

Signals Technical Maintenance Plan

ESM-26-02

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1 Introduction

1.1 Purpose

This procedure specifies requirements for the application of the Signals Technical Maintenance Plan.

1.2 Scope

This procedure covers the complete ARTC network. It details the requirement for the performance of maintenance activities on signalling and control systems infrastructure and related infrastructure.

1.3 Risks Controlled

This procedure is a control for the following Risks:

- Train to Train collision
- Train derailment
- Train to Track worker collision
- Train to obstruction
- Infrastructure loss, degradation & constraint
- Systems loss, degradation & constraint

The detailed Hazards that are addressed and the respective controls are listed in Appendix 1.

1.4 Standard Owner

The Manager Standards is the Standard Owner and is the initial point of contact for all queries relating to this standard.

1.5 Responsibilities

The Area Manager for maintenance is responsible that appropriate competent staff are available to undertake the maintenance of all signalling, control systems and related infrastructure in accordance with the requirements of the signalling standards and the signals technical maintenance plan. The Area Manager is responsible that all signalling, control systems and related infrastructure assets are included in the **asset management system** and that maintenance service tasks are issued for each and every item in accordance with the signals technical maintenance plan. The Area Manager is responsible that the performance of the maintenance is recorded in the asset management system. The Area Manager is responsible that any defects found during maintenance or otherwise are recorded in the asset management system. The Area Manager cannot make technical decisions in regard to technical items for which they do not have competency. The Area Manager relies upon the technical guidance of the Signal Maintenance Engineer in areas where the Signal Maintenance Engineer has the competency for signals technical issues.

The Signal Maintenance Engineer or equivalent position is responsible for providing technical support to the Area Manager and the signals staff performing the maintenance tasks. The Signals Maintenance Engineer shall undertake Surveillance inspections in accordance with the standards to ensure that the maintenance tasks are being performed in accordance with the standards and procedures including the recording of maintenance outcomes and of defects in the infrastructure into the asset management system.

The Signal Work Group Leader is responsible for managing the process for signals staff completing the maintenance activities within the nominated time frame.

The Signal Technicians and other signals staff are responsible for performing the maintenance activities in accordance with the respective Service Schedule and technical standards.

1.6 Reference Documents

The following documents support this procedure:

- Maintenance Service Schedules.
- Signalling standards

1.7 Definitions and Acronyms

The following terms and acronyms are used in this document.

Term or acronym	Description
TMP	Technical Maintenance Plan
EGI	Equipment Group Identifier as used in the Ellipse system
Ellipse	The current asset management system when drafting the standard
Latitude	The permitted time plus or minus between the service due date and the performed date
Standard Job	This is the Ellipse name for the specific service schedules
Service Schedule	The detailed document covers the actions required when maintaining a specific item of equipment
Technical Standards	The ARTC engineering standards and procedures including signalling standards and procedures that cover work on ARTC infrastructure

2 General

The maintenance of signalling equipment is managed in accordance with a maintenance plan. This plan details the frequency for the performance of each type of maintenance service. This is specified as the period between each scheduled maintenance service. For a large integrated item of signalling equipment, there may be different maintenance services each with its own maintenance frequency.

The system for managing the maintenance will issue maintenance work orders for the activities to be completed in a forthcoming period, usually a month.

Generally, it is desirable for efficiency reasons, that the different maintenance activities are coordinated. For example a base level maintenance activity may be scheduled every 3 months and a second maintenance may be at 12 month intervals. When the 3 month maintenance and the 12 month maintenance are to be completed within the same period, they should be done at the same maintenance visit.

2.1 Periodicity

The period between the maintenance services is based on experience with the equipment to achieve the following:

- Prevention of failures of the equipment;
- Renewal of consumables in the equipment if applicable;
- Prevention of wear and tear of the equipment;

- Adjustment of the equipment tolerances within limits;
- Prevention of any issues with the equipment that may lead to safety risks or hazards.

As such, the maintenance frequency is not an absolute value for every piece of equipment in service. It is an optimum value that will provide the required service and reliability outcome across all of the items of that type currently in use.

