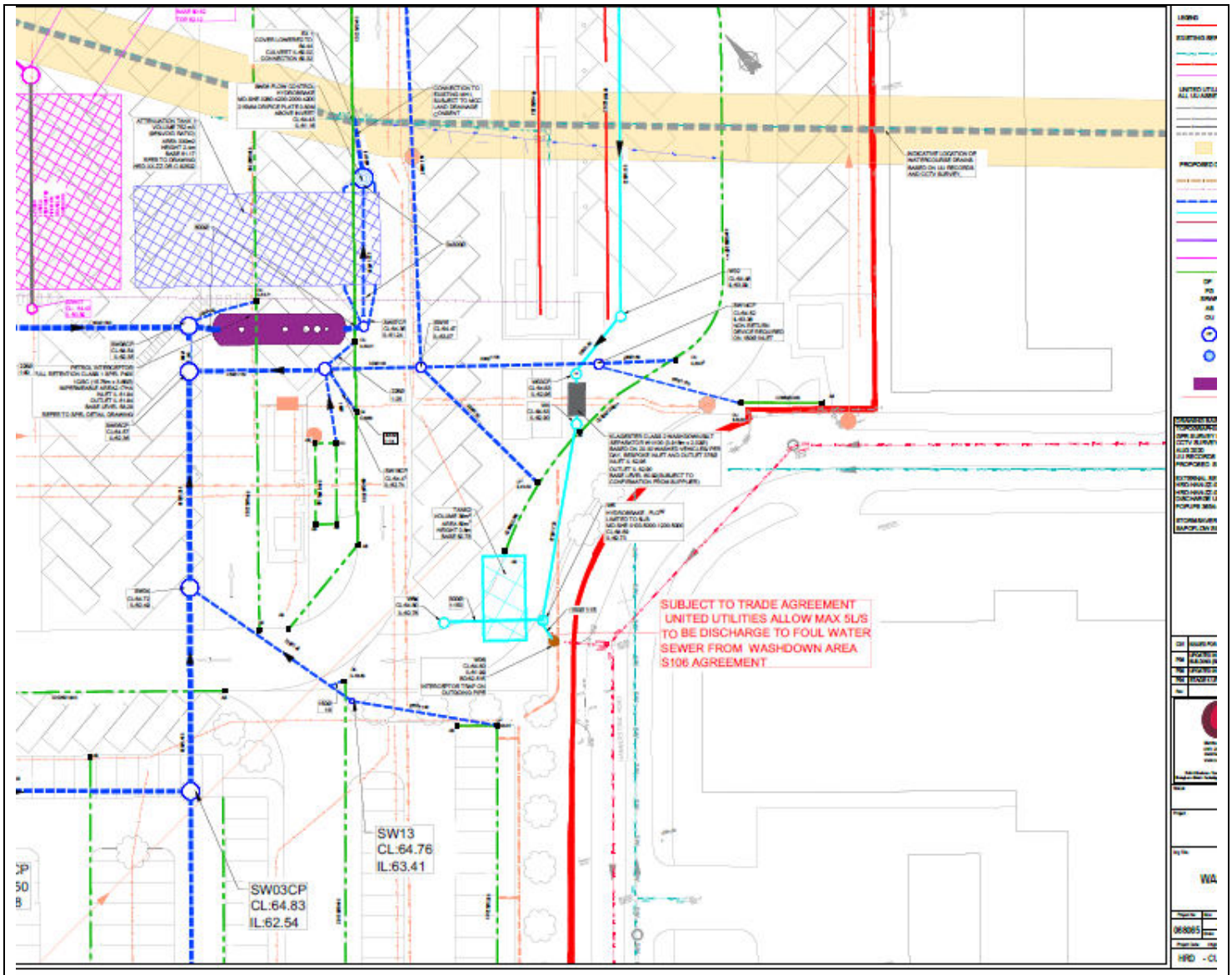
Consent To Discharge of Trade Effluent form received with the application - which indicates The sewer in which the trade effluent may be discharged and the point of discharge is the foul sewer situated at Hammerstone Road (Manhole Ref 2801)

Appproval is for the Washdown area – which has been granted consent from Trade Effluent Team.

Approval granted for the foul connection utilising the existing private drainage which outalls to the 375mm foul sewer in Hammerstone Road. (MH 2801)

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.

Please note, if you are proposing to connect to an existing, unchartered drain or sewer then it is the developer's responsibility to confirm that it communicates with the Public Sewer.
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.



Developer Services Inspector	**Lynne Berry**
Contact number	**07881 034558**
Date	**13/03/2024**

Appendix L

Construction Record Drawings - Lower Ground Drainage

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TABLE 1: PROPOSED CATCHMENTS MAXIMUM FLOW RATES					
CATCHMENT REF	AREA (Ha)	CALCULATION METHOD	FLOW RATE - 1:1 YEAR STORM EVENT	FLOW RATE - 1:30 YEAR STORM EVENT	FLOW RATE - 1:100 YEAR + 40% CC STORM EVENT
CATCHMENT PC (LOWER GROUND CP)	0.332	50% BROWNFIELD OF THE EXISTING 1-YEAR STORM EVENT AREA EC (25%)	7.0	7.0	7.0
REFER TO DRAWINGS HRD-CUR-XX-00-DR-C-92-621 & 622 FOR DETAILS OF EXISTING AND PROPOSED CATCHMENTS					

INFORMATION PROVIDED BY THE CCTV SURVEY DID NOT PROVIDE CONFIRMATION WHERE SOUTH WATERCOURSE IS LOCATED

FOR EXISTING DRAINAGE REFER TO DRAWING NUMBER: HRD-CUR-XX-00-DR-C-92-510

PROPOSED SERVICES SHOULD BE LOCATED OUTSIDE PROPOSED DRAINAGE

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

LEGEND

- SITE BOUNDARY

PROPOSED DRAINAGE

- PROPOSED SURFACE WATER DRAIN
- PRIVATE SURFACE WATER DIVERSION
- Ø225 GATIC CHANNEL C250 (UNLESS NOTED D400)
- CP CATCHPIT
- HB HYDROBRAKE
- BD BACKDROP
- AB ACCESS BOX
- OU OUTLET BOX

UNITED UTILITIES RECORDS UUPS-ORD-76950 ALL UU ASSETS ARE SHOWN INDICATIVELY

- CW UU FOUL WATER SEWER
- SW UU SURFACE WATER
- SEWER WATERCOURSE
- SW-B2 PRIVATE SURFACE WATER
- FW-B2 PRIVATE FOUL
- CW-B2 PRIVATE COMBINED
- 8M EASEMENT BASED ON SEWER FOR ADOPTION 6TH EDITION
- OIL INTERCEPTOR
- ATTENUATION TANK
- SW PROPOSED SERVICES

