

# SPECIFICATION 711

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# TRAFFIC CONTROL EQUIPMENT SOFTWARE

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**SPECIFICATION 711**  
**TRAFFIC CONTROL EQUIPMENT SOFTWARE**  
**REVISION REGISTER**

Date	Clause Number	Description of Revision	Authorised By
14/03/2014	Whole document	NGEN Version Updated RMS and Austroads references updated Annexure 711H updated	EE
26/05/2011	Whole document	RGEN Software replaced with NGEN	EE
11/07/2007	Guidance Notes	Change of Specification custodian	TESM
01/08/2006	Whole document	Complete revision of Issue 1.0 to new format	MCP

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# SPECIFICATION 711

## TRAFFIC CONTROL EQUIPMENT SOFTWARE

### GENERAL

#### 711.01 SCOPE

1. The work and services under this specification consist of the programming and testing of traffic signal controller equipment software, operational fitting on site, and provision of all technical documentation for traffic signal installation, commissioning and maintenance.
2. Traffic Control Equipment Software shall be prepared to implement the phase sequence, timings and special features shown in the Traffic Signal Design Drawings and software documentation.

#### 711.02 REFERENCES

1. Australian Standards, MAIN ROADS Western Australia Standards and MAIN ROADS Western Australia Test Methods are referred to in abbreviated form (e.g. AS 1234, MRS 67-08-43 or WA 123). For convenience, the full titles are given below:

##### Australian Standards

AS 1742.14 Manual of Uniform Traffic Control Devices Part 14 – Traffic signals

##### Other Standards

- RMS Traffic Signal Design Standards (RTA-TC-189)
- RMS RMS Standard Personality Reference Manual (RTA-TC-185)
- RMS NGEN 6.0.0.4 Personality Generator/Editor (RTA-TC-130)
  
- RMS Traffic Signal Practice Design RMS NSW 1992  
Guide to Traffic Management Part 9: Traffic Operations  
(AUSTROADS 2009).

##### MAIN ROADS Standards

MRWA Traffic Signal Document Standards i.e. Phasing, Detectors, etc.

#### 711.03 DEFINITIONS

RTA Roads and Traffic Authority of New South Wales  
SCATS Sydney Coordinated Adaptive Traffic System

#### 711.04 – 711.05 NOT USED

## PERSONNEL

### 711.06 QUALIFIED PROGRAMMERS

1. Software shall be prepared, documented and tested by personnel with a minimum of three year experience in programming and integration of traffic control systems to RTA-TC-189, the RMS NGEN 6.0.0.4. The Contractor shall submit a copy of a resume detailing the proposed programmer's past experience and demonstrating that the above requirement is met.

**NGEN  
Experience**

711.07 – 711.10 NOT USED

## SOFTWARE COMPATIBILITY

### 711.11 ADAPTIVE ENGINEERING SYSTEM

1. All software shall be produced using the version of NGEN used by Main Roads WA and must be fully compatible with the Main Roads WA database.

**NGEN  
Version**

2. An overview of the modifications to the standard NGEN personality file to meet WA requirements is provided in Annexure 711A.

**NGEN  
Modifications**

3. The Personality Revision Number shall be nominated by the programmer, based on the design changes and personality history.

**Revision  
Number**

### 711.12 EQUIPMENT COMPATIBILITY

1. The software shall be compatible with all of the traffic signal controller equipment and its components.

**Compatible  
with  
Controller**

### 711.13 COMMUNICATIONS

1. The software shall be compatible with all SCATS communications protocols.

**Compatible  
with SCATS**

711.14 - 711.20 NOT USED

## DOCUMENTATION

### 711.21 GENERAL

1. Documentation shall include:

**Document**

- a) Description of operation of the software and hardware including Flexilink fallback operating modes and special features.
- b) Instructions for installation, maintenance and commissioning.

- c) Electronic NGEN file.
  - d) Results of testing and commissioning.
  - e) As Constructed information including intersection plans, cable charts, phase sequence charts, conflict chart, detector chart, timing chart and special Feature documentation (if any).
2. All documentation is to be in the latest version of Microsoft Word used by Main Roads Western Australia. **Microsoft Word**
3. Copies of such documentation shall be provided as listed below: **Number of Copies**
- a) Two paper copies
  - b) One electronic copy
4. **The documents shall be delivered to the Superintendent five (5) working days before the commissioning of the traffic signals.** **HOLD POINT**

**711.22 TIMING CHART**

1. Provide a timing chart in the Main Roads WA standard format detailing the time settings and parameters used in the software and their purpose. The chart is also to provide the personality Checksum in hexadecimal format. **Time Settings**

**711.23 SCATS MASTERLINK/FLEXILINK DETAILS**

1. SCATS Masterlink/Flexilink details will be provided to Main Roads as a part of the Phase Chart. The standard format lists SCATS Masterlink and Flexilink operational details such as the allocation of SCATS flags and Flexilink release flags. **Flexilink**