It is permissible under managed situations to extend the period of the maintenance for an individual item of equipment. This shall be done on an exception basis and not as a regular situation for the item of equipment.

This extension of time for an individual maintenance service activity is the Signal Maintenance Engineer's Latitude or Tolerance for the performance of the maintenance activity. For example, a maintenance activity due every 90 days may have a Latitude of 15 days in which to perform the service.

2.2 Maintenance Period Reference Date

The planning of maintenance activities is on the basis of the number of maintenance activities in a given period typically a year. This then results in a scheduled date for completion. The schedule includes a latitude which may be exercised before or after the scheduled date (that is it is plus or minus the latitude). This provides some flexibility to manage maintenance visits within the period to optimise travel arrangements and to coincide with other maintenance activities at the location. The Ellipse system is set up to schedule the maintenance in this manner. The due date may occur on a weekend, public holiday or other date when the maintenance work cannot normally be undertaken. It is also efficient to plan the work to minimise travelling time and to do as much work at one location as possible. The TMP includes a Planning Latitude to allow for the work to be undertaken on a suitable date. The local team can set the date for performance within this planning latitude. If there are no outstanding defects against the signals equipment, then no further approval is required to use the Planning Latitude as detailed in the table in section 3.

2.3 Compliance

Compliance is achieved if maintenance is completed by the due date plus Signal Maintenance Engineer latitude, provided that the necessary assessment of the asset condition, risks and any necessary risk mitigation is documented.

Monitoring of compliance with the intent of the periodicities contained in the TMP is to be assessed by the Maintenance Engineer and Compliance Engineer or other nominated role.

This process requires that a comparison of the maintenance due date with the actual completed date looking for exceptions outside the maintenance due date plus Signal Workgroup Leader latitude.

The exception report is to be checked off against the approval for use of the signal maintenance latitude for each event.

The application of the Signal Engineer's latitude is detailed in ESM-26-03.

If the signals equipment cannot be maintained within the Engineer's latitude then it shall be booked out of use or an Engineering Waiver approved for the extended maintenance frequency.

3 Maintenance Plan

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	Frequency	Planning Latitude %	Planning Latitude Days		
CS	Control System	010	Operator	CS0101	Control System Operator Local panel	N/A	Operator Monitored	N/A	N/A		
				011	Equipment	CS0111	Control System Territory Phoenix	S01111	7	30%	2
		CS0112	Control System Territory PTOS			S01112	180	15%	27		
		CS0113	Control System Territory TMACS			S01121	30	10%	3		
		CS0113	Control System Territory TMACS			S01131	30	10%	3		
		012	Equipment Monitor	CS0121	Control Sys Equip Mon 4Site	N/A	Operator Monitored	N/A	N/A		
				CS0122	Control Sys Equip Mon Points	N/A	Operator Monitored	N/A	N/A		
				CS0123	Control Sys Equip Mon WAM	N/A	Operator Monitored	N/A	N/A		
				CS0124	Control Sys Equip Mon Maint Terminal	N/A	Operator Monitored	N/A	N/A		
		TM	Telemetry	020	Telemetry	TM0201	Telemetry FDM	S02011	180	15%	27
						TM0202	Telemetry iMAC	S02021	180	15%	27
						TM0203	Telemetry Kingfisher	S02031	180	15%	27
TM0204	Telemetry Moscad					S02041	180	15%	27		
TM0205	Telemetry ICAPs					S02051	180	15%	27		