GENERAL NOTES:

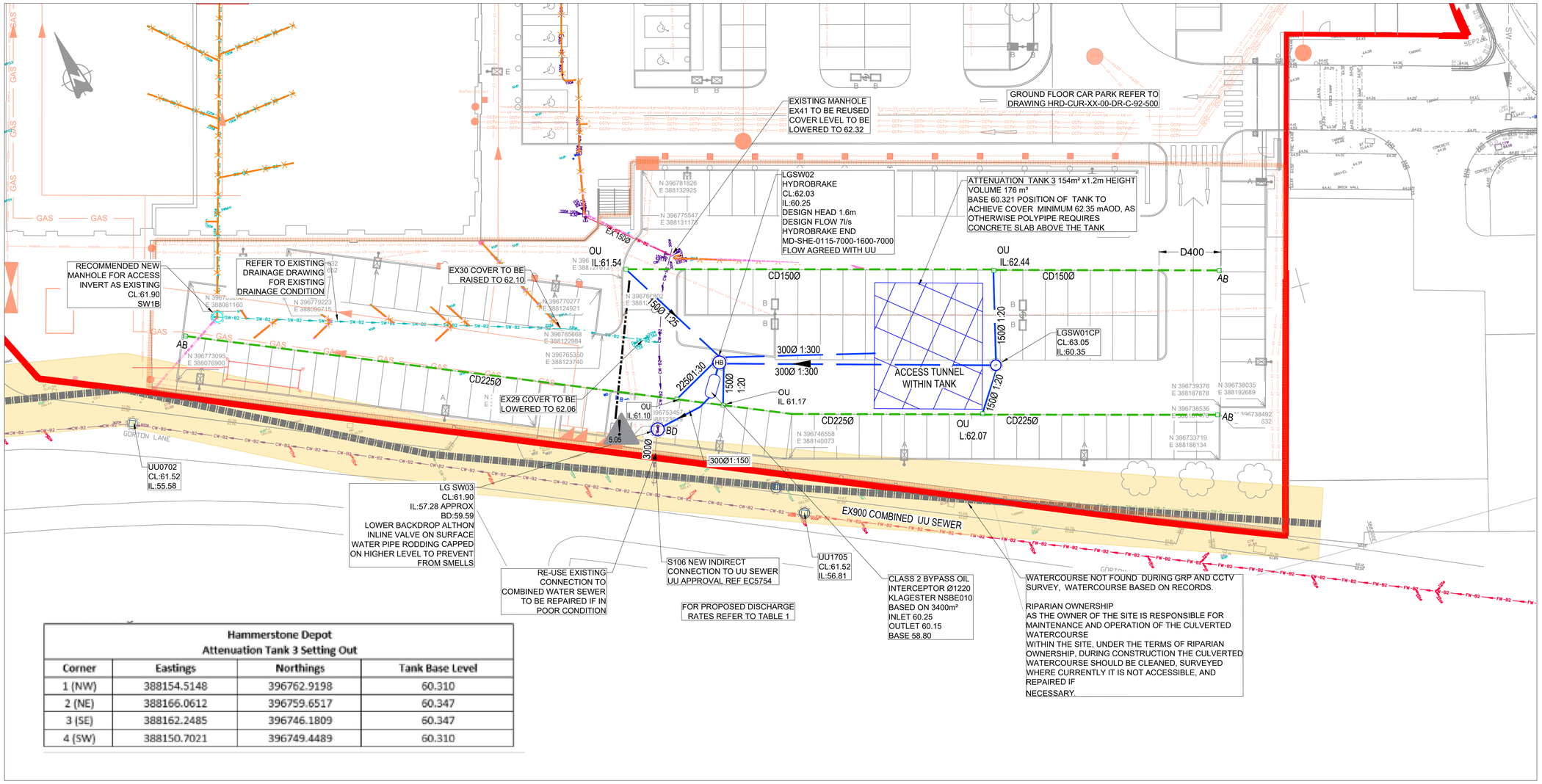
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN. ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
3. DO NOT SCALE THIS DRAWING. ALL DETAILS AND DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
5. 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.
6. 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.
7. 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.
8. OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.
9. FOR FULL DRAINAGE NOTES REFER TO HRD-CUR-XX-ZZ-DR-C-92-502

DRAWING BASED ON:
TOPOGRAPHICAL SURVEY BY SEP S15724-T
GPR SURVEY BY SEP S17480-U DEC 2018 JUNE 2018
CCTV SURVEY BY SEP DRAINAGE SURVEYS LTD DEC 2018 AND AUG 2020
UU RECORDS UUPS-ORD-76950

PROPOSED SITE PLAN GA
HRD-FRA-00-XX-SK-A-90-9006 REV C02

SIPHONIC DRAINAGE
STORMSAVER 05.07.22
SAPOFLOW SIPHON SYSTEM 29.06.22

Lower Ground Surface Water																	
MH REF	CL (mAOD)	IL (mAOD)	DEPTH TO SOFFIT (m)	DS PIPE DIA (mm)	MH DIA (mm)	MH TYPE	CATCHPIT	COVER SIZE (mm)	COVER CLASS	COVER TYPE	RECESSED	RESTRICTED ACCESS	BACK DROP	Back drop IL (mAOD)	COMMENTS	EASTING	NORTHING
Lower Ground Surface Water																	
LGSW01	63.05	60.35	2.55	150	1200	TYPE B	Y	600X600	D400	SINGLE SEALED	N	N	N	N/A	CATCHPIT MIN SUMP DEPTH 300mm	388165.024	396750.481
LGSW02	62.03	60.25	1.48	300	1500	HYDROBRAKE CHAMBER	N	1200X675	D400			N	N	N/A	FLOW CONTROL CHAMBER REFER TO HYDROBRAKE DETAILS FOR SUMP DEPTH	388135.490	396758.968
LGSW03	61.90	57.28	4.32	300	1500	TYPE A2	N	600X600	C250			N	Y	59.59		388126.901	396753.635
SW1B	61.90	60.30	1.38*	225	1500*	TYPE C*	N	1200X675*	D400			N	N		MANHOLE TO BE CONSTRUCTED ON EXISTING DRAIN. *INVERT LEVEL INTERPOLATED FROM CCTV SURVEY - TBC ON SITE	388083.112	396778.715
EX29	62.06	EXISTING MANHOLE COVER ADJUSTED TO SUIT PROPOSED LEVELS						600X600	C250			N	N	N/A		388127.742	396763.677
EX30	62.10							600X600	C250			N	N	N/A		388119.157	396767.106
EX41	62.32							600X600	C250			N	N	N/A		388133.251	396771.833



