

Portland Consulting Engineers		Page 5
10 Bankside The Watermark Gateshead Tyne & Wear NE11 9SY	Extra Care Hebburn	
Date 12/07/2023 File SW CALCS 26.06.23.MDX	Designed by KC Checked by SH	
Innovyze	Network 2020.1.3	

Online Controls for Storm

Hydro-Brake® Optimum Manhole: 22, DS/PN: 1.012, Volume (m³): 3.2

Unit Reference	MD-SHE-0108-6000-1500-6000
Design Head (m)	1.500
Design Flow (l/s)	6.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	108
Invert Level (m)	36.822
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	6.0
Flush-Flo™	0.448	6.0
Kick-Flo®	0.918	4.8
Mean Flow over Head Range	-	5.3

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	3.7	1.200	5.4	3.000	8.3	7.000	12.4
0.200	5.4	1.400	5.8	3.500	8.9	7.500	12.8
0.300	5.8	1.600	6.2	4.000	9.5	8.000	13.2
0.400	6.0	1.800	6.5	4.500	10.1	8.500	13.6
0.500	6.0	2.000	6.9	5.000	10.6	9.000	14.0
0.600	5.9	2.200	7.2	5.500	11.1	9.500	14.4
0.800	5.4	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

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Gateshead Tyne & Wear
NE11 9SY

Extra Care Hebburn

Date 12/07/2023
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Network 2020.1.3

Micro Drainage

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

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.350

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 17.700 Cv (Winter) 0.840

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, 240, 360, 480, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level
									(m)
1.000	1 15	Winter	1	+0%	100/15	Summer			38.152
1.001	2 15	Winter	1	+0%	100/15	Summer			38.065
1.002	3 15	Winter	1	+0%	100/15	Summer			37.989
2.000	4 15	Winter	1	+0%	100/15	Summer			38.138
1.003	4 15	Winter	1	+0%	100/15	Summer			37.977
1.004	5 15	Winter	1	+0%	100/15	Summer			37.780
1.005	7 15	Winter	1	+0%	30/15	Winter			37.558
1.006	8 15	Winter	1	+0%	100/15	Summer			37.496
1.007	9 15	Winter	1	+0%	30/15	Summer			37.286
3.000	12 15	Winter	1	+0%	100/15	Summer			38.054
3.001	11 15	Winter	1	+0%	100/15	Summer			37.883
4.000	11 15	Winter	1	+0%	100/15	Summer			38.270
3.002	12 15	Winter	1	+0%	30/15	Winter			37.558
3.003	13 15	Winter	1	+0%	30/15	Summer			37.467
5.000	14 15	Winter	1	+0%					38.282
5.001	15 15	Winter	1	+0%	100/15	Summer			37.894
3.004	14 15	Winter	1	+0%	30/15	Summer			37.388
6.000	13 15	Winter	1	+0%					38.284
6.001	18 15	Winter	1	+0%	100/15	Summer			37.556

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

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)						
1.000	1	-0.245	0.000	0.07			4.6	OK	
1.001	2	-0.247	0.000	0.07			4.6	OK	
1.002	3	-0.294	0.000	0.07			6.4	OK	
2.000	4	-0.187	0.000	0.06			2.0	OK	
1.003	4	-0.275	0.000	0.16			18.5	OK	
1.004	5	-0.257	0.000	0.21			25.1	OK	
1.005	7	-0.236	0.000	0.30			29.6	OK	
1.006	8	-0.244	0.000	0.26			31.1	OK	
1.007	9	-0.243	0.000	0.21			31.9	OK	
3.000	12	-0.246	0.000	0.07			5.8	OK	
3.001	11	-0.229	0.000	0.12			10.3	OK	
4.000	11	-0.080	0.000	0.09			1.1	OK	
3.002	12	-0.219	0.000	0.16			12.1	OK	
3.003	13	-0.212	0.000	0.19			14.5	OK	
5.000	14	-0.118	0.000	0.10			2.5	OK	
5.001	15	-0.118	0.000	0.10			2.4	OK	
3.004	14	-0.192	0.000	0.28			18.2	OK	
6.000	13	-0.191	0.000	0.05			4.6	OK	
6.001	18	-0.179	0.000	0.09			5.5	OK	

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Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

Water

Level

(m)

US/MH

PN

Name

Storm

Return Period

Climate Change

First (X) Surge

First (Y) Flood

First (Z) Overflow

Overflow Act.

1.000

1 15

Winter

30

+0%

100/15

Summer

38.184

1.001

2 15

Winter

30

+0%

100/15

Summer

38.106

1.002

3 15

Winter

30

+0%

100/15

Summer

38.062

2.000

4 15

Winter

30

+0%

100/15

Summer

38.160

1.003

4 15

Winter

30

+0%

100/15

Summer

38.055

1.004

5 15

Winter

30

+0%

100/15

Summer

37.874

1.005

7 15

Winter

30

+0%

30/15

Winter

37.813

1.006

8 15

Winter

30

+0%

100/15

Summer

37.736

1.007

9 15

Winter

30

+0%

30/15

Summer

37.641

3.000

12 15

Winter

30

+0%

100/15

Summer

38.086

3.001

11 15

Winter

30

+0%

100/15

Summer

37.934

4.000

11 15

Winter

30

+0%

100/15

Summer

38.282

3.002

12 15

Winter

30

+0%

30/15

Winter

37.797

3.003

13 15

Winter

30

+0%

30/15

Summer

37.742

5.000

14 15

Winter

30

+0%

38.301

5.001

15 15

Winter

30

+0%

100/15

Summer

37.913

3.004

14 15

Winter

30

+0%

30/15

Summer

37.679

6.000

13 15

Winter

30

+0%

38.305

6.001

18 15

Winter

30

+0%

100/15

Summer

37.661

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2.000	4	-0.165	0.000	0.16		4.9	OK	
1.003	4	-0.197	0.000	0.43		51.5	OK	
1.004	5	-0.163	0.000	0.59		70.2	OK	
1.005	7	0.019	0.000	0.75		74.5	SURCHARGED	
1.006	8	-0.004	0.000	0.61		72.0	OK	
1.007	9	0.112	0.000	0.41		62.1	SURCHARGED	
3.000	12	-0.214	0.000	0.18		14.0	OK	
3.001	11	-0.178	0.000	0.33		27.7	OK	
4.000	11	-0.068	0.000	0.23		2.6	OK	
3.002	12	0.020	0.000	0.41		30.2	SURCHARGED	
3.003	13	0.063	0.000	0.43		34.1	SURCHARGED	
5.000	14	-0.099	0.000	0.25		6.0	OK	
5.001	15	-0.099	0.000	0.25		6.0	OK	
3.004	14	0.099	0.000	0.59		38.8	SURCHARGED	
6.000	13	-0.170	0.000	0.13		11.2	OK	
6.001	18	-0.074	0.000	0.23		14.1	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
7.000	14	15 Winter	30	+0%					38.301
7.001	20	15 Winter	30	+0%	100/15 Summer				37.696
6.002	14	15 Winter	30	+0%	30/15 Summer				37.650
3.005	17	15 Winter	30	+0%	30/15 Summer				37.588
1.008	18	240 Winter	30	+0%	30/15 Summer				37.558
1.009	19	240 Winter	30	+0%	30/15 Summer				37.557
1.010	19	240 Winter	30	+0%					37.555
1.011	20	240 Winter	30	+0%	30/15 Winter				37.554
1.012	22	240 Winter	30	+0%	30/15 Winter				37.575
1.013	23	60 Summer	30	+0%					36.842
1.014	24	360 Summer	30	+0%					36.789

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
7.000	14	-0.174	0.000	0.11			8.6	OK	
7.001	20	-0.153	0.000	0.22			14.4	OK	
6.002	14	0.108	0.000	0.70			25.1	SURCHARGED	
3.005	17	0.155	0.000	0.96			55.7	SURCHARGED	
1.008	18	0.176	0.000	0.40			34.3	SURCHARGED	
1.009	19	0.182	0.000	0.45			34.3	SURCHARGED	
1.010	19	-0.695	0.000	0.00			34.0	OK	
1.011	20	0.267	0.000	0.04			7.1	SURCHARGED*	
1.012	22	0.303	0.000	0.04			6.0	SURCHARGED	
1.013	23	-0.396	0.000	0.04			6.0	OK	
1.014	24	-0.405	0.000	0.02			6.0	OK	

