

		ACTION	DATE
TO	1. SENIOR ENGINEER, CONTROLLER APPLICATIONS		
	2. COLBY MADILL, PROGRAM DELIVERY		
FROM	CAMERON TERRILL	DATE	16/07/21
SITE	CALDER HIGHWAY NR STATION STREET	SITE NO.	6243
REGION	NORTHERN	MUNICIPALITY	GREATER BENDIGO

GENERAL

Works Program Job?	Yes	Project Number	45POSBS
Classification	SIMPLE	Works Order Number	4A007704
Description	<input type="checkbox"/> New intersection signals <input checked="" type="checkbox"/> New pedestrian operated signals <input type="checkbox"/> Controller swap. Reason for swap		

CONTROLLER DETAILS

Type	ATSC 4	Software Version & Release	V6.2 R20	Lanterns	ELV LED
Number of Signal Groups	Vehicle	2	Pedestrians	1	Total 3
Number of special outputs / Pedestrian Wait State Outputs					
Controller capacity	4				
Number of detectors	Vehicle	4	Pedestrians	1	Total 5
	Tram		Other		

CONTROLLER APPLICATIONS

Target Date for Draft Opsheet	22 JULY 2021
Target Date for completion of Program	12 AUGUST 2021

Prepare Interlocking

PERSONALITY CHECKSUMS

	Hex	Octal
Total	87	207
Times	23	43
Pers	A4	244
Dispatched	30/07/21	

PROGRAM DELIVERY - SIGNAL INSTALLATION

If switch-on of a metro site is to occur without a Telstra line, seek approval of the T/L Signal Services

SCATS connection	Controller must be connected to SCATS at switch-on
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PRIOR NOTICE

A job must be entered into RAI Action database before this switch on will be allowed.

<input checked="" type="checkbox"/>	SCATS data changes - notify	CAMERON TERRILL	Ext	1210
	OR	NATHAN CORCORAN	Ext	1210
before 3:00pm on the day before switch on.				

SCATS Data Changes - Slot data and graphics

TRAFFIC MANAGEMENT CENTRE

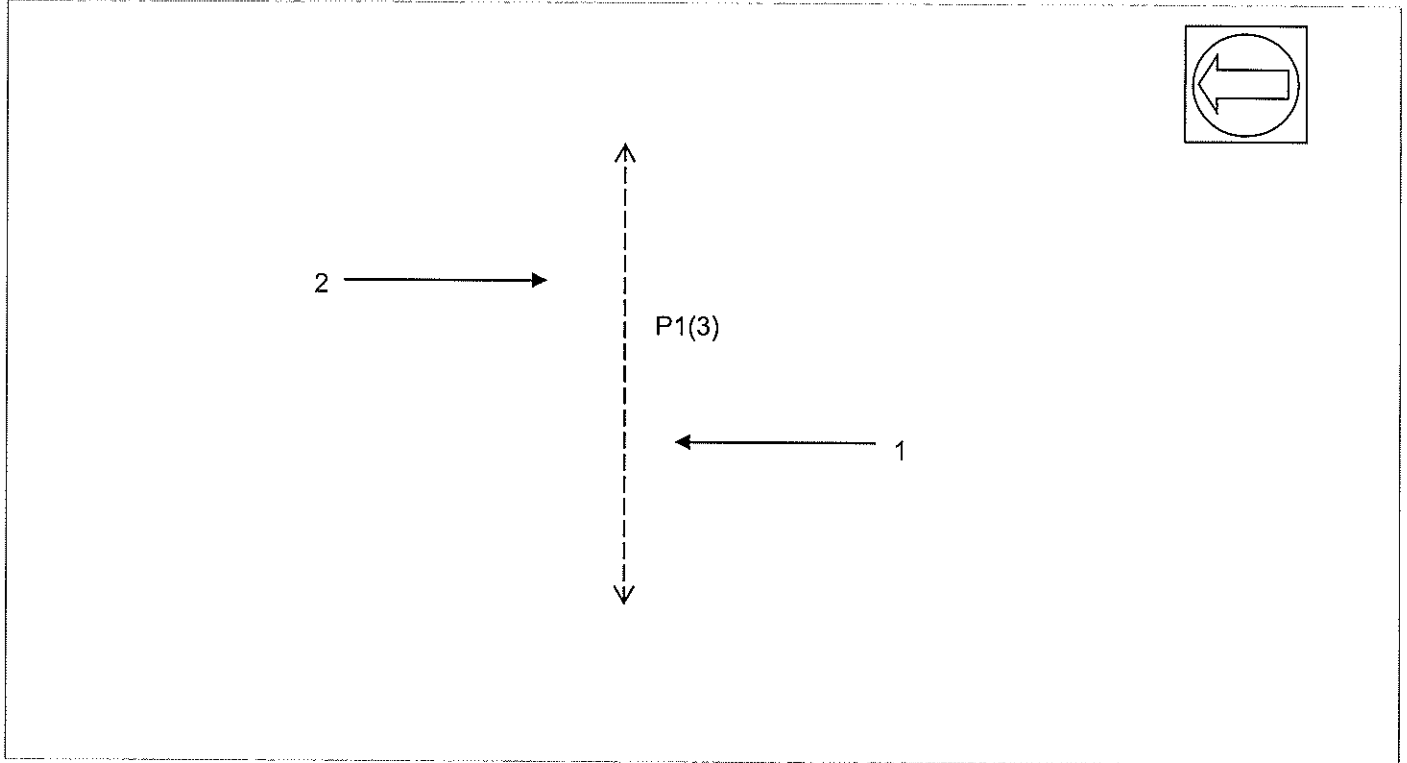
<input checked="" type="checkbox"/>	Please notify CAMERON TERRILL (x1210) on job completion.
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DATE OF NEW CONTROLLER SWITCH ON

