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Auckland Traffic Management Unit

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AN INTEGRATED TRAFFIC MANAGEMENT PARTNERSHIP

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Appendices

1. Acknowledgements

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2. Glossary

Controller	The equipment (including the housing) that switches power to signal lanterns and controls the duration and sequence of signal displays as defined by the controller personality.
Controller Information Sheets (CIS)	The information used by the software specialist to generate a specific Controller Personality file
Controller Personality	The unique program stored in the PROM or PCMCIA, which configures the controller to the specific operational design of the intersection.
Network Management Operation (NMO)	The consultant tasked with assisting the TMU with managing the flow of traffic throughout the Auckland Region
PCMCIA card	A plug-in card in the Controller that the controller personality information is loaded into. Used in TSC/4 compliant controllers. In this document PROM refers to either a PROM or a PCMCIA card.
PROM	A computer chip containing the controller personality information housed in the TSC/3 compliant controller. In this document PROM refers to either a PROM or a PCMCIA card.
Road Asset and Maintenance Management (RAMM)	An Internet accessible system that stores the Traffic Signal assets, associated files and records the activity of the Maintenance Contractors on the Maintenance Contracts of the LTAs.
RCA	Road Controlling Authority
Road Transport Authority of New South Wales RTA (NSW)	The Authority that is accepted as the basis for the TMU standards and for product approval
Sydney Co-ordinated Adaptive Traffic System (SCATS)	A fully adaptive area wide control system for traffic signals.
Traffic Management Unit (TMU)	Organisation tasked with managing the flow of traffic throughout the Auckland Region by monitoring SCATS and also responsible for routing all fault calls to the various traffic signal maintenance contractors.
WinTraff	A software programme used to test the controller personality file.

3. Background

The Auckland Traffic Management Unit (TMU) has prepared this document to assist those responsible for converting the Traffic signal design plans into operational software to run the controllers. The process and standards adopted have been created to ensure that controller information is being created consistently to promote safety and efficiency at intersections. This document will assist all intersections to be designed to the highest standard, with variations being the exception rather than the norm.

There are 22 differing types of controller personalities into which all signalised intersections can be categorised. (A copy of the list is in appendix K.) It is important that these 22 types of controller personalities are standardised and maintained as such. This allows adjustments required due to changes in traffic demand to be quick and simple and to make for documentation concise.

This document details the process used to create the controller information sheets, from which a controller personality is created and then stored in the PROM when either new intersections are installed or existing ones modified. This document does not cover the geometric, traffic signal layout or phasing design of the intersection as this is assumed to have been completed prior to this process commencing.

Note: The “TMU Traffic Signals Design Guidelines document is to be used in conjunction with this document.

4. Review of information provided to TMU

The information provided to the TMU as part of the brief from the RCA is reviewed and checked off against the **Project Information Sheet** to ensure that all documentation required to undertake the work has been provided. If insufficient data has been provided then the TMU will request the missing information and the project may have to be put on hold if the required information is critical to the software development. This is to ensure that assumptions are not made at this early stage that could result in an inappropriate controller personality being created for an intersection. A copy of the Project Information Sheet is attached in Appendix B.

In many instances the person preparing the Controller Information Sheet (CIS) requires a site visit to verify and take physical measurements to ensure the accuracy of the information. This is critical to the calculation of pedestrian crossing times, clearance times, amber and red times as well as measuring conflict distances, which may override the all red calculations.

5. Preparation of Project Tracking Sheet

Once the TMU has received confirmation from the RCA that a new personality is required for an intersection a **Project Tracking Sheet** is created. This sheet tracks the progress of the project from the review of the information supplied to the creation of the controller information sheets to the installation of the new PROM. A copy of the Project Tracking Sheet is attached in Appendix C.

This sheet contains a list of checkpoints that indicate the various milestones that must be met and signed off before progressing to the next stage. The project tracking sheets requires each step to be dated and signed upon completion thus ensuring that a record of all jobs and their status can be maintained and reported.

6. Preparation of Controller Information Sheets (CIS)

The **Controller Information Sheets** (CIS) consist of 12 pages covering all the information required to generate a controller personality file and create a PROM for a set of traffic signals. A copy of the sheets is attached in Appendix G. The CIS is prepared based on the information supplied by the TMU. The information covered in the CIS is listed below. This is a continuing improvement process and as new items are deemed to be included they are added and the revision number amended. The current revision number is 14.

- Intersection Layout and Phasing - Cover
- Installation Notes
- Signal Group Definitions – Active phases
- Signal Group Modifications
- Phase Information
- Prohibits and Maximum Transfers
- Max Control and Reversion
- Detectors
- Red Light Running Data
- Detector Alarm Categories
- Detector Types
- Presence Detector Delays
- Time Settings
- Phase Special All Reds and Special Movement All Reds
- Phase Approach Timers
- Detector Table Modifications
- Pedestrian Times
- Pedestrian Protection Type
- Special Purpose Timers
- Audio Times
- Lamp Dimming Voltage
- Notes
- Special Logic Notes
- Flexi link Data Sequences
- Master link and Flexi link Special Flags
- Flexi link Plan Data
- Flexi link Schedule Data
- Conflict Matrix
- All-Red calculations

Once the CIS has been completed it is peer reviewed. Any changes required are forwarded to the software specialist who created the CIS. The amended CIS is then resubmitted to the TMU for final review and acceptance.

