

# RE-PROGRAM OF EXISTING CONTROLLER

	ACTION	DATE
TO	1. SENIOR ENGINEER, CONTROLLER APPLICATIONS 2. STEVE BELZ, PROGRAM DELIVERY	
FROM	DAVID NIEMIECKI	22/08/18
SITE	CALDER HWY/LOCKWOOD RD/CAMP RD	SITE NO. 6253
REGION	NORTHERN	MUNICIPALITY GREATER BENDIGO

## GENERAL

Works Program Job?	Yes	Project Number	BC122C
Classification	MINOR	Works Order Number	4A006099

## EXISTING CONTROLLER DETAILS

Type	PSC 2003	Software Version & Release	V5R82	Lanterns	QH
------	----------	----------------------------	-------	----------	----

## CONTROLLER APPLICATIONS

Target Date for Draft Opsheet	24/08/2018
Target Date for completion of Program	7/09/2018

Prepare Interlocking	
----------------------	--

Update Graphics, Site Notes	No
-----------------------------	----

Description of changes	LED Upgrade, timesetting changes
------------------------	----------------------------------

## PERSONALITY CHECKSUMS

	Hex	Octal
Total	87	207
Times	B6	266
Pers	31	61

Dispatched 7/09/18

<input checked="" type="checkbox"/>	Site ID Revision updated to	B
-------------------------------------	-----------------------------	---

## PROGRAM DELIVERY - SIGNAL INSTALLATION

<input checked="" type="checkbox"/>	Changes to signal hardware	<input type="checkbox"/>	Changes to interlocking
<input type="checkbox"/>	Additional detectors	<input type="checkbox"/>	Changes to existing detector numbering
<input type="checkbox"/>	Upgrade controller software to		
<input type="checkbox"/>	Other changes		
<input checked="" type="checkbox"/>	Place new operation specification in controller		

## PRIOR NOTICE

A job must be entered into RAI Action database before this PROM change will be allowed.

<input checked="" type="checkbox"/>	SCATS data changes - notify	DARREN VAUGHAN	Ext	1210
	OR	DAVID NIEMIECKI	Ext	1210

before 3:00pm on the day before switch on.