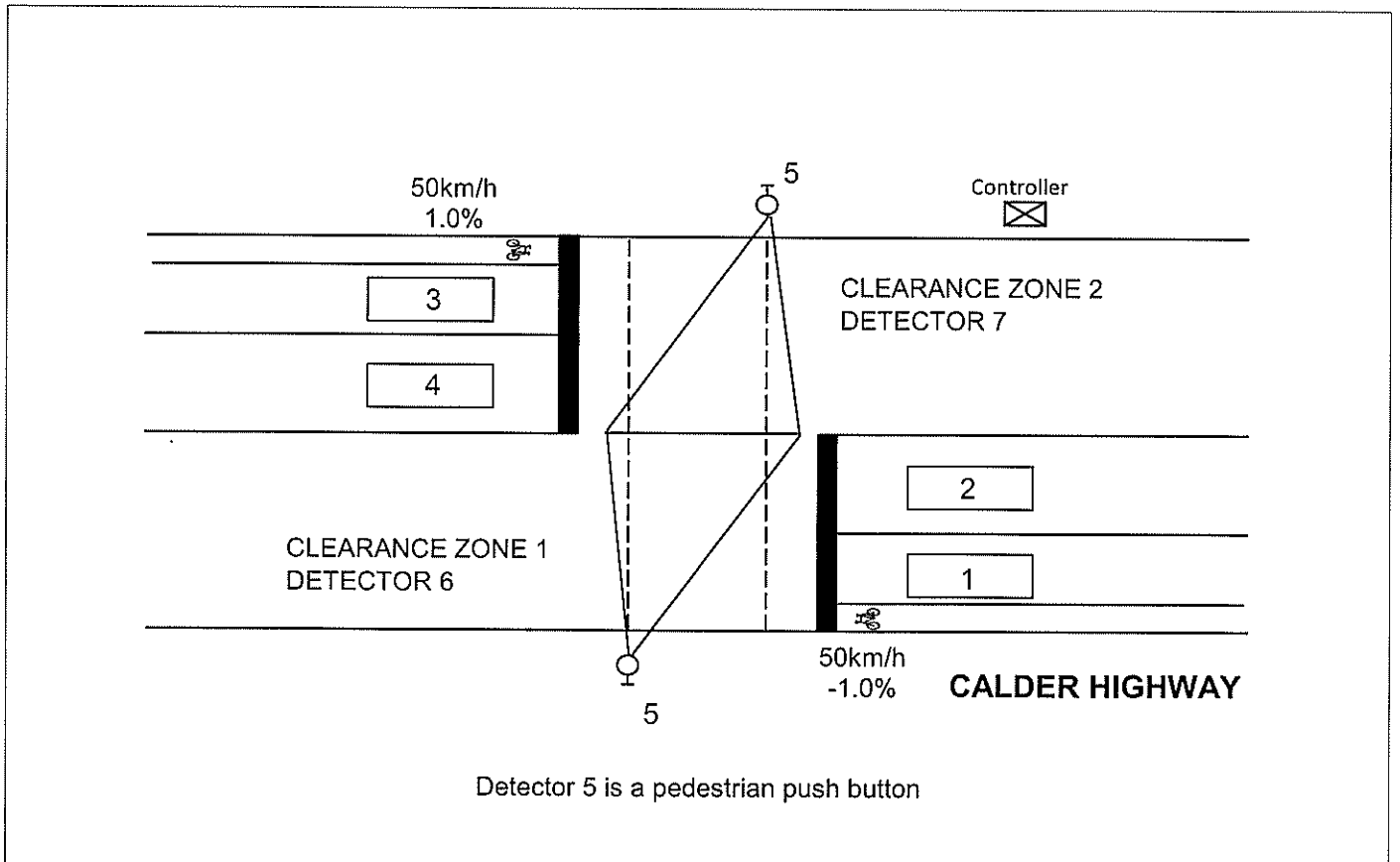
CONTROLLER OPERATION SPECIFICATION

SITE NAME	CALDER HIGHWAY NR STATION STREET		SITE NO.	6243
MUNICIPALITY	<u>GREATER BENDIGO</u>	DESIGNED BY	<u>CAMERON TERRILL</u>	DATE
PLAN NO.	<u>955343</u>	DESIGN CHECKED	<u>[Signature]</u>	DATE
CONTROLLER TYPE	<u>ATSC 4</u>	PROM CHECKED	<u>[Signature]</u>	DATE
				<u>30/07/21</u>

