

# **ALBERTA TRANSPORTATION DESIGN BULLETIN #60**

## **AMENDMENT TO ENGINEERING CONSULTANT GUIDELINES RE: SURVEY REQUIREMENTS TO SUPPORT GPS MACHINE CONTROL CONSTRUCTION**

### **Introduction**

This bulletin supplements information contained in Volumes 1 and 2 of the Engineering Consultant Guidelines for Highway and Bridge Projects in regards to providing survey and design information to the contractor on grade construction projects.

In recent years there has been a move by the contracting industry to use GPS machine control equipment whereas the operation of the equipment is partially controlled through GPS technology and computer software using electronic survey and design data. This technology has been widely reported as improving the efficiency of the contractors operations by minimizing the amount of re-grading required to meet specified grades and dimensions.

In addition to the requirements outlined in section 1.7.2 Survey Information (Volume 2 Construction Contract Administration) the following information, and when requested by the Contractor, is to be provided In order to facilitate GPS Machine Control Construction (GPS MCC).

It is recognized that not all types of grade construction (e.g. grade widening, intersection treatments) is conducive to using GPS MCC and there will be instances where the electronic survey and design data is not available in a suitable format for all portions of the project. The intent behind this bulletin is to have consultants enter into the preliminary survey and design phases with the goal to have good quality electronic design data which could be provided to the Contractor in support of GPS MCC.

### **Preliminary Survey**

Original ground coordinates shall consist of cross section pick up at a maximum interval of 20 m stations with breakline information and additional pick-up collected at any ground irregularities (i.e. hills or valleys).

### **Construction Control Points**

Construction control points as described in Section 6 Preliminary Engineering (Volume 1 Design and Tender) shall be selected to surround the project and encompass the construction limits (i.e. both sides of highway along the entire length) including borrow sources. Control point data is to be provided to the Contractor in P,N,E,Z,D file format with the intent that the same control points will be used during construction by both the Consultant and Contractor.

If additional control points or other design related information is required by the Contractor, it will be the Contractor's responsibility to obtain, however this does not preclude the Consultant in offering assistance depending upon the level of effort required and whether there is a benefit to the Department in so providing.

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## Electronic Design Files

Electronic design files shall meet the following requirements.

- Electronic survey data to be provided as top of subgrade.
- Designs should be presented as a complete and continuous surface.
- The preferred file format is .xml however other formats (e.g. .tin) are acceptable if compatible with GPS MCC.
- For linear work (i.e. roadways or canals) the data should be presented in road files or template format.
- For non linear work (ponds, etc.) the design is best presented as a Digital Terrain Model (DTM) with a line work file defining all critical elements.

## Survey Information on Contract Plans

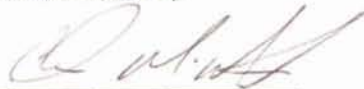
Contract plans should include the following survey information.

- A coordinate list for horizontal alignment with northings and eastings for all PI locations
- Complete curve data
- A coordinate list for control points with design assumptions used (i.e. ground versus grid, scale factors, etc.)

## Special Provisions

For grading projects the Consultant shall include special provisions detailing what portions of the work has survey and electronic design data that is suitable for GPS MCC according to the requirements outlined in this bulletin. Questions regarding this bulletin may be directed to Jim Gavin, Roadway Construction Standards Specialist @ 780-415-1008.

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