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Construction Phase Environmental Management Plan
Addendum 1
Surface Water Management

Science Teaching Hub, University of Aberdeen

Description of Measures:

1. Site levels have been built to keep water within site and reduce risk of water running off towards gullies. The entire site has been covered in a crushed stone and geotextile blanket – this eliminates the possibility of subsoil erosion and hence largely eliminates production of silty run-off at source. Water that is not absorbed by infiltration will be collected by a drainage system and channelled towards controlled discharge point as described below.

2. Attenuation French drain system – in combination with the void space in the stone blankets in 1. above – the void space in the French drain network provides storm water attenuation storage to accommodate a 10 year return storm event. WA Fairhurst have designed this on Robertson's behalf, calculations are supplied. Because the piling platform must be flat, local minor sumps and pumping will be utilised to move any ponding surface water from here to the positions of the cruciform French drain in this area. In addition to attenuation, the geotextiles and stone media will pre-filter the surface water before it reaches the silt bag chamber.

3. Silt Bag chamber – surface water collected by the French Drain system is conveyed to the silt bag chamber by gravity as the French drains are laid to falls. Each silt bag is securely fastened to the spigot of the inlet pipe using zip-ties. Water can only exit the inlet pipe by filtering through the silt bag. The driving head for the bag is provided entirely by gravity – there are no pumps. No fuel or chemicals are consumed.

4. A sampling chamber is provided immediately downstream of the silt bag chamber, using a proprietary polypropylene inspection chamber and extension pieces. From here the treated water can be visually examined for turbidity. The sample will be visually checked for oil sheen as there will be diesel on site and the ph of the water will be checked with a test strip as there are concreting activities on site.

5. Hydrobrake manhole provides physical restriction to the flow rate in order to meet stipulated maximum flow criterion by use of a proprietary vortex type hydrobrake.

Aerial Photograph of Current Conditions on Site 20 March 2019

1. Site has been entirely covered in rolled compacted stone with geotextile filter membrane beneath – thus preventing subsoil erosion – elimination of silt at source
2. Piling platform for new construction outlined in red – this must be billiard table flat for the safety of the piling rigs, hence some minor surface water ponding is inevitable during periods of wet weather.

3. New tar patch for road crossing to culvert in playing field outlined in blue – new surface water drainage pipe has been laid and connected to the existing culvert – nothing is currently connected to this drain. The site is currently managing its surface water by containing it within the site (all falls are inward) and then soaking away the surface water.

WA Fairhurst Attenuation Volume Calculations

FAIRHURST CONSULTING AND CIVIL STRUCTURAL ENGINEERS	W.A. FAIRHURST & PARTNERS		CALCULATION SHEET	
PROJECT	JOB No.	129455	Calculated by	KHB
STH Construction SUDS	SHEET No.	1		
DRAINAGE DESIGN ATTENUATION VOLUME CALCULATIONS	DATE	12/112/18	Checked by	KHB

Total impervious area to be drained 0.530 ha (A)
Discharge to be controlled to 4.75 l/s (Qout)

Rainfall Return Period 10 years + 20% for climate change

Duration (t) mins	Intensity (i) mm/hr	Qin = 2.71 x A x i l/s	Volume = (Qin - Qout) x10-3 x t x 60 m3
15	32.76	47.05	38.07
30	22.18	31.86	48.79
45	17.67	25.37	55.69
60	15.03	21.59	60.62
75	13.26	19.05	64.35
90	11.97	17.20	67.22
105	10.98	15.77	69.46
120	10.19	14.63	71.13
135	9.53	13.69	72.44
150	8.99	12.91	73.44
165	8.52	12.24	74.12
180	8.11	11.65	74.55
195	7.76	11.14	74.78
210	7.44	10.69	74.79
225	7.16	10.28	74.66
240	6.90	9.91	74.36
255	6.67	9.58	73.91
270	6.46	9.28	73.36
285	6.27	9.00	72.71
300	6.09	8.75	71.95
315	5.93	8.51	71.08
330	5.77	8.29	70.12
345	5.63	8.09	69.05
360	5.50	7.89	67.93

Critical duration occurs at first peak in volume i.e. Storage volume of 74.79 m3

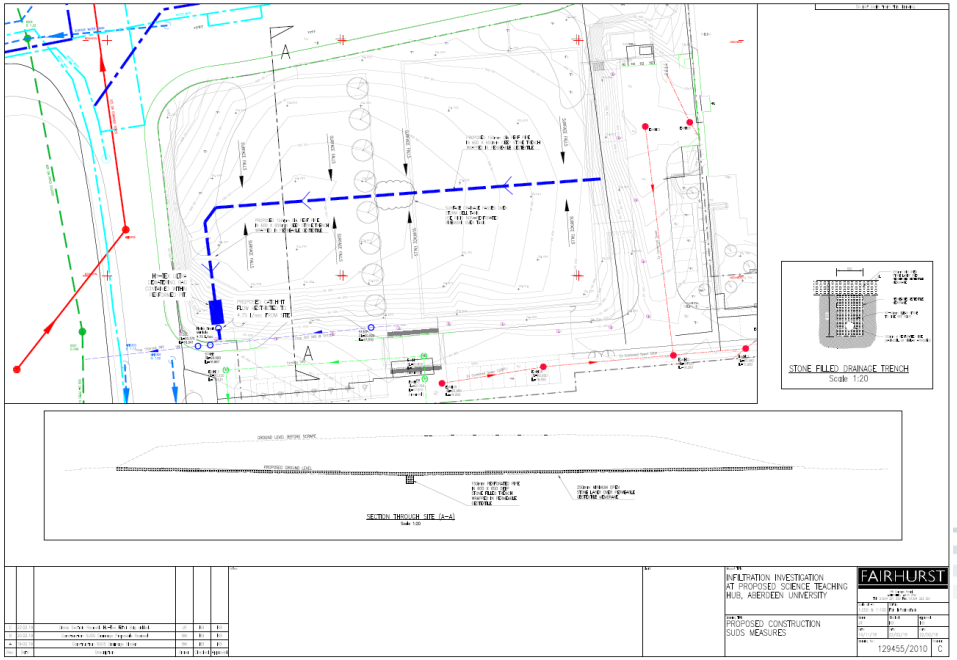
For pipe storage of 74.79 m3

Dia mm	CSA m2	Length required m
	0.000	0.00
	0.000	0.00
	0.000	0.00
	0.000	0.00
	0.000	0.00

