

Drainage Statement

for

St John's Phase 3 Link
Road, Hedge End



ARCH ASSOCIATES
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

Drainage Statement

for

St John's Phase 3 Link Road
Hedge End

Client:

Foreman Homes Ltd
Unit 1, Station Industrial Park
Duncan Rd, Park Gate
Southampton SO31 1BX

ISSUE		A	B
Issued By	C Hendry	C Hendry	
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Approved By	CH	CH	

Project No. FHL013

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1.0 An introduction to sustainable drainage systems or SuDS

SuDS are an environmentally friendly approach to managing rainfall that uses landscape features to deal with surface water. SuDS aim to:

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

2.0 SuDS at St. John's Phase 3 Link Road

SuDS at this development have been designed to prevent flooding and to provide the adequate level of treatment for the receiving watercourse.

In line with the drainage strategy for the wider development in this location, infiltration is not viable due to the geology and groundwater levels. Reference should be made to the previous Drainage Strategy reports put forward by Paul Basham Associates and Baker Gilby Associates.

Surface water run-off from the road surface is collected by silt trapping gullies, from which it is piped by gravity into large balancing pond, which stores the attenuation volumes for storms up to and including the 1 in 100 year event plus 40% for climate change. The pond also provides further treatment via gabion basket permeable 'walls', but the associated treatment for a detention basin as per the Ciria SuDS Manual mitigation indices.

The pond outfalls into a flow control manhole, which limits the flow rate to 3 litres per second as per the planning approved strategy, after which there is a Downstream Defender filter manhole by Hydro International, which provides the final round of treatment before the system discharges into the watercourse.



Two sections of watercourse are to be culverted under the proposed road as shown on the general arrangement drawings in Appendix 2. One of the two culverts includes a manhole at midpoint to allow a change in gradient, which is required to avoid a clash with the proposed central storm drain within the road, which cannot be raised to avoid the culvert due to the topography and required falls in the network.

3.0 SuDS Treatment

Based on the guidance in CIRIA C753, the following analysis has been undertaken with the relative mitigation indices for the proposed levels of treatment taken from CIRIA C753 Tables 26.3 (surface waters) and Table 26.4. The resultant assessment is summarised within the Table below. A Downstream Defender filter manhole has been added to the design to provide the required mitigation indices, which were obtained directly from Hydro International.

Element	Pollution Hazard Indices			
	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Road	Medium	0.7	0.6	0.7
	Pollution Mitigation Indices			
Detention Basin		0.5	0.5	0.6
Downstream Defender		0.5	0.4	0.8
Total		0.75	0.7	>0.95
Sufficiency		Sufficient	Sufficient	Sufficient



4.0 SuDS Maintenance Schedule

The following tables are taken from the Ciria SuDS Manual (Report C753) and are relevant for the proprietary treatment systems, which include the Downstream Defender and sump catchpits, and the detention basin.

TABLE 14.2 An example of operation and maintenance requirements for a proprietary treatment system		
Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months



TABLE 22.1 Operation and maintenance requirements for detention basins

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseedling or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

SuDS Maintenance Responsibility

The maintenance of the road drainage is to be provided by HCC Highways. However, maintenance for the balancing pond is to be provided by Eastleigh Borough Council.



APPENDIX 1

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
SW MH 01.00	0.045	5.00	48.640	1200	448439.462	111612.072	1.826
SW MH 02.00	0.019	5.00	48.070	1200	448434.318	111581.851	1.461
SW MH 03.00	0.039	5.00	47.500	1200	448433.327	111550.630	1.100
SW MH 04.00	0.077	5.00	46.950	1200	448431.439	111528.470	1.959
SW MH 05.00			46.950	1200	448434.691	111528.969	1.968
SW MH 06.00	0.044	5.00	46.775	1200	448443.001	111484.820	1.558
SW MH 07.00	0.043	5.00	47.025	1200	448453.622	111441.143	1.658
SW MH 08.00	0.043	5.00	47.325	1200	448479.192	111404.508	1.809
SW MH 09.00	0.044	5.00	47.500	1200	448516.603	111384.633	1.720
SW MH 10.00	0.039	5.00	47.275	1200	448561.435	111385.564	1.295
SW MH 11.00	0.041	5.00	47.700	1200	448637.092	111383.077	1.383
OUTFALL			45.900	50	448444.426	111530.324	0.944
Pond			45.100	50	448454.460	111511.620	0.400
SW MH 12.00			45.300	1200	448455.763	111490.556	0.640

Pipeline Schedule

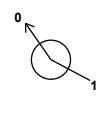
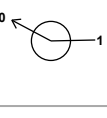
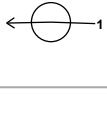
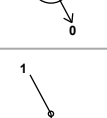
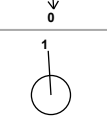
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	75.698	224.6	225	Circular	47.700	46.317	1.158	47.275	45.980	1.070
1.001	44.842	224.2	225	Circular	47.275	45.980	1.070	47.500	45.780	1.495
1.002	42.363	224.1	225	Circular	47.500	45.780	1.495	47.325	45.591	1.509
1.003	44.676	299.8	300	Circular	47.325	45.516	1.509	47.025	45.367	1.358
1.004	44.950	300.0	300	Circular	47.025	45.367	1.358	46.775	45.217	1.258
1.005	45.155	300.0	300	Circular	46.775	45.217	1.258	46.950	45.066	1.584
1.006	3.290	375.0	375	Circular	46.950	44.991	1.584	46.950	44.982	1.593
2.000	30.656	149.5	150	Circular	48.640	46.814	1.676	48.070	46.609	1.311
2.001	31.237	149.5	150	Circular	48.070	46.609	1.311	47.500	46.400	0.950
2.002	22.240	18.8	150	Circular	47.500	46.400	0.950	46.950	45.216	1.584
1.007	9.829	375.0	375	Circular	46.950	44.982	1.593	45.900	44.956	0.569
1.008	21.225	61.5	375	Circular	45.900	45.045	0.480	45.100	44.700	0.025
1.009	21.104	527.6	375	Circular	45.100	44.700	0.025	45.300	44.660	0.265

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW MH 11.00	1200	Manhole	Adoptable	SW MH 10.00	1200	Manhole	Adoptable
1.001	SW MH 10.00	1200	Manhole	Adoptable	SW MH 09.00	1200	Manhole	Adoptable
1.002	SW MH 09.00	1200	Manhole	Adoptable	SW MH 08.00	1200	Manhole	Adoptable
1.003	SW MH 08.00	1200	Manhole	Adoptable	SW MH 07.00	1200	Manhole	Adoptable
1.004	SW MH 07.00	1200	Manhole	Adoptable	SW MH 06.00	1200	Manhole	Adoptable
1.005	SW MH 06.00	1200	Manhole	Adoptable	SW MH 04.00	1200	Manhole	Adoptable
1.006	SW MH 04.00	1200	Manhole	Adoptable	SW MH 05.00	1200	Manhole	Adoptable
2.000	SW MH 01.00	1200	Manhole	Adoptable	SW MH 02.00	1200	Manhole	Adoptable
2.001	SW MH 02.00	1200	Manhole	Adoptable	SW MH 03.00	1200	Manhole	Adoptable
2.002	SW MH 03.00	1200	Manhole	Adoptable	SW MH 04.00	1200	Manhole	Adoptable
1.007	SW MH 05.00	1200	Manhole	Adoptable	OUTFALL	50	Manhole	Adoptable
1.008	OUTFALL	50	Manhole	Adoptable	Pond	50	Junction	
1.009	Pond	50	Junction		SW MH 12.00	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW MH 01.00	448439.462	111612.072	48.640	1.826	1200				
SW MH 02.00	448434.318	111581.851	48.070	1.461	1200		2.000	46.814	150
SW MH 03.00	448433.327	111550.630	47.500	1.100	1200		2.001	46.609	150
SW MH 04.00	448431.439	111528.470	46.950	1.959	1200		2.001	46.400	150
SW MH 05.00	448434.691	111528.969	46.950	1.968	1200		2.002	45.216	150
SW MH 06.00	448443.001	111484.820	46.775	1.558	1200		1.006	45.066	300
SW MH 07.00	448453.622	111441.143	47.025	1.658	1200		1.007	44.982	375
							1.006	44.982	375
							1.004	45.217	300
							1.005	45.217	300
							1.003	45.367	300
							1.004	45.367	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW MH 08.00	448479.192	111404.508	47.325	1.809	1200		1.002	45.591	225
SW MH 09.00	448516.603	111384.633	47.500	1.720	1200		1.001	45.780	225
SW MH 10.00	448561.435	111385.564	47.275	1.295	1200		1.000	45.980	225
SW MH 11.00	448637.092	111383.077	47.700	1.383	1200		1.000	46.317	225
OUTFALL	448444.426	111530.324	45.900	0.944	50		1.007	44.956	375
Pond	448454.460	111511.620	45.100	0.400	50		1.008	45.045	375
SW MH 12.00	448455.763	111490.556	45.300	0.640	1200		1.009	44.700	375

Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Drain Down Time (mins)	240
FSR Region	England and Wales	Winter CV	0.840	Additional Storage (m³/ha)	20.0
M5-60 (mm)	19.700	Analysis Speed	Normal	Check Discharge Rate(s)	x
Ratio-R	0.345	Skip Steady State	x	Check Discharge Volume	x

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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	100	40	0	0
30	0	0	0				

Node SW MH 12.00 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	44.660	Product Number	CTL-SHE-0090-3000-0440-3000
Design Depth (m)	0.440	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.0	Min Node Diameter (mm)	1200

Node Pond Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	44.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	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)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	684.7	0.0	0.100	727.9	0.0	0.200	771.6	0.0	0.300	815.7	0.0	0.400	860.2	0.0	0.500	905.2	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	102.653	29.047	1 year 480 minute winter	7.970	3.170
1 year 15 minute winter	72.037	29.047	1 year 600 minute summer	9.946	2.720
1 year 30 minute summer	68.383	19.350	1 year 600 minute winter	6.795	2.720
1 year 30 minute winter	47.988	19.350	1 year 720 minute summer	8.958	2.401
1 year 60 minute summer	47.619	12.584	1 year 720 minute winter	6.020	2.401
1 year 60 minute winter	31.637	12.584	1 year 960 minute summer	7.488	1.972
1 year 120 minute summer	30.420	8.039	1 year 960 minute winter	4.961	1.972
1 year 120 minute winter	20.210	8.039	1 year 1440 minute summer	5.579	1.495
1 year 180 minute summer	23.944	6.161	1 year 1440 minute winter	3.750	1.495
1 year 180 minute winter	15.564	6.161	1 year 2160 minute summer	4.095	1.132
1 year 240 minute summer	19.292	5.098	1 year 2160 minute winter	2.821	1.132
1 year 240 minute winter	12.817	5.098	1 year 2880 minute summer	3.467	0.929
1 year 360 minute summer	15.006	3.862	1 year 2880 minute winter	2.330	0.929
1 year 360 minute winter	9.754	3.862	1 year 4320 minute summer	2.695	0.705
1 year 480 minute summer	11.996	3.170	1 year 4320 minute winter	1.775	0.705

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 5760 minute summer	2.264	0.579	30 year 8640 minute summer	2.997	0.765
1 year 5760 minute winter	1.465	0.579	30 year 8640 minute winter	1.934	0.765
1 year 7200 minute summer	1.947	0.497	30 year 10080 minute summer	2.665	0.680
1 year 7200 minute winter	1.256	0.497	30 year 10080 minute winter	1.720	0.680
1 year 8640 minute summer	1.714	0.437	100 year +40% CC 15 minute summer	455.995	129.031
1 year 8640 minute winter	1.106	0.437	100 year +40% CC 15 minute winter	319.997	129.031
1 year 10080 minute summer	1.539	0.393	100 year +40% CC 30 minute summer	307.136	86.909
1 year 10080 minute winter	0.993	0.393	100 year +40% CC 30 minute winter	215.534	86.909
30 year 15 minute summer	251.551	71.180	100 year +40% CC 60 minute summer	211.286	55.837
30 year 15 minute winter	176.527	71.180	100 year +40% CC 60 minute winter	140.373	55.837
30 year 30 minute summer	167.807	47.484	100 year +40% CC 120 minute summer	130.891	34.591
30 year 30 minute winter	117.760	47.484	100 year +40% CC 120 minute winter	86.961	34.591
30 year 60 minute summer	114.808	30.340	100 year +40% CC 180 minute summer	99.969	25.725
30 year 60 minute winter	76.275	30.340	100 year +40% CC 180 minute winter	64.982	25.725
30 year 120 minute summer	71.163	18.806	100 year +40% CC 240 minute summer	78.280	20.687
30 year 120 minute winter	47.279	18.806	100 year +40% CC 240 minute winter	52.007	20.687
30 year 180 minute summer	54.588	14.047	100 year +40% CC 360 minute summer	59.277	15.254
30 year 180 minute winter	35.484	14.047	100 year +40% CC 360 minute winter	38.531	15.254
30 year 240 minute summer	42.982	11.359	100 year +40% CC 480 minute summer	46.406	12.264
30 year 240 minute winter	28.556	11.359	100 year +40% CC 480 minute winter	30.831	12.264
30 year 360 minute summer	32.750	8.428	100 year +40% CC 600 minute summer	37.822	10.345
30 year 360 minute winter	21.288	8.428	100 year +40% CC 600 minute winter	25.842	10.345
30 year 480 minute summer	25.763	6.809	100 year +40% CC 720 minute summer	33.572	8.998
30 year 480 minute winter	17.117	6.809	100 year +40% CC 720 minute winter	22.562	8.998
30 year 600 minute summer	21.081	5.766	100 year +40% CC 960 minute summer	27.389	7.212
30 year 600 minute winter	14.404	5.766	100 year +40% CC 960 minute winter	18.143	7.212
30 year 720 minute summer	18.776	5.032	100 year +40% CC 1440 minute summer	19.664	5.270
30 year 720 minute winter	12.619	5.032	100 year +40% CC 1440 minute winter	13.215	5.270
30 year 960 minute summer	15.405	4.056	100 year +40% CC 2160 minute summer	13.903	3.842
30 year 960 minute winter	10.204	4.056	100 year +40% CC 2160 minute winter	9.580	3.842
30 year 1440 minute summer	11.155	2.990	100 year +40% CC 2880 minute summer	11.442	3.067
30 year 1440 minute winter	7.497	2.990	100 year +40% CC 2880 minute winter	7.690	3.067
30 year 2160 minute summer	7.960	2.200	100 year +40% CC 4320 minute summer	8.519	2.227
30 year 2160 minute winter	5.485	2.200	100 year +40% CC 4320 minute winter	5.610	2.227
30 year 2880 minute summer	6.598	1.768	100 year +40% CC 5760 minute summer	6.926	1.773
30 year 2880 minute winter	4.434	1.768	100 year +40% CC 5760 minute winter	4.483	1.773
30 year 4320 minute summer	4.965	1.298	100 year +40% CC 7200 minute summer	5.827	1.487
30 year 4320 minute winter	3.270	1.298	100 year +40% CC 7200 minute winter	3.761	1.487
30 year 5760 minute summer	4.069	1.042	100 year +40% CC 8640 minute summer	5.048	1.288
30 year 5760 minute winter	2.633	1.042	100 year +40% CC 8640 minute winter	3.258	1.288
30 year 7200 minute summer	3.444	0.878	100 year +40% CC 10080 minute summer	4.471	1.140
30 year 7200 minute winter	2.222	0.878	100 year +40% CC 10080 minute winter	2.885	1.140

