

17-4.09 Monuments [Rev. Apr. 2016]

17-4.09(01) General [Rev. Apr. 2016]

A monument is set to perpetuate the location of a disturbed public land survey or grant corner within a right of way, to reestablish an alignment monument that may be disturbed during construction or created from a PR line, or to establish and define a vertical reference point. Monuments used by the Department are shown in the INDOT *Standard Drawings* series E 615-SCMN, E 615-SLBM, and E 615-SLMN and are defined as follows.

1. Monument Type A. Use this type with vitrified brick or asphalt surface on concrete base.
2. Monument Type B. Use this type with an asphalt pavement.
3. Monument Type C. Use this type where a monument is required outside the pavement area.
4. Monument Type D. Use this type with a concrete pavement.
5. Benchmark Post. Use this type to establish a Department benchmark.
6. Section Corner Monument. Use this type to perpetuate the location of a public land survey or grant corner.

It is the responsibility of the designer to select the type of monument that best suits the location where a monument is required.

17-4.09(02) Section Monuments [Rev. Apr. 2016]

The following will apply.

1. Location. Provide a monument at each section corner, quarter-section corner, and grant corner that lies within the right of way for a new facility, or for a facility to be reconstructed except as described in item 2 below.
2. Responsibilities. The district office will request the county surveyor to establish each public land survey and grant corner located within the right of way that is not already

defined by a monument at the time of construction. If the county surveyor fails to establish each such point as requested, the district office will eliminate each monument provided for this purpose from the contract. Those section corner, quarter-section corner or grant corners that lie within the right of way that were previously monumented, but will be destroyed during construction, must be re-established.

3. Plans. Designate each monument by type and show it on the plans with an arrow to its approximate location.

17-4.09(03) Survey Line Control Point [Rev. Apr. 2016]

A survey or design alignment is used as the basis for the descriptions of acquired right of way. With respect to right-of-way descriptions, it is as significant as a section corner. A survey line control point and survey and design alignment monuments must be set by an Indiana registered land surveyor. A partial 3R project or a project not requiring additional right of way is exempt from this requirement. The following will apply.

1. Monumenting PI, PC, and PT. The following will apply.
 - a. Where a PI appears within the right of way, provide a monument at the PI.
 - b. Provide a monument for each PC and PT.
 - c. Designate each monument by type and show it on the plans with an arrow to its approximate location.
 - d. Place a monument at the intersection of the main line with the “S” line.
2. Monumenting Beginning and End Point of Project. Place a monument on the survey and/or design alignment centerline at each of these points.
3. Monumenting POT and POC. The following will apply.
 - a. It is not necessary to monument each POT and POC. These intermediate points are to be monumented as necessary so the maximum interval between adjacent monuments does not typically exceed one quarter mile.

- b. Where practical, a monument required to define a POC or POT should coincide with a POC or POT established during the original survey.
- c. Designate each POC and POT monument by type and station and show it on the plans with an arrow to its approximate location.

17-4.09(04) INDOT Benchmark [Rev. Apr. 2016]

One benchmark should be provided at least every 1.5 mile. Benchmarks should be located as follows.

1. Structure. Include a benchmark tablet on each bridge. Where twin structures or dual structures are constructed in the same vicinity, a benchmark is only required on one structure. Benchmark tablets should be installed at locations with continuous, deep foundations such as abutment, pier or pile cap. Avoid locations such as curbs, sidewalks, bridge decks, and railings. Location must accommodate the establishment of an accurate elevation of the bench mark. Benchmark tablets set as noted above or in a benchmark post should not be paid for directly.
2. Non-Structure. Where the spacing of structures is in excess of 1.5 miles, show benchmark posts on the plans and space them such that the maximum spacing between benchmarks is 1.5 miles. Benchmark posts should be paid for per INDOT *Standard Specifications*.
3. Plans. Designate each benchmark post or tablet on the plans with a note as follows:

Benchmark Post (or Tablet) Required
 Station _____ + _____
 Offset distance _____ Direction (Lt. or Rt.) _____

17-4.09(05) Correcting Plans [Rev. Apr. 2016]

The district construction engineer will notify the district Capital Program Manager, project manager, and district Survey Manager in which the project is located, for approval prior to any monument being eliminated from the contract or if the location of a monument is proposed to be changed. The as-built plans are to reflect any changes made to the monument locations shown in the construction plans.

17-4.09(06) Right-of-Way Marker

See Section 85-7.0 for information.

