NEW EQUIPMENT & SYSTEM APPROVAL PROFORMA

Ref: *08-08-11-104*

Note: the prompts given below are only a guide to the information required for approval. Dependent on the type of equipment or system that requires approval delete any section that is not applicable or include additional information if necessary. Mandatory fields are marked with an asterisk (*).

1 **Equipment or System to be approved** *

Bi-directional derail on dual gauge track

2 **Originator** *

Name: R. Wyatt Company: Janus Railway & Civil for Abigroup Contractors

3 **Introduction** *

The Port River Expressway – Stage 3 Railworks project documentation calls for a bi-directional derail to be located in dual gauge track in the eastern leg of the Port Flat Triangle. Uni-directional derails are commonplace on the ARTC system but it is understood there are no bi-directional units.

An off-the-shelf Western-Cullen-Hayes unit, type HBXS has been adopted.

4 **Determination of Need** *

There is a requirement to protect both the Port Flat yard and the main line beyond the eastern leg of the Port Flat Triangle from uncontrolled movements. Two separate uni-directional derails could have been installed but would incur the cost of two units complete with switch machines and on-going maintenance thereof. A decision was taken to install an available off-the-shelf bi-directional unit with similar functionality to that of two uni-directional units but with the advantage of eliminating duplication of equipment.

5 **Significant Change or Not** *(as determined by the Manager Standards)* *

This change in equipment or system is assessed as MINOR

6 **Review Panel** *(as determined by the Manager Standards)* *

- John Furness - Manager Standards
- Ian Domleo – Senior Track & Civil Engineer
- Matthew Hart – Delivery Manager

7 **Safety**

No relevant standard identified.

The derail is located on a 200m radius curve on dual gauge track on the common rail, on the inside of the curve. It is considered that the derail would not be successful under all conditions.

Refer to attached Risk Assessment.

8 **Performance and Suitability**

Refer to attached performance and suitability summary.

(i) **Use in other rail networks**

Although not as common as uni-directional units, bi-directional derails occur with sufficient frequency in the USA for the manufacturer to develop and produce a design. The HBXS is relatively new and is an improvement on the HBX type which has been in use for some years.

The Western-Cullen-Hayes unit was supplied by Bradken (contact Russell Coulson 07 3335 2286).

(ii) **Use in the ARTC network**

None known

(iii) **Issues arising from usage of the equipment/system**

No new issues arise from using a bi-directional unit over a uni-directional unit apart from a small increase in the deviation angle experienced by a derailing wheelset. This slightly reduces the effectiveness of the derail for a given speed of operation. This issue is addressed by confining application of the bi-directional derails to low-speed locations.

(iv) **Changes required to infrastructure or systems for use of the equipment**

No changes necessary

9 **Reliability**

Reliability is the same as for existing uni-directional units.

10 **Maintainability**

Refer to attached Maintenance Plan. There is no effective difference from the maintenance requirements of a uni-directional derail.

11	**Approval** *						
	The device, identified as Western-Cullen-Hayes derail, Model HBXS should be approved for use at this location only.						
12	**Conditions of Approval** *						
	1. The derail should be installed in accordance with the manufacturer's "Installation Instructions" and "Derail installation, inspection and maintenance handbook" or with site-specific details directed by a qualified engineer. 2. Speed of operation at this site shall not exceed 15km/hr. ***<<NOTE: Review Panel may add additional Conditions of Approval>>***						
13	**Does the Originator accept the additional Conditions of Approval as set by the Review Panel:**	Yes	☐	No	☐	N/A	☒

14	**Sign off**		***ARTC office use only***
	Review Panel:		
	John Furness	Date:	2/7/08.
	Ian Domleo	Date:	1/7/08.
	Matthew Hart	Date:	2/7/08.

RISK ASSESSMENT SUMMARY SHEET: Bi directional derail at entrance to Port Flat Yard

Prepared by: Ian Domleo Date: 24/6/08

Reviewed by: _____ Date: 24/6/08.

Reviewed by: MK Hook 24/6/08 _____ Date: ____/____/____

Effectiveness of Bi Directional Derail on Dual Gauge track at Entrance to Port Flat Yard

Element	Hazard	Failure mode(s)	Existing Controls	Likelihood of risky event	Exposure to hazard	Consequence of incident	Risk Score	Additional Controls Proposed
IDENTIFICATION STAGE			*ANALYSIS STAGE*					
Derail not derailing runaway vehicles/trains due to its location on inside leg of curve.	Bi directional derail not functioning as intended.	1. Collision, caused by a train proceeding over the derail from an easterly direction and entering Port Flat Yd causing a collision.	1.1 Trains travelling in an easterly direction to get to the derail in position would need to overrun 2 signals, then travel about 300m along the Eastern leg of the triangle before encountering the derail giving drivers some time to stop the train.	Remotely possible	Rare	Disaster	**45**	None
			1.2 Trains approaching level crossing would operate warning devices.					
		2. Collision, caused by a train/vehicles proceeding over the derail, along the track and colliding with road vehicles at level crossing or another train.	2.1 Trains/shunted vehicles encountering the derail from the Port Flat Yd side would need to overrun a signal before encountering the derail.	Remotely possible	Rare	Disaster	**45**	None
			2.2. Low speed (15km/h) operation at this location. Derail designed for low speed operation.					
			2.3 Shunting area in Yard is on flat ground so overshunting, not a runaway building up speed that causes the failure.					
			2.4 Bulk of shunting occurs some 150m away from entrance to Yard.					

Notes:

1. The derail is located on the inside (common) rail of a curve of about 200m radius, which is against the manufacturers recommendations.
2. It is anticipated that the derail will only be effective about 50% of the time it is called into duty.
3. The provision of the bi directional derail and the associated signalling is an enhancement over the previous situation which did not have any derail protection for the level crossing.

I S Domleo 24/6/08

~~DRAFT~~/~~FINAL~~

Safety Committee approval date: _____/_____/_____