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Planning Latitude Days
						S03012	90	30%	27
						S03013	360	15%	54
						S03014	720	10%	72
				LX0302	Level Xing Mon RX-5 Lights & Booms	S03012	90	30%	27
				LX0302	Level Xing Mon RX-5 Lights & Booms	S03013	360	15%	54
				LX0302	Level Xing Mon RX-5 Lights & Booms	S03014	720	10%	72
				LX0303	Level Xing Mon RX-12 Ped. Lights	S03012	90	30%	27
				LX0303	Level Xing Mon RX-12 Ped. Lights	S03013	360	15%	54
				LX0303	Level Xing Mon RX-12 Ped. Lights	S03014	720	10%	72
				LX0304	Level Xing Mon RX-12 Ped. Light & Boom	S03012	90	30%	27
				LX0304	Level Xing Mon RX-12 Ped. Light & Boom	S03013	360	15%	54
				LX0304	Level Xing Mon RX-12 Ped. Light & Boom	S03014	720	10%	72
				LX0304	Level Xing Mon RX-12 Ped. Light & Boom	S03015	5460	5%	273
				LX0305	Level Xing Mon Supplementary Lights	S03012	90	30%	27
				LX0305	Level Xing Mon Supplementary Lights	S03013	360	15%	54
				LX0305	Level Xing Mon Supplementary Lights	S03014	720	10%	72

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
				LX0311	Level Xing Not Mon RX-5 Lights	S03012	30	10%	3
						S03013	180	15%	27
						S03014	360	15%	54
				LX0312	Level Xing Not Mon RX-5 Lights & Booms	S03012	30	10%	3
						S03013	180	15%	27
						S03014	360	15%	54
				LX0313	Level Xing Not Mon Ped Lights	S03012	30	10%	3
						S03013	180	15%	27
						S03014	360	15%	54
				LX0314	Level Xing Not Mon Ped Light & Boom	S03012	30	10%	3
						S03013	180	15%	27
						S03014	360	15%	54
						S03015	5460	5%	273
				LX0315	Level Xing Not Mon Supplementary Lights	S03012	30	10%	3
						S03013	180	15%	27
S03014	360	15%	54						

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
SG	Signal	040	Signal	SG0401	Signals Incandescent	S04011	90	30%	27
				SG0402	Signal LED	S04021	180	15%	27
		041	Mechanical	SG0411	Signal Mechanical Semaphore	S04111	60	10%	6
						S04113	360	15%	54
042	Noticeboards/Signs	SG0421	Signal Noticeboard Signs	S04211	180	15%	27		
IN	Interlocking	050	Relay	IN0501	Int. Relay AC Shelf	S05011	360	15%	54
						S05012	720	10%	72
						S05013	3630	5%	182
				IN0502	Int. Relay DC Shelf	S05021	360	15%	54
						S05013	3630	5%	182
				IN0503	Int. Relay Miniature Plug in	S05031	180	15%	27
				IN0504	Int. Relay Large Plug in (line)	S05041	180	15%	27
						S05042	720	10%	72

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
IN	Interlocking	051	Computer Based	IN0511	Int. CBI Microlok 2	S05111	180	15%	27
				IN0512	Int. CBI HIMA	S05121	180	15%	27
				IN0513	Int. CBI Westrace 1	S05131	180	15%	27
				IN0514	Int. CBI Westrace 2	S05141	180	15%	27
				IN0515	Int. CBI ElectrologIXS	S05151	180	15%	27
				IN0516	Int. CBI Westlock/SSI	S05161	30	10%	3
						S05162	180	15%	27
						S05163	180	15%	27
				IN0517	Int. CBI VHLC	S05171	180	15%	27
				IN0518	Int. CBI EC4	S05181	180	15%	27
		IN0519	Int. CBI EC5	S05191	180	15%	27		
		052	Computer Based 2	IN0521	Int. CBI VPI	S05211	180	15%	27
				IN0522	Int. CBI HD Link	S05221	180	15%	27
		053	Mechanical	IN0531	Int. Mech. Cam And Tappet Main Frame	S05311	30	10%	3
						S05312	90	30%	27
						S05313	180	15%	27
						S05314	720	10%	72
				IN0532	Int. Mech. Ground Frame	S05321	60	10%	6
						S05322	360	15%	54
						S05323	1440	10%	144
				IN0533	Int. Mech. Rel.	S05331	180	15%	27
		S05332	1440			10%	144		