Portland Consulting Engineers

Page 12

10 Bankside The Watermark
Gateshead Tyne & Wear
NE11 9SY

Date 12/07/2023
File SW CALCS 26.06.23.MDX

Innovyze

Extra Care Hebburn

Designed by KC
Checked by SH

Network 2020.1.3

Micro Drainage

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

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.350

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 17.700 Cv (Winter) 0.840

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, 240, 360, 480, 960, 1440

Return Period(s) (years) 1, 30, 100

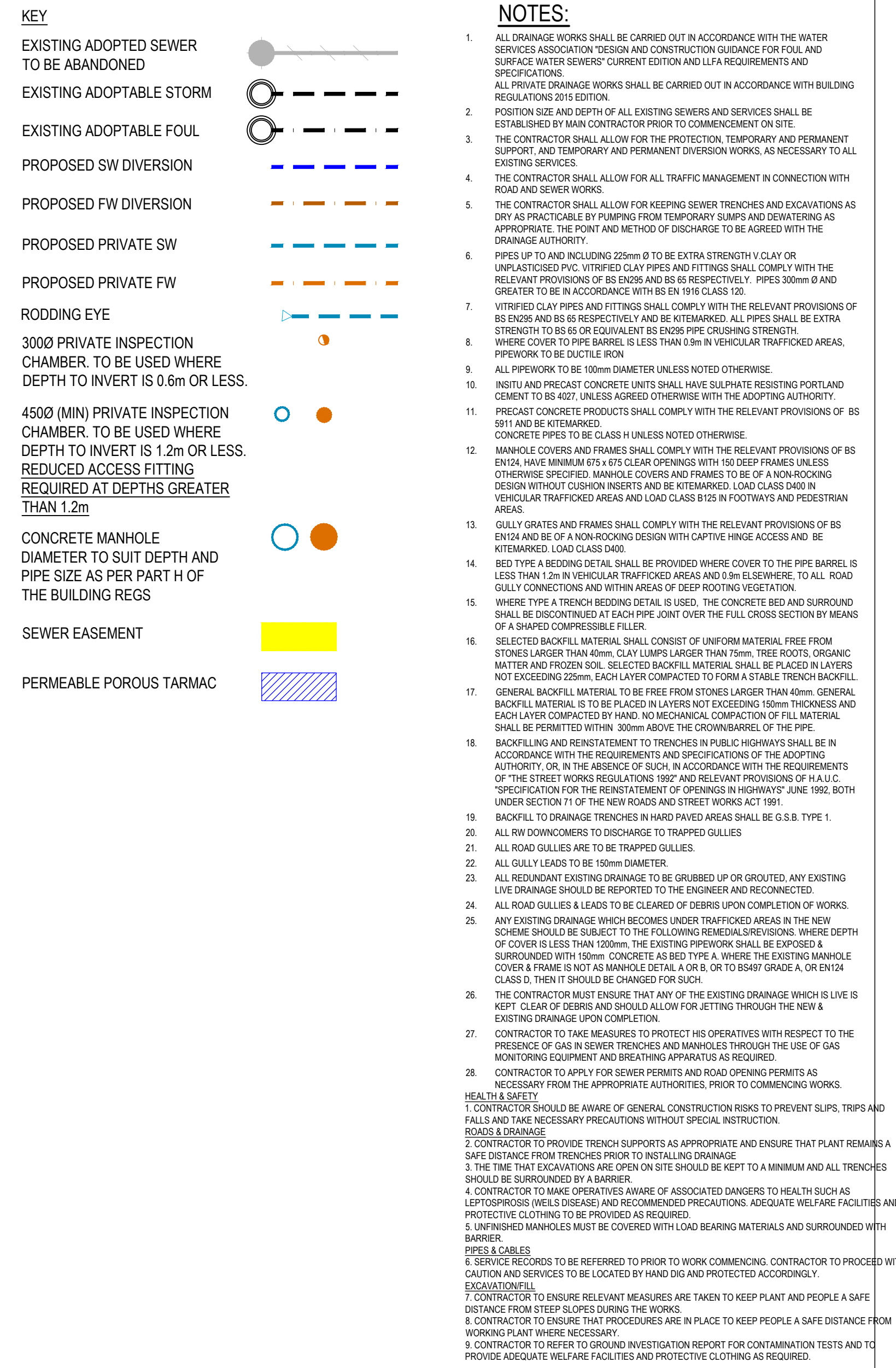
Climate Change (%) 0, 0, 45

	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water
	PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Level
								Act.	(m)
1.000	1	15 Winter	100	+45%	100/15 Summer				38.620
1.001	2	15 Winter	100	+45%	100/15 Summer				38.606
1.002	3	15 Winter	100	+45%	100/15 Summer				38.594
2.000	4	15 Winter	100	+45%	100/15 Summer				38.588
1.003	4	15 Winter	100	+45%	100/15 Summer				38.583
1.004	5	15 Winter	100	+45%	100/15 Summer				38.493
1.005	7	15 Winter	100	+45%	30/15 Winter				38.358
1.006	8	15 Winter	100	+45%	100/15 Summer				38.270
1.007	9	360 Winter	100	+45%	30/15 Summer				38.090
3.000	12	15 Winter	100	+45%	100/15 Summer				38.602
3.001	11	15 Winter	100	+45%	100/15 Summer				38.577
4.000	11	15 Winter	100	+45%	100/15 Summer				38.516
3.002	12	15 Winter	100	+45%	30/15 Winter				38.467
3.003	13	15 Winter	100	+45%	30/15 Summer				38.366
5.000	14	15 Winter	100	+45%					38.338
5.001	15	15 Winter	100	+45%	100/15 Summer				38.295
3.004	14	15 Winter	100	+45%	30/15 Summer				38.256
6.000	13	15 Winter	100	+45%					38.326
6.001	18	15 Winter	100	+45%	100/15 Summer				38.257

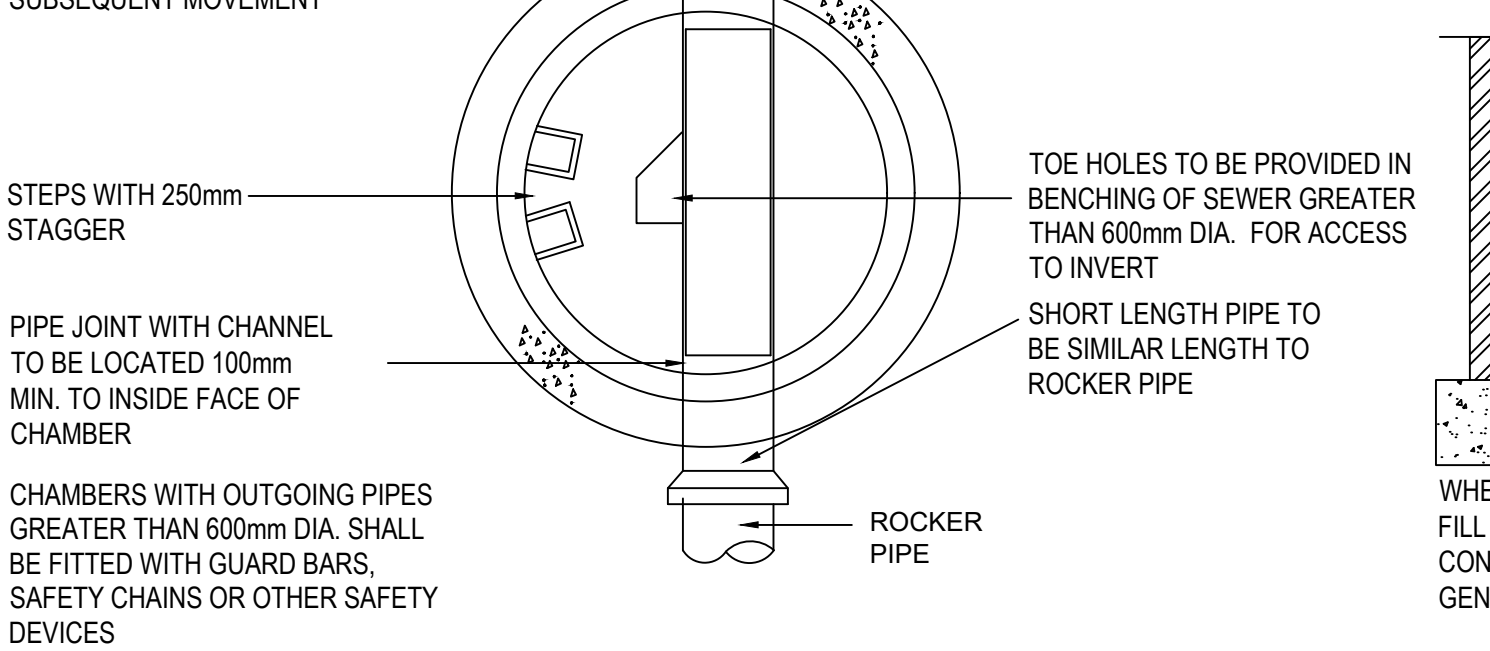
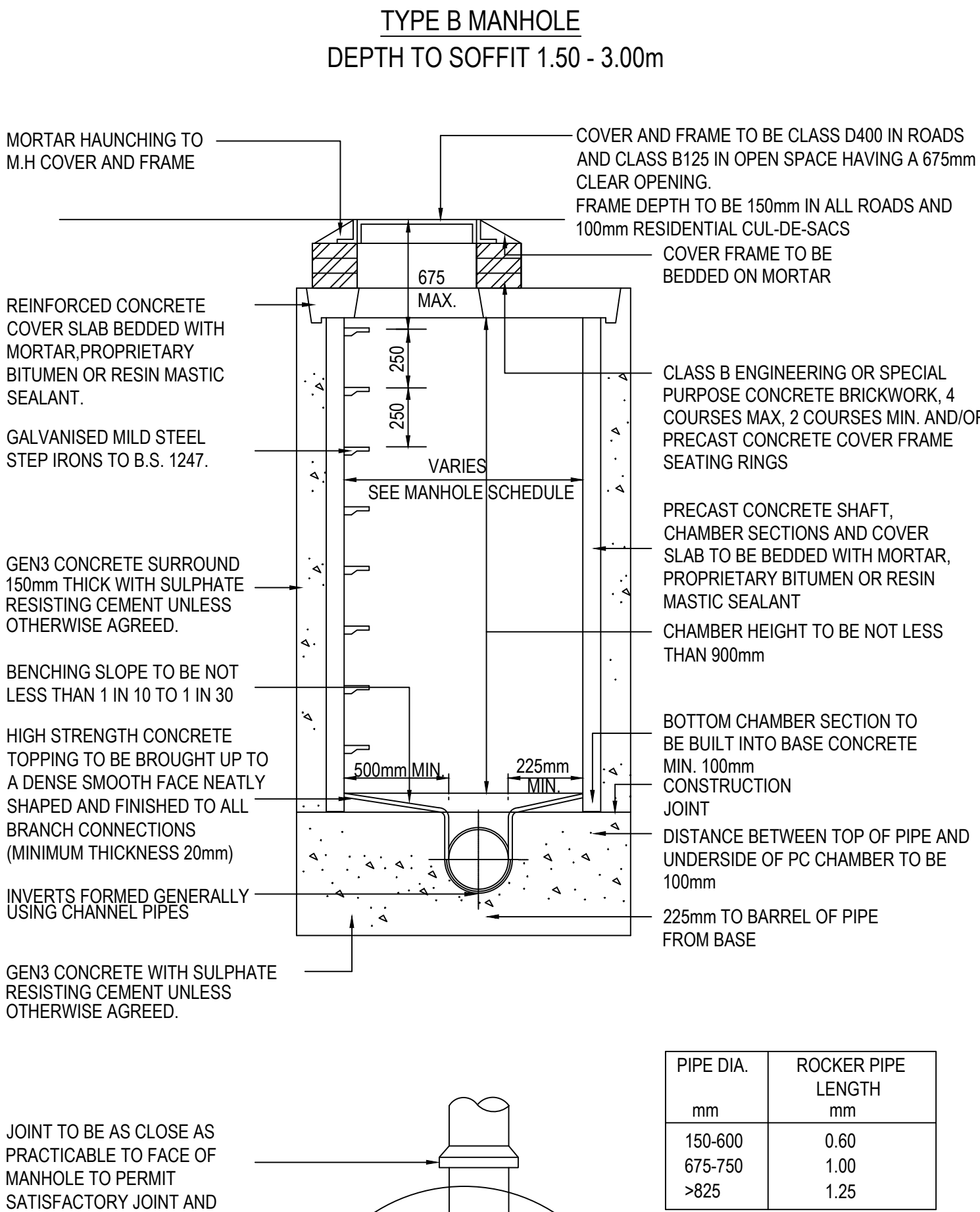
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Portland Consulting Engineers								Page 14	
10 Bankside The Watermark Gateshead Tyne & Wear NE11 9SY					Extra Care Hebburn				
Date 12/07/2023 File SW CALCS 26.06.23.MDX					Designed by KC Checked by SH				
Innovyze					Network 2020.1.3				
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
7.000	14	15 Winter	100	+45%					38.321
7.001	20	15 Winter	100	+45%	100/15 Summer				38.269
6.002	14	15 Winter	100	+45%	30/15 Summer				38.236
3.005	17	15 Winter	100	+45%	30/15 Summer				38.120
1.008	18	360 Winter	100	+45%	30/15 Summer				38.088
1.009	19	360 Winter	100	+45%	30/15 Summer				38.087
1.010	19	360 Winter	100	+45%					38.084
1.011	20	360 Winter	100	+45%	30/15 Winter				38.083
1.012	22	360 Winter	100	+45%	30/15 Winter				38.104
1.013	23	120 Summer	100	+45%					36.842
1.014	24	1440 Summer	100	+45%					36.789
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
7.000	14	-0.154	0.000	0.21			16.1	OK	
7.001	20	0.420	0.000	0.33			21.1	SURCHARGED	
6.002	14	0.694	0.000	1.13			40.4	SURCHARGED	
3.005	17	0.687	0.000	1.78			102.7	SURCHARGED	
1.008	18	0.705	0.000	0.56			48.3	SURCHARGED	
1.009	19	0.711	0.000	0.64			48.2	SURCHARGED	
1.010	19	-0.166	0.000	0.00			48.1	FLOOD RISK*	
1.011	20	0.796	0.000	0.05			9.1	FLOOD RISK*	
1.012	22	0.832	0.000	0.04			6.0	FLOOD RISK	
1.013	23	-0.396	0.000	0.04			6.0	OK	
1.014	24	-0.405	0.000	0.02			6.0	OK	
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Appendix I Drainage Drawings