**711.24 SPECIAL FEATURES DOCUMENTATION**

1. Special features incorporated into the software or any additional information that is not detailed on the other charts shall be documented. Examples of such information is: **Special Features**
- a) Parallel pedestrian protection/operation.
  - b) Advance warning sign operation and timing design.
  - c) Railway controller wiring details.
  - d) Emergency vehicle operation.
  - e) Flashing No Right Turn sign operation.
  - f) UPS Monitoring details

**711.25 JOB DESCRIPTION SHEET**

1. A job description sheet shall be provided to list specific intersection details as well as signed completed checks.

**711.26 - 711.30 NOT USED**

## SOFTWARE FORMAT

### 711.31 GENERAL

1. The format of the source code shall be clear and concise.
2. Remarks shall be provided in the source code outlining the purpose of each line or section of the code when necessary.

### 711.32 SOURCE CODE LANGUAGE

1. Software for traffic signal controllers shall be the Australian industry standard "C" mnemonic language. Software for other controller equipment shall use Australian industry standards wherever possible and shall retain uniformity adopted for existing controller equipment.

**C Source Code**

### 711.33 NGEN FILE

1. The relevant NGEN file named PyyyyyMS.M68, where yyyyy is the five digit intersection (LM) number shall be supplied to Main Roads WA no less than 5 working days prior to the planned commissioning.
2. Existing NGEN personality files are named XyyyyMS.M68, where yyyy is the four digit intersection (LM) number.

**NGEN File**

### 711.34 – 711.40 NOT USED

## SOFTWARE CONTENT

### 711.41 GENERAL

1. The software shall meet the requirements of Austroads Guide of Traffic Management Part 9: Traffic Operations for all traffic engineering designs and practice.
2. The software shall meet the requirements of Traffic Signal Practice Design (RMS NSW 1992) in the majority of applications except where Main Roads practice should be in accordance with Annexure 711A - Traffic Signal Personalities - WA Standard.

**Annexure 711A**

### 711.42 NGEN UNIFORMITY

1. Traffic signal controller software shall be prepared using the existing standard tables in NGEN. Where this is impossible the Principal's instructions shall be sought.

### 711.43 FLEXILINK

1. Traffic signal controller software shall provide for a Flexilink mode of operation, when SCATS coordination fails. The Flexilink shall compensate for the intended operation under full SCATS control to the extent possible. The Flexilink shall also be used to operate special features.

#### **711.44 SPECIAL SCATS FEATURES**

1. The software shall include any special SCATS feature, such as XSF bits and MSS bits and special facility signals required by SCATS.

#### **711.45 EPROM OR PERSONALITY CARD COPY**

1. The software will be provided to Main Roads Western Australia on either an EPROM for WinTraff Single Controller Version 6.1.5.0 to Personality on PC and supplied by RMS.

***EPROM or Personality Cards***

1. An EPROM, Personality Card or XPM Dongle copy of the software shall be prepared in suitable form to be installed directly into the Personality Module or Logic Processor card, respectively. The EPROM window is to be covered by a purpose made foil backed label to provide protection from the effect of light and for use as device identification. A label is also to be placed on the cover of the Personality Module. Both labels shall provide the following information:

***EPROM Labels***

- a) Intersection Site Number (i.e. LM).
- b) Intersection Revision Letter.
- c) Checksum of personality in Hexadecimal format.
- d) Date EPROM or Personality Card was programmed.

#### **711.46 - 711.50 NOT USED**

### **TESTING AND DEBUGGING**

#### **711.51 GENERAL**

1. Software shall be thoroughly tested and debugged, following the procedures outlined below, to verify phase sequence, timings, fault modes and exclusion of dangerous operating modes such as display of conflicting control signals. The Contractor must prepare a checklist detailing all checks carried out at each stage of testing and who undertook them. The completed checklist must be provided to Main Roads WA prior to the commissioning of the traffic signals.

***Test Sequence***

#### **711.52 TESTING FACILITY**

1. The Contractor shall prepare a testing facility incorporating a test traffic signal controller for the purposes of thoroughly testing and debugging software. The facility shall have suitable output and input devices that simulate the final environment in which the software will operate, including a connection to SCATS.

***Test Bed***

#### **711.53 INITIAL SOFTWARE TESTING**

1. The software shall be tested on the Contractor's testing facility, without the SCATS connection being in place, against all aspects of the design documentation. If any faults/errors are found the software shall be corrected and completely re-tested again. This process shall be repeated until no errors are found.

***Verify Basic Operation***

#### **711.54 SCATS TESTING**

1. The software shall be tested on the Contractor's testing facility, with the SCATS connection in place and in conjunction with the Traffic Operation Centre SCATS personnel, against all aspects of the design documentation. If any faults/errors are found the software shall be corrected and completely re-tested again (i.e. starting at the test in Clause 711.53). This process shall be repeated until no errors are found on any test.

