

Pennywood, Hollybush Ride, Finchampstead
Existing Surface Water Assessment and Improved Drainage Strategy**Surface Water Drainage**

It is our understanding that planning enforcement action has been taken against the developer, due to the hard-paving of the driveway and parking areas, which is contrary to the planning approval.

It has been requested that the drainage system be assessed and improved to accommodate a 1 in 100 year + 40% climate change event.

The original house and its garage had a roof area of 240m² and an adjacent parking hardstand of 24m², giving a total original impermeable area of 264m².

Using the Modified Rational Method we can calculate the original 1 in 1 year run-off rate as,

$A_p = 0.0264$ hectares (existing site)

Therefore existing 1 in 1 year site discharge approximates to:

$$Q = 2.78 \times 55 \times 0.0264 \times 1 = \underline{4.04 \text{ litres per second}}$$

(based on $T_c = 5$ mins, $R = 55$ mm/hr, $C_v = 1$)

Having received surveyed information in respect of the already installed surface water drainage system, we can confirm that the current drainage will not accommodate a 1 in 100 year + 40% storm event, however to remedy this, we recommend that the channel drain at the rear of the patio be removed, and allow run-off from the patio to drain directly on to the soft landscaping which falls away from the house to the woodland, this would usually be the preferred method of draining a patio. Removing this run-off from approximately 400m² of hard standing significantly improves the performance of the surface water network.

In addition to this, after carrying out hydraulic-modelling, it has been established that storage attenuation should be provided in the volume of approximately 54 cubic metres, this can be provided in the form of geocellular storage units with overall dimensions of 6.5m wide, 11m long and 0.8m deep, the surface water will drain through these units, discharging to a flow control manhole with a flow restriction of 2 l/s, which is approximately of 50% of the existing 1 in 1 year flow rate. The surface water will ultimately discharge at a maximum rate of 2 l/s for all storms up to and including the 1 in 100 year +40% event, to a watercourse within woodland inside the site curtilage.

A new French drain has been introduced to pick up run-off from the driveway, in addition to connecting the 120mm ACO channel drain at the front to the on-site surface water network.

Hydraulic Modelling has been carried out to support this, and is attached at the end of this report, along with a Drainage Layout outlining the measures to be taken to improve the surface water drainage system on-site. The Hydraulic Modelling used FEH-22 rainfall data at a point within the site.

Maintenance Management Plan

The maintenance requirements for each proposed SuDS component is given below, based on the CIRIA report C753 "The SuDS Manual".

The maintenance of the private drainage system will be the responsibility of the property owner or their appointed maintenance company.

Drainage Pipes and Inspection Chambers/Manholes and Flow Control

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove sediment and debris from inspection chambers, gullies, channel drains and flow control manhole.	Annually
	Cleaning of gutters and any filters on downpipes.	Annually
	Remove any root ingress	As required
Occasional Maintenance	CCTV Survey of drains to check for cracking, misalignment, blockage.	10 year interval

Attenuation Tank

Maintenance Schedule	Required Action	Typical Frequency
Occasional Maintenance	CCTV Survey to check condition, to include jetting through and removal of any silt build-up.	10 year interval

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	4.00	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)	Depth (m)
STORAGE			74.740		2.222
S0			73.340	600	0.925
S1			74.150	1200	1.652
S2	0.021	4.00	74.970	600	1.300
S3	0.005	4.00	75.030	600	0.993
S4	0.006	4.00	75.080	600	0.946
S5	0.006	4.00	75.080	600	0.852
S6	0.009	4.00	75.030	600	1.098
S7	0.005	4.00	75.040	600	0.985
S8	0.005	4.00	75.030	600	0.855
S9	0.013	4.00	75.080	600	0.800
G1	0.023	4.00	74.850		0.500
GATE ACO	0.007	4.00	74.740		0.290

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)
1.000	GATE ACO	G1	14.500	0.600	74.450	74.350	0.100	145.0	100	4.38	50.0
1.001_1	G1	S4	22.000	0.600	74.350	74.134	0.216	101.9	100	4.86	50.0
1.001	S4	S3	9.000	0.600	74.134	74.037	0.097	92.8	150	5.01	50.0
1.002	S3	S2	16.750	0.600	74.037	73.670	0.367	45.6	150	5.19	50.0
1.003	S2	STORAGE	6.000	0.600	73.670	73.183	0.487	12.3	150	5.23	50.0
1.004	STORAGE	S1	2.000	0.600	72.518	72.498	0.020	100.0	150	5.26	50.0
1.005	S1	S0	10.000	0.600	72.498	72.415	0.083	120.5	150	5.44	50.0
2.000	S9	S8	9.500	0.600	74.280	74.175	0.105	90.5	100	4.20	50.0
2.001	S8	S7	6.800	0.600	74.175	74.055	0.120	56.7	100	4.31	50.0
2.002	S7	S6	10.000	0.600	74.055	73.982	0.073	137.0	100	4.56	50.0
2.003	S6	S2	26.000	0.600	73.932	73.670	0.262	99.2	150	4.99	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)
1.000	0.636	5.0	0.9	0.190	0.400	0.007	0.0
1.001_1	0.762	6.0	4.1	0.400	0.846	0.030	0.0
1.001	1.043	18.4	5.7	0.796	0.843	0.042	0.0
1.002	1.493	26.4	6.4	0.843	1.150	0.047	0.0
1.003	2.886	51.0	13.6	1.150	1.407	0.100	0.0
1.004	1.005	17.8	13.6	2.072	1.502	0.100	0.0
1.005	0.914	16.2	13.6	1.502	0.775	0.100	0.0
2.000	0.809	6.4	1.8	0.700	0.755	0.013	0.0
2.001	1.025	8.1	2.4	0.755	0.885	0.018	0.0
2.002	0.655	5.1	3.1	0.885	0.948	0.023	0.0
2.003	1.009	17.8	4.3	0.948	1.150	0.032	0.0

