

RAFTS RESULTS

DEVELOPED

'Compton Road'

RTI DL RELEASE EHP

Developed_Q5-25_Q2-25_Q1-25.txt
Run started at: 18th February 2010 14:02:18

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#####  
                        RUNTIME      RESULTS  
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Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK P1 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.7672E-01
ESTIMATED PEAK FLOW (CUMECS) = 0.52E-01
ESTIMATED TIME TO PEAK (MINS) = 21.00
LINK P2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.3229
ESTIMATED PEAK FLOW (CUMECS) = 0.32
ESTIMATED TIME TO PEAK (MINS) = 15.00
LINK PN1 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.3660
ESTIMATED PEAK FLOW (CUMECS) = 0.36
ESTIMATED TIME TO PEAK (MINS) = 15.00
LINK Compton Rd 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.3660
ESTIMATED PEAK FLOW (CUMECS) = 0.36
ESTIMATED TIME TO PEAK (MINS) = 15.00

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QB10035 Greyhounds - Developed  
Results for period from 0: 0.0 1/ 1/1990  
to 5: 0.0 1/ 1/1990  
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Developed_Q5-25_Q2-25_Q1-25.txt

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 5.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.52
TOTAL OF SECOND SUB-AREAS (ha) = 0.55
TOTAL OF ALL SUB-AREAS (ha) = 1.07

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area #1 #2 (ha)	Slope #1 #2 (%)	% Impervious #1 #2 (%)	Pern #1 #2	B #1 #2	Link No.
P1	.00001 0.2630	.0010 2.000	100.0 0.000	.025 .040	.0002 .0129	1.000
P2	0.5150 0.1440	3.000 2.000	100.0 0.000	.015 .033	.0006 .0081	1.001
PN1	.00001 0.1470	.0010 2.100	100.0 0.000	.025 .033	.0002 .0080	1.002
Compton Rd.	.00001 0.000	.0010 0.000	0.000 0.000	.025 0.00	.0021 0.000	1.003

Link Label	Average Intensity (mm/h)	Init. Loss #1 #2 (mm)	Cont. Loss #1 #2 (mm/h)	Excess Rain #1 #2 (mm)	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
P1	95.709	0.000 10.00	0.000 2.500	39.879 29.087	0.0517	21.00	3.000
P2	95.709	0.000 10.00	0.000 2.500	39.879 29.087	0.3219	15.00	0.000
PN1	95.709	0.000 10.00	0.000 2.500	39.879 29.087	0.3567	15.00	0.000
Compton Rd	95.709	0.000 0.000	0.000 0.000	39.879 0.000	0.3567	15.00	0.000

LINK P1 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.5350E-01
ESTIMATED PEAK FLOW (CUMECS) = 0.33E-01
ESTIMATED TIME TO PEAK (MINS) = 25.00

LINK P2 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.2428
ESTIMATED PEAK FLOW (CUMECS) = 0.24
ESTIMATED TIME TO PEAK (MINS) = 15.00

LINK PN1 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.2729
ESTIMATED PEAK FLOW (CUMECS) = 0.26
ESTIMATED TIME TO PEAK (MINS) = 15.00

LINK Compton Rd 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.2729
ESTIMATED PEAK FLOW (CUMECS) = 0.26
ESTIMATED TIME TO PEAK (MINS) = 15.00

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QB10035 Greyhounds - Developed

Developed_Q5-25_Q2-25_Q1-25.txt
 Results for period from 0: 0.0 1/ 1/1990
 to 5: 0.0 1/ 1/1990

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ROUTING INCREMENT (MINS) = 1.00
 STORM DURATION (MINS) = 25.
 RETURN PERIOD (YRS) = 2.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 0.52
 TOTAL OF SECOND SUB-AREAS (ha) = 0.55
 TOTAL OF ALL SUB-AREAS (ha) = 1.07

Link Label	Catch. Area		Slope		% Impervious		Pern		B		Link No.
	#1 (ha)	#2	#1 (%)	#2	#1 (%)	#2	#1	#2	#1	#2	
P1	.00001	0.2630	.0010	2.000	100.0	0.000	.025	.040	.0002	.0129	1.000
P2	0.5150	0.1440	3.000	2.000	100.0	0.000	.015	.033	.0006	.0081	1.001
PN1	.00001	0.1470	.0010	2.100	100.0	0.000	.025	.033	.0002	.0080	1.002
Compton Rd.	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.003

Link Label	Average Intensity (mm/h)	Init. Loss		Cont. Loss		Excess Rain		Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
		#1 (mm)	#2	#1 (mm/h)	#2	#1 (mm)	#2			
P1	74.909	0.000	10.00	0.000	2.500	31.212	20.462	0.0334	25.00	3.000
P2	74.909	0.000	10.00	0.000	2.500	31.212	20.462	0.2421	15.00	0.000
PN1	74.909	0.000	10.00	0.000	2.500	31.212	20.462	0.2634	15.00	0.000
Compton Rd.	74.909	0.000	0.000	0.000	0.000	31.212	0.000	0.2634	15.00	0.000

LINK P1 3.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.3605E-01
 ESTIMATED PEAK FLOW (CUMECS) = 0.21E-01
 ESTIMATED TIME TO PEAK (MINS) = 25.00

LINK P2 3.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.1801
 ESTIMATED PEAK FLOW (CUMECS) = 0.18
 ESTIMATED TIME TO PEAK (MINS) = 15.00

LINK PN1 3.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.2002
 ESTIMATED PEAK FLOW (CUMECS) = 0.19
 ESTIMATED TIME TO PEAK (MINS) = 15.00

LINK Compton Rd 3.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.2002
 ESTIMATED PEAK FLOW (CUMECS) = 0.19
 ESTIMATED TIME TO PEAK (MINS) = 15.00

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QB10035 Greyhounds - Developed

Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

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ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 1.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.52
TOTAL OF SECOND SUB-AREAS (ha) = 0.55
TOTAL OF ALL SUB-AREAS (ha) = 1.07

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area #1 (ha)	Catch. Area #2	Slope #1 (%)	Slope #2 (%)	% Impervious #1 (%)	% Impervious #2 (%)	Perin #1	Perin #2	B #1	B #2	Link No.
P1	.00001	0.2630	.0010	2.000	100.0	0.000	.025	.040	.0002	.0129	1.000
P2	0.5150	0.1440	3.000	2.000	100.0	0.000	.015	.033	.0006	.0081	1.001
PN1	.00001	0.1470	.0010	2.100	100.0	0.000	.025	.033	.0002	.0080	1.002
Compton Rd.	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.003

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2	Cont. Loss #1 (mm/h)	Cont. Loss #2	Excess Rain #1 (mm)	Excess Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
P1	58.278	0.000	10.00	0.000	2.500	24.283	13.616	0.0213	25.00	3.000
P2	58.278	0.000	10.00	0.000	2.500	24.283	13.616	0.1776	15.00	0.000
PN1	58.278	0.000	10.00	0.000	2.500	24.283	13.616	0.1903	15.00	0.000
Compton Rd.	58.278	0.000	0.000	0.000	0.000	24.283	0.000	0.1903	15.00	0.000

Run completed at: 18th February 2010 14:02:32

mik open 0

Run started at: 18th February 2010 14:03:59

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	RUNTIME	RESULTS
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Max. no. of links allowed =          1500

Max. no. of routing increments allowed =      250000

Max. no. of rating curve points =      250000

Max. no. of storm temporal points =      250000

Max. no. of channel subreaches =          25

Max link stack level =          25

Input Version number =          700

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LINK P1          1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1197
ESTIMATED PEAK FLOW (CUMecs) = 0.11
ESTIMATED TIME TO PEAK (MINS) = 16.00
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LINK P2                                1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.4480
ESTIMATED PEAK FLOW (CUMECS) = 0.45
ESTIMATED TIME TO PEAK (MINS) = 15.00

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LINK PN1          1.000
ESTIMATED VOLUME (CU METRES*10**3) =          0.5145
ESTIMATED PEAK FLOW (CUMEC) =          0.52
ESTIMATED TIME TO PEAK (MINS) =          15.00
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LINK Compton Rd	1.000	
ESTIMATED VOLUME (CU METRES*10**3) =		0.5145
ESTIMATED PEAK FLOW (CUMECs) =		0.52
ESTIMATED TIME TO PEAK (MINS) =		15.00

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QB10035 Greyhounds - Developed
Results for period from 0: 0.0 1/ 1/1990
                        to 5: 0.0 1/ 1/1990
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Developed_Q20-25_Q10-25.txt

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 20.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.52
TOTAL OF SECOND SUB-AREAS (ha) = 0.55
TOTAL OF ALL SUB-AREAS (ha) = 1.07

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link	Catch. Area	Slope	% Impervious	Pern	B	Link
Label	#1 #2	#1 #2	#1 #2	#1 #2	#1 #2	No.
	(ha)	(%)	(%)			
P1	.00001 0.2630	.0010 2.000	100.0 0.000	.025 .040	.0002 .0129	1.000
P2	0.5150 0.1440	3.000 2.000	100.0 0.000	.015 .033	.0006 .0081	1.001
PN1	.00001 0.1470	.0010 2.100	100.0 0.000	.025 .033	.0002 .0080	1.002
Compton Rd.	.00001 0.000	.0010 0.000	0.000 0.000	.025 0.00	.0021 0.000	1.003

Link	Average Intensity	Init. Loss	Cont. Loss	Excess Rain	Peak Inflow	Time to Peak	Link Lag
Label	(mm/h)	#1 #2 (mm)	#1 #2 (mm/h)	#1 #2 (mm)	(m ³ /s)	Peak mins	mins
P1	123.45	0.000 5.000	0.000 2.500	51.437 45.479	0.1064	16.00	3.000
P2	123.45	0.000 5.000	0.000 2.500	51.437 45.479	0.4542	15.00	0.000
PN1	123.45	0.000 5.000	0.000 2.500	51.437 45.479	0.5213	15.00	0.000
Compton Rd.	123.45	0.000 0.000	0.000 0.000	51.437 0.000	0.5213	15.00	0.000

LINK P1 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.1022
ESTIMATED PEAK FLOW (CUMECS) = 0.78E-01
ESTIMATED TIME TO PEAK (MINS) = 17.00

LINK P2 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.3865
ESTIMATED PEAK FLOW (CUMECS) = 0.39
ESTIMATED TIME TO PEAK (MINS) = 15.00

LINK PN1 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.4436
ESTIMATED PEAK FLOW (CUMECS) = 0.44
ESTIMATED TIME TO PEAK (MINS) = 15.00

LINK Compton Rd 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.4436
ESTIMATED PEAK FLOW (CUMECS) = 0.44
ESTIMATED TIME TO PEAK (MINS) = 15.00

QB10035 Greyhounds - Developed

Developed_Q20-25_Q10-25.txt
 Results for period from 0: 0.0 1/ 1/1990
 to 5: 0.0 1/ 1/1990

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ROUTING INCREMENT (MINS) = 1.00
 STORM DURATION (MINS) = 25.
 RETURN PERIOD (YRS) = 10.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 0.52
 TOTAL OF SECOND SUB-AREAS (ha) = 0.55
 TOTAL OF ALL SUB-AREAS (ha) = 1.07

SUMMARY OF CATCHMENT AND RAINFALL DATA											
Link Label	Catch. Area		Slope		% Impervious		Pern		B		Link No.
	#1 (ha)	#2	#1 (%)	#2	#1 (%)	#2	#1	#2	#1	#2	
P1	.00001	0.2630	.0010	2.000	100.0	0.000	.025	.040	.0002	.0129	1.000
P2	0.5150	0.1440	3.000	2.000	100.0	0.000	.015	.033	.0006	.0081	1.001
PN1	.00001	0.1470	.0010	2.100	100.0	0.000	.025	.033	.0002	.0080	1.002
Compton Rd.	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.003

Link Label	Average Intensity (mm/h)	Init. Loss		Cont. Loss		Excess Rain		Peak Inflow (m ³ /s)	Time to Peak mins	Link Lag mins
		#1 (mm)	#2	#1 (mm/h)	#2	#1 (mm)	#2			
P1	107.22	0.000	5.000	0.000	2.500	44.673	38.756	0.0780	17.00	3.000
P2	107.22	0.000	5.000	0.000	2.500	44.673	38.756	0.3865	15.00	0.000
PN1	107.22	0.000	5.000	0.000	2.500	44.673	38.756	0.4396	15.00	0.000
Compton Rd	107.22	0.000	0.000	0.000	0.000	44.673	0.000	0.4396	15.00	0.000

Run completed at: 18th February 2010 14:04:08

mik open

Developed_Q50-60.txt

Run started at: 18th February 2010 14:05:46

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RUNTIME RESULTS

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Max. no. of links allowed = 1500

Max. no. of routing increments allowed = 250000

Max. no. of rating curve points = 250000

Max. no. of storm temporal points = 250000

Max. no. of channel subreaches = 25

Max link stack level = 25

Input Version number = 700

LINK P1 1.000

ESTIMATED VOLUME (CU METRES*10**3) =	0.2286
ESTIMATED PEAK FLOW (CUMEC/S) =	0.13
ESTIMATED TIME TO PEAK (MINS) =	26.00

LINK P2 1.000

```
ESTIMATED VOLUME (CU METRES*10**3) = 0.8283
ESTIMATED PEAK FLOW (CUMECS) = 0.52
ESTIMATED TIME TO PEAK (MINS) = 25.00
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LINK PN1 1.000

```
ESTIMATED VOLUME (CU METRES*10**3) = 0.9562
ESTIMATED PEAK FLOW (CUMECS) = 0.60
ESTIMATED TIME TO PEAK (MINS) = 25.00
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LINK Compton Rd	1.000
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```
ESTIMATED VOLUME (CU METRES*10**3) = 0.9562
ESTIMATED PEAK FLOW (CUMECS) = 0.60
ESTIMATED TIME TO PEAK (MINS) = 25.00
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QB10035 Greyhounds - Developed
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Results for period from 0: 0.0 1/ 1/1990
                      to 5: 0.0 1/ 1/1990
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Developed_Q50-60.txt

ROUTING INCREMENT (MINS) = 1.00
 STORM DURATION (MINS) = 60.
 RETURN PERIOD (YRS) = 50.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 0.52
 TOTAL OF SECOND SUB-AREAS (ha) = 0.55
 TOTAL OF ALL SUB-AREAS (ha) = 1.07

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area #1 (ha)	Catch. Area #2	Slope #1 (%)	Slope #2 (%)	% Impervious #1 (%)	% Impervious #2 (%)	Pern #1	Pern #2	B #1	B #2	Link No.
P1	.00001	0.2630	.0010	2.000	100.0	0.000	.025	.040	.0002	.0129	1.000
P2	0.5150	0.1440	3.000	2.000	100.0	0.000	.015	.033	.0006	.0081	1.001
PN1	.00001	0.1470	.0010	2.100	100.0	0.000	.025	.033	.0002	.0080	1.002
Compton Rd.	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.003

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Init. Loss #2	Cont. Loss #1 (mm/h)	Cont. Loss #2	Excess Rain #1 (mm)	Excess Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
P1	92.291	0.000	3.000	0.000	2.500	92.291	86.916	0.1312	26.00	3.000
P2	92.291	0.000	3.000	0.000	2.500	92.291	86.916	0.5228	25.00	0.000
PN1	92.291	0.000	3.000	0.000	2.500	92.291	86.916	0.6000	25.00	0.000
Compton Rd	92.291	0.000	0.000	0.000	0.000	92.291	0.000	0.6000	25.00	0.000

Run completed at: 18th February 2010 14:05:51

mik open 0

Developed_Q100-25.txt
Run started at: 18th February 2010 14:06:32

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#####
#####          RUNTIME          RESULTS
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Max. no. of links allowed = 1500

Max. no. of routing increments allowed = 250000

Max. no. of rating curve points = 250000

Max. no. of storm temporal points = 250000

Max. no. of channel subreaches = 25

Max link stack level = 25

Input Version number = 700

LINK P1 1.000

ESTIMATED VOLUME (CU METRES*10**3) =	0.1749
ESTIMATED PEAK FLOW (CUMECS) =	0.15
ESTIMATED TIME TO PEAK (MINS) =	16.00

LINK P2 1.000

ESTIMATED VOLUME (CU METRES*10**3) =	0.6141
ESTIMATED PEAK FLOW (CUMECS) =	0.61
ESTIMATED TIME TO PEAK (MINS) =	15.00

LINK PN1 1.000

ESTIMATED VOLUME (CU METRES*10**3) =	0.7115
ESTIMATED PEAK FLOW (CUMECS) =	0.71
ESTIMATED TIME TO PEAK (MINS) =	15.00

LINK Compton Rd 1.000

ESTIMATED VOLUME (CU METRES*10**3) =	0.7115
ESTIMATED PEAK FLOW (CUMECS) =	0.71
ESTIMATED TIME TO PEAK (MINS) =	15.00

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#####
QB10035 Greyhounds - Developed
Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990
#####
#####
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Developed_Q100-25.txt

ROUTING INCREMENT (MINS) = 1.00
 STORM DURATION (MINS) = 25.
 RETURN PERIOD (YRS) = 100.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 0.52
 TOTAL OF SECOND SUB-AREAS (ha) = 0.55
 TOTAL OF ALL SUB-AREAS (ha) = 1.07

SUMMARY OF CATCHMENT AND RAINFALL DATA											
Link Label	Catch. Area		Slope		% Impervious		Pern		B		Link No.
	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	
	(ha)		(%)		(%)						
P1	.00001	0.2630	.0010	2.000	100.0	0.000	.025	.040	.0002	.0129	1.000
P2	0.5150	0.1440	3.000	2.000	100.0	0.000	.015	.033	.0006	.0081	1.001
PN1	.00001	0.1470	.0010	2.100	100.0	0.000	.025	.033	.0002	.0080	1.002
Compton Rd.	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.003

Link Label	Average Intensity	Init. Loss	Cont. Loss	Excess Rain	Peak Inflow	Time to Peak	Link Lag
	(mm/h)	#1	#2	#1	#2	(m^3/s)	mins
		(mm)		(mm/h)			
P1	161.71	0.000	0.000	0.000	2.500	67.381	66.339
P2	161.71	0.000	0.000	0.000	2.500	67.381	66.339
PN1	161.71	0.000	0.000	0.000	2.500	67.381	66.339
Compton Rd.	161.71	0.000	0.000	0.000	0.000	67.381	0.000

Run completed at: 18th February 2010 14:06:36

mik open 0

RAFTS RESULTS

EXISTING

'Cronulla Court'

Existing_Q5.60_Q2.60_Q1.60.txt
Run started at: 3rd December 2009 12:39:56

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RUNTIME RESULTS #####
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Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK N2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1840
ESTIMATED PEAK FLOW (CUMECs) = 0.13
ESTIMATED TIME TO PEAK (MINS) = 26.00
LINK Cronulla C 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1840
ESTIMATED PEAK FLOW (CUMECs) = 0.13
ESTIMATED TIME TO PEAK (MINS) = 26.00

#####

QB10035 LGF - Existing Q100

Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 60.
RETURN PERIOD (YRS) = 5.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.38
TOTAL OF ALL SUB-AREAS (ha) = 0.38

SUMMARY OF CATCHMENT AND RAINFALL DATA
Link Catch. Area Slope % Impervious Pern B Link
Page 1

Existing_Q5.60_Q2.60_Q1.60.txt

Label	#1 (ha)	#2	#1 (%)	#2	#1 (%)	#2	#1	#2	#1	#2	No.
N2	.00001	0.3820	.0010	3.200	100.0	0.000	.025	.032	.0002	.0105	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
N2	60.107	0.000	10.00	0.000	2.500	60.107	48.066	0.1315	26.00	0.000
Cronulla C	60.107	0.000	0.000	0.000	0.000	60.107	0.000	0.1315	26.00	0.000

LINK N2 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.1327
 ESTIMATED PEAK FLOW (CUMECs) = 0.83E-01
 ESTIMATED TIME TO PEAK (MINS) = 27.00

LINK Cronulla C 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.1327
 ESTIMATED PEAK FLOW (CUMECs) = 0.83E-01
 ESTIMATED TIME TO PEAK (MINS) = 27.00

 #####
 QB10035 LGF - Existing Q100
 Results for period from 0: 0.0 1/ 1/1990
 to 5: 0.0 1/ 1/1990
 #####
 #####

ROUTING INCREMENT (MINS) = 1.00
 STORM DURATION (MINS) = 60.
 RETURN PERIOD (YRS) = 2.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 0.00
 TOTAL OF SECOND SUB-AREAS (ha) = 0.38
 TOTAL OF ALL SUB-AREAS (ha) = 0.38

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area #1 (ha)	Area #2	Slope #1 (%)	% Impervious #2	Pern #1	#2	B #1	#2	Link No.
N2	.00001	0.3820	.0010	3.200	100.0	0.000	.025	.032	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
N2	46.634	0.000	10.00	0.000	2.500	46.634	34.676	0.0830	27.00	0.000
Cronulla C	46.634	0.000	0.000	0.000	0.000	46.634	0.000	0.0830	27.00	0.000

Existing_Q5.60_Q2.60_Q1.60.txt

LINK N2 3.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.9296E-01
ESTIMATED PEAK FLOW (CUMECS) = 0.54E-01
ESTIMATED TIME TO PEAK (MINS) = 32.00
LINK Cronulla C 3.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.9297E-01
ESTIMATED PEAK FLOW (CUMECS) = 0.54E-01
ESTIMATED TIME TO PEAK (MINS) = 32.00

QB10035 LGF - Existing Q100
Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 60.
RETURN PERIOD (YRS) = 1.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.38
TOTAL OF ALL SUB-AREAS (ha) = 0.38

SUMMARY OF CATCHMENT AND RAINFALL DATA
Link Catch. Area slope % Impervious Pern B Link
Label #1 #2 #1 #2 #1 #2 #1 #2 #1 #2 No.
(ha) (%) (%)
N2 .00001 0.3820 .0010 3.200 100.0 0.000 .025 .032 .0002 .0105 1.000
Cronulla C.00001 0.000 .0010 0.000 0.000 0.000 .025 0.00 .0021 0.000 1.001

Link Average Init. Loss Cont. Loss Excess Rain Peak Time Link
Label Intensity #1 #2 #1 #2 #1 #2 Inflow to Lag
(mm/h) (mm) (mm/h) (mm) (m^3/s) Peak mins
N2 36.158 0.000 10.00 0.000 2.500 36.158 24.267 0.0540 32.00 0.000
Cronulla C 36.158 0.000 0.000 0.000 0.000 36.158 0.000 0.0540 32.00 0.000

Run completed at: 3rd December 2009 12:40:02

mik open 0

Existing_Q20.25 and Q10.25.txt
Run started at: 3rd December 2009 12:27:52

#####

RUNTIME RESULTS

Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK N2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1738
ESTIMATED PEAK FLOW (CUMECs) = 0.20
ESTIMATED TIME TO PEAK (MINS) = 16.00
LINK Cronulla C 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1738
ESTIMATED PEAK FLOW (CUMECs) = 0.20
ESTIMATED TIME TO PEAK (MINS) = 16.00

QB10035 LGF - Existing Q100
Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 20.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.38
TOTAL OF ALL SUB-AREAS (ha) = 0.38

SUMMARY OF CATCHMENT AND RAINFALL DATA
Link Catch. Area Slope % Impervious Pern B Link
Page 1

Existing_Q20.25 and Q10.25.txt

Label	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	No.
	(ha)		(%)		(%)						
N2	.00001	0.3820	.0010	3.200	100.0	0.000	.025	.032	.0002	.0105	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
N2	123.45	0.000	5.000	0.000	2.500	51.437	45.479	0.1965	16.00	0.000
Cronulla C	123.45	0.000	0.000	0.000	0.000	51.437	0.000	0.1965	16.00	0.000

LINK N2 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.1475
 ESTIMATED PEAK FLOW (CUMECs) = 0.17
 ESTIMATED TIME TO PEAK (MINS) = 16.00

LINK Cronulla C 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.1475
 ESTIMATED PEAK FLOW (CUMECs) = 0.17
 ESTIMATED TIME TO PEAK (MINS) = 16.00

 #####
 QB10035 LGF - Existing Q100
 Results for period from 0: 0.0 1/ 1/1990
 to 5: 0.0 1/ 1/1990
 #####
 #####

ROUTING INCREMENT (MINS) = 1.00
 STORM DURATION (MINS) = 25.
 RETURN PERIOD (YRS) = 10.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 0.00
 TOTAL OF SECOND SUB-AREAS (ha) = 0.38
 TOTAL OF ALL SUB-AREAS (ha) = 0.38

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area #1	Area #2	Slope #1	Slope #2	% Impervious #1	% Impervious #2	Pern #1	Pern #2	B #1	B #2	Link No.
	(ha)		(%)		(%)						
N2	.00001	0.3820	.0010	3.200	100.0	0.000	.025	.032	.0002	.0105	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
N2	107.22	0.000	5.000	0.000	2.500	44.673	38.756	0.1654	16.00	0.000
Cronulla C	107.22	0.000	0.000	0.000	0.000	44.673	0.000	0.1654	16.00	0.000

Existing_Q20.25 and Q10.25.txt

Run completed at: 3rd December 2009 12:27:58

mik open 0

RTI DL RELEASE - EHP

Existing_Q50.25.txt
Run started at: 3rd December 2009 12:23:33

#####

Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK N2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.2161
ESTIMATED PEAK FLOW (CUMECS) = 0.22
ESTIMATED TIME TO PEAK (MINS) = 16.00
LINK Cronulla C 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.2161
ESTIMATED PEAK FLOW (CUMECS) = 0.22
ESTIMATED TIME TO PEAK (MINS) = 16.00

QB10035 LGF - Existing Q100
Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 50.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.38
TOTAL OF ALL SUB-AREAS (ha) = 0.38

SUMMARY OF CATCHMENT AND RAINFALL DATA
Link Catch. Area Slope % Impervious Pern B Link
Page 1

Existing_Q50.25.txt

Label	#1 (ha)	#2	#1 (%)	#2	#1 (%)	#2	#1	#2	#1	#2	No.
N2	.00001	0.3820	.0010	3.200	100.0	0.000	.025	.032	.0002	.0105	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak mins	Link Lag mins
N2	145.03	0.000	3.000	0.000	2.500	60.430	56.430	0.2183	16.00	0.000
Cronulla C	145.03	0.000	0.000	0.000	0.000	60.430	0.000	0.2183	16.00	0.000

Run completed at: 3rd December 2009 12:23:35

mik open 0

RTI DL RELEASE - EHP

Existing_Q100.25.txt
Run started at: 3rd December 2009 12:15:24

#####

RUNTIME RESULTS #####
#####

Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK N2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.2536
ESTIMATED PEAK FLOW (CUMECS) = 0.25
ESTIMATED TIME TO PEAK (MINS) = 16.00

LINK Cronulla C 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.2536
ESTIMATED PEAK FLOW (CUMECS) = 0.25
ESTIMATED TIME TO PEAK (MINS) = 16.00

#####

QB10035 LGF - Existing Q100

Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.38
TOTAL OF ALL SUB-AREAS (ha) = 0.38

SUMMARY OF CATCHMENT AND RAINFALL DATA
Link Catch. Area Slope % Impervious Pern B Link
Page 1

Label	Existing_Q100.25.txt										No.
	#1 (ha)	#2	#1 (%)	#2	#1 (%)	#2	#1	#2	#1	#2	
N2	.00001	0.3820	.0010	3.200	100.0	0.000	.025	.032	.0002	.0105	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m^3/s)	Time to Peak mins	Link Lag mins
N2	161.71	0.000	0.000	0.000	2.500	67.381	66.339	0.2485	16.00	0.000
Cronulla C	161.71	0.000	0.000	0.000	0.000	67.381	0.000	0.2485	16.00	0.000

Run completed at: 3rd December 2009 12:15:26

mik open 0

RTI DL RELEASE - EHP

RAFTS RESULTS

DEVELOPED

'Cronulla Court'

RTI DL RELEASE - EHP

Developed Q5-60_Q2-60_Q1-90.txt
Run started at: 18th February 2010 14:07:54

#####

Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK PN2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1292
ESTIMATED PEAK FLOW (CUMECs) = 0.92E-01
ESTIMATED TIME TO PEAK (MINS) = 26.00
LINK Cronulla C 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1292
ESTIMATED PEAK FLOW (CUMECs) = 0.92E-01
ESTIMATED TIME TO PEAK (MINS) = 26.00

QB10035 Greyhounds - Developed
Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 60.
RETURN PERIOD (YRS) = 5.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.27
TOTAL OF ALL SUB-AREAS (ha) = 0.27

SUMMARY OF CATCHMENT AND RAINFALL DATA
Link Catch. Area Slope % Impervious Pern B Link
Page 1

developed Q5-60_Q2-60_Q1-90.txt

Label	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	No.
	(ha)		(%)		(%)						
PN2	.00001	0.2680	.0010	3.200	100.0	0.000	.025	.033	.0002	.0089	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
PN2	60.107	0.000	10.00	0.000	2.500	60.107	48.066	0.0919	26.00	0.000
Cronulla C	60.107	0.000	0.000	0.000	0.000	60.107	0.000	0.0919	26.00	0.000

LINK PN2 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.9310E-01
 ESTIMATED PEAK FLOW (CUMECs) = 0.58E-01
 ESTIMATED TIME TO PEAK (MINS) = 28.00

LINK Cronulla C 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.9311E-01
 ESTIMATED PEAK FLOW (CUMECs) = 0.58E-01
 ESTIMATED TIME TO PEAK (MINS) = 28.00

 #####
 QB10035 Greyhounds - Developed
 Results for period from 0: 0.0 1/ 1/1990
 to 5: 0.0 1/ 1/1990
 #####
 #####

ROUTING INCREMENT (MINS) = 1.00
 STORM DURATION (MINS) = 60.
 RETURN PERIOD (YRS) = 2.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 0.00
 TOTAL OF SECOND SUB-AREAS (ha) = 0.27
 TOTAL OF ALL SUB-AREAS (ha) = 0.27

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area #1 (ha)	Area #2	Slope #1 (%)	Slope #2	% Impervious #1 (%)	% Impervious #2	Pern #1	Pern #2	B #1	B #2	Link No.
PN2	.00001	0.2680	.0010	3.200	100.0	0.000	.025	.033	.0002	.0089	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
PN2	46.634	0.000	10.00	0.000	2.500	46.634	34.676	0.0580	28.00	0.000
Cronulla C	46.634	0.000	0.000	0.000	0.000	46.634	0.000	0.0580	28.00	0.000

Developed Q5-60_Q2-60_Q1-90.txt

LINK PN2 3.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.7703E-01
ESTIMATED PEAK FLOW (CUMECs) = 0.39E-01
ESTIMATED TIME TO PEAK (MINS) = 40.00

LINK Cronulla C 3.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.7703E-01
ESTIMATED PEAK FLOW (CUMECs) = 0.39E-01
ESTIMATED TIME TO PEAK (MINS) = 40.00

#####

#####

QB10035 Greyhounds - Developed

Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 90.
RETURN PERIOD (YRS) = 1.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.27
TOTAL OF ALL SUB-AREAS (ha) = 0.27

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link	Catch. Area	Slope	% Impervious	Pern	B	Link
Label	#1 #2	#1 #2	#1 #2	#1 #2	#1 #2	No.
	(ha)	(%)	(%)			
PN2	.00001 0.2680	.0010 3.200	100.0 0.000	.025 .033	.0002 .0089	1.000
Cronulla C	.00001 0.000	.0010 0.000	0.000 0.000	.025 0.00	.0021 0.000	1.001

Link	Average	Init. Loss	Cont. Loss	Excess Rain	Peak	Time	Link
Label	Intensity	#1 #2	#1 #2	#1 #2	Inflow	to	Lag
	(mm/h)	(mm)	(mm/h)	(mm)	(m ³ /s)	Peak	mins
PN2	27.751	0.000 10.00	0.000 2.500	41.627 28.678	0.0390	40.00	0.000
Cronulla C	27.751	0.000 0.000	0.000 0.000	41.627 0.000	0.0390	40.00	0.000

Run completed at: 18th February 2010 14:08:01

mik open 0

Developed_Q20-25_Q10-25.txt
Run started at: 18th February 2010 14:09:22

#####

Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK PN2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1210
ESTIMATED PEAK FLOW (CUMECs) = 0.15
ESTIMATED TIME TO PEAK (MINS) = 16.00
LINK Cronulla C 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1210
ESTIMATED PEAK FLOW (CUMECs) = 0.15
ESTIMATED TIME TO PEAK (MINS) = 16.00

QB10035 Greyhounds - Developed
Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 20.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.27
TOTAL OF ALL SUB-AREAS (ha) = 0.27

SUMMARY OF CATCHMENT AND RAINFALL DATA
Link Catch. Area Slope % Impervious Pern B Link
Page 1

Developed_Q20-25_Q10-25.txt

Label	#1 (ha)	#2	#1 (%)	#2	#1 (%)	#2	#1	#2	#1	#2	No.
PN2	.00001	0.2680	.0010	3.200	100.0	0.000	.025	.033	.0002	.0089	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Cont. Loss #1 (mm/h)	Excess Rain #1 (mm)	Peak Inflow (m ³ /s)	Time to Peak mins	Link Lag mins			
PN2	123.45	0.000	5.000	0.000	2.500	51.437	45.479	0.1450	16.00	0.000
Cronulla C	123.45	0.000	0.000	0.000	0.000	51.437	0.000	0.1450	16.00	0.000

LINK PN2 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.1041
 ESTIMATED PEAK FLOW (CUMECS) = 0.12
 ESTIMATED TIME TO PEAK (MINS) = 16.00

LINK Cronulla C 2.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.1041
 ESTIMATED PEAK FLOW (CUMECS) = 0.12
 ESTIMATED TIME TO PEAK (MINS) = 16.00

 #####
 QB10035 Greyhounds - Developed
 Results for period from 0: 0.0 1/ 1/1990
 to 5: 0.0 1/ 1/1990
 #####
 #####

ROUTING INCREMENT (MINS) = 1.00
 STORM DURATION (MINS) = 25.
 RETURN PERIOD (YRS) = 10.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 0.00
 TOTAL OF SECOND SUB-AREAS (ha) = 0.27
 TOTAL OF ALL SUB-AREAS (ha) = 0.27

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area #1 (ha)	#2	Slope #1 (%)	#2	% Impervious #1 (%)	#2	Pern #1	#2	B #1	#2	Link No.
PN2	.00001	0.2680	.0010	3.200	100.0	0.000	.025	.033	.0002	.0089	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Cont. Loss #1 (mm/h)	Excess Rain #1 (mm)	Peak Inflow (m ³ /s)	Time to Peak mins	Link Lag mins			
PN2	107.22	0.000	5.000	0.000	2.500	44.673	38.756	0.1238	16.00	0.000
Cronulla C	107.22	0.000	0.000	0.000	0.000	44.673	0.000	0.1238	16.00	0.000

Developed_Q20-25_Q10-25.txt

Run completed at: 18th February 2010 14:09:26

mik open 0

RTI DL RELEASE - EHP

Developed_Q50-25.txt
Run started at: 18th February 2010 14:10:20

#####

Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK PN2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1511
ESTIMATED PEAK FLOW (CUMECS) = 0.16
ESTIMATED TIME TO PEAK (MINS) = 15.00
LINK Cronulla C 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1511
ESTIMATED PEAK FLOW (CUMECS) = 0.16
ESTIMATED TIME TO PEAK (MINS) = 15.00

QB10035 Greyhounds - Developed
Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 50.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.27
TOTAL OF ALL SUB-AREAS (ha) = 0.27

SUMMARY OF CATCHMENT AND RAINFALL DATA
Link Catch. Area Slope % Impervious Pern B Link
Page 1

Developed_Q50-25.txt

Label	#1 (ha)	#2	#1 (%)	#2	#1 (%)	#2	#1	#2	#1	#2	No.
PN2	.00001	0.2680	.0010	3.200	100.0	0.000	.025	.033	.0002	.0089	1.000
Cronulla C	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
PN2	145.03	0.000	3.000	0.000	2.500	60.430	56.430	0.1602	15.00	0.000
Cronulla C	145.03	0.000	0.000	0.000	0.000	60.430	0.000	0.1602	15.00	0.000

Run completed at: 18th February 2010 14:10:22

mik open 0

RTI DL RELEASE - EHP

Developed_Q100-25.txt
Run started at: 18th February 2010 14:11:03

#####

Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK PN2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1781
ESTIMATED PEAK FLOW (CUMECS) = 0.18
ESTIMATED TIME TO PEAK (MINS) = 15.00
LINK Cronulla C 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1781
ESTIMATED PEAK FLOW (CUMECS) = 0.18
ESTIMATED TIME TO PEAK (MINS) = 15.00

QB10035 Greyhounds - Developed
Results for period from 0: 0.0 1/ 1/1990
to 5: 0.0 1/ 1/1990

#####

ROUTING INCREMENT (MINS) = 1.00
STORM DURATION (MINS) = 25.
RETURN PERIOD (YRS) = 100.
BX = 1.0000
TOTAL OF FIRST SUB-AREAS (ha) = 0.00
TOTAL OF SECOND SUB-AREAS (ha) = 0.27
TOTAL OF ALL SUB-AREAS (ha) = 0.27

SUMMARY OF CATCHMENT AND RAINFALL DATA
Link Catch. Area Slope % Impervious Pern B Link
Page 1

Developed_Q100-25.txt

Label	#1 (ha)	#2	#1 (%)	#2	#1 (%)	#2	#1	#2	#1	#2	No.
PN2	.00001	0.2680	.0010	3.200	100.0	0.000	.025	.033	.0002	.0089	1.000
Cronulla	C.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.001

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak mins	Link Lag mins
PN2	161.71	0.000	0.000	0.000	2.500	67.381	66.339	0.1817	15.00	0.000
Cronulla	C161.71	0.000	0.000	0.000	0.000	67.381	0.000	0.1817	15.00	0.000

Run completed at: 18th February 2010 14:11:05

mik open 0

RTI DL RELEASE - EHP



Appendix C Rational Method Data

RTI DL RELEASE - EHP

PROJECT	QB10035	LGF	WORK PACKAGE
TASK	RATIONAL M - EXISTING	ELEMENT	RATIS Check
<u>INFLUENCE FROM EXTERNAL CATCHMENTS</u>			
<ul style="list-style-type: none"> GROUND TRUTH SITE INSPECTION HAS IDENTIFIED $\frac{1}{2}$ OF KINGSDON ROAD DISCHARGES THROUGH THE WESTERN BOUNDARY OF THE CATCHMENT BEFORE ULTIMATELY ENTERING THE OPEN CHANNEL DRAIN FLOWING NORTH EAST. 			X- CATCHMENT
<ul style="list-style-type: none"> INDUSTRIAL LOTS ON SOUTH, EAST & NORTH-EAST ADJACENT BOUNDARIES DO NOT DIRECTLY AFFECT DEVELOPMENT SITE AS ANY FLOW FROM THESE WOULD DISCHARGE TO THE OPEN CHANNEL. GROUND TRUTH INSPECTION HAS IDENTIFIED THAT MAJORITY OF LOTS DO NOT DISCHARGE INTO CHANNEL. EFFECT IS MINIMAL. - ASSUMED NEUTRAL 			NEUTRAL
<ul style="list-style-type: none"> CATCHMENTS FROM WEST OF KINGSDON ROAD ENTERS N.E. OPEN CHANNEL VIA 2x ϕ 825mm RCP CULVERTS. FLOWS AGAIN DO NOT DIRECTLY AFFECT DEVELOPMENT. ASSUMED NEUTRAL. 			NEUTRAL
<ul style="list-style-type: none"> CRONALLA COURT IS BELOW N.E. CORNER OF SITE. ASSUMED NEUTRAL 			NEUTRAL
<ul style="list-style-type: none"> COMPTON ROAD IS BELOW LEVELS ON SITE 			NEUTRAL

COMMENTS ON CALCULATION RECORD:

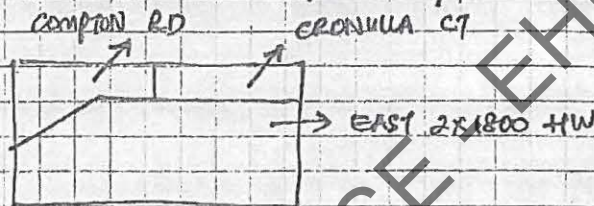
Comments by: _____ Date: _____

PROJECT QB 10035 LCF WORK PACKAGE _____
TASK RATIONAL M. EXISTING. ELEMENT RAPIR CHECK

CATCHMENT DISTRIBUTION

- DEVELOPMENT SITE IS CURRENTLY CRONULLA PARK, PREDOMINANTLY GRASED (POOR) W: TREES (POOR GRASS COVER) AT THE WEST, ALONG KINGHORN ROAD.