***Verify  
SCATS  
Operation***

#### **711.55 INDEPENDENT TESTING**

1. The software shall be further tested on the Contractor's testing facility as described above by a person independent of the programmer. If any faults/errors are found the software shall be corrected by the programmer and completely re-tested again (i.e. starting at the test in Clause 711.53) prior to resubmission for independent testing. This process shall be repeated until no errors are found on any test.

***Validate  
Independently***

#### **711.56 TESTING BY MAIN ROADS WA**

1. **Following completion of the above tests, the relevant NGEN file shall be supplied to Main Roads Traffic Operation Centre for review no less than 5 working days prior to the planned commissioning. The testing checklists completed to that time must also be provided to Main Roads WA. If any faults/errors are found Main Roads, the software shall be corrected and completely re-tested again (i.e. starting at the test in Clause 711.53). This process shall be repeated until no errors are found on any test.**

***HOLD  
POINT***

#### **711.57 TRAFFIC SIGNAL CONTROLLER TESTING**

1. For new traffic signal installations or traffic signal modifications that require the installation of a replacement traffic signal controller, the software shall be tested in the controller prior to installation in the field. If the traffic signal controller is not to be replaced then a similar test traffic signal controller must be used. The testing shall be completed with all hardware in place and configured in accordance with the designed controller configuration. If any faults/errors are found the software shall be corrected and completely re-tested again (i.e. starting at the test in Clause 711.53). This process shall be repeated until no errors are found on any test. Documentary evidence of test results must be provided to Main Roads WA prior to any further testing being carried out.

***Testing of  
Replacement  
Controllers***

#### **711.58 SOAK TEST**

1. If a new traffic signal controller is to be installed, then in addition to the testing outlined in Clause 711.57 the new software shall be test run in the new traffic signal controller on site for a minimum period of 48 hours with traffic signals off prior to commissioning. If any faults/errors are detected during this period they must be corrected and if they relate to software then the software shall be corrected and completely re-tested again (i.e. starting at the test in Clause 711.53). This process shall be repeated until no errors are found on any test.

***Burn-in Test***

## POST COMMISSIONING ADJUSTMENTS

### 711.61 COMMISSIONING

1. The operation of the equipment including the software shall be inspected for a minimum period of 30 minutes following commissioning to confirm safe and efficient operation under actual traffic. If any faults/errors are detected during this period they must be corrected and if they relate to software then the software shall be corrected and completely re-tested again (i.e. starting at the test in Clause 711.53). This process shall be repeated until no errors are found on any test.

**Verify  
Operation at  
Site**

2. Complete Documentation shall be provided to Main Roads WA within five (5) working days of commissioning.

**Documentation**

### 711.62 SCATS CONNECTION

1. Verify that the personality checksum has been entered and communications has been established with Main Roads Traffic Operations Centre.

**Check  
SCATS  
Connection**

### 711.63 POST COMMISSIONING

1. Upon commissioning, the Contractor must check (inclusive of 2 x morning peak and 2 afternoon peak traffic flow periods) the operation of the traffic signals for a minimum period of 8 hours during normal weekdays to ensure that timings and other software parameters selected are optimum. The Contractor shall also check the operation of the signal during an off peak period during minimal traffic flows. Particular attention shall be paid to the variation in normal traffic flow due to a nearby shopping centre, sporting centre or other venue that generate varied traffic flow at a particular time such as a Thursday night or Saturday morning.

**Monitor  
Operation  
and Traffic  
Flow**

2. The Contractor must adjust detector settings for sensitivity and presence time for each detector input according to the location and demand requirements for the specific lane. Complete Detector Settings Record card supplied with the Controller including input mapping information.

**Adjust  
Detectors**

3. The Contractor must check with the Traffic Operations Centre for the existence of any SCATS alarms and investigate and rectify any such problems.

**Check for  
Alarms**

4. The Contractor must adjust such parameters where required, produce a new EPROM, Personality Card, or XPM dongle, and new documentation to reflect these changes. The software shall be corrected and completely re-tested again (i.e. starting at the test in Clause 711.53).

**Retesting**

5. The Contractor shall carry out a complete check as listed in Annexure 711L.

## **711.64 CHANGES TO PERSONALITIES**

1. The time allowable for the Contractor to complete any software changes shall be as follows:
  - a) Timing change requirements (changes that cannot be made in RAM) – 12 hours
  - b) Timing changes copied from RAM into EPROM or Personality Card – 7 days
  - c) Phasing changes – 24 hours
  - d) Additional SCATS features – 24 hours
  - e) Emergency personality changes due to incorrect or faulty operation – 1 hour
2. . The updated timings will result in a new sft file being created. If this results in a new checksum then the EPROM or Personality Card in the controller must be replaced.

