

7 Appendices

7.1 Appendix A – Site Plan

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rev	date	amendment
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project

OLD PARK LODGE
SLAUGHAM LANE
WARNINGLID

title
**PROPOSED
SITE PLAN**

drawn CAD/RNT	date 26.10.23
scale 1:500@A3	number 2315.100

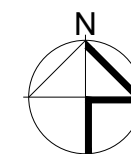
Thornton[©]
architecture + design

Telephone: 07773 245612
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Website: www.thornton-desgn.com

Realigned
driveway &
hard standing

The House

WARNING!



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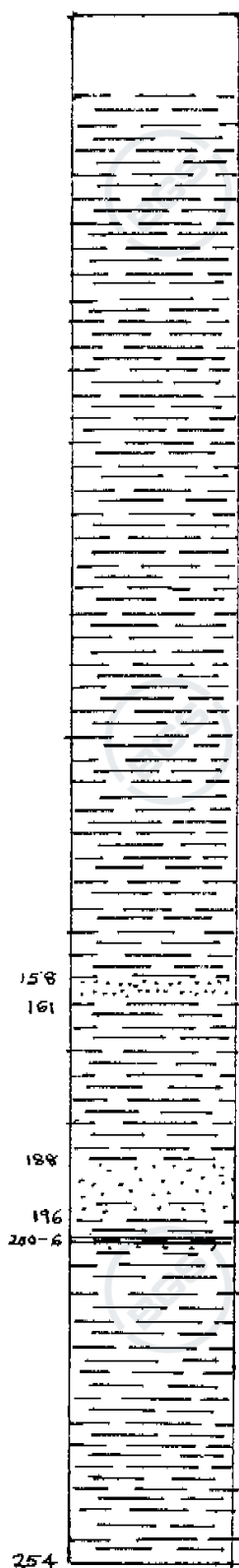
7.2 **Appendix B – Borehole Logs**

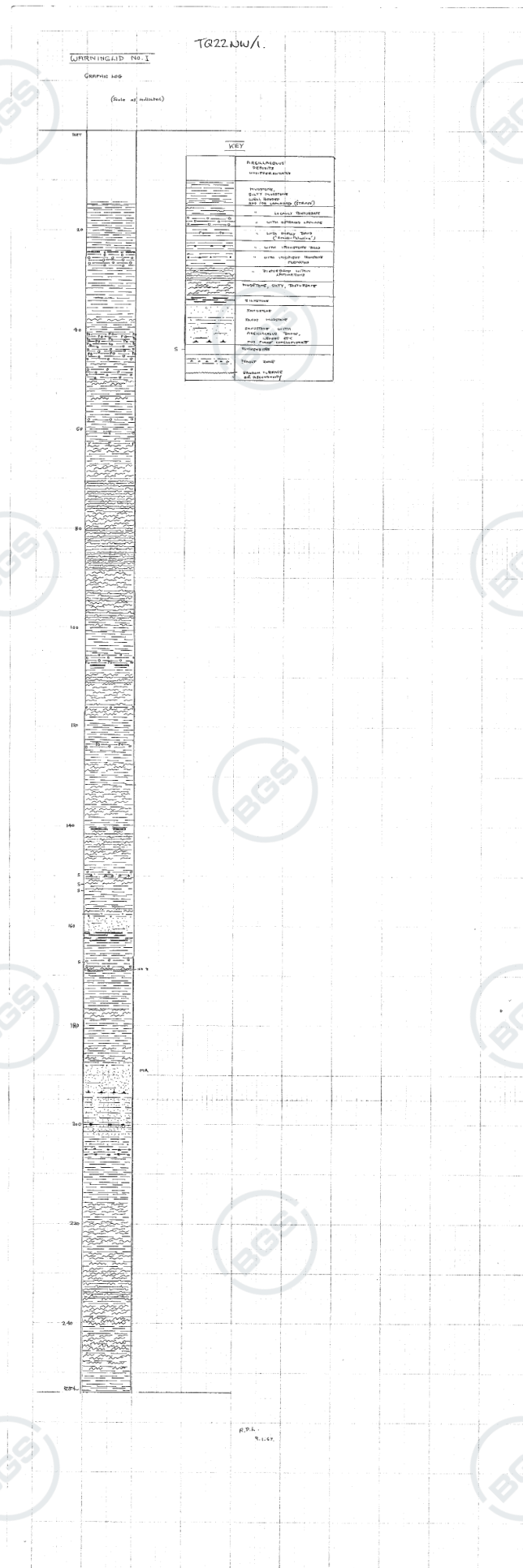


WARNINGEID NO 1.

Scale 40 ft to 1 in

TQ22NW1/1







GEOLOGICAL SURVEY OF GREAT BRITAIN
RECORD OF SHAFT OR BORE FOR MINERALS

Name of Shaft or Bore given by Geological Survey:

Warninglid No.1

Name and Number given by owner:

For whom made I.G.S.

Town or Village Slaugham (Warninglid) County E. Sussex

Exact site 600 yd W 10° S of Old Park and 1000 yd N 10° W of Inn at Warninglid (Attach a tracing from a map, or a sketch-map, if possible.)

Purpose for which made To prove age of Wealden clay present

Ground Level at shaft relative to O.D. c 300 (900 ft) If not ground level give O.D. of beginning of shaft bore

Made by I.G.S. (Contractors: D.P.I. Ltd.)

Date of sinking May 1966

Information from

Date received

Examined by R.G. Thurrell, R.D. Lake

(For Survey use only)

6-inch Map Registered No.

TQ 22 NW/1

Nat. Grid Reference

2488 2701

1" N.S. Map No.

302

1" O.S. Map No.

Confidential or not

NCT

SPECIMEN NUMBERS AND ADDITIONAL NOTES

Colours logged as wet unless indicated thus: - * (dry)

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS		DEPTH	
		FT	IN.	FT	IN.
	Rock bit in yellowish brown unctuous clay becoming stiff below	10	6	10	6
				(3.2 m)	
	Clay, slightly silty, medium bluish grey (5B5/1)* but mainly weathered to moderate olive brown (5Y4/4) stained by ferruginous percolation to moderate brown (5YR3/4), becoming fresher downward. Locally, paler fine silty bands are preserved (eg. 13 ft. 10)				
	Core much broken, some lost.	4	0	14	6
				(4.4 m)	
	Mudstone, slightly silty, dark grey (N5) to dark greenish grey (5GY4/1)				
	Core much broken, some lost	2	6	17	0
				(5.1 m)	
	Mudstone, silty, laminated - strongly in places, ? calcareous, medium light grey (N6)* locally pinkish. Fractures iron-stained. ? Ferruginous linear growth at 20 ft 3.				
	Core much broken to 18 ft.	5	0	22	0
				(6.7 m)	
	Mudstone, very silty, hard; well-bedded with worm burrows, dip 3°-5°.				

TQ 22 NW/1

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Warninglid No. 1.

Brought Forward		22	0
Medium light grey (N6)	- 6	(6.71m)	6
Mudstone, laminated, silty, Medium dark grey (N4); 1 in. siltstone band at 24'3 with ostracods, ? fish fragments, various organic compressions. Ostracods continue to 25 ft. 6.	3 0	25	6
		(7.77m)	
Mudstone, silty, laminated ('striped') bedding, becoming more silty downward; moderate olive brown (5Y4/4) alternating with light olive brown (5Y5/6), ostracod bearing horizons present. (Colour indicates weathering by percolating water).	1 6	27	0
		(8.23m)	
Siltstone, dusky yellow (5Y6/4), with clayey silt and silty clay partings, and fine sandstone (ferruginous) moderate brown (5YR3/4). Plant bearing with ?rootlet/worm tubes.	- 7	27	7
		(8.41m)	
Mudstone, silty, laminated ('striped'), dark greenish grey with ferruginous staining (5GY4/1); becoming more clayey and greyer downward. ? Rootlet/worm tubes.	1 3	28	10
		(8.78m)	
Open hole (no core, no cuttings obtained)	6 2	35	0
		(10.67m)	
Mudstone, silty, medium grey (N4-N5), iron-stained dark yellowish orange (10YR6/6) to moderate brown (5YR3/4) on joints and in cavities. Local carbonaceous fragments at 35 ft. 6., striped light grey (N7*) c 36 ft. (where seen), bioturbated possibly c 38 ft. - core much reconstituted. 2/3 recovery condition fragmentary.	6 0	41	0
		(12.50m)	
Mudstone, silty, laminated becoming darker, more massive below and less silty. Dark greenish grey (5G4/1) to medium bluish grey (5B5/1). Shell bands ('small-Paludina') 41 ft. to 43 ft., (chitinous segment at 42 ft. 6), 44 ft. 10 (1/2 in.), 45 ft. 3 (fish), ? rootlet activity at 45 ft. 6, carbonaceous fragments 46 ft. 0-3. Ostracods throughout. ? Reconstituted, imbricate c. 43 ft.	5 3	46	3
		(14.10m)	
Mudstone, laminated locally by silty layers. Silt- stone beds in places to 1/2 in. Dark grey (N3) becoming shaly at 54 ft., olive black (5Y2/1) tending to dark greenish grey (5GY3/1), becoming dark greenish grey (5G4/1) at 57 ft. Ostracods 48 ft. to 49 ft. 6, carbonaceous fragments at 49 ft., 53 ft. 0-6. Bioturbate c. 47 ft., 50 ft. 3 - 51 ft., 54 ft. Core much broken 46 ft. 3 - 48 ft. and nearly all reconstituted.	11 3	57	6
		(12.53m)	
Mudstone very slightly silty, vaguely laminated. Ostracod rich band at 58 ft. (? 4" thick)	1 0	58	6
		(17.33m)	
Mudstone, silty, laminated, dark greenish grey (5G4/1)	1 6	60	0
		(18.29m)	
Mudstone, very slightly silty, vaguely laminated.	1 0	61	0
		(18.59m)	
Mudstone, very slightly silty, hard. Laminated in parts becoming bioturbate at 63 ft. - 64 ft. 7 but locally laminated still. Ostracod bands above thick laminations at 61 ft. 6. Greenish			

TQ 22 NW/1

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Warninglid No. 1.

Brought Forward

grey (5Y5/1) tending to light olive grey (5Y4/1)* in parts. Shelly band at 62 ft. 9 below bioturbate bed.	3	7	61	0	(18.59m)
Mudstone, laminated to massive greenish black (5Y2/1) to olive black (5Y2/1) rapidly becoming light olive grey (5Y6/1*).	2	5	64	7	(19.69m)
Mudstone, slightly silty, bioturbate (bioturbation shown by irregular red patches), hard, blocky as between 67 ft. 3 and 69 ft. Dark greenish grey (5Y3/1). Plant remains and ? worm tubes at 68 ft. 6.	2	6	67	0	(20.42m)
Mudstone, silty, well banded locally but bioturbate with vague dark and pale alternations in dark greenish grey (5Y4/1) and medium grey (N5) tending to greenish grey (5Y6/1) alternating with more clayey dark greenish grey (5Y4/1). No fossils seen. Current lineations at 70 ft. Bioturbation occurs throughout (within bands in laminated beds). Lamination becomes less distinct 77 ft. 6 to 79 ft. 6, 89 ft. 0 in. to 92 ft., 94 ft. 6 to 96 ft. Core reconstituted 77 ft. to 78 ft. 6, 83 ft. 6 to 84 ft. 6, 90 ft. to 96 ft. Jointing random. Dip < 5°.	29	6	69	6	(21.18m)
Mudstone, slightly silty, medium/dark greenish grey (5Y5/1*) (sudden colour change here). Sporadically laminated. Ostracods. Core reconstituted in parts. Tends to be less green, more bioturbate (trails etc.) at 99 ft. 6, striping developed ca 101 ft. Core reconstituted 102 ft. to 104 ft. 6.	6	0	99	0	(30.18m)
Mudstone, slightly silty, homogeneous medium grey (N5)* locally olive tinged tending to light grey (N6)*. Shelly band at 105 ft. 3. Ostracods scattered throughout.	2	5	105	0	(32.00m)
Siltstone, light olive grey (5Y6/1)* 1" thick associated with ostracod bed above.	0	1	107	5	(32.74m)
Mudstone as above becoming bioturbate at 109 ft., olive tinged at 109 ft. 9, reverting to medium light grey (N6)* at 110 ft. 2, sporadically thinly striped. At 111 ft. 6 becomes bioturbate with reduction 'shadows', olive tinged. Carbonaceous fragments 114 ft. to 116 ft. Ostracods at 116 ft.	10	9	107	6	(32.77m)
Mudstone as above, but striped, the lamination decreasing in intensity below 119 ft. 4. Carbonaceous fragments 119 ft. 4 to 121 ft. esp 119 ft. 6 - ? rootlets.	2	9	118	3	(36.04m)
Mudstone, medium light grey (N6)*, homogeneous, massive with plant fragments. Locally olive tinged.	2	0	121	0	(36.96m)
(Core diameter reduced to 3") Mudstone, dark greenish grey (5Y4/1)*, homogeneous, silty becoming medium dark grey (N4) at 123 ft. 5 with ostracod-bearing laminae and shell 'nests'.	2	0	123	0	(37.57m)

TQ 22 NW/1

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Warninglid No. 1.