Page 2
Revised 14-03-25

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)
2.000 1	S5	S4	5.000	0.600	74.228	74.134	0.094	53.2	100	4.08	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)
2.000 1	1.059	8.3	0.8	0.752	0.846	0.006	0.0

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	1 year (l/s)	0.0
Rainfall Events	Singular	Drain Down Time (mins)	240	30 year (l/s)	0.0
Summer CV	0.750	Additional Storage (m³/ha)	20.0	Check Discharge Volume	x
Winter CV	0.840	Starting Level (m)			
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

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

Pre-development Discharge Rate

Site Makeup	Brownfield	PIMP (%)	100	Betterment (%)	50
Brownfield Method	MRM	CV	1.000	Q 1 year (l/s)	
Contributing Area (ha)	0.026	Time of Concentration (mins)	4.00	Q 30 year (l/s)	

Node S1 Online ACO Q-Brake Control

Flap Valve	x	Design Depth (m)	1.570	Min Node Diameter (mm)	1050
Replaces Downstream Link	✓	Design Flow (l/s)	2.0	Orifice Diameter (m)	0.062
Invert Level (m)	72.498	Min Outlet Diameter (m)	0.095		

Node STORAGE Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	72.518	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.800
Safety Factor	2.0	Width (m)	6.500	Inf Depth (m)	
Porosity	0.95	Length (m)	11.000		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	110.601	31.296	2 year 360 minute winter	10.949	4.335
2 year 15 minute winter	77.615	31.296	2 year 480 minute summer	13.198	3.488
2 year 30 minute summer	70.850	20.048	2 year 480 minute winter	8.768	3.488
2 year 30 minute winter	49.719	20.048	2 year 600 minute summer	10.722	2.933
2 year 60 minute summer	46.932	12.403	2 year 600 minute winter	7.326	2.933
2 year 60 minute winter	31.180	12.403	2 year 720 minute summer	9.473	2.539
2 year 120 minute summer	33.647	8.892	2 year 720 minute winter	6.366	2.539
2 year 120 minute winter	22.354	8.892	2 year 960 minute summer	7.650	2.015
2 year 180 minute summer	27.171	6.992	2 year 960 minute winter	5.068	2.015
2 year 180 minute winter	17.662	6.992	2 year 1440 minute summer	5.421	1.453
2 year 240 minute summer	21.915	5.791	2 year 1440 minute winter	3.643	1.453
2 year 240 minute winter	14.560	5.791	30 year 15 minute summer	318.817	90.214
2 year 360 minute summer	16.844	4.335	30 year 15 minute winter	223.731	90.214

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 30 minute summer	206.774	58.510	100 year 360 minute winter	29.935	11.851
30 year 30 minute winter	145.105	58.510	100 year 480 minute summer	35.150	9.289
30 year 60 minute summer	137.788	36.413	100 year 480 minute winter	23.353	9.289
30 year 60 minute winter	91.543	36.413	100 year 600 minute summer	28.025	7.665
30 year 120 minute summer	84.667	22.375	100 year 600 minute winter	19.148	7.665
30 year 120 minute winter	56.251	22.375	100 year 720 minute summer	24.404	6.540
30 year 180 minute summer	64.176	16.515	100 year 720 minute winter	16.401	6.540
30 year 180 minute winter	41.716	16.515	100 year 960 minute summer	19.283	5.078
30 year 240 minute summer	49.947	13.200	100 year 960 minute winter	12.774	5.078
30 year 240 minute winter	33.184	13.200	100 year 1440 minute summer	13.227	3.545
30 year 360 minute summer	36.932	9.504	100 year 1440 minute winter	8.889	3.545
30 year 360 minute winter	24.007	9.504	100 year +40% CC 15 minute summer	569.165	161.054
30 year 480 minute summer	28.252	7.466	100 year +40% CC 15 minute winter	399.414	161.054
30 year 480 minute winter	18.770	7.466	100 year +40% CC 30 minute summer	374.417	105.947
30 year 600 minute summer	22.567	6.172	100 year +40% CC 30 minute winter	262.748	105.947
30 year 600 minute winter	15.419	6.172	100 year +40% CC 60 minute summer	250.584	66.222
30 year 720 minute summer	19.683	5.275	100 year +40% CC 60 minute winter	166.482	66.222
30 year 720 minute winter	13.228	5.275	100 year +40% CC 120 minute summer	150.356	39.735
30 year 960 minute summer	15.603	4.109	100 year +40% CC 120 minute winter	99.893	39.735
30 year 960 minute winter	10.336	4.109	100 year +40% CC 180 minute summer	113.011	29.082
30 year 1440 minute summer	10.772	2.887	100 year +40% CC 180 minute winter	73.460	29.082
30 year 1440 minute winter	7.240	2.887	100 year +40% CC 240 minute summer	87.579	23.144
100 year 15 minute summer	406.546	115.039	100 year +40% CC 240 minute winter	58.185	23.144
100 year 15 minute winter	285.296	115.039	100 year +40% CC 360 minute summer	64.474	16.591
100 year 30 minute summer	267.440	75.676	100 year +40% CC 360 minute winter	41.910	16.591
100 year 30 minute winter	187.677	75.676	100 year +40% CC 480 minute summer	49.209	13.005
100 year 60 minute summer	178.989	47.301	100 year +40% CC 480 minute winter	32.694	13.005
100 year 60 minute winter	118.916	47.301	100 year +40% CC 600 minute summer	39.234	10.732
100 year 120 minute summer	107.397	28.382	100 year +40% CC 600 minute winter	26.807	10.732
100 year 120 minute winter	71.352	28.382	100 year +40% CC 720 minute summer	34.165	9.157
100 year 180 minute summer	80.722	20.773	100 year +40% CC 720 minute winter	22.961	9.157
100 year 180 minute winter	52.472	20.773	100 year +40% CC 960 minute summer	26.997	7.109
100 year 240 minute summer	62.556	16.532	100 year +40% CC 960 minute winter	17.883	7.109
100 year 240 minute winter	41.561	16.532	100 year +40% CC 1440 minute summer	18.518	4.963
100 year 360 minute summer	46.053	11.851	100 year +40% CC 1440 minute winter	12.445	4.963