**711.65 - 711.80 NOT USED**

## **AS BUILT AND HANDOVER REQUIREMENTS**

**711.81 – 711.90 NOT USED**

## **CONTRACT SPECIFIC REQUIREMENTS**

**711.91 – 711.99 NOT USED**

# ANNEXURE 711A

## TRAFFIC SIGNAL PERSONALITIES – WA STANDARD

The NGEN is a standard personality generator program that provides the user with the option of creating a new traffic signal personality, editing an existing traffic signal personality, or examining an existing traffic signal personality. NGEN forms part of the NGEN Adaptive Engineering System that was created by the Roads and Traffic Authority of NSW and used by Main Roads Western Australia.

The version of NGEN currently used in Western Australia is version 6.0.0.4. It must be noted that this version has been modified to meet Western Australia requirements that are listed below.

1. MODE \$0A91

1.1 The MODE entry allows variations to the controller operation to be specified.

1.2 This entry specifies the operation particular to a country or locality e.g. Western Australia.

Refer Appendix 711B.

2. CMODE \$0297

2.1.1 It is necessary to specify the nominal mains voltage to allow the controller to set up correct voltage thresholds for conflict monitoring. The controller is also able to provide voltage control and dimming. Refer Appendix 711C.

3. MAXTAB

(Table of Maximum Time Settings): SPARE = 1500  
PRES 1-8 = 150  
PRES 9-16 = 150  
PRES 17-24 = 150  
SPECIALS 9-16 = 2500

The Maximum Limits for the controller time settings are fixed by the entries in the MAXTAB Table. Refer Appendix 711D.

4. CDEF

(Indexed Condition Definitions):

CDEF 23 FDB PSTAT-RAM Ped X in Delay, Walk or Clearance 1.

FDB \$7C

CDEF 24 FDB PSTAT-RAM Ped X in Delay, Walk or Clearance.

FDB \$7E

Note that each pointer references the base address of an array of locations, which may be tested. The test value to be used in each condition test immediately follows the pointer for the particular condition test.

5. Pointers To Sunrise and Sunset Times

DIMPR FDB DIMDAT-PERS

6. Manufacturers Data

SPECPR FDB MANDAT-PERS

7. Pointers To Tables

REDRPR	FDB	REDRUN-PERS
8.	DIMDAT	(Dimming Data)
DIMDAT	EQU	*
SUMDWN	FDB	04
	FDB	35
WINRIS	FDB	07
	FDB	18
WINSET	FDB	17
	FDB	18
SUMDSK	FDB	19
	FDB	54

Refer Appendix 711E.

9. Conflict Characteristic Matrices for Conventional Signal Groups

CFTAB9 Pelican Vehicle vs Pedestrian  
 Pedestrian Group with Flashing Don't Walk for Clearance  
 Flashing OFF is conflict

10. Signal Group Type Tables for Conventional Signal Groups

PELVEH EQU \$85 Pelican Vehicle Group Type

11. Special Condition Definitions

COMMS EQU \$D980 SCATS Communications  
 MZNEG EQU \$9810 SCATS Master ZNEG  
 NMZNEG EQU \$D810 No SCATS Master ZNEG  
 NCOMMS EQU \$9980 No SCATS Communications  
 FILTR1 EQU \$9401 LSB (Bit 1) Set In SCATS XSF Message  
 NFILTR1 EQU \$D401 No LSB (Bit 1) Set In SCATS XSF Message  
 MZPOS EQU \$9820 SCATS Master ZPOS  
 NMZPOS EQU \$D820 No SCATS Master ZPOS  
 FILTR2 EQU \$9402 LSB (Bit 2) Set In SCATS XSF Message  
 NFILTR2 EQU \$D402 No LSB (Bit 2) Set In SCATS XSF Message  
 SPECTO EQU \$AF23 Special Timer 1 Timed Out  
 NSPECTO EQU \$EF23 Not Special Timer 1 Timed Out

Refer Appendix 711F.

12. MANDAT (Manufacturers Data)

MANDAT EQU \*

Changes the lamp threshold to 15 Watts

Refer Appendix 711G.

13. Pointers to flexilink tables

\*\*\* Pointers to flexilink tables

FCALPR	FDB	0	
FRELPR	FDB	RELPR1-PERS	Pointer to flexilink release table

\* Flexi sequence selection

\*  

	FDB	FLEXI,YPOS
	FDB	SELSEQ,2
	FDB	ELSE
	FDB	SELSEQ,1

\*

\*\*\* FLEXILINK TABLES

\*\*\* Flexilink release data

RELPR1	FDB	S1REL-PERS	Sequence 1
	FDB	S2REL-PERS	Sequence 2

\*

S1REL	EQU	*	
	FDB	END	Auto release phases
	FDB	END	R- release phases
	FDB	END	R+ release phases
	FDB	END	Q- release phases
	FDB	END	Q+ release phases
	FDB	END	Auto release groups
	FDB	END	R- release groups
	FDB	END	R+ release groups
	FDB	END	Q- release groups
	FDB	END	Q+ release groups

\*

S2REL	EQU	*	
	FDB	END	Auto release phases
	FDB	END	R- release phases
	FDB	END	R+ release phases
	FDB	END	Q- release phases
	FDB	END	Q+ release phases
	FDB	END	Auto release groups
	FDB	END	R- release groups
	FDB	END	R+ release groups
	FDB	END	Q- release groups

FDB      END

Q+ release groups

14.      Programmer's details

Name:      \_\_\_\_\_

Address:    \_\_\_\_\_

\_\_\_\_\_

Tel:      \_\_\_\_\_

Email:     \_\_\_\_\_

15.      Special Features

The programmer's shall provide any special features related to the supplied software, e.g. source of code, etc.

