SURFACE WATER MANHOLE SCHEDULE - REFER TO SFA 7th EDITION

MH	CL	IL	DEPTH TO SOFFIT (m)	DS PIPE DIA (mm)	MH DIA (mm)	MH TYPE	COVER TYPE		Easting (X)	Northing (Y)
S9	33.525	30.666	2.484	375	1500	TYPE 2	450 x 450 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384268.320	397428.680
S10	33.425	30.430	2.620	375	1500	TYPE 2	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384253.984	397420.625
S11	33.460	30.410	2.675	375	1500	TYPE 2	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384248.312	397417.122
S20	33.490	30.307	3.083	100	1500	TYPE 2	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384241.607	397413.660
SA25	33.550	30.300	2.875	375	1800	TYPE 1	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384234.966	397412.565
SA26	34.180	30.233	3.572	375	1800	HYDROBRAKE CHAMBER	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384208.386	397400.212
SA27	34.180	30.122	3.683	375	1200	SMART FILTER CHAMBER	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384208.386	397398.180
SA37	34.180	27.074	6.731	375	1500	TYPE 1	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384202.577	397395.924

FOUL WATER MANHOLE SCHEDULE - REFER TO SFA 7th EDITION

MH	CL	IL	DEPTH TO SOFFIT (m)	DS PIPE DIA (mm)	MH DIA (mm)	MH TYPE	COVER TYPE		Easting (X)	Northing (Y)
F14	33.520	29.190	4.105	225	1200	TYPE 1B	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384236.622	397415.444
F14A	33.490	29.127	4.138	225	1200	TYPE 1B	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384245.944	397418.343
F15	33.340	28.997	4.118	225	1200	TYPE 1B	600 x 600 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384262.551	397427.484
F17	33.455	28.896	4.259	300	1500	TYPE 1B	451 x 450 - D400	RECESSED TO ACCEPT SURFACE FINISHES	384268.605	397432.016

FOR DETAILS OF DRAINAGE SERVING BUILDINGS 5 & 6, REFER TO DRAWING CSAL-CUR-ZT-ZZ-DR-D-90001

FOR DETAILS OF DRAINAGE SERVING BUILDING 9, REFER TO DRAWING 062617-CUR-09-ZZ-DR-D-70-500

FOR DETAILS OF DRAINAGE SERVING BUILDINGS 7 & 8, REFER TO DRAWING CSAL-CUR-ZL-ZZ-DR-C-90001

FOR DETAILS OF DRAINAGE SERVING BUILDINGS 2,3 & 4, REFER TO DRAWINGS CS-CUR-ZZ-0B-DR-C-90000 CS-CUR-ZZ-0G-DR-C-90002

EX MH F18 CL: 33.34 IL: 28.74

DRAINAGE CONNECTS TO STUBS INSTALLED IN PHASE 1A

MH F17 CL: 33.455 IL: 28.896

BD IL: 31.800

3750 L70

1500 1:75

2250 1:66

MH S9 CL: 33.525 IL: 30.666

MH F15A CL: 33.36 IL: 31.19

NRV

BACKDROP HAS NOT BEEN CONSTRUCTED TO BE BUILT IN NEXT PHASE.

SADDLE CONNECTION IL 30.750

3750 1:57

MH F15 CL: 33.340 IL: 28.997 BD IL 31.136 NRV ON 100Ø INLET PIPE . STEEL ROPE INSTALLED TO ALLOW MANUAL CLOSURE OF UNIT FROM GROUND LEVEL .AS AGREED WITH MCC BUILDING CONTROL

MHS10 CL: 33.425 IL: 30.430

BACKDROPS HAVE NOT BEEN CONSTRUCTED. TO BE BUILT IN NEXT PHASE.

DRAINAGE TO TIE INTO BUILDING 5/6 DRAINAGE NETWORK

MH F14A CL: 33.49 IL: 29.127

2250 1:125

3750 1:250

MH F14 CL: 33.520 IL: 29.190

2250 1:104

MHS11 CL: 33.460 IL: 30.410

MHS20 CL: 33.490 IL: 30.307

3750 1:250

MH SA25 CL: 33.550 IL: 30.300

3750 1:300

BACKDROP HAS NOT BEEN CONSTRUCTED. TO BE BUILT IN NEXT PHASE.

BENCHING AND BACKDROP HAS NOT BEEN CONSTRUCTED. TO BE BUILT IN NEXT PHASE.

ATTENUATION TANK. REQUIREMENT OF 100m³ (21.5 X 3.0 X 1.6m) BASE OF TANK LEVEL: 30.150 TANK TO BE 'PLUVIAL CUBES' BY ESS LTD

MH SA37 CL: 34.180 IL: 27.074 BD IL 29.618 (INTERNAL)

3750 @ 1:100

3750 @ 1:8

INTERNAL BACKDROP

MH SA26 CL: 34.180 IL: 30.233 COMPLEX CONTROL: HYDROBRAKE DESIGN FLOW: 72l/s DESIGN HEAD: 0.7m O/FLOW PIPE WITH 240Ø ORIFICE PLATE SET AT 31.903

SA27 NAYLOR SMART FILTER CHAMBER SF03.2B 2.0 X 1.0 X 2.0M WITH 1200Ø ABOVE CL: 34.180 IL: 30.122

KEY

- BUILDINGS 2, 3 & 4 WORKS AREA
- BUILDINGS 5 & 6 WORKS AREA
- BUILDING 7 & 8 WORKS AREA
- BUILDING 9 WORKS AREA
- DRAINAGE INSTALLED IN PREVIOUS PHASES
- SURFACE WATER DRAINAGE INSTALLED FOR SECTIONAL COMPLETION
- FOUL WATER DRAINAGE INSTALLED FOR SECTIONAL COMPLETION
- DRAINAGE NOT REQUIRED FOR SECTIONAL COMPLETION
- ATTENUATION TANK
- BASEMENT EXTENTS

SURFACE WATER CONNECTION TO SEWER

THE ALLOWABLE MAXIMUM FLOW RATES FOR THE TOTAL SITE ARE APPROXIMATELY:
- 72 l/s FOR THE 1 IN 1 YEAR EVENT
- 176 l/s FOR THE 1 IN 30 YEAR EVENT
- 218 l/s FOR THE 1 IN 100 YEAR EVENT

THE FLOW RATES CALCULATED IN THE DRAINAGE MODEL ARE APPROXIMATELY:
- 70.0 l/s FOR THE 1 IN 1 YEAR EVENT
- 132.2 l/s FOR THE 1 IN 30 YEAR EVENT
- 203.7 l/s FOR THE 1 IN 100 YEAR EVENT (INCLUDING ALLOWANCE OF 30% FOR CLIMATE CHANGE)

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. ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE: 150MM DIA TO BE VITRIFIED CLAY. 225MM DIA TO BE VITRIFIED CLAY. 300MM DIA TO BE VITRIFIED CLAY. 375MM DIA AND GREATER TO BE CLASS 120 CONCRETE PIPES.
5. ALL VITRIFIED CLAY PIPES TO BS EN 295-1: ALL CONCRETE PIPES TO BE TO BS EN 1916. ALL CONCRETE MANHOLES TO BE TO BS EN1917.
6. FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.
7. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.
8. ALL SEWER WORKS TO COMPLY WITH WRC SEWERS FOR ADOPTION, 6TH EDITION', WATER AUTHORITY REQUIREMENTS AND KITE-MARKED(OR SIMILAR APPROVED) WHERE PRACTICABLE. WHERE CONFLICTING DETAILS OCCUR, WATER AUTHORITY'S DETAILS SHALL TAKE PRECEDENCE IN ALL CASES.
9. MANHOLE COVERS SHALL HAVE A CLEAR OPENING IN ACCORDANCE WITH SFA 6TH EDITION AND SHALL BE CLASS D400 TO BS EN 124 WITH 150MM DEEP FRAMES IN VEHICULAR TRAFFICKED AREA; CLASS B125 COVERS AND FRAMES TO BE PROVIDED ON ALL OTHER MANHOLES IN LANDSCAPING.
10. FILLED GROUND MUST BE FILLED AND CONSOLIDATED BEFORE ANY SEWER WORKS ARE CARRIED OUT.
11. THE WATER AUTHORITY IS NOT OBLIGED TO ACCEPT FILTER DRAIN / LAND DRAINAGE RUN OFF INTO THE PUBLIC SEWER NETWORK OR ADOPTABLE DRAINAGE SYSTEM (DIRECTLY OR INDIRECTLY). AN ALTERNATIVE METHOD OF DISPOSAL OF LAND DRAINAGE RUN OFF WILL THEREFORE BE REQUIRED AND ANY PROPOSALS MUST BE AGREED WITH THE LOCAL AUTHORITY LAND DRAINAGE SECTION.
12. COVER SLABS MUST CARRY THE BSI KITEMARK AND SHALL COMPLY WITH BS 5911 PART3 / BS EN 1917 :2000. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOAD BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN AS SPECIFIED ABOVE. PLEASE REFER TO CONCRETE PIPELINE SYSTEMS ASSOCIATION (CPSA) 'TECHNICAL BULLETIN' ISSUED AUTUMN 2004 FOR KITE-MARKED COVER SLAB OPENING SIZES.
13. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.
14. SEWERS MUST HAVE 5M CLEARANCE FROM TREES AND HEDGES OR TO HAVE SUITABLE ROOT PROTECTION IN ACCORDANCE WITH THE SFA 6TH EDITION REQUIREMENTS.
15. ALL PIPES TO HAVE CLASS 'S' GRANULAR BED AND SURROUND UNLESS OTHERWISE STATED. BEDDING AND BACKFILL MATERIALS TO CONFORM TO THE REQUIREMENTS OF WIS 4-08-02 (TABLE A2). WHERE DEPTH OF COVER TO TOP OF SEWER IS LESS THAN 1.2M IN HIGHWAYS AND VERGES (OR LESS THAN 0.9M IN NON-VEHICULAR ACCESSED AREAS), THEN A CLASS 'Z' BEDDING TO BE USED.
16. ALL SEWER TRENCHES AND BRANCH CONNECTIONS TO BE BACKFILLED WITH SUITABLE MATERIAL IN LAYERS NOT EXCEEDING 225MM UNCONSOLIDATED THICKNESS THEN FULLY COMPACTED.
17. SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
18. PLASTIC CHANNEL SECTIONS WILL NOT BE PERMITTED WITHIN MANHOLE CHAMBERS. CLAYWARE CHANNELS SHALL BE USED WITHIN MANHOLES FOR PIPE SIZES UP TO AND INCLUDING 300MM DIAMETER.
19. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTION AND BENDS.
20. ALL STACKS AND RWPS TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT TO BE ABOVE ANY GROUND FLOOR CONNECTED APPLIANCE SPILL LEVEL.
21. ALL GULLY AND CHANNEL DRAIN OUTLETS AND TERMINATION POINTS TO BE TRAPPED AND RODDABLE. INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.
22. ALL CONNECTIONS PASSING THROUGH BASES OR EDGE BEAMS TO BE IN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150MM FROM FACE OF CONCRETE.
23. ALL INTERNAL COVERS TO BE MECHANICALLY JOINTED CORNERS AND DOUBLE SEALED.
24. FOR SPECIFIC MANHOLE DETAILS AND COVER SIZES SEE MANHOLE SCHEDULES.
25. ALL MANHOLE COVERS IN BLOCK/SLAB PAVING AREA TO HAVE RECESSED COVERS OF THE APPROPRIATE GRADE TO ACCEPT ARCHITECT'S PAVING PROPOSAL.
26. CHANNELS IN ALL MANHOLES TO BE SET AT THE APPROPRIATE INCOMING AND OUTGOING PIPE GRADIENTS AND SHALL BE PRE-FORMED UP TO 225Ø.
27. ALL BRANCH CONNECTIONS TO BE MADE WITH SWEPT BENDS IN THE DIRECTION OF FLOW IN THE MAIN SEWER.
28. INTERNAL DRAINAGE CONNECTIONS ARE PROVIDED TO THE PENETRATION POSITIONS SHOWN ON M&E DRAWINGS. ALL INTERNAL CHANNEL DRAINS AND GULLIES SHALL DISCHARGE VIA TRAPPED AND RODDABLE SUMP UNITS. UNIT SPECIFICATION BY OTHERS.
29. EXTERNAL LINEAR CHANNEL DRAINS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND SHALL DISCHARGE VIA TRAPPED RODDABLE GULLY UNITS UNLESS ADVISED OTHERWISE. LINEAR CHANNELS TO BE TO LOAD CLASS D400 GRATING AND HEALGUARD SPECIFICATION. UNITS TO HAVE A 200MM MINIMUM CONCRETE BED AND HAUNCH.
30. PROPOSED DRAINAGE CHANNEL POSITIONS ARE INDICATIVE ONLY AND SUBJECT TO FINAL CO-ORDINATION WITH DETAILED LEVELS BY LANDSCAPE ARCHITECT.
31. SECTION 163 OF THE HIGHWAYS ACT 1980 REQUIRES PROVISION TO BE MADE TO PREVENT WATER FALLING ON OR FLOWING ONTO THE HIGHWAY FROM PRIVATE DRIVEWAYS OR PROPERTIES. ANY DRAINAGE REQUIREMENTS MUST BE CONNECTED INTO THE PRIVATE SURFACE WATER DRAINAGE SYSTEM.
32. THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING:-

(i). ALL OPERATIONS SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE GENERAL HEALTH AND SAFETY POLICY OF THE DEVELOPER AS REQUIRED BY SECTIONS 2 OF THE HEALTH AND SAFETY AT WORK ACT 1974 AND IN PARTICULAR THE CONSTRUCTION (GENERAL PROVISIONS) REGULATIONS.

(ii). THE LOCAL AUTHORITY AND UTILITIES COMPANIES ARE TO BE NOTIFIED PRIOR TO COMMENCEMENT OF WORK ON SITE.