Stone attenuation blanket (20% voids 74.79 m3
Allow 20% for climate changes 89.75 m3

Length m	Depth m	Width m
50.00	0.25	29.92

Volume provided = 55x42x0.25x0.2= 116 m3



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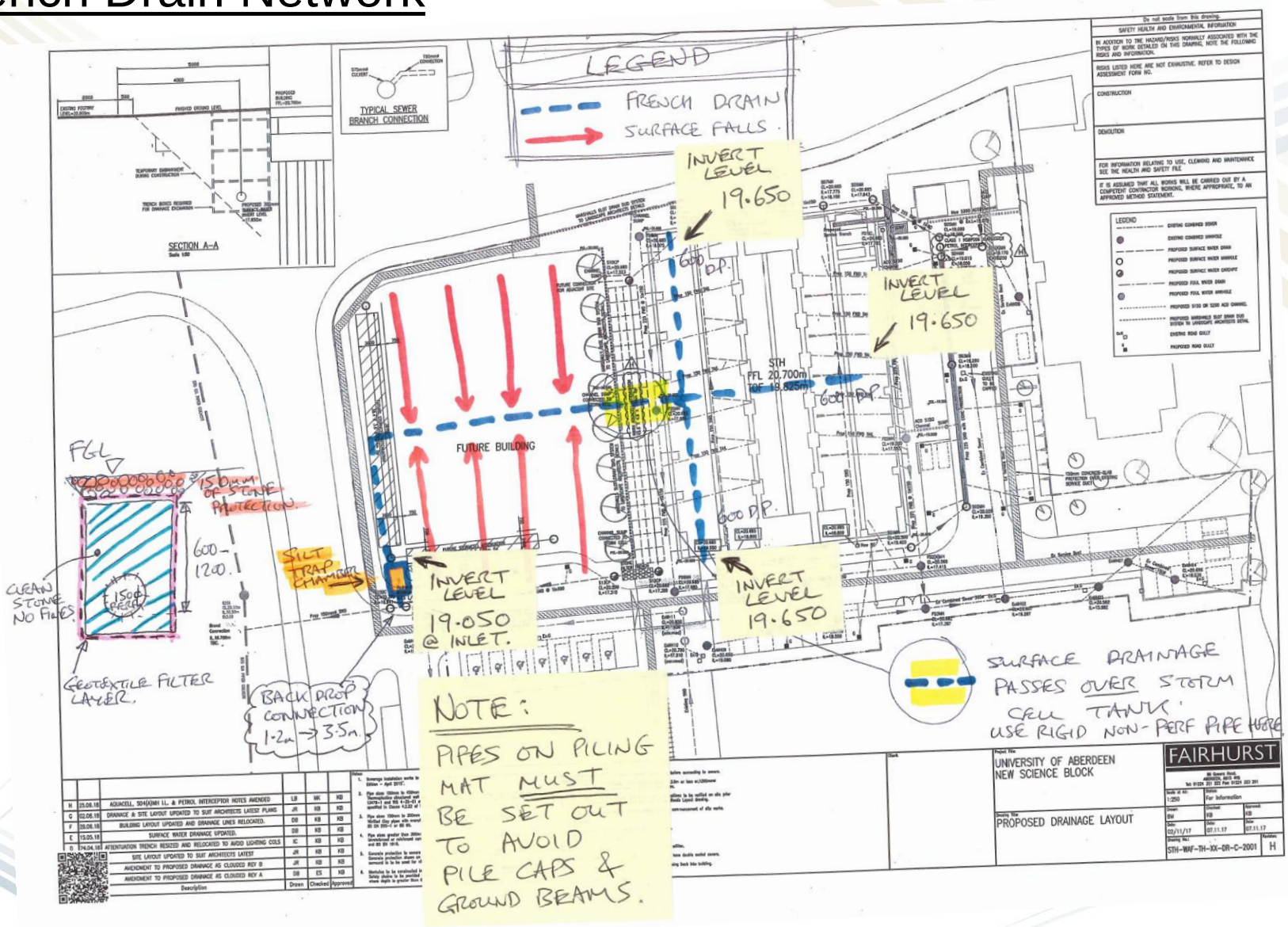
French Drain Network



Please note that attenuation tanks shown on this drawing are permanent works for the building and future buildings – they do not form part of the construction phase SUDS system

