

Data Classification - Structures

EGW-10-01

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1 Introduction

1.1 Purpose

ARTC maintains an Enterprise Asset Management System (EAMS) to ensure that assets are fit for the purpose of allowing the operation of trains over ARTC infrastructure. The EAMS enables ARTC to perform the following core responsibilities;

- Capital investment in the network
- Manage the infrastructure comprising the network
- Maintain the infrastructure comprising the network

The purpose of this work instruction is to describe the mandatory attributes required by the system as currently configured to manage structures assets (to achieve the stated purpose above).

1.2 Scope

This work instruction currently applies to ARTC's infrastructure assets as follows;

- All structures assets
- The entire ARTC Network

This work instruction applies to the following aspects of the enterprise assessment management system;

- The management of assets
 - Register of structures assets, including configuration and engineering data
 - Register of deficiencies affecting structures assets

This work instruction excludes the following aspects of the ARTC asset, and the computerised asset management system;

- Financial data relating to the ARTC asset (Ci Financials)
- Management of infrastructure documentation (this is configuration management)
- Governance of required scheduled reporting (this is managed by engineering compliance)
- Engineering governance of infrastructure (this is managed by engineering compliance)

1.3 Document Owner

The General Manager Technical Standards is the Document Owner and is the initial point of contact for all queries relating to this work instruction.

1.4 Responsibilities

Business Unit management is responsible for delegating (and documenting) responsibility for each function of the asset management system (with regards to structures), as described by this work instruction.

Business Unit management is responsible for ensuring that all inspection, assessment, monitoring and review functions of the asset management system are delegated to (and carried out by) competent rail industry workers.

1.5 Reference Documents

This work instruction supports the following documents and systems:

- ARTC Safety Management System (SMS)
- Section 9 Structures
- ETG-09-01 Structures Inventory
- ETE-09-01 Structures Inspection
- ETE-09-02 Structures Inspection Procedure
- EGP-10-01 Asset Management System
- EGP-03-01 Rail Network Configuration Management
- EGP-20-01 Project Management
- EGW-20-01 Managing Complex Projects
- EGW-20-02 Managing Simple Projects

The following documents support this work instruction:

- ETE-00-03 Civil Technical Maintenance Plan (Track and Civil)
- EGP-04-01 Engineering Drawings and Documentation
- EGP-04-02 Drawing Management System

Note: Until the documents listed above are brought up to date with Ellipse, this work instruction shall take precedence over any clause in these documents relating to the Asset Management System, Structures Management System or the Bridge Management System (BMS). In the event any confusion or contradiction occurs the owner of this document shall be contacted for clarification.

1.6 Definitions

The following terms and acronyms are used within this document:

Term or acronym	Description
AAA	Automatic Assignment Allocation
ADA	Asset Data Administrator
AEI	Associate Equipment Item
AMP	Asset Management Plan
EAMS	Enterprise Asset Management System
ARTC	Australian Rail Track Corporation Ltd.
Attribute	Single component of a record. Similar to a database field.

Term or acronym	Description
AWP	Annual Works Program
CAP	Capital Works
Component	The component or element of the equipment reference for the known condition
CoP	ARTC Engineering (Track and Civil) Code of Practice
Defect	Any unsatisfactory condition which has the potential to develop into asset failure. May be a discrete fault against a component of the asset, or the overall condition of the asset
DMS	Drawing Management System
EC	Equipment Class
EGI	Equipment Group Identifier
Inspection	The examination of an infrastructure asset, for the purposes of ensuring the asset is safe and capable of performing to operation requirements
km	Kilometrage
Modifier	Code indicating the component or element of the equipment reference, if there is more than one
MPM	Major Periodic Maintenance
MST	Maintenance Schedule Task
Nameplate	Instrument used to store engineering characteristics against an asset in Ellipse
NDT	Non-Destructive Testing
Part	Optional filter for designating the sub-element or sub-component affected by a known condition
PU	Productive Unit, used to group assets within the business hierarchy
RCRM	Routine Corrective and Reactive Maintenance
Responsible Manager	ARTC personnel with designated responsibility for management of the asset, or an aspect of the management of the asset
RPPD	Revised Priority or Planned Date
SMS	Safety Management System
SPN	Structured Plant Number
TCR	Train Control Report
TMP	Technical Maintenance Plan
TSR	Temporary Speed Restriction
User	A suitably competent person, authorised to interact with the AMS in accordance with this procedure
Value	The stored contents of an attribute within the AMS
WO	Work Order

Table 1 – Definitions

2 Important Note on the Use of this Work Instruction

This work instruction is intended to be read and used in conjunction with EGP-10-01. EGP-10-01 is required to fully understand the contents of this work instruction.

Where data attributes or requirements are universal (i.e. they are the same for all equipment classes), ARTC’s requirements will be described in EGP-10-01 and will not be repeated in this work instruction.

2.1 Nomenclature

This work instruction describes both the physical structure (and its constituents), and its associated digital records. To avoid confusion, the nomenclature described in Table 2 has been used in the work instruction to differentiate between the physical and the digital structures;

Physical Asset	Asset Management System
Asset (i.e. a bridge)	Equipment
	Parent Equipment
	AEI Equipment Structure
	Component Modifier Equipment Structure
Element (i.e. a bridge girder)	Child Equipment
	Associate Equipment Item (AEI)
	Component
	Modifier
	Part

Table 2 - Nomenclature

3 Equipment Register

Users shall adhere to the equipment register requirements as described in EGP-10-01. Additional requirements specific to structures are provided in the following clauses.

3.1 Description

The description is an uncontrolled attribute. The equipment description consists of 2 separate attributes that may contain up to 40 characters each. The purpose of the description is;

- To allow users to easily identify what and where the asset is
- To allow users to search off the description, to more easily find a specific asset in the equipment register

The responsible manager shall conform to the additional structures specific requirements specified below generating or amending equipment records.

3.1.1 Description 1

Description 1 shall describe ‘what’ the asset is.

Where an asset has a colloquial name this shall be used (e.g. Moonee Ponds Viaduct).

Where an asset does not have a colloquial name (e.g. a generic small pipe culvert) the format as described in Table 3 will be used to generate the description 1 from the nameplate attribute data;

Equipment Type	Description 1 Derivation	Example
Equipment	Function Abbreviation ^{Note 1} + Colloquial Name	UNDBR MOONEE PONDS VIADUCT
Equipment	Function Abbreviation ^{Note 1} + Track Name	OVRBR COOKS RIVER – PRINCES HWY
Assembly	Assembly Description + Assembly Position (Numeral only)	ABUTMENT 1
AEI	AEI EGI Description + Assembly Position + Element Position	STEEL MAIN/TOP GIRDER S001 N02

Table 3 - Construction of Description 1

Note 1: Function Abbreviation is provided in Table 15.

3.1.2 Description 2

Description 2 shall describe ‘where’ the asset is.

The format as described in Table 4 will be used to generate description 2;

Equipment Type	Description 2 Derivation	Example
Equipment	Km’s + Corridor Segment Description	0294.234 MILE END – SAVIC BORDER
Assembly	Equipment Description 1	UNDBR MOONEE PONDS VIADUCT
AEI	Equipment Description 1	UNDBR MOONEE PONDS VIADUCT

Table 4 - Construction of Description 2

3.2 Structures Equipment Hierarchy

Refer to EGP-10-01 for more information on the ARTC productive unit hierarchy. The levels of the productive unit hierarchy used by structures equipment (AEI Equipment Structure) are shown in Table 5.

Level	Description	Example
6	Equipment	UNDBT MOONEE PONDS VIADUCT
7	Bridge Assembly	SPAN 1
8	Associate Equipment	Main/Top Girder S003 N02

Table 5 - Structures Equipment Hierarchy

3.3 Equipment Class (EC)

The valid Equipment Class codes for structures assets are described in Table 6;

Equipment Class	Class Description	Application
BR	Bridge	Equipment
CU	Culvert	Equipment
TU	Tunnel	Equipment
MS	Miscellaneous Structure	Equipment
BA	Bridge Assembly	Bridge Assembly
SP	Superstructure	Associate Equipment Item
SB	Substructure	Associate Equipment Item
OT	Other	Associate Equipment Item
DG	Sub-surface Drainage ^{Note 1}	Equipment
XX	Obsolete Equipment ^{Note 2}	None

Table 6 - Equipment Class

Note 1: Sub-surface Drainage (DG) assets are culverts that do not satisfy the definitions in Section 9 CoP, i.e. culverts less than 350mm diameter. "DG" assets do not require scheduled structures inspections. The responsible manager shall ensure that no structures assets are incorrectly categorised as "DG".