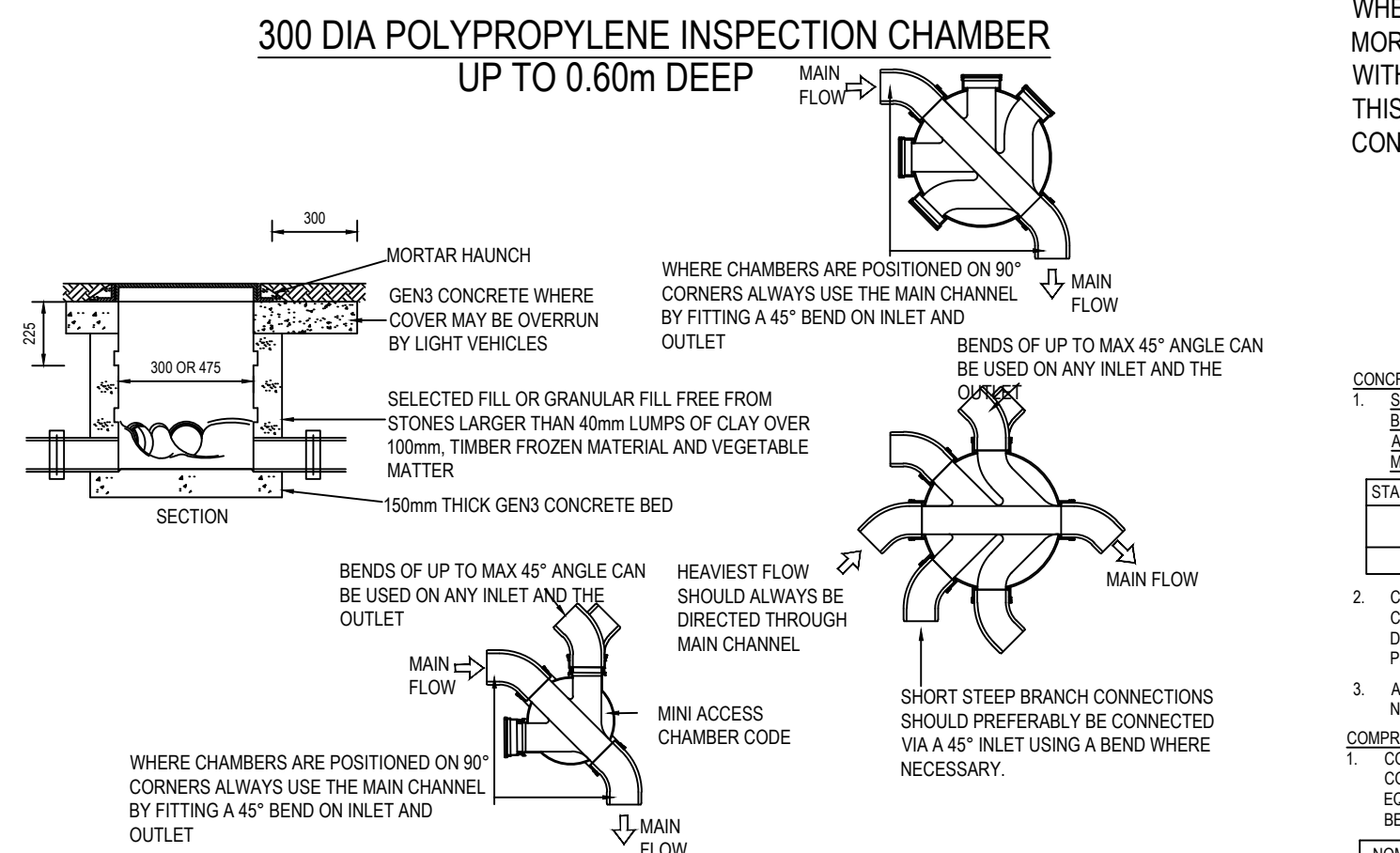


 Portland consulting engineers			
10 Benkards, The Watermark, Galsbrook, Tyne & Wear, NE11 6DY T: 0191 4610770 W: www.portlandconsulting.co.uk F: 0191 460308 E: info@portlandconsulting.co.uk			
Client Karbon Homes			
Project STC Extra Care Scheme Hebburn			
Drawing Title Proposed Drainage Layout			
Scale	1:250	Sheet Size	A0
Drawn By KC	Checked By SH	Approved By LRB	Date 31/03/23
Drawing Status			
Construction			
Project No. 2022092	Drawing No. 010-01	Revision AE	
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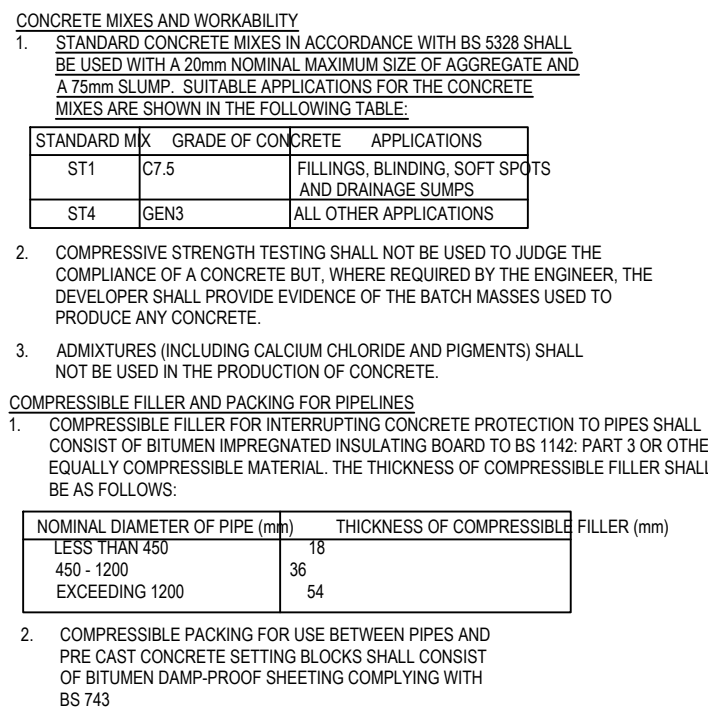
DIAMETER OF LARGEST PIPE IN MANHOLE (mm)	INTERNAL DIAMETER OF MANHOLE (mm)
LESS THAN 375	1200
375 - 700	1500
750 - 900	1800

ALL SEWERAGE WORKS TO BE IN ACCORDANCE
SEWERS FOR ADOPTION - 6TH EDITION.



450 DIA POLYPROPYLENE INSPECTION CHAMBER
UP TO 1.20m DEEP

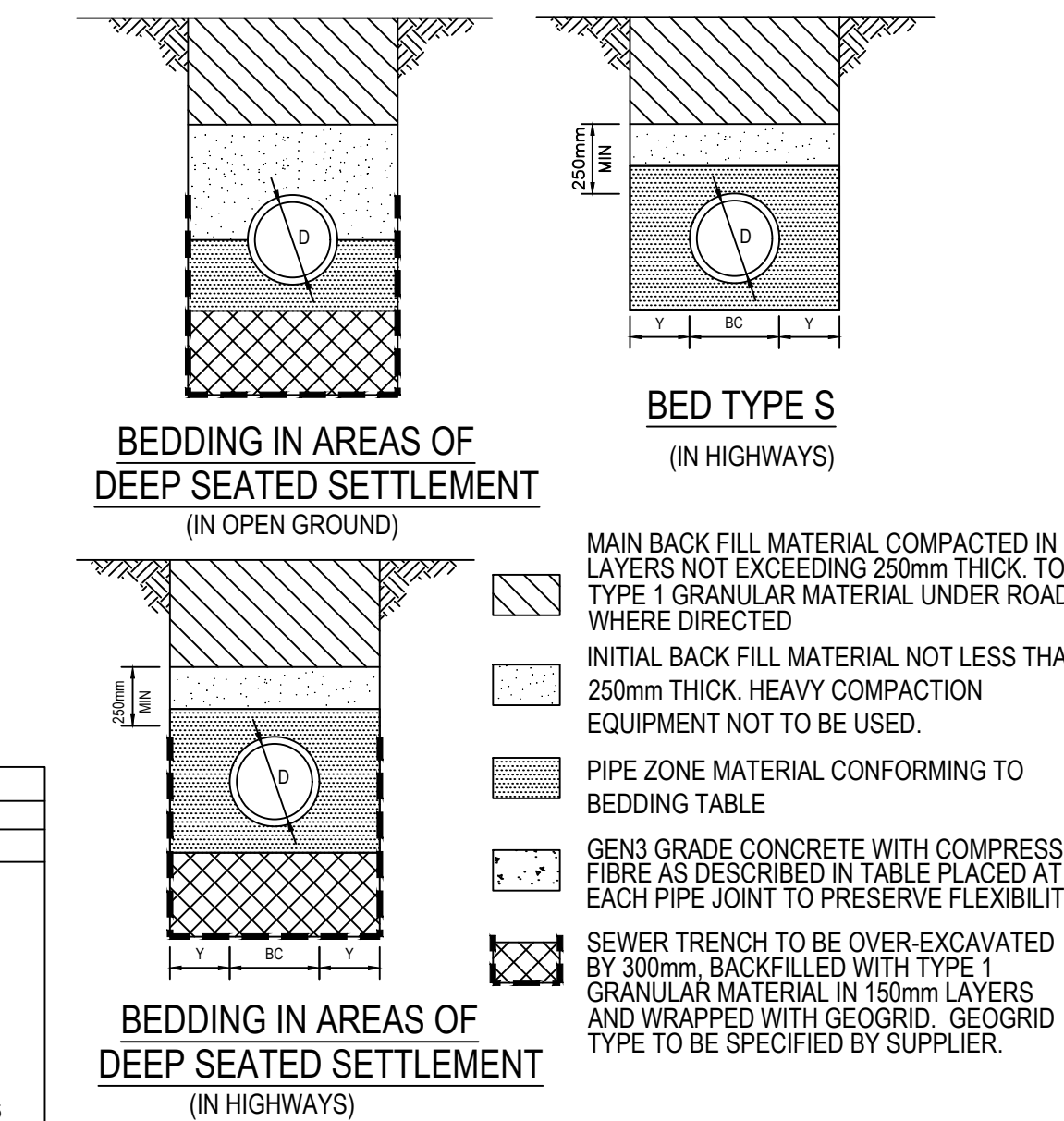
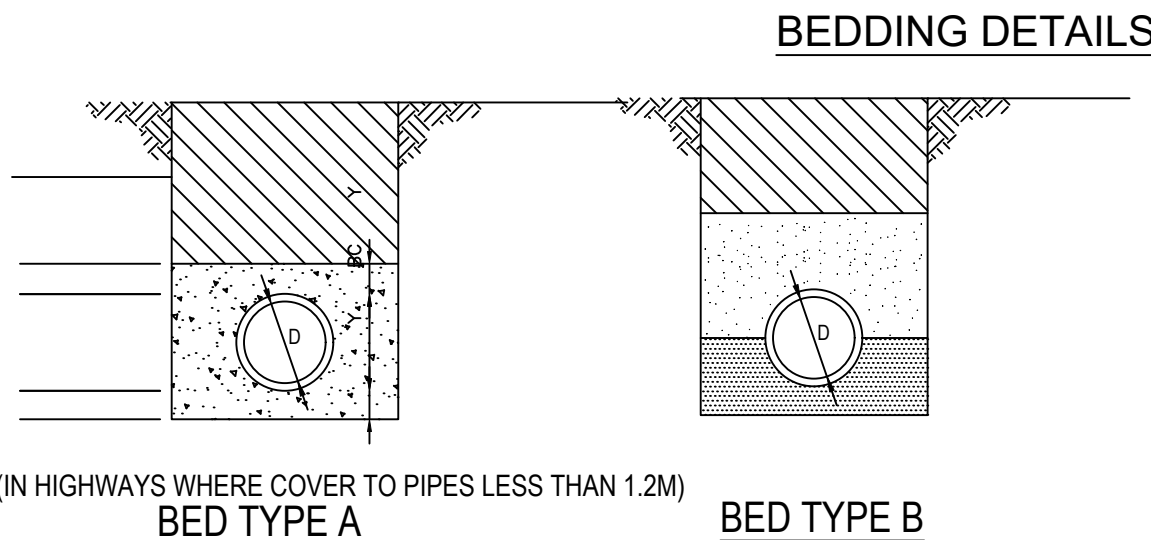
DRAINAGE NEAR BUILDINGS