Note: The version level must be incremented each time a change is made to the document. The electronic file is to be named as per the procedure in Appendix D.

6.1 Intersection Layout and Phasing – Cover Page

This page contains a schematic of the intersection layout and phasing. The layout includes the following information;

- Lane configuration;
- Roadmarking;
- North point;
- Controller location;
- Detector locations and numbering including pedestrian;
- Signal group numbering including pedestrians.

6.2 Installation Notes

This page provides information on the intersection location and whether this project is a new installation, upgrade or modification. It also tracks who is creating the CIS and the date on which it was created.

The installation notes also provide information on whether hardware and/or SCATS data changes are required prior to installation of the PROM, eg if the wiring needs to be modified or SCATS data needs to be updated. Defines the type of Controller the software is written for.

6.3 Signal Group Definitions – Active Phases

When completing the Signal Group Definitions table for vehicle signal groups, show the appropriate phase that each will be displayed in e.g. A, F, F1, etc, for pedestrian movements show W in the appropriate phase. The appropriate pedestrian movement number with the signal group number e.g. P1(16), P2(13), etc should be shown in the table.

The signal group table number must be specified using DO for diamond overlap movements and if a table is to be modified this needs to be recorded in the special logic. Diamond lead phasing has strict convention, which must be followed.

Details on signal group conventions are detailed below and examples of typical intersection layouts and signal group numbering are attached in Appendix H.

Vehicle signal groups are numbered anticlockwise generally main road first, followed by the side roads, then auxiliary arrows. Pedestrian signal groups are numbered anticlockwise with the main roads first and side roads second using the last group and numbered in ascending order, e.g. 4 Peds in a 16 group controller will be denoted as (P1=16, P2=15, P3=14, & P4=13.) If only two Pedestrian groups then P1=16 and P2 =15.

Table 1 Signal Groups

8 Signal Group					12 Signal Group															
With 1 Ped			With 2 Peds		With 1 Ped			With 2 Peds			With 3 Peds			With 4 Peds			With 5 Peds		
1					1															
2					2															
3					3															
4					4															
5					5															
6					6															
7			7	- P2	7															
8	- P1		8	- P1	8													8	-	P5
					9									9	-	P4		9	-	P4
					10						10	-	P3	10	-	P3		10	-	P3
					11			11	-	P2	11	-	P2	11	-	P2		11	-	P2
					12	- P1		12	-	P1	12	-	P1	12	-	P1		12	-	P1

Similarly across the top end for 16, 24 and 32 detectors (i.e. Ped #1 has highest Signal Group number.)

6.4 Signal Group Modifications

Any signal group tables that need to be modified should be shown with an ‘M’ supplement e.g. 39M, details filled in the ‘Signal Group Modifications’ table. All variations must be listed on the CIS with reasons given for the exception. Thus should conditions change then it is easy to determine if the exception is still valid or not.

6.5 Phase Information

The following information must be entered in the phase information table;

» Default cycle Start Phase – normally A phase

» Default phase sequence

» Alternative Sequence for Flexilink use

Details on phasing conventions are detailed in the Traffic Signals Design Guidelines, Section 4.5

6.6 Prohibits and Maximum Transfers

Any phase transition prohibits must be entered as well as any maximum time ‘transfer’ or ‘steal’ operation.

6.7 Max Control and Reversion

Details of any Max control and reversion operation must be indicated in this table. This is normally associated with advance loops only.

6.8 Detectors

The details of the detector card that exists or will be installed in the controller must be entered.

6.8.1 Variable Initial Green (VIG) Detectors

The details of the detectors and signal groups involved with VIG (variable Initial Green) must be entered here. This is normally associated with advance loops only.

6.8.2 Calling Detectors

For calling detectors enter the vehicle detectors that will use locking or non-locking calls and the pedestrian detector and the movement number e.g. P1(13), etc. Note that advance loops will normally extend only and not call a phase for safety reasons. Any associated phase Flags e.g. Z-, Z+, etc should also be entered.

There are four approach times for each Phase. If possible it is desirable to separate detectors

Details on detector conventions are detailed below.

6.9 Red Light Running Data

Defines which detectors will be monitored and which Virtual detectors will record the count. These are normally inserted from the first detector number after the last logical input. If there are 16 inputs in the controller the red light counting will start at 17.

6.10 Detector Alarm Categories

The appropriate DAC for each detector must be entered here and the action that a 'Call and extend' or 'Call only' alarmed detector will take. A copy of the detector alarm categories is in appendix H.

6.11 Presence Detector Delays

Details of the presence detector delays should be entered if loops are likely to be traversed by vehicles and call unnecessary phases.

6.12 Time Settings

The appropriate vehicle phase time settings must be entered. Time settings for Yellow and red times and pedestrian times must be calculated. SIDRA or other design program results may be available and used to set time settings.

The automatic links in the CIS Worksheets ensure that the Yellow/Red/Special Red times will be automatically transferred from the 'All Red' worksheet.

Below are the standard timings to be used. These are modified when unusual conditions exist, eg uphill grades, large percentage of heavy vehicles, school crossings, elderly people, large numbers of pedestrians etc. and for particular vehicle or signal group tables.

