Chapter II.6
SURVEYS AND PERMANENT MONUMENTATION

1. INTRODUCTION

This chapter relates the minimum criteria, standards and acceptable procedures for establishing survey monuments required by the City of Rio Rancho's Subdivision Ordinance (Chapter 155) and the New Mexico State Statutes Chapter 61-23-1 Engineering and Surveying Practices Act (NMSA 1978).

The City Engineer or his /her designee is responsible for: subdivision monumentation, the interrelationship of City control monumentation with other agencies (National Geodetic Survey, NOAA, etc.), and the recordation and perpetuation of records and monumentation for the City's network.

All subdivision surveys shall be referenced to the coordinate system based on the New Mexico State Plane, Central Meridian, with vertical datum utilizing North American Vertical Datum 1988 (NAVD'88) and horizontal datum utilizing North American Datum 1983 (NAD'83). Where existing platting references land grant or other information, subsequent platting will reference the New Mexico State Plane, Central Meridian Coordinate System (Chapter 155.24 (D) (3),(a) and 155.25(C),(5)).

In general, any registered land surveyor licensed and registered with the State of New Mexico can perform the survey requirements for the development process; however, certain portions must be performed under the City Engineer or his /her designee approval and specifications.

Governing Regulations

The Mexico State Statutes, NMSA 1978, 61-23-1, Engineering and Surveying Practices Act, contain the regulations governing monumentation and surveys for subdivisions in the City of Rio Rancho. Survey, design, and construction professionals should be thoroughly familiar with the survey and monumentation requirements of these regulations.

A. Definitions

METES AND BOUNDS – A precise legal, literal narrative of the perimeter boundary of a survey using grid bearing, and distance notation from a beginning point to an end point which would complete the entire perimeter of the subject survey site. This shall be done on all plats.

MONUMENT. One or more of the following:

(1) PERMANENT SURVEY MONUMENT – A brass cap set in a base which meets city standards, or a standard Bureau of Land Management monument marking sectionalized corners, containing coordinates referenced to the New Mexico Coordinate System and the land surveyor's registration number prescribed thereon.

(2) CENTERLINE MONUMENT AT PCs AND PTs – A 3 ½" aluminum monument set flush with the pavement. This marker shall have the land surveyor's registration number affixed thereto.

2. MONUMENTATION

2. l. Centerline Monuments

a. A minimum of two (2) centerline monuments must be inter-visible and a tie to a third Permanent Survey or centerline monument must be assured. The surveyor setting the monumentation will be required to submit notes, drawings, or other reproducible documentation of each point set for permanent files and publication. Acceptable formats and forms are available in Appendix 2.6.2.

NOTE: The developer may submit a centerline monumentation plan at preliminary plat for approval by the City Engineer or his / her designee. If acceptable, the monuments must be included in the street design package and will be constructed with the street improvements and will be inspected for acceptance by the City along with other street improvements at the time of final inspection.

b. Centerline monuments must be 5/8" mild steel bar, minimum 24" long. Alternate monuments may be 3/4" iron pipe, minimum 24" long or as approved by the City Engineer or his /her designee. In loose sand or unstable soil, a monument 36" or longer will be required.

c. Monuments must be set flush with the earth or within 0.2 feet above and must bear a cap or permanent tag identifying the registration number of the surveyor setting the monument.

d. Centerline monuments shall be set only under the supervision of a Land Surveyor registered in the State of New Mexico.

e. Centerline monuments must be set in conformance with the standards and specifications for Class 3 surveys as defined in Table 26.1. The centerline monument must have a position error relative to the referenced Permanent Survey Monuments no greater than 1/10,000 of the distance to the nearest Permanent Survey Monument plus 0.10 feet.

2.2. Permanent Survey Monuments

a. No point within the subdivision shall be more than one-half (1/2) mile if possible from a permanent survey monument, and at least two corners or points on or near the perimeter of the subdivision traverse, must be tied to, or monumented with permanent survey Monuments as approved by the City Engineer or his / her designee. These points or monuments must be tied by Grid Bearing in the Central New Mexico State Plane Coordinate System to the network, currently under development. The location of Permanent Survey Monuments showing ties to the

network, currently under development, together with 1) the New Mexico State Plane Central Meridian, 2) the Delta Alpha and combined sea level and scale factor at the point or for the centroid of the parcel of the subdivided land, 3) the vertical elevation