- HAS 3 DISCHARGE LOCATIONS FROM SITE.



- LARGEST SUB-CATCHMENT GOES EAST INTO ~ 2x Ø 1800 RCP HEADWALL (CONCRETE APRON) NEAR BREAD FACTORY.

EAST RCP
Major SUB-C.

EAST HEADWALL CATCHMENT

- SUBJECT OF RAPIR VERIFICATION / VALIDATION
- SUB-CATCHMENT AREA = $9.18^{8.50}$ ha (FROM CAD, APPROX.)
- $60 \frac{1}{10}$ (1 HOUR, 10 YEAR STORM) = 67 mm/hr
- AREA WAS A PREVIOUS LANDFILL, $\therefore$ CLAY CAPPING LAYER EXISTS BELOW TOPSOIL. INSPECTIONS FOUND $> 50\%$ OF SITE IS POORLY GRASED, WITH EXPOSED HARD, COMPACTED CLAY SURFACE.

8.50
 9.18 ha.
LCC TABLE
 $2.9.18$.

COMMENTS ON CALCULATION RECORD:

Comments by: _____ Date: _____

PROJECT	OB 10035 - LGF	WORK PACKAGE
TASK	RATIONAL M. - EXISTING	ELEMENT RAFTS CHECK

SUB-CATCHMENT CHARACTERISTICS

- FOR PARKS, QUDM (2007) OFTEN SPECIFIES A FRACTION IMPERVIOUS AS 0.0. SINCE KNOWING HISTORY OF SITE & INSPECTION OF EXISTING GROUND CONDITIONS, f_i ESTIMATED TO BE HIGHER, APPROXIMATELY $f_i = 0.15$ QUDM(2007)
FIG 4.05
- $f_i = 0.15$ OBTAINED FROM WEIGHTED AVERAGE OF:
 - GREEN AREAS $\Rightarrow f_i = 0.0$
 - POOR GRASS/EARTH $\Rightarrow f_i = 0.15$
 - ROADS $\Rightarrow f_i = 0.90$
- $(0.2 \times 0.90) + \frac{7.2}{9.18 + 8.50} (7.88 \times 0.15) + (1.1 \times 0.00) = 0.148$ $f_i = 0.15$
WEIGHTED AVE
- C_{10} VALUE APPROXIMATED AS 0.70 QUDM (2007)
FIG. 4.05.3(b)
- FREQUENCY FACTORS AS PER QUDM, 2007, CHAPTER 4.

TIME OF CONCENTRATION

- COMPONENTS USUALLY COMPOSED OF:
 - $\Rightarrow$ SHALLOW OVERLAND FLOW
 - $\Rightarrow$ CHANNEL FLOW (RILLS OR DEEPEND CHANNEL)
- IN THIS CASE, TOP OF CATCHMENT IS $\frac{1}{2}$ KINGSTON RD. BUT MAJOR TIME COMPONENT WILL BE DETERMINED BY FLOW ACROSS SITE, WHICH WILL BE SHALLOW O/L FLOW. SMALL TOP
1/2 ROAD
CATCHMENT.

COMMENTS ON CALCULATION RECORD:	Comments by:	Date:
---------------------------------	--------------	-------

PROJECT QB 10035 - LGF WORK PACKAGE _____
TASK RATIONAL M. - EXISTING ELEMENT RAFTS CHECK

• OVERLAND SHEET FLOW:

- ⇒ LENGTH $\approx$ 90 m
- ⇒ SLOPE AVERAGE $\approx$ 2.0%
- ⇒ POORLY GRASSED SURFACE
- ∴ $f \approx$ 13 MIN

QUDM (2007)
FIG 4.07

• OPEN CHANNEL:

- ⇒ LENGTH $\approx$ 480 m, Drop $\approx$ 30.5 RL - 20.5 RL = 10 m
- ⇒ ASSUME $V = 1.0$ m/s (TYPICAL)
- ⇒ $t = 8$ MIN.

CHECK AGAINST FIG 4.09 QUDM (2007) $f \approx 4.5 \times 2$
 ≈ 9 MIN

QUDM (2007)
FIG 4.09

⇒ ASSUMPTION OF $V = 1$ m/s OK, ADOPT $t = 9$ MIN

(CONSERVATIVE)

• TOTAL $t_c = 13 + 9 = 21$ MIN.

• SEGMA BIT LONG, BUT ADOPT, SINCE LONGER t_c IS CONSERVATIVE.

RATIONAL METHOD

• FLOOD (PEAK) ESTIMATED FROM QUDM, 2007.

QUDM (2007)
Sec. 4.03.1

$$Q = \frac{C \times I \times A}{360}$$

• REFER EXCEL CALCULATION FOR FLOODS.

COMMENTS ON CALCULATION RECORD:

Comments by: _____ Date: _____

RATIONAL METHOD FLOWRATE ESTIMATION

Logan Greyhound Facility
QB10035

Sub-Catchment
FRACTION IMPERVIOUS Fi
60INT10
C10 VALUE

Pre-Dev
0.150
67
0.700

CATCHMENT AREA (Ha) 8.50

TIME IN CONCENTRATION Tc (min) 21 From Calc Sheet

	F1	F2	F5	F10	F20	F50	F100
	0.8	0.85	0.95	1	1.05	1.15	1.2
	C1	C2	C5	C10	C20	C50	C100
Pre-Dev	0.56	0.60	0.67	0.70	0.74	0.81	0.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(mm/hr)	INT1	INT2	INT5	INT10	INT20	INT50	INT100
	65.0	83.0	104.0	117.0	133.0	156.0	173.0
	Q1	Q2	Q5	Q10	Q20	Q50	Q100
Pre-Dev	0.859	1.166	1.633	1.934	2.308	2.965	3.431
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL (m3/s)	0.859	1.166	1.633	1.934	2.308	2.965	3.431

APPROXIMATE VOLUME OF RUNOFF

SIMPLIFIED TRIANGULAR METHOD

	Q1	Q2	Q5	Q10	Q20	Q50	Q100
VOLUME (m3)	2451.22	3325.65	4657.32	5515.25	6582.94	8456.71	9786.03

CRITICAL STORM DURATION (ASSUMED) 60 (min)



Appendix D Open Channel Calculations

RTI DL RELEASE - EHP

Project No. _____
SHEET No. 1
PREPARED BY HSY
CHECKED BY _____
File _____
OF _____
DATE 25/11
DATE _____

PROJECT	QB10035 GREYHOUNDS	WORK PACKAGE	EXTERNAL CATCHMENT
TASK	FLOW ESTIMATION	ELEMENT	
<p>EXTERNAL CATCHMENTS DISCHARGE INTO OPEN DRAIN.</p> <p>PART OF THE EXTERNAL CATCHMENT CONTRIBUTES TO PSI NODES & THE REMAINDER ADDS TO FLOW AT PS2.</p> <p>ESTIMATION OF CATCHMENT AREAS & BOUNDARIES IS BY TOPOGRAPHICAL INFORMATION. SEE ATTACHED DRAWING FIGURE</p> <p>ESTIMATION OF FLOWS IS BY USE OF RATIONAL METHOD:</p> $Q = \frac{C I A}{360}$ <p>WHERE C = 0.90 (DEVELOPED URBAN AREA)</p> <p>A = AREA IN HECTARES</p> <p>I = INTENSITY FOR 100 YEAR STORM BASED ON t_c AT PSI, PS2, PS3 & OUTLET.</p> <p>t_c FOR EX. CATCHMENTS TO PSI IS:</p> <p>→ STD INLET TIME = 5 MIN (ROADS, PAVED, URBAN) TB 4.06.1 QUDM 2007</p> <p>→ UNDERGROUND PIPED SYSTEM ⇒ L = 640 m.</p> <p>⇒ DROP = $11(43-1) - 11.32.50$ (CULVERT OUTLET FROM KINGSTON RD)</p> <p>= 9.5 m</p> <p>⇒ t = 6.5 MIN FIG 4.09 QUDM 2007</p> <p>→ KINGSTON RD CULVERT TO PSI ⇒ L = 205 m</p> <p>DROP = $11.32.50 - 11.29.50$</p> <p>= 3.0 m.</p> <p>NOTE: USING MULTIPLIERS IN FIG. 4.09 DOES NOT APPEAR RIGHT. EXPECTED ↑ Q, ∴ RELATIVELY ↑ V ON AVERAGE.</p> <p>⇒ V ASSUMED = 1.0 m/s</p> <p>⇒ t ≈ 3 MIN.</p>			
COMMENTS ON CALCULATION RECORD:			<p>Comments by: _____</p> <p>Date: _____</p>

Logan City Council Storm Water OVERVIEW MAP

LEGEND

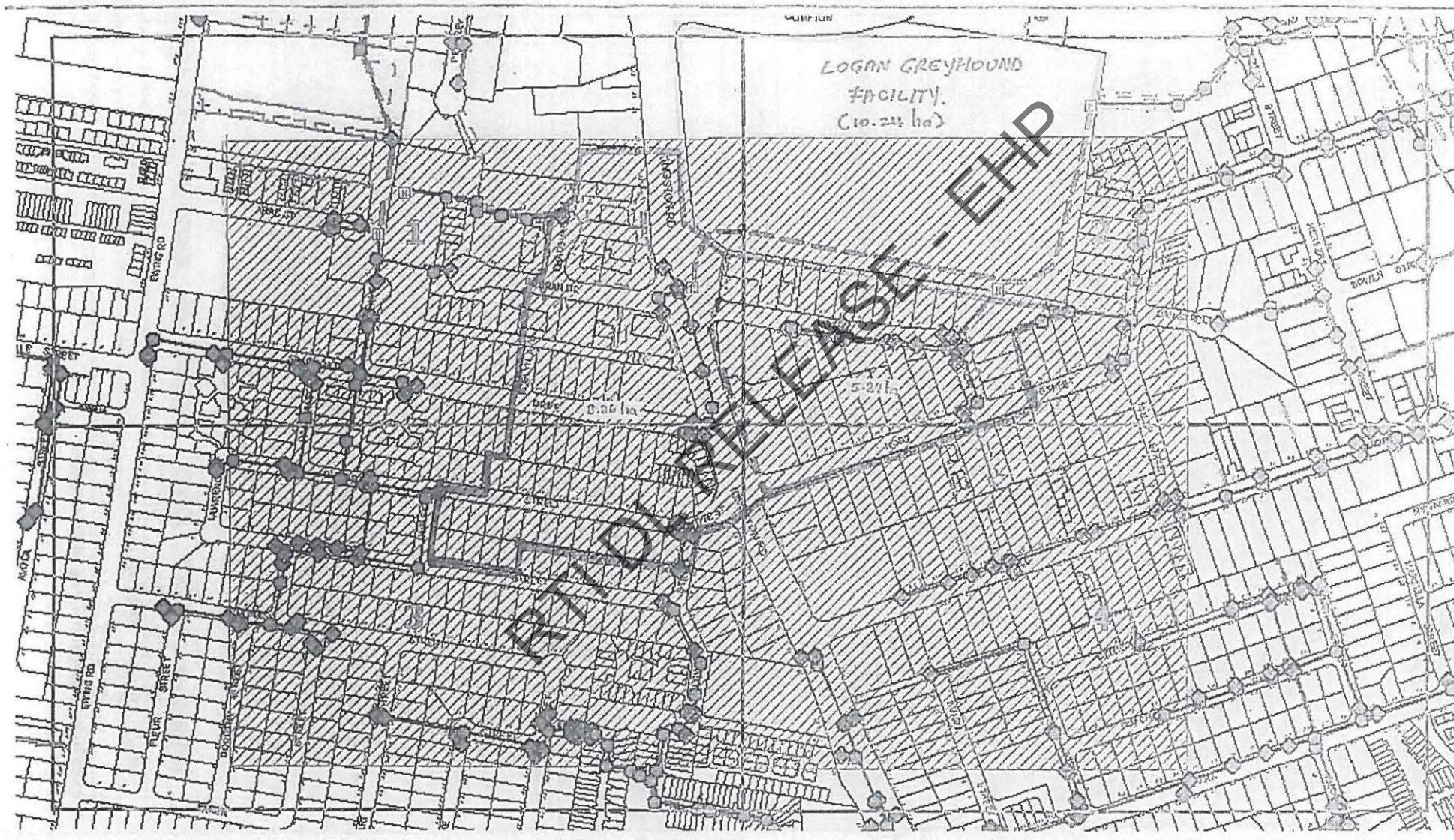
- DEVELOPMENT SITE
- EXTERNAL CATCHMENT
- EXTERNAL SUB-CATCHMENT (REFER C.A.S.)



Sequence No: 17222191

Dig Location: monash St Slacks Creek, Qld 4127

Date: 25/11/2009



Project No. _____
SHEET No. 2
PREPARED BY HST
CHECKED BY _____
File _____
OF _____
DATE 25/11
DATE _____

PROJECT	Q610035 LGF	WORK PACKAGE	EXTERNAL CATCHMENT
TASK	FLOW ESTIMATION	ELEMENT	
<p>$\therefore t_c = 5 + 6.5 + 3.0 = 14.5 \text{ MIN. SAY } 15 \text{ MIN.}$</p>			
<p>• INTENSITY FOR $t_c = 15 \text{ MIN}$ & $Q = 100$ IS 200 mm/hr</p>			LCC PS 5
<p>• Q AT PSI, $= \frac{0.9 \times 200 \times 8.86 (\text{EST. AREA})}{360}$</p>			TB 2.9.1B
<p>$= 4.43 \text{ m}^3/\text{s}$</p>			
<p>• DISCHARGE FROM LGF SITE AS REPORTED IN RAFTS FOR</p>			
<p>A Q100 SPDM IS $1.489 \text{ m}^3/\text{s}$</p>			
<p>• TOTAL Q EXPECTED TO FLOW PAST PSI IS THEREFORE</p>			
<p>$4.43 + 1.489 = 5.919 \text{ m}^3/\text{s}$</p>			
<p>• CHECKS OF OPEN CHANNEL CAPACITY TO BE DONE USING FLOW METER. REFER FLOODMARKS RESULTS.</p>			
<p>• t_c FOR EX. CATCHMENT TO PS2 IS :</p>			
<p>→ PRIOR t_c ABOVE = 15.0 MIN.</p>			
<p>→ ADD FURTHER OPEN CHANNEL $\Rightarrow 3.0 \text{ MIN}$ (FROM RAFTS PSI LAG TIME)</p>			
<p>$\therefore t_c = 15.0 + 3.0 = 18 \text{ MIN.}$</p>			
<p>• $I_{100} = 185 \text{ mm/hr}$</p>			ADDITIONAL AREA
<p>• Q AT PS2 (FROM EX.) = $\frac{0.9 \times 185 \times (8.86 + 5.84)}{360}$</p>			TB 2.9.1B
<p>$= 6.79 \text{ m}^3/\text{s}$</p>			LCC P. SCHEME 5
<p>• DISCHARGE FROM RAFTS REPORTED IN RAFT IS $1.991 \text{ m}^3/\text{s}$</p>			
<p>FOR Q100 SPDM.</p>			
COMMENTS ON CALCULATION RECORD:			Comments by: _____ Date: _____

Project No. _____
SHEET No. 3 OF _____
PREPARED BY HEV DATE 25/11
CHECKED BY _____ DATE _____

PROJECT RB 100 35 LCF WORK PACKAGE EXTERNAL CATCHMENT
TASK FLOW ESTIMATION ELEMENT _____

• TOTAL Q EXPECTED AT PS2 IS THEREFORE :

$$6.79 + 1.19 = 7.98 \text{ m}^3/\text{s}$$

• CHECKS TO BE DONE FOR OPEN CHANNEL USING
FLOWMASTER. REFER FLOWMASTER RESULTS.

• t_c FOR EX. CATCHMENT TO PS3 IS :

$$\rightarrow \text{PROP } t \text{ ABOVE} = 18.0 \text{ MIN.}$$

$$\rightarrow \text{ADD FURTHER OPEN CHANNEL } 2.9 \text{ MIN (FROM RAFTS LAG TIME)}$$

$$\therefore t_c = 18 + 2.9 = 20.9 \text{ MIN.}$$

$$\bullet I_{100} = 173 \text{ mm/hr}$$

NO ADDITIONAL EX. CATCHMENTS.

$$\bullet Q \text{ AT PS3 (EX.)} = 0.9 \times 173 \times 14.7$$

$$= 6.36 \text{ m}^3/\text{s} \quad (\downarrow I, \downarrow Q, = A : V)$$

• DISCHARGE FROM RAFTS A PS3 IS $3.414 \text{ m}^3/\text{s}$ IN A
Q100 STORM.

• TOTAL Q EXPECTED AT PS2 IS THEREFORE :

$$6.36 + 3.414 = 9.774 \text{ m}^3/\text{s}$$

COMMENTS ON CALCULATION RECORD:

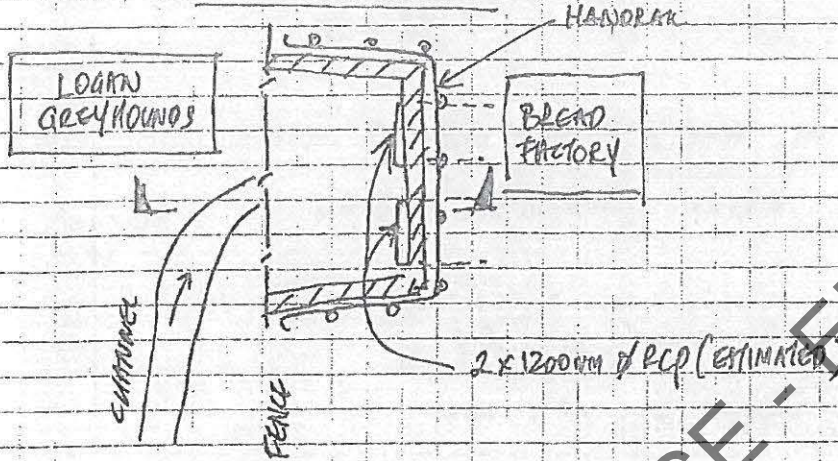
Comments by: _____ Date: _____

Project No. _____ File _____
SHEET No. 4 OF _____
PREPARED BY HSY DATE 28/11
CHECKED BY _____ DATE _____

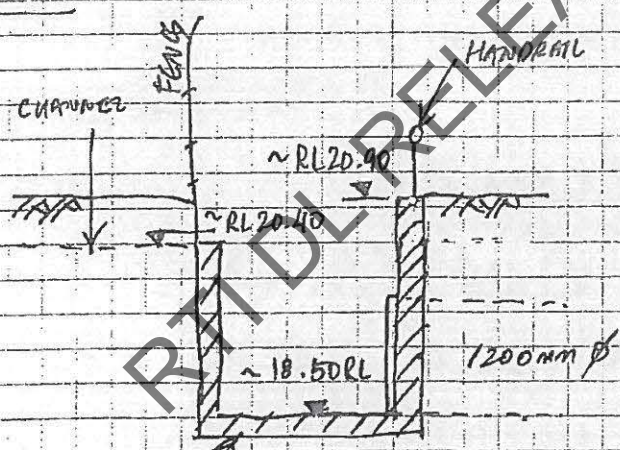
PROJECT QB10035 GREYHOUNDS WORK PACKAGE EXTERNAL CATCHMENT

TASK Flow ESTIMATION ELEMENT _____

ESTIMATED INLET HEADWALL INTO:



SECTION



HEADWALL IS A BOXED PI/SUMP WITH 2x1200mm Ø RCP (ESTIMATED) AT THE BOTTOM.

• WEIR (TOP OF BOX AT RL 20.90) HAS BEEN ESTIMATED AS 5.0 m.

COMMENTS ON CALCULATION RECORD:

Comments by: _____ Date: _____

PS1 table
Worksheet for Irregular Channel

Project Description	
Project File	d:\yau'ss~1\progra~1\flowma~1\qb10035.fm2
Worksheet	PS1_REAL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

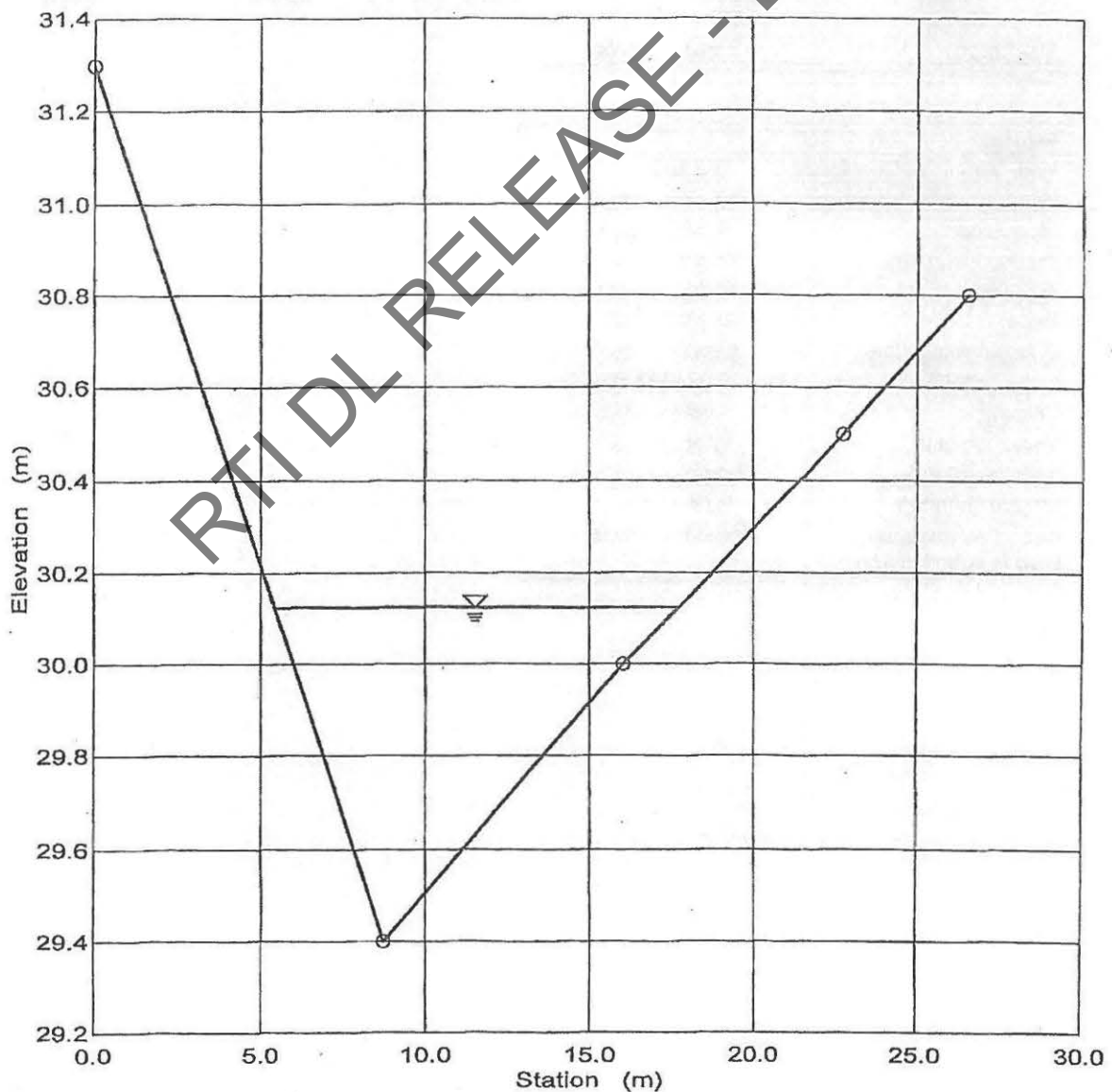
Input Data					
Channel Slope		0.011363 m/m			
Elevation range: 29.40 m to 31.30 m.					
Station (m)	Elevation (m)	Start Station	End Station	Roughness	
0.00	31.30	0.00	8.75	0.050	
8.75	29.40	8.75	16.00	0.040	
16.00	30.00	16.00	22.80	0.030	
22.80	30.50	22.80	26.56	0.025	
26.56	30.80				
Discharge	5.919	m ³ /s			

Results		
Wtd. Mannings Coefficient	0.039	
Water Surface Elevation	30.12	m
Flow Area	4.37	m ²
Wetted Perimeter	12.35	m
Top Width	12.24	m
Depth	0.72	m
Critical Water Elev.	30.03	m
Critical Slope	0.024648	m/m
Velocity	1.35	m/s
Velocity Head	0.09	m
Specific Energy	30.22	m
Froude Number	0.72	
Full Flow Capacity	92.40	m ³ /s
Flow is subcritical.		

PS1 cross section
Cross Section for Irregular Channel

Project Description	
Project File	d:\yau'ss~1\progra~1\flowma~1\qb10035.fm2
Worksheet	PS1_REAL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.039
Channel Slope	0.011363 m/m
Water Surface Elevation	30.12 m
Discharge	5.919 m ³ /s



PS2 table
Worksheet for Irregular Channel

Project Description	
Project File	d:\yau'ss~1\progra~1\flowma~1\qb10035.fm2
Worksheet	PS2_REAL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

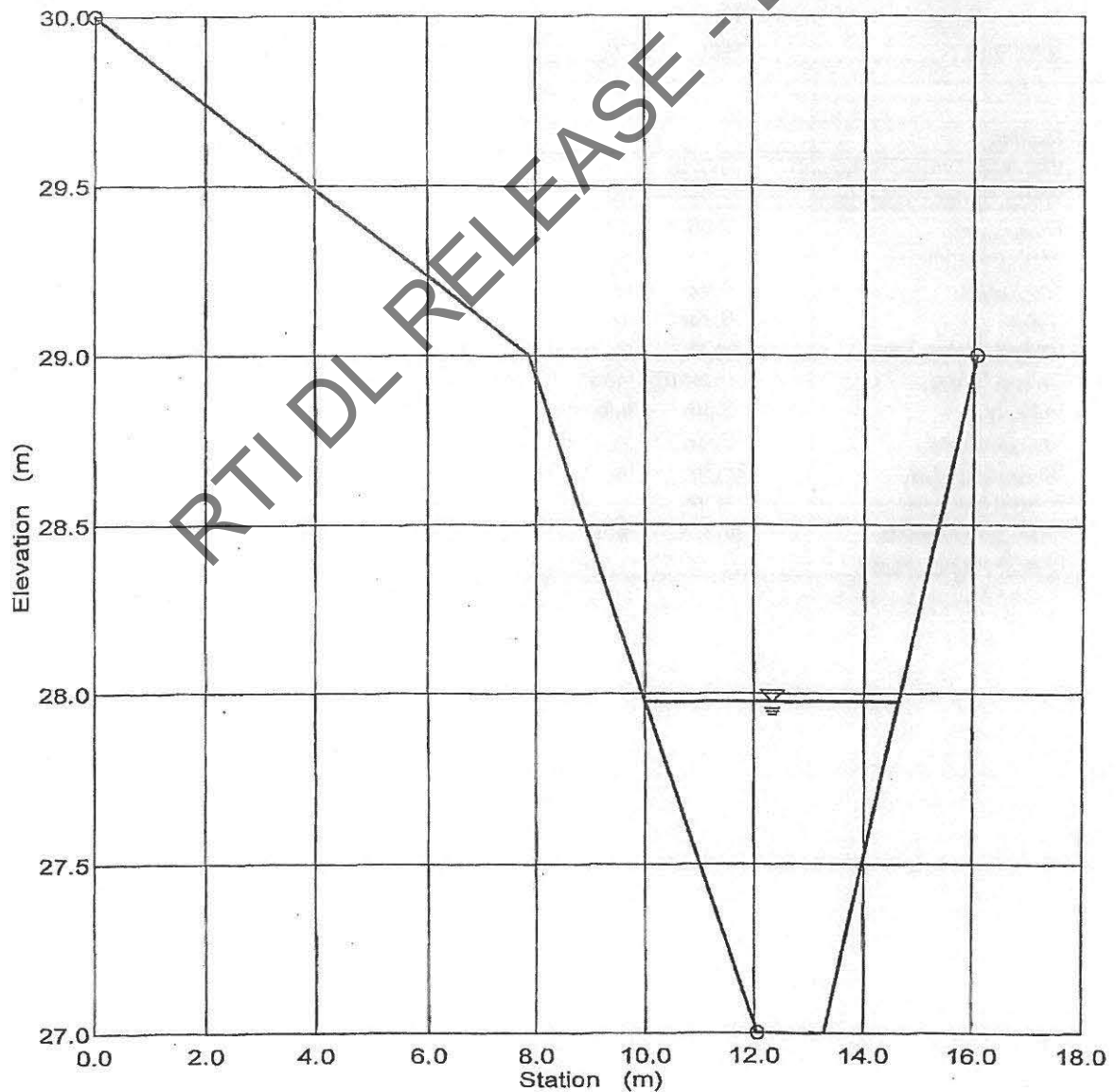
Input Data					
Channel Slope		0.014400 m/m			
Elevation range: 27.00 m to 30.00 m.					
Station (m)	Elevation (m)	Start Station	End Station	Roughness	
0.00	30.00	0.00	12.06	0.050	
7.88	29.00	12.06	16.06	0.025	
12.06	27.00				
13.27	27.00				
16.06	29.00				
Discharge	7.98	m³/s			

Results		
Wtd. Mannings Coefficient	0.029	
Water Surface Elevation	27.98	m
Flow Area	2.85	m ²
Wetted Perimeter	5.15	m
Top Width	4.62	m
Depth	0.98	m
Critical Water Elev.	28.04	m
Critical Slope	0.011078	m/m
Velocity	2.80	m/s
Velocity Head	0.40	m
Specific Energy	28.38	m
Froude Number	1.14	
Full Flow Capacity	90.37	m ³ /s
Flow is supercritical.		

PS2 cross section
Cross Section for Irregular Channel

Project Description	
Project File	d:\yau'ss~1\progra~1\flowma~1\qb10035.fm2
Worksheet	PS2_REAL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.029
Channel Slope	0.014400 m/m
Water Surface Elevation	27.98 m
Discharge	7.98 m ³ /s



PS3 table
Worksheet for Irregular Channel

Project Description	
Project File	d:\yau'ss~1\progra~1\flowma~1\qb10035.fm2
Worksheet	PS3_REAL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

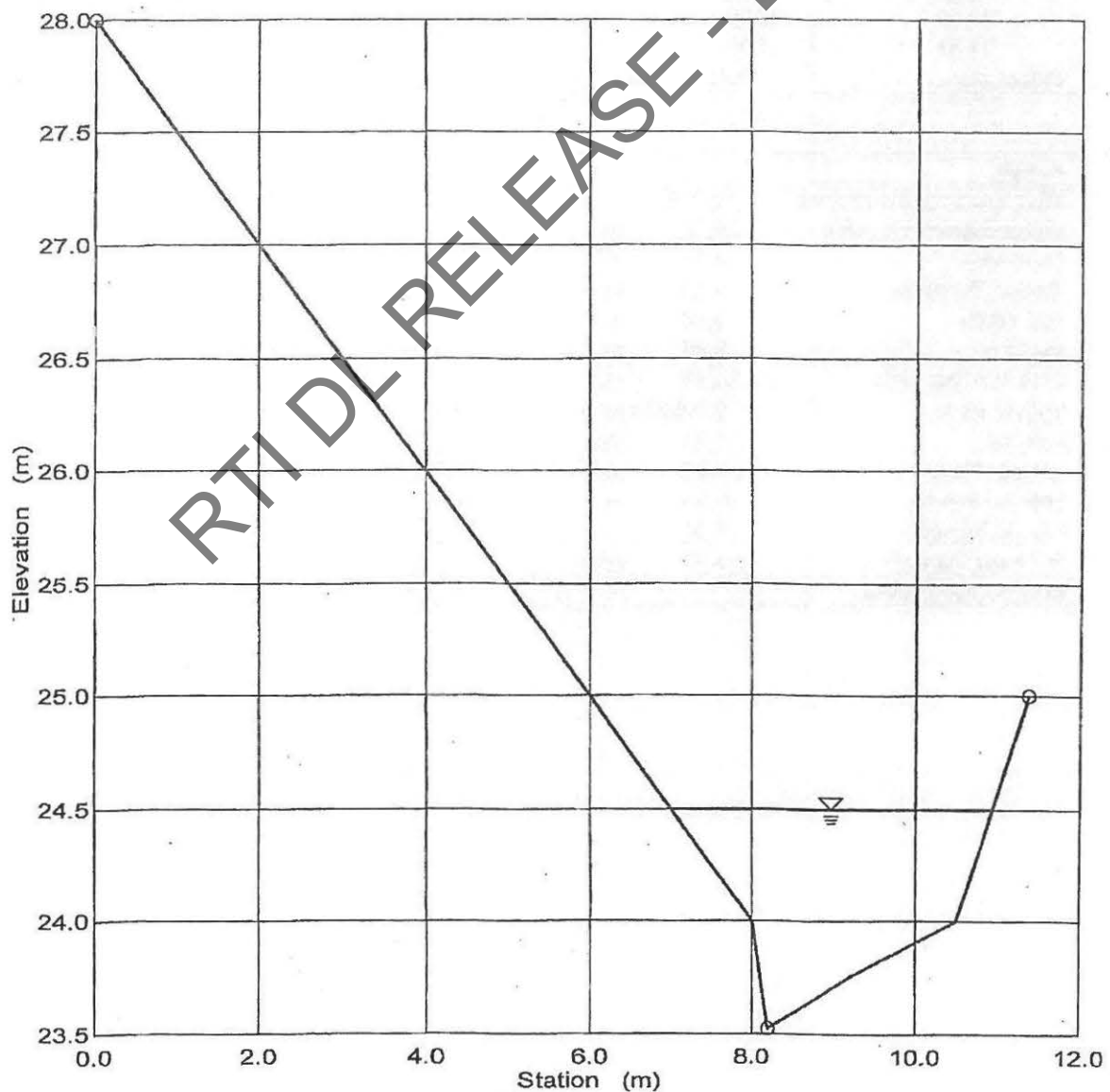
Input Data					
Channel Slope		0.033000 m/m			
Elevation range: 23.52 m to 28.00 m.					
Station (m)	Elevation (m)	Start Station	End Station	Roughness	
0.00	28.00	0.00	8.20	0.040	
8.00	24.00	8.20	11.37	0.025	
8.20	23.52				
9.20	23.75				
10.50	24.00				
11.37	25.00				
Discharge	9.774	m ³ /s			

Results		
Wtd. Mannings Coefficient	0.024	
Water Surface Elevation	24.50	m
Flow Area	2.17	m ²
Wetted Perimeter	4.64	m
Top Width	3.92	m
Depth	0.98	m
Critical Water Elev.	24.83	m
Critical Slope	0.008678	m/m
Velocity	4.51	m/s
Velocity Head	1.04	m
Specific Energy	25.53	m
Froude Number	1.94	
Full Flow Capacity	255.43	m ³ /s
Flow is supercritical.		