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.08%

	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
	SW MH 01.00	10	46.879	0.065	5.9	0.1063	0.0000	OK
	SW MH 02.00	11	46.694	0.085	8.3	0.1177	0.0000	OK
	SW MH 03.00	11	46.460	0.060	13.0	0.1101	0.0000	OK
	SW MH 04.00	12	45.215	0.224	46.4	0.4299	0.0000	OK
	SW MH 05.00	12	45.196	0.214	46.5	0.2425	0.0000	OK
	SW MH 06.00	13	45.354	0.137	27.5	0.2325	0.0000	OK
	SW MH 07.00	12	45.493	0.126	23.2	0.2077	0.0000	OK
	SW MH 08.00	12	45.627	0.111	18.6	0.1776	0.0000	OK
	SW MH 09.00	12	45.882	0.102	14.9	0.1677	0.0000	OK
	SW MH 10.00	11	46.060	0.080	10.1	0.1378	0.0000	OK
	SW MH 11.00	11	46.375	0.058	5.4	0.1001	0.0000	OK
	OUTFALL	12	45.170	0.214	46.5	0.0004	0.0000	OK
	Pond	272	44.777	0.077	9.9	53.8510	0.0000	OK
	SW MH 12.00	272	44.776	0.116	3.0	0.1306	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW MH 01.00	2.000	SW MH 02.00	5.8	0.664	0.397	0.2692	
15 minute winter	SW MH 02.00	2.001	SW MH 03.00	8.1	0.971	0.563	0.2623	
15 minute winter	SW MH 03.00	2.002	SW MH 04.00	13.1	2.036	0.317	0.1429	
15 minute winter	SW MH 04.00	1.006	SW MH 05.00	46.5	0.694	0.453	0.2202	
15 minute winter	SW MH 05.00	1.007	OUTFALL	46.5	0.714	0.453	0.6400	
15 minute winter	SW MH 06.00	1.005	SW MH 04.00	26.6	0.851	0.417	1.4927	
15 minute winter	SW MH 07.00	1.004	SW MH 06.00	23.0	0.779	0.361	1.3294	
15 minute winter	SW MH 08.00	1.003	SW MH 07.00	18.7	0.727	0.294	1.1523	
15 minute winter	SW MH 09.00	1.002	SW MH 08.00	14.1	0.830	0.409	0.7206	
15 minute winter	SW MH 10.00	1.001	SW MH 09.00	9.4	0.640	0.273	0.6720	
15 minute winter	SW MH 11.00	1.000	SW MH 10.00	5.1	0.507	0.148	0.7807	
15 minute winter	OUTFALL	1.008	Pond	46.5	3.323	0.182	0.3554	
360 minute winter	Pond	1.009	SW MH 12.00	3.0	0.202	0.035	0.4745	
360 minute winter	SW MH 12.00	Hydro-Brake®		3.0				66.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.08%

US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
SW MH 01.00	12	47.036	0.222	14.6	0.3599	0.0000	SURCHARGED
SW MH 02.00	12	46.868	0.259	18.6	0.3603	0.0000	SURCHARGED
SW MH 03.00	10	46.494	0.094	28.1	0.1725	0.0000	OK
SW MH 04.00	11	45.359	0.368	113.1	0.7051	0.0000	OK
SW MH 05.00	11	45.316	0.334	112.2	0.3779	0.0000	OK
SW MH 06.00	12	45.527	0.310	68.4	0.5257	0.0000	SURCHARGED
SW MH 07.00	13	45.620	0.253	59.4	0.4168	0.0000	OK
SW MH 08.00	12	45.713	0.197	47.4	0.3160	0.0000	OK
SW MH 09.00	12	45.979	0.199	37.4	0.3267	0.0000	OK
SW MH 10.00	11	46.116	0.136	25.1	0.2361	0.0000	OK
SW MH 11.00	11	46.411	0.094	13.3	0.1614	0.0000	OK
OUTFALL	11	45.239	0.283	112.5	0.0006	0.0000	OK
Pond	352	44.890	0.190	21.2	138.2844	0.0000	OK
SW MH 12.00	352	44.890	0.230	3.1	0.2606	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW MH 01.00	2.000	SW MH 02.00	12.8	0.789	0.885	0.5397	
15 minute winter	SW MH 02.00	2.001	SW MH 03.00	17.4	1.125	1.202	0.4553	
15 minute winter	SW MH 03.00	2.002	SW MH 04.00	29.2	2.396	0.707	0.3198	
15 minute winter	SW MH 04.00	1.006	SW MH 05.00	112.2	1.046	1.093	0.3512	
15 minute winter	SW MH 05.00	1.007	OUTFALL	112.5	1.160	1.096	0.9486	
15 minute winter	SW MH 06.00	1.005	SW MH 04.00	66.5	0.982	1.043	3.1695	
15 minute winter	SW MH 07.00	1.004	SW MH 06.00	56.1	0.899	0.880	2.9979	
15 minute winter	SW MH 08.00	1.003	SW MH 07.00	47.0	0.865	0.737	2.5005	
15 minute winter	SW MH 09.00	1.002	SW MH 08.00	35.3	1.047	1.022	1.4160	
15 minute winter	SW MH 10.00	1.001	SW MH 09.00	24.0	0.779	0.695	1.3827	
15 minute winter	SW MH 11.00	1.000	SW MH 10.00	12.7	0.640	0.369	1.5422	
15 minute winter	OUTFALL	1.008	Pond	113.0	4.031	0.442	0.6732	
30 minute summer	Pond	1.009	SW MH 12.00	4.4	0.307	0.051	0.6444	
30 minute winter	SW MH 12.00	Hydro-Brake®		3.0				44.7

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.08%

US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
SW MH 01.00	12	48.112	1.298	26.4	2.1084	0.0000	SURCHARGED
SW MH 02.00	13	47.747	1.138	28.9	1.5836	0.0000	SURCHARGED
SW MH 03.00	12	47.022	0.622	45.1	1.1440	0.0000	SURCHARGED
SW MH 04.00	11	45.555	0.564	182.6	1.0819	0.0000	SURCHARGED
SW MH 05.00	11	45.458	0.476	181.9	0.5383	0.0000	SURCHARGED
SW MH 06.00	12	46.002	0.785	102.0	1.3306	0.0000	SURCHARGED
SW MH 07.00	12	46.297	0.930	82.6	1.5338	0.0000	SURCHARGED
SW MH 08.00	12	46.476	0.960	66.3	1.5411	0.0000	SURCHARGED
SW MH 09.00	13	46.853	1.073	52.3	1.7624	0.0000	SURCHARGED
SW MH 10.00	13	47.036	1.056	42.0	1.8308	0.0000	FLOOD RISK
SW MH 11.00	13	47.118	0.801	24.1	1.3801	0.0000	SURCHARGED
OUTFALL	11	45.299	0.343	181.7	0.0007	0.0000	OK
Pond	690	45.079	0.379	23.1	291.0651	0.0000	FLOOD RISK
SW MH 12.00	690	45.079	0.419	3.1	0.4742	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW MH 01.00	2.000	SW MH 02.00	18.3	1.041	1.266	0.5397	
15 minute winter	SW MH 02.00	2.001	SW MH 03.00	25.9	1.473	1.790	0.5499	
15 minute winter	SW MH 03.00	2.002	SW MH 04.00	41.9	2.386	1.015	0.3915	
15 minute winter	SW MH 04.00	1.006	SW MH 05.00	181.9	1.650	1.772	0.3629	
15 minute winter	SW MH 05.00	1.007	OUTFALL	181.7	1.648	1.770	1.0619	
15 minute winter	SW MH 06.00	1.005	SW MH 04.00	102.4	1.454	1.605	3.1798	
15 minute winter	SW MH 07.00	1.004	SW MH 06.00	83.5	1.187	1.310	3.1653	
15 minute winter	SW MH 08.00	1.003	SW MH 07.00	65.7	0.934	1.030	3.1461	
15 minute winter	SW MH 09.00	1.002	SW MH 08.00	48.5	1.221	1.405	1.6848	
30 minute summer	SW MH 10.00	1.001	SW MH 09.00	32.6	0.820	0.944	1.7834	
15 minute summer	SW MH 11.00	1.000	SW MH 10.00	21.9	0.717	0.633	3.0106	
15 minute winter	OUTFALL	1.008	Pond	181.4	4.355	0.710	0.9872	
15 minute winter	Pond	1.009	SW MH 12.00	6.5	0.374	0.075	1.0832	
15 minute summer	SW MH 12.00	Hydro-Brake®		3.0				43.7



APPENDIX 2

DRAINAGE LEGEND

PROPOSED FEATURES

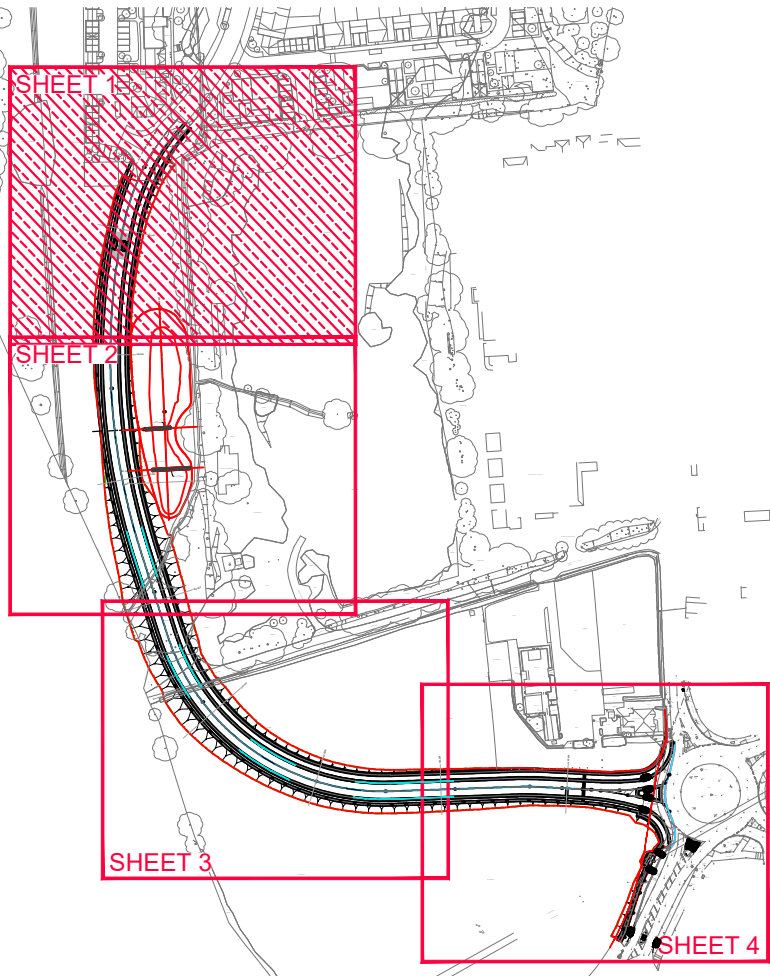
- SURFACE WATER DRAIN
- RG ■ ROAD GULLY (TRAPPED)
- STORM WATER MANHOLE TYPE B
FOR INTERNAL DIAMETER REFER TO PLAN
DEPTH FROM COVER TO SOFFIT OF PIPE 1.5m - 3m
- STORM WATER MANHOLE TYPE C
INTERNAL DIMENSION Ø1550
DEPTH FROM COVER TO SOFFIT LESS THAN 1.5m
(MAX PIPE DIAMETER 450mm)
- PIPE DETAIL: Ø, LENGTH, GRADIENT,
- MANHOLE REFERENCE:
CL COVER LEVEL,
IL INVERT LEVEL,
SIL SUMP INVERT LEVEL,
MH TYPE,
CATCHPIT MANHOLE (IF REQUIRED),
COVER GRADE
- MAJOR CONTOUR
MINOR CONTOUR
- SW MH 1.0
CL 00.00
IL 00.00
SIL 00.00
TYPE C MH
CATCHPIT
D400