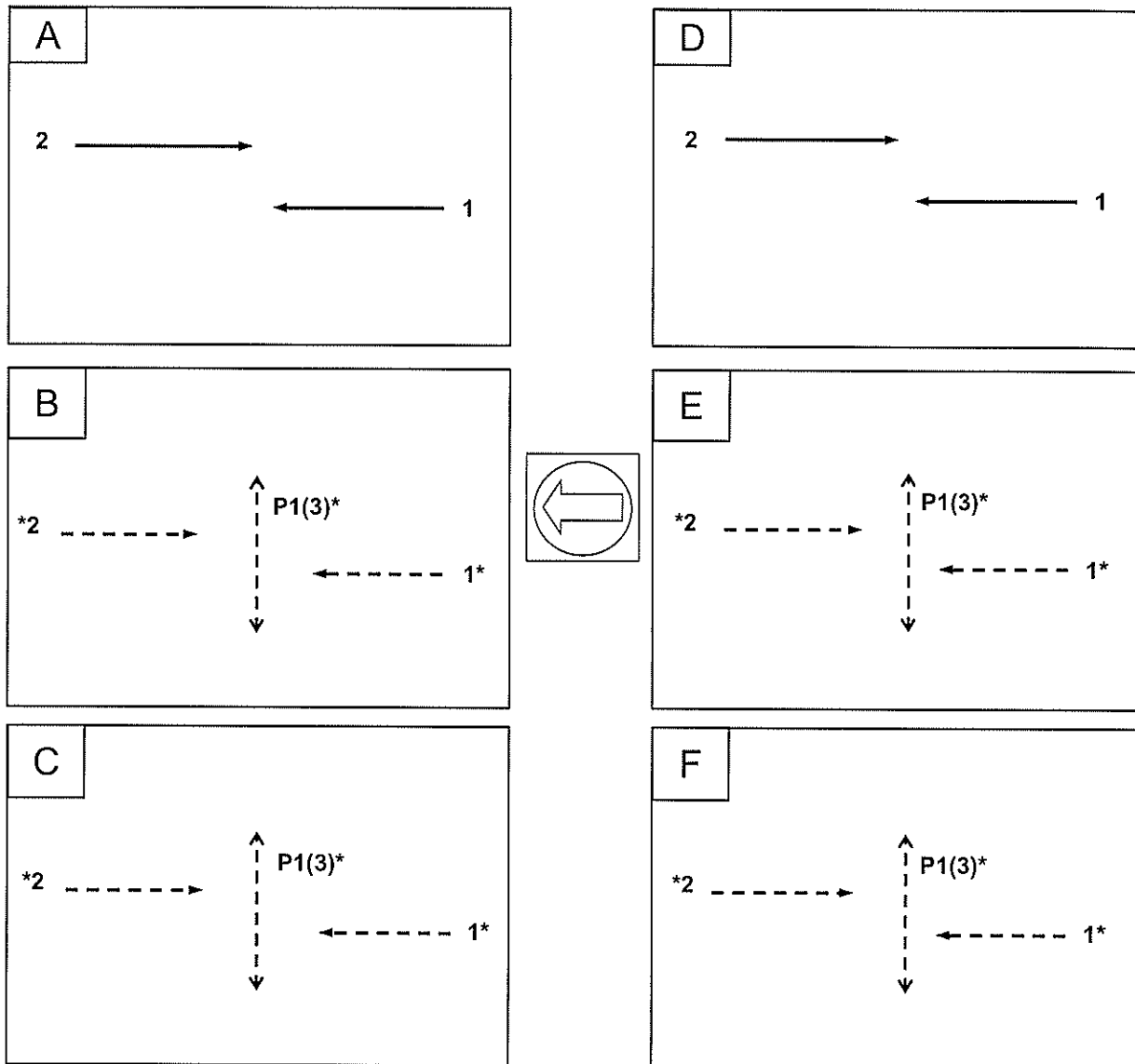
GROUP ALLOCATION



DETECTOR MAP



PHASING DIAGRAM



OPERATION IN LINK MODE

1. Signal groups are independent of phasing. All phases have a permanent demand in Masterlink & Flexilink
2. SG1 & SG2 cannot close down during AØ (refer note 6 below for the exception).
- * 3. SG1 & SG2 can close down at any time during BØ green, provided SG1 & SG2 minimum green has expired and both approaches gap or waste. If SG1 & SG2 close down at the end of BØ green (i.e. at the start of BØ yellow), P1 introduces at the start of CØ
- * 4. SG1 & SG2 cannot close down during CØ
5. Any ped demand placed during BØ intergreen or during CØ will not be serviced until the next cycle.
6. If BØ is left out of the sequence in Masterlink or Flexilink, SG1 & SG2 can close down at the start of AØ yellow and P1 introduces at the start of CØ.
7. The operation of DØ, EØ, FØ are the same as for AØ, BØ, CØ respectively. DØ, EØ and FØ are only used when double phasing.

OPERATION IN V.A. AND FLEXI ISOLATED MODES

1. Controller runs AØ and CØ.
2. AØ is extended by the vehicle detectors. When AØ gaps or wastes, AØ and SG1 & SG2 close down together.
3. CØ is called by P1. P1 introduces at the start of CØ (SG1 & SG2 close down at the start of AØ yellow). CØ runs for the duration of P1 walk, clearance and solid don't walk time.