PS3 cross section
Cross Section for Irregular Channel

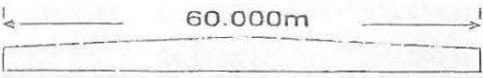
Project Description	
Project File	d:\yau'ss~1\progra~1\flowma~1\qb10035.fm2
Worksheet	PS3_REAL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.024
Channel Slope	0.033000 m/m
Water Surface Elevation	24.50 m
Discharge	9.774 m ³ /s



CulvertW - Design Case No 2

(File: QB10035.CUL - Date: 18-2-2010)


2 No 1200 cl 2 RCP (1.220m dia) at a slope= 0.20%
Inlet RL 18.500m Outlet RL 18.380m

Culvert Data

Using Mannings 'n' = 0.013
Entrance Loss Coefficient 'k' = 0.500
Entrance - Sqr end & headwall

Weir Data

Weir Length = 6.000m Weir Coefficient = 0.577
Weir Crest Height = 2.520m (RL 20.900m)

No Channel Data specified to be used

Headwater

Approach Flow = 12.869m³/s
Flow in each Culvert = 4.478m³/s
Flow over weir = 3.913m³/s (depth = 0.527m)
Tailwater depth = 1.200m (RL 19.580m)
Using fixed Tailwater depth
Critical depth at outlet = 1.104m (RL 19.484m)
Effective tailwater depth = 1.200m (RL 19.580m)
Head Loss in Culvert = 1.834m
Depth at outlet adopted to
calculate outlet velocity = 1.200m (RL 19.580m)
Outlet Velocity = 3.831m/s

OUTLET control

Headwater is at RL 21.427m - 0.527m above Weir Crest
Tailwater is at RL 19.580m - 1.200m above outlet invert

QB10035_Developed_rev1.out
Run started at: 18th February 2010 13:06:20

#####

Max. no. of links allowed = 1500
Max. no. of routing increments allowed = 250000
Max. no. of rating curve points = 250000
Max. no. of storm temporal points = 250000
Max. no. of channel subreaches = 25
Max link stack level = 25
Input Version number = 700

LINK PN4 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 1.100
ESTIMATED PEAK FLOW (CUMECS) = 0.68
ESTIMATED TIME TO PEAK (MINS) = 25.00

LINK PN5 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 1.857
ESTIMATED PEAK FLOW (CUMECS) = 1.2
ESTIMATED TIME TO PEAK (MINS) = 25.00

LINK T1 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 1.822
ESTIMATED PEAK FLOW (CUMECS) = 0.70
ESTIMATED TIME TO PEAK (MINS) = 35.00

LINK T2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 3.330
ESTIMATED PEAK FLOW (CUMECS) = 1.3
ESTIMATED TIME TO PEAK (MINS) = 34.00

LINK KR2 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.1271
ESTIMATED PEAK FLOW (CUMECS) = 0.93E-01
ESTIMATED TIME TO PEAK (MINS) = 22.00

LINK KR1 1.000
ESTIMATED VOLUME (CU METRES*10**3) = 0.2872
ESTIMATED PEAK FLOW (CUMECS) = 0.20
ESTIMATED TIME TO PEAK (MINS) = 22.00

QB10035_Developed_rev1.out

LINK P3 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.8847
 ESTIMATED PEAK FLOW (CUMECS) = 0.55
 ESTIMATED TIME TO PEAK (MINS) = 25.00

LINK P4 Basin 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 1.786
 ESTIMATED PEAK FLOW (CUMECS) = 1.0
 ESTIMATED TIME TO PEAK (MINS) = 25.00

iosd 11kta 0 8
 LINK EX1 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 9.090
 ESTIMATED PEAK FLOW (CUMECS) = 6.2
 ESTIMATED TIME TO PEAK (MINS) = 22.00

LINK PS1 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 11.80
 ESTIMATED PEAK FLOW (CUMECS) = 7.5
 ESTIMATED TIME TO PEAK (MINS) = 28.00

LINK EX2 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 6.000
 ESTIMATED PEAK FLOW (CUMECS) = 3.7
 ESTIMATED TIME TO PEAK (MINS) = 26.00

LINK PS2 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 18.83
 ESTIMATED PEAK FLOW (CUMECS) = 11.
 ESTIMATED TIME TO PEAK (MINS) = 28.00

LINK PS3 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 22.64
 ESTIMATED PEAK FLOW (CUMECS) = 12.
 ESTIMATED TIME TO PEAK (MINS) = 29.00

LINK East Cmbr 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 24.50
 ESTIMATED PEAK FLOW (CUMECS) = 13.
 ESTIMATED TIME TO PEAK (MINS) = 31.00

LINK PN2 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.2700
 ESTIMATED PEAK FLOW (CUMECS) = 0.17
 ESTIMATED TIME TO PEAK (MINS) = 26.00

LINK Cronulla c 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.2700
 ESTIMATED PEAK FLOW (CUMECS) = 0.17
 ESTIMATED TIME TO PEAK (MINS) = 26.00

LINK P1 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 0.2652
 ESTIMATED PEAK FLOW (CUMECS) = 0.15
 ESTIMATED TIME TO PEAK (MINS) = 26.00

LINK P2 1.000

QB10035_Developed_rev1.out

ESTIMATED VOLUME (CU METRES*10**3) = 0.9408
 ESTIMATED PEAK FLOW (CUMECS) = 0.59
 ESTIMATED TIME TO PEAK (MINS) = 25.00

LINK PN1 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 1.089
 ESTIMATED PEAK FLOW (CUMECS) = 0.68
 ESTIMATED TIME TO PEAK (MINS) = 25.00

LINK Compton Rd 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 1.089
 ESTIMATED PEAK FLOW (CUMECS) = 0.68
 ESTIMATED TIME TO PEAK (MINS) = 25.00

LINK Dummy 1.000

ESTIMATED VOLUME (CU METRES*10**3) = 25.86
 ESTIMATED PEAK FLOW (CUMECS) = 14.
 ESTIMATED TIME TO PEAK (MINS) = 31.00

 #####

QB10035 Greyhounds - Developed

Results for period from 0: 0.0 1/ 1/1990
 to 5: 0.0 1/ 1/1990

 #####

ROUTING INCREMENT (MINS) = 1.00
 STORM DURATION (MINS) = 60.
 RETURN PERIOD (YRS) = 100.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 13.76
 TOTAL OF SECOND SUB-AREAS (ha) = 11.61
 TOTAL OF ALL SUB-AREAS (ha) = 25.37

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link Label	Catch. Area #1 (ha)	Catch. Area #2 (ha)	Slope #1 (%)	Slope #2 (%)	% Impervious #1 (%)	% Impervious #2 (%)	Pern #1	Pern #2	B #1	B #2	Link No.
PN4	0.3580	0.7240	5.000	3.700	100.0	0.000	.013	.033	.0004	.0139	1.000
PN5	.00001	0.7510	.0010	10.10	100.0	0.000	.025	.033	.0002	.0086	1.001
T1	0.0900	1.711	.5000	1.000	100.0	0.000	.013	.033	.0006	.0417	2.000
T2	0.0750	1.427	.5000	1.000	100.0	0.000	.013	.033	.0005	.0379	2.001
KR2	0.0980	0.0260	3.000	3.500	100.0	0.000	.015	.033	.0003	.0025	3.000
KR1	0.2280	0.0520	3.000	3.000	100.0	0.000	.015	.033	.0004	.0039	4.000
P3	0.2270	0.3610	2.000	1.700	100.0	0.000	.015	.040	.0005	.0164	4.001
P4 Basin	0.4100	0.4750	3.000	1.300	100.0	0.000	.015	.034	.0005	.0192	4.002
EX1	7.088	1.772	3.000	3.000	100.0	0.000	.013	.035	.0022	.0256	5.000
PS1	.00001	0.8170	3.000	2.000	100.0	0.000	.014	.036	0.000	.0214	3.001

QB10035_Developed_rev1.out

EX2	4.672	1.168	3.000	3.000	0.000	0.000	.013	.035	.0154	.0206	6.000
PS2	.00001	1.031	.0010	1.800	100.0	0.000	.025	.033	.0002	.0239	3.002
PS3	.00001	0.4740	.0010	5.000	100.0	0.000	.025	.036	.0002	.0102	2.002
East Cmb	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	1.002
PN2	.00001	0.2680	.0010	3.200	100.0	0.000	.025	.033	.0002	.0089	7.000
Cronulla C.	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	7.001
P1	.00001	0.2630	.0010	2.000	100.0	0.000	.025	.040	.0002	.0129	8.000
P2	0.5150	0.1440	3.000	2.000	100.0	0.000	.015	.033	.0006	.0081	8.001
PN1	.00001	0.1470	.0010	2.100	100.0	0.000	.025	.033	.0002	.0080	8.002
Compton Rd.	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	8.003
Dummy	.00001	0.000	.0010	0.000	100.0	0.000	.025	0.00	.0002	0.000	1.003

Link Label	Average Intensity (mm/h)	Init. Loss #1 (mm)	Loss #2	Cont. Loss #1 (mm/h)	Loss #2	Excess Rain #1 (mm)	Rain #2	Peak Inflow (m ³ /s)	Time to Peak	Link Lag mins
PN4	103.22	0.000	0.000	0.000	2.500	103.22	100.72	0.6836	25.00	.5000
PN5	103.22	0.000	0.000	0.000	2.500	103.22	100.72	1.168	25.00	0.000
T1	103.22	0.000	0.000	0.000	2.500	103.22	100.72	0.7026	35.00	0.000
T2	103.22	0.000	0.000	0.000	2.500	103.22	100.72	1.295	34.00	0.000
KR2	103.22	0.000	0.000	0.000	2.500	103.22	100.72	0.0930	22.00	2.800
KR1	103.22	0.000	0.000	0.000	2.500	103.22	100.72	0.2045	22.00	.5000
P3	103.22	0.000	0.000	0.000	2.500	103.22	100.72	0.5479	25.00	2.000
P4 Basin	103.22	0.000	0.000	0.000	2.500	103.22	100.72	1.046	25.00	0.000
EX1	103.22	0.000	0.000	0.000	2.500	103.22	100.72	6.247	22.00	3.000
PS1	103.22	0.000	0.000	0.000	2.500	103.22	100.72	7.497	28.00	3.000
EX2	103.22	0.000	0.000	0.000	2.500	103.22	100.72	3.673	26.00	0.000
PS2	103.22	0.000	0.000	0.000	2.500	103.22	100.72	10.999	28.00	1.400
PS3	103.22	0.000	0.000	0.000	2.500	103.22	100.72	12.489	29.00	1.500
East Cmb	103.22	0.000	0.000	0.000	0.000	103.22	0.000	13.278	31.00	0.000
PN2	103.22	0.000	0.000	0.000	2.500	103.22	100.72	0.1652	26.00	0.000
Cronulla c	103.22	0.000	0.000	0.000	0.000	103.22	0.000	0.1652	26.00	0.000
P1	103.22	0.000	0.000	0.000	2.500	103.22	100.72	0.1485	26.00	3.000
P2	103.22	0.000	0.000	0.000	2.500	103.22	100.72	0.5887	25.00	0.000
PN1	103.22	0.000	0.000	0.000	2.500	103.22	100.72	0.6787	25.00	0.000
Compton Rd	103.22	0.000	0.000	0.000	0.000	103.22	0.000	0.6787	25.00	0.000

QB10035_Developed_rev1.out
 Dummy 103.22 0.000 0.000 0.000 0.000 103.22 0.000 13.838 31.00 0.000

SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m ³ /s)	Time to Peak	Peak Outflow (m ³ /s)	Total Inflow (m ³)	Vol. Avail	Basin Vol. Used	Stage Used
P4 Basin	25.00	1.045	29.00	.7893	1786.1	0.0000	578.90	31.663

SUMMARY OF BASIN OUTLET RESULTS

Link Label	No. of	S/D Factor (m)	Dia (m)	width (m)	Pipe Length (m)	Pipe Slope (%)
P4 Basin	1.0	1.000		0.000	20.000	0.2000

Run completed at: 18th February 2010 13:06:48

mik open

0

RTI DL RELEASE - EHP



Appendix E MUSIC Model Data

RTI DL RELEASE - EHP

SINCLAIR KNIGHT MERZ

LOGAN GREYHOUND FACILITY – Site Based Stormwater Management Plan

Figure E3: MUSIC Model Inputs – Printscreens of input data

Detention Basin

Properties of Detention Basin

Location: Detention Basin

Inlet Properties

Low Flow By-pass (cubic metres per sec) 0.000

High Flow By-pass (cubic metres per sec) 100.000

Storage Properties

Surface Area (square metres) 792.0

Extended Detention Depth (metres) 0.01

Permanent Pool Volume (cubic metres) 0.0

Vegetation Cover (% of surface area) 10.0

Seepage Loss (mm/hr) 0.00

Evaporative Loss as % of PET 100.00

Outlet Properties

Equivalent Pipe Diameter (mm) 450

Overflow Weir Width (metres) 8.0

Notional Detention Time (hrs) 46.6E-3

Re-use... Fluxes... Notes... More

Cancel Back Finish

Bio-Retention Basin (turnaround)

Properties of Bio-R basin 1

Location: Bio-R basin 1

Inlet Properties

Low Flow By-Pass (cubic metres per sec) 0.000

High Flow By-pass (cubic metres per sec) 100.000

Storage Properties

Extended Detention Depth (metres) 0.30

Surface Area (square metres) 540.0

Seepage Loss (mm/hr) 0.00

Infiltration Properties

Filter Area (square metres) 440.0

Filter Depth (metres) 0.6

Filter Median Particle Diameter (mm) 0.45

Saturated Hydraulic Conductivity (mm/hr) 180.00

Depth below underdrain pipe (% of Filter Depth) 0.0

Outlet Properties

Overflow Weir Width (metres) 3.0

Fluxes... Notes... More

Cancel Back Finish

Bio-Retention Basin (tracks – typical)

Properties of Potential Bio-Basin

Location: Potential Bio-Basin

Inlet Properties

Low Flow By-Pass (cubic metres per sec) 0.000

High Flow By-pass (cubic metres per sec) 100.000

Storage Properties

Extended Detention Depth (metres) 0.10

Surface Area (square metres) 150.0

Seepage Loss (mm/hr) 0.00

Infiltration Properties

Filter Area (square metres) 100.0

Filter Depth (metres) 0.6

Filter Median Particle Diameter (mm) 0.45

Saturated Hydraulic Conductivity (mm/hr) 180.00

Depth below underdrain pipe (% of Filter Depth) 0.0

Outlet Properties

Overflow Weir Width (metres) 3.0

Fluxes... Notes... More

Cancel Back Finish

Rainwater Tank

Properties of Rainwater Tank

Location: Rainwater Tank

Inlet Properties

Low Flow By-pass (cubic metres per sec) 0.0000

High Flow By-pass (cubic metres per sec) 100.000

Storage Properties

Volume below overflow pipe (kL) 15.00

Depth above overflow (metres) 0.20

Surface Area (square metres) 21.0

Outlet Properties

Overflow Pipe Diameter (mm) 100

Re-use Properties

☐ Use stored water for irrigation or other purpose

Annual Demand (l L/yr) scaled by daily PE1 0.000

Daily Demand (l L/day) 0.000

Monthly distribution of Annual Demand (l L/yr) 0.000

Fluxes... Notes... More

Cancel Back Finish

Bio-Retention Trench

Properties of Bio-Retention	
Location <input type="text" value="Bio-Retention"/>	
Inlet Properties	
Low Flow By-Pass (cubic metres per sec)	<input type="text" value="0.000"/>
High Flow By-pass (cubic metres per sec)	<input type="text" value="100.000"/>
Storage Properties	
Extended Detention Depth (metres)	<input type="text" value="0.10"/>
Surface Area (square metres)	<input type="text" value="72.0"/>
Seepage Loss (mm/hr)	<input type="text" value="0.00"/>
Infiltration Properties	
Filter Area (square metres)	<input type="text" value="24.0"/>
Filter Depth (metres)	<input type="text" value="0.6"/>
Filter Median Particle Diameter (mm)	<input type="text" value="0.45"/>
Saturated Hydraulic Conductivity (mm/hr)	<input type="text" value="180.00"/>
Depth below underdrain pipe (% of Filter Depth)	<input type="text" value="0.0"/>
Outlet Properties	
Overflow Weir Width (metres)	<input type="text" value="2.0"/>
Fluxes... Notes... More	
<input type="button" value="Cancel"/> <input type="button" value="Back"/> <input checked="" type="button" value="Finish"/>	

Swales (typical input -- length varies)

Properties of Swale	
Location <input type="text" value="Swale"/>	
Inlet Properties	
Low Flow By-Pass (cubic metres per sec)	<input type="text" value="0.000"/>
Storage Properties	
Length (metres)	<input type="text" value="40.0"/>
Bed Slope (%)	<input type="text" value="0.50"/>
Base Width (metres)	<input type="text" value="1.2"/>
Top Width (metres)	<input type="text" value="3.6"/>
Depth (metres)	<input type="text" value="0.30"/>
Vegetation Height (metres)	<input type="text" value="0.100"/>
Seepage Loss (mm/hr)	<input type="text" value="0.00"/>
Fluxes... Notes... More	
<input checked="" type="button" value="Cancel"/> <input type="button" value="Back"/> <input checked="" type="button" value="Finish"/>	

Buffer Strips (typical input)

Properties of Buffer	
Location <input type="text" value="Buffer"/>	
Treatment Properties	
Percentage of upstream area buffered (%)	<input type="text" value="50.0"/>
Buffer Area (% of upstream impervious area)	<input type="text" value="2.0"/>
Seepage Loss (mm/hr)	<input type="text" value="0.00"/>
Fluxes... Notes...	
<input checked="" type="button" value="Cancel"/> <input type="button" value="Back"/> <input checked="" type="button" value="Finish"/>	

LOGAN GREYHOUND FACILITY – Site Based Stormwater Management Plan

Figure E4: MUSIC Model Inputs – Results

Treatment Train Effectiveness - Receiving Node			
	Sources	Residual Load	% Reduction
Flow (ML/yr)	41.4	34.8	16.0
Total Suspended Solids (kg/yr)	12.3E3	1.28E3	89.6
Total Phosphorus (kg/yr)	17.6	4.50	74.4
Total Nitrogen (kg/yr)	111	58.7	46.9
Gross Pollutants (kg/yr)	391	0.00	100.0



Appendix F Services Demand Calculations

RTI DL RELEASE - EHP

PROJECT LOGAN GREYHOUND FACILITY WORK PACKAGE

TASK WATER DEMAND ESTIMATE ELEMENT

MAIN BUILDING FACILITY HAS: - 20 WC
- 6 Urinals
- 15 Basins

↳ ASSUME KITCHENS & BARS HAVE 11" SINKS WITH AERATED TAPS

KENNEL BLOCK HAS - 1 WC
- 1 Basin
- 1 Sink (standard tap)

↳ ASSUME KENNEL BLOCK REQUIRES WASHING USING:

- 2 Internal standard taps (15mm)
- 6 External Washdown Bays - 1 tap each

ASSUME TRIALLING KENNEL REQUIRES: - 4 Washdown Bays
- 1 tap each

- 1 Internal tap for
hosing down

BASED ON AS3500.1 (2003), LOADING UNITS ARE:

- 21 WC	x 2 LU = 42
- 6 Urinals	x 2 LU = 12
- 16 Basins	x 1 LU = 16
- 11 Sinks (Aerated taps)	x 2 LU = 22
- 1 Sink (Standard tap)	x 3 LU = 3
- 13 Taps (15mm)	x 4 LU = 52
	<u>147 LU</u>

PROBABLE SIMULTANEOUS FLOW

TABLE 3.3 AS3500.1 (2003) ONLY UP TO 60 LU

∴ USE TABLE 48 (INSTITUTE OF PLUMBING AUSTRALIA -
SELECTION & SIZING OF COPPER TUBES
FOR WATER PIPING SYSTEMS)

⇒ PROBABLE SIMULTANEOUS FLOW RATE = 1.40 L/s

COMMENTS ON CALCULATION RECORD:

Comments by: Date:

PROJECT LGF WORK PACKAGE
TASK WATER DEMAND ESTIMATE ELEMENT

GREYHOUNDS QLD (CLIENT) HAS ADVISED ADDITIONAL WATER
USAGE FOR CURRENT ALBION, QLD TRACK AS FOLLOWS:

- 150,000 L/WEEK FOR SUMMER
- 120,000 L/WEEK FOR WINTER

WHICH EQUATES TO:

	SUMMER	WINTER
	21,500 L/day	17,150 L/day
OR	893 L/hr	715 L/hr
OR	0.248 L/s	0.199 L/s

ESTIMATED WATER DEMAND:

$\rightarrow$ IN SUMMER (Worst) $= 1.40 + 0.25 = 1.65 \text{ L/s}$
 $\rightarrow$ IN WINTER $= 1.40 + 0.20 = 1.60 \text{ L/s}$

} ASSUME
 1.65 L/s
 (CONSERVATIVE)

LOGAN CITY SPECIFIES AVERAGE DAY DEMAND (ADD)
AS 340 L/EP/day

$\therefore 1.65 \text{ L/s}$ EQUIVALENT TO 142,560 L/day

$\Rightarrow$ 420 EP FOR THE SITE

COMMENTS ON CALCULATION RECORD:

Comments by: Date:

SKM

Calculation Record

Project No. Q1310035 Form E12 August 96
 SHEET No. 3 File
 PREPARED BY ES OF
 CHECKED BY DATE 23/3/10
 DATE

PROJECT L&F WORK PACKAGE
 TASK WATER DEMAND ESTIMATE ELEMENT

DEVELOPMENT SITE IS IN 'CENTRE ZONE' ASSUMED

∴ ZONAL RETICULATION IS BY MAX HOUR

AND CODES SPECIFY

$$\frac{MH}{AD} = 2.6 \quad (\text{FACTOR FOR PEAK DEMAND})$$

LCC
 TB 2.7.1A
 (PS No. 5)

$$MH = 2.6 (142,560 / 24) \quad L/hr$$

$$= 15,444 \quad L/hr$$

$$\therefore \text{MAX SECOND} = 15,444 / 3600 \quad L/s$$

$$= 4.3 \quad L/s$$

RTI DL RELEASE - EHP

COMMENTS ON CALCULATION RECORD:

Comments by: Date:

Topic No. 4.2		Description PROBABLE SIMULTANEOUS FLOW DATA. DIVERSITY OF FLOW, LOADING UNITS TO LITRES PER SECOND					
LOADING UNITS	PROBABLE SIMULTA- NEOUS FLOW LITRES/ SEC.	LOADING UNITS	PROBABLE SIMULTA- NEOUS FLOW LITRES/ SEC.	LOADING UNITS	PROBABLE SIMULTA- NEOUS FLOW LITRES/ SEC.	LOADING UNITS	PROBABLE SIMULTA- NEOUS FLOW LITRES/ SEC.
1	0.10	170	1.57	1440	5.60	2800	8.78
2	0.12	180	1.65	1480	5.68	2840	8.94
3	0.15	190	1.72	1520	5.76	2880	9.01
4	0.18	200	1.80	1560	5.91	2920	9.09
5	0.21	240	1.97	1600	5.98	2960	9.24
6	0.23	280	2.20	1640	6.06	3000	9.31
7	0.24	320	2.42	1680	6.13	3040	9.39
8	0.25	360	2.57	1720	6.29	3080	9.47
9	0.26	400	2.73	1760	6.36	3120	9.54
10	0.27	440	2.95	1800	6.44	3160	9.69
11	0.28	480	3.10	1840	6.51	3200	9.77
12	0.29	520	3.26	1880	6.66	3240	9.84
13	0.30	560	3.41	1920	6.74	3280	9.92
14	0.31	600	3.48	1960	6.82	3320	10.00
15	0.32	640	3.64	2000	6.89	3360	10.15
16	0.33	680	3.76	2040	7.04	3400	10.22
17	0.34	720	3.86	2080	7.12	3440	10.30
18	0.35	760	4.01	2120	7.19	3480	10.45
19	0.36	800	4.09	2160	7.27	3520	10.53
20	0.38	840	4.17	2200	7.42	3560	10.60
30	0.42	880	4.32	2240	7.50	3600	10.68
40	0.45	920	4.39	2280	7.57	3640	10.83
50	0.52	960	4.47	2320	7.65	3680	10.91
60	0.64	1000	4.54	2360	7.80	3720	10.98
70	0.73	1040	4.70	2400	7.88	3760	11.06
80	0.83	1080	4.77	2440	7.95	3800	11.13
90	0.92	1120	4.85	2480	8.03	3840	11.28
100	1.00	1160	5.00	2520	8.18	3880	11.36
110	1.10	1200	5.07	2560	8.25	3920	11.44
120	1.20	1240	5.15	2600	8.33	3960	11.51
130	1.27	1280	5.23	2640	8.48	4000	11.66
140	1.35	1320	5.38	2680	8.56		
150	1.42	1360	5.45	2720	8.63		
160	1.50	1400	5.53	2760	8.71		

NOTE: When assessing design flows, taps and sanitary fixtures used out of hours, such as cleaner's sinks and hose taps should be ignored. In addition taps and outlets such as air conditioning plant which require full flow should have that flow added to the probable simultaneous flow required for all other taps and sanitary fixtures in the building.

SECTION 3 SIZING OF WATER SERVICES

3.1 SCOPE OF SECTION

This Section specifies the requirements for the sizing of pipes for water service installations.

3.2 FLOW REQUIREMENTS

A1

3.2.1 Flow rates

The flow rates of taps, valves and cisterns shall be not less than the flow rates specified in Table 3.1.

The maximum flow rate from a shower, basin, and kitchen sink or laundry trough outlet shall not exceed 9 L/min.

3.2.2 Loading units

Loading units are factors that take into account the flow rate, length of time in use, and frequency of use of the fixture or appliance. When installed in a domestic situation, loading units for fixtures/appliances shall be as given in Table 3.1.

TABLE 3.1
FLOW RATES AND LOADING UNITS

Fixture/appliance	Flow rate, L/s	Flow rate, L/min	Loading units
Water closet cistern ✓	0.10	6	2 ✓
Bath	0.30	18	8
Basin (standard outlet) ✓	0.10	6	1 ✓
Spray tap	0.03	1.8	0.5
Shower	0.10	6	2
Sink (standard tap)	0.12	7	3
Sink (acrated tap)	0.10	6	2
Laundry tub	0.12	7	3
Washing/machine/dishwasher	0.20	12	3
Mains pressure water heater	0.20	12	8
Hose tap (20 nom. size)	0.30	18	8
Hose tap (15 nom. size)	0.20	12	4

NOTES:

- 1 In the case of valves and appliances where test information indicates that they will function satisfactorily with a flow rate less than that shown in Table 3.1, the tested flow rate may be substituted and the loading units adjusted accordingly.
- 2 Flow rates and loading units given above are taken with cold water flowing at each individual outlet.

PART CLASSIFICATION OF BUILDINGS A3 AND STRUCTURES

A3.1

Principles of classification

The classification of a building or part of a building is determined by the purpose for which it is designed, constructed or adapted to be used.

A3.2

Classifications

Buildings are classified as follows:

Class 1: one or more buildings which in association constitute—

(a) Class 1a — a single dwelling being—

- (i) a detached house; or
- (ii) one of a group of two or more attached dwellings, each being a building, separated by a fire-resisting wall, including a row house, terrace house, town house or villa unit; or

(b) Class 1b — a boarding house, guest house, hostel or the like—

- (i) with a total area of all floors not exceeding 300 m² measured over the enclosing walls of the Class 1b; and

- (ii) in which not more than 12 persons would ordinarily be resident,

which is not located above or below another dwelling or another Class of building other than a private garage.

Class 2: a building containing 2 or more sole-occupancy units each being a separate dwelling.

Class 3: a residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons, including—

- (a) a boarding-house, guest house, hostel, lodging-house or backpackers accommodation; or
- (b) a residential part of a hotel or motel; or
- (c) a residential part of a school; or
- (d) accommodation for the aged, children or people with disabilities; or
- (e) a residential part of a health-care building which accommodates members of staff; or

(f) a residential part of a detention centre.

Class 4: a dwelling in a building that is Class 5, 6, 7, 8 or 9 if it is the only dwelling in the building.

Class 5: an office building used for professional or commercial purposes, excluding buildings of Class 6, 7, 8 or 9.

Class 6: a shop or other building for the sale of goods by retail or the supply of services direct to the public, including—

- (a) an eating room, cafe, restaurant, milk or soft-drink bar; or
- (b) a dining room, bar, shop or kiosk part of a hotel or motel; or
- (c) a hairdresser's or barber's shop, public laundry, or undertaker's establishment; or
- (d) market or sale room, showroom, or service station.

Class 7: a building which is—

- (a) Class 7a — a carpark; or
- (b) Class 7b — for storage, or display of goods or produce for sale by wholesale.

Class 8: a laboratory, or a building in which a handicraft or process for the production, assembling, altering, repairing, packing, finishing, or cleaning of goods or produce is carried on for trade, sale, or gain.

Class 9: a building of a public nature—

- (a) Class 9a — a health-care building, including those parts of the building set aside as a laboratory; or
- (b) Class 9b — an assembly building, including a trade workshop, laboratory or the like in a primary or secondary school, but excluding any other parts of the building that are of another Class; or
- (c) Class 9c — an aged care building.

Class 10: a non-habitable building or structure—

- (a) Class 10a — a non-habitable building being a private garage, carport, shed, or the like; or
- (b) Class 10b — a structure being a fence, mast, antenna, retaining or free-standing wall, swimming pool, or the like.

A3.3

Multiple classification

Each part of a building must be classified separately, and—

(a)

- (i) where parts have different purposes — if not more than 10% of the floor area of a storey, being the minor use, is used for a purpose which is a different classification, the classification applying to the major use may apply to the whole storey; and
- (ii) the provisions of (i) do not apply when the minor use is a laboratory or Class 2, 3 or 4 part; and

(b) Classes 1a, 1b, 7a, 7b, 9a, 9b, 9c, 10a and 10b are separate classifications; and

(c) a reference to—

(i) Class 1 — is to Class 1a and 1b; and

(ii) Class 7 — is to Class 7a and 7b; and

(iii) Class 9 — is to Class 9a, 9b and 9c; and

(iv) Class 10 — is to Class 10a and 10b; and

(d) A plant room, machinery room, lift motor room, boiler room or the like must have the same classification as the part of the building in which it is situated.

A3.4

Parts with more than one classification

- (a) Notwithstanding A3.3, a building or part of a building may have more than one classification applying to the whole building or to the whole of that part of the building.
- (b) If a building or part of a building has more than one classification applying to the whole building or part in accordance with (a), that building or part must comply with all the relevant provisions of the BCA for each classification.

RTI DL RELEASE - END

Supporting Documentation BCC Requirements Sewerage Code - Part 1 (Planning and Design)

Pt 1 – 1.3.3 Design Responsibilities

The design of the works shall be carried out under the direction of and certified by a Registered Professional Engineer of Q'ld. (RPEQ).

The Designer shall obtain the written approval from Council for any variations to the requirements of latest edition of WSA 02-2002 Sewerage Code as amended by this Supplementary Manual prior to the submission of the final design.

Pt 1 – 3.2.1 Design Flow Estimation Method - General

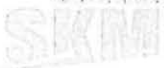
EP Estimation

The dry weather flow (sanitary flow) is calculated from the product of the number of Equivalent Persons (EP) and the flow rate per EP. The EP's are determined by converting the areas of residential, commercial and industrial development to an equivalent residential population on a sewage flow basis. The development areas are based on actual areas excluding roads etc. except where noted otherwise. EP/ha values for various types of development shall be in accordance with Table 3.1.

Table 3.1
Development Area Densities - EP/ha

City Plan Classification	EP/ha	City Plan Classification	EP/ha
Residential		Community Use	
Character and Low Density	36	Community facilities, Education and Emergency Purposes	18
Low-Medium Density	72	Health Care Purposes	60
Medium Density	108	Utility Services	5
High Density	150	Special Purposes Centres	
Emerging Community	36	Major Hospital & Medical facility	60
Industry		Major Educational & Research facility	18
Light	24	Major Sporting Stadium	30
General, Heavy and Future	30	Entertainment Centre	30
Multi-Purpose centres		Port	24
City Centre MP1	100	Major Institution	36
Major Centre MP2	80	Vehicle Sales & Service	18
Suburban Centre MP3	60	Mixed Industry & Business	60
Convenience Centre MP4	20	Office Park	60
		Cottage Industry / Retail	36
		South Bank	18

Where existing or future developments will produce EP's greater than those determined from the above densities, site specific flows shall be used in the analysis. This particularly relates to industrial and commercial type developments. Site specific flow estimates shall utilise sewage flow and / or water consumption data where available. Where this information is not available or in the case of future development where the flow has not been quantified, the rates given in Table 3.2 shall apply.



Appendix G Logan City Council Correspondence

RTI DL RELEASE - EHP

SINCLAIR KNIGHT MERZ

Yau, Hoy Sung (SKM)

From: Osipowicz, Marta [MartaOsipowicz@logan.qld.gov.au]
Sent: Thursday, 8 October 2009 3:29 PM
To: Yau, Hoy Sung (SKM)
Subject: QB10035 Logan Greyhounds: Flood search requirement - POS Corner Kingston Road and Compton Road

Hi Yau,

Please see Nardine's email below. You do not need to consider prospective flooding from Slacks Creek.

In relation to the water supply and sewerage enquiry - I forwarded that to Marco Bonotto. I hope he gets back to you otherwise you may want to phone him and follow up the email I forwarded yesterday.

Take care ... Kind Regards,

Marta Osipowicz
Senior Planning Officer (North East)
Development Assessment Branch
Logan City Council
150 Wembley Rd, Logan Central QLD 4114

☎ +61 7 3412 4931
☎ +61 7 3412 3444
✉ martaosipowicz@logan.qld.gov.au

-----Original Message-----

From: Bird, Nardine
Sent: Thursday, 8 October 2009 2:53 PM
To: Osipowicz, Marta
Subject: RE: QB10035 Logan Greyhounds: Flood search requirement - POS Corner Kingston Road and Compton Road

Hi Marta

If you are enquiring about 146-178 Kingston Road, Slacks Creek, this property does not have a flood overlay. If its not that property just let me know the address.

Kind Regards

Nardine Bird | Flood Plain Management Officer |
Roads Infrastructure Management | **Logan City Council** | 150 Wembley Road, Logan Central, QLD 4114 | P: +61 7 3412 5170 | M: +61 7 3412 3444 | nardinebird@logan.qld.gov.au
49-Sch4 - Mobile phone

<<http://www.logan.qld.gov.au/>>

-----Original Message-----

From: Osipowicz, Marta
Sent: Wednesday, 7 October 2009 4:48 PM
To: Bird, Nardine
Cc: 'HSYau@skm.com.au'
Subject: FW: QB10035 Logan Greyhounds: Flood search requirement - POS Corner Kingston Road and Compton Road

Hello Nardine,

We met with consultants in relation to the development of a Greyhound Racing Facility at the POS reserve on the corner of Kingston Road and Compton Road a couple weeks back. Slacks Creek is a few hundred metres away from the site but one of the consultants would like to know whether there are any flooding concerns in relation to the subject site; do they need to take it into consideration during the planning process?

You can respond to me if you like otherwise the consultant is happy to liaise with you directly. His contact details are below.

Regards,

Marta Osipowicz
Senior Planning Officer (North East)
Development Assessment Branch
Logan City Council
150 Wembley Rd, Logan Central QLD 4114

☎ +61 7 3412 4931
☎ +61 7 3412 3444
✉ martaosipowicz@logan.qld.gov.au

-----Original Message-----

From: Yau, Hoy Sung (SKM) [mailto:HSYau@skm.com.au]
Sent: Wednesday, 7 October 2009 2:00 PM
To: Osipowicz, Marta
Subject: FW: QB10035 Logan Geryhounds: Flood search requirement

Marta

This relates to my query at the meeting itself. Once again, I'll be happy to follow up directly with the respective officer. Thanks.

Kind regards
Yau

From: Yau, Hoy Sung (SKM)
Sent: Thursday, 1 October 2009 4:24 PM
To: 'martaosipowicz@logan.qld.gov.au'
Cc: 'MHolford@skm.com.au'
Subject: QB10035 Logan Geryhounds: Flood search requirement

Dear Marta

We met at the meeting at Council last Friday and I was the stormwater engineer who brought up the issue of whether Council has any requirements to mitigate flooding at the proposed development (I believe it is near to a creek). Have you been able to follow up on the query? I would appreciate your response. Thank you.