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
PT	Points	060	Combined	PT0601	Points Combined M Series	S0601L	Optional	15%	N/A
						S06011	60	10%	6
						S06012	360	15%	54
				PT0602	Points Combined HW Series	S0601L	Optional	15%	N/A
						S06021	60	10%	6
						S06022	360	15%	54
				PT0603	Points Combined KA Series	S0601L	Optional	15%	N/A
						S06031	60	10%	6
						S06032	360	15%	54
		061	Derailer	PT0611	Points Derailer M Series	S06111	60	10%	6
						S06112	360	15%	54
				PT0612	Points Derailer KA Series	S06121	60	10%	6
						S06122	360	15%	54
				PT0613	Points Derailer 84M Series	S06131	60	10%	6
						S06132	360	15%	54
		062	Clamp Lock	PT0621	Points Clamplock Hydraulic	S0601L	Optional	15%	N/A
						S06211	60	10%	6
						S06212	360	15%	54
				PT0622	Points Clamplock Vossloh Series	S0601L	Optional	15%	N/A
						S06221	180	15%	27
						S06222	360	15%	54

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
PT	Points	063	Clawlock	PT0631	Points Clawlock 84M Series	S0601L	Optional	15%	N/A
						S06311	90	30%	27
						S06312	360	15%	54
				PT0632	Points Clawlock S700 Series	S0601L	Optional	15%	N/A
						S06321	90	30%	27
						S06322	360	15%	54
		064	Spherolok	PT0641	Points Spherolok 84M Series	S0601L	Optional	15%	N/A
						S06411	180	15%	27
						S06412	360	15%	54
				PT0642	Points Spherolok S700 Series	S0601L	Optional	15%	N/A
						S06421	180	15%	27
						S06422	360	15%	54
		065	Mechanical	PT0651	Points Mechanical	S0601L	Optional	15%	N/A
						S06511	60	10%	6
				PT0652	Points Mechanical Solar Hydra Series	S06521	60	10%	6
				PT0653	Points Mechanical Derailer	S06531	90	30%	27
PT0654	Points Mechanical GRS	S06541	60	10%	6				

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
PT	Points	066	Releasing Switches And Switchlocks	PT0661	Points Releasing Switch	S06611	90	30%	27
						S06612	180	15%	27
						S06613	720	10%	72
				PT0662	Points Releasing Switch Fortress	S06621	180	15%	27
						S06622	720	10%	72
				PT0663	Points Switchlock Westinghouse	S06631	60	30%	18
						S06632	180	15%	27
		PT0664	Points Switchlock Westinghouse HLM	S06641	60	30%	18		
				S06642	180	15%	27		
		PT0665	Points Releasing PTOS Master Key Safe	S06651	360	15%	54		
067	Not commissioned/Booked Out	PT0671	Points Not Comm./Seldom used/Booked Out	S06711	90	30%	27		
TD	Train Detection	070	DC	TD0701	Train Detection DC Standard	S07011	180	15%	27
						S07012	720	10%	72
				TD0702	Train Detection DC Shelf Type	S07011	90	30%	27
						S07012	720	10%	72
						S05013	3630	5%	182
				TD0703	Train Detection Westrack/TD4	S07051	180	15%	27
		S07052	720			10%	72		
		071	HVI	TD0711	Train Detection HVI	S07111	180	15%	27
						S07112	720	10%	72
		072	AC	TD0721	Train Detection AC	S07211	90	30%	27
						S07212	360	15%	54
						S05013	3630	5%	182

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
TD	Train Detection	073	Frequency	TD0731	Train Detection Frequency CSEE	S07311	180	15%	27
						S07312	720	10%	72
				TD0732	Train Detection Frequency MLTI21 Analog	S07321	180	15%	27
						S07322	720	10%	72
				TD0733	Train Detection Frequency MLTI21 Digital	S07331	180	15%	27
						S07332	720	10%	72
				TD0734	Train Detection Frequency PSO III	S07341	180	15%	27
						S07342	720	10%	72
				TD0735	Train Detection Frequency PSO 4000	S07351	180	15%	27
						S07352	720	10%	72
		TD0736	Train Detection Frequency SMTC	S07361	180	15%	27		
				S07362	720	10%	72		
		TD0737	Train Detection Frequency IPITC	S07371	180	15%	27		
				S07372	720	10%	72		
		TD0738	Train Detection Frequency AFTAC Model 2	S07381	180	15%	27		
				S07382	720	10%	72		
		TD0739	Train Detection Frequency FS2500	S07391	180	15%	27		
				S07392	720	10%	72		
		074	Axle Counter	TD0741	Train Detection Axle Counter ACS2000	S07411	360	15%	54
				TD0742	Train Detection Axle Counter FADC R1	S07412	360	15%	54
075	Treadle	TD0751	Train Detection Treadle Mechanical	S07511	90	30%	27		
				S07512	180	15%	27		

