



Project Lands at Watts Close, London, N15 5DW				Job Ref. 22778	
Section Drainage Strategy Report				Sheet no./rev. 31	
Calc. by MG	Date 26/04/2022	Chk'd by DB	Date 26/04/2022	App'd by DB	Date 26/04/2022

APPENDIX IV – STORM WATER DESIGN CALCULATIONS

Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	0.76
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.500
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1.9	0.010	5.00	11.815	450	51.450	29.400	0.925
S1.8	0.010	5.00	11.815	450	48.900	20.900	0.935
S2.0	0.010	5.00	11.815	450	43.100	31.900	0.845
S1.7	0.010	5.00	11.815	450	40.500	23.650	1.025
S1.6	0.010	5.00	11.260	450	36.850	20.000	0.910
S3.1	0.010	5.00	11.260	450	11.950	18.750	0.860
S3.0	0.010	5.00	11.260	450	28.250	18.750	1.020
S1.5	0.010	5.00	11.260	450	36.850	15.900	1.073
S1.4	0.010	5.00	11.260	450	39.750	12.550	1.090
S1.3	0.012	5.00	11.260	450	39.750	1.940	1.196
S1.2	0.012	5.00	11.260	450	27.700	1.300	2.670
S5.1	0.010	5.00	11.260	450	0.400	10.900	0.860
S5.0	0.012	5.00	11.260	450	0.400	1.850	0.949
S4.1	0.012	5.00	11.260	450	27.100	7.750	0.860
S4.0	0.012	5.00	11.260	450	13.300	7.750	0.990
Storage			11.260		20.100	1.125	2.746
Outfall			11.260	450	12.500	0.950	2.682

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
M9	S1.9	S1.8	8.874	0.600	10.890	10.880	0.010	887.4	100	5.59	50.0
M8	S1.8	S1.7	8.839	0.600	10.880	10.790	0.090	98.2	100	5.78	50.0
S20	S2.0	S1.7	8.650	0.600	10.970	10.796	0.174	49.7	100	5.13	50.0
M7	S1.7	S1.6	5.162	0.600	10.790	10.399	0.391	13.2	150	5.81	50.0
M6	S1.6	S1.5	4.100	0.600	10.350	10.190	0.160	25.6	150	5.85	50.0
S31	S3.1	S3.0	16.300	0.600	10.400	10.240	0.160	101.9	100	5.36	50.0
S30	S3.0	S1.5	9.060	0.600	10.240	10.187	0.053	170.9	150	5.55	50.0
M5	S1.5	S1.4	4.431	0.600	10.190	10.170	0.020	221.5	225	5.93	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
M9	0.251	2.0	1.4	0.825	0.835	0.010	0.0
M8	0.776	6.1	2.7	0.835	0.925	0.020	0.0
S20	1.095	8.6	1.4	0.745	0.919	0.010	0.0
M7	2.787	49.3	5.4	0.875	0.711	0.040	0.0
M6	1.997	35.3	6.8	0.760	0.920	0.050	0.0
S31	0.761	6.0	1.4	0.760	0.920	0.010	0.0
S30	0.765	13.5	2.7	0.870	0.923	0.020	0.0
M5	0.874	34.8	10.8	0.845	0.865	0.080	0.0

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
M4	S1.4	S1.3	10.610	0.600	10.170	10.064	0.106	100.0	225	6.06	50.0
M3	S1.3	S1.2	12.067	0.600	10.130	10.009	0.121	100.0	225	6.22	50.0
M2	S1.2	Storage	7.602	0.600	8.590	8.514	0.076	100.0	225	6.32	50.0
S51	S5.1	S5.0	9.050	0.600	10.400	10.311	0.089	101.7	100	5.20	50.0
S50	S5.0	Storage	19.713	0.600	10.311	10.118	0.193	102.1	100	5.63	50.0
S41	S4.1	S4.0	13.800	0.600	10.400	10.270	0.130	106.2	100	5.31	50.0
S40	S4.0	Storage	9.494	0.600	10.270	10.177	0.093	102.1	100	5.52	50.0
M1	Storage	Outfall	1.000	0.600	8.590	8.578	0.012	80.0	225	6.33	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
M4	1.307	52.0	12.2	0.865	0.971	0.090	0.0
M3	1.307	52.0	13.8	0.905	1.026	0.102	0.0
M2	1.307	52.0	15.4	2.445	2.521	0.114	0.0
S51	0.762	6.0	1.4	0.760	0.849	0.010	0.0
S50	0.760	6.0	3.0	0.849	1.042	0.022	0.0
S41	0.746	5.9	1.6	0.760	0.890	0.012	0.0
S40	0.761	6.0	3.3	0.890	0.983	0.024	0.0
M1	1.463	58.2	21.7	2.445	2.457	0.160	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
M9	8.874	887.4	100	Circular	11.815	10.890	0.825	11.815	10.880	0.835
M8	8.839	98.2	100	Circular	11.815	10.880	0.835	11.815	10.790	0.925
S20	8.650	49.7	100	Circular	11.815	10.970	0.745	11.815	10.796	0.919
M7	5.162	13.2	150	Circular	11.815	10.790	0.875	11.260	10.399	0.711
M6	4.100	25.6	150	Circular	11.260	10.350	0.760	11.260	10.190	0.920
S31	16.300	101.9	100	Circular	11.260	10.400	0.760	11.260	10.240	0.920
S30	9.060	170.9	150	Circular	11.260	10.240	0.870	11.260	10.187	0.923
M5	4.431	221.5	225	Circular	11.260	10.190	0.845	11.260	10.170	0.865
M4	10.610	100.0	225	Circular	11.260	10.170	0.865	11.260	10.064	0.971
M3	12.067	100.0	225	Circular	11.260	10.130	0.905	11.260	10.009	1.026
M2	7.602	100.0	225	Circular	11.260	8.590	2.445	11.260	8.514	2.521
S51	9.050	101.7	100	Circular	11.260	10.400	0.760	11.260	10.311	0.849

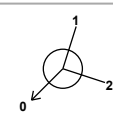
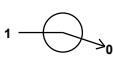
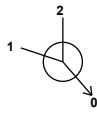
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
M9	S1.9	450	Manhole	Adoptable	S1.8	450	Manhole	Adoptable
M8	S1.8	450	Manhole	Adoptable	S1.7	450	Manhole	Adoptable
S20	S2.0	450	Manhole	Adoptable	S1.7	450	Manhole	Adoptable
M7	S1.7	450	Manhole	Adoptable	S1.6	450	Manhole	Adoptable
M6	S1.6	450	Manhole	Adoptable	S1.5	450	Manhole	Adoptable
S31	S3.1	450	Manhole	Adoptable	S3.0	450	Manhole	Adoptable
S30	S3.0	450	Manhole	Adoptable	S1.5	450	Manhole	Adoptable
M5	S1.5	450	Manhole	Adoptable	S1.4	450	Manhole	Adoptable
M4	S1.4	450	Manhole	Adoptable	S1.3	450	Manhole	Adoptable
M3	S1.3	450	Manhole	Adoptable	S1.2	450	Manhole	Adoptable
M2	S1.2	450	Manhole	Adoptable	Storage		Junction	
S51	S5.1	450	Manhole	Adoptable	S5.0	450	Manhole	Adoptable

Pipeline Schedule

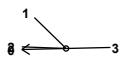
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
S50	19.713	102.1	100	Circular	11.260	10.311	0.849	11.260	10.118	1.042
S41	13.800	106.2	100	Circular	11.260	10.400	0.760	11.260	10.270	0.890
S40	9.494	102.1	100	Circular	11.260	10.270	0.890	11.260	10.177	0.983
M1	1.000	80.0	225	Circular	11.260	8.590	2.445	11.260	8.578	2.457

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S50	S5.0	450	Manhole	Adoptable	Storage		Junction	
S41	S4.1	450	Manhole	Adoptable	S4.0	450	Manhole	Adoptable
S40	S4.0	450	Manhole	Adoptable	Storage		Junction	
M1	Storage		Junction		Outfall	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1.9	51.450	29.400	11.815	0.925	450				
S1.8	48.900	20.900	11.815	0.935	450		0 M9	10.890	100
						1 M9	10.880	100	
						0 M8	10.880	100	
S2.0	43.100	31.900	11.815	0.845	450				
S1.7	40.500	23.650	11.815	1.025	450		0 S20	10.970	100
						1 S20	10.796	100	
						2 M8	10.790	100	
						0 M7	10.790	150	
S1.6	36.850	20.000	11.260	0.910	450		1 M7	10.399	150
						0 M6	10.350	150	
S3.1	11.950	18.750	11.260	0.860	450				
						0 S31	10.400	100	
S3.0	28.250	18.750	11.260	1.020	450		1 S31	10.240	100
						0 S30	10.240	150	
S1.5	36.850	15.900	11.260	1.073	450		1 S30	10.187	150
						2 M6	10.190	150	
						0 M5	10.190	225	
S1.4	39.750	12.550	11.260	1.090	450		1 M5	10.170	225
						0 M4	10.170	225	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1.3	39.750	1.940	11.260	1.196	450		1 M4	10.064	225
S1.2	27.700	1.300	11.260	2.670	450		0 M3 1 M3	10.130 10.009	225 225
S5.1	0.400	10.900	11.260	0.860	450		0 S51	8.590	225
S5.0	0.400	1.850	11.260	0.949	450		1 S51 0 S50	10.400 10.311	100 100
S4.1	27.100	7.750	11.260	0.860	450		0 S41	10.400	100
S4.0	13.300	7.750	11.260	0.990	450		1 S41 0 S40	10.270 10.270	100 100
Storage	20.100	1.125	11.260	2.746			1 S40 2 S50 3 M2 0 M1	10.177 10.118 8.514 8.590	100 100 225 225
Outfall	12.500	0.950	11.260	2.682	450		1 M1	8.578	225

Simulation Settings

Rainfall Methodology	FEH-13	Drain Down Time (mins)	240	100 year (l/s)	2.5
Summer CV	0.750	Additional Storage (m³/ha)	20.0	Check Discharge Volume	✓
Winter CV	0.840	Check Discharge Rate(s)	✓	100 year 360 minute (m³)	51
Analysis Speed	Normal	1 year (l/s)	0.7		
Skip Steady State	x	30 year (l/s)	1.9		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.188	Betterment (%)	0
SAAR (mm)	620	QBar	0.8
Soil Index	4	Q 1 year (l/s)	0.7
SPR	0.47	Q 30 year (l/s)	1.9
Region	6	Q 100 year (l/s)	2.5
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)	0.188	Storm Duration (mins)	360
Soil Index	4	Betterment (%)	0
SPR	0.47	PR	0.431
CWI	93.333	Runoff Volume (m³)	51

Node Storage Online Pump Control

Flap Valve	x	Design Depth (m)	1.500	Switch off depth (m)	0.000
Replaces Downstream Link	x	Design Flow (l/s)	2.5		
Invert Level (m)	8.590	Switch on depth (m)	1.000		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	2.500	1.500	2.500

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	8.590
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	85.0	0.0	1.500	85.0	0.0	1.501	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 96.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1.9	11	10.948	0.058	1.4	0.0216	0.0000	OK
15 minute winter	S1.8	11	10.929	0.049	2.7	0.0184	0.0000	OK
15 minute winter	S2.0	10	10.998	0.028	1.4	0.0109	0.0000	OK
15 minute winter	S1.7	10	10.826	0.036	5.4	0.0126	0.0000	OK
15 minute winter	S1.6	10	10.397	0.047	6.8	0.0177	0.0000	OK
15 minute winter	S3.1	10	10.432	0.032	1.4	0.0127	0.0000	OK
15 minute winter	S3.0	11	10.285	0.045	2.8	0.0160	0.0000	OK
15 minute winter	S1.5	11	10.279	0.092	10.8	0.0316	0.0000	OK
15 minute winter	S1.4	11	10.243	0.073	12.1	0.0252	0.0000	OK
15 minute winter	S1.3	11	10.214	0.150	13.6	0.0539	0.0000	OK
1440 minute winter	S1.2	1170	9.068	0.478	1.4	0.1190	0.0000	SURCHARGED
15 minute winter	S5.1	10	10.433	0.033	1.4	0.0127	0.0000	OK
15 minute winter	S5.0	11	10.361	0.050	3.0	0.0204	0.0000	OK
15 minute winter	S4.1	10	10.435	0.035	1.6	0.0154	0.0000	OK
15 minute winter	S4.0	11	10.322	0.052	3.2	0.0209	0.0000	OK
1440 minute winter	Storage	1290	9.068	0.554	2.6	38.6195	0.0000	SURCHARGED
15 minute summer	Outfall	1	8.578	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1.9	M9	S1.8	1.3	0.314	0.679	0.0377	
15 minute winter	S1.8	M8	S1.7	2.7	0.848	0.440	0.0280	
15 minute winter	S2.0	S20	S1.7	1.4	0.747	0.160	0.0160	
15 minute winter	S1.7	M7	S1.6	5.4	1.750	0.109	0.0158	
15 minute winter	S1.6	M6	S1.5	6.7	0.873	0.190	0.0317	
15 minute winter	S3.1	S31	S3.0	1.4	0.486	0.227	0.0458	
15 minute winter	S3.0	S30	S1.5	2.7	0.344	0.198	0.0712	
15 minute winter	S1.5	M5	S1.4	10.8	0.837	0.310	0.0570	
15 minute winter	S1.4	M4	S1.3	12.1	0.618	0.233	0.2083	
15 minute winter	S1.3	M3	S1.2	13.7	1.069	0.264	0.1550	
1440 minute winter	S1.2	M2	Storage	2.2	0.128	0.042	0.3023	
15 minute winter	S5.1	S51	S5.0	1.4	0.457	0.229	0.0273	
15 minute winter	S5.0	S50	Storage	2.9	0.754	0.484	0.0756	
15 minute winter	S4.1	S41	S4.0	1.6	0.477	0.267	0.0454	
15 minute winter	S4.0	S40	Storage	3.1	0.761	0.518	0.0386	
1440 minute winter	Storage	M1	Outfall	0.0	0.000	0.000	0.0000	0.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 96.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1.9	11	11.083	0.193	4.2	0.0725	0.0000	SURCHARGED
15 minute winter	S1.8	11	11.041	0.161	7.7	0.0600	0.0000	SURCHARGED
15 minute winter	S2.0	10	11.021	0.051	4.2	0.0201	0.0000	OK
15 minute winter	S1.7	10	10.855	0.065	15.4	0.0229	0.0000	OK
15 minute winter	S1.6	11	10.461	0.111	19.5	0.0419	0.0000	OK
15 minute winter	S3.1	11	10.471	0.071	4.2	0.0278	0.0000	OK
15 minute winter	S3.0	11	10.411	0.171	8.1	0.0607	0.0000	SURCHARGED
15 minute winter	S1.5	11	10.387	0.200	31.1	0.0690	0.0000	OK
15 minute winter	S1.4	11	10.346	0.176	35.1	0.0604	0.0000	OK
15 minute winter	S1.3	11	10.294	0.230	39.9	0.0830	0.0000	OK
360 minute winter	S1.2	368	9.590	1.000	6.8	0.2490	0.0000	SURCHARGED
15 minute winter	S5.1	12	10.559	0.159	4.2	0.0622	0.0000	SURCHARGED
15 minute winter	S5.0	12	10.520	0.209	8.1	0.0861	0.0000	SURCHARGED
15 minute winter	S4.1	11	10.569	0.169	5.0	0.0742	0.0000	SURCHARGED
15 minute winter	S4.0	11	10.485	0.215	9.0	0.0864	0.0000	SURCHARGED
360 minute winter	Storage	368	9.590	1.076	9.4	80.7892	0.0000	SURCHARGED
360 minute winter	Outfall	376	8.610	0.032	2.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1.9	M9	S1.8	3.7	0.476	1.893	0.0694	
15 minute winter	S1.8	M8	S1.7	7.5	1.045	1.225	0.0582	
15 minute winter	S2.0	S20	S1.7	4.1	0.946	0.482	0.0379	
15 minute winter	S1.7	M7	S1.6	15.3	2.250	0.311	0.0360	
15 minute winter	S1.6	M6	S1.5	19.4	1.143	0.548	0.0646	
15 minute winter	S3.1	S31	S3.0	3.9	0.545	0.650	0.1121	
15 minute winter	S3.0	S30	S1.5	7.9	0.446	0.581	0.1595	
15 minute winter	S1.5	M5	S1.4	31.2	0.901	0.897	0.1555	
15 minute winter	S1.4	M4	S1.3	35.2	0.932	0.677	0.3878	
15 minute winter	S1.3	M3	S1.2	40.0	1.368	0.770	0.3525	
360 minute winter	S1.2	M2	Storage	6.7	0.180	0.129	0.3023	
15 minute winter	S5.1	S51	S5.0	3.5	0.551	0.590	0.0708	
15 minute winter	S5.0	S50	Storage	7.7	0.986	1.289	0.1491	
15 minute winter	S4.1	S41	S4.0	4.4	0.566	0.745	0.1080	
15 minute winter	S4.0	S40	Storage	8.7	1.114	1.458	0.0728	
360 minute winter	Storage	M1	Outfall	2.5	0.682	0.043	0.0037	34.2

Results for 100 year Critical Storm Duration. Lowest mass balance: 96.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1.9	11	11.221	0.331	5.5	0.1241	0.0000	SURCHARGED
15 minute winter	S1.8	11	11.152	0.272	9.9	0.1016	0.0000	SURCHARGED
15 minute winter	S2.0	10	11.031	0.061	5.5	0.0243	0.0000	OK
15 minute winter	S1.7	11	10.867	0.077	20.0	0.0272	0.0000	OK
15 minute winter	S1.6	11	10.634	0.284	25.1	0.1075	0.0000	SURCHARGED
15 minute winter	S3.1	12	10.646	0.246	5.5	0.0964	0.0000	SURCHARGED
15 minute winter	S3.0	11	10.533	0.293	9.8	0.1041	0.0000	SURCHARGED
15 minute winter	S1.5	11	10.498	0.311	39.4	0.1072	0.0000	SURCHARGED
15 minute winter	S1.4	11	10.446	0.276	44.3	0.0948	0.0000	SURCHARGED
15 minute winter	S1.3	11	10.334	0.270	50.4	0.0973	0.0000	OK
960 minute winter	S1.2	675	9.747	1.157	4.4	0.2881	0.0000	SURCHARGED
15 minute winter	S5.1	12	10.788	0.388	5.5	0.1520	0.0000	SURCHARGED
15 minute winter	S5.0	12	10.731	0.420	10.3	0.1728	0.0000	SURCHARGED
15 minute winter	S4.1	12	10.779	0.379	6.6	0.1661	0.0000	SURCHARGED
15 minute winter	S4.0	12	10.636	0.366	11.7	0.1467	0.0000	SURCHARGED
960 minute winter	Storage	675	9.747	1.233	5.9	93.4596	0.0000	SURCHARGED
480 minute winter	Outfall	288	8.610	0.032	2.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1.9	M9	S1.8	4.8	0.608	2.418	0.0694	
15 minute winter	S1.8	M8	S1.7	9.5	1.275	1.560	0.0631	
15 minute winter	S2.0	S20	S1.7	5.5	1.051	0.635	0.0465	
15 minute winter	S1.7	M7	S1.6	19.9	2.243	0.404	0.0689	
15 minute winter	S1.6	M6	S1.5	24.7	1.405	0.701	0.0722	
15 minute winter	S3.1	S31	S3.0	4.8	0.618	0.809	0.1275	
15 minute winter	S3.0	S30	S1.5	9.8	0.554	0.721	0.1595	
15 minute winter	S1.5	M5	S1.4	39.1	0.984	1.126	0.1762	
15 minute winter	S1.4	M4	S1.3	44.1	1.110	0.849	0.4220	
15 minute winter	S1.3	M3	S1.2	50.0	1.411	0.962	0.4279	
960 minute winter	S1.2	M2	Storage	4.3	0.150	0.083	0.3023	
15 minute winter	S5.1	S51	S5.0	4.3	0.555	0.725	0.0708	
15 minute winter	S5.0	S50	Storage	9.5	1.219	1.596	0.1521	
15 minute winter	S4.1	S41	S4.0	5.6	0.721	0.963	0.1080	
15 minute winter	S4.0	S40	Storage	11.3	1.438	1.884	0.0735	
960 minute winter	Storage	M1	Outfall	2.5	0.682	0.043	0.0037	102.4