DG is included here for completeness and shall henceforth not be considered as a structures equipment class by this work instruction.

Note 2: Obsolete Equipment (XX) exists as an Equipment Class in Ellipse. To maintain traceability this Equipment Class shall not be used for structures.

Structures that have been replaced, removed etc. shall instead retain their structures Equipment Class and should be marked with the Status 'Disposed Of' (DI).

3.4 Equipment Group Identifier (EGI)

Refer to EGP-10-01 for more information about the function of the EGI.

Correct application of the EGI onto structures equipment will vary depending on what level of the equipment hierarchy the equipment is located.

There are two formats of equipment structure used for structures equipment in Ellipse;

- AEI Equipment
- Component Modifier Equipment

Equipment with the AEI equipment structure consists of parent and child equipment; with a discrete piece of subordinate equipment to describe each element of the asset (e.g. there will be one AEI equipment record per girder on a bridge). There are different EGI codes to represent the parent (equipment) and child (associate equipment item) equipment items.

Equipment with the component modifier structure consists of a single parent equipment record. Individual elements of the equipment are identified via the alarms and defect module as defects are identified. Individual elements of the asset do not exist against the equipment in a persistent state.

3.4.1 Equipment Group Identifier Format (Equipment)

The Equipment EGI is a controlled attribute. It contains a 5 character alphanumeric code.

The format of the Equipment EGI consists of the relevant 2 character Equipment Class code, followed by a 3 digit unique identifier suffix.

Refer to Table 7 for the valid (parent) Equipment EGI codes;

EGI	Description	Application
BR001	Bridge – Masonry	AEI Equipment Structure
BR002	Bridge – Concrete	AEI Equipment Structure
BR003	Bridge - Steel	AEI Equipment Structure
BR004	Bridge – Timber	AEI Equipment Structure
BR005	Bridge – Other	AEI Equipment Structure
BR006	Complex Bridge	AEI Equipment Structure
CU001	Complex Culvert - Masonry	AEI Equipment Structure
CU002	Complex Culvert – Concrete	AEI Equipment Structure
CU003	Complex Culvert – Steel	AEI Equipment Structure
CU004	Complex Culvert – Other	AEI Equipment Structure
CU005	Simple Culvert – Masonry	Component Modifier Equipment Structure
CU006	Simple Culvert – Concrete	Component Modifier Equipment Structure
CU007	Simple Culvert – Steel	Component Modifier Equipment Structure
CU008	Simple Culvert - Other	Component Modifier Equipment Structure
MS001	Access Structure	Note 1
MS002	Buffer Stop	Note 1
MS003	Flood Structure	Note 1
MS004	Lighting Gantry	Note 1
MS005	Lighting Tower	Note 1
MS006	Loading Structure	Note 1
MS007	Overhead Service Crossing	Note 1
MS008	Signal Gantry	Note 1
MS009	Sound Barrier	Note 1
MS010	Turntable	Note 1
MS011	Water Structure	Note 1

EGI	Description	Application
MS012	Weighbridge	Note 1
MS013	Small Retaining Wall	Note 1
MS014	Large Retaining Wall	Note 1
MS015	Culvert Non-track	Note 1
TU001	Tunnel	AEI Equipment Structure

Table 7 – Equipment EGI Codes

Note 1: The updated equipment structure for Miscellaneous Structures has not been fully implemented. Miscellaneous structures will continue to use the previous equipment structure implementation until further notice.

3.4.2 Equipment Group Identifier Format (Bridge Assembly)

The Bridge Assembly EGI is a controlled attribute. It contains a 6 character alphanumeric code.

The bridge assembly EGI is a level of the equipment hierarchy that is used to logically group AEI's together based on their location against the asset. The bridge assembly is not a physical asset, unlike equipment and AEI.

Refer to Table 8 for the valid bridge assembly EGI codes;

EGI	Description
BAABUT	Bridge Assembly - Abutment
BASPAN	Bridge Assembly – Span
BAPIER	Bridge Assembly - Pier
BATRUS	Bridge Assembly – Bridge Truss
BAENDB	Bridge Assembly – Footbridge End
BABARL	Bridge Assembly – Culvert Barrel
BAENDC	Bridge Assembly – Culvert End
BAENDT	Bridge Assembly – Tunnel Portal
BAWALT	Bridge Assembly – Tunnel Wall
BAROFT	Bridge Assembly – Tunnel Roof

Table 8 - Bridge Assembly EGI Codes

3.4.3 Equipment Group Identifier Format (AEI)

The Associate Equipment Item (AEI) EGI is a controlled attribute. It contains a 10 character alphanumeric code.

The Associate Equipment Item EGI code contains the additional data required to control the defect types that may be created against the AEI EGI.

Refer to Table 9 for the rules governing the construction of AEI EGI codes;

Position	Description	Values	Value Descriptions
1+2	AEI Equipment Class	SP	Superstructure
		SB	Substructure
		TU	Tunnel
		OT	Other
3	Separator Zero	0	
4	Element Significance	P	Primary
		S	Secondary
5	Description Sub-group		e.g. for walkway/refuge;
		W	Walkway
		R	Refuge
6	Material Sub-group		e.g. for steel;
		S	Steel
		B	Broad Flange Beam
		W	Wrought Iron
		C	Cast Iron
7	Separator Zero	0	
8+9	Component Code		Refer to appendix A for full list
		22	Main/Top Girder
		53	Columns or Pile
10	Main Material Group	S	Steel
		P	Precast Concrete
		C	In-situ Concrete
		T	Timber
		M	Masonry
		O	Other

Table 9 - Construction of an Associate Equipment Item EGI

Table 10 provides AEI EGI code examples. Refer to Appendix B for a comprehensive list of valid AEI EGI's.

The prescribed rules have only been applied as required to create concise and clear defect type lists against each of the defined AEI EGI's. As new defect types are defined, further AEI EGI's may be described at a later date, as required.

Example Description	1	2	3	4	5	6	7	8	9	10
Steel Main/Top Girder (Primary)	S	P	0	P	0	S	0	2	2	S
Steel Main/Top Girder (Primary/BFB)	S	P	0	P	0	B	0	2	2	S
Timber Stringer (Secondary)	S	P	0	S	0	0	0	2	8	T

Table 10 - Associate Equipment Item EGI Examples

3.4.4 Example Equipment AEI Register

An example of all the provisions of this section (of the work instruction) being used to create an equipment AEI register is shown in Table 11 below. Refer to cl 3.8 for more information on the SPN.

EC	EGI	SPN	Description
BR	BR003	S00100400330.230UB	UNDBR Murray River
BA	BAABUT	S00100400330.230UBA001	Abutment 1
SB	SB0000055C	S00100400330.230UBA00155C	Concrete Abutment A001
SB	SB0000056C	S00100400330.230UBA00156CN01	Concrete Wingwall A001N01
SB	SB0000056C	S00100400330.230UBA00156CN02	Concrete Wingwall A001N02
BA	BASPAN	S00100400330.230UBS001	Span 1
DE	DE00000001T	S00100400330.230UBS00101T	Timber Deck S001
SP	SP0P0S022S	S00100400330.230UBS00122SN01	Steel Main/Top Girder S001N01
SP	SP0P0S022S	S00100400330.230UBS00122SN02	Steel Main/Top Girder S001N02
SP	SP0S00041O	S00100400330.230UBS00141OS001N01	Steel Girder/Stringer Wind Bracing S001N01
BA	BAPIER	S00100400330.230UBP001	Pier 1
SB	SB0000054M	S00100400330.230UBP00154M	Masonry Blade Pier P001
BA	BASPAN	S00100400330.230UBS002	Span 2
DE	DE00000001T	S00100400330.230UBS00201T	Timber Deck S002
SP	SP0P0S022S	S00100400330.230UBS00222SN01	Steel Main/Top Girder S002N01
SP	SP0P0S022S	S00100400330.230UBS00222SN02	Steel Main/Top Girder S002N02
SP	SP0S00041O	S00100400330.230UBS00141OS002N01	Steel Girder/Stringer Wind Bracing S002N01
BA	BAABUT	S00100400330.230UBA002	Abutment 2
SB	SB0000055C	S00100400330.230UBA00255C	Concrete Abutment A002
SB	SB0000056C	S00100400330.230UBA00256CN01	Concrete Wingwall A002N01
SB	SB0000056C	S00100400330.230UBA00256CN02	Concrete Wingwall A002N02

Table 11 - Example Equipment AEI Register

3.5 Status

The current valid Status codes for structures assets are described in Table 12;

Code	Description	To be used for structures
BO	Booked Out	N
DI	Disposed Of	Y
GM	Within Group MST	N
IS	In Service	Y
NM	Not Maintained	Y

Code	Description	To be used for structures
PN	Project New	N
RI	Redundant Infrastructure	Y
SW	Service Withdrawn	N

Table 12 - Asset Status

3.6 Alternate References

A structures equipment record in Ellipse may be created (or populated) using multiple data sources.