Table 2 Standard Time Settings

	Seconds
Minimum green	5.0*
Red arrow off displays	5.0
Vehicle Late Start for pedestrians	3.0
Yellows minimum	4.0 – should be calculated
Red minimum	1.0 – should be calculated
SCATS loop extension/gap	3.0
Headways through lane	1.2
Headways right turning lane	0.8
Headways left turning lane	1.0
Waste times minimum	4.0
Waste times maximum	10% of max. green

* Can go to 3.0 seconds for right turn

6.13 Phase Special All Reds and special Movement All Reds

Details of special All Red times must entered and the location of the time setting specified either the phase for special All Red or the special movement time setting number.

6.14 Phase Approach Timers

The phase approach timers must be entered here and where practical all approach timers should be used by allocating each detector loop a timer so that it may be individually adjusted.

For diamond phase operation B, C, F1 and F2 allow the through detectors to extend with a positive value where required or 0.1 where not initially required but available for future adjustment. G and D in a double diamond need not use the through loops for extending as both have A and E respectively permanent demand for overlap.

The standard approach timer layout for diamond phasing to be used is as follows:

Phase	Detectors	Table	SG
A	1,2	DO	2
	7,8	DO	1
B	3	DO	3
	1,2	DO	1
C	7,8	DO	2
	9	DO	4

Phase	Detectors	Table	SG
Diamond	3	DO	3
	9	DO	4

6.15 Detector Table Modifications

Any Detector tables that need to be modified should be shown with an 'M' supplement e.g. 39M, details filled in the Detector Modifications table. All variations must be listed on the CIS with reasons given for the exception. Thus should conditions change then it is easy to determine if the exception is still valid or not.

6.16 Pedestrian Times

Details of the pedestrian movements and times must be entered. The automatic links in the CIS Worksheets ensure that the clearance times will be automatically transferred from the 'All Red' worksheet.

Table 3 Standard Pedestrian Timings

	Seconds
Vehicle Late Start for pedestrians	3.0
Pedestrian cross times	6.0
Pedestrian clearances	as per Austroads Part 7*

*clearance 1 + clearance 2 = kerb to kerb width divided by 1.2 m/s

clearance 2 = intergreen – 2.0 seconds

clearance 3 = 2 seconds

There are three main controller timers available to provide pedestrian movement protection they are late start, delay and special timers.

» Late Start allows the introduction of some signal groups to be delayed from the start of a phase.

» Delay allows the introduction of a pedestrian movement to be delayed from the start of a phase.

» Special timers 11-19 are commonly used for timing the duration of the red arrow for timed pedestrian protection. The arrow time can be for the walk time; walk plus part clearance time or the walk plus clearance time as appropriate.

Any one or a combination of the three timers can be used to provide protection. The following are details of the different situations that commonly occur and the timers to be used.

6.17 Pedestrian Protection Type

Details of the type of pedestrian protection proposed and special timers must be entered. These times are dependant upon local conditions and may vary depending upon RCA requirements.

6.17.1 Right Turn Traffic from a previous Right Turn or Filter Turn Phase

Use the pedestrian delay timer to hold the introduction of the pedestrian movement after the start of the phase. The delay time to be measured as the time the right turn vehicle will take to clear the conflict point with the pedestrian after the previous phase All Red period has finished. This delay will be in the order of 1.0 second. Using the delay timer will allow all other unaffected vehicle movements to start at the phase start time.

6.17.2 Through Traffic from a previous Through Phase

Use the pedestrian delay timer to hold the introduction of the pedestrian movement after the start of the phase. The delay time to be measured as the time the through vehicle will take to clear the conflict point with the pedestrian after the previous phase All Red period has finished. The delay time will be in the order of 1.0 second. Using the delay timer will allow all other unaffected vehicle movements to start at the phase start time.

6.17.3 Right Turn Traffic from a current Filter Turn Phase – Right Turn Red Arrow available

Use the vehicle Special Timer to hold the Right Turn Red Arrow for an appropriate time. This time will be the equivalent of the walk time. Using the Special Timer will allow all other unaffected vehicle movements to start at the phase start time.

6.17.4 Right Turn Traffic from a current Filter Turn Phase – No Right Turn Red Arrow available

No measures are normally required for pedestrian protection from an uncontrolled filter right turn. The fact that the right turn driver must first Give Way to through traffic would normally mean that the driver is unable to proceed until later in the phase.

6.17.5 Left Turn Traffic from a current Filter Turn Phase – Left Turn Red Arrow available

Use the vehicle Special Timer to hold the Left Turn Red Arrow for an appropriate time. This time will be the equivalent of the walk time. Using the Special Timer will allow all other unaffected vehicle movements to start at the phase start time.

6.17.6 Left Turn Traffic from a current Filter Turn Phase – No Left Turn Red Arrow available

Use the vehicle Late Start to hold the Full Green display adjacent to the pedestrian movement for an appropriate time. This time will be three seconds. All other unaffected vehicle movements can start at the phase start time.

6.18 Special Purpose Timers

Details of any special timers must be entered. Special timers 11-19 are commonly used for timing the duration of the red arrow for timed pedestrian protection. The arrow time can be for the walk time; walk plus part clearance time or the walk plus clearance time as appropriate. Special timer 20 is for the standard All Red on start up.

The common special timer requirements are listed below.