Brought Forward			123	0	(37.49m)
At 125 ft. 6 becomes medium grey (N5)* with olive tinge locally. Core almost completely reconstituted.	4	0	127	0	(38.71m)
Mudstone, medium grey (N5)* tending to light grey (N7)*, silty, bioturbate with occasional bands of striped variety, esp. 129 ft. 3 to 131 ft. 6 becoming massive with carbonaceous fragments to 133 ft., laminated 'striped' at 135 ft. 6, then massive bioturbate to 137 ft. 6 where vaguely bedded, increasingly massive, less bioturbate. Core reconstituted 135 ft. 10 - 136 ft. 4.	12	10	139	10	(42.62m)
Mudstone, hard, dark greenish grey with $\frac{1}{2}$ " siltstone, greenish grey (56Y6/1) at base. 56Y6/1	-	9 $\frac{1}{2}$	140	7 $\frac{1}{2}$	(42.85m)
Mudstone, silty, bioturbate with local laminations, greenish grey becoming dark grey below, striped from 143 ft. 11 to 144 ft. 3, massive light grey (N6)* with darker wisps giving vague lamination becoming increasingly bioturbate to 145 ft. 7, striped from 146 ft. 0 - 4, increasingly bioturbate to 146 ft. 10, striped to 147 ft., homogeneous, fossiliferous with occasional trail markings to 149 ft. 4. Ostracods at 148 ft. 10. Jointing random, sporadic. Reconstituted 145 ft. to 146 ft.	8	8 $\frac{1}{2}$	149	4	(45.52m)
Slickensided zone of above lithology consisting of upper shatter zone and lower subvertical slickenside zone.	0	8	150	0	(45.72m)
Mudstone, silty, 'striped' initially becoming bioturbate from 150 ft. 3 to 151 ft. 6, then homogeneous, massive, only slightly bioturbated, medium light grey (N5)* (olive tinged at 153 ft. downward) becoming laminated (not colour distinct) with rough mottled bedding surfaces to 156 ft. 2. Slickenside at 157 ft. 4, 152 ft. 9.	6	2	156	2	(47.60m)
Mudstone silty, 'striped' individual laminae being bioturbated, medium light grey (N6)*, becoming well bedded homogeneous from 157 ft. tending to very silty, well laminated to base.	1	6	157	8	(48.06m)
Mudstone, with silty and sandy laminations, the latter being irregularly shaped.	-	4	158	0	(48.16m)
Sandstone, greenish grey (56Y6/1) to pale olive grey (5Y6/1), fine-grained, compact, calcareous, locally well laminated with occasional silt/mudstone lenses. Micaceous, lignite particles present. Becomes greyer silty 160 ft. 0 to 160 ft. 4.	3	1	161	1	(49.10m)
Siltstone, alternating with silty mudstone becoming less silty.	1	11	163	0	(49.68m)
Mudstone, hard, silty laminated to 164 ft. 6, then massive with many carbonaceous fragments and occasional bands of greenish wisps tending to be more argillaceous to base. Core reconstituted 164 ft.-165 ft.	4	0	167	0	(50.90m)

TQ 22 NW/1

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Warninglid No. 1.

Brought Forward

			167	0
			(50.90m)	
Mudstone, light grey (N7)* homogeneous, well bedded with ostracod bed above and at 167 ft. 9, rapidly becoming bioturbate below. Slickensides at 167 ft. 4: Mudstone roughly fractured below this.	1	8	168	8
			(51.41m)	
Mudstone, silty, evenly laminated, well bedded, medium grey (N5)* with sharp contact above. Contains occasional 'stringers' of organic debris becoming olive grey, laminated at 171 ft. 7, reverting to medium light grey (N6)* colour laminated at 171 ft. 7, reverting to medium light grey (N6)* colour laminated at 173 ft., becoming medium grey (N5)* olive tinged at 174 ft., bioturbate 177 ft. to 178 ft., striped to 178 ft. 7, homogeneous with slight colour lamination, lost by overall oxidation to 180 ft. Continues to 183 ft. 10 as fairly homogeneous with occasional green/black wisps (bioturbation small) becoming striped at 183 ft. 10, reverting to homogeneous, slightly bioturbate at 184 ft. 8. Medium light grey (N6)*, homogeneous with occasional carbonaceous fragments to base. Lystic surfaces at 168 ft. 9, 184 ft. 9. Core reconstituted 175 ft. - 177 ft., 186 ft. 0-186 ft. 8, 184 ft. 9 to 185 ft. 9.	17	6	186	2
			(56.74m)	
Mudstone, silty, bioturbate, less blue than above with sharp contact above. Rapidly becomes non-bioturbate, locally 'striped'; colour laminated with flat fracture to base.	1	1	187	3
			(57.07m)	
Silty, mudstone and sandy mudstone, calcareous becoming sandier downward. Sandy lenticles slickensided against clayey lenticles, bedding disturbed. Red ox. variation picks out silty mudstone grade lenticles (pink).	0	11	188	2
			(57.35m)	
Sandstone, hard, calcareous with occasional clayey partings containing lignite fragments. Rootlet activity evident in more calcareous bands e.g. 189 ft. 8. Most contacts are deformed by differential compaction. Local high dips (20°) in sandier beds due to slumping? e.g. 188 ft. 7. The bedding is apparently rhythmic & mudstone grading to siltstone upwards capped by a more calcareous sandstone. The core is sheared between 190 ft. 6 and 191 ft. 3.	3	0	191	2
			(58.27m)	
Sandstone, hard, fine grained, calcareous with ripple marked tops to seams, separated by mudstones with silty wisps. The sandstones are locally cross bedded. The thicker sandstone units contain lignite laminae and mud flake conglomerates e.g. 192 ft. 8 and grade downward to siltstone e.g. 193 ft. Mud flake conglomerate at 193 ft. 9 contains a piece of bone causing bedding disturbance around it. Slumping is picked out by the lignite laminae.	3	1	194	3
			(59.21m)	
Mudstone, silty greenish grey with 1/2 in. sandy partings as above but becoming predominantly				

TQ 22 NW/1

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Warninglid No. 1.

Brought Forward			194	3	(59.21m)
argillaceous especially after 196 ft. with only thin runs and lenses of sand.	5	11	200	2	(61.01m)
Mudstone with clay ironstone bands.	-	1	200	6	(61.11m)
Mudstone/sandstone as above neither seams exceeding 1 in. in thickness. The seams are rippled and lensed, the mudstone is locally bioturbate.	2	0	202	6	(61.72m)
Mudstone, silty and banded.	-	9	203	3	(61.95m)
Mudstone with sandy lenses to 205 ft., dark greenish grey. Incipient clay ironstones at 205 ft. 2 to 205 ft. 2 $\frac{1}{2}$, 205 ft. 3 to 205 ft. 4, 206 ft. 3 to 206 ft. 3 $\frac{1}{2}$	3	3	206	6	(62.94m)
Mudstone, silty, generally homogeneous (but locally slightly bioturbate) with carbonaceous fragments in places, occasionally vaguely laminated with quite clean fracture. Colour generally medium light grey (N6)* / medium dark grey (N4)* at 215 ft. 6 / Dark greenish black compact band for $\frac{1}{2}$ " to 210 ft. 9 $\frac{1}{2}$ " (chamositic?). Becomes bioturbate from 216 ft.	11	6	218	0	(66.45m)
Mudstone, silty, medium light grey, sometimes greenish, striped.	1	0	219	0	(66.75m)
As above but bioturbate	3	2	222	2	(67.72m)
As before but striped	-	4	222	6	(67.82m)
As before but bioturbate	1	6	224	0	(68.28m)
Mudstone, silty, colour as before, vaguely striped tending to homogeneous locally.	1	6	225	6	(68.73m)
Mudstone, silty, slightly bioturbate	1	6	227	0	(69.19m)
Mudstone, silty, striped slightly bioturbate at 228 ft. 0.	1	6	228	6	(69.65m)
Mudstone, silty, bioturbate	2	10	231	4	(70.51m)
Mudstone, as above, but locally striped	3	8	235	0	(71.63m)
Mudstone, silty, strongly striped.	1	2	236	2	(71.98m)
Mudstone, silty, bioturbate	1	10	238	0	(72.54m)
Mudstone, silty, striped	-	6	238	6	(72.76m)
Mudstone, silty, bioturbate	1	8	240	2	(73.20m)
Mudstone, silty, colour as before, strongly striped becoming siltier with less distinct lamination.	2	1	242	3	(73.84m)
Mudstone, bioturbate less silty than above.	2	10	245	1	(74.70m)
Mudstone, silty, strongly striped.	1	2	246	3	(75.06m)
Mudstone, silty, bioturbate	-	10	247	1	(75.31m)

TQ 22 NW / 1

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Warninglid No. 1.

Brought Forward

Mudstone, . silty, striped.
Mudstone, silty, bioturbate.
Mudstone, silty, striped.
Mudstone, silty, bioturbate
Mudstone, silty, striped, with olive tinge,
Lystic surfaces at 250 ft. 8.
Seen to base at

		247	1
		(75.31m)	
-	4	247	5
		(74.41m)	
-	7	248	0
		(75.59m)	
-	8	248	8
		(75.79m)	
-	4	249	0
		(75.90m)	
5	0	254	0
		(77.42m)	

I.C.S. EXPL. CORE

CONFIDENTIAL IN CONFIDENCE

302 TO 22/19 N.N.
127

Warninglid No. 1 [TQ 2488 2701] Surface level c. + 300 O.D.

600 yd (549 m) W 10° S of Old Park and 1000 yd (914 m) W 10° W of the

Half Moon Inn at Warninglid.

4½-in (0.11 m) core to 123 ft (37.49 m). 3-in (0.08 m) core from 123 ft - 254 ft
(37.49 m - 77.42 m).

G.S.R. specimen numbers. By 9621-9968.

Colours logged as wet unless indicated thus:- * (dry)

WHALE
CLAY

	Thickness			Depth to base		
	ft	in	m	ft	in	m
Clay, yellowish brown, unctuous, becoming stiff below (rockbitted).	10	6	3.20	10	6	3.20
Clay, slightly silty, medium bluish grey (5B5/1)* but mainly weathered to moderate olive brown (5Y4/4) stained by ferruginous percolation to moderate brown (5YR3/4), becoming fresher downward. Locally, paler fine silty bands are preserved.	4	0	1.22	14	6	4.42
Mudstone, slightly silty, dark grey (N5) to dark greenish grey (5GY4/1).	2	6	0.76	17	0	5.18
Mudstone, silty, laminated - strongly in places, medium light grey (N6)* locally pinkish.	5	0	1.53	22	0	6.71
Mudstone, very silty, hard; well-bedded, with worm burrows, dip 3° - 5°. Medium light grey (N6).	-	6	0.15	22	6	6.86
Mudstone, silty, laminated. Medium dark grey (N4): 1 in (25.4 mm) siltstone band at 24 ft 3 in (7.39 m) with ostracods: Ostracods continue to 25 ft 6 in (7.77 m).	3	0	0.91	25	6	7.77
Mudstone, silty, laminated, becoming more silty downward; moderate olive brown (5Y4/4) alternating with light olive brown (5Y5/6); ostracod horizons present. (Colour indicates weathering by percolating water).	1	6	0.46	27	0	8.23
Siltstone, dusky yellow (5Y6/4), with clayey silt and silty clay partings, and fine sandstone (ferruginous) moderate brown (5YR5/4). Plant bearing with rootlet/worm tubes.	-	7	0.18	27	7	8.41

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TQ22/19

	Thickness			Depth to base		
	ft	in	m	ft	in	m
Mudstone, silty, laminated dark greenish grey with ferruginous staining (5GY4/1); becoming more clayey and greyer downward. ?Rootlet/worm tubes.	1	3	0.38	28	10	8.79
<u>Open hole (no core, no cuttings obtained).</u>	6	2	1.88	35	0	10.67
Mudstone, silty, medium grey (N4-N5), iron-stained dark yellowish orange (10YR6/6) to moderate brown (5YR3/4) on joints and in cavities. Local carbonaceous fragments at 35 ft 6 in. (10.82 m), striped light grey (N7) c. 36 ft (10.97 m) (where seen).	6	0	1.83	41	0	12.50
Mudstone, silty, laminated becoming darker, more massive below and less silty. Dark greenish grey (5GY4/1) to medium bluish grey (5B5/1). Shell bands ('small-Paludina') 41 ft to 43 ft (12.50 to 13.11 m), (chitinous segment at 42 ft 6 in (12.95 m)), 44 ft 10 in (13.71 m) (13.67 m (12.7 mm)), 45 ft 3 in (13.79 m) (fish); Rootlets at 45 ft 6 in (13.87 m), carbonaceous fragments 46 ft 0-3 in (14.02 - 14.10 m). Ostracodes throughout.	5	3	1.60	46	3	14.10
Mudstone, with local silt partings. Siltstone beds in places to 1/2 in (12.7 mm). Dark grey (N5) becoming shaly at 54 ft (16.46 m), olive black (5Y2/1) tending to dark greenish grey (5GY3/1), becoming dark greenish grey, (5GY4/1) at 57 ft (17.37 m). Ostracodes 48 ft to 49 ft 6 in (14.63 to 15.09 m); carbonaceous fragments at 49 ft, 53 ft 0-6 in (14.94, 16.15-16.31 m). Bioturbated c. 47 ft, 50 ft 3 in - 51 ft, 54 ft (14.33, 15.32 - 15.54, 16.46 m).	11	3	3.43	57	6	17.53
Mudstone, very slightly silty, vaguely laminated. Ostracod rich band at 58 ft (17.68 m).	1	0	0.30	58	6	17.83
Mudstone, silty, laminated, dark greenish grey (5GY4/1).	1	6	0.46	60	0	18.29
Mudstone, very slightly silty, vaguely laminated.	1	0	0.30	61	0	18.59