DRAINAGE NOTES

- ALL PIPES TO BE A THERMOPLASTIC STRUCTURED WALL SEWER PIPES TO WIS 4-35-01 (CLASS BKN/SQM) AND BE CAPABLE OF WITHSTANDING 4000 PSI JETTING
- FOR CONSTRUCTION DETAILS REFER TO THE RELEVANT ARCH ASSOCIATES DRAWING NUMBERS LISTED ON THE DRAWING ISSUE SHEET.
- ADOPTABLE HIGHWAY WORKS ARE TO BE IN ACCORDANCE WITH LOCAL AUTHORITY DESIGN GUIDANCE.
- ANY WORKS ASSOCIATED WITH THE HIGHWAY/EXTERNAL WORKS INCLUDING HIGHWAY DRAINAGE, SHALL BE IN ACCORDANCE WITH THE HIGHWAYS AGENCY 'MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOL 1' (MCHW), UNLESS OTHERWISE SPECIFIED.
- ALL ADOPTABLE SEWERS WITH LESS THAN 1.20m OF COVER WHEN LAID BENEATH THE ROADS, OR 0.90m OF COVER IN OTHER AREAS, SHALL HAVE CONCRETE PROTECTION IN ACCORDANCE WITH EITHER OF THE DETAILS SHOWN ON THE STANDARD DRAWING PROVIDED.
- ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT, THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
- COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
- ROAD GULLY PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS ALL GULLIES SHALL BE FITTED WITH GRADE DA00 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED
- IN ORDER TO MAINTAIN THE SATISFACTORY FUNCTION OF SURFACE WATER SEWERS, ALL ROAD AND YARD GULLIES ARE TO BE "TRAPPED".
- ALL NON ADOPTABLE LATERALS BENEATH THE HIGHWAY SHALL BE BACK FILLED WITH A TYPE 1 GRANULAR MATERIAL AS CL803 (MCHW) APPROVED BY THE ENGINEER.
- THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
- THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE. NO DIMENSIONS ARE TO BE SCALED FROM THESE DRAWINGS
- IT IS THE CONTRACTORS/SUBCONTRACTORS RESPONSIBILITY TO ENSURE COMPLIANCE WITH THE CURRENT BUILDING REGULATIONS AND CODES OF PRACTICE.
- STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
- GULLY AND CHANNEL DRAIN POSITIONS ARE LIABLE TO AMENDMENT WHEN THE DESIGN LEVELS HAVE BEEN DETERMINED.
- INFILTRATION BASIN/BALANCING POND/POND SYSTEM TO CONFORM TO CIRIA C793 THE SUDS MANUAL C698 SITE HANDBOOK FOR THE CONSTRUCTION OF SUDS.
- ALL REDUNDANT DRAINAGE TO BE ABANDONED ONCE THE CONTRACTOR HAS SATISFIED HIMSELF THAT NO CONNECTIONS REMAIN LIVE. REDUNDANT DRAINAGE TO BE GRUBBED OUT.
- ALL BELOW GROUND CONCRETE TO ACCORD WITH BS5328:1997/SULPHATE CLASS TBA
- IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. GENERALLY SUB SOIL DRAINS AFFECTED ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER DRAINAGE SYSTEM. PIPE DIAMETERS AND GRADIENTS ARE TO BE MAINTAINED.
- BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPIERS TO WHICH CONNECTIONS ARE PROPOSED. ADDITIONAL SPUR/MANHOLE CONNECTIONS ARE TO BE AGREED WITH THE RELEVANT ADOPTING AUTHORITY. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
- ROAD REINSTATEMENTS ARE TO BE TO THE HIGHWAY AUTHORITY APPROVAL.
- NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.

NOTES

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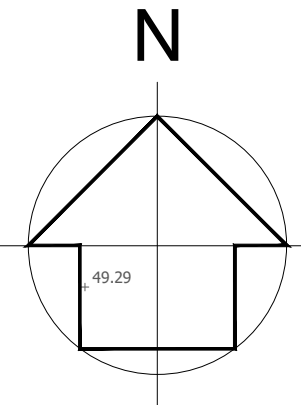
FOR SECTIONS SEE DRAWING
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- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- ⚠ INDICATES A RESIDUAL RISK AS A WARNING
- ℹ INDICATES A RESIDUAL RISK FOR INFORMATION

P02	07/02/23	UPDATED TO SUIT CLIENT COMMENTS	JLM
P01	21/12/22	PRELIMINARY ISSUE FOR COMMENT	SPB
Rev.	Date	Description	By



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Client
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Architect

N/A

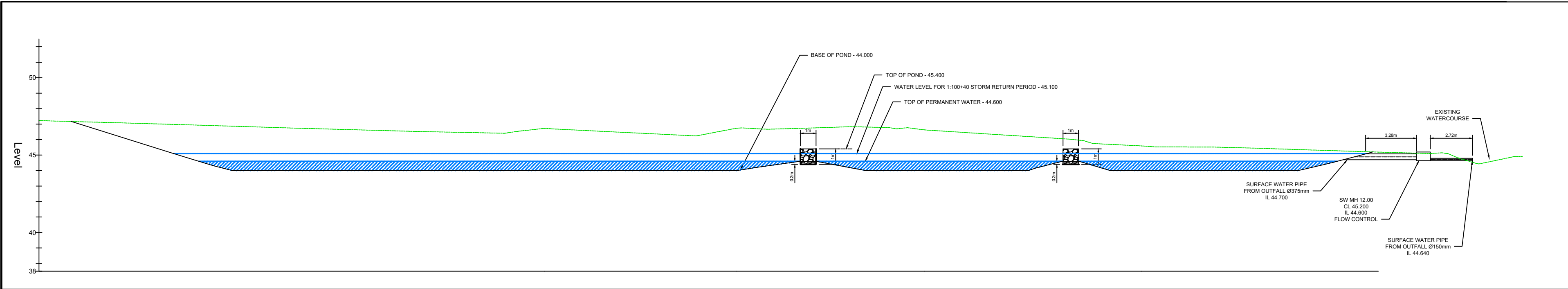
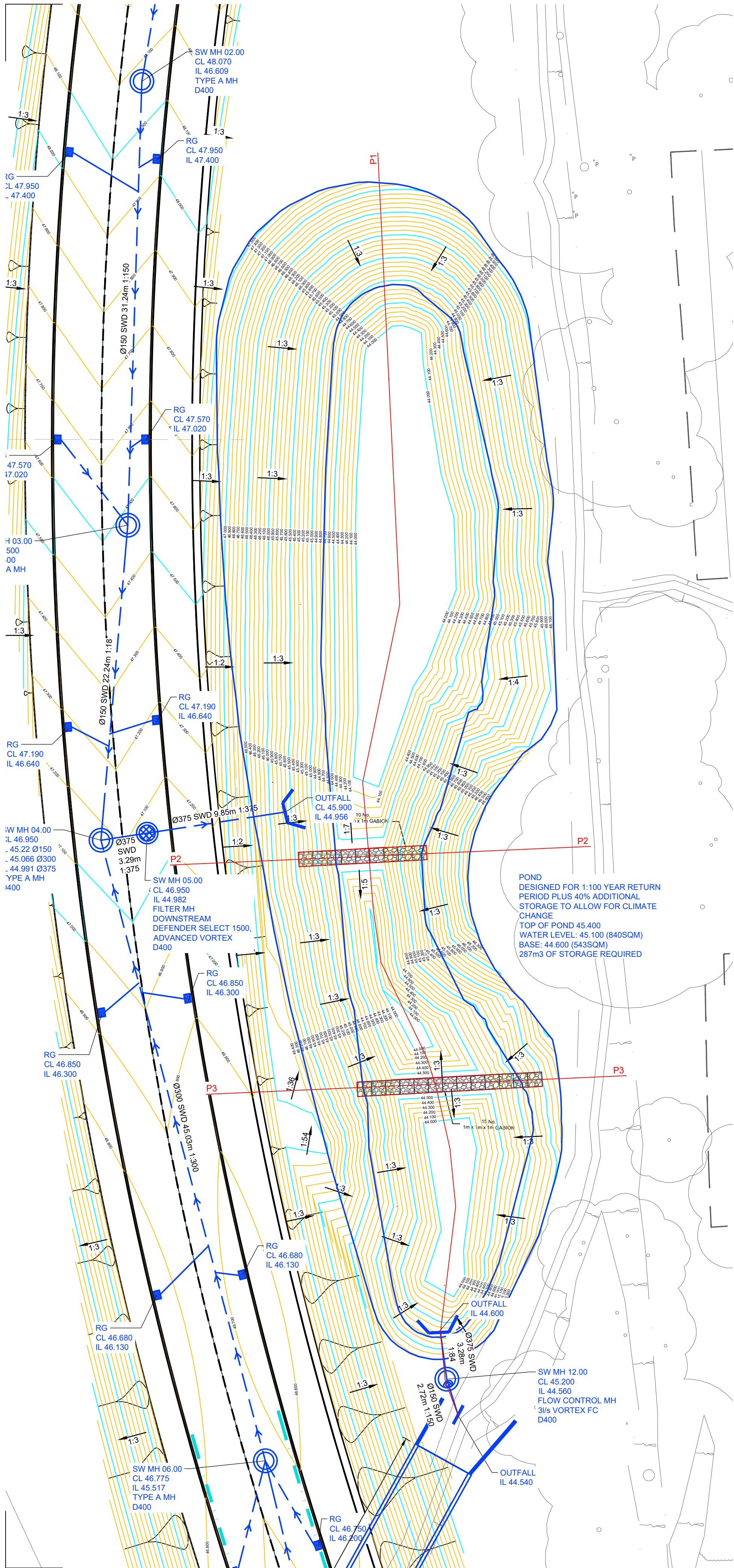
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PHASE 3,
ST JOHN'S ROAD,
HEDGE END.

Drawing title
PROPOSED LEVELS & DRAINAGE
SHEET 1 OF 4

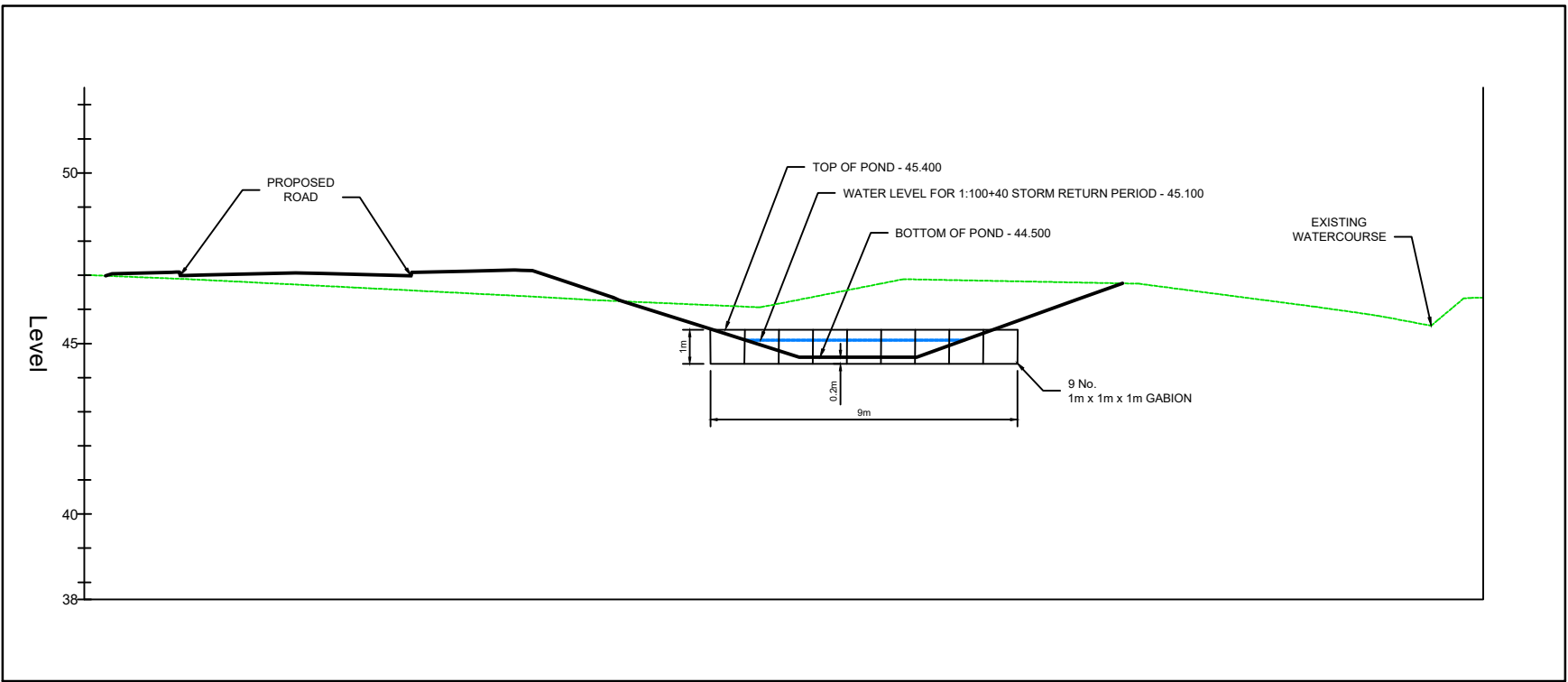
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Project code / No. | Originator | Zone | Level | Type | Role | Number | Revision

