Queensland Government

Our ref 517/00029
Your ref
Enquiries Bryce Llewellyn

Department of
Transport and Main Roads

TRAFFIC SIGNAL SEQUENCE REPORT

Introduction

This Traffic Sequence Report has been prepared for the intersection of Lower King Street and Bruce Highway, Caboolture on the 24th November 2013.

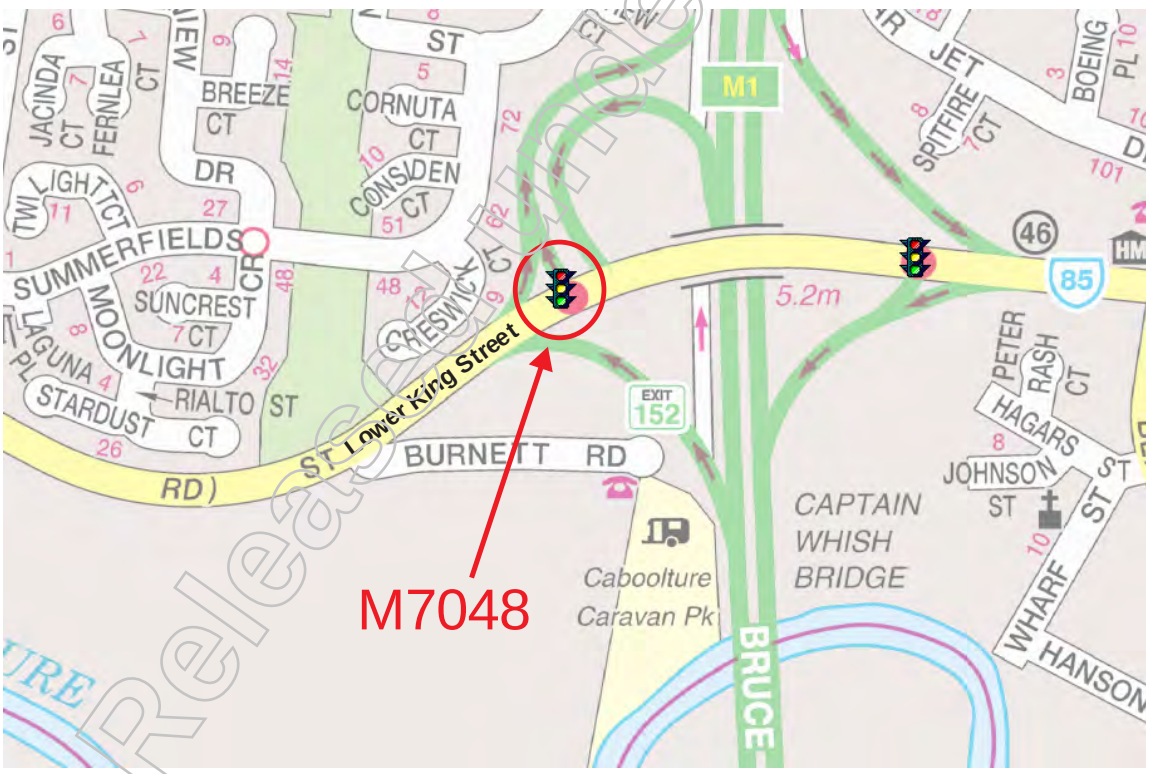
The purpose of this report is to explain the operation of the traffic signals, provide the critical signal timing data and identify any faults that may have occurred with the signal operation for the time requested.

TMR Intersection Identification Number

M7048

Traffic Signal Location

Intersection of Lower King Street and Bruce Highway, Caboolture.



Program Delivery & Operations
North Coast District / Maroochydore Office
PO Box 1600
Maroochydore Qld 4558

Telephone **+61 7 5451 7055**
Facsimile +61 7 5451 7098
Website www.tmr.qld.gov.au
Email **northcoast@tmr.qld.gov.au**
ABN 39 407 690 291

Aerial Photography Image

No image has been provided as the intersection configuration has changed since the 24th November 2013.

Traffic Signal Operation

The basic objective of the use of signal control is the time separation of conflicting traffic movements to ensure safe operation of the intersection.