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TQ22/19
depth

	Thickness			to base		
	ft	in	m	ft	in	m
Mudstone, very slightly silty, hard. Laminated in parts becoming bioturbated at 63 ft - 64 ft 7 in (19.20 - 19.69 m) but locally laminated still. Ostracod bands above thick laminations at 61 ft 6 in (18.75 m). Greenish grey (5GY5/1) tending to light olive grey (5Y4/1)* in parts. Shelly band at 62 ft 9 in (19.13 m) below bioturbated bed.	3	7	1.10	64	7	19.69
Mudstone, laminated to massive, greenish black (5GY2/1) to olive black (5Y2/1) rapidly becoming light olive grey (5Y6/1)*.	2	5	0.75	67	0	20.42
Mudstone, slightly silty, bioturbated (bioturbation shown by irregular red patches), hard, blocky as between 67 ft 3 in and 69 ft (20.50 and 21.03 m). Dark greenish grey (5GY3/1). Plant remains and worm tubes at 68 ft 6 in (20.88 m).	2	6	0.76	69	6	21.18
Mudstone, silty, well laminated locally but bioturbated, with vague dark and pale alternations in dark greenish grey (5GY4/1) alternating with more clayey dark greenish grey (5GY4/1). No fossils seen. Current lineations at 70 ft (21.34 m). Bioturbation occurs throughout (within bands in laminated beds). Lamination becomes less distinct 77 ft 6 in (23.62 m) to 79 ft 6 in (24.23 m), 89 ft 0 in to 92 ft (27.13 to 28.04 m), 94 ft 6 in to 96 ft (29.80 to 29.26 m). Dip less than 5°.	29	6	9.00	99	0	30.18
Mudstone, slightly silty, medium/dark greenish grey (5GY5/1)* (sudden colour change here). Sporadically laminated. Ostracods. Tends to be less green, more bioturbated (trails etc) at 99 ft 6 in (30.33 m); striping developed c. 101 ft (30.78 m).	6	0	1.82	105	0	32.00
Mudstone, slightly silty, homogeneous, medium grey (N5)* locally olive tinged tending to light grey (N6)*. Shelly band at 105 ft 3 in (32.08 m). Ostracods scattered throughout and at base.	2	5	0.74	107	5	32.74
Ostracods 14 ft 11 in (4.45 m) (5Y6/1)*	-	1	0.03			

and medium grey (N5) tending to greenish grey (5Y6/1)

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TQ22/19
Depth

	Thickness			to base		
	ft	in	m	ft	in	m
Mudstone, as above, becoming bioturbated at 109 ft (33.22 m), olive tinged at 109 ft 9 in (33.45 m), reverting to medium light grey (M6)* at 110 ft 2 in (33.58 m), sporadically thinly striped. At 111 ft 6 in (33.99 m) becomes bioturbated. Carbonaceous fragments 114 ft to 116 ft (34.75 to 35.36 m). Ostracods at 116 ft (35.36 m).	10	9	3.27	110	3	36.04
Mudstone, as above, but striped, the lamination decreasing in intensity below 119 ft 4 in (36.37 m). Carbonaceous fragments 119 ft 4 in to 121 ft (36.37 to 36.88 m) esp. 119 ft 6 in (36.42 m) - Tractlets here.	2	9	0.84	121	0	36.88
Mudstone, medium light grey (M6)*, homogeneous, massive with plant fragments. Locally olive tinged.	2	0	0.61	123	0	37.49
(Core diameter reduced to 2" (0.08 m)).						
Mudstone, homogeneous, silty, dark greenish grey (5GY4/1)*, becoming medium dark grey (M4) at 123 ft 5 in (37.62 m) with ostracod-bearing laminae and shell pockets. At 125 ft 6 in (38.25 m) becomes medium grey (M5)* with olive tinge locally.	4	0	1.22	127	0	38.71
Mudstone, silty, medium grey (M5)* tending to light grey (M7)*, bioturbated with occasional bands of striped variety, esp. 129 ft 3 in to 131 ft 6 in (39.40 to 40.08 m) becoming massive with carbonaceous fragments to 133 ft (40.54 m), laminated at 135 ft 6 in (41.30 m) then massive bioturbated to 137 ft 6 in (41.91 m) where vaguely bedded, increasingly massive, less bioturbated.	12	10	3.91	139	10	42.62
Mudstone, hard, dark greenish grey with $\frac{1}{2}$ in (12.7 mm) siltstone, greenish grey (5GY6/1) at base.	-	9 $\frac{1}{2}$	0.24	140	7 $\frac{1}{2}$	42.86
Mudstone, silty, bioturbated with local laminations, greenish grey becoming dark grey below, striped from 143 ft 11 in to 144 ft 3 in (43.87 to 43.97 m) massive light grey (M6)* with darker wisps giving vague lamination becoming						

302/127

TQ22/19

	Thickness			Depth to base		
	ft	in	m	ft	in	m
increasingly bioturbated to 145 ft 7 in (44.37 m), striped from 146 ft 0-4 in (44.50 - 44.60 m), increasingly bioturbated to 146 ft 10 in (44.75 m), striped to 147 ft (44.81 m); homogeneous, fissile with occasional trail markings to 149 ft 4 in (45.52 m). Ostracods at 148 ft 10 in (45.36 m).	8	8½	2.66	149	4	45.52
Slacken-sided zone of above lithology consisting of upper shatter zone and lower sub-vertical slacken-side zone.	-	8	0.20	150	0	45.72
Mudstone, silty, striped initially becoming bioturbated from 150 ft 3 in to 151 ft 6 in (45.80 to 46.18m); then homogeneous, massive, only slightly bioturbated medium light grey (N5)* (olive tinged at 153 ft (46.63 m) downward) becoming laminated (not colour distinct) with rough mottled bedding surfaces to 156 ft 2 in (47.60 m). Slacken-sides at 151 ft 4 in (46.13 m), 152 ft 9 in (46.56 m).	6	2	1.88	156	2	47.60
Mudstone, silty, striped, laminae internally bioturbated, medium light grey (N6)*, becoming well-bedded homogeneous from 157 ft (47.85 m) tending to very silty, well laminated to base.	1	6	0.46	157	8	48.06
Mudstone, with silty and sandy partings, the latter being irregularly shaped.	-	4	0.10	158	0	48.16
Sandstone, greenish gray (5GY6/1) to pale olive gray (5Y6/1), fine-grained, compact, calcareous, locally well laminated with occasional silt/mudstone lenses. Micaceous, lignite particles present. Becomes greyer, silty 160 ft 0-4 in (48.77-48.87 m).	3	1	0.94	161	1	49.10
Siltstone, alternating with silty mudstone tending to clayey.	1	11	0.58	163	0	49.68
Mudstone, silty, hard, laminated to 164 ft 6 in (50.14 m), then massive with many carbonaceous fragments and occasional bands of greenish waxes tending to be more argillaceous to base.	4	0	1.22	167	0	50.90

HORSHAM
STONE
(upper
BED)

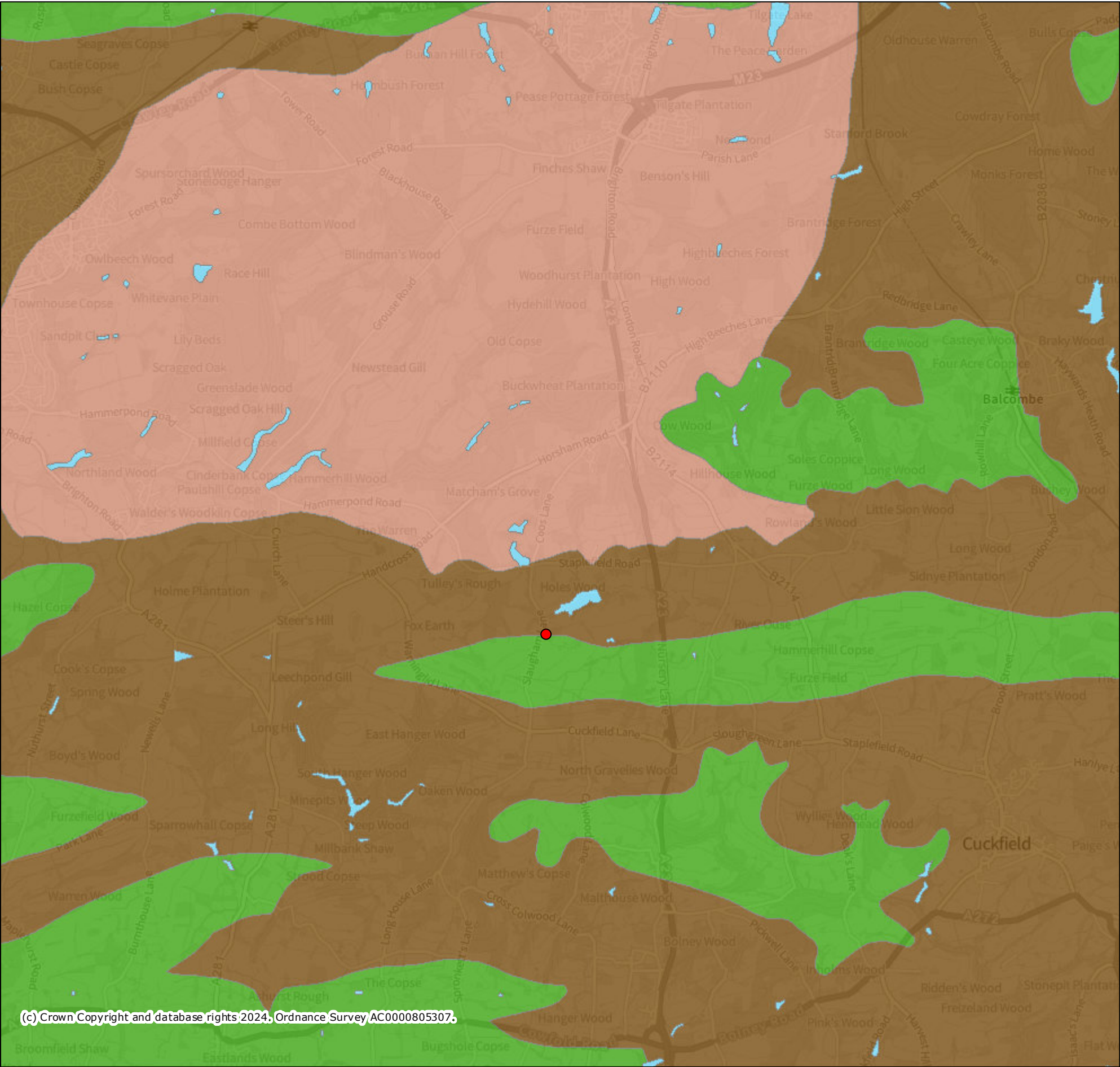
302/127

TQ22/19

	Thickness			Depth to base		
	ft	in	m	ft	in	m
Mudstone, light grey (W7)*, homogeneous, well bedded with ostracod partings at 167 ft 0 in (50.90 m) and at 167 ft 9 in (51.13 m), rapidly becoming bioturbated below 167 ft 9 in (51.13 m). Slickensides at 167 ft 4 in (51.00 m).	1	8	0.51	168	8	51.41
Mudstone, silty, evenly laminated, well-bedded, medium grey (W5)* with sharp contact above. Contains occasional 'stringers' of organic debris becoming olive grey, non-laminated at 171 ft 7 in (52.30 m), reverting to medium light grey (W6)* colour laminated at 173 ft (52.73 m), becoming medium grey (W5)* olive tinged at 174 ft (53.04 m), bioturbated 177 ft to 178 ft (53.95 to 54.25 m), striped to 178 ft 7 in (54.43 m), homogeneous with slight colour lamination to 179 ft 7 in (54.74 m): lamination lost by overall oxidation to 180 ft (54.86 m). Continues to 183 ft 10 (56.03 m) in as fairly homogeneous with occasional green/black wisps (bioturbated), becoming striped at 183 ft 10 in (56.03 m), reverting to homogeneous, slightly bioturbated at 184 ft 8 in (56.29 m). Medium light grey (W6)*, homogeneous with occasional carbonaceous fragments to base. Listric surfaces at 183 ft 9 in, 184 ft 9 in (51.43, 56.31 m).	17	6	5.33	186	2	56.74
Mudstone, silty, bioturbated, with sharp contact above. Rapidly becomes non-bioturbated, locally striped: colour laminated to base.	1	1	0.33	187	3	57.07
Mudstone, silty and sandy, calcareous becoming sandier downward. Sandy lentils slickensided against pinkish clayey lentils, bedding disturbed.	-	11	0.28	188	2	57.35
Sandstone, hard, calcareous with occasional clayey partings containing lignite fragments. Rootlets evident in more calcareous bands. Most contacts are deformed by differential compaction. Local high dips (20°) in sandier beds due to slumping? The bedding is apparently rhythmic: mudstone grading to siltstone upwards, capped by a more	2	0	0.07	194	2	58.07