Regards,

HS Yau
Civil Engineer
Level 3, 32 Cordelia Street
South Brisbane QLD 4101

(P.O. Box 3848 South Brisbane QLD 4101)

Tel: +61 7 3026 7348

Fax: +61 7 3026 7307

Email: HSYau@skm.com.au

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RTI DE RELEASE

Yau, Hoy Sung (SKM)

From: Bonotto, Marco [MarcoBonotto@logan.qld.gov.au]
Sent: Wednesday, 21 October 2009 6:37 PM
To: Yau, Hoy Sung (SKM)
Cc: Osipowicz, Marta; Holford, Marcus (SKM); WaterDA
Subject: RE: QB10035 Greyhounds: Water Supply design
Attachments: Connections.pdf

Categories: QB10035

Hi Yau,

Logan Water does not provide the standard package of Brisbane Water as per your email.

By the way I'm not sure why you have to provide an internal water supply reticulation for the proposed development: does this development involve any reconfiguration of lots? If not, I believe there is no the requirement of extension of Council's retic water or sewerage infrastructure, as already available for the site.

I've attached snapshot of our GIS showing the existing water and sewer infrastructure and the suggested connection point. For the as constructed drawing you need to request them to Techservices Branch. Please follow the link below: <http://www.logan.qld.gov.au/lcc/residents/buildingdevelopment/yourproperty/asconstructedplans.htm>

Regards,

Marco Bonotto | Acting Senior Development Response Engineer
Logan Water Infrastructure
LOGAN CITY COUNCIL
58-60 Manila Street - Beenleigh 4207 QLD
☎: 07-3412 4237 ✉: marcobonotto@logan.qld.gov.au

-----Original Message-----

From: Yau, Hoy Sung (SKM) [mailto:HSYau@skm.com.au]
Sent: Monday, 19 October 2009 3:50 PM
To: Bonotto, Marco
Cc: Osipowicz, Marta; Holford, Marcus (SKM)
Subject: RE: QB10035 Greyhounds: Water Supply design

Hi Marco

How are you? I have some queries. The local authority I often deal with is Brisbane City Council and Council (Brisbane Water) provides a standard package where Council would design and size the internal water supply reticulation pipes for the development and charges the developer a fee for the service. Could you confirm whether Logan City Council provides the same service or do we submit a fully designed water reticulation network for our development at Kingston and Compton Road?

Can Council advise on a designated connection point for the water supply (for example, is there a valve we can connect to along the water reticulation pipe along Kingston Road?) and a designated connection manhole for sewerage? Is it possible to obtain copies of as-constructed information for these services near our development site?

I'll be happy to give you a call to discuss if you wish. Much obliged if I could hear back from you. Thank you.

Regards
Yau
07 3026 7348

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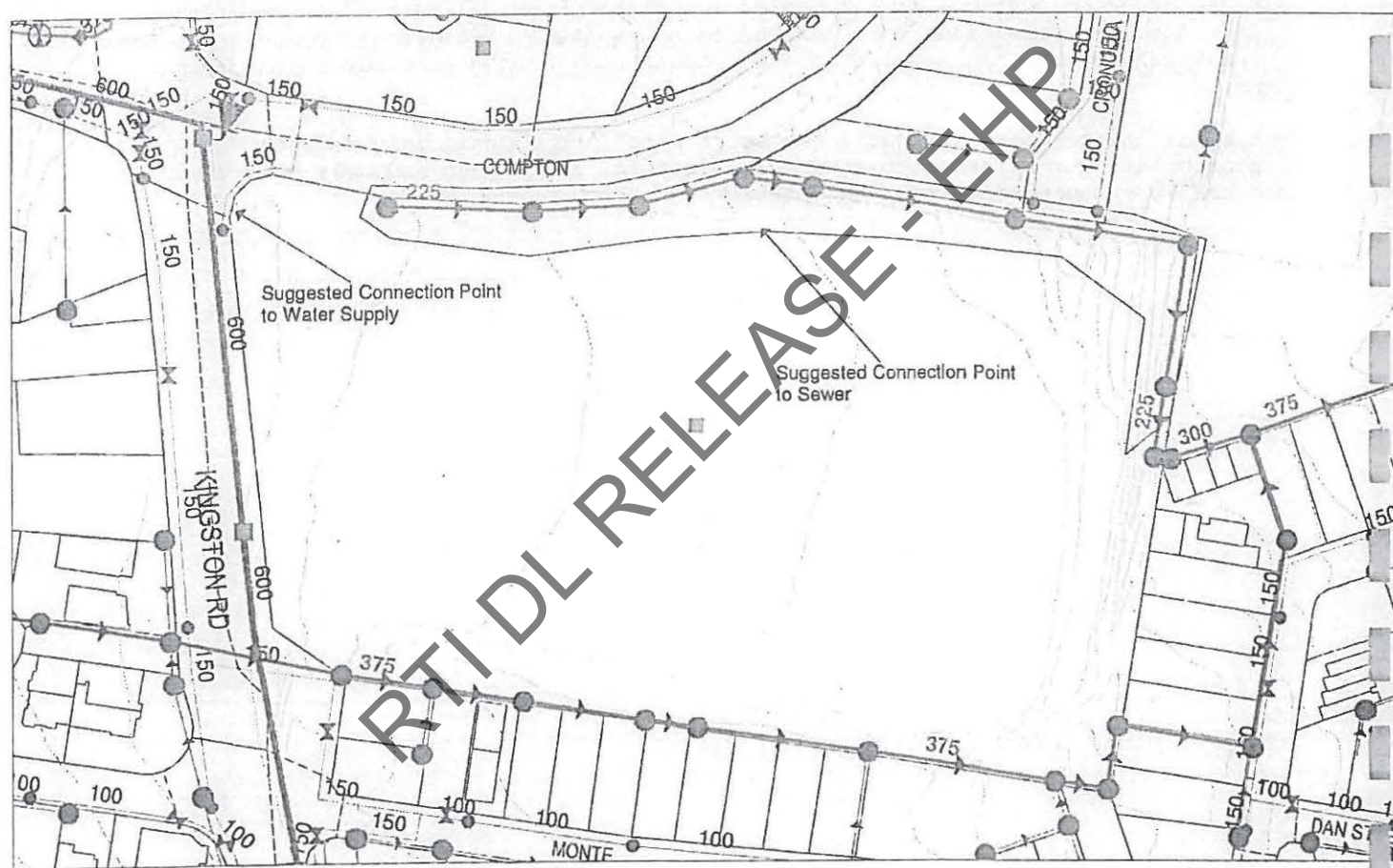
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RTI DL RELEASE - EHP





Appendix H Code Compliance Assessment

RTI DL RELEASE - EHP

SINCLAIR KNIGHT MERZ

1. Earthworks

Specific outcomes and prescribed solutions for earthworks being operational work

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
Protection from natural physical processes		
O1 Development provides for earthworks that protect development and is protected from natural physical processes.	S1.1 Development being assessable development in respect of which earthworks are carried out complies with the standards for earthworks specified in <i>Planning Scheme Policy No. 5 (Design and construction of work) 2006</i> .	S1.1 The earthworks to be carried out for the assessable development will be in compliance with the standards for earthworks specified in <i>Planning Scheme Policy No. 5 (Design and construction of work) 2006</i> . Refer to section 3 in 'Infrastructure Servicing Plan and Site Based Stormwater Management Plan' report (hereafter known as the 'Infrastructure Report' attached with this submission for additional details
	S1.2 Development provides that earthworks complies with— (a) <i>AS 3798:1996: Guidelines on earthworks for commercial and residential development</i> except to the extent that the Earthworks code specifies otherwise; and (b) the <i>Soil Erosion and Sediment Control Guidelines</i> except to the extent that the Earthworks code specifies otherwise.	S1.2 (a) Compliance with S1.1 will comply with AS3798. (b) Refer to section 5.7.10 of the Infrastructure Report for additional details on erosion and sediment control measures.
Protection and enhancement of existing and planned infrastructure		

SINCLAIR KNIGHT MERZ

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PAGE 1

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
O2 Development does not have an adverse impact on infrastructure including any service.	S2.1 Development provides that a survey mark remains accurate and is not disturbed.	S1.1 Survey of the existing site did not identify any survey marks within the development. Any recorded survey marks which are used as reference for future surveys are to be retained and protected during the development.
	S2.2 Development provides for the rectification of any damage caused by the development.	S2.2 In the event of damage to any existing infrastructure or services, appropriate rectification measures will be undertaken to restore it to existing condition(s).
	S2.3 Development does not interfere with infrastructure.	S2.3 The existing site surveys and dial-before-you-dig requests have not identified any major infrastructure over the site. In the event of any damage however, appropriate rectification measures will be undertaken.
	S2.4 Development provides for the raising of the level of a manhole, an inspection hole or access, valve and hydrant surround and cover and water meter box and lid for a service on the premises to the ground level of the premises after it has been filled and paved.	S2.4 Where the works do affect any nearby manhole or inspection chambers or other service points which are meant to be accessible, the lid levels of these existing service locations will be raised or lowered as required to match the proposed finished level of works.
Protection and enhancement of ecosystems and protection and enhancement of nature conservation values		
Site clearing		

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
O3 Development provides that— (a) the extent of clearing of the premises is minimised so that interference to plants is minimised; and (b) cleared plants other than environmental weeds are mulched and reused on the premises as far as possible; and (c) mulched plants are not stockpiled so as to constitute a fire hazard.	S3.1 Development limits the clearing on the premises to the full width of the ground to be occupied by the completed earthworks, plus a maximum of 1 metre on either side and an area for the installation of a service.	S3.1 Refer to section 3 of the 'Infrastructure Report' attached with this submission for additional details.
	S3.2 Development is carried out to prevent damage to plants by clearing— (a) overhanging trees or boughs; or (b) trees that are hung up as a result of clearing; or (c) any dead or dying tree or part of a tree that is otherwise dangerous.	S3.2 Where possible, any existing trees are to be retained and damage minimised as part of the works. Additional clearing information is provided in section 3 of the 'Infrastructure Report' attached with this submission.
	S3.3 Development is carried out so that an area, including an existing or future park that is not to be cleared, is fenced off or otherwise delineated before clearing commences.	S3.1 Where areas are not to be developed, appropriate fencing or barriers will be provided before clearing commences.
	S3.4 Development provides for— (a) the grubbing of the cleared land to a minimum depth of 300mm below the surface of the ground level; and (b) all grub holes to be adequately filled and compacted.	S3.4 Grubbing of cleared land to be minimised as much as possible due to site's past use as a managed landfill. Any grub holes will be adequately filled and compacted to standards.
O4 Development provides for— (a) cleared premises to be maintained in a clean state; and (b) cleared plants and waste not to be	S4.1 Development provides that all cleared plants are mulched and retained on the site or cleared plants and waste are removed from the site to be disposed of elsewhere.	S4.1 Refer to section 3 of the 'Infrastructure Report' for clearing and removal measures.

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
incinerated.		
<i>Stripping and stockpiling of topsoil and spoil</i>		
O5 Development provides an area on the premises to stockpile topsoil and spoil that does not cause adverse impacts on other property.	S5.1 Development provides that an area used to stockpile topsoil and soil is located a minimum of 5 metres from the boundary of the premises.	S5.1 Refer to section 3 of the 'Infrastructure Report' for stockpile measures.
<i>Filling and excavation</i>		
O6 Development provides that— (a) fill material is solid clean earth free of organic and putrescible waste, rubbish and refuse material; and (b) filling and excavation does not remove or expose actual acid sulfate soils or potential acid sulfate soils.	S6.1 None applicable	S6.1 (a) Fill material will be of suitable fill material free of organic and unwanted materials and will be sourced from reputable providers. (b) The risk of acid sulphate soils will be addressed by a geotechnical site investigation report. This report determined whether an acid sulphate soil management plan is required. Measures to mitigate the risk posed by acid sulphate soils will be outlined in a separate acid sulphate soil management plan if required.
Protection and enhancement of personal health and safety and property and protection and enhancement of amenity and character		
<i>Surface water drainage</i>		
O7 Development provides for the drainage of the	S7.1 Development provides for the premises to—	S7.1

SINCLAIR KNIGHT MERZ

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PAGE 4

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
premises so as not to cause— (a) the ponding of stormwater on the premises; or (b) a hazard to personal health and safety or property.	(a) be self draining; and (b) have a minimum crossfall of 1 in 100.	(a) Minimum crossfalls of 1 in 100 will be designed for. (b) Minimum crossfalls of 1 in 100 will be designed for.
<i>Natural flow of surface water</i>		
O8 Development provides that the natural flow of surface water from the premises or adjoining premises is not altered so as to cause a risk to personal health and safety or property.	S8.1 Development provides that the natural flow of surface waters from the premises or adjoining premises is not concentrated onto other premises.	S8.1 Refer to details under section 5.6 of the 'Infrastructure Report' which demonstrates no post-development nett increase of peak discharge.
<i>Erosion and sediment control</i>		
O9 Development protects and enhances nature conservation values from the adverse impacts of sediment and erosion.	S9.1 Development being assessable development complies with the standards for earthworks specified in <i>Planning Scheme Policy No. 5 (Design and construction of work) 2006</i> .	S8.1 Refer to answer provided in S1.2 for Outcome O1.
<i>Batter</i>		
O10 Development provides a batter that is safe and stable.	S10.1 Development provides that a batter is contained wholly within the premises so that the toe of the batter is not within 1.5 metres of the boundary of the premises. S10.2 Development provides that a batter does not extend into an existing or proposed park or a conservation area.	S10.1 All batters required as part of the development will be no less than 1.5m from the development's RP boundaries. S10.2 No batters will extend into adjacent parks or beyond the development's RP boundaries.

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
	S10.3 Development provides that a batter is limited to a maximum slope of— (a) 1 in 4; or (b) 1 in 10, in a park.	S10.3 Any designed batters will have a maximum slope of 1:4 to allow for ease of maintenance. Alternatively, batter slopes steeper than 1:4 will be assessed by an experienced geotechnical engineering professional.
	S10.4 Development provides that a batter is landscaped in accordance with the batter treatment in Table 5.3.10A (Batter treatments) and complies with the slope treatment in Table 5.3.10B (Slope treatments).	S10.3 Batter treatment to batters no steeper than 1:4 will be grassed or turfed or otherwise in accordance with Table 5.3.10A of the Council Work Code.
	S10.5 Development provides that 80% of the landscape treatment of the batter is achieved within 3 months of the completion of the development.	S10.3 The landscape treatment specified will be capable of achieving the require batter treatment within 3 months from completion.
<i>Retaining wall</i>		
O11 Development provides that a retaining wall is— (a) in a location— (i) that avoids conflict with adjoining lots; and (ii) where infrastructure is not affected; and (b) landscaped so that the retaining wall does not have an adverse impact on the visual amenity of adjacent premises or a public place.	S11.1 Development provides that a retaining wall— (a) which has a height which does not exceed 1.5 metres has a clearance from the boundary of minimum of half the height of the retaining wall; and (b) which has a height that exceeds 1.5 metres— (i) has a clearance from the boundary of the premises which is a minimum distance equal to the height of the retaining wall; and	S11.1 Retaining walls are not expected for the development. However where it is deemed necessary during the Operational Works phase, the walls will meet or exceed the minimum clearance requirements as well as other additional requirements as specified under O11.

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
	<p>(ii) is stepped a minimum of .75 metres for every 1.5 metres in height; and</p> <p>(iii) is terraced and landscaped; and</p> <p>(c) does not exceed an angle of repose of 45 degrees to adjoining buildings.</p> <p>S11.2 Development provides for the relocation of services or the relocation of the retaining wall if the services are contained within the area of influence of the loads of the retaining wall.</p>	
<i>Filling of a dam</i>		
O12 Development involving the filling of an existing dam – (a) does not adversely affect drainage; and (b) provides for the compacting of the fill.	<p>S12.1 Development involving the filling of an existing dam, provides for the dam to be dewatered and all unsuitable material to be removed from the premises.</p> <p>S12.2 Development provides for the backfilling of a dam using selected fill compacted in layers not exceeding 300mm depth to a level 2 certification as set out in AS 3798:1996: <i>Guidelines on earthworks for commercial and residential development.</i></p>	<p>S11.2 As mentioned in the response to S11.1, where retaining walls are required and if it was found existing services are within the wall's zone of influence, the affected services will be assessed and relocation provided on a case by case basis. Agreement will be sought with Council regarding such findings.</p> <p>S12.1 No dams are present in the development site</p> <p>S12.2 No dams are present in the development site</p>
<i>Hazards</i>		
O13 Development protects and enhances personal	S13.1 Development is not located on premises which	S13.1 Development is located on an existing

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
health and safety and property of the community from a hazard.	is contaminated land.	designated public park which was previously a managed landfill. Refer to separate Contaminated Site Investigation report for details on contamination management.

Specific outcomes and prescribed solutions for earthworks being building work

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
Protection from natural physical processes		
O1 Development provides for earthworks that protect development and is protected from natural physical processes.	<p>S1.1 Development being assessable development in respect of which earthworks are carried out complies with the standards for earthworks specified in <i>Planning Scheme Policy No. 5 (Design and construction of work) 2006</i>.</p> <p>S1.2 Development provides that earthworks complies with—</p> <ul style="list-style-type: none"> (a) <i>AS3798:1996: Guidelines on earthworks for commercial and residential development</i> except to the extent that the Earthworks code specifies otherwise; and (b) the <i>Soil Erosion and Sediment Control Guidelines</i> except to the extent that the Earthworks code specifies otherwise. 	<p>S1.1 The earthworks to be carried out for the building works will be in compliance with the standards for earthworks specified in <i>Planning Scheme Policy No. 5 (Design and construction of work) 2006</i>. Refer to section 3.2.2 of the 'Infrastructure Report' attached with this submission for additional details.</p> <p>S1.2</p> <ul style="list-style-type: none"> (a) Compliance with S1.1 will comply with AS3798. (b) Refer to section 5.7.10 of the Infrastructure Report for additional details on erosion and sediment control measures.

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
Protection and enhancement of personal health and safety and property		
<i>Natural flow of surface water</i>		
O2 Development provides that the natural flow of surface water from the premises or adjoining premises is not altered so as to cause a risk to personal health and safety or property.	S2.1 Development provides that the natural flow of surface waters from the premises or adjoining premises is not concentrated onto other premises.	S1.1 Concentration of flow onto adjacent premises are not anticipated. The majority of the flows enter an existing open channel drain within the current RP boundary of the development.
<i>Batter</i>		
O3 Development provides a batter that is safe and stable.	S3.1 None applicable.	S1.1 Batter slopes steeper than 1:4 will be assessed by an experience geotechnical engineering professional.
<i>Retaining wall</i>		

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
O4 Development provides that a retaining wall is— (a) in a location— (i) that avoids conflict with adjoining lots; and (ii) where infrastructure is not affected; and (b) landscaped so that the retaining wall does not have an adverse impact on the visual amenity of adjacent premises or a public place.	S4.1 Development provides that a retaining wall— (a) which has a height which does not exceed 1.5 metres is set back a minimum of half the height of the retaining wall from the boundary of the premises; and (b) which has a height that exceeds 1.5 metres is— (i) set back from the boundary of the premises a minimum distance equal to the height of the retaining wall; and (ii) stepped a minimum of 0.75 metres for every 1.5 metres in height; and (c) does not exceed an angle of repose of 45 degrees to adjoining buildings.	S4.1 Retaining walls are not expected for the development. However where it is deemed necessary during the Operational Works phase, the walls will meet or exceed the minimum clearance requirements as well as other additional requirements as specified under O4.
	S4.2 Development provides for the relocation of services or the relocation of the retaining wall if the services are contained within the area of influence of the loads of the retaining wall.	S4.1 Retaining walls are not expected for the development. If required, proposed measures will be as per general earthworks S11.1 under Outcome O1.
<i>Stripping and stockpiling of topsoil and spoil</i>		
O5 Development provides an area on the premises to stockpile topsoil and soil that does not cause adverse impacts on other property.	S5.1 Development provides that an area used to stockpile topsoil and soil is located a minimum of 5 metres from the boundary of the premises.	S5.1 Refer to section 3 of the 'Infrastructure Report' for proposed stockpile measures.
<i>Hazards</i>		

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
O6 Development protects and enhances personal health and safety and property of the community from a hazard.	S6.1 Development is not located on premises which is contaminated land.	S5.1 Refer to S13.1 above.

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2. Infrastructure

Specific outcomes and prescribed solutions for the planning of infrastructure

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
Provision of infrastructure to service the development		
<i>Provision of infrastructure</i>		
O1 Development provides infrastructure to service the development where— (a) the existing infrastructure provided by an infrastructure provider that is necessary to service the development is not adequate; or (b) the infrastructure to be provided by an infrastructure provider to service the development is necessary but is not yet available; or (c) the development is not consistent with the assumptions upon which infrastructure has been provided or is planned to be provided by an infrastructure provider.	S1.1 None applicable.	S5.1 Refer to the 'Infrastructure Report' for infrastructure servicing details.
O2 Development provides land (including an easement), works or a monetary sum or a combination of land, works or a monetary sum in respect of infrastructure determined by the local government in accordance with <i>Planning Scheme Policy No. 7 (Infrastructure contributions) 2006</i> .	S2.1 None applicable.	S5.1 Refer to 'Town Planning Assessment Report' for further detail

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Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
<p>O3 An easement is provided to—</p> <ul style="list-style-type: none"> (a) an infrastructure provider which contains all the infrastructure under the control of the infrastructure provider which traverses the premises; and (b) the local government which contains all land required to accommodate the flow or detention of stormwater on the premises. <p><i>Design and construction of infrastructure</i></p>	<p>S3.1 None applicable.</p>	<p>S5.1 The existing open channel drain flowing northeast connects piped stormwater networks currently maintained by Logan City Council at both ends. As such, the open channel is proposed to be made an easement which will be maintained by Council.</p>
<p>O4 Development provides infrastructure which—</p> <ul style="list-style-type: none"> (a) meets the standards at the least whole of life cost, including avoiding unnecessary duplication; and (b) is robust and fit for the purpose and intended period of operation; and (c) is easily maintained without unnecessarily requiring specialist expertise or equipment; and (d) is comprised of components and materials that are as readily accessible and available as practicable; and (e) is readily integrated with the existing infrastructure networks and facilitates the orderly provision of future infrastructure networks. <p>Protection and enhancement of existing and planned infrastructure</p>	<p>S4.1 Development provides infrastructure to the standards specified for infrastructure in <i>Planning Scheme Police No 5 (Design and Construction of Work) 2006</i>.</p>	<p>S5.1 Infrastructure will be designed to the standards and specifications outlined in Logan City Council's <i>Planning Scheme Police No. 5 (Design and Construction of Work) 2006</i>.</p>

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
O5 Development does not adversely impact on existing or planned infrastructure.	S5.1 None applicable.	S5.1 Preliminary discussions held with Logan City Council indicated existing infrastructure is available and has adequate capacity for the said development
O6 Development protects existing and planned infrastructure from natural physical processes.	S6.1 None applicable.	S5.1 Development is not anticipated to affect any existing services. Where it does, appropriate management measure to protect or divert the affected service will be undertaken with input from Logan City Council.
O7 Development does not— (a) interfere with or adversely impact on the prescribed infrastructure; and (b) place an adverse loading on the prescribed infrastructure.	S7.1 Development provides that— (a) there is an unobstructed horizontal clearance of a minimum width of— (i) 15 metres from the prescribed infrastructure, if the building work and operational work involves pile driving; and (ii) 2 metres from the prescribed infrastructure, if the building work and operational work does not involve pile driving; and (b) there is an unobstructed vertical clearance of a minimum depth of 2.5 metres from the ground level above the prescribed infrastructure to any part of the prescribed infrastructure work; and (c) filling is limited to a maximum of 3 metres of material over the prescribed infrastructure; and	S5.1 General adherence to the requirement will be included as part of detailed design during the Operational Works phase. Any potential non-compliance will be brought to the attention of Logan City Council.

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
	<p>(d) excavation is limited to a residual cover over the prescribed infrastructure of a minimum of 600mm; and</p> <p>(e) fill, plants or a paved surface are not placed over an access cover to the prescribed infrastructure; and</p> <p>(f) there is a clearance of a minimum of 2.5 metres between buildings or structures where the prescribed infrastructure is located between buildings or structures; and</p> <p>(g) there is a clearance of a minimum of 2.5 metres between a building or a structure and the boundary of the premises where the prescribed infrastructure is located behind a building or a structure; and</p> <p>(h) there is a clearance of a minimum of 1.5 metres through the premises where it is necessary to access through the premises to access the prescribed infrastructure on adjacent premises.</p> <p>In this prescribed solution and specific outcome prescribed infrastructure means infrastructure which is part of—</p> <p>(a) the sewerage system; and</p> <p>(b) the water supply system; and</p> <p>(c) the local government's stormwater drainage.</p>	

Column 1 Specific outcomes	Column 2 Acceptable solutions—if self-assessable Probable solutions—if code assessable	Column 3
Protection against development of an inconsistent scale, form and intensity		
<i>Pattern of development</i>		
O8 Development provides for the orderly and efficient provision of planned infrastructure as shown on a structure plan map.	S8.1 None applicable.	S5.1 Not relevant to the development application
O9 Development is consistent with the assumptions upon which infrastructure has been provided or planned by the local government or other infrastructure provider.	S9.1 None applicable.	S5.1 The redevelopment of the site is minor in scale and generally in accordance with the land for land zoned 'Sport and Recreation'.

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ATTACHMENT

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Proposed External Lighting Data Sheet

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Where
innovation
comes to
light.



Greyhounds
Logan

Contents

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18.10 Calculation Printout

1. SLA – The Company

Sylvania Lighting Australasia (SLA) is a vertically integrated designer, manufacturer and distributor of lighting systems.

With key international partners and access to leading edge lamp technologies, SLA markets a comprehensive selection of lighting fixtures for architectural, industrial/commercial, decorative and residential applications.

Complementary to this extensive range of fixture products, SLA provides a unique access to the diverse international lamp market for incandescent, fluorescent, compact fluorescent, high intensity discharge, halogen, miniature incandescent and special lamp sources.

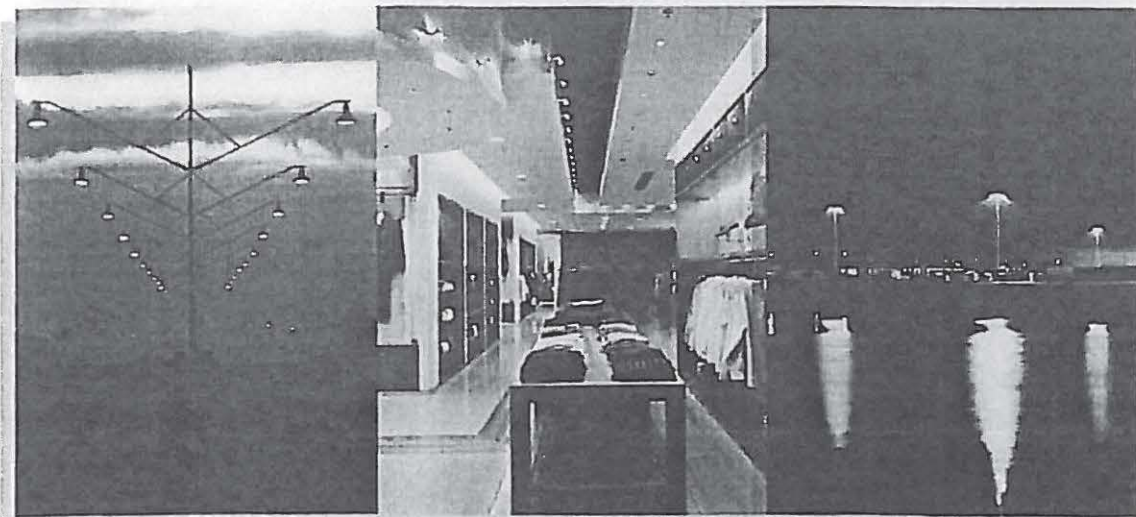
Locally, Sylvania Lighting Australasia markets the respect brands of Concord, Sylvania and represents Siteco.

Under our quality accreditation of ISO9001 and ISO14001, we continue to design and manufacture an extensive line of lighting fixtures for architectural industrial/commercial, decorative and residential applications tailored to Australian standards and conditions

SLA is owned by Gerard Industries, an Australian owned operation. Gerard Industries has a national distribution network throughout Australia and New Zealand, marketing various Lighting brands. With the inclusion of the SLA network, Gerard Industries is the largest lighting company in Australia and New Zealand.

Nationally in Australia, SLA is supported by a lighting product design and manufacturing facility in Gosford, NSW, with office and warehouse facilities situated in each state of Australia and New Zealand.

Locally, in NSW, SLA provides a Customer Service Centre responsible for administration and distribution of SLA products and services.



2. Overview of SLA Submission:

The SLA objective for the Logan Greyhound Facility, floodlighting proposal is based on four important features;

1. Provide the client with an efficient lighting design compliant with international colour television parameters, whilst adopting principals' specific to the lighting requirements of harness racing tracks.
2. Provide a lighting design that acknowledges and complies with the obtrusive light requirements for spill light and glare to the adjacent railway line.
3. Provide the client with an energy efficient system whereby the actual energy savings can be realised over the life-time of the installation.
4. To provide an affordable solution.

The SLA submission is inclusive of the following items:

1. Complete lighting design.
2. The supply and delivery of floodlighting luminaires complete with lamps and control gear.
3. The supply of labour and technical expertise for aiming and commissioning of the installation.

The SLA submission is based on a quantity of 194 off R2 Maxi floodlights spread over 9 off columns, ranging in heights from 20m to 30m above track level. The lighting design, calculated results and the type of column offered are summarised at sections 3 and 5 of this report.

• R2 Maxi with Environ System:

The Sylvania Environ Series of luminaires offers the end user a combination of greatly reduced energy consumption whilst extending lamp life.

The Sylvania Environ system is designed to run metal halide lamps to provide constant lumen output during the life of the lamp.

Optimising the control of the lamp, results in lamp life extension of up to 50%.

This condition allows for significant running cost savings and thus reductions in greenhouse gas emissions as well as reduced maintenance costs due to extended re-lamping intervals.

As there are no Australian Standards pertaining to the lighting Grey Hound racing tracks, the SLA lighting design adopts the specification set out in the Sky Racing Outside Broadcast Technical Digital Production Guide, as per the client's recommendation.

At the end of this submission we provide relevant luminaire and column data sheets, together with computerised printouts of all relevant lighting calculations.

3. Technical Overview – Lighting Design:

Section 3, "technical overview lighting design", outlines the SLA lighting design for Logan Greyhound Facility.

We state the clients brief and known requirements, summarise the principles employed and the basis behind the design, together with a complete summary of calculated results.

The floodlights are using an energy saving control gear, explained in chapter 4 of this submission.

3.1 Floodlight and Lamp:

The Sylvania R2 Maxi floodlight complete with 2KW, Double ended, short arc, Metal Halide lamp is used for all track lighting calculations as part of this proposal.

The R2 Maxi is a high performance floodlight used for High definition TV applications. Refer section 6 of this report for extra detail regarding R2 Maxi.

The lamp type used within the R2 Maxi is the Sylvania 2KW double ended, short arc Metal Halide lamp (HSI-TD2000W/D). This lamp has an initial light output (100 hours) of 200,000 lumens, Correlated Colour Temperature of 5800K and Colour Rendering Index of Ra92 (Group 1A).

3.2 Emergency Track Lighting - Generator:

We note that the approach taken with Victorian and South Australian tracks regarding emergency track lighting is to install a no-break generator.

Usually, the no-break generator supplies approximately 20% of the track lighting while 80% is supplied from the power grid. The no-break generator runs all the time during the race meeting.

We acknowledge that this is an important feature that should not be overlooked. However, in the interest of both parties, SLA would require more detail from the client regarding the floodlight percentage to be run from the generator and strict

operating parameters for the generator in order to provide an accurate assessment of cost.

We therefore make no allowance, at this stage, for a no-break generator or provision for cabling.

3.3 Obtrusive Light:

AS 4282 1997 excludes lighting installation for television coverage.

Design Objective and Supporting Criteria:

The design objective was to provide an efficient lighting design for Logan Greyhound Facility in accordance with the client's requirements, whilst acknowledging the specific requirements of the Obtrusive light standards.

We note that although it is important to comply with the specified obtrusive light parameters, AS4282-1997 does mention and **excludes** installations that are designed for colour television broadcasting, due mainly to the high lighting levels that CTV requires.

Calculated Results:

3.4 Summary of SLA Lighting Design:

The following is a summary of the information and calculations provided throughout section 3, "Technical Overview – Lighting Design."

- A quantity of 194 off R2 Maxi floodlights is proposed for the CTV track lighting at Logan Greyhound Facility. These are spread over 9 off columns ranging in height from 20m to 30m.
- The SLA design achieves the client's requirement of a Maintained Average of 1000 lux to the Main Camera.
- The SLA design achieves the client's requirement of a Maintained Average of 800 lux at the track surface.
- The SLA design achieves recommended uniformity ratio's specified Free TV Operational guidelines for colour TV broadcasting.
- The SLA design achieves recommended glare ratios specified by the Free TV Operational guidelines for colour TV broadcasting.
- The SLA design adopts the Sky Racing Outside Broadcast Technical Digital Production Guide with respect to vertical illumination towards the Camera steward location.

4. Technical Overview – Control System:

Named Environ System, SLA offers this floodlight control system as an **ENERGY Saving Option**.

Sylvania's Environ System

The Sylvania Environ System incorporating Active Reactor Control runs the Sylvania Metal Halide lamp to provide constant designed illuminance throughout lamp life.

It offers up to 20% energy savings without any additional controls being required.

Each gear tray consists of an Active Reactor electronic controller which monitors the lamp and adjusts lamp current to ensure that the designed illuminance is maintained.

Additional savings can be obtained by utilizing the dimming function of the active reactor whereby levels can be dimmed before races and between races via a CBus control signal to the active reactor.

Features

- _ Lamp characteristics continuously monitored to ensure constant lamp flux
 - _ Constant designed illuminance levels throughout lamp life
 - _ Constant light output maintained with supply voltage variations of up to 10%
 - _ Ballast watts loss reduced by 10%
 - _ Reliable magnetic ballasts
 - _ Conventional igniters and PF correction capacitors
 - _ Electronic lamp control unit housed in IP66 cassette
 - _ Lamp life extended by greater than 50%
 - _ Complies with: AS/NZS CISPR15:2006(EMC)
- AS/NZS1158.6:2004 (Lighting for roads and public spaces - Luminaires)
AS/NZS60598.1:2003 (Luminaires - General requirements and tests)

Benefits

- _ Controlled lumen output equating to reduced power consumption
- _ Energy savings of approximately 20%
- _ Reduction in greenhouse gas emissions
- _ Reduced lamp maintenance costs
- _ Reduced downtime
- _ Opportunity to offset power savings the controller in the

It is expected that the Energy Savings could be up to 20% of the total power consumption of the floodlights. **We note that this is 20% power and not 20% light output.**

4.2 Environ Dim Plus:

Although not part of this SLA submission the *Environ Dim Plus* is an extra enhancement to the standard Environ System. Environ Dim Plus is offered for consideration only.

This system utilizes an additional programmable controller which allows for a multilevel system and offers additional energy savings of up to 10% over the standard Environ System. The programmable controller controls all the luminaires and interfaces with user operated switches in addition with its own in built programming to set precise lighting levels and offer additional energy savings.

Aiming & commissioning:

- Aiming and commissioning of the installation shall be in conjunction with Sylvania and allows for 2 men for the duration of the commissioning works.

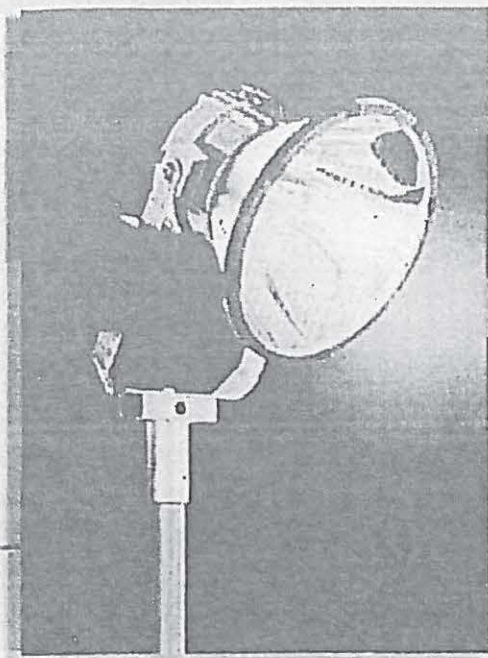
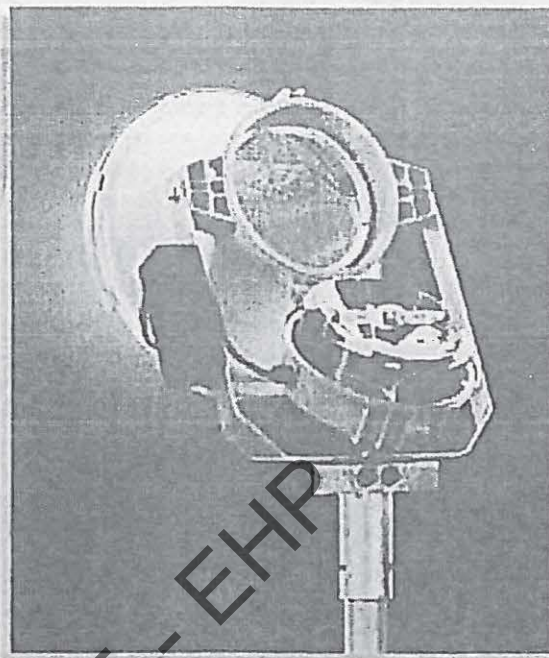
5. Luminaire and Lamp Literature:

5.1 Luminaire:

The R2 Maxi floodlight is proposed for all track lighting.