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
TD	Train Detection	076	Coded	TD0761	Train Detection Coded Microtrax	S07611	180	15%	27
						S07612	720	10%	72
				TD0762	Train Detection Coded Electrode 4	S07621	180	15%	27
						S07622	720	10%	72
				TD0763	Train Detection Coded Electrode 5	S07631	180	15%	27
						S07632	720	10%	72
				TD0764	Train Detection Coded GEO	S07641	180	15%	27
						S07642	720	10%	72
		077	Predictor	TD0771	Train Det. Predictor(Non Mon)GCP 3000	S07711	90	30%	27
						S07712	720	10%	72
				TD0772	Train Detection Predictor GCP 3000	S07711	180	15%	27
						S07712	720	10%	72
				TD0773	Train Det. Predictor(Non Mon)GCP 4000	S07721	90	30%	27
						S07722	720	10%	72
				TD0774	Train Detection Predictor GCP 4000	S07721	180	15%	27
						S07722	720	10%	72
		TD0775	Train Detection Predictor HXP-3	S07751	180	15%	27		
		TD0776	Train Detection Predictor XP-4	S07761	180	15%	27		
		078	Gauge Detector	TD0781	Train Detection Gauge Detector TURCK	S07811	180	15%	27

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
TA	Train Authority Systems (TA Sys.)	080	Token Block	TA0801	TA Sys.Token Block Train Staff	S08011	360	15%	54
						S08012	720	10%	72
PO	Power Supply	090	AC	PO0901	Power Supply AC	S09011	360	15%	54
				PO0902	Power Supply AC Transformed	S09021	180	15%	27
		091	Motor Generator	PO0911	Power Supply Motor Generator	S09111	90	30%	27
						S09112	360	15%	54
		092	UPS	PO0921	Power Supply UPS	S09211	180	15%	27
		093	DC Supplies	PO0931	Power Supply DC Batt Backup LX No Mon	S09311	30	10%	3
						S09312	360	15%	54
				PO0932	Power Supply DC Battery Backup	S09311	180	15%	27
						S09312	360	15%	54
				PO0933	Power Supply DC Batt Backup LX Mon	S09311	90	15%	14
						S09312	360	15%	54
		PO0934	Power Supply DC Rectified	S09341	180	15%	27		
				S09342	360	15%	54		
		094	Solar	PO0941	Power Supply Solar Battery	S09411	180	15%	27
		095	Wind Turbine	PO0951	Power Supply Wind Turbine	S09511	90	15%	14

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
CM	Communications	100	Radio	CM1001	Comms Vital Radio	S10011	180	15%	27
				CM1002		S10012	360	15%	54
				CM1003	Comms Radio Satellite	S10021	360	15%	54
		101	Tower	CM1003	Comms Non Vital Radio	S10031	180	15%	27
		102	System	CM1011	Comms Tower Comms Equipment	S10111	180	15%	27
				CM1021	Comms System	S10211	180	15%	27
LR	Cable & Line Route	110	Signalling Cable	LR1101	Signalling Cable	S11011	1440	10%	144
		111	Cable Route	LR1111	Cable Route	S11111	360	15%	54
		112	Aerial Route	LR1121	Aerial & Pole Route	S11211	90	30%	27
				LR1122		S11212	1440	10%	144
							Pole Inspection	S11212	1440
EN	Equipment Enclosures	120	Enclosures	EN1201	Equipment Enclosures	S12011	180	15%	27
TC	Communications Based Train Control (CBTC)	130	Office / Field	see CBI field equip.	CBTC Field ATMS	see CBI field equip.	see CBI field equip.		
				TC1302	CBTC Office ATMS	S13021	180	15%	27
		131	Trainborne	TC1311	CBTC Trainborne ATMS Loco	S13111	180	15%	27
				TC1312	CBTC Trainborne ATMS EOTD	S13121	180	15%	27
		132	Office / Field	TC1321	Field TPWS	S13211	180	15%	27
133	Trainborne	TC1331	Trainborne TPWS	S13311	180	15%	27		
TE	Test Equipment	150	Test Equipment	TE1501	Test Instruments	S15011	720	10%	72
				TE1502	Maintenance Gauges	S15021	720	10%	72