V.A. SEQUENCE AC

DESIGNED BY: CAMERON TERRILL

DATE 16/07/21

DETECTOR FUNCTIONS

DETECTOR No.	Internal / External	Input Number	SPECIAL FUNCTION	DETECTOR ALARMS					
				DA Category	Disable	DA on S/C only	Fault Simulation		
							Call & Extend	Call Only	Ignore
1	I	1	Extend SG1, Approach 1 *	0			✓		
2	I	2	Extend SG1, Approach 1 *	0			✓		
3	I	3	Extend SG2, Approach 2 *	0			✓		
4	I	4	Extend SG2, Approach 2 *	0			✓		
5	E	1	Call CØ. Places demand for Ped 1**.	6		✓			
6	E	2	Clearance Zone 1	0					
7	E	3	Clearance Zone 2	0					
8	E #	4	Off - Clearance zone det. used for Walk Ext. On - Clearance zone det not used for Walk Ext.	1					
9	E #	5	Off-Clearance zone det. used for Clearance Ext. On- Clearance zone det not used for Clearance Ext.	1					
10									
11									
12									
13									
14									
15									
16									

Refer to Notes on Page 3/2

* For Queuing Feature, refer notes on page 6 ** MSS11 is set for the duration of P1 demand.

INTERGREEN AND PEDESTRIAN TIMES

INTERGREEN TIMES

	LEGAL SPEED	GRADE (%) ^x	DESIGN SPEED		INTERGREEN		
			YELLOW	RED	YELLOW	RED	TOTAL
SG1	50	-1.0	50	-	3.5	2.0	5.5
SG2	50	1.0	50	-	3.5	2.0	5.5

^xPositive grade indicates an uphill approach & negative grade indicates a downhill approach.

