

## **SECTION 108 MONITOR EXISTING STRUCTURES**

### **108-1 Description.**

Provide settlement, vibration and groundwater monitoring in accordance with the requirements of this Section. The work required under this Section does not modify the requirements or responsibilities for preservation of existing property from damage in accordance with 7-11.1.

Evaluate the need for, design of, and provide any necessary precautionary features to protect existing structures from damage. Employ construction methods that will not produce damaging vibrations, soil movement, soil loss, or instability of existing structures.

### **108-2 Construction.**

#### **108-2.1 Inspection and Settlement Monitoring:**

**108-2.1.1 Miscellaneous Structures:** When constructing foundations for miscellaneous structures such as sign, signal, lighting, or intelligent transportation system structures, inspect and document the condition of the existing structures shown in the Plans, and survey and monitor for settlement the existing structures shown in the Plans.

**108-2.1.2 Structures other than Miscellaneous:** When excavating or constructing retaining walls and foundations for bridges, buildings, and structures other than miscellaneous structures, inspect and document the condition of the following existing structures, and survey and monitor for settlement the following existing structures:

1. as shown in the Plans.
2. within a distance of five shaft or auger cast pile diameters, or the estimated depth of drilled shaft or auger cast pile excavation, whichever is greater, measured from the center of these foundation elements.
3. within a distance of three times the depth of any other excavations.
4. within 200 feet of sheet pile installation and extraction operations.
5. within 100 feet of steel soldier pile installation and extraction operations.
6. for projects with pile driving operations, inspect and document the condition of all structures within a distance, in feet, of pile driving operations equal to 0.25 times the square root of the impact hammer energy, in foot-pounds. Survey and monitor for settlement all structures within a distance, in feet, of pile driving operations equal to 0.5 times the square root of the impact hammer energy, in foot-pounds.

**108-2.1.3 Roadway Compaction Operations:** When performing embankment and asphalt compaction, inspect and document the condition of the following existing structures, and survey and monitor for settlement the following existing structures:

1. as shown in the Plans.
2. within 75 feet of vibratory compaction (in any mode) operations.

**108-2.1.4 Inspection and Documentation Requirements:** Inspect and document the condition of the existing structures and all existing cracks with descriptions and pictures using a qualified Specialty Engineer. Prepare two reports documenting the condition of the structures: one report before beginning the construction operations that may affect the existing structures such as but not limited to foundation construction, excavations, vibratory compaction, dewatering and retaining wall construction, and a second report after completing such construction operations. Include in the reports the Specialty Engineer's assessment of any

damage present, and in the event of damage, the Specialty Engineer's assessment of whether the observed damage is the result of the construction operations. Submit both reports to the Engineer. Inspecting and documenting the condition of bridges, sign, signal, lighting and ITS structures owned by the Department is not required except when shown in the Contract Documents.

The Department will make the necessary arrangements to provide right of way entry to the existing structures.

**108-2.1.5 Settlement Surveying and Monitoring Requirements:** Obtain the Engineer's approval for the number and location of monitoring points. Survey and monitor the settlement of structures, recording elevations to 0.001 foot:

1. before beginning construction
2. daily, during the driving of any casings, piling, or sheeting,
3. daily, during compaction
4. daily, during foundation drilling
5. weekly, for two weeks after stopping pile driving
6. during excavation
7. during blasting
8. or, as directed by the Engineer

Upon either detecting movement of 0.005 feet or damage to the structure, immediately stop the construction operations affecting the structure, backfill any open excavations, notify the Engineer and submit a corrective action plan for acceptance by the Engineer.

**108-2.2 Vibration Monitoring:** When shown in the Contract Documents, employ a qualified Specialty Engineer to continuously monitor and record vibration levels at the structures shown in the Plans during the operation of any equipment causing vibrations or during blasting operations. Submit the vibration records to the Engineer within 24 hours of performing the monitoring activity. Provide vibration monitoring equipment capable of detecting velocities of 0.01 inches per second or less. Obtain the Engineer's approval of the number and locations of the monitoring points.

Upon either detecting vibration levels reaching 0.5 inches per second or damage to the structure, immediately stop the source of vibrations, backfill any open excavations, notify the Engineer and submit a corrective action plan for acceptance by the Engineer.

**108-2.3 Groundwater Monitoring:** Install a piezometer at the right of way line and near any existing structure that may be affected by dewatering operations, or as directed by the Engineer. Monitor the piezometer and record the groundwater elevation level each day that dewatering activities are performed and for one week after activities have ceased, or on a schedule approved by the Engineer. Notify the Engineer of any groundwater lowering near the structure of 12 inches or more.

### **108-3 Method of Measurement.**

The quantities to be paid for will be lump sum, completed and accepted. No separate payment will be made for the design, furnishing, construction, and removal of precautionary features, such as but not limited to sheeting, shoring, or bracing, installed for protection of existing structures.

**108-4 Basis of Payment.**

Price and payment will be full compensation for all work and materials specified in this Section.

Payment will be made under:

- Item No. 108- 1      Monitor Existing Structures - Inspection and Settlement Monitoring - lump sum.
- Item No. 108- 2      Monitor Existing Structures - Vibration Monitoring - lump sum.
- Item No. 108- 3      Monitor Existing Structures - Groundwater Monitoring - lump sum.