Within the traffic signal controller, traffic movements are associated with 'signal groups' (groups of signals that are connected on the same electrical circuit so that they always show the same display). These signal groups are allocated to phases (unique groups of traffic movements; see definition **below**). This grouping of movements and allocation to phases, or design of the signal phasing, should result in safe and efficient control of the specific intersection layout with the traffic volumes being considered.

The signal phasing, together with other data defining the operation of an intersection, is called the 'controller personality'. This data is 'burnt' onto an erasable reprogrammable read only memory module (EPROM) which must be plugged into a 'slot' in the controller central processor unit for the controller to operate.

Traffic signals can operate independently (isolated mode) or coordinated with adjacent signalised intersections operating on a common cycle time.

Isolated Mode

When operating in the isolated mode, the signals are operating in isolation from any other adjacent traffic signals and do not operate on set phase times. The phases operate in vehicle actuation mode whereby they are called when the vehicle detectors register occupancy.

Vehicle detectors are loops of wire buried in the pavement connected to a sensor unit housed in a roadside cabinet. The inductance of the loop changes when metal is present above the loop and this change is used to detect the vehicles. If a vehicle is sitting on the detector for 2 seconds, it then registers that there is a demand for the appropriate phase.

The intersection will remain in Phase A until a demand is registered on the loop detectors for any other phase. If a demand for another phase occurs, the signals will change through the phase sequence to the demanded phase/s either after a three second gap is registered in the demand for A Phase or when A Phase reaches its maximum green time, whichever comes first.

Coordinated Mode

In order to coordinate a route of signalised intersections, all the intersections within the route will operate on a common cycle time. The timing of the signals is controlled by various 'time of day' plans according to the expected traffic conditions throughout the day. Each phase in the cycle within each plan is allocated set duration times. These phase duration times vary dependant on pre-set criteria such as phase release settings and pedestrian frequency.

The amber, red and minimum green time settings "Critical Phase Time Settings" (Table 3) will always apply to any phase when called in the coordinated mode.

Intersection Operation at Time of the Incident

Due to the intersection has been modified, operational system records no longer exist for the 24th November 2013.

There were no faults recorded on the 24th November 2013.

Note: The intersection traffic signal controller incorporates protection that will not allow green lanterns to be displayed to conflicting traffic movements at any time. The traffic lights are designed to automatically switch off within 100 milliseconds if this occurs.

Intersection Signal Phasing

On the 24th November 2013 traffic movements at this intersection were controlled by 3 traffic phases as shown **below**, see attached M7048_BruceHwyNBRamps&Cab-BribieIsland 406726F.pdf for more detail.

Phases are broken into Signal Groups (SG) or aspects as shown by the numbered arrows in phase diagram **below**.

