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Traffic Signal Software Development

For the Traffic Management Unit



The Process

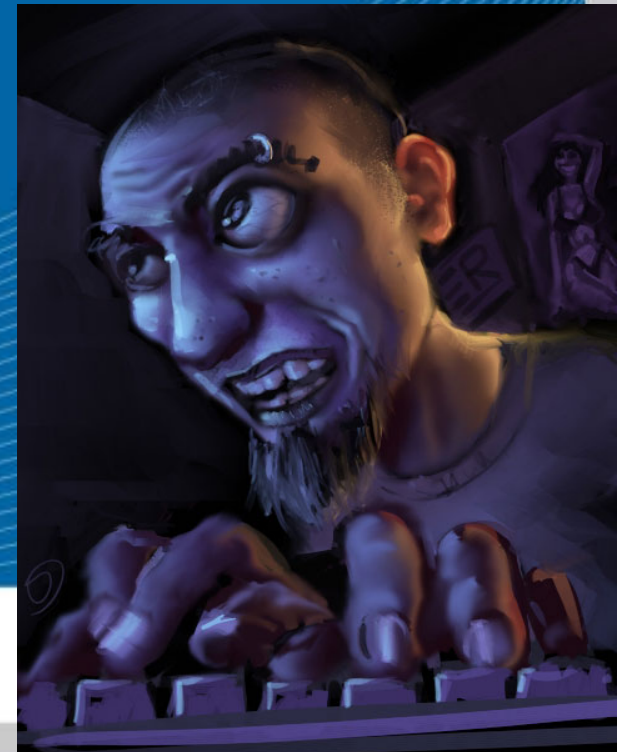
- Similar to that used for Design Guidelines
- Same Group of Traffic Signal Specialist were involved
- The process is in a constant state of evolution (Version 11)
- Software development process requires multiple steps.



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The Focus of the Process:

Transform the design drawings into usable logic that can operate the traffic signals as they were intended.





The First Steps

Approved Plan
Provided

Controller Information Sheets created and peer reviewed

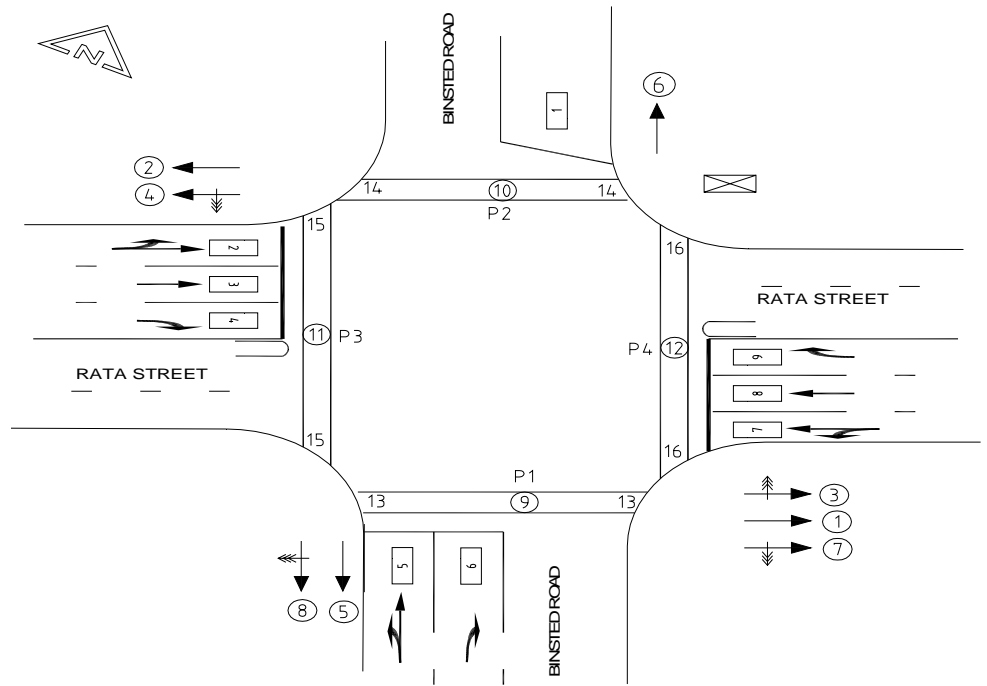
Detail faults and
required
corrections

No

CIS approved
by TMU?



