STANDARD SPECIFICATION FOR

DIGITAL GROUND SURVEY

ROAD PROJECTS
CONSTRUCTION DIVISION

DEPARTMENT OF INFRASTRUCTURE
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1. PURPOSE
This document specifies the minimum requirements for Digital Ground Surveys (DGS) conducted by or for Road Projects Engineering Services, Construction Division, Department of Planning and Infrastructure.

Perform and present all survey work in accordance with the following requirements to ensure that uniformity and consistency of detail, format, quality and procedure is achieved.

2. SCOPE
This document applies to all digital ground survey commissioned for the purposes of design, analysis and computation.

Further advice and information can be obtained by contacting the Manager Engineering Services, Road Projects.

3. DEFINITIONS
The following terms used in this procedure have the specific meanings indicated:

- DGS Digital Ground Survey
- SCM Survey Control Mark
- RCM Road Centreline Mark
- IM Indicator Mark
- OM Offset Mark
- BM Bench Mark
- GPS Global Positioning System
- GDA Geodetic Datum Australia
- MGA Map Grid Australia
- AHD Australian Height Datum
- DTM Digital Terrain Model
- PRP Permanent Reference Point

4. SAFE WORK PRACTICES
Further to the Conditions of Tendering and Contract, the Consultant shall ensure that his employees, agents or sub-consultants or their employees, agents or sub-contractors or their employees or agents comply with the requirements of the Work Health Act, the Dangerous Goods Act, Australian Standards and the requirements of the Power Water Corporation, Telstra, NT Gas Pty Ltd, Origin Energy, Central Energy Australia Pty Ltd and Freightlink Pty Ltd for work on railway sites, in so far as they are applicable to the execution of work under the contract.

The Consultant shall make himself aware of all potential hazards and of all safety requirements relating to the Works.

4.1 WORK IN THE VICINITY OF POWER AND WATER CORPORATION ASSETS
Prior to commencing work in the vicinity of any sewerage system, high voltage cable or power line or other high voltage structure, the Consultant shall contact the Power and Water Corporation, and obtain and become cognisant with written guidelines or procedures setting out safe practices for working in or adjacent to such hazardous areas.

Whilst working in the vicinity of sewerage systems, high voltage cables or power lines or other high voltage structures the Consultant shall follow all directions and instructions issued by the Power and Water Corporation.
4.2 WORK IN THE VICINITY OF GAS PIPELINES AND FUEL LINES

In accordance with the Energy Pipelines Act, the Consultant shall obtain the written approval of NT Gas Pty Ltd or the relevant asset owner before commencing any of the following activities in the vicinity of high pressure gas pipelines:

1. Any activities within the pipeline right-of-way which involve construction of any kind including:
   - excavation for drains, pipelines or sewers,
   - excavation for buried utilities or services,
   - construction or maintenance of roads or tracks,
   - boring of holes for posts or any survey or exploration work involving excavation, explosives or vibration.

2. Any nearby construction activities which are likely to affect the right-of-way, such as re-routing surface water flows, construction of high voltage lines, or erection of large metal structures.

3. Any passage of heavy vehicles and equipment over the pipeline other than on public roads.

Whilst working in the vicinity of gas pipelines the Consultant shall follow all directions and instructions issued by the asset owner.

Similarly the Consultant shall follow all directions and instructions issued by the asset owner of fuel lines.

4.3 WORK WITHIN RAILWAY RESERVES

Prior to commencing work within any railway sites, the Consultant shall obtain the consent of Freightlink Pty Ltd, and comply with their guidelines or procedures setting out safe practices for working in or adjacent to their sites.

Whilst working within railway sites the Consultant shall follow all directions and instructions issued by Freightlink Pty Ltd.

5. CULTURAL AND HERITAGE SITES

All prescribed archaeological places and objects are protected under the Heritage Conservation Act 1991, whether they have been recorded or not and regardless of whether they have been disturbed in the past or otherwise. It is an offence under the Act to carry out work of any sort on, damage, disturb or alter these materials without the consent in writing of the Minister for Environment.

Known information about cultural and heritage sites will be provided to the Consultant.

Do not enter aboriginal sacred sites without appropriate authority, and avoid disruption to identified archaeological sites.

The Consultant shall ensure that his employees are aware of the possibility that archaeological and heritage sites may exist within the work area, and of the requirement to notify the Office of Environment and Heritage if a site is encountered.