## SCATS Data Changes - Slot data

## TRAFFIC MANAGEMENT CENTRE

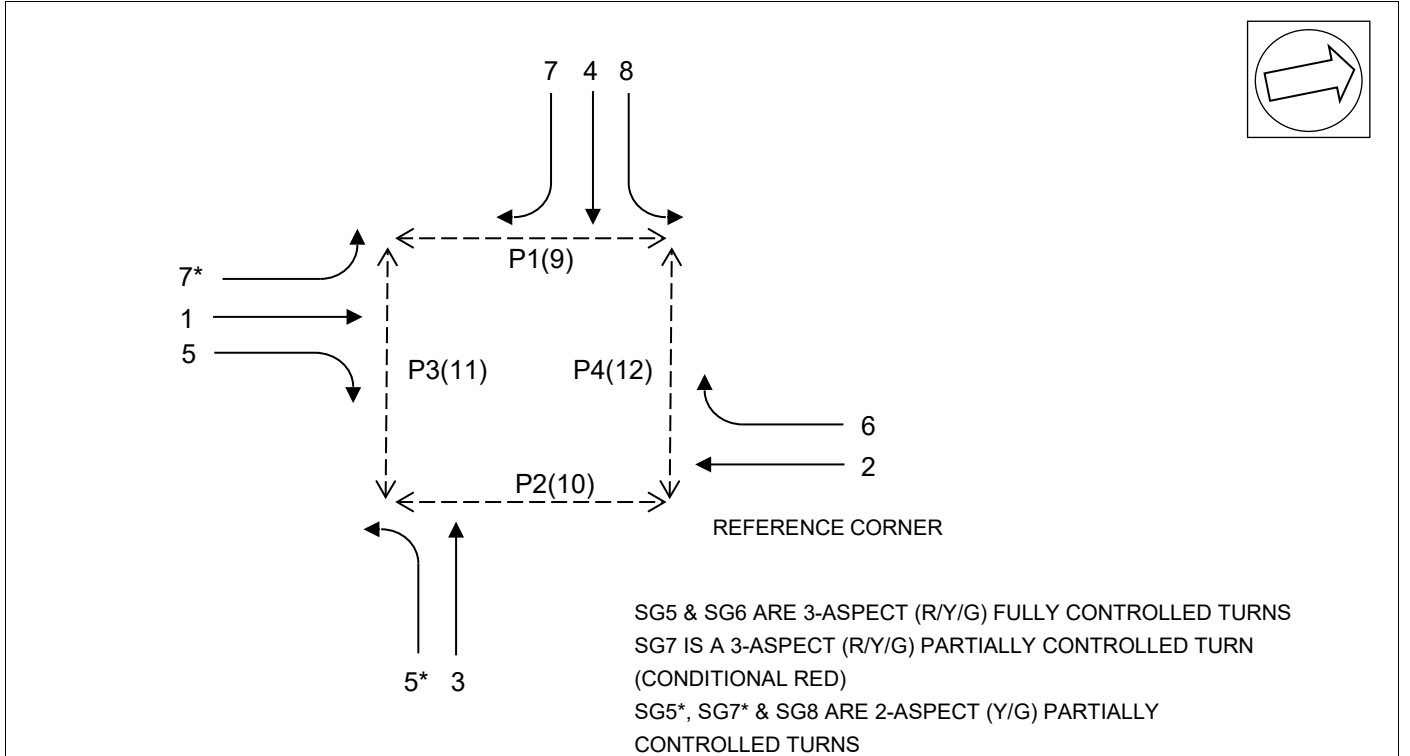
<input type="checkbox"/>	Checksum update only
<input type="checkbox"/>	Changes to trim or manual intervention features required
<input checked="" type="checkbox"/>	Please notify DARREN VAUGHAN (x1210) on job completion.