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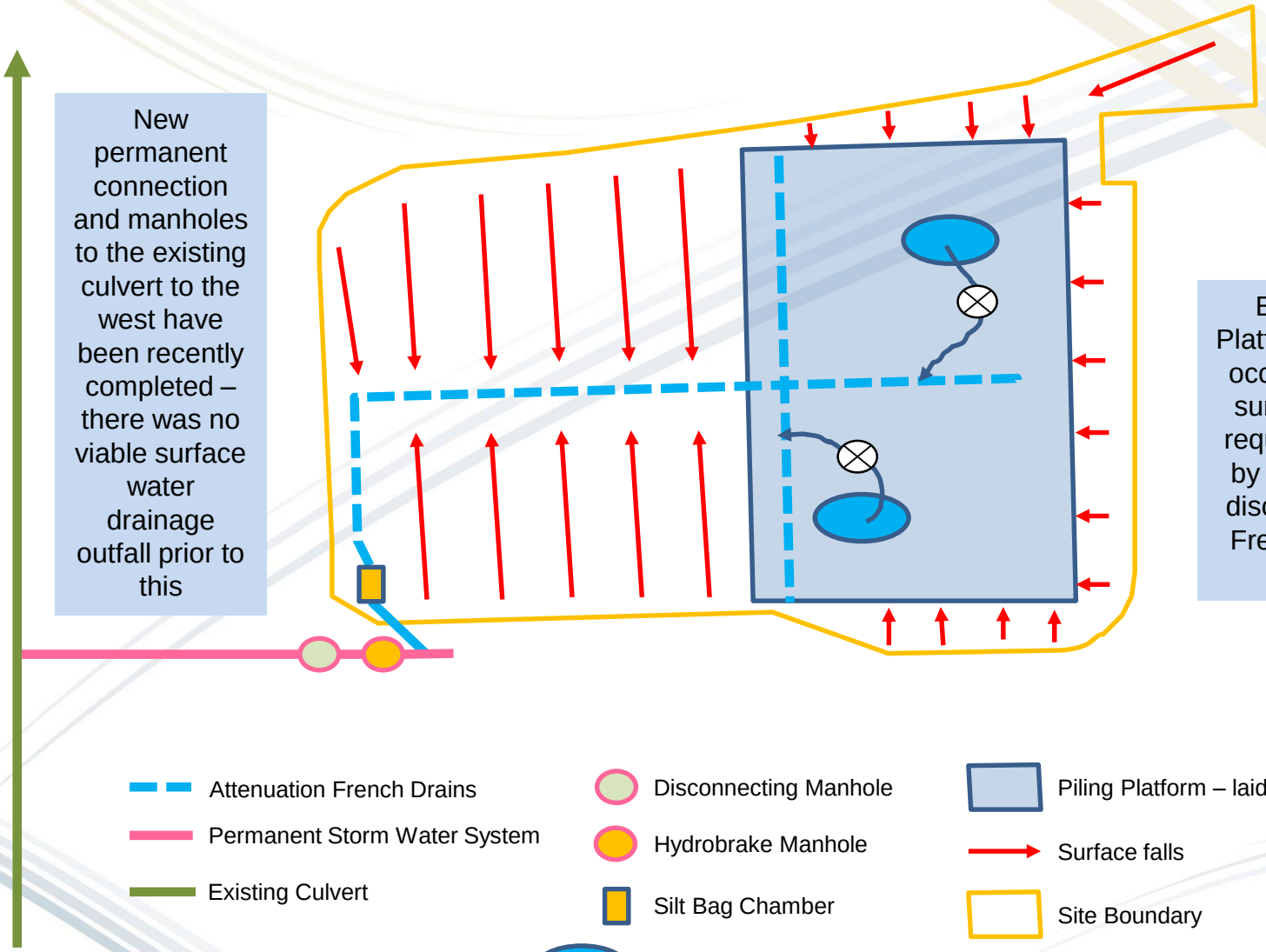
French Drain Strategy – Phase 1 Building Frame Construction

New permanent connection and manholes to the existing culvert to the west have been recently completed – there was no viable surface water drainage outfall prior to this



Because Piling Platform must be flat, occasional ponding surface water may require to be moved by small pump and discharged over the French Drains – as shown

- Attenuation French Drains
- Permanent Storm Water System
- Existing Culvert
- Disconnecting Manhole
- Hydrobrake Manhole
- Silt Bag Chamber
- Occasional Surface Water
- Piling Platform – laid to flat level
- Surface falls
- Site Boundary
- Small Pump

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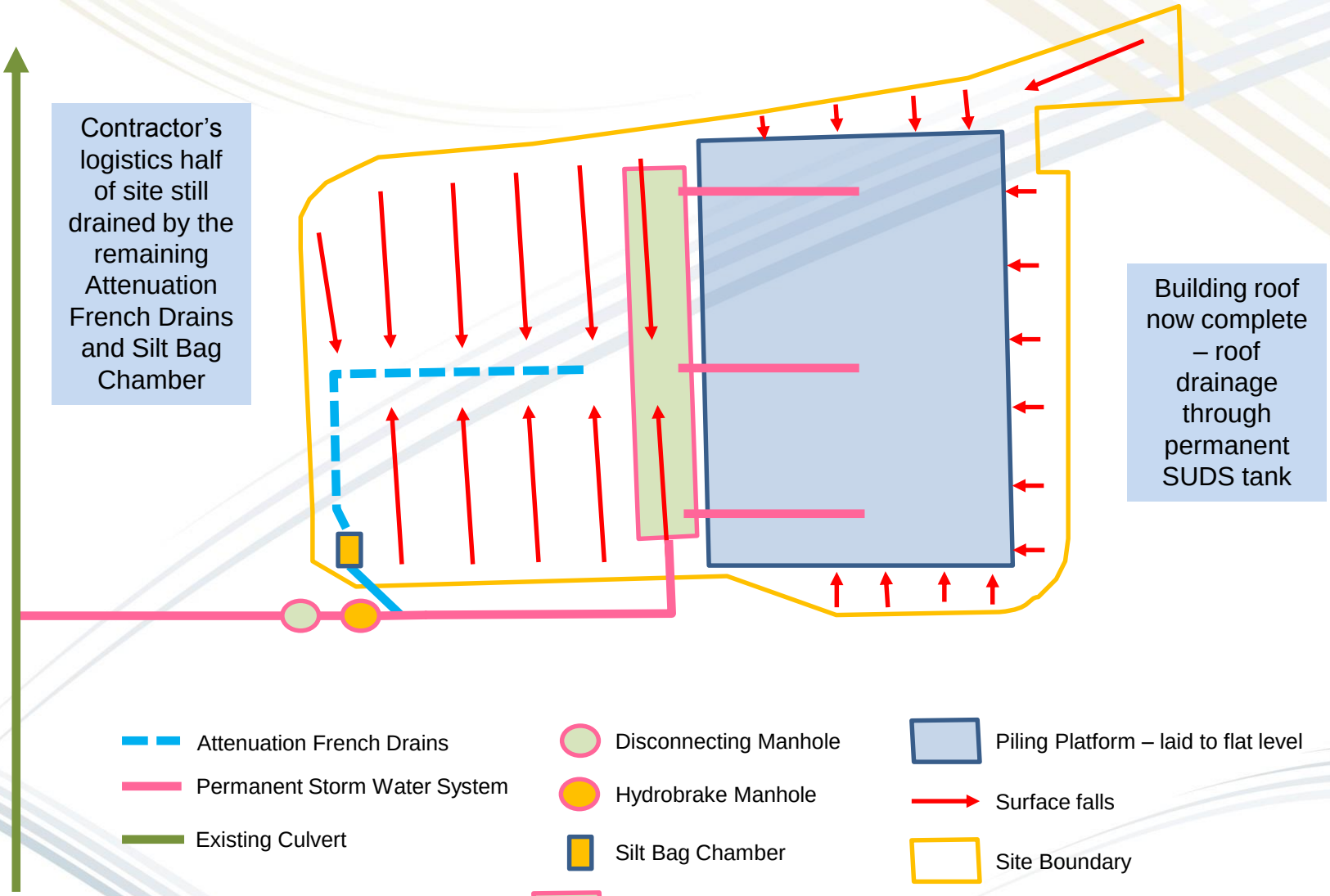
French Drain Strategy – Phase 2 Building Roof Complete