6. ENTRY TO LAND

The Consultant shall obtain permission from landowners before entering private property. The Manager Engineering Services will as necessary provide the Consultant with an appropriate letter to facilitate entry for the purpose of conducting the survey. The Consultant will maintain a record of all contacts made for this purpose.

Where any land proposed for survey is on a Crown Reserve, or is a designated Aboriginal Sacred Site or is protected under Native Title or any other encumbrance, the Consultant shall obtain all necessary clearances from the appropriate authorities and/or occupiers of the land.

New tracks shall not be formed, existing tracks altered, fencing cut, clearing carried out, or damage or disturbance of any kind effected unless strictly necessary for the purpose of the brief and permission and clearances have been obtained. The Consultant shall ensure that such disturbances are the minimum required and shall reinstate, clean up and leave the site as close to its pre-disturbed
condition as possible, and a safe condition. The Consultant shall be responsible for the cost of reinstating any damage to property resulting from work carried out under the brief.

7. TRAFFIC CONTROL

Where survey involves working on, or immediately adjacent to, trafficked roads, the Consultant shall take appropriate measures for the protection of employees, other road users and property.

The Consultant shall assume responsibility for minimising obstruction and inconvenience to the public, and the safe conduct of traffic through or around the works, 24 hours a day, from commencement to completion of the survey works.

Establish traffic control, as necessary, in accordance with the requirements of Australian Standard AS1742.3, Manual of uniform traffic control devices, Part 3: Traffic control devices for works on roads.

In urban areas, program work and install signs accordingly so that traffic is not impeded during the following hours:

- 0700 hours to 0900 hours
- 1600 hours to 1730 hours.

Road lanes shall not be closed without prior written permission of the Manager Engineering Services. When required, a Traffic Management Plan prepared by a suitably accredited person must be submitted for the approval of the Manager Engineering Services, a minimum of 2 working days prior to commencement of the survey works.

8. SURVEY

8.1 GENERAL

Provide a three-dimensional mathematical representation (model) of the site upon which geometric design, analysis and computation can be based.

Establish permanent bench marks and control marks from which the works can be set out.

Comply with the specific requirements defined in the Project Survey Brief.

All natural and artificial features occurring within the survey project area shall be captured and represented in the digital model as points and strings. Sufficient measurements shall be taken to ensure all points and strings in the digital model accurately reflect their true geometric shape and location.

Provide text annotation to adequately define and describe the following:

- Road names.
- Rivers, streams or lake names.
- Names and numbers of SCM’s, BM’s or any other control used for the survey or located in the survey project area.
- PRP distances.
- Distance markers legend and distances.
- Minor sign annotation – eg speed signs 90km/h.
- Culvert type, size or diameter and number of pipes or boxes. Note; culvert/pipe dimensions shall be internal measurements and description of protection works.
- Any other relevant annotation that will assist in the definition of features within the survey area.
8.2 SURVEY DATUM

8.2.1 Coordinate Datum
The horizontal position of field data is to be supplied in PLANE GRID COORDINATES based on an assumed local datum.
The orientation of the plane grid is to be closely aligned with or identical to radiation bearings applicable to adjacent cadastral boundaries.
A text tabulation of the identity, coordinates, reduced level and type of mark for each control point is to be included in the data file and shown on the verification plots.

8.2.2 Connection to MGA94
Provide a common point at each end of the project establishing the relationship between the assumed coordinate datum and the MGA94 coordinate system. Include equivalent coordinates, the line scale factor and the difference in orientation of the north points as a text note in the data file and on the verification plots.

8.2.3 Height Datum
Where possible, use Australian Height Datum (AHD). Where AHD is not possible height information will be on an assumed datum.

8.2.4 Chainage Datum
Where possible, the chainage of the start point of the survey will be derived from the nearest Departmental Permanent Reference Point (PRP) for the road being surveyed.
Refer to the Project Survey Brief for the PRP to be used for this survey.

8.3 FIELD MARKING

8.3.1 Safety
Survey marks may constitute a danger to the public, land owners and users, if visual indicator marks have been interfered with or removed. In locations where this is likely to occur, survey marks are to be driven to ground level and be of a type suitable for the location.
Locate marks where minimum disturbance is likely.

8.3.2 Survey Control Marks (SCM)
Use short star pickets or deck spikes.
Place at least three (3) control marks on each project.
Locate marks so that they are inter-visible to adjacent marks in each direction.
The maximum distance between successive marks is 600 metres.
Uniquely identify each mark by stamping the identity into a solid aluminium tag fixed to the mark.