Specify negative grade values with a "-" prefix

SG1 & SG2 are special movements that use AØ yellow and BØ all red timesettings.

PEDESTRIAN TIMES

	WALK			CLEARANCE			MINIMUM SOLID DON'T WALK
	DISTANCE (m)	TIME		DISTANCE (m)	TIME		
		GRAPH	ADOPTED		GRAPH	ADOPTED	
P1	18.5	8	13	18.5	12	17	3.0

PEDESTRIAN OPERATION VARIABLE WALK AND CLEARANCE OPERATION (PUFFIN)

1. DETECTION INFORMATION

The controller is capable of supporting 1 PUSH BUTTON detector input and 2 CLEARANCE ZONE detector inputs.

Note: There are no WAIT ZONE detectors at this site.

2. NOTES ON OPERATION

A. PEDESTRIAN DEMAND

A demand for the pedestrian is placed by an activation of the PUSH BUTTON detector input.

ABNORMAL OPERATION

If the push button is continuously stuck on, then a permanent demand for the pedestrian will be placed. When the controller is on line to SCATS and the push button is continuously ON for the periods as specified by the SCATS TDA message, then a Detector Alarm (DA) will be generated on the push button.

If the push button is continuously OFF, then a pedestrian demand is not placed.

B. WALK EXTENSION FUNCTION USING CLEARANCE ZONE DETECTORS

GENERAL

The walk display runs for a minimum time. This minimum is specified in Special Purpose Timesetting No. 14. Activation of the CLEARANCE ZONE detectors (i.e. detectors 6 and/or 7) provides extension of the walk display up to a maximum time. This maximum time is specified in the Walk Time of Pedestrian No. 1.

Between the minimum and maximum times as specified above, the walk display is terminated if the CLEARANCE ZONE detectors have been vacated for the period as specified in Special Purpose Timesetting No. 12.
(Note: Generally set to 1 s).

ABNORMAL OPERATION

If the CLEARANCE ZONE detectors (i.e. 6 and/or 7) do not toggle ON during the Walk interval up to the "STANDARD" walk, then terminate at this instant. The "STANDARD" walk is specified as the total of Special Purpose Timesetting No. 14 plus Special Purpose Timesetting No. 15.

Note: When the controller is online to SCATS and a **CLEARANCE ZONE detector does not toggle ON** for the period as specified by the SCATS TDA message, then a Detector Alarm (DA) will be generated on that CLEARANCE ZONE detector. If one CLEARANCE ZONE detector is alarmed, and the other toggles ON during the Walk interval, the minimum walk time is the "STANDARD" walk time, and the walk can be extended.

If a CLEARANCE ZONE detector does not toggle OFF during the Walk, then extend to maximum (i.e. Walk Time of Pedestrian No. 1). This may be due to a faulty detector, or a large number of pedestrians.

Note: When the controller is on line to SCATS and a **CLEARANCE ZONE detector does not toggle OFF** for the period as specified by the SCATS TDA message, then a Detector Alarm (DA) will be generated on that CLEARANCE ZONE detector. If a DA occurs on one or both CLEARANCE ZONE detectors then the minimum walk time is the "STANDARD" walk time. (i.e. the total of Special Purpose Timesetting No. 14 plus Special Purpose Timesetting No. 15). The Walk can be extended by the CLEARANCE ZONE detector that toggles ON.

C. CLEARANCE EXTENSION FUNCTION

GENERAL

The Flashing Clearance display runs for a minimum time. This minimum time is specified in Special Purpose Timesetting No. 16. Activation of the CLEARANCE ZONE detectors (i.e. detectors 6 and/or 7) provides extension of the Flashing Clearance display up to a maximum time. This maximum time is specified in the Clearance 1 Time of Pedestrian No. 1.

Between the minimum and maximum times as specified above, the Flashing Clearance display is terminated if the CLEARANCE ZONE detector has been vacated for the period as specified in Special Purpose Timesetting No. 13 (Note: generally set to 1 s).

ABNORMAL OPERATION

If the CLEARANCE ZONE detectors (i.e. detectors 6 and/or 7) do not toggle ON during the Walk and through the Flashing Clearance interval up to the "STANDARD" clearance time, then terminate at this instant. The "STANDARD" clearance time is specified as the total of Special Purpose Timesetting No. 16 plus Special Purpose Timesetting No. 17.