Siteco lighting manufacture the R2 Maxi floodlight in Germany and is stocked and distributed by Sylvania Lighting in Australia.

The lamp type used within the R2 Maxi is the Sylvania 2KW double ended, short arc Metal Halide lamp (HSI-TD 2000W/D). This lamp has an initial light output (100 hours) of 200,000 lumens, Correlated Colour Temperature of 5800K and Colour Rendering Index of Ra92.

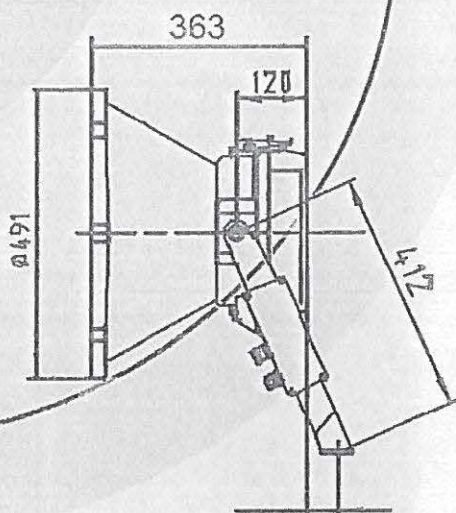
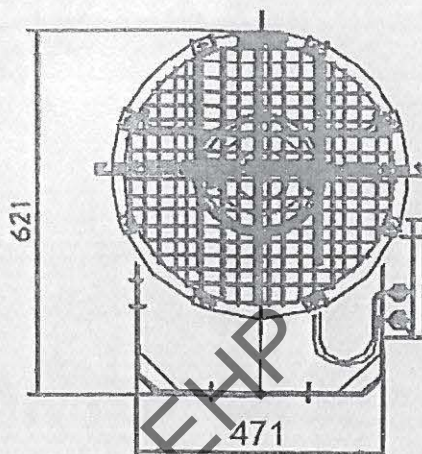


We provide diagrams and data sheets at section 18, "Attachments".

Features:

- 5 off beam distributions from high grade aluminum roto-symmetrical reflector system
- Optional stainless steel hail guard.
- Igniter is integral to floodlight. Control gear is mounted remote to floodlight (415 volt supply)
- Lamp changed via the rear without effecting aiming conditions or the need for any tools.
- When rear lamp door is opened for maintenance power supply is automatically disconnected.
- Sealed to an International Protection Rating of IP65.
- Floodlight Weight is 12 kg
- Sail Area = 0.20 m² (Glass vertical)

Dimensions:



Normal Ignition: 12 kg (including hail-guard)



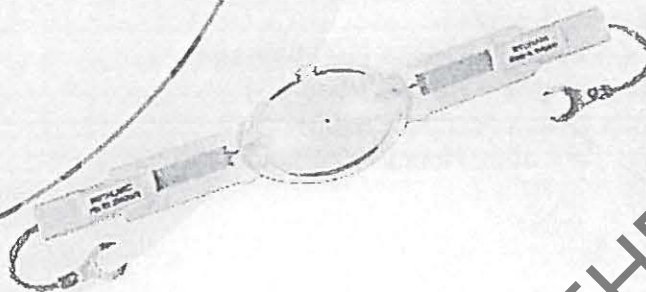
R2 Maxi shown with hail-guard attached

Material:

- Die cast aluminium housing.
- Reflector - high purity aluminium
- Body Fixings are stainless steel.
- The front glass is chemically toughened, resistant to temperature fluctuations and complete with supportive mesh.
- The floodlight mounting bracket (trunion arm) made from galvanized steel.

5.2 Lamp:

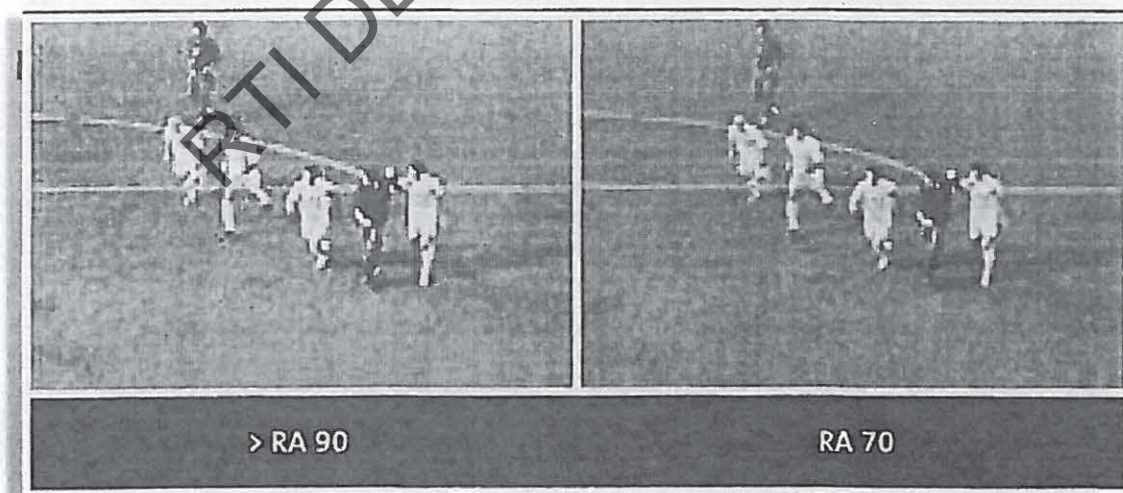
The lamp type used within the R2 Maxi is the Sylvania 2KW double ended, short arc Metal Halide lamp (HSI-TD 2000W/D).



This lamp has an initial light output (100 hours) of 200,000 lumens, Correlated Colour Temperature of 5800K and Colour Rendering Index of Ra92.

The high colour rendering index of greater than Ra 90 makes it ideally suited to high definition colour TV broadcasting applications.

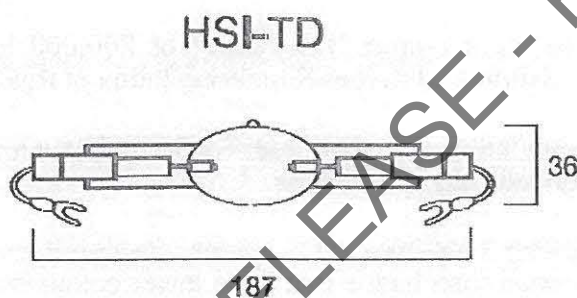
The high colour rendering properties with values greater than 90 ensure better quality images are recorded than lamps that have lower colour rendering properties. The image below compares Ra 90 images with Ra 70 images.



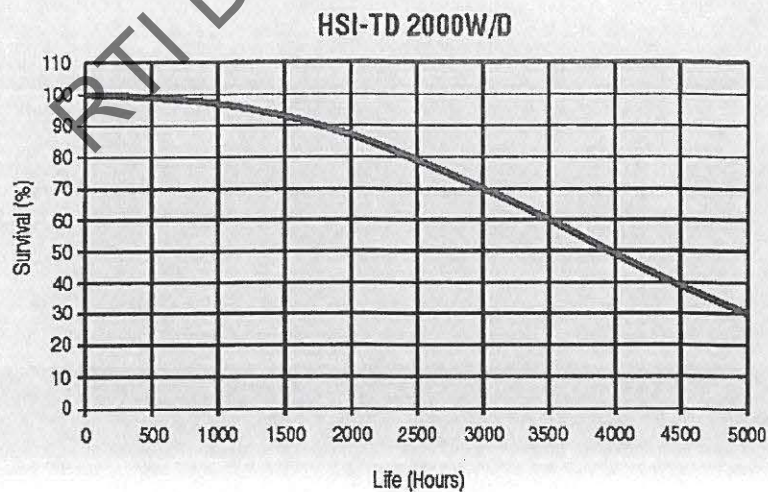
Technical Data:

- Manufacturer's Name = Sylvania Lighting
- Sylvania Catalogue (Part Number) = HIS-TD 2000 W/D
- Operating Voltage = 415 Volts
- Lamp Voltage = 205 Volts
- Lamp Current = 11.3 Amps
- Luminous Flux = 200,000 lumens (100 hours)
- Colour Rendering Index = Ra92 (Group 1A)
- Correlated Colour Temperature = 5600K
- Average Rated life = 4000 Hours (50% failures)

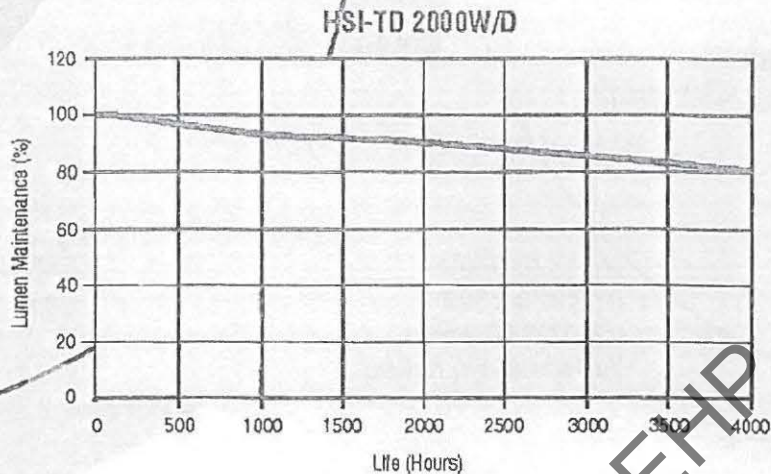
Dimensions.



Lamp Survival Curve:



Lamp Output Depreciation Curve:



6. Australian Product Content:

Wherever possible, SLA will support local and national industry.

We note, that all products could be sourced outside Australia, however, we have endeavored to support local product content wherever we can.

We summarise local and overseas content as follows;

- **High Mast Floodlights** – R2 Maxi body cast in Germany. R2 Maxi is stocked and assembled at the SLA Gosford facility.
- **Dimming Control Gear** – Manufactured and assembled within Australia.
- **Lamps** – Manufactured by Sylvania International, United States. Lamps are stocked locally at the Gosford manufacturing plant.
- **Columns** – Manufactured and assembled within Australia

Nationally in Australia, SLA is supported by a lighting product design and a manufacturing facility in Gosford, NSW, with office and warehouse facilities situated in each state of Australia and New Zealand.

7. Servicing of Contract:

For the purpose of contractual correspondence and administration SLA Provide:

Kaushal Kapadia
Sylvania Lighting Australasia
Sylvania Way
Gosford
NSW 2250

Telephone	02 4328 0600
Facsimile	02 4328 2605
Mobile	49-Sch4 - Mobile phone
E-mail	kaushal@sla.net.au

For the purpose of lighting design enquiries, placement of orders and servicing of contract SLA Provide:

John Adams
National Projects Manager
Sylvania Lighting Australasia
25 Donkin St
West End
Qld 4101 Australia

Mobile	49-Sch4 - Mobile phone
Facsimile	07 3846 3689
E-mail	johnadams@sla.net.au

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8. Warranty:

SLA agrees to free replace to point of delivery, goods as supplied against this specification which have failed in excess of nominated performance due to faulty components or workmanship. These warranties for floodlight, lamp and control gear are based on yearly hours of usage specified by the client at tender brief.

Floodlights and Control Gear:

Floodlights and control gear are warranted for a period of ten(10) years, from date of supply, against faulty components or defects due to workmanship.

Lamps:

Lamps supplied under this contract are warranted for 12 months. This is increased too, 24 to 30 months when the lamps are run with the Sylvania Environ System.

For the provision of lamp warranty and in an attempt to measure true lamp life, not subject to over voltage, excessive or inappropriate usage and a suitable duty cycle, SLA may request proof of hourly lamp usage and applicable voltage applied in the event of an uncharacteristic lamp failure.

9. Delivery:

This offer is made on the basis of a mutually agreed supply program for supply of luminaires and columns.

Sylvania confirms it maintains a stock holding for the floodlights offered in this bid, however, due to the large quantities required, it is highly likely that the consumption of this stock will be exhausted. Therefore, SLA offers a lead time of the following:

Luminaires:

- 12-16 weeks from receipt of order (and design approval if applicable)

Columns:

- 12-14 weeks from receipt of order (and design approval if applicable).

Column Foundation Cages:

- 3-4 weeks from receipt of order (and design approval if applicable).

10. Offer Pricing:

Please refer to the attached quotation

11. Project References:

Harness Racing projects completed within Australia using the R2 Maxi floodlight include;

- Melton Harness Racing Club - Victoria

Year 2008 (To be aimed and commissioned early 2009)

Quantity - 283

Sports – Harness Racing

Recent projects completed within NSW using the R2 Maxi floodlight include;

- Sydney Cricket Ground

Year 2008

Quantity - 672

Sports – Cricket and AFL

- Sydney University – Oval # 1

Year 2008

Quantity - 84

Sports – Cricket and AFL

- Cook Park – Mt Pritchard

Year 2008

Quantity - 28

Sports – Soccer

Projects completed worldwide by Siteco, using R2 Maxi, are referenced in the following pages.

12. Quality Assurance and Insurance Certificates:



JARDINE LLOYD THOMPSON

10 July 2008

To Whom It May Concern

Jardine Lloyd Thompson Pty Ltd
ABN 69 009 098 864
3rd Floor, 70 Hindmarsh Square
Adelaide SA 5000
GPO Box 1693
Adelaide SA 5001
DX 186 Adelaide
<http://www.jlt.com.au>
Telephone (08) 8418 0288
Facsimile (08) 8418 0903
Direct Dial (08) 8418 0221
Email yamm@jlt.com.au

Professional Indemnity Certificate of Currency

(JLT Ref 025517)

Insurance Class	Professional Indemnity
Insured Name	Sylvania Australasia Pty Ltd
Policy Expiry Date	30 June 2009
Interest	Civil liability arising out of a breach of professional duty in connection with the specified business giving rise to a claim made and notified to the insurer during the period of insurance
Limit of Liability	\$5,000,000 each and every claim and in the aggregate during the period of insurance
Deductible	\$25,000 each and every claim (inclusive of costs and expenses)
Insurer	Vero Insurance Limited
Policy Number	LPP010458331
Special Provisions	As per policy

This certificate of currency provides a summary of the policy cover and is current on the date of issue. It is not intended to amend, extend, replace or override the policy terms and conditions contained in the actual policy document.

This certificate of currency is issued as a matter of information only and confers no rights upon the certificate holder. We accept no responsibility whatsoever for any inadvertent or negligent act, error or omission on our part in preparing these statements or in transmitting this certificate by email or for any loss, damage or expense thereby occasioned to any recipient of this letter.

MICHAEL YAM
Account Broker

Genl C:\Users\PJ\Documents\12.docx



JARDINE LLOYD THOMPSON

10 July 2008

TO WHOM IT MAY CONCERN

Jardine Lloyd Thompson Pty Ltd
ABN 69 009 098 664
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Certificate Of Currency

(JLT Ref: 011244)

POLICY	1. Combined Public/Products Liability Insurance 2. Umbrella Liability Insurance
INSURED	Gerard Lighting Holdings Pty Ltd Group Including Sylvania Australasia Pty Ltd and all subsidiary and controlled companies now existing or hereafter formed or acquired.
INSURED BUSINESS	Principally Design, Manufacture and Distribution of luminaries, lighting products, architectural, industrial and commercial lighting systems and accessories, strip heaters, commercial and industrial lamps, lighting and injection moulding products, Contract moulding, metal shop, paint line and die cast work, Boat and Helicopter Charterers, including property occupiers and any other occupations incidental thereto past or present
INTEREST INSURED	Legal liability to third parties for personal injury and/or property damage caused by an occurrence arising out of or in connection with the Business of the Insured.
SITUATIONS and/or PREMISES INSURED	World-wide.
LIMIT OF LIABILITY	<u>General Public/Products Liability Insurance</u> \$10 million any one originating cause and in the aggregate in respect of Products Liability Property in the care, custody and control - \$250,000 any one occurrence and in the aggregate any one period of insurance <u>Umbrella Liability Insurance</u> \$20 million any one occurrence in excess of the amount recoverable under the underlying insurances and in the aggregate in respect of Products Liability. Combined Limit provided by these two policies - \$30 million
DEDUCTIBLE	\$10,000 all claims
INSURER / POLICY NO.	Allianz Australia Insurance Limited Public/Products Liability Policy No. 95-0955866-LCP Umbrella Liability Insurance Policy No.: To be advised

Certificate of Currency



EXPIRY DATE 30 June 2009

SPECIAL PROVISIONS As per Policy

This certificate of currency provides a summary of the policy cover and is current on the date of issue. It is not intended to amend, extend, replace or override the policy terms and conditions contained in the actual policy document.

This certificate of currency is issued as a matter of information only and confers no rights upon the certificate holder. We accept no responsibility whatsoever for any inadvertent or negligent act, error or omission on our part in preparing these statements or in transmitting this certificate by email or for any loss, damage or expense thereby occasioned to any recipient of this letter.

MICHAEL YAM
Account Broker

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Page 2 of 2

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Sylvania Lighting Australasia Pty Ltd **Lisarow NSW**

operates a Management System
that complies with the requirements of

AS / NZS ISO 9001:2000
AS/NZS ISO 14001:2004

As detailed in the accompanying Scope of Certification.

49-Sch4 - Signature

on behalf of the Board of Directors

Certification Number: 6005
Certificate Number: 6005-08
Issue Date: 6 June 2006



This Certificate remains the property of NCS International Pty Limited ACH 179 148 311
A wholly owned subsidiary of The National Association of Testing Authorities, Australia ACH 184 372 145
Accreditation by the Joint Accreditation System of Australia and New Zealand (www.jas-anz.com.au/register)

SCOPE OF CERTIFICATION**Certification Number:** 6005**Sylvania Lighting Australasia Pty Ltd**Sylvania Way
LISAROW NSW 2250**Phone:** (02) 4328 0600**Fax:** (02) 4328 2605**Certification Standard:**AS/NZS ISO 9001:2000
AS/NZS ISO 14001:2004**Certification Date:** 22 April 1991
Certification Date: 26 August 1996**Capability Statement:**

Design, manufacture and distribution of lamps, luminaires and associated lighting equipment to service both interior and exterior lighting requirements.

Issue Date: 6 June 2006
Valid Until: 30 April 2009
Page 1 of 1

49-Sch4 - Signature

on behalf of the
Board of DirectorsThis Scope of Certification remains the property of
NCS International Pty Limited ACN 079 888 211
A wholly owned subsidiary of The National Association of Testing Authorities, Australia ACN 004 879 213

ACCREDITED LABORATORY



National Association of Testing Authorities, Australia

(ABN 59 004 379 748)

has accredited

**Sylvania Lighting Australasia
SLA Lighting Applications Laboratory**

following demonstration of its technical competence
to operate in accordance with

ISO/IEC 17025 (1999)

which includes the management requirements of ISO 9002:1994.

This facility is accredited in the field of

Optics and Radiometry

for the tests, calibrations and measurements shown on
the *Scope of Accreditation* issued by NATA.

The COMMON SEAL of the NATIONAL ASSOCIATION
OF TESTING AUTHORITIES, AUSTRALIA
was affixed hereto by authority of the
Board of the Association in the presence of

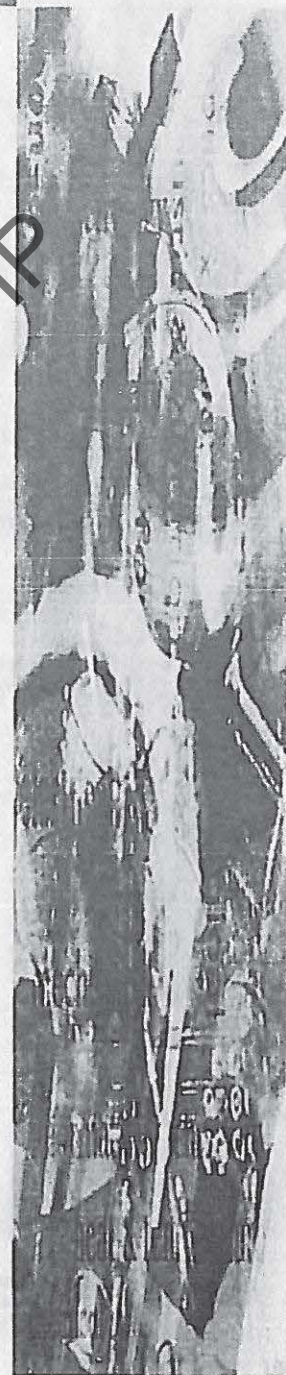
49-Sch4 - Signature

A J RUSSELL
CHIEF EXECUTIVE

Date of accreditation: 11 January 1994

Accreditation number: 4616

NATA is Australia's government-endorsed laboratory accreditor, and a leader in accreditation internationally.
NATA is a signatory to the international mutual recognition agreements of the International Laboratory
Accreditation Cooperation (ILAC) and the Asia Pacific Laboratory Accreditation Cooperator (APLAC).



SYLVANIA
Greyhounds Logan



ACCREDITATION NO: 4616

Sylvania Lighting Australasia

SLA Lighting Applications Laboratory
Sylvania Way
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CONTACT: Mr D Ford

PHONE: (02) 4328 0678 FAX: (02) 4328 2605 MOBILE: Sch4 - Mobile phone

EMAIL: lab@sla.net.au

WEB SITE: www.sla.net.au

FACILITIES: Normally not available for public testing

This laboratory complies with the requirements of ISO/IEC 17025 (1999)

4.31 Distribution of luminous intensity

.01 Road lighting luminaires

Using the relative method with light-emitting dimensions not exceeding 660 mm and a test distance not less than 15 x the maximum light-emitting dimension with least uncertainties of measurement of -
0.4° in angle
4% in relative luminous intensity
2.5% in light output ratio

.02 Interior lighting luminaires

Using the relative method with a test distance not less than 15 x the maximum light-emitting dimension with least uncertainties of measurement of -
0.4° in angle
4% in relative luminous intensity
2.5% in light output ratio

.03 Flood lighting luminaires

Tests on luminaires with half peak angle exceeding 15°
Using the relative method with least uncertainties of measurement of -
0.4° in angle
4% in relative luminous intensity
2.5% in light output ratio

4.92 Other tests

.04 Power a.c. and d.c.

Voltage, current and active power

by the methods of -

CIE Publication No. 43, 121, AS 1680.3, AS 3771, AS/NZS 1158.1.1, AS/NZS 1158.3.1, AS 1158.4

Accreditation No: 4616
(Scope Last Changed 09/08/04)

13. Attachments – Lighting Design Technical Drawings

- 13.1 Calculation Printout – Column Numbering and Reference Drawing
- 13.2 Calculation Printout – Track Horizontal Illumination
- 13.3 Calculation Printout – Track Vertical Illumination towards Main
Camera
- 13.4 Quotation Estimate

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Property Vegetation Management Plan

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146-178 Kingston Road, Slacks Creek

Property Vegetation Management Plan

Job Number 7801-87

Prepared for Greyhounds Queensland

2 March 2010



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Document Control

Version	Date	Author		Reviewer	
1	2 March 2010	Robert Speirs	49-Sch4 - Signature	Mark Harris	49-Sch4 - Signature

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146-178 Kingston Road, Slacks Creek Property Vegetation Management Plan

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Appendices

APPENDIX A Copy of Vegetation Management Act Regional Ecosystem and Remnant Map – Version 6 and Essential Habitat Map

APPENDIX B Site Plan Drawing No: GREY0001 SK-001-E

1 Introduction

This Property Vegetation Management Plan (PVMP) has been prepared by Cardno (QLD) Pty Ltd on behalf of Greyhounds Queensland (the "Proponents") in support of a Material Change of Use (MCU) application to be submitted over Lot 658 on SL12298 (the "site") in order to establish greyhound racing facilities and associated infrastructure. The locality of the site is illustrated in Figure 1. The works proposed as part of the establishment of the proposed greyhound racing facility will require the removal of 'assessable vegetation'¹ pursuant to the *Vegetation Management Act 1999* ("VM Act"). As such, the proposed vegetation clearance must be assessed against the relevant provisions of the Department of Environment and Resource Management's ("DERM") *Concurrence Agency Policy for Material Change of Use – Version 2 (21 October 2009)* (the "MCU Policy").

This PVMP provides:

- in Section 2.0, a description of the site and the vegetation communities which occur within;
- in Section 3.0, a detailed description of the purpose and extent of the proposed clearance of assessable vegetation; and
- in Section 4.0, an assessment of the proposed application against the relevant provisions of the DERM's *MCU Policy*, and subsequently, the 'Performance Criteria' of the relevant 'Part' of DERM's *Regional Vegetation Management Code for Southeast Queensland – Version 2 (6 November 2009)*.

¹ *Concurrence Agency Policy for Material Change of Use – version 2, 21 October 2009 - Dictionary*
Assessable vegetation - For the purpose of this policy is vegetation as shown in Table 1 below.

Table 1: Assessable vegetation

Land Tenure	Assessable Vegetation
Trust Land	<ul style="list-style-type: none">• All vegetation shown as remnant vegetation on a regional ecosystems or remnant map unless Category X on a PMAV• Category A, B or C area on a PMAV• If the clearing will be undertaken by someone other than the trustee – vegetation that is not remnant vegetation shown on a regional ecosystem or remnant map.

2 Site Description

The site consists of a 10.24 hectare parcel of land located at the intersection of Kingston Road and Compton Road within the Logan City Council ("LCC") jurisdiction. The site is identified as having 'Non-urban and Conservation Locality – Public Open Space' land use designation pursuant to Zone Map - LZ Map 4 of the Logan Planning Scheme 2006. The site is currently State owned land in trust to LCC. The Proponents are in the process of purchasing the site from the state which will eventually modify the tenure of the land to freehold. However the MCU application will be submitted while the site remains State owned trust land. Owing to the past land use of the site (i.e. LCC landfill), the majority of the site now consists of cleared and mown grassland which is maintained by LCC over the remediated landfill (refer Figure 2). In addition, the site supports woody vegetation consisting of the following.

1. Vegetation Community A – A band of Tallowwood (*Eucalyptus microcorys*) dominated woodland approximately 50 metres in width located in the westernmost extent of the site. This band of woodland is identified as constituting RE 12.9-10.4 on the DERM's Vegetation Management Act Regional Ecosystem and Remnant Map – Version 6 ("RE Map"), which is briefly described as *Eucalyptus racemosa* woodland on sedimentary rocks. A copy of the RE Map for the site locality is provided herewith in Appendix A. The location and extent of this band of RE 12.9-10.4 is illustrated as an overlay on 2007 aerial photography in Figure 2. This band of RE 12.9-10.4 supports:
 - a. a canopy dominated by large old Tallowwood trees approximately 18 to 27 metres in height with other associated species including, White mahogany (*Eucalyptus acmenoides*), Grey gum (*E. major*), Scribbly gum (*E. racemosa*), Narrow-leaved red gum (*E. seeana*), Pink Bloodwood (*Corymbia intermedia*), Smooth-barked apple (*Angophora leiocarpa*), and Brush box (*Lophostemon confertus*);
 - b. a sparse to nonexistent midstorey approximately 5 to 14 metres in height comprising scattered trees of the following species Brush box, Smooth-barked apple, Narrow-leaved red gum, Swamp box (*Lophostemon suaveolens*), Smudgee apple (*Angophora woodsiana*), Flooded gum (*Eucalyptus grandis*), Grey gum, Black wattle (*Acacia leiocalyx*), Red ash (*Alphitonia excelsa*) and Black she-oak (*Allocasuarina littoralis*); and
 - c. a groundstorey consisting of slashed Guinea grass (*Megathyrsus maximus*), *Paspalum* sp., and Green couch (*Cynodon dactylon*) with a few scattered Flax lily (*Dianella* sp.).
2. Vegetation Community B – Approximately 12 large trees consisting of the species described above that have been retained within the section of the site adjoining the above described band of RE 12.9-10.4 (refer Figure 2).
3. Vegetation Community C – A discontinuous, and in some place scattered, approximately 4 to 8 metre wide band of regrowth vegetation containing Black wattle, Red ash, Black she-oak, Broad-leaved paperbark (*Melaleuca quinquenervia*), Flooded gum and Tallowwood, located a drainage channel that has been constructed along the southern and eastern boundaries of the site (refer Figure 2). A number of large retained trees of the above listed Eucalypt and allied species have been retained in scattered locations along the southern and eastern boundaries of the site. In addition, one large Small-leaved fig (*Ficus obliqua*) is located against the southern boundary of the site.

This band of regrowth vegetation also contains significant infestations of woody and herbaceous *Land Protection (Pest and Stock Route Management) Act 2002* Declared Pest Plants and other environmental weeds.

Plates 1 to 4 below are representative photographs of Vegetation Communities A, B and C.

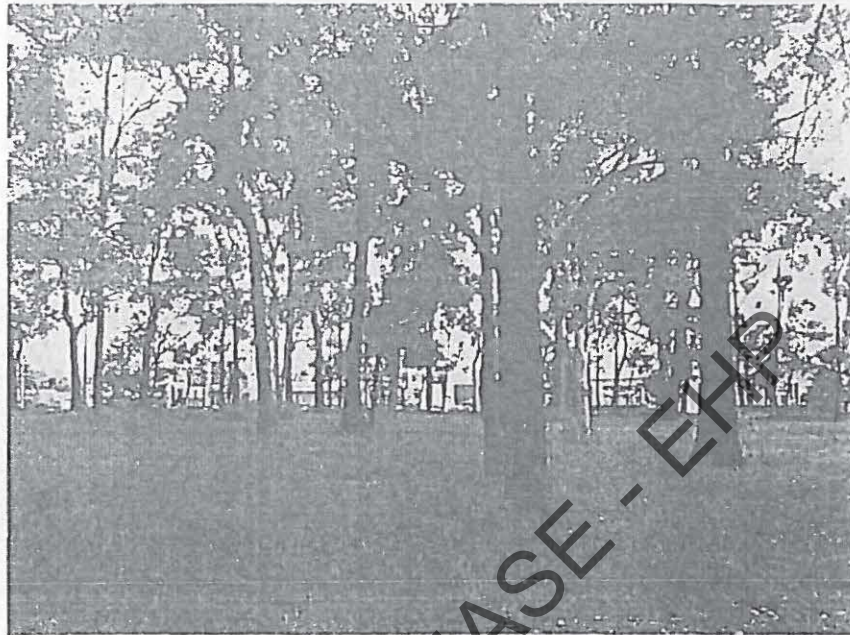


Plate 1 – Vegetation Community A

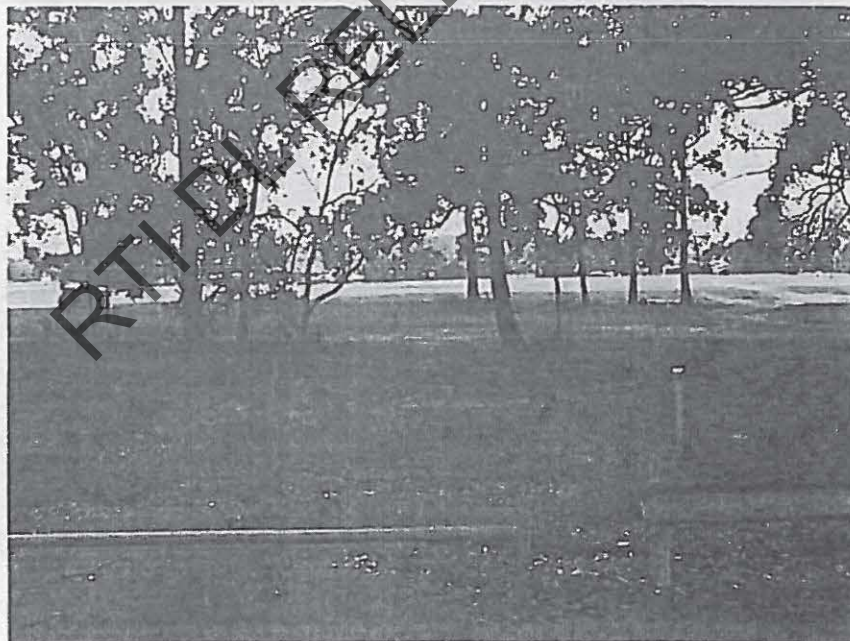


Plate 2 – Vegetation Community A – Section to be cleared to construct entrance driveway.



Plate 3 – Vegetation Community B



Plate 4 – Vegetation Community C

3 Extent and Purpose of Proposed Vegetation Clearance

3.1 Extent of Proposed Assessable Vegetation Clearance

As illustrated in Figure 3, the construction of the proposed development will require the clearance of 'assessable vegetation' consisting of, and limited to, the following.

1. A section of the band of RE 12.9-10.4 (Vegetation Community A) approximately 1721m² in area, to construct the entrance driveway to the proposed facility and the carpark. As illustrated on Figure 3, this area includes an additional 5 metre wide buffer to these areas within which vegetation clearance (groundstorey and potentially some canopy) may be required to carry out earthworks and construct batters etc. The clearance of canopy vegetation within this 5 metre wide buffer will be avoided to the extent practicable. The proposed clearance within Vegetation Community A will require removal of approximately 20 canopy/midstorey trees.
2. Approximately 6 large eucalypt and allied species trees that have been retained within the section of the site adjoining the above described band of RE 12.9-10.4 (Vegetation Community B). The area covered by the drip line of these trees is approximately 1121m². These trees will be removed in order to construct the entrance driveway to the proposed facility and the carpark.

The proposed plan of development for the site will not require any disturbance of the vegetation associated with the constructed drainage channel located along the southern and eastern boundaries of the site (i.e. Vegetation Community C).

3.2 Purpose and Compliance Assessment of Proposed Vegetation Clearance

It is proposed to clear native woody vegetation in order to develop the site for the purposes of establishing a greyhound racing track and associated infrastructure. A copy of the preliminary *Site Plan Drawing No: GREY0001 SK-001-E* prepared by ML Design and dated 30th of November 2009 is provided herewith as Appendix B. Figure 3 provides the proposed plan of development as illustrated on this drawing on a 2007 aerial photograph.

Pursuant to the DERM's *MCU Policy*, an MCU application for a 'relevant purpose'² as defined under Section 22A of the *VM Act* (in this case for constructing necessary built infrastructure) must be assessed under the relevant 'Criteria Table' identified in Assessment Table 1 of the *MCU Policy*.

As identified in Assessment Table 1, MCU applications on trust land where 'Clearing as a result of the MCU'³ involves clearing of least concern regional ecosystems or other 'assessable vegetation' are to be assessed against the 'Assessment Criteria' of 'Criteria Table F-2' of the *MCU Policy*. As

² Pursuant to Section 22A of the *VM Act* -

... (2) A vegetation clearing application is for a relevant purpose under this section if the applicant satisfies the chief executive that the development applied for is -
(d) for establishing a necessary fence, firebreak, road or vehicular track, or for constructing necessary built infrastructure, and the clearing for the relevant infrastructure can not reasonably be avoided or minimised.

³ Pursuant to Item 2 of the *MCU Policy* -

... Clearing as a result of the MCU includes:

(a) clearing of assessable vegetation that will result from the change in use; and
(b) clearing of assessable vegetation that will become exempt if the development application is approved.

illustrated in Figure 3, the proposed plan of development for the site will involve clearing of *least concern* regional ecosystems and other 'assessable vegetation' by the Proponents who are not the trustee and, as such, the proposed plan of development must achieve compliance with 'Performance Requirement F1' and 'Performance Requirement F2' of 'Criteria Table F-2' which are as follows.

PR F1 – To regulate the clearing of vegetation in a way that ensures the conservation of regional ecosystems, clearing as a result of the MCU only occurs where the applicant has demonstrated that the development has first avoided and minimised the impacts of the development.

With regard to PR F1, it should be noted that the proposed development layout has been designed in a manner which avoids and minimises the clearance of assessable vegetation via:

- reducing and condensing the development footprint in order to provide for the retention of the majority of the band of RE 12.9-10.4;
- locating the entrance driveway from Kingston Road roughly in the same position as the existing entrance driveway, thereby minimising the required clearance of trees;
- locating the car park in a manner which minimises intrusion into the band of RE 12.9-10.4; and
- locating the proposed development outside of the drip line of the trees associated with the constructed drainage channel running along the southern and eastern boundaries of the site.

It should also be noted that location and dimensions of the entrance driveways and car parks has been determined with respect to traffic considerations in addition to minimising vegetation clearance.

PR F2 – Clearing as a result of the MCU assessed under this Table may occur only where the MCU meets Performance Requirements 2 to 10 of the relevant code, Part P for all other purposes.

In accordance with PR F2, the proposed plan of development must be assessed against Performance Requirements 2 to 10 of Part P of the *Regional Vegetation Management Code for South East Queensland Bioregion – Version 2* (6 November 2009) (the "RVM Code").