Hammerstone Depot Attenuation Tank 3 Setting Out			
Corner	Eastings	Northings	Tank Base Level
1 (NW)	388154.5148	396762.9198	60.310
2 (NE)	388166.0612	396759.6517	60.347
3 (SE)	388162.2485	396746.1809	60.347
4 (SW)	388150.7021	396749.4489	60.310

Rev:	Description:	Date:	By:	Chkd:
C07	CONSTRUCTION RECORD ISSUE	28.05.24	ATL	ATL
C06	LG SW03 AMENDED IN LINE WITH ON SITE INFORMATION	14.07.23	ATL	ATL
C05	LG SW03 MOVED FOLLOWING ADDITIONAL SURVEY	3.07.23	MW	MW
C04	ATTENUATION TANK AMENDED TO SUIT REVISED REQUIREMENTS	27.06.23	ATL	MW
C03	TANK RELOCATED TO ACHIEVE COVER RECOMMENDED BY POLYPIPE	24.10.22	MW	MW
C02	OIL INTERCEPTOR BASED ADDED	19.08.22	MW	MW
C01	CONSTRUCTION ISSUE	22.07.22	ATL	MW
P08	DRAINAGE NOTE ADDED	25.04.22	ATL	MW
P07	MAIN BUILDING DRAINAGE AMENDED	25.03.22	ATL	MW
P06	STAGE 4 UPDATED	05/08/21	MW	MW
P05	ISSUED FOR STAGE 4	09/04/21	MW	MW
P04	UPDATED TO COMMENTS FOR COSTING	23/03/21	MW	MW
P03	ISSUED FO STAGE 3- UPDATED SITE PLAN	02/12/20	MW	MW
P02	ISSUED FOR STAGE 3	18/11/20	MW	MW
P01	ISSUED FOR STAGE 3	29.01.19	MW	CG

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Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham

Status: CR - CONSTRUCTION RECORD

Project: HAMMERSTONE ROAD

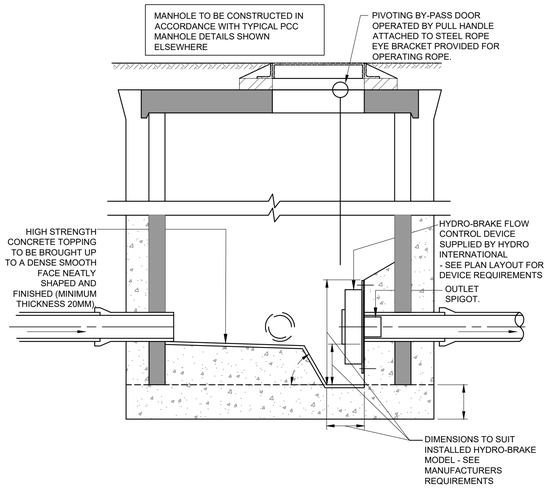
Drg Title: PROPOSED LOWER FLOOR DRAINAGE

Project No:	Size:	Date:	Drawn By:	Designed By:	Checked By:
068065	A1	29.01.19	MW	MW	CG
	Scale: 1:250				

Project Code: Originator: Zone: Level: Type: Discipline: Category / Number: Rev:

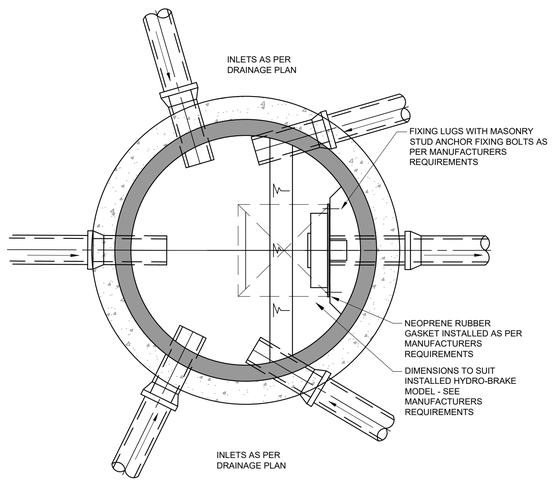
HRD - CUR - XX - 00 - DR - C - 92-501 - C07

\\ma-fs-1\Projects\068065 - 065000\068065 - Hammerstone Road Depot\DMS 4 Production\49 Models & Drawings_Civil-C\CAD\92\



TYPICAL FLOW CONTROL MANHOLE
(HYDRO-BRAKE)

LOWER CAR PARK MANHOLE LGSW03 MD-SHE-0115-7000-1600-7000



LOWER GROUND FLOOR LGSW03 MD-SHE-0115-7000-1600-7000

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.600	7.000
Flush-Flo™	0.476	6.980
Kick-Flo®	0.977	5.558
Mean Flow		6.128

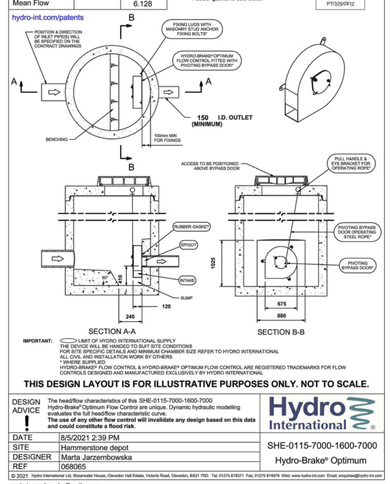
Hydro-Brake® Optimum Flow Control including:

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

BBA APPROVAL INSPECTION TESTING CERTIFICATION

WRc Approved PT329/0412

hydro-int.com/patents



IMPORTANT: LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR DETAILS OF OUTLET PIPE DIAMETER AND RUBBER 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.

