

**SECTION 31 20 00**

**EARTHWORK-EXCAVATION, FILLING & GRADING**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDED**

- A. Over-excavating soil for building and improvement areas.
- B. Excavating soil and other materials for surface improvements.
- C. Compaction of existing ground.
- D. Placement of fill (if necessary)
- E. Preparation of subgrade for other improvements.
- F. Grading of soil.

**1.02 RELATED SECTIONS**

- A. Contract General Conditions
- B. Section 31 11 00 – Clearing of Work for Site Improvements
- C. Section 31 14 00 – Soil Materials
- D. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

**1.03 REFERENCES**

- A. ASTM D 1557.

**1.04 COORDINATION**

- A. Coordinate work with Owner's Construction Manager and other personnel.
- B. Contractor to contact Utility companies, USA Dig (811), and others prior to starting excavation work onsite.

**1.05 EXISTING UTILITIES**

- A. The Engineer has indicated on the plans the location of all known existing utility facilities within the work area. The location of said facilities shall be considered approximate only, until exposed by the Contractor. Contractor responsible for reviewing as-builts provided during bid phase, and hold a job walk prior to excavation to review said documents with crews performing the work with Owner's Construction Manager.
- B. Service laterals have been shown where information was available. The location of said facilities shall be considered approximate only, until exposed by the Contractor.
- C. Contractor shall verify all utilities within the work area, including using hand method. Contractor shall protect all existing utilities not designated to be removed.
- D. Maintain all existing utility mains and service lines in constant service during construction of the work.

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- E. Utility shutdowns of any nature must be pre-approved by CM and FCZ 5 days prior to scheduled work activities. This is critical in order not to compromise the varied environments that the animals reside in throughout the Zoo.

#### 1.06 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of utilities encountered, provide as-built information. Contractor to provide both horizontal and vertical dimensions for all lines encountered during work from a hardscape item such as a curb, pathway, etc.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Fill in Turf or Other Planting Areas: Type A per Section 31 14 00.
- B. Fill in Non-planting Areas: Type B or C per Section 31 14 00.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Verify site conditions.

#### 3.02 PREPARATION

- A. Identify required elevation.
- B. Locate, identify, and protect existing above and below grade utilities from damage.
- C. Protect any existing improvement not authorized for removal.
- D. Areas with existing improvements, to be removed, should be excavated to a minimum depth of 12 inches below existing improvements to be removed and the exposed surfaces shall be scarified to a depth of 8 inches, moisture conditioned and compacted as engineering fill.
- E. Within the area of the planned buildings, retaining wall and other structures, over-excavation must extend to a depth of 2 feet below the existing grade elevation, or 2 feet below the footings, whichever is deeper. The over-excavation must extend at least 5 feet laterally outside of the building areas where accessible.
- F. Within the area of the planned pavement, over-excavation must extend to a minimum depth of 12 inches below the existing surface or 18 inches below the pavement surface soil, whichever is greater. The over-excavation must extend 3 feet beyond the improvement area.
- G. Within the area of planned slabs and walking areas, over-excavation must extend to a depth of 12 inches below the existing grade elevation or 1 foot below the planned surface, whichever is deeper. The over-excavation area must extend at least 3 feet beyond the improvements.

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- H. Following the over-excavation of the pavement and building areas, the exposed ground surface must be reviewed by the Geotechnical Engineer to evaluate if loose or soft zones are present that will require additional