Table 4 Special Purpose Timers

Timer Number	Details
1	Reserved for diamonds
2	Reserved for diamonds
3	Reserved for diamonds
4	Reserved for diamonds
5	Reserved for diamonds
6	Reserved for diamonds
7	Reserved for diamonds
8	Reserved for diamonds
9	Reserved CT B/C
10	Reserved CT F1/F2
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	All Red Start (10)
21	
22	
23	
24	

Any change to the standard time settings for audio tactile buzzers should be noted.

6.19 Audio Times

This feature allow the audio beeping to be muted during certain hours in residential areas. Details of the agreed times should be entered.

6.20 Lamp Dimming Voltage

Details of the times should be set as per the geographic location. The latest controllers generally have 10% or 20% dimming based upon wattage.

6.21 Notes

Any notes appropriate to standard operation should be detailed here. Features activated by the Z-, Z+, XSF bits must be listed.

6.22 Special Logic

Any special features that are peculiar to this particular site must be detailed here including;

- Special timer information
- Bus priority information

6.23 Flexi link Data

The appropriate Flexilink data for both the default sequence and the alternative sequence must be noted here.

In a controller PROM the minimum amount of data required for Flexilink operation is:

- Default and Alternative Sequences
- Look Ahead To
- Release
- Special Flags

Generally the Pivot phase will be A phase. It is important to allow “Look Ahead To” for the appropriate phases to ensure the controller will move through the sequence if a phase gaps or is skipped. Use release pulses (R-, R+, Q-, Q+) in order for up to four main phases in the default and alternative sequences. Auto Release should be used for the minor phases other than B, C and F in diamond phasing.

Additional information on the types of Flexilink data required is provided below.

6.23.1 Default Sequence

The Default Sequence is the standard sequence that the controller would be required to operate under isolated or Flexilink operation. It most likely would be the SCATS standard sequence as well.

6.23.2 Alternative Sequence

The Alternative Sequence would either be a different sequence that could be used occasionally or the same as the default sequence but with different Look Ahead To or Pulse data if required.

6.23.3 Look Ahead To

Look Ahead To data indicates which phases the controller can move onto if the current phase were either not demanded or gapped out. The current phase could be a Flexilink Pseudo phase. Look Ahead To data from the Pseudo phase will apply regardless of the phase that is operating. There is no Look Ahead To on the Pivot phase.

6.23.4 Release

The Release pulses control phase gapping. If a Release pulse is present the phase (or Pseudo phase) can gap out. It the release pulse is not present the phase will not gap. The Release pulse can either be continuous or entered at a particular point in the phase as appropriate.

An AUTO Release pulse permanently enables gapping for that phase.

6.23.5 Example Flexilink Data

An example of the Flexilink Data for a standard single diamond overlap would be as follows:

Table 5 Example Flexilink Data

Phase	Movements
A	Main Road through
B	One direction right turn overlap
C	Second direction right turn overlap
D	Side Road split approach
E	Side Road split approach
F	Main Road diamond phase

Default Sequence – ADEF Alternative Sequence - ABCDEF

Table 6 Flexilink Data Sequence 1

Phase	Look Ahead To	Release
A	PIVOT	R-
B	-	-
C	-	-
D	EFA	R+
E	FA	Q-
F	A	Q+
G		

* No Look Ahead on PIVOT Phase

Table 7 Flexilink Data Sequence 2

Phase	Look Ahead To	Release
A	PIVOT	R-
B	-	-
C	-	-
D	EFA	R+
E	FA	Q-
F	A	Q+
G		

* No Look Ahead on PIVOT Phase

6.24 Masterlink and Flexilink Special Flags

The details of any special flags must be noted here.

Special Flags control the operation of Flexilink, introduction of the alternative sequence and any other phase or Special Facility Flags.

Y- and Y+ are reserved Flexilink Flags. Y- provides the dual function of the Link/Isolate signal for Flexilink and the Offset for co-ordination. Y+ selects the Alternative Sequence.

Z and XSF Flags control phase demand and filtering operation as appropriate to different controller personalities e.g. Z- and Z+ allow B and C phase introduction in a standard diamond phasing.

Table 8 Masterlink and Flexilink Special Flags

Flag		Function
Y-	Flexi	C (Continuous) entry or an offset value will enable Flexilink
Y-	Master	
Y+	Flexi	Run Alternative Sequence
Z-	Flexi	Allow introduction of a phase
Z-	Master	Allow introduction of a phase
Z+	Flexi	Allow introduction of a phase
Z+	Master	Allow introduction of a phase

6.25 Conflict Matrix

The conflict matrix must be completed for all CIS's. The pedestrian groups must be identified and labelled accordingly. An X should be placed in each square to indicate a conflict between either a vehicle to vehicle or vehicle to pedestrian movement. It should be noted that a split approach right turn verses a pedestrian movement is a conflict. This matrix is used to verify the personality burn test in a controller prior to installation on site.

6.26 All Red Calculation Worksheet

This worksheet is designed to assist in the calculation of yellow, red and special red timers. The crossing distances and approach speed of vehicles should be entered. The conflict information must be gathered from either a scale plan or measured on site and entered into the vehicle – vehicle or vehicle – pedestrian conflict tables.