(iii). PRIOR TO CONSTRUCTION THE ACTUAL POSITIONS AND DEPTHS OF SERVICES LIKELY TO BE AFFECTED BY THE WORKS SHOULD BE ESTABLISHED BY MEANS OF HAND DIG IN CLOSE LIAISON WITH THE UTILITY COMPANIES. THE CONTRACTOR SHALL IMMEDIATELY ADVISE THE ENGINEER OF ANY SERVICES EXPOSED WHICH MAY AFFECT THE DESIGN.

(iiii). ALL OPERATIVES WORKING ON THE HIGHWAY WORKS MUST HAVE STREET WORKS ACCREDITATION.

33. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
34. THE CONTRACTOR SHALL ALLOW FOR KEEPING TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SUMPS AND DE-WATERING AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY & LLFA AND ENVIRONMENT AGENCY.
35. ALL DRAINAGE WORKS ARE TO BE CONSTRUCTED FROM THE OUTFALL TOWARDS THE HEAD OF RUN TO ENSURE THE OUTFALL CAN BE ACHIEVED.

Rev.	Description:	Date:	By:	Chkd:
C02	FINAL CONSTRUCTION	26.02.19	MW	MW
C01	ISSUED FOR SECTIONAL COMPLETION	15.02.19	ATL	CG

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Status: INFORMATION

Project: CIRCLE SQUARE PHASE 1B

Drg Title: DRAINAGE SECTIONAL COMPLETION DETAILS FEB 2019

Size:	Date:	Drawn By:	Designed By:	Checked By:
A0	15.02.19	ATL	ATL	MW

Scale: 1:100

Project No:	Originator:	Zone:	Level:	Type:	Discipline:	Category / Number:	Rev:
063401	CUR	00	ZZ	DR	C	92-501	-C02

Appendix G

Manufacturers Details (SuDS)

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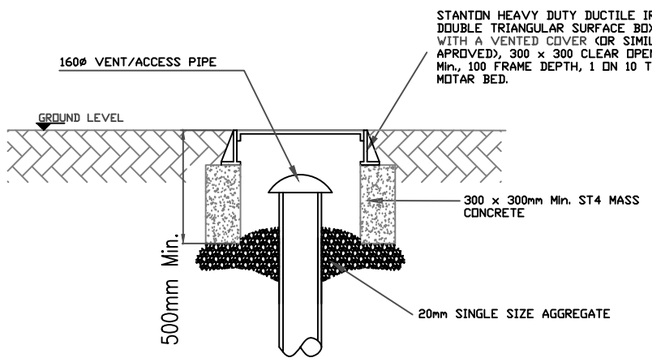
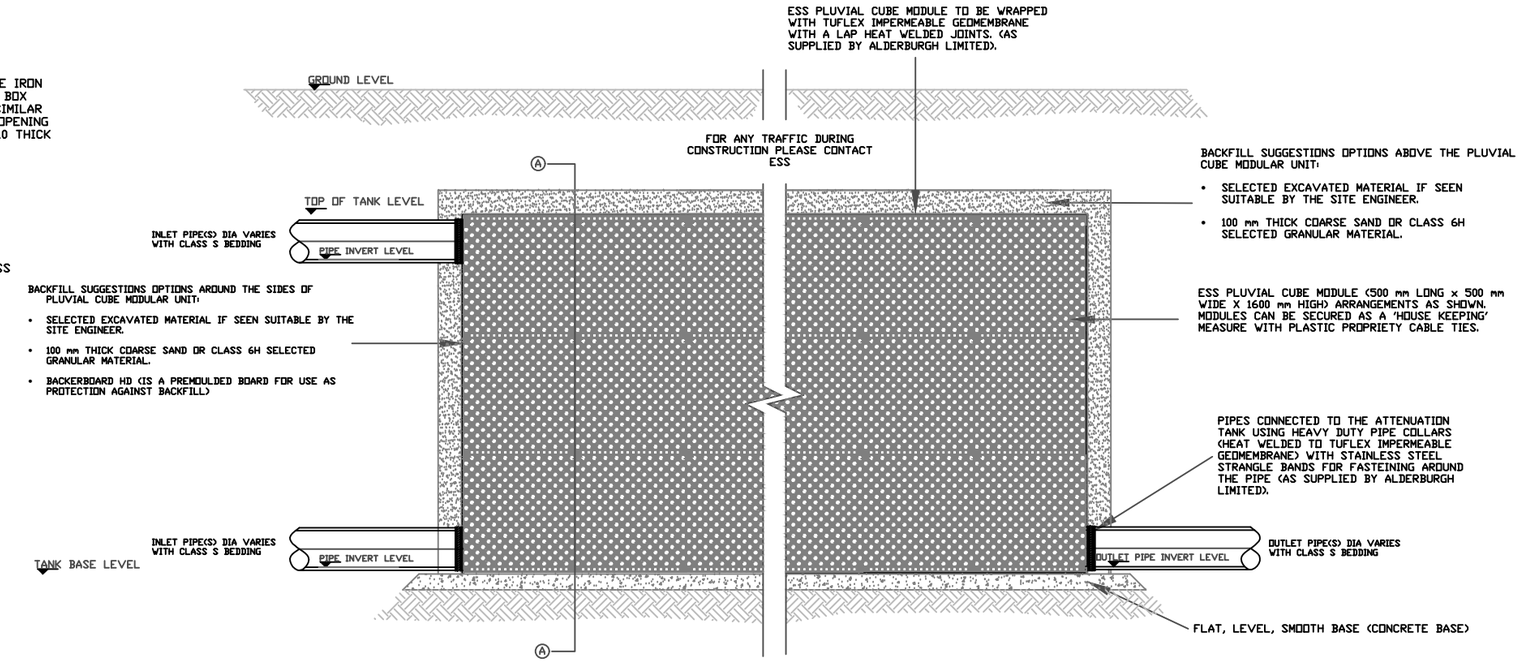
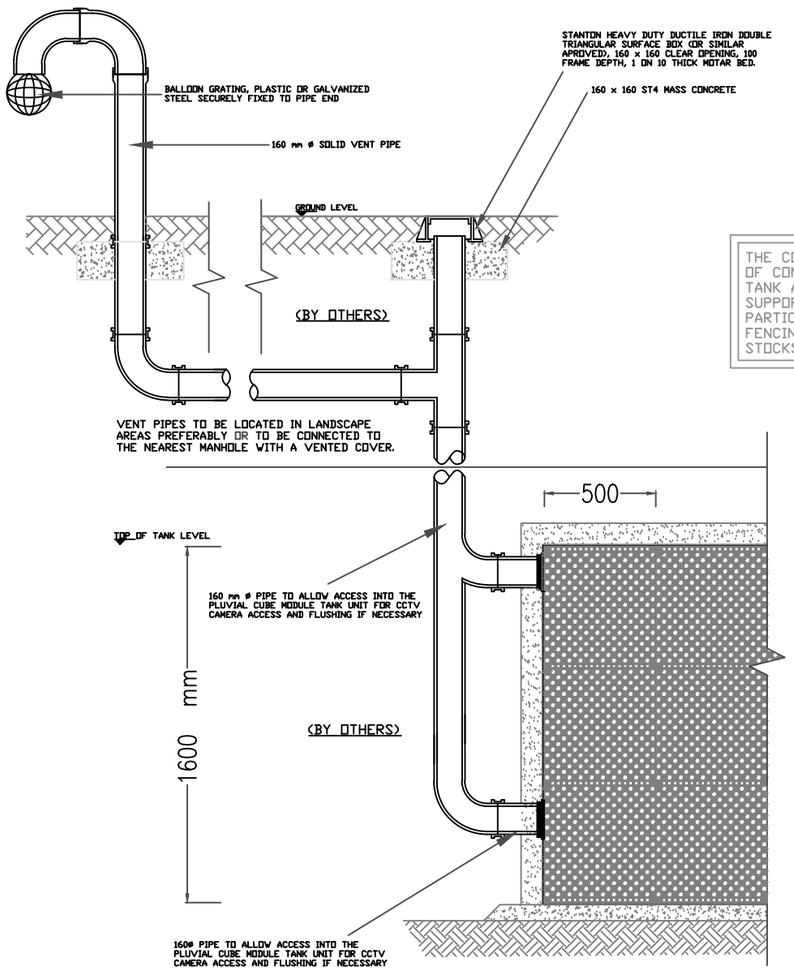


VENT BOX DETAIL
BY OTHERS
(OPTIONAL)



TYPICAL INLET PIPE CONNECTION TYPICAL IN/OUTLET PIPE CONNECTION

TYPICAL DETAILS OF ATTENUATION TANK USING
PLUVIAL CUBE MODULAR UNITS

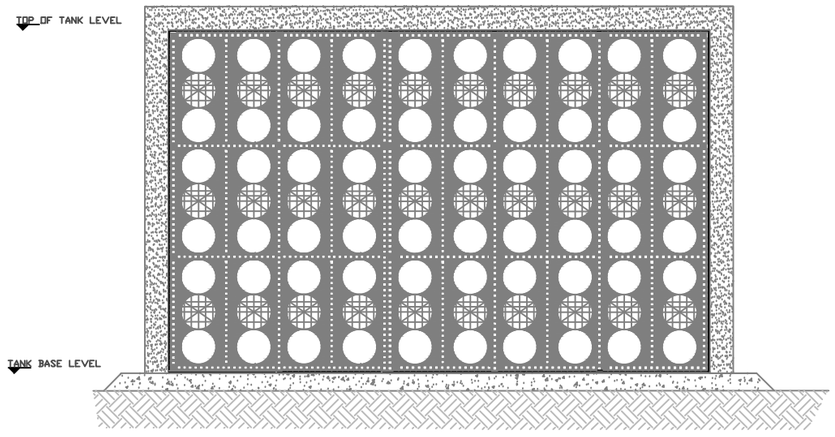


TYPICAL 160ø VENT/ACCESS PIPE CONNECTION

INLET/OUTLET PIPES MUST BE SUPPORTED WITH CONCRETE TO PROTECT IT DURING BACKFILLING

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.,

A 3 - 5% CBR HAS BEEN ASSUMED AT SUB-BASE LEVEL SHOULD THE CBR BE TESTED AND FOUND TO BE LESS THAN 3% THEN THE ENGINEER SHALL BE NOTIFIED. ALSO, ANY SOFT SPOTS FOUND AT SUB-BASE LEVEL SHALL BE REPORTED TO THE ENGINEER



TYPICAL DETAILS OF ATTENUATION TANK USING
PLUVIAL CUBE MODULAR UNITS
(SECTION A-A)

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Notes :-

1. ALL STORAGE TANK DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS, METHOD STATEMENTS AND RECOMMENDATIONS OF ENVIRONMENTAL SUSTAINABLE SOLUTIONS (ESS) LIMITED, ROCHDALE.

2. THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS / SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS ON SITE. ANY DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

3. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.

4. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.

5. ALL LEVELS AND DIMENSIONS SHALL BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS. ANY DISCREPANCIES SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

6. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS IN LINE WITH CURRENT LEGISLATION WHEN WORKING IN / NEAR CONFINED SPACES, DEEP EXCAVATIONS AND MACHINERY.

7. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY TO PROTECT PEDESTRIANS AND VEHICLES FROM THE WORKING AREAS.

8. TO PROTECT THE ESS PLUVIAL CUBE MODULAR ATTENUATION / STORAGE TANK FROM CONSTRUCTION SITE DEBRIS, THE CONTRACTOR SHALL ENSURE THAT STOPPERS ARE SECURELY PLACED IN ALL CONNECTIONS IMMEDIATELY UPSTREAM OF THE TANK UNITS, ONLY TO BE REMOVED ONCE THE FINAL CLEANING OF THE ROADS / DRAINAGE HAS BEEN COMPLETED.

9. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE, NO DEBRIS SHALL BE PERMITTED TO ENTER THE TANK STORAGE SYSTEM.

10. NUMBER OF VENT UNITS DEPENDS ON THE SIZE OF THE TANK (REFER LAYOUT DRAWING)

11. REFER SEQUENCE OF WORK DOCUMENT FOR DETAILED INSTALLATION METHODOLOGY (CONTACT ENVIRONMENTAL SUSTAINABLE SOLUTIONS (ESS) LIMITED)

Notes :- All the Dimensions by Millimeters

ENVIRONMENTAL SUSTAINABLE SOLUTIONS LTD

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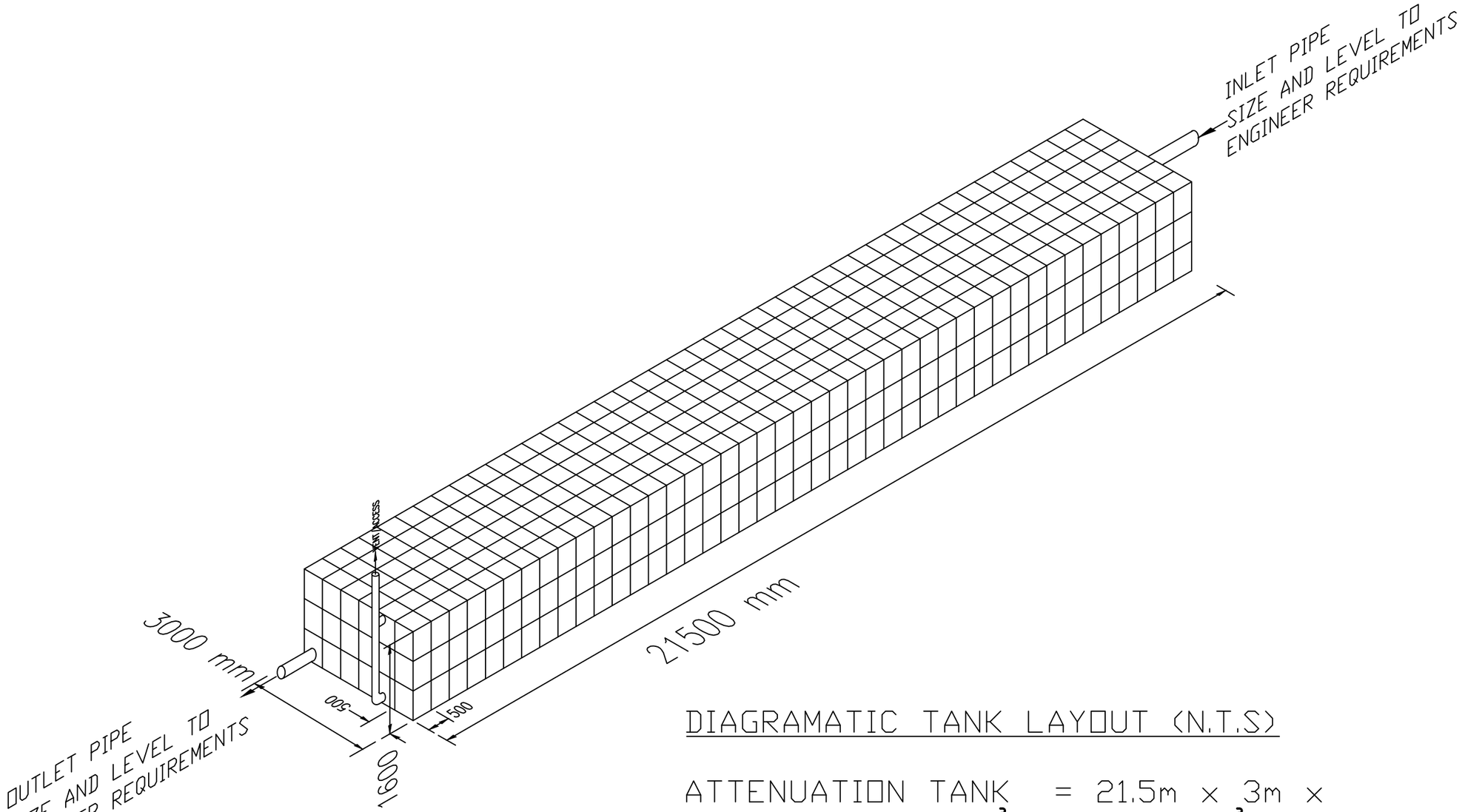
PROJECT
CIRCLE SQUARE, AFFINITY LIVING BLOCKS 5-8

ATTENUATION TANK - DETAILS

TITLE
ATTENUATION STORAGE TANK DETAILS USING PLUVIAL CUBE MODULE UNITS.