8.3.3 Bench Marks (BM)
Place bench marks at one kilometre intervals (1000m) on 25m offsets. Where the length of the project is less than one kilometre place one bench mark at each end of the project.
Bench marks should be established on existing substantial features or be a well driven star picket, 600mm minimum length.
Identify all marks by running chainage and offset distance left and right, stamped into a solid aluminium tag securely fixed to the mark.
8.3.4 Road Centreline Marks (RCM)
Place marks at 50 metre intervals on straights and 25 metre intervals on curves unless specified otherwise in the Project Survey Brief.
Place marks at curve tangent and secant points.
Do not place RCM’s if they are located within 5 metres of the edge of a rural road carriageway.
Use 25 x 25 x 600mm long angle iron pegs, or other suitable mark for safety. Do not use galvanised iron nails in a gravel road pavement.
Identify all marks by running chainage stamped into a solid aluminium tag securely fixed to the mark.

8.3.5 Offset Marks (OM)
Place offset marks generally 25 metres left and right of the road centreline, but not within 5 metres of the edge of a rural road carriageway.
Place offset marks at 200 metre intervals unless specified otherwise in the Project Survey Brief.
Place offset marks at curve tangent and secant points.
Use 25 x 25 x 600mm long angle iron pegs, or other suitable mark for safety.
Identify all marks by running chainage and offset distance left or right, stamped into a solid aluminium tag securely fixed to the mark.

8.3.6 Indicator Marks (IM)
Use pressed metal fence spreaders minimum length 1000mm.
Place indicator marks at SCM’s, BM’s, RCM’s and OM’s.
When placement of RCM’s and OM’s is not required, place indicator marks on, or offset from, the approximate road centreline, at 100 metre intervals on straights and 50 metre intervals on curves.
Identify all marks by running chainage and offset distance left and right, stamped into a solid aluminium tag securely fixed to the mark.
Do not place indicator marks within 5 metres of the edge of a rural road carriageway.

8.4 ACCURACY

8.4.1 Survey Control Marks - Horizontal Accuracy
The survey of Bench Marks and Control Marks shall be to Class C or better and Order 3 or better.
The ICSM Standards and Specifications for Control Surveys 1994 (SP1) outlines the requirements of Class and Order.

8.4.2 Survey Control Marks - Vertical Accuracy
The levels of all survey control points shall be established by differential levelling, two-way levelled or forming part of a single level run between two known bench marks.
The level difference, in metres, between the forward and backward levelling of a two-way run or between two known bench marks in a single run shall not exceed 0.012√K, where K is the distance in kilometres and K is greater than or equal to 1 km. The vertical accuracy for distances less than 1 km shall be on a pro rata basis relative to the 1 km tolerance, 0.012 metre.

8.4.3 Measurement Accuracy for Points and Linear Features
The measurement accuracy and feature type classifications for the standard point and linear feature classifications are listed in the following tables. The accuracies stated are relative to the adopted values of the nearest control point.
Table 1: Measurement Accuracy for Point and Linear Feature Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Horizontal accuracy</th>
<th>Vertical accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>± 20 mm</td>
<td>± 10 mm</td>
</tr>
<tr>
<td>B</td>
<td>± 25 mm</td>
<td>± 20 mm</td>
</tr>
<tr>
<td>C</td>
<td>± 50 mm</td>
<td>± 20 mm</td>
</tr>
<tr>
<td>D</td>
<td>± 100 mm</td>
<td>± 40 mm</td>
</tr>
<tr>
<td>E</td>
<td>± 200 mm</td>
<td>± 40 mm</td>
</tr>
</tbody>
</table>

Table 2: Feature Type and Accuracy Classification

<table>
<thead>
<tr>
<th>Feature Type</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment control, construction control point</td>
<td>A</td>
</tr>
<tr>
<td>Kerbs, Rail, Boundary Markers, Bridges</td>
<td>B</td>
</tr>
<tr>
<td>Culverts, headwalls, drainage pits, U/G services, on-road features</td>
<td>C</td>
</tr>
<tr>
<td>Power/Light poles, road furniture, trees</td>
<td>D</td>
</tr>
<tr>
<td>Ground features, natural surface, open drains</td>
<td>E</td>
</tr>
</tbody>
</table>

Regardless of defined accuracies, linear and point features must adhere to their true position relative to the position of adjacent features.