## DATE PROM INSTALLED

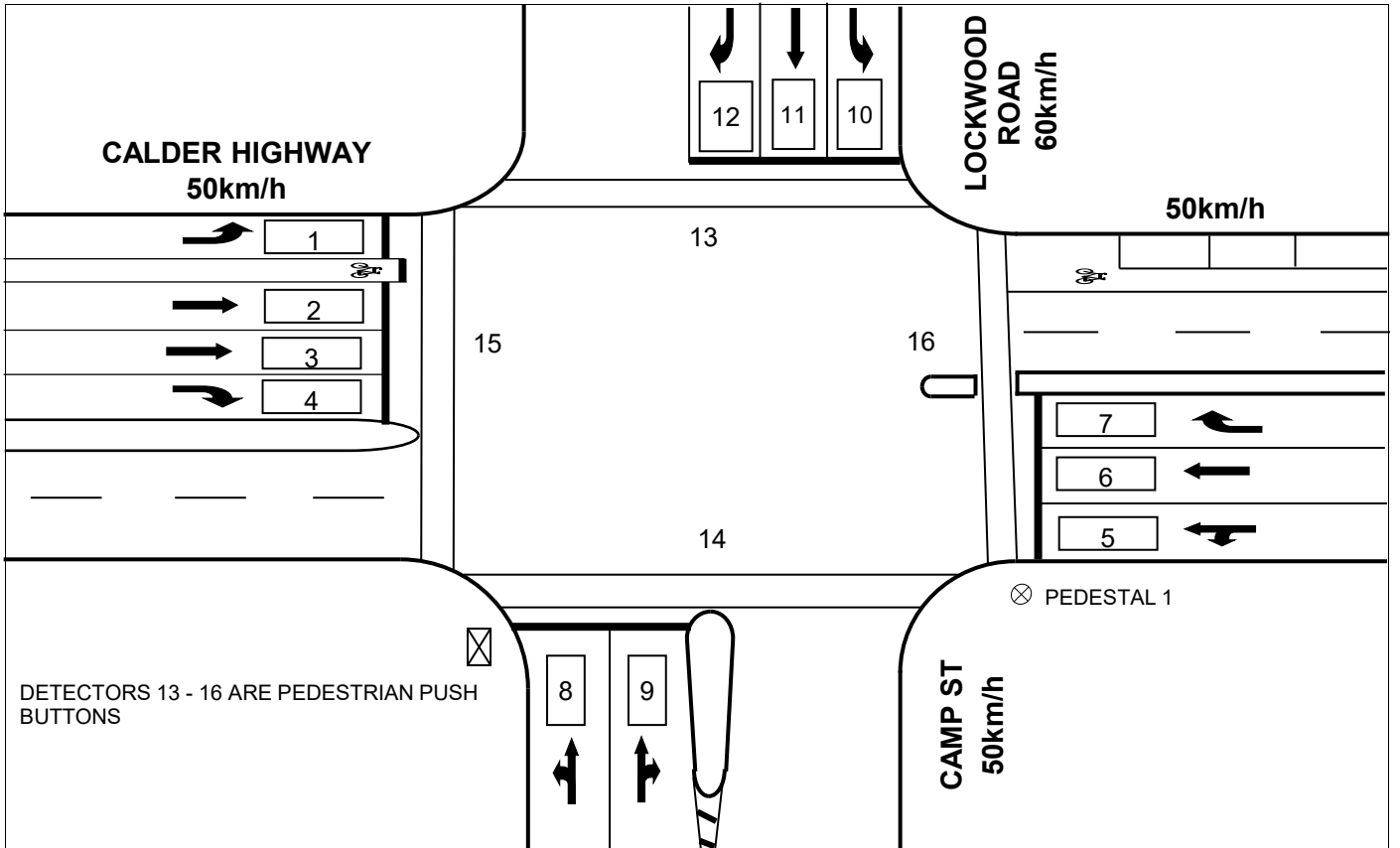
# CONTROLLER OPERATION SPECIFICATION

SITE NAME	<b>CALDER HWY/LOCKWOOD RD/CAMP RD</b>			SITE NO.	<b>6253</b>
MUNICIPALITY	GREATER BENDIGO	DESIGNED BY	DAVID NIEMIECKI	DATE	22/08/18
PLAN NO.	499468	DESIGN CHECKED		DATE	
CONTROLLER TYPE	PSC 2003	PROM CHECKED		DATE	

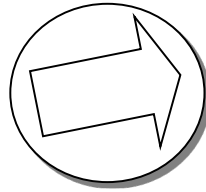
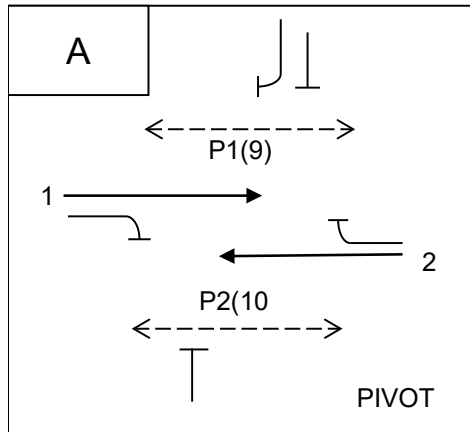
## GROUP ALLOCATION