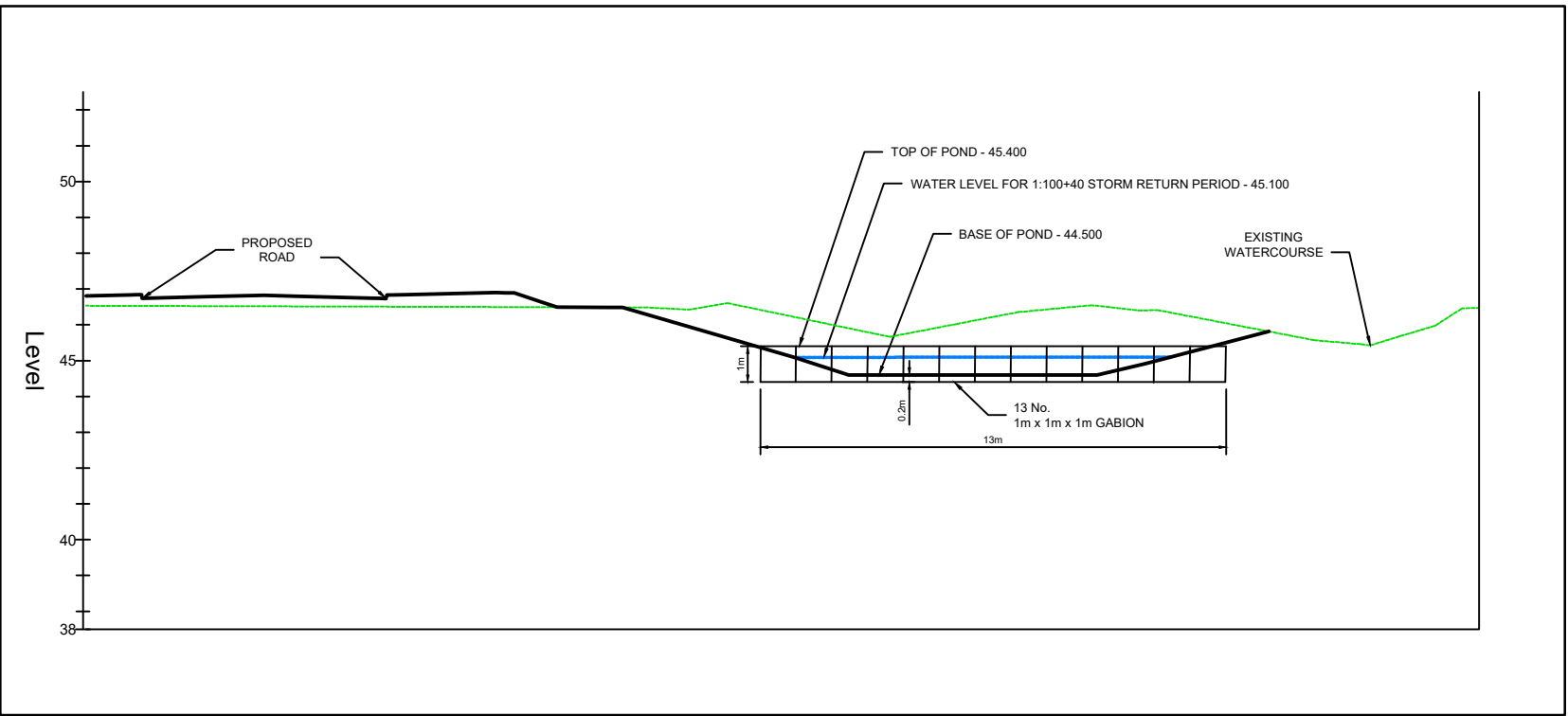
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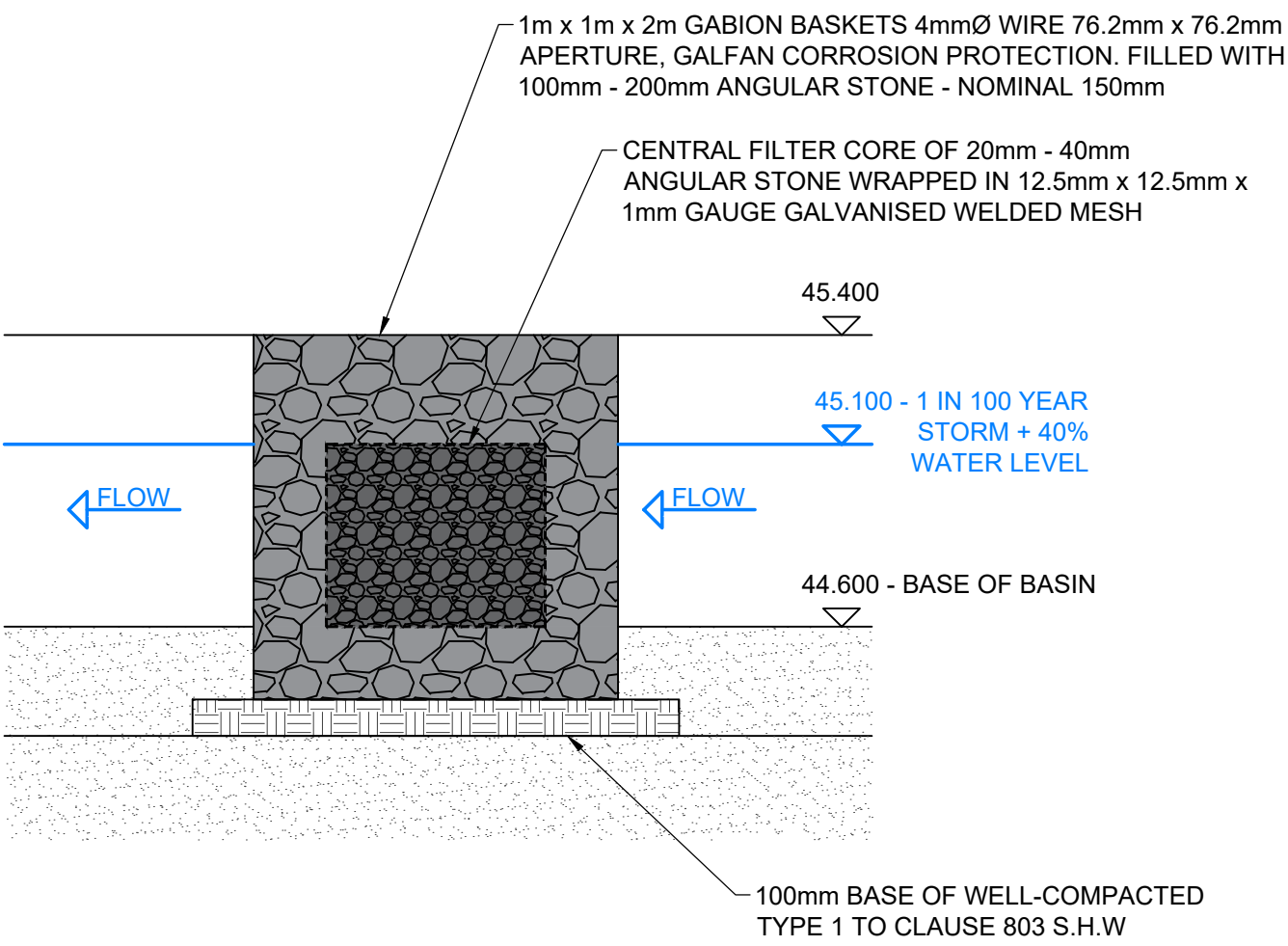
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PROPOSED POND SECTION
P2-P2



PROPOSED POND SECTION
P3-P3



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P03	01/03/23	UPDATED TO SUIT COMMENTS	SPB
P02	01/03/23	UPDATED TO SUIT COMMENTS	SPB
P01	07/02/23	PRELIMINARY ISSUE FOR COMMENT	SPB
Rev.	Date	Description	By

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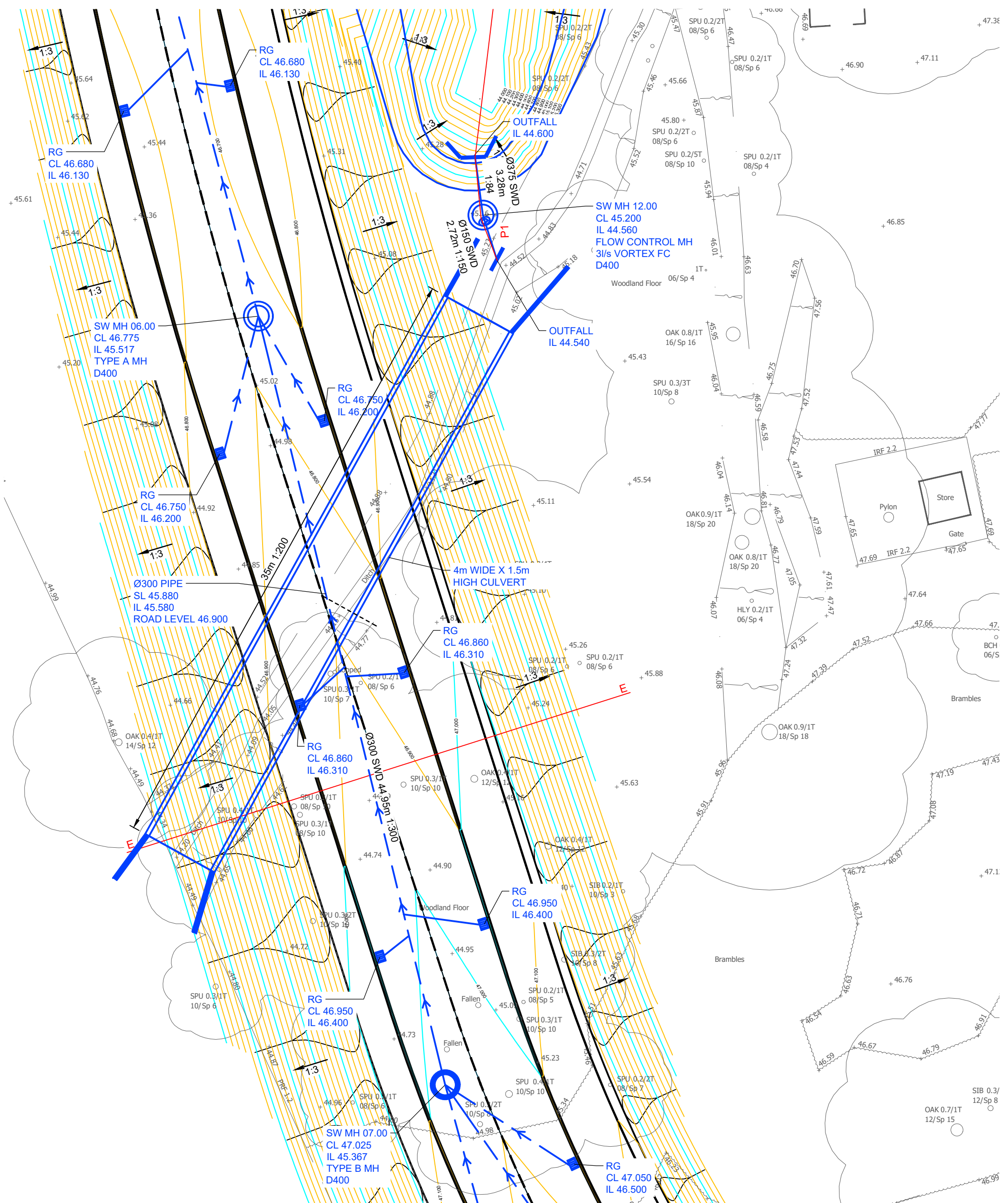
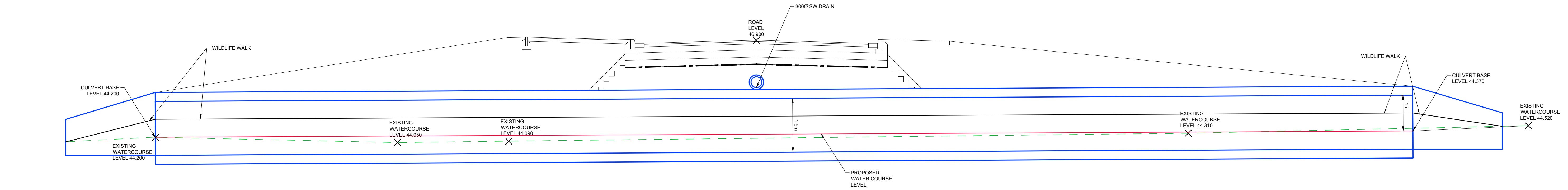
Architect
N/A