8.4.4 Interpolated points on feature strings

Linear features shall be captured such that the accuracies of interpolated points on the defined string are within twice the nominated accuracy for the relevant classification.

8.4.5 Barrier Strings

The production of the final triangulation mesh is to be controlled through the use of barrier strings/break lines. These strings will represent features that form the edges of triangles in the model, such as tops of banks or road shoulders.

The barrier string attribute is implicit within the feature coding and shall be the only acceptable form of triangle modification. All barrier strings appearing in the survey data must be coded in the field.

The triangulation model must be capable of re-creation directly from the survey information supplied, without the need for interactive editing.

8.4.6 Surfaces

Within the survey project area, sufficient points and linear features shall be captured to ensure the following surface definitions:

Points interpolated on the planar triangulation surface, shall be within the vertical accuracy nominated in the table below for the relevant surface type. Any point that can be brought within the vertical tolerance by the nominated horizontal shift shall be considered correct.
Table 3: Interpolated Surface Accuracy

<table>
<thead>
<tr>
<th>Surface type</th>
<th>Vertical accuracy</th>
<th>Horizontal shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed road</td>
<td>± 40 mm</td>
<td>± 100 mm</td>
</tr>
<tr>
<td>Formed surface</td>
<td>± 80 mm</td>
<td>± 200 mm</td>
</tr>
<tr>
<td>Natural surface</td>
<td>± 200 mm</td>
<td>± 500 mm</td>
</tr>
</tbody>
</table>

8.4.7 Triangulation Dimensions
No triangle side shall have a length greater than 25 metres on the road pavement and 50 metres elsewhere in the project area.

8.5 BOUNDARIES

8.5.1 Property Boundaries
Locate and connect to, or place sufficient marks to establish connection with, property boundaries over the length of the project.

8.5.2 Site Boundaries
Where sacred and heritage sites have been identified, mark the site boundaries at 25 metre intervals.

8.6 NATURAL AND ARTIFICIAL SURFACES
Describe natural terrain surfaces and man made surfaces by observing changes of grade and as many intermediate points between the changes of grade as are needed to ensure the description of a feature maintains "model accuracy". The maximum interval between observations is 25 metres along the corridor of interest. The minimum corridor of interest is generally 25 metres left and right of the road centreline alignment in a rural road situation but may be extended to cover the width of the road reserve when specified.

The natural inverts of creeks are to be located and levelled for a minimum distance of 50 metres from the centre line. Cross sections at right angles to the creek are to extend for at least 50 metres from the invert or to the top of the highest bank, whichever is the further from the invert.

Describe table drains and windrows sufficient to enable reasonable volume computations and indicate the drainage pattern.

Off let drains should be included.

At proposed bridge or culvert sites a grid at 5 metre intervals is required. The grid is to start 25 metres before the creek invert and finish 25 metres after the invert. The grid is to extend upstream and downstream of the centre line to the corridor of interest limits.

8.7 PITS
Describe the top of access chambers and large pits that are flush with the surface by a single string to indicate size, shape and grade of the top.

If the chamber or pit top is above or below the surrounding surface by an amount greater than 50mm then a corresponding string at surface level is required in addition to the MH outline.

Small Telstra jointing boxes, water gate valve covers etc, can be shown as a single central point

8.8 BEDROCK
Describe the extent of bedrock outcrops.
8.9 KERBS AND GUTTERS
Generally one string along the top back of kerb and a second along the lip of the gutter/edge of bitumen is sufficient to describe kerb/and gutter.
An invert string may be specified for some projects.

8.10 VEGETATION
Describe uncharacteristic vegetation (ie special due to size, colour, one off, type etc) that falls within the project site as individual specimens or as an outline around a group.
Describe other vegetation that falls within the project site as an outline around the denser groups or as the edge between wood land and plain.
Where the entire project area falls within an open woodland with none of the features described above, a text description to that effect will suffice.
Locate individual specimens when the trunk diameter exceeds 100mm at 1 metre above ground level. Otherwise use a perimeter string or other comment to indicate smaller specimens.
Describe individual specimens by type, height, canopy diameter, trunk diameter, and location at ground level.
Describe group outlines of vegetation by a general type description, average height, typical canopy diameter, average trunk diameter.