Scale	Drawn	Checked
NTS	VH	PD

Date	Drawing No.	Revision
01/05/2018	PCST - 3.0	R0



DIAGRAMATIC TANK LAYOUT (N.T.S)

ATTENUATION TANK = 21.5m x 3m x 1.6mDEEP = 103.2m³ GROSS/ 99.07m³ NETT
(LEVELS TO THE ENGINEER REQUIREMENTS PLEASE REFER TO THE LATEST DRAINAGE LAYOUT)

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Notes :-

1. ALL STORAGE TANK DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS, METHOD STATEMENTS AND RECOMMENDATIONS OF ENVIRONMENTAL SUSTAINABLE SOLUTIONS (ESS) LIMITED, ROCHDALE.

2. THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS / SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS ON SITE. ANY DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

3. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.

4. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.

5. ALL LEVELS AND DIMENSIONS SHALL BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS. ANY DISCREPANCIES SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

6. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS IN LINE WITH CURRENT LEGISLATION WHEN WORKING IN / NEAR CONFINED SPACES, DEEP EXCAVATIONS AND MACHINERY.

7. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY TO PROTECT PEDESTRIANS AND VEHICLES FROM THE WORKING AREAS.

8. TO PROTECT THE ESS PLUVIAL CUBE MODULAR ATTENUATION / STORAGE TANK FROM CONSTRUCTION SITE DEBRIS, THE CONTRACTOR SHALL ENSURE THAT STOPPERS ARE SECURELY PLACED IN ALL CONNECTIONS IMMEDIATELY UPSTREAM OF THE TANK UNITS, ONLY TO BE REMOVED ONCE THE FINAL CLEANING OF THE ROADS / DRAINAGE HAS BEEN COMPLETED.

9. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE, NO DEBRIS SHALL BE PERMITTED TO ENTER THE TANK STORAGE SYSTEM.

10. NUMBER OF VENT UNITS DEPENDS ON THE SIZE OF THE TANK (REFER LAYOUT DRAWING)

11. REFER SEQUENCE OF WORK DOCUMENT FOR DETAILED INSTALLATION METHODOLOGY (CONTACT ENVIRONMENTAL SUSTAINABLE SOLUTIONS (ESS) LIMITED)

Notes :- All the Dimensions by Millimeters

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FAX 01706 376785
EMAIL: TECHNICAL@Y-ESS.COM

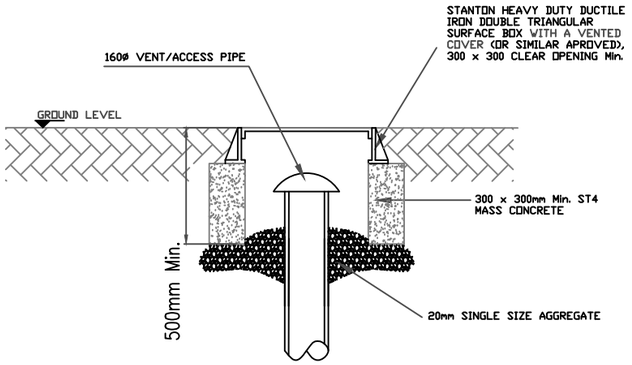
PROJECT
CIRCLE SQUARE, AFFINITY LIVING BLOCKS 5-8

ATTENUATION TANK - LAYOUT

TITLE
ATTENUATION STORAGE TANK DETAILS USING PLUVIAL CUBE MODULE UNITS.

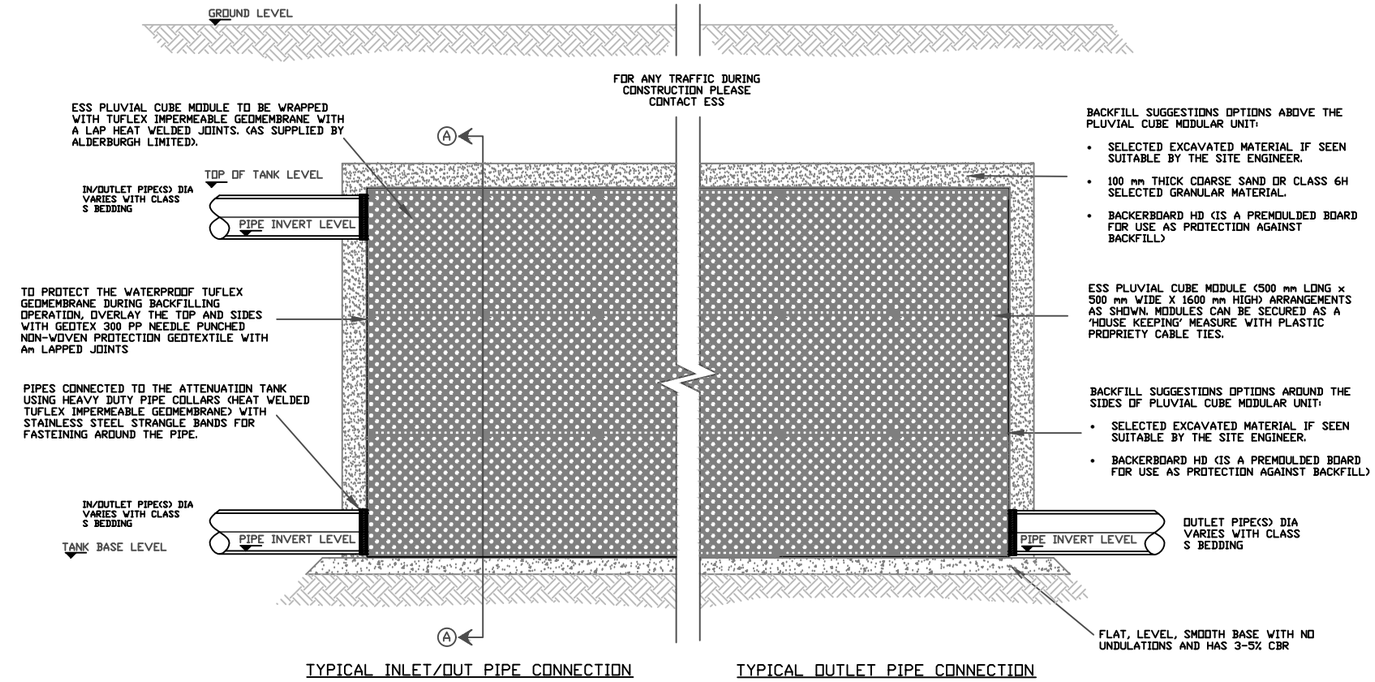
Scale	Drawn	Checked
NTS	VH	PD

Date	Drawing No.	Revision
01/05/2018	PCST - 3.1	R0



VENT BOX DETAIL
BY OTHERS
(OPTIONAL)

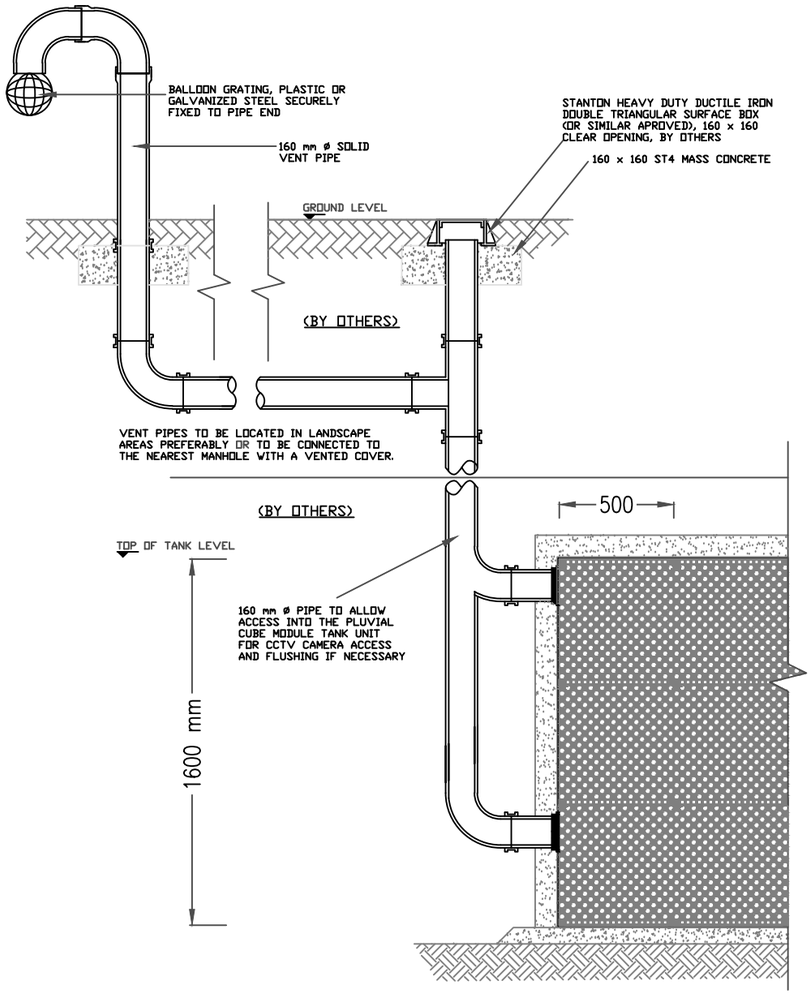
VENT/ACCESS TERMINATION DETAILS OPTIONS TO SUIT SITE AND ENGINEER REQUIREMENTS.



TYPICAL INLET/OUT PIPE CONNECTION

TYPICAL OUTLET PIPE CONNECTION

TYPICAL DETAILS OF ATTENUATION TANK USING PLUVIAL CUBE MODULAR UNITS

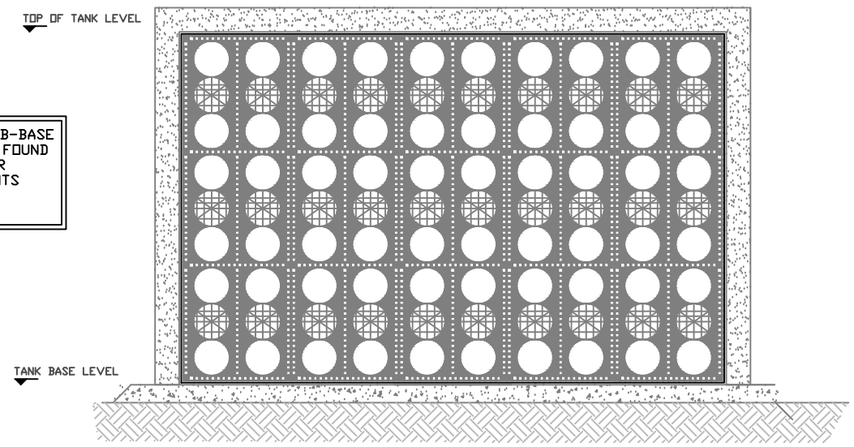


TYPICAL 160ø VENT/ACCESS PIPE CONNECTION

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.,

INLET/OUTLET PIPES MUST BE SUPPORTED WITH CONCRETE TO PROTECT IT DURING BACKFILLING

A 3 - 5% CBR HAS BEEN ASSUMED AT SUB-BASE LEVEL SHOULD THE CBR BE TESTED AND FOUND TO BE LESS THAN 3% THEN THE ENGINEER SHALL BE NOTIFIED. ALSO, ANY SOFT SPOTS FOUND AT SUB-BASE LEVEL SHALL BE REPORTED TO THE ENGINEER



TYPICAL DETAILS OF ATTENUATION TANK USING PLUVIAL CUBE MODULAR UNITS

(SECTION A-A)

Notes :-

1. ALL STORAGE TANK DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS, METHOD STATEMENTS AND RECOMMENDATIONS OF ENVIRONMENTAL SUSTAINABLE SOLUTIONS (ESS) LIMITED, ROCHDALE.

2. THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS / SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS ON SITE. ANY DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

3. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.

4. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.

