

CLARIFICATION NOTE FOR CURVATURE MASTER AND AMT-SP-101 ALIGNMENT DELIVERABLES INCLUDING STAGED WORKS

TO	Network Wide
FROM	Manager Asset Management Systems
DATE	11 September 2026
TITLE	Clarification Note for Curvature Master and AMT-SP-101 Alignment Deliverables including staged works

APPLICATION

The following outlines the changes made to Curvature Master for Staged Works, Horizontal and Vertical Geometry to better align and simplify deliverables from contractors for both Curvature Reports and GIS deliverables. As well as this several clarifications have been made to alignment content in AMT-SP-101.

UPDATED DOCUMENTATION

For the purposes of alignment, the above changes impact the following documents which have been updated to align with this direction:

- AMT-WI-036 ARTC Curvature Master Work Instruction
- AMT-FM-009 ARTC Curvature Master Excel Template
- AMT-FM-010 ARTC Curvature Master Bentley OpenRail Template

IMPACTED DOCUMENTATION

For the purposes of alignment, the above changes impact the following documents which will be updated in due course:

- AMT-SP-101 Technical Specification for Asset Field Data Collection

CLARIFICATION FOR STAGED WORKS

Where a large project is staged into multiple work packages, ARTC \ IRPL require that GIS and Geometry deliverables be prepared and delivered for only the stage of works being completed. Ie, if a project is split into 5 stages, there shall be 5 separable curvature master and GIS deliverables. This allows ARTC to maintain the track to the commissioned design at the end of each stage. The following also applies:

- ARTC \ IRPL require staged rail centreline geometric models (GIS and Rail Design) and Curvature Masters to be provided at both pre-possession IFC and post-possession As-Built for all 'Staged' works to reflect the exact section of track involved in the possession works
 - Where staged work is not contiguous and involves more than one section in the staged slew, then separate curvature master and GIS layers are required for each section.

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- The Start and End km's in the Horizontal and Vertical Curvature Master tables shall match those of the track km's involved in the staged works as provided in the final Scope Summary and Operational Readiness Tracker
- Staged TRAN_HorizontalTrackAlignment_Pt and TRAN_VerticalTrackAlignment_Pt GIS layers shall align with the information in the staged Curvature Masters and be included with other relevant layers provided to IRPL as staged pre and post possession GIS deliverables. These deliverables shall define the works to be accepted into service.
- In cases where the possession activity only involves a Vertical change to the track, with no change to the Horizontal, the Horizontal Curvature Master data should be populated with respect to the 'existing' horizontal track information for the staged works.

CLARIFICATION OF MEASUREMENT ACCURACY

All measure values shall be reported to millimetre decimal accuracy

Kilometre	0000.000000
Metre	0000.000

All coordinate values shall be reported to millimetre accuracy

Easting	000000.000
Northing	000000.000
Latitude	000.00000000
Longitude	000.00000000

REVISION OF CURVATURE MASTER

To better align the standard output of Bentley OpenRail and 12d Geometry reporting to the ARTC GIS requirements, the following fields have been added to Vertical Geometry and a revision of AMT-FM-009 produced.

- Start Description
- End Description
- Curve Radius

Gradient has been standardised, with ARTC requiring Grade to be documented as 1 in X.

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Horizontal Start and End Description

The following are ARTC's preferences for Geometry Points and abbreviations applicable to horizontal curvature.

Bend	Bend in Straight
TP	Tangent Point
CTP	Common Tangent Point
TRS	Transition Point
CTRS	Compound Transition Point
CC	Centre of Circle
IP	Inflection Point

Vertical Start and End Description

The following are ARTC's preferences for Geometry Points and abbreviations applicable to vertical curvature.

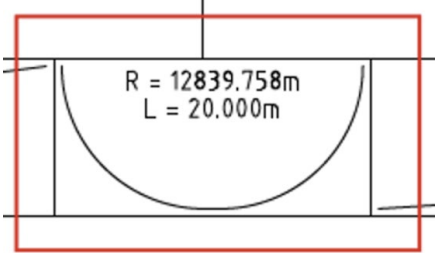
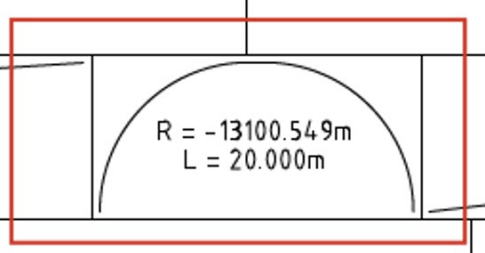
SVC	Start Vertical Curve
IP	Intersection Point
EVC	End Vertical Curve

Vertical Curve Radius

Curve Radius field has been added to both Curvature Master and TRAN_VerticalAlignment_Pt. Curve radius will be documented in metres.

Sign Convention for Vertical Curve Radius

The following sign conventions shall be used on Vertical Curve Long Sections and Curve Master Reports.