8.11 STRUCTURES
Describe the following (at least):
Buildings: Locate the outer wall surface.
Wall cladding material and floor type.
Locate protruding awnings
Record the reduced level of the floor.
Locate and level low eave lines.
Fencing: Location, type, height and condition including gate openings.
Bridges: Shape and size of the deck
Abutment and expansion joint.
Culverts: Head wall location and levels
Wing wall location and levels
Apron location and levels
Invert level of each opening and dimensions of opening
Clear silts and gravels before invert levels are taken and standing water levels are to be observed.
Description protection works
Footings: Shape, size, height, depth.
Aerials Sag point, and the like to enable the identification of site constraints.

8.11.1 Abandoned Infrastructure
Locate and describe derelict, abandoned or partially demolished structures.

8.12 RAILWAY
Within the corridor of interest, locate the position, shape and grade of the formation, ballast bed and tracks.
Locate and level communication cables and connection pits, signalling devices, and track crossing barriers and signs.

8.13 EXISTING ROADS AND TRACKS

As a general requirement, locate and level the shape and grade of the wearing surface, shoulders, kerbing, side entry pits, kerb crossings, islands, fill and cut batters, table drains and windrows at all changes of grade.

Take cross sections at 25 metre maximum intervals.

Extend cross sections generally 25 metres left and right of the defined road centreline or the centreline of the corridor of interest, unless specified otherwise in the project survey brief.

At intersections, survey the side road for a minimum distance of 100 metres from the intersecting point, or as specified in the project survey brief.

Locate the actual crown line dividing plane surfaces or the high point of the road pavement where it does not coincide with the centre line.

Extend the survey by a minimum of five cross sections at 25 metre intervals in each direction from the nominated start and end chainages.

Locate and describe road furniture, signage, guard rails, lane lines, edge lines, painted pavement markings, merge lines, chevron outlines, etc.

Locate traffic lights, controller boxes, conduits, junction pits, electricity supply, communication pits and in-pavement vehicle detection loops.

At least five cross sections are required to describe a sealed floodway. Locate concrete margins and protection works.

8.14 FUEL AND GAS PIPES

Locate and describe the position, depth below or height above ground level, the diameter, type of pipe, fuel type and valves.

Locate and level pipe racks and the support structure.

8.15 ELECTRICITY

8.15.1 Overhead Electricity Reticulation

Record the position of every main and stay pole within the project site.

Describe the alignment of the conductors with a line string.

Where an existing alignment or proposed centreline passes under overhead conductors, record the position and reduced level of the lowest conductor at the intersecting point, the position and levels of the base of poles on each side of the crossing, and the position and reduced level of the sag point of the lowest conductor.

Where the service runs parallel to the project, record the general height of the lowest conductor.

Locate service poles, aerial transformers, aerial and ground stay wires.

8.15.2 Overhead Electricity HV Transmission

In addition to the above, locate and level each footing of each tower and any protection works.

8.15.3 Underground Transmission/Reticulation

Locate electrical cabling by the position of pits, signs of trenching and surface markers in conjunction with service plans and with the assistance of PowerWater.

Describe the cable alignment with a line string.

The depth of cables shall be ascertained from plans and verified where possible in pits.
Record the size, depth and construction of pits.
Locate and level the slab of ground level transformers.
Describe whether the service is low or high voltage supply.

8.15.4 Street Lighting
Locate street lighting poles within the project area and electricity supply poles adjacent to the project area when the electricity supply crosses the project boundary.
Locate underground electricity supply cables and cable pits.
Describe the alignment of overhead and underground electricity supply with a line string.

8.15.5 Substations and Switch Yards
Describe the substation or yard by the outline of the perimeter and whether it is stand alone or part of a structure.
Describe details inside the substation as specified in the project survey brief.

8.16 WATER SUPPLY
Describe the position, pipe type, diameter, and reduced levels for above ground level and, if possible, below ground pipelines.
Describe the pipe alignment with a line string.
Locate air and scour valves, stop valves and fire hydrants.
Describe the size, shape and depth of associated pits.
When specified, liaise with the PowerWater to expose pipes to ascertain orientation and grade information.
When pipes are exposed, record the position of flange faces, the diameter of the flange and the number of bolt holes.
Locate and level bore compound fencing and gate openings.
Locate and level concrete slabs within the compound.
Locate electrical cabinets and associated electricity supply.
Locate and level the feet of bore tripods at ground level.
Note the bore identity.
Locate and level the top of the bore casing and the diameter.
Level the natural surface beside the casing and a 20 metre area at 5 metre intervals about the casing.
Locate and level the inlet and outlet pipes to the tank.
Level the base of the tank and measure the wall height and the maximum water level.
Note the diameter and type of tank.
Locate and level the tank stand feet at ground level.
Measure the dimensions of the tank stand platform.
Locate the flow controller box and associated valves.