HORSHAM
STONE
(LOWER
BED)

7.3 **Appendix C – Soilscape**



Legend

Soilscape (England)

- 1 - Saltmarsh soils
- 2 - Shallow very acid peaty soils over rock
- 3 - Shallow lime-rich soils over chalk or limestone
- 4 - Sand dune soils
- 5 - Freely draining lime-rich loamy soils
- 6 - Freely draining slightly acid loamy soils
- 7 - Freely draining slightly acid but base-rich soils
- 8 - Slightly acid loamy and clayey soils with impeded drainage
- 9 - Lime-rich loamy and clayey soils with impeded drainage
- 10 - Freely draining slightly acid sandy soils
- 11 - Freely draining sandy breckland soils
- 12 - Freely draining floodplain soils
- 13 - Freely draining acid loamy soils over rock
- 14 - Freely draining very acid sandy and loamy soils
- 15 - Naturally wet very acid sandy and loamy soils
- 16 - Very acid loamy upland soils with a wet peaty surface
- 17 - Slowly permeable seasonally wet acid loamy and clayey soils
- 18 - Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils
- 19 - Slowly permeable wet very acid upland soils with a peaty surface
- 20 - Loamy and clayey floodplain soils with naturally high groundwater
- 21 - Loamy and clayey soils of coastal flats with naturally high groundwater
- 22 - Loamy soils with naturally high groundwater
- 23 - Loamy and sandy soils with naturally high groundwater and a peaty surface
- 24 - Restored soils mostly from quarry and opencast spoil
- 25 - Blanket bog peat soils
- 26 - Raised bog peat soils
- 27 - Fen peat soils
- 28 - Sea
- 30 - UC
- 31 - Water

Projection = OSGB36
xmin = 512600
ymin = 121700
xmax = 538000
ymax = 135100

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7.4 **Appendix D – Infiltration test results report**

Ref: C3424

David Simpson & Phil Marshall

18th December 2024**Re: Old Park Lodge, Warninglid– Soakaway Testing – Infiltration Test Result Summary**

The following investigation was carried out at the above location in accordance with our quotation.

1. Site Works

The aim of this investigation is to provide soakaway test data in accordance with the guidance outlined in BRE Document 365 (Soakaway Design). The test was conducted at a location corresponding to the proposed locations for potential infiltration devices.

The accompanying drawing shows the location of the test pit. The BRE365 pit was excavated to a depth of 0.9m, consistent with the anticipated depth of a possible infiltration feature.

The testing commenced on 5th December 2024 with three tests being undertaken in accordance with BRE 365.

2. BRE 365 Soakaway Test Findings

The SAT 1 test, was conducted on subsoils identified as very thick clay, and yielded a BRE 365 design infiltration rate of 1.00×10^{-6} m/s. This was the slowest rate of among the three tests performed. The infiltration rate confirmed poor infiltration characteristics.

3. BRE 365 Soakaway Test Results

Test Pit No	Infiltration Rate (1-3 Tests)			Depth of Test	Soil Type
SAT1	1.78x10 ⁻⁶ m/s	1.57x10 ⁻⁶ m/s	1.00x10 ⁻⁶ m/s	0.9m	Very thick clay

Appendix A – Soakaway Test Location Plan





Consulting Civil Engineers

Appendix B – Site Photographs

Old Park Lodge, Warninglid- Infiltration Test Photographs



Old Park Lodge, Warninglid- Infiltration Test Photographs



Old Park Lodge, Warninglid- Infiltration Test Photographs



Appendix C – Soakaway Test Results

SAT1

Job: Old Park Lodge, Warrinlid - Test 1

Infiltration Calculator

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

a_{p50} = Internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} = The time for the water level to fall from 75% to 25% effective depth

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	0.9
Trial pit length	=	1

a_{p50} = 1.47 m/squared

t_{p75-25} = 51650 seconds

V_{p75-25} = 0.135 m/cubed

F =

1.78E-06

Job: Old Park Lodge, Warrnglid - Test 2

Infiltration Calculator

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

a_{p50} = Internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} = The time for the water level to fall from 75% to 25% effective depth

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	0.9
Trial pit length	=	1

a_{p50} = 1.47 m/squared

t_{p75-25} = 58650 seconds

V_{p75-25} = 0.135 m/cubed

F =

1.57E-06

Job: Old Park Lodge, Warringlid - Test 3

Infiltration Calculator

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

a_{p50} = Internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} = The time for the water level to fall from 75% to 25% effective depth

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	0.9
Trial pit length	=	1

a_{p50} = 1.47 m/squared

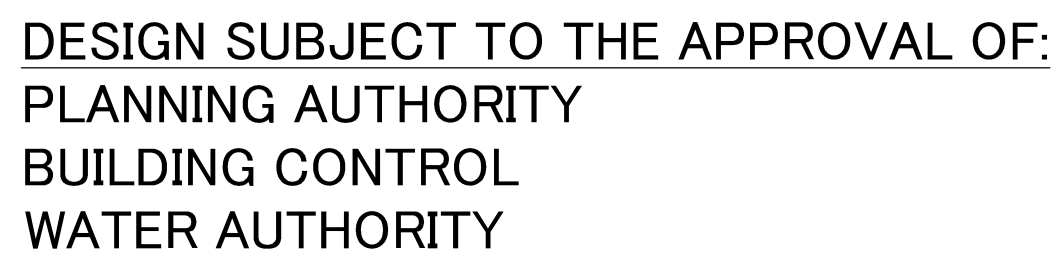
t_{p75-25} = 91700 seconds

V_{p75-25} = 0.135 m/cubed

F =

1E-06

7.5 **Appendix E – Existing Runoff, Proposed Drainage Strategy, Contributing Area Plan, Exceedance Flow Routes and Hydraulic Calculations**



DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
LOCATION AND DEPTH OF EXISTING UTILITIES
ROOT PROTECTION AREAS



- STANDARD DRAWING NOTES
1. DO NOT SCALE FROM THIS DRAWING. REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
 2. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
 3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
 4. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
 5. BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST VERIFY AND DETERMINE INVERT LEVELS OF THE EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
 6. ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT. THE WORKS SHOULD PROCEED UPSTREAM AND 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.
 7. COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
 8. ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA
 9. ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS65 (SWS) ONLY, OR CONCRETE PIPES TO BE EN 1916 AND BS5911-PART 1.
 10. ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND PROTECTIVE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATING AND FRAMES TO BS EN 2424, UNLESS OTHERWISE STATED.
 11. ALL ADAPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN DOWN IN SEWERS FOR ADOPTION 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
 12. ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS AND DRAINAGE DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
 13. 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 DRAWINGS CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
 14. STUB CONNECTIONS TO ADAPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
 15. IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
 16. NO PRIVATE AREAS ARE TO DRAIN INTO ADAPTABLE AREAS AND VICE VERSA.
 17. ALL EXISTING MANHOLE COVERS, GULLIES, ETC. ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
 18. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT
 19. UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEY OF DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION
 20. MANHOLE AND CHAMBER COVER GRADERS

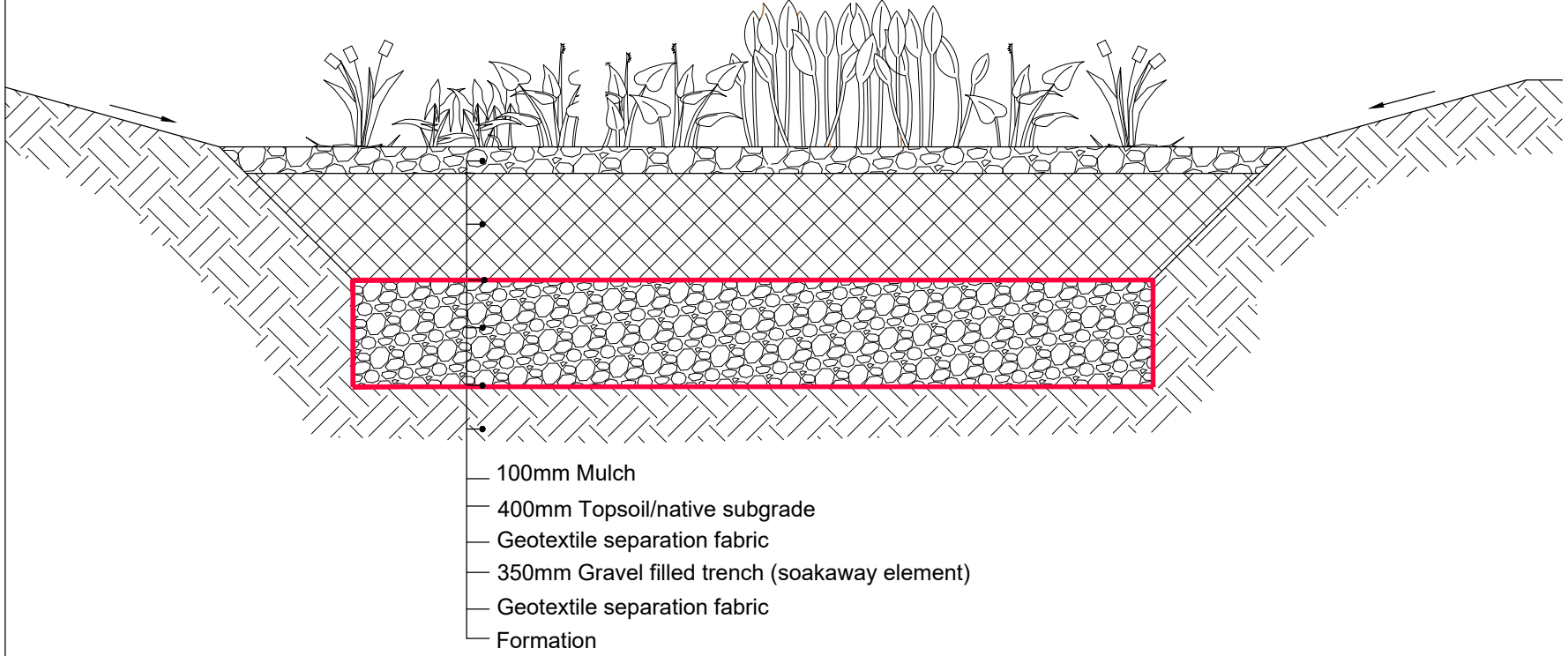
- 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
- 'B125' IN ALL DRIVEWAYS
- 'C250' IN PRIVATE PARKING AREAS
- 'D400' IN CARRIAGEWAY/ACCESS ROAD

Prefixed to drawing numbers shall signify the following:-

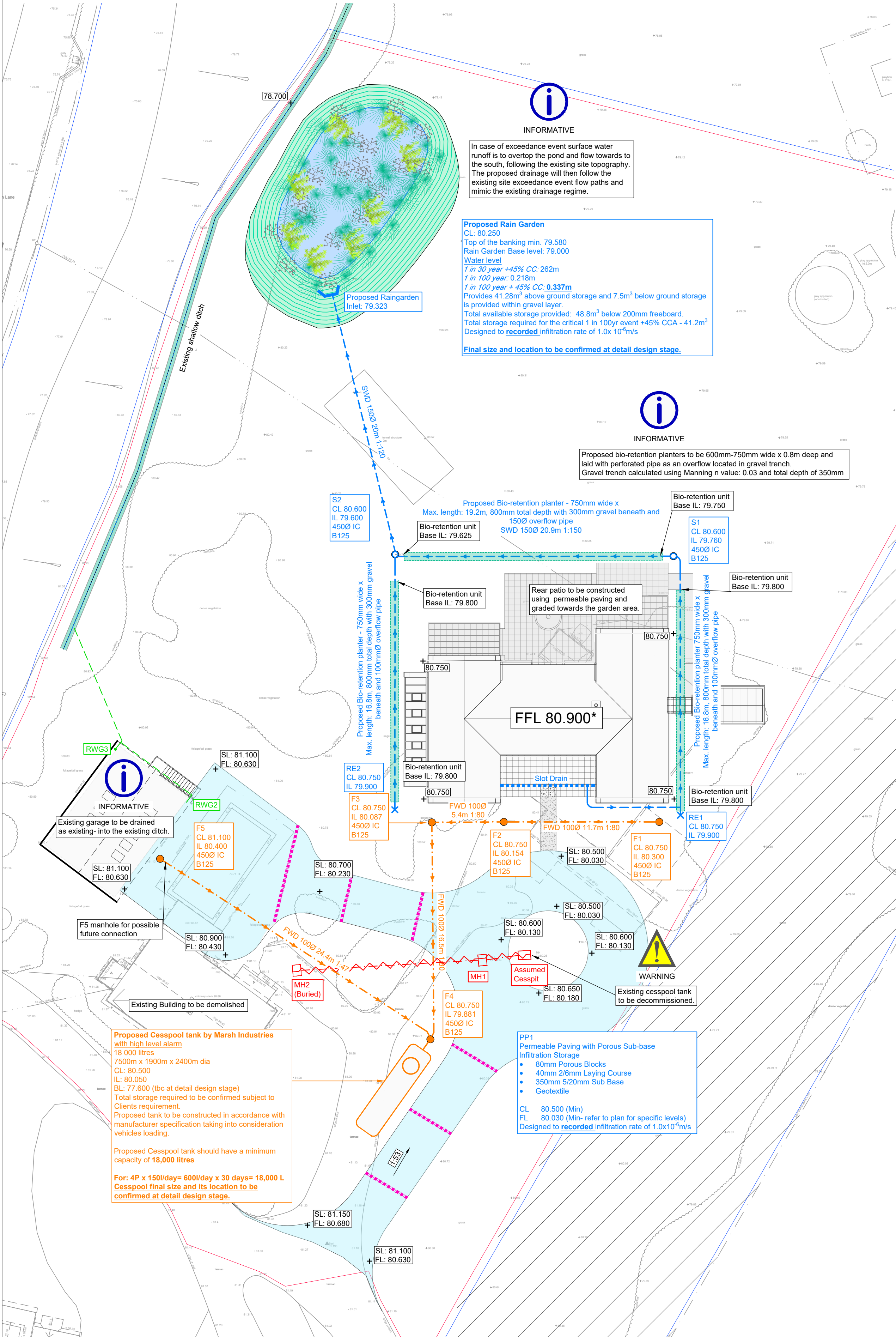
PL = PLANNING	Shall <u>not</u> be used for contract or construction purposes
P = PRELIMINARY	Shall <u>not</u> be used for contract or construction purposes
T = TENDER	Shall <u>not</u> be used for construction purposes
C = CONSTRUCTION	These are the <u>only</u> drawings that shall be used for construction purposes
R = RECORD	Record of actual completed work