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	STORAGE	90	72.654	0.136	5.6	7.3429	0.0000	OK
15 minute summer	S0	1	72.415	0.000	1.4	0.0000	0.0000	OK
120 minute winter	S1	90	72.653	0.155	2.8	0.1757	0.0000	SURCHARGED
15 minute winter	S2	10	73.728	0.058	15.0	0.0354	0.0000	OK
15 minute winter	S3	10	74.091	0.054	7.1	0.0206	0.0000	OK
15 minute winter	S4	10	74.198	0.064	6.3	0.0264	0.0000	OK
15 minute winter	S5	10	74.250	0.022	0.9	0.0094	0.0000	OK
15 minute winter	S6	10	73.986	0.054	4.9	0.0240	0.0000	OK
15 minute winter	S7	10	74.119	0.064	3.6	0.0245	0.0000	OK
15 minute winter	S8	10	74.217	0.042	2.8	0.0167	0.0000	OK
15 minute summer	S9	10	74.320	0.040	2.0	0.0241	0.0000	OK
15 minute winter	G1	10	74.416	0.066	4.6	0.0610	0.0000	OK
15 minute winter	GATE ACO	10	74.482	0.032	1.1	0.0153	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)
60 minute summer	STORAGE	1.004	S1	3.8	0.571	0.214	0.0295	
120 minute winter	S1	ACO Q-Brake	S0	1.6				14.9
15 minute winter	S2	1.003	STORAGE	14.8	2.423	0.291	0.0368	
15 minute winter	S3	1.002	S2	7.0	1.169	0.266	0.1006	
15 minute winter	S4	1.001	S3	6.3	0.975	0.341	0.0580	
15 minute winter	S5	2.000_1	S4	0.9	0.286	0.108	0.0166	
15 minute winter	S6	2.003	S2	4.8	0.806	0.270	0.1560	
15 minute winter	S7	2.002	S6	3.5	0.687	0.682	0.0511	
15 minute winter	S8	2.001	S7	2.8	0.675	0.347	0.0285	
15 minute summer	S9	2.000	S8	2.0	0.670	0.315	0.0284	
15 minute winter	G1	1.001_1	S4	4.5	0.839	0.760	0.1192	
15 minute winter	GATE ACO	1.000	G1	1.1	0.286	0.218	0.0554	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	STORAGE	118	72.934	0.416	13.2	26.3616	0.0000	SURCHARGED
15 minute summer	S0	1	72.415	0.000	2.0	0.0000	0.0000	OK
120 minute winter	S1	118	72.933	0.435	3.7	0.4923	0.0000	SURCHARGED
15 minute winter	S2	10	73.773	0.103	36.8	0.0626	0.0000	OK
15 minute winter	S3	11	74.125	0.088	16.3	0.0336	0.0000	OK
15 minute winter	S4	10	74.241	0.107	14.2	0.0440	0.0000	OK
15 minute winter	S5	10	74.266	0.038	2.6	0.0163	0.0000	OK
15 minute winter	S6	10	74.022	0.090	11.7	0.0404	0.0000	OK
15 minute winter	S7	11	74.280	0.225	8.3	0.0865	0.0000	SURCHARGED
15 minute winter	S8	11	74.381	0.206	6.9	0.0823	0.0000	SURCHARGED
15 minute winter	S9	11	74.452	0.172	5.6	0.1046	0.0000	SURCHARGED
15 minute winter	G1	11	74.850	0.500	11.0	0.4724	0.0000	FLOOD RISK
15 minute summer	GATE ACO	10	74.740	0.290	3.0	0.1929	0.0000	FLOOD RISK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	STORAGE	1.004	S1	4.5	0.650	0.253	0.0352	
120 minute winter	S1	ACO Q-Brake	S0	2.0				35.4
15 minute winter	S2	1.003	STORAGE	36.5	2.974	0.716	0.0736	
15 minute winter	S3	1.002	S2	16.2	1.383	0.613	0.1978	
15 minute winter	S4	1.001	S3	14.2	1.170	0.769	0.1088	
15 minute winter	S5	2.000_1	S4	2.6	0.437	0.313	0.0265	
15 minute winter	S6	2.003	S2	11.6	0.981	0.650	0.3122	
15 minute winter	S7	2.002	S6	8.2	1.044	1.586	0.0761	
15 minute winter	S8	2.001	S7	6.4	0.821	0.798	0.0532	
15 minute summer	S9	2.000	S8	5.2	0.789	0.819	0.0743	
15 minute winter	G1	1.001_1	S4	9.7	1.244	1.627	0.1721	
15 minute summer	GATE ACO	1.000	G1	3.2	0.409	0.640	0.1135	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.82%