DESIGN ADVICE	The head/flow characteristics of this SHE-0115-7000-1600-7000 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	8/5/2021 2:39 PM
SITE	Hammerstone depot
DESIGNER	Marta Jarzembowska
REF	068065

Hydro International

SHE-0115-7000-1600-7000

Hydro-Brake® Optimum

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marta.jarzembowska@curtins.com

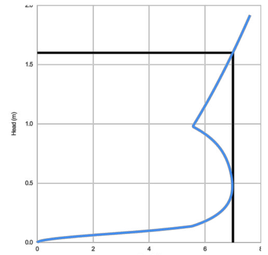
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.600	7.000
Flush-Flo	0.476	6.980
Kick-Flo®	0.977	5.558
Mean Flow		6.128

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE No 09/4058

WRc APPROVED PT329/0412

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.055	1.591
0.110	4.484
0.166	5.861
0.221	6.332
0.276	6.635
0.331	6.821
0.386	6.926
0.441	6.972
0.497	6.977
0.552	6.953
0.607	6.904
0.662	6.833
0.717	6.736
0.772	6.605
0.828	6.425
0.883	6.183
0.938	5.859
0.993	5.600
1.048	5.742
1.103	5.881
1.159	6.016
1.214	6.147
1.269	6.276
1.324	6.402
1.379	6.525
1.434	6.646
1.490	6.764
1.545	6.880
1.600	6.994

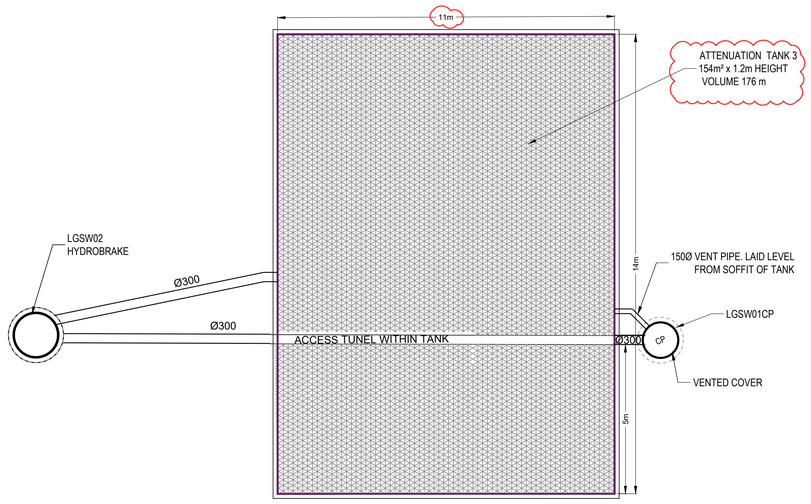
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DATE	05/08/2021 14:39
Site	Hammerstone depot
DESIGNER	Marta Jarzembowska
Ref	068065

Hydro International

SHE-0115-7000-1600-7000

Hydro-Brake Optimum®

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ATTENUATION TANK 3
PLAN

ATTENUATION TANK 3
3 x 400mm LAYERS OF POLYSTORM PSM1/ POLYSTORM INSPECT PSM4 (400mm DEEP)
BASED ON APPROXIMATE MINIMUM BURIAL DERTH OF 2.81m.

TANK IS LOCATED IN AN AREA SUBJECT TO LIGHT VEHICULAR LOADING (MAX 7T)

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. 62.447 (MIN 0.937m COVER).
MAXIMUM GROUND LEVEL IS APPROX. 63.152 (MIN 1.605M COVER).

INVERT LEVEL OF INLET PIPE 60.347
INVERT LEVEL OF OUTLET PIPE 60.310
BASE OF TANK TO BE LAID AT 1:300 FALL.

DIMENSIONS OF TOTAL UNIT ARE 14m X 11m.
TOTAL DEPTH OF TANK IS 1200mm.
ATTENUATION VOLUME, BASED ON 95% VOID RATIO IS 176m³

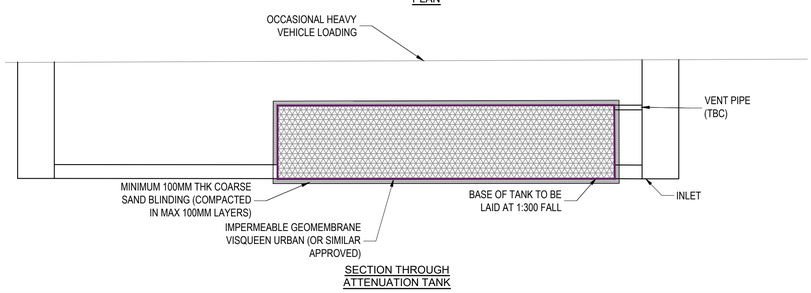
TANK TO BE WRAPPED IN IMPERMEABLE MEMBRANE AND THE MEMBRANE SHOULD BE LAPPED BY A MINIMUM OF 300mm.

TANK TO BE BED AND SURROUND IN MINIMUM OF 100mm LAYER OF COMPACTED COARSE SAND OR CLASS 6H SELECTED GRANULAR MATERIAL. REQUIREMENT FOR CONCRETE SURROUND OR PROTECTION TO BE CONFIRMED WITH THE MANUFACTURER.

HIGH GROUNDWATER LEVEL ESTIMATED AT 60.44 BASED ON SITE INVESTIGATION (CP01). INITIAL FLOATTATION CALCULATIONS INDICATE THAT THE TANK IS NOT AT RISK OF FLOATATION. HOWEVER, THE MAUFACTURER SHOULD PROVIDE CALCULATIONS TO CONFIRM THIS.

(IF AN ALTERNATIVE MANUFACTURER IS USED, THESE REQUIREMENTS SHOULD BE IN LINE WITH THEIR REQUIREMENTS)

REFER TO DRAINAGE LAYOUT HRD-CUR-XX-00-DR-C-92501



SECTION THROUGH
ATTENUATION TANK

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 ENGINEER,S ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
9. REFER TO DRAINAGE LAYOUT HRD-CUR-XX-00-DR-C-92-501 FOR THE LOCATION OF THE ATTENUATION TANK.
10. ATTENUATION TANK TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
11. WHERE AN ALTERNATIVE ATTENUATION TANK DEVICE IS PREFERRED, IT WILL BE SUBJECT TO REDESIGN TO CONFIRM WHETHER THE SYSTEM HAS CAPACITY.
12. THE DESIGN OF THE TANK SHOULD BE PROVIDED BY THE MANUFACTURER OR SUPPLIER TO ENSURE THE TANK IS SUFFICIENT FOR THE SITE SPECIFIC CRITERIA.
13. THE TANK DESIGN SHOULD INCORPORATE:
    - CRATES SUBJECT TO OCCASIONAL HEAVY VEHICLE LOADING
    - SUITABLE MAINTENANCE ACCESS; AND
    - VENTING TO PREVENT TRAPPED AIR POCKETS.
12. THE STRENGTH OF THE TANK SHOULD COMPLY WITH CIRIA C680 STRUCTURAL DESIGN OF MODULAR GEOCELLULAR DRAINAGE TANKS.
13. ACCESS FOR MAINTENANCE SHOULD BE IN ACCORDANCE WITH CIRIA GUIDANCE.
14. 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.
15. CONSTRUCTION AND INSTALLATION OF THE TANK SHOULD BE STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION REQUIREMENTS.
16. THE CURRENT DESIGN OF THE TANK IS BASED ON USE OF POLYPIPE POLYSTORM 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.
17. 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.
18. FLOW CONTROL TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.
19. WHERE AN ALTERNATIVE FLOW CONTROL DEVICE IS PREFERRED, IT WILL BE SUBJECT TO REDESIGN TO CONFIRM WHETHER THE SYSTEM HAS CAPACITY.