# ANNEXURE 711B

## SPECIAL OPERATION MODES

The MODE entry allows variations in the controller operation to be specified. This entry specifies the operation particular to a country or locality.

The bits in the MODE are defined as follows:

Bit 15	-	1	Unused
	-	0	Unused
Bit 14	-	1	To select Flexilink daycodes for Muslim countries
	-	0	To select standard Flexilink daycodes
Bit 13	-	1	For Flexilink reference at midnight (2am Hong Kong)
	-	0	For Flexilink reference at last plan change time
Bit 12	-	1	For no restart from Fault Mode
	-	0	For restart from Fault Mode up to limit in FAILS
Bit 11	-	1	For overriding 5 second minimum for Minimum Green times
	-	0	For zero minimum limit permitted for Minimum Green times
Bit 10	-	1	Reserved (for Hardware Clock as master for Flexilink)
	-	0	Reserved
Bit 9	-	1	For one second cycle generator steps in Flexilink
	-	0	For two second cycle generator steps in Flexilink
Bit 8	-	1	For New Zealand ped feature (D/W extinguished until ped demand)
	-	0	For normal pedestrian operation
Bit 7	-	1	For Flashing Yellow and All Red start up sequence
	-	0	For starting Green start up sequence
Bit 6	-	1	For Maximum Green timed from start of Minimum Green
	-	0	For Maximum Green timed in Extension interval only
Bit 5	-	1	For starting Red/Yellow before Green
	-	0	For normal Green following Red
Bit 4	-	1	For restart by Lamps On (eg Y+ under SCATS operation)
	-	0	For no restart when lamps switched on
Bit 3	-	1	For Flashing Walk for Pedestrian Clearance
	-	0	For Flashing Don't Walk for Pedestrian Clearance
Bit 2	-	1	For Flashing Green before Yellow for vehicle displays
	-	0	For normal Yellow vehicle displays
Bit 1	-	1	For operation with 60Hz mains frequency
	-	0	For operation with 50Hz mains frequency
Bit 0	-	1	To disable loading time settings into EEPROM
	-	0	To enable loading time settings into EEPROM

Notes:

1. Bits 4 and 7 are normally specified together
2. Bits 2 and 5 may not be specified together

\*\*\* SPECIAL OPERATION MODE  
MODE FDB \$0A91



## ANNEXURE 711D

### TABLE OF MAXIMUM TIME SETTINGS

The Maximum Limits for the controller time settings are fixed by the entries in the MAXTAB Table. Normally this table would not need to be altered, however the option is available should the need arise.

The table entries are expressed in tenths of seconds

\*\*\* TABLE OF MAXIMUM TIME SETTINGS:

MAXTAB	FDB	50	SPARE
	<i>FDB</i>	<i>200</i>	<i>LS GRN</i>
	FDB	200	MIN GRN
	FDB	50	INC
	FDB	400	MAX INITIAL
	FDB	1500	MAX
	FDB	200	ECO GRN
	FDB	64	AMBER
	FDB	150	ALL RED
	FDB	150	SPECIAL ALL RED
	FDB	100	GAP 1
	FDB	100	GAP 2
	FDB	100	GAP 3
	FDB	100	GAP 4
	FDB	50	HWAY 1
	FDB	50	HWAY 2
	FDB	50	HWAY 3
	FDB	50	HWAY 4
	FDB	500	WASTE 1
	FDB	500	WASTE 2
	FDB	500	WASTE 3
	FDB	500	WASTE 4
	FDB	200	PED DELAY
	FDB	400	WALK
	FDB	400	CLR1
	FDB	100	CLR2
	FDB	50	PRES 1-8
	FDB	50	PRES 9-16
	FDB	50	PRES 17-24
	FDB	150	SPECIAL MOVEMENTS
	FDB	2000	SPECIALS 9-16
	FDB	2000	SPECIALS 17-40

## ANNEXURE 711E

### DIMMING TABLE

\*\*\* DIMMING TABLE

DIMDAT	EQU	*	
SUMDWN	FDB	04	Earliest summer dawn - Hours
	FDB	35	Earliest summer dawn - Minutes
WINRIS	FDB	07	Latest winter sunrise - Hours
	FDB	18	Latest winter sunrise - Minutes
WINSET	FDB	17	Earliest winter sunset - Hours
	FDB	18	Earliest winter sunset - Minutes
SUMDSK	FDB	19	Latest summer dusk - Hours
	FDB	54	Latest summer dusk - Minutes