Any vehicle – vehicle time greater than 1.0 second must be transferred to the All Red period field while any vehicle – pedestrian time greater than 1.0 second must be transferred to the Special All Red field. The SCATS Intergreen time must be entered and is the sum of the (Early cut off) ECO + yellow + red times.

7. Process for the Creation of the Controller Personality

Once the CIS have been reviewed and accepted by the TMU it is forwarded to the nominated software technician for the generation of the controller personality file (SFT). Once this is completed the software specialist provides a soft file to the TMU for checking against the approved CIS. Any irregularities are clarified before the SFT is submitted to the TMU for review.

Note: The version level of the SFT must be incremented each time a change to the document is made. The electronic file is to be named as per the procedure in Appendix D.

7.1 Test of Controller Personality using WinTraff

The controller personality file (SFT) must be checked for errors using the WinTraff computer software package and verified that it performs as documented in the CIS. The check sheets for undertaking the **Controller Personality Testing** using WinTraff are attached in Appendix E.

If errors are detected they shall be listed. If it is a problem with the controller personality (SFT) creation then the software technician shall make the corrections and resubmit the SFT file for WinTraff testing. If the errors are in the CIS then the CIS shall be returned to the software specialist for correction and then resubmitted to the software technician to create a new controller personality (SFT) which will then be resubmitted for WinTraff testing.

Once the WinTraff testing has been passed then the controller personality file (SFT) is passed to the TMU. Once reviewed by the TMU the CIS and SFT files shall be provided to the signals contractor for burning and testing prior to installation. At this point the CIS and SFT files are loaded into RAMM..

7.2 Loading of the Controller Personality

The signals contractor shall burn the controller personality software onto a PROM or load the controller personality (SFT) into a PCMCIA card as required depending on the type of controller on site.

7.3 Bench testing of the Controller Personality

The burnt PROM or loaded PCMCIA must be checked for errors by bench testing. This is done by installing the PROM or PCMCIA into an appropriate controller similar to that which is proposed to be used on site. Then with the appropriate hand held terminal, check the items required on the check sheets. The check sheets for the **Controller Personality Bench Testing** are attached in Appendix F. If possible testing is to be run overnight to enable a thorough checking of the conflict matrix.

If errors are detected they shall be listed on the Controller Personality Bench Testing Check sheet and returned to the TMU. Depending on whether the errors are in the CIS or SFT the list shall be passed to the originating software specialist to make corrections and the process will proceed from that point until the revised files are checked by the TMU. The new file(s) are issued to the signals contractor for burning and bench testing again.

8. Installation of the Controller Personality

8.1 Co-ordination of Hardware Changes

Hardware changes that are required to allow the new software to function correctly are listed on the Install page of the CIS. A TMU representative shall coordinate with the signal installation contractor with regard to the completion date of any physical works required prior to the installation of the new Controller Personality.

8.2 Creation of SCATS Graphics

The TMU arrange for the creation of new graphics for both new and modified intersections. The SCATS data and graphics can be set up prior to the commissioning of the intersection however it is more common that the SCATS data and graphics are created at the time of the commissioning. The operations are then monitored on screen and on site in parallel.

8.3 Advising TMU

The contractor shall advise the TMU of the installation date of the new Controller Personality so that the RAMM database can be updated.

8.4 New Installation

The signal installation contractor shall complete final hardware changes as defined on the Install page of the CIS and install the new PROM or PCMCIA. The Engineers Representative shall attend this installation and monitor the operation.

If errors are detected following the installation of the new PROM or PCMCIA, then it shall be removed immediately and the signals shall be turned off and appropriate signage installed until such time as the fault can be remedied. All errors shall be listed and the list shall be returned to the signal installation contractor for review and correction. If the errors are not hardware related then the list shall be referred to the TMU for review and correction and resubmission through the checking process.

8.5 Intersection Upgrade

The signal installation contractor shall advise the TMU at the commencement of the upgrade, then complete final hardware changes and install the new PROM or PCMCIA. The TMU shall confirm concurrent SCATS changes take place as required.

If errors are detected during the installation, then the new PROM or PCMCIA shall be removed immediately and the signals shall be turned off and appropriate signage installed while the signal installation contractor checks the hardware. If the errors persist after the hardware check then the hardware shall be returned to its original configuration and the original PROM or PCMCIA reinstalled. The errors shall be listed and referred to the TMU for review and correction and resubmission through the checking process.

8.6 Updating SCATS Data

The TMU shall update the SCATS data and monitor the initial operation of the intersection.

