

Central Federal Lands Highway Division
QUALITY CONTROL REVIEW GUIDE FOR STAKING DATA
May 2007

OBJECTIVE:

To reduce the potential of errors in construction staking data and to ensure the construction staking data accurately represents the cross-sections.

SCOPE:

These guidelines apply to the quality control review and verification check of staking data by Design and Construction personnel.

Types of Staking Data Currently Generated using GEOPAK		
Staking Data Report	GEOPAK criteria used in the design of the project	
	X10	X30
Control point listing	x	x
Original ground cross-section reports	x	x
Horizontal and vertical alignment descriptions	x	x
Slope stake reports	x	
Grade finishing stakes (red tops)	x	
Grade finishing stakes (yellow tops)	x	x
Grade finishing stakes (blue tops)	x	x
Staking detail reports	x	x
Subgrade template reports		x
Other Reports (Parking area layouts)	x	x

Anticipated Duration of Staking Data Review Activities		
Functional Area	Type of Review	Anticipated Duration*
Design	Quality control review of an internally-designed project	5-20 hours
Design	Verification check of an A/E-designed project	4-8 hours
Construction	Verification check of either an internally- or A/E-designed project	2-4 hours

*Anticipated duration depends on the complexity and length of the project.

METHODS:

Conduct a thorough, independent quality control review and verification check as described below:

Quality Control Review of an Internally- designed Project (Performed by Design)	
Staking Data Report	Method
Control point listing	Spot check the control point listing to verify that it is the same as what is shown in the plans
Original ground cross-section reports	Verify that the original ground cross-section report is included.
Horizontal and vertical alignment descriptions	Verify that the correct chain and profile have been described.
Slope stake reports	<p><i>Visual design check:</i> Run the GEOPAK 3-port criteria 'ssb_trace.3pc' as described on the CFL website at http://www.cflhd.gov/cadd/misc/3PCSSBTrace.cfm</p> <p><i>Manual check:</i> Approximately 10 percent of the total number of cross-sections (about 1 every 500 feet) should receive a manual verification of the information in the reports. In addition, all complex areas (such as culvert inlet basins, guardrail terminal flares, pavement widening, etc) or areas that required manual manipulation of cross-section elements should be checked closely.</p>
Grade finishing stakes (red tops, yellow tops, and blue tops)	<p><i>Visual design check:</i> Run the GEOPAK 3-port criteria 'chk_xs_report.3pc' as described on the CFL website at http://www.cflhd.gov/cadd/misc/3PCCheckXSReport.cfm</p> <p><i>Manual check:</i> Approximately 10 percent of the total number of cross-sections (at least 1 every 500 feet) should receive a manual verification of the information in the reports. In addition, all complex areas (i.e. areas with changes in typical section such as culvert inlet basins, guardrail terminal flares, pavement widening, etc) or areas that required manual manipulation of cross-section elements should be checked closely.</p>
Staking detail reports	Check about 10 percent (at least 1 every 500 ft) of the cross sections to verify that the report matches the cross sections
Subgrade template reports	Check about 10 percent (at least 1 every 500 ft) of the cross sections to verify that the report matches the cross sections. Verify that the subgrade template report drawings match the

	project-specific information.
Other reports (Parking area layouts)	The quality control review practices of staking data provided for parking areas need to be determined on an individual basis. Each situation is unique and will have site-specific requirements. Discuss quality review methods with the Highway Design Manager (HDM) and the Construction Operations Engineer (COE).
All reports	Verify that the hard copies and the CD of electronic files are in the correct formats. Refer to Chapter 21 of the CFLHD CADD Standards Manual for information on formatting and printing staking data.

Verification Check of an A/E- designed Project (Performed by Design)	
Staking Data Report	Method
All reports	<ul style="list-style-type: none"> • Verify that the A/E firm has completed a thorough quality check of the staking data using both 3-port criteria and manual methods. • Perform spot checks of the data in each of the reports. Concentrate on complex areas (i.e. areas with changes in typical section, such as culvert inlet basins, guardrail terminal flares, pavement widening, etc) and areas that required manual manipulation. • Verify that the format of the hard copies of the staking reports is correct. • Verify that the correct electronic files were transmitted to CFLHD, and that the proper formats were used.

Verification Check of an Internally- or A/E- designed Project (Performed by Construction)	
Staking Data Report	Method
All reports	<ul style="list-style-type: none"> • Provide the final check of the staking data before the Contractor uses it. The intent of this review is not for accuracy of the data, but to become familiar with the project and discover any systematic problems with the data.