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 96.13%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1.9	12	11.604	0.714	7.8	0.2677	0.0000	FLOOD RISK
15 minute winter	S1.8	12	11.503	0.623	13.0	0.2324	0.0000	SURCHARGED
15 minute winter	S2.0	12	11.210	0.240	7.8	0.0951	0.0000	SURCHARGED
15 minute winter	S1.7	12	11.093	0.303	24.5	0.1072	0.0000	SURCHARGED
480 minute winter	S1.6	440	11.045	0.695	4.5	0.2636	0.0000	FLOOD RISK
480 minute winter	S3.1	440	11.046	0.646	0.9	0.2533	0.0000	FLOOD RISK
480 minute winter	S3.0	448	11.046	0.806	1.8	0.2860	0.0000	FLOOD RISK
480 minute winter	S1.5	448	11.045	0.858	7.2	0.2959	0.0000	FLOOD RISK
480 minute winter	S1.4	440	11.046	0.876	8.1	0.3004	0.0000	FLOOD RISK
480 minute winter	S1.3	448	11.045	0.981	9.2	0.3531	0.0000	FLOOD RISK
480 minute winter	S1.2	440	11.046	2.456	10.3	0.6115	0.0000	FLOOD RISK
15 minute winter	S5.1	12	11.209	0.809	7.8	0.3170	0.0000	FLOOD RISK
15 minute winter	S5.0	12	11.112	0.801	13.9	0.3299	0.0000	FLOOD RISK
15 minute winter	S4.1	12	11.175	0.775	9.3	0.3394	0.0000	FLOOD RISK
480 minute winter	S4.0	448	11.047	0.777	2.2	0.3115	0.0000	FLOOD RISK
480 minute winter	Storage	440	11.045	2.531	14.4	121.2057	0.0000	FLOOD RISK
1440 minute summer	Outfall	720	8.610	0.032	2.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1.9	M9	S1.8	5.9	0.760	3.020	0.0694	
15 minute winter	S1.8	M8	S1.7	11.9	1.522	1.954	0.0692	
15 minute winter	S2.0	S20	S1.7	7.0	1.092	0.817	0.0677	
15 minute winter	S1.7	M7	S1.6	24.3	2.247	0.494	0.0909	
480 minute winter	S1.6	M6	S1.5	4.5	0.788	0.128	0.0722	
480 minute winter	S3.1	S31	S3.0	0.9	0.426	0.150	0.1275	
480 minute winter	S3.0	S30	S1.5	1.8	0.302	0.133	0.1595	
480 minute winter	S1.5	M5	S1.4	7.2	0.747	0.207	0.1762	
480 minute winter	S1.4	M4	S1.3	8.1	0.500	0.156	0.4220	
480 minute winter	S1.3	M3	S1.2	9.2	0.962	0.177	0.4799	
480 minute winter	S1.2	M2	Storage	10.2	0.255	0.195	0.3023	
15 minute winter	S5.1	S51	S5.0	5.7	0.732	0.957	0.0708	
15 minute winter	S5.0	S50	Storage	12.5	1.601	2.097	0.1527	
15 minute winter	S4.1	S41	S4.0	7.5	0.953	1.273	0.1080	
480 minute winter	S4.0	S40	Storage	2.2	0.698	0.368	0.0743	
480 minute winter	Storage	M1	Outfall	2.5	0.682	0.043	0.0037	71.4



Project Lands at Watts Close, London, N15 5DW				Job Ref. 22778	
Section Drainage Strategy Report				Sheet no./rev. 41	
Calc. by MG	Date 26/04/2022	Chk'd by DB	Date 26/04/2022	App'd by DB	Date 26/04/2022

APPENDIX V – FOUL WATER DESIGN CALCULATIONS

Design Settings

Frequency of use (kDU)	1.00	Minimum Velocity (m/s)	0.76
Flow per dwelling per day (l/day)	900	Connection Type	Level Inverts
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.200
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	0.900
Additional Flow (%)	0	Include Intermediate Ground	✓

Nodes

	Name	Dwellings	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
✓	Ex. F 1.0		11.000	Manhole	Adoptable	450	3.700	0.000	2.155
✓	F1.0		11.000	Manhole	Adoptable	450	0.000	1.600	2.079
✓	F1.1		11.000	Manhole	Adoptable	450	0.000	3.100	2.050
✓	F1.2	10	11.000	Manhole	Adoptable	450	0.000	6.830	1.981
✓	F1.3		11.000	Manhole	Adoptable	450	0.000	16.410	1.801
✓	F1.4		11.000	Manhole	Adoptable	450	7.910	16.410	1.667
✓	F1.5		11.000	Manhole	Adoptable	450	10.730	16.410	1.599
✓	F1.6		11.000	Manhole	Adoptable	450	10.730	19.560	1.541
✓	F1.7	5	11.000	Manhole	Adoptable	450	14.670	19.560	1.467
✓	F1.8	5	11.000	Manhole	Adoptable	450	16.070	19.560	1.440
✓	F1.9		11.000	Manhole	Adoptable	450	16.570	19.560	1.427
✓	F1.10		11.000	Manhole	Adoptable	450	17.970	19.560	1.401
✓	F1.11		11.000	Manhole	Adoptable	450	22.270	19.560	1.319
✓	F1.12	5	11.000	Manhole	Adoptable	450	23.670	19.560	1.293
✓	F1.13	5	11.000	Manhole	Adoptable	450	24.210	19.560	1.281
✓	F1.14	10	11.000	Manhole	Adoptable	450	25.580	19.560	1.254
✓	F1.15		11.000	Manhole	Adoptable	450	29.480	19.560	1.181
✓	F1.16		11.000	Manhole	Adoptable	450	29.480	16.440	1.122
✓	F1.17	10	11.000	Manhole	Adoptable	450	32.280	16.440	1.069
✓	F1.18		11.000	Manhole	Adoptable	450	37.380	16.440	0.974
✓	F1.19		11.565	Manhole	Adoptable	450	37.380	20.440	1.115
✓	F1.20		11.565	Manhole	Adoptable	450	39.830	22.790	1.045
✓	F1.21		11.565	Manhole	Adoptable	450	43.580	21.640	0.895
✓	F1.22		11.565	Manhole	Adoptable	450	45.030	21.240	0.845
✓	F1.23		11.565	Manhole	Adoptable	450	49.380	20.440	0.675
✓	F1.24	6	11.565	Manhole	Adoptable	450	50.780	25.090	0.495
✓	F1.25		11.565	Manhole	Adoptable	450	52.030	29.090	0.345
✓	F2.0		11.000	Manhole	Adoptable	450	40.230	12.890	0.890
✓	F2.1	10	11.000	Manhole	Adoptable	450	40.230	6.820	0.770
✓	F2.2		11.000	Manhole	Adoptable	450	40.230	3.090	0.700
✓	F2.3		11.000	Manhole	Adoptable	450	35.410	3.090	0.520
✓	F3.0	6	11.565	Manhole	Adoptable	450	41.630	27.990	0.935
✓	F3.1		11.565	Manhole	Adoptable	450	42.780	32.000	0.845
✓	F4.0		11.000	Manhole	Adoptable	450	4.900	3.000	0.700
✓	Outfall		10.010	Manhole	Adoptable	450	1.000	-10.800	4.324

Links (Input)

	Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type
?	M0	F1.0	Ex. F 1.0	6.040	1.500	Colebrook-White	8.921	8.845	0.076	79.5	100	Circular
?	M1	F1.1	F1.0	2.310	1.500	Colebrook-White	8.950	8.921	0.029	79.7	100	Circular
?	M2	F1.2	F1.1	5.520	1.500	Colebrook-White	9.019	8.950	0.069	80.0	100	Circular
?	M3	F1.3	F1.2	14.330	1.500	Colebrook-White	9.199	9.019	0.180	79.6	100	Circular
✓	M4	F1.4	F1.3	10.660	1.500	Colebrook-White	9.333	9.199	0.134	79.6	100	Circular
✓	M5	F1.5	F1.4	5.430	1.500	Colebrook-White	9.401	9.333	0.068	79.9	100	Circular
✓	M6	F1.6	F1.5	4.610	1.500	Colebrook-White	9.459	9.401	0.058	79.5	100	Circular
✓	M7	F1.7	F1.6	5.920	1.500	Colebrook-White	9.533	9.459	0.074	80.0	100	Circular
✓	M8	F1.8	F1.7	2.110	1.500	Colebrook-White	9.560	9.533	0.027	78.1	100	Circular
✓	M9	F1.9	F1.8	1.000	1.500	Colebrook-White	9.573	9.560	0.013	76.9	100	Circular
✓	M10	F1.10	F1.9	2.020	1.500	Colebrook-White	9.599	9.573	0.026	77.7	100	Circular
✓	M11	F1.11	F1.10	6.560	1.500	Colebrook-White	9.681	9.599	0.082	80.0	100	Circular
✓	M12	F1.12	F1.11	2.040	1.500	Colebrook-White	9.707	9.681	0.026	78.5	100	Circular
✓	M13	F1.13	F1.12	1.000	1.500	Colebrook-White	9.719	9.707	0.012	80.0	100	Circular
✓	M14	F1.14	F1.13	2.160	1.500	Colebrook-White	9.746	9.719	0.027	80.0	100	Circular
✓	M15	F1.15	F1.14	5.850	1.500	Colebrook-White	9.819	9.746	0.073	80.0	100	Circular
✓	M16	F1.16	F1.15	4.700	1.500	Colebrook-White	9.878	9.819	0.059	79.7	100	Circular
✓	M17	F1.17	F1.16	4.250	1.500	Colebrook-White	9.931	9.878	0.053	80.0	100	Circular
?	M18	F1.18	F1.17	7.590	1.500	Colebrook-White	10.026	9.931	0.095	79.9	100	Circular
?	M19	F1.19	F1.18	6.060	1.500	Colebrook-White	10.450	10.030	0.420	14.4	100	Circular
✓	M20	F1.20	F1.19	5.030	1.500	Colebrook-White	10.520	10.450	0.070	71.9	100	Circular
?	M21	F1.21	F1.20	5.940	1.500	Colebrook-White	10.670	10.520	0.150	39.6	100	Circular
?	M22	F1.22	F1.21	2.280	1.500	Colebrook-White	10.720	10.670	0.050	45.6	100	Circular
?	M23	F1.23	F1.22	6.520	1.500	Colebrook-White	10.890	10.720	0.170	38.4	100	Circular
?	M24	F1.24	F1.23	7.400	1.500	Colebrook-White	11.070	10.890	0.180	41.1	100	Circular
?	M25	F1.25	F1.24	6.230	1.500	Colebrook-White	11.220	11.070	0.150	41.5	100	Circular
?	S2-0	F2.0	F1.18	6.760	1.500	Colebrook-White	10.110	10.026	0.084	80.0	100	Circular
?	S2-1	F2.1	F2.0	9.240	1.500	Colebrook-White	10.230	10.110	0.120	77.0	100	Circular
?	S2-2	F2.2	F2.1	5.500	1.500	Colebrook-White	10.300	10.230	0.070	78.6	100	Circular
?	S2-3	F2.3	F2.2	7.230	1.500	Colebrook-White	10.480	10.300	0.180	40.2	100	Circular
?	S3-0	F3.0	F1.20	8.150	1.500	Colebrook-White	10.630	10.520	0.110	74.1	100	Circular
?	S3-1	F3.1	F3.0	6.200	1.500	Colebrook-White	10.720	10.630	0.090	68.9	100	Circular
?	S4-0	F4.0	F1.1	7.390	1.500	Colebrook-White	10.300	10.115	0.185	40.0	100	Circular
?	Q0	Ex. F 1.0	Outfall	12.210	1.500	Colebrook-White	8.845	5.686	3.159	3.9	450	Circular

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
M0	6.040	79.5	100	Circular	11.000	8.921	1.979	11.000	8.845	2.055
M1	2.310	79.7	100	Circular	11.000	8.950	1.950	11.000	8.921	1.979
M2	5.520	80.0	100	Circular	11.000	9.019	1.881	11.000	8.950	1.950
M3	14.330	79.6	100	Circular	11.000	9.199	1.701	11.000	9.019	1.881
M4	10.660	79.6	100	Circular	11.000	9.333	1.567	11.000	9.199	1.701
M5	5.430	79.9	100	Circular	11.000	9.401	1.499	11.000	9.333	1.567
M6	4.610	79.5	100	Circular	11.000	9.459	1.441	11.000	9.401	1.499
M7	5.920	80.0	100	Circular	11.000	9.533	1.367	11.000	9.459	1.441
M8	2.110	78.1	100	Circular	11.000	9.560	1.340	11.000	9.533	1.367
M9	1.000	76.9	100	Circular	11.000	9.573	1.327	11.000	9.560	1.340
M10	2.020	77.7	100	Circular	11.000	9.599	1.301	11.000	9.573	1.327
M11	6.560	80.0	100	Circular	11.000	9.681	1.219	11.000	9.599	1.301
M12	2.040	78.5	100	Circular	11.000	9.707	1.193	11.000	9.681	1.219
M13	1.000	80.0	100	Circular	11.000	9.719	1.181	11.000	9.707	1.193
M14	2.160	80.0	100	Circular	11.000	9.746	1.154	11.000	9.719	1.181
M15	5.850	80.0	100	Circular	11.000	9.819	1.081	11.000	9.746	1.154
M16	4.700	79.7	100	Circular	11.000	9.878	1.022	11.000	9.819	1.081
M17	4.250	80.0	100	Circular	11.000	9.931	0.969	11.000	9.878	1.022
M18	7.590	79.9	100	Circular	11.000	10.026	0.874	11.000	9.931	0.969
M19	6.060	14.4	100	Circular	11.565	10.450	1.015	11.000	10.030	0.870
M20	5.030	71.9	100	Circular	11.565	10.520	0.945	11.565	10.450	1.015
M21	5.940	39.6	100	Circular	11.565	10.670	0.795	11.565	10.520	0.945
M22	2.280	45.6	100	Circular	11.565	10.720	0.745	11.565	10.670	0.795
M23	6.520	38.4	100	Circular	11.565	10.890	0.575	11.565	10.720	0.745
M24	7.400	41.1	100	Circular	11.565	11.070	0.395	11.565	10.890	0.575

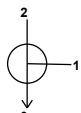
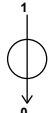
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
M0	F1.0	450	Manhole	Adoptable	Ex. F 1.0	450	Manhole	Adoptable
M1	F1.1	450	Manhole	Adoptable	F1.0	450	Manhole	Adoptable
M2	F1.2	450	Manhole	Adoptable	F1.1	450	Manhole	Adoptable
M3	F1.3	450	Manhole	Adoptable	F1.2	450	Manhole	Adoptable
M4	F1.4	450	Manhole	Adoptable	F1.3	450	Manhole	Adoptable
M5	F1.5	450	Manhole	Adoptable	F1.4	450	Manhole	Adoptable
M6	F1.6	450	Manhole	Adoptable	F1.5	450	Manhole	Adoptable
M7	F1.7	450	Manhole	Adoptable	F1.6	450	Manhole	Adoptable
M8	F1.8	450	Manhole	Adoptable	F1.7	450	Manhole	Adoptable
M9	F1.9	450	Manhole	Adoptable	F1.8	450	Manhole	Adoptable
M10	F1.10	450	Manhole	Adoptable	F1.9	450	Manhole	Adoptable
M11	F1.11	450	Manhole	Adoptable	F1.10	450	Manhole	Adoptable
M12	F1.12	450	Manhole	Adoptable	F1.11	450	Manhole	Adoptable
M13	F1.13	450	Manhole	Adoptable	F1.12	450	Manhole	Adoptable
M14	F1.14	450	Manhole	Adoptable	F1.13	450	Manhole	Adoptable
M15	F1.15	450	Manhole	Adoptable	F1.14	450	Manhole	Adoptable
M16	F1.16	450	Manhole	Adoptable	F1.15	450	Manhole	Adoptable
M17	F1.17	450	Manhole	Adoptable	F1.16	450	Manhole	Adoptable
M18	F1.18	450	Manhole	Adoptable	F1.17	450	Manhole	Adoptable
M19	F1.19	450	Manhole	Adoptable	F1.18	450	Manhole	Adoptable
M20	F1.20	450	Manhole	Adoptable	F1.19	450	Manhole	Adoptable
M21	F1.21	450	Manhole	Adoptable	F1.20	450	Manhole	Adoptable
M22	F1.22	450	Manhole	Adoptable	F1.21	450	Manhole	Adoptable
M23	F1.23	450	Manhole	Adoptable	F1.22	450	Manhole	Adoptable
M24	F1.24	450	Manhole	Adoptable	F1.23	450	Manhole	Adoptable

Pipeline Schedule

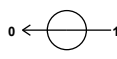
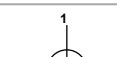
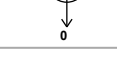
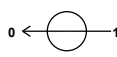
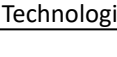
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
M25	6.230	41.5	100	Circular	11.565	11.220	0.245	11.565	11.070	0.395
S2-0	6.760	80.0	100	Circular	11.000	10.110	0.790	11.000	10.026	0.874
S2-1	9.240	77.0	100	Circular	11.000	10.230	0.670	11.000	10.110	0.790
S2-2	5.500	78.6	100	Circular	11.000	10.300	0.600	11.000	10.230	0.670
S2-3	7.230	40.2	100	Circular	11.000	10.480	0.420	11.000	10.300	0.600
S3-0	8.150	74.1	100	Circular	11.565	10.630	0.835	11.565	10.520	0.945
S3-1	6.200	68.9	100	Circular	11.565	10.720	0.745	11.565	10.630	0.835
S4-0	7.390	40.0	100	Circular	11.000	10.300	0.600	11.000	10.115	0.785
Q0	12.210	3.9	450	Circular	11.000	8.845	1.705	10.010	5.686	3.874

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
M25	F1.25	450	Manhole	Adoptable	F1.24	450	Manhole	Adoptable
S2-0	F2.0	450	Manhole	Adoptable	F1.18	450	Manhole	Adoptable
S2-1	F2.1	450	Manhole	Adoptable	F2.0	450	Manhole	Adoptable
S2-2	F2.2	450	Manhole	Adoptable	F2.1	450	Manhole	Adoptable
S2-3	F2.3	450	Manhole	Adoptable	F2.2	450	Manhole	Adoptable
S3-0	F3.0	450	Manhole	Adoptable	F1.20	450	Manhole	Adoptable
S3-1	F3.1	450	Manhole	Adoptable	F3.0	450	Manhole	Adoptable
S4-0	F4.0	450	Manhole	Adoptable	F1.1	450	Manhole	Adoptable
Q0	Ex. F 1.0	450	Manhole	Adoptable	Outfall	450	Manhole	Adoptable

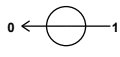
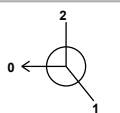
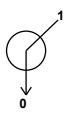
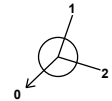
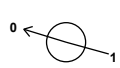
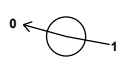
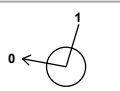
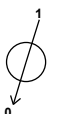
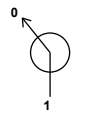
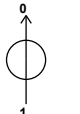
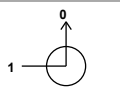
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
Ex. F 1.0	3.700	0.000	11.000	2.155	450	Manhole	Adoptable		1 M0	8.845	100	Circular
F1.0	0.000	1.600	11.000	2.079	450	Manhole	Adoptable		1 M1	8.921	100	Circular
F1.1	0.000	3.100	11.000	2.050	450	Manhole	Adoptable		1 S4-0 2 M2	10.115 8.950	100 100	Circular Circular
F1.2	0.000	6.830	11.000	1.981	450	Manhole	Adoptable		1 M3	9.019	100	Circular
									0 M2	9.019	100	Circular

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
F1.3	0.000	16.410	11.000	1.801	450	Manhole	Adoptable		1	M4	9.199	100	Circular
F1.4	7.910	16.410	11.000	1.667	450	Manhole	Adoptable		1	M3	9.199	100	Circular
									0	M4	9.333	100	Circular
F1.5	10.730	16.410	11.000	1.599	450	Manhole	Adoptable		1	M6	9.401	100	Circular
									0	M5	9.401	100	Circular
F1.6	10.730	19.560	11.000	1.541	450	Manhole	Adoptable		1	M7	9.459	100	Circular
									0	M6	9.459	100	Circular
F1.7	14.670	19.560	11.000	1.467	450	Manhole	Adoptable		1	M8	9.533	100	Circular
									0	M7	9.533	100	Circular
F1.8	16.070	19.560	11.000	1.440	450	Manhole	Adoptable		1	M9	9.560	100	Circular
									0	M8	9.560	100	Circular
F1.9	16.570	19.560	11.000	1.427	450	Manhole	Adoptable		1	M10	9.573	100	Circular
									0	M9	9.573	100	Circular
F1.10	17.970	19.560	11.000	1.401	450	Manhole	Adoptable		1	M11	9.599	100	Circular
									0	M10	9.599	100	Circular
F1.11	22.270	19.560	11.000	1.319	450	Manhole	Adoptable		1	M12	9.681	100	Circular
									0	M11	9.681	100	Circular
F1.12	23.670	19.560	11.000	1.293	450	Manhole	Adoptable		1	M13	9.707	100	Circular
									0	M12	9.707	100	Circular
F1.13	24.210	19.560	11.000	1.281	450	Manhole	Adoptable		1	M14	9.719	100	Circular
									0	M13	9.719	100	Circular
F1.14	25.580	19.560	11.000	1.254	450	Manhole	Adoptable		1	M15	9.746	100	Circular
									0	M14	9.746	100	Circular
F1.15	29.480	19.560	11.000	1.181	450	Manhole	Adoptable		1	M16	9.819	100	Circular
									0	M15	9.819	100	Circular

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
F1.16	29.480	16.440	11.000	1.122	450	Manhole	Adoptable		1 M17	9.878	100	Circular
								0	M16	9.878	100	Circular
F1.17	32.280	16.440	11.000	1.069	450	Manhole	Adoptable		1 M18	9.931	100	Circular
								0	M17	9.931	100	Circular
F1.18	37.380	16.440	11.000	0.974	450	Manhole	Adoptable		1 S2-0	10.026	100	Circular
								2	M19	10.030	100	Circular
								0	M18	10.026	100	Circular
F1.19	37.380	20.440	11.565	1.115	450	Manhole	Adoptable		1 M20	10.450	100	Circular
								0	M19	10.450	100	Circular
F1.20	39.830	22.790	11.565	1.045	450	Manhole	Adoptable		1 S3-0	10.520	100	Circular
								2	M21	10.520	100	Circular
								0	M20	10.520	100	Circular
F1.21	43.580	21.640	11.565	0.895	450	Manhole	Adoptable		1 M22	10.670	100	Circular
								0	M21	10.670	100	Circular
F1.22	45.030	21.240	11.565	0.845	450	Manhole	Adoptable		1 M23	10.720	100	Circular
								0	M22	10.720	100	Circular
F1.23	49.380	20.440	11.565	0.675	450	Manhole	Adoptable		1 M24	10.890	100	Circular
								0	M23	10.890	100	Circular
F1.24	50.780	25.090	11.565	0.495	450	Manhole	Adoptable		1 M25	11.070	100	Circular
								0	M24	11.070	100	Circular
F1.25	52.030	29.090	11.565	0.345	450	Manhole	Adoptable		0 M25	11.220	100	Circular
F2.0	40.230	12.890	11.000	0.890	450	Manhole	Adoptable		1 S2-1	10.110	100	Circular
								0	S2-0	10.110	100	Circular
F2.1	40.230	6.820	11.000	0.770	450	Manhole	Adoptable		1 S2-2	10.230	100	Circular
								0	S2-1	10.230	100	Circular
F2.2	40.230	3.090	11.000	0.700	450	Manhole	Adoptable		1 S2-3	10.300	100	Circular
								0	S2-2	10.300	100	Circular

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
F2.3	35.410	3.090	11.000	0.520	450	Manhole	Adoptable		0	S2-3	10.480	100	Circular
F3.0	41.630	27.990	11.565	0.935	450	Manhole	Adoptable		1	S3-1	10.630	100	Circular
F3.1	42.780	32.000	11.565	0.845	450	Manhole	Adoptable		0	S3-0	10.630	100	Circular
F4.0	4.900	3.000	11.000	0.700	450	Manhole	Adoptable		0	S3-1	10.720	100	Circular
Outfall	1.000	-10.800	10.010	4.324	450	Manhole	Adoptable		1	Q0	5.686	450	Circular



Project Lands at Watts Close, London, N15 5DW				Job Ref. 22778	
Section Drainage Strategy Report				Sheet no./rev. 49	
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APPENDIX VI – DRAINAGE MAINTENANCE PLAN

PROJECT: LANDS AT WATTS CLOSE,
LONDON. N15 5DW

PROJECT NO: 22778

DOCUMENT TITLE: DRAINAGE STRATEGY REPORT

DOCUMENT NO: 22778-RP-01

DATE: 30th JANUARY 2023

Project Lands at Watts Close, London, N15 5DW				Job Ref. 22778	
Section Drainage Maintenance Plan				Sheet no./rev. 2	
Calc. by BC	Date 30/01/23	Chk'd by DB	Date 30/01/23	App'd by DB	Date 30/01/23

1. GENERAL

Sustainable Drainage Systems (SuDS) are an environmentally friendly approach to managing rainfall. SuDS techniques use landscape features to deal with surface water with the aim to:

- Control the flow, volume and frequency of water leaving a development.
- Prevent pollution by intercepting silt and cleaning runoff from hard surfaces.
- Provide attractive surroundings for the community.