## DETECTOR MAP

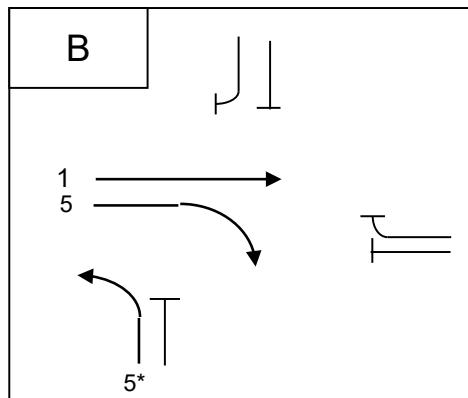


# PHASING DIAGRAM

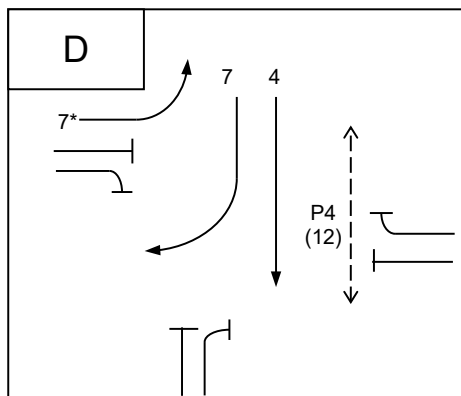
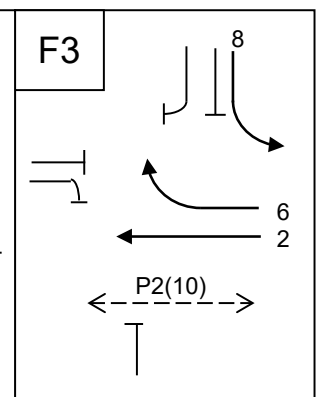
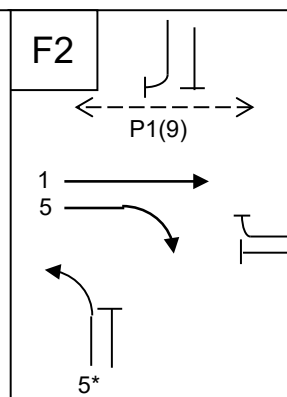
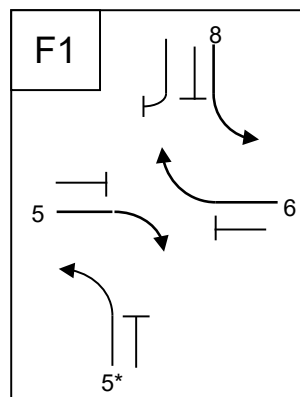
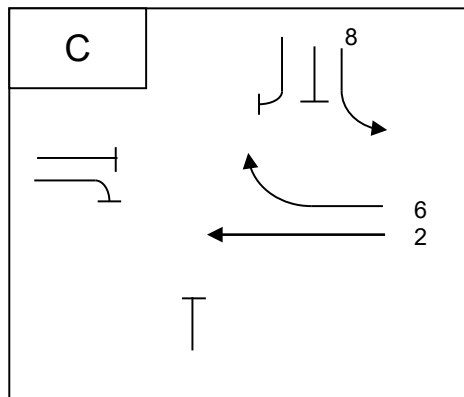
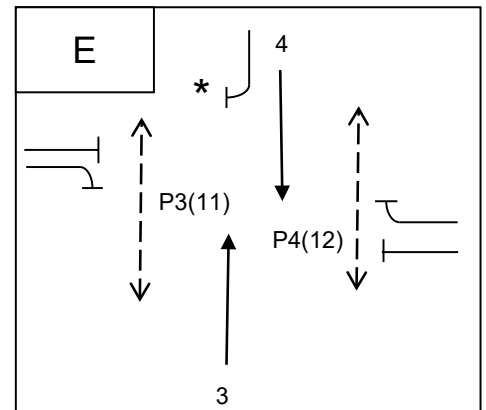


Refer General Notes

PHASE	PROHIBITED PHASE CHANGES TO	REVERSION ON MAXIMUM	MAXIMUM V.I.G ON REVERSION
E	D		



\* RED ARROW DROPS IN EØ



V.A. SEQUENCE ADEF

DESIGNED BY: DAVID NIEMIECKI

DATE 22/08/18

## DETECTOR FUNCTIONS

DETECTOR No.	Internal / External	Input Number	CALL PHASE	LOCKING CALL	NON-LOCKING CALL	SET VIG ON PHASE	EXTEND PHASE	SPECIAL FUNCTION			DETECTOR ALARMS						
								Detector Type	Description	Refer Special Notes	DA Category	Disable	DA on S/C only	Fault Simulation			
														Call & Extend	Call Only	Ignore Alarm	Refer Special Notes
1	I	1	A	✓			A,B,D				0			✓			
2	I	2	A	✓			A,B				0			✓			
3	I	3	A	✓			A,B				0			✓			
4	I	4	B,F	✓			B,F			✓	0			✓			
5	I	5	A	✓			A,C				0			✓			
6	I	6	A	✓			A,C				0			✓			
7	I	7	C,F	✓			C,F			✓	0			✓			
8	I	8	E	✓			E				0			✓			
9	I	9	E	✓			E				0			✓			
10	I	10	CF	✓			C,E,F			✓	0			✓			
11	I	11	E	✓			E				0			✓			
12	I	12	D,E	E	D		D,E			✓	0			✓			
13	E	1	A		✓			P1		✓	6		✓				
14	E	2	A		✓			P2		✓	6		✓				
15	E	3	E		✓			P3		✓	6		✓				
16	E	4	E		✓			P4		✓	6		✓				
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
31																	
32																	