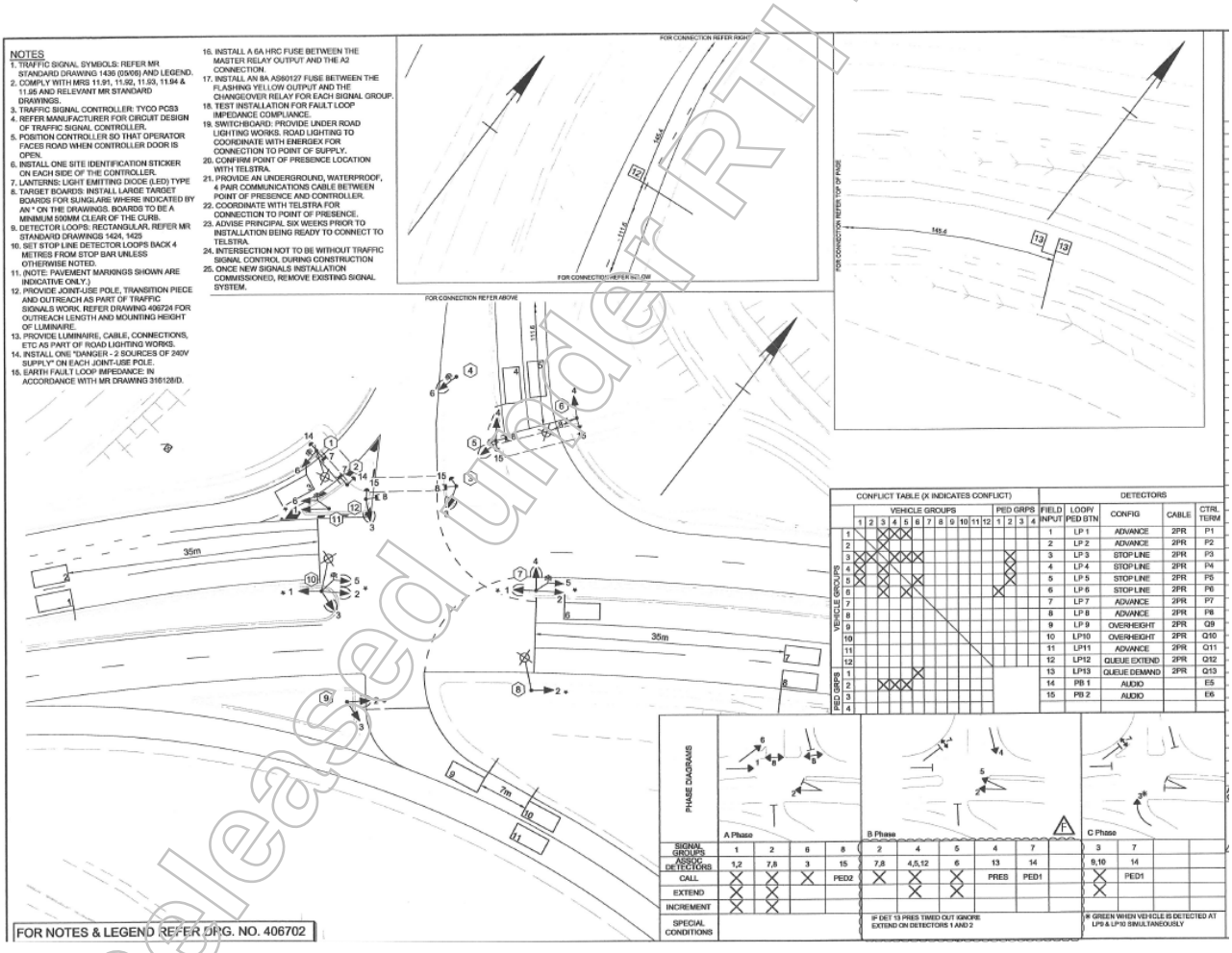


Diagram 1 – Traffic Signal Plan for M7048 Lower King Street and Bruce Highway

Intersection Signal Phasing

On the 24th November 2013 traffic movements at intersection M7048 were controlled by 3 traffic phases.

Table 1 sets out the traffic lights or aspects displayed to traffic on each approach. For this report; Lower King Street is identified as the east / west approach and Bruce Highway is referred to as the south / north approach.

Aspects have been labelled below with the Signal Group (SG) to correspond with the Intersection Phasing Diagram in Diagram 1

Note: This report cannot specifically identify which traffic lights or aspects were being displayed at the exact time of the incident as the precise time cannot be identified.

Table 1 – Aspect Display for M7048

Phase	Traffic Light / Aspect Displayed to Traffic			
	West Approach Lower King Street	**East Approach Lower King Street**	**South Approach Bruce Highway**	**North Approach Bruce Highway**
A	 SG6 SG1	 SG2 SG5	 SG3	 SG4
B	 SG6 SG1	 SG2 SG5	 SG3	 SG4
C	 SG6 SG1	 SG2 SG5	 SG3	 SG4

Table 2 sets out the traffic lights or aspects displayed to pedestrians on each approach for each phase. **Note:** Pedestrian lanterns (aspects) only illuminate during the phase if demanded via push button.

Table 2 – Pedestrian Display for M7048

Phase	Traffic Light / Aspect displayed to Pedestrians crossing	
	West Approach Lower King Street	**North Approach Bruce Highway**
A	SG7 (PED1) 	SG8 (PED2) 
B	SG7 (PED1) 	SG8 (PED2) 
C	SG7 (PED1) 	SG8 (PED2) 

Table 2 – Pedestrian Display for M7048

Critical Phase Time Settings

Due to the intersection has been modified critical phase time settings no longer exist for the 24th November 2013.