The surface water drainage strategy for this development utilises an attenuation tank as the main SUDs feature. The below section provides a brief description of proposed SUDs features and outlines the maintenance programme that should be adopted.

2. CLEANING OF THE DRAINAGE SYSTEM

Drainage systems should be inspected at regular intervals and where necessary, thoroughly cleaned out during the inspection. Any defects discovered should be made good.

The following operations should be carried out during the periodic cleaning of a drainage system: -

Product Type	Period	Responsibility	Maintenance Methods
<i>Silt Trap</i>	As necessary and before wet season	Owner or Maintenance Company for communal areas	• Sediment and debris that accumulated during summer needs to be removed before the wet season. • Inspect and clean out routinely prior to inlet pipework to minimise debris reaching the tank. • Conduct inspections more frequently during the wet season for the area where sediment or trash accumulates more often. Clean and repair as needed.
<i>Standard Manholes/ Inspection Chambers</i>	As necessary	Owner or Maintenance Company for communal areas	• Remove and clean any soil and vegetation that covers the manhole cover to prevent blockage of the drainage system at the manhole.
			• Renew/replace any damaged/missing bolts and damaged/missing manhole covers.
<i>Drainage Pipes</i>	Six monthly interval	Owner or Maintenance Company for communal areas	• Inspect underground drainage pipes to ensure that the distribution pipework arrangement is operational and free from blockages. If required, take remedial action.
<i>Orifice Plate and attenuation tank</i>	Monthly for 3 months	Owner/ Maintenance Company	• Inspect and identify any areas that are not operating correctly. If required, take remedial action.

Project Lands at Watts Close, London, N15 5DW				Job Ref. 22778	
Section Drainage Maintenance Plan				Sheet no./rev. 3	
Calc. by BC	Date 30/01/23	Chk'd by DB	Date 30/01/23	App'd by DB	Date 30/01/23

	Monthly	Owner/ Maintenance Company	Debris removal from catchment surface (where may cause risks to performance).
	Annually and after large storms	Owner/ Maintenance Company	Inspection/check all inlets and outlets to ensure that they are in good condition and operating as designed.
Aco Channels	As necessary and before wet season	Owner or Maintenance Company for communal areas	- All ACO drains to be fitted with individual channel drain sump units with silt buckets for each private property. - Sediment and debris that accumulated during summer needs to be removed before the wet season. - Inspect and clean out routinely prior to minimize debris travelling downstream to the attenuation tank, and to prevent local blockage. - Conduct inspections more frequently during the wet season for the area where sediment or trash accumulates more often. Clean and repair as needed.

3. CLEANING OF THE DRAINAGE SYSTEM

The locations of the above features can be found by examining the drawings contained in Appendices of this report.



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Project Lands at Watts Close, London, N15 5DW				Job Ref. 22778	
Section Drainage Strategy Report				Sheet no./rev. 54	
Calc. by MG	Date 26/04/2022	Chk'd by DB	Date 26/04/2022	App'd by DB	Date 26/04/2022

APPENDIX VII – HARDSTANDING & OVERLAND FLOW DRAWINGS

NOTES

1. ALTERNATIVE BASE COURSE MATERIAL:
NOT USED
2. USE OF BASE COURSE FOR CONSTRUCTION TRAFFIC:
NOT USED
3. DEPTH OF SUB-BASE & CAPPING LAYER:
THE DEPTH OF THE SUB-BASE AND CAPPING LAYERS WILL VARY WITH THE SUBGRADE STRENGTH, AS INDICATED BY THE CBR TEST RESULTS.
THE THICKNESS OF THE SUB-BASE LAYER SHOULD BE 150mm FOR ALL FORMS OF ROADWAY CONSTRUCTION.
THE THICKNESS OF THE CAPPING LAYER WILL VARY WITH THE CBR VALUE, AS INDICATED IN TABLE 3.1 BELOW. IF THE CBR VALUE OF THE SUBGRADE EXCEEDS 15%, NO CAPPING LAYER IS REQUIRED.
- | LOWEST SUBGRADE CBR (%) | MINIMUM CAPPING LAYER THICKNESS (mm) |
|-------------------------|--------------------------------------|
| * LESS THAN 2 | (SEE FOOTNOTE) |
| 2-5 | 450-250 |
| 5-15 | 250-150 |
| MORE THAN 15 | NO CAPPING LAYER REQUIRED |

* FOR SUBGRADES WITH A CBR OF LESS THAN 2%, A GEOTEXTILE SEPARATOR (e.g. TERRAM 1000) SHOULD BE USED AND SPECIALIST ADVICE SOUGHT REGARDING MINIMUM THICKNESS.

IF THE CONTRACTOR PROPOSES TO USE THE SUB-BASE FOR CONSTRUCTION TRAFFIC HE SHOULD SEEK APPROVAL FROM THE ENGINEER TO DO SO. SUCH APPROVAL WILL ONLY NORMALLY BE GIVEN ON CONDITION THAT THE SUB-BASE THICKNESS IS INCREASED. TYPICALLY FOR CBR VALUES $\leq$ 4% THE SUB-BASE THICKNESS WILL HAVE TO BE INCREASED BY 150mm. FOR CBR VALUES $>$ 4% AN INCREASE OF 80mm WILL BE SUFFICIENT.

SUBGRADE STRENGTH SHOULD BE ESTABLISHED BY MEANS OF THE CALIFORNIA BEARING RATIO (CBR) TEST, IN ACCORDANCE WITH BS 1377-4:1990. SAMPLES SHOULD BE TAKEN AT THE RATE OF ONE PER 100m OF ROAD AND WHERE SIGNIFICANT VARIATIONS IN SOIL TYPE ARE ANTICIPATED. EXTRA SAMPLES MAY BE REQUIRED BY THE LOCAL AUTHORITY WHERE THE DIFFERENCE IN STRENGTH BETWEEN TWO ADJACENT SAMPLES INDICATES A SIGNIFICANT VARIATION IN SOIL TYPE. IN PREPARING THE TEST SPECIMEN, THE METHOD OF COMPACTION SHOULD BE THE STATIC COMPACTION METHOD 2, AS SPECIFIED IN PARAGRAPH 7.2.3.3 OF BS 1377-4:1990.

4. MATERIAL SPECIFICATION FOR SUB-BASE AND CAPPING LAYER:

(a) SUB-BASE
SUB-BASE MATERIAL SHOULD COMPRISE TYPE 2 UNBOUND MIXTURE IN ACCORDANCE WITH CLAUSE 804 OF THE SPECIFICATIONS FOR HIGHWAY WORKS. THE MATERIAL SHOULD LIE WITHIN THE GRADING LIMITS SET OUT IN TABLE 4.1 BELOW.

ISO SIEVE SIZE (mm)	OVERALL GRADING RANGE	SUPP. DECLARED VALUE GRADING RANGE	TOLERANCE
63	100	NR	NR
31.5	80-99	NR	NR
16	55-85	NR	NR
8	35-65	NR	NR
4	22-60	NR	NR
1	10-35	NR	NR
0.063	0-7	NR	NR

PARTICLE SIZE DISTRIBUTION SHOULD BE DETERMINED BY THE WASHING AND SIEVING METHOD OF BS EN 933-1. ALL MATERIAL USED SHOULD BE FROST RESISTANT.

MATERIAL PASSING THE 0.425mm SIEVE, WHEN TESTED IN ACCORDANCE WITH BS 1377-2, SHOULD BE NON-PLASTIC.

THE MATERIAL SHOULD HAVE A TEN PERCENT FINES VALUE OF 100kN, OR MORE, WHEN TESTED IN ACCORDANCE WITH BS EN 933-1.

THE SUB-BASE SHOULD BE LAID AND COMPACTED TO THE REQUIREMENTS OF CLAUSE 802 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS, WITHOUT DRYING OUT, OR SEGREGATION.

(b) CAPPING LAYER

THE CAPPING LAYER SHALL BE CONSTRUCTED WITH CLASS 6F1 OR 6F2 MATERIAL AS PER SERIES 600 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS AND COMPRISING OF EITHER CRUSHED ROCK, NATURAL GRAVEL, CRUSHED GRAVEL OR CRUSHED CONCRETE. THE MATERIAL SHOULD HAVE A MAXIMUM SIZE OF 100mm AND THE MAXIMUM ALLOWABLE PASSING THE 63 MICRON SHOULD BE 10%. THE MATERIAL SHOULD BE WELL GRADED THROUGHOUT ALL SIZES.

SELECTED DEMOLITION MATERIALS WHICH MEET THE ABOVE REQUIREMENTS MAY ALSO BE USED, SUBJECT TO APPROVAL.

5. CONCRETE FOR ROAD PAVEMENTS:

PAVING QUALITY CONCRETE SHOULD BE PAV2 MIX (AIR ENTRAINED CONCRETE, OR SIMILAR APPROVED BBV MIX) MADE FROM NATURAL AGGREGATES, CEMENT, WATER AND AIR ENTRAINING AGENT COMPLYING WITH BS 206-1, BS 8500-1, BS 8500-2, EN 13877-2 AND THE REQUIREMENTS OF SERIES 1000 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS.

TABLE 5.1 CONSTITUENTS FOR PAVING QUALITY CONCRETE	
MINIMUM CEMENT CONTENT	340kg/m ³
MAXIMUM FREE WATER/CEMENT RATIO	0.45
MAXIMUM AGGREGATE SIZE	20mm
MINIMUM STRENGTH CLASS	C32/40
AIR CONTENT	4.5 %
SUMP CLASS	S3



HARDSTANDING LAYOUT PLAN

SCALE @ A1: 1:150
SCALE @ A3: 1:300

FOR CONSTRUCTION

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS & ARCHITECT'S DRAWINGS FIGURED DIMENSIONS ONLY (NOT SCALING) TO BE USED. WHERE A CONFLICT OF INFORMATION EXISTS OR IF IN ANY DOUBT - 'ASK'.
2. CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.

KEY

KEY	SPECIFICATION
	PRECAST CONCRETE FLAG PAVEMENT Paving Slabs to Architects Details 50mm Compacted Thk Sharp Sand Bedding 150mm Type 1 Compacted Granular Sub-base
	BLOCK PAVER PAVEMENT PEDESTRIAN AREAS Block Paving to Architects Details 50mm Compacted Thk Sharp Sand Bedding 150mm Type 1 Compacted Granular Sub-base
	BLOCK PAVER PAVEMENT CAR PARK & VEHICULAR AREAS Block Paving to Architects Details 50mm Compacted Thk Sharp Sand Laying Course (See Note 11) 150mm Type 2 Compacted Granular Sub-base (See Note 3) "X"mm min thk Capping Layer (See Note 4) on Subgrade
	POLYMETRIC SURFACED AMENITY AREA (BY OTHERS) Polymetric Surface to Specialist Supplier Details (Build up to Specialist Supplier Details but typically) 25mm Open textured Surface Course Macadam AC20/14 50mm open textured Binder Course Macadam AC20/14 150mm Type 1 Compacted Granular Sub-base Capping Layer as per General Notes
	MOWN GRASS SOFT LANDSCAPING AREA (BY OTHERS) Mown Grass Soft Landscaping Areas to LA Details
	PROPOSED SOFT-LANDSCAPE PLATING (BY OTHERS) Soft Landscaping Planting Areas to LA Details

KEY

KEY	SPECIFICATION
	W1 215mm Thk brickwork wall max height 1.2m Movement Joints at max 9.0m crs. 500w x 300dp Strip footing with 1 layer of A393 central mesh. Lean mix trench fill to 1.5m BGL Steel railings to be fixed directly to Strip Footing
	W2 215mm Thk brickwork wall max height 1.2m Movement Joints at max 9.0m crs. 500w x 200dp Strip footing with 1 layer of A393 central mesh. Lean mix trench fill to 1.5m BGL
	W3 Steel Railings to Railing Suppliers Details
	W4 215mm Thk brickwork wall max height 1.8m Movement Joints at max 9.0m crs. 500w x 300dp Strip footing with 1 layer of A393 central mesh. Lean mix trench fill to 1.5m BGL
	W5 Steel Railings to Railing Suppliers Details
	W6 Steel Railings to Railing Suppliers Details
	W7 Timber Boarding Fence to Fence Suppliers Details
	W8 Steel Railings to Railing Suppliers Details

C1	30.01.22	ISSUED FOR CONSTRUCTION	KO	S.B.	D.B.
ISSUE	DATE	DESCRIPTION	DRN	ORIG	P.S.

ISSUE STATUS	☒ PRELIMINARY (P1, P2, P3 etc.)	☐ PLANNING (PL1, PL2, PL3 etc.)
	☐ TENDER (T1, T2, T3 etc.)	☐ CONSTRUCTION (O, 1, 2 etc.)



CLIENT
FORMATION GROUP

PROJECT TITLE
WATTS CLOSE, LONDON. N15 EDW

DRAWING TITLE
HARDSTANDING LAYOUT PLAN

SCALE @ A1 AS SHOWN	JOB NO. 22778	DRAWING NO. C-1201	ISSUE C1
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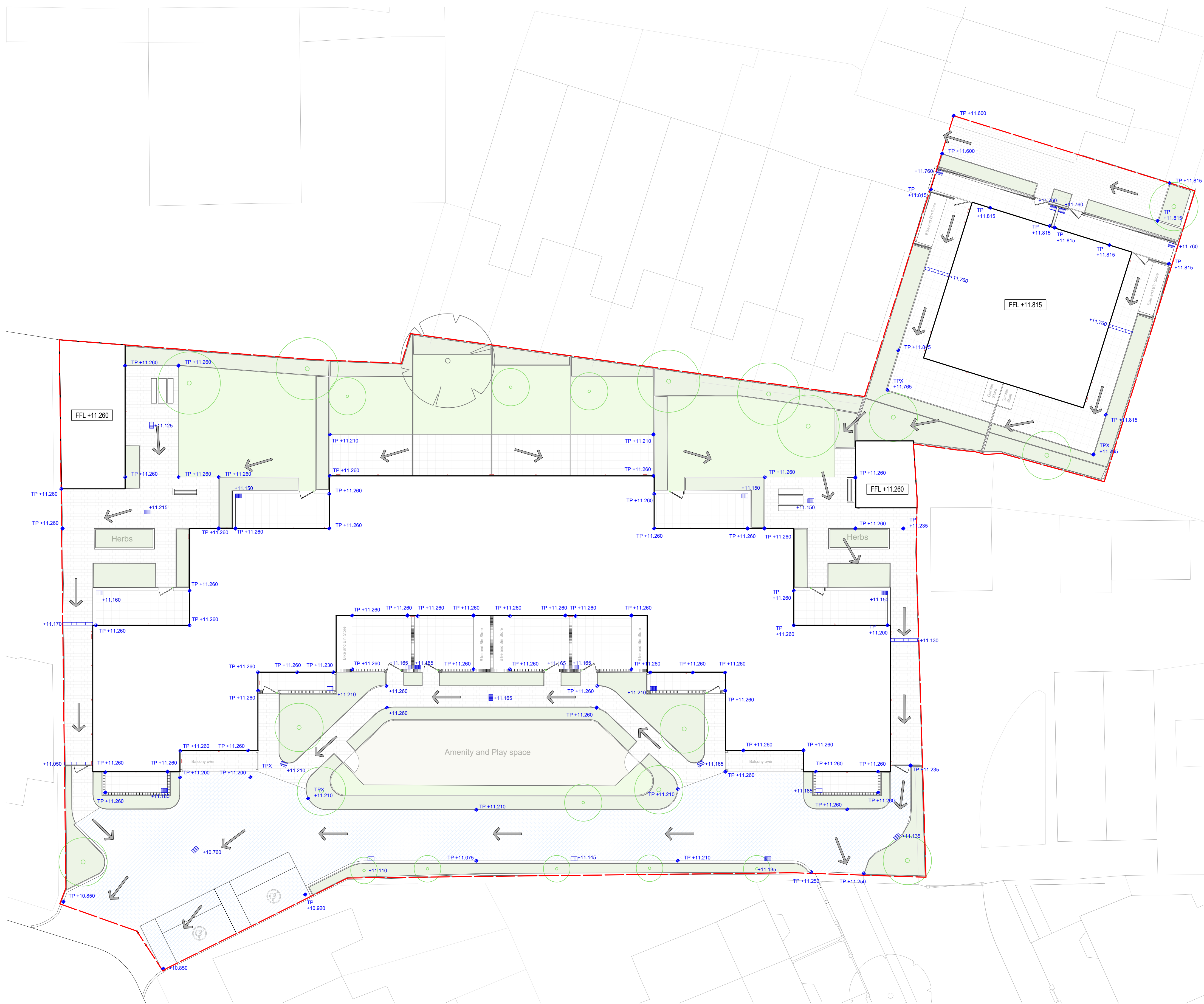
FOR CONSTRUCTION

NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS & ARCHITECT'S DRAWINGS FIGURED DIMENSIONS ONLY (NOT SCALING) TO BE USED. WHERE A CONFLICT OF INFORMATION EXISTS OR IF IN ANY DOUBT - 'ASK'.
- CONSULTANTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS.
- THIS DRAWING IS FOR DISCHARGE OF PLANNING IN CONJUNCTION WITH ALL RELEVANT SERIES DESIGN DRAWINGS, SPECIFICATIONS AND DOCUMENTATION.
- CONSTRUCTION TO BE IN ACCORDANCE WITH ALL BRITISH AND EUROPEAN STANDARDS AND BUILDING REGULATIONS.
- ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METRES ABOVE LOCAL DATUM.
- ANY DISCREPANCIES IN THE DETAILS SHOWN ARE TO BE REPORTED TO THE EMPLOYERS REPRESENTATIVE/ENGINEER PRIOR TO CONSTRUCTION.
- ALL EXISTING SERVICES ARE TO BE LOCATED PRIOR TO THE COMMENCEMENT OF ANY WORKS. THE CONTRACTOR MUST NOTIFY THE ENGINEER IMMEDIATELY OF ANY CONFLICT WITH THE PROPOSED WORKS.
- THE GENERAL SPECIFICATION OF MATERIALS AND WORKMANSHIPS FOR THE CONSTRUCTION OF THE ACCESS ROAD, FOOTPATHS AND OTHER AREAS OF HARDSTANDING SHALL BE THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOLUME 1, SPECIFICATION OF HIGHWAY WORKS (SHW) PUBLISHED BY THE STATIONARY OFFICE.