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<p>A</p>	<p>D</p>	<p>E</p>	<p>F</p>
<p>B</p> <p>Z-</p>			<p>F1</p>
<p>C</p> <p>Z+</p>			<p>F2</p>



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Intersection:	Rata Street/Binsted Road	Site ID:	3002
Date:	7/09/2006	Version:	1c
		By:	Kent McNaughten

Warning

This PROM requires hardware changes to the intersection before installation. Do Not install this PROM until the following hardware changes have been completed

Yes	<input type="checkbox"/>
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This PROM requires SCATS data changes to the intersection before installation.

Yes	<input type="checkbox"/>
------------	--------------------------

Controller Type to be installed

PSC2

Lamp Dimming to be used

Yes	No
------------	-----------

1	Vehicle & pedestrian detector numbers upgraded to TMU standard SG's numbers upgraded to TMU standard
2	Update SCATS data and graphic
3	
4	
5	
6	
7	
8	



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Intersection: Rata Street/Binsted Road

Site ID: 3002

Date: 7/09/2006

Version: 1c

By: Kent McNaughten

SIGNAL GROUP DEFINITIONS - Active phases

Phase Group	A	B(Z-)	C(Z+)	D	E	F	G	Table	Phase Group	A	B(Z-)	C(Z+)	D	E	F	G	Table
1	A	B				F1		DO	(P1)9	W	W				W1		DO
2	A		C			F2		DO	(P2)10	W		W			W2		DO
3		B				F/F1		DO	(P3)11					W			PD1
4			C			F/F2		DO	(P4)12				W				PD1
5					E			1	13								
6				D				1	14								
7					E			DO	15								
8			C		E	F/F2		DO	16								

Signal Group Modifications

SG	Table	Description

PHASE INFORMATION

Start Phase :

Phase Sequence:

Alternative Sequence:



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Intersection: Rata Street/Binsted Road

Site ID: 3002

Date: 7/09/2006

Version: 1c

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PROHIBITS AND MAXIMUM TRANSFERS

From Phase	Prohibit to	Transfer max	Steal Max
A			
B			
C			
D			
E			
F			
G			

MAXIMUM CONTROL AND REVERSION

MAXIMUM CONTROL AND REVERSION			
Phase	Arterial Demand	Use VIG on reversion	Reversion
A			
B			
C			
D			
E			
F			
G			



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DETECTORS

Controller Inputs

VIG DETECTORS			
Det#	Approach SG	Det#	Approach SG

CALLING DETECTORS			
Phase	Ped#	Locking	Nonlocking
A	P1(13) P2(14)	2,3,7,8	
B		9	
C		4	
D	P3(15)	1	
E	P4(16)	5,6	
F		4,9	
Counting Detectors			

DETECTOR ALARM CATEGORIES

Det	1	2	3	4	5	6	7	8
Cat	0	0	0	0	0	0	0	0
Det	9	10	11	12	13	14	15	16
Cat	0	1	1	1	7	7	7	7
Det	17	18	19	20	21	22	23	24
Cat	1	1	1	1	1	1	1	1
Det	25	26	27	28	29	30	31	32
Cat	1	1	1	1	1	1	1	1

Alarmed detectors to call and extend	1-9
Alarmed detectors do not call or extend	

PRESENCE DETECTOR DELAYS



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Intersection: Rata Street/Binsted Road **Ste ID:** 3002
Date: 7/09/2006 **Version:** 1c **By:** Kent McNaughten

TIME SETTINGS

PHASE	LS	LS SG	MG	IN	MV	MAX	ECO	ECO SG	YEL	RED	SRED
A	5	3,4	5			60			4.0	1.0	0.0
B (Z-)	5	3	5			15			4.0	1.0	0.0
C (Z+)	5	4	5			15			4.0	1.0	0.0
D	3	6	5			30			4.0	1.0	2.0
E			5			25			4.0	1.0	2.0
F			5			30			4.0	1.0	0.0