RAINWATER PIPE CONNECTED TO MAIN RUN

DIAMETER mm	BED TYPE A		BED TYPE B		BED TYPE S	
	MAX TRENCH WIDTH	BD (MIN)	PIPE BEDDING MATERIAL SINGLE SIZE (mm)	GRADED (mm)	MAX TRENCH WIDTH	BD (MIN)
150	900	178	150	10 OR 14	14-5	
225	1021	271	150	10, 14 OR 20	14-5 OR 20-5	
300	1160	410	150	10, 14 OR 20	14-5 OR 20-5	
375	1240	490	150	14 OR 20	14-5 OR 20-5	
450	1326	576	150	14 OR 20	14-5 OR 20-5	
525	1420	670	150	14, 20 OR 40	14-5, 20-5 OR 40-5	
600	1522	772	150	14, 20 OR 40	14-5, 20-5 OR 40-5	

ALL GRANULAR MATERIAL TO COMPLY WITH THE
REQUIREMENTS OF BS 882:1983



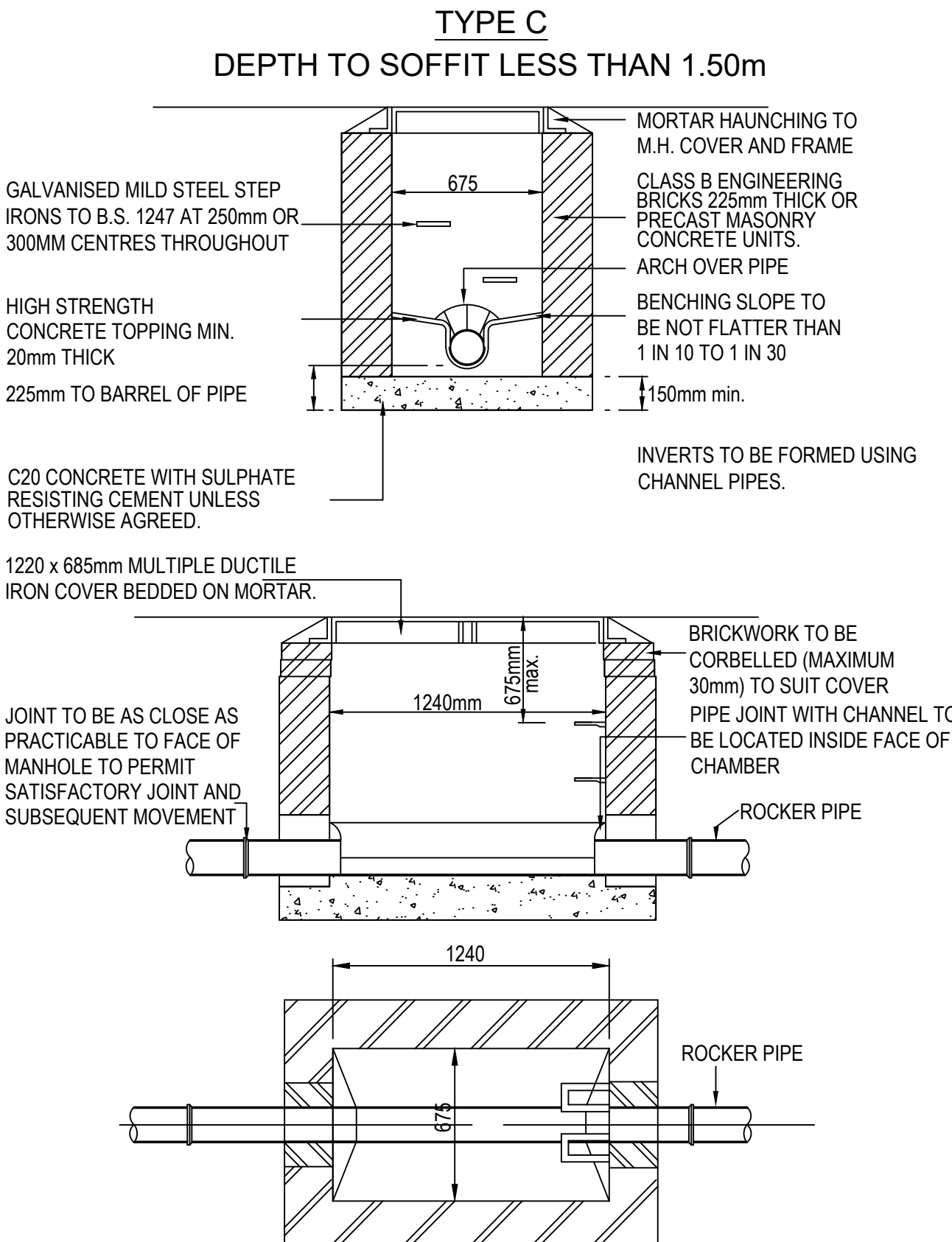
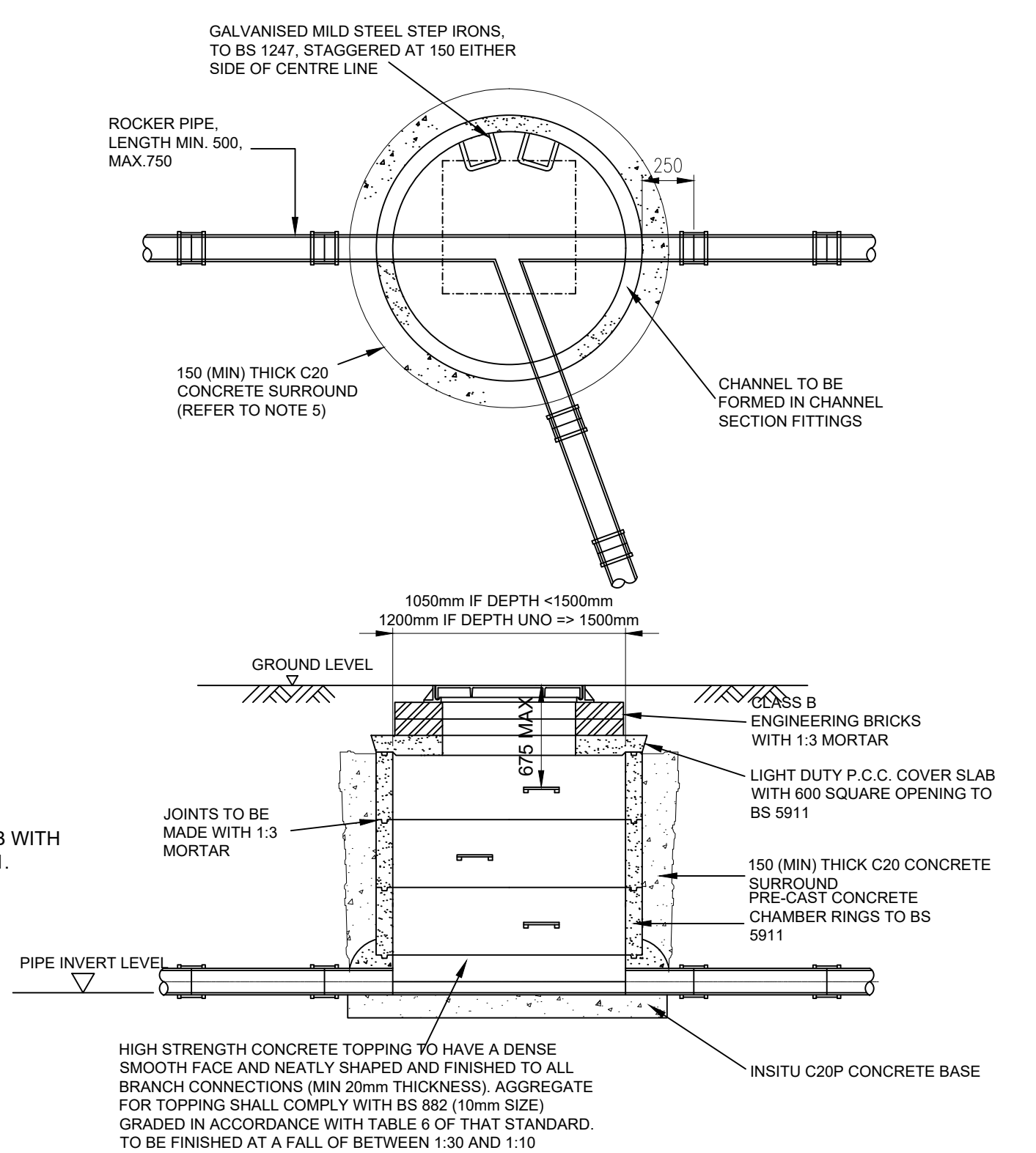
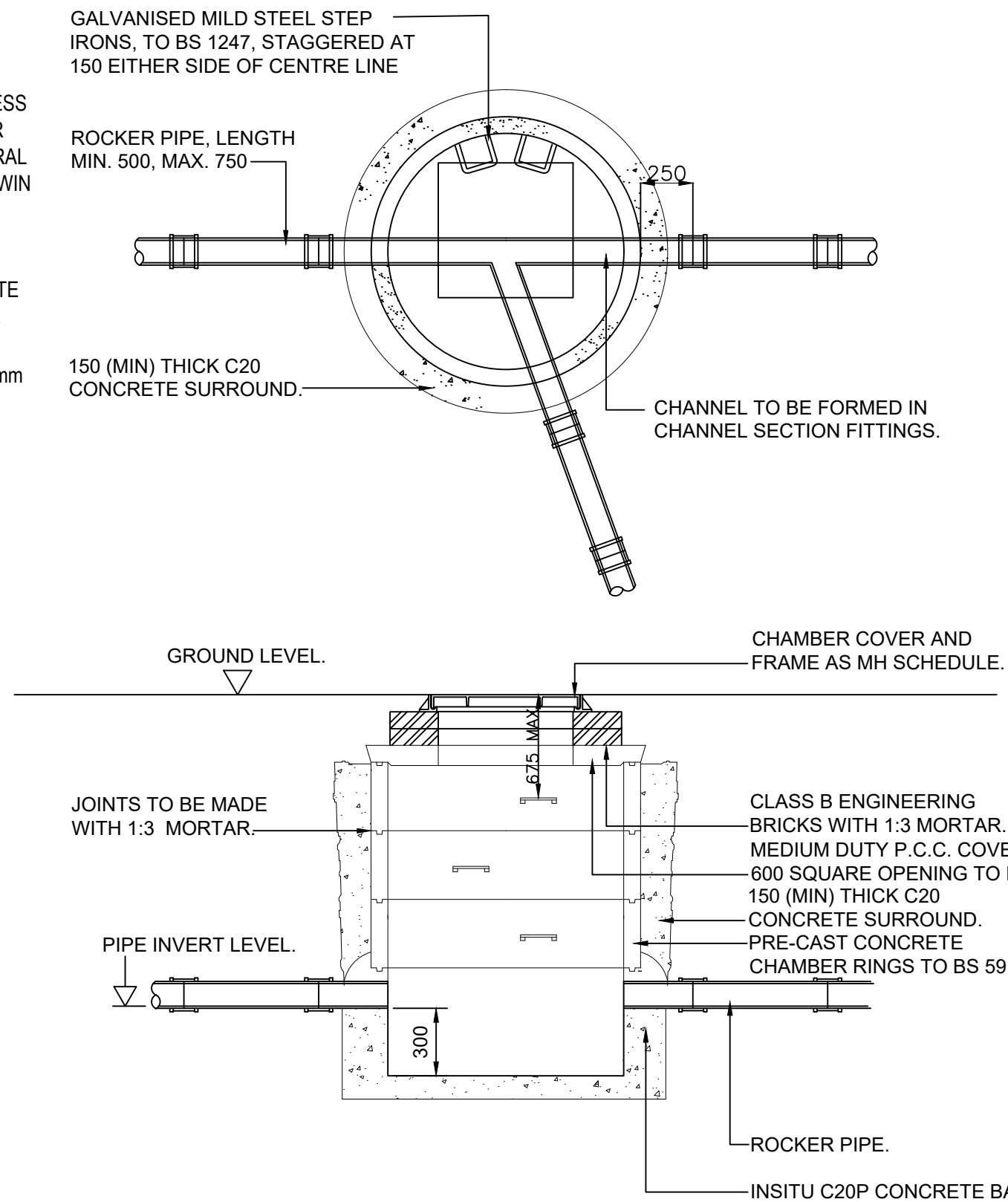
MAIN BACK FILL MATERIAL COMPACTED IN LAYERS NOT EXCEEDING 250mm THICK, TO BE TYPE 1 GRANULAR MATERIAL UNDER ROADS WHERE DIRECTED.