				
Consulting Civil Engineers				
CLIENT DAVID SIMPSON & PHIL MARSHALL				
ARCHITECT THORNTON ARCHITECTURE + DESIGN				
JOB TITLE OLD PARK LODGE, WARNINGLID, RH17 5TJ				
DRAWING TITLE EXISTING RUNOFF				
DRAWN MR	ENGINEER TZ	CHECKED TZ	APPROVED CS	
DATE DECEMBER 2024		SCALE @ A1	1:200	
JOB No. C3424	STATUS PL	DRAWING No. 051	REV. PL-	

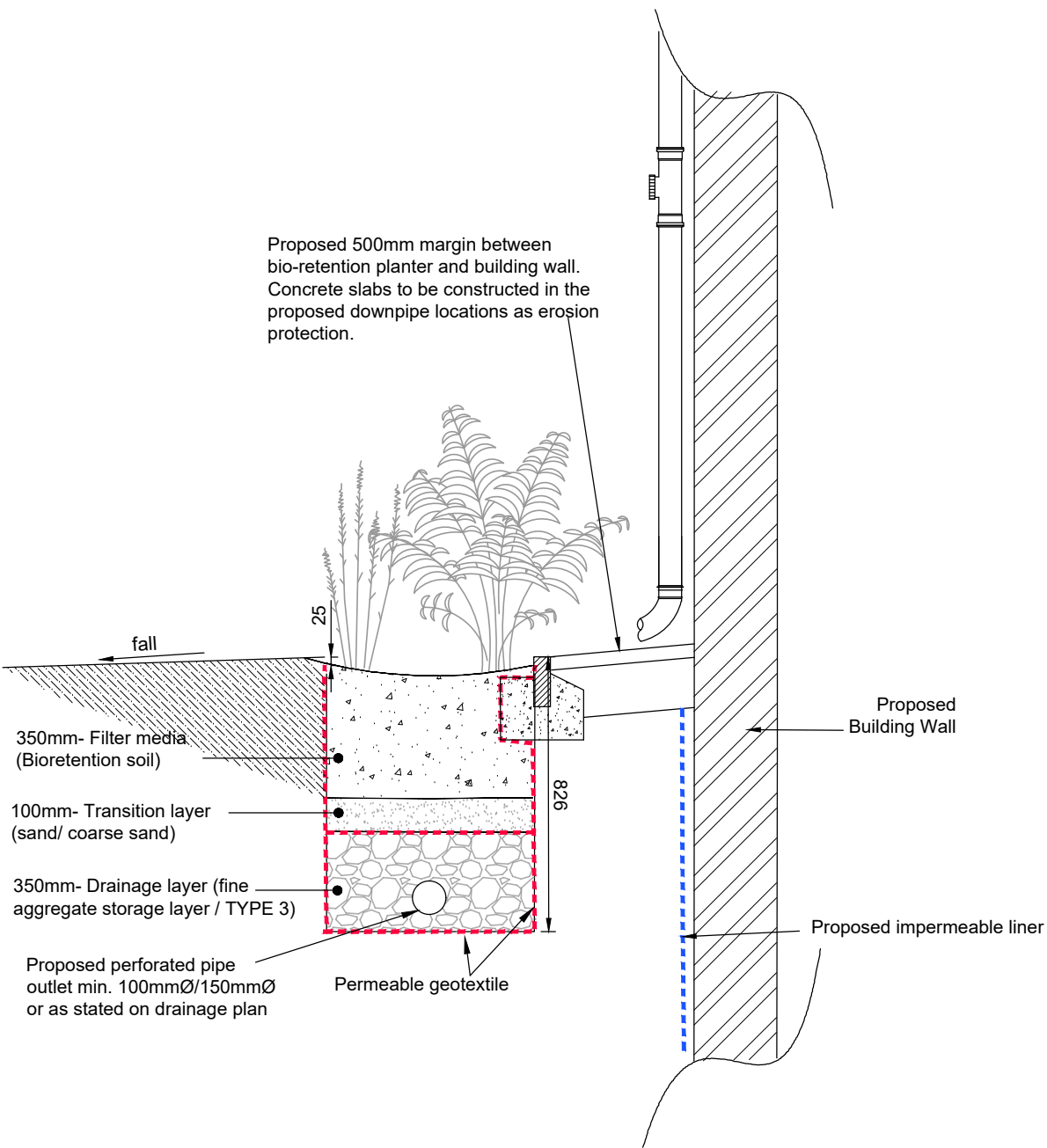
RAIN GARDENS TO BE PLANTED WITH A MINIMUM OF 10 SPECIES LISTED BELOW			
COMMON NAME	SCIENTIFIC NAME	HABIT	SUNLIGHT AND ASPECT
GUELDER ROSE	VIBURNUM OPULIS	PERENNIAL SHRUB	ANY
DOGWOOD	CORNUS SANGUINEA	PERENNIAL SHRUB	ANY
CULVERS ROOT	VERONICASTRUM VIRGINICUM	HERBACEOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
ASTER	ASTER SPP.	HERBACEOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
BLACK EYED SUSAN	RUDBECKIA BIRTA	HERBACEOUS ANNUAL OR BIENNIAL	FULL SUN OR PARTIAL SHADE
STINKING HELLEBORE	HELLEBORUS FOETIDUS	HERBACEOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
MONTBRETIA	CROCOSMIA SPP.	DECIDUOUS RHIZOMATOUS PERENNIAL	PARTIAL SHADE
BUGLE	AJUGA REPTANS	RHIZOMATOUS PERENNIAL	PARTIAL SHADE
COLUMBINE	AQUILEGIA SPP.	HERBACEOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
INULA	INULA HOOKERI	HERBACEOUS PERENNIAL	PARTIAL SHADE
HEMP AGRIMONY	EUPATORIUM CANNABINUM	HERBACEOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
BELLFLOWER	CAMPANULA GLOMERATA	HERBACEOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
SNEEZEWEED	HELENIUM SP.	HERBACEOUS PERENNIAL	FULL SUN
LESSER PERIWINKLE	VINCA MINOR	PERENNIAL SUB-SHRUB	ANY
ELEPHANTS EAR	BERGENIA SP.	RHIZOMATOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
PLANTAIN LILIES	HOSTA SPP.	HERBACEOUS PERENNIAL	PART SHADE
YELLOW FLAG	IRIS PSEUDOCORUS	RHIZOMATOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
SIBERIAN FLAG	IRIS SIBIRICA	RHIZOMATOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
GARLIC AND ONIONS	BULBOSUS SPP.	PERENNIALS	FULL SUN
SOFT RUSH	JUNCUS EFFUSUS	EVERGREEN PERENNIAL	FULL SUN OR PARTIAL SHADE
PENDULOUS SEDGE	CAREX PENDULA	RHIZOMATOUS PERENNIAL	FULL SUN OR PARTIAL SHADE
ZEBRA GRASS	MISCANTHUS SINENSIS	PERENNIAL, DECIDUOUS GRASS	FULL SUN
SWITCH GRASS	PANICUM VIRGATUM	DECIDUOUS PERENNIAL GRASS	FULL SUN
ROYAL FERN	OSMUNDA REGALIS	DECIDUOUS FERN	ANY
MALE FERN	DRYOPTERIS FELIX-MAS	"DECIDUOUS OR EVERGREEN FERN"	PARTIAL SHADE OR FULL SHADE
BROAD BUCKLER FERN	DRYOPTERIS DILATATA	"DECIDUOUS OR EVERGREEN FERN"	PARTIAL SHADE OR FULL SHADE



Typical Rain Garden Detail



Proposed 500mm margin between bio-retention planter and building wall. Concrete slabs to be constructed in the proposed downpipe locations as erosion protection.

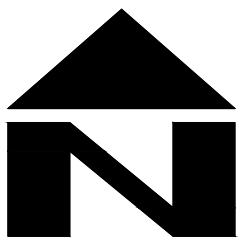


Proposed Bio-retention Unit Typical Detail (Scale 1:20)

- Site Specific Notes**
- Proposed SW and FW drainage designed based on desktop study, infiltration test results, BGS Map viewer website and from information provided from site.
 - Based on the site walkover and existing drainage CCTV, it was confirmed that surface water runoff from the existing building discharges either onto the ground or into the existing ditch. The site's topography indicates that any overland flows are directed toward the existing ditch, flowing into the ground depression located northwest, adjacent to Slaughtam Lane. Surface water runoff then discharges into the wetland, from where it flows towards third-party land and ultimately into the existing shallow ditch, which directed surface water into the existing Slaughtam Mill Pond.
 - The proposed surface water management strategy involves collecting runoff and directing it into onsite bio-retention planters. Any excess runoff will then be discharged into the onsite rain garden, where it will infiltrate into the ground.
 - The proposed bio-retention planters will facilitate both infiltration and runoff interception, effectively reducing the required downstream storage and ensuring that the proposed rain garden half-empty time remains under 24 hours.
 - The proposed rain garden has been designed to accommodate the Critical 1 in 100 year + 45% CC rainfall event.
 - Drainage layout subject to external levels design by others.
 - Driveway to be constructed using permeable self-draining surface. Final surface construction to Client specifications.
 - Due to the proposed site being located within the area not served by public sewers, foul water is to be discharged into the onsite cesspool. Foul water is then to be tanked away once per month.
 - Proposed Cesspool tank location, size and type to be confirmed at detailed design stage.
 - All external levels to be designed by others. All surface levels shown for drainage purposes only. All the proposed external levels to be agreed prior construction.