**APPROACH DEFINITIONS****PHASE APPROACHES**

Approach No	EXTENDING DETECTORS	APPROACH TIMER AND TIMESETTING DEFINITION*	SIGNAL GROUP	APPROACH EXPIRY (EXPAP)	Refer Special Notes
1	2,3	A11, B22	1	$A\emptyset \leftrightarrow B\emptyset$	
2	5,6	A22, C22	2	$A\emptyset \leftrightarrow C\emptyset$	
3	1	A33, B33, D22	1,7	$A\emptyset \leftrightarrow B\emptyset, B\emptyset \rightarrow D\emptyset$ $A\emptyset \leftrightarrow D\emptyset$	
4	4	B11, F11	5		
5	7	C11, F22	6		
6	10	C33, E33, F33	4,8	$C\emptyset \rightarrow D\emptyset, C\emptyset \rightarrow E\emptyset$ $E\emptyset \rightarrow F1\emptyset, E\emptyset \rightarrow F3\emptyset$	
7	12	D11, E44	4,7		
8	8,9	E11	3		
9	11	E22	4		
10					
11					
12					
13					
14					
15					
16					

\* There are 8 approach timers and 4 approach timesettings available per phase:

- Where there are 4 or fewer approaches per phase, allocate one timesetting to each timer.

For example: A11. A22, A33, B11, C11.

- Where there are more than 4 approaches per phase, two or more timers must have the same timesetting.

For example: A11. A21, A32, A43, A54, B11.

**SPECIAL APPROACHES**

Approach No	EXTENDING DETECTORS	APPROACH TIMESETTING	SIGNAL GROUP	DESCRIPTION	Refer Special Notes
1					
2					
3					
4					

**DESIGN OF INTERGREEN AND PEDESTRIAN TIMES****INTERGREEN TIMES**

PHASE	CLEARANCE DETAILS		LEGAL SPEED	DESIGN SPEED		INTERGREEN		
	GROUP TRANSITION	DISTANCE		YELLOW	RED	YELLOW	RED	TOTAL
A	2 → P3	36.0	50	50	50	3.5	2.5	6.0
B	5 → P2	27.0	50	50	45	3.5	2.5	6.0
C	6 → P1	33.0	50	50	50	3.5	2.5	6.0
D	7 → P3	33.0	60	45	45	3.0	2.5	5.5
E	4 → P2	35.5	60	60	50	4.0	2.5	6.5
F	6 → P1	33.0	50	45	45	3.0	2.5	5.5
G	→							

**PHASE SPECIAL ALL REDS AND SPECIAL MOVEMENT ALL REDS**

FROM PHASE	TO PHASE	CLEARANCE DETAILS		DESIGN SPEED	ALL RED	PHASE or S.M. No*
		GROUP TRANSITION	DISTANCE			
		→				
		→				
		→				
		→				
		→				
		→				

\* Specify where the timesetting is stored (the phase special all red or the special movement time setting number)

**PEDESTRIAN TIMES**

PED	PHASE(S)	WALK			CLEARANCE				MINIMUM SOLID DON'T WALK
		DISTANCE (m)	TIME		DISTANCE (m)	TIME			
			GRAPH	ADOPTED		GRAPH	CL1	CL2	
1	A	21.0	8	8	21.0	14	15.0		6.0
2	A	18.0	8	8	18.0	12	12.0		6.0
3	E	23.0	8	8	23.0	15	15.0		6.5
4	E	23.0	8	13	23.0	15	15.0		6.5