INITIAL BACK FILL MATERIAL NOT LESS THAN 250mm THICK. HEAVY COMPACTION EQUIPMENT NOT TO BE USED.

PIPE ZONE MATERIAL CONFORMING TO BEDDING TABLE.

GEN3 GRADE CONCRETE WITH COMPRESSIBLE FIBRE AS DESCRIBED IN TABLE PLACED AT EACH PIPE JOINT TO PRESERVE FLEXIBILITY.

SEWER TRENCH TO BE OVER-EXCAVATED BY 300mm, BACKFILLED WITH TYPE 1 GRANULAR MATERIAL IN 150mm LAYERS AND WRAPPED WITH GEOGRID. GEOGRID TYPE TO BE SPECIFIED BY SUPPLIER.



F	Rainwater pipe detail added	KC	SH	LRB	04/04/25
E	Construction Issue	KC	SH	LRB	01/08/24
D	Type C added	KC	SH	LRB	24/05/24
C	Contract Issue	KC	SH	LRB	19/12/23
B	Steps added to Type E MH	KC	SH	LRB	11/12/23
A	1200x750 detail added	KC	SH	LRB	26/10/23
Ø	Initial Issue	KC	SH	LRB	31/03/23

Rev.	Description	By	Chk	App	Date
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10 Bankside, The Watermark, Gateshead, Tyne & Wear, NE11 9SY
T: 0191 4619770 W: www.portlandconsulting.co.uk
F: 0191 4603028 E: info@portlandconsulting.co.uk

Client **Karbon Homes**

Project **STC Extra Care Scheme**
Hebburn

Drawing Title **Drainage Construction Details**

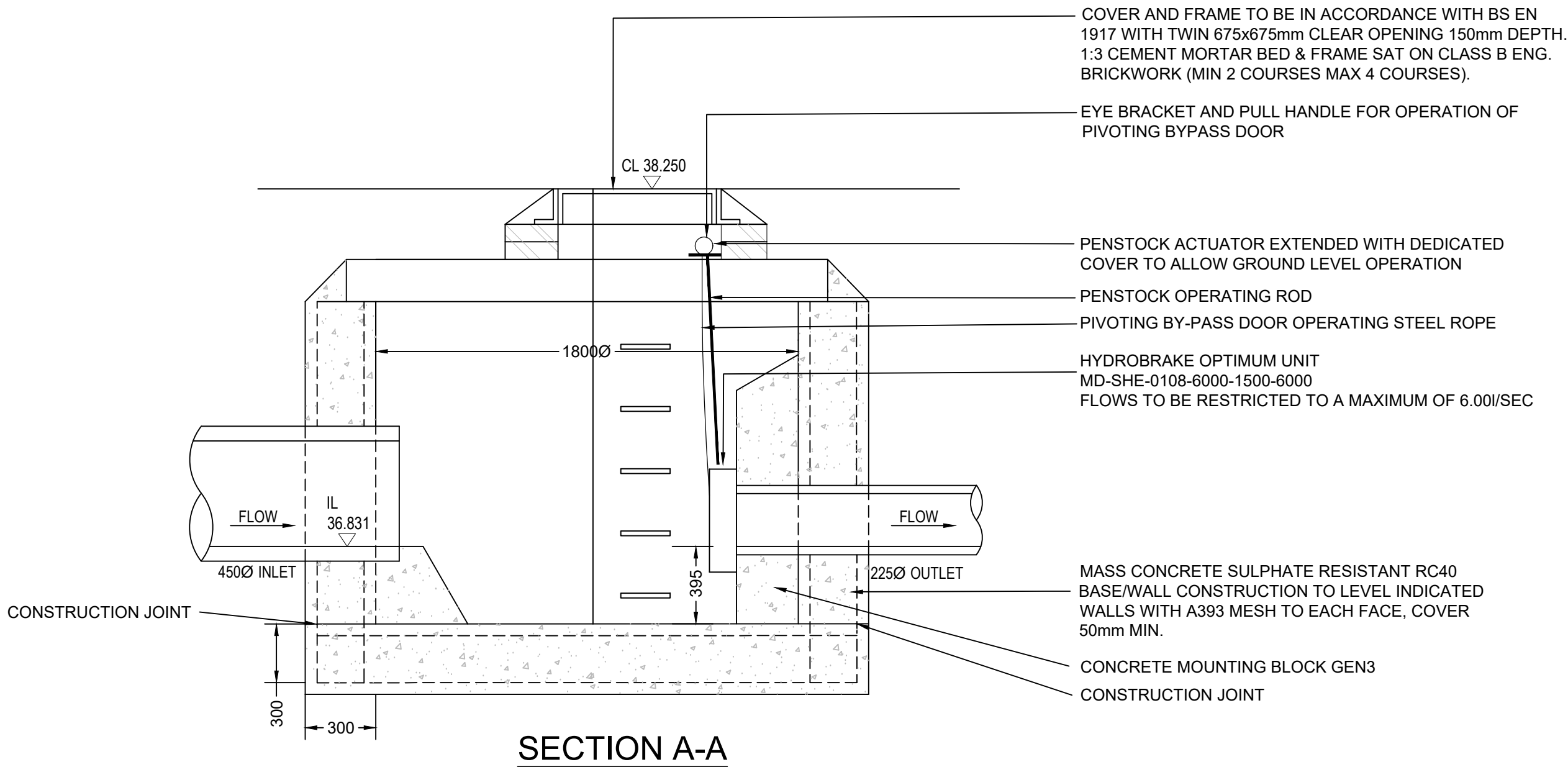
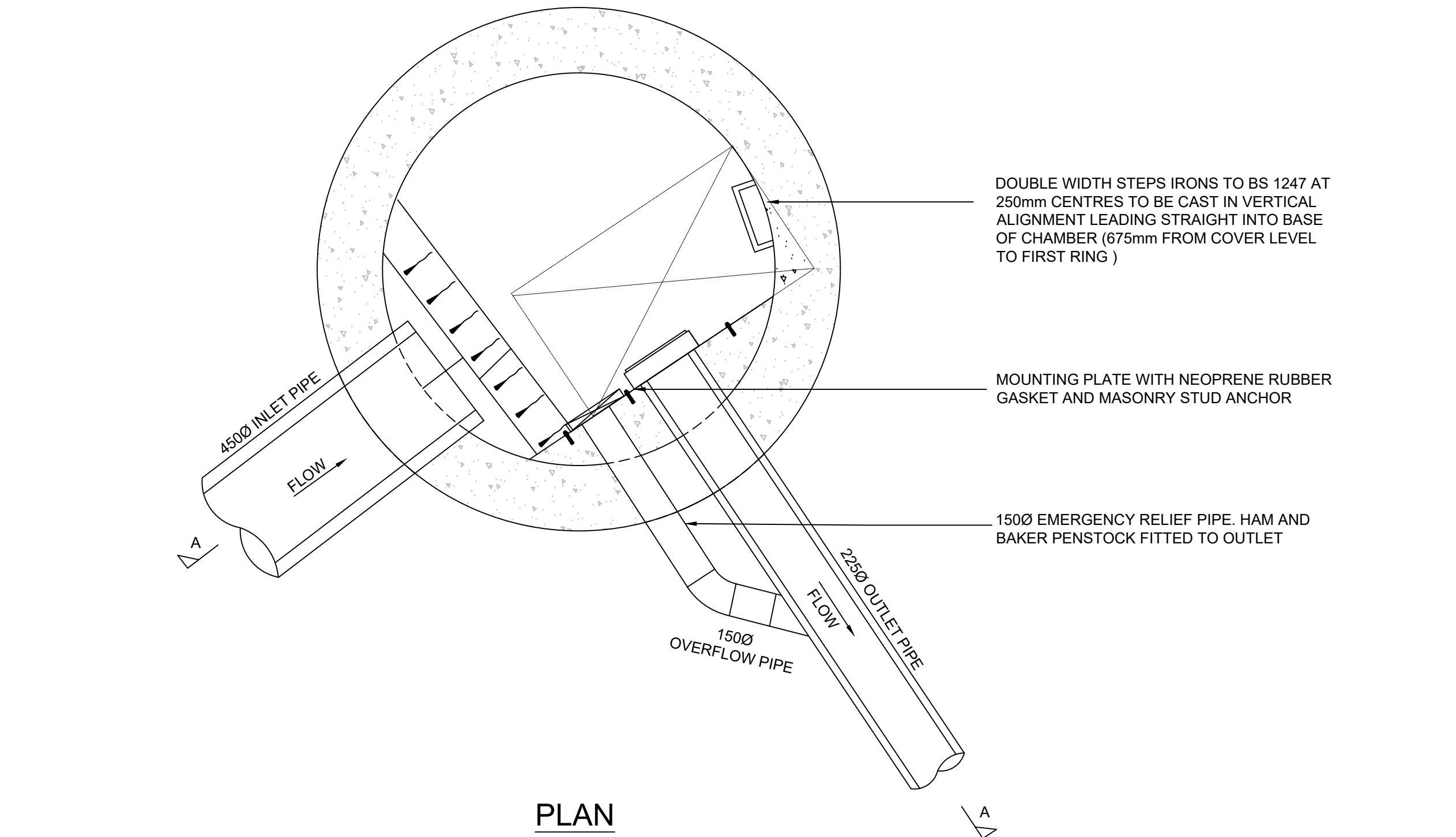
Scale	1:25	Sheet Size	A1
Drawn By	KC	Checked By	SH
Approved By	LRB	Date	31/03/23

