Section 821. PRESERVATION OF LAND MONUMENTS, CONTROL POINTS, AND PROPERTY CORNERS

821.01. Description. This work consists of preserving the corners and control points as shown on the plans, identified in the contract, or directed by the Engineer. These corners and control points are defined in subsection 821.01.A. The Department considers the terms point and corner synonymous when used in this section.

A. Definitions.

Public Land Survey System Corners. Section Corners, ¼ Section Corners, Center of Sections, and Meander Corners.

Property Controlling Corners. Corners that control boundaries for several parcels of land and include ¼ – ¼ (1/16) Corners, Property Corners, Subdivision Corners and Subdivision Block Corners.

Alignment Control Points. Points of Curvature (PCs), Points of Tangent Intersections (PIs), Points on Tangents (POTs), Points on Tangents in Curve Areas (POCTs), and Points on Curve Centerline (POCs). Alignment Points may be Property Controlling Corners.

Geodetic Control Points. Horizontal or Vertical Control Monuments are published by the National Geodetic Survey as part of the National Spatial Reference System (NSRS).

B. Administrative Requirements. In accordance with 1980 PA 299, perform work to verify point positions, evaluate, witness, place points, and report, under the direct supervision of a professional surveyor licensed in the State of Michigan. Use employees of the professional surveyor, or surveying firm to perform this work.

Coordinate with the licensed professional surveyor during construction activities to schedule the work, including the following:

1. Verification of preliminary point positions;
2. Setting of temporary witnesses;
3. Installing monument boxes in paved areas; and
4. Final placement of preservation points.

Ensure the licensed professional surveyor notifies the Engineer of the completion of the required preliminary verification and witnessing work before beginning construction activities on the project.
Witness corners and points identified as “Preserve” with straight-line witnesses before beginning construction. Reestablish the corners and points in accordance with this section and 1970 PA 74.

The plans will identify Vertical Control Monuments published by the National Geodetic Survey (NGS), as part of the National Spatial Reference System, that may be disturbed or destroyed during construction as “Preserve-Vertical”. Transfer or reference the original benchmark elevation of these monuments before the start of construction. Follow the procedures established in the NGS Benchmark Reset Procedure guidelines for transferring, referencing, resetting, and documenting a National Geodetic Survey Vertical Control Monument, found at the following website address:

http://www.ngs.noaa.gov/heightmod/Leveling-Manuals/Benchmark_9_13_07.pdf

The guidelines are also available through the National Geodetic Survey website. Contact the appropriate MDOT Region Surveyor and the NGS State Geodetic Advisor to discuss before beginning field work.

Submit the required data for each monument to the MDOT Region Surveyor and the NGS State Geodetic Advisor for review.

Upon completing the requirements of this section and 1970 PA 74, for each corner and point identified as “Preserve”, ensure the licensed professional surveyor submits, to the Department, two copies of a “Land Corner Recordation Certificate,” approved by the Michigan State Board of Professional Surveyors for Section 5 of Act 74. Do not document more than four survey points on each form. Submit one copy of the “Land Corner Recordation Certificate” to the Engineer and mail one copy to the MDOT Region Survey Manager.

For Public Land Survey System Corners or previously recorded Property Controlling Corners preserved under this provision, ensure the licensed professional surveyor records a Land Corner Recordation Certificate in the Register of Deeds Office in the County where the corner is located. Transmit the two copies of the Land Corner Recordation Certificate with the Register of Deeds recording stamp with the Liber and Page or File Number where the certificate is recorded. Review, with the licensed professional surveyor, the positions of corners within and near the construction limits identified on the plans as “Protect”. Mark these positions to prevent their disturbance. If a corner is in danger of being disturbed, identify and witness the corner with straight-line witnesses before construction, using the same method as for corners identified as “Preserve”.

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Corners identified as “Protect”, but witnessed and left undisturbed, do not require remonumentation. Maintain documentation of witnesses for payment purposes.

Ensure the licensed professional surveyor submits, to the Department, two copies of a list of corners identified as “Protect,” indicating the corners witnessed by the professional surveyor. List corners identified as “Protect,” as “not witnessed”, if outside the construction area, not in danger of disturbance, and not witnessed. Include, in the list identifying “Protect” corners, a statement indicating that the corners were found undisturbed after construction. Ensure the licensed professional surveyor signs, seals, and dates the statement.

Complete the work and submit the documentation within four weeks after the completion of construction work.

821.02. Materials. Provide and install monument box castings, as required by law, at survey points shown on the plans, or directed by the Engineer.