With regard to the above, it should be noted that the Proponents are in the process of purchasing the site at which time the resulting tenure of the site will be freehold. It should therefore be recognised that if the Proponents were to delay the MCU application until post purchase of the site, all vegetation within the site would be 'non-assessable vegetation' under the 'routine management'⁴

⁴ Pursuant to Part 2 of Schedule 24 of the *SPR* -

Clearing is non-assessable on freehold land where the clearing is-

- (i) *necessary for routine management in an area of the land and the vegetation is regulated regrowth vegetation, or a least concern regional ecosystem-*
- (i) *shown on a PMAV for the area as a category B area; or*
- (ii) *if there is no PMAV for the area - shown on the regional ecosystem map or remnant map as remnant vegetation.*

Pursuant to Schedule 26 (Dictionary) of the *SPR*-

Routine management for clearing native vegetation on land, means the clearing of native vegetation-

- (b) *to construct necessary built infrastructure, including core airport infrastructure, other than contour banks, fences, roads, or vehicular tracks, if -*
 - (i) *the clearing is not to source construction timber; and*
 - (ii) *the total extent of clearing is less than 2ha; and*
 - (iii) *the total extent of the infrastructure is on less than 2ha.*

Exemption set out in Schedule 24 of the *Sustainable Planning Regulation 2009* ("SPR") and the above described requirement to assess the proposed plan of development against the provisions of the *MCU Policy* would not apply.

Notwithstanding the above, the Proponents wish to progress the MCU application prior to the purchase of the property and, in this regard, an assessment of the proposed plan of development against Performance Requirements of Part P of the Code is provided in Table 1 herein.

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4 Regional Vegetation Management Code Assessment

The purpose of the *Regional Vegetation Management Code for Southeast Queensland - Version 2* (6 November 2009) is to provide performance criteria and, where appropriate, acceptable solutions that achieve the purpose of the *VM Act*. In this respect, it is relevant to note that the RVM Code is used to assess development applications for clearing native vegetation under the *Sustainable Planning Act 2009* ("SPA"). The RVM Code is prepared in accordance with provisions set out in the *VM Act* and it applies in the circumstances where the *VM Act* allows that an application for assessable clearing be accepted.

A vegetation clearing application will be assessed under the RVM Code if the applicant has satisfied the Chief Executive that the development applied for is a relevant purpose listed in Section 22A of the *VM Act*.

The relevant purposes are:

- a project declared to be a significant project under the *State Development and Public Works Organisation Act 1971*, section 26; or
- necessary to control non-native plants or declared pests; or
- to ensure public safety; or
- for establishing a necessary fence, firebreak, road or vehicle track, or for constructing necessary built infrastructure, and the clearing for the relevant infrastructure can not reasonably be avoided or minimised; or
- a natural and ordinary consequence of other assessable development for which a development approval as defined under the *Integrated Planning Act 1997* was given, or a development application was made under that Act, before 16 May 2003; or;
- for fodder harvesting; or
- for thinning; or
- for clearing of encroachment; or
- for an extractive industry; or
- for clearing regrowth vegetation on freehold land, indigenous land or leases issues under the *Land Act 1994* for agriculture or grazing purposes, in an area shown as a registered area of agriculture on a registered area of agriculture map in a wild river high preservation area.

The proposed plan of development constitutes a 'relevant purpose' pursuant to Section 22A of the *VM Act*, given the following.

1. The establishment of the proposed Greyhound Racing Facility constitutes establishing 'necessary built infrastructure'.
2. The clearing required for the establishment of the proposed Greyhound Racing Facility 'can not reasonably be avoided or minimised' further than to the extent that is proposed. This extent of vegetation clearance has been minimised to the extent practicable whilst ensuring that access/egress and car parking requirements are suitably catered for.

As such, the plan of development satisfies the 'relevant purpose' requirements of Section 22A of the *VM Act*.

The RVM Code is comprised of 8 parts, E, F, P, S, T, W, Xa and Xb. *Part P – Requirements for clearing for public safety and infrastructure* of the RVM Code contains 'Performance Requirements' and 'Acceptable Solutions' for applications pertaining to '*establishing a necessary fence, firebreak,*

road or vehicular track, or for constructing necessary built infrastructure, if there is no suitable alternative site for the fence, firebreak, road, track or infrastructure'.

Assessment of the proposed clearance of assessable vegetation within the site against the 'Performance Requirements' of Part P of the RVM Code is provided in Table 1.

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Table 1 Regional Vegetation Management Code (Part P) Assessment

Performance Requirement	Compliance Assessment Comments
<p>PR P.1: Limits to clearing for public safety and infrastructure To regulate the clearing of vegetation in a way that conserves remnant vegetation that are regional ecosystems, does not cause land degradation, prevents the loss of biodiversity and maintains ecological processes – subject to the limitations required to meet PR P.2 to PR P.10 – clearing is limited to the extent that is necessary–</p> <p>a) for establishing a necessary fence, firebreak, road or vehicular track, or for constructing necessary built infrastructure, if there is no suitable alternative site for the fence, firebreak, road track or infrastructure; or</p> <p>b) as a natural and ordinary consequence of other assessable development for which a development approval as defined under the IPA was given, or a development application as defined under IPA was made before 16 May 2003; or</p> <p>c) to ensure public safety.</p>	<p>The clearance of assessable vegetation within the site proposed in order to establish the proposed Greyhound Racing Facility and associated infrastructure will be limited to the following.</p> <ol style="list-style-type: none"> 1. A section of the band of RE 12.9-10.4 approximately 1721m² in area, required to be cleared in order to construct the entrance driveway to the proposed facility and the car park. This clearance will require the removal of approximately 20 canopy/midstorey trees. 2. Approximately 6 of the large eucalypt and allied species trees that have been retained within the section of the site adjoining the above described clump of RE 12.9-10.4. These trees will require removal in order to construct the entrance driveway and the car park. <p>This extent of vegetation clearance has been minimised to the extent practicable whilst ensuring that access/egress and car parking requirements are suitably catered for. It is relevant to note that the proposed access/egress driveway linking the facility to Kingston Road will be located in roughly the same position as the exiting access road (refer Figure 3). In this regard, the actual clearance of vegetation required to construct the entrance driveway within the band of RE 12.9-10.4 located in the western section of the site will be minimal (i.e. approximately 8 trees).</p> <p>Given the above, the proposal achieves compliance with PR P.1 in that the proposed layout of the 'necessary built infrastructure' has been designed in a manner that has limited the required clearance of vegetation to the extent practicable.</p>

Performance Requirement	Acceptable Solution	Compliance Assessment Comments
PR P.2: Wetlands To regulate the clearing of vegetation in a way that prevents the loss of biodiversity and maintains ecological processes – assessable vegetation associated with any natural significant wetland and/or natural wetland is protected to maintain— a) water quality by filtering sediments, nutrients and other pollutants; and b) aquatic habitat; and c) terrestrial habitat.	AS P.2 P.2.1 Clearing does not occur— a) in any natural wetland; and b) within 100 metres from any natural wetland; and c) in any natural significant wetland; and d) within 200 metres from any natural significant wetland. AND P.2.2 Where clearing is for a significant community project, maintain the current extent of assessable vegetation associated with any natural significant wetland and/or natural wetland to provide— a) water quality by filtering sediments, nutrients and other pollutants; and b) aquatic habitat; and c) terrestrial habitat.	The proposed works <u>will not</u> involve the clearance of any assessable vegetation in or within 100 metres of any natural wetland, given that the site does not include any vegetation that supports or is associated with plants that are adapted to and dependent on living in wet conditions for at least part of their lifecycle, <u>and</u> that is— a) a regional ecosystem that is listed in Table 12; or b) represented as a swamp, lake, marsh, waterhole, wetland, billabong, pool, spring or the like on any topographic map; or c) listed as an active spring in the Queensland Springs Database. The proposal therefore satisfies PR P.2 through achieving compliance with AS P.2.1.
PR P.3: Watercourses To regulate the clearing of vegetation in a way that does not cause land degradation, prevents the loss of biodiversity and maintains ecological processes – assessable vegetation associated with any watercourse is protected to maintain— a) bank stability by protecting against bank erosion; and b) water quality by filtering sediments, nutrients and other pollutants; c) aquatic habitat; and d) terrestrial habitat.	AS P.3 P.3.1 Clearing does not occur— a) in any watercourse; and b) within 50 metres from each high bank of each watercourse with a stream order of 5 or greater; and c) within 25 metres from each high bank of each watercourse with a stream order 3 or 4; and d) within 10 metres from each high bank of each watercourse with a stream order 1 or 2. AND P.3.2 Where clearing is for a significant community project, maintain the current extent of assessable vegetation associated with any watercourse to provide— a) bank stability by protecting against bank erosion; and b) water quality by filtering sediments, nutrients and other pollutants; and c) aquatic habitat; and d) terrestrial habitat.	It is noted that a 'stream order 1' watercourse is identified as extending into the western section of the site on the 1:100,000 Vegetation Management Watercourse Map. However an inspection of this area during the site survey concluded that no such feature occurs within the subject section of the site and the subject section of the site supports flat, mown grass occurring over the remediated landfill. Nevertheless, no assessable vegetation occurs within 10 metres of this mapped 'stream order 1' watercourse, and therefore the proposed development will not require the clearance of assessable vegetation with 10 metres of the mapped watercourse. The proposal therefore satisfies PR P.3 through achieving compliance with AS P.3.1.

Performance Requirement	Acceptable Solution	Compliance Assessment Comments
<p>PR P.4: Connectivity</p> <p>To regulate the clearing of vegetation in a way that prevents the loss of biodiversity and maintains ecological processes – areas of mapped remnant vegetation are retained that are–</p> <p>a) of sufficient size and configured in a way to maintain ecosystem functioning; and</p> <p>b) of sufficient size and configured in a way to remain in the landscape in spite of any threatening processes; and</p> <p>c) located on the lot(s) that are the subject of the application to maintain connectivity to remnant vegetation on adjacent properties.</p>	<p>AS P.4</p> <p>P.4.1</p> <p>Where clearing is less than–</p> <p>a) 10 metres wide; or</p> <p>b) 2 hectares;</p> <p>Clearing does not–</p> <p>i. reduce the width of remnant vegetation to less than 100 metres; and</p> <p>ii. occur where the width of remnant vegetation is less than 100 metres;</p> <p>AND</p> <p>P.4.2</p> <p>Clearing does not–</p> <p>a) reduce areas of contiguous remnant vegetation to less than 10 hectares; and</p> <p>b) occur in areas of contiguous remnant vegetation that are less than 10 hectares; and</p> <p>c) reduce the width of remnant vegetation to less than 100 metres; and</p> <p>d) occur where the width of remnant vegetation is less than 100 metres; and</p> <p>e) reduce the total extent of remnant vegetation to less than 30%; and</p> <p>f) occur where the total extent of remnant vegetation is less than 30%.</p> <p>AND</p> <p>P.4.3</p> <p>Where clearing is for a significant community project, maintain the current extent of mapped remnant vegetation where the vegetation is –</p> <p>a) of sufficient size and configured in a way to maintain ecosystem functioning; and</p> <p>b) of sufficient size and configured in a way to remain in the landscape in spite of any threatening processes; and</p> <p>c) located on the lot(s) that are the subject of the application to maintain connectivity to mapped remnant vegetation on adjacent properties.</p>	<p>While the proposed clearing of vegetation within the band of RE 12.9-10.4 located in the western extent of the site will less than a) 10 metres wide and b) less than 2 hectares, it is noted that this clearing will occur where the width of remnant vegetation is less than 100 metres. As such, the proposal does not achieve compliance with AS P.4.1. However the proposed plan of development is compliant with PR P.4, given the following.</p> <ol style="list-style-type: none"> 1. The site is located within a heavily developed locality, bordered on all sides by industrial/commercial development and roadways. 2. The band of RE 12.9-10.4 located within the western extent of the site represents the only area of remnant vegetation mapped as such on the RE Map within close proximity of the site. The nearest offsite area of remnant vegetation to the site consists of a similarly isolated small clump of remnant vegetation located approximately 250 metres to the north of the site. 3. The location of busy roadways including Kingston Road and Compton Road means that very limited habitat linkage or fauna movement opportunities exist between the site and any other vegetation within the wider locality. The only fauna species that would be likely to utilise the habitat provided by the vegetation within the site would be highly mobile species (such as common cosmopolitan birds) and native species that have adapted to, and indeed often benefit from, intensive anthropological presence (i.e. Common brushtail possum (<i>Trichosurus vulpecula</i>) and Common ringtail possum (<i>Pseudocheirus peregrinus</i>). In this regard, it can be considered that the habitat value of the vegetation within the site is limited to that of a 'stepping-stone' nature for the above described fauna. 4. As described in Section 2 herein, past land management of the site has resulted in the vegetation within the band of RE 12.9-10.4 being comprised almost solely of old canopy trees. The band of remnant vegetation supports very few midstorey trees and lacks any native species recruitment within the understorey and groundstorey. 5. The clearance of vegetation within the mapped band of RE 12.9-10.4 will be minor in extent (refer comments for PR P.1 above) and therefore, will neither significantly alter the size or configuration of this band of remnant vegetation nor the limited 'ecosystem functioning' therein. 6. The minor sections of the mapped band of RE 12.9-10.4 that are proposed for clearance support only those common tree species which are the dominant or sub-dominant components of the canopy throughout the band of remnant vegetation. As such, the proposed clearance of these trees will not result in a loss of biodiversity within the site or surrounding locality. 7. The minor clearance of vegetation within the band of RE 12.9-10.4 proposed under the proposed plan of development will not result in the intensification of any threatening process. <p>Given the above, it is considered that the proposed plan of development is compliant with PR P.4 in that it will not result in the loss of the limited biodiversity values of the site and it will maintain the limited ecological processes that occur within the site.</p>

Performance Requirement	Acceptable Solution	Compliance Assessment Comments
PR P.5: Soil erosion To regulate the clearing of vegetation in a way that does not cause land degradation and maintains ecological processes – the effect of clearing does not result in– a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion or scalding; and b) any associated loss of chemical, physical or biological fertility—including, but not limited to water holding capacity, soil structure, organic matter, soil biology and nutrients, within and/or outside the lot(s) that are the subject of the application.	AS P.5 P.5.1 Mechanical clearing only occurs on– a) stable soils on a slope less than 30%; and b) unstable soils on a slope less than 10%; and c) very unstable soils on a slope less than 1%.	<p>The topography of the site as recorded during the field survey is generally flat with a slight decline from west to east across the site. This assessment is consistent with the surveyed contours for the site as illustrated on the preliminary <i>Site Plan Drawing No: GREY0001 SK-001-E</i> prepared by ML Design and dated 30th of November 2009 (refer Appendix B).</p> <p>The soil types within the site are likely to be of varied composition owing to the substantial excavation and movement of soils that has occurred within the site during the operation and remediation of the landfill. In this respect, it is reasonable to deem that as the underlying geology and corresponding soil types with the site were of a suitable composition for LCC to establish a landfill within the site, such soils must be of a reasonably stable composition.</p> <p>In any case, given the flat nature of the section of the site that will be disturbed during construction of the proposed development, it is not envisaged that mechanical clearing will occur on soils which slope at greater than 5%.</p> <p>The proposal therefore satisfies PR P.5 through achieving compliance with AS P.4.1.</p> <p>Notwithstanding the above, the mechanical clearing and excavation works associated with the proposed plan of development will be conducted in accordance with a Construction Environmental Management Plan (CEMP) that will be prepared prior to Operational Works to guide the construction of the proposed development.</p>
PR P.6: Salinity To regulate the clearing of vegetation in a way that does not cause land degradation and maintains ecological processes – clearing does not contribute to– a) waterlogging; or b) the salinisation of groundwater, surface water or soil.	AS P.6 P.6.1 Where clearing is less than– a) 2 hectares; or b) 10 metres wide; Clearing does not occur in any discharge area. AND P.6.2 Where clearing is less than – a) 5 hectares; or b) 50 metres wide. Clearing does not occur– i) in a discharge area; and ii) within 200 metres of any discharge area. AND P.6.2 Clearing does not occur in areas greater than 5 hectares.	<p>The clearance of assessable vegetation in order to construct the proposed works will be less than 2 hectares (i.e. maximum of approximately 0.28ha). As such, AS P.6.1 is of relevance to this application.</p> <p>With reference to <i>The Salinity Management Handbook</i>, Queensland's Department of Natural Resources, 1997("the Handbook"), discharge areas are defined as 'areas where the net movement of water is out of the groundwater. They generally occur where there is some hydrologic restriction to downslope water transmission causing water to flow toward the soil surface where it discharges from the groundwater.'</p> <p>The Handbook identifies the following geomorphological features as being typical discharge areas:</p> <ul style="list-style-type: none"> • toeslopes; • permanent streams; • permanent waterholes, lakes and swamps; • playa lakes; and • areas of poorly incised drainage. <p>The proposal will not require the clearance of assessable vegetation within any area that supports such geomorphological features.</p> <p>The proposal therefore satisfies PR P.6 through achieving compliance with AS P.6.1.</p>

Performance Requirement	Acceptable Solution	Compliance Assessment Comments
<p>PR P.7: Conserving remnant <i>endangered</i> regional ecosystems and of concern regional ecosystems</p> <p>To regulate the clearing of vegetation in a way that conserves remnant <i>endangered</i> regional ecosystems and remnant of concern regional ecosystems – maintain the current extent of endangered regional ecosystems and of concern regional ecosystems.</p>	<p>AS P.7 P.7.1 Clearing-</p> <p>a) does not occur in an endangered regional ecosystem or an of concern regional ecosystem that is listed in Table 1: and</p> <p>b) in an endangered regional ecosystem or an of concern regional ecosystem that is not listed in Table 1 only occurs where the clearing is less than 10 metres wide or 0.5 hectares.</p>	<p>The proposal will not necessitate the clearance of any vegetation identified as supporting <i>Endangered</i> or <i>Of Concern</i> REs on the current RE Map (refer Figure 2, and Appendix A). The proposal therefore achieves compliance with PR P.7.</p>
<p>P.8: Essential habitat</p> <p>To regulate the clearing of vegetation in a way that prevents the loss of biodiversity – maintain the current extent of essential habitat.</p>	<p>AS P.8 P.8.1 Clearing does not occur in an area shown as essential habitat on the essential habitat map.</p>	<p>The band of RE 12.9-10.4 within the western extent of the site is identified as essential habitat for the Koala (<i>Phascolarctos cinereus</i>) on the Essential Habitat Map (refer Appendix A).</p> <p>With reference to the identification of the band of remnant vegetation as essential habitat for the Koala, the following must be noted.</p> <ol style="list-style-type: none"> 1. The vegetation within the site is separated from the small isolated clump of remnant vegetation to the north of the site (also identified as essential habitat for the Koala) by approximately 250 metres of industrial/commercial development. 2. The vegetation within the site is separated from the closest expansive and known areas of Koala habitat by 1.85km in the case of Karawatha State Forest and 3.4km in the case of Daisy Hill Reserve. The land between the site and these Koala habitat areas supports dense industrial/commercial and residential development. No habitat linkage or fauna movement corridors have been retained or created between the site and areas of suitable Koala habitat. 3. The site and the majority of the surrounding properties are bordered by 1.8 metre high fencing which has made no provision for Koala movement through the locality. 4. An extensive search for evidence of Koala habitation of the site (i.e. visual sightings, scats, characteristic scratches etc.) did not locate any such evidence. In addition, anecdotal accounts provided by neighbouring business people advised that no Koala have been observed within the site in recent years. 5. Kingston Road and Compton Road which border the western and northern boundaries of the site are State controlled roads with high volumes of traffic and speed limits of 60 and 70 km/h. Such roads do not provide for the safe crossing of Koalas and attempts by Koalas (or other fauna) to cross these roads would be likely to result in injury or mortality. 6. The site is not mapped as a 'Koala Conservation Area', 'Koala Sustainability Area' or 'Urban Koala Area' on the <i>Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016</i> mapping. 7. The site is not mapped as 'Interim Koala Habitat Protection Area' or 'Koala Bushland Habitat Area' on the <i>Draft South East Queensland Koala State Planning Regulatory Provisions 2009</i> mapping.

Performance Requirement	Acceptable Solution	Compliance Assessment Comments
		<p>With respect to the above, it can be determined that the band of RE 12.9-10.4 within the western extent of the site has been identified as essential habitat for the Koala relying upon vegetation species composition alone (i.e. canopy of Eucalypt and allied species which are known Koala food trees). The inability of any Koala population to access, and therefore utilise the vegetation within the site would preclude the site from constituting actual and functional habitat for the Koala.</p> <p>In this regard, it should be noted that the DERM's definition of 'Essential Habitat' for protected wildlife is –</p> <p>...an area of vegetation shown on the regional ecosystem map or remnant map as remnant vegetation-</p> <p>(a) that has at least 3 essential habitat factors for the protected wildlife that must include any mandatory essential habitat factors; or</p> <p>(b) in which the protected wildlife, at any stage of its life cycle is located.</p> <p>As discussed above, the Koala does not occur within the site due to the inability of Koalas to access the site. Whilst the site supports RE 12.9-10.4 (essential habitat criteria 1) and occurs between sea level and 1000 metres AHD (essential habitat criteria 2), as discussed herein, the band of remnant vegetation does not contain 'multiple strata layers' (required for essential habitat criteria 3). The band of RE 12.9-10.4 therefore does not have at least 3 of the nominated essential habitat factors.</p> <p>It is therefore considered that the proposal achieves compliance with PR P. 8.</p>
PR P.9: Conserving status thresholds To regulate the clearing of vegetation in a way that conserves remnant regional ecosystems and prevents the loss of biodiversity – maintain the current extent of regional ecosystems listed in Table 2.	AS P.9 P.9.1 Clearing in a regional ecosystem listed in Table 2, does not occur unless the clearing is less than – <ul style="list-style-type: none"> • 10 metres wide; or • 2 hectares. 	<p>The proposal will not necessitate the clearance of any Regional Ecosystems identified in Table 2 of the RVM Code.</p> <p>The proposal therefore achieves compliance with PR P. 9 through achieving compliance with AS P.9.1.</p>
PR P. 10: Acid sulfate soils To regulate the clearing of vegetation in a way that does not cause land degradation and maintains ecological processes – clearing activities do not result in disturbance of acid sulfate soils or changes to the hydrology of the location that will either– <ul style="list-style-type: none"> a) aerate horizons containing iron sulfides; or b) mobilise acid and/or metals. 	AS P.10.1 Clearing in land zone 1, land zone 2 or land zone 3 in areas below 5 metres Australian Height Datum– <ul style="list-style-type: none"> a) is carried out in accordance with an acid sulfate soils environmental management plan as outlined in the <i>State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils</i>; and b) follows management principles in accordance with the Soil Management Guidelines in the <i>Queensland Acid Sulfate Soil Technical Manual</i>. 	<p>No section of the proposed development will occur on land that is located below 5m AHD and it is therefore unlikely that construction of the proposed development will result in the disturbance of Acid Sulfate Soils.</p> <p>With regard to the above the proposal achieves compliance with AS P.10.1 and therefore satisfies PR P.10.</p>

FIGURES

- Figure 1 Locality Plan
- Figure 2 Vegetation Communities and Regional Ecosystems Mapping
on 2007 Aerial Photography
- Figure 3 Proposed Plan of Development and Locations and Extents of
Assessable Vegetation Clearance

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Scale 1:20,000(A4)

FIGURE 1
LOCALITY PLAN

LEGEND
Site boundary

Map reproduced with permission of JHEC.
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Rev. Orig. Date: 25 February 2010

ML Design
L00105 (REVISED) - Local Property Management Plan - Locality planning
JHEC P. Johnston

Project No.: 7201/07

PRINT DATE: 23 February, 2010 - 542735



Aerial image sourced from Google Earth, 2007

This document is a Vegetation Management Plan (VMP) for the property located at 148-178 Kingston Road, Slacks Creek, Queensland. It is prepared in accordance with the requirements of the Environmental Protection Act 1994 (EPA) and the Environmental Protection Regulation 2000 (EPR). The VMP is a legal document that outlines the management and protection of the vegetation on the property. It is a condition of the development approval for the property. The VMP is a legal document that outlines the management and protection of the vegetation on the property. It is a condition of the development approval for the property.

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Rev: Orig. Date: 25 February 2010

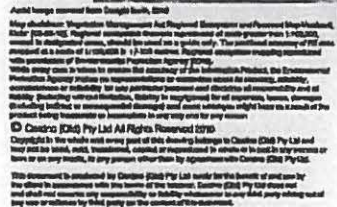
M.L. Design
Corteco Pty Ltd
13-054

VEGETATION COMMUNITIES AND REGIONAL ECOSYSTEMS MAPPING ON 2007 AERIAL PHOTOGRAPHY

Scale 1:1,500 (A3)

FIGURE 2

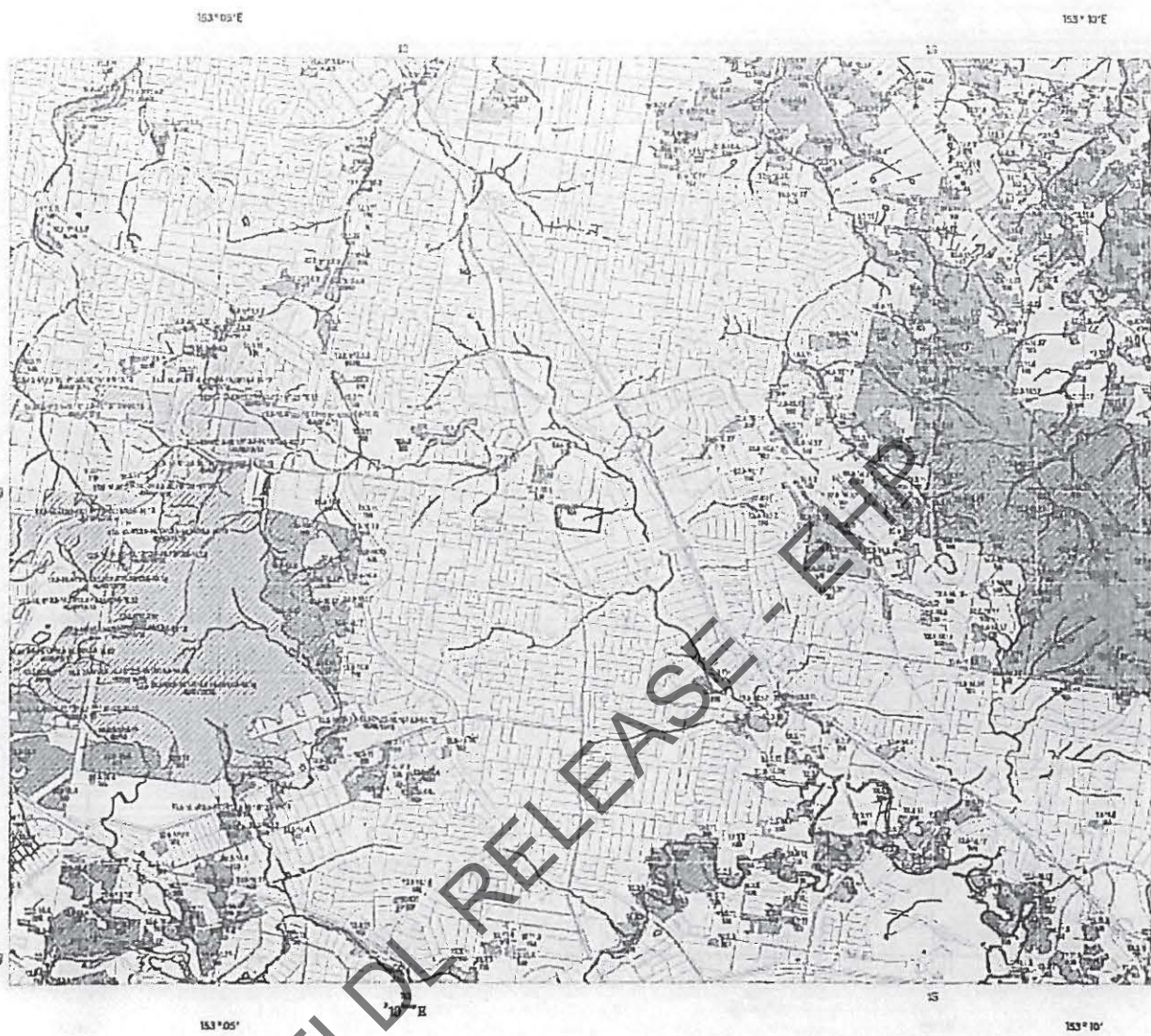
Project No: 7001/07
Date: 25 February 2010



APPENDIX A

Copy of Vegetation Management Act
Regional Ecosystem and Remnant Map –
Version 6 and Essential Habitat Map

RTI DL RELEASE - EHP



Vegetation Management Act Regional Ecosystem and Remnant Map-Version 6

Remnant vegetation containing endangered regional ecosystems

Based on 2008 Landsat TM Imagery

- Dominant
- Sub-dominant
- Remnant vegetation containing of concern regional ecosystems
 - Dominant
 - Sub-dominant
- Remnant vegetation that is a least concern regional ecosystem
- Remnant vegetation under Section 20AH of the VMA
- Non-remnant
- Plantation Forest
- Dam or Reservoir
- Remnant Vegetation
- PMAV Category X area
- Great Barrier Reef Wetlands
- Vegetation Management Act Essential Habitat
For further information on VMA Essential Habitat, please see the attached VMA Essential Habitat map.
- Subject Lot
- Watercourse (Stream order shown as black number against stream where available)
- Bioregion boundary
- Roads © MapInfo Australia Pty Ltd 2008
- National Park, Conservation Area State Forest and other reserves
- Cadastral line
The maximum spatial error of parcels extracted for this map from the Digital Cadastral Data Base (DCDB) range from: 14m to 261m at a 95% confidence level. Property boundaries shown are provided as a locational aid only.
- Towns

Requested By: ANDREW GAFFNEY@MLDESIGN.COM.AU
Data: 03 Feb 10 Time: 12.28.30

Centered on Lot on Plan:
658 SL12298
Bioregion: Southeast Queensland



Queensland
Government



1000 0 1000 m

Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)

A remnant map covers areas not covered by a regional ecosystem map.

Defined map areas are labelled with the regional ecosystem (RE) code along with the percentage breakdown if more than one RE occurs within the area. Detailed definitions of regional ecosystems are available from www.derm.qld.gov.au/REDD. Defined map areas smaller than 6ha may not be labelled.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/-100 metres. The extent of remnant regional ecosystems as of 2008, depicted on this map is based on rectified 2006 Landsat TM imagery (supplied by the Statewide Landcover and Trees Study (SLATS), Department of Environment and Resource Management (DERM)).

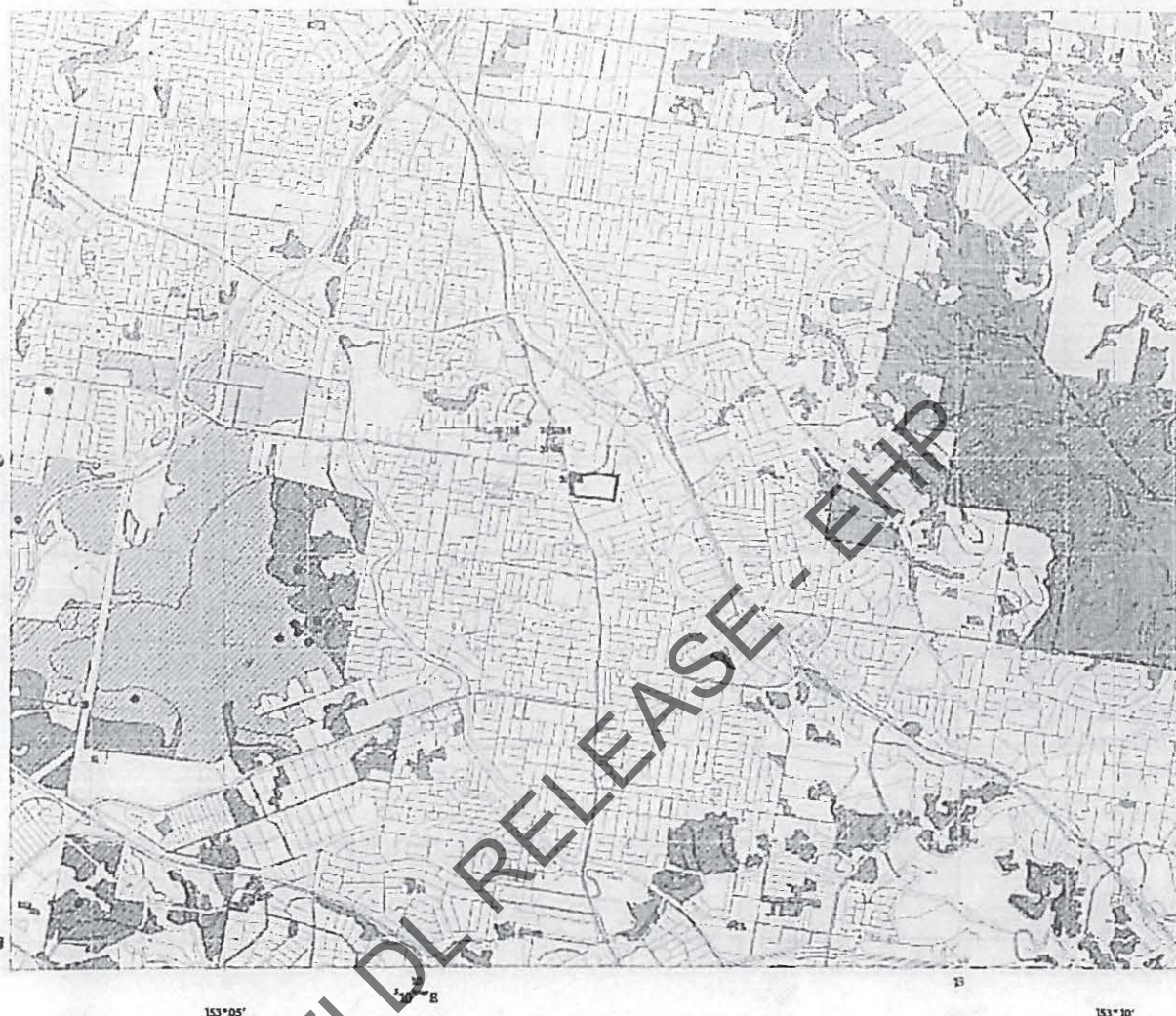
Some watercourse lines are derived from GeoScience Australia 1:250 000 mapping.

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Environment and Resource Management and MapInfo Australia Pty Ltd, makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

All datasets are updated as they become available to provide the most current information as of the date shown on this map.

Additional information is required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.derm.qld.gov.au/vegetation or contact the Department of Environment and Resource Management.

Digital regional ecosystem data is available in shapefile format, for Lot on Plans from www.derm.qld.gov.au/REDDATA or from DERM for larger areas.

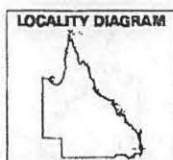


Vegetation Management Act Essential Habitat Map Version 3.0

- Remnant vegetation containing endangered regional ecosystems
 - Dominant
 - Sub-dominant
 - Remnant vegetation containing of concern regional ecosystems
 - Dominant
 - Sub-dominant
 - Remnant vegetation that is a least concern regional ecosystem
 - Remnant vegetation under Section 20AH of the VMA
 - Non-remnant
 - Plantation Forest
 - Dam or Reservoir
 - Remnant Vegetation
 - PMVA Category X area
 - Vegetation Management Act Essential Habitat
 - Vegetation Management Act Essential Habitat Species Records
 - Subject Lot
 - Roads • MapInfo Australia Pty Ltd 2009
 - National Park, Conservation Area State Forest and other reserves
 - Cadastral line
- The maximum spatial error of parcels extracted for this map from the Digital Cadastral Data Base (DCDB) range from: 14m to 251m at a 95% confidence level. Property boundaries shown are provided as a locational aid only.
- Towns

Requested By: ANDREW GAFFNEY@MLDESIGN.COM.AU
Date: 03 Feb 10 Time: 12.28.38

Centered on Lot on Plan:
658 SL12288



1000 0 1000 m

Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)

Labels for the Vegetation Management Act Essential Habitat are centred on the subject lot (1.1km surrounding and including a Lot on Plan). Labels correlate to the label field in the attached essential habitat database.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/-100 metres. The extent of remnant regional ecosystems as of 2005, depicted on this map is based on rectified 2005 Landsat TM imagery (supplied by SLATS, Department of Environment and Resource Management).

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All datasets are updated as they become available to provide the most current information as of the data shown on this map.

Additional information is required for the purposes of land clearing or assessment of a regional ecosystem map or PMVA applications. For further information go to the web site: www.derm.qld.gov.au/vegetation or contact the Department of Environment and Resource Management.