Phase	Dets	Table	SG	Appr No.	Gap	Hwy	Waste	Dets	Table	SG	Appr No.	App Timer Setting (1-4)
A	2,3	DO	2	1	3	1.2	6				5	
	7,8	DO	1	2	3	1.2	6				6	
				3							7	
				4							8	
B	9	DO	3	1	3	0.8	4				5	
	7,8	DO	1	2	3	1.2	4				6	
				3							7	
				4							8	
C	2,3	DO	2	1	3	1.2	4				5	
	4	DO	4	2	3	0.8	4				6	
				3							7	
				4							8	
D	1	1	6	1	3	1	4				5	
											6	
				3							7	
				4							8	
E	5	1	5	1	3	1	4				5	
	6	1	5	2	3	0.8	4				6	
				3							7	
				4							8	
F	9	DO	3	1	3	0.8	4				5	
	4	DO	4	2	3	0.8	4				6	
				3							7	
				4							8	
				1							5	
				2							6	
				3							7	
				4							8	

Detector Table Modifications

	Description



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PEDESTRIAN TIMES

Ped No	Table No	Callaway Phase	Ped Operates in Phases	SG No	Delay Time	Cross	Clear 1	Clear 2	Ped Protection Y/N
1	DO		A,B,F1	9		6	14	3	Y
2	DO		A,C,F2	10		6	13	3	Y
3	PD1		D	11		6	16	3	Y
4	PD1		E	12		6	17	3	Y
5									
6									
7									
8									

Wait Extinguish :	Y
-------------------	---

PEDESTRIAN PROTECTION TYPE

	Type of Protection		Conflicting Signal Group	Timer	Comments
	Partial Pedestrian	Full Pedestrian			
P1	Y		4,7	S11	
P2	Y		3	S12	
P3	Y		8	S13	
P4	Y			L.S SG 6	
P5					
P6					

Delete these notes on the working copy

Where: **Partial Ped Protection** requires a timer for the Red Arrow protection

Full Ped Protection does not require a timer as the SG Table uses the Walk-Clearance + Z5 flag to hold the Red Arrow and introduces the Green at end of the Red Arrow SG at the end of Ped subject to the Z5 flag.

If a Ped does not require **ANY** protection, then answer **N** to both and put note in comment field eg. "**None required.**"



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SPECIAL PURPOSE TIMERS

Timer	Function	Value	Timer	Function	Value	Timer	Function	Value
1			9			17		
2			10			19		
3			11	Partial prot for P1	5	20	All-Red on start up	10
4			12	Partial prot for P2	5	21		
5			13	Partial prot for P3	3	22		
6			14			23		
7			15			24		
8			16			25		

Audio times set for audio tactile
TSH=06 TSM=55 (start 06:55hrs)
TFH=20 TFM=45 (finish 20:45hrs)

Lamp Dimming Voltage	
Lamp Dimming Start Time	
Lamp Dimming End Time	

NOTES

1	Standard single diamond overlap with split side roads (non filter with filter option)
2	B phase allowed to introduce if Z- flag active under Masterlink or Flexilink
3	C phase allowed to introduce if Z+ flag active under Masterlink or Flexilink
4	SG3 permitted to filter when XSF 1 is active; SG4 permitted to filter when XSF2 is active.
5	5 sec L.S for S.G's 3 & 4 when allowed to filter.

SPECIAL LOGIC

1	
2	



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FLEXI LINK DATA - Sequence 1

Phase	Look Ahead To	Release (R-, R+, Q-, Q+)
A	Pivot	R-
B		
C		
D	EFA	R+
E	FA	Q-
F	A	Q+
G		