8.7 Updating Files and Controller Cabinet

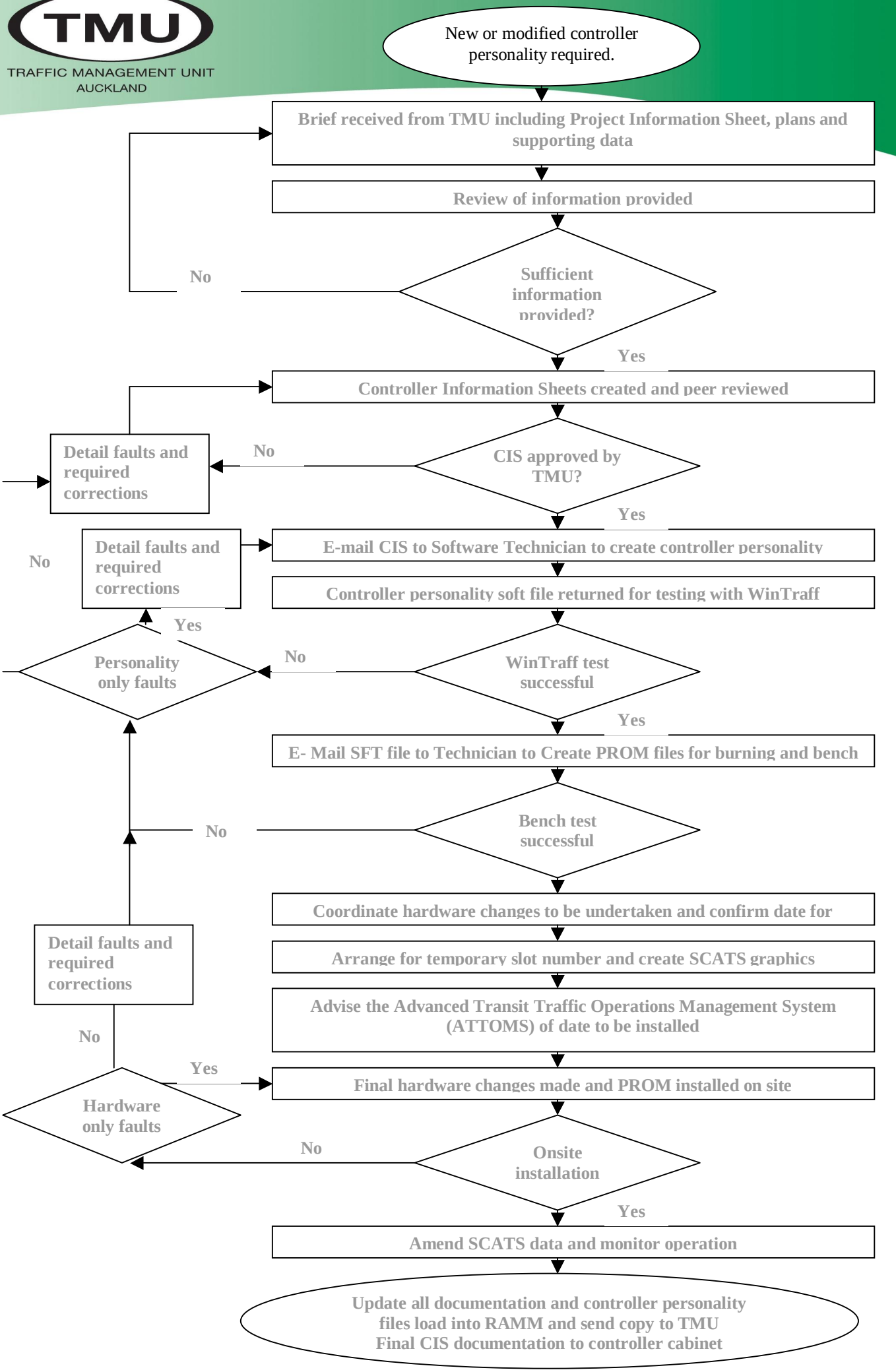
The TMU shall ensure that all files are updated, supply a copy of the final CIS to the contractor for installation in the controller cabinet and load a copy of the CIS and PROM files into the applicable Intersection asset file in the RAMM database.

The other associated files .m68, .ihx etc are to be collected from the software developer and filed in the TMU database along with the CIS & SFT

Appendix A

Process Flowchart

TMU
TRAFFIC MANAGEMENT UNIT
AUCKLAND



Appendix B

Project Information Sheet

TRAFFIC MANAGEMENT UNIT
AUCKLAND

Project Information Sheet

Intersection Name:			
Intersection Identification:	Controlling Authority:	Intersection number:	
Date Requested:			
Type of Project (circle as appropriate)	New Intersection	Physical Modification	Software only Modification
Personality Type:			
Design Plan Number:			
Design Consultant:			
Designer Name:			
Designer Contact Number:			
Contractor to create PROM:			
Contractor to install PROM:			
Proposed switch on date:			
Entity to be Charged			

Item	**Information required**	**Supplied***	**Comments**
PROM	Existing PROM files		
Controller Hardware	Controller type		
	Signal Groups on board		
	Detector Card on board		
Intersection Layout	A3 Plans (see Note 1)		
Information on Plans	Lane layout		
	Roadmarking		
	Controller position		
	Cable and Ducting		
	Relevant Notes		

* Y / N / NA / Unknown

Item	Information required	Supplied	Comments
Signal Group Numbering	Vehicle		
	Pedestrian		
	Cycle		
	Bus		
Detector Numbering	Vehicle		
	Pedestrian		
	Cycle		
	Bus		
Phasing	Sequence		
	Default		
	Alternative		
	Start phase		
	Phase transition prohibits		
Speed on Approach Roads	Posted Speed		
	85^{th} %ile (actual or estimated)		
Modelling	Signal Timing Analysis		
	SIDRA or similar		
Flexilink	Data Requirements		
	Pivot phase		
	Release pulses		

Note 1: The Intersection layout is to be supplied in .pdf format and if it is not a basic Intersection, an Intersection layout in CAD would be appreciated to enable the CIS layout to reflect the true picture.