Prepared by:

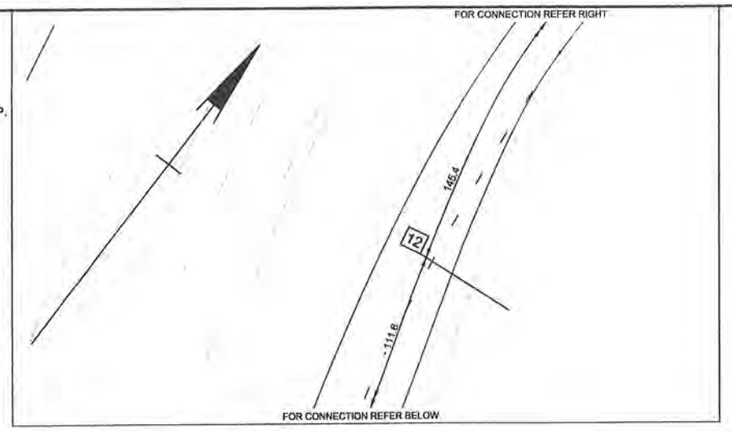
Document Prepared: 6th November 2017

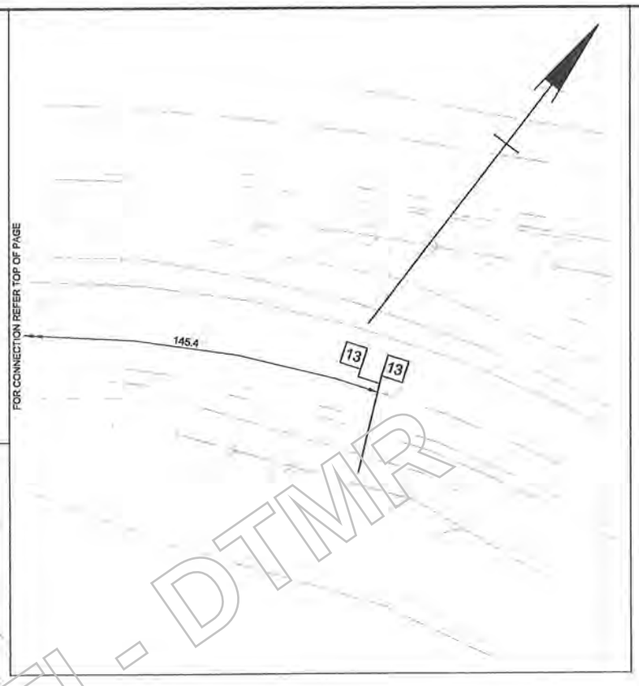
Bryce Llewellyn - A Principal Engineer (Traffic)