## ANNEXURE 711F

### SPECIAL CONDITION DEFINITIONS

#### \*\*\* SPECIAL CONDITION DEFINITIONS

COMMS	EQU	\$D980	SCATS COMMUNICATIONS
MZNEG	EQU	\$9810	SCATS MASTER ZNEG
NMZNEG	EQU	\$D810	NO SCATS MASTER ZNEG
NCOMMS	EQU	\$9980	NO SCATS COMMUNICATIONS
FILTR1	EQU	\$9401	LSB (BIT 1) SET IN SCATS XSF MESSAGE
NFILTR1	EQU	\$D401	NO LSB (BIT 1) SET IN SCATS XSF MESSAGE
MZPOS	EQU	\$9820	SCATS MASTER ZPOS
NMZPOS	EQU	\$D820	NO SCATS MASTER ZPOS
FILTR2	EQU	\$9402	LSB (BIT 2) SET IN SCATS XSF MESSAGE
NFILTR2	EQU	\$D402	NO LSB (BIT 2) SET IN SCATS XSF MESSAGE
SPECTO	EQU	\$AF23	SPECIAL TIMER 1 TIMED OUT
NSPECTO	EQU	\$EF23	SPECIAL TIMER 1 NOT TIMED OUT
ADJUST	RMB	8-*&7	ADJUST * TO 8 BYTE BOUNDARY
TAIL	FDB	\$FF	CHECKSUM FOR ENTIRE PERSONALITY
	FDB	\$FF	CHECKSUM CORRECTOR
		END	

## ANNEXURE 711G

### MANUFACTURER'S DATA

These modifications to the Personality change the lamp threshold to 15 Watts

\*\*\* MANUFACTURER'S DATA

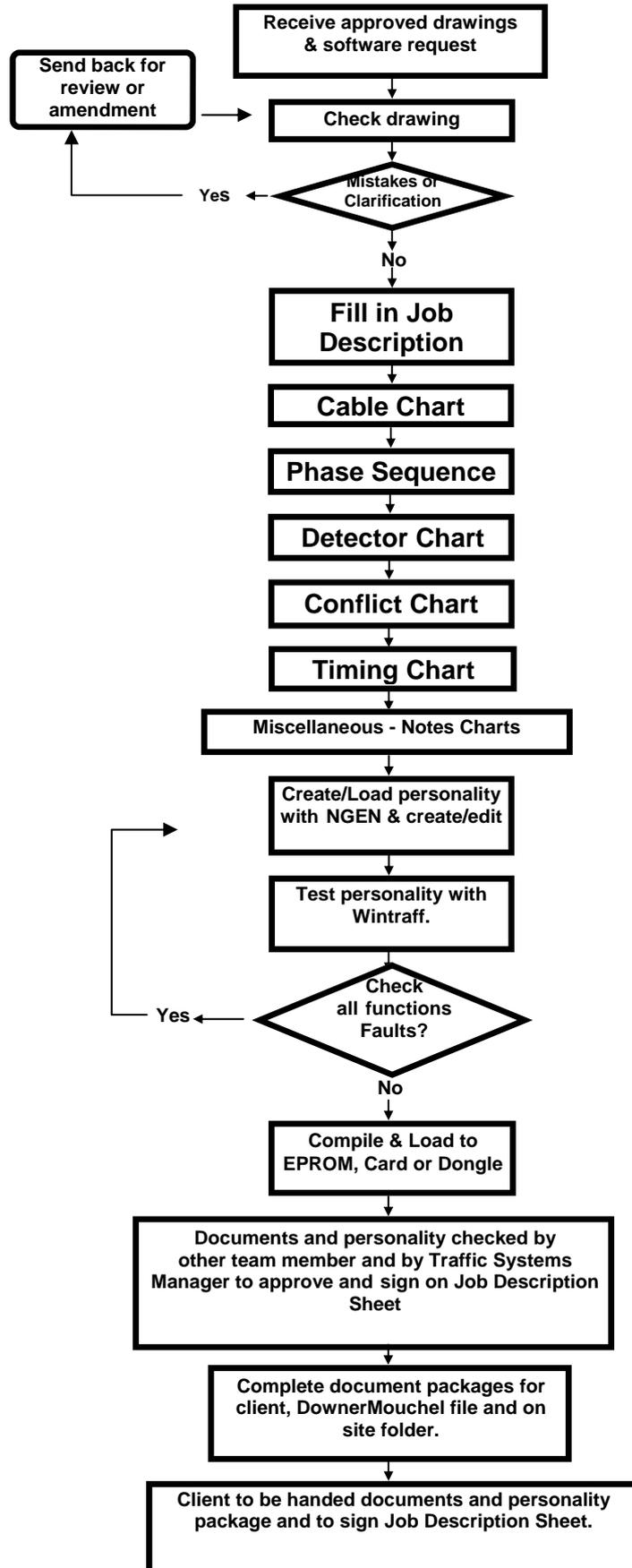
SPECPR                    FDB    DIMDAT-PERS