Table 26.1 SURVEY STANDARDS AND SPECIFICATIONS

	CLASS 1	CLASS 2	CLASS 3
POSITION CLOSURE	1"15,000	1:10,000	1:5,000
ANGLES ACCURATE TO DISTANCES ACCURATE TO (per 100 feet)	5 sec.	7 sec.	14 sec.
	0.002 ft. (1:50,000)	0.004 ft. (1:25,000)	0.007 ft. (1:15,000)
REJECTION LIMIT OR SPREADS BETWEEN D & R AND SETS	5 sec.	5 sec.	10 sec.
NUMBER OF POSITIONS OR SETS			
1" Instrument	4 Pos.	4 Pos.	2 Pos.
10" Instrument	1 Set 6DR	1 Set 6DR	1 Set 2DR
20" Instrument	2 Sets 6DR	2 Sets 6DR	1 Set 4DR
30" Instrument	3 Sets 6DR	3 Sets 6DR	1 Set 6DR
1' Instrument			1 Set 8DR
AZIMUTH CLOSURE	8" (N*)0.5	10" (N*)0.5	30" (N*)0.5
AZIMUTH CLOSURE PER ANGLE POINT	3 Sec.	5 Sec.	10 Sec.
NUMBER OF REPETITIONS (distance measurements)	1	1	1
TAPING CRITERIA			
Temperature	Accurate to ± °F	Accurate to ± 3°F	Accurate to ± 6 °F
Tension	Accurate to ± 1# of standard	Accurate to ± 2# of standard	Accurate to ± 3# of standard
Calibration	**	**	**
			Plumb Bob String or
TYPE OF TARGET	Fixed	Fixed	Fixed

Table 26-1 General Notes

- It is recommended that 30" transits not be used for Class 1 & 2 surveys.
- * N = Number of angle stations carrying azimuth. The smallest value for the azimuth closure criteria will apply.
- Fractions of a full tape length must be checked.
- Properly calibrated electronic distance measuring equipment may be used in place of metal tapes
- .5. Side points observed from primary traverses shall conform within reason to the required accuracy for the primary traverse. The accuracy of the observations, of course, will depend on the type of point observed. Whenever indefinite points, such as fence corners, tree stumps, etc., are involved, the best approximation of the center or specific point previously described should be observed. Each angle should be observed 2 DR and the spread between the D and R observations should not exceed ± 20".
- Method of taping outlined in paper. Tension applied should be same used to standardize or calibrate tape.

- Standardized tape or one calibrated with a standardized tape.
- Global positioning system surveys are acceptable to the same standards as other previously noted surveying.
- Detailed explanation can be found in the American Congress of Surveying and Mapping publication Horizontal Control as Applied to Local Survey Needs.
- .Line weights shall be consistent with DPM Chapter II.1, Appendix 2.1.1, Line Weight CAD Standards

related to the North American Vertical Datum 1988 (NAVD '88) and 4) horizontal coordinates related to the North American Datum of 1983,(NAD '83) shall be shown on the final plat for which the survey is made. Survey origination points shall be shown on the plats.

b. Permanent survey monuments must be brass caps set in an acceptable base as shown in the figure in Appendix 2.6.1. Caps shall bear the registration number of the surveyor establishing the point and identifying letters or numbers approved by the City Engineer or his/her designee. This information must be stamped permanently into the cap and must be shown on the final plat for which the survey is performed. Standard caps design is provided in Appendix 2.6.1.

c. A brief narrative covering the procedures and pertinent information used to establish the Monumentation must be submitted to the City Engineer or his/ her designee at least thirty (30) days prior to submission of a final plat for review and approval. GPS survey data shall include a detailed description of the post processing procedure which was used to establish the monument. Monument information must be submitted on standard forms available from the City Engineer or his/her designee, or on forms which are identical in format to those in Appendix 2.6.2.

d. Permanent survey monuments shall be considered properly positioned and represented only after the City Engineer or his /her designee has approved all survey procedures, calculations, and verified conformance to standards and specifications for Class 2 surveys or greater. If found to be deficient, the Land Surveyor submitting the final plat and documentation may be required to perform additional work to bring monumentation into conformance, regardless whether the final plat is recorded or not.

2.3 Bench Marks

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2.4 City of Rio Rancho Control Survey Network

a. Complete information on existing network monumentation is available from the City Engineer or his /her designee or the Department of Public Works – Records/GIS Section.

2.5 Record Requirements

a. Control Station Data forms are available from Appendix 2.6.2. They must be filled out and submitted to the City for established survey control.

3. CONSTRUCTION SURVEYS

3.1 The physical staking for the contractor's work in the construction phase of any project is the responsibility of the developer on a privately financed project.