5. ALL LEVELS AND DIMENSIONS SHALL BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS. ANY DISCREPANCIES SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

6. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS IN LINE WITH CURRENT LEGISLATION WHEN WORKING IN / NEAR CONFINED SPACES, DEEP EXCAVATIONS AND MACHINERY.

7. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY TO PROTECT PEDESTRIANS AND VEHICLES FROM THE WORKING AREAS.

8. TO PROTECT THE ESS PLUVIAL CUBE MODULAR ATTENUATION / STORAGE TANK FROM CONSTRUCTION SITE DEBRIS, THE CONTRACTOR SHALL ENSURE THAT STOPPERS ARE SECURELY PLACED IN ALL CONNECTIONS IMMEDIATELY UPSTREAM OF THE TANK UNITS, ONLY TO BE REMOVED ONCE THE FINAL CLEANING OF THE ROADS / DRAINAGE HAS BEEN COMPLETED.

9. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE, NO DEBRIS SHALL BE PERMITTED TO ENTER THE TANK STORAGE SYSTEM.

10. NUMBER OF VENT UNITS DEPENDS ON THE SIZE OF THE TANK (REFER LAYOUT DRAWING)

11. REFER SEQUENCE OF WORK DOCUMENT FOR DETAILED INSTALLATION METHODOLOGY (CONTACT ENVIRONMENTAL SUSTAINABLE SOLUTIONS (ESS) LIMITED)

R1	07/04/2020	TANK SIZE AMENDED

Notes :- All the Dimensions by Millimeters

ENVIRONMENTAL SUSTAINABLE SOLUTIONS (ESS) LIMITED
SOLUTION HOUSE
DANE STREET
ROCHDALE
OL11 4EZ
TEL: 01706 374416
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EMAIL: TECHNICAL@Y-ESS.COM

PROJECT
CIRCLE SQUARE PLOT 14

ATTENUATION TANK - DETAILS

TITLE
ATTENUATION STORAGE TANK DETAILS USING PLUVIAL CUBE MODULE UNITS.

Scale	Drawn	Checked
N.T.S.	MI	AY

Date	Drawing No.	Revision
07/04/2020	PCST - 3.0	R1

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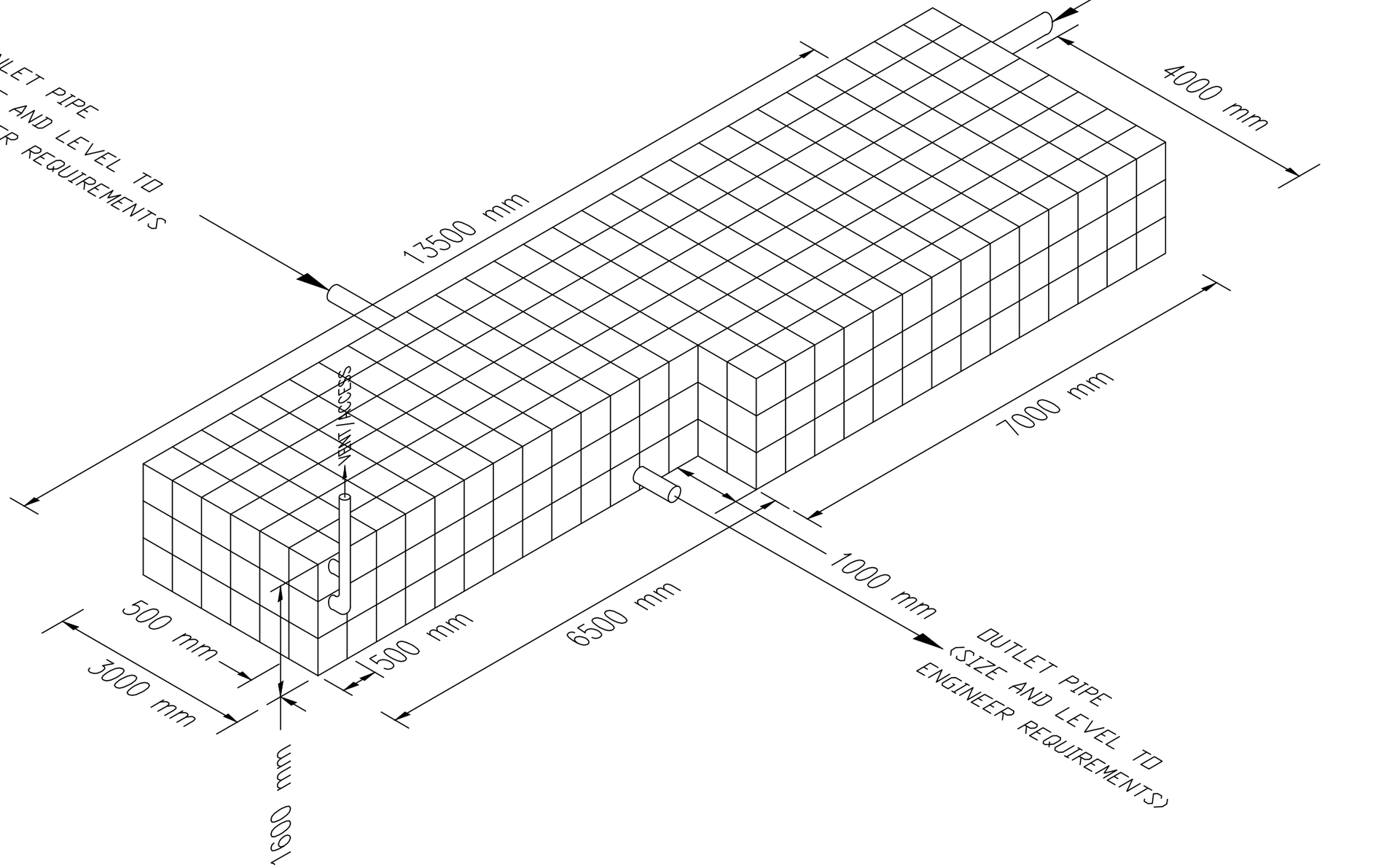

DIAGRAMATIC TANK LAYOUT (N.T.S)

ATTENUATION TANK
47.5m² x 1.6m DEEP = 76m³
(LEVELS TO THE ENGINEER REQUIREMENTS
PLEASE REFER TO THE LATEST DRAINAGE
LAYOUT PRIOR TO INSTALLATION)

© Copyright

Notes :-

1. ALL STORAGE TANK DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS, METHOD STATEMENTS AND RECOMMENDATIONS OF ENVIRONMENTAL SUSTAINABLE SOLUTIONS (ESS) LIMITED, ROCHDALE.

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9. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE, NO DEBRIS SHALL BE PERMITTED TO ENTER THE TANK STORAGE SYSTEM.

10. NUMBER OF VENT UNITS DEPENDS ON THE SIZE OF THE TANK (REFER LAYOUT DRAWING)

11. REFER SEQUENCE OF WORK DOCUMENT FOR DETAILED INSTALLATION METHODOLOGY (CONTACT ENVIRONMENTAL SUSTAINABLE SOLUTIONS (ESS) LIMITED)

R1	07/04/2020	TANK SIZE AMENDED

Notes :- All the Dimensions by Millimeters

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PROJECT
CIRCLE SQUARE PLOT 14

ATTENUATION TANK - LAYOUT

TITLE
ATTENUATION STORAGE TANK DETAILS USING PLUVIAL CUBE MODULE UNITS.

Scale	Drawn	Checked
N.T.S.	MI	AY

Date	Drawing No.	Revision
07/04/2020	PCST - 3.1	R1

PLUVIAL CUBE MODULE – DATA SHEET

Pluvial Cube Module Dimensions* (mm)	Module Configuration	Units per m^3	Module Volume (m^3)	Storage Volume (m^3)
500 (L) x 500 (W) x 550 (D)	Single	7.27	0.1375	0.132
500 (L) x 500 (W) x 1075 (D)	Double	3.72	0.2688	0.258
500 (L) x 500 (W) x 1600 (D)	Triple	2.5	0.4	0.384

***** Bespoke modules with different configuration available



Single Module



Double Module



Triple Module

Product Data	Standard Pluvial Cube Module	Heavy Duty Pluvial Cube Module
Application	Stormwater Management	Stormwater Management
Average Weight (kg) – single module	7	8
Compressive Strength* (kN/m^2)	320	400
Lateral Strength* (kN/m^2)	200	200
Long Term Creep Testing** (kN/m^2)	90	120
Void Ratio (%)	96	96
Surface Void Ratio (%)	Greater than 90	Greater than 90
Minimum Backfill Cover# (mm)	450	450
Maximum Backfill Cover (mm)	4500	5000
Material	Polypropylene	Polypropylene
Chemical resistance	Good	Good
Bacterial Resistance	Good	Good
UV Resistance	Good	Good

Note: Other Modules with Compressive Strength more than 1500 kN/m^2 available

* Modules tested using UKAS calibrated test machine, range 0 – 60 Tons, UDL, loading rate 0.2 kN/m^2

** Modules tested for long term creep testing for 90, 180 days and new ongoing test for 208 days.

\# Any cover less than 450 mm – contact ESS design department

Note: All Alderburgh products are manufactured to the highest quality, being subjected to rigid quality control. However the company cannot control conditions of application and use of its products, thus any warranty, written or implied, is given in good faith for materials only. Alderburgh Ltd will not accept any responsibility for damage or injury arising from storage handling, misapplication or misuse of its products. All transactions are subject to our standard condition of sales, copies of which are available on request. Product design and specification are subject to change without further notice

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ENVIRONMENTAL SUSTAINABLE SOLUTIONS LTD

ALDERBURGH
Sladen Mill Halifax Road Littleborough Lancashire OL15 OLB

GEOTEX 300 PP

DESCRIPTION

A needle punched non woven geotextile made from 100% virgin polypropylene staple fibres, UV resistant, produced without the addition of chemical binders and without thermal bonding of the filaments.

PRIMARY FUNCTIONS

Fabric used for ground stabilisation and membrane protection.
Enclosing granular layers in formed drainage systems.

TECHNICAL DATA

Roll Size:	Width	6 m	
	Length	50m, 100m	
Weight:	300g/m^2		
Fabric Thickness:	4.0mm nom.		BS 2544 AS
Tensile strength:	MD	13KN/M	BSEN ISO 10319
	CD	21KN/M	BSEN ISO 1996
Extension:	MD	103%	BSEN ISO 1996
	CD	80%	BSEN ISO 1996
Water Transmitivity	**@ 100mm head**	**140 lt/m/sec**	**BSEN ISO 10319**
Apparent Opening size	**90% finer**	**90 microns**	**BS6906 PE2 1989**
CBR (Puncture):	Part 4	2400N	
Displacement (mm) Cone PropTest (mm)		70 17mm	

The above are typical mean values of 5 samples taken at random for test purposes, as defined in BSEN ISO standard.

SPECIFICATION

The Geotex 300PP filter fabric should be specified by name with specific reference to the technical requirements of its use

GEOMEMBRANES

LDERPRUFE TUFLEX







Features

- Excellent Barrier Properties
- High Puncture Resistance
- Exceptional Multiaxial Stress and Strain Properties
- Good Tear Resistance
- High Surface Friction
- Good Low Temperature Behaviour
- Low Coefficient of Thermal Expansion
- Very Good Chemical Resistance
- Very Good UV Resistance
- Excellent Environmental Stress Crack Resistance (ESCR)
- Excellent Welding Properties - Wide Seaming Temperature Window

ALDERPRUFE

Tuflex

General Description

Alderprufe Tuflex is a single layer cold applied geomembrane suitable for environmental protection to structures, containments and cut-off trenches.

Alderprufe Tuflex combines excellent chemical resistance with low flexural modulus to provide a malleable, flexible membrane suitable for non-smooth surfaces and factory prefabrication to optimise on-site installation.

Alderprufe Tuflex is the ideal membrane for building protection systems and cut-off trench containment particularly on contaminated sites which would otherwise prove too difficult or costly to develop.

Building Protection Membrane

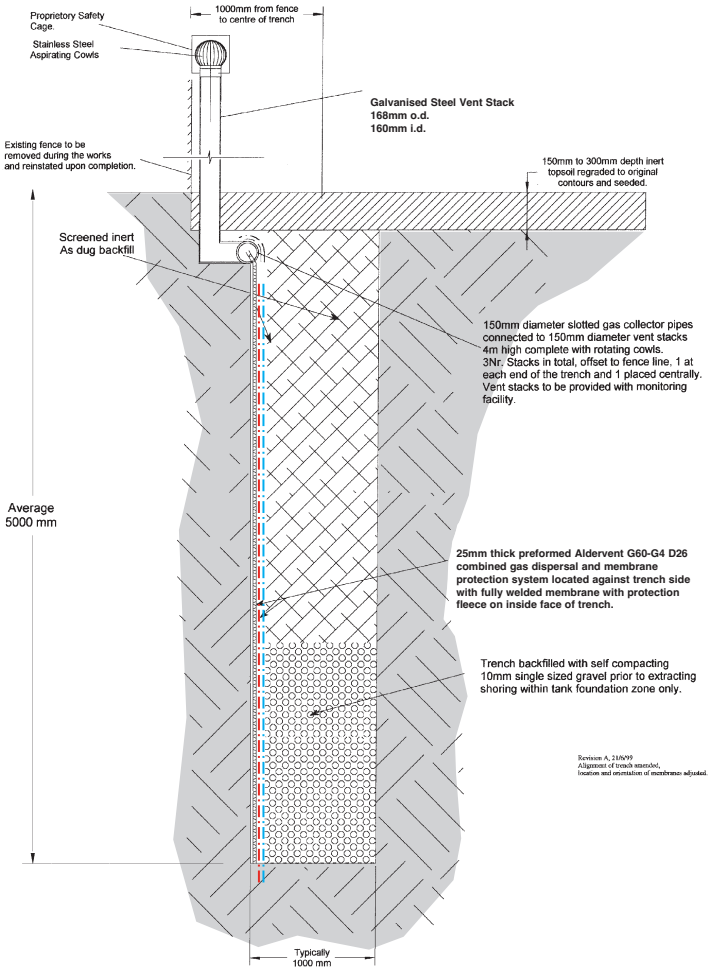
Applied as a Gas Barrier Membrane to protect the building against the ingress of all land borne gases - Methane, Carbon Dioxide and Radon. Tuflex is laid in a single layer over a prepared site. Due to its inherent weldability and on site quality assurance monitoring, the membrane is recommended to be laid by trained operatives certified for the purpose. On smaller sites factory fabricated panels can be supplied for application by others. Applied to cover the whole of the slab area above Aldervent gas ventilation system if required.