Drawing Status **Construction**

Project No.	Drawing No.	Revision
2022092	012	F

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NOTES:

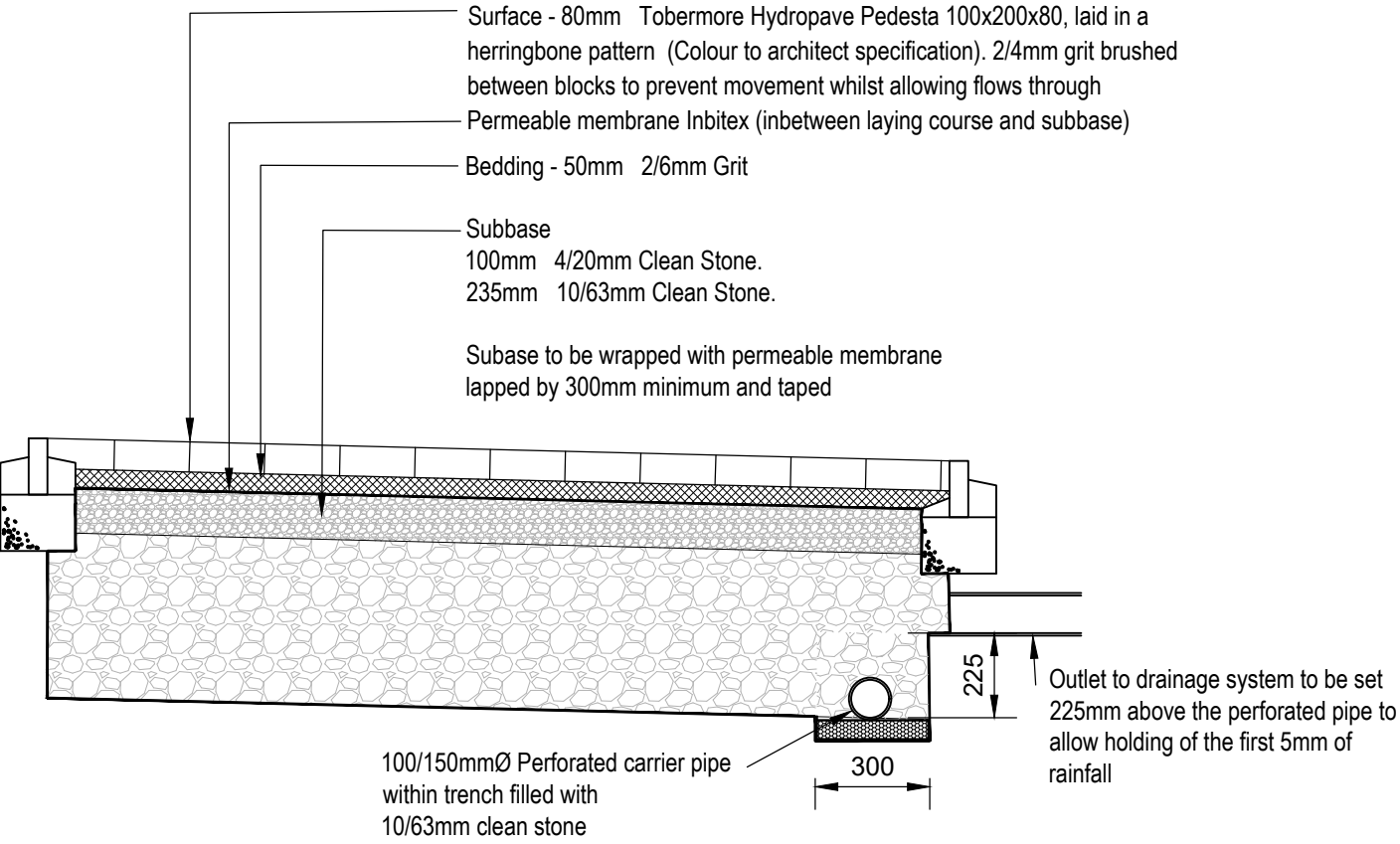
- ALL DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE WATER SERVICES ASSOCIATION 'DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS' CURRENT EDITION AND LFA REQUIREMENTS AND SPECIFICATIONS.
- ALL PRIVATE DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS 2015 EDITION.
- POSITION SIZE AND DEPTH OF ALL EXISTING SEWERS AND SERVICES SHALL BE ESTABLISHED BY MAIN CONTRACTOR PRIOR TO COMMENCEMENT ON SITE.
- THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
- THE CONTRACTOR SHALL ALLOW FOR ALL TRAFFIC MANAGEMENT IN CONNECTION WITH ROAD AND SEWER WORKS.
- THE CONTRACTOR SHALL ALLOW FOR KEEPING SEWER TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SUMPS AND DEWATERING AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY.
- PIPES UP TO AND INCLUDING 225mm Ø TO BE EXTRA STRENGTH V CLAY OR UNPLASTICISED PVC. VITRIFIED CLAY PIPES AND FITTINGS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN205 AND BS 65 RESPECTIVELY. PIPES 300mm Ø AND GREATER TO BE IN ACCORDANCE WITH BS EN 1916 CLASS 120.
- VITRIFIED CLAY PIPES AND FITTINGS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN205 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS EN205 PIPE CRUSHING STRENGTH.
- WHERE COVER TO PIPE BARREL IS LESS THAN 0.9m IN VEHICULAR TRAFFICKED AREAS, PIPEWORK TO BE DUCTILE IRON.
- ALL PIPEWORK TO BE 100mm DIAMETER UNLESS NOTED OTHERWISE.
- IN-SITU AND PRECAST CONCRETE UNITS SHALL HAVE SULPHATE-RESISTING PORTLAND CEMENT TO BS 4027, UNLESS AGREED OTHERWISE WITH THE ADOPTING AUTHORITY.
- PRECAST CONCRETE PRODUCTS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 8911 AND BE KITEMARKED.
- CONCRETE PIPES TO BE CLASS H UNLESS NOTED OTHERWISE.
- MANHOLE COVERS AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124. HAVE MINIMUM 675 x 675 CLEAR OPENINGS WITH 150 DEEP FRAMES UNLESS OTHERWISE SPECIFIED. MANHOLE COVERS AND FRAMES TO BE OF A NON-ROCKING DESIGN WITHOUT CUSHION INSERTS AND BE KITEMARKED. LOAD CLASS D400 IN VEHICULAR TRAFFICKED AREAS AND LOAD CLASS B125 IN FOOTWAYS AND PEDESTRIAN AREAS.
- GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS D400.
- BED TYPE A BEDDING DETAIL SHALL BE PROVIDED WHERE COVER TO THE PIPE BARREL IS LESS THAN 1.2m IN VEHICULAR TRAFFICKED AREAS AND 0.9m ELSEWHERE. TO ALL ROAD GULLY CONNECTIONS AND WITHIN AREAS OF DEEP ROOTING VEGETATION.
- WHERE TYPE A TRENCH BEDDING DETAIL IS USED, THE CONCRETE BED AND SURROUND SHALL BE DISCONTINUED AT EACH PIPE JOINT OVER THE FULL CROSS SECTION BY MEANS OF A SHAPED COMPRESSIBLE FILLER.
- SELECTED BACKFILL MATERIAL SHALL CONSIST OF UNIFORM MATERIAL FREE FROM STONES LARGER THAN 40mm, CLAY LUMPS LARGER THAN 75mm, TREE ROOTS, ORGANIC MATTER AND FROZEN SOIL. SELECTED BACKFILL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 225mm, EACH LAYER COMPACTED TO FORM A STABLE TRENCH BACKFILL.
- GENERAL BACKFILL MATERIAL TO BE FREE FROM STONES LARGER THAN 40mm. GENERAL BACKFILL MATERIAL IS TO BE PLACED IN LAYERS NOT EXCEEDING 150mm THICKNESS AND EACH LAYER COMPACTED BY HAND. NO MECHANICAL COMPACTION OF FILL MATERIAL SHALL BE PERMITTED WITHIN 300mm ABOVE THE CROWN/BARREL OF THE PIPE.
- BACKFILLING AND REINSTATEMENT TO TRENCHES IN PUBLIC HIGHWAYS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE ADOPTING AUTHORITY, OR, IN THE ABSENCE OF SUCH, IN ACCORDANCE WITH THE REQUIREMENTS OF 'THE STREET WORKS REGULATIONS 1992' AND RELEVANT PROVISIONS OF H.A.U.C. 'SPECIFICATION FOR THE REINSTATEMENT OF OPENINGS IN HIGHWAYS' JUNE 1992, BOTH UNDER SECTION '1' OF THE NEW ROADS AND STREET WORKS ACT 1991.
- BACKFILL TO DRAINAGE TRENCHES IN HARD PAVED AREAS SHALL BE G.S.B. TYPE 1.
- ALL RW DOWNCOMERS TO DISCHARGE TO TRAPPED GULLIES.
- ALL ROAD GULLIES ARE TO BE TRAPPED GULLIES.
- ALL GULLY LEADS TO BE 150mm DIAMETER.
- ALL REDUNDANT EXISTING DRAINAGE TO BE CURBED UP OR GROUTED. ANY EXISTING LIVE DRAINAGE SHOULD BE REPORTED TO THE ENGINEER AND RECONNECTED.
- ALL ROAD GULLIES & LEADS TO BE CLEARED OF DEBRIS UPON COMPLETION OF WORKS.
- ANY EXISTING DRAINAGE WHICH BECOMES UNDER TRAFFICKED AREAS IN THE NEW SCHEME SHOULD BE SUBJECT TO THE FOLLOWING REMEDIALS/REVISIONS, WHERE DEPTH OF COVER IS LESS THAN 1200mm. THE EXISTING PIPEWORK SHALL BE EXPOSED & SURROUNDED WITH 150mm CONCRETE AS BED TYPE A. WHERE THE EXISTING MANHOLE COVER & FRAME IS NOT AS MANHOLE DETAIL A OR B, OR TO BS497 GRADE A, OR EN124 CLASS D, THEN IT SHOULD BE CHANGED FOR SUCH.
- THE CONTRACTOR MUST ENSURE THAT ANY OF THE EXISTING DRAINAGE WHICH IS LIVE IS KEPT CLEAR OF DEBRIS AND SHOULD ALLOW FOR JETTING THROUGH THE NEW & EXISTING DRAINAGE UPON COMPLETION.
- CONTRACTOR TO TAKE MEASURES TO PROTECT HIS OPERATIVES WITH RESPECT TO THE PRESENCE OF GAS IN SEWER TRENCHES AND MANHOLES THROUGH THE USE OF GAS MONITORING EQUIPMENT AND BREATHING APPARATUS AS REQUIRED.
- CONTRACTOR TO APPLY FOR SEWER PERMITS AND ROAD OPENING PERMITS AS NECESSARY FROM THE APPROPRIATE AUTHORITIES, PRIOR TO COMMENCING WORKS.

CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.					
ROADS & DRAINAGE					
2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE.					
3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.					
4. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIROSIS (WELLS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.					
5. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.					
PIPES & CABLES					
6. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.					
EXCAVATION/FELL					
7. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.					
8. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.					
9. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.					
C	Construction Issue	KC	SH	LRB	01/08/24
B	Orientation of Hydrobrake and outlet amended.	KC	SH	LRB	17/06/24
A	Contract Issue	KC	SH	LRB	14/12/23
φ	Initial Issue	KC	SH	LRB	09/08/23
Rev.	Description	By	Chk	App	Date



10 Bankside, The Watermark, Gateshead, Tyne & Wear, NE11 9SY
T: 0191 4619770 W: www.portlandconsulting.co.uk
F: 0191 4603028 E: info@portlandconsulting.co.uk

Client	Karbon Homes		
Project	STC Extra Care Scheme Hebburn		
Drawing Title	Hydrobrake MH Details Private SW MH26		
Scale	1:20	Sheet Size	A1
Drawn By	KC	Checked By	SH
		Approved By	LRB
		Date	28/07/23
Drawing Status	Construction		
Project No.	2022092	Drawing No.	013
		Revision	C



Permeable Parking Bays
Scale 1:20

REFER TO FLOOD RISK ASSESSMENT FOR CALCULATIONS TO ESTABLISH THE DEPTH BELOW THE OUTLET PIPE REQUIRED TO RETAIN THE ASSOCIATED VOLUMES.



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T: 0191 4619770 W: www.portlandconsulting.co.uk
F: 0191 4603028 E: info@portlandconsulting.co.uk

Client
Karbon Homes/STC

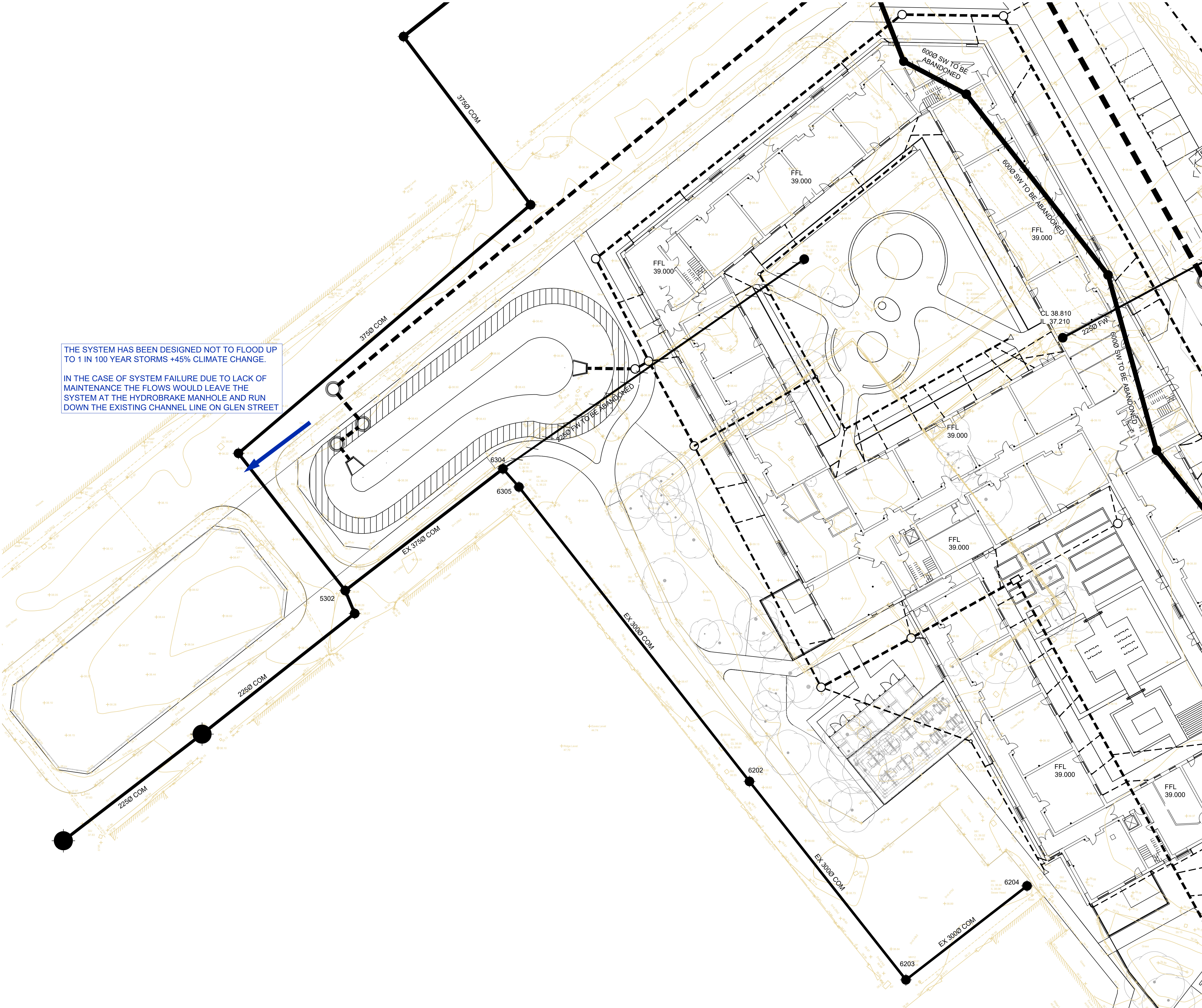
Project
STC Extra Care
Hebburn

Drawing Title
Permeable Paving Detail

Scale AS SHOWN		Sheet Size A3	
Drawn By KC	Checked By SH	Approved By LRB	Date 28/07/23

Drawing Status For Approval		
Project No. 2022092	Drawing No. SK04	Revision Ø

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THE SYSTEM HAS BEEN DESIGNED NOT TO FLOOD UP TO 1 IN 100 YEAR STORMS +45% CLIMATE CHANGE.

IN THE CASE OF SYSTEM FAILURE DUE TO LACK OF MAINTENANCE THE FLOWS WOULD LEAVE THE SYSTEM AT THE HYDROBRAKE MANHOLE AND RUN DOWN THE EXISTING CHANNEL LINE ON GLEN STREET

SUBJECT TO APPROVAL BY SOUTH TYNESIDE COUNCIL

Rev.	Description	By	Chk	App	Date
0	Initial Issue	KC	SH	LRB	12/07/23



10 Bankside, The Watermark, Gateshead, Tyne & Wear, NE11 9SY
T: 0191 4619770 W: www.portlandconsulting.co.uk
F: 0191 4603028 E: info@portlandconsulting.co.uk

Client
Karbon Homes

Project
STC Extra Care Scheme
Hebburn

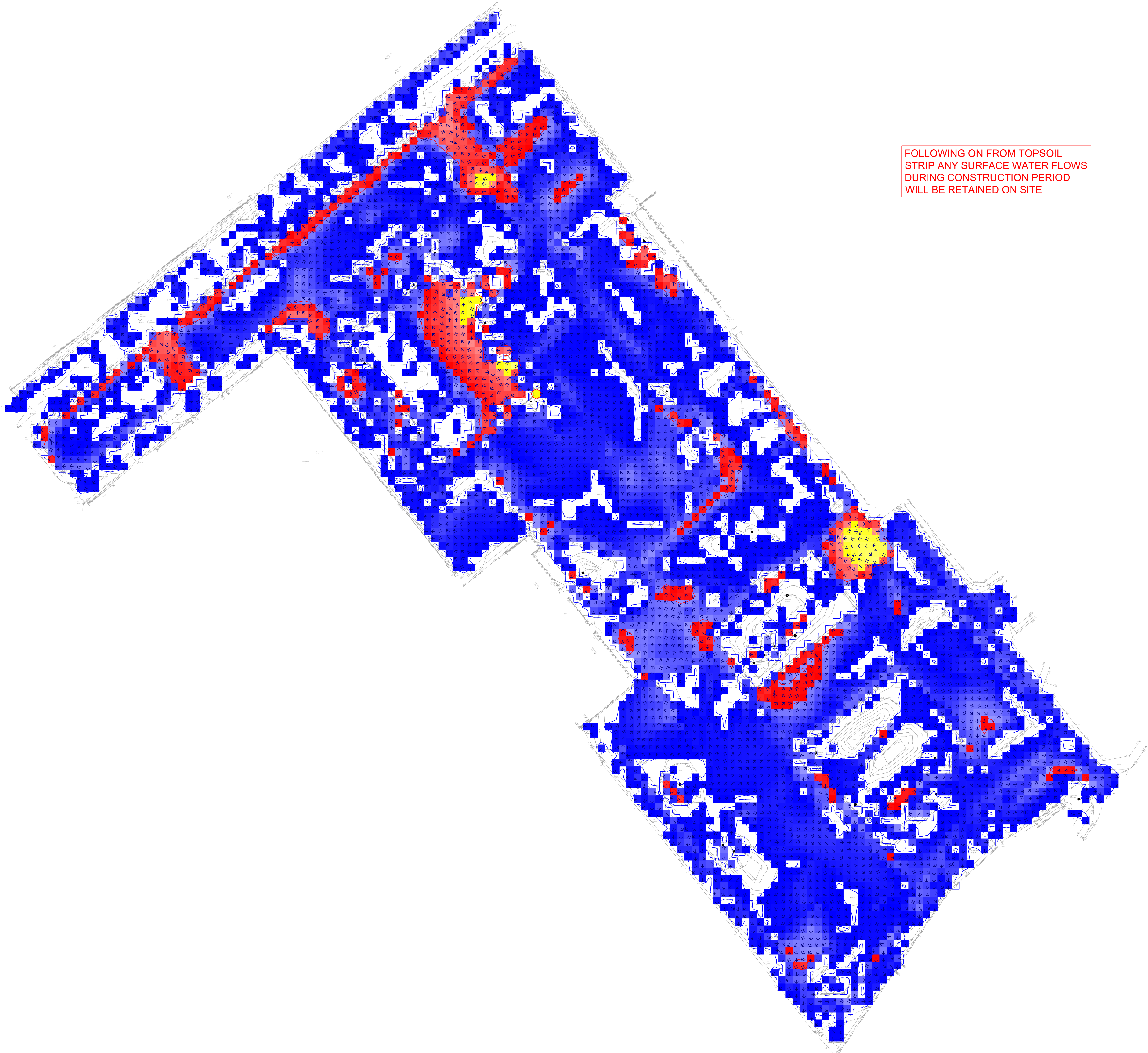
Drawing Title
Flood Route Drawing

Scale	1:250	Sheet Size	A1
Drawn By	KC	Checked By	SH
Approved By	LRB	Date	31/03/23
Drawing Status	Preliminary		