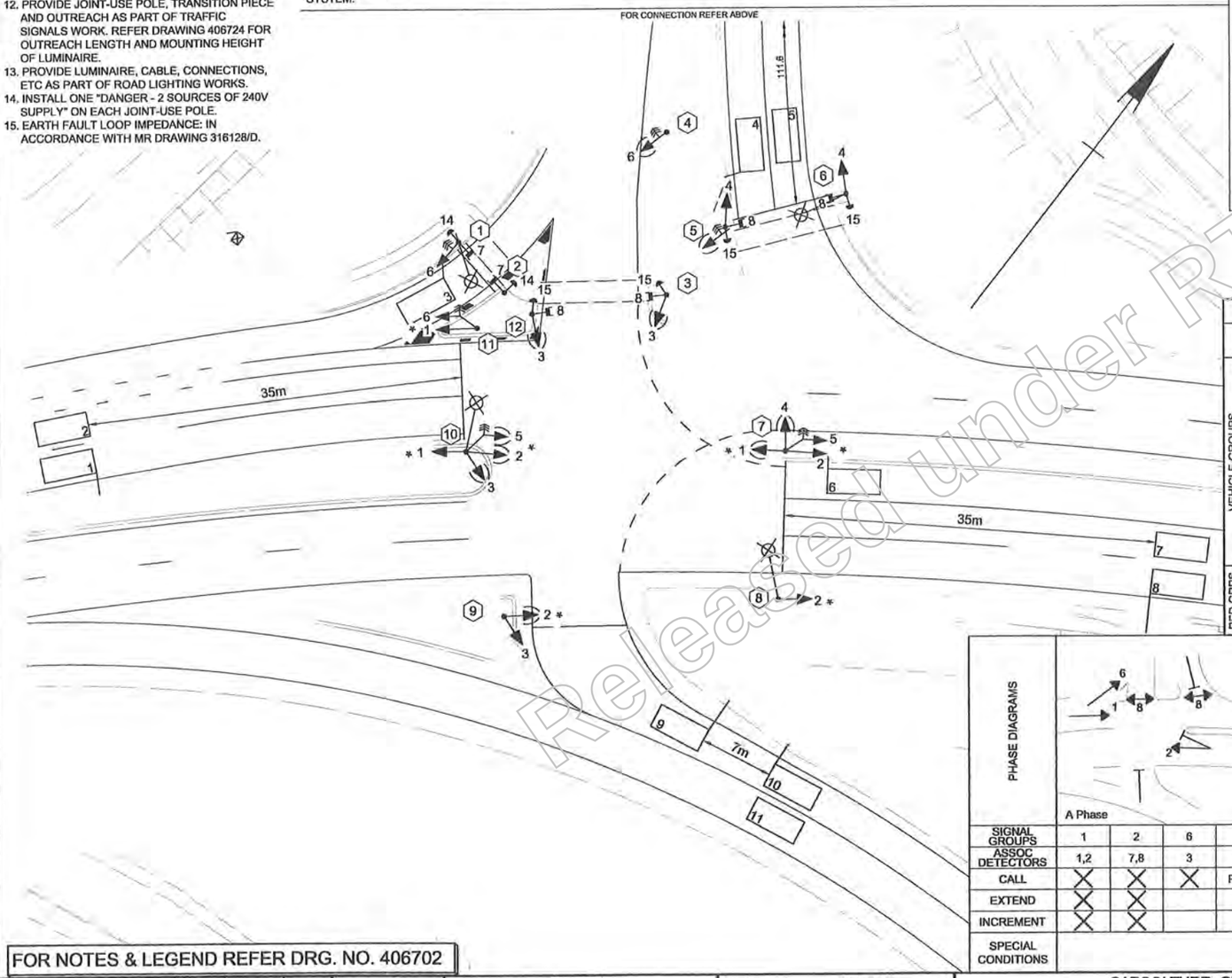
Program Delivery & Operations
North Coast District / Maroochydore Office
PO Box 1600
Maroochydore Qld 4558

NOTES

1. TRAFFIC SIGNAL SYMBOLS: REFER MR STANDARD DRAWING 1436 (05/06) AND LEGEND.
2. COMPLY WITH MRS 11.91, 11.92, 11.93, 11.94 & 11.95 AND RELEVANT MR STANDARD DRAWINGS.
3. TRAFFIC SIGNAL CONTROLLER: TYCO PCS3
4. REFER MANUFACTURER FOR CIRCUIT DESIGN OF TRAFFIC SIGNAL CONTROLLER.
5. POSITION CONTROLLER SO THAT OPERATOR FACES ROAD WHEN CONTROLLER DOOR IS OPEN.
6. INSTALL ONE SITE IDENTIFICATION STICKER ON EACH SIDE OF THE CONTROLLER.
7. LANTERNS: LIGHT EMITTING DIODE (LED) TYPE
8. TARGET BOARDS: INSTALL LARGE TARGET BOARDS FOR SUNGLARE WHERE INDICATED BY AN * ON THE DRAWINGS. BOARDS TO BE A MINIMUM 500MM CLEAR OF THE CURB.
9. DETECTOR LOOPS: RECTANGULAR. REFER MR STANDARD DRAWINGS 1424, 1425
10. SET STOP LINE DETECTOR LOOPS BACK 4 METRES FROM STOP BAR UNLESS OTHERWISE NOTED.
11. (NOTE: PAVEMENT MARKINGS SHOWN ARE INDICATIVE ONLY.)
12. PROVIDE JOINT-USE POLE, TRANSITION PIECE AND OUTREACH AS PART OF TRAFFIC SIGNALS WORK. REFER DRAWING 406724 FOR OUTREACH LENGTH AND MOUNTING HEIGHT OF LUMINAIRE.
13. PROVIDE LUMINAIRE, CABLE, CONNECTIONS, ETC AS PART OF ROAD LIGHTING WORKS.
14. INSTALL ONE "DANGER - 2 SOURCES OF 240V SUPPLY" ON EACH JOINT-USE POLE.
15. EARTH FAULT LOOP IMPEDANCE: IN ACCORDANCE WITH MR DRAWING 316128/D.
16. INSTALL A 6A HRC FUSE BETWEEN THE MASTER RELAY OUTPUT AND THE A2 CONNECTION.
17. INSTALL AN 8A AS60127 FUSE BETWEEN THE FLASHING YELLOW OUTPUT AND THE CHANGEOVER RELAY FOR EACH SIGNAL GROUP.
18. TEST INSTALLATION FOR FAULT LOOP IMPEDANCE COMPLIANCE.
19. SWITCHBOARD: PROVIDE UNDER ROAD LIGHTING WORKS. ROAD LIGHTING TO COORDINATE WITH ENERGEX FOR CONNECTION TO POINT OF SUPPLY.
20. CONFIRM POINT OF PRESENCE LOCATION WITH TELSTRA.
21. PROVIDE AN UNDERGROUND, WATERPROOF, 4 PAIR COMMUNICATIONS CABLE BETWEEN POINT OF PRESENCE AND CONTROLLER.
22. COORDINATE WITH TELSTRA FOR CONNECTION TO POINT OF PRESENCE.
23. ADVISE PRINCIPAL SIX WEEKS PRIOR TO INSTALLATION BEING READY TO CONNECT TO TELSTRA.
24. INTERSECTION NOT TO BE WITHOUT TRAFFIC SIGNAL CONTROL DURING CONSTRUCTION
25. ONCE NEW SIGNALS INSTALLATION COMMISSIONED, REMOVE EXISTING SIGNAL SYSTEM.