Note: When the controller is online to SCATS and a **CLEARANCE ZONE detector does not toggle ON** for the period as specified by the SCATS TDA message, then a Detector Alarm (DA) will be generated on that CLEARANCE ZONE detector. If one CLEARANCE ZONE detector is alarmed, and the other toggles ON during the Walk or Clearance interval, the minimum clearance time is the "STANDARD" clearance time, and the clearance time can be extended.

If a CLEARANCE ZONE detector does not toggle OFF during the Walk and through the Flashing Clearance interval, then extend to maximum (i.e. Clearance 1 Time of Pedestrian No. 1). This may be due to a faulty detector, or a large number of pedestrians.

Note: When the controller is on line to SCATS and a **CLEARANCE ZONE detector does not toggle OFF** for the period as specified by the SCATS TDA message, then a Detector Alarm (DA) will be generated on that CLEARANCE ZONE detector. If this occurs on one or both CLEARANCE ZONE detectors then the minimum Flashing Clearance interval is the "STANDARD" clearance time (i.e. the total of Special Purpose Timesetting No. 16 plus Special Purpose Timesetting No. 17). The Clearance time can be extended by the CLEARANCE ZONE detector that toggles ON.

3. OPERATION WITHOUT THE CLEARANCE ZONE DETECTORS BEING USED FOR WALK EXTENSION

If it is decided that the pedestrians is to operate **without the CLEARANCE ZONE detectors extending the walk**, either or both of the following 2 methods can be used to allow this to occur.

Switch detector 8 to the ON position
Set XSF5 flag

In this situation the walk interval will be automatically set to the "STANDARD" walk time (i.e. the total of Special Purpose Timesetting No. 14 plus Special Purpose Timesetting No. 15).

4. OPERATION WITHOUT THE CLEARANCE ZONE DETECTORS BEING USED FOR CLEARANCE EXTENSION

If it is decided that the pedestrians is to operate **without the CLEARANCE ZONE detectors extending the clearance**, either or both of the following 2 methods can be used to allow this to occur.

Switch detector 9 to the ON position
Set XSF6 flag

In this situation the clearance interval will be automatically set to the "STANDARD" clearance time (i.e. the Special Purpose Timesetting No. 16 plus Special Purpose Timesetting No. 17).

CONTROLLER TIMESETTINGS - 1

PHASE TIMESETTINGS

Front Panel Command: Phase No.Timesetting No (e.g. 1.6 accesses A phase maximum extension green)

DESCRIPTION	Timesetting No	PHASE						
		A (1)	B (2)	C (3)	D (4)	E (5)	F (6)	G (7)
RED / YELLOW	1	-	-	-	-	-	-	-
LATE START	2	-	-	-	-	-	-	-
MINIMUM GREEN (1)	3	3.0	0.0	3.0	3.0	0.0	3.0	-
INCREMENT	4	-	-	-	-	-	-	-
MAXIMUM INITIAL GREEN	5	-	-	-	-	-	-	-
MAXIMUM EXTENSION GREEN (4)	6	40	-	-	-	-	-	-
EARLY CUT OFF	7	-	-	-	-	-	-	-
YELLOW (2)	8	3.5	3.5	3.0	3.5	3.5	3.0	-
ALL RED (2)	9	2.0	2.0	0.0	2.0	2.0	0.0	-
SPECIAL ALL RED	10	0*	-	-	-	-	-	-
GAP 1 (3)	11	2.5	-	-	-	-	-	-
GAP 2 (3)	12	2.5	-	-	-	-	-	-
GAP 3	13	-	-	-	-	-	-	-
GAP 4	14	-	-	-	-	-	-	-
HEADWAY 1	15	0.6	-	-	-	-	-	-
HEADWAY 2	16	0.6	-	-	-	-	-	-
HEADWAY 3	17	-	-	-	-	-	-	-
HEADWAY 4	18	-	-	-	-	-	-	-
WASTE 1	19	7	-	-	-	-	-	-
WASTE 2	20	7	-	-	-	-	-	-
WASTE 3	21	-	-	-	-	-	-	-
WASTE 4	22	-	-	-	-	-	-	-

1. For SG1 & SG2 minimum green in Isolated mode, refer Special Purpose Timesetting 10.

* Special all red for AØ → BØ, DØ → EØ.