All membrane penetrations (i.e. steel stanchions and service entry points) to be sealed with factory formed units welded to the membrane on site.

At all points where the membrane passes through load bearing walls, Aldercourse Tuflex DPC or GRA DPC is installed and welded to the overlaying Tuflex membrane.



Pressure testing of welded joints (part of standard CQA procedures)



Membrane Protection

Protect finished membrane with Geotex or Alderway protection mats if following trades are erecting steel fabrication for slab reinforcement.

All punctures to be repaired by a minimum overlap of 150mm.

Cut-off Trench Containment

Alderprufe Tuflex has been successfully installed up to 8 metres deep as a vertical barrier to contain contaminants and gases on brown fields sites and around landfill.

Installed by accredited contractors.

Bespoke systems have been designed to suit site specific parameters.

Trilaminate membranes with exceptionally high puncture resistance are available.

Cut-off trenches for contaminant control, with large volume gas and liquid dispersal properties, are possible, utilising Aldervent Geogrid, Geovoid, or Geocell systems. (see separate data sheets.)





In-service performance

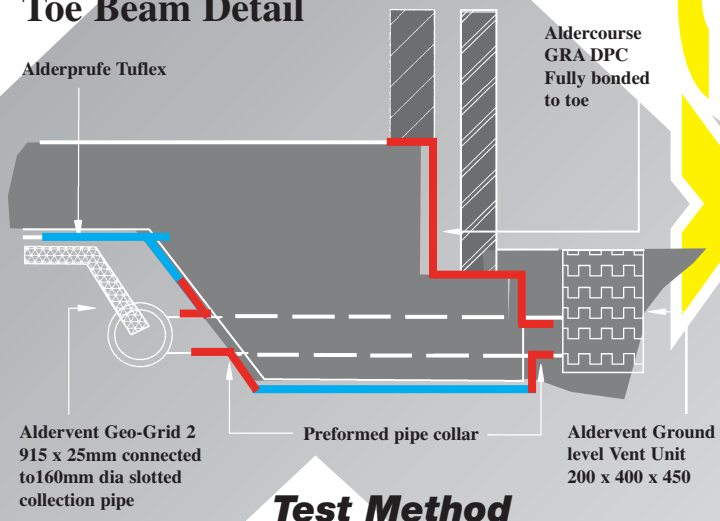
The demands made on Alderprufe Tuflex in landfill, water containment or pollution control are considerable. The flexibility of Alderprufe Tuflex is due to the polymeric structure of the resin. There are no plasticisers in the Alderprufe Tuflex formulation that can be leached out by exposure to chemicals or sunlight causing the membrane to become brittle.

Design and Specification

All Alderprufe Tuflex systems carry Product Guarantee Insurance including efficacy cover. Bespoke system designs with third party accreditation including P.I. cover are available to the developer to offer full security and warranties.

This product satisfies the criteria set out in BS 6920: Part 1: 1996 "Specification" and thus complies with the requirements of the Water Bylaws Scheme Tests of Effect on Water Quality (BS 6920: 1996). It is suitable for use with cold but not hot water.

Toe Beam Detail



Test Method

Thickness mm +/- 10%	0.75	1.0	1.5	ASTM D - 751
Density g/cm^3	0.9	0.9	0.9	ASTM D - 792
Tensile Stress @ break Min N/mm^2	13	18	26	ASTM D - 638
Elongation @ Break %	>700	>700	>750	ASTM D - 638
Puncture Resistance Min N	120	150	200	FTMS 101C Method 2065
Tear Resistance Min N	45	60	90	ASTM D - 1004
Dimensional Stability	+/-2%	+/- 2.0	+/-2%	ASTM D - 1204
% Change Max				1 Hr @ 1000C
Stress Crack Resistance	100%	100%	100%	ASTM 5397
Volatile Loss 5%	0.2	0.2	0.2	ASTM D - 1203
Loss Max				Method A
Ozone Resistance	No cracks	No Cracks	No Cracks	ASTM D - 1149
Carbon Black Content	2-3%	2 - 3%	2-3%	ASTM 1063
Moisture Vapour g/m^2/day	<0.01	< 0.1	<0.01	ASTM E96
Friction Angle (Non Woven Geotextile)		21^0		Shear Box
Methane Permeability	0.14	0.11	0.007	European standard g/m^2/day/atm
Methane Transmission Rate		1.8 x 10^{-9} m^3/m^2/s/atm		BRE
Permeability Coefficient		1,8 x 10^{-12}		

ALDERPRUFE





Alderprufe Tuflex possess exceptional flexibility, tear and puncture resistance qualities for all water containment projects, even at very low temperatures.

Ornamental ponds and water storage lakes used in landscaping and irrigation projects utilise the special attributes of the Alderprufe Tuflex geomembrane.









Alderprufe Tuflex geomembranes are used as liners and capping to contain both the gas and liquids produced by a landfill operation. The multiaxial strain qualities of Alderprufe Tuflex are so good that the geomembrane will resist out of plane forces caused by subsidence which occurs with differential waste consolidation and unstable site substrates

Tuflex



The flexibility of Alderprufe Tuflex geomembranes ensures that most ponds, ditches, lagoons, lakes and dams can be lined including those with inherently complex shapes.











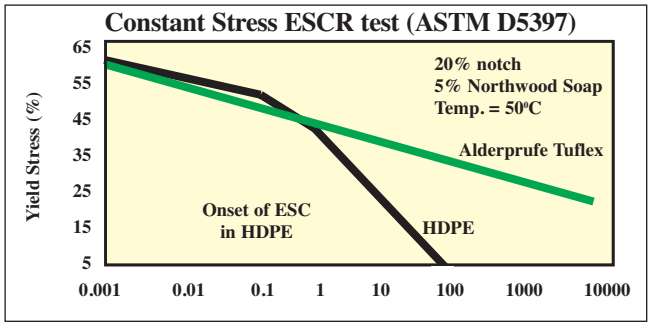


The exceptionally wide seaming temperature window ensures a reliable weld is achieved in most weather conditions. Fluctuations in temperature are not as critical as they are with other geomembranes.

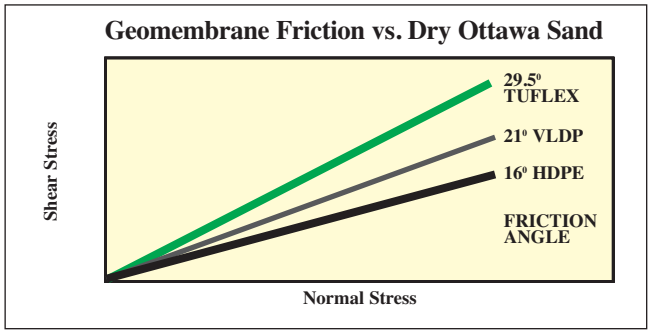
ALDERPRUFE

Tuflex

Environmental Stress Crack Resistance (NCTL)



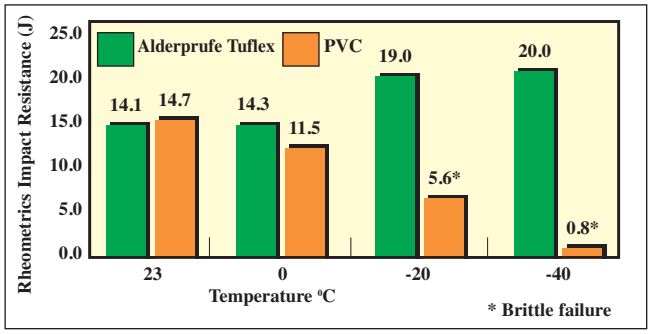
Comparative Friction Angles



Alderprufe Tuflex possesses outstanding environmental stress crack resistance compared to other materials. Alderprufe Tuflex also retains its flexibility at low temperatures and does not become brittle even at at temperatures as low as -40°C. This feature is particularly important as it enables the Geomembrane to be handled or installed during severe weather conditions or at high altitude.

The friction angle of Alderprufe Tuflex measured by this method is higher than that of all the commonly used smooth geomembrane materials. This allows the construction of steeper side slopes, increasing the capacity and, in the case of landfills, speeding up waste settlement.

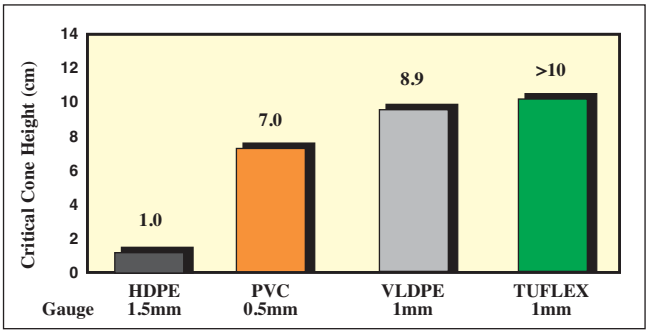
Low Temperature Impact Resistance

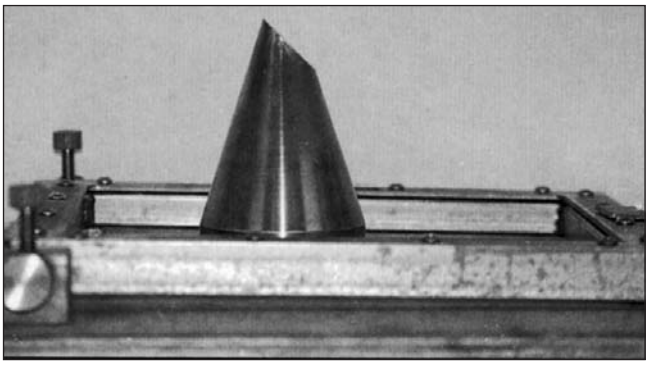


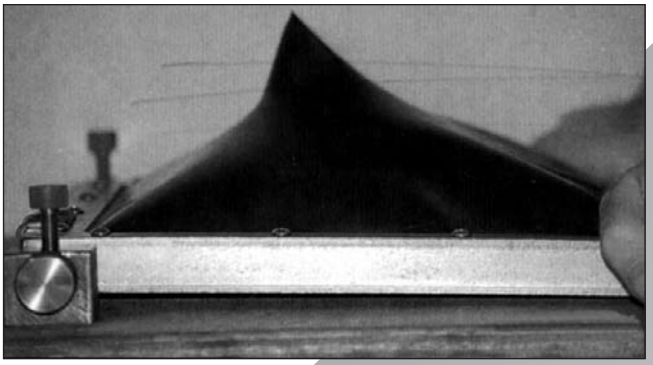
Puncture Resistance
Truncated Cone

Alderprufe Tuflex, when placed under load on uneven or rocky substrates, has an exceptionally high puncture resistance. It even exceeds the specifications of GRI test method GM - 3 and possesses the highest puncture resistance of all geomembrane materials measured by this test.

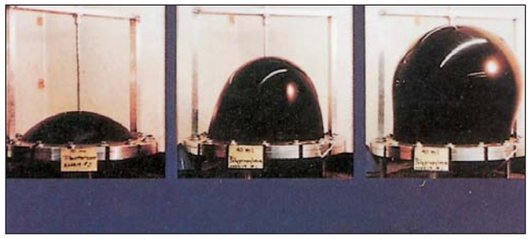
Alderprufe Tuflex readily conforms to projections and deforms easily when under static load. Stresses are evenly distributed throughout the material's structure as it deforms thus allowing the membrane to maintain its "barrier" properties when subjected to both short and long term static loads.







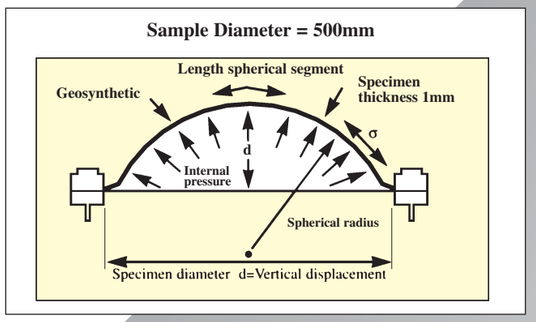
Large Scale Multiaxial Stress-Strain Test



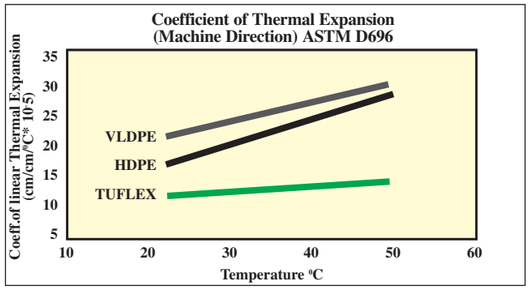
One of the most noteworthy features of Alderprufe Tuflex is the inherent ability to elongate when subjected to out of plane stresses. Localised deformation typically occurs in a landfill capping as the solid waste subsides or under slabs as piled sites are subject to ground subsidence.

The outstanding multiaxial performance of Alderprufe Tuflex is most beneficial in these applications where a high degree of subsidence is anticipated.

the excellent multiaxial elongation demonstrated by Alderprufe Tuflex indicates that it can accommodate more differential settlement than other membranes.