8.17 TELECOMMUNICATIONS
Locate the position, and where specified, depth below surface or height above ground level of the asset. Liaise with Telstra where necessary.
Describe the alignment of underground cables or overhead lines with a line string.
Indicate where the asset is optical fibre or copper wire.
Locate small boxes and pillars as a point and large pits by outline. Describe the size, shape and depth of large pits. Describe, locate and level security fencing surrounding aerials, and the associated sheds.

8.18 SEWERAGE

8.18.1 Sewer Alignment and Chambers
Locate the position of access chambers and, where specified, the depth of pipe below the surface, type and diameter of pipe. Describe the pipe alignment with a line string. The shape and size of the top of the access chamber. Record the number on the lid. Level the top of the lid and the inlet and outlet inverts where possible otherwise the centre invert. Make sure external drop structures are identified and both inlet inverts levelled. Locate and level air valves and scour valves on rising mains.

8.18.2 Sewer Treatment ponds and spray out areas
Locate and level the top and bottom of the pond walls. Level the maximum effluent level, the inlet invert and the outlet level. Describe, locate and level overflow flood ways. Level the current floor of the ponds. Locate and level the bypass system and valves. Locate electrical and monitoring cabinets. Locate the water supply and wash down points. Locate and level the spray out pump, concrete slab and valves. Locate and level ground level at each spray. Note the height of the spray head. Describe the spray out network and all associated valves.

8.18.3 Sewer Pump stations
Locate the outline of the collection and pump chambers. Locate the water and electricity supplies. Locate and level inlet and outlet inverts, top and floor of chambers and maximum storage levels.

8.18.4 Septic systems
Locate and level the outline of the tank, inspection points, absorption lines and adjacent building outline. Locate and level the outlet from the building, the overflow point, and the inlet and outlet of the tank.

8.19 STORMWATER DRAINAGE
Locate the position of access chambers, type and diameter of pipe systems crossing or within the corridor of interest. The shape and size of the top of access chambers within the corridor. Record the number on the lid. Level the top of the lid and the inlet and outlet inverts where possible otherwise the centre invert.
Describe open lined and unlined drains by size, shape and grade of the channel.
Indicate the type and thickness of any lining.
Locate and level the extent of any rock intrusions.
Describe, locate and level drop structures, rock baskets and concrete mattress by type, thickness and shape.

8.20 PHOTOGRAPHY
Provide colour digital photographs of:
- Culvert inlet & outlet structures.
- Signs.
Label or number photographs and provide an index that includes the location of the feature by chainage, and the position and view direction from which the photograph was taken.

8.21 LODGED INFORMATION
On completion of the DGS the Consultant shall lodge the following information:
- Information on all survey control used or in the survey project area.
- New control point information as specified.
- A digital survey data file in Microstation or AutoCad format, in accordance with the file structure and presentation standards as specified in Attachment A.
- A summary of non-standard feature codes used.
- A field verified plot of the defined survey project area with a signed endorsement stating that the plot is a true representation of both the digital data supplied and the defined survey project area, and that it fully complies with the requirements of this standard and the relevant project scope.
The Verification plot of the survey area shall be:
- At a scale of 1:1000 for rural areas or 1:250 for the urban areas, unless an alternative scale is specified.
- Contoured at 0.1m intervals unless specifically directed to use alternative contour interval.
- Plotted using DIPE standard symbology and line styles, in biro on reasonable quality paper.
Include the following Metadata:
- Consultants name, address, phone & fax contact numbers and Survey Reference number.
- Description of Project
- Date of Survey
- Plan Scale
- Co-ordinate and Vertical Datum

8.22 SURVEY REPORT
Provide a survey report including any items and issues that may have compromised the survey and any matters that may be of interest to the project designer.

8.23 TRANSFER OF FILE
The preferred means of transfer is E-mail. The file is to be a data file only attached to the e-mail.
Where e-mail is not possible transfer will be on disk.
File compression is permissible but no self-extracting executable formats are to be used.