

**Title 20—DEPARTMENT OF INSURANCE, FINANCIAL INSTITUTIONS AND  
PROFESSIONAL REGISTRATION**

**Division 2030—Missouri Board for Architects, Professional Engineers,  
Professional Land Surveyors, and Professional Landscape Architects  
Chapter 18—First and Second Order Horizontal and Vertical Control**

**PROPOSED AMENDMENT**

**20 CSR 2030-18.060 Traverse Survey Guidelines.** The board is amending sections (1) and (2).

*PURPOSE: This rule is being amended to reflect modern day terminology and to be in compliance with HB 650, which was passed in 2013 and moves the State Land Surveyor's Office from the Missouri Department of Natural Resources to the Missouri Department of Agriculture.*

(1) First Order Traverse Procedure.

- (B) All first order traverse lines shall start from[,] and close upon[,] first order stations **or higher order stations** of the Missouri Geographic Reference System (MO GRS) or National [*Geographic*] **Spatial** Reference System (*[GRS]* **NSRS**) in accordance with these procedures.
- (C) Properly maintained theodolites with a least count of one second (1") or a [*din rating*] **DIN 18723 specification** of one and one-half seconds (1.5") or [*better*] **smaller** shall be used to observe directions and azimuths. At least four (4) positions or repetitions of the angles shall be observed. The theodolite and targets should be centered to within two millimeters (2 mm) over the survey station or traverse point.
- (D) Electronic distance measuring (**EDM**) instruments shall be used to measure all distances. [*Electronic Distance Meter (EDM)*] instruments shall be tested on a [*DNR*] **Missouri Department of Agriculture (MDA)** base line at the start of and on the completion of any first [*or second*] order traverse. Copies of the EDM [*calibrations*] **base line comparisons** shall be [*provided to the department*] **included** in the survey report **submitted to the department**. Barometric pressure to **the nearest** five millimeters (5 mm) **of mercury** and temperature to **the nearest** one degree Celsius (1°C) shall be recorded for each measurement.
- (E) Each traverse shall be tied to a minimum of two (2) bench marks. [*Trig.*] **Trigonometric** or spirit leveling will be observed along all traverse lines. All **Instrument Heights (HI[']s)**, **Reflector Heights (HO[']s)** and zenith angles shall be recorded and submitted.
- (F) The traverse shall be controlled by an astronomic azimuth at each end of the traverse line and at not more than every six (6) segments along the line. Astronomic azimuths shall have a standard deviation of one and one-half seconds (1.5") or [*better*] **less**.
- (G) All field data shall be submitted to **Missouri Department of [*Natural Resources (DNR)*] Agriculture (MDA)** in a format acceptable to the department. This shall

include directions, distances, azimuth, and elevations.

(2) Second Order Traverse Procedure.

- (B) All second order traverse lines shall start from and close upon[,] second order or higher **order** stations of the MO GRS or [NGRS] NSRS in accordance with these procedures [or shall be run in closed circuits].
- (C) Properly maintained theodolites with a least count of one second (1") or [din] **DIN 18723 specification** of one and one-half seconds (1.5") or [better] **smaller** shall be used to observe directions and azimuths. At least four (4) positions or repetitions of the angles shall be observed. The theodolite and targets should be centered to within two millimeters (2 mm) over the survey station or traverse point.
- (D) Electronic distance measuring (**EDM**) instruments shall be used to measure all distances. EDM instruments shall be tested on an [DNR] **MDA** base line at the start of and on the completion of any [first] **second** order traverse. Copies of the EDM [calibrations] **base line comparisons** shall be [provided to the department] **included** in the survey report **submitted to the department**. Barometric pressure to **the nearest** five millimeters (5 mm) of **mercury** and temperature to **the nearest** one degree Celsius (1°C) shall be recorded for each measurement.
- (E) Each traverse shall be tied to a minimum of (two) 2 bench marks. [Trig.] **Trigonometric** or spirit leveling will be observed along all traverse lines. All HI[']s, HO[']s, and zenith angles shall be recorded and submitted.
- (F) The traverse shall be controlled by an astronomic azimuth at each end of the traverse line and at not more than every eight (8) segments along the line. Astronomic azimuth shall have a standard deviation of two seconds (2") or [better] **less**.
- (G) All field data shall be submitted to the [DNR] **MDA** in a format acceptable to the department. This shall include directions, distances, azimuth and elevations.

*AUTHORITY: sections 327.041 and 327.272, RSMo [Supp. 1993] 2016. Original rule filed May 3, 1994, effective Dec. 30, 1994. Moved to 20 CSR 2030-18.060, effective Aug. 28, 2006. Amended: Filed November 18, 2016.*

*PUBLIC COST: This proposed amendment will not cost state agencies or political subdivisions more than five hundred dollars (\$500) in the aggregate.*

*PRIVATE COST: This proposed amendment will not cost private entities more than five hundred dollars (\$500) in the aggregate.*

*NOTICE TO SUBMIT COMMENTS: Anyone may file a statement in support of or in opposition to this proposed amendment with the Missouri Board of Architects, Professional Engineers, Professional Land Surveyors, and Professional Landscape Architects, PO Box 184, Jefferson City, MO 65102, via facsimile at (573)751-8046, or via email at moapels@pr.mo.gov. To be considered, comments must be received within thirty (30) days after publication of this notice in the **Missouri Register**. No public hearing is scheduled.*