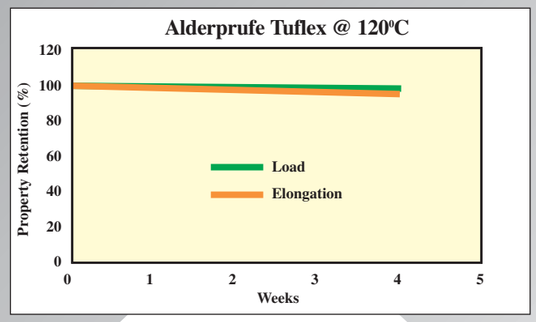


Coefficient of Thermal Expansion

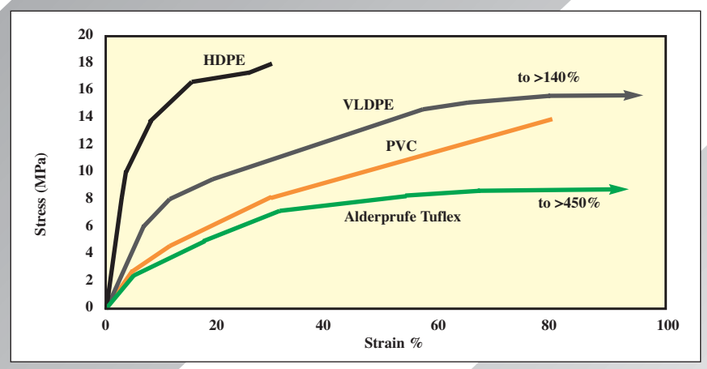


Alderprufe Tuflex has an unusually low coefficient of thermal expansion (CLTE), as little as half that of some other geomembranes. During installation, Alderprufe Tuflex geomembrane does not expand or contract as much and therefore forms fewer and smaller wrinkles. Also, placement of cover material may be simplified since the liner has a better tendency to lay flat. These factors lead to easier and higher quality installations.

Thermal Ageing tests of Alderprufe Tuflex Geomembranes



Geomembrane Multiaxial Stress-Strain Behaviour



The high melting point of Alderprufe Tuflex makes it particularly suitable for environments such as black liquor effluent ponds with operating temperatures of 70°C and solar ponds where liners must withstand temperatures fluctuating from 10° - 80°C. Alderprufe tuflex maintains its mechanical properties across an unusually broad range of temperatures.

TUFLEX-P CHEMICAL RESISTANCE

The following chemical resistance values are provided only as a guide

Chemical	Concentration	Temperature °C	Resistant
A			
Acetic acid	100%	50	S
Acetic anhydride	100%	50	S
Acetone	100%	50	S
Acrylonitrile	100%	50	S
Aluminium hydroxide		23	S
Aluminium sulphate	38%	23	S
Ammonia water (conc)	100%	30	S
Ammonium chloride	30%	50	S
Ammonium hydroxide	100%	23	S
Ammonium nitrate	50%	50	S
Ammonium phosphate(monobasic)	20%	50	S
Ammonium phosphate (di-basic)	24%	30	S
Ammonium sulphate	43%	30	S
Amyl acetate	100%	30	U
Amyl alcohol		30	S
Aniline		30	S
B			
Barium Chloride	27%	30	S
Barium Hydroxide	20%	30	S
Barium Sulphate	sat	30	S
Benzene		23	U
Benzyl alcohol			S
Boric acid	5%	30	S
N-butanol	100%	30	U
Butyraldehyde			
C			
Calcium carbonate	sat	50	S
Calcium chloride	50%	30	S
Calcium hydroxide	100%	23	S
Chloroacetic	25%	30	S
Chloroform	100%	23	U
Chlorosulphonic acid	98%	30	U
Chromic acid	50%	30	U
Citric acid	33%	30	S
Cresol (Meta)			U
Cupric chloride	sat	30	S
Cupric sulphate	sat	50	S
Cychlorohexane	100%	30	U
Cyclohexanol			
D			
Decalin		30	U
Di-butyl phthalate		30	S
Di-ethyl ether			U
Di-octyl phthalate		30	S
Dimethylamine	40%	23	S
E			
Ethanediol	40%	23	S

Chemical	Concentration	Temperature °C	Resistant
Ethanol	100%	23	S
Ethyl acetate	50%	23	S
Ethyl alcohol (denatured)		30	S
Ethylene glycol	100%	23	S
F			
Ferric chloride	15%	30	S
Ferric sulphate	17%	30	S
Formaldehyde	37%	23	S
Formic acid	99%		U
Furfural		30	S
G			
Gasoline	35%	23	U
Glycerine		30	S
H			
Hexane	100%	23	U
Hydrochloric acid		30	S
Hydrofluoric acid	40%	30	S
I			
Indolene			U
Iso-butyraldehyde			
Isoctane			U
Isopropanol	30%	23	U
Iso-propyl ether			U
K			
Kerosene	100%		U
L			
Lactic acid	pure	50	S
Linseed oil			U
M			
Magnesium chloride	sat	30	S
Methanol	50%	23	S
Methylene chloride	100%	23	U
Methyl acetate			U
Methyl alcohol			S
Methyl ethyl ketone			U
Methylisobutylketone	60%	23	S
Methyl methacrylate			U
N-methylmorpholine oxide	60%	23	S
N			
Nickel chloride	33%	30	S
Nickel sulphate	50%	30	S
Nitric acid	38%	30	S
Nitric acid	65%		U

The following chemical resistance values are provided only as a guide

Chemical	Concentration	Temperature °C	Resistant
Nitrobenzene			U
N-n-di-methyl formamide			
O			
Oil ASTM 1	pure		U
Oil ASRM 2	pure		U
Oil ASTM 3	pure		U
Oil OB/22-AT	35%		U
Oil of Linseed	pure	30	U
Oil of olive	pure	23	U
Oil of chicken	pure	23	U
Oil of beef	pure	23	U
Oil of pork	pure	23	U
Oleum			U
Oxalic acid	10%	30	S
P			
Pentane	pure	23	U
Phenol	sol.	30	S
Phophoric acid	85%	30	S
Potassium bi-chromate	20%	30	S
Potassium bromide	sat.	23	S
Potassium chloride	27%	30	S
Potassium hydroxide	50%	30	S
Potassium iodide	57%	30	S
Potassium phosphate	17%	30	S
Potassium sulphate	11%	30	S
N-propanol	pure	23	S
Propionic acid	100%	23	S
Propyl ether			U
N-propyl nitrate			U
Pyridine			U
S			
Sodium chloride	sat.	23	S

Chemical	Concentration	Temperature °C	Resistant
Sodium hydroxide	50%	23	S
Sodium hydroxide	100%	50	S
Sodium hyperchloride	20%	30	S
Sodium hyperchlorite	20%	30	S
Sodium nitrate	43%	30	S
Sodium phosphate (monobasic)	43%	30	S
Sodium sulphate	40%	30	S
Sodium thiosulphate	45%	30	S
Solna 100	30%	23	U
Stearic acid	100%	50	S
Sulphuric acid	35%	23	S
Sulphuric acid	50%	50	S
Sulphuric acid	96%		U
T			
Tannic acid	10%	30	S
Tartaric acid	20%	30	S
Tetralin	100%	23	U
Tin chloride	62%	30	S
Toluene	pure	50	U
Tri-butyl phosphate			U
Trichloroethylene	pure	50	U
Triethanolamine		30	S
V			
Vaseline oil	pure	30	U
W			
Wine	pure	30	S
X			
Xylene	pure	30	U

CODE:

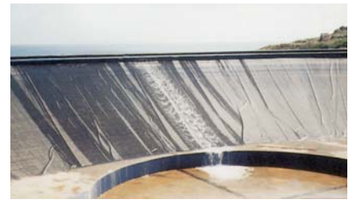
S = Satisfactory
L = Limited application possible
U = UNSATISFACTIORY
\- = Not tested

CONCENTRATION:

Sat. sol. = Saturated aqueous solution

prepared at 20°C (68°F)
sol = aqueous solution with concentration above 10% but below saturation level
dil. sol = diluted aqueous solution with concentration below 10%
cust. conc = customary service concentration





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Alderburgh Limited.
Sladen Mill, Halifax Road, Littleborough, OL15 0LB.
For Further Assistance Tel: 01706 374416, Fax: 01706 376785

E&OE. Without Guarantee.

Technical Specification

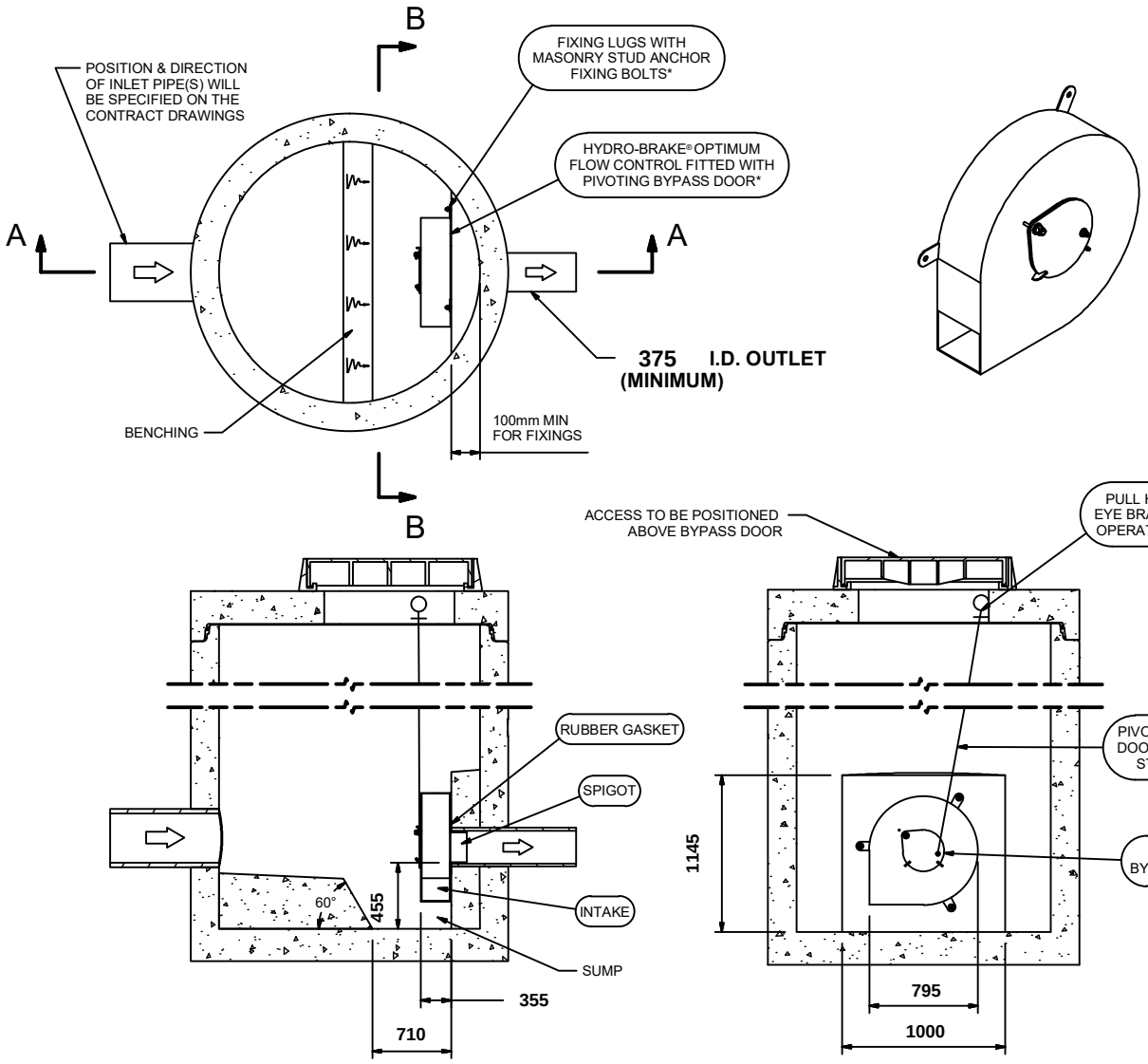
Control Point	Head (m)	Flow (l/s)
Primary Design	0.700	72.000
Flush-Flo™	0.461	71.948
Kick-Flo®	0.636	68.688
Mean Flow		51.242

Hydro-Brake® Optimum Flow Control including:

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

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

WRc Approved PT/329/0412



SECTION A-A

SECTION B-B

IMPORTANT: ⬭ LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

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

DESIGN ADVICE

The head/flow characteristics of this SHE-0348-7200-0700-7200 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.

Hydro International®

DATE	6/3/2019 2:32 PM
SITE	Circle Square Plot 234
DESIGNER	Andrew Losty
REF	CS

SHE-0348-7200-0700-7200
Hydro-Brake® Optimum

© 2019 Hydro International Ltd, Shearwater House, Clevedon Hall Estate, Victoria Road, Clevedon, BS21 7RD. Tel; 01275 878371 Fax; 01275 874979 Web; www.hydro-int.com Email; enquiries@hydro-int.com

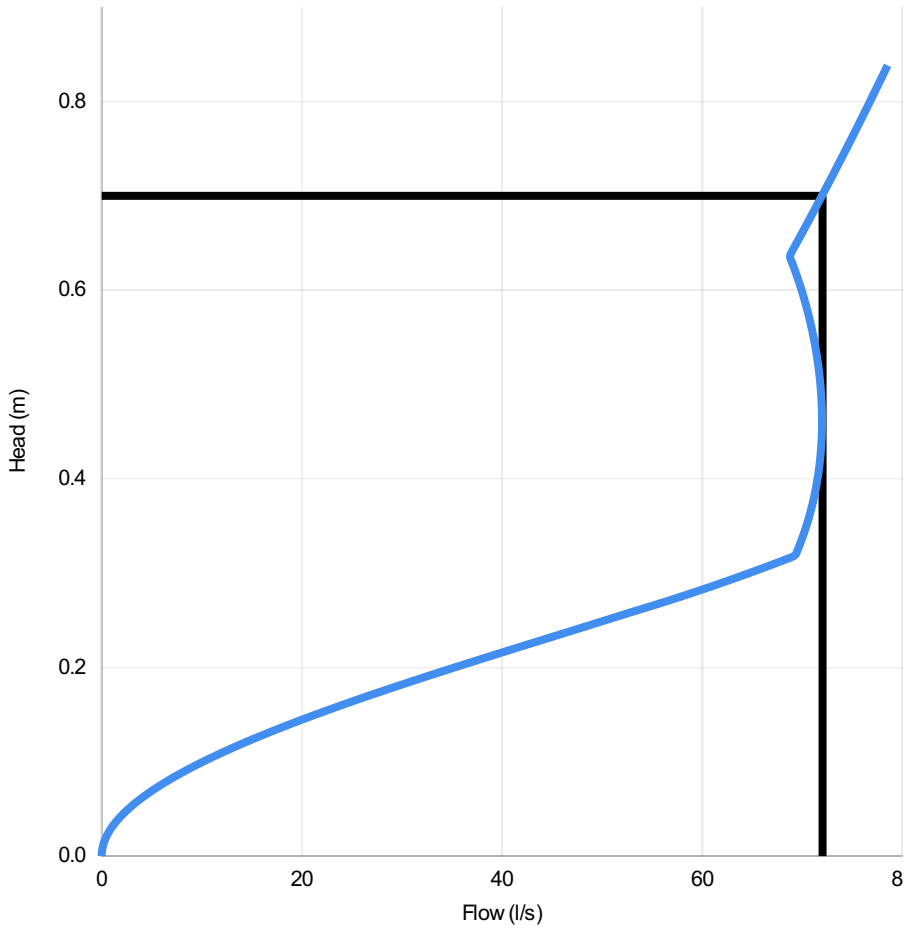
andy.losty@curtins.com

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.700	72.000
Flush-Flo	0.461	71.948
Kick-Flo®	0.636	68.688
Mean Flow		51.242