Project title
**PHASE 3,
ST JOHN'S ROAD,
HEDGE END.**

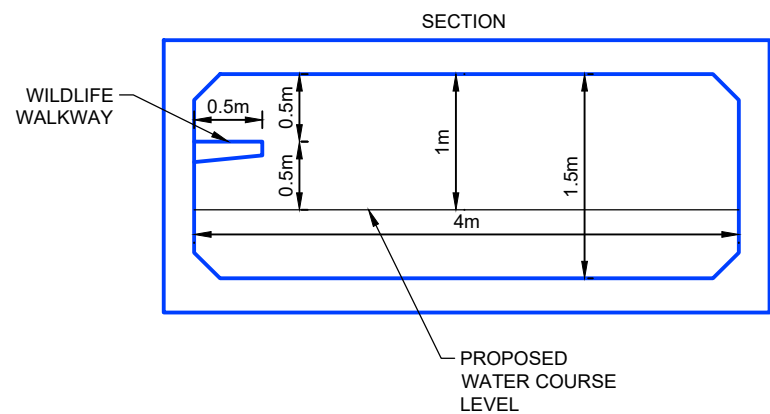
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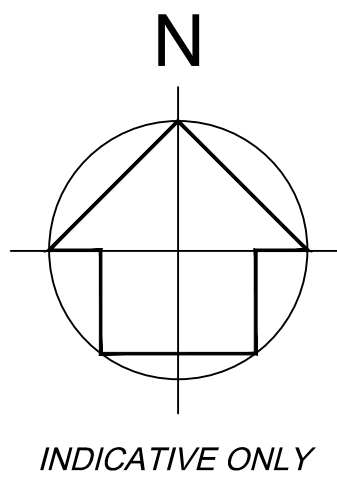


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	INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION			
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	INDICATES A RESIDUAL RISK AS A WARNING			
	INDICATES A RESIDUAL RISK FOR INFORMATION			

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Rev.	Date	Description	By



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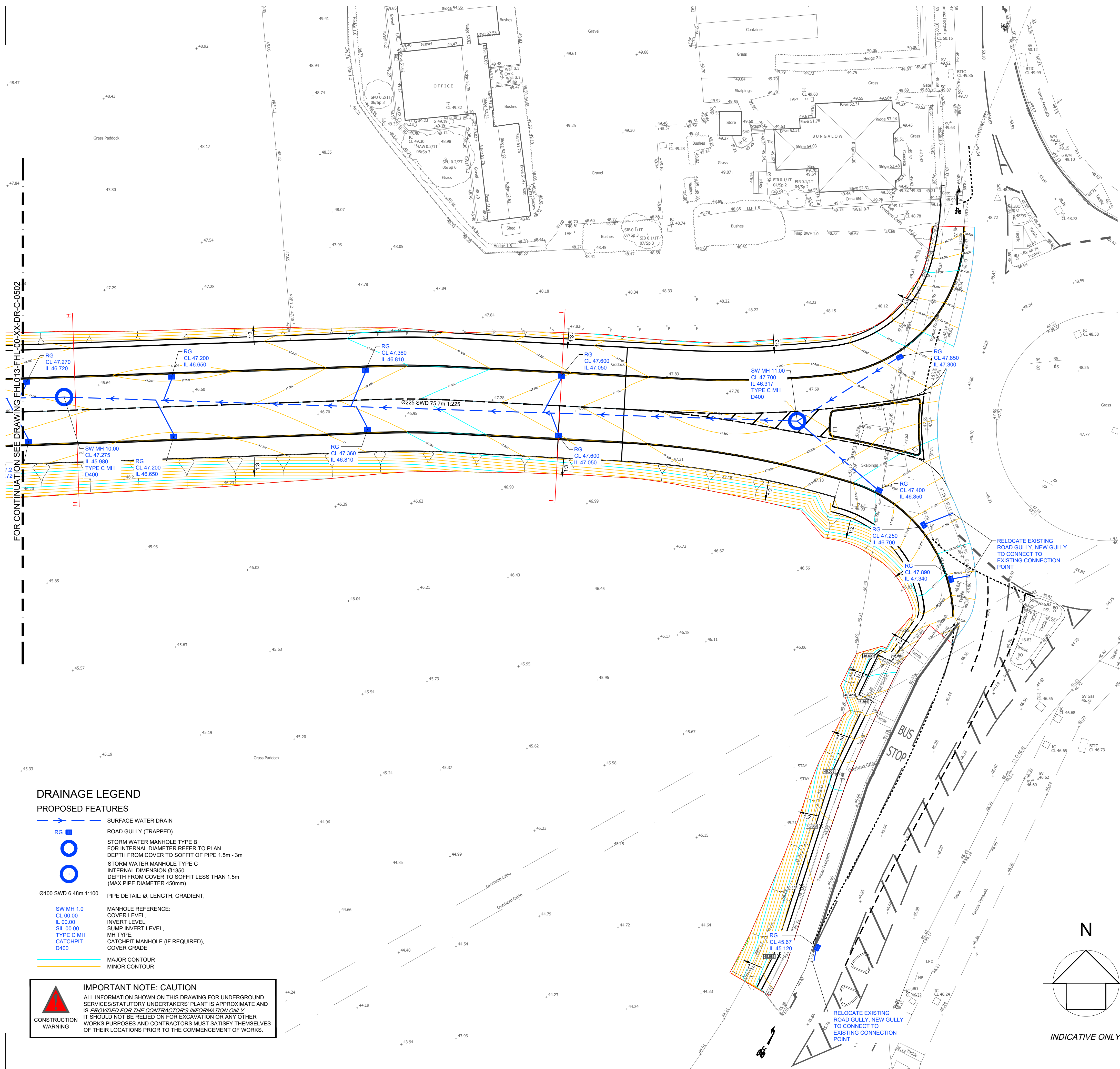
Architect:
N/A

Project title:
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ST JOHN'S ROAD,
HEDGE END.**

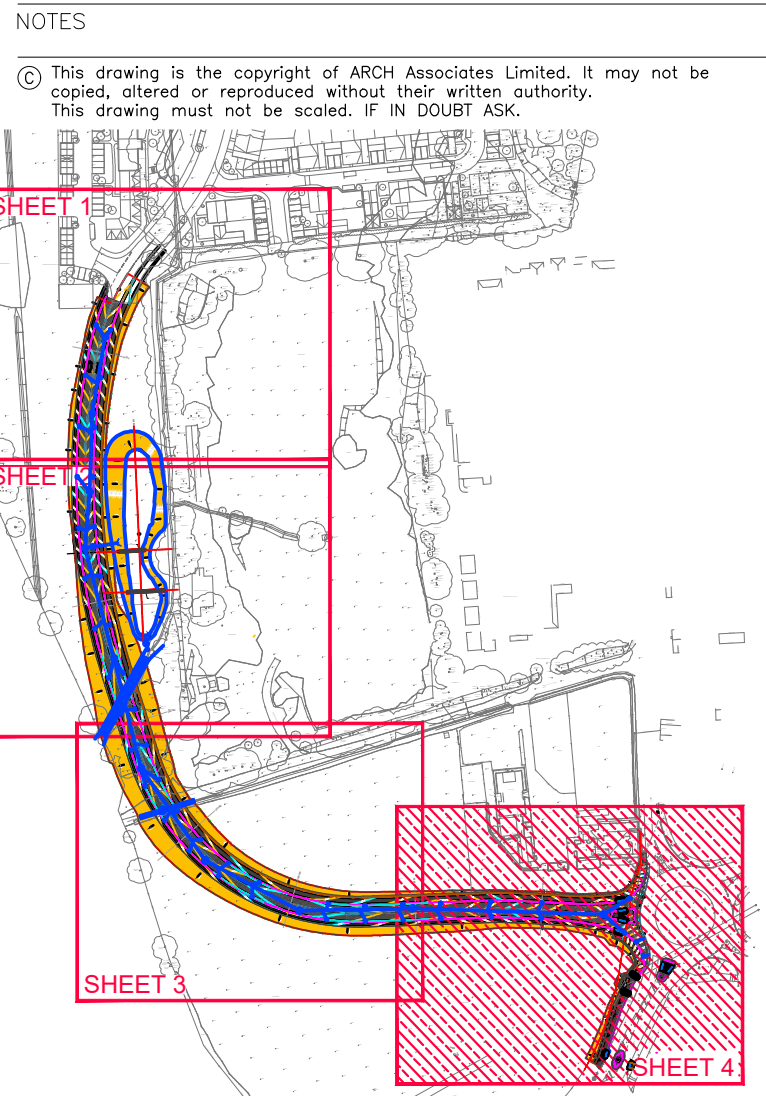
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Project code / No. | Originator | Zone | Level | Type | Role | Number | Revision
FHL013 - AAL-00-XX-DR-C-0527-P02



- ### DRAINAGE NOTES
- ALL PIPES TO BE A THERMOPLASTIC STRUCTURED WALL SEWER PIPES TO WIS 4-35-01 (CLASS 8KN/SOM) AND BE CAPABLE OF WITHSTANDING 4000 PSI JETTING
 - FOR CONSTRUCTION DETAILS REFER TO THE RELEVANT ARCH ASSOCIATES DRAWING NUMBERS LISTED ON THE DRAWING ISSUE SHEET.
 - ADOPTABLE HIGHWAY WORKS ARE TO BE IN ACCORDANCE WITH LOCAL AUTHORITY DESIGN GUIDANCE.
 - ANY WORKS ASSOCIATED WITH THE HIGHWAY/EXTERNAL WORKS INCLUDING HIGHWAY DRAINAGE, SHALL BE IN ACCORDANCE WITH THE HIGHWAYS AGENCY 'MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOL 1' (MCHW), UNLESS OTHERWISE SPECIFIED.
 - ALL ADOPTABLE SEWERS WITH LESS THAN 1.20m OF COVER WHEN LAID BENEATH THE ROADS, OR 0.90m OF COVER IN OTHER AREAS, SHALL HAVE CONCRETE PROTECTION IN ACCORDANCE WITH EITHER OF THE DETAILS SHOWN ON THE STANDARD DRAWING PROVIDED.
 - ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT, THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY
 - COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
 - ROAD GULLY PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED
 - IN ORDER TO MAINTAIN THE SATISFACTORY FUNCTIONING OF SURFACE WATER SEWERS, ALL ROAD AND YARD GULLIES ARE TO BE "TRAPPED".
 - ALL NON ADOPTABLE LATERALS BENEATH THE HIGHWAY SHALL BE BACK FILLED WITH A TYPE 1 GRANULAR MATERIAL AS CL803 (MCHW) APPROVED BY THE ENGINEER.
 - THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
 - THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE. NO DIMENSIONS ARE TO BE SCALED FROM THESE DRAWINGS.
 - IT IS THE CONTRACTORS/SUBCONTRACTORS RESPONSIBILITY TO ENSURE COMPLIANCE WITH THE CURRENT BUILDING REGULATIONS AND CODES OF PRACTICE.
 - STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
 - GULLY AND CHANNEL DRAIN POSITIONS ARE LIABLE TO AMENDMENT WHEN THE DESIGN LEVELS HAVE BEEN DETERMINED.
 - INFILTRATION BASIN/BALANCING POND/POND SYSTEM TO CONFORM TO CIRIA C793 THE SUDS MANUAL C698 SITE HANDBOOK FOR THE CONSTRUCTION OF SUDS.
 - ALL REDUNDANT DRAINAGE TO BE ABANDONED ONCE THE CONTRACTOR HAS SATISFIED HIMSELF THAT NO CONNECTIONS REMAIN LIVE. REDUNDANT DRAINAGE TO BE GRUBBED OUT.
 - ALL BELOW GROUND CONCRETE TO ACCORD WITH BS5328:1997/SULPHATE CLASS TBA
 - IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. GENERALLY SUB SOIL DRAINS AFFECTED ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER DRAINAGE SYSTEM. PIPE DIAMETERS AND GRADIENTS ARE TO BE MAINTAINED.
 - BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPIRS TO WHICH CONNECTIONS ARE PROPOSED. ADDITIONAL SPUR/MANHOLE CONNECTIONS ARE TO BE AGREED WITH THE RELEVANT ADOPTING AUTHORITY. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
 - ROAD REINSTATEMENTS ARE TO BE TO THE HIGHWAY AUTHORITY APPROVAL.
 - NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.



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DRAINAGE LEGEND

PROPOSED FEATURES

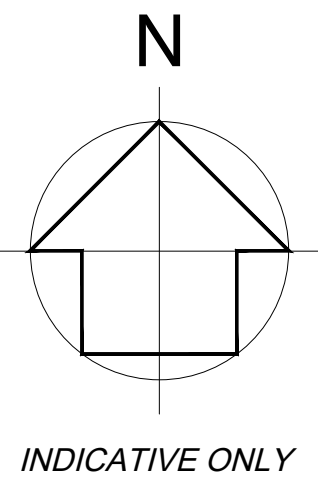
- SURFACE WATER DRAIN
- ROAD GULLY (TRAPPED)
- STORM WATER MANHOLE TYPE B FOR INTERNAL DIAMETER REFER TO PLAN DEPTH FROM COVER TO SOFFIT OF PIPE 1.5m - 3m
- STORM WATER MANHOLE TYPE C INTERNAL DIMENSION Ø1350 DEPTH FROM COVER TO SOFFIT LESS THAN 1.5m (MAX PIPE DIAMETER 450mm)
- PIPE DETAIL: Ø, LENGTH, GRADIENT,
- MANHOLE REFERENCE: COVER LEVEL, INVERT LEVEL, SUMP INVERT LEVEL, MH TYPE, CATCHPIT MANHOLE (IF REQUIRED), COVER GRADE
- MAJOR CONTOUR
- MINOR CONTOUR