## CONTROLLER TIMESETTINGS - 1

### PHASE TIMESETTINGS

Front Panel Command: Phase No.Timesetting No (e.g. 3.2 accesses C phase late start)

DESCRIPTION	Timesetting No	PHASE						
		A (1)	B (2)	C (3)	D (4)	E (5)	F (6)	G (7)
RED / YELLOW	1	-	-	-	-	-	-	-
LATE START	2					2	2	
MINIMUM GREEN	3	10	6	6	6	8	6	
INCREMENT	4							
MAXIMUM INITIAL GREEN*	5							
MAXIMUM EXTENSION GREEN	6	30	5	5	10	20	15	
EARLY CUT OFF	7					4.0		
YELLOW	8	3.5	3.5	3.5	3.0	4.0	3.0	
ALL RED	9	2.5	2.5	2.5	2.5	2.5	2.5	
SPECIAL ALL RED	10							
GAP 1	11	2.5	2.5	2.5	2.5	2.5	2.5	
GAP 2	12	2.5	2.5	2.5	2.5	2.5	2.5	
GAP 3	13	2.5	2.5	2.5		2.5	2.5	
GAP 4	14					2.5		
HEADWAY 1	15	0.6	1.2	1.2	1.2	0.6	1.2	
HEADWAY 2	16	0.6	0.6	0.6	1.2	1.2	1.2	
HEADWAY 3	17	1.2	1.2	1.2		1.2	1.2	
HEADWAY 4	18					1.2		
WASTE 1	19	7	7	7	7	7	7	
WASTE 2	20	7	7	7	7	7	7	
WASTE 3	21	7	7	7		7	7	
WASTE 4	22					7		

\* Maximum Initial Green = Minimum Green + V.I.G.

### 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	8.0	8.0	8.0	13.0				
CLEARANCE 1	3	15.0	12.0	15.0	15.0				
CLEARANCE 2	4								

\* Minimum walk time - used in Isolated and Flexilink operation

For walk times in Masterlink operation, refer to slot data.

## 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	2.5	SG5 ALL RED (SUBSTITUTE FØ ALL RED)
2	2.5	SG6 ALL RED (SUBSTITUTE FØ ALL RED)
3	2.5	SG8 ALL RED (SUBSTITUTE FØ ALL RED)
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	6	MAXIMUM EXTENSION GREEN FOR SG5 IN FØ (XSF7)
10	6	MAXIMUM EXTENSION GREEN FOR SG6 & SG8 IN FØ (XSF8)
11	8	DURATION FOR HOLDING SG7 RED IN EØ WITH P3 DEMAND
12	4	MINIMUM BLANK PERIOD FOR SG7
13		
14		
15		
16		
17		
18	0	LIMIT GREEN WATCHDOG TIMER
19	0	SPECIAL FACILITY CONTROLS ALARM TIMER
20	10	ALL RED START UP INTERVAL
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		



## 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	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	3.0
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	

NOTE: Set presence time to zero if the detector is not a presence detector

**DAILY EVENT TIMESETTINGS**

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

## FLEXILINK OPERATION

### PHASE SEQUENCES

No	PHASE SEQUENCE
1 (No Y+)	ABCDEF
2 (Y+)	

### 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	R-
B	No	R+
C	No	R-
D	Yes (to E,F,A)	Auto
E	Yes (to F,A)	Auto
F	Yes (to A)	Auto
G		

PHASE SEQUENCE 2		
PHASE	LOOK AHEAD*	RELEASE
A		
B		
C		
D		
E		
F		
G		

\* 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,C,D

### 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	
Z- Flexi	
Z- Master	
Z+ Flexi	
Z+ Master	
R- Flexi	AØ RELEASE PULSE
R+ Flexi	BØ RELEASE PULSE
Q- Flexi	CØ RELEASE PULSE
Q+ Flexi	