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

WRc APPROVED
PT/329/0412



Head (m)	Flow (l/s)
0.000	0.000
0.024	0.636
0.048	2.489
0.072	5.464
0.097	9.458
0.121	14.359
0.145	20.044
0.169	26.380
0.193	33.218
0.217	40.390
0.241	47.701
0.266	55.016
0.290	61.922
0.314	68.142
0.338	69.996
0.362	70.718
0.386	71.263
0.410	71.641
0.434	71.866
0.459	71.948
0.483	71.896
0.507	71.718
0.531	71.420
0.555	71.002
0.579	70.465
0.603	69.803
0.628	69.009
0.652	69.496
0.676	70.728
0.700	71.937

DESIGN ADVICE

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

Hydro International®

DATE	03/06/2019 14:32
Site	Circle Square Plot 234
DESIGNER	Andrew Losty
Ref	CS

SHE-0348-7200-0700-7200

Hydro-Brake Optimum®

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Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.700	25.000
Flush-Flo™	0.330	24.990
Kick-Flo®	0.561	22.500
Mean Flow		19.771

Hydro-Brake® Optimum Flow Control including:

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

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

WRc Approved PT/329/0412

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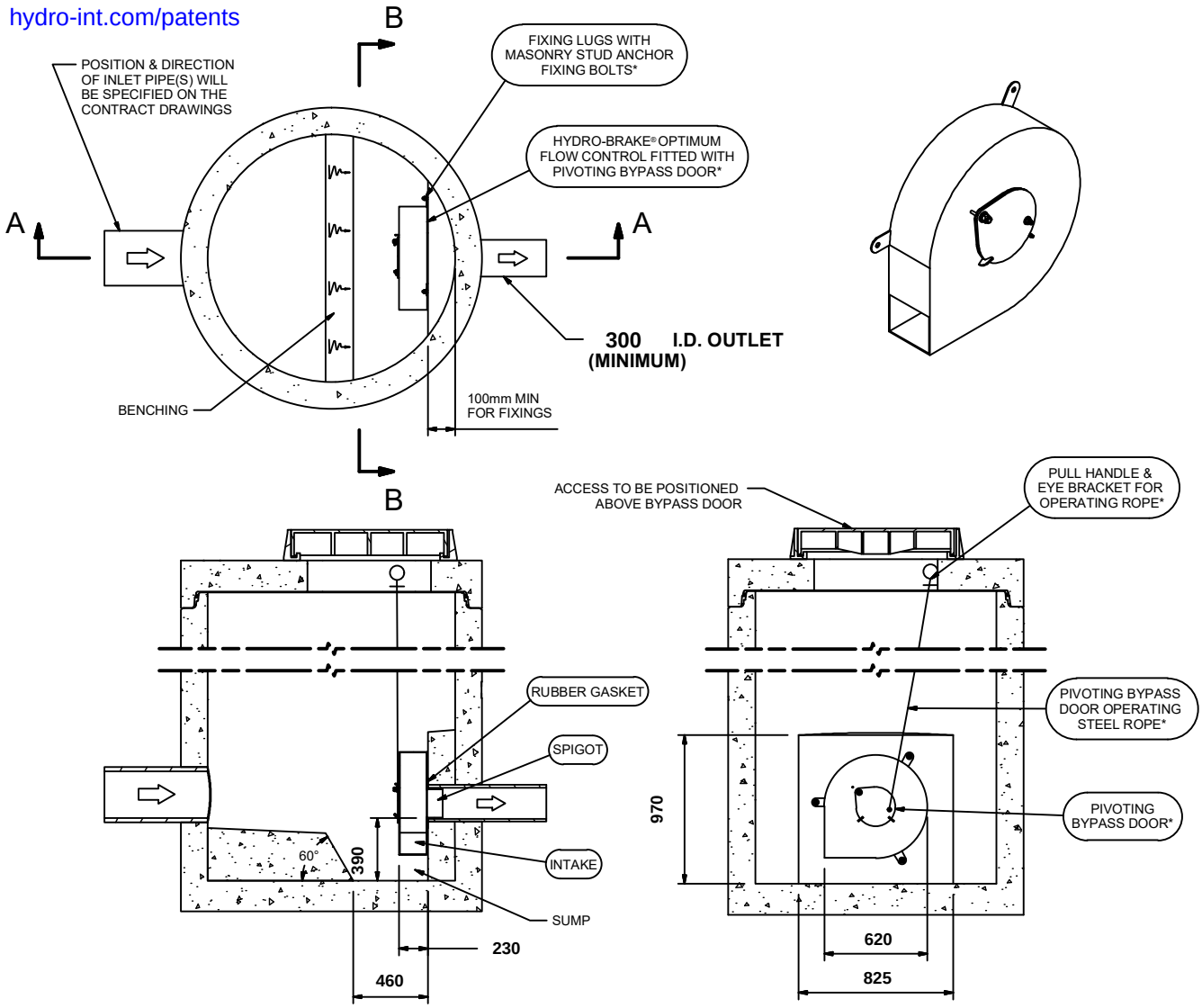

SECTION A-A

SECTION B-B

IMPORTANT:
LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
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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-0222-2500-0700-2500 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.

Hydro International®

DATE	1/20/2020 10:04 AM
SITE	Plot 14
DESIGNER	Andrew Losty
REF	064428

SHE-0222-2500-0700-2500

Hydro-Brake® Optimum

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andylosty@hotmail.com

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.700	25.000
Flush-Flo	0.330	24.990
Kick-Flo®	0.561	22.500
Mean Flow		19.771

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

WRc APPROVED
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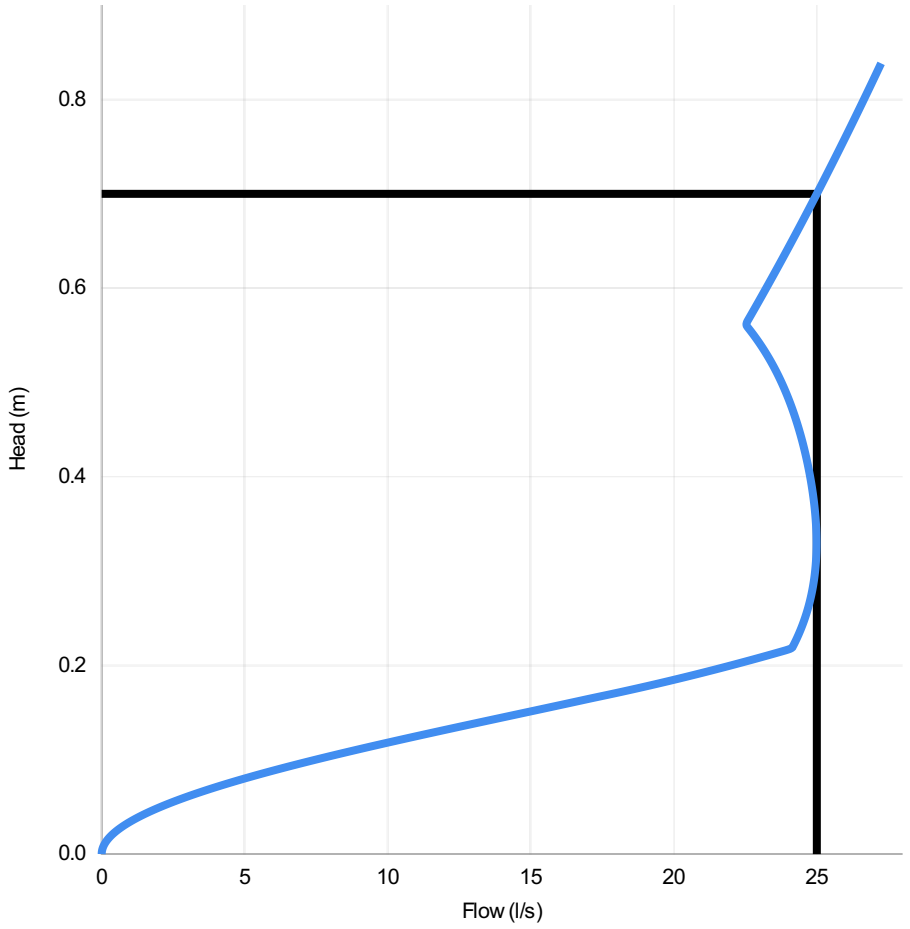

Head (m)	Flow (l/s)
0.000	0.000
0.024	0.498
0.048	1.920
0.072	4.138
0.097	7.008
0.121	10.363
0.145	14.004
0.169	17.705
0.193	21.112
0.217	24.069
0.241	24.478
0.266	24.735
0.290	24.897
0.314	24.976
0.338	24.987
0.362	24.939
0.386	24.842
0.410	24.701
0.434	24.519
0.459	24.290
0.483	24.009
0.507	23.659
0.531	23.221
0.555	22.671
0.579	22.844
0.603	23.292
0.628	23.731
0.652	24.162
0.676	24.584
0.700	24.999

DESIGN ADVICE

The head/flow characteristics of this SHE-0222-2500-0700-2500 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.**

Hydro International®

DATE	20/01/2020 10:04
Site	Plot 14
DESIGNER	Andrew Losty
Ref	064428

SHE-0222-2500-0700-2500

Hydro-Brake Optimum®

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The Smart Sponge® Family

Smart Filter® Chamber Range

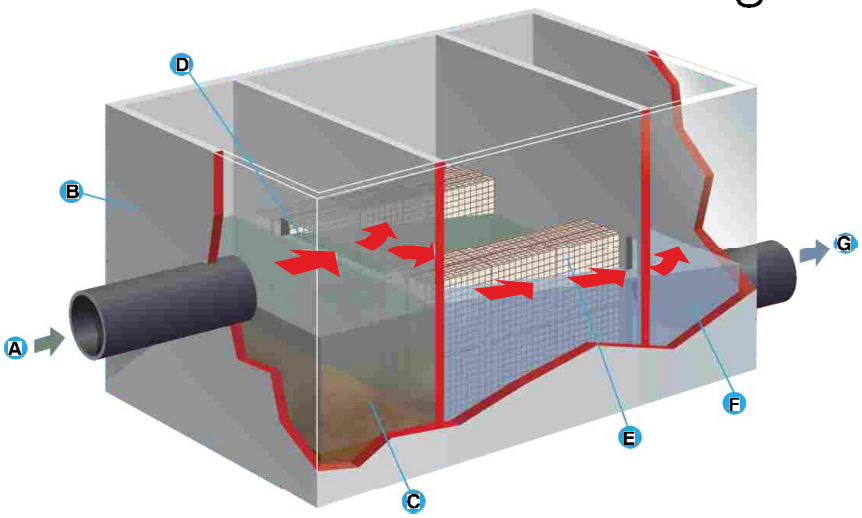

Diagram Key

A. Inflow

B. Lightweight composite chamber with vehicle loading capability

C. Chamber with weir to trap sediment

D. Flow passes through Smart Paks and through side orifices

E. Smart Paks to absorb hydrocarbons

F. Collection chamber with outlet to sewer

G. Outflow

Note: Arrows show direction of water flow

Smart Filters® for Highways, Large Catchment Areas etc:

Specifically designed for extreme storm events and larger flow situations, the basic principles of the smaller Smart Filters® can be adapted to virtually any flow and also adapted to site restrictions.

The Smart Filters® come in several standard modular chamber sizes but can also be manufactured bespoke to suit specific site conditions. Contaminated wastewater enters the system into a settlement chamber and passes through an orifice into a distribution chamber and then is passed through the Smart Sponge® units (Paks) which removes up to 95% of all hydrocarbons. The cleaned water then passes through purpose designed side orifices to exit the treatment chamber via the outlet pipe.



Smaller Smart Filter® being lowered into position

Smart Filter's® Advantages:

- Treats 100% of the storm flow
- Removes 95% of hydrocarbons
- Removes heavy metals & silts
- Can cope with extreme conditions
- Shallow excavations
- Low head drop
- Modular design
- Virtually any flow catered for
- Waste product 100% recyclable
- Easy maintenance procedure

Prod No.	Description	Dimensions WxLxH	Treated Flow (l/s)	Max Flow (l/s)	380 x 380 Smart Paks	Pak Height (no.)	Aux Silt Capacity	Max Oil Capacity	Head Drop across unit
SF03.1A	Smart Filter®44 l/s Flow, c/w 200mm dia pipes	0.8 x 1.2 x 1.2	10.9	44	4	1	190 litres	48 litres	380mm
SF03.1B	Smart Filter®88 l/s Flow, c/w 300mm dia pipes	0.8 x 1.2 x 1.2	21.7	88	8	1	75 litres	96 litres	380mm
SF03.2A	Smart Filter®130 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	32.6	130	12	1	210 litres	144 litres	380mm
SF03.2B	Smart Filter®265 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	70.4	265	24	2	420 litres	288 litres	760mm
SF03.2C	Smart Filter®350 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	94	350	32	2	75 litres	384 litres	760mm
SF03.3A	Smart Filter®400 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	117	425	40	2	275 litres	480 litres	760mm

N.B. A suitable hydrodynamic separator (HDS) should be utilised prior to the Smart Filter® to remove the majority of silt from entering the filter. An auxilary silt storage, is provided as a fail safe on all units. Treated Flow calculations are calculated according to first flush effect for typical storms.