The unique ID from any data set used to create the equipment record shall be stored in the Alternate References sub-frame, to provide backwards compatibility with historic data and documents. Examples of this identifying data include;

- BMS Asset Number (BMSID)
- BMS Structure Name (BMSNAME)
- Downer EDI Asset Number (EDINUM)
- Temporary AMP Database 'Temporary Asset Number'

3.7 Extended Description

The Extended Description frame may be used to store any data migrated from historic databases that either do not warrant a nameplate record, or were rarely populated (e.g. access phone number in BMS).

Entry of any data in this frame will be at the responsible manager's discretion.

3.8 ARTC Structured Plant Number

Refer to EGP-10-01 for more information about the function of the SPN.

3.8.1 Structures SPN format

All structures Equipment Classes use an identical SPN format. The form and length of the structures SPN recorded against a piece of structures equipment will vary depending on the position of the equipment within the equipment hierarchy. Refer to cl 3.2 for more information about the structures equipment hierarchy.

Table 13 describes the construction of the structures SPN for each level of the equipment hierarchy;

Position	Description	Size	Equipment	Assembly	AEI
1	ROUTE	3	✓	✓	✓
2	BASECODE	5	✓	✓	✓
3	KMS	8	✓	✓	✓
4	FUNCTION	2	✓	✓	✓
5	ASSEMBLY POSITION	4		✓	✓
6	ELEMENT POSITION	6			✓

Table 13 – Construction of the (Structures) Structured Plant Number

Table 12 provides examples for the construction of SPN codes at the various levels of the equipment hierarchy;

Example Desc.	1	2	3	4	5	6
Equipment	S00	10044	0485.255	UB		
Assembly	S00	10044	0485.255	UB	S001	
AEI (Single)	S00	10044	0485.255	UB	S001	01P ^{Note}
AEI (multi)	S00	10044	0485.255	UB	S001	22SN01 ^{Note}

Table 14 - SPN Examples

Note: Refer to cl 3.8.4 for information on the SPN 6 data requirements

3.8.2 Function (Plant Segment 4)

The current Function codes for structures assets are described in Table 15. Only the last 2 characters of the table code will be visible in the SPN.

Table Code	Description	Active	Function Abbreviation
BRFB	Footbridge	Y	FTBR
BROB	Overbridge	Y	OVRBR
BRUB	Underbridge	Y	UNDBR
CULC	Large Culvert	Y	CULVT
CUSC	Small Culvert	Y	CULVT
MSAC	Access Structure	Y	ACCSTR
MSBS	Buffer Stop	Y	BUFFST
MSFE	Sound Barrier or Fencing	Y	SNDBARR
MSFS	Flood Structure	Y	FLOODST
MSLG	Lighting Gantry	Y	LGTGANT
MSLS	Loading Structure	Y	LOADST
MSLT	Lighting Tower	Y	LGTTWR
MSNC	Non-track Culvert	Y	NTCULV

Table Code	Description	Active	Function Abbreviation
MSOC	(Overhead) Service Crossing	Y	OHSXG
MSOT	Other Miscellaneous	Y	OTMISC
MSRL	Large Retaining Wall	Y	LRGRET
MSRS	Small Retaining Wall	Y	SMLRET
MSSG	Signal Gantry	Y	SIGGNT
MSSW	Water Structure	Y	WATSTR
MSTC	Telecoms Tower	Y	TELETWR
MSTT	Turntable	Y	TURNTBLE
MSWB	Weighbridge	Y	WEIGHBR
TUTU	Tunnel	Y	TUNNEL

Table 15 – Function Values

Note: only the function values described in Table 15 are valid. Any function value not described in Table 15 shall be marked as inactive in Ellipse, and the relevant equipment records corrected.

3.8.3 Assembly Position (Plant Segment 5)

The Assembly Position is an uncontrolled attribute. The responsible manager shall generate and record a 4 character alphanumeric code for each equipment record. The Assembly Position is used for Assembly and AEI equipment.

The assembly position format is ANNN.

The alpha prefix denotes the assembly type, as described in Table 16 below. The 3 digit number refers to the assembly number, for example;

- A001 Abutment 1
- S004 Span 4
- P003 Pier 3

Prefix	Description	Application
S	Span	Bridge
P	Pier	Bridge
A	Abutment	Bridge
B	Barrel	Culvert
E	End	Culvert

Table 16 - Assembly Position Prefixes

3.8.4 Element Position (Plant Segment 6)

The element position is an uncontrolled attribute. The responsible manager shall generate and record a 3 or 6 character alphanumeric code depending on the characteristics of the AEI, as described in this clause. The assembly position is only used for AEI equipment.

For AEI equipment that can only be recorded once per assembly (i.e. a bridge deck) only a 3 character component code will be recorded. Refer to Appendix B for the comprehensive component code list.

For AEI equipment that can be recorded multiple times per assembly (i.e. girders) the 3 character component number shall be recorded as a suffix to the component code.

Refer to Table 17 for the rules governing construction of the element position description.

Refer to Table 11 for examples of the element position being used.

Position	Description	Example	Single	Multi
1+2	Component Code	22	✓	✓
3	Main Material Group	S	✓	✓
4	Element Number Prefix	N		✓
5+6	Element Number	02		✓

Table 17 – Construction of Element Position

Note: The value of the element number prefix shall always be 'N'.

3.9 Element Location Nomenclature

Refer to Appendix A for illustrations of how to correctly identify and describe bridge elements as AEI against an equipment record.

4 Nameplate

Nameplate attributes are unique to each EGI. Nameplate attributes allow ARTC to build a more comprehensive dataset for each asset.

Nameplate data is located in the Nameplate sub-frame (refer to **Error! Reference source not found. Error! Reference source not found.**).

The data contained in the Nameplate attributes is editable by the Responsible Manager. The Responsible Manager shall ensure that the records maintained for each asset in the Nameplate sub-frame are as complete and accurate as possible.

4.1 Nameplate Attributes

The current Nameplate Attributes for structures assets are described in Appendix C.

4.2 Nameplate Attribute Enabling Files

The current Nameplate Attributes Enabling Files for structures assets are described in Appendix D.

Note: The enabling files can be reviewed in Ellipse using the module MSE010.

5 Equipment Known Conditions

Users shall adhere to the equipment known condition requirements as described in EGP-10-01. Additional structures specific requirements and details are provided in the following clauses.

5.1 Application of Equipment Structures to EGI

The equipment structure applied to a given EGI will have a significant impact on how known conditions are recorded against the equipment.

5.1.1 Navigation

The following process is recommended when recording a new defect, to ensure that a valid AEI or component against the equipment record is selected;

MSE600 (Select equipment record) → Actions (Top Menu Ribbon) → Productive Unit (to open MSE60A Update Equipment Register)

MSE60A Update Equipment Register → Select AEI or Component → Actions (Top Menu Ribbon) → Create Defect (to open MSEWDA)

Note: Entry of a known condition directly via the alarms and defects module does not restrict the drop lists to valid entries for the given asset – they will be populated with global data. Navigation of the global drop lists reduces the likelihood that a known condition will be correctly or successfully recorded.