IMPORTANT NOTE: CAUTION
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KEY TO HEALTH AND SAFETY SYMBOLS

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING
- INDICATES A RESIDUAL RISK FOR INFORMATION



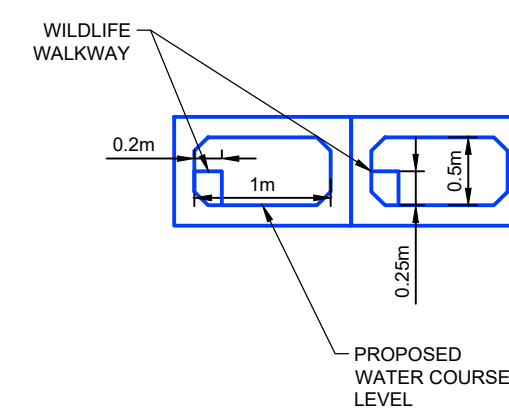
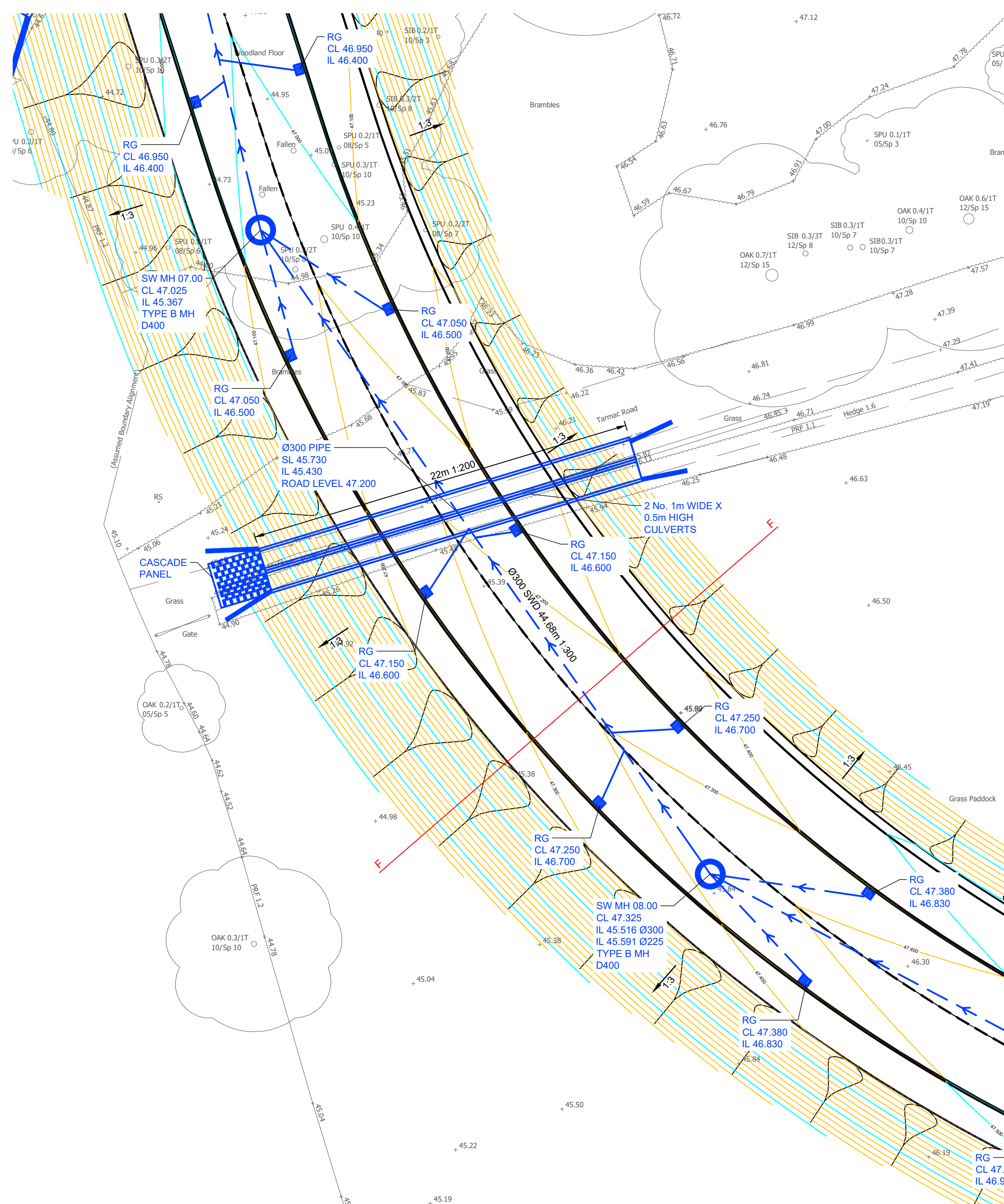
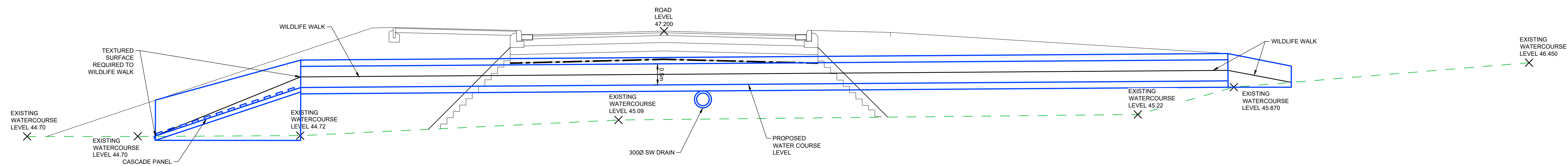
P02	07/02/23	UPDATED TO SUIT CLIENT COMMENTS	JLM
P01	21/12/22	PRELIMINARY ISSUE FOR COMMENT	SPB
Rev.	Date	Description	By



Client: FOREMAN HOMES
Architect: N/A

Project title: PHASE 3, ST JOHN'S ROAD, HEDGE END.
Drawing title: PROPOSED LEVELS & DRAINAGE SHEET 4 OF 4

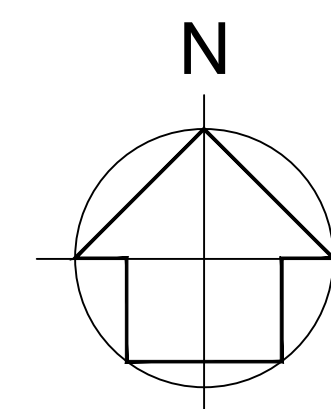
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Name: FHL013 - AAL-00-XX-DR-C-0503-P02					
Project code / No. Originator Zone Level Type Role Number Revision					



ALL DETAILS SUBJECT TO ORDINARY
WATERCOURSE TECHNICAL REVIEW
AND CONSENT



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INDICATIVE ONLY

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CARRYING OUT THE WORK USING AN
APPROVED SAFE METHOD OF WORKING

- | | |
|---|--|
|  | INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION |
|  | INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION |
|  | INDICATES A RESIDUAL RISK AS A WARNING |
|  | INDICATES A RESIDUAL RISK FOR INFORMATION |

P02	01/03/23	UPDATED TO SUIT COMMENTS	SPB
P01	01/03/23	PRELIMINARY ISSUE FOR COMMENT	SPB
Rev.	Date	Description	By



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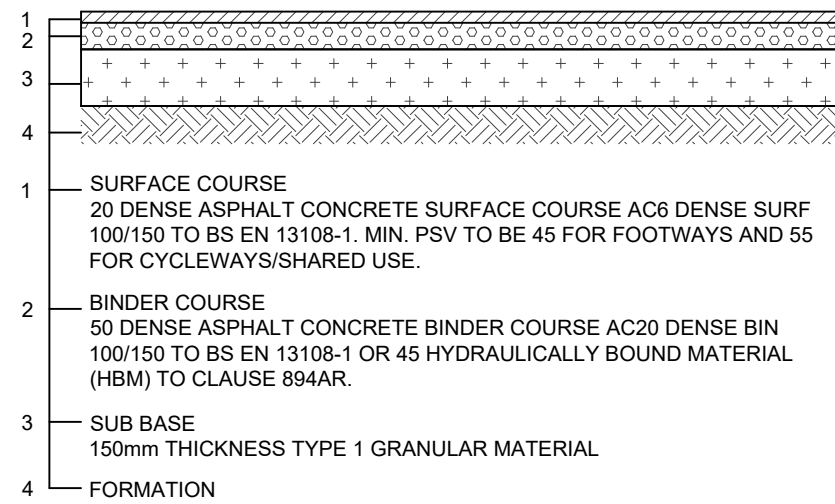
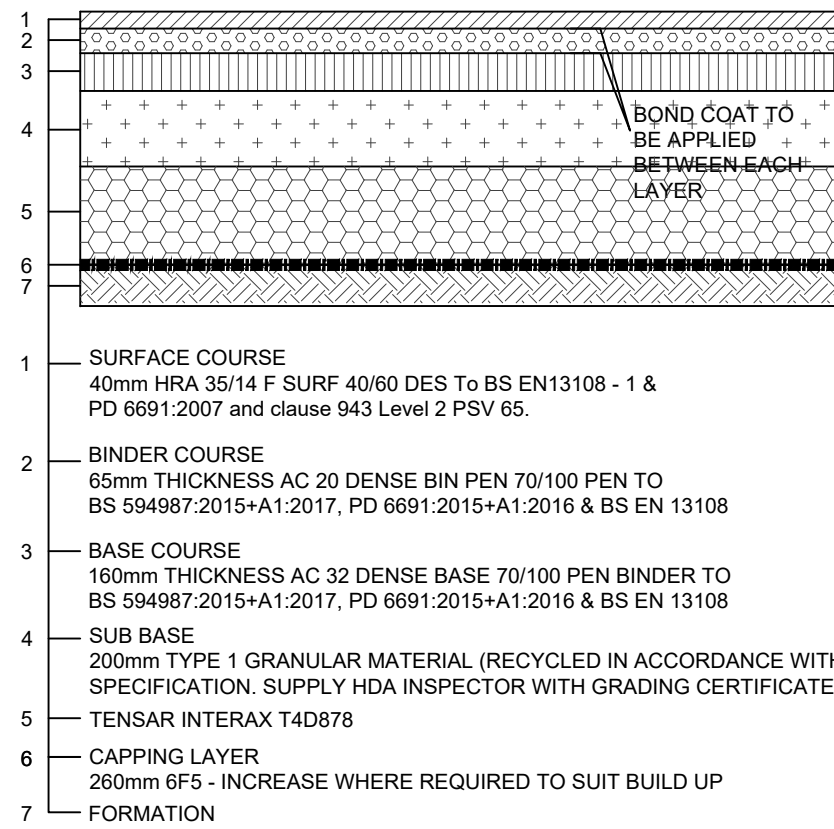
Architect
N/A

Project title
PHASE 3,
ST JOHN'S ROAD,
HEDGE END.

Drawing title
PROPOSED CULVERT B

Scale	Paper size	Date	Drawn by	Checked by	Status
NOT TO SCALE	A1	DEC 2022	SPB	SPB	S4

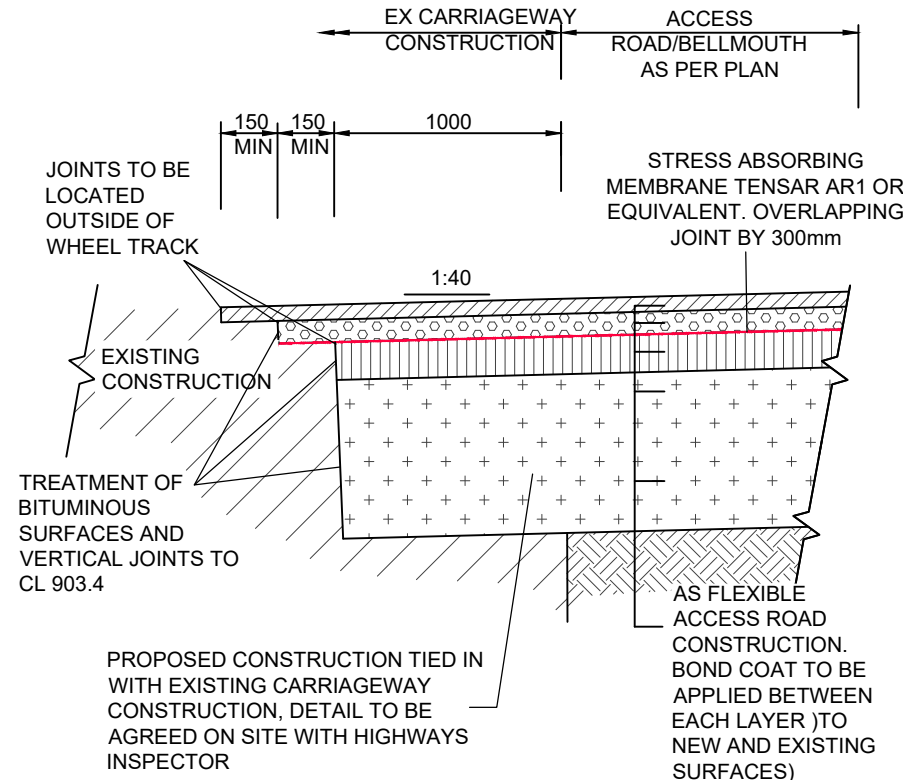
Name
Project code / No. | Originator | Zone | Level | Type | Role | Number | Revision
FHL013 - AAL-00-XX-DR-C-0528-P02



FLEXIBLE FOOTWAY CONSTRUCTION

INCREASE CAPPING WHERE REQUIRED TO SUIT PROPOSED GROUND LEVELS.