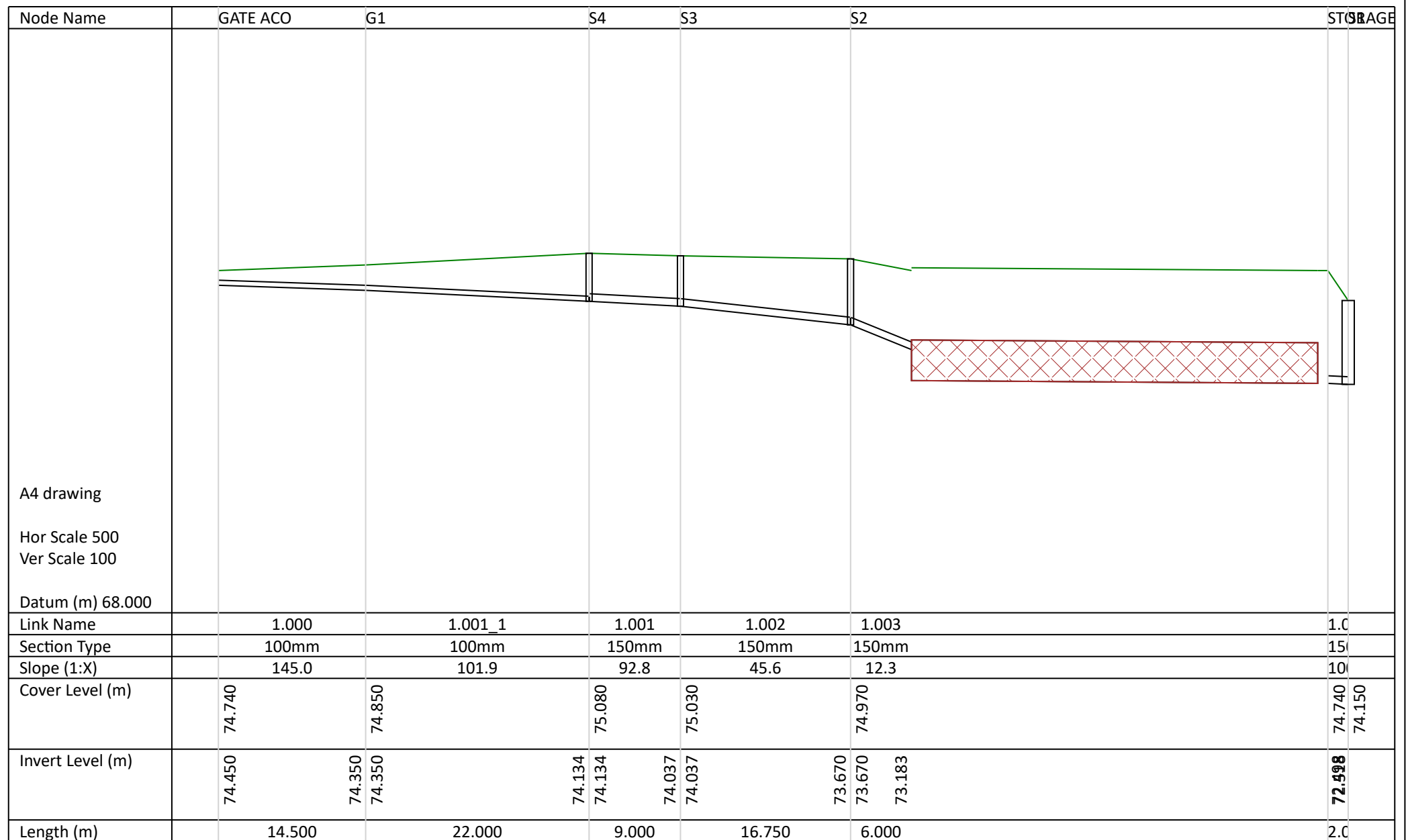
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	STORAGE	180	73.101	0.583	12.1	37.7534	0.0000	SURCHARGED
15 minute summer	S0	1	72.415	0.000	2.0	0.0000	0.0000	OK
180 minute winter	S1	180	73.101	0.603	3.4	0.6821	0.0000	SURCHARGED
15 minute winter	S2	10	73.793	0.123	45.0	0.0747	0.0000	OK
15 minute winter	S3	11	74.138	0.101	19.8	0.0388	0.0000	OK
15 minute winter	S4	11	74.261	0.127	17.3	0.0520	0.0000	OK
15 minute winter	S5	10	74.272	0.044	3.3	0.0186	0.0000	OK
15 minute winter	S6	11	74.035	0.103	14.0	0.0459	0.0000	OK
15 minute winter	S7	11	74.379	0.324	10.0	0.1244	0.0000	SURCHARGED
15 minute winter	S8	11	74.521	0.346	8.5	0.1383	0.0000	SURCHARGED
15 minute winter	S9	11	74.626	0.346	7.2	0.2103	0.0000	SURCHARGED
15 minute summer	G1	10	74.850	0.500	13.3	0.6935	0.0000	FLOOD RISK
15 minute summer	GATE ACO	9	74.740	0.290	4.5	0.3262	0.0000	FLOOD RISK

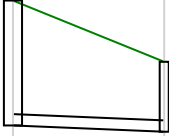
Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	STORAGE	1.004	S1	4.2	0.692	0.239	0.0352	
30 minute winter	S1	ACO Q-Brake	S0	2.0				27.9
15 minute winter	S2	1.003	STORAGE	44.6	3.055	0.874	0.0874	
15 minute winter	S3	1.002	S2	19.8	1.425	0.751	0.2353	
15 minute winter	S4	1.001	S3	17.3	1.206	0.938	0.1285	
15 minute summer	S5	2.000_1	S4	3.3	0.511	0.397	0.0278	
15 minute winter	S6	2.003	S2	14.0	1.012	0.785	0.3667	
15 minute winter	S7	2.002	S6	9.7	1.237	1.881	0.0772	
15 minute winter	S8	2.001	S7	7.6	0.975	0.947	0.0532	
15 minute winter	S9	2.000	S8	5.7	0.794	0.900	0.0743	
15 minute winter	G1	1.001_1	S4	11.6	1.488	1.946	0.1721	
15 minute winter	GATE ACO	1.000	G1	3.9	0.493	0.771	0.1135	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.82%