Rev:	Description:	Date:	By:	Chkd:
C03	TANK SIZE UPDATED	27.06.23	ATL	MW
C02	TANK ROTATED AND INVERT UPDATED	24.10.22	MW	MW
C01	CONSTRUCTION ISSUE	20/07/22	ATL	MW

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Status: STAGE 5

Project: HAMMERSTONE ROAD DEPOT

Drg Title: DRAINAGE DETAILS
SHEET 5

Project No:	Size:	Date:	Drawn By:	Designed By:	Checked By:
068065	A1	20/07/22	MW	MW	MW
	Scale: 1:20				

Project Code:	Originator:	Zone:	Level:	Type:	Discipline:	Category / Number:	Rev:
HRD	- CUR	- XX	- ZZ	- DR	- C	- 92-524	-C03

\\mafs02\Projects\068001 - 069000\068065 - Hammerstone Road Depot\2MS 4 Production\4B Models & Drawings_Civil C\CAD\

Appendix M

LLFA Comments Received 3rd April 2025

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Application details:	**Application number**: CDN/25/0113 **Proposal**: Discharge of condition 11 (drainage) attached to planning permission referenced 137572/JO/2023 **Location**: Hammerstone Road Depot, Hammerstone Road, Manchester, M18 8EQ

LLFA Comments 02/04/2025

The following Information has been considered:

Planning Portal uploads:	10/02/2025
Further submission emails:	-
Previous CDN attempts to discharge the Condition:	CDN/24/0138

Any LLFA Comments to LPA
Decision Notice did not publish the LLFA Condition clauses. We do not recommend this is done, as it can prolong the CDN discharge process or risk a refusal. The queries raised during the previous attempt to discharge this condition (CDN/24/0138) have been listed below the condition clauses table, marked in green where the query has been addressed and red where further information is required.

Condition number	11
Decision Notice	137572/JO/2023

Decision Notice Clause	**Contained in submission**	**Approvable standard**	**Further information required:**
A finalised drainage layout showing all components, outfalls, levels and connectivity;	Y	N	The following is required: - Please clearly mark all limited discharge rates on the drainage layout within the details for each flow control chamber. <standard comment: The applicant must present a consistent package to discharge this condition (Including all layouts and calculations). The layout and calculations must be jointly updated to account for any edits required. When preparing a resubmission, the applicant must ensure that the drainage layout and hydraulic calculations correspond, and that they can be cross-referenced for checks. This includes layout annotations and schedule printouts. >
Provide Existing and finalised Proposed GA Plan.	Y	Y	
Details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester Trafford and Salford Strategic Flood Risk Assessment, i.e. at least a 50% reduction in runoff rate compared to the existing rates, as the site is located within Conurbation Core Critical Drainage Area;	Y	Y	The lower ground car park surface water discharge rate is limited to 7l/s, as agreed with UU, providing >50% betterment. For the existing building, a discharge rate limited to 18.1l/s has been proposed. This amounts to a 50% reduction. For the ground floor yard, a combination of brownfield 50% reduction and greenfield rate has been proposed, with a final proposed limited discharge rate of 33l/s at MH S28. The LLFA email (dated 17 August 2022) accepted total proposed flow rates to the ordinary watercourse whereby "*new areas*

			discharging to the culvert at Qbar and existing areas being reduced by 50% and restricted to the 1 in 30 year event."
An existing and proposed impermeable areas drawing to accompany all discharge rate calculations.	Y	Y	
Demolition Plan to be provided.	Y	Y	
Roof access stairs construction details and foundation plans to be provided.	Y	Y	
Runoff volume in the 1 in 100 year, 6 hours rainfall shall be constrained to a value as close as is reasonable practicable to the greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment;	N	N	Please provide.
Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event with allowance for 40% climate change in any part of a building;	Y	N	Flooding is predicted in the M100 + 40%CC events. An overland flow routes and above ground attenuation plan (HRD-CRU-XX-00-DR-C-92-512-C04) has been provided. However the manhole/outlet references have not been included on the plan, so it is difficult to cross-reference these with the hydraulic calculations of predicted flood volumes. The following is required: - Please indicate the manhole references on the overland flow plan so that these can be cross-referenced with the manhole schedule/hydraulic calculations.
Culvert feasibility study and survey findings to be provided.	N	N	Please provide.

Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.	Y	Y	A S106 approval cover letter for the application to make a connection to the public sewerage system (UU Ref: 4200049101, dated 09/05/2022) has been provided. The corresponding approval notice states "*Approval for the 150mm foul connection and the 300mm surface water connection via the utilisation of an existing private drain which communicates to the 900mm combined sewer in Gorton Lane attenuation indicated with a flow control on the surface water restricted to 7l/s.*"
Where surface water is connected to the ordinary watercourse, agreement in principle from Manchester City Council as Lead Local Flood Authority is required. Please note that all new connections to the watercourses shall comply with reduction of flows to Greenfield runoff rates. An email of acceptance of proposed flows and/or new connection will suffice.	Y	Y	The LLFA email (dated 17 August 2022) accepted total proposed flow rates to the ordinary watercourse whereby "*new areas discharging to the culvert at Qbar and existing areas being reduced by 50% and restricted to the 1 in 30 year event*."
Where surface water is connected to ordinary watercourse, any works within or adjacent to the watercourse that would affect it would require consent from Manchester City Council as Lead Local Flood Authority. Consent applications can be made at the following link: https://manchester.civicapayforms.co.uk/Sales/LaunchInternet.aspx?saleform=drainage	N	N	Applications for Land Drainage Consent are required for the new connections into the northern culverted watercourse.
For sites where proposed development would cause unusual pollution risk to surface water (large car park areas (>50 parking	Y	Y	

spaces) or industrial estates), evidence of pollution control measures (preferably through SuDS) is required.			
Hydraulic calculation of the proposed drainage system.(Hydraulic calcs should coincide with finalised drainage plans.	Y	N	The following is required: - Please provide hydraulic calculations which correspond with the surface water network draining to manhole SRH06 (Flow Control Manhole).
Construction details of flow control and SuDS elements.	Y	N	Construction details have been provided for Attenuation Tank 1 & 2. Flow control device/chamber construction details have been provided for the Washdown Area, SRH06, and S28. Drawing HRD CUR XX ZZ DR C 92522-C03 states that "*manufacturer will need to confirm that the tank has sufficient strength for this location in accordance with CIRIA C680*." The following is required: - Please confirm that the proposed attenuation tanks are in accordance with CIRIA C680. - Please provide construction details for Tank 3 & Tank 4.
Please see below for details of the queries previously raised under application CDN/24/0138.	Y	N	Responses provided below.