5.2 Known Conditions

The data attributes required for structures known condition records is described in Table 18;

Attribute	Size	Enabling File	Mandatory
Equipment Reference	12N	MSE600	Y
Component ^{Note 1}		MSE010/CO	N
Component Modifier Code ^{Note 1}	2AN	MSE010/MO	N
Attribute Link ID		MSEWLA	Y
Part	4AN	MSE010/PART	N
Response ^{Note 2}	2N		Y
Response ^{Note 3}	255AN		Y
Severity	2N	MSE010/SEVR	Y
User Status	2N	MSE010/ADUS	Y
Corrective Action Code	2N	MSE010/CASL	Y
Priority Code	2AN	MSE010/PY	Y
Corrective Action	255AN		N
Fault Found Description	255AN		

Table 18 - Defect Attributes

Note: Any attributes that appear in the alarms and defects frame and are not listed in Table 18 are not necessary for the creation of a structures defect record

5.3 Equipment Reference

The equipment Reference is the SPN of either the equipment or AEI.

For equipment with the AEI equipment structure it is important to select the correct equipment record, as certain parts and known conditions can only be recorded against parent equipment.

Known defects should never be recorded against Bridge Assembly equipment, as Bridge Assemblies do not represent a physical asset.

Equipment with the component modifier equipment structure will always record the parent equipment SPN.

5.4 Component

The component is a controlled attribute. It contains a 3 character alphanumeric code.

Only equipment with the component modifier equipment structure will use the Component attribute. Currently, the Component attribute is only used for simple culvert EGI's. The component attribute is used to identify the element of the asset affected by a known condition.

Refer to Table 19 for the valid component codes;

Component	Description	Application
63S	Pipe Barrel Steel	CU007
63P	Pipe Barrel Concrete	CU006
63O	Pipe Barrel Other Material	CU008
64P	Box Culvert Concrete	CU006
65S	Arch Barrel Steel	CU007
65P	Arch Barrel Concrete	CU006
65M	Arch Barrel Masonry	CU005
67C	Culvert Apron	CU005 – CU008
68C	Culvert Headwall	CU005 – CU008
56C	Culvert Wingwall	CU005 – CU008

Table 19 - Simple Culvert Component Codes

5.5 Component Modifier Code

The Component Modifier Code is a controlled value attribute. It contains a 2 character alphanumeric code.

Only equipment with the component modifier equipment structure will use the component modifier code attribute. Currently, the component modifier code attribute is only used for simple culvert EGI's. The component modifier code attribute is used to identify the specific element of the asset affected by a known condition.

Refer to Table 20 for the valid component modifier codes;

Modifiers	Description	Application
B1	Barrel 1	Barrel
B2	Barrel 2	Barrel
B3	Barrel 3	Barrel
B4	Barrel 4	Barrel
B5	Barrel 5	Barrel
B6	Barrel 6	Barrel
B7	Barrel 7	Barrel
B8	Barrel 8	Barrel
B9	Barrel 9	Barrel
B0	Barrel 10+ ^{Note 1}	Barrel
E1	End 1	Headwall, Apron
E2	End 2	Headwall, Apron
E3	End 1 Number 1	Wingwall
E4	End 1 Number 2	Wingwall
E5	End 2 Number 1	Wingwall
E6	End 2 Number 2	Wingwall

Table 20 - Simple Culvert Component Modifier Codes

Note 1: For barrel numbers greater than 10+, this component should be selected and the actual barrel number recorded in the Fault Found Detail attribute. This component shall not be used to group known conditions into a single record.

5.6 Attribute Link ID

The MSEWLA enabling file values for structures defects are based on the intervention criteria guidelines in ETE-09-01 (appendix 1).

When recording a new known condition, the Attribute Link ID drop down list shall be populated by Ellipse based on;

- The EGI of the equipment, or
- The EGI of the AEI, or
- The component selected, and
- If a Part has been selected

The attribute link ID list is generated from the defined relationship between;

- The EGI (equipment)
- The EGI (AEI) or Component
- The Defect Type

Refer to appendix E for more information on the defined Defect Types.

5.7 Parts

The Part is a controlled attribute. It contains a 6 character alphanumeric code. The Part is a non-mandatory filter that is used to;

- Provide additional granulation of the known condition drop list (reduce pool of valid known conditions available for the record)
- Enable the inspector to record additional data against the known condition record, without having to rely on the corrective action attribute

Table 21 describes the construction of the parts codes;

Position	Description	Value	Value Description
1+2	Equipment Class		Refer to Table 6
3+4	Component Code		Refer to Appendix A
5	Main Material Group	S	Steel
		P	Precast Concrete
		C	In-situ Concrete
		T	Timber
		M	Masonry
		O	Other
6	Numerator	1-9	To create unique value

Table 21 - Construction of Parts Code

Parts have been implemented for structures equipment primarily to reduce the number of associate equipment items against bridge equipment. Table 22 describes the valid part codes and what equipment type they have been implemented as parts against. Parts have only been included in a known condition definition where the known condition is unique to the part (i.e. 'locked bearing' can only affect the part 'bearing', which is recorded against primary girder AEI's).

Part	Description	Application
OT93C1	Approach Traffic Barrier	Equipment
OT98O1	Signage	Equipment
OT99O1	Miscellaneous Component	Equipment
BR92O1	Waterway	Bridge EC
OT95O1	Conduit	Equipment
OT96O1	Water Pipe	Equipment
OT97O1	Sewerage Pipe	Equipment
SP42O1	Bearing	Primary Superstructure AEI
SP62O1	Mortar Pad/Bearing Pedestal/Bearing Pads	Primary Superstructure AEI
DE02O1	Kerb	Deck, Walkway AEI

Part	Description	Application
DE04O1	Railing/Barrier/Parapet/Balustrade	Deck AEI
DE05O1	Guard Rail	Deck AEI
DE07O1	Ballast Kerb	Deck, Walkway AEI
DE06O1	Other Transom	Timber Deck AEI
DE06P1	PCC Transom	PCC Deck AEI
DE06S1	Steel Transom	Steel Deck AEI
DE06T1	Timber Transom	Timber Deck AEI
TU84O1	Other Tunnel Rock Anchor	Tunnel EC
TU84S1	Steel Tunnel Rock Anchor	Tunnel EC
TU85O1	Other Tunnel Attachment	Tunnel EC
SB66O1	Culvert Invert	Tunnel EC

Table 22 - Part Codes

5.8 Response

Refer to EGP-10-01 for more information about the function of the Response attribute.

The type of response attribute available will depend on the defect attributes type.

For known conditions with the attribute type 'TX – Text' the response attribute will comprise a 255 character text box. Currently, only the custom defect attribute is defined with a text response.

For known conditions with the attribute type 'CF – Condition/Feature Test' the response attribute the response attribute will comprise a drop list containing the CoP Section 9 defect categories, as per Table 23.

The response list for a given known condition will be restricted per the relevant entry in the defect intervention guideline in ETE-09-01 (i.e. not every defect will have A-D + M available as potential responses).

Response	Response Description	Response Restrictions
A	Exceedant A	
B	Exceedant B	
C	Exceedant C	Refer ETE-09-01 Appendix A
D	Exceedant D	
M	Exceedant M	

Table 23 - Response Codes

5.9 Severity

Refer to EGP-10-01 for more information about the function of the Severity attribute.

Note: In previous implementations of Ellipse, the Severity Code attribute contained discipline specific data. The AMIP project will transition all disciplines to a universal Severity Code format.

Structures will migrate to the universal Severity Code format on 28th August 2017.

5.10 User Status

Refer to EGP-10-01 for more information about the function of the User Status attribute.

5.11 Corrective Action Code

Refer to EGP-10-01 for more information about the function of the Corrective Action Code attribute.

5.12 Priority Code

Refer to EGP-10-01 for more information about the function of the Priority Code attribute.

Note: In previous implementations of Ellipse, the Priority Code attribute contained discipline specific priority codes. The AMIP project will transition all disciplines to a universal Priority Code format.

Structures will migrate to the universal Priority Code format on 28th August 2017.

5.13 Fault Found Description

Fault Found Description is an uncontrolled attribute. It is a 255 character alphanumeric text box. The Fault Found Description attribute shall be used by the inspector to provide ARTC with additional information on the nature of the defect that is not otherwise covered by the defined attributes or the Corrective Actions attribute.

Any information recorded in the corrective action attribute will not map over to the work order or work request (when the known condition is actioned by the responsible manager). The Fault Found Description attribute can be used to record any other useful information the inspector has collected, that is not appropriate for the Corrective Action attribute.

5.14 Corrective Action

Corrective Action is an uncontrolled attribute. It is a 255 character alphanumeric text box. The Corrective Actions attribute shall be used by the inspector to provide ARTC with additional information on the nature of the defect that is not otherwise covered by the defined attributes.