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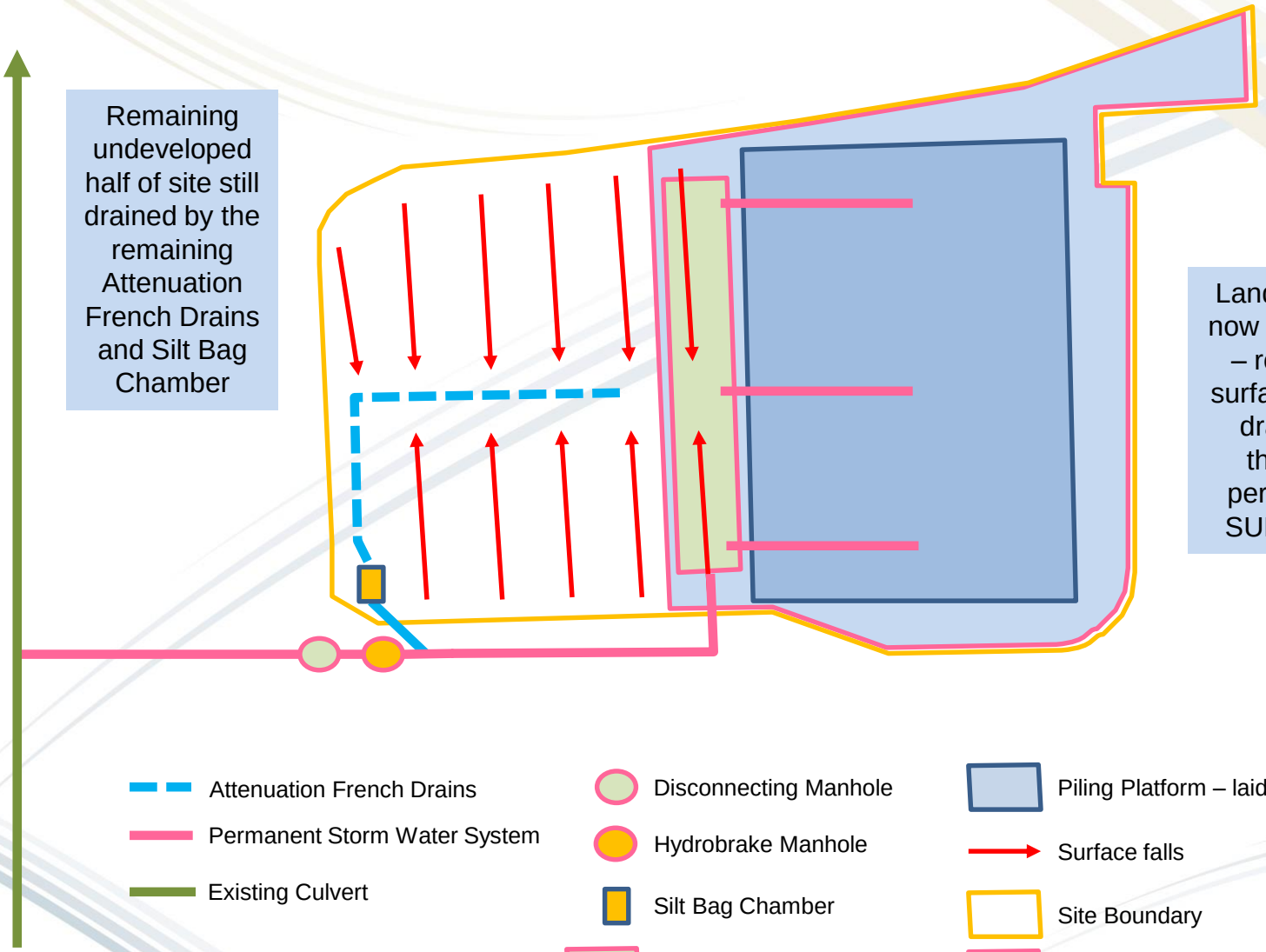
French Drain Strategy – Phase 3 Landscaping Complete