LEGEND

FFL +11.260 FINISHED FLOOR LEVEL
→ OVERLAND FLOW



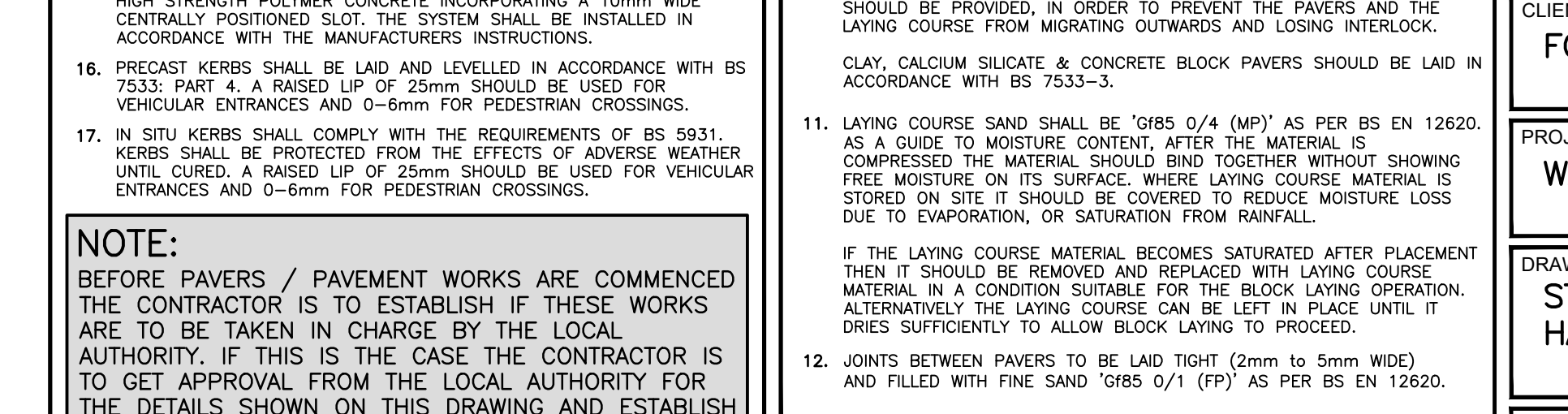
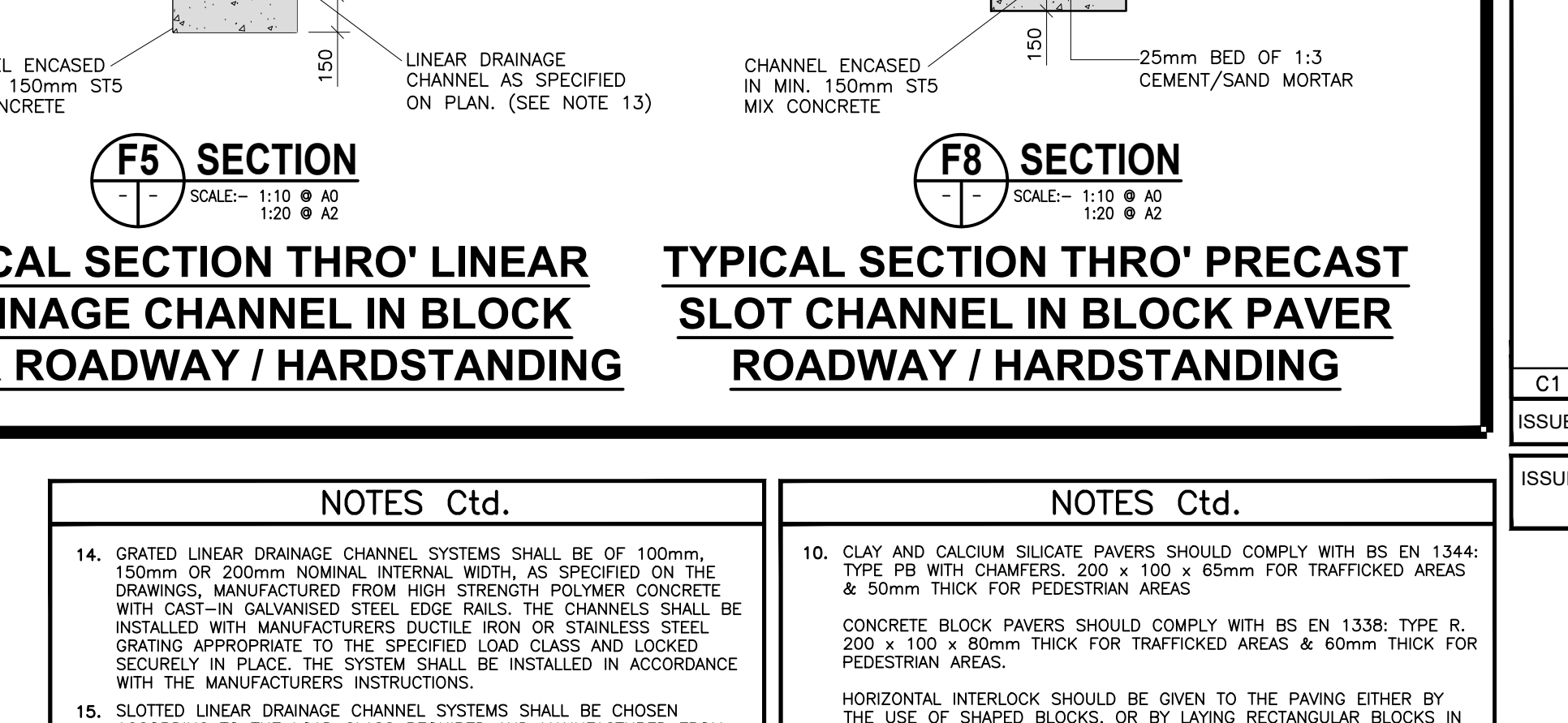
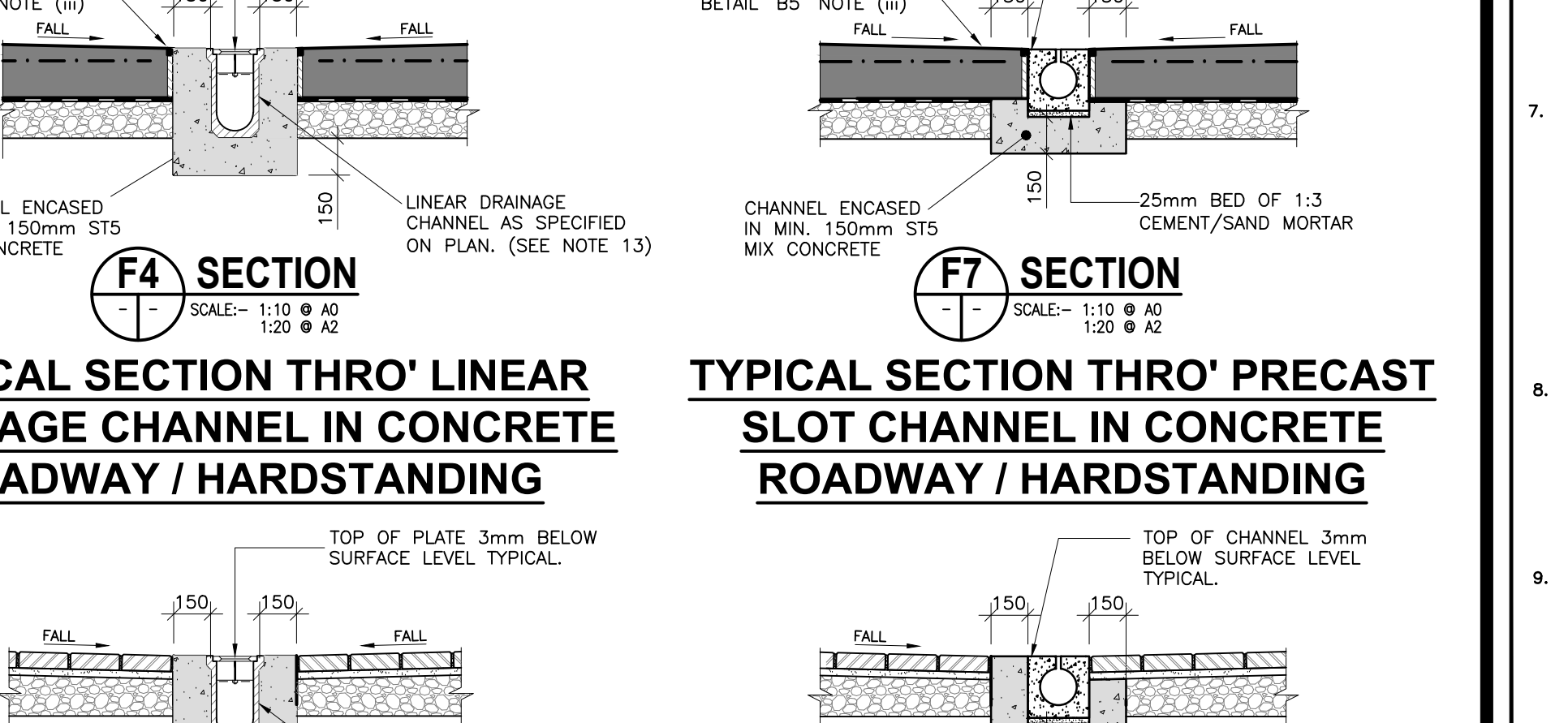
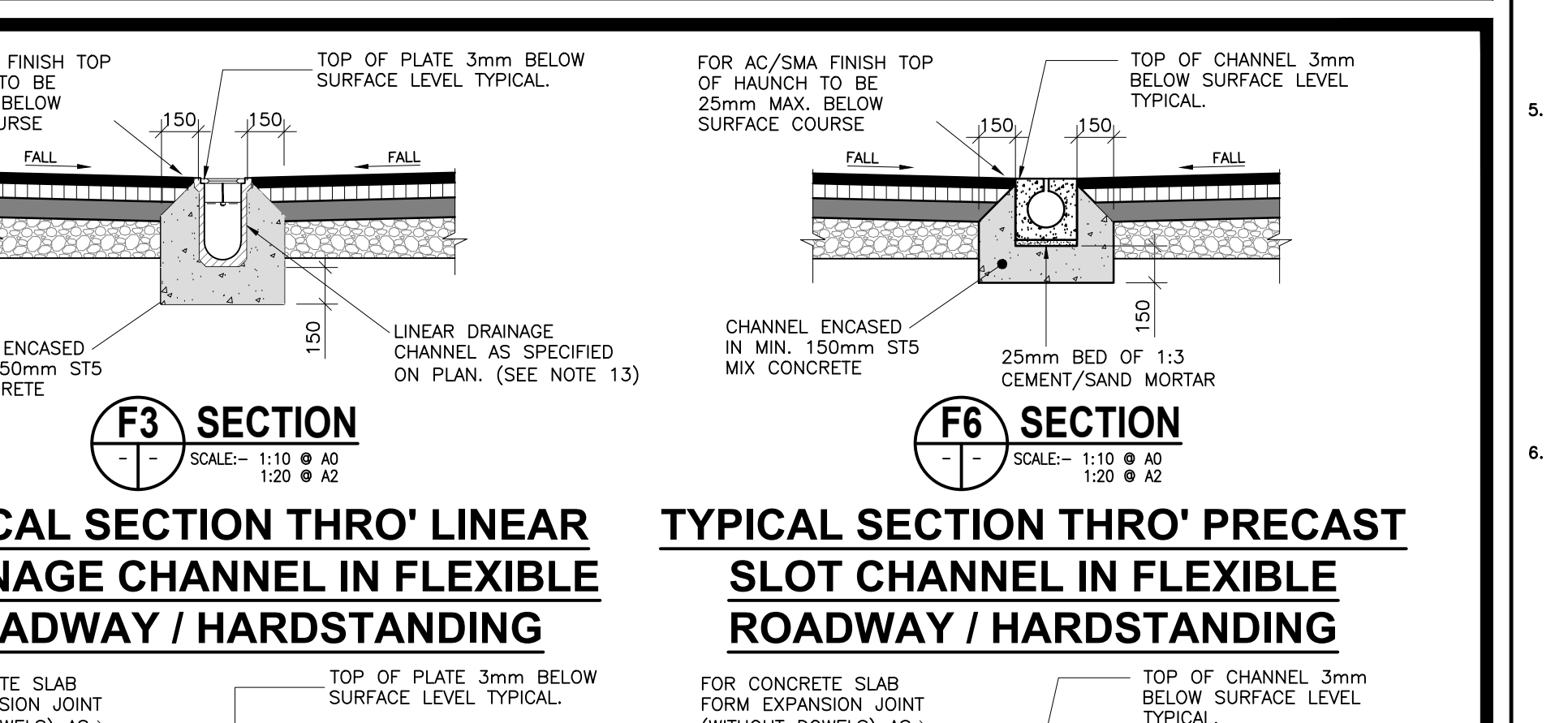
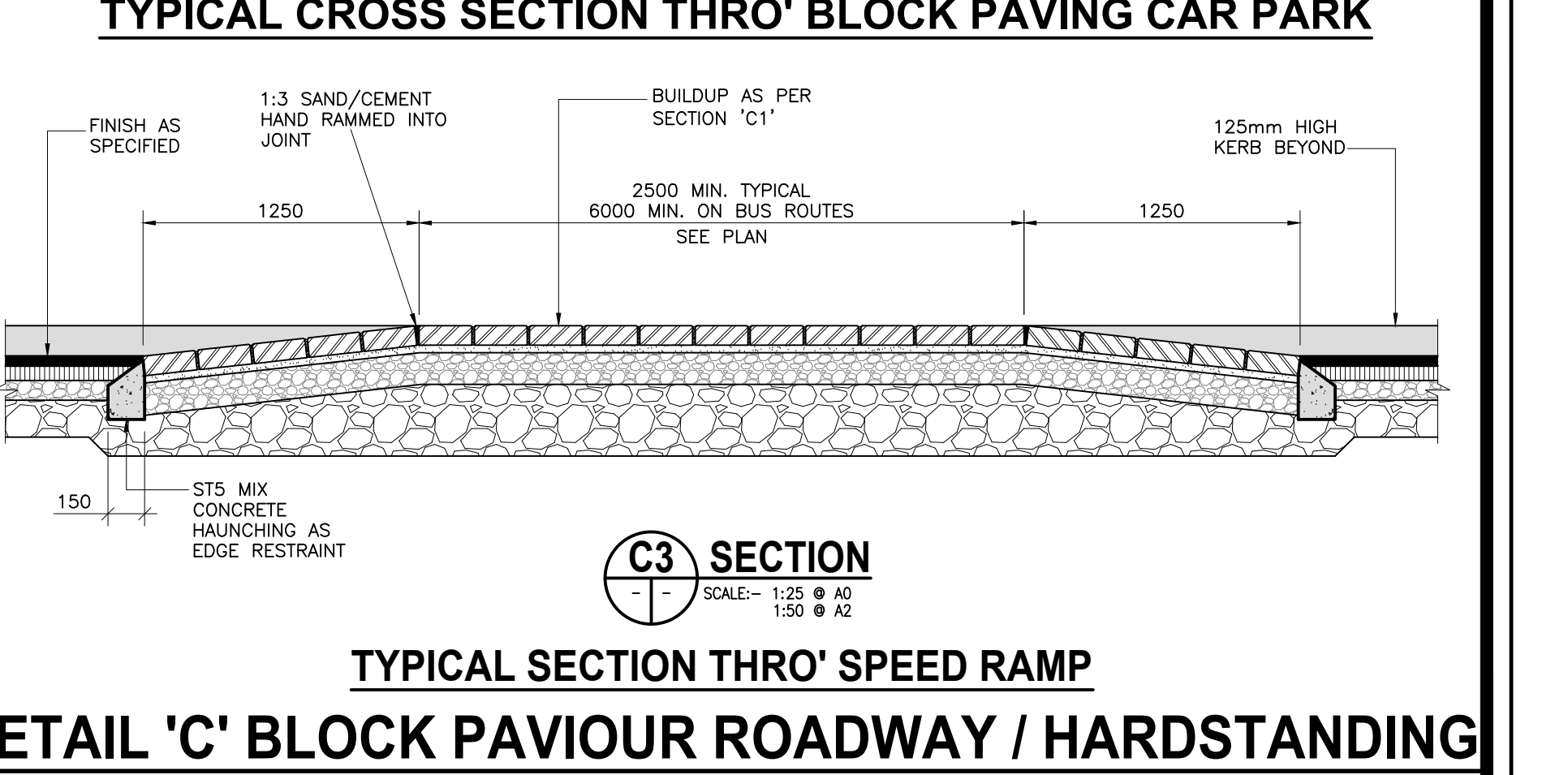
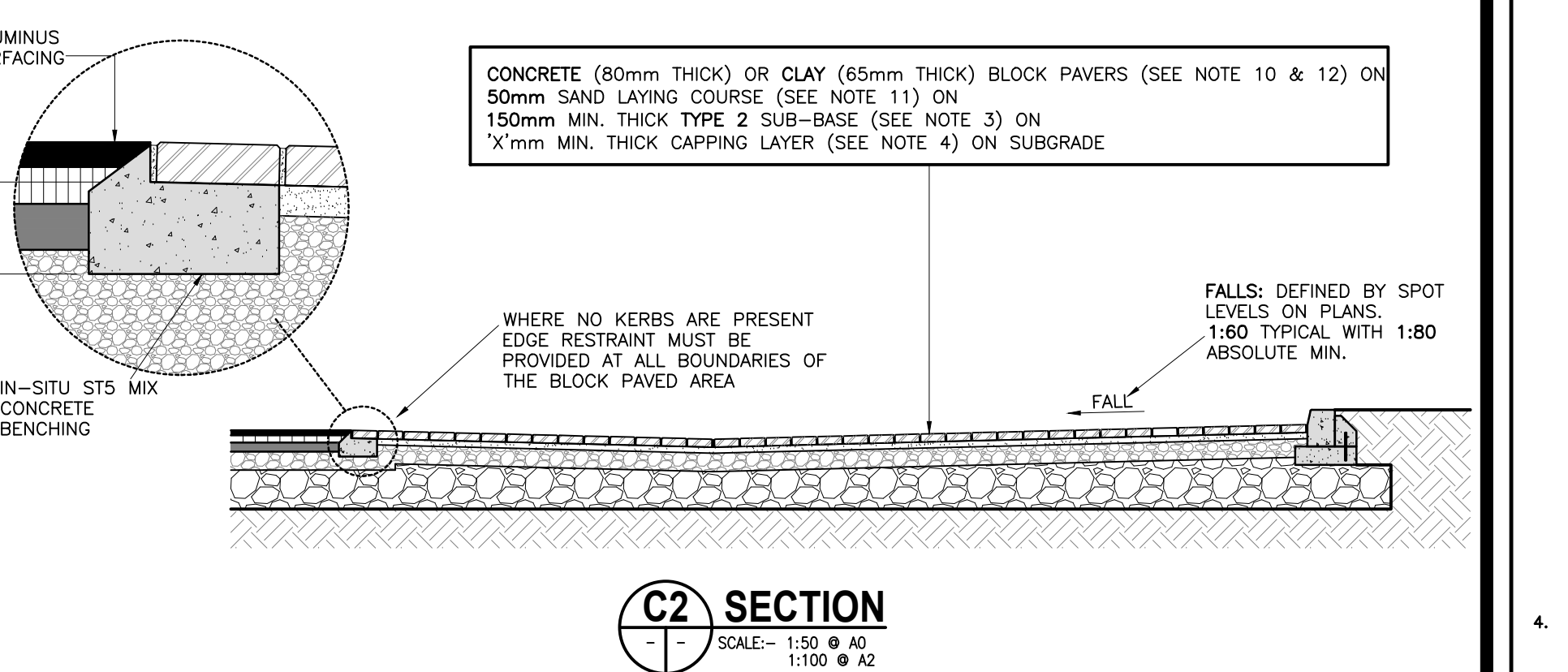