* No look ahead on Pivot Phase

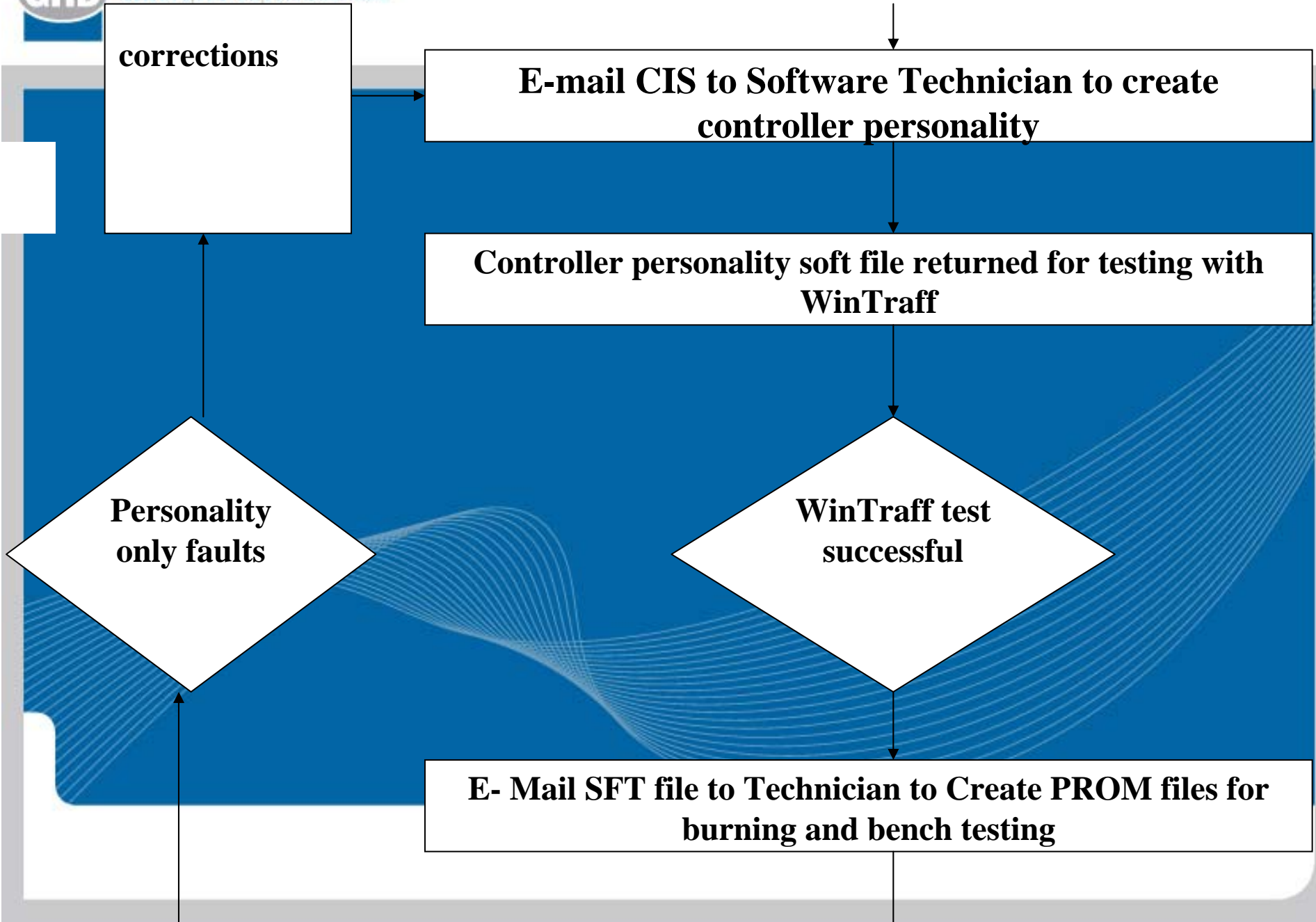
FLEXI LINK DATA - Sequence 2

Phase	Look Ahead To	Release (R-, R+, Q-, Q+)
A	Pivot	R-
B		
C		
D	EFA	R+
E	FA	Q-
F	A	Q+
G		

* No look ahead on Pivot Phase

MASTERLINK & FLEXILINK SPECIAL FLAGS

Flag	Function
Y- Flexi	C' (Continuous) entry or an offset value will enable Flexilink
Y- Master	Auto recall for pedestrian demands
Y+ Flexi	Run alternative sequence
Z- Flexi	Allows the introduction of B phase
Z- Master	Allows the introduction of B phase
Z+ Flexi	Allows the introduction of C phase
Z+ Master	Allows the introduction of C phase
XSF1 Flexi,Master	SG3 permitted to filter
XSF2 Flexi,Master	SG4 permitted to filter