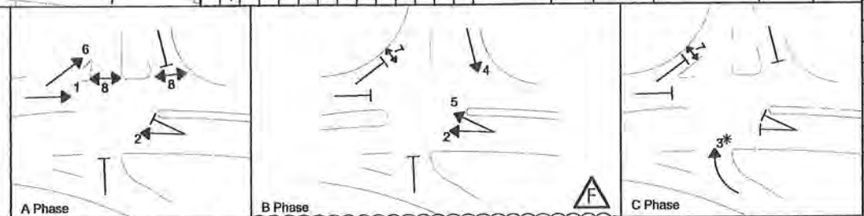
CONTROLLER TERMINALS	SIGNAL GROUP FUNCTION		RUN 1 CONNECTIONS FINAL TERMINALS	RUN 1 CONNECTIONS CONNECTS ⊠1 to 6 CORES USED	RUN 2 CONNECTIONS FINAL TERMINALS	RUN 2 CONNECTIONS CONNECTS ⊠12 to 7 CORES USED
A5	RED	1			1	1
A4	YELLOW	1			2	2
A3	GREEN	1			3	3
A8	RED	2			4	4
A7	YELLOW	2			5	5
A6	GREEN	2			6	6
A11	RED	3	7	7	7	7
A10	YELLOW	3	8	8	8	8
A9	GREEN	3	9	9	9	9
A14	RED	4	10	10	10	10
A13	YELLOW	4	11	11	11	11
A12	GREEN	4	12	12	12	12
B5	RED	5			13	13
B4	YELLOW	5			14	14
B3	GREEN	5			15	15
B8	RED	6	16	16	16	16
B7	YELLOW	6	17	17	17	17
B6	GREEN	6	18	18	18	18
B11	RED DW	7	19	19		
	PED	1				
B9	GREEN W	7	20	20		
B14	RED DW	8	21	21	21	21
	PED	2				
B12	GREEN W	8	22	22	22	22
C5	RED	9				
C4	YELLOW	9				
C3	GREEN	9				
C8	RED	10				
C7	YELLOW	10				
C6	GREEN	10				
C11	RED	11				
C10	YELLOW	11				
C9	GREEN	11				
C14	RED	12				
C13	YELLOW	12				
C12	GREEN	12				
A2	240V SUPPLY		26	26	26	26
E6	PED DET 15		24	24	24	24
E5	PED DET 14		25	25		
E3	DET COMMON		27	GY	27	GY
A1, B1, C1, D1,	NEUTRAL		NL	BK	NL	BK
	SPARE CORES			1-6 13-15 23		19-20 23 25
	CABLE SIZE			29		29