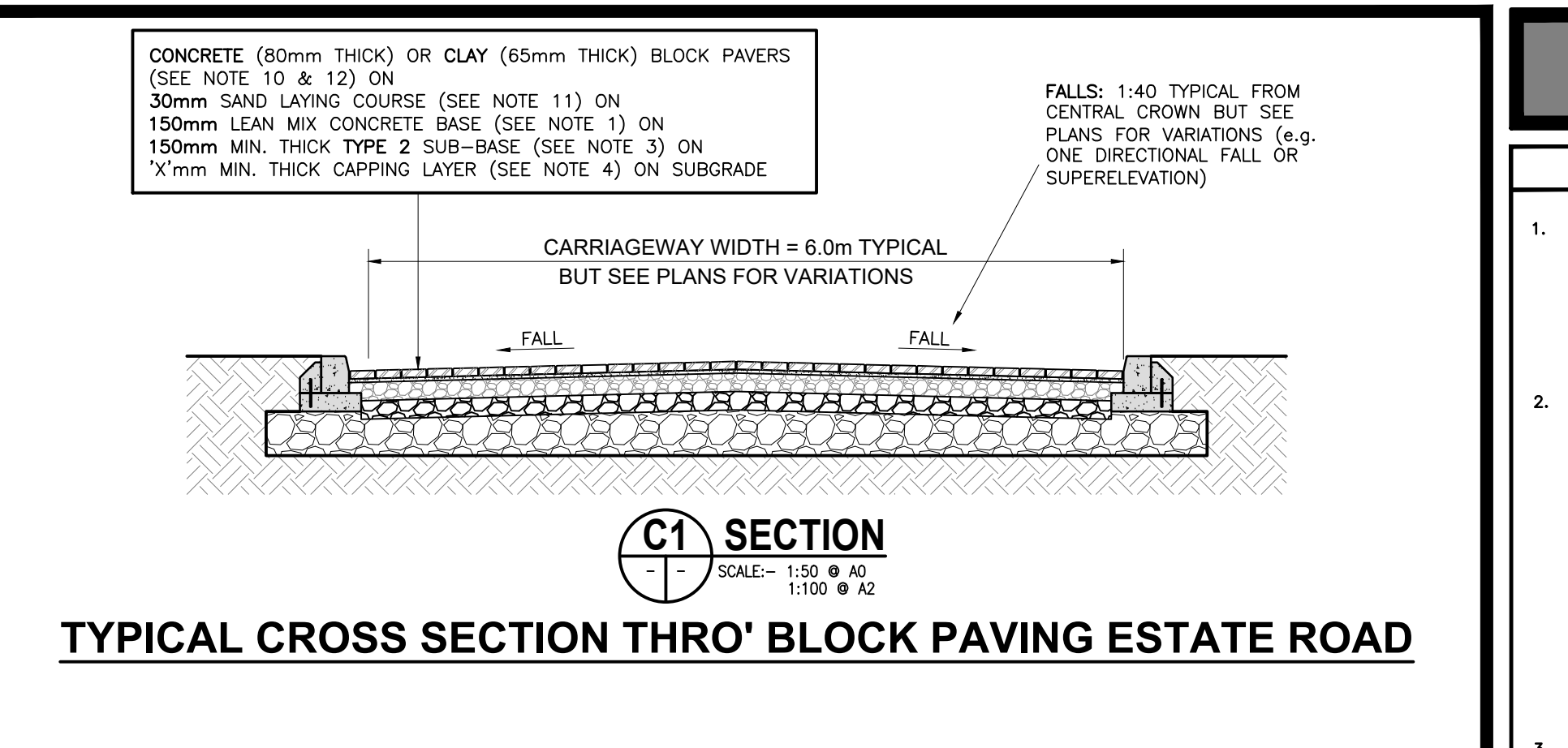
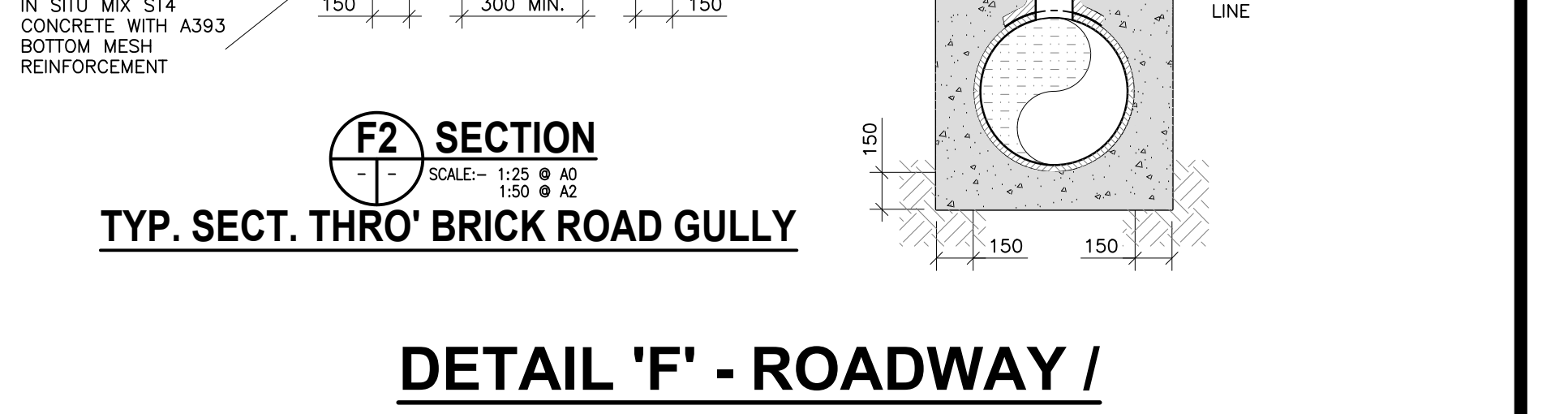
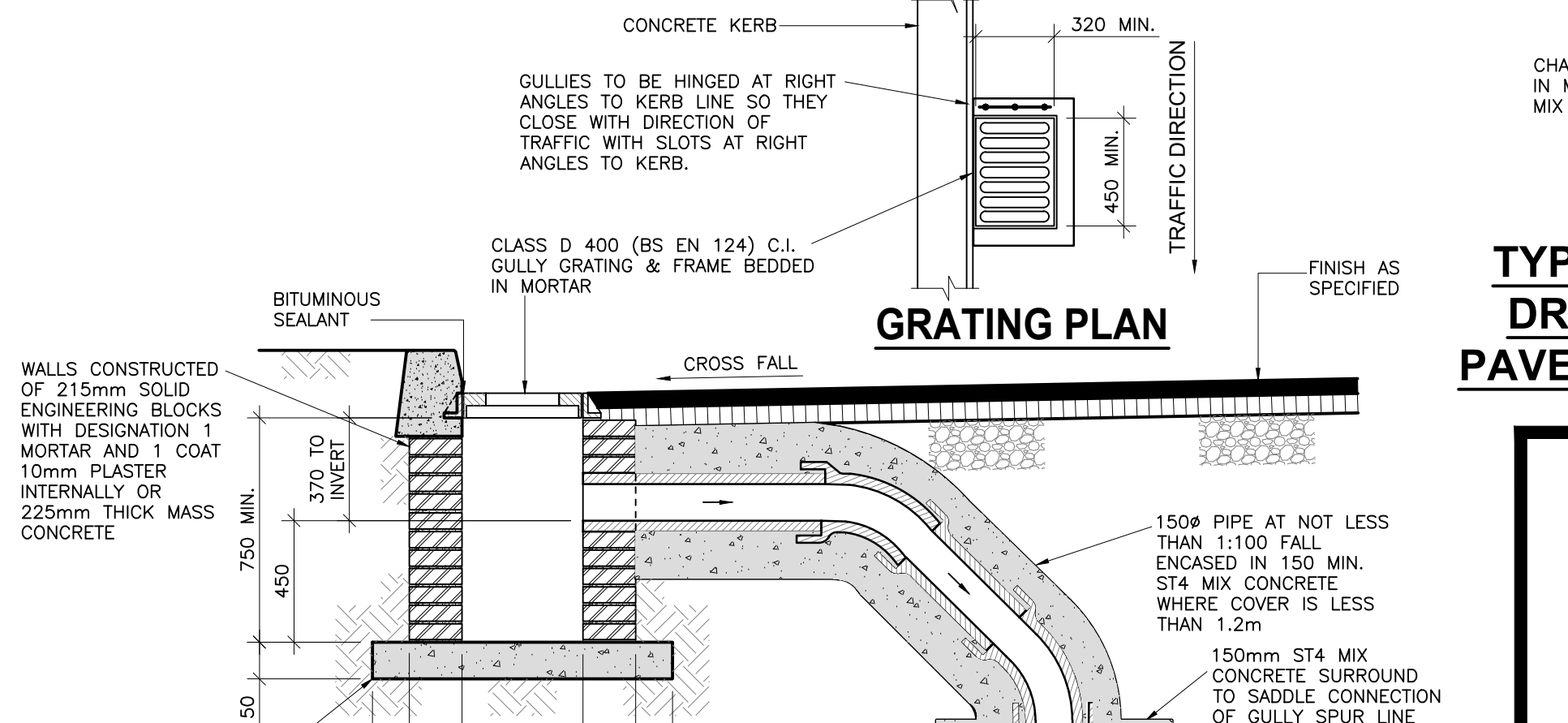
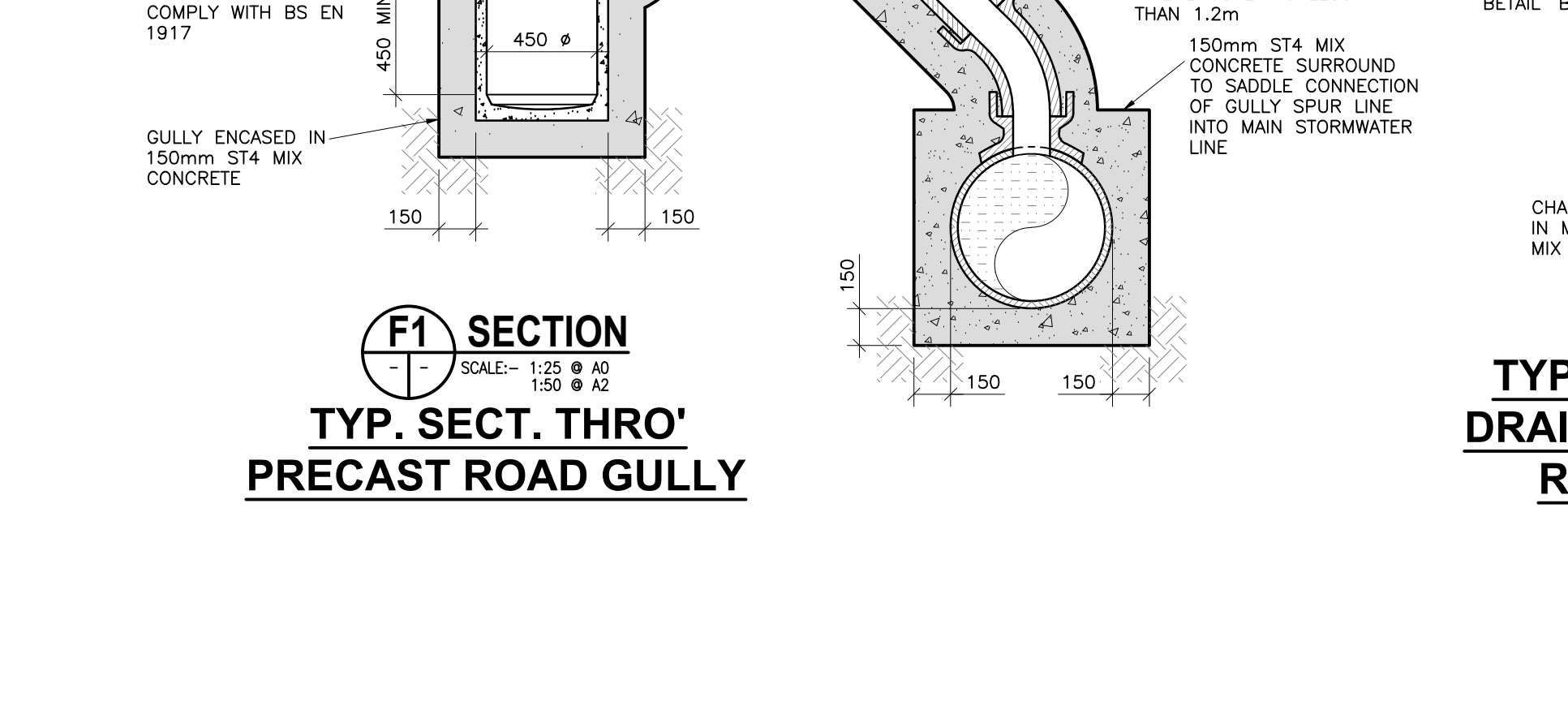
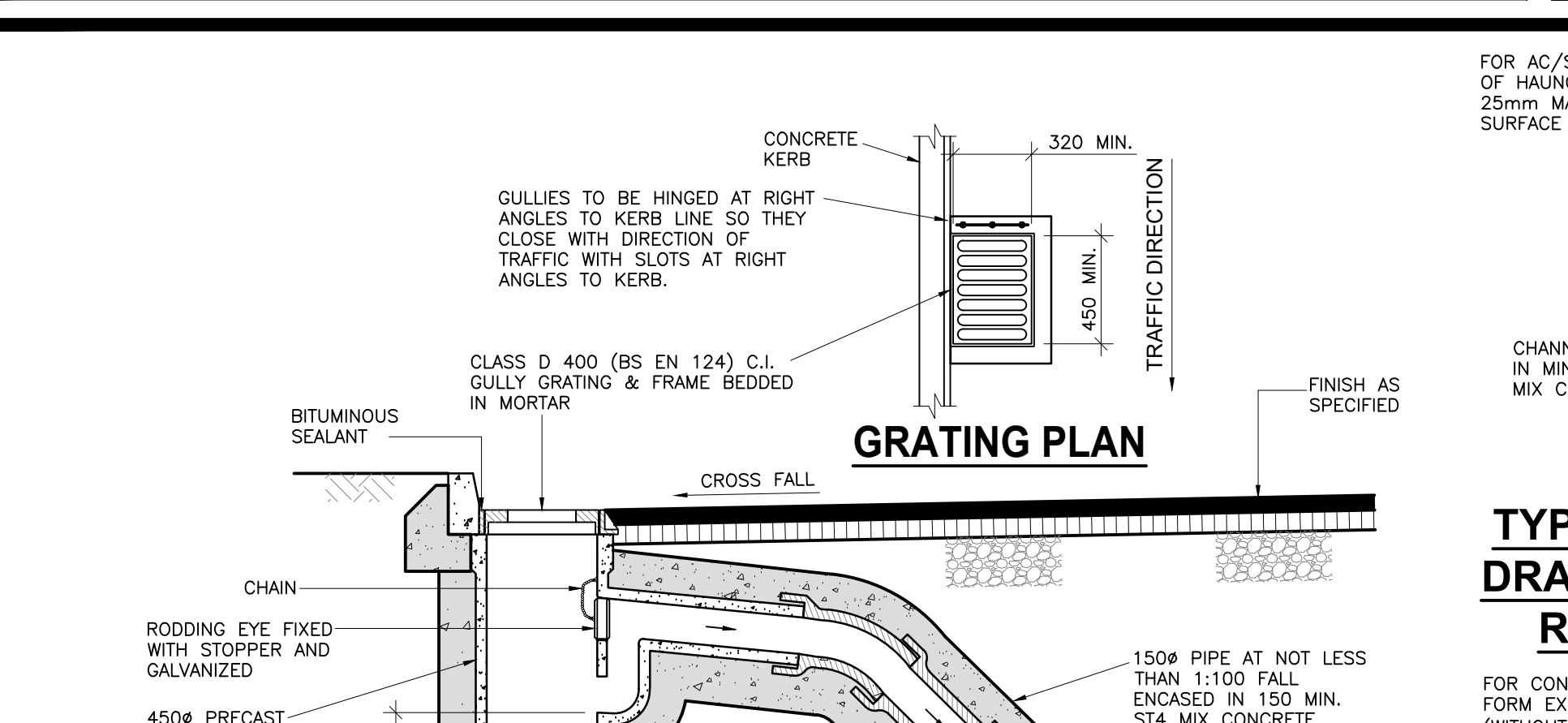
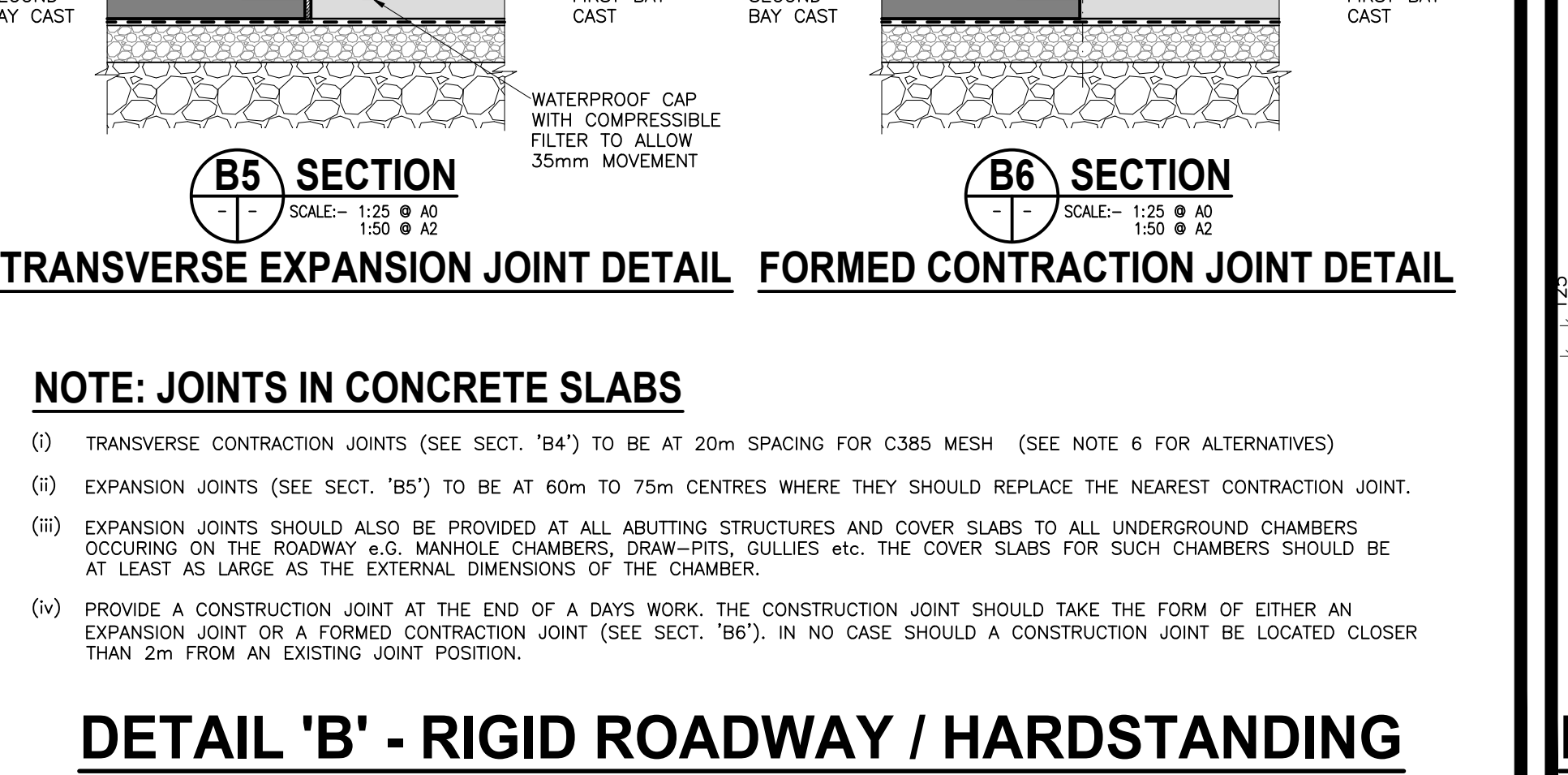
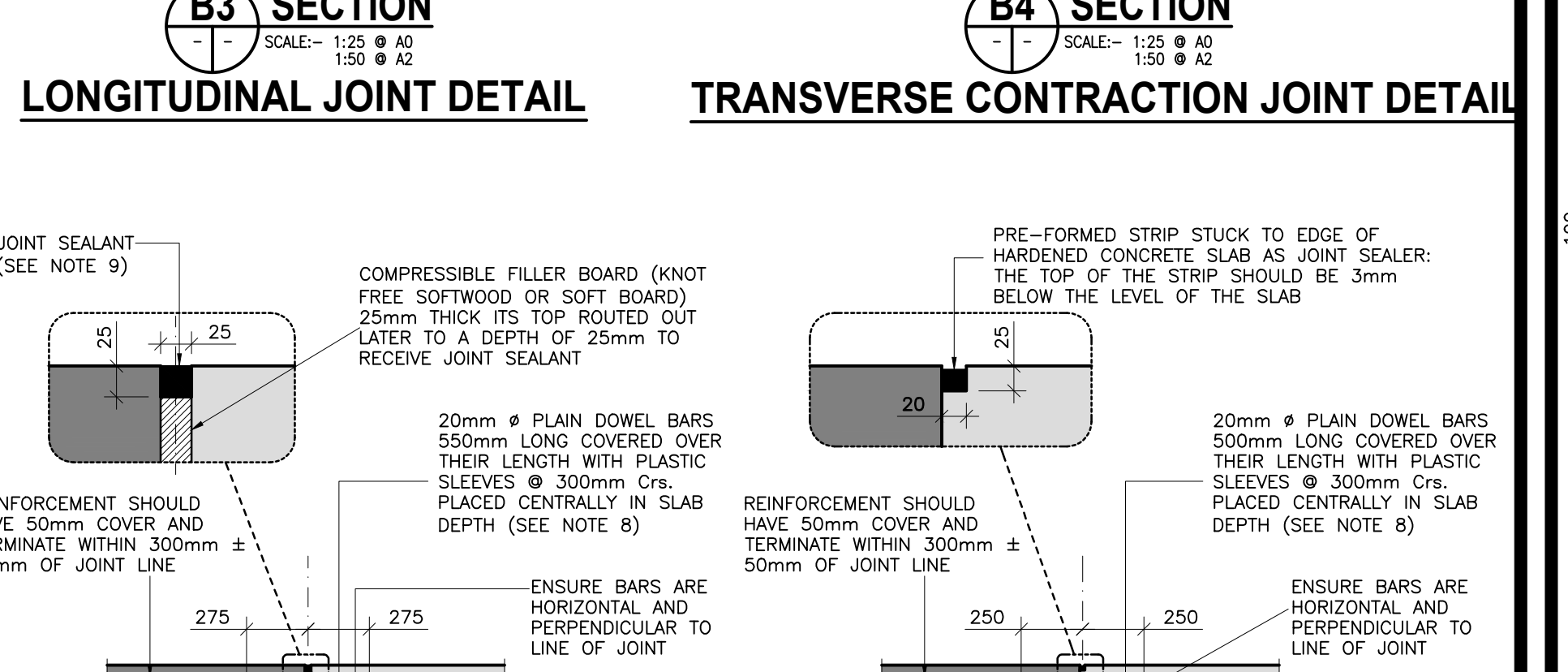
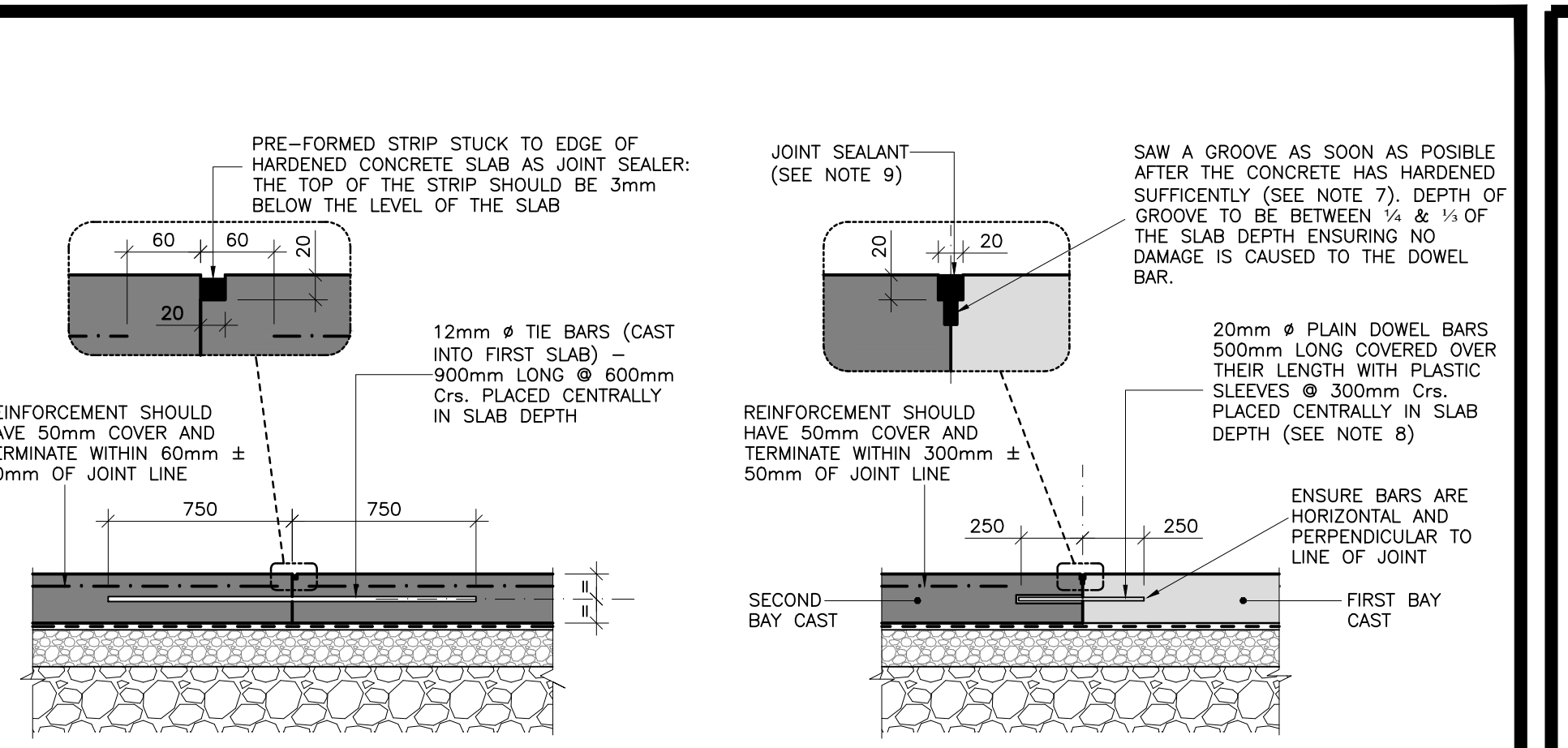