Appendix C

Project Tracking Sheet

TRAFFIC MANAGEMENT UNIT
AUCKLAND

Project Tracking Sheet

Intersection Name:			
Intersection Identification:	Controlling Authority:	Intersection number:	
Priority: (circle as appropriate)	High	Moderate	Low
Type of Project: (circle as appropriate)	New Intersection	Physical Modification	Software only Modification
Work Required:		Personality Type:	
Contractor to create CIS:			
Contractor to create PROM:			
Contractor to install PROM:			
Proposed switch on date:			

Task	**Comments**	**Date**	**Signed**
CIS prepared			
CIS approved by TMU			
CIS sent to Software Technician			
SFT received for WinTraff testing			
SFT passed WinTraff testing			
Personality sent to be burnt			
PROM passed Bench test			
Instruction for hardware changes issued			

Task	Comments	Date Signed
Graphics completed		
TMU advised of switch on date		
PROM passed on site installation		
SCATS data amended		
Documentation filed and sent to controller		
Job finalised		

Appendix D

Naming of CIS and SFT Files

TRAFFIC MANAGEMENT UNIT
AUCKLAND

Naming Convention for CIS and SFT Files

CIS

The electronic files are to be named in the following format:

<NNNN>CIS V<na>_<AbleSt_BrownRd>.xls

Where:
<NNNN> is the Intersection number.

<na> is the version level.

<AbleSt_BrownRd> is the name of the Intersection.

<a> is to be changed to the next alpha character for every iteration of the CIS during the development phase.
<n> is to be increased by one for each recycle of the CIS where a change is being made in the operation after the previous version had been released

SFT

The electronic files are to be named in the following format:

XO<NNNN> V<nab>_AA.sft

Where:
<NNNN> is the Intersection number.

<nab> is the version level.

<na> is the version level of the CIS that the SFT was generated from.
<b> is to be changed to the next alpha character for every iteration of the SFT during the development phase.

AA is the initials of the Software Specialist that generated the SFT.

Appendix E

Controller Personality Testing

TRAFFIC MANAGEMENT UNIT
AUCKLAND

Controller Personality Testing

Intersection Name:		
Intersection Identification:	Controlling Authority:	Intersection number:
Contractor created CIS:		
Contractor created Personality:		
Personality File Number:		
Date Personality Created:		
Name of Personality Tester:		
Date Personality Tested:		
Personality Test:	Pass	Fail

Start up

Test	Result/Comment	Signed
All-Red		
Cycle		
Clock Time/Date		
Software Arterial		

Phasing

Vehicle Signal Groups

	A	B	C	D	E	F	G
V1							
V2							
V3							
V4							
V5							
V6							
V7							

V8							
V9							
V10							
V11							
V12							

Phase Sequence

Test	Result/Comment	Signed
Sequence 1		
Sequence 2		
Phase skipping		

Phase Transitions

Test	Result/Comment	Signed
A – B/C/D/E/F/G		
B – C/D/E/F/G		
C – D/E/F/G		
D – E/F/G		
E – F/G		
F – G		

Vehicle Detectors

Call

Test	Result/Comment	Signed
A		
B		
C		
D		
E		
F		
G		

Extend

Test	Result/Comment	Signed
A		
B		
C		
D		
E		
F		
G		

Pedestrian Operations

	A	B	C	D	E	F	G
P1							
P2							
P3							
P4							
P5							
P6							
P7							
P8							

Test	Result/Comment	Signed
Overlaps		
Late Introduction		
Call Away		

Special Facilities

Test	Result/Comment	Signed
XSF 1		

Test	Result/Comment	Signed
XSF 2		
XSF 3		
XSF 4		
Z-		
Z+		

Timing

Test	Result/Comment	Signed
Min/Max/Yel/Red		
Gap/Hdy/Waste		
Walk/CL1/CL2		
Presence timers		
Special timers		

Flexilink

Test	Result/Comment	Signed
Phase sequence		
Release pulses		
Look Ahead		

SCATS

Test	Result/Comment	Signed
Phase sequence		
Phase skipping		
Phase transitions		
Pedestrian overlaps		
Pedestrian Walk for green		
Pedestrian Late introduction		
Special Facilities (XSF, Z-, etc)		
Dwells		

Conflict Matrix

Need to identify pedestrian signal groups. Either signal groups 13 –16 or 20 – 24.

		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																								
	2																								
	3																								
	4																								
	5																								
	6																								
	7																								
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	22																								
	23																								
	24																								

Appendix F

Controller Personality Bench Testing

TRAFFIC MANAGEMENT UNIT
AUCKLAND

Controller Personality Bench Testing

Intersection Name:		
Intersection Identification:	Controlling Authority:	Intersection number:
Personality File Number:		
Date PROM Created:		
Name of PROM Tester:		
Date PROM Bench Tested:		
PROM Bench Test:	Pass	Fail

Test	Result/Comment	Signed
Time Settings – Vehicle		
Time Settings – Pedestrian		
Time Settings – Presence		
Time Settings – Special Purpose		
Flexilink Call Data		
Filter Operation		
Special Logic		
Calling Detectors		
Phase Movements		
Conflict Matrix		
Ram Version		
Functionality		

Appendix G

Controller Information Sheets (CIS)