Equipment Class	Equipment Class Description	Asset Group Code	Asset Group Description	EGI Code	EGI Description	Standard Job	New Frequency	Planning Latitude %	Latitude Days
WS	Wayside	160	Infrastructure	WS1601	WSI Slip Detector	S16011	180	15%	27
				WS1602	WSI Rockfall Detector	S16021	180	15%	27
				WS1603	WSI Rainfall Detector	S16031	180	15%	27
				WS1604	WSI Ground Fault Det.	S16041	180	15%	27
				WS1605	WSI Pump Station	S16051	180	15%	27
				WS1606	WSI Camera	S16061	180	15%	27
		161	Rollingstock	WS1611	WSR Hot Box Detector (HBD) with DED	S16111	180	15%	27
				WS1612	WSR Bearing Acoustic Monitor - (RailBAM)	S16121	180	15%	27
				WS1613	WSR Dragging Equipment Detector (DED)	S16131	180	15%	27
				WS1614	WSR Wheel Condition Monitor (WCM)	S16141	180	15%	27
				WS1615	WSR Wheel Profile Monitor	S16151	180	15%	27
				WS1616	WSR Wheel Noise Detector (Rail SQAD)	S16161	180	15%	27
				WS1617	WSR Bogie Monitor (TBOGI)	S16171	180	15%	27
				WS1618	WSR Weigh Bridge	S16181	180	15%	27
				WS1619	WSR Height Detector	S16191	180	15%	27
RW	Right Of Way	170	Engineer Inspection	RW1701	Engineer Inspection	S17011	720	10%	72
				RW1702	Signal Sighting – Front of Rail Vehicle	S17012	360	15%	54

4 Appendix 1 -Hazard – Control Traceability Matrix

The development of this standard has identified a number of Hazards and scenarios that would impact the safe operation of the signalling infrastructure. The traceability matrix lists these Hazards and the controls for these in this standard.

This matrix can be used when drafting Engineering waivers to identifying the Hazards and the Controls being waived.

Hazard Reference	Hazard Description	Cause	Contributing Factor	Control Ref
HR01.01	Train to train collision	Signal Infrastructure not safe	Maintenance service not completed to the TMP schedule frequency	3
HR01.02	Train to train collision	Signal infrastructure outside safe tolerance	Maintenance service not completed to the TMP schedule frequency	3
HR01.03	Train Derailment	Signal Infrastructure not safe	Maintenance service not completed to the TMP schedule frequency	3
HR01.04	Train Derailment	Signal infrastructure outside safe tolerance	Maintenance service not completed to the TMP schedule frequency	3
HR01.05	Train to Track Worker	Signal Infrastructure not safe	Maintenance service not completed to the TMP schedule frequency	3
HR01.06	Train to Track Worker	Signal infrastructure outside safe tolerance	Maintenance service not completed to the TMP schedule frequency	3
HR01.07	Train to obstruction	Signal Infrastructure not safe	Maintenance service not completed to the TMP schedule frequency	3
HR01.08	Train to obstruction	Signal infrastructure outside safe tolerance	Maintenance service not completed to the TMP schedule frequency	3
HR01.09	Infrastructure/System loss, degradation & constraint	Signal infrastructure fails in service	Maintenance service not completed to the TMP schedule frequency	3
HR01.10	Infrastructure/System loss, degradation & constraint	Signal infrastructure fails in service	Maintenance service not completed to the TMP schedule frequency	3