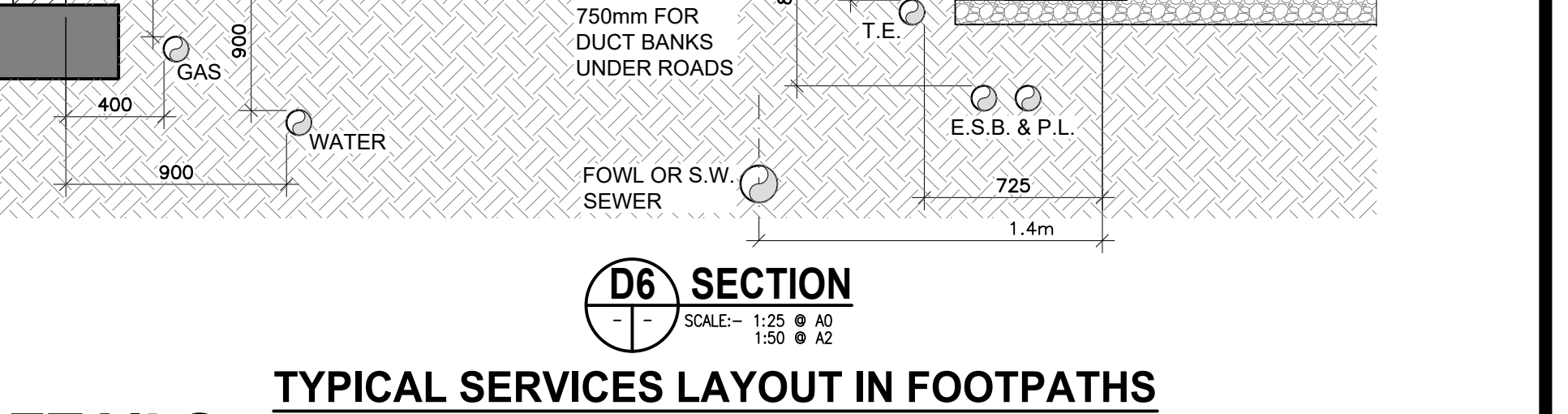
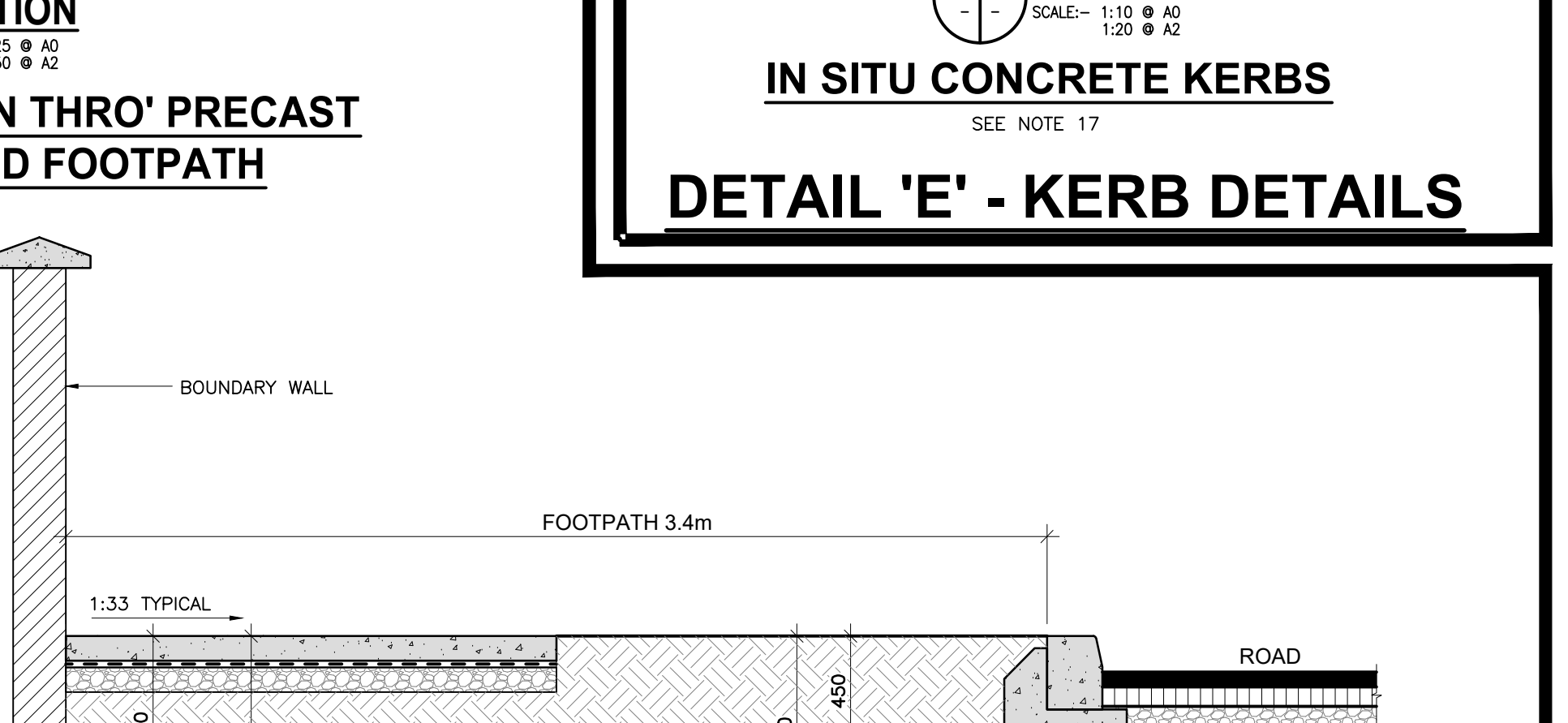
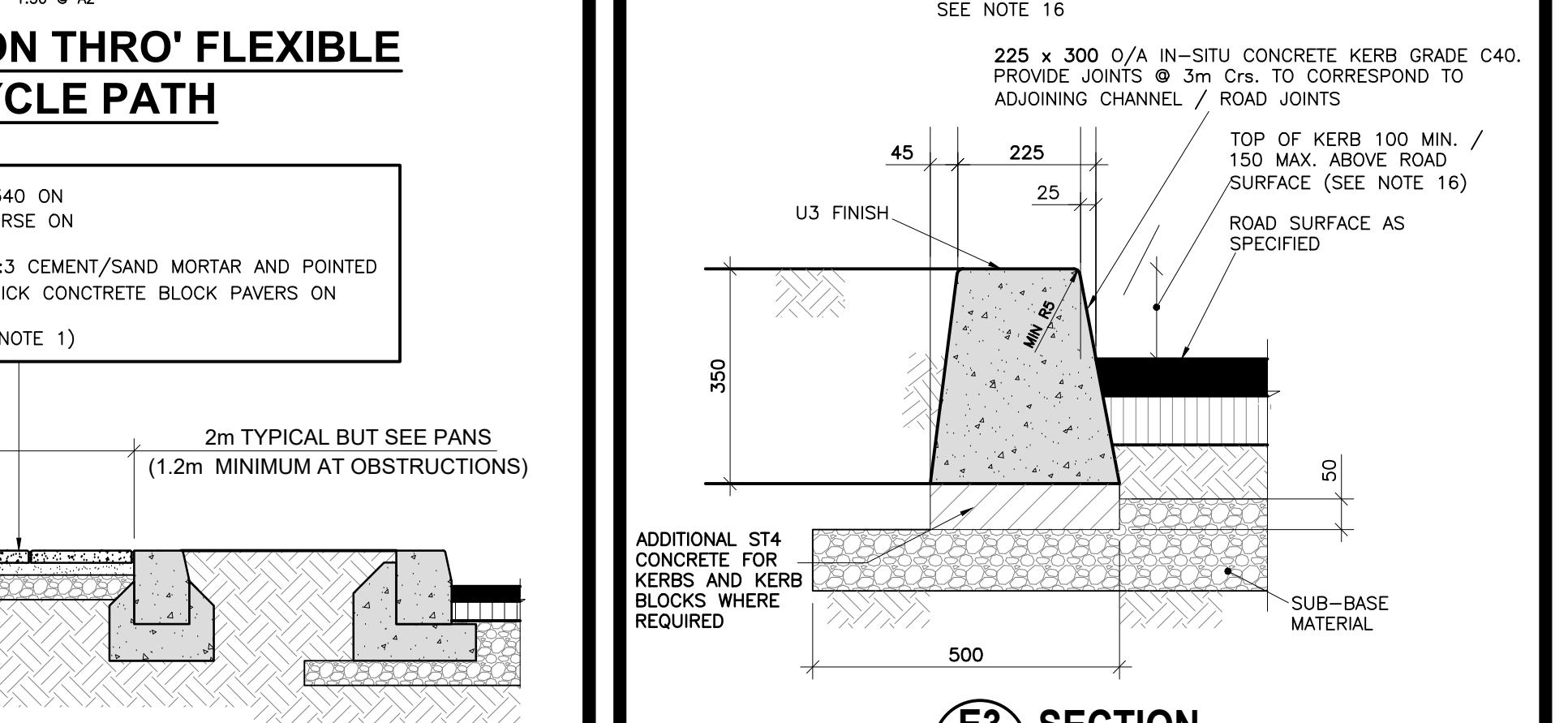
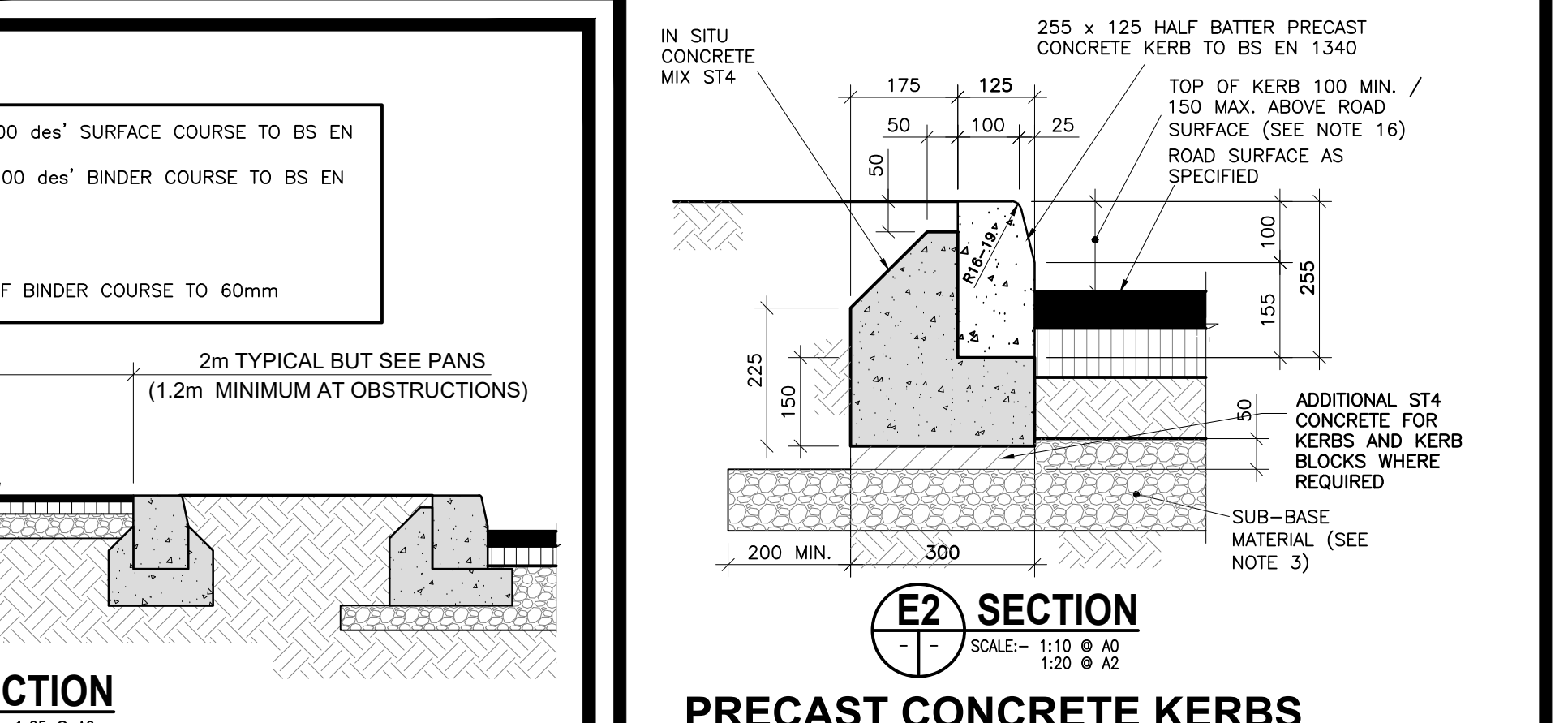
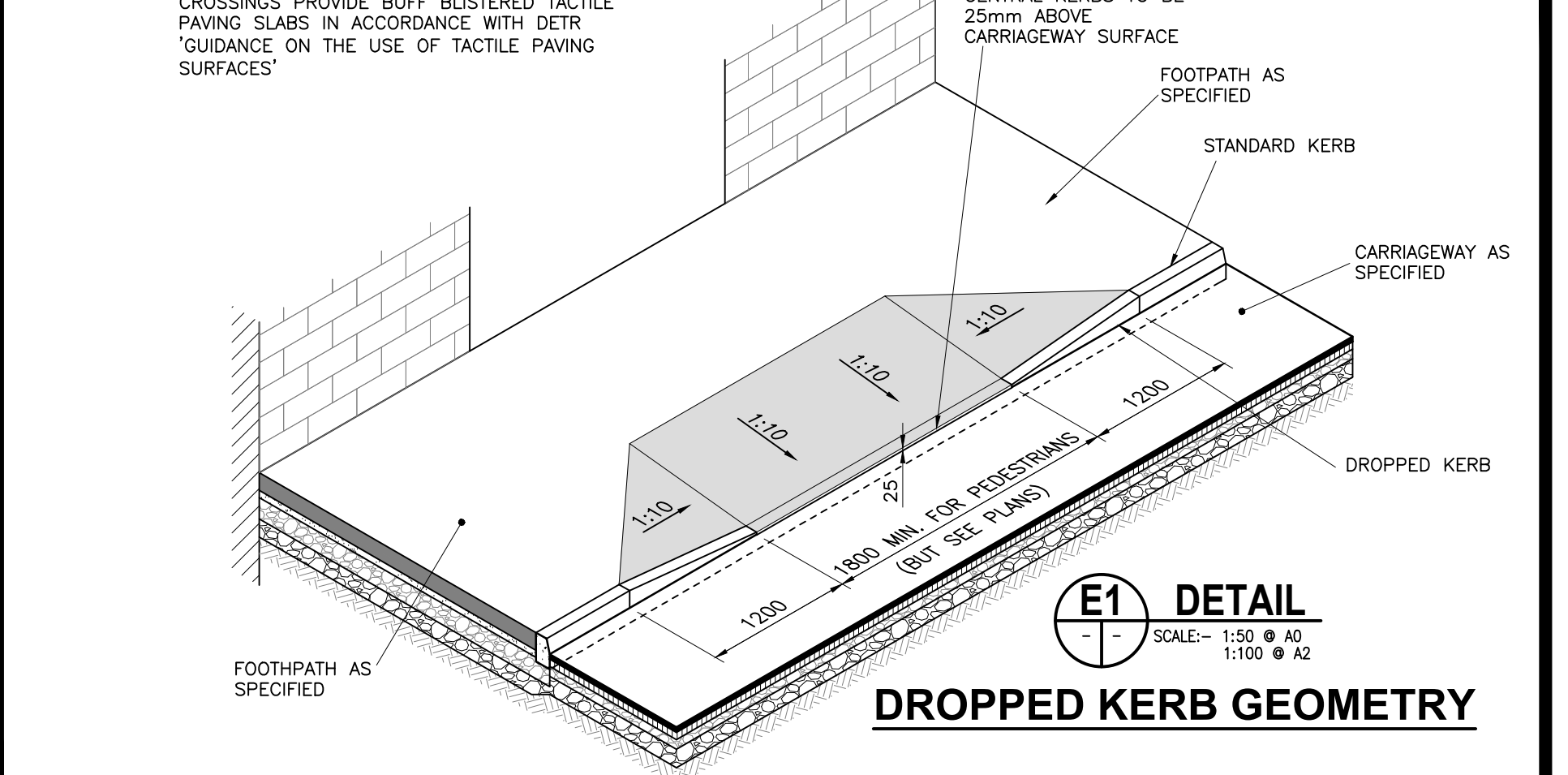
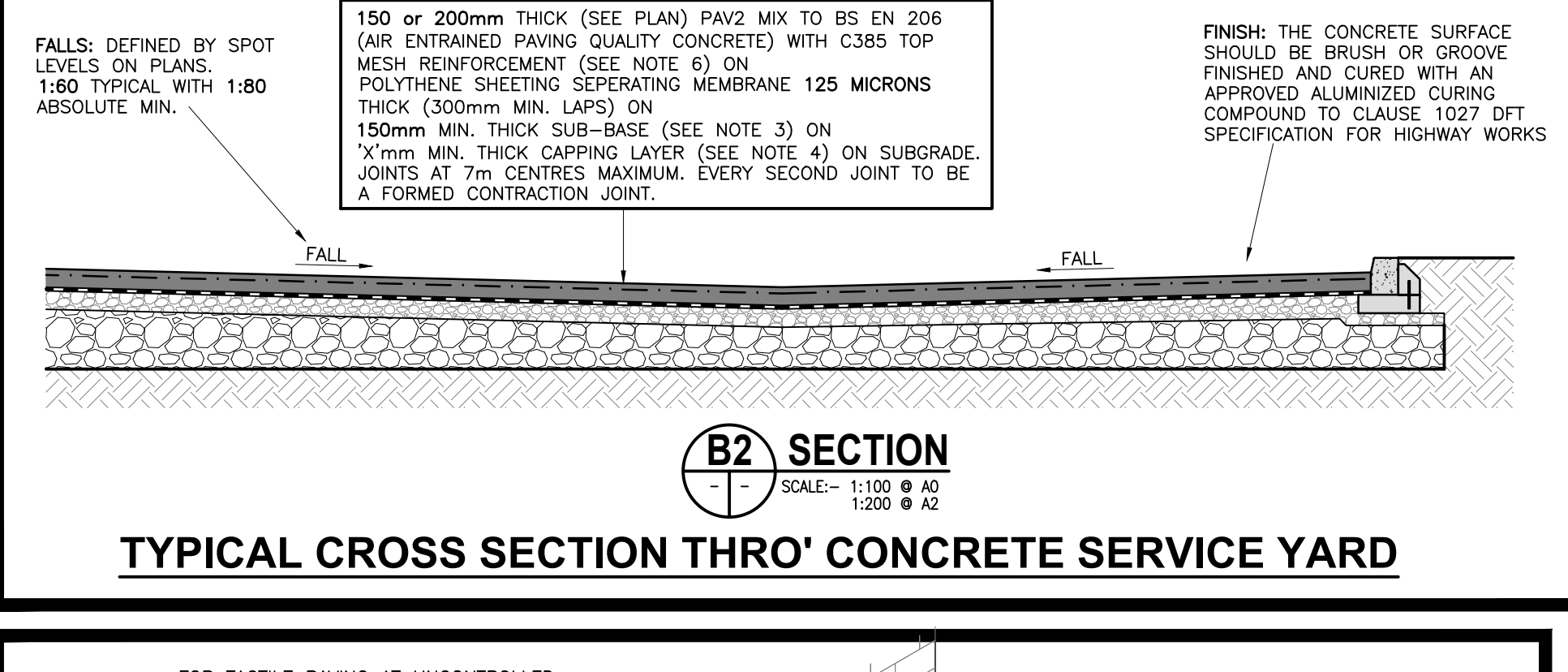
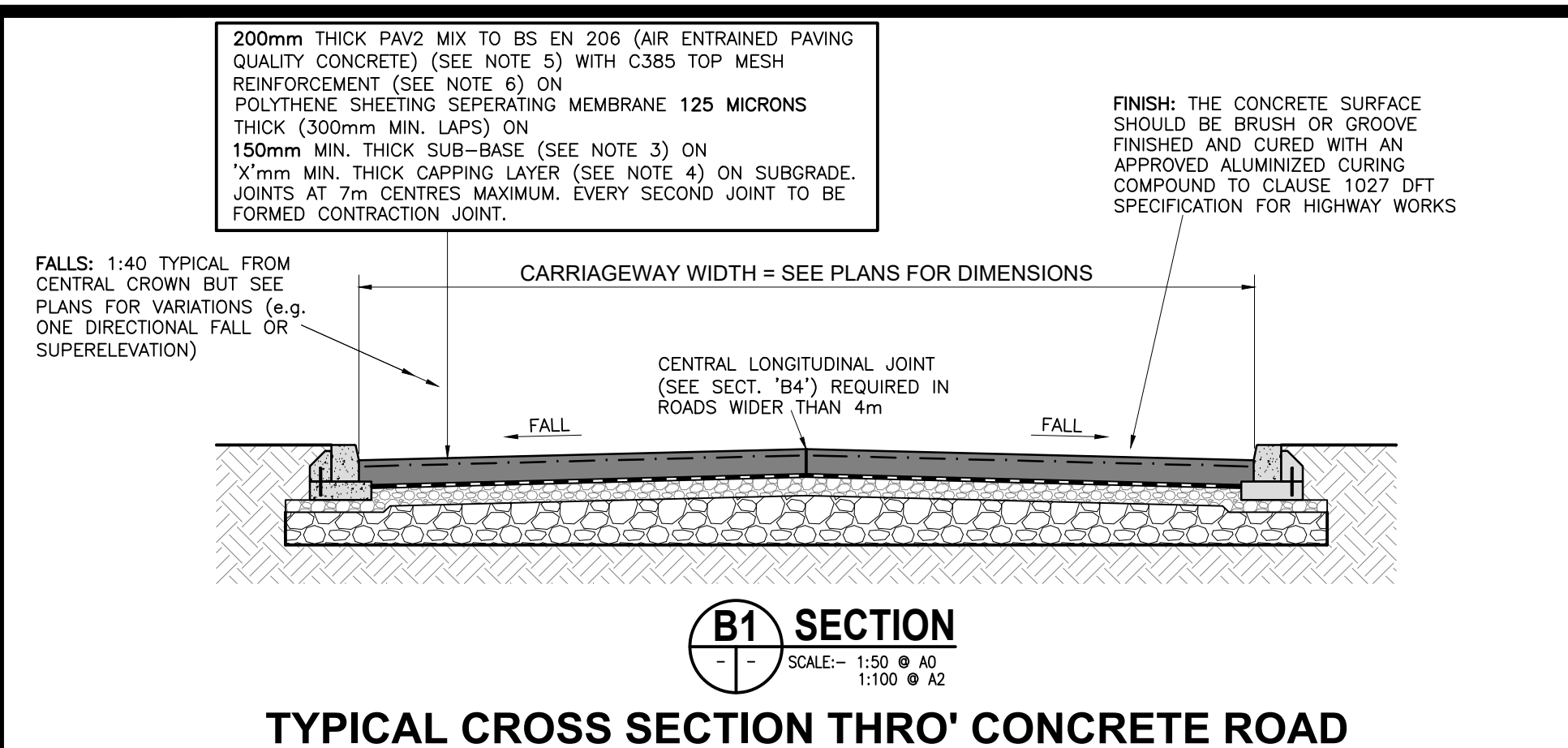