## 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	,	4	,	4
(phases) (split plans) (walks)						
INT	=	6253				
VC	=	5				
CS	=					
COM	=	NET				
PK	=	!				
S#	=					
LM	=					
RMN	=	0				
DCL	=	0				
AT	=	6				
BT	=	6				
CT	=	6				
DT	=	6				
ET	=	7				
FT	=	6				
GT	=					
W1	=	0A	W1 T	=	21	
W2	=	0A	W2 T	=	18	
W3	=	8	W3 T	=	22	
W4	=	2E	W4 T	=	22	
W5	=		W5 T	=		
W6	=		W6 T	=		
W7	=		W7 T	=		
W8	=		W8 T	=		
PP1	=	0,0A				
PP2	=	0,0A				
PP3	=	0,0A				
PP4	=	0,0A				

### TYPICAL SPLIT PLAN DATA

PHASE SEQUENCE 1		PHASE SEQUENCE 2		PHASE SEQUENCE 3	
A =	0PDD	A =		A =	
B =	1C	B =		B =	
C =	1D	C =		C =	
D =	15E	D =		D =	
E =	15(TG)F	E =		E =	
F =	15TGA	F =		F =	

### TYPICAL VARIATION PARAMETERS

VP1 =	3	VP22 =		VP43 =	
VP2 =	0	VP23 =		VP44 =	
VP3 =	1	VP24 =		VP45 =	
VP4 =	45	VP25 =		VP46 =	
VP5 =	160	VP26 =		VP47 =	
VP6 =	1	VP27 =		VP48 =	
VP7 =	45	VP28 =		VP49 =	
VP8 =	157	VP29 =		VP50 =	
VP9 =	2	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 =			

# GROUP CONFLICT TABLE

PED NO	PED NO							m	m	P1	P2	P3	P4													
	GROUP NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
	1			X	X		X	X	X			X	X													
	2			X	X	X		X				X	X													
	3	X	X			X	X	X		X	X															
	4	X	X			X	X			X	X															
	5		X	X	X			X			X	X														
	6	X		X	X			X		X			X													
m	7	X	X	X		X	X			X		X														
m	8	X								X			X													
P1	9			X	X		X	X	X																	
P2	10			X	X	X																				
P3	11	X	X			X		X																		
P4	12	X	X				X		X																	
	13																									
	14																									
	15																									
	16																									
	17																									
	18																									
	19																									
	20																									
	21																									
	22																									
	23																									
	24																									

CHECKED: Bob Harris DATE: 12/12/08

## GENERAL NOTES

### **SUMMARY OF XSF FLAGS**

(Communications Operation of XSF flags is required)

- XSF1 - Allows the late introduction of P1 in Aφ (Master)
- XSF2 - Allows the late introduction of P2 in Aφ (Master)
- XSF5 - Inhibits calls for SG5 in Fφ and clears demands for Cφ in Masterlink and Flexilink
- XSF6 - Inhibits calls for SG6 in Fφ and clears demands for Bφ in Masterlink and Flexilink
- XSF7 - Selects special maximum for SG5 in Fφ via Special Purpose Timesetting no. 9.
- XSF8 - Selects special maximum for SG6 and SG8 in Fφ via Special Purpose Timesetting no. 10.

### **GENERAL OPERATION**

1. If in Bφ clear demands for Cφ.
2. If in Cφ clear demands for Bφ.
3. If in Eφ clear demands for Dφ.
4. In Flexi Isolated Bφ is allowed to run if XSF5 is set and Cφ is allowed to run if XSF6 is set.
5. Use Fφ yellow for Bφ yellow if going Bφ→Aφ.
6. Use Fφ yellow for Cφ yellow if going Cφ→Aφ.
7. Use Eφ yellow for Dφ yellow if going Dφ→Fφ or Dφ→Aφ.

### **SIGNAL GROUP OPERATION**

#### **Signal Group 5**

1. SG5 closes down in Bφ when going Bφ→Fφ (called by SG6).  
SG5 does not introduce in Fφ when going Bφ→Fφ.
2. SG5 is controlled by Special Movement Timesetting no.1 in Fφ.  
Fφ All Red timesetting is substituted for Special Movement Timesetting no.1.
3. XSF7 is used to set the maximum extension green time for SG5 in Fφ.  
This time is stored in Special Purpose Timesetting no. 9.  
SG5 is forced off after this maximum extension green time.