CONFLICT TABLE (X INDICATES CONFLICT)

	VEHICLE GROUPS 1	2	3	4	5	6	7	8	9	10	11	12	PED GRPS 1	2	3	4
VEHICLE GROUPS 1			X	X	X									X		
2			X	X	X									X		
3	X	X		X	X	X								X		
4	X	X	X		X	X								X		
5	X	X	X	X		X										
6			X	X	X								X			
7																
8																
9																
10																
11																
12																
PED GRPS 1					X											
2			X	X	X											
3																
4																

DETECTORS FIELD INPUT	LOOP/ PED BTN	CONFIG	CABLE	CTRL TERM
1	LP 1	ADVANCE	2PR	P1
2	LP 2	ADVANCE	2PR	P2
3	LP 3	STOP LINE	2PR	P3
4	LP 4	STOP LINE	2PR	P4
5	LP 5	STOP LINE	2PR	P5
6	LP 6	STOP LINE	2PR	P6
7	LP 7	ADVANCE	2PR	P7
8	LP 8	ADVANCE	2PR	P8
9	LP 9	OVERHEIGHT	2PR	Q9
10	LP10	OVERHEIGHT	2PR	Q10
11	LP11	ADVANCE	2PR	Q11
12	LP12	QUEUE EXTEND	2PR	Q12
13	LP13	QUEUE DEMAND	2PR	Q13
14	PB 1	AUDIO		E5
15	PB 2	AUDIO		E6

PHASE DIAGRAMS



	A Phase				B Phase						C Phase			
SIGNAL GROUPS	1	2	6	8	2	4	5	4	7		3	7		
ASSOC DETECTORS	1,2	7,8	3	15	7,8	4,5,12	6	13	14		9,10	14		
CALL	X	X	X	PED2	X	X	X	PRES	PED1		X	PED1		
EXTEND	X	X				X	X				X			
INCREMENT	X	X												
SPECIAL CONDITIONS					IF DET 13 PRES TIMED OUT IGNORE EXTEND ON DETECTORS 1 AND 2						* GREEN WHEN VEHICLE IS DETECTED AT LP9 & LP10 SIMULTANEOUSLY			

FOR NOTES & LEGEND REFER DRG. NO. 406702

Revisions		Certified	Date	Microfiled
F	Phasing Amended	SJ	9/12/08	
E	Loops & Signals Amended	BS	5/08/08	
D	Loop Spacing Increased	MK	12/02/08	
C	For Construction			

CAD FILES: j:\84000\84099\drawings\civil\drgs\ts01.dwg

Associated Job Nos

Auxiliary Drg Nos

Survey Data: Horiz. Datum; Azimuth Datum; Height Datum; Survey Books: S

Site Number M7048

Scales: 0 5 10 15m (1:250) Full Size A1

Dimensions shown in except where shown otherwise

CABOOLTURE SHIRE

BRUCE HIGHWAY (BRISBANE – GYMPIE)

CONTROL CHAINAGE: 350–450 (MCIO)

Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP
10A/5	0.102	6.126	4.752	10A/7

Through Chainage from

BRUCE HIGHWAY UPGRADE

BRIBIE ISLAND RD/ BRUCE HWY NORTHBOUND ON/OFF RAMPS INTERSECTION SHEET 1 OF 4

Drawing	Design	Design Review	Traffic Certification	Electrical Certification	Permission to use
JGN	JGN	Original by SJ	Original by Steve Jones 6/12/07	Original by Roy Everett 6/12/07	Original by SM 6/12/07
Checked RE	Verified RE	Date: 6/12/07	RPEQ No. 8549	RPEQ No. 5190	

Design Consultant: ARUP, Level 4 Mincom Central, 192 Ann Street, Brisbane, QLD, Australia, GPO Box 685, Brisbane, QLD 4001, Tel (07) 3023 6000 Fax (07) 3023 6023, www.arup.com

Drawing Number: 84099/TS01

Queensland Government Department of Main Roads

Job No.	140/U13C/58
Contract No.	NCHD–1998
Drawing No.	406726 F
Series Number	228 of 648
	MRT Detail (08/06)

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