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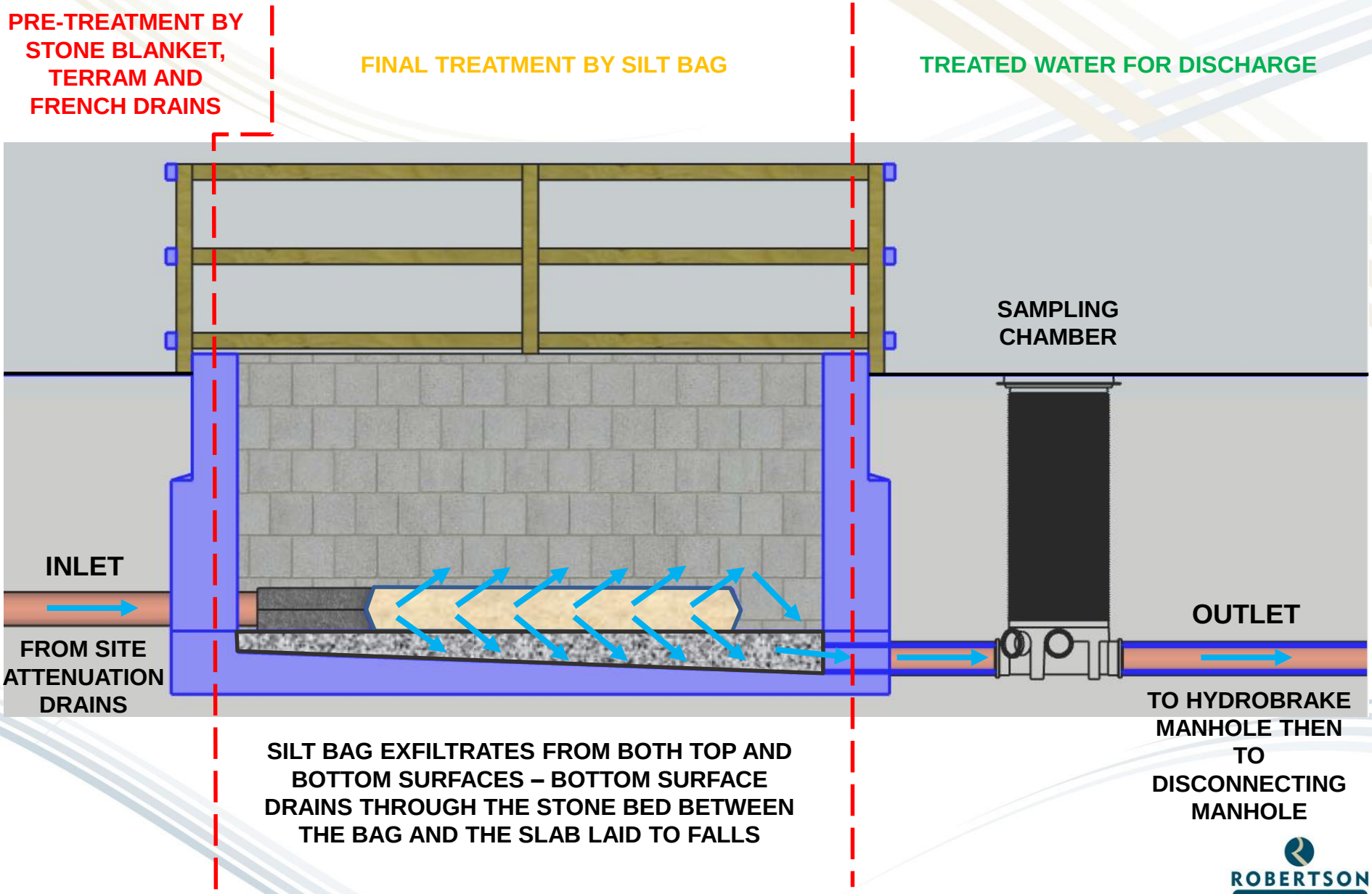
Silt Bag Chamber – Cross Section



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Silt Bag Availability

1. We propose to use the Hy-Tex Ultra Dewatering Sediment bag as the final treatment media in the silt bag chamber.

2. These bags were trialled successfully on site during January and February 2019.

3. See adjacent stock statement from Hy-Tex. They keep 50 number 1.8 x 1.8m Ultra Dewatering Bags in stock at all times. Standard delivery time is 3 days, although next day delivery is also available.

4. Site will initially buy 12 silt bags, and will review stock when the sixth bag has been fitted (i.e. still with 6 bags in site stock). Trials on site have indicated that a bag may last a month or two with the flows expected.

HY-TEX ESTABLISHED 1991

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Hy-Tex (UK) Limited
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Mill Lane
Aldington
ASHFORD
Kent TN25 7AJ

Statement of Stock Levels, Lead Times and Delivery

Product: Ultra Dewatering Sediment Bag. Oil and Sediment Model.

Typical minimum stock level:
20no Size 0.91 x 1.22m (3 x 4ft). Code 9729.
50no Size 1.80 x 1.80m (6 x 6ft). Code 9724.
40no Size 3.05 x 4.55m (10 x 15ft). Code 9725.

Additional stock lead time approx. 5 to 7 working days.

Delivery Options for AB Postcode Area:
Standard delivery: 3 working day service
Optional Upgrades: Next working day, timed delivery and weekend delivery.

Trust the above is of assistance

For and on behalf of Hy-Tex (UK) Limited

David J Poole
Director

Director: DJ Poole
Company Registration Nr: 02597134

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Textiles for Civil Engineering, Construction, Landscaping, Horticulture and Agriculture

Accidental Spill Protocol:

1. If a spill takes place on site that could pose a risk to the water environment, an emergency shut-off procedure will be implemented. This will be fully described in the Site Spill Response Plan and explained to the site staff responsible for responding to environmental incidents.

2. The first action is to disconnect the silt bag, then immediately bung the inlet and outlet pipes of the silt bag chamber. Bungs for this specific purpose will be kept inside a sealed box located inside the silt bag chamber. A secondary safety bung will also be placed in the inlet side of the hydrobrake manhole.