PERFORMANCE

**Personality
only faults**

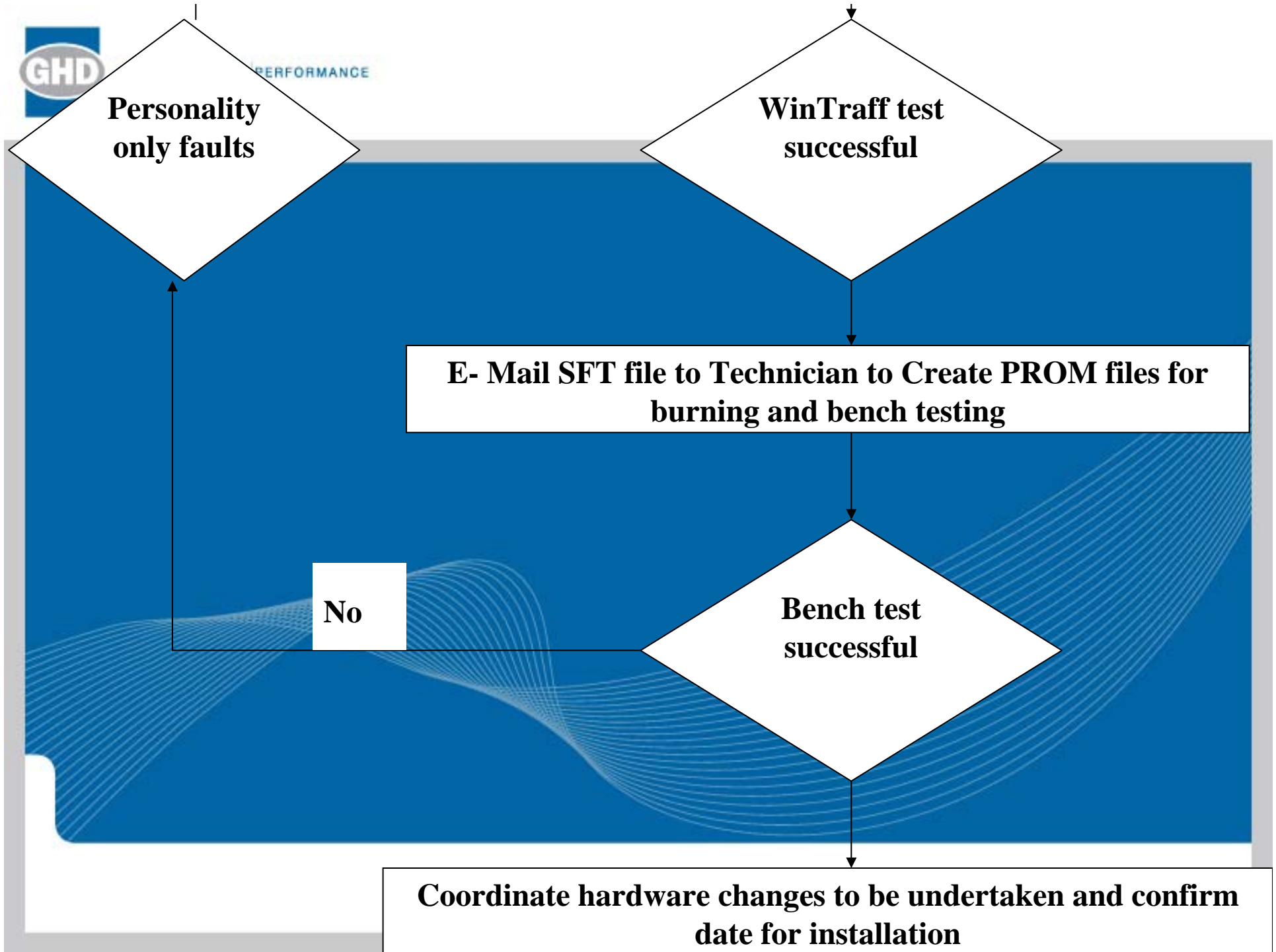
**WinTraff test
successful**

**E- Mail SFT file to Technician to Create PROM files for
burning and bench testing**

No

**Bench test
successful**

**Coordinate hardware changes to be undertaken and confirm
date for installation**





Where to from here

- The TMU is using this software development process to improve consistency of operation in the field.
- We will be taking it to the SNUG (Signal National User Group)



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Question

Does the group believe that this software development process should be adopted nationally?



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End
Thank you