Project No.	2022092	Drawing No.	017	Revision	Ø
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Depth < (mm)	Hazard Rating <	Lower Colour	Upper Colour
10	0.00	Not Drawn	
100	0.75		
300	1.50		
600	2.50		
>			

Ø	Initial Issue	MA	SH	LRB	10/08/23
Rev.	Description	By	Chk	App	Date



10 Bankside, The Watermark, Gateshead, Tyne & Wear, NE11 9SY
T: 0191 4619770 W: www.portlandconsulting.co.uk
F: 0191 4603028 E: info@portlandconsulting.co.uk

Client
Karbon Homes

Project
STC Extra Care Scheme
Hebburn

Drawing Title
Post Site Strip Flood Flow Analysis

Scale	1:500	Sheet Size	A1
Drawn By	MA	Checked By	SH
Approved By	LRB	Date	10/08/23

Drawing Status
For Information

Project No.	Drawing No.	Revision
2022092	017-02	Ø

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Appendix J Maintenance Schedules

Section1

General Maintenance & Inspection Requirements

For Below Ground Gravity Drainage. (Including Drainage Channels)

1. No work shall be carried out on the drainage system without permission from a nominated person, who has access to information/a working knowledge of the system.
2. Maintenance/inspection work shall be carried out in a safe/planned manner.
3. All work is to be carried out by competent persons suitably trained and equipped in accordance with current statutory safe working policies.
4. Entry into confined spaces shall be kept to a minimum and be restricted to suitably qualified/equipped persons working in accordance with current statutory safe working policies.
5. High levels of hygiene shall be maintained at all times, with adequate welfare facilities being provided for the personnel.
6. Drainage systems shall be inspected on a regular basis or should any problems be suspected. Any debris/ defects discovered shall be recorded and a programme of cleaning/ repair initiated. Urgent repairs/ cleaning shall be actioned as soon as practicable.
7. The following operations should be carried out annually.
 - a) Covers of inspection chambers and manholes shall be removed and the sides, benchings and channels cleared.
 - b) Accumulated deposits of silt in soakaways, catchpit manholes, drainage channels, gullies etc. shall be removed. Any traps shall then be plunged and thoroughly flushed out with clean water.
 - c) Main and branch drains shall be cleared as required and afterwards be flushed with clean water. Any obstructions found shall be removed and not flushed down the system.
 - d) Covers of inspection chambers, manholes, gullies etc. shall be replaced, bedded in suitable grease or other sealing material as required and bolted/locked down as appropriate. Missing bolts and broken items shall be replaced in accordance with the manufacturer's details.
8. Trapped gullies shall be checked and replenished as necessary in order to maintain the seal preventing the escape of odours.
9. Clearing of the drainage system can be achieved by a number of methods depending on the nature of the work
 - a) Rodding – Manual/Mechanical with flexible rods.
 - b) Jetting – High pressure water jetting.
 - c) Plunging.

All adopted drainage to be maintained by Northumbrian Water Limited

All non-adopted drainage to be maintained by Canney Communications CIC or a management company appointed by them.

Drainage installation to be carried out by a suitably qualified Contractor appointed by and under the supervision of Canney Communications CIC.

Section2
Specific Items

Regular Maintenance		
Element	Maintenance/Action required	Frequency
CatchPits	Clear out sumps of catch pits to remove all silt/debris	Annually – Autumn after leaf fall
Aco Channels	Covers should be lifted and debris cleared out	Annually - Autumn after leaf fall
Permeable Paving	Regular cleaning will be required, brushing should suffice to remove surface dirt and silt build up between blocks. Following the routine maintenance it may be necessary to redress the surface with 2-4mm gritstone as per manufacturer's recommendations	Bi-Annual – In the spring Autumn after leaf fall
Regular Monitoring		
Permeable Paving: Initial Inspections	1- Inspect for poor operation 2- Inspect for evidence of poor operation and or weed growth. Take remedial action if required.	1- Monthly for 3 months after installation 2- Every 3 months, 48hours after large storms
Permeable Paving	Check surface is draining adequately during storms.	Annually – during storm conditions
Remedial Actions		
Rutting of paving /broken blocks	Repair areas as necessary	As required
Surface and upper substructure if poor operation is encountered and cannot be rectified by cleaning of surface etc	Rehabilitation/Replacement of these layers	As required
Adjacent landscaping	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required

Maintenance schedule for Hydrobrake Manhole

Regular Maintenance		
Element	Maintenance/Action required	Frequency
Manhole	1-Clear out sump 2-Check pivoting bypass door is operational	1- Bi annual – after leaf fall and after first large storm 2-Annually in dry weather
Regular Monitoring		
Manhole and swale	Check manhole/swale to ensure emptying is occurring satisfactorily	Annually – during heavy storm conditions and If water builds up in swales
Outlet pipe	Check for blockages or pipe damage	Annually
Remedial Actions		
Manhole/swale not emptying/flooding	Activate pivoting bypass door to release the water. Once system is empty check and remove blockages and silt deposits	As required
Outlet pipe: Damaged or blocked	Repair pipe/unblock pipe Clear out all silt from catch pit	As required

Maintenance schedule for SUDS basin

Regular Maintenance		
Element	Maintenance/Action required	Frequency
Litter removal	Litter collection should be undertaken at each visit and at the beginning of any maintenance task, particularly grass cutting. All litter to be removed off-site.	Monthly
Grass cutting on slopes and in bottom of basin	All grass cuttings managed on site in wildlife or compost piles	Monthly
Scrub clearance from bankside	Overhanging branches and encroaching growth to be removed	Annually
Occasional Maintenance		
Element	Maintenance/Action required	Frequency
Silt removal	Remove silt from base and place in site piles	Once every 10 years
Re-seed areas of poor vegetation growth	Less likely when vegetation has established.	Annually
Remedial Actions		
Element	Maintenance/Action required	Frequency
Repair of erosion or damage	Re-turfing or seeding	Once every 10 years
Re-level uneven surfaces and reinstate design levels	Scraping, profiling and levelling	Once every 40 years
Management		
Element	Maintenance/Action required	Frequency
Inspect and clean debris screens	Ensure no obstructions at screen	Monthly

SITE NAME: _____ SITE NUMBER: _____

SUDS ID: _____ SUDS TYPE: _____

WEATHER CONDITIONS: _____ DRY / CALM / WET / WINDY

DATE: _____

Activity	Tick if activity carried out	Comments
DETENTION BASIN - MONTHLY		
Check inlet and outlet for blockages		
Check grass heights		
Check litter and aesthetic damage		
Litter and unwanted items removed		
Grass cutting of isolated access areas only		
Weed and removed nuisance plants		
DETENTION BASIN - QUARTERLY		
Check condition of safety grill and check its secure		
Check for excessive scour		
Check flood levels		

Activity	Tick if activity carried out	Comments
DETENTION BASIN - ANNUALLY		
Check stone backfill condition and extent		
Remove excessive sediment build up but limit excavation activities		
Reseed and replant		
Clean drainage pipe		
DETENTION BASIN – BI-ANNUALLY		
Check water quality		
Check structural integrity of inlet/outlet		
Check silt trap manhole		
Check sediment levels		
Remove silt from silt trap manholes		

SITE NAME: _____ SITE NUMBER: _____

SUDS ID: _____ SUDS TYPE: _____

WEATHER CONDITIONS: _____ DRY / CALM / WET / WINDY

DATE: _____

Observations	Tick if observed	Comments
Visible pollutants	Foul Water (sewage)	
	Grey water	
	Other	
Blockage to inlet		
Blockage to outlet		
Deterioration of flow control		

Additional work undertaken/Other comments:

Supervisor
Name

Supervisor
Signature

SITE NAME: _____ SITE NUMBER: _____

SUDS ID: _____ SUDS TYPE: _____

WEATHER CONDITIONS: _____ DRY / CALM / WET / WINDY

DATE: _____

Activity	Tick if activity carried out	Comments
Hydrobrake		
Pivoting bypass door to be tested. Litter and debris removed. The door must be returned to the closed position following maintenance (Quarterly) .		
The unit should be jetted from downstream, in accordance with standard sewer jetting procedures (Annually) .		
Basin		
Check inlet and outlet for blockages, check grass heights, check litter and aesthetic damage. Remove weeds, litter and nuisance plants. (Monthly)		
Check condition of safety grilles and check they are secure, check for excessive scour, Check flood levels (quarterly)		
Check stone backfill condition, remove excessive sediment build up, but limit Excavation activities. Repair fencing if required (annually)		
Check water quality, structural integrity of inlet/outlet, check sediment levels, Reseed and repair as necessary. (Bi-annual)		

SITE NAME: _____ SITE NUMBER: _____

SUDS ID: _____ SUDS TYPE: _____

WEATHER CONDITIONS: _____ DRY / CALM / WET / WINDY

DATE: _____

Other Observations	Tick if observed	Comments
Visible pollutants	Foul Water (sewage)	
	Grey water	
	Other	
Evidence of flood levels being exceeded	Yes/no	
Evidence of sediment build up	Yes/no	
Maintenance requirements to be updated to Maintain effectiveness	Yes/no	

Additional work undertaken/Other comments:
--

Supervisor Name Date	Supervisor Signature
--------------------------------	-------------------------

SITE NAME: _____ SITE NUMBER: _____

SUDS ID: _____ SUDS TYPE: _____

WEATHER CONDITIONS: _____ DRY / CALM / WET / WINDY

DATE: _____

Activity	Tick if activity carried out	Comments
Permeable Paving		
Surface and joints to be brushed with a hard bristled brush to ensure that voids do not self-seal. (Monthly) .		
To ensure long-term effectiveness, the sediment that accumulates in SuDS is to be removed. (Quarterly) .		
Surface and joints to be jet-washed to ensure that voids do not self-seal. (Annually) .		
Manholes and pipework will be jet-washed to ensure that the system remains clear of Blockage. (Annually) .		
As with conventional concrete block pavements, depressions, rutting and cracked or broken blocks, considered to be detrimental to the structural performance of the pavement or a hazard to users, will require appropriate corrective action. When applicable, a replacement of the whole structure shall be undertaken at the discretion of the LPA/LLFA.		
Flow control		
The flow control shall be inspected monthly and following any major storm event . Debris and litter is to be removed and the overflow door tested to ensure that it is able to be opened from ground level. (Monthly) .		
When applicable, a replacement of the whole structure shall be undertaken at the discretion of the LPA/LLFA.		

SITE NUMBER:

SUDS TYPE:

DRY / CALM / WET / WINDY

Observations	Tick if observed	Comments
Visible pollutants	Foul Water (sewage)	
	Grey water	
	Other	
Blockage to inlet		
Blockage to outlet		
Deterioration of flow control		

Additional work undertaken/Other comments:

Supervisor
Signature