Any information recorded in the corrective action attribute shall map over to the work order or work request when the known condition is actioned by the responsible manager. As such the information provided should be limited to what the responsible manager will require to action any corrective work. Additional information can be recorded in the Fault Found Description Attribute.

The required format for Corrective Action entry shall be as follows:

1. The known condition measurement (i.e. the width or length of a crack, depth of corrosion), followed by an enter key stroke
2. Any recommendations (e.g. temporary speed restriction, inspection frequency change, and short term actions)

Note: Due to the character limit the inspector should refrain from duplicating any information in the Corrective Actions attribute that is contained in the defined attributes.

6 Appendix A – Structures Component Codes

Component	Description	Application
063S	Pipe Barrel Steel	CU007
065S	Arch Barrel Steel	CU007
063P	Pipe Barrel Concrete	CU006
064P	Box Culvert Concrete	CU006
065P	Arch Barrel Concrete	CU006
065M	Arch Barrel Masonry	CU005
063O	Culvert Barrel Other Material	CU008
056C	Culvert Wingwall	CU005, CU006, CU007, CU008
067C	Culvert Apron	CU005, CU006, CU007, CU008
068C	Culvert Headwall	CU005, CU006, CU007, CU008

Table 24 – Components

Modifier	Description	Application
B1	Barrel 1	
B2	Barrel 2	
B3	Barrel 3	
B4	Barrel 4	
B5	Barrel 5	
B6	Barrel 6	
B7	Barrel 7	
B8	Barrel 8	CU005, CU006, CU007, CU008
B9	Barrel 9	
B0	Barrel 10 +	
E1	End 1	
E2	End 2	
E3	End 1 Number 1	
E4	End 1 Number 2	
E5	End 2 Number 1	
E6	End 2 Number 2	

Table 25 – Modifiers

Appendix A – Structures Component Codes

Part	Description	Application
OT93C1	Approach Traffic Barrier	Parent Equipment
OT98O1	Signage	Parent Equipment
OT99O1	Miscellaneous Component	Parent Equipment
BR92O1	Waterway	Parent Equipment (Bridges)
OT95O1	Conduit	Parent Equipment
OT96O1	Water Pipe	Parent Equipment
OT97O1	Sewerage Pipe	Parent Equipment
SP42O1	Bearing	Superstructure (primary) AEI's
SP62O1	Mortar Pad/Bearing Pedestal/Bearing Pads	Superstructure (primary) AEI's
DE02O1	Kerb	Deck and Walkway AEI's
DE04O1	Railing/Barrier/Parapet/Balustrade	Parent Equipment, Abutment, deck, retaining wall, headwall AEI's
DE05S1	Guard Rail	Deck AEI's
DE07O1	Ballast Kerb	Deck and Walkway AEI's
TU84O1	Other Tunnel Rock Anchor	Tunnel AEI's
TU84S1	Steel Tunnel Rock Anchor	Tunnel AEI's
TU85O1	Other Tunnel Attachment	Tunnel AEI's
SB66O1	Culvert Invert	Culvert Barrel (Components and AEI's)
SB61C1	Ballast Log	Abutment, Wingwall AEI's

Table 26 - Parts

7 Appendix B – Associate Equipment Item Equipment Group Identifier Codes

EGI	Description
DE0000001C	Concrete Deck
DE0000001O	Other Deck
DE0000001P	PCC Deck
DE0000001S	Steel Deck
DE0000001T	Timber Deck
DE00T0001T	Transom Top Timber Deck
DE0000003C	Concrete Walkway/Refuge
DE0000003O	Other Walkway/Refuge
DE0000003P	PCC Walkway/Refuge
DE0000003S	Steel Walkway/Refuge
DE0000003T	Timber Walkway/Refuge
DE0000008T	Timber Longdecking/Running Planks
DE0000009O	Other Safety Screen

Table 27 - Deck AEI's

EGI	Description
SP0P00021C	Concrete Box Girder
SP0P00021P	PCC Box Girder
SP0P00021S	Steel Box Girder
SP0P00022C	Concrete Main/Top Girder
SP0P00022P	PCC Main/Top Girder
SP0P0S022S	Steel Main/Top Girder
SP0P0B022S	Steel Main/Top Girder (BFB)
SP0000023C	Concrete Arch
SP0000023M	Masonry Arch
SP0000023O	Other Arch
SP0000023P	PCC Arch
SP0000023S	Steel Arch
SP0000024S	Steel Cables/Hangers/Tie Rod
SP0S00026O	Other Cross Girder
SP0S00026S	Steel Cross Girder

Appendix B – Associate Equipment Item Equipment Group Identifier Codes

EGI	Description
SP0ST0026S	Steel Cross Girder (Temporary System) ^{Note 1}
SP0000027C	Concrete Diaphragm (System)
SP0000027S	Steel Diaphragm (System)
SP0S00028O	Other Stringer
SP0S00028S	Steel Stringer
SP0ST0028S	Steel Stringer (Temporary System) ^{Note 1}
SP0P00029O	Other Bottom Girder
SP0P0S029S	Steel Bottom Girder
SP0P0B029S	Steel Bottom Girder (BFB)
SP0S00030O	Other Transverse Beam
SP0S00030S	Steel Transverse Beam
SP0S00040O	Other Girder Sway Bracing (System)
SP0S00040S	Steel Girder Sway Bracing (System)
SP0S00040T	Timber Girder Sway Bracing (System)
SP0S00041O	Other Girder Wind Bracing (System)
SP0S00041S	Steel Girder Wind Bracing (System)
SP0S00041T	Timber Girder Wind Bracing (System)
SP0000043C	Concrete Footbridge Stairs/Ramp
SP0000043P	PCC Footbridge Stairs/Ramp
SP0000043S	Steel Footbridge Stairs/Ramp
SP0000043T	Timber Footbridge Stairs/Ramp
SP0000044C	Concrete Footbridge Landing
SP0000044P	PCC Footbridge Landing
SP0000044S	Steel Footbridge Landing
SP0000044T	Timber Footbridge Landing

Table 28 - Superstructure AEI's

Note 1: Temporary System EGI's have been implemented to permit inspectors to record known conditions against the correct AEI whilst the equipment inventory is completed. These AEI EGI's are not for permanent use.

EGI	Description
SP0P00031O	Other Truss Top Chord
SP0P00031S	Steel Truss Top Chord
SP0P00031T	Timber Truss Top Chord
SP0P00032O	Other Truss Bottom Chord

Appendix B – Associate Equipment Item Equipment Group Identifier Codes

EGI	Description
SP0P00032S	Steel Truss Bottom Chord
SP0P00032T	Timber Truss Bottom Chord
SP0P00033O	Other Truss Vertical Member
SP0P00033S	Steel Truss Vertical Member
SP0P00033T	Timber Truss Vertical Member
SP0P00034O	Other Truss Diagonal Member
SP0P00034S	Steel Truss Diagonal Member
SP0P00034T	Timber Truss Diagonal Member
SP0P00035O	Other Truss End Post
SP0P00035S	Steel Truss End Post
SP0P00035T	Timber Truss End Post
SP0S00036O	Other Truss Sway Bracing
SP0S00036S	Steel Truss Sway Bracing
SP0S00036T	Timber Truss Sway Bracing
SP0S00037O	Other Truss Top Chord Wind Bracing
SP0S00037S	Steel Truss Top Chord Wind Bracing
SP0S00037T	Timber Truss Top Chord Wind Bracing
SP0S00038O	Other Truss Bottom Chord Wind Bracing
SP0S00038S	Steel Truss Bottom Chord Wind Bracing
SP0S00038T	Timber Truss Bottom Chord Wind Bracing
SP0P00039O	Other Truss Portal
SP0P00039S	Steel Truss Portal
SP0P00039T	Timber Truss Portal

Table 29 - Superstructure (Truss) AEI's

EGI	Description
SP0P00022T	Timber Main/Top Girder
SP0000025T	Timber Corbel
SP0S00026T	Timber Cross Girder
SP0S00028T	Timber Stringer
SP0P00029T	Timber Bottom Girder
SP0S00030T	Timber Transverse Beam
SB0000051T	Timber Headstock
SB0000052T	Timber Sill
SB0000053T	Timber Columns or Pile