For SG1 & SG2 minimum green in link mode, refer Special Purpose Timesetting 11.

2. When SG1 & SG2 close down they use AØ yellow and BØ all-red.

3. SG1 & SG2 use the gap, headway and waste times specified in AØ timesettings.

4. AØ maximum extension green is used only in Isolated mode.

PEDESTRIAN TIMESETTINGS

Front Panel Command: Pedestrian No.Timesetting No (e.g. 18.2 accesses P2 walk)

DESCRIPTION	Timesetting No	PEDESTRIAN							
		P1 (17)	P2 (18)	P3 (19)	P4 (20)	P5 (21)	P6 (22)	P7 (23)	P8 (24)
DELAY	1	-	-	-	-	-	-	-	-
WALK*	2	13	-	-	-	-	-	-	-
CLEARANCE 1	3	17	-	-	-	-	-	-	-
CLEARANCE 2	4	0	-	-	-	-	-	-	-

SITE NAME **CALDER HIGHWAY NR STATION STREET**SITE NO. **6243****CONTROLLER TIMESETTINGS - 2****SPECIAL MOVEMENT TIMESETTINGS**

Front Panel Command: B.Timesetting No (e.g. B.5 accesses Special Movement Timesetting No 5)

Timesetting No	Timesetting (Range: 0-5)	FUNCTION
1		
2		
3		
4		
5		
6		
7		
8		

SPECIAL PURPOSE TIMESETTINGS

Front Panel Command: B.Timesetting No (e.g. B.19 accesses Special Movement Timesetting No 19)

Timesetting No	Timesetting (Range: 0-200)	FUNCTION
9		
10	10	SG1 & SG2 MINIMUM GREEN IN ISOLATED MODE
11	10	SG1 & SG2 MINIMUM GREEN IN LINK MODE
12	1	WALK EXTENSION (USING CLEARANCE ZONE DETECTORS)
13	1	CLEARANCE EXTENSION (USING CLEARANCE ZONE DETECTORS)
14	6	MINIMUM WALK
15	2	ADDITIONAL WALK FOR 'STANDARD' WALK
16	4	MINIMUM CLEARANCE
17	8	ADDITIONAL CLEARANCE FOR 'STANDARD' CLEARANCE
18	0	LIMIT GREEN WATCHDOG TIMER
19	0	SPECIAL FACILITY CONTROLS ALARM TIMER
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		

STANDARD
WALK = 8STANDARD
CLEARANCE = 12

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CONTROLLER TIMESETTINGS - 3

PRESENCE TIMESETTINGS

Front Panel Command: D,Detector No (e.g. D.7 accesses Presence time for detector 7)

DETECTOR No	TIMESETTING (Range: 0-10)
1	6.0
2	6.0
3	6.0
4	6.0
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

QUEUING FEATURE

APPROACH 1:

- If XSF9 (Masterlink) or R- (Flexilink) is set, and the presence time for detector 1 and/or detector 2 is expired in BØ, and there is a demand for P1, expire approach 1
- If XSF9 (Masterlink) or Q- (Flexilink) is set, and the presence time for detector 1 and/or detector 2 is expired in EØ, and there is a demand for P1, expire approach 1

APPROACH 2:

- If XSF10 (Masterlink) or R+ (Flexilink) is set, and the presence time for detector 3 and/or detector 4 is expired in BØ, and there is a demand for P1, expire approach
- If XSF10 (Masterlink) or Q+ (Flexilink) is set, and the presence time for detector 3 and/or detector 4 is expired in EØ, and there is a demand for P1, expire approach

DAILY EVENT TIMESETTINGS

FUNCTION	TIMESETTING
Daily start time (Hours)	
Daily start time (Minutes)	
Daily finish time (Hours)	
Daily finish time (Minutes)	

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CONTROLLER TIMESETTINGS - 4

SPECIAL MOVEMENT TIMESETTINGS

GROUP No	STAGE 1 TIMESETTINGS (Yellow Timing)	STAGE 2 TIMESETTINGS (Red Timing)
1	3.5 (AØ Yellow)	2.0 (BØ All Red)
2	3.5 (AØ Yellow)	2.0 (BØ All Red)
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
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18		
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20		
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23		
24		
25		
26		
27		
28		
29		
30		
31		
32		