3. The spill will be dealt with on site using traditional spill kit techniques.

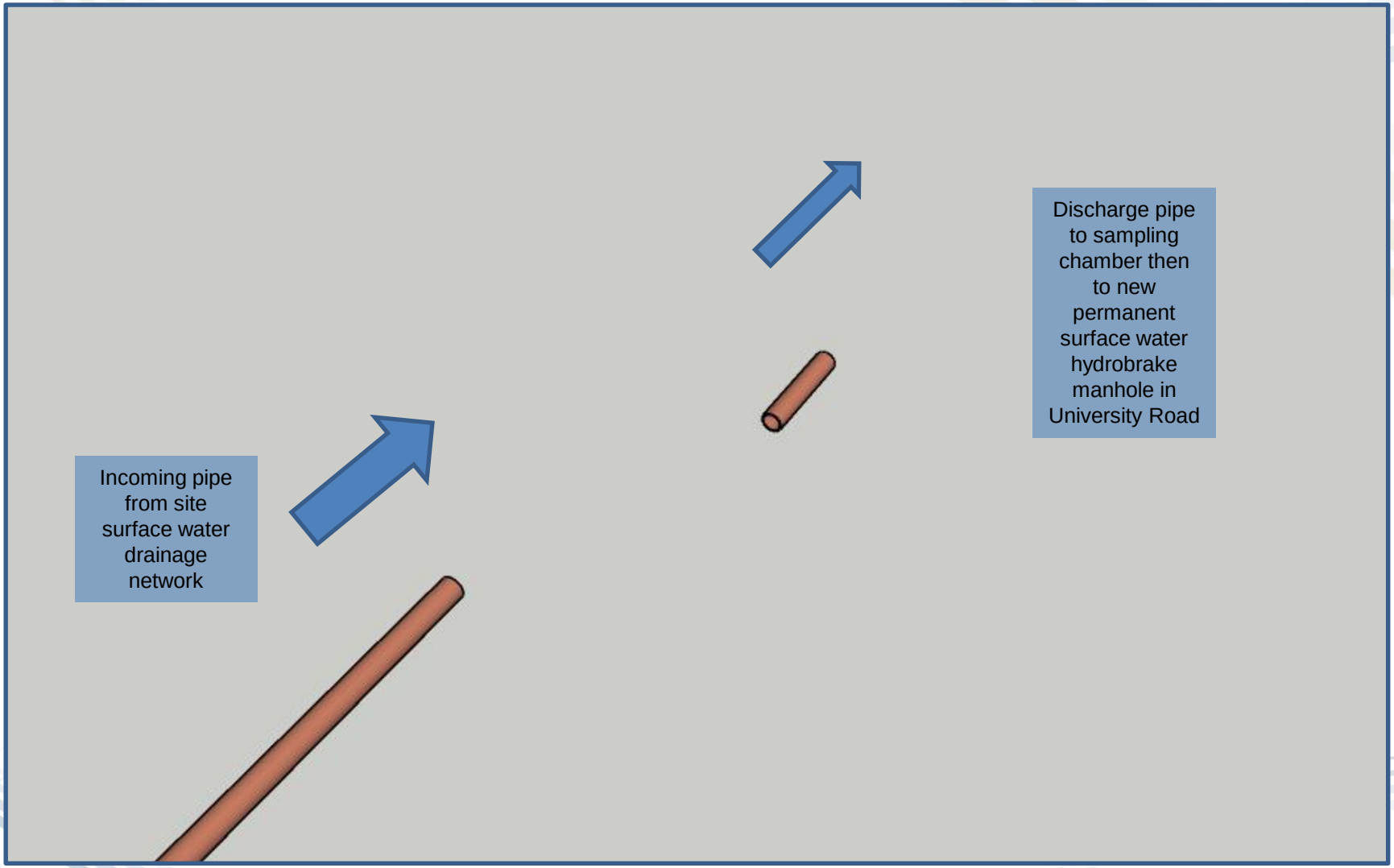
4. The disconnected silt bag will be removed from the chamber and safely placed aside for drying and disposal.

5. The inlet bung will be removed and a new silt bag will be immediately connected. The outlet bung will remain in position.

6. Water will run through the silt bag as normal, but the water will be impounded in the chamber and tested for contaminants. If confirmed contaminated, the impounded water will be pumped out of the chamber to tanker for disposal. This step will be repeated until contaminant levels fall below trigger thresholds. Once clean water is achieved, the impounded water will be over-pumped out of the silt bag chamber into the sampling chamber until empty to allow the downstream bung to be removed – then normal service will resume.

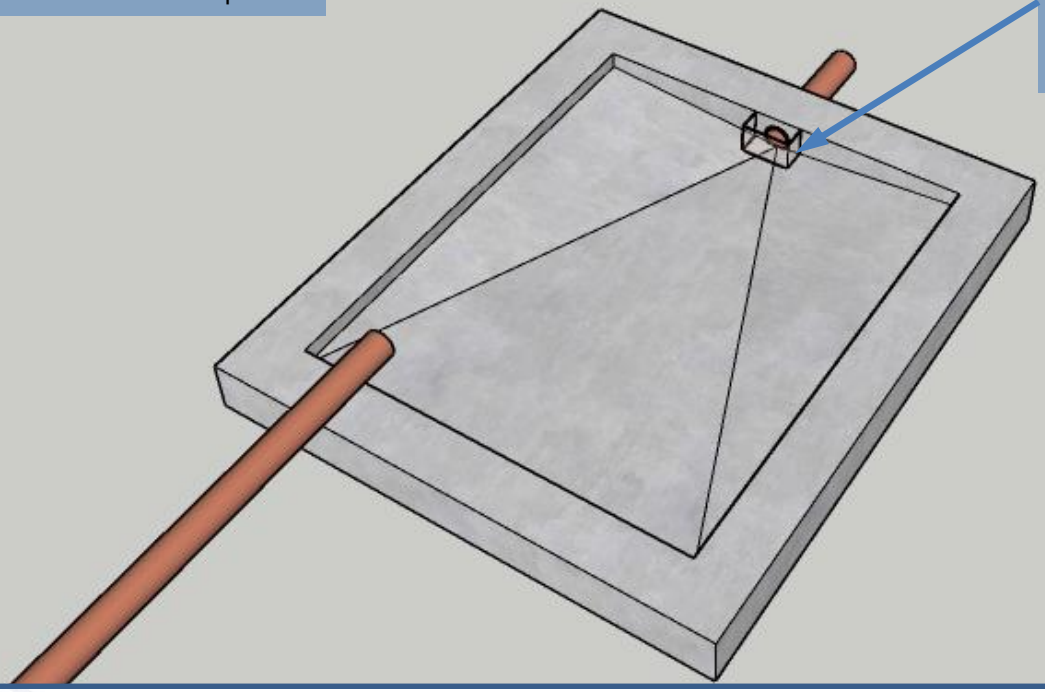
7. If despite these measures, pollution to the water environment occurs, a rapid response specialist contractor e.g. Briggs Marine or Damm will be deployed to minimise the impact on the environment, and to clean up any damage. All pollution events will be reported to SEPA.