3.2 A topographic design survey/control map, containing survey control, needs to be included as a sheet within the final construction plans. This typically should be tied to a grading and drainage plan.

3.3 It is the responsibility of the surveyor performing construction staking (establishing grades and positions for improvements) to confer with the design engineer whose seal and statement appear on the approved construction plans prior to such staking activities.

3.4 The surveyor performing construction staking is also responsible for conferring with the registered surveyor who certified the plat, prior to construction staking.

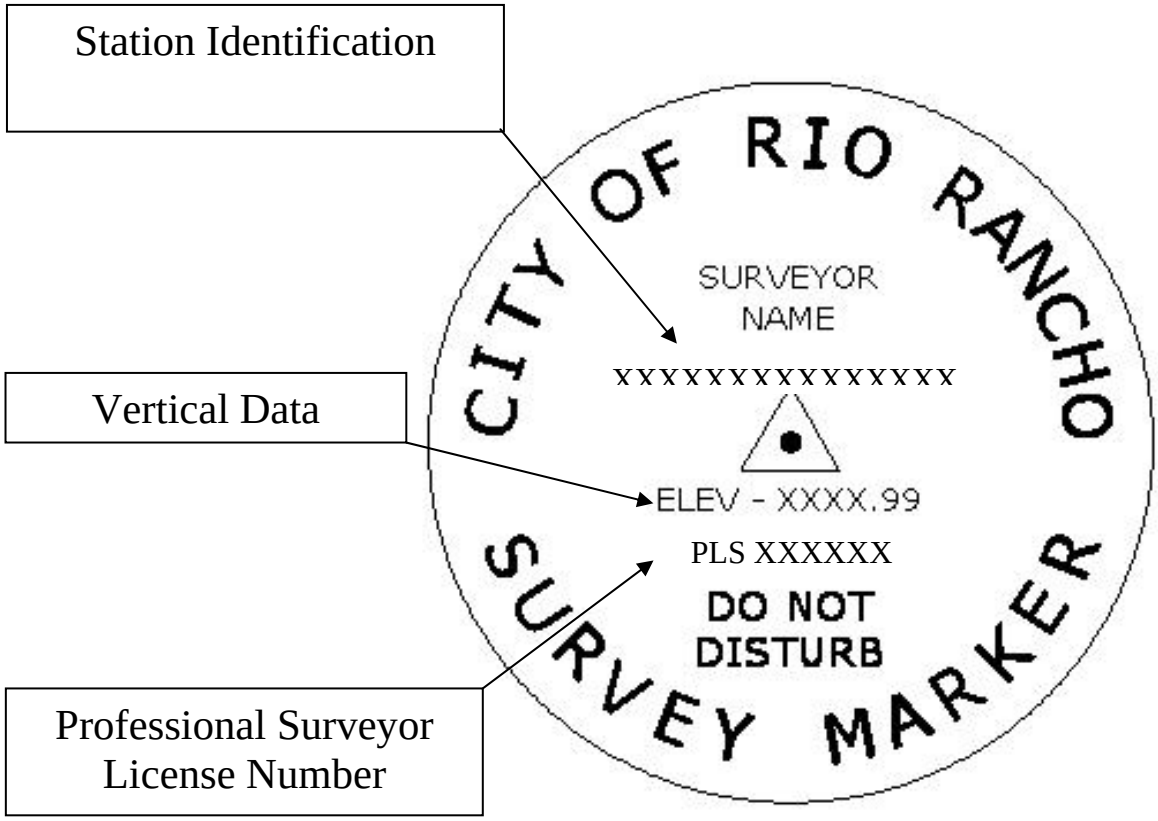
3.5 The surveyor performing construction staking must satisfy himself/herself as to the accuracy of subdivision controls and to the intent of the construction plans, as they relate to positions and elevations prior to the commencement of work.

3.6 The developer must reasonably assure himself/herself that the person(s) intending to provide construction staking have an understanding of the intent of the plans, conditions of control monuments and that construction surveying will be under the supervision of a registered engineer or land surveyor.

3.7 The contractor is responsible for protecting and maintaining all plat and monumentation controls set by the land surveyor. In the event of inadvertent destruction or alteration, the contractor must immediately notify the land surveyor and the City Engineer or his /her designee.

APPENDIX 2.6.1

EXAMPLE OF PERMANENT MONUMENTATION



APPENDIX 2.6.2

MONUMENT RECORD FORMS INSTRUCTIONS

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