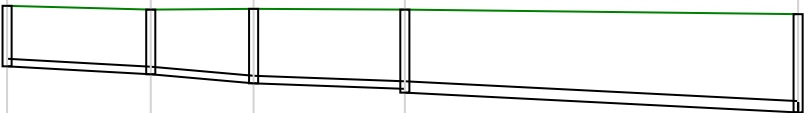
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	STORAGE	176	74.109	1.591	17.0	52.5088	0.0000	SURCHARGED
15 minute summer	S0	1	72.415	0.000	2.0	0.0000	0.0000	OK
180 minute winter	S1	176	74.109	1.611	3.2	1.8223	0.0000	FLOOD RISK
180 minute winter	S2	176	74.110	0.440	17.0	0.2668	0.0000	SURCHARGED
15 minute winter	S3	12	74.320	0.283	23.0	0.1083	0.0000	SURCHARGED
15 minute winter	S4	12	74.486	0.352	20.8	0.1443	0.0000	SURCHARGED
15 minute winter	S5	12	74.506	0.278	4.7	0.1177	0.0000	SURCHARGED
15 minute winter	S6	11	74.247	0.315	17.0	0.1408	0.0000	SURCHARGED
15 minute winter	S7	12	74.683	0.628	12.4	0.2411	0.0000	SURCHARGED
15 minute winter	S8	12	74.885	0.710	11.2	0.2838	0.0000	FLOOD RISK
15 minute winter	S9	12	75.029	0.749	10.1	0.4552	0.0000	FLOOD RISK
15 minute summer	G1	9	74.850	0.500	18.1	1.2309	0.0000	FLOOD RISK
15 minute summer	GATE ACO	9	74.740	0.290	5.9	0.6244	0.0000	FLOOD RISK

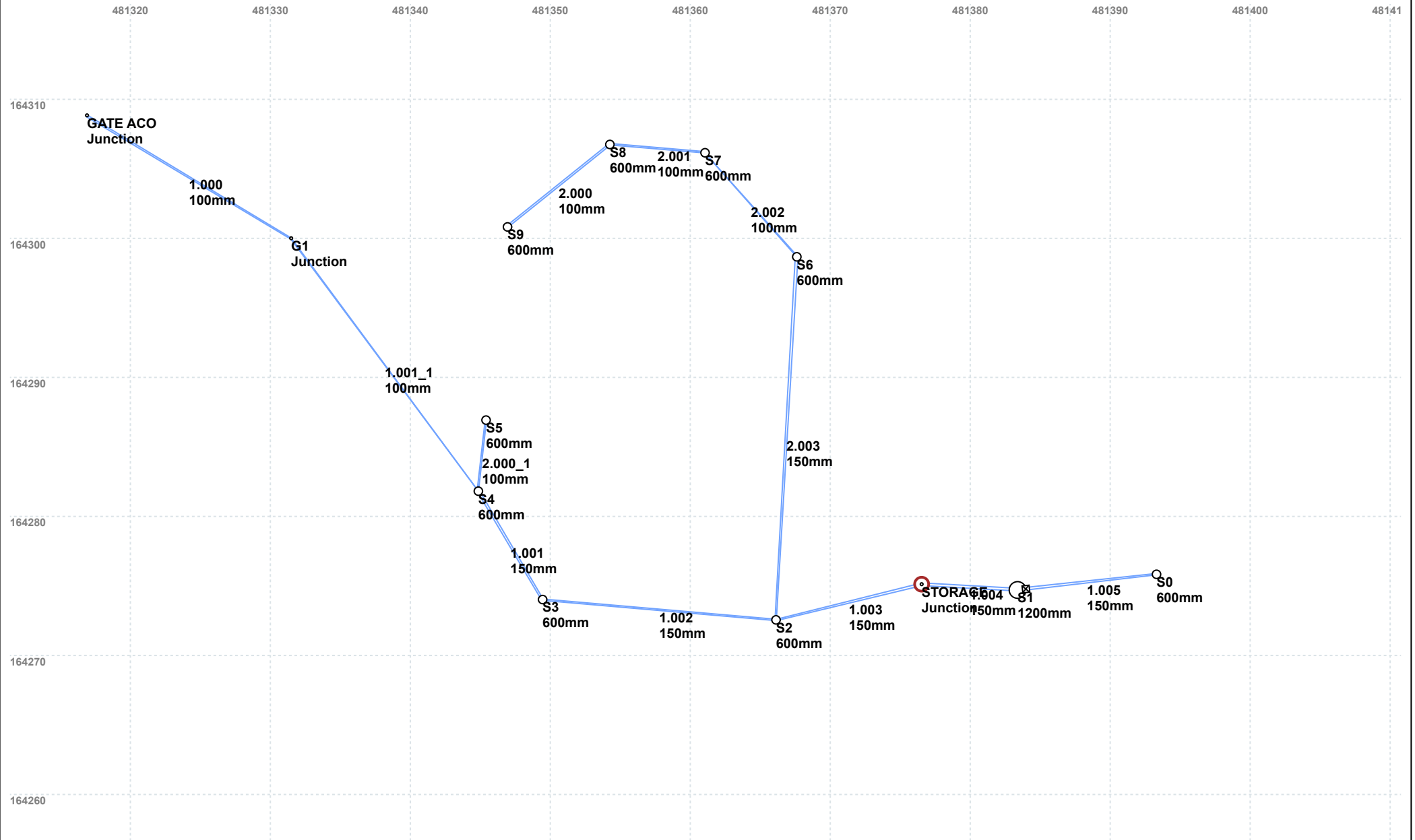
Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	STORAGE	1.004	S1	4.5	0.690	0.254	0.0352	
180 minute winter	S1	ACO Q-Brake	S0	2.0				36.0
15 minute winter	S2	1.003	STORAGE	52.4	3.037	1.028	0.1056	
15 minute winter	S3	1.002	S2	25.0	1.513	0.947	0.2949	
15 minute winter	S4	1.001	S3	20.8	1.226	1.129	0.1584	
15 minute summer	S5	2.000_1	S4	3.9	0.546	0.475	0.0391	
15 minute winter	S6	2.003	S2	17.0	1.026	0.954	0.4577	
15 minute summer	S7	2.002	S6	12.0	1.537	2.337	0.0782	
15 minute winter	S8	2.001	S7	9.1	1.163	1.130	0.0532	
15 minute winter	S9	2.000	S8	7.3	0.933	1.149	0.0743	
15 minute winter	G1	1.001_1	S4	14.2	1.814	2.373	0.1721	
15 minute winter	GATE ACO	1.000	G1	5.1	0.653	1.022	0.1135	