TRAFFIC MANAGEMENT UNIT
AUCKLAND

Controller Personality Bench Testing

Intersection Name:		
Intersection Identification:	Controlling Authority:	Intersection number:
Personality File Number:		
Date PROM Created:		
Name of PROM Tester:		
Date PROM Bench Tested:		
PROM Bench Test:	Pass	Fail

Test	Result/Comment	Signed
Time Settings – Vehicle		
Time Settings – Pedestrian		
Time Settings – Presence		
Time Settings – Special Purpose		
Flexilink Call Data		
Filter Operation		
Special Logic		
Calling Detectors		
Phase Movements		
Conflict Matrix		
Ram Version		
Functionality		

Appendix H

Detector Alarm Category Table

Traffic Signal Controller Software
NZ Detector Alarm Categories

The following 11 categories are available:

Category	Description	Alarming	Alternate Day
0	Default TDA from SCATS	Hourly, based on the SCATS DAP	Sunday
1	No TDA	No detector alarm checking	
2	Busy Main Road Detector	Normal Profile: 06:00-07:00 30min 07:00-09:00 10min 09:00-15:00 30min 15:00-18:00 10min 18:00-22:00 60min Alternate Profile: 09:00-18:00 30min	Sunday
3	Main Road Detector	Normal Profile: 07:00-07:30 30min 07:30-09:00 10min 09:00-15:00 30min 15:00-18:00 10min 18:00-22:00 60min Alternate Profile: 09:00-18:00 60min	Sunday
4	Busy Minor Road Detector	Normal Profile: 07:00-07:30 30min 07:30-09:00 20min 09:00-15:00 30min 15:00-18:00 20min 18:00-20:00 60min Alternate Profile: 09:00-18:00 60min	Sunday
5	Minor Road Detector	Normal Profile: 07:00-09:00 30min 09:00-15:00 60min 15:00-18:00 30min 18:00-20:00 60min Alternate Profile: 09:00-18:00 120min	Sat/Sun
6	Non-Morning Detector	Normal Profile: 09:00-15:00 30min 15:00-18:00 10min 18:00-22:00 60min Alternate Profile: 09:00-18:00 60min	Sunday

7	Non-Evening Detector	Normal Profile: 07:00-07:30 30min 07:30-09:00 20min 09:00-18:00 30min 18:00-22:00 60min Alternate Profile: 09:00-18:00 60min	Sunday
8	Cycle Detector for commuter cycling	Normal Profile: 07:00-07:30 30min 07:30-09:00 10min 09:00-15:00 120min 15:00-18:00 20min Alternate Profile: No Alarm Checking	Sat/Sun
9	Cycle Detector Predominantly for Schools	Normal Profile: 08:00-09:00 20min 09:00-15:00 360min 15:00-15:30 10min Alternate Profile: No Alarm Checking	Sat/Sun
10	Ped Detector in the CBD	Normal Profile: 09:00-18:00 60min Alternate Profile: No Alarm Checking	Sat/Sun
11	Ped Detector in Lightly used areas	Normal Profile: 09:00-18:00 120min Alternate Profile: No Alarm Checking	Sat/Sun

Appendix I

Traffic Signal Personality Types

Traffic Signal Personalities Description

Code	Description
PX	Standard Mid block Pedestrian Crossing
PXI	Standard Mid block Pedestrian Crossing with in ground detection
PXS	Staggered Mid Block Pedestrian Crossing
PXIS	Staggered Mid Block Pedestrian Crossing with in ground detection
T	Standard Tee (No left turn SG's) - Filter/Non Filter
TLM	Standard Tee with LT SG on Main Rd - Filter/Non Filter
TLS	Standard Tee with LT SG on Side Rd - Filter/Non Filter
TLSM	Standard Tee with LT SG on Main Rd and Side Rd - Filter/Non Filter
X	Simple 2 Phase Cross Road
XL	3 Phase Cross Road with lead RT phase on Main or Side roads – Filter – Non Filter
XLO	3 Phase Cross Road with lead RT phase on Main or Side roads and opposing LT SG - Filter/Non Filter
XLSM	4 Phase Cross Road with lead RT phase on Main and Side roads – Filter/Non Filter
XLOSM	4 Phase Cross Road with lead RT phase on Main and Side roads – Filter/Non Filter and opposing LT SG
SDO	Standard Single Diamond Overlap with Split or combined Side Road Phases (No LT SG's) – Filter/Non Filter
SDOM	Standard Single Diamond Overlap with Split or combined Side Road Phases with LT SG's on Main Road – Filter/Non Filter
SDOS	Standard Single Diamond Overlap with Split or combined Side Road Phases with LT SG's on Side Road – Filter/Non Filter
SDOSM	Standard Single Diamond Overlap with Split or combined Side Road Phases with LT SG's on Main and Side Roads – Filter/Non Filter
DDO	Standard Double Diamond Overlap (No LT SG's) – Filter/Non Filter
DDOM	Standard Double Diamond Overlap with LT SG's on Main Road – Filter/Non Filter
DDOS	Standard Double Diamond Overlap with LT SG's on Side Road – Filter/Non Filter
DDOSM	Standard Double Diamond Overlap with LT SG's on Main and side Roads – Filter/Non Filter
MX	Motorway Interchange (Similar to Northcote and Constellation Dr)