% Complete submission:	80%
% At approvable standard:	50%
Refusal trigger points: Submission 1 = less than 20% complete. Submission 2 = not 100% approvable standard.	

LLFA Recommendation:	**Further information required (as detailed above).**

Queries raised under CDN/24/0138

General comments:

- *Please can the applicant provide a proposed levels plan. (Navigating the site without levels is difficult to follow.)*

  A Levels Plan (HRD-CUR-XX-00-DR-C-91-602 C05) has been provided within Appendix A of document HRD-CUR-00-XX-T-RE-006.

- *Area 5, MCC Bin store, north of the site. Clarity on Roof Access Stairs construction. Provide Foundation plans. (A potential clash between stair structure and culvert structure).*

  The roof access stairs requirements were satisfied under the discharge of Condition 33, application CDN/24/0436.

- *Please note the LLFA do not approve any build overs on culverted watercourses and applicants must maintain appropriate easements.*

No new buildings are proposed over the culverted watercourses. The roof access stairs requirements were satisfied under the discharge of Condition 33, application CDN/24/0436. The vehicle cleaning ramp is demountable and therefore does not restrict access to the culvert.

- *Demolition Plan to be provided.*

has been provided within Appendix C of document HRD-CUR-00-XX-T-RE-006.

- *Kindly supply the CCTV documentation, as it has not been included in this application.*

has been provided within Appendix D of document HRD-CUR-00-XX-T-RE-006.

Reference: Proposed Ground Floor Drainage.

- *MCC LLFA previously advised against siphonic drainage. "We would not permit the use of siphonic in this instance, as this would likely increase the outfall discharge rate from the existing building to the watercourse." Please refer to LLFA response from Oliver Timmins 05 Aug 2021. Please clarify why this option as has been progressed?*

"*The existing building drainage is served by an extremely large number of rainwater pipes. These rainwater pipes discharge to several different sewers, both inside and outside of the site. It would have not been feasible to provide new gravity drainage for the building and route the surface water drainage to the watercourse. The use of siphonic drainage allows for a new connection into the watercourse. As shown on the drainage information, the flow into the watercourse is restricted*." The siphonic drainage is shown to discharge into Tank 4, so the proposed drainage from the existing building is therefore restricted.

- *Catchment plans - Errors have been identified regarding hatches and labelling in relation to the provided legend. Please review and update.*

Updated Catchment Plans have been provided within Appendix A of document HRD-CUR-00-XX-T-RE-006.

- *Could you please elaborate on the methodology of 33 l/s discharge rate for MH S28?*

The following explanation has been provided:

"The overall discharge for the external works for the site was calculated as the following:

- *1 in 1 year storm: 45 l/s*
- *1:30-year storm: 107 l/s*
- *1:100-year (+40%CC): 140 l/s*

These discharge rates have been calculated using a combination of brownfield and greenfield runoff rates.

The lower ground car park drainage is limited to a discharge of 7 l/s (across all storm events, as agreed with UU) The washdown drainage is limited to a discharge of 5 l/s (across all storm events, as agreed with UU).

The discharge rates for the main ground floor external drainage have been calculated by subtracting the discharge rates for the lower ground/ washdown areas from the overall drainage allowance:

- *1 in 1 year storm: 45 l/s (48% reduction from existing discharge)*
- *1:30-year storm: 107 l/s (48% reduction from existing discharge)*
- *1:100-year (+40%CC): 140 l/s (49% reduction from existing discharge)"*

- *We require a sectional view from SRH04 to Tank 4. The LLFA must ensure that there are no clashes or conflicts.*

Drawing HRD-CUR-XX-00-DR-C-92-540 has been provided, showing a sectional view from SRH04 to Tank 4. This shows that there are no conflicts with the 300mm or 225mm surface water pipes crossing this sectional.

- *The drawing mentions 'rising main by others' and 'RWH by others.' Where can we find this information? Without it, we lack a complete understanding of the system.*

It has been stated that the RWH tank is used to provide water for the vehicle washdown area. Details of the Rainwater harvesting tanks have been provided in Appendix E, the rainwater harvesting tanks are included within the cellular storage.

- *Once again, "Siphons Break at chambers. Refer to Sapoflow Details" Where might we access this information?*

Sapoflow details are enclosed in Appendix F.

- *Please provide tank 4 construction details.*

It has been stated that construction details for tank 4 have been provided within Appendix E and on drawing HRD CUR XX ZZ DR C 92522-C03. However, these construction details are for Attenuation Tank 1, which discharges to MH S28. Please provide construction details for Tank 4 (which discharges to SRH06).

- *Please provide Vented cover construction details.*

A Vented Manhole detail has been enclosed in Appendix F – drawing HRD-CUR-XX-ZZ-DR-C-92-520.

- *Connection north of MH S16 is not hydraulically efficient, please review and update.*

The following statement has been provided: "The connection into MH S16 has been detailed in order to bring the pipework into the manhole square to the outlet pipe."

- *What is the purpose of having three pipes at SRH06a? Is this configuration the most efficient? Please provide construction details of this MH. Additionally, please provide confirmed 150 dia vent pipe level.*

"The triple pipe connection has been used in order to allow the connection into the attenuation tank – the maximum direct connection to the tank is 375mm diameter. Therefore, three pipes have been used in order to provide sufficient capacity from SRH06 into the tank. The triple pipe configuration has been incorporated in the drainage model."

- *Once more, why are there three pipes at S27 and S28? Is this arrangement the most efficient? Please provide construction details of this MH.*

As above. "This also allows for the connection into the Tank access unit channel, which allows inspection and cleaning through the tank".