- STANDARD DRAINAGE NOTES**
- DO NOT SCALE FROM THIS DRAWING. REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
 - ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
 - 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.
 - 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 SPURS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
 - 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.
 - ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA
 - ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS65 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 AND BS5911:PART 1.
 - ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D40 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
 - ALL ADAPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
 - ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
 - 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.
 - STUB CONNECTIONS TO ADAPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
 - IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
 - NO PRIVATE AREAS ARE TO DRAIN ONTO ADAPTABLE AREAS AND VICE VERSA.
 - ALL EXISTING MANHOLE COVERS, GULLIES, ETC. ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
 - IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT
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 - MANHOLE AND CHAMBER COVER GRADES:

- 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
- 'B125' IN ALL DRIVEWAYS
- 'C250' IN PRIVATE PARKING AREAS
- 'D400' IN CARRIAGEWAY/ACCESS ROAD



DESIGN SUBJECT TO THE APPROVAL OF:
PLANNING AUTHORITY
BUILDING CONTROL
WATER AUTHORITY

DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
LOCATION AND DEPTH OF EXISTING UTILITIES
ROOT PROTECTION AREAS

DRAINAGE LEGEND

EXISTING FEATURES

- Ex SWD Existing surface water sewer/drain and manhole (as taken from CCTV survey)
- Ex FWD Existing foul water sewer/drain and manhole (as taken from CCTV survey)

PROPOSED FEATURES

- FWD Foul Drainage
- SWD Surface Water Drainage
- Pipe crossing (thickening denotes pipe above)
- Storm water orifice flow control chamber (5000)
- Storm water access chamber (3000)
- Storm water inspection chamber (4500)
- Storm water rodding eye
- Proposed permeable driveway- acting as self-draining area
- Proposed impermeable footpath and patio areas
- Proposed bio-retention planter
- Foul water access chamber (3000)
- Foul water inspection chamber (4500)
- Proposed subbase concrete baffles. (See drainage 'Permeable Paving Calculations')
- Pipe info - diameter, length, gradient, bedding type
- Proposed surface and formation level- indicative only for drainage purposes. Surface levels to be designed by others.
- Fall in surface and gradient
- Finished floor level (assumed)

ABBREVIATIONS

- MH - MANHOLE
- IC - INSPECTION CHAMBER
- AC - ACCESS CHAMBER
- CP - CATCHPIT
- BC - BRAKE CHAMBER
- RE - RODDING EYE
- IL - INVERT LEVEL
- SL - SUMP LEVEL
- RA - RESTRICTED ACCESS COVER
- CL - COVER LEVEL
- TL - TOP OF CELLULAR SA
- BL - BASE OF CELLULAR SA
- FL - FORMATION LEVEL

Site Boundary (as taken from Thornton Architecture + Design 'Proposed Site Plan' drawing no: 2315.100, dated: 26.10.23)

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P2	19.03.25	UPDATED TO LPA COMMENTS	TZ	CS	CS
P1	30.01.25	UPDATED TO CLIENT COMMENTS	MR	TZ	CS
P	18.12.24	PRELIMINARY ISSUE	MR	TZ	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

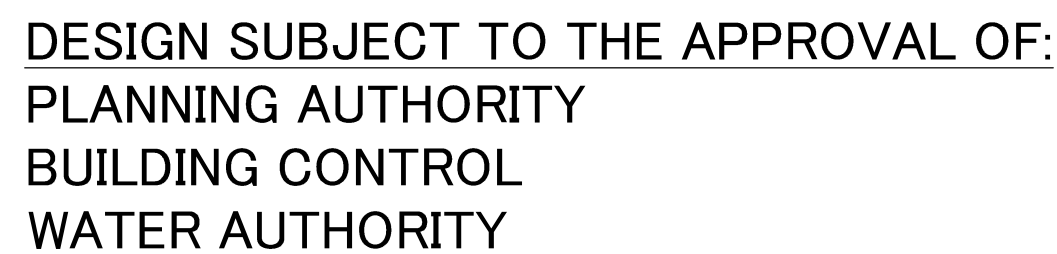
CLIENT
DAVID SIMPSON & PHIL MARSHALL

ARCHITECT
THORNTON ARCHITECTURE + DESIGN

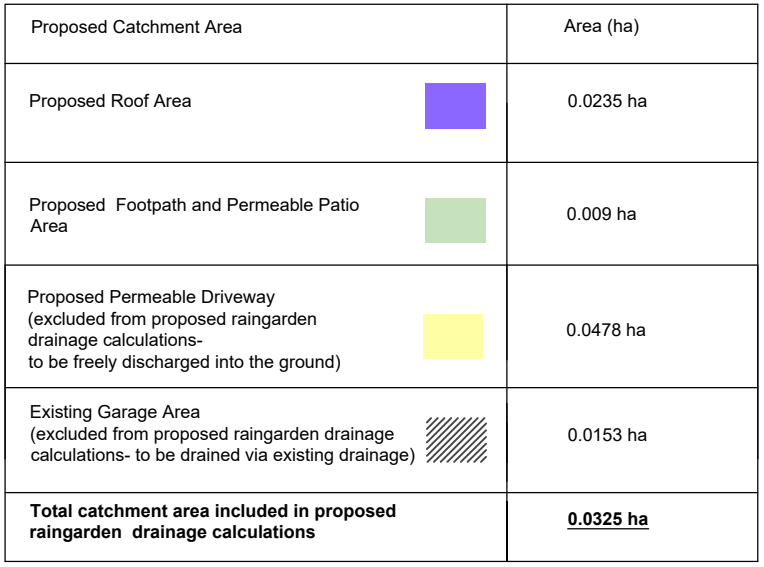
JOB TITLE
OLD PARK LODGE, WARNINGLID, RH17 5TJ

DRAWING TITLE
PROPOSED DRAINAGE STRATEGY

DRAWN MR	ENGINEER TZ	CHECKED TZ	APPROVED CS
DATE DECEMBER 2024	SCALE @ A1 1:200		
JOB NO. C3424	STATUS PL	DRAWING No. 101	REV. P3



DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
LOCATION AND DEPTH OF EXISTING UTILITIES
ROOT PROTECTION AREAS



1. DO NOT SCALE FROM THIS DRAWING. REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
2. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
4. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
5. 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 EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
6. ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT. THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE EXISTING INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZE PIPES ETC. SHOULD BE SUFFICIENT TO SOFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER. IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
7. COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
8. ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA
9. ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS95 (SWS) ONLY, OR CONCRETE PIPES TO BE EN 1916 AND BS9911-PART 1.
10. ROAD GULLY OUTLET 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 EN24, UNLESS OTHERWISE STATED.
11. ALL ADAPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN IN SEWERS FOR ADOPTION 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
12. ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATION 2008 DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
13. 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 DRAWINGS CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
14. SUB CONNECTIONS TO ADAPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
15. IF ANY SOIL SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SOIL SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
16. NO PRIVATE AREAS ARE TO DRAIN ONTO ADAPTABLE AREAS AND VICE VERSA.
17. ALL EXISTING MANHOLE COVERS, GULLIES, ETC. ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
18. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT
19. UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEY OF DRAINAGE SYSTEM WHICH TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION
20. MANHOLE AND CHAMBER COVER GRADIES.

- 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
- 'B125' IN ALL DRIVEWAYS
- 'C250' IN PRIVATE PARKING AREAS
- 'D400' IN CARRIAGEWAY/ACCESS ROAD

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P1	19.03.25	UPDATED TO LPA COMMENTS	TZ	CS	CS
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REV	DATE	DESCRIPTION	BY	CHK	APP



CLIENT
DAVID SIMPSON & PHIL MARSHALL

ARCHITECT
THORNTON ARCHITECTURE + DESIGN

JOB TITLE

OLD PARK LODGE,
WARNINGLID, RH17 5TJ

DRAWING TITLE

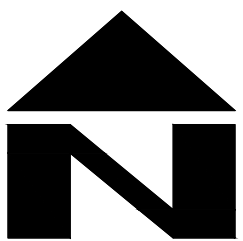
CONTRIBUTING AREA PLAN

DRAWN	ENGINEER	CHECKED	APPROVED
MR	TZ	TZ	CS

DATE	SCALE @ A1
DECEMBER 2024	1:200

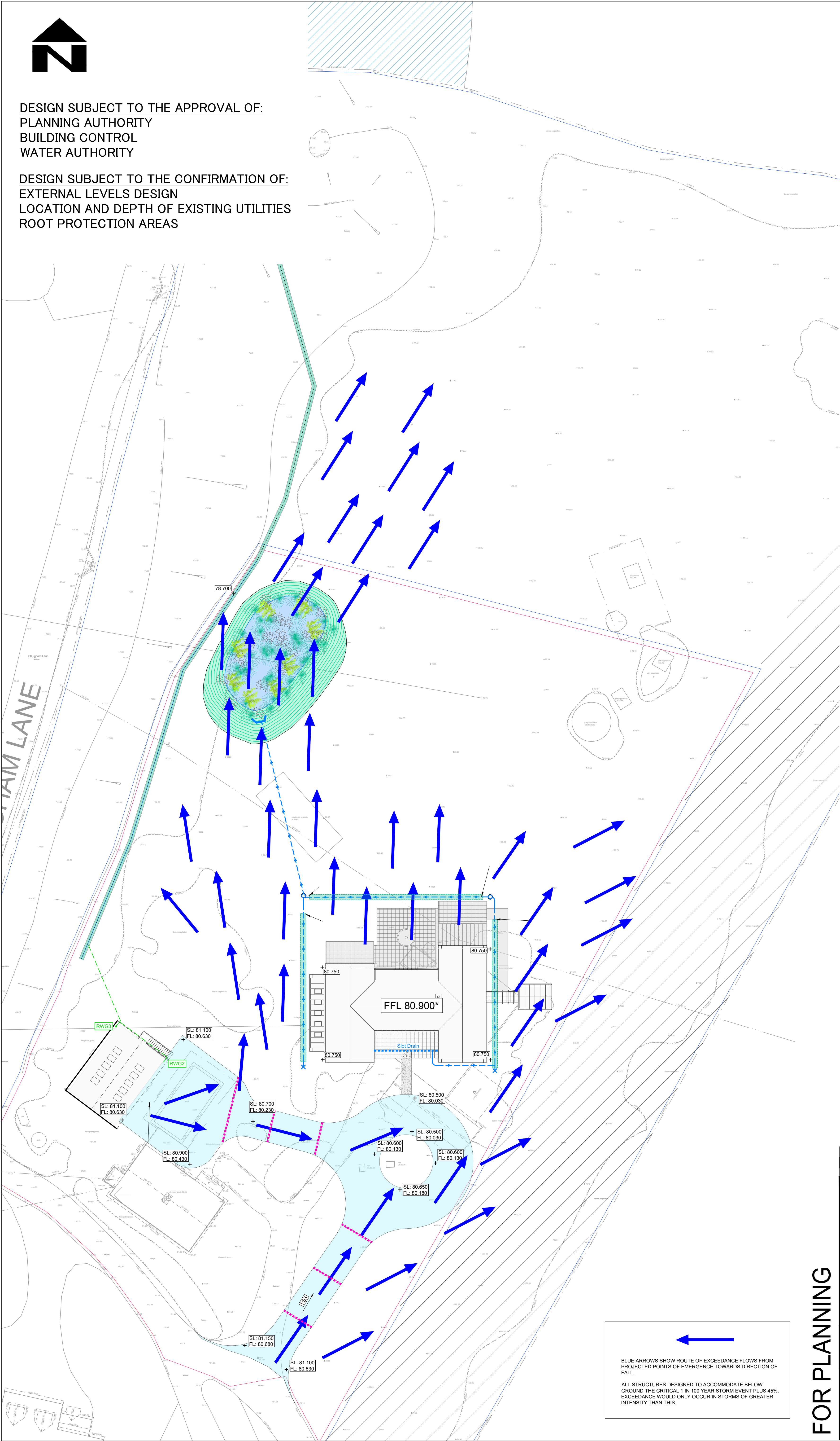
JOB No.	STATUS	DRAWING No.	REV.
C3424	PL	201	PL1

FOR PLANNING



DESIGN SUBJECT TO THE APPROVAL OF:
PLANNING AUTHORITY
BUILDING CONTROL
WATER AUTHORITY

DESIGN SUBJECT TO THE CONFIRMATION OF:
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- STANDARD DRAINAGE NOTES
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P.	18.12.24	PRELIMINARY ISSUE	MR	TZ	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

 Consulting Civil Engineers					
CLIENT DAVID SIMPSON & PHIL MARSHALL					
ARCHITECT THORNTON ARCHITECTURE + DESIGN					
JOB TITLE OLD PARK LODGE, WARNINGLID, RH17 5TJ					
DRAWING TITLE EXCEEDANCE FLOW ROUTES					
DRAWN MR	ENGINEER TZ	CHECKED TZ	APPROVED CS		
DATE DECEMBER 2024	SCALE @ A1 1:200				
JOB NO. C3424	STATUS PL	DRAWING NO. 301	REV. PL1		

FOR PLANNING

BLUE ARROWS SHOW ROUTE OF EXCEEDANCE FLOWS FROM PROJECTED POINTS OF EMERGENCE TOWARDS DIRECTION OF FALL.

ALL STRUCTURES DESIGNED TO ACCOMMODATE BELOW GROUND THE CRITICAL 1 IN 100 YEAR STORM EVENT PLUS 45% EXCEEDANCE WOULD ONLY OCCUR IN STORMS OF GREATER INTENSITY THAN THIS.