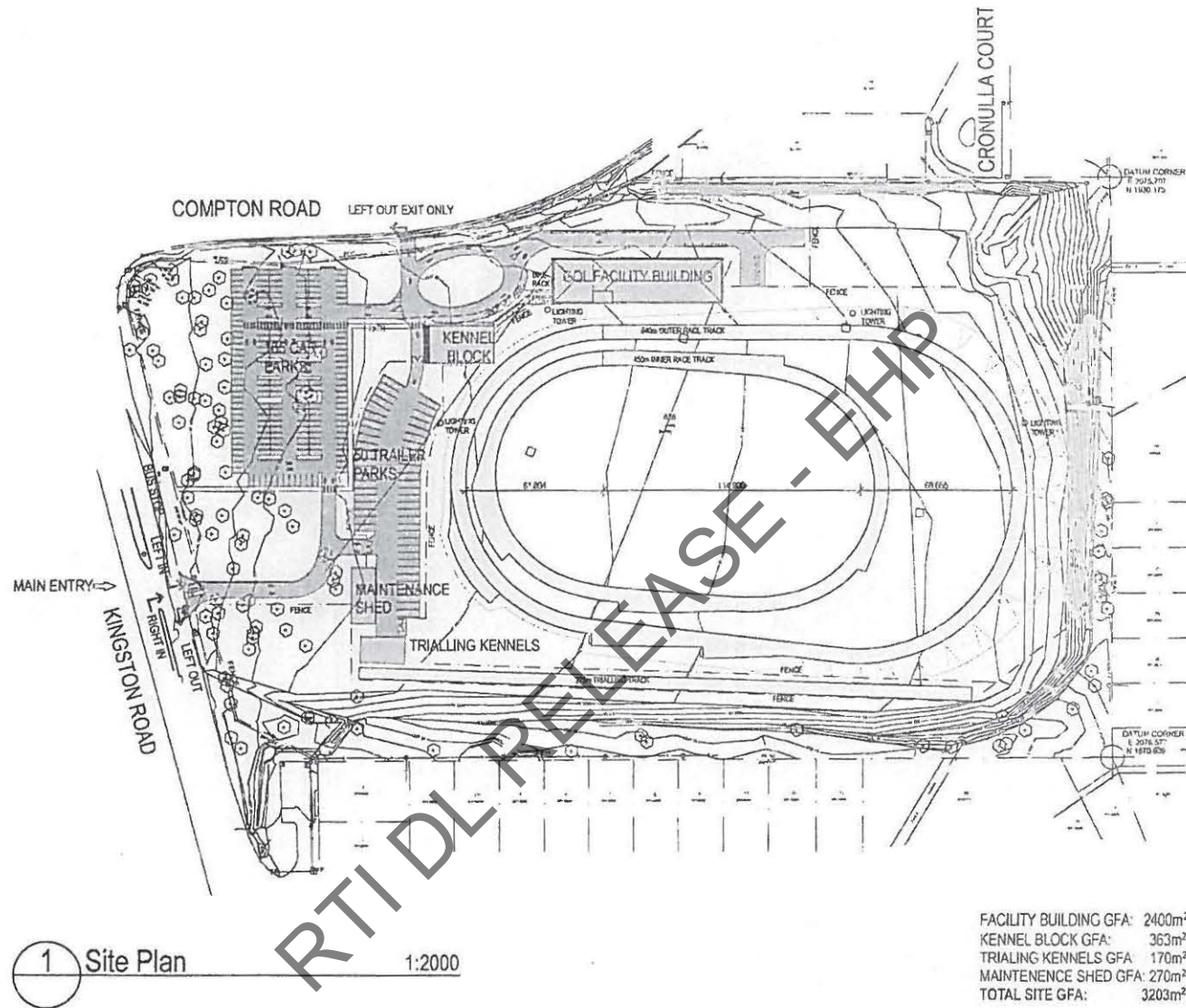
Digital regional ecosystem data is available in shapefile format, for Lot on Plans from www.derm.qld.gov.au/REDATA or from DERM for larger areas.

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APPENDIX B

Site Plan Drawing No: GREY0001 SK-001-E

RTI DL RELEASE - EHP



PRELIMINARY
NOT FOR CONSTRUCTION

SITE PLAN -

LOGAN GREYHOUND FACILITY
GREYHOUNDS QUEENSLAND

ML Design
architecture | master planning | urban design | interior design

ML Design Pty Ltd
ACN 100 000 000
180 100 000 000

File Name: 13-054
File Path: P:\00000000\13-054\13-054.dwg

13-054

SCALE: 1:2000 @ A3

APPROVED FOR ISSUE:

30/11/2009 ©

SK-001 -E

JOB NO: GREY0001

DL Documents

Page 150 of 178

Logan Greyhound Facility Supplementary Site Investigation

Legend



Site Boundary

- Notes:
1. Aerial Photograph - Google Earth Pro, 2008
 2. Scale and features shown are approximate locations only

Figure 1
Site Location Plan

SKM



0 400 m

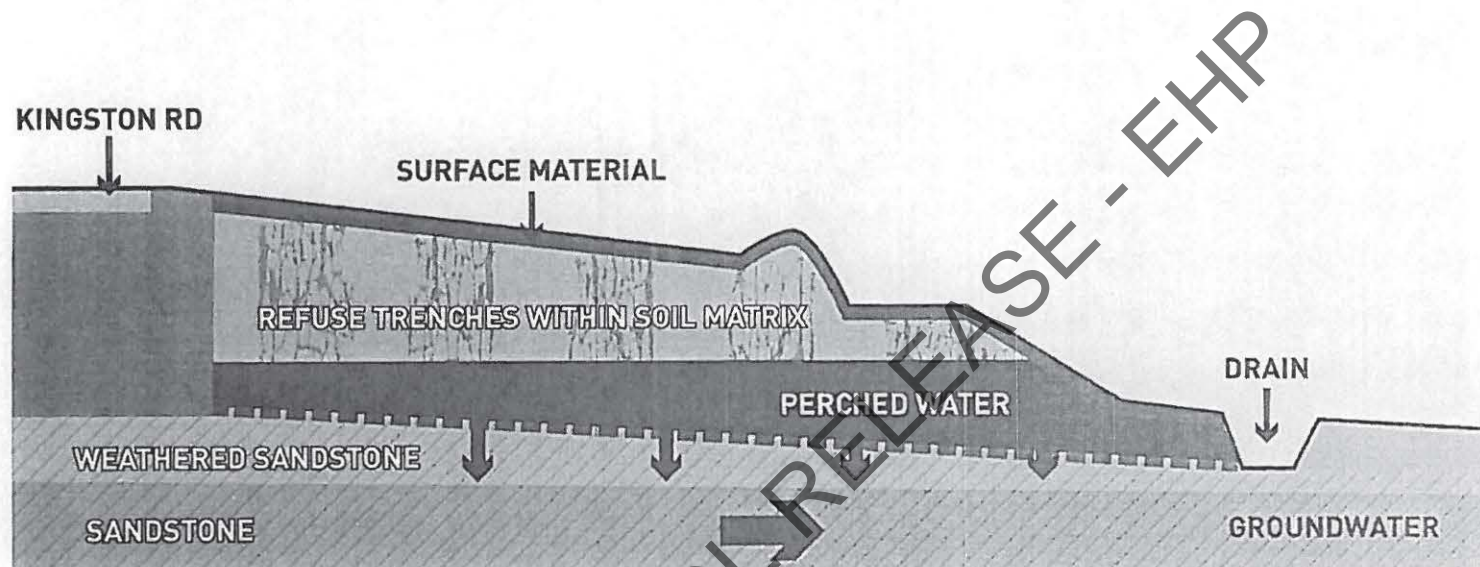






Logan Greyhound Facility
Supplementary Site
Investigation

Legend



Notes:
1. Figure not to scale.

Figure 5
Conceptual Site Geology

SKM

Logan Greyhound Facility

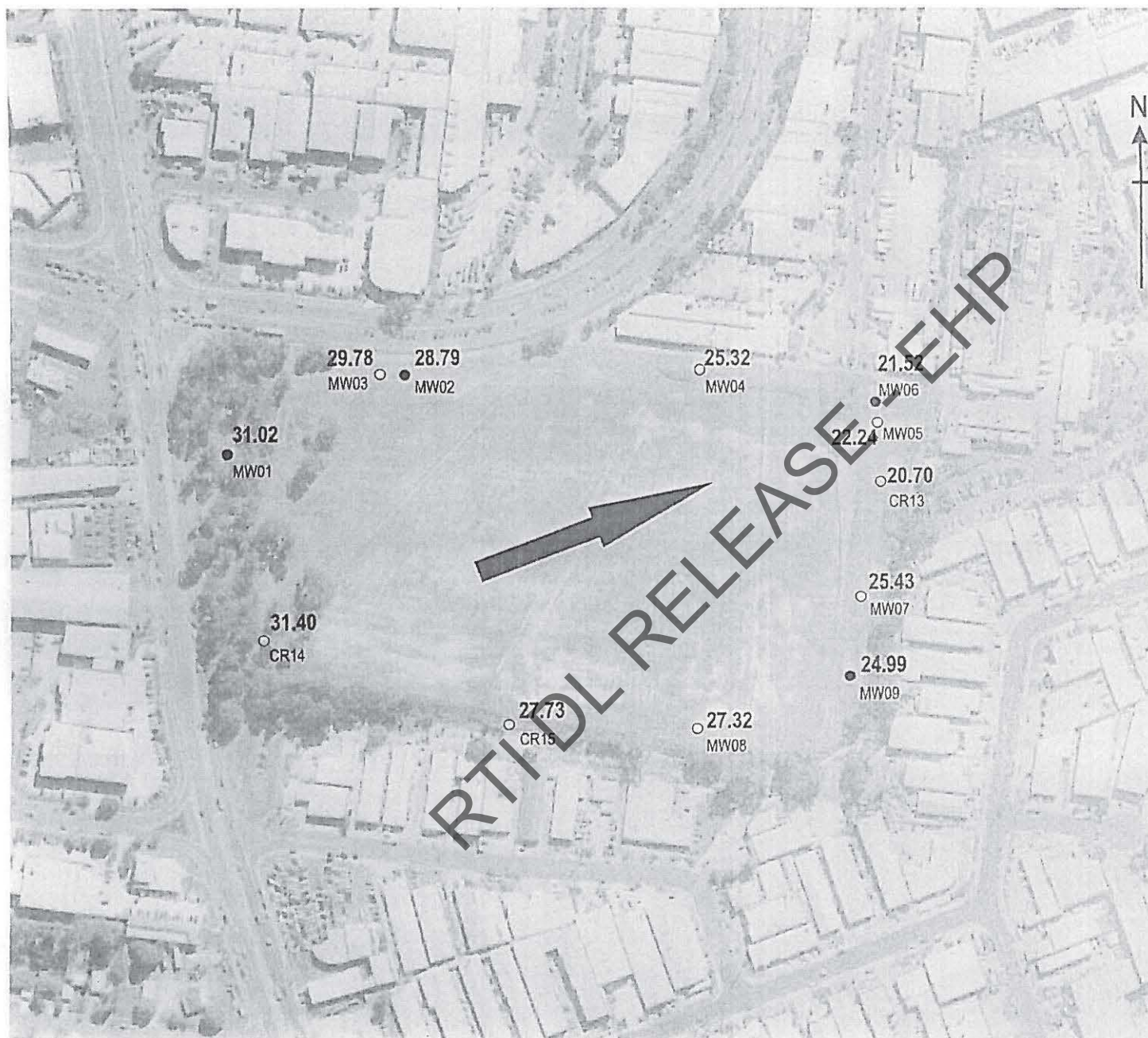
Legend

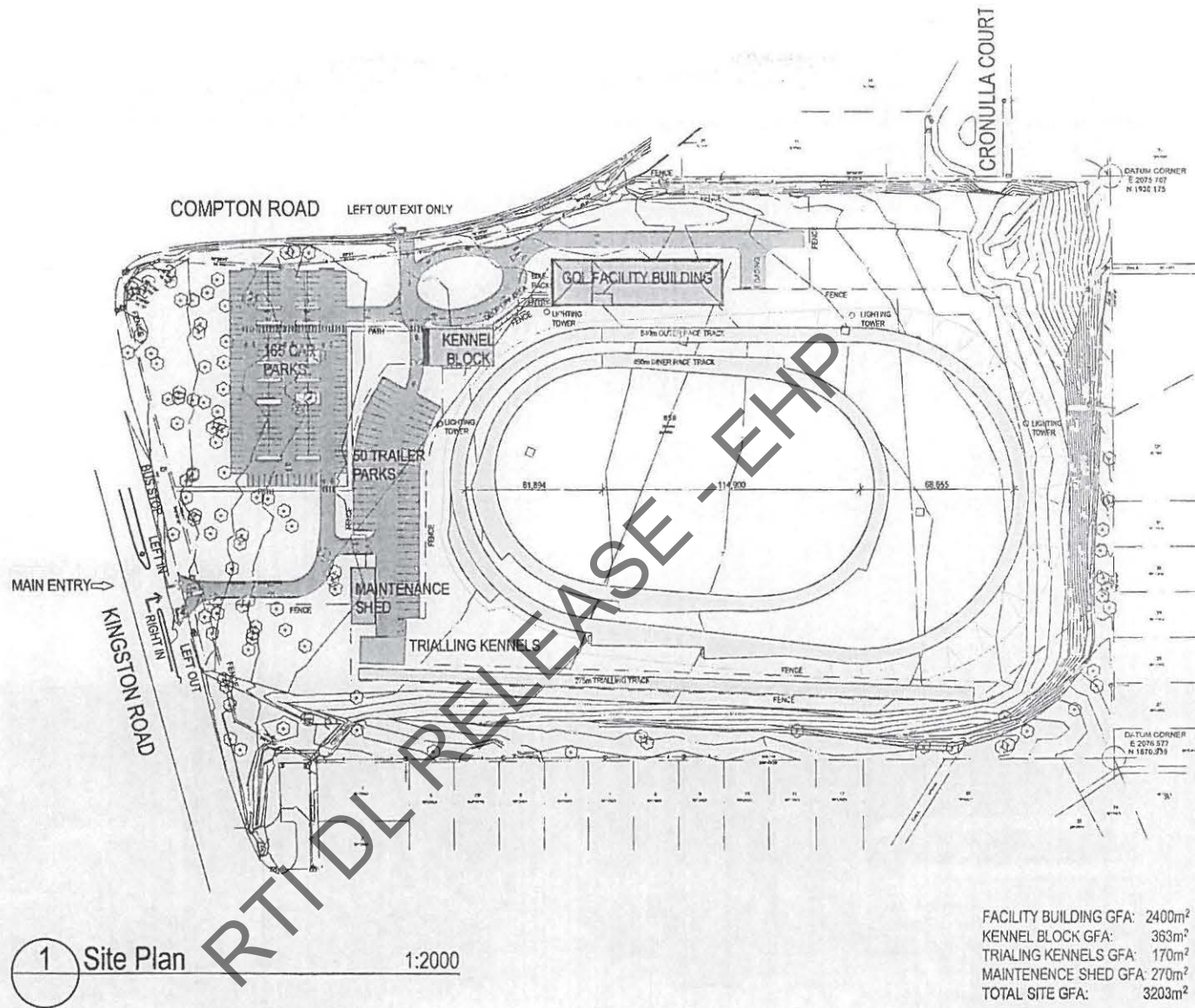
- 2009 Shallow Monitoring Bore
- 2002 Shallow Monitoring Bore
- 2009 Deep Monitoring Bore
- 22.24 Average Groundwater Level over monitoring period (m AHD)
- ➔ Approximate Groundwater Flow Direction

Notes:
1. Aerial Photograph - Google Earth Pro, 2008
2. Scale and features shown are approximate locations only

Figure 6
Average Groundwater Levels

SKM





PRELIMINARY
NOT FOR CONSTRUCTION

SITE PLAN -

LOGAN GREYHOUND FACILITY
GREYHOUNDS QUEENSLAND

ML Design
architecture | master planning | urban design | interior design
Page 157 of 178

ML Design Pty Ltd
ACN 105 492 304
ABN 58 105 492 304
13 054

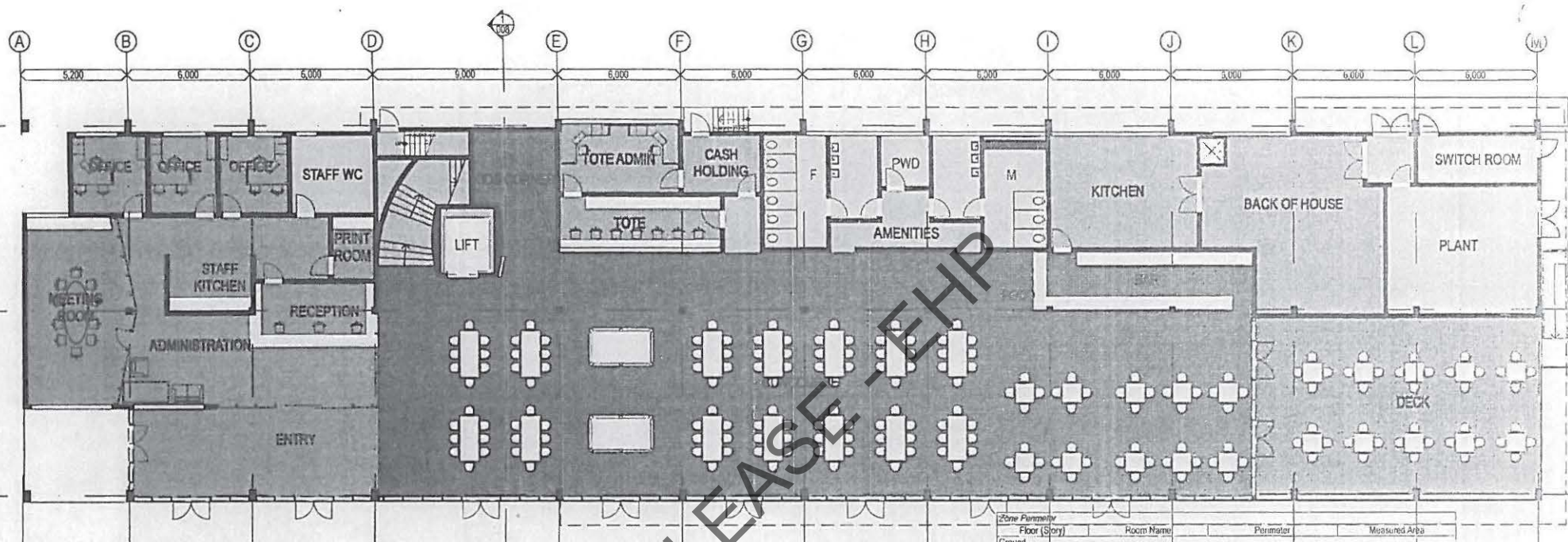


0 10.0 20.0 40.0 60.0 80.0 100m

SCALE- 1 2000 @ A3

APPROVED FOR ISSUE:
DL Documents

30/11/2009 © SK-001 -E JOB NO. GREY0001

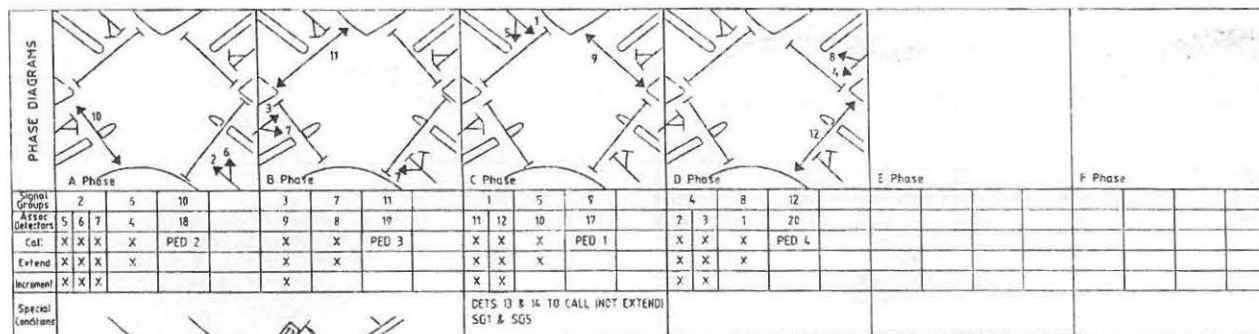


1 GROUND FLOOR PLAN 1:200

Zone	Room Name	Perimeter	Measured Area
Ground		9.00	1.65
		9.22	5.32
		21.00	15.36
		25.82	35.49
		77.71	250.28
	ADMINISTRATION	44.60	60.60
	AMENITIES	35.39	65.14
	BACK OF HOUSE	13.21	10.85
	CASH	110.23	503.78
	CONCOURSE	45.60	124.60
	DECK	19.67	20.71
	KIDS CORNER	25.39	39.57
	KITCHEN	27.13	45.65
	PLANT	15.60	15.20
	STAFF WC	16.33	13.49
Level 01	TOTE	20.61	19.31
	TOTE ADMIN	18.40	19.72
Level 01		13.10	6.82
		123.41	197.50
	RESTAURANT / FUNCTION	113.48	418.81
	AMENITIES	44.60	60.60
	BACK OF HOUSE	29.60	53.85
	BAR	20.67	28.14
	DECK	39.95	69.85
	KITCHEN	35.60	82.68
Level 02	LOUNGE	24.60	37.70
	TOTE	16.40	14.25
Level 03	STAIR	23.11	24.62
		21.20	15.09
		22.60	27.08
		1,064.53 m	2,291.51 m²

PRELIMINARY
NOT FOR CONSTRUCTION

LOGAN GREYHOUND FACILITY
GREYHOUNDS QUEENSLAND



CONFLICT TABLE (X indicates conflict)

	Signal Groups												Ped Groups		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Signal Group Function

	RED	1	1	1	1	1	1	1	1	1	1	1	1	1
A5 YELLOW	2	2	2	2	2	2	2	2	2	2	2	2	2	2
A3 GREEN	3	3	3	3	3	3	3	3	3	3	3	3	3	3
A8 RED	4	4	4	4	4	4	4	4	4	4	4	4	4	4
A7 YELLOW	5	5	5	5	5	5	5	5	5	5	5	5	5	5
A6 GREEN	6	6	6	6	6	6	6	6	6	6	6	6	6	6
A11 RED	7	7	7	7	7	7	7	7	7	7	7	7	7	7
A7 YELLOW	8	8	8	8	8	8	8	8	8	8	8	8	8	8
A9 GREEN	9	9	9	9	9	9	9	9	9	9	9	9	9	9

Phase diagrams	A phase					B phase					C phase					D phase (Emergency)					Site M2436 (Fire Stn)				
Signal groups	1	2	8	9		3	4	5			6	7	10			4	5	9	11		a(Red)	b			
Vehicle/Red Group	Vg1	Vg2	Pg1	Pg2		Vg3	Vg4	Vg5			Vg6	Vg7	Pg3			Vg4	Vg5	Pg2	Pg4		a(Red)	b			
Logical input	2,3,4	8,9	16	15		1	7				5,6	10	14						13						
Call	X	X	X	X		X	X	Pres			Pres	X	X						X		X				
Extend	X	X				X	X				X	X													
Increment	X	X																							
Special Conditions	SG4 OFF after 6 seconds or Pg1 Walk										SG5 RED for Walk period if Pg3					See Notes below									

Refer Standard Drawings:-
 1333 Minimum clearance of Overhead Electric Lines from Ground and Structures
 1413 Termination Panel Traffic Signals Junction Box (Type A)
 1414 Traffic Signals Junction Box (Type A) Wiring Details
 1420 Traffic Signal Components
 1426 Standard Loop Configurations
 1428 Base Mounted Signals Post Installation Details
 1435 Traffic Signal Symbols

Refer Standard Specifications:-
 MPS11.93 Traffic Signals
 MRS11.95 Switchboards and Cables

Conflict table (X - indicates conflict)															
Vehicle Groups								Ped Groups							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	X	X	X	X	X	X	X								
2	X	X	X	X	X	X	X								
3	X	X	X	X	X	X	X								
4	X	X	X	X	X	X	X								
5	X	X	X	X	X	X	X								
6	X	X	X	X	X	X	X								
7	X	X	X	X	X	X	X								
8	X	X	X	X	X	X	X								
9								X	X						
10								X	X						
11								X	X						
12								X	X						
13								X	X						
14								X	X						
15								X	X						
16								X	X						

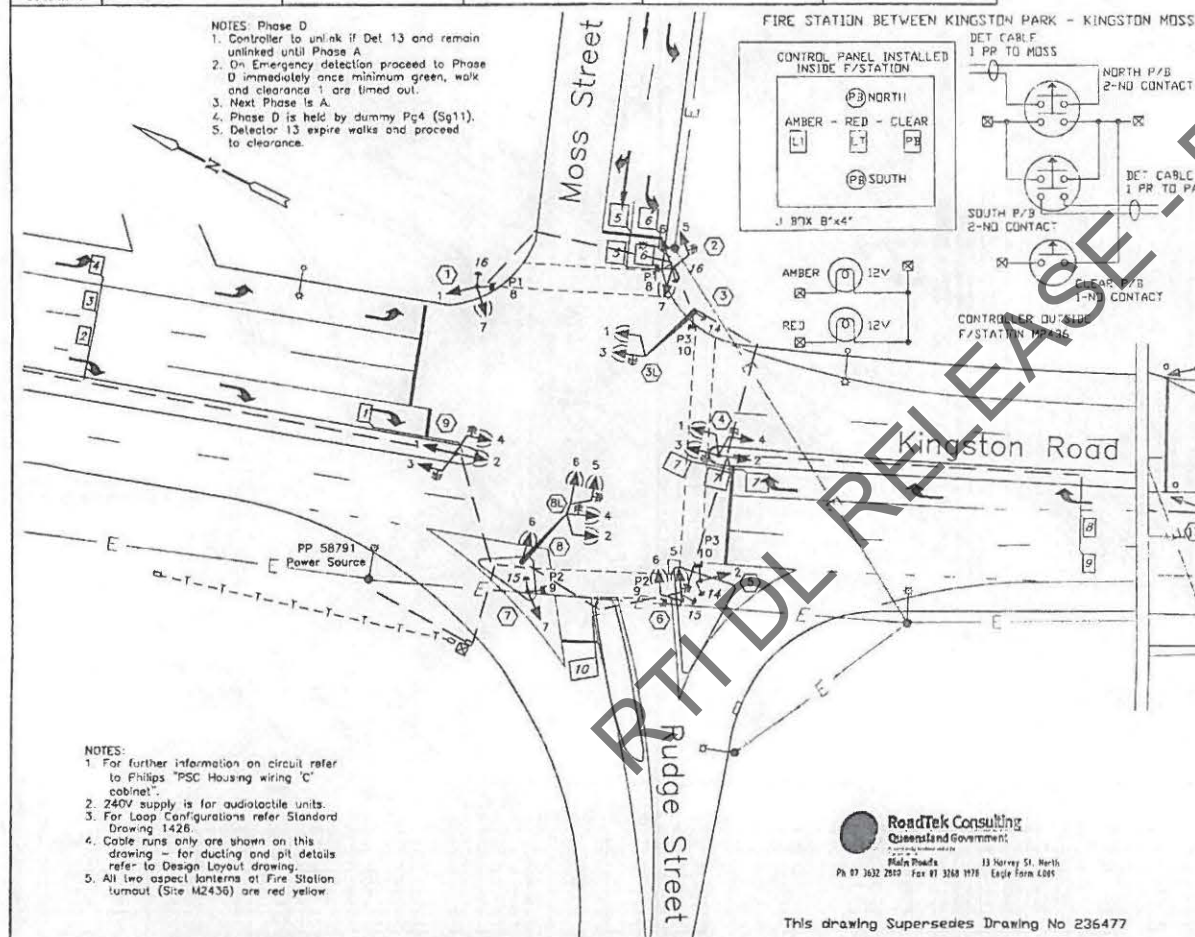
Function		Run 1 connections		Run 2 connections		Run 3 connections		Run 4 connections		Run 5 connections	
Terminal	Color	Terminal	Color	Terminal	Color	Terminal	Color	Terminal	Color	Terminal	Color
A5	Red	1	1	1	1						
A4	Yellow	2	2	2	2						
A3	Green	3	3	3	3						
A8	Red					4	4				
A7	Yellow					5	5				
A6	Green					6	6				
A11	Red	7	7	7	7						
A10	Yellow	8	8	8	8						
A9	Green	9	9	9	9						
A14	Red					10	10				
A13	Yellow					11	11				
A12	Green					12	12				
B5	Red	5	11	11	11	13	13				
B4	Yellow	5	12	12	12	14	14				
B3	Green	5	13	13	13	15	15				
B8	Red	6	14	14	14	16	16				
B7	Yellow	6	15	15	15	17	17				
B6	Green	6	16	16	16	18	18				
B11	Red	7	17	17	17			1	1		
B10	Yellow	7	18	18	18			2	2		
B9	Green	7	19	19	19			3	3		
B14	Red	D/Walk	8	20	20						
B13	Yellow										
B12	Green										
C3	Red	D/Walk	9			20	20			4	4
C2	Yellow										
C1	Green										
C5	Green	Work	9			21	21			5	5
C6	Red	D/Walk	10	22	22	22	22				
C7	Yellow										
C8	Green	Walk	10	23	23	23	23				

VEHICLE CLEARANCE TIMES									
CLEARANCE TIMES ARE CALCULATED FOR 60 KM/H									
FROM PHASE		ALL RED TIMES (SECS)							
		A	B	C	D	E	F	G	H
1	2	1.8	2.2	1.9					
2	3	2.0		2.0	2.0				
3	4	2.5	2.0		2.5				
4	5	2.0				2.0			

PEDESTRIAN CLEARANCE TIMES									
CLEARANCE TIMES ARE CALCULATED FOR 60 KM/H									
M/WALK CLEARANCE 1 (SECS)		CLEARANCE 2 (SECS)		SPECIAL CONDITIONS					
PLD 1	9	12	4						
PLD 2	4	3	4						
PLD 3	10	16	4						
PLD 4	0	15	0						

Function		Run 1 connections		Run 2 connections		Run 3 connections		Run 4 connections		Run 5 connections	
Terminal	Color	Terminal	Color	Terminal	Color	Terminal	Color	Terminal	Color	Terminal	Color
M2436 Red	a									1	
M2436 Yellow	c									2	
A2	240V (Loop Note)	32	Oy	32	Oy	32	Oy				
E5	Ext det 1	24	24								
E6	Ext det 2			21	24			15	15		
E7	Ext det 3	25	25	25	25						
E8	Ext det 4										
E9	Det common	26	26	26	26	16	16			4	
E10	Neutral	NL	Bk	NL	Bk	NL	Bk	NL	Bk	NL	Bk
Spore cores		4-6	10			19		6-14			
Cable size		20	19	25	19	25	19	19	19	19	19

Detector Table - PSC PD700 Series Integrated Detector System											
Physical input	Contr term	Logical input	Loop Config refer Std Dwg 1426	Det mode	Physical input	Contr term	Logical input	Loop Config refer Std Dwg 1426	Det mode	Physical input	Contr term
Loop 1	P1	1	1a (174)	Locked							
Loop 2	P2	2	1ND	Locked							
Loop 3	P3	3	1ND	Locked							
Loop 4	P4	4	1ND	Locked							
Loop 5	P5	5	2a (289)	Locked							
Loop 6	P6	6	2b (772)	Locked							
Loop 7	P7	7	3a (280)	Locked							
Loop 8	P8	8	1ND	Locked							
Loop 9	P9	9	1ND	Locked							
Loop 10	P10	10	11 (249)	Locked							
EXT 1	E1	11									
EXT 2	E2	12									
EXT 3	E3	13	P04-Std								
EXT 4	E4	14	P03-Judice								
EXT 5	E5	15	P02-Audio								
EXT 6	E6	16	P01-Audio								



- NOTES:
- For further information on circuit refer to Philips "PSC Housing wiring C" cabinet.
 - 240V supply is for audiotactile units.
 - For Loop Configurations refer Standard Drawing 1426.
 - Cable runs only are shown on this drawing - for ducting and pit details refer to Design Layout drawing.
 - All two aspect lanterns at Fire Station turnout (Site M2436) are red yellow.

RoadTek Consulting
 Queensland Government
 Main Roads 13 Harvey St, North
 Ph 07 3632 2510 Fax 07 3638 1178 Eagle Farm QLD

This drawing Supersedes Drawing No 236477

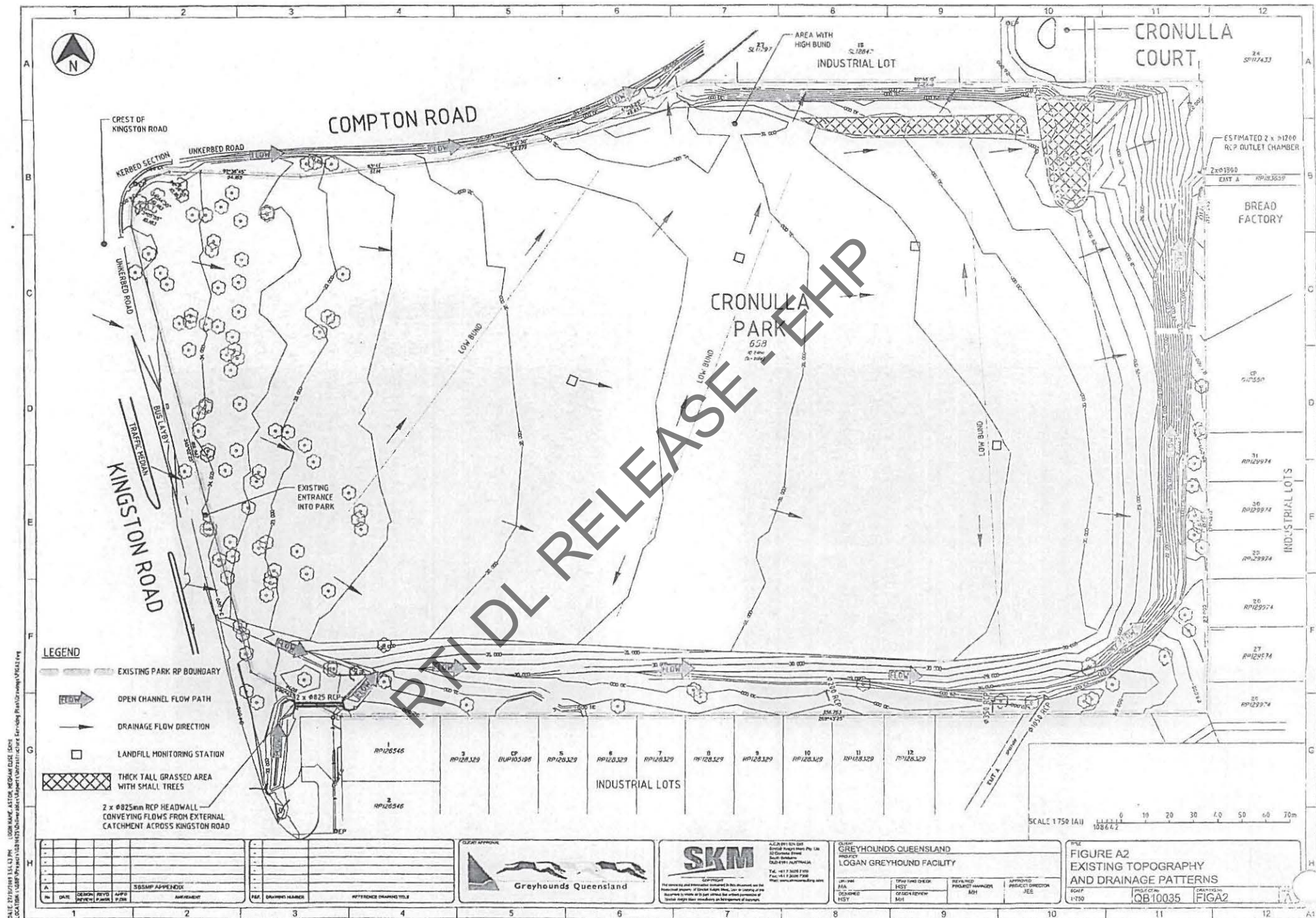
Site No. **M2429**
ITS INFRASTRUCTURE ROAD SYSTEM & ENGINEERING

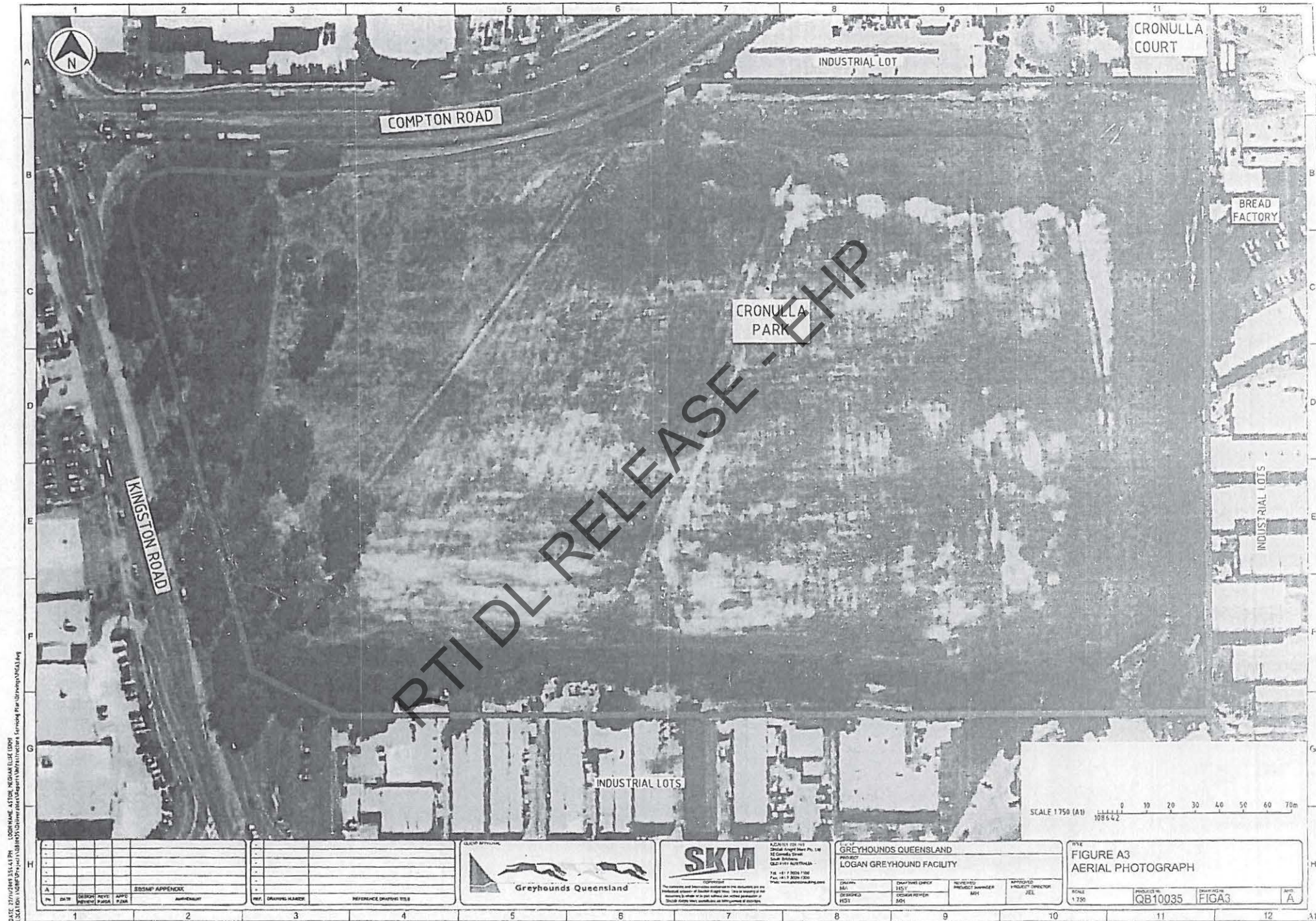
Revisions	Certified	Date	Microfired	Associated job nos	Dimensions in metres except where shown otherwise, Culvert sizes in millimetres.	Survey books
C FIRE STN DETAIL ADDED	MJS	2/02		315804 - 315806		
B AS CONSTRUCTED (19/7/01)	MJS	9/01				
A Original issue				(Office use only)		

LOGAN CITY						
BRISBANE - BEENLEIGH ROAD						
KINGSTON ROAD, MOSS STREET & RUDGE STREET						
Reference Points					Survey	Byds
Preceding RPC	Dist to start of job (km)	From start to end of job	From end to following RPC	Following RPC	Ckd	Ckd

TRAFFIC SIGNAL INSTALLATION							
TYCO PSC GC8-ID CONTROLLER							
CABLE CONNECTIONS							
Drawn RGS	Design RGS	Examined	Certified	Approved 6/4/01			
Ckd GO'D	Ckd GO'D		L Davis 4/4/01	ROSS BINCO			
			RPEQ	Manager (Infrastructure Delivery) Macquarie Infrastructure Services			

Queensland Government
 Department of Transport
 JOB No. 70/204/205
 Contract No. 315805
 Drawing 1/1





DATE: 17/11/2015 15:15:45 PM LOCATION: Aerial photograph of Cronulla Park and surrounding industrial areas. The image is overlaid with a grid from 1 to 12 horizontally and A to H vertically. Labels include 'COMPTON ROAD', 'KINGSTON ROAD', 'INDUSTRIAL LOT', 'CRONULLA COURT', 'BREAD FACTORY', 'CRONULLA PARK', and 'INDUSTRIAL LOTS'. A large diagonal watermark reads 'PTI DL RELEASE - EHP'. A north arrow is in the top left. A scale bar at the bottom right indicates 1:750 scale. Various project information boxes are at the bottom.