Provide and install a monument to mark the location of a replaced Plat Block Corner or Plat Corner not located in pavement or other hard surfaces. This monument must consist of a precast concrete cylinder 4 inches in diameter, 36 inches in length, and have a ½-inch rebar protruding 1 inch from the center of the cylinder. Other monuments must be at least ½ inch in diameter and at least 18 inches long.

Ensure that monuments possess a magnetic field and are legibly capped showing the license number of the professional surveyor.

821.03. Construction. Reestablish the horizontal position of monuments within 0.02 foot of the original position.

Install points in paved surfaces in monument boxes. Install points located outside of paved surfaces and within gravel roadways, including gravel shoulders, at least 6 inches below the gravel surface. Install points, located outside of paved surfaces, and outside of unpaved roadways, flush with the ground. Drill and grout points located on rock outcroppings into solid rock to at least 8 inches deep.

Install monument boxes in accordance with Standard Plan R-11 Series. Reinstall old monument boxes if the monument boxes meet the requirements of Standard Plan R-11 Series.

Use coring, after completion of paving operations, to place new monument boxes in pavement areas. Obtain the Engineer’s approval of coring equipment before starting the work. Use a core diameter no greater than 1 inch larger than the largest diameter of the monument.
box. Grout the monument box in place using non-shrink grout to the full depth, as approved by the Engineer. Do not place the grout in the monument box. Do not place granular material more than 0.1 foot above bottom of the monument box frame. Install monument boxes so neither the box nor the cover extends above the pavement surface and so no part is more than 0.02 foot below the pavement surface. Compact the material at the base of the box before placing the box.

Prevent the reset monument or cap from touching the side of the monument box. Position the center of the monument within 0.25 foot of the center of the monument box. Position the top of the monument from 0.1 foot to 0.5 foot below the top of the monument box.

Before construction, measure the distance from the corner position to existing record witnesses to within ±0.01 foot to verify and establish the “Preserve” corner position. Document the record and measured distances to existing witnesses on the Land Corner Recordation Certificate.

To preserve existing points, place temporary witnesses with straight-line witnesses before construction begins. Place at least four hubs with tacks, two on each side of the roadway, outside potential construction activity limits, at right angles to the roadway centerline. Determine precise measurements from the corner to points on the temporary witness line. Document this information in Section B of the Land Corner Recordation Certificate.

If not measuring temporary witness points directly from the corner, make check measurements to ensure the accuracy of the directly measured witness. Submit a copy of the field notes for these check measurements to the Department.

During remonumentation, check and compare straight-line witnesses with the record measurements. For deviations from the record measurements, document the new measurement and the record measurement, and the method for resolving the deviations in remonumentation, in Section B of the Land Corner Recordation Certificate.

Preservation of existing points includes documenting at least four newly established or recovered permanent record witness points expected to remain for five years after construction.

Locate witnesses in at least three separate quadrants from the corner monument. Orient witness points from the corner position by bearing to the nearest 5 degrees, and distance to within 0.01 foot.
821.04 Measurement and Payment.

A. Monument Preservation. The Engineer will measure Monument Preservation by the number of monuments, public land survey corners, property controlling corners, and highway alignment control points preserved. The unit price for Monument Preservation includes the cost of the following:

1. Preliminary position verification;
2. Temporary witnessing;
3. Providing and installing new monument and permanent witnessing;
4. Recording the Land Corner Record Certificate in accordance with 1970 PA 74;
5. Providing the required documents;
6. Preparation work;
7. Traffic maintenance;
8. Cleanup; and
9. Site restoration.

B. Monument Preservation, Vertical. The Engineer will measure Monument Preservation, Vertical by the number of vertical geodetic control points preserved. The unit price for Monument Preservation, Vertical includes the cost of the following:

1. Preparation work,
2. Traffic maintenance,
3. Cleanup,
4. Site restoration, and
5. Other costs associated with this work.
C. **Monument Box.** The unit price for **Monument Box** includes the cost of removing existing monument boxes, and providing and installing the monument box castings and monument box cover.

D. **Protect Corners.** The unit price for **Protect Corners** includes the cost of verifying point positions before and after construction, witnessing before construction, and documentation.

E. **Monument Box Adjust.** The unit price for **Monument Box Adjust** includes the cost of providing and installing monument box adjusting rings, and raising or lowering monument boxes to a position flush with the final paved grade.

If the adjustment process disturbs the location of a monument, the unit price for **Monument Box Adjust** includes the cost of verifying the preliminary position, temporary witnessing, permanent witnessing, recording the Land Corner Record Certificate in accordance with 1970 PA 74, and providing the required documents.