CAPPING LAYER TO BE COMPACTED TO PROVIDE MIN 15% CBR

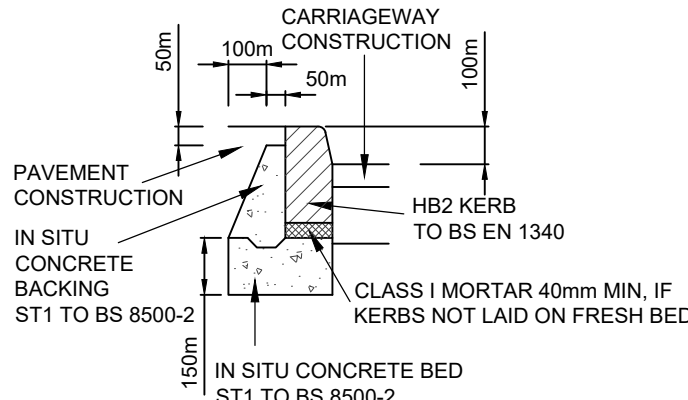


NEW ACCESS ROAD TIE IN DETAILS WITH EXISTING ACCESS ROAD REFER TO HCC DETAIL HCC11/M/025

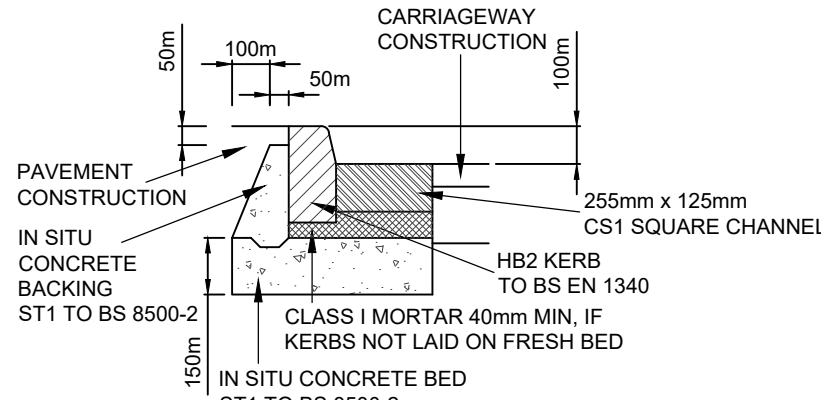
CBR TO BE CONFIRMED AT JUNCTION DURING FIRST WEEK OF CONSTRUCTION AND CONFIRMED TO HCC HIGHWAYS

FLEXIBLE CARRIAGEWAY CONSTRUCTION

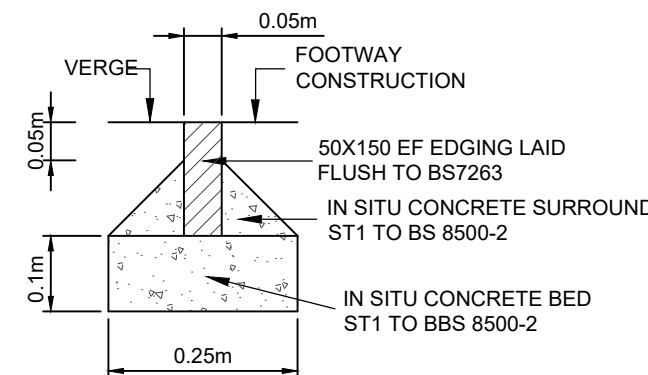
NOTE:
ALL JOINTS SHALL BE OFFSET AT LEAST 150mm FROM PARALLEL JOINTS IN THE LAYER BENEATH WHEREVER POSSIBLE, AND IN A LAYOUT APPROVED BY ENGINEER. JOINTS IN THE WEARING COURSE OR POUROUS ASPHALT SHALL COINCIDE WITH EITHER THE LANE EDGE OR THE LANE MARKING, WHICHEVER IS APPROPRIATE. CONSTITUTIONAL JOINTS IN MATERIALS SUBJECT TO PERCENTAGE REFUSAL DENSITY TESTING SHALL NOT BE SITUATED IN WHEEL TRACK ZONES



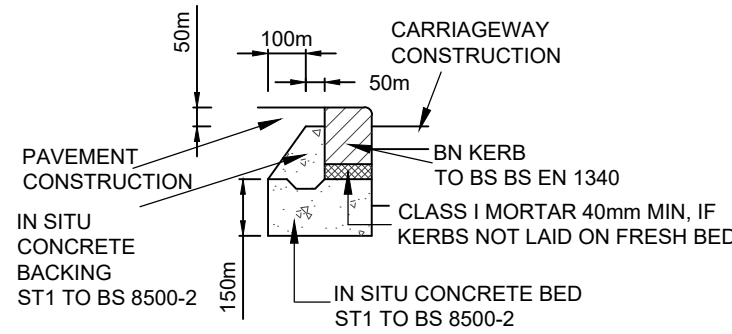
HB2 KERB



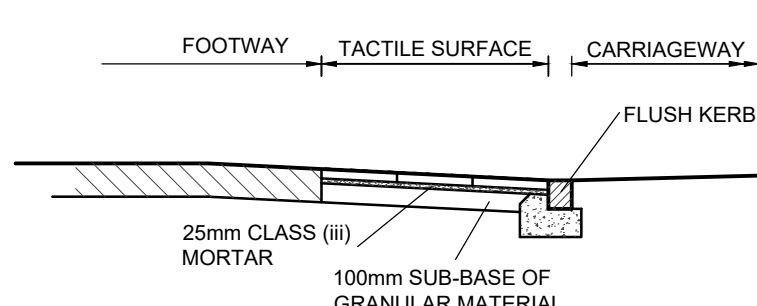
HB2 KERB WITH CHANNEL KERB



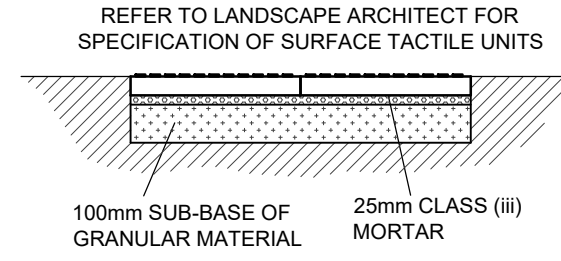
EF EDGING FOOTWAY EDGE DETAIL



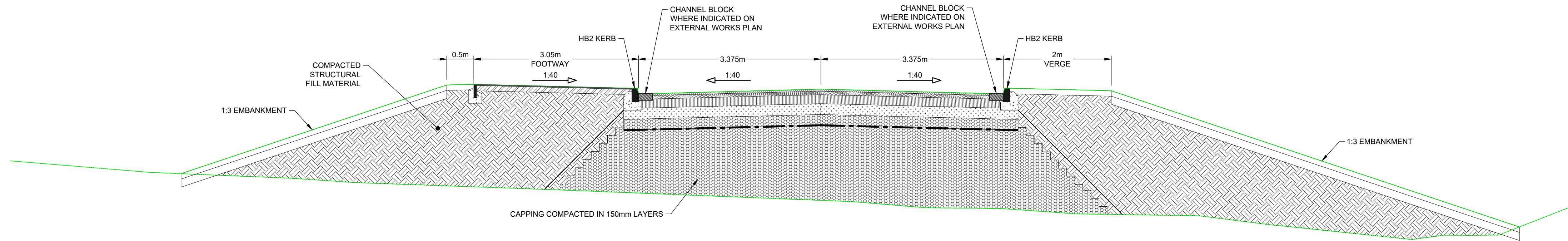
BN KERB



PEDESTRIAN TACTILE PAVING (Scale 1:10)



CYCLEWAY TACTILE PAVING (Scale 1:10)



TYPICAL ROAD SECTION IN AREAS OF FILL 1:50

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	INDICATES A RESIDUAL RISK AS A WARNING				
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NOTES
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GENERAL NOTES

- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
- ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
- HB2 KERB UPSTAND TO BE 100mm. EF EDGINGS TO BE USED AT THE BACK OF ADOPTED FOOTWAYS/VERGES
- GENERALLY CROSS FALLS TO ADOPTED HIGHWAY AND FOOTWAY TO BE 1 IN 40.
- ROAD CONSTRUCTION HAS BEEN DESIGNED TO A CBR VALUE OF 1.2% AS CONFIRMED BY THE SITE INVESTIGATION
- SOFT SPOTS IN THE FORMATION ARE TO BE REMOVED AND REPLACED WITH SUITABLE MATERIAL.
- ALL EXISTING MANHOLE COVERS, GULLYS, ETC., TO BE RAISED TO SUIT NEW LEVELS.
- RE-GRADING AND HIGHWAY EMBANKMENTS ARE TO HAVE A MAXIMUM SLOPE GRADIENT OF 1:3. SLOPE GRADIENTS IN GARDENS TO BE RESTRICTED TO 1 IN 12.
- ALL PROPOSED SIGNING AND LINING, AND ANY EXISTING TO BE REINSTATED, IS TO BE IN ACCORDANCE WITH THE TRAFFIC SIGNS REGULATIONS AND GENERAL DIRECTIONS 2016 AND TO THE SATISFACTION OF THE HIGHWAYS INSPECTOR.
- NO BLOCKS/SLABS WITH A UNIT WEIGHT IN EXCESS OF 20KG TO BE USED.
- KERBS IN EXCESS OF 20KG TO BE MACHINE LAID

P01	21/12/22	PRELIMINARY ISSUE FOR COMMENT	SPB
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Client
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Architect
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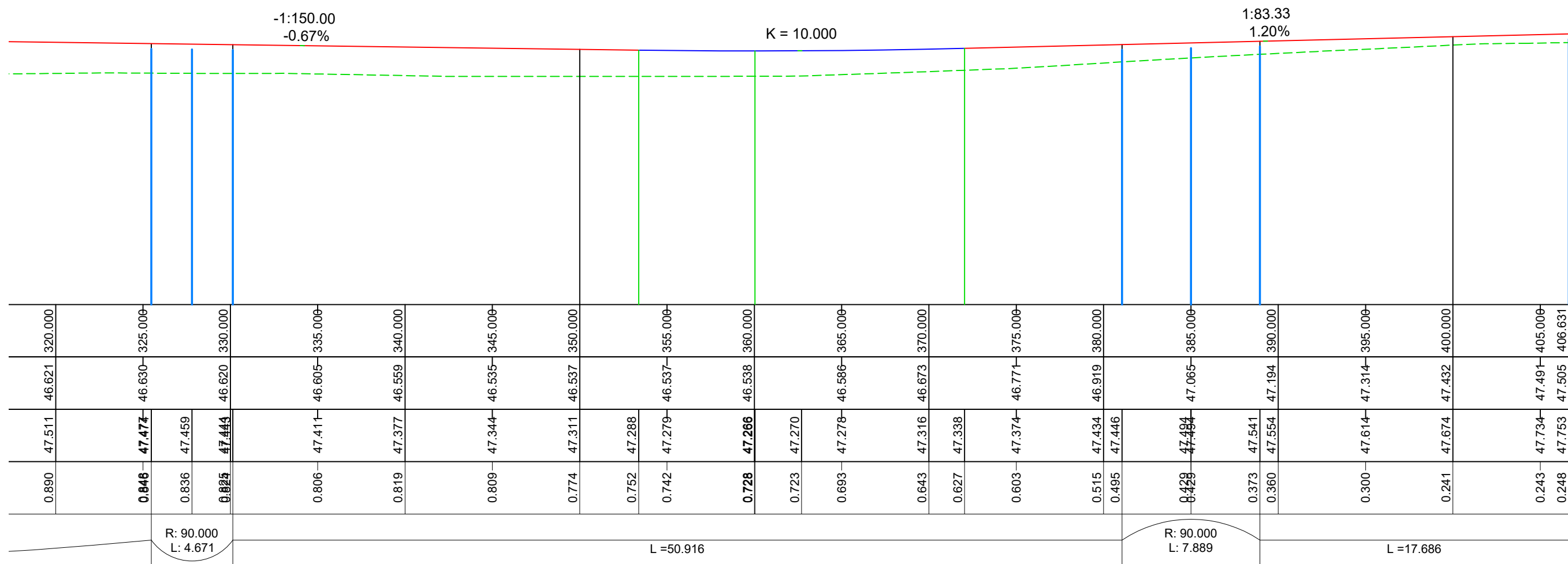
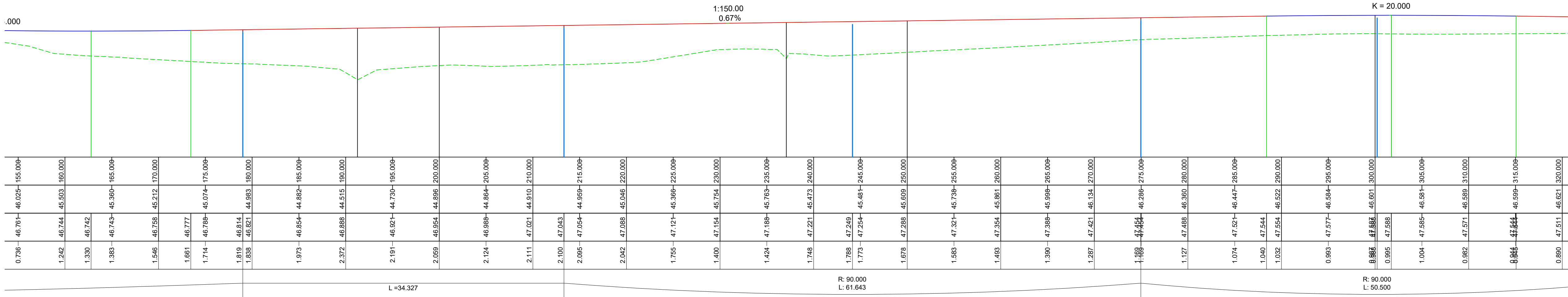
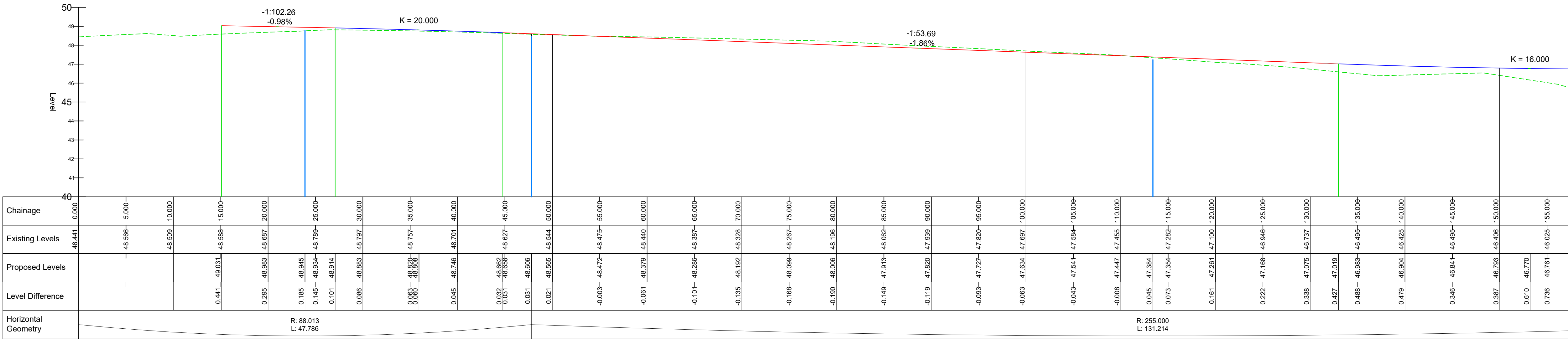
Project title
**PHASE 3,
ST JOHN'S ROAD,
HEDGE END.**

Drawing title
EXTERNAL WORKS DETAILS

Scale	Paper size	Date	Drawn by	Checked by	Status
1:20	A1	DEC 2022	SPB	SPB	S4

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P01	21/12/22	PRELIMINARY ISSUE FOR COMMENT	SPB
Rev.	Date	Description	By



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Client
FOREMAN HOMES

Architect
N/A

Project title
PHASE 3,
ST JOHN'S ROAD,
HEDGE END.