Appendix B – Associate Equipment Item Equipment Group Identifier Codes

EGI	Description
SB0000059T	Timber Pile Waling

Table 30 - Superstructure and Substructure (Timber Framing) AEI's

EGI	Description
SB0000051C	Concrete Headstock
SB0000051P	PCC Headstock
SB0000051S	Steel Headstock
SB0000052C	Concrete Sill
SB0000053C	Concrete Columns or Pile
SB0000053P	PCC Columns or Pile
SB0P0S053S	Steel Columns or Pile
SB0P0I053S	Steel Columns/Pile (Cast Iron Caisson)
SB0000054C	Concrete Blade Pier
SB0000054M	Masonry Blade Pier
SB0000055C	Concrete Abutment
SB0000055M	Masonry Abutment
SB0000055O	Other Abutment
SB0000055P	PCC Abutment
SB0000055T	Timber Abutment
SB0000056C	Concrete Wingwall
SB0000056M	Masonry Wingwall
SB0000056O	Other Wingwall
SB0000056P	PCC Wingwall
SB0000056T	Timber Wingwall
SB0000057C	Concrete Footing/Pile Cap/Sill Log
SB0000057P	PCC Footing/Pile Cap/Sill Log
SB0000057T	Timber Footing/Pile Cap/Sill Log
SB0000058S	Steel Trestle Bracing
SB0000058T	Timber Trestle Bracing
SB0000059S	Steel Pile Waling
SB0000060T	Timber Wingwall Pile

Table 31 - Substructure AEI's

Appendix B – Associate Equipment Item Equipment Group Identifier Codes

EGI	Description
SB0000063O	Other Pipe Culvert
SB0000063P	PCC Pipe Culvert
SB0000063S	Steel Pipe Culvert
SB0000064C	Concrete Box Culvert
SB0000064O	Other Box Culvert
SB0000064P	PCC Box Culvert
SB0000065M	Masonry Arch Culvert
SB0000065O	Other Arch Culvert
SB0000065P	PCC Arch Culvert
SB0000065S	Steel Arch Culvert
SB0000067C	Concrete Culvert Apron
SB0000067O	Other Culvert Apron
SB0000068C	Concrete Culvert Headwall
SB0000068M	Masonry Culvert Headwall
SB0000068O	Other Culvert Headwall

Table 32 - Substructure (Culvert) AEI's

EGI	Description
OT0000091O	Other Bridge Approaches
OT0000094C	Concrete Retaining Wall
OT0000094M	Masonry Retaining Wall
OT0000094O	Other Retaining Wall
OT0000094P	PCC Retaining Wall
OT0000094T	Timber Retaining Wall
OT0000099O	Other Miscellaneous Component

Table 33 - Other AEI's

EGI	Description
TU00000T81C	Concrete Tunnel Portal
TU00000T81O	Other Tunnel Portal
TU00000T81P	Precast Concrete Tunnel Portal
TU00000T82C	Concrete Tunnel Roof
TU00000T82O	Other Tunnel Roof
TU00000T82P	Precast Concrete Tunnel Roof

EGI	Description
TU00000T82S	Steel Tunnel Roof
TU00000T83C	Concrete Tunnel Wall
TU00000T83O	Other Tunnel Wall

Table 34 - Tunnel AEI's

8 Appendix C – Nameplate Attributes

Attribute Name	Attribute Description	Control Type	Special Edit	Enabling File	EGI Availability
PLANTSEG1	Plant Segment 1	10AN		P1	
PLANTSEG2	Plant Segment 2	10AN		P2	
PLANTSEG3	Plant Segment 3	10AN		P3	
PLANTSEG4	Plant Segment 4	10AN		P4	
PLANTSEG5	Plant Segment 5	8N		-	
LKMLK	Discrete Kilometrage (km)	10AN	DEC3	-	
TYPESTQ	Structure Type	2N		+STQ	
TYPESTR				+STR	
TYPESTJ				+STJ	
TYPESTS				+STS	
TYPESPA	Span Type	2N		+SPA	
TYPESPB				+SPB	
TYPESPC				+SPC	
TYPESPD				+SPD	
TYPESPE				+SPE	
TYPESPF				+SPF	
TYPESPG				+SPG	
TYPESPH				+SPH	
TYPESPI				+SPI	
TYPESPJ				+SPJ	
TYPESPK				+SPK	

Appendix C – Nameplate Attributes

Attribute Name	Attribute Description	Control Type	Special Edit	Enabling File	EGI Availability
MATSA	Span Material	2N		+SMA	
MATSB				+SMB	
MATSC				+SMC	
MATSD				+SMD	
MATSE				+SME	
MATSH				+SMH	
MATSJ				+SMJ	
TYPEDK	Deck Type	2N		+DTT	
MATD	Deck Material	21N		+DMT	
SC	Structure Configuration	30AN		-	
DTYC	Year of Construction (ccyy)	4>Z		-	
HMPVD	Posted Vertical Clearance (m)	10N	DEC3	-	
HMAVC	Actual Vertical Clearance (m)	10N	DEC3	-	
YNW	Walkway (Y/N)	1YNS		-	
WMWW	Walkway Width (m)	10N	DEC1	-	
LMCTWWH	Track CL – Walkway Handrail (m)	10N	DEC3	-	
YNR	Refuge (Y/N)	1YNS		-	
HMMAXHC	Maximum Horizontal Clearance (m)	10N	DEC3	-	
QS	Number of Spans	10N		-	
LMBR	Bridge Length (m)	10N	DEC1	-	
WMD	Deck Width (m)	10N	DEC1	-	
QTK	Number of Tracks	10N		-	
TA	Track Alignment	2N		+TAT	
HMDS	Design Superelevation (m)	10N	DEC3	-	
YNGR	Guard Rails (Y/N)	1YNS		-	
HMLLIL	Rail Level to Invert Level (m)	10N	DEC3		
MATTM	Transom Material	2N		+TMA	
QTS	Number of Transoms	10N		-	

Appendix C – Nameplate Attributes

Attribute Name	Attribute Description	Control Type	Special Edit	Enabling File	EGI Availability
DMM	Transom Bolt Diameter (mm)	3N		-	
TYPETB	Transom Bolt Type	2N		+TBT	
HMMT	Transom Height (mm)	10N		-	
WMMT	Transom Width (mm)	10N		-	
LMMT	Transom Length (mm)	10N		-	
LMMTS	Transom Spacing (mm)	10N		-	
DTDR	When Renewed (dd/mm/yy)	D		-	
YINPUT	Packing Under Transom (Y/N)	1YNS		-	
TYPESP	Type of Sleeper Plate	2N		+SPT	
YNP	Painted (Y/N)	1YNS		-	
YNLP	Lead Paint (Y/N)	1YNS		-	
PC	Paint Condition	2N		+PCT	
DTYRR	Recommend Repaint Year (ccyy)	4>Z		-	
DTYLP	Last Painted Year (ccyy)	4>Z		-	
DOLLP	Cost of Repaint (\$)	10N	DEC2	-	
YNU	Used as Underpass (Y/N)	1YNS		-	
QC	Number of Cells	10N		-	
WMC	Cell Width or Diameter (m)	10N	DEC1	-	
HMC	Cell Height (m)	10N	DEC1	-	
LMBA	Barrel Length (m)	10N	DEC1	-	
HMMINVC	Minimum Vertical Clearance (m)	10N	DEC3	-	
HMMINHC	Minimum Horizontal Clearance (m)	10N	DEC3	-	
IL	Internal Lining	2N		-	
TYPEFR	Floor Type	2N		+DTT	
MATF	Floor Material	2N		+DMT	
LMT	Tunnel Length (m)	10N		-	

Attribute Name	Attribute Description	Control Type	Special Edit	Enabling File	EGI Availability
HMV	Wall Height (m)	10N	DEC1	-	
LMW	Wall Length (m)	10N	DEC1	-	

Table 35 - Nameplate Attributes

9 Appendix D – Nameplate Enabling Files

Table Value	Description
01	Ballast Top
02	Direct Fixation
03	Other
04	Pedestrian Deck
05	Road Deck
06	Transom Top

Table 36 - Deck Type (Nameplate)

Table Value	Description
01	Masonry
02	Concrete
03	Other
04	Steel
05	Timber
06	Wrought Iron

Table 37 - Deck Material (Nameplate)

Table Value	Description
01	Huck Bolt
02	Mild Steel Bolt

Table 38 - Transom Bolt Type (Nameplate)

Table Value	Description
01	Pandrol
02	Double Shouldered

Table 39 - Sleeper Plate Type (Nameplate)