- *Please provide manufacturer data sheets for proposed petrol interceptor and "SPEL Detail drawing"*

Spel Interceptor Details are enclosed in Appendix H

- *Please provide Gatic channel construction details and manufacturer specification / data sheets.*

Gatic channel construction details drawing HRD-CUR-XX-ZZ-DR-C-92-521 and performance information are shown on drawing in Appendix I.

- *The construction specifications for "Connections to culvert" lack clarity. The instruction, "Manholes to be constructed in accordance with typical PCC manhole details shown elsewhere," is insufficient. Please provide comprehensive details, including adherence to BS codes, mortar haunching specifications, kite marking, concrete grade, minimum clear access requirements, and site-specific, special manhole details for the two connections into the watercourse: MH S29 and MH SRH08. Ensure that the provided details are scaled correctly and tailored to the site's requirements.*

Drawing HRD-CUR-XX-ZZ-DR-C-92-528 in Appendix G includes manhole details for MH S29 and MH SRH08.

- *A correspondence from Oliver Timmins 09/03/2021 mentions: "If retaining wall structures are to remain on site and if the culverted watercourse is found to be directly beneath this, then it is the landowners responsibility as a riparian owner to ensure that the structural integrity of the culverted watercourse is not compromised by the proposed on site works." No details regarding retaining wall have been provided. Clarity required on any structural implications to the culvert. What happened to the retaining wall?*

The following statement has been provided: "*This referenced the retaining wall along the southern boundary of the lower ground car park. This work has been completed without causing damage to the culvert. As there are no further works to be undertaken in this area, this is not now considered an issue*."

- *Kindly supply the CCTV documentation, as it has not been included in this application.*

The CCTV survey information has been provided within Appendix D.

- *Method statement for connection to watercourse not provided.*

A method statement has been provided in Appendix G. However, it is not clear which section specifically refers to the construction of manholes on the culverted watercourse, and it is unclear what temporary works (e.g. dry working area, over-pumping) or mitigation (e.g. silt mitigation) works are proposed. Please provide a clear step-by-step method statement, detailing how the connections will be made into the culverted watercourse.

- *Hydraulic calcs. Pending review due to clarification on the above points.*

See above condition clauses table.

Reference – Washdown Drainage

- *Please kindly confirm if you've addressed the requirement for sufficient sediment control in the design to prevent silt from entering the public sewer?*

Details of 4 sediment control elements have been provided: silt traps on the in-situ concrete channels, a catchpit chamber on connections from the channels, a Washdown separator, and a further catchpit before the hydrobrake manhole.

- *Supply information of enquiry to UU trade effluent team regarding any potential chemical discharge into the public sewer and determining the necessary treatment and licensing procedures.*

A trade effluent consent from United Utilities has been provided (dated 01 August 2023).This states that up to 30m^3 trade effluent may be discharged per 24 hours.

- *Provide Sub-meter details*

Provided within the e-mail enclosed in Appendix K.

- *Please provide manufacturer data sheets / details for proposed silt-separator.*

Interceptor Details are enclosed in Appendix H

- *Evidence of Klargester confirmation.*

An e-mail from the manufacturer (Spel), confirming the sizing of the separator has been included within Appendix H.

- *Please provide S106 approval in principle.*

A S106 approval in principle has been provided in Appendix K, for the foul/trade effluent for the Washdown area, dated 13/03/2024.

- *Regarding the correspondence from Oliver Timmins dated 17/08/2022, could you kindly confirm whether the ramp's impact or abnormal loading on the culvert has been thoroughly assessed and addressed? We seek clarity on whether this matter has been checked and resolved.*

It has been stated that *"The vehicles ramp will carry one vehicles at a time, and contains a number of supporting columns. As such, the loading on any individual column will be lower than the equivalent loading created by a single wheel load from the vehicle."*

- *Please confirm S106 south-east of the site is only for foul?*

The S106 agreement in principle (in Appendix K) confirms that the agreement is for trade effluent from the washdown area only, and that the point of discharge is the foul sewer situated at Hammerstone Road (Manhole Ref 2801).

- *Hydraulic calcs. Pending review due to clarification on the above points.*

See above condition clauses table.

Reference - Proposed Lower Floor Drainage

- *No objections in principle, however S106 was issued 06/05/2022 and is only valid for 12 months. Has UU been re-consulted or has this been built out already?*

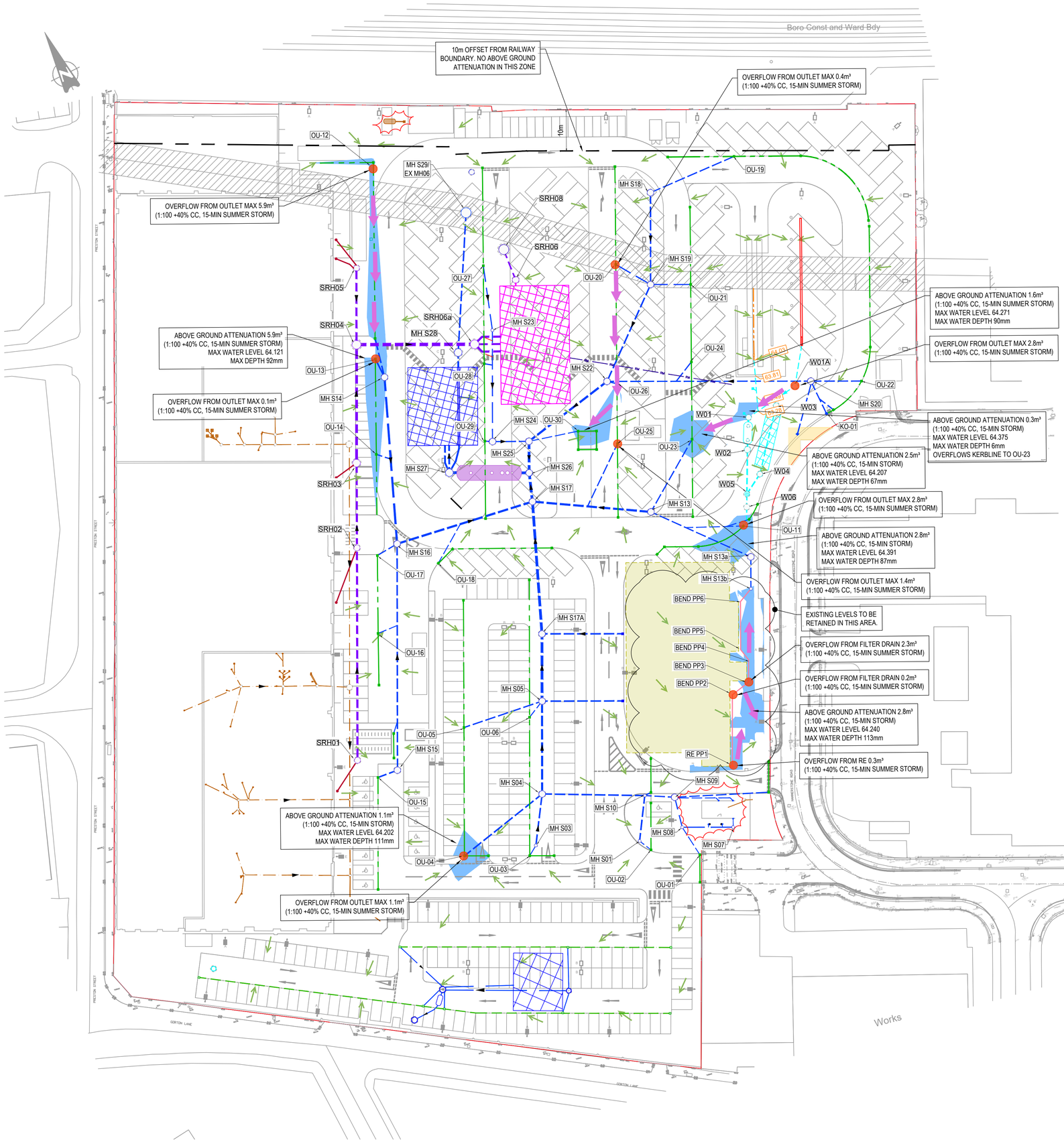
It has been stated that The Lower Ground Floor Drainage was completed in May 2024.