(Enter MANDAT Table below DIMDAT Table)

MANDAT	EQU	*	
	FDB	\$0C00	Identifies this as a Philips Personality
	FDB	\$FFFF	Assumes detector setting tables are not used
	FDB	\$FFFF	No options
	FDB	\$000F	Lamp threshold = 15 Watts (000F = 15 decimal)
	FDB	\$0000	End (table terminator)

# ANNEXURE 711H

## TRAFFIC SIGNALS PROGRAMMING PROCESS



# TRAFFIC SIGNALS PERSONALITY SOFTWARE CHECK-LIST

LM: ..... REV: .....	
INTERSECTION: .....	
	✓
Confirm LM#, Intersection Name and the Revision number.	
For existing sites (upgrades) or checking someone's work. Check documentation and compare with drawings (e.g. number and type of phases, number of Signal Groups, Detectors and Peds.) Also any special features – AWFS, UPS, Railway etc.	
Load and start Program using WinTraff or a Workstation. Note the start-up phase sequence and the revert phase.	
Check all Programmed times with the Timing Chart and posted speed limits. Modify SCATS Ram Times as required (Flexi, Call-backs for Diamonds and Repeat phases).	
Check Detector operation; note Approach numbers, Ped demands, overlaps and call-away phases. If possible check input mapping and peds via external inputs.	
Check Signal Phasing as well as overlaps of all signal groups as per chart.	
Verify Signal Phasing notes where possible e.g. Late Starts, Minimum Off/Green-states, Call-back Flags via flexi-link	
Check All signal conflicts and confirm with drawing and chart.	
Check Conflict Chart against Drawings and program settings	
Confirm special movements during Diamonds and Emergency calls.	
Confirm Pedestrian protection and test for conflicts at various BST intergreen stages.	
Run phases and signals in random order, noting overlaps and pedestrian protection (see Phase Chart). Place ped demands during intergreens.	
Check cable chart(s) against supplied drawings.	
Check for additional documentation, e.g. Filter detector operation, Railway Charts, UPS information, Advanced warning signs data, Timer Protected Ped information	
Check for standard Chart/document formatting with up to date logo's, headers & footers	
Confirm Personality operation on a "loaded" work-station or Test controller if possible with a Scats (Comms) connection for testing Scats features.	
Confirm Total check-sum as per Timing chart and tested Personality.	
Check and complete <i>Job Description Form</i> for valid data and Drawing numbers.	
Confirm all documentation has been copied to the "Inters" network folder including : Program file (.M68), Timing file (.HEX) and Compiled file (.SFT)	
Amend and mark any errors on charts/ drawing in <b>red</b> if possible	
Create / Fill out data in the Downer Signals Database.	
 <i>Notes:</i>	
 <i>Name:</i> .....	
<i>Signature:</i> ..... <i>Date:</i>	

## INITIAL SOFTWARE TEST

LM: .....	
INTERSECTION: .....	
REQUIRED ACTIONS ON SITE / REMARKS	RESULT
<b>Visual Check of Site:-</b>	
1. Lines and Signage correctly installed.....	Yes/No/NA
2. Visual check of lamp displays completed and all correct.....	Yes/No/NA
3. Lamps / Poles correctly aligned.....	Yes/No/NA
<b>Controller Check:-</b>	
4. Lamp 'Relearn' carried out, wattages checked.....	Yes/No/NA
5. Loops activating correctly.....	Yes/No/NA
6. Loops sensitivity, frequencies & Ptim settings set correctly, and Detector Settings sheet completed.....	Yes/No/NA
7. NRT(s) tested and NRT lamp(s) operational.....	Yes/No/NA
8. New documentation installed.....	Yes/No/NA
9. Relevant old paperwork transferred to site folder.....	Yes/No/NA
10. Confirm UPS Tested and Operational.....	Yes/No/NA
11. Confirm ammended red ink markup drawing(s) are in the folder.....	Yes/No/NA
12. Confirm ammended site inventory form is in folder.....	Yes/No/NA
13. Push buttons physically tested.....	Yes/No/NA
14. Railway call, early and late calls are operating correctly .....	Yes/No/NA
15. Communications to site confirmed with TOC.....	Yes/No/NA
<b>Notes:</b> ..... .....	
Name:.....	
Signature:.....Date:.....	

## ANNEXURE 711L

### SITE POST COMMISSIONING CHECKS

Upon commissioning, the Contractor must check the operation of the traffic signals as listed below:

#### 711 L.1 Operations check

- Ensure that all vehicular and pedestrian movements are executed safely.
- Ensure that all Signal Groups are operating as per design drawing and as specified in the Phase Sequence Chart.
- Verify the operation of all signal groups overlap as specified.
- Ensure that the pedestrian protection (time separation, short arrow, and full protection) is adequate and operating correctly.
- Check that all software documentation in controller folder is up to date and accurate.