Logan City Council Storm Water OVERVIEW MAP

LEGEND

- DEVELOPMENT SITE
- EXTERNAL CATCHMENT
- EXTERNAL SUB-CATCHMENT (REFER GALCS.)

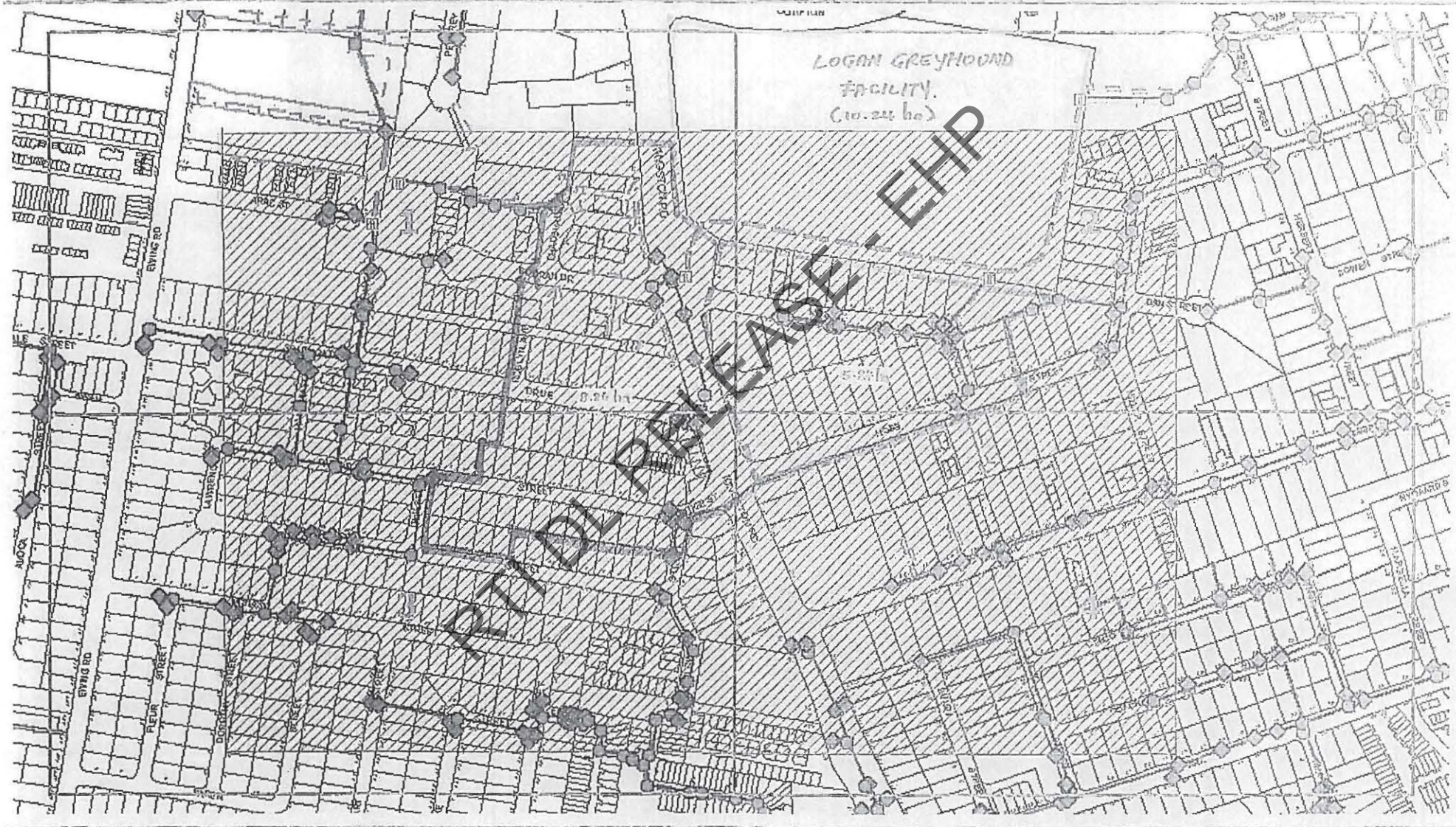


LOGAN CITY COUNCIL

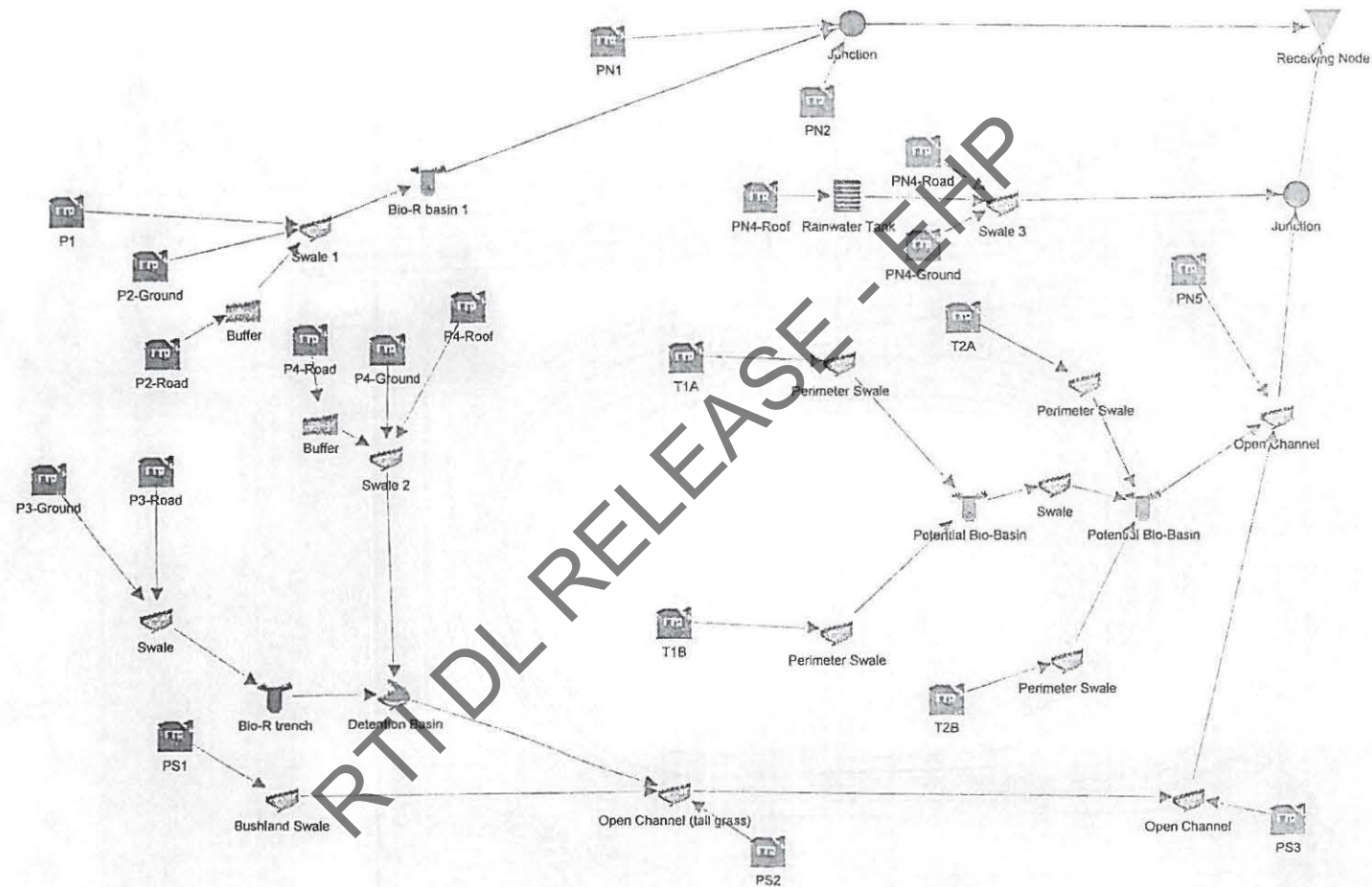
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Dig Location: monash St Slacks Creek, Qld 4127

Date: 25/11/2009



LOGAN GREYHOUND FACILITY - Site Based Stormwater Management Plan
Figure E2 - MUSIC Model Schematic



GENERAL NOTES

3. CLEARING OF VEGETATION IS NOT TO BE UNDERTAKEN UNLESS PRECEDED OR ACCOMPANIED BY INSTALLATION OF ADEQUATE RUNOFF DIVERSION AND SEDIMENT CONTROL MEASURES.
4. AREAS OF VEGETATION THAT IS NOT TO BE DISTURBED AT ANY GIVEN STAGE OF THE WORKS SHOULD BE FENCED OFF TO MINIMISE DISTURBANCE.
5. ALL CLEARED VEGETATION IS TO BE MULCHED WITHIN 2 DAYS AND STOCKPILED AT THE LOCATIONS NOMINATED BY THE SUPERINTENDENT.
6. TOPSOIL SHALL BE STRIPPED IN ACCORDANCE WITH THE SPECIFICATION AND STOCKPILED AT THE LOCATIONS NOMINATED BY THE SUPERINTENDENT.
7. TOPSOIL THAT IS TEMPORARILY STOCKPILED ON SITE MUST BE PROTECTED FROM WIND AND WATER EROSION.
8. A SEDIMENT FENCE IS TO BE INSTALLED IMMEDIATELY DOWNSTREAM OF ANY SOIL/MULCH STOCKPILE.
9. ALL EROSION AND SEDIMENT CONTROL DEVICES ARE TO BE INSPECTED AT INTERVALS SPECIFIED IN L.C.C. ESC STANDARDS, PRIOR TO EXPECTED RAINFALL AND AFTER RAINFALL EVENTS. ANY DAMAGE OR EXCESS EROSION/SEDIMENT IS TO BE REPAIRED/MOVED AS REQUIRED TO MAINTAIN THE DEVICES EFFECTIVE OPERATION.
10. GRADING SHOULD COMMENCE IMMEDIATELY FOLLOWING RE-SPREADING OF TOPSOIL OVER DISTURBED AREAS, IN ACCORDANCE WITH L.C.C. STANDARDS.

PRE-CONSTRUCTION PHASE

11. GROUND COVERAGE OF 70% OF ALL SOIL MUST BE PROVIDED WITHIN 30 CALENDAR DAYS FROM COMPLETION OF ANY WORKS ON DISTURBED AREAS. DURING THE INTERIM PERIOD BETWEEN COMPLETION OF WORKS AND THE ESTABLISHMENT OF AT LEAST 70% GROUND COVER, THE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES MUST BE MAINTAINED INCLUDING DIVERSION/CUTOFF DRAINS
12. TRENCHES MUST BE BACKFILLED, CAPPED WITH TOPSOIL AND COMPACTED TO A LEVEL AT LEAST 100mm ABOVE ADJOINING GROUND LEVEL.
13. THE OPENING TO GULLY PITS ARE TO BE PROTECTED BY INSTALLED PORTABLE GRAVEL KERB SEDIMENT TRAPS.
14. THE REQUIREMENT FOR AND PROVISION OF GULLY PIT LITTER BASKETS IS TO BE DIRECTED BY THE SUPERINTENDENT FOLLOWING ASSESSMENT OF POTENTIAL DEBRIS/LITTER LOADINGS WITHIN THE SITE OF WORKS.
15. ALL REASONABLE AND PRACTICABLE MEASURES MUST BE TAKEN TO PREVENT ROAD PAVEMENT MATERIALS, CEMENT SLURRY, LOOSE AGGREGATE OR DEPOSITED SEDIMENT FROM ENTERING THE STORMWATER DRAINS.
16. SEDIMENT AND DEBRIS REMOVED FROM ROADS OR FROM CONTROLS AT GULLY PITS MUST BE PLACED IN A CONTROLLED AREA FOR READY FOR DISPOSAL.
17. ONCE FINAL TRIMMING AND RESPREADING OF TOPSOIL TO VERGES IS COMPLETED, TURF IS TO BE PLACED FOR THE FULL WIDTH FROM PROPERTY BOUNDARY TO BACK OF KERB WHERE NOT FRONTING HOUSE CONSTRUCTION.
18. SEDIMENT CONTROL DEVICES THAT ARE REQUIRED TO BE REMOVED TO ALLOW CONSTRUCTION ACCESS, ARE TO BE REINSTATED AT THE COMPLETION OF EACH DAY'S WORK.
19. ALL MATERIAL EXCAVATED FROM THE SITE IS TO BE TESTED AND TREATED FOR POTENTIAL ACID SULPHATE CONDITIONS. THE PERMISSIBLE pH LOWER LIMIT IS TO BE NOT LESS THAN 5.5.

CONSTRUCTION PHASE

1. ALL REASONABLE AND PRACTICABLE EFFORTS MUST BE TAKEN TO MINIMISE THE REMOVAL OR DISTURBANCE OF TREES, SHRUBS AND PARTICULARLY GROUND COVERS ON THE SITE DURING LAND DISTURBING ACTIVITIES.
2. CLEARING OF VEGETATION IS NOT TO BE UNDERTAKEN UNLESS PRECEDED OR ACCOMPANIED BY INSTALLATION OF ADEQUATE RUNOFF DIVERSION AND SEDIMENT CONTROL MEASURES.

GENERAL NOTES

1. ATTENTION IS DRAWN TO THE FOLLOWING ACTS OF LEGISLATION RELEVANT TO THE ENVIRONMENTAL MANAGEMENT OF THE WORKS.
 - ENVIRONMENTAL PROTECTION ACT 1994
 - ENVIRONMENTAL PROTECTION (WATER) POLICY 1997
 2. THE CONTRACTOR IS TO PREPARE AN ENVIRONMENTAL MANAGEMENT PLAN TO ADDRESS EROSION AND SEDIMENT CONTROL, VEGETATION PROTECTION, NOISE AND DUST CONTROL. THIS MUST BE SUBMITTED TO THE SUPERINTENDENT PRIOR TO COMMENCEMENT OF WORKS. THE NOTES ON THIS PLAN ARE TO BE USED AS A GUIDE FOR THE CONTRACTORS ENVIRONMENTAL MANAGEMENT PLAN.
- VEGETATION PROTECTION
3. VEGETATION PROTECTION ORDERS ON THE SITE OR ADJACENT TO THE SITE MUST BE OBSERVED AT ALL TIMES.
 4. CAREFUL ATTENTION IS TO BE GIVEN TO VEGETATION THAT IS IDENTIFIED TO REMAIN. THESE AREAS ARE TO BE FENCED OR CLEARLY MARKED.
 5. THE PARKING OF MACHINERY AND STORAGE OF MATERIALS NEAR AREAS OF VEGETATION TO BE RETAINED IS PROHIBITED.
- NOISE
6. ALL PLANT AND EQUIPMENT SHALL BE CONTROLLED TO MINIMISE NOISE EMISSION IN ACCORDANCE WITH AS2436 (GUIDE TO NOISE CONTROL ON CONSTRUCTION, MAINTENANCE AND DEMOLITION). THE SITE WORKING HOURS TO BE:
 - MONDAY - SATURDAY 7.00am - 6.00pm
 - SUNDAY OR PUBLIC HOLIDAYS - NO WORK PERMITTED
- DUST
7. NO VISIBLE DUST EMISSIONS, AND OTHER AIR EMISSIONS INCLUDING ODOURS MUST OCCUR THE BOUNDARIES OF THE SITE DURING EARTHWORKS AND CONSTRUCTION ACTIVITIES ON THE SITE.
 8. NO VISIBLE DUST EMISSIONS, AND OTHER AIR EMISSIONS INCLUDING ODOURS MUST OCCUR THE BOUNDARIES OF THE SITE DURING EARTHWORKS AND CONSTRUCTION ACTIVITIES ON THE SITE.
- THE CONTRACTOR SHALL ENSURE A WATER TRUCK IS AVAILABLE AS REQUIRED TO MITIGATE THE DUST EMISSIONS GENERATED BY CONSTRUCTION TRAFFIC.
- LITTER/DEBRIS
9. THE CONTRACTOR IS TO ENSURE THAT ALL LITTER AND DEBRIS INTRODUCED TO THE SITE IS COLLECTED DAILY AND DISPOSED IN A SKIP OR SIMILAR CONTAINER FOR REMOVAL FROM SITE.

SOIL TESTING AND SAMPLING DETAILS
- DESIGN BASED ON DISTURBED AREAS OF CONSTRUCTION TO BE PREDDOMANATELY (SILTY CLAYS - CH)
CONSERVATIVE ASSUMPTION = 33% FINER THAN 0.075mm

BAŞIN TYPE SELECTION

- ADOPT TYPE 'F' BASIN
BASIN DESIGN FORMULA
SETTLING ZONE VOLUME $V_s = 400 \times C_v \times A$
SEDIMENT STORAGE VOLUME $V_{ss} = 0.5 \times V_s$

SEDIMENT BASIN DESIGN CALCULATIONS

	SB1	SB2	SB3
CONTRIBUTING CATCHMENT AREA =			
SETTLING ZONE VOLUME REQUIRED (V _s) =			
SEDIMENT STORAGE VOLUME REQUIRED (V _{ss}) =	TBC	TBC	TBC
TOTAL STORAGE VOLUME REQUIRED (V _{ssl}) =			
ACTUAL VOLUMES			
SETTLING DEPTH			
SEDIMENT STORAGE DEPTH			
BASE AREA			

PRE CONSTRUCTION WORKS

- 1 SITE MEETING TO BE HELD WITH SUPERINTENDENT PRIOR TO COMMENCEMENT OF EROSION AND SEDIMENT CONTROL WORKS.
- 2 EMERSON CLASS SOIL TESTS TO BE CARRIED OUT TO DETERMINE IF SITE IS SUBJECT TO DISPERSIVE SOILS. RESULTS TO BE FORWARDED TO THE SUPERINTENDENT AND THE L.C.C.

CLEARING AND STRIPPING PHASE

- 3 IDENTIFY AREAS OF SITE TO BE CLEARED PAYING CAREFUL ATTENTION TO VEGETATION TO BE RETAINED
- 4 INSPECT SITE WITH SUPERINTENDANT TO DETERMINE ACCESS LOCATION TO SITE
- 5 INSTALL CONSTRUCTION ENTRY/EXIT SHAKEDOWN DEVICE
- 6 CONSTRUCT TEMPORARY SEDIMENT BASINS S82 AND S83 BASINS TO BE DETERMINED FOLLOWING STORM EVENTS AS PER BASIN DETERMINATION PROCEDURE
- 7 CONSTRUCT CUT OF DRAINS AND INSTALL ROCK CHECK DAMS AT MAX 20m SPACING
- 8 INSTALL SEDIMENT FENCE DOWNSTREAM OF CLEARING WORK ZONE
- 9 UNDERTAKE SELECTIVE CLEARING, MULCH MATERIAL AND STOCKPILE AS DIRECTED
- 10 UNDERTAKE STRIPPING OF TOPSOIL MATERIAL AND STOCKPILE AS DIRECTED

BULK EARTHWORKS PHASE

11. EXISTING STOCKPILE ON SITE TO BE REMOVED.
12. COMMENCE FILLING AND EARTHWORKS.
13. INSTALL SEDIMENT FENCES TO TOE OF BATTER FOLLOWING PROGRESSIVE EARTHWORKS COMPLETION
14. ENSURE RUNOFF FROM PAVEMENT BOX IS DIRECTED TO TEMPORARY SEDIMENT BASINS
15. RESPREAD TOPSOIL TO ALLOTMENTS AND COMMENCE GRASS SEEDING OR APPLY HYDROMULCH, IN ACCORDANCE WITH L.C.C. STANDARDS
16. STABILISATION OF CATCHMENT REQUIRED PRIOR TO TESTING, TREATING, Dewatering and FILLING OF BASINS SBI AND S SUPERINTENDENT TO CONFIRM MINIMUM GROUND COVER HAS BEEN ACHIEVED IN ACCORDANCE WITH L.C.C. STANDARDS PRIOR TO BASIN DECOMMISSIONING

OPERATIONAL WORKS PHASE

- 17 PROVIDE ADEQUATE PROTECTION TO STORMWATER NETWORK
- 18 TURF FULL WIDTH OF VERGES.
- 19 INSTALL SEDIMENT FENCE IMMEDIATELY BEHIND BACK OF KERB FRONTING CONSTRUCTION SITES

WATER QUALITY MONITORING

WATER QUALITY SAMPLES ARE TO BE TAKEN AND TESTED
PRIOR TO RELEASING OF ANY WATER FROM THE BASINS

WATER QUALITY OBJECTIVES.

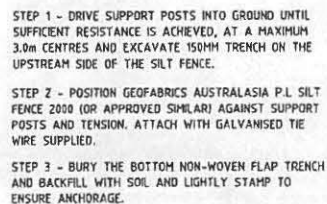
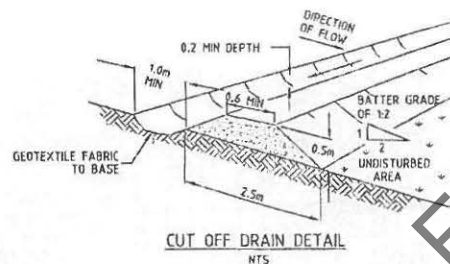
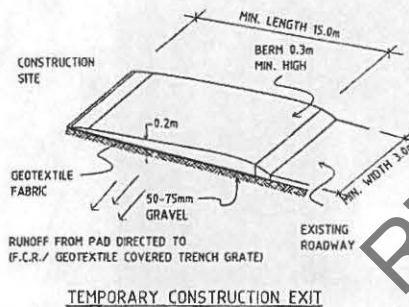
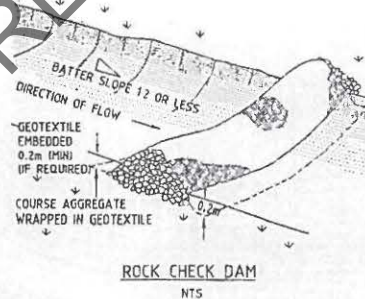
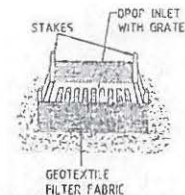
SUSPENDED SOLIDS (TSS) = 50mg/L
pH BETWEEN 6.5 AND 8.5 AT ALL TIMES

[illegible]

CLIENT GREYHOUNDS QUEENSLAND			
PROJECT LOGAN GREYHOUND FACILITY			
DESIGN ASA	DRAFTING CHECK HASY	REVISIONS PROJECT MANAGER MM	APPROVED PROJECT DIRECTOR JEE
DESIGNED HXY	DESIGN REVIEW MEL		

FIGURE E6
EROSION AND SEDIMENT CONTROL
TYPICAL NOTES

SCALE 1/8"=1'	PROJECT NO. QB10035	DRAWING NO. E'IGE6	DATE A
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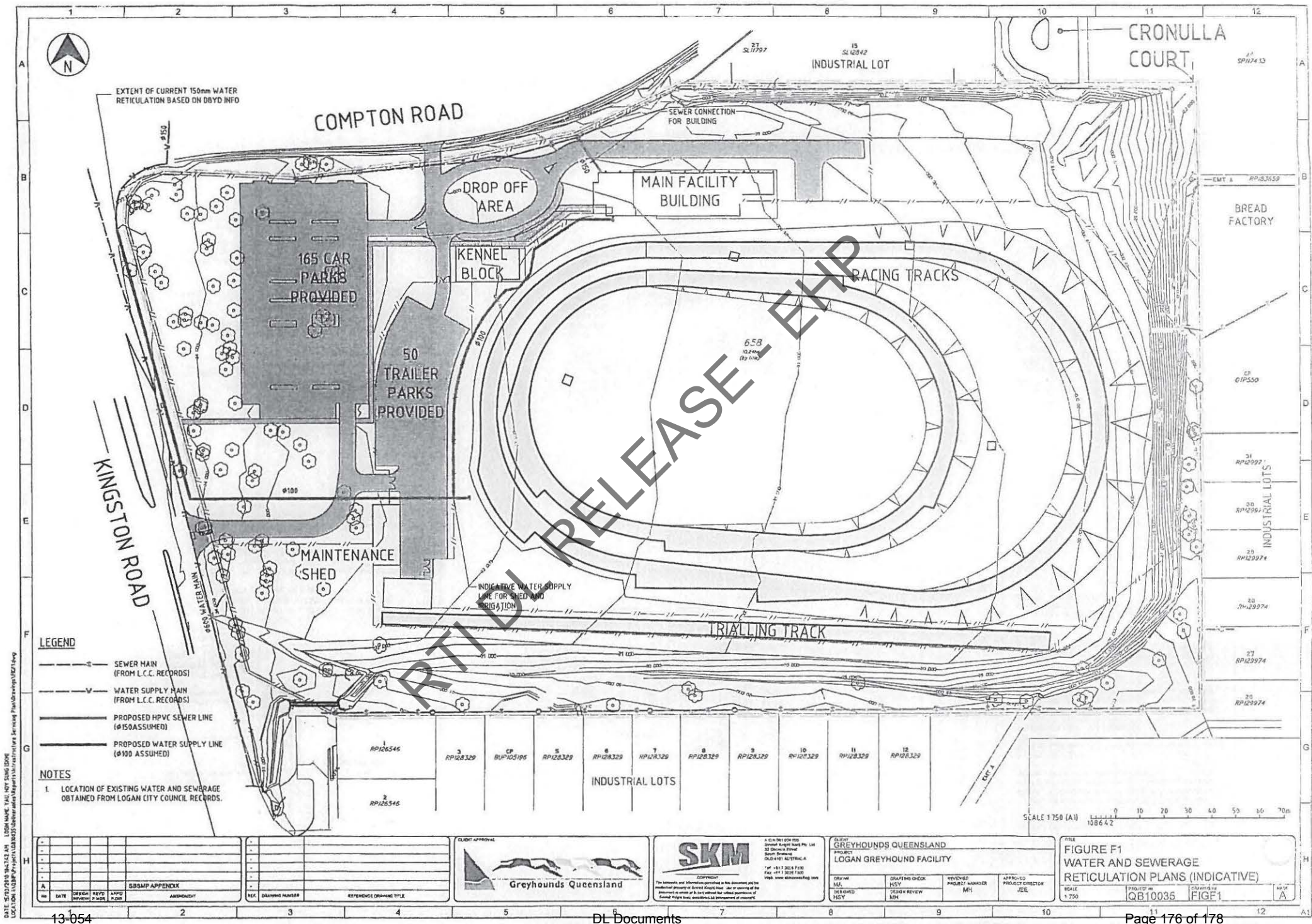
GEOTEXTILE FILTER FABRIC DROP INLET
SEDIMENT TRAP
NTS

- ## SEDIMENT BASIN NOTES
1. ALL SEDIMENT CONTROL DEVICES (ISILT FENCES, SPILLWAYS, ROCK CHECK DAMS) TO BE CHECKED AFTER ALL MAJOR RAINFALL EVENTS AND RECTIFIED AS NECESSARY.
 2. IF SEDIMENT WATER IS SHOWN TO HAVE SUSPENDED SOLIDS $> 50\text{mg/L}$ THEN THE USE OF FLOCCULANTS IS TO BE APPLIED AS DIRECTED BY SUPERINTENDENT PRIOR TO THE BASIN BEING DRAINED BY PUMPING OR SIPHONING. FOLLOWING THE PASSING OF THE FIELD TEST ON THE RETAINED RUNOFF.
- THE FIELD TEST IS:-
- FILL A CLEAR 945mm SOFT DRINK BOTTLE WITH BASIN WATER IF YOU CANNOT SEE CLEARLY THROUGH THE SAMPLE, THEN FLOCCULANTS NEED TO BE APPLIED
- THE PH OF THE WATER MUST BE IN THE RANGE 6.5 TO 8.5 PRIOR TO DISCHARGE IF THE RESULTS ARE OUTSIDE THESE LIMITS THE SUPERINTENDENT IS TO BE NOTIFIED AND HE WILL ADVISE ON TREATMENT.
3. INLET Baffle WITH $\phi 100\text{mm}$ POSTS AT MAXIMUM 1000mm CENTRES SET 800mm DEEP WITH SEDIMENT FENCE FABRIC WITH 50mm HOLES CUT AT 300mm CENTRES TO BE CONSTRUCTED DIRECTLY DOWNSTREAM OF INLET STRUCTURE.
 4. SEDIMENT BASINS TO BE INSPECTED AT LEAST ONCE EVERY WEEK AND DE-SILTED AFTER EACH MAJOR STORM EVENT OR AS DIRECTED BY SUPERINTENDENT.

[illegible]

CLIENT GREYHOUNDS QUEENSLAND			
PROJECT LOGAN GREYHOUND FACILITY			
ISSUING BAA	DRAFTING CHECK HSY	REVIEWED PROJECT MANAGER NM	APPROVED PROJECT DIRECTOR JEE
DESIGNED HSY	DESIGN REVIEW NM		

FIGURE E7 EROSION AND SEDIMENT CONTROL TYPICAL DETAILS			
SCALE AS SHOWN	PROJECT NO. OB10035	DRAWING NO. FIGE7	DATE



49-Sch4 - Business affairs

System	Light	Light Type	Light	Light Type
1	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood
2	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood
3	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood
4	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood
5	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood
6	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood
7	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood
8	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood
9	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood	SLA R2 2000W Flood

Tower Locations & Luminaire Aiming

Luminaire Details

Total Quantity
194 x SLA R2 Maxi 2000W floods
(85 with glare shield)

- > Lighting Tower 1 - 37 floods
- > Lighting Tower 2 - 35 floods
- > Lighting Tower 3 - 11 floods
- > Lighting Tower 4 - 25 floods
- > Lighting Tower 5 - 27 floods
- > Lighting Tower 6 - 27 floods
- > Lighting Tower 7 - 9 floods
- > Lighting Tower 8 - 14 floods
- > Lighting Tower 9 - 9 floods

Design Notes

- For further calculations and/or for installation aiming details please consult your SLA representative.
- A maintenance factor of 0.8 has been applied to all luminaires.
- A maintenance policy should be adopted to support the maintenance factor of 0.8.
- M.H.=30m & 20m. Indicates height above the playing surface to the top crossarm.
- There have been no obstructions such as trees, fences or buildings included in this lighting calculation.

SLA Concord
SYLVANIA
Where Innovation comes to Light!

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A.B.N. 81 000 534 243

DATE
18/02/2010

DESIGNER
J.H.

JOB No.
Q0785

Lighting Engineering and Design PROJECT

Logan Greyhound Facility, QLD
Floodlighting Proposal for Colour Television
1000 lux Ev average to Main Camera

Q0785 9 Pole - Tower Locations.AGI

This printout is provided as a user service. Results, shown herein, are subject to practical tolerances associated with photometric measurement, site dimensional variations, aiming accuracy and control gear / lamp characteristics. Results, therefore, should only be used as a design guide / evaluation aid. Individual point values are not guaranteed. Subject to dimensional accuracy, average values will be within +/- 10 percent. For contractual project situations, refer to details in SLA commercial offer/quotation. Renderings are generated using diffuse (mat) surfaces and user defined reflectances and colours. These will influence the visual appearance of the illuminated surfaces. Therefore any rendering shown can only be taken as an indication of how the area might visually appear.

0 25 50 75 100
METRES

DATE
18/02/2010

DESIGNER
J.H.

JOB No.
Q0785

Lighting Engineering and Design PROJECT

Logan Greyhound Facility, QLD
Floodlighting Proposal for Colour Television
1000 lux Ev average to Main Camera

Q0785 9 Pole Outer Track Eh AGI

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0 25 50 75 100
METRES

Item	Qty	Unit	Price	Total	Notes
Outer Track Floods at 1000lux	194	SLA R2 Maxi 2000W Floods	1,500	291,000	
Inner Track Floods at 1000lux	85	SLA R2 Maxi 2000W Floods	1,500	127,500	
Total	279			418,500	

Item	Qty	Unit	Price	Total	Notes
Lighting Tower 1	1	SLA R2 Maxi 2000W Floods	1,500	1,500	
Lighting Tower 2	1	SLA R2 Maxi 2000W Floods	1,500	1,500	
Lighting Tower 3	1	SLA R2 Maxi 2000W Floods	1,500	1,500	
Lighting Tower 4	1	SLA R2 Maxi 2000W Floods	1,500	1,500	
Lighting Tower 5	1	SLA R2 Maxi 2000W Floods	1,500	1,500	
Lighting Tower 6	1	SLA R2 Maxi 2000W Floods	1,500	1,500	
Lighting Tower 7	1	SLA R2 Maxi 2000W Floods	1,500	1,500	
Lighting Tower 8	1	SLA R2 Maxi 2000W Floods	1,500	1,500	
Lighting Tower 9	1	SLA R2 Maxi 2000W Floods	1,500	1,500	
Total	9			13,500	

49-Sch4 - Business affairs

Illuminance Switching -> Outer Track - Ehorizontal

Luminaire Details

Total Quantity
194 x SLA R2 Maxi 2000W floods
(85 with glare shield)

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- > Lighting Tower 2 - 35 floods
- > Lighting Tower 3 - 11 floods
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Design Notes

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A maintenance factor of 0.8 has been applied to all luminaires.
A maintenance policy should be adopted to support the maintenance factor of 0.8.

MH = 30m & 20m indicates height above the playing surface to the top crossarm.

There have been no obstructions such as trees, fences or buildings included in this lighting calculation.