Silt Bag Chamber Construction Details Follow


Incoming pipe from site surface water drainage network
Discharge pipe to sampling chamber then to new permanent surface water hydrobrake manhole in University Road

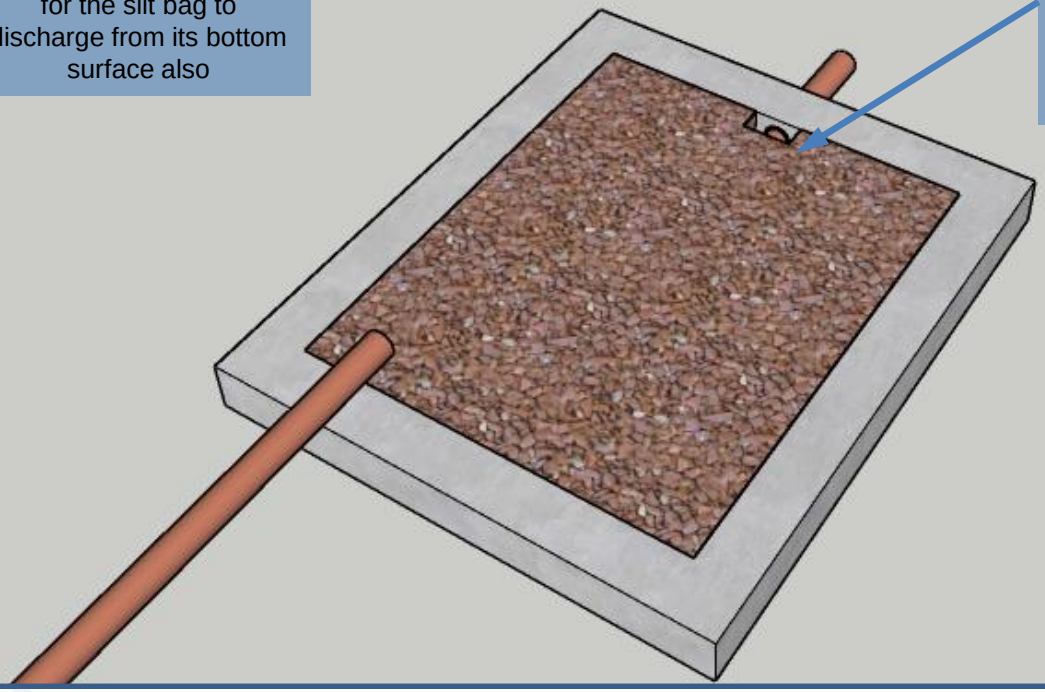
Insitu concrete base with kicker to support blockwork chamber walls, slab laid to falls, outlet pipe cast in with level invert to lowest point

Metal mesh guard fitted around mouth of discharge pipe to facilitate cleaning and bunging operations during emergency lockdown



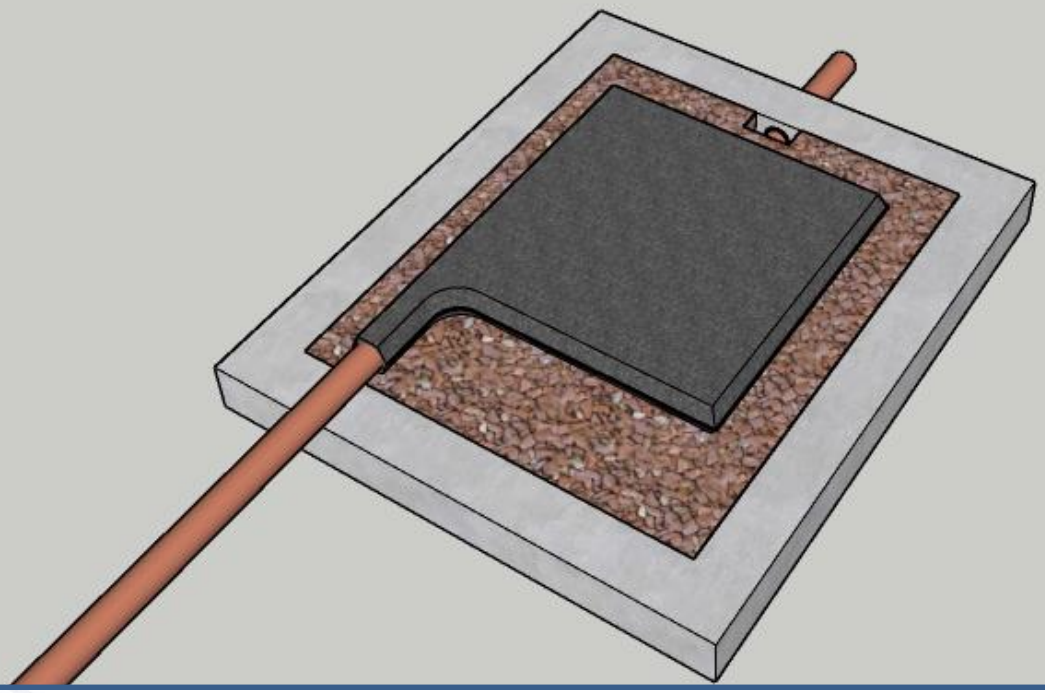
Clean single-sized stone filling to the tray to provide maximum ability for the silt bag to discharge from its bottom surface also

Gap formed by metal mesh guard fitted around mouth of discharge pipe to facilitate cleaning and bunging operations during emergency lockdown



Silt bag shown in position connected to incoming pipe from surface water network

Connection Manhole levels
S14HB
CL 20.500
IL 16.967
i.e. 3.5 metres deep.
Proposed connection of temporary drainage is via a back-drop to limit depths of temporary drainage system to 1200mm max.