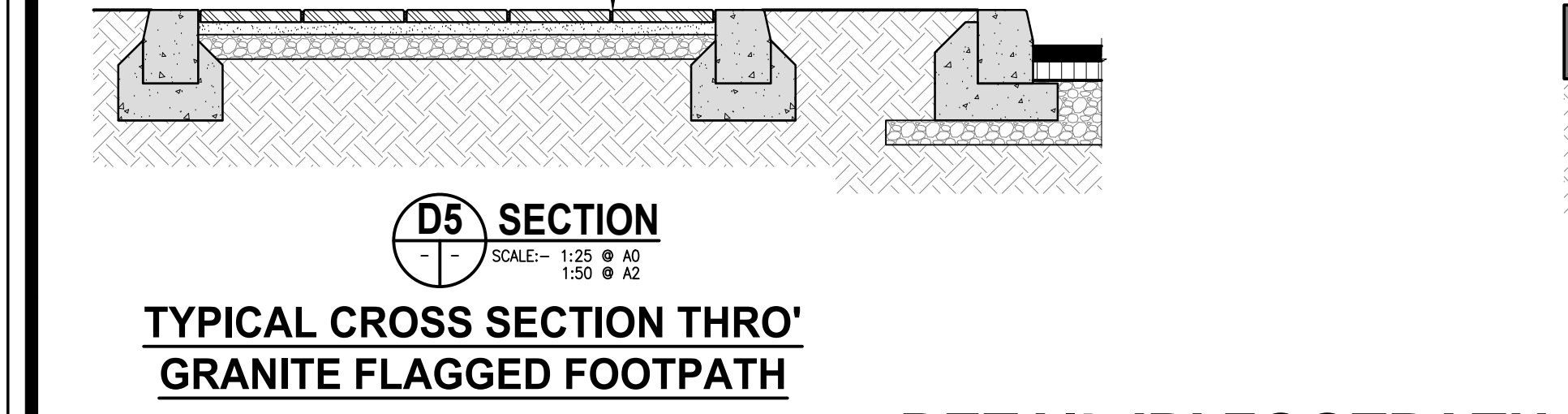
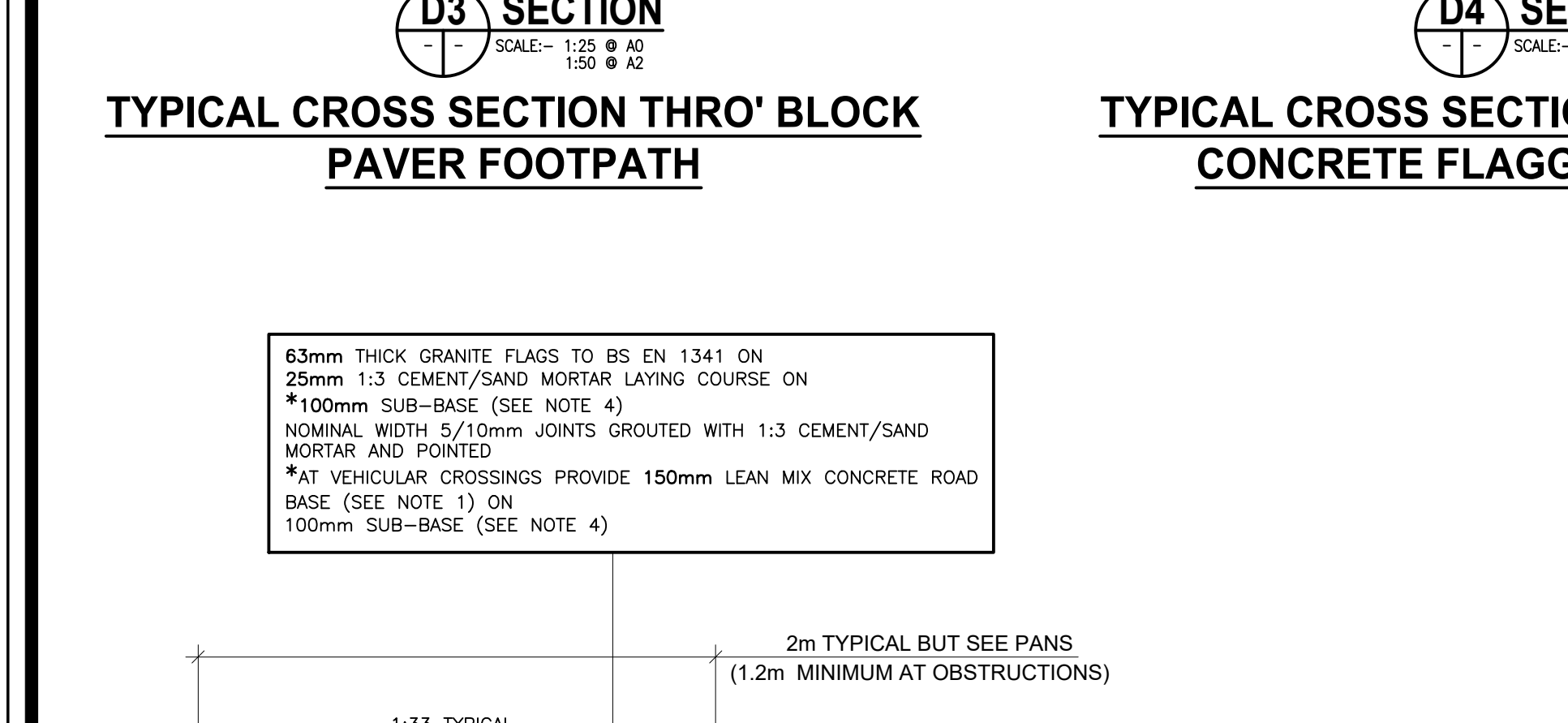
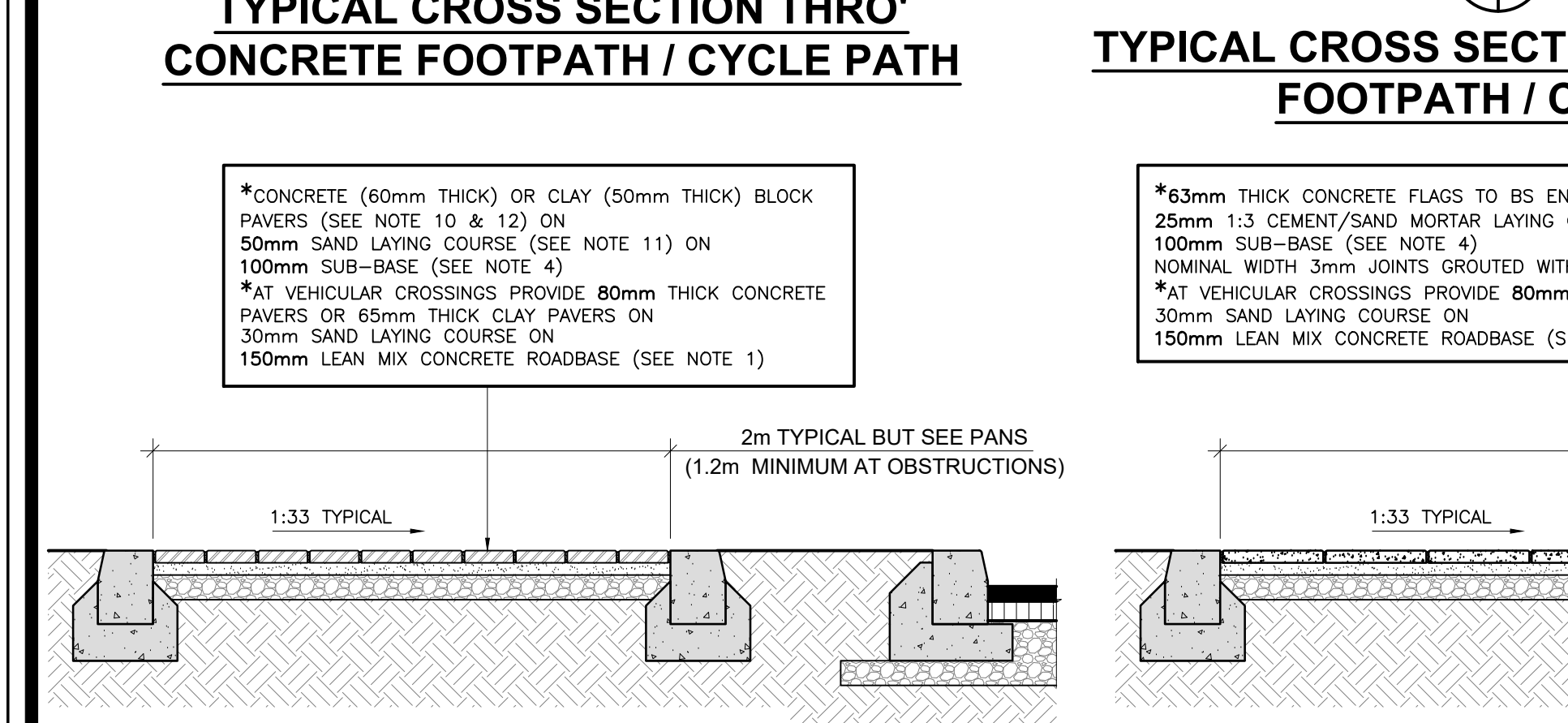
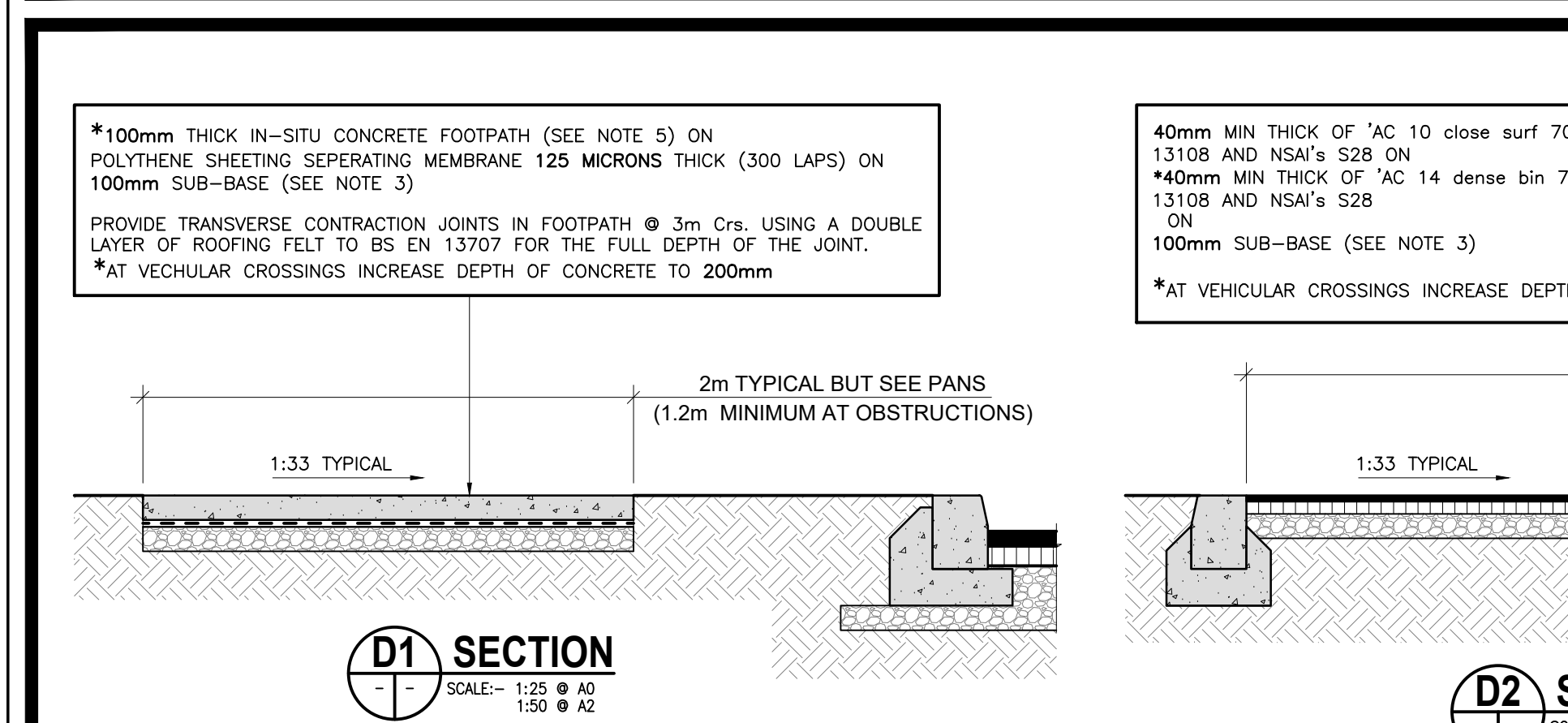
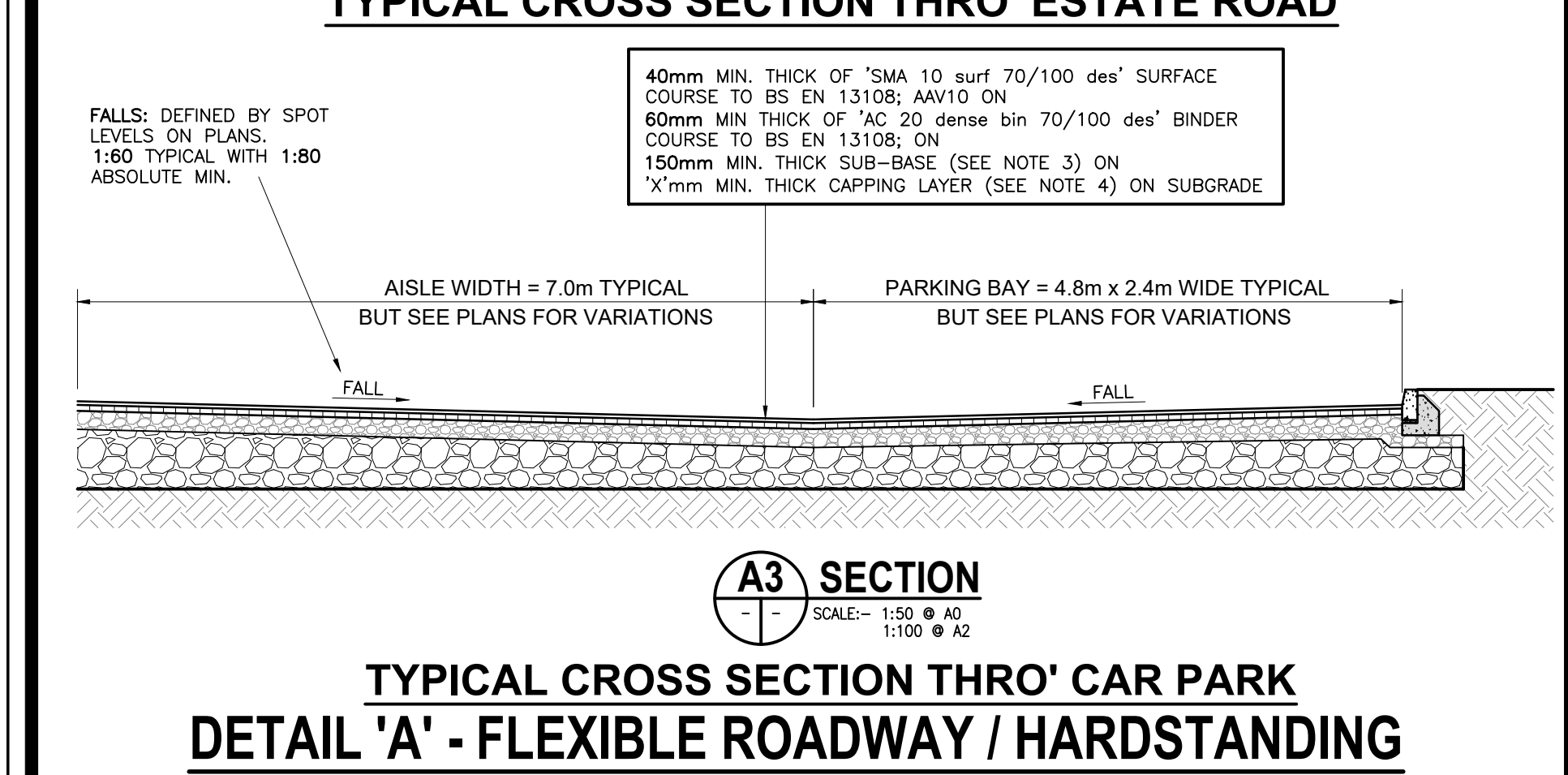
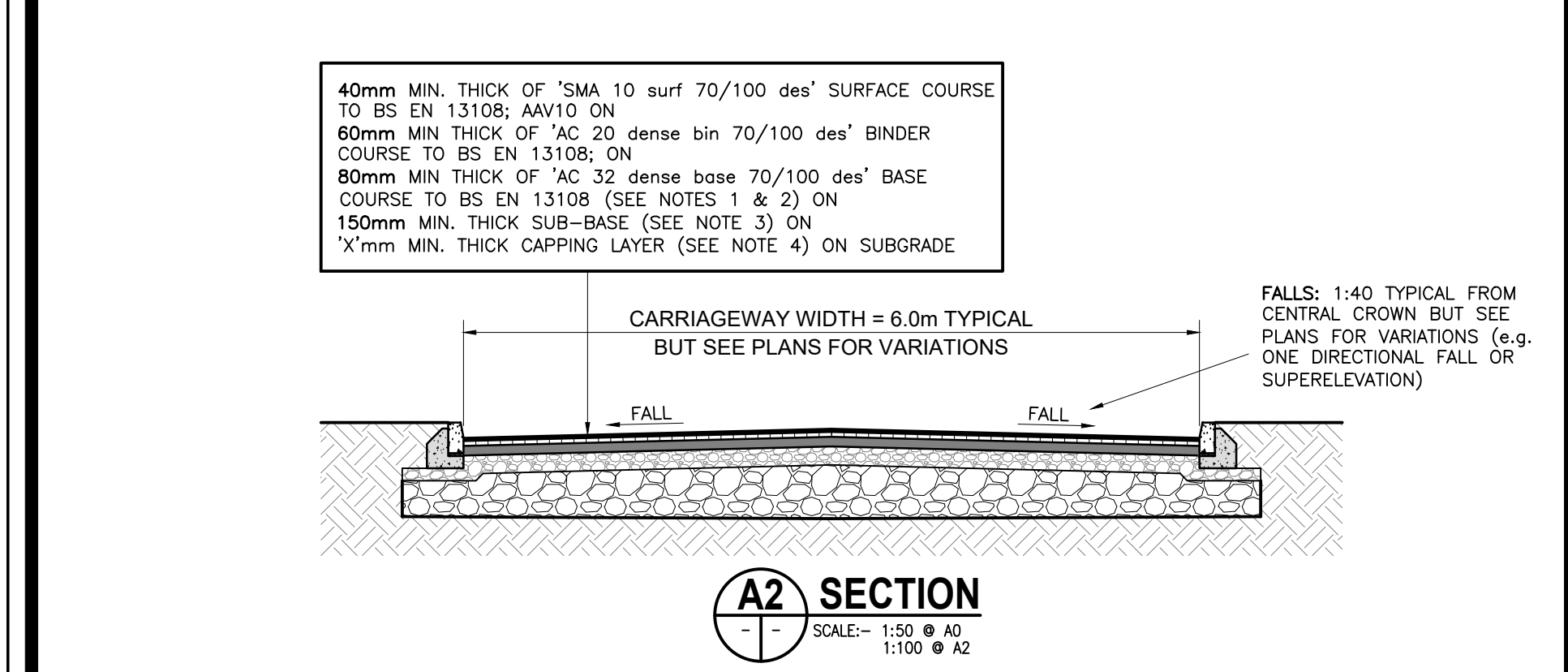
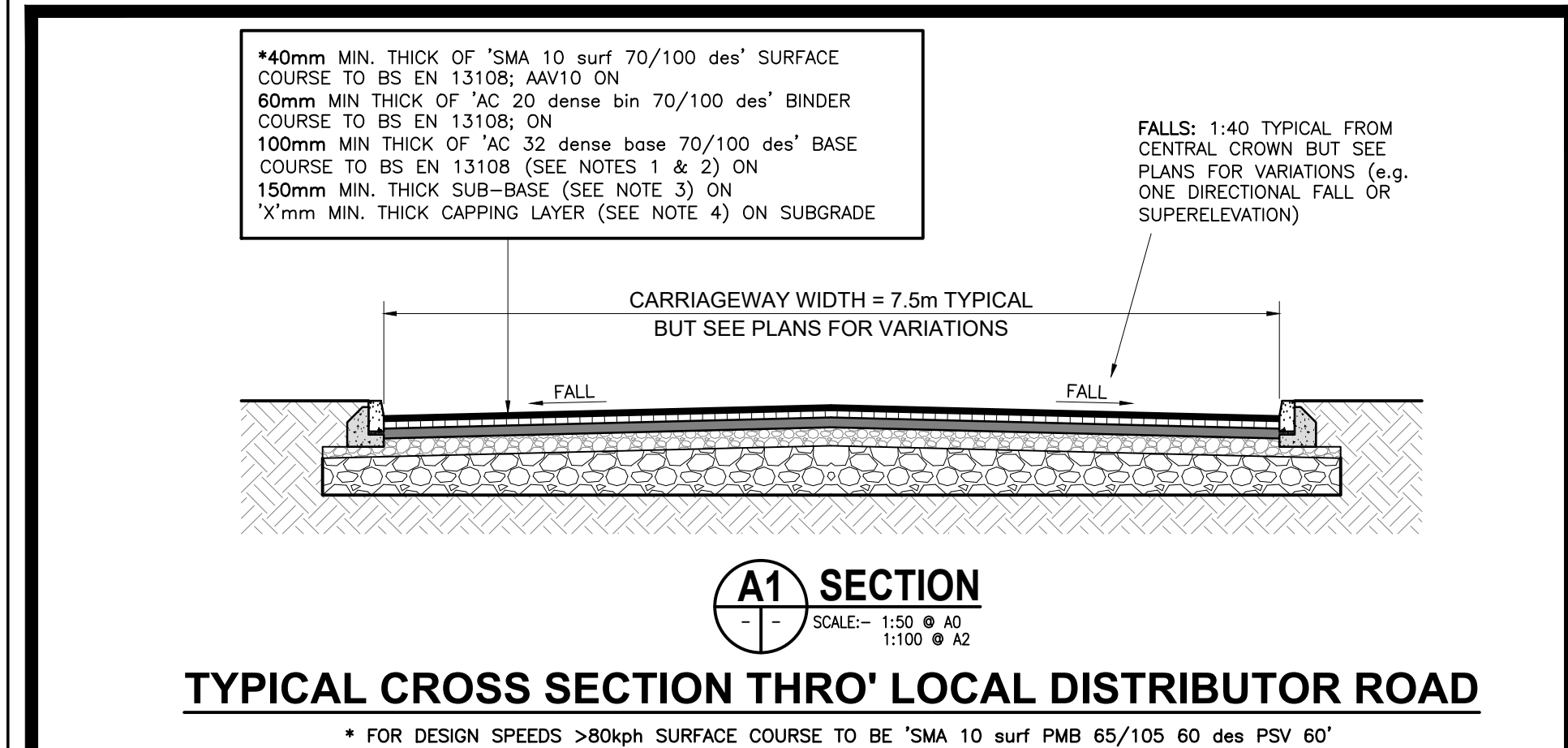
PROPOSED OVERLAND DRAINAGE FLOWS