- *Please provide tank 3 construction details.*

Construction details for Tank 3 have been provided within Appendix L.

Appendix N

Proposed Drainage Drawings



KEY

- SITE BOUNDARY TAKEN FROM DRAWING HRD-FRA-00-XX-DR-A-0200 REV C2
- 64.00 — MAJOR CONTOUR
- MINOR CONTOUR
- PROPOSED SURFACE WATER DRAINAGE (MAIN NETWORK)
- PROPOSED SURFACE WATER DRAINAGE (MAIN BUILDING ROOF)
- PROPOSED SURFACE WATER DRAINAGE (WASHDOWN AREA)
- PROPOSED LINEAR DRAINAGE CHANNEL LOCATION
- LOCATION OF FLOODING WITHIN DRAINAGE NETWORK
- ROUTE OF OVERLAND FLOW FROM FLOOD POINT
- AREA OF ABOVE GROUND ATTENUATION
- GENERAL FALLS

DRAWING BASED ON:
TOPOGRAPHICAL SURVEY BY SEP S15724-T
GPR SURVEY BY SEP S17480-U DEC 2018 JUNE 2018
CCTV SURVEY BY SEP DRAINAGE SURVEYS LTD DEC 2018 AND AUG 2020
UU RECORDS UUPS-ORD-76950
PROPOSED SITE PLAN HRD-FRA-00-XX-DR-A-90-0200-C07

PROPOSED SITE PLANS
HRD-FRA-00-XX-DR-A-90-0200 REV C11 GA
HRD-FRA-00-XX-DR-A-90-0207 REV C06 EXTERNAL WORKS SETTING OUT SHEET 1
HRD-FRA-00-XX-DR-A-90-0208 REV C08 EXTERNAL WORKS SETTING OUT SHEET 2
HRD-FRA-00-XX-DR-A-90-0210 REV C10 EXTERNAL WORKS

EXTERNAL SERVICES
HRD-ABE-00-00-DR-E-7002 P03 CABLES
HRD-HAN-ZZ-00-DR-M-50-03 C01 External Gas & Water Layout
DISCHARGE UNITS PROVIDED 26.03.21
POPUPS 3654-HRD-HAN-ZZ-00-DR-M-0610

RAINWATER HARVESTING/ STORAGE
HRD-ABE-ZZ-ZZ-DR-M-5032 REV P03 TANK LAYOUT

SIPHONIC DRAINAGE DETAILS
HRD-SAP-01-RL-DR-X-0001 REV C04 SIPHONIC ROOF PLAN
HRD-SAP-01-RL-DR-X-0002 REV C05 SHED E SIPHONIC ROOF PLAN
HRD-SAP-01-RL-DR-X-0003 REV C04 SIPHONIC UGD DETAILS

SITE INVESTIGATIONS
HDR-CUR-00-XX-RP-GE-002-P01 HAMMERSTONE ROAD PHASE 2 SITE INVESTIGATION
HRD-CUR-00-XX-RP-G-004-C01_HAMMERSTONE ROAD DEPOT TRIAL PITS

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. 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.
3. DO NOT SCALE THIS DRAWING. ALL DETAILS AND DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
5. 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.
6. 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.
7. 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.
8. OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

Rev:	Description:	Date:	By:	Chkd:
C05	MANHOLE/ OUTLET LABELS ADDED	01.05.25	JC	ATL
C04	ISSUED FOR CONSTRUCTION	25.11.24	JC	ATL
P08	UPDATED FOR NEW TENDER	02.02.24	ATL	MW
C03	FLOOD VOLUMES AMENDED	23.11.22	ATL	MW
C02	SWITCH ROOM LEVELS AMENDED	27/10/22	EBR	MW
C01	ISSUED FOR CONSTRUCTION	23.09.22	ATL	MW
P07	DRAINAGE LAYOUT UPDATED	22.08.22	ATL	MW
P06	UPDATED IN LINE WITH REVISED LEVELS & DRAINAGE	04.08.22	ATL	ATL
P05	UPDATES	21.07.22	MW	MW
P04	UPDATED IN LINE WITH REVISED DRAINAGE	07.04.22	ATL	MW
P03	UPDATED IN LINE WITH REVISED LEVELS	02.12.21	TH	ATL
P02	STAGE 4 UPDATED	05.08.21	ATL	MW
P01	STAGE 4 ISSUE	14.04.21	ATL	MW

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Status: STAGE 5

Project: HAMMERSTONE ROAD

Drg Title: OVERLAND FLOW ROUTES AND ABOVE GROUND ATTENUATION

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	14.04.21	ATL	ATL	MW
Scale: 1:500				

Project No: Originator: Zone: Level: Type: Discipline: Category / Number: Rev.

HRD - CUR - XX - 00 - DR - C - 92-512 -C05

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