Table Value	Description
01	Fair
02	Good
03	Poor
04	Protective coating not req'd

Table 40 - Paint Condition (Nameplate)

Table Value	Description
01	Radius < 250m
02	Radius > 1000m
03	Radius 250-350m
04	Radius 350-500m
05	Radius 500-750m
06	Radius 750-1000m
07	Straight

Table 41 - Track Alignment (Nameplate)

Table Value	Description	BR001	BR002	BR003	BR004	BR005 – BR008	CU001, CU005	CU002, CU006	CU003, CU007	CU004, CU008	TU001
01	Tunnel										✓
02	Footbridge	✓	✓	✓	✓	✓					
03	Overbridge	✓	✓	✓	✓	✓					
04	Underbridge	✓	✓	✓	✓	✓					
05	Small Culvert						✓	✓	✓	✓	
06	Large Culvert						✓	✓	✓	✓	
07	Non-track Culvert										
08	Access Structure										
09	Buffer Stop										
10	Cattle Stop										
11	Flood Structure										
12	Lighting Gantry										
13	Lighting Tower										
14	Loading Structure										
15	Other Miscellaneous										
16	Small Retaining Wall										
17	Large Retaining Wall										
18	Service Crossing										
19	Signal Gantry										
20	Sound Barrier or Fencing										

Table Value	Description	BR001	BR002	BR003	BR004	BR005 – BR008	CU001, CU005	CU002, CU006	CU003, CU007	CU004, CU008	TU001
21	Turntable										
22	Water Structure										
23	Weighbridge										

Table 42 - Structure Type (Nameplate)

Table Value	Description	BR001	BR002	BR003	BR004	BR005 – BR008	CU001, CU005	CU002, CU006	CU003, CU007	CU004, CU008	TU001
01	Not Applicable										
02	Arch	✓	✓	✓		✓	✓	✓	✓	✓	✓
03	Box					✓	✓	✓		✓	
04	Box Girder		✓	✓		✓					
05	Broad Flange Beam			✓		✓					
06	PVC Structurally Lined									✓	
07	Inverted Truss			✓		✓					
08	Jack Arch	✓	✓	✓		✓					
09	Multi-plate								✓	✓	
10	Pipe							✓	✓	✓	
11	Plate Web Girder Riveted			✓		✓					
12	Plate Web Girder Riveted Through			✓		✓					

Table Value	Description	BR001	BR002	BR003	BR004	BR005 – BR008	CU001, CU005	CU002, CU006	CU003, CU007	CU004, CU008	TU001
13	Plate Web Girder Welded			✓		✓					
14	Plate Web Girder Welded Through			✓		✓					
15	Pre-stressed Concrete Girder										
16	Rail or Battle Deck		✓								
17	Reinforced Concrete Girder		✓								
18	Rolled Section			✓							
19	Slab		✓								
20	Through Truss			✓		✓					
21	Timber Girder				✓						

Table 43 - Span Type (Nameplate)

Table Value	Description	BR001	BR002	BR003	BR004	BR005 – BR008	CU001, CU005	CU002, CU006	CU003, CU007	CU004, CU008	TU001
01	Masonry	✓					✓				✓
02	Cast Iron			✓					✓		✓
03	Concrete		✓					✓			✓
04	Corrugated Steel								✓		✓
05	Other Material					✓				✓	✓
06	Natural Stone	✓					✓				✓

Table Value	Description	BR001	BR002	BR003	BR004	BR005 – BR008	CU001, CU005	CU002, CU006	CU003, CU007	CU004, CU008	TU001
07	Pre-stressed Concrete		✓					✓			✓
08	Steel			✓					✓		✓
09	Timber				✓						✓
10	Wrought Iron			✓					✓		✓
11	Post-tensioned Concrete		✓					✓			✓

Table 44 - Span Material (Nameplate)

10 Appendix E – Defect Type Codes

Due to the character limit applied to the defect description attributes, and the complexity of the known conditions being described, a number of abbreviations have been used. These are described in Table 45;

Abbreviation	Description
BFB	Broad Flange Beam
Col.	Column
Comp.	Component
Compon.	
Conc.	concrete
CSP	Corrugated Steel Pipe
CXN	Connection
DEF	Deficient

Abbreviation	Description
FC	Fibre Composite
OTH	Other
PRI	Primary
RDT	Redundant
reo	Reinforcement
SC	Safety Critical
SEC	Secondary

Table 45 - Defect Attribute Abbreviations

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
001STR	Custom Defect Entry		TX	
002STR	Primary Component Cracked (mm long)		CF	A > 80mm long B 10mm – 80mm long C < 10mm long
003STR	Primary BFB Component Cracked (mm long)		CF	A > 25mm long B ≤ 25mm long
004STR	Primary Comp. Corrosion Loss to Section	Corrosion Loss to Sectional Area	CF	B > 50% D 20% - 50% M < 20%
005STR	Primary Component Missing		CF	A Any
006STR ^{Note 1}	Bearing Zone Component Cracked (mm)		CF	C > 250mm D 50mm – 250mm M < 50mm

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
006STRA ^{Note 1}	Bearing Cracked (mm)		CF	C > 250mm D 50mm – 250mm M < 50mm
007STR ^{Note 1}	Bearing Zone Corrosion Loss	Corrosion Loss to Sectional Area	CF	D > 50% M ≤ 50%
007STRA ^{Note 1}	Bearing Corrosion Loss	Corrosion Loss to Sectional Area	CF	D > 50% M ≤ 50%
008STR ^{Note 1}	Bearing Zone Component Missing		CF	A Any
008STRA ^{Note 1}	Bearing Component Missing		CF	A Any
009STR ^{Note 1}	Bearing Locked in Position		CF	M No Movement
013STR	Iron Caisson Cracked (mm long)		CF	D ≥ 200mm long M < 200mm long
014STR	Primary Compon. Out of Alignment (mm)	Causing Misalignment to Track	CF	A > 50mm B 300mm – 50mm C < 30mm
015STR	Primary Compon. Major Structural Damage	Structure likely unable to carry load	CF	A Likely unable to carry load
016STR	Outstand Flange Vertically Deformed	(% of Outstand) Excludes Trestles	CF	B > 60% of outstand C 30% - 60% of outstand M < 30% of outstand
017STR	Braced Bay Flange Horiz. Deformed (mm)		CF	B > 60mm C 30mm – 60mm M < 30mm

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
018STR	Primary Comp. Horizontally Deformed (mm)	Between Braced Bays	CF	C > Between bays M ≤ Between bays
019STR	Primary Component Notched (mm)		CF	B > 30mm C ≤ 30mm
020STR	Trestle Col. Deformed any direction (mm)		CF	A > 100mm B 50mm – 100mm D 25mm – 49mm M < 25mm
021STR	Splice or End CXN Missing Fasteners	Primary Component	CF	A > 25% D 5% - 25% M < 5%
022STR	Splice or End CXN Ineffective Fasteners	Primary Component	CF	A > 25% D 5% - 25% M < 5%
026STR	Bearing Grout Bed or HD Bolts Missing		CF	D > 30% Per bearing M ≤ 30% Per bearing
029STR	Stitching Rivet Slackness due to Wear		CF	D > 2mm play M ≤ 2mm play
030STR	Stitching Head Rivet Corroded		CF	D > 75% play M ≤ 75% play

Table 46 - Defect Attributes (Steel)

Note1: Defect can only be recorded against a Part

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
010STR	Secondary Component Cracked		CF	D Any
011STR	Secondary Comp. Section Corrosion Loss		CF	D Any
012STR	Secondary Component Missing		CF	B Any
023STR	PRI to SEC CXN Missing Fasteners	Primary to Secondary Compon. Connection	CF	A > 40% D 10% - 40% M < 10%
024STR	PRI to SEC CXN Ineffective Fasteners	Primary to Secondary Compon. Connection	CF	A > 40% D 10% - 40% M < 10%
025STR	PRI to OTH CXN Missing Fasteners	Primary to Secondary Compon. Connection	CF	A > 40% D 10% - 40% M < 10%
027STR	SEC to PRI/OTH CXN Missing Fasteners		CF	D > 25% M ≤ 25%
028STR	SEC to PRI/OTH CXN Ineffective Fasteners		CF	D > 25% M ≤ 25%

Table 47 - Defect Attributes (Steel Attachments)