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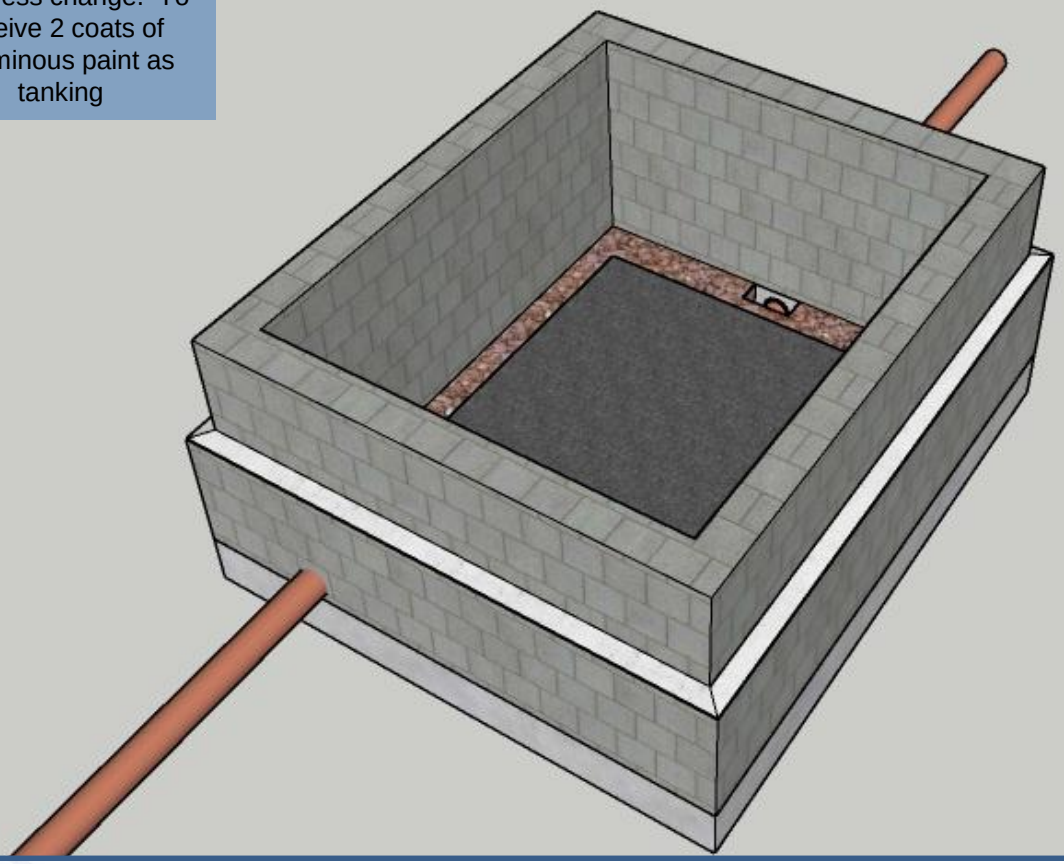
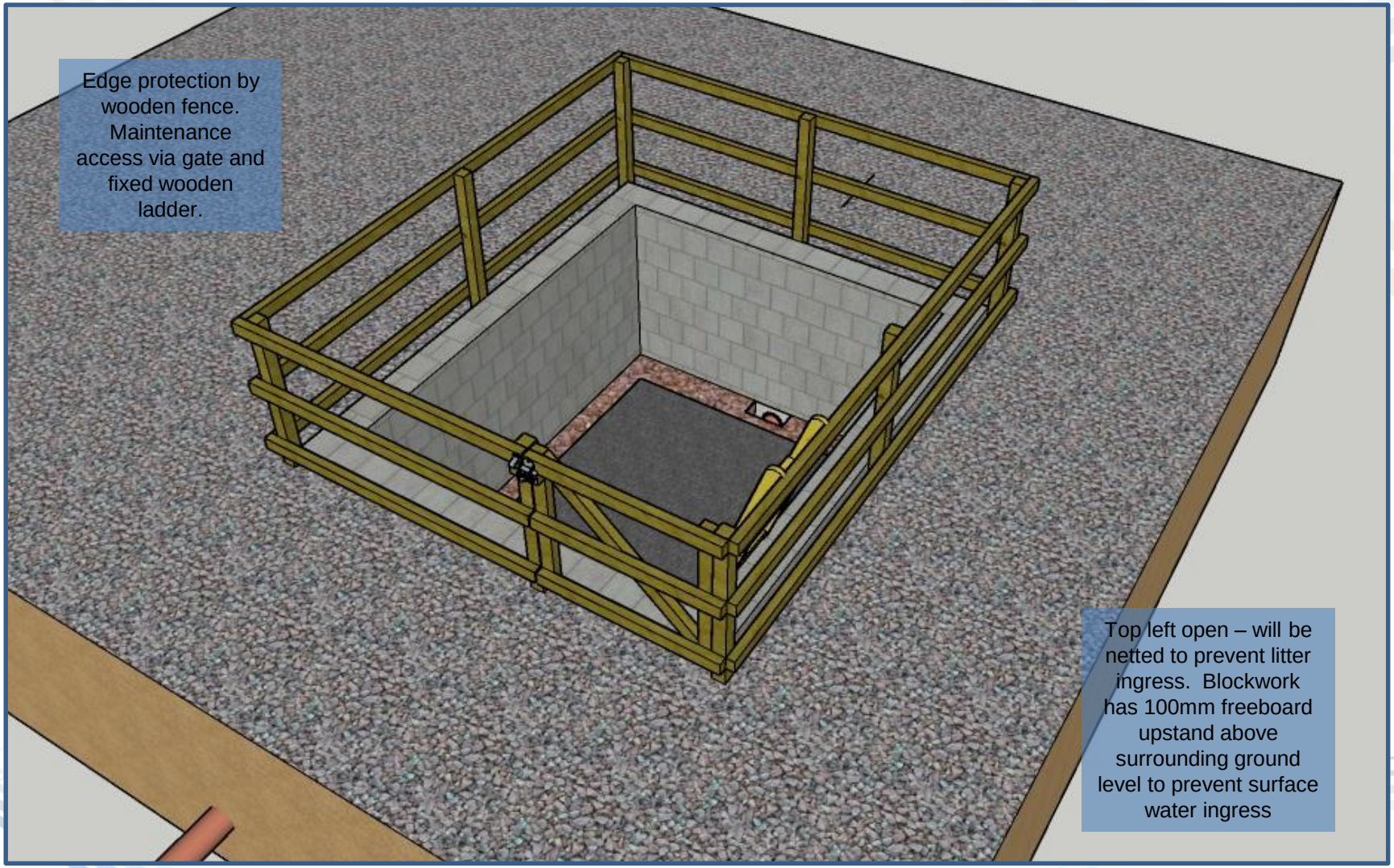
Blockwork retaining wall chamber with mortar fillet at thickness change. To receive 2 coats of bituminous paint as tanking




Edge protection by wooden fence. Maintenance access via gate and fixed wooden ladder.
Top left open – will be netted to prevent litter ingress. Blockwork has 100mm freeboard upstand above surrounding ground level to prevent surface water ingress

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