D.J.Barton Associates	D J Barton Associates Limited	File: 2474 DRAINAGE ASSESSMENT FEH22.pfd Network: Storm Network Philip Barton 14/03/2025	Page 2 Revised 14-03-25
Node Name		S1	S0
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 68.000			
Link Name		1.005	
Section Type		150mm	
Slope (1:X)		120.5	
Cover Level (m)		74.150	73.340
Invert Level (m)		72.498	72.415
Length (m)		10.000	
Flow v14.0 Copyright © 1988-2025 Causeway Technologies Ltd			

Flow v14.0 Copyright © 1988-2025 Causeway Technologies Ltd

Node Name	S9	S8	S7	S6	S2
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 69.000					
	2.000	2.001	2.002	2.003	
	100mm	100mm	100mm	150mm	
	90.5	56.7	137.0	99.2	
	75.080	75.030	75.040	75.030	74.970
Invert Level (m)	74.280	74.175	74.055	73.982	73.670
Length (m)	9.500	6.800	10.000	26.000	



AREA OF DRIVEWAY BETWEEN EDGE OF HOLLYBUSH RIDE CARRIAGEWAY AND THE ACO CHANNEL TO BE OF POROUS CONSTRUCTION, GRAVEL OR RESIN BOUND GRAVEL OR SIMILAR, TO BE UNDERLAIN BY A MINUM OF 250mm THICKNESS OF TYPE 3 MATERIAL. (MINIMUM VOIDS 35%)

ACO DRAINAGE CHANNEL (minimum of 120mm wide) TO BE CONNECTED TO THE NEW FRENCH DRAIN ALONG THE NORTHERN SIDE OF THE DRIVE.

INDIVIDUAL KERBS TO BE RE-LAND FLUSH FOR A MINIMUM OF 300mm AT 3m CENTRES ALLOWING SURFACE WATER TO RUN-OFF INTO THE NEW FRENCH DRAIN

PERFORATED PIPE LAID IN FRENCH DRAIN, CONNECTING TO THE EXISTING GULLY

CROSS HATCHED AREA IS THE AREA DISCHARGING TO THE ACO CHANNEL DRAIN, AND TO THE NEW FRENCH DRAIN ON THE NORTHERN SIDE OF THE DRIVEWAY =67m²

DRAINAGE CHANNEL ALONG REAR OF PATIO MUST BE REMOVED IN ORDER TO REDUCE THE HARD STANDING, BY APPROXIMATELY 400m², FROM DISCHARGING TO THE SURFACE WATER SYSTEM.
THESE AREAS SHOULD RUN-OFF TO THE SOFT LANDSCAPING, I.E. THE GRASSED GARDEN AREA THAT FALLS AWAY FROM THE HOUSE TOWARDS THE WOODLAND.

NOTES

Private surface water sewer

ACO channel drainage

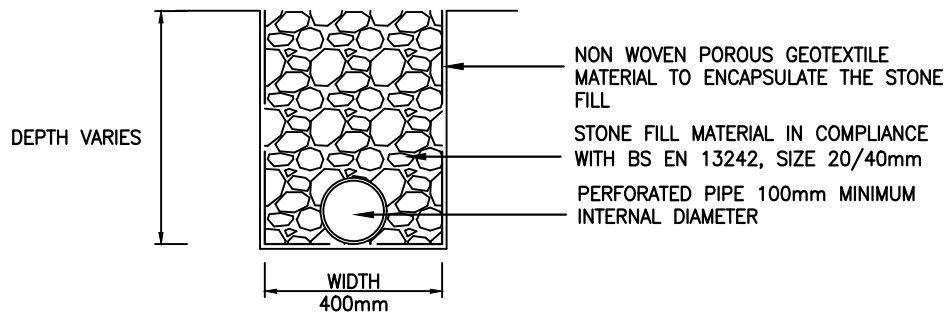
Private drainage to be an 'OSMA' underground drainage system, flexibly jointed, or similar approved. All private sewer pipes are to be 100mm dia, unless shown otherwise, and to be laid in accordance with the manufacturers instructions. All pipes to be obtained from an approved manufacturer.

NOTE: ALL COVER LEVELS ARE APPROXIMATE

NOTE: LEVEL DETAILS OF INSPECTION CHAMBERS, WHERE MARKED EXISTING ARE BASED ON DETAILS PROVIDED BY THE SITE CONTRACTOR.

FLOW CONTROL CHAMBER TO BE ACO Q-BRAKE, PRE-FORMED CHAMBER FITTED WITH A VORTEX FLOW CONTROL RESTRICTED TO 2 l/s AT A HEAD OF 1.57m