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	1.000	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)	75.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Raingarden	0.019	4.00	79.574	1200	479589.469	231599.158	0.554
J1			80.200		479593.204	231586.999	1.180
J2		4.00	80.750		479594.565	231577.663	1.000
RE1	0.005	4.00	80.750	150	479615.594	231559.883	0.733
RE2	0.005	4.00	80.750	150	479594.461	231561.575	0.733
S1	0.006	4.00	80.600	450	479615.068	231579.294	0.825
S2	0.006	4.00	80.600	450	479594.478	231579.506	1.087
J3		4.00	80.750		479615.049	231578.605	0.950
J4			80.600		479613.987	231579.275	0.836
J5		4.00	80.600		479595.662	231579.464	0.975

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)
1.001	S2	J1	20.000	0.600	79.513	79.314	0.199	100.5	150	4.34	54.0
3.001	S1	J4	1.081	0.600	79.775	79.764	0.011	98.3	100	4.04	54.0
2.000	J5	S2	1.185	0.600	79.625	79.513	0.112	10.6	150	4.01	54.0
1.000	J2	S2	1.845	0.600	79.750	79.513	0.237	7.8	150	4.01	54.0
3.000	J3	S1	1.000	0.600	79.800	79.790	0.010	100.0	100	4.02	54.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.001	1.002	17.7	1.2	0.937	0.736	0.006	0.0	26	0.566
3.001	0.775	6.1	1.2	0.725	0.736	0.006	0.0	30	0.601
2.000	3.115	55.1	0.0	0.825	0.937	0.000	0.0	0	0.000
1.000	3.633	64.2	0.0	0.850	0.937	0.000	0.0	0	0.000
3.000	0.769	6.0	0.0	0.850	0.710	0.000	0.0	0	0.000

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)
1.001	20.000	100.5	150	Circular	80.600	79.513	0.937	80.200	79.314	0.736
3.001	1.081	98.3	100	Circular	80.600	79.775	0.725	80.600	79.764	0.736
2.000	1.185	10.6	150	Circular	80.600	79.625	0.825	80.600	79.513	0.937
1.000	1.845	7.8	150	Circular	80.750	79.750	0.850	80.600	79.513	0.937
3.000	1.000	100.0	100	Circular	80.750	79.800	0.850	80.600	79.790	0.710

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.001	S2	450	Manhole	Adoptable	J1		Junction	
3.001	S1	450	Manhole	Adoptable	J4		Junction	
2.000	J5		Junction		S2	450	Manhole	Adoptable
1.000	J2		Junction		S2	450	Manhole	Adoptable
3.000	J3		Junction		S1	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
Raingarden	479589.469	231599.158	79.574	0.554	1200					
J1	479593.204	231586.999	80.200	1.180			1	1.001	79.314	150
J2	479594.565	231577.663	80.750	1.000			0	1.000	79.750	150
RE1	479615.594	231559.883	80.750	0.733	150					
RE2	479594.461	231561.575	80.750	0.733	150					
S1	479615.068	231579.294	80.600	0.825	450		1	3.000	79.790	100
							0	3.001	79.775	100
S2	479594.478	231579.506	80.600	1.087	450		1	2.000	79.513	150
							2	1.000	79.513	150
							0	1.001	79.513	150
J3	479615.049	231578.605	80.750	0.950			0	3.000	79.800	100

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
J4	479613.987	231579.275	80.600	0.836		1 	3.001	79.764	100
J5	479595.662	231579.464	80.600	0.975		0 	2.000	79.625	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

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 %)
10	0	0	0
30	0	0	0
30	45	0	0
100	0	0	0
100	45	0	0

Node Raingarden Rain Garden Storage Structure

Filter Conductivity (m/hr)	0.03600	Porosity	0.30
Filter Depth (m)	0.250	Invert Level (m)	79.020
Base Inf Coefficient (m/hr)	0.00360	Time to half empty (mins)	1336
Side Inf Coefficient (m/hr)	0.00360	Analyse flow through structure	x
Safety Factor	2.0		

Inlets

J1

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	93.0	0.574	190.0

Node J3 Bioretention Area Storage Structure

Underdrain Link Type	Circular	Filter Depth (m)	0.300
Underdrain Diameter (mm)	100	Base Inf Coefficient (m/hr)	0.00360
Underdrain Velocity	Manning	Side Inf Coefficient (m/hr)	0.00360
Underdrain ks (mm) / n	0.030	Safety Factor	1.0
Underdrain Length (m)	19.400	Porosity	0.30
Underdrain Slope (1:X)	999.0	Invert Level (m)	80.000
Underdrain Height above base (m)	0.100	Time to half empty (mins)	9
Underdrain DS Node	S1	Main Channel Length (m)	16.800
Filter Conductivity (m/hr)	0.03600	Main Channel Slope (1:X)	999.0

Node J3 Bioretention Area Storage Structure

Main Channel n 0.030

Inlet	Connects
Node	To
RE1	Underdrain

Depth	Area	Depth	Area
(m)	(m²)	(m)	(m²)
0.000	10.0	0.800	10.0

Node J2 Bioretention Area Storage Structure

Underdrain Link Type	Circular	Base Inf Coefficient (m/hr)	0.00360
Underdrain Diameter (mm)	100	Side Inf Coefficient (m/hr)	0.00360
Underdrain Velocity	Manning	Safety Factor	1.0
Underdrain ks (mm) / n	0.030	Porosity	0.30
Underdrain Length (m)	19.400	Invert Level (m)	80.000
Underdrain Slope (1:X)	999.0	Time to half empty (mins)	7
Underdrain Height above base (m)	0.100	Main Channel Length (m)	16.800
Underdrain DS Node	S2	Main Channel Slope (1:X)	999.0
Filter Conductivity (m/hr)	0.03600	Main Channel n	0.030
Filter Depth (m)	0.300		

Inlet	Connects
Node	To
RE2	Underdrain

Depth	Area	Depth	Area
(m)	(m²)	(m)	(m²)
0.000	10.0	0.800	10.0

Node J5 Bioretention Area Storage Structure

Underdrain Link Type	Circular	Base Inf Coefficient (m/hr)	0.00360
Underdrain Diameter (mm)	150	Side Inf Coefficient (m/hr)	0.00360
Underdrain Velocity	Manning	Safety Factor	1.0
Underdrain ks (mm) / n	0.030	Porosity	0.30
Underdrain Length (m)	19.200	Invert Level (m)	79.874
Underdrain Slope (1:X)	150.0	Time to half empty (mins)	
Underdrain Height above base (m)	0.100	Main Channel Length (m)	19.200
Underdrain DS Node	S2	Main Channel Slope (1:X)	150.0
Filter Conductivity (m/hr)	0.03600	Main Channel n	0.030
Filter Depth (m)	0.350		

Inlet	Connects
Node	To
J4	Underdrain

Depth	Area	Depth	Area
(m)	(m²)	(m)	(m²)
0.000	11.6	0.800	11.6



Approval Settings

Node Size	x	Coordinates	x	Full Bore Velocity	x	Time to Half Empty	✓
Node Losses	x	Crossings	x	Proportional Velocity	x	Return Period (years)	10
Link Size	x	Cover Depth	x	Surcharged Depth	x	Discharge Rates	x
Link Length	x	Backdrops	x	Flooding	x	Discharge Volume	x

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	Raingarden	304	79.145	0.125	1.2	13.1122	0.0000	OK
120 minute summer	Raingarden Filter Layer	576	79.020	0.250	0.4	6.9611	0.0000	OK
360 minute winter	J1	304	79.147	0.127	1.2	0.0000	0.0000	OK
15 minute summer	J2	11	79.765	0.015	1.4	0.2932	0.0000	OK

1440 minute winter	J2 Filter Layer	930	79.704	0.004	0.0	0.0113	0.0000	OK
15 minute summer	RE1	11	80.052	0.035	2.0	0.0000	0.0000	OK
15 minute summer	RE2	11	80.052	0.035	2.0	0.0000	0.0000	OK
30 minute summer	S1	21	79.833	0.058	3.1	0.0092	0.0000	OK
30 minute summer	S2	19	79.565	0.052	4.6	0.0083	0.0000	OK
30 minute summer	J3	20	79.838	0.038	1.3	0.2831	0.0000	OK

30 minute summer	J3 Filter Layer	21	79.769	0.069	1.1	0.2203	0.0000	OK
15 minute summer	J4	1	79.764	0.000	0.0	0.0000	0.0000	OK
15 minute summer	J5	1	79.625	0.000	0.0	0.0003	0.0000	OK

30 minute summer	J5 Filter Layer	21	79.679	0.155	4.1	0.6173	0.0000	OK
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Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
360 minute winter	Raingarden	Filtration		0.5			
120 minute summer	Raingarden Filter Layer	Infiltration		0.1			
15 minute summer	J2	1.000	S2	1.4	0.566	0.022	0.0050
15 minute summer	J2	Filtration		0.0			
15 minute summer	J2	Underdrain		0.0	0.000	0.000	0.0000
1440 minute winter	J2 Filter Layer	Infiltration		0.0			
15 minute summer	RE1	Bioretention Area	J3	1.4	0.092	0.009	
15 minute summer	RE2	Bioretention Area	J2	1.4	0.092	0.009	
30 minute summer	S1	3.001	J4	2.2	0.630	0.354	0.0056
30 minute summer	S2	1.001	J1	4.5	0.833	0.253	0.1075
30 minute summer	J3	3.000	S1	1.3	0.483	0.219	0.0030
30 minute summer	J3	Filtration		0.0			
30 minute summer	J3	Underdrain		0.0	-0.035	-0.053	0.0236
30 minute summer	J3 Filter Layer	Infiltration		0.0			
15 minute summer	J4	Bioretention Area	J5	0.0	0.000	0.000	
15 minute summer	J5	2.000	S2	0.0	0.000	0.000	0.0027
15 minute summer	J5	Filtration		0.0			
15 minute summer	J5	Underdrain		1.8	0.294	0.327	0.1167
30 minute summer	J5 Filter Layer	Infiltration		0.0			

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Raingarden	1380	79.172	0.152	0.6	16.1849	0.0000	OK
180 minute summer	Raingarden Filter Layer	360	79.020	0.250	0.5	6.9611	0.0000	OK
1440 minute winter	J1	1410	79.172	0.152	0.4	0.0000	0.0000	OK
15 minute summer	J2	11	79.768	0.018	2.0	0.3588	0.0000	OK

360 minute winter	J2 Filter Layer	344	79.704	0.004	0.0	0.0127	0.0000	OK
15 minute summer	RE1	11	80.060	0.043	2.6	0.0000	0.0000	OK
15 minute summer	RE2	11	80.060	0.043	2.6	0.0000	0.0000	OK
30 minute summer	S1	20	79.852	0.077	4.3	0.0122	0.0000	OK
30 minute summer	S2	19	79.576	0.063	6.4	0.0101	0.0000	OK
30 minute summer	J3	20	79.853	0.053	1.8	0.3429	0.0000	OK

30 minute summer	J3 Filter Layer	22	79.785	0.085	1.4	0.2803	0.0000	OK
15 minute summer	J4	1	79.764	0.000	0.0	0.0000	0.0000	OK
15 minute summer	J5	1	79.625	0.000	0.0	0.0003	0.0000	OK

30 minute summer	J5 Filter Layer	21	79.691	0.167	5.9	0.6852	0.0000	OK
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Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
1440 minute winter	Raingarden	Filtration		0.4			
180 minute summer	Raingarden Filter Layer	Infiltration		0.1			
15 minute summer	J2	1.000	S2	2.0	0.591	0.030	0.0071
15 minute summer	J2	Filtration		0.0			
15 minute summer	J2	Underdrain		0.0	0.000	0.000	0.0000
360 minute winter	J2 Filter Layer	Infiltration		0.0			
15 minute summer	RE1	Bioretention Area	J3	2.0	0.105	0.013	
15 minute summer	RE2	Bioretention Area	J2	2.0	0.105	0.013	
30 minute summer	S1	3.001	J4	3.2	0.625	0.528	0.0073
30 minute summer	S2	1.001	J1	6.4	0.919	0.362	0.1396
30 minute summer	J3	3.000	S1	1.8	0.451	0.293	0.0046
30 minute summer	J3	Filtration		0.0			
30 minute summer	J3	Underdrain		-0.2	-0.072	-0.218	0.0446
30 minute summer	J3 Filter Layer	Infiltration		0.0			
15 minute summer	J4	Bioretention Area	J5	0.0	0.000	0.000	
15 minute summer	J5	2.000	S2	0.0	0.000	0.000	0.0038
15 minute summer	J5	Filtration		0.0			
15 minute summer	J5	Underdrain		2.6	0.332	0.489	0.1529
30 minute summer	J5 Filter Layer	Infiltration		0.0			

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Raingarden	1410	79.282	0.262	1.0	30.4192	0.0000	OK
60 minute summer	Raingarden Filter Layer	278	79.020	0.250	0.6	6.9611	0.0000	OK
1440 minute winter	J1	1440	79.282	0.262	0.8	0.0000	0.0000	OK
15 minute summer	J2	11	79.772	0.022	3.0	0.4680	0.0000	OK
480 minute summer	J2 Filter Layer	320	79.705	0.005	0.0	0.0164	0.0000	OK
15 minute summer	RE1	11	80.073	0.056	3.7	0.0000	0.0000	OK
15 minute summer	RE2	11	80.073	0.056	3.7	0.0000	0.0000	OK
30 minute summer	S1	20	79.884	0.109	6.2	0.0173	0.0000	SURCHARGED
30 minute summer	S2	19	79.594	0.081	9.8	0.0129	0.0000	OK
30 minute summer	J3	20	79.886	0.086	2.8	0.4441	0.0000	OK
30 minute summer	J3 Filter Layer	23	79.836	0.136	1.7	0.4454	0.0000	OK
15 minute summer	J4	1	79.764	0.000	0.0	0.0000	0.0000	OK
15 minute summer	J5	1	79.625	0.000	0.0	0.0003	0.0000	OK
30 minute summer	J5 Filter Layer	20	79.711	0.187	8.8	0.7861	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	
1440 minute winter	Raingarden	Filtration		0.6				
60 minute summer	Raingarden Filter Layer	Infiltration		0.1				
15 minute summer	J2	1.000	S2	3.0	0.601	0.046	0.0103	
15 minute summer	J2	Filtration		0.0				
15 minute summer	J2	Underdrain		0.0	0.000	0.000	0.0000	
480 minute summer	J2 Filter Layer	Infiltration		0.0				
15 minute summer	RE1	Bioretention Area	J3	3.0	0.122	0.019		
15 minute summer	RE2	Bioretention Area	J2	3.0	0.122	0.019		
30 minute summer	S1	3.001	J4	4.6	0.602	0.763	0.0085	
30 minute summer	S2	1.001	J1	9.8	1.022	0.553	0.1917	
30 minute summer	J3	3.000	S1	2.7	0.445	0.440	0.0074	
30 minute summer	J3	Filtration		0.0				
30 minute summer	J3	Underdrain		-0.6	-0.131	-0.792	0.0814	
30 minute summer	J3 Filter Layer	Infiltration		0.0				
15 minute summer	J4	Bioretention Area	J5	0.0	0.000	0.000		
15 minute summer	J5	2.000	S2	0.0	0.000	0.000	0.0057	
15 minute summer	J5	Filtration		0.0				
15 minute summer	J5	Underdrain		4.1	0.380	0.755	0.2026	
30 minute summer	J5 Filter Layer	Infiltration		0.0				