	
Positive (+ve) Vertical Curve Radius represent Sags	Negative (-ve) Vertical Curve Radius represent Hogs or Peaks

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DESIGN SPEED CHANGES MID-ELEMENT

Where the design speed of track changes mid-element for a given speed class (Freight or Passenger), the element shall be split in both the design and output Curvature Master so that the output reports a unique speed per class per element row.

Example – Non-Compliant

BaseCode	BaseCodeDescription	CurveType	Aspect	StartDescription	KmStart	Radius1	StartSuper	EndDescription	KmEnd	Radius2	EndSuper	Length	DesignSpeedFreight [km/h]	DesignSpeedPassenger [km/h]
10044	MAIN SOUTH DOWN	Straight	STRAIGHT	TP	484.85	Straight	0	TP	485.162034	Straight	0	312.034	40 / 100	40 / 110

Example - Compliant

BaseCode	BaseCodeDescription	CurveType	Aspect	StartDescription	KmStart	Radius1	StartSuper	EndDescription	KmEnd	Radius2	EndSuper	Length	DesignSpeedFreight [km/h]	DesignSpeedPassenger [km/h]
10044	MAIN SOUTH DOWN	Straight	STRAIGHT	TP	484.85	Straight	0	TP	485	Straight	0	0.150	100	110
10044	MAIN SOUTH DOWN	Straight	STRAIGHT	TP	485	Straight	0	TP	485.162034	Straight	0	0.162034	40	40

REVISION OF AMT-SP-101

To better align the requirements of the Curvature Master deliverable and the GIS deliverable outlined in AMT-SP-101 the following clarifications and updates highlighted below have been made and will be required ongoing until AMT-SP-101 undergoes its periodic review.

4.35 Track Alignment (TRAN_VerticalTrackAlignment_Pt)

The following revisions have been made to TRAN_VerticalTrackAlignment_Pt:

Field	Alias	Description	Data Type	Valid Attributes	Required
FramePt	Frame Point	Track Alignment frame points and curve details. Note, FramePT is called Start / End Description in the curvature master.	Text	SVC IP EVC	Yes
Gradient	Gradient	Gradient of the referenced track in a 1 in X format	Integer		Yes
Length_m	Element Length (m)	Design length of Element as per Design Drawings to mm accuracy	Double		Yes
RevNo	Revision Number	Revision number of the feature if derived from design data	Text		Yes

4.35 Track Alignment (TRAN_HorizontalTrackAlignment_Pt)

The following is issued as a clarification for TRAN_HorizontalTrackAlignment_Pt:

NOTE: Elevation is no longer required on TRAN_HorizontalTrackAlignment_Pt

Field	Alias	Description	Data Type	Valid Attributes	Required
FramePt	Frame Point	Track Alignment frame points and curve details. Note, FramePT is called Start / End Description in the curvature master.	Text	Bend TP CTP TRS CTRS CC IP	Yes
Gradient	Gradient	Gradient of the referenced track in a 1 in X format	Integer		Yes
RevNo	Revision Number	Revision number of the feature if derived from design data	Text		Yes

Example GIS output of Vertical points.

Note not are all columns included.

Table 1 TRAN_VerticalTrackAlignment_Pt

Field	KmMeasure	SurveyKm	FramePt	CurveType	VertCurvRad	Gradient	Length_m
	564.250000	564+250.000	IP	Linear		1175	60.575
	564.310575	564+310.575	SVC	Parabola	12839.793		20.000
	564.320575	564+320.575	IP	Parabola	12839.793		
	564.330575	564+330.575	EVC	Linear		415	140.000
	564.470575	564+470.575	SVC	Parabola	-13100.549		20.000
	564.480575	564+480.575	IP	Parabola	-13100.549		
	564.490575	564+490.575	EVC	Linear		1134	220.000
	564.710575	564+710.575	SVC	Parabola	26969.019		20.000
	564.720575	564+720.575	IP	Parabola	26969.019		
	564.730575	564+730.575	EVC	Linear		616	260.000
	564.990575	564+990.575	IP	Linear		693	213.412
	565.203986	565+203.986	SVC	Parabola	7581.803		30.000
	565.218986	565+218.986	IP	Parabola	7581.803		
	565.233986	565+233.986	EVC	Linear		185	76.000
	565.309986	565+309.986	SVC	Parabola	-7307.402		35.000
	565.327486	565+327.486	IP	Parabola	-7307.402		

A detailed example of a completed Curve Master is in AMT-FM-009 ARTC Curvature Master Excel Template.

CLARIFICATION NOTE FOR CURVATURE MASTER AND AMT-SP-101 ALIGNMENT DELIVERABLES INCLUDING STAGED WORKS**OPTIONAL FIELDS IN GIS FEATURE CLASSES**

- Both mandatory AND optional attribute fields existing in the GDB schema templates (AMT-FM-101) or AMT-SP-101 must be included in all GIS layer deliverables
- All attribute fields on layers in GIS deliverables need to be 'ordered' to match the attribute order as listed in AMT-SP-101
- The following fields marked as Optional in AMT-SP-101 need to be treated as mandatory and populated with their associated domain attributes (where relevant) in all deliveries
 - Feature Source, Revision No, Alternative Description (used to symbolise Subsurface Utility Points and Lines) and Planar Sys