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
031STR	Girder or Corbel or Headstock Piped		CF	A > 250mm B 226mm – 250mm C 200mm – 225mm D 151mm – 99mm M < 150mm

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
032STR	Girder or Corbel or Headstock Crushed		CF	B Any
033STR	Girder Excessive Deflection (mm)	Timber Girder at Mid Span	CF	B > 8mm deflection (<4m span) B > 10mm deflection (4-5m span) B >15mm deflection (5-7m span) B > 20mm deflection (>7m span)
037STR	Waling Headstock Rotted Out		CF	B Rotted Out
038STR	Body Bolts Loose in Connection Group	Timber	CF	D ≥ 25% M < 25%
039STR	Corbel Bolts Loose in Connection Group	Timber	CF	D ≥ 25% M < 25%
040STR	Trestle Bolts Loose in Connection Group	Timber	CF	D ≥ 25% M < 25%
041STR	Section Loss in more than 50% of Group	Timber Pile, Trestle or Abutment Group	CF	A > 75% M ≤ 75%
042STR	Section Loss in more than 25% of Group	Timber Pile, Trestle or Abutment Group	CF	B > 75% M ≤ 75%
043STR	Section Loss in any Pile	Timber Pile, Individual	CF	C ≥ 75% D 50% - 75% M < 49%
044STR	Pumping Timber Pile	Any Evidence of Pumping under Load	CF	D Any

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
045STR	Adjacent Timber Transoms Rotten		CF	B 3 Adjacent transoms C 2 Adjacent transoms M 1 transom
046STR	Adjacent Transoms with Missing T-Bolts	Transom Bolts, 2 per Transom	CF	B 3 Adjacent transoms C 2 Adjacent transoms M Both bolts in a transom
047STR	Timber Deck Split or Rotted Out		CF	C > 30% M ≤ 30%
048STR	Timber Section Termite Infestation	Any Evidence of Damage	CF	D Any evidence of damage
049STR	BridgeWood Decking Surface Checking (mm)		CF	D > 8mm M ≤ 8mm
050STR	BridgeWood Decking Crushed	Any Evidence of Damage	CF	B Any
051STR	BridgeWood Decking Delaminated	Any Evidence of Damage or Bubbling	CF	C Any
052STR	Superstructure Component Impact Damage	Structure likely unable to carry load	CF	A Likely unable to carry load

Table 48 - Defect Attributes (Timber)

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
053STR	Components Visible Deflection Between	Conc – Any Visible Differential Deflect	CF	C Visible
054STR	Superstructure Component Cracked			C ≥ 3mm M < 3mm

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
055STR	Superstructure Compon. Reo Section Loss	Due to Spalled Concrete		D ≥ 30% Reo section loss M < 30% Reo section loss
056STR	PTC Component with Tendon Exposed	Concrete Spalled, Tendon Corroded		C Any
057STR	Substructure Component Cracked			C > 10mm wide M ≤ 10mm wide
058STR	Substructure Compon. Reo Section Loss	Due to Spalled Concrete		D ≥ 40% Reo section loss M < 40% Reo section loss
059STR	Substructure Component Dislocated	Vertically or Laterally		C > 50mm M ≤ 50mm
060STR	Deck Joint Fouled with Ballast or Debris	Fouling Likely to Deteriorate Joint		D Debris likely to cause deterioration of joint
061STR ^{Note 1}	Bearing Fouled with Ballast or Debris	Fouling Likely to Deteriorate Bearing		D Debris likely to cause deterioration of bearing
062STR ^{Note 1}	Bearing Pad Bearing Area Missing			D > 30% M ≤ 30%

Table 49 - Defect Attributes (Concrete)

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
063STR	Arch Ring, Brick Dislocated (Per sq. m)	Brickwork Missing or Unbonded		B > 50% in any sq. m D 20% - 50% in any sq. m M < 20% in any sq. m

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
064STR	Arch Ring Lateral Crack	Crack not Through and Across		B > 3mm wide or through and across D 2mm – 3mm wide M < 2mm wide
065STR	Arch Ring Longitudinal Crack (mm wide)			D > 6mm wide and > 2m long M ≤ 6mm
066STR	Arch Ring Profile Distortion (mm)	Detectable in Topline Undulations		D > 50mm undulation M ≤ 50mm
067STR	Brickwork Dislocated (per sq. m)	Other than on a Brick Arch		D > 50% in any sq. m M ≤ 50% in any sq. m
068STR	Spandrel Wall Laterally Displaced (mm)	Lateral Displacement or Tilt or Combined		D > 30mm or >20mm lateral + 20mm tilt M ≤ 30mm
069STR	Invert Floor Heaving (mm)	Floor to Brick or Masonry Arch		M ≥ 100mm
070STR	Any other Brickwork Dislocated			D Any

Table 50 - Defect Attributes (Masonry, and Masonry or Concrete Arches)

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
071STR	Pier or Abutment in Waterway Undermined	Safety Critical Issue		B Safety critical issue
072STR	Pier or Abutment in Waterway Scoured	Loss of Bearing Area		C > 10% loss n bearing area M ≤ 10% loss in bearing area

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
073STR	Bridge Waterway Blocked due to Debris	Percentage of Waterway Area		D > 10% loss in waterway M ≤ 10% loss in waterway
074STR	Handrails Deficient – Safety Critical?			B Safety critical issue
075STR	Walkway Deficient – Safety Concern?	Or Refuge		B Causing safety concern M Not causing safety concern
076STR	Deck Nails or Screws Protruding – SC?			C > 10mm M ≤ 10mm
077STR	Deficient Stairway – Safety Critical?			B Safety critical issue M Not safety critical issue
078STR	Screen or Barrier Deficient – SC?	Missing or Broken		B Safety critical issue M Not safety critical issue
079STR	Traffic Barrier Deficient – SC?	Missing or Broken or Deteriorated		B Safety critical issue M Not safety critical issue
080STR	Clearance Signage Deficient	Missing or Illegible		B Safety critical issue M Not safety critical issue
081STR	Ballast Falling From Height			B Any
034STR	FC Component Surface Chipped (mm dia)	Coating Chipped, Not Deck		D > 25mm in diameter M ≤ 25mm in diameter

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
035STR	FC Component Coating Chipped (mm deep)	Not Deck		D > 5mm deep M ≤ 5mm deep
036STR	Fibre Composite Component Cracked			C Any
090STR	Fibre Composite Comp. Crushed at Support			C Any
091STR	Fibre Composite UV or Fire Damage			C Any
092STR	Fibre Composite Component Excessive Wear			C Any

Table 51 - Defect Attributes (Miscellaneous and "Other" Material)

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
082STR	Culvert Collapsed – Safety Critical?	Subsidence Undermines Track Safety		A Undermines track safety M Does not undermines track safety
083STR	Culvert Barrel Blocked Preventing Flood			D > 20% M ≤ 20%
084STR	Crack Related to Culvert (mm wide)	Cracked Culvert Barrel		B > 50mm wide D 10mm – 50mm
085STR	Culvert Joint Broken or Separated			D Any
086STR	Culvert Barrel Deformed (mm)			D > 50mm M ≤ 50mm
087STR	Headwall or Wingwall Cracked (mm wide)	Culvert		B > 50mm wide D 10mm – 50mm wide M < 10mm wide

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
088STR	Culvert Apron Scour Underneath (mm deep)			D > 150mm M ≤ 150mm
089STR	Culvert Invert Heaving (mm)			D > 150mm M ≤ 150mm
094STR	CSP Liner Sectional Area Loss	Due to Abrasion		C Any
095STR	CSP Liner Fire or UV Damage	PVC or HDPE Plastic Liner		C Any

Table 52 - Defect Attributes (Culvert)

Attribute ID	Description 1	Description 2	Attribute Type	Response Values
096STR	RDT DEF Traffic Barrier – Safety Crit?	Missing or Damaged		B Safety critical issue M Not safety critical issue
097STR	RDT Deficient Fence – Safety Critical?	Missing or Damaged		B Safety critical issue M Not safety critical issue
098STR	RDT Deficient Signage – Safety Critical?	Missing or Damaged		B Safety critical issue M Not safety critical issue
099STR	RDT Any Other Safety Critical Defects?	Effecting Safety of Vehicles		B Safety critical issue M Not safety critical issue
100STR	RDT DEF Personnel Barrier – Safety Crit?	Effecting Safety of People		B Safety critical issue M Not safety critical issue

Table 53 - Defect Attributes (Redundant Structures)