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Raingarden	1410	79.238	0.218	0.8	24.4421	0.0000	OK
120 minute summer	Raingarden Filter Layer	290	79.020	0.250	0.6	6.9611	0.0000	OK
1440 minute winter	J1	1440	79.238	0.218	0.6	0.0000	0.0000	OK
15 minute summer	J2	11	79.770	0.020	2.5	0.4223	0.0000	OK

480 minute winter	J2 Filter Layer	344	79.705	0.005	0.0	0.0145	0.0000	OK
15 minute summer	RE1	11	80.067	0.050	3.2	0.0000	0.0000	OK
15 minute summer	RE2	11	80.067	0.050	3.2	0.0000	0.0000	OK
30 minute summer	S1	20	79.871	0.096	5.5	0.0153	0.0000	OK
30 minute summer	S2	19	79.587	0.074	8.5	0.0118	0.0000	OK
30 minute summer	J3	20	79.873	0.073	2.4	0.4061	0.0000	OK

30 minute summer	J3 Filter Layer	24	79.813	0.113	1.6	0.3702	0.0000	OK
15 minute summer	J4	1	79.764	0.000	0.0	0.0000	0.0000	OK
15 minute summer	J5	1	79.625	0.000	0.0	0.0003	0.0000	OK

30 minute summer	J5 Filter Layer	20	79.704	0.180	7.7	0.7495	0.0000	OK
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Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
1440 minute winter	Raingarden	Filtration		0.5			
120 minute summer	Raingarden Filter Layer	Infiltration		0.1			
15 minute summer	J2	1.000	S2	2.5	0.592	0.039	0.0089
15 minute summer	J2	Filtration		0.0			
15 minute summer	J2	Underdrain		0.0	0.000	0.000	0.0000
480 minute winter	J2 Filter Layer	Infiltration		0.0			
15 minute summer	RE1	Bioretention Area	J3	2.5	0.115	0.016	
15 minute summer	RE2	Bioretention Area	J2	2.5	0.115	0.016	
30 minute summer	S1	3.001	J4	4.1	0.593	0.681	0.0084
30 minute summer	S2	1.001	J1	8.5	0.987	0.480	0.1720
30 minute summer	J3	3.000	S1	2.3	0.436	0.382	0.0064
30 minute summer	J3	Filtration		0.0			
30 minute summer	J3	Underdrain		-0.4	-0.109	-0.526	0.0677
30 minute summer	J3 Filter Layer	Infiltration		0.0			
15 minute summer	J4	Bioretention Area	J5	0.0	0.000	0.000	
15 minute summer	J5	2.000	S2	0.0	0.000	0.000	0.0049
15 minute summer	J5	Filtration		0.0			
15 minute summer	J5	Underdrain		3.5	0.363	0.649	0.1842
30 minute summer	J5 Filter Layer	Infiltration		0.0			

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	Raingarden	945	79.357	0.337	1.5	41.2373	0.0000	OK
30 minute summer	Raingarden Filter Layer	264	79.020	0.250	0.6	6.9611	0.0000	OK
960 minute winter	J1	960	79.357	0.337	1.2	0.0000	0.0000	OK
15 minute summer	J2	11	79.775	0.025	3.9	0.5543	0.0000	OK
600 minute summer	J2 Filter Layer	405	79.706	0.006	0.0	0.0193	0.0000	OK
15 minute summer	RE1	11	80.083	0.066	4.7	0.0000	0.0000	OK
15 minute summer	RE2	11	80.083	0.066	4.7	0.0000	0.0000	OK
30 minute summer	S1	19	79.913	0.138	7.8	0.0220	0.0000	SURCHARGED
15 minute summer	S2	11	79.610	0.097	12.9	0.0154	0.0000	OK
30 minute summer	J3	19	79.919	0.119	3.5	0.5232	0.0000	SURCHARGED
30 minute summer	J3 Filter Layer	22	79.874	0.174	2.5	0.6036	0.0000	OK
15 minute summer	J4	1	79.764	0.000	0.0	0.0000	0.0000	OK
15 minute summer	J5	1	79.625	0.000	0.0	0.0003	0.0000	OK
30 minute summer	J5 Filter Layer	20	79.727	0.203	11.4	0.8662	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
960 minute winter	Raingarden	Filtration		0.7			
30 minute summer	Raingarden Filter Layer	Infiltration		0.1			
15 minute summer	J2	1.000	S2	3.9	0.585	0.060	0.0128
15 minute summer	J2	Filtration		0.0			
15 minute summer	J2	Underdrain		0.0	0.000	0.000	0.0000
600 minute summer	J2 Filter Layer	Infiltration		0.0			
15 minute summer	RE1	Bioretention Area	J3	3.9	0.134	0.025	
15 minute summer	RE2	Bioretention Area	J2	3.9	0.134	0.025	
30 minute summer	S1	3.001	J4	6.0	0.772	0.992	0.0085
15 minute summer	S2	1.001	J1	12.7	1.080	0.720	0.2359
30 minute summer	J3	3.000	S1	3.5	0.458	0.574	0.0078
30 minute summer	J3	Filtration		0.0			
30 minute summer	J3	Underdrain		-1.0	-0.174	-1.463	0.1161
30 minute summer	J3 Filter Layer	Infiltration		0.0			
15 minute summer	J4	Bioretention Area	J5	0.0	0.000	0.000	
15 minute summer	J5	2.000	S2	0.0	0.000	0.000	0.0071
15 minute summer	J5	Filtration		0.0			
15 minute summer	J5	Underdrain		5.4	0.414	1.006	0.2387
30 minute summer	J5 Filter Layer	Infiltration		0.0			

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	1.000	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)	75.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Permeable Paving	0.002	4.00	80.650	479567.551	231557.698	0.470

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	0	0	0
30	0	0	0
30	45	0	0
100	0	0	0
100	45	0	0

Node S3 Overflow Online Orifice Control

Flap Valve	x	Design Depth (m)	0.100	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.0		
Invert Level (m)	0.000	Diameter (m)	0.041		

Node Permeable Paving Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00360	Invert Level (m)	80.180	Slope (1:X)	53.0
Side Inf Coefficient (m/hr)	0.00360	Time to half empty (mins)	799	Depth (m)	0.350
Safety Factor	2.0	Width (m)	3.600	Inf Depth (m)	
Porosity	0.30	Length (m)	5.800		

Approval Settings

Node Size	✓	Accuracy (m)	1.000
Node Losses	✓	Crossings	✓
Link Size	✓	Cover Depth	✓
Minimum Diameter (mm)	150	Minimum Cover Depth (m)	
Link Length	✓	Maximum Cover Depth (m)	3.000
Maximum Length (m)	100.000	Backdrops	✓
Coordinates	✓	Minimum Backdrop Height (m)	

Approval Settings

Maximum Backdrop Height (m)	1.500	Return Period (years)	
Full Bore Velocity	✓	Maximum Surcharged Depth (m)	0.100
Minimum Full Bore Velocity (m/s)		Flooding	✓
Maximum Full Bore Velocity (m/s)	3.000	Return Period (years)	30
Proportional Velocity	✓	Time to Half Empty	x
Return Period (years)		Discharge Rates	✓
Minimum Proportional Velocity (m/s)	0.750	Discharge Volume	✓
Maximum Proportional Velocity (m/s)	3.000	100 year 360 minute (m³)	
Surcharged Depth	✓		

Results for 10 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	Permeable Paving	312	80.344	0.164	0.1	0.6871	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
480 minute winter	Permeable Paving	Infiltration	0.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	Permeable Paving	405	80.387	0.207	0.1	0.9600	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
600 minute winter	Permeable Paving	Infiltration	0.0					

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	Permeable Paving	630	80.463	0.283	0.1	1.4341	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
960 minute winter	Permeable Paving	Infiltration	0.0					

Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	Permeable Paving	615	80.438	0.258	0.1	1.2765	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
960 minute winter	Permeable Paving	Infiltration	0.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Permeable Paving	930	80.574	0.394	0.1	1.8597	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
1440 minute winter	Permeable Paving	Infiltration	0.0					

7.6 **Appendix F – Maintenance Schedule**

Maintenance Schedule

Old Park Lodge, Warninglid

For

David Simpson and Phil Marshall

Rev – **P1**

Reference **C3424**

Date **16th December 2024**

Revision	Date of Issue	Comments	Prepared By	Checked By
P	16/12/2024	Initial Issue	MR	CS
P1	31/03/2025	Updated to suit updated drainage	TZ	CS

Maintenance

1.1 Introduction

- 1.1.1 During construction, the Contractor will be responsible for maintaining the drainage and SuDS (Sustainable Drainage Systems). Upon handover, the occupier will take on the responsibility of these duties as laid out in this report.
- 1.1.2 The maintenance schedule for the proposed development will be split down into two separate categories; SuDS features and regular private drainage.

1.2 SuDS at Old Park Lodge, Warninglid

- 1.2.1 As listed above, in section 5.1.2, the SuDS features used on site will be **Permeable Pavement and Raingarden**.
- 1.2.2 The SuDS features have been designed for easy maintenance and comprise:
- Regular Day-to-Day care – litter collection, regular gardening to control vegetation growth and checking inlets where water enters the SuDS features
 - Occasional tasks – checking the SuDS features and removing any silt that builds up in the SuDS feature
 - Remedial work – repairing damage where necessary

1.3 SuDS Drainage Maintenance Specification

1.1.1 Raingarden

In order to maintain the functioning of the Infiltration Basin, the following maintenance requirements should be adhered to:

Table 21.3 Operation and maintenance requirements for Infiltration Basins		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter, debris, and trash	Monthly
	Cut the grass – for landscaped areas	Monthly (during growing season) or as required
	Cut the meadow grass in and around basin	Half yearly (spring, before nesting season, and autumn)
	Inspect marginal and bankside vegetations and remove nuisance plants (for the first 3 years)	Monthly (at start, then as required)
Occasional maintenance	Reseed areas of poor vegetation growth	Annually, or as required
	Prune and trim trees and remove cuttings	As required
	Remove sediment from pre-treatment system when 50% full	As required
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realign the rip-rap	As required
	Repair / rehabilitate inlets, outlets and overflows	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	As required
	Relevel uneven surface and reinstate design levels	As required
Monitoring	Inspect inlets, outlets and overflows for blockages and clean if required	Monthly
	Inspect banksides, structure, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and pre-treatment systems for silt accumulation; establish appropriate silt removal frequencies	Half Yearly
	Inspect infiltration surface for compaction and ponding	Monthly

1.1.2 Permeable Paving

In order to maintain the functioning of the permeable paving, the following maintenance requirements should be adhered to:

Table 21.3 Operation and maintenance requirements for permeable paving		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rate and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

1.3.1 Bio retention systems

In order to maintain the functioning of the bio retention systems, the following maintenance requirements should be adhered to:

Table 18.3 Operation and maintenance requirements for bio retention systems		
Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspection infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockages	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

1.2 General Drainage Maintenance Specification

1.2.1 Inlet Structures and Inspection Chambers

- Inlet structures such as rainwater downpipes, road gullies and channel drains should be free from obstruction at all times to allow free flow through the SuDS
- Inspection Chambers and Rodding Eyes are used on bends or where pipes come together. They allow access and cleaning to the system if necessary.

Inlet Structures and Inspection Chambers	
Regular Maintenance	Frequency
Inlet Structures Inspect rainwater downpipes, channel drains and road gullies, removing obstructions and silt as necessary. Check that there is no physical damage. Trim vegetation 1m min surround to structures and keep area free from silt and debris	Monthly
Inspection Chambers and below ground control chambers. Remove cover and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in Autumn	Annually
Occasional Maintenance Check topsoil levels are 20mm above edges of chambers to avoid mower damage.	As necessary
Remedial Work Repair physical damage if necessary	As required

1.2.2 Below ground drainage pipes

- Below ground drainage pipes convey water to the SuDS system. They should always be free from obstruction to allow free flow.

Below Ground Drainage Pipes	
Regular Maintenance	Frequency
Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months then annually
Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
Remove sediment from pre-treatment inlet structures and inspection chambers.	Annually or as required
Maintain vegetation to designed limits within the vicinity of below ground drainage pipes and tanks.	Monthly or as required
Remedial Work	
Repair physical damage if necessary	As required
Monitoring	
Inspect all inlets, outlets and vents to ensure that they are in good conditions and operating as designed.	Annually
Survey inside of pipe runs for sediment build up and remove if necessary.	Every 5 years or as required