Chapter 6: Surveying Standards

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1. Purpose

These Standards are intended to define the minimum requirements for the practice of surveying within The City of Delaware. All surveys conducted for the purpose of designing or preparing plans and maps for improvements requiring approval by the City of Delaware shall be performed by or under the direction and close supervision of a Professional Surveyor.

2. Definitions

A. **As-built Surveys:** these are surveys to determine positions of structures as actually constructed. "As-built" surveys are required to check the contractor's work, assure that the structures will function according to design, and provide a record of locations of structures for maintenance and other subsequent design purposes. In addition to the requirements of these Standards, the information and data obtained for and presented on the "as-built" plan should conform to the as-built survey specifications currently accepted by the surveying profession.

B. **Benchmarks:**

1. **Master benchmark:** a vertical control monument which is durable, easily identifiable and permanently located within the development area in a position which affords the highest possible protection from disturbance. At least one "master benchmark" shall be established for each development area.
2. **Master Benchmark Standards**: the elevation of each "master benchmark" shall be determined and established by measurements designed and executed with control over uncertainty, through use of well-designed specifications.
3. **Source benchmark:** an existing, permanently established, and undisturbed monument with a known elevation which is related to the "National Geodetic Vertical Datum" with a high level of certainty.
4. **Temporary benchmark:** a benchmark of a lesser nature and with elevations derived from the "master benchmark" which may be used for control within the development area.

C. **Development Area:** the area of land included within each individual subdivision (or phase of subdivision) as submitted for review and approval.

D. **Photogrammetry:** the science of making measurements on photographs.

1. **Terrestrial photogrammetry** applies to the measurement of photographs that are taken from a ground station, the position of which usually is known or can be readily determined.
2. **Aerial photogrammetry** applies to the measurement of photographs taken from the air and includes all operations, processes and products involving the use of aerial photographs. Among these are included the measurement of horizontal distances, the determination of elevations, the compilation of planimetric and topographic maps, the preparation of mosaics and orthophotos, and the interpretation and analysis of aerial photographs.

E. **Plat, Subdivision:** a map of a subdivision of land prepared in accordance with State Plat statutes and the City of Delaware Subdivision Regulations, located in section 1111 of the city code.

F. **Plat, Survey:** a graphical description drawn to scale showing all essential data pertaining to the boundaries and subdivisions of a tract of land.

G. **Professional Surveyor:** a registered surveyor authorized to practice professional surveying by the Ohio State Board of Registration, as specified under Section 4733 (Adm. Code) ORC

H. **Property Surveying:** the branch of surveying that involves "the art and science of: (1) reestablishing cadastral surveys and land boundaries based on documents of record and historical evidence; (2) planning, designing and establishing property boundaries; and (3) certifying surveys as required by statute or local ordinance such as subdivision plats, registered land surveys, judicial surveys and space delineation" (knowledge of both the weight-of-authority and statute law relative to the establishment of boundaries by both written and unwritten methods is imperative).

I. **Subdivision:** (1) The division of any parcel of land shown as a unit or as contiguous units on the last preceding tax roll into two or more parcels, sites, or lots, any one of which is less than five acres for the purpose, whether immediate or future, of transfer of ownership provided, however, that the division or partition of land into parcels of more than five acres not involving any new streets or easements of access, and the sale or exchange of parcels between adjoining lot owners where such sale or exchange does not create additional building sites shall be exempted; or (2) The improvement of one or more parcels of land for residential, commercial or industrial structures or groups of structures involving the division or allocation of land for the opening, widening or extension of any street or streets, except private streets serving industrial structures; the division or allocation of land as open spaces for common use by owners, occupants or lease holders or as easements for the extension and maintenance of public sewer, water, storm drainage or other public facilities. (Section 711.001, ORC)

J. **Surveying Practice:** includes any professional service which requires the application of special knowledge of the principles of mathematics, the related physical and applied sciences, and the relevant requirements of law for the adequate performance of the art of surveying (included are all major categories of surveying practice, e.g., property, topographic, hydrographic, engineering, geologic, photogrammetric, environmental [remote sensing], and soil surveying, etc.).

3. Engineering Plan and Topographic Surveying

A. The following shall be on all final engineering plans:
   1. The location, description and elevation of the "master benchmark(s)" within the subject development area and the "source benchmark(s)", and
   2. The total expected error and its certainty (90% or greater) in vertical measurements between each "master benchmark" and its respective "source benchmark(s)" based on actual design or sound judgment.

B. Topographic Standards shall be as follows:
   1. The elevation of ninety percent (90%) of all identifiable points shall be in error not more than one-half contour interval.
   2. No point shall be in error more than a full contour interval.

4. Surveys and Monuments

A. General

Survey and monument activities shall meet "Minimum Standards for Boundary Surveys in the State of Ohio" set forth in Ohio Administrative Code Section 4733-37. Permanent monuments shall be tied to and referenced in the Ohio Plane Coordinate System.

B. Lot Monuments (pins)

A minimum of four permanent monuments are required. Iron pins must be set on the property corners at the street ROW line on each lot corner after construction of the house and final lot grading Lot pins shall be one-inch diameter iron pins thirty inches long, buried one foot below finish grade and bearing the identification mark of the surveyor or surveying company that set the marker.

C. Boundary Monuments (pins)

Subdivision boundary pins shall be composed of durable material, have a minimum length of thirty inches and a minimum cross-section area of 0.2 square inches. Every boundary monument shall be identified with a durable marker bearing the surveyor's Ohio registration number and/or name or company name. One such monument shall be placed at each corner and at each change of direction of the boundary. When it is impossible or impractical to set a boundary monument on a corner, the surveyor shall set a reference monument along one of the property lines which intersect at that corner. The datum shall be stated.

D. Roadway Monuments

Roadway monuments shall be placed at the intersection of all newly constructed roadways in accordance with the Standard Details. Additionally center punched railroad spikes shall be placed in the centerlines of all new roads at the limits of the subdivision, at points of curve and at points of tangency. The datum shall be stated. A letter of Certification must be submitted for each monument. The letter shall identify the coordinates and elevations of the monument.

E. Certification

Before release of the surety, the subdivider's surveyor shall certify by letter to the City Engineer that all monuments are in place and those disturbed during construction have been replaced.

5. As-Built Plan Requirements

All final copies of plans and maps that are submitted for record shall conform to Section 5, Record Drawings and Digital Submission standards in this document.