#### **Signal Group 6**

1. SG6 closes down in Cφ when going Cφ→Fφ (called by SG5).  
SG6 does not introduce in Fφ when going Cφ→Fφ.
2. SG6 is controlled by Special Movement Timesetting no.2 in Fφ.  
Fφ All Red timesetting is substituted for Special Movement Timesetting no.2.
3. XSF8 is used to set the maximum extension green time for SG6 in Fφ.  
This time is stored in Special Purpose Timesetting no. 10.  
SG6 is forced off after this maximum extension green time.

#### **Signal Group 7**

1. SG7 operates green-yellow-red in Dφ.
2. SG7 goes red with SG4 in Eφ, and remains red through Fφ, Aφ, Bφ and Cφ.
3. SG7 closes down at the end of Dφ green, remains red through Eφ late start, then goes 'blank' at the start of Eφ minimum green.

When P3 is demanded.

5. If going A $\phi$ , B $\phi$  or C $\phi$ →E $\phi$ , with a demand for P3, hold SG7 red for the duration of Timer 1 (Special Purpose Timesetting No.11). Timer 1 starts timing at the start of P3 walk. When Timer 1 expires SG7 red is switched off.
6. If going D $\phi$ →E $\phi$ , with a demand for P3, SG7 goes red at the start of D $\phi$  all red period, and is held red for the duration of Timer 1 (Special Purpose Timesetting No.11). Timer 1 starts timing at the start of P3 Walk. When Timer 1 expires SG7 red is switched off.
7. E $\phi$  ECO is used to guarantee SG7 minimum blank period. Timer 2 (Special Purpose Timesetting No.12) starts timing at the start of SG7 blank period. When Timer 2 expires, expire E $\phi$  ECO.

### **Signal Group 8**

1. SG8 closes down in C $\phi$  when going C $\phi$ →F $\phi$  (called by SG5).  
SG8 does not introduce in F $\phi$  when going C $\phi$ →F $\phi$ .
2. SG8 is controlled by Special Movement Timesetting no.3 in F $\phi$ .  
F $\phi$  All Red timesetting is substituted for Special Movement Timesetting no.3.
3. XSF8 is used to set the maximum extension green time for SG8 in F $\phi$ .  
This time is stored in Special Purpose Timesetting no.10.  
SG8 is forced off after this maximum extension green time.
4. Late start SG8 in F $\phi$  when going E $\phi$ →F1 $\phi$  or E $\phi$ →F3 $\phi$ .

## **PEDESTRIAN GROUP OPERATION**

### **Pedestrian 1**

P1 calls A $\phi$ .

P1 can introduce at anytime in F2 $\phi$  and at the start of A $\phi$  and can overlap F2 $\phi$ →A $\phi$ .

In Master P1 can introduce at any time in A $\phi$  while XSF1 is set.

### **Pedestrian 2**

P2 calls A $\phi$ .

P2 can introduce at anytime in F3 $\phi$  and at the start of A $\phi$  and can overlap F3 $\phi$ →A $\phi$ .

In Master P2 can introduce at any time in A $\phi$  while XSF2 is set.

### **Pedestrian 3**

P3 calls E $\phi$ .

P3 can introduce at the start of E $\phi$ .

### **Pedestrian 4**

P4 calls E $\phi$ .

P4 can introduce at anytime in D $\phi$  and at the start of E $\phi$  and can overlap D $\phi$ →E $\phi$ .

**DETECTOR OPERATION****General**

Clear vehicle demands during associated phase green and yellow.

**Detector 4**

Clear demands for B $\phi$  and F $\phi$  from detector 4 during SG5 green and yellow

**Detector 7**

Clear demands for C $\phi$  and F $\phi$  from detector 7 during SG6 green and yellow

**Detector 10**

Clear demands for C $\phi$  and F $\phi$  from detector 10 during SG4 and SG8 green and yellow

If in A $\phi$  and there is a demand for E $\phi$ , clear demands for C $\phi$  and F $\phi$  from detector 10