Geometry Guidance

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Introduction

Geospatial information is vital to PNG DoWH, as it underpins the management, analysis and reporting of land transport assets now and into the future.

Transport assets are often located close together and beside other physical objects. Having confidence in the recorded location of assets is important, as it can enable assets to be located and identified more efficiently, and for faults to be found and remedied promptly.

This guidance provides a framework for recording the location of transport assets with sufficient accuracy for future needs. It will help to ensure consistency and confidence in the positional information of assets to assist maintenance and support planning.

Unlike some other practice documents and standards, which provide clarification on how to determine positional measurements, the underlying focus of this guidance is on specifying a relatively simple and generic way of recording the position of transport assets.

Purpose of the guidance

This guidance establishes a specification for the positional accuracies for recording transport assets. It is intended to be used when collecting information on the location of assets, such as when preparing an 'as built' record. This will enable the surveyed spatial information to be recorded in RAMM accurately in three dimensions (X, Y, Z).

The guidance is not expected to be applied to existing records, as this could create a significant burden and expense for PNG DoWH. Instead, it provides a framework that can be used whenever there is physical interaction with the asset, such as during maintenance or fault repair.

The guidance is intended to enable the assets to be located and relocated at any time, using GNSS (Global Satellite Navigation System) technology such as GPS. The accuracy obtainable from various products using this technology continues to increase and become more affordable.

It also provides for the recording of accurate invert levels. More accurate technologies may be required to determine these levels.

Target audience and users

The guidance is intended to be used by PNG DoWH, contractors, surveyors and engineers who undertake work on the assets.

PNG DoWH and asset managers will be able to specify (e.g. in contracts) that this guidance should be used when recording the location of new or maintained assets.

Scope

The guidance is limited to the position associated with an asset (i.e. the X, Y, Z coordinates).

Datums and Projections

This section of the document has not been populated and needs to be confirmed. Some resources from *The Association of Surveyors of Papua New Guinea* has been found that may be relevant to this topic: http://www.aspng.org/techinfovert.htm and http://www.aspng.org/techinfopng94.htm

This section outlines how the horizontal and vertical positions should be reported, suggested asset geometries, and the capture and use of the Z location.

Horizontal Position

All horizontal positions should be reported in TBC.

Vertical Position

All vertical positions should be reported in TBC.

Suggested Asset Geometries

Geometry Type	Lat/Long	Start Lat/Long	End Lat/Long	Z	Asset Information
Point	Yes			Yes	Yes
Polyline, Polygon and Voxel	Yes	Yes	Yes	Yes	Yes

Accuracy

Specifying the level of accuracy is important, and this is to be assessed based on the method of collection used for both horizontal and vertical reference systems. Options include:

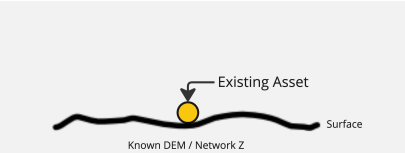
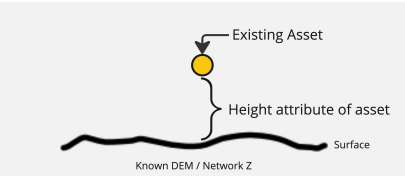
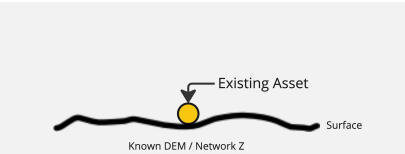
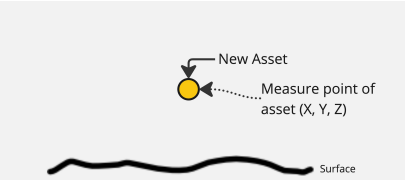
- draped
- LiDAR
- survey
- nothing

The capture and use of the Z location

New assets should have their Z location collected with a high level of accuracy. Where this information is not available or feasible to collect, the Z location could be calculated using appropriate software applications that can leverage the Network Model as a base point / DEM.

The accuracy level for DEM calculated Z geometry will only be as good as the DEM and Network Model that is

currently available. Some common scenarios are outlined below.

Asset Status	Does the asset sit flush on the surface?	Guidance	Guidance Diagram
Existing Asset	Yes	If the asset has no previous Z geometry information, then the Z value defaults to the surface level of the DEM/Network Model.	
	No	The Z value is calculated from the DEM/Network Model and the the asset height field.	 Where Asset Z = DEM or Network Model Z + Height of Asset
New Asset	Yes	Record the Z for the new asset with the data collection device placed on the ground.	
	No	Record the Z for the new asset with the measurement taken from the base of the asset at its start height from the surface.	

Reference / Attribution