Indicates approximate finished drive levels



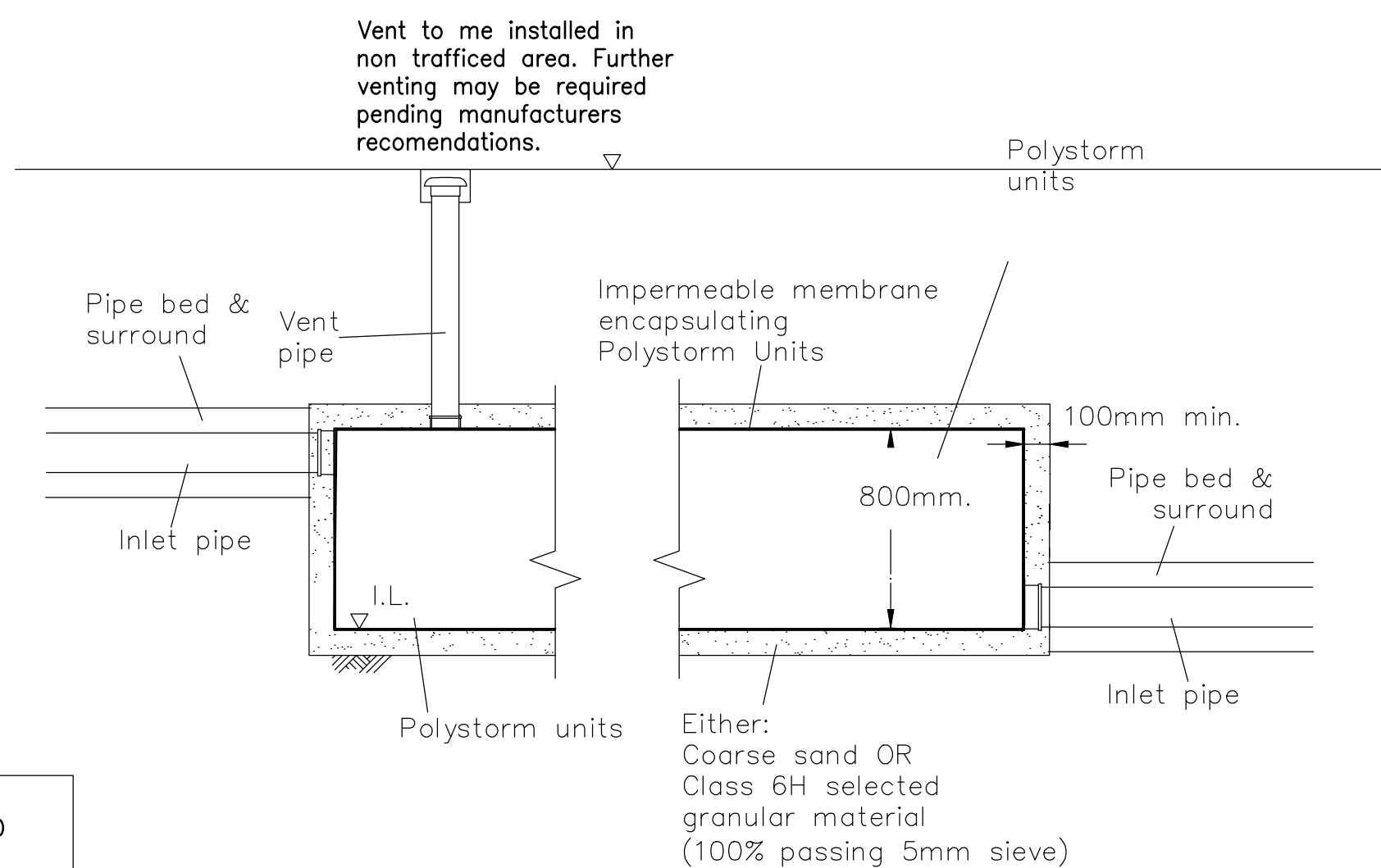
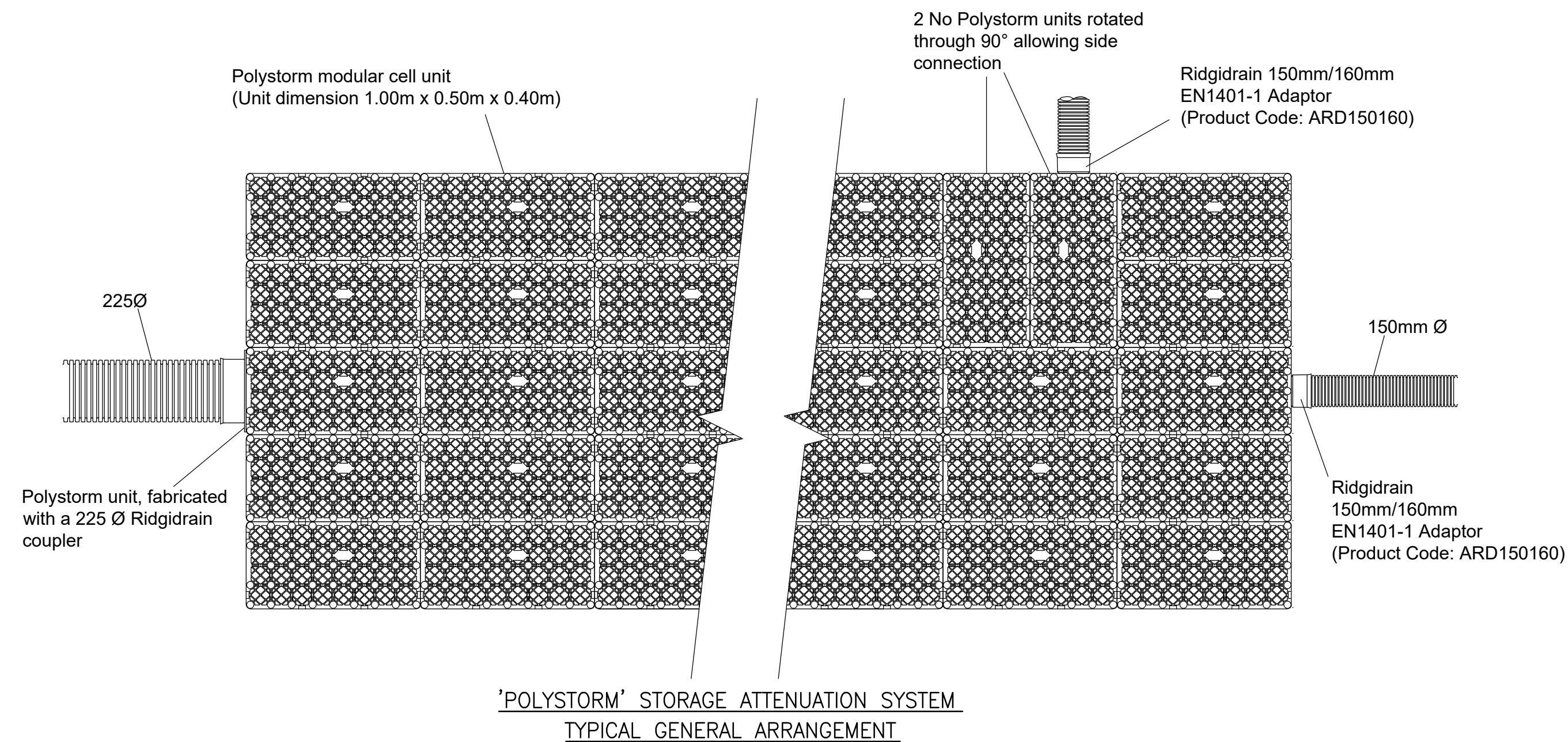
TYPICAL FRENCH DRAIN TRENCH DETAIL
SCALE: NTS