NOTE: Stage 1: Timesetting (Yellow Time)
 Default is zero, uses phase yellow if special movement is activated
 Can specify phase timesettings, eg. A phase yellow, or a time value, eg. 3 secs
 Stage 2: Timesetting (Red Time)
 Default is zero, Traff will use 2 secs red as default if special movement is activated
 Can specify phase timesettings or other timesettings, eg. A phase red, or a time value, eg. 2.5 secs

FLEXILINK OPERATION

PHASE SEQUENCES

No	PHASE SEQUENCE
1 (No Y+)	ABCDEF (Only ABC run)
2 (Y+)	ABCDEF

NOTES:

1. All phases must be specified in the phase sequence
2. Only specify phase sequence 2 if it is different from phase sequence 1.

LOOK AHEADS & RELEASES

PHASE SEQUENCE 1		
PHASE	LOOK AHEAD*	RELEASE
A	No	No
B	No	No
C	No	No
D	No	No
E	No	No
F	No	No
G	No	No

PHASE SEQUENCE 2		
PHASE	LOOK AHEAD*	RELEASE
A	No	No
B	No	No
C	No	No
D	No	No
E	No	No
F	No	No
G	No	No

* Specify the phases to which look ahead is permitted, e.g. Yes (to E, F, G, A)

INHIBIT PHASES

The following phases can be inhibited in flexilink by setting the call pulse one step before the call pulse of the next phase in sequence

B, E

PULSE STEP LENGTH

☐ One Second
 ☒ Two Second

MASTERLINK & FLEXILINK SPECIAL FLAGS

FLAG	FUNCTION
Y- Flexi	The site will operate in flexilink mode if the signal is continuously sent (C) or is used as an offset (e.g. 25)
Y- Master	
Y+ Flexi	Double phasing, i.e. Run ABCDEF
Z- Flexi	
Z- Master	
Z+ Flexi	
Z+ Master	
R- Flexi	Queuing Feature (refer notes on page 6)
R+ Flexi	Queuing Feature (refer notes on page 6)
Q- Flexi	Queuing Feature (refer notes on page 6)
Q+ Flexi	Queuing Feature (refer notes on page 6)

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SCATS INTERSECTION DATA

The data shown on this page is typical data that can be used for testing controller operations.
This data is not necessarily applicable when the site is switched on in the field

TYPICAL SLOT DATA

SLOT <i>n</i>	=	6	,	1	,	0
(phases) (split plans) (walks)						
INT	=	6243				
VC	=	6				
CS	=					
COM	=	NET				
PK	=	!				
S#	=					
LM	=					
RMN	=	0				
DCL	=	0				
AT	=	4				
BT	=	6				
CT	=	3				
DT	=	4				
ET	=	6				
FT	=	3				
PP1	=	0,0A				
PP2	=	0,0A				
PP3	=	0,0A				
PP4	=	0,0A				

TYPICAL SPLIT PLAN DATA

PHASE SEQUENCE 1	
A =	0PDB
B =	50NGC
C* =	23#NGA
D =	1E
E =	1F
F =	1A

PEDNO	PED NO				P1
	GROUP NO	1	2	3	
	1				X
	2				X
P1	3		X	X	

* CØ = WALK + CLEARANCE + 3 SECONDS

TYPICAL VARIATION PARAMETERS

VP1 =		VP22 =		VP43 =	
VP2 =		VP23 =		VP44 =	
VP3 =		VP24 =		VP45 =	
VP4 =		VP25 =		VP46 =	
VP5 =		VP26 =		VP47 =	
VP6 =		VP27 =		VP48 =	
VP7 =		VP28 =		VP49 =	
VP8 =		VP29 =		VP50 =	
VP9 =		VP30 =		VP51 =	
VP10 =		VP31 =		VP52 =	
VP11 =		VP32 =		VP53 =	
VP12 =		VP33 =		VP54 =	
VP13 =		VP34 =		VP55 =	
VP14 =		VP35 =		VP56 =	
VP15 =		VP36 =		VP57 =	
VP16 =		VP37 =		VP58 =	
VP17 =		VP38 =		VP59 =	
VP18 =		VP39 =		VP60 =	
VP19 =		VP40 =		VP61 =	
VP20 =		VP41 =		VP62 =	
VP21 =		VP42 =			