Tel 01226 794135 Fax 01226 791531 E-mail environmental@naylor.co.uk Web: www.naylor.co.uk

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THE SMARTER SOLUTION TO:
Quick Installation & Maintenance

Passive Skimmers

It is intended that proactive checks are completed on a six monthly basis, any remedial work will be managed reactively.

1. Fix a tether rope to the absorbent Passive Skimmer and record the weight in Kg
2. Fix the tether so that the Passive Skimmers can be recovered but allowing the skimmer to float freely.
3. Every 6 months withdraw the Passive Skimmer, shake off excess water and check and record weight. If weight is above trigger value replace skimmer.

Passive Skimmers are deemed spent if their weights are greater than:

Size	Dry Weight	Spent Weight
PS1313 (Small)	0.5kg ☑	2.0kg (approx. 2.4 litres) ☒
PS1818 (Medium)	0.9kg ☑	3.6kg (approx. 4.2 litres) ☒
PS2727 (Large)	1.9kg ☑	7.6kg (approx. 9.0 litres) ☒



Passive Skimmers are available in Small, Medium and Large packs
PS1313 (Small) shown

Smart Gully Adaptor®

Smart Gully Adaptor.® Instructions for SGA Installation and Maintenance.



Insert the back plate into the rodding eye of the gully



Slide the front plate with Smart Pak in down onto the back plate



Back plate will lock into position on the tabs provided



Remove the front plate by sliding upward



Weigh the unit with Smart Pak in



Remove and replace spent Smart Pak



Install new Smart Pak and refit

Size	Dry Weight	Spent Weight
SMPK (150X150X62.5)	0.5kg ☑	1.2kg (approx. 1.4 litres) ☒

Smart Paks - Smart Filters®

It is intended that proactive checks are completed on a six monthly basis, any remedial work will be managed reactively.

1. Open the top of the Smart Filter® & using the plastic ties lift out the wire cage containing the Smart Paks, snip the plastic ties & remove the individual Smart Pak, shake off excess water & weigh the Smart Pak and record this on the maintenance schedule.
2. If the recorded weight is greater than twice the dry weight, replace the Smart Paks accordingly with new ones. If less than twice the weight, a changeover date can be calculated based on the relative weights.
3. Relace the Smart Paks back in the wire cages, renewing any plastic ties to hold the cages closed and slide the cage back into

Size	Dry Weight	Spent Weight	Size	Dry Weight	Spent Weight
SMPK1212-2.5	1.95kg ☑	4.6kg ☒	SMPK1515-2.5	2.9kg ☑	7.2kg ☒
SMPK1212-3	2.22kg ☑	5.5kg ☒	SMPK 1515-3	3.5kg ☑	8.7kg ☒

Smart Pak weights before and after application (assumes a non confined unit).

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THE SMARTER SOLUTION TO:

Quick Installation & Maintenance

Ultra-Urban® Filters

The Ultra-Urban® Filters can be installed as a drop in unit with a collar or as a slot in system secured to the side of the gully or inlet with brackets.









The Ultra-Urban® Filter Is Easily Installed

Installation time varies depending upon mounting devices selected. A single mounting bracket made of 16-gauge galvanised steel is required for the installation of the Curb Opening (CO) series. The Ultra-Urban ® Filter should not be installed where modules obstruct the drain pipe outlet. The size of the drain should allow room for stormwater over flow. The Drain Inlet (DI) series Ultra-Urban® Filter will suspend from the drain into the catch basin through a structural plasic mount and funnel mechanism.

Low Maintenance

The Ultra-Urban® Filter should be serviced as needed to remove sediment and debris, according to expected debris accumulation. The sediment and debris can be quickly vacuumed out of the modules through the opening of the drain with conventional maintenance equipment. Under normal operating conditions the Ultra-Urban® Filter should be replaced every 1-3 years.

Prod No.	Dry Weight	Spent Weight	Litres
UUF1414N	9.1kg	27kg	21Ltr
UUF1414H	5.9kg	17kg	13Ltr
UUF1616N	10.9kg	32kg	25Ltr
UUF1616H	8.2kg	24kg	19Ltr
UUF2020N	13.6kg	40kg	31Ltr
UUF2020H	10kg	30kg	24Ltr

Smart Sponge® & Smart Sponge® **PLUS** technology effectively and efficiently reduces the amount of coliform bacteria, debris and hydrocarbons, to keep the UK's beaches, marinas, airports regulations in compliance with Bathing Water Directive and Stormwater regulations.



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SMART sponge®

A revolutionary new product that is taking the global surface water market by storm

BRITISH WATER
expertise worldwide

Naylor Industries plc - more than 100 years of manufacturing and supply to the Construction Industry

- Vitrified clay pipe systems for trench and trenchless installation
- Thermachem - Chemical Drainage and Industrial Ceramics
- Band-Seal couplings for the repair of and connections into existing pipelines
- Plastic Land Drainage, Twinwall Ducting Systems and Access Boxes
- Yorkshire Flowerpots, a range of frostproof plant pots

INVESTORS IN PEOPLE | Silver

NAYLOR ENVIRONMENTAL

A MEMBER OF THE NAYLOR GROUP OF COMPANIES

NAYLOR ENVIRONMENTAL
CLOUGH GREEN
CAWTHORNE
BARNSLEY
SOUTH YORKSHIRE, S75 4AD

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Ref: ENVIRO1214

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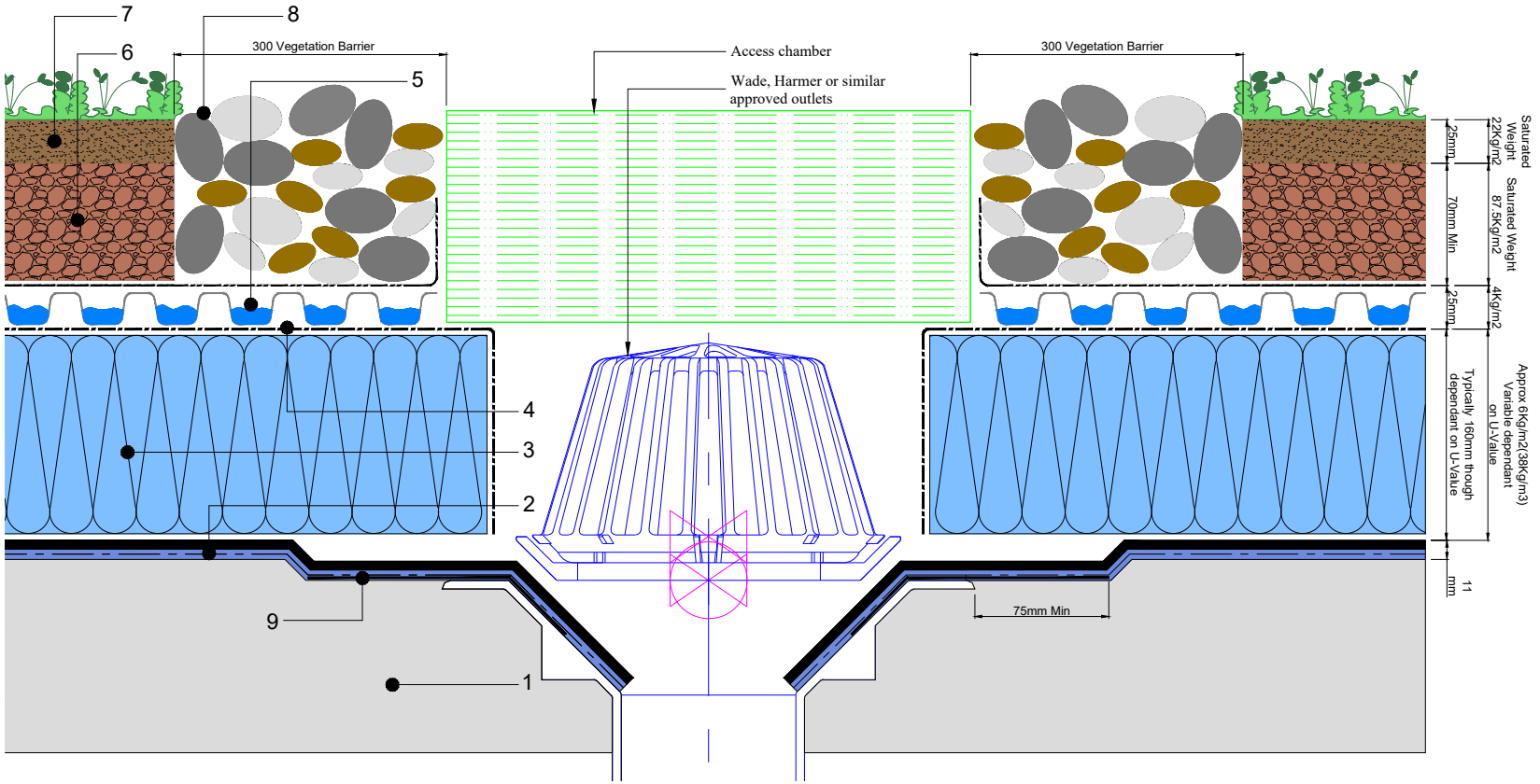

1. Concrete deck
2. Permaquik 6100 system
   - > Radmat Permaquik 6100 3mm hot melt membrane
   - > Radmat 2016 reinforcement fleece
   - > Radmat Permaquik 6100 3mm hot melt membrane
   - > Radmat 5mm root barrier membrane
3. Extruded polystyrene insulation board
4. Min-K thermal sheet
5. Radmat D25 water retention & drainage board, G12 filter membrane
6. Radmat 100% recycled green roof growing media
7. Pregrown roof garden mat
8. 300mm wide ballast margin
9. Radmat 2060 uncured neoprene rubber strap

Note: Expected rainwater retention from 20 litres/m2

PRELIMINARY	
FOR APPROVAL	x
FOR CONSTRUCTION	
AS BUILT	

No.	Revision/Issue	Date

NOTES

PROJECT.	CIRCLE SQUARE - MANCHESTER		
TITLE.	RADMAT - INVERTED PERMAQUIK 6100 SEDUM BLANKET		
CLIENT.	BOWMER & KIRKLAND	DRAWN BY	ADAM WALTERS
DATE.	17/12/2018	DRAWING No.	301
SCALE.	NTS @ A4		
CONTRACT No.	C2647	REV.	-

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ALLARD CONSTRUCTION
Unit 28, Bradmarsh Business Park, Bow Bridge Close,
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Tel: 01709 782 322
Email: info@allardconstruction.co.uk
Web: www.allardconstruction.co.uk

ALL DIMENSIONS IN MM

DO NOT SCALE THIS DRAWING

Radmat
building products
GUARANTEED ROOFING SOLUTIONS

MedO
SedumPlus

Product Data Sheet





A low maintenance, drought resistant, ready to lay sedum vegetation blanket (Mat).

SedumPlus

Product Data Sheet

General Information

Radmat SedumPlus sedum blanket is a low maintenance, drought resistant, ready to lay sedum vegetation blanket (Mat). Grown in the UK SedumPlus comprises sixteen varieties of sedum pre-grown in a strong biodegradable 450g/m² felt mat made from recycled British textiles.

Providing a variety of colour and interest, Radmat SedumPlus has been specially developed to provide a variety of different leaf types and flowers throughout the year whilst enhancing biodiversity. Colours range from greens through to vibrant reds, oranges, purples and browns at appropriate times of the Spring and Summer.

Installation instructions

Unroll over a suitably prepared and irrigated Radmat growing medium. Loosely butt sides and ends. Once installed irrigate for the prescribed period based on season.

Directions of applications

Delivery Form Rolls

Storage and transport 48m² Delivered on a pallet. Store flat.

Product Dimensions

Subject	Performance	Unit
Vegetative Coverage	80	%
Length	2.0	m
Width	0.6 or 1.2	m
Thickness	25	mm
m² / roll	1.2 or 2.4	m²
Weight / m² (saturated)	25	kg

Species mix

Variety	Common name	Description
Sedum Stoloniferum	Stolon Stonecrop	20cm, pink, starshaped flowers, red stems
Sedum Pulchellum	Widow's-cross	10cm, brilliant pink, rich flowering, lush green foliage
Sedum Oreganum	Oregon stonecrop	5cm, yellow, forms cushions, red-brown in sunlight.
Sedum Montanum	Jenny	20cm, golden, dark green needle-like foliage.
Sedum hybridum	Czars Gold	15cm, golden, rich flowering, reddish stems, ever green carpet
Sedum hispanicum	Spanish Stonecrop	10cm, cushion plant, whitish-pink, grey-green cushions.
Sedum Floriferum	Bailey's Gold	10cm, golden, evergreen, crenate foliage.
Sedum Ellacombianum	Selskianum hort	10cm, yellow, unbranched stems and scalloped leaves.
Sedum aizoon	Euphorbioides	40cm, abundant yellow star shaped flowers.
Sedum acre	Oktoberfest	6cm, bright cream-white starflowers, fresh green cushions.
Sedum acre	Yellow	6cm, yellow, mat-forming.
Sedum album	White	10cm, white umbel panicles.
Sedum Spurium	Coccineum	15cm, dark pink flowers.
Sedum Sexangulare	Tasteless Stonecrop	8cm, lemon yellow, dense sweet smelling foliage.
Sedum Reflexum	Crooked Yellow Stonecrop	30cm, yellow flowers with grey leaves.
Sedum telephium	Fabaria	40cm, dense purple-red umbels, dark stemmed, strong blue-green foliage. Attracts bees.

This information given in good faith and is based on the latest knowledge available to Radmat Building products Ltd. Whilst every effort has been made to ensure that the contents of the publication are current while going to press, customers are advised that products, techniques and codes of practice are under constant review and liable to change without notice.

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