#### 711 L.2 Timing checks

- Check that the minimum value is displayed for a safe minimum time for vehicles to enter the intersection.
- Check that the maximum green values are correct for Isolated operation in peak periods.
- Check the yellow values are set according to the posted speed limit and the road gradient.
- Check that the all-red values allow a safe clearance of vehicles within the intersection.
- Check that the Gap / Headway / Waste values are adequate for each approach.
- Check the pedestrian clearance times are adequate.
- Check the Advanced Warning Flashing Signs (AWFS) times are adequate.

Timings can be adjusted in RAM through the KDU or SCATS. When all the timings are finalised the timings are burned in a new EPROM or Personality Card and installed on site.

#### 711 L.3 Demands and Extension

- Ensure that all pedestrian pushbuttons demands are registered and activated to service the corresponding crossing.
- Ensure that all the loops demand and extensions operate as per design and detector chart to demand and extend the corresponding movement.

#### 711 L.4 SCATS Checks

- Ensure that SCATS communications are correctly established.
- SCATS Masterlink/Flexilink features operate as specified.
- Check that the SCATS controlled operation is correct with special flags and XSF bits correctly set and cleared.
- Check that all special functions under Masterlink or Flexilink control are operating correctly.

## SPECIFICATION 711 GUIDANCE NOTES

DELETE THESE GUIDANCE NOTES FROM FINAL DOCUMENT AFTER USING FOR REFERENCE

All edits to downloaded TDP documents shall be tracked (most word processing software allows this to be done automatically). Deletions shall be struck through e.g. ~~example~~. Insertions shall be in italics e.g. *example*. If **all** information relating to a clause is deleted then the clause number should be retained and the words "**NOT USED**" should be inserted.

The proposed documents with tracked changes shall be submitted to the Project Manager for review, prior to printing the final batch of documents. When this final printing is carried out, the tracked changes option is to be **turned off**.

The Custodian of this specification is the Electrical Engineer.

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### 1. SCOPE

1.1 This Specification primarily covers the requirements for **new** Traffic Signal Software.

1.2 Where **modifications** to existing Traffic Signals are proposed, then the scope (Clause 711.01) will need careful editing to clearly outline the extent of the Works.

1.3 This Specification is **not** suitable for Traffic Signals Installations undertaken by Public Transport Authority.

### 2. TRAFFIC SIGNAL CONTRACTS

2.1 Where this specification is used in a contract that is solely or predominantly for the installation of traffic signals, inclusion of and cross-referencing to other relevant specifications is likely to be required, such as:

Specification 100 GENERAL REQUIREMENTS

Specification 302 EARTHWORKS

Specification 901 CONCRETE – GENERAL WORKS

Specification 908 ANTI-GRAFFITI

### CONTRACT SPECIFIC REQUIREMENTS TO ADD OR DELETE

The following clauses are to be placed under the CONTRACT SPECIFIC REQUIREMENTS as required.

NONE AT THIS TIME.

## SPECIFICATION AMENDMENT CHECKLIST

Specification Name: No: **711** Revision No: \_\_\_\_\_ Title: **TRAFFIC CONTROL EQUIPMENT SOFTWARE**

Project Manager: Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Checked By: Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Contract No: \_\_\_\_\_ Contract Description: \_\_\_\_\_

ITEM	DESCRIPTION	SIGN OFF
<i>Note: All changes/amendments <b>must</b> be shown in Tracked Change mode until approved.</i>		
1.	Project Manager has reviewed Specification and identified Additions and Amendments.	
2.	<b>CONTRACT SPECIFIC REQUIREMENTS</b> addressed? – Contract specific materials/products/clauses added? (Refer Specification Guidance Notes for guidance).	
3.	Any unlisted Materials/Products proposed and approved by the Project Manager? – if “Yes” provide details at 15.	
4.	Standard Clauses amended? – <b>MUST SEEK</b> approval from MCP.	
5.	Clause deletions shown as ‘NOT USED’.	
6.	Appropriate <b>INSPECTION &amp; TESTING</b> parameters included in Spec 201 (Test Methods, Minimum Testing Frequencies verified).	
7.	<b>ANNEXURES</b> completed (Refer Specification Guidance Notes).	
8.	<b>HANDOVER</b> and <b>AS BUILT</b> requirements addressed.	
9.	Main Roads QS has approved changes to <b>SMM</b> .	
10.	Project Manager certifies completed Specification reflects intent of the design.	
11.	Completed Specification – independent verification arranged by Project Manager	
12.	Project Manager’s review completed.	
13.	<b>SPECIFICATION GUIDANCE NOTES</b> deleted.	
14.	<b>TABLE OF CONTENTS</b> updated.	
15	Supporting information prepared and submitted to Project Manager.	
Further action necessary:		

Signed: \_\_\_\_\_ (*Project Manager*) Date: \_\_\_\_\_