17-4.09(07) National Geodetic Survey Benchmark

Each National Geodetic Survey (NGS) benchmark disturbed by highway construction must be re-established. It is the responsibility of the Contractor to secure the replacement disk for such a benchmark. In addition, the construction plans should include the note as follows:

N.G.S. Benchmark Post No. _____,
Station _____, (Rt.) (Lt.) shall be re-established by the Contractor.

Procedures for re-establishing soon-to-be disturbed or destroyed bench marks should follow the guidelines established in the NGS *Bench Mark Reset Procedures* document and can be obtained at the link provided below:

http://www.ngs.noaa.gov/PUBS_LIB/Benchmark_4_1_2011.pdf

17-4.09(08) NGS Horizontal Control Point [Rev. Apr. 2016]

The designer is responsible for notifying the NGS if a NGS horizontal control point (formerly triangulation point) will be destroyed due to proposed highway construction. This notification will be made by the Highway Design and Technical Support Division director and should be made at the time the plans are sent to the district office. Sufficient detail of the mark should be provided with notification to ensure positive identification. Said notifications will be made to the following:

NOAA, National Geodetic Survey, N/NGS43
Bldg. SSMC3, Room 8545
1315 East-West Highway
Silver Spring, MD 20910
Phone: 301-713-3242

It is not necessary to show a monument in the plans for use in re-establishing a NGS horizontal-control point.

17-4.09(09) United States Geological Survey Benchmark [Rev. Apr. 2016]

Each United States Geological Survey (USGS) benchmark disturbed by highway construction must also be re-established. Information on resetting such may be obtained by contacting the following:

National Spatial Data Infrastructure Partnership Office
U.S. Geological Survey
Ohio Mapping Partnership Office
6480 Doubletree Avenue
Columbus, OH 43229
Phone: (614)-430-7768

17-4.10 Seeding and Sodding

17-4.10(01) Seeding for Grading and Paving Project

The following will apply.

1. Rural Area of 1 ac or Larger. An area within the right of way that is not sodded or paved should be seeded as follows.
 - a. Seeding. Use Seed Mixture R as specified in the INDOT *Standard Specifications*. Estimate the quantity assuming an application rate of 170 lb/ac.
 - b. Mulching. Use the pay item Mulching Material and estimate it at a rate of 2 T/ac.
 - c. Fertilizer. For estimating purposes, assume an application rate of 800 lb/ac.
2. Urban Area of 1 ac or Larger. An area within the right of way that is not sodded or paved should be seeded as follows.
 - a. Seeding. Use Seed Mixture U as specified in the INDOT *Standard Specifications*. Estimate the quantity assuming an application rate of 150 lb/ac.
 - b. Mulching. Use the pay item Mulching Material and estimate it at a rate of 2 T/ac.
 - c. Fertilizer. For estimating purposes, assume an application rate of 800 lb/ac.

3. Rural Area of Smaller Than 1 ac. For an area within the right of way which is not sodded or paved, use the pay item Mulched Seeding R. Estimate the area and pay quantity in square yards.
4. Urban Area of Smaller Than 1 ac. For an area within the right of way which is not sodded or paved, use the pay item Mulched Seeding U. Estimate the area and pay quantity in square yards.

17-4.10(02) Seeding for Grading Project

The following will apply.

1. Shoulder Point to Shoulder Point. The area between the outside shoulder points should be seeded as follows.
 - a. Seeding. Use Seed Mixture P as specified in the INDOT *Standard Specifications*. Estimate the quantity assuming an application rate of 80 lb/ac.
 - b. Fertilizer. For estimating purposes, assume an application rate of 400 lb/ac.
2. Shoulder Point to Right-of-Way Line. The area between the outside shoulder point and the right-of-way line should be seeded according to the requirements for a grading and paving project as discussed in Section 17-3.10(01).

17-4.10(03) Temporary Seeding and Temporary Mulch [Rev. Apr. 2016]

This section has been moved to 17-6.0.

17-4.10(04) Seeding for Environmental Mitigation

Where environmental mitigation is required by the environmental document, the Design Summary, or as determined from a field check, specify one of the following seed mixtures.

1. Seed Mixture Grass. The following will apply.
 - a. Type 1. Specify this mixture where a special grass is required in addition to the regular seed mixture. The pay item is Seed Mixture Grass Type 1. For estimating purposes, assume an application rate of 195 lb/ac.