Drawing title
PROPOSED ROAD
LONGSECTION

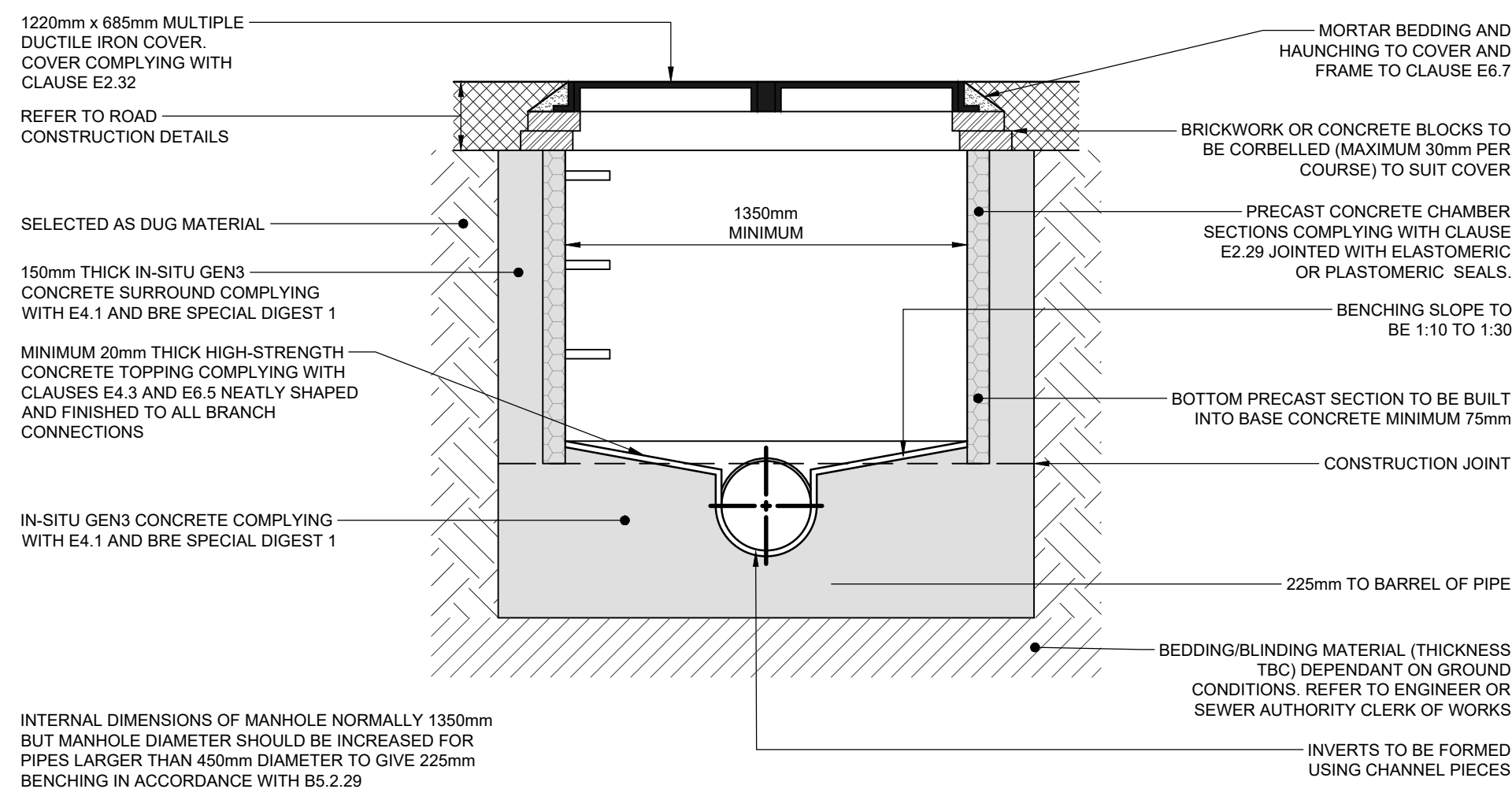
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Project code / No. | Originator | Zone | Level | Type | Role | Number | Revision
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TYPE C - TYPICAL MANHOLE DETAIL
FIGURE B 15 (ALTERNATIVE) SEWERAGE SECTOR GUIDANCE APPENDIX C - 'THE CODE'
DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE LESS THAN 1.5m
MAXIMUM PIPE SIZE 450 mm DIAMETER
RIGID MATERIAL CONSTRUCTION WITH CONCRETE SURROUND

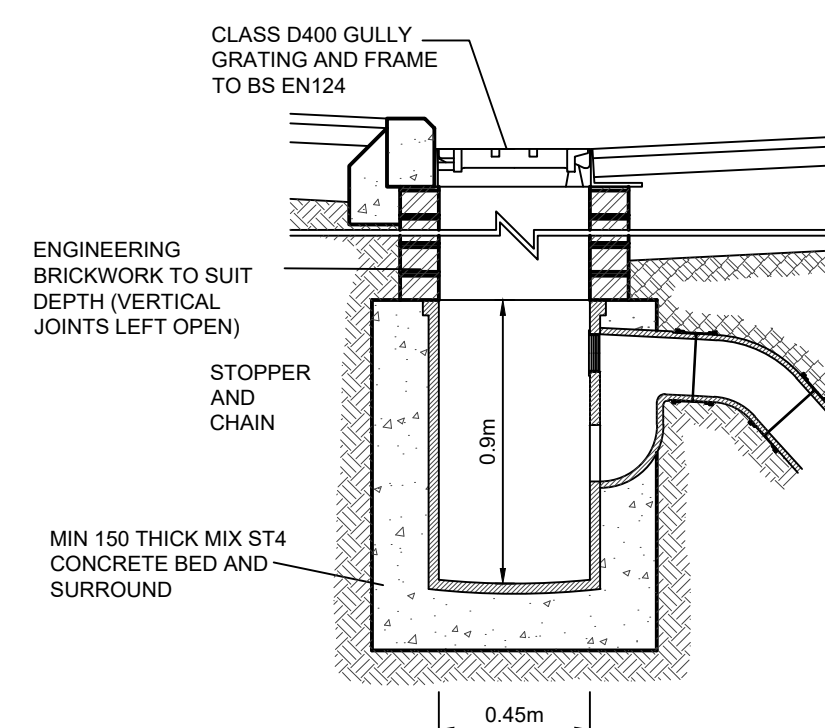
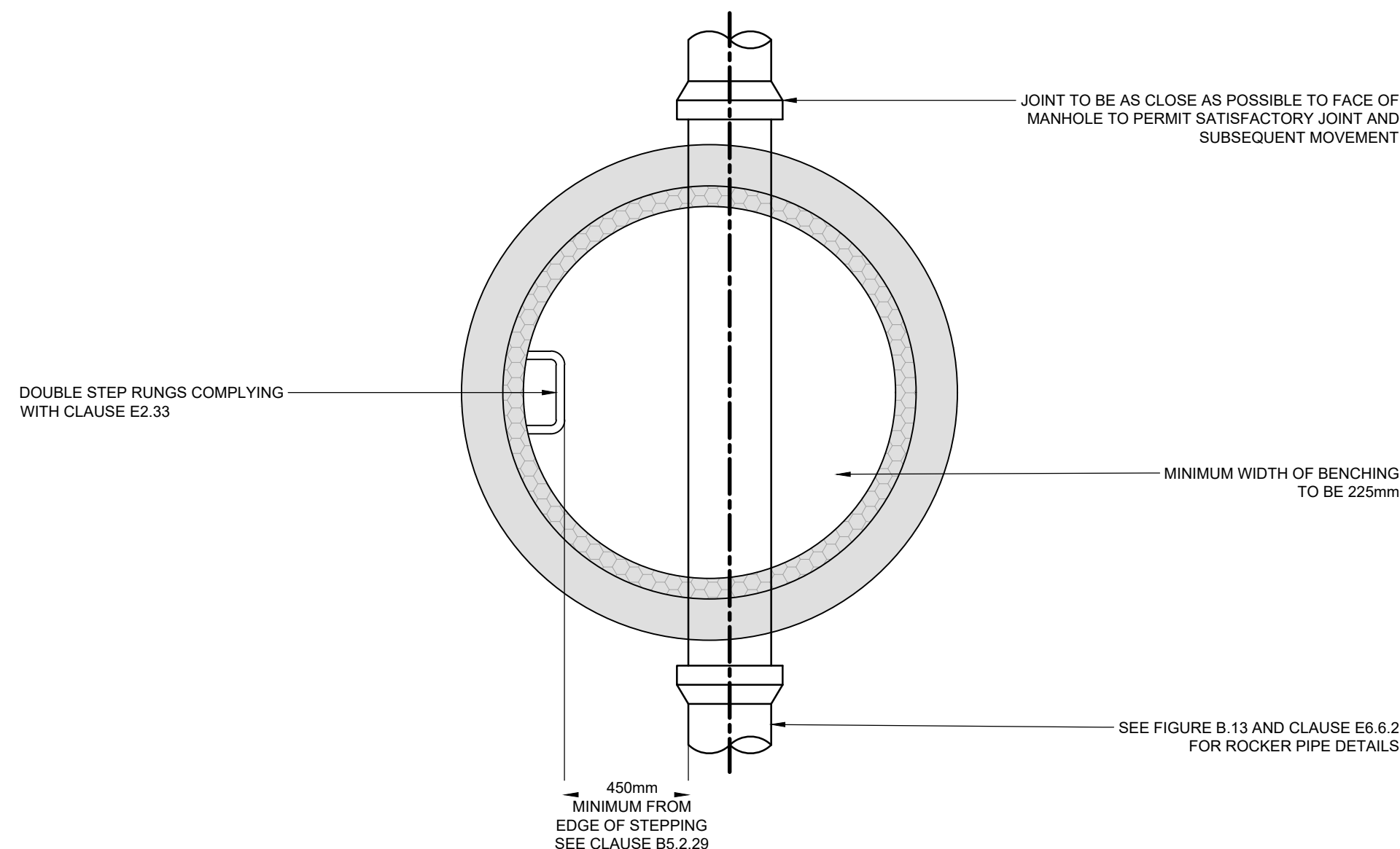
WITHIN MANHOLES

PENDIX C - 'THE CODE'

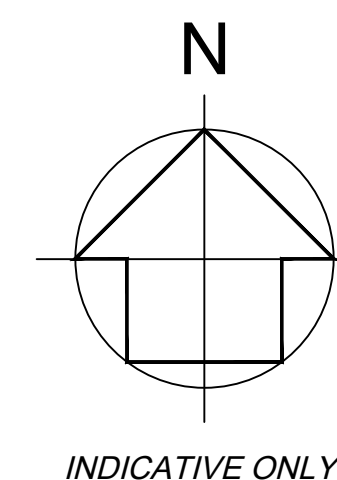


NOMINAL DIAMETER (mm)	MAXIMUM EFFECTIVE LENGTH (m)
150 - 600	0.60
601 - 750	1.00
OVER 750	1.25

MANHOLE DIAMETERS	
NOMINAL INTERNAL DIAMETER OF LARGEST PIPE IN MANHOLE (mm)	MINIMUM NOMINAL INTERNAL DIAMETER OF MANHOLE (mm)
< 375	1200
375 - 450	1350
500 - 700	1500
750 - 900	1800
> 900	CONSULT UNDERTAKER



PIPE BEDDING DETAILS IN ADOPTED AREAS



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- | | | | |
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| P01 | 21/12/22 | PRELIMINARY ISSUE FOR COMMENT | SPB |
| Rev. | Date | Description | By |

Architect
N/A

PHASE 3,
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HEDGE END.

Name									
Project code / No. Originator Zone Level Type Role Number Revision									

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