SCALE @ A1: 1:150
SCALE @ A3: 1:300

C1	30.01.23	ISSUED FOR CONSTRUCTION	KO	DB
ISSUE	DATE	DESCRIPTION	DRN	P.D.
ISSUE STATUS		☒ PRELIMINARY (P1, P2, P3 etc.,)	☐ PLANNING (PL1, PL2, PL3 etc.,)	
		☐ TENDER (T1, T2, T3 etc.,)	☐ CONSTRUCTION (O, 1, 2 etc.,)	



CLIENT			
FORMATION GROUP			
PROJECT TITLE			
WATTS CLOSE, LONDON. N15 EDW			
DRAWING TITLE			
PROPOSED OVERLAND DRAINAGE FLOWS			
SCALE @ A1	JOB NO.	DRAWING NO.	ISSUE
AS SHOWN	22778	C-1202	C1



FOR CONSTRUCTION

NOTES

1. **ALTERNATIVE BASE COURSE MATERIAL:**

AS AN ALTERNATIVE TO ASPHALTIC CONCRETE BASE COURSE THE CONTRACTOR CAN USE AN STANDARD CONCRETE MIX 'SMA 10' LEAN MIX BASE COURSE 150mm THICK STANDARD CONCRETE MIX ST4 SHALL BE USED INSTEAD OF ASPHALTIC CONCRETE MIX ST4. BS EN 13077-1, CURING OF LEAN-MIX ROAD BASE SHALL BE BY BUTYROMEX SPRAYING TO CLAUSE 920 DFT SPECIFICATION FOR HIGHWAY WORKS.

2. **USE OF BASE COURSE FOR CONSTRUCTION TRAFFIC:**

THE BASE COURSE MAY BE USED FOR CONSTRUCTION TRAFFIC PROVIDED IT IS INCREASED IN THICKNESS BY 50mm AND SURFACE DRESSED. SURFACE DRESSING SHOULD BE CARVED UP AT THE APPROPRIATE RATE. CLAUSE 919 AND 922 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS. THE BINDER SHOULD BE CUTBACK BITUMEN OR CATIONIC BITUMEN EMULSION, COMPLYING WITH THE SPECIFICATION. OTHER BINDERS MAY BE USED, SUBJECT TO APPROVAL.

CUTBACK BITUMEN SHOULD BE OF THE APPROPRIATE GRADE SPECIFIED. CATIONIC BITUMEN EMULSION SHOULD HAVE A NOMINAL BITUMEN CONTENT OF 70%. THE BINDER SHOULD BE SPREAD AT THE APPROPRIATE RATE. SPECIFIED. CHIPPINGS SHOULD BE OF A SINGLE SIZE AS APPROVED BY THE LOCAL AUTHORITY. CURIAL, SHAPE AND SHOULD COMPLY WITH THE REQUIREMENTS OF TABLE 2.4 OF CLAUSE 919 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS.

3. **DEPTH OF SUB-BASE & CAPPING LAYER:**

THE DEPTH OF THE SUB-BASE AND CAPPING LAYERS WILL VARY WITH THE SUBGRADE STRENGTH, AS INDICATED BY THE CBR TEST RESULTS.

THE THICKNESS OF THE SUB-BASE LAYER SHOULD BE 150mm FOR ALL FORMS OF ROADWAY CONSTRUCTION.

THE THICKNESS OF THE CAPPING LAYER WILL VARY WITH THE CBR VALUE, SEE 4025 OF DFT DESIGN MANUAL FOR ROADS AND BRIDGES.

* FOR SUBGRADES WITH A CBR OF LESS THAN 2%, A GEOTEXTILE SEPARATOR (e.g. TERM 1000) SHOULD BE USED AND SPECIALIST ADVICE SOUGHT REGARDING MINIMUM THICKNESS.

4. **MATERIAL SPECIFICATION FOR SUB-BASE AND CAPPING LAYER:**

(a) SUB-BASE

SUB-BASE MATERIAL SHOULD COMPREHEND 2 UNBOUND MIXTURE IN ACCORDANCE WITH CLAUSE 803 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS. THE MATERIAL SHOULD BE LAD IN THE GRADING LIMITS SET OUT IN TABLE 4.1 BELOW.

(b) CAPPING LAYER

THE CAPPING LAYER SHALL BE CONSTRUCTED WITH CLASS BF1 OR BF2 MATERIAL. CLASS BF2 SHALL BE USED FOR THE ENTIRE CAPPING LAYER. THE CAPPING LAYER SHALL BE COMPRESSED TO A MINIMUM OF 95% OF THE THEORETICAL DENSITY. THE CAPPING LAYER SHALL BE LAD IN THE GRADING LIMITS SET OUT IN TABLE 4.1 BELOW.

5. **CONCRETE FOR ROAD PAVEMENTS:**

PAVING QUALITY CONCRETE SHOULD BE PA2 MIX (AIR ENTRAINED CONCRETE) MADE FROM NATURAL AGGREGATES, CEMENT, WATER AND AIR. ENTHRINNING AGENT COMPLYING WITH BS 2661-1, BS 8500-1, BS 8500-2, EN 13077-2 AND THE REQUIREMENTS OF SERIES 1000 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS.

6. **REINFORCEMENT FOR CONCRETE SLABS SHOULD BE LONG WESH STEEL, FABRIC, COMPLYING WITH BS 4443 AND SHOULD BE FREE FROM LOOSE MILL SCALE, RUST, OIL, PAINT OR GREASE. THE MINIMUM WEIGHT OF REINFORCEMENT SHOULD BE 2.0kg/m². THE REINFORCEMENT SHOULD HAVE 50mm MINIMUM COVER FROM THE SURFACE AND SHOULD TERMINATE BETWEEN 200 AND 300mm FROM ANY TRANSVERSE JOINT BETWEEN 40 AND 80mm FROM A LONGITUDINAL JOINT. THE REINFORCEMENT SHOULD TERMINATE BETWEEN 100 AND 150mm FROM THE EDGE OF THE SLAB. REINFORCING MATS SHOULD OVERLAP SUCH THAT THE TRANSVERSE WIRE OF ONE MAT LIES WITHIN THE LAST COMPLETE MESH OF THE PREVIOUS MAT AND THE OVERLAP SHOULD BE AT LEAST 450mm. TRANSVERSE CONTRACTION JOINT SPACING FOR VARIOUS MESH SIZES SHOULD BE AS FOLLOWS:**

LONG WESH REINFORCEMENT TO BS 4443	MAXIMUM SPACING (m) OF CONTRACTION JOINTS
C283	15m
C385	20m
C503	25m

7. **SANING OF JOINT GROOVES SHOULD BE UNDERTAKEN AS SOON AS POSSIBLE AFTER THE CONCRETE HAS HARDENED SUFFICIENTLY TO ENABLE A SHARP EGGED GROOVE TO BE PRODUCED, WITHOUT DISRUPTING THE CONCRETE AND BEFORE RANDOM CHIPS DEVELOP IN THE SLAB. THIS SHOULD BE WITHIN 6 TO 24 HOURS AFTER THE CONCRETE IS POURED. THE GROOVES SHOULD BE BETWEEN 4 X 1/4". THE DEPTH OF SLAB AND JOINT CONCRENT WITH NOT LESS THAN 3mm. THE GROOVE CAN BE MADE BY SANING AT THIS STAGE, OR LATER, TO ACCOMMODATE THE JOINT SEALANT.**

8. **DOWEL BARS AND TIE BARS SHOULD BE 80008 STEEL, COMPLYING WITH BS EN 13077-3 AND SHOULD BE FREE FROM OIL, DIRT, LOOSE SCALE AND RUST. DOWEL BARS SHOULD BE STRAIGHT, FREE OF BARRS AND OTHER IRREGULARITIES, WITH THE SLOPING END SAWN. DOWEL BARS SHOULD BE GROOVED OVER THEIR LENGTH WITH A TIGHT, DURABLE PLASTIC SHEATH OF AVERAGE THICKNESS NOT GREATER THAN 1.25mm. FOR EXPANSION JOINTS, THE EXPANSION SPACE AVAILABLE IN THE WATERPROOF CAP SHOULD BE 10mm GREATER THAN THE THICKNESS OF THE JOINT FILLER BOARD.**

9. **JOINT GROOVES SHOULD BE SEALED WITH A COLD APPLIED JOINT-SEALING COMPOUND COMPLYING WITH BS 5212 TYPE N. THE FINISHED SURFACE OF THE SEAL SHOULD BE 3mm BELOW THE SURFACE LEVEL OF THE CONCRETE.**

TABLE 4.1 SUB-BASE MATERIAL - PERCENTAGE BY MASS PASSING

ISO SEVE SIZE (mm)	OVERALL GRADING RANGE	SUPP. DECLARED VALUE	PERCENTAGE BY MASS PASSING	TOLERANCE
63	100	NR	NR	NR
75	80-99	NR	NR	NR
105	55-85	NR	NR	NR
150	35-65	NR	NR	NR
200	22-50	NR	NR	NR
250	10-35	NR	NR	NR
300	0-7	NR	NR	NR

TABLE 5.1 CONSTITUENTS FOR PAVING QUALITY CONCRETE

MINIMUM CEMENT CONTENT	340kg/m ³
MAXIMUM FREE WATER/CEMENT RATIO	0.45
MAXIMUM AGGREGATE SIZE	20mm
MINIMUM STRENGTH CLASS	C32/40
AIR CONTENT	4.5 ± 0.5
SUMP CLASS	53

NOTES Ctd.

14. **GRADED LINEAR DRAINAGE CHANNEL SYSTEMS SHALL BE 100mm, 150mm OR 200mm NOMINAL INTERNAL WIDTH, AS SPECIFIED ON THE DRAWINGS. MANUFACTURED FROM HIGH STRENGTH POLYMER CONCRETE WITH CAST-IN GALVANIZED STEEL EDGE RAILS. THE CHANNELS SHALL BE INSTALLED WITH MANUFACTURERS DUCTILE IRON OR STAINLESS STEEL GRATING APPROPRIATE TO THE TRAFFIC LOAD CLASS AND LOCKED SECURELY IN PLACE. THE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.**

15. **SLOTTED LINEAR DRAINAGE CHANNEL SYSTEMS SHALL BE CHOSEN ACCORDING TO THE LOAD CLASS REQUIRED AND MANUFACTURED FROM HIGH STRENGTH POLYMER CONCRETE INCORPORATING A 10mm WIDE CENTRALLY POSITIONED SLOT. THE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.**

16. **PRECISE KERBS SHALL BE LAD AND LEVELLED IN ACCORDANCE WITH BS 7533 PART 4. A RAISED UP OF 25mm SHOULD BE USED FOR VEHICULAR ENTRANCES AND 0-5mm FOR PEDESTRIAN CROSSINGS.**

17. **IN SITU KERBS SHALL COMPLY WITH THE REQUIREMENTS OF BS 5931. KERBS SHALL BE PROTECTED FROM THE EFFECTS OF ADVERSE WEATHER FREE, CURED & RAISED UP OF 25mm. SHOULD BE USED FOR VEHICULAR ENTRANCES AND 0-5mm FOR PEDESTRIAN CROSSINGS.**

NOTES Ctd.

10. **CLAY AND CALCULUM SILICATE PAVERS SHOULD COMPLY WITH BS EN 1344: TYPE B8 WITH CHAMFERS: 200 x 100 x 65mm FOR TRAFFICED AREAS & 50mm THICK FOR PEDESTRIAN AREAS.**

200 x 100 x 65mm THICK PAVERS SHOULD COMPLY WITH BS EN 1338: TYPE B8. TYPE B8 WITH CHAMFERS: 200 x 100 x 65mm FOR TRAFFICED AREAS & 50mm THICK FOR PEDESTRIAN AREAS.

11. **THE LAYING COURSE MATERIAL SHOULD BE OWN TO THE PAVING EITHER BY THE USE OF SHAPED BLOCKS, OR BY LAYING RECTANGULAR BLOCKS IN A HORIZONTAL COURSE. THE MATERIAL SHOULD BE FULLY COMPACTED TO THE THEORETICAL DENSITY. THE MATERIAL SHOULD BE COMPRESSED TO A MINIMUM OF 95% OF THE THEORETICAL DENSITY. THE LAYING COURSE SHOULD BE LAD IN THE GRADING LIMITS SET OUT IN TABLE 4.1 BELOW.**

12. **JOINTS BETWEEN PAVERS TO BE LAD TIGHT (2mm to 5mm WIDE) AND FILLED WITH FINE SAND 0/6 (PP) @ PER BS EN 12620.**

13. **LEAN MIX CONCRETE SYSTEMS SHALL BE FULLY COMPLIANT WITH BS EN 1433:2002 AND CERTIFIED TO THE LOAD CLASSES SPECIFIED ON THE DRAWINGS AND AS DEFINED IN BS EN 1433:2002.**

NOTE:

BEFORE PAVERS / PAVEMENT WORKS ARE COMMENCED THE CONTRACTOR IS TO ESTABLISH IF THESE WORKS ARE TO BE TAKEN IN CHARGE BY THE LOCAL AUTHORITY. IF THIS IS THE CASE THE CONTRACTOR IS TO GET APPROVAL FROM THE LOCAL AUTHORITY FOR THE DETAILS SHOWN ON THIS DRAWING AND ESTABLISH INSPECTION AND TESTING REQUIREMENTS BEFORE COMMENCING THE WORK.

NOTES Ctd.

14. **GRADED LINEAR DRAINAGE CHANNEL SYSTEMS SHALL BE 100mm, 150mm OR 200mm NOMINAL INTERNAL WIDTH, AS SPECIFIED ON THE DRAWINGS. MANUFACTURED FROM HIGH STRENGTH POLYMER CONCRETE WITH CAST-IN GALVANIZED STEEL EDGE RAILS. THE CHANNELS SHALL BE INSTALLED WITH MANUFACTURERS DUCTILE IRON OR STAINLESS STEEL GRATING APPROPRIATE TO THE TRAFFIC LOAD CLASS AND LOCKED SECURELY IN PLACE. THE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.**

15. **SLOTTED LINEAR DRAINAGE CHANNEL SYSTEMS SHALL BE CHOSEN ACCORDING TO THE LOAD CLASS REQUIRED AND MANUFACTURED FROM HIGH STRENGTH POLYMER CONCRETE INCORPORATING A 10mm WIDE CENTRALLY POSITIONED SLOT. THE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.**

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17. **IN SITU KERBS SHALL COMPLY WITH THE REQUIREMENTS OF BS 5931. KERBS SHALL BE PROTECTED FROM THE EFFECTS OF ADVERSE WEATHER FREE, CURED & RAISED UP OF 25mm. SHOULD BE USED FOR VEHICULAR ENTRANCES AND 0-5mm FOR PEDESTRIAN CROSSINGS.**

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Barden Chapman
Civil & Structural Design Consultants

FORMATION GROUP

PROJECT TITLE
WATTS CLOSE, LONDON. N15 EDW

DRAWING TITLE
STANDARD ROADS / HARDSTANDING / FOOTPATH DETAILS

SCALE @ A0
AS SHOWN

JOB NO.
22778

DRAWING NO.
C-1210

ISSUE
C1



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