- REVISION:
- A. 21-02-25 ATTENUATION INCREASED IN SIZE AND FINISHED LEVELS ADDED
- B. 05-03-25 AREA DISCHARGING TO ACO AT THE GATE SHOWN HATCHED. ADDITIONAL GULLIES ADDED AND FLOW RATE CORRECTED.
- C. 14-03-25 INTRODUCTION OF A NEW FRENCH DRAIN ON THE NORTH SIDE OF THE DRIVEWAY.
- D. 23-04-25 ADDITIONAL NOTES ADDED

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ARCHITECTS LAYOUT.
ANY DISCREPANCIES ARE TO BE REPORTED IMMEDIATELY

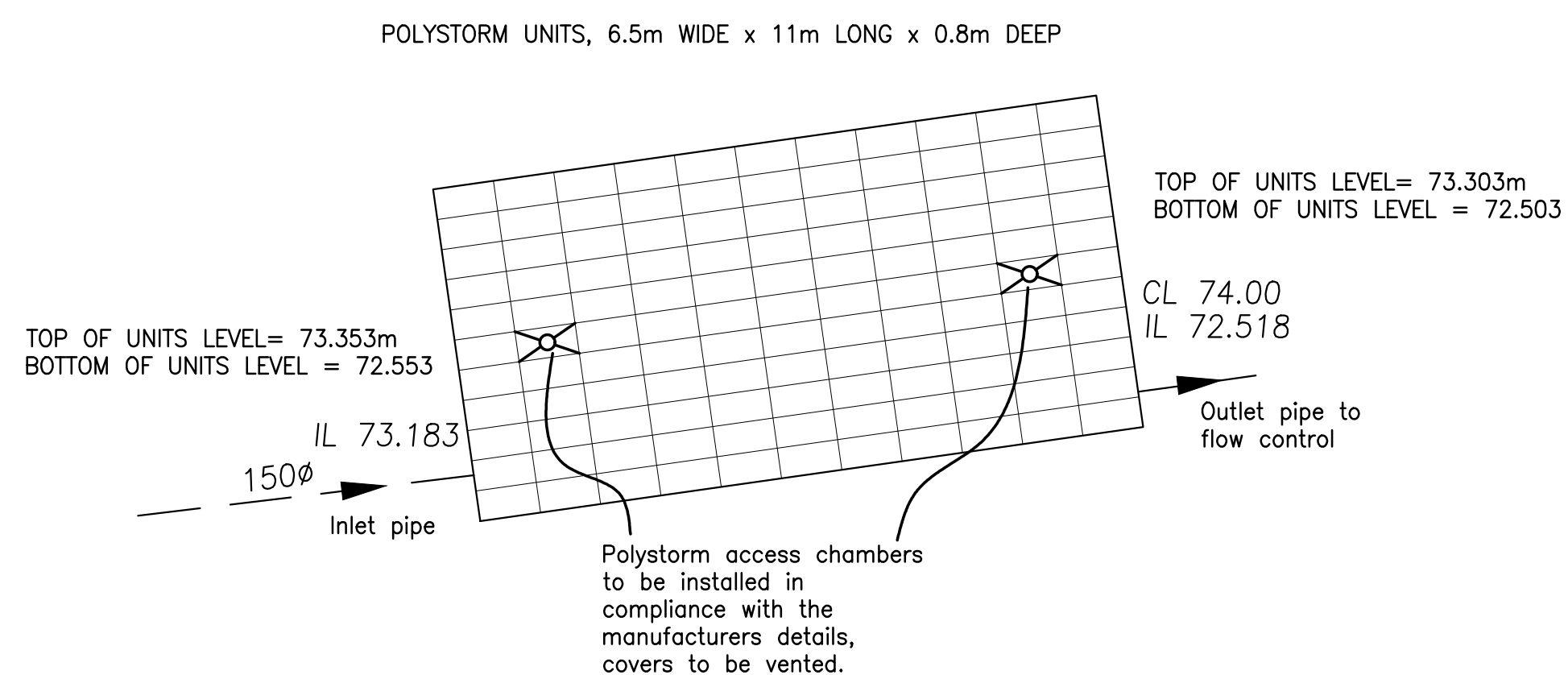
THIS DRAWING IS NOT TO BE USED FOR SETTING OUT OF BUILDINGS

D.J.Barton Associates CIVIL & STRUCTURAL ENGINEERING CONSULTANTS Tel: Kelvedon (01376) 573247 Email: djbarton@btinternet.com		
Client	MRS LI	
Job	PENNYWOOD, HOLLYBUSH RIDE FINCHAMPSTEAD	
Title	SURFACE WATER DRAINAGE STRATEGY	
Scale	1 IN 200	Drg. No.
Date	JANUARY 2025	2474/E/1
		Rev.
		D



NOTE: STORAGE TO BE CONSTRUCTED USING A 'POLYSTORM' STORAGE SYSTEM MANUFACTURED BY POLYPIPE (TEL. NO: 01509 615100)

TO BE CONSTRUCTED IN FULL COMPLIANCE WITH THE MANUFACTURERS RECOMMENDATIONS.



REVISION:
A. 21-02-25 STORAGE ATTENUATION INCREASED IN SIZE

D.J.Barton Associates CIVIL & STRUCTURAL ENGINEERING CONSULTANTS Tel: (01376) 573247 E-mail: djbarton@btinternet.com		
Client	MRS LI	
Job	PENNYWOOD, HOLLYBUSH RIDE FINCHAMPSTEAD	
Title	STORAGE ATTENUATION TANK DETAILS	
Scale	NTS	Drg. No.
Date	JANUARY 2025	2474/E/2
		Rev. A