

## SECTION 01 71 23

### FIELD ENGINEERING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. The Contractor shall provide construction stakeout sufficient to construct the proposed improvement in accordance with the approved construction plans.
- B. All stakeout services shall be completed under the direct supervision of a Professional Land Surveyor licensed in the State where the project is located.
- C. The Owner shall provide the following prior to the commencement of any stake-out services:
  - 1. Construction site drawings and associated electronic files.
  - 2. Copies of the topographic survey that the approved site plans have been based on. The topographic survey shall include at least one benchmark, which shall be used for vertical control; and,
  - 3. Copies of the boundary survey that the approved site plans have been based on. The boundary survey shall be closed and monumented/ironed. These monuments/irons shall be used for horizontal control related to the site boundary and the dimensional control plan.
- D. Contractor shall verify existing grades prior to performing work under this section. If existing grades are at variance with the drawings, notify the Owner and receive instructions prior to proceeding. No additional compensation will be considered resulting from grade variances once site clearing has commenced.

#### PART 2 - PRODUCTS

##### 2.01 MATERIALS

- A. The Contractor/Surveyor shall supply all stakeout materials.

##### 2.02 EQUIPMENT

- A. The Contractor/Surveyor shall supply all equipment necessary to accomplish the work.

#### PART 3 - EXECUTION

##### 3.01 PERFORMANCE STANDARDS

- A. Building Layout
  - 1. Set a minimum of 4 building corners (to be the outer most building limits or as requested by the Contractor) with 2 (10 foot minimum) offsets per corner. A benchmark or a finished floor benchmark will be set within close proximity to the proposed building.
- B. Building Pad/Limits Certification
  - 1. Grade elevations for the building limits (finished floor elevation) shall be provided at a 50 foot grid for subgrade acceptance, stone base acceptance, and prior to slab placement.
- C. Detention/Retention Ponds and Storm Drainage
  - 1. The Contractor shall provide an as-built survey of all constructed detention/retention ponds and associated drainage structures prior to final acceptance, including a written certification verifying the constructed pond volume and inverts of the proposed drainage structures.
- D. Curb Layout
  - 1. Stakes shall be located at a minimum of 25 feet and a maximum of 50 feet intervals and also at points of curvature, points of tangency, radius points, and transitions, high and low points, and deflections. Offsets will be at 4 feet from face of curb, elevations to top of curb, elevations of top of curb to be provided at this 4 foot offset.
- E. Storm and Sanitary Manholes
  - 15 feet and 25 feet offset stakes in the same direction will be set from the centerline opening of structure lath. One offset stake will have an elevation to top of rim and inverts. Intermediate grade stakes to pipe invert elevation will be provided if needed. (Note: These stakes are not to conflict with piping.)

- F. Catch Basins
  1. Set a centerline of structure lath with 10 foot offset HUB along the face of curb on either side of the lath at face of curb. One offset stake will have an elevation to top of grate and inverts. (Note: These stakes are not to conflict with piping.)
- G. Utility Layout
  1. Water – Stakes shall be located at 50 foot intervals along centerline of pipe and at deflections with no offsets. One 10 foot offset stake to the center of hydrant with a grade ring elevation will be provided;
  2. Lighting – Centerline of lighting structure with a 5 foot offset will be staked. Offset stake elevation will be to finished grade; and,
  3. Centerline of pipes will be staked with no offset.
- H. Roadway Layout
  1. Grade stakes shall be located at centerline of roadway at 50 foot intervals, including point of curvature, point on curve, point of tangency, and points of vertical curves. Grades shall be at finished grade.
- I. Wall Layout
  1. Stakes with 10 feet offset shall be provided at 50 feet intervals, deflections, beginning and end of wall. Additional stakes may be required, depending on wall height and conditions.
- J. Limits of Disturbance
  1. Clearing limits shall be staked at 100 feet ± intervals and at all critical areas.
- K. Grade Stakes
  1. Stakes will be provided at a 50 foot grid. Grade elevations shall be to finished grade.

### **3.02 CONTRACTOR VERIFICATION**

- A. Contractor will field verify the utility location, size and invert elevations at points of connection in area of conflict, prior to construction and protect them from damage.
  1. Finished subgrades shall be verified by the Contractor to ensure proper elevation and conditions for construction above subgrade;
  2. Protect subgrade from excessive construction traffic and wheel loading including concrete and dump trucks; and,
- B. Notify Owner if it is necessary to destroy or remove control points and/or benchmarks due to construction. Contractor shall be responsible for the protection of benchmarks, including the cost for relocation as required.
- C. Advise Owner of any discrepancies between plans and field layout.

### **3.03 QUALITY ASSURANCE**

- A. The survey crew shall discuss all layout procedures with the Contractor's supervisor prior to commencing work.
- B. A survey crew daily report detailing that day's work, shall be completed and signed by the Contractor's supervisor at the end of that day's layout.
- C. Copies of sketches, cut sheets, etc. shall be provided to the Contractor by the beginning of the next workday.
- D. All costs related to re-staking due to construction or Contractors' work resulting in destruction or movement of stakes, shall be paid for by the Contractor and at no additional expense to the Owner.
- E. Building dimensions shall be obtained only from the approved architectural/structural drawings. Dimensions are to be obtained only from the appropriate approved (engineering, architectural and structural) drawings. The surveyor shall report any conflicts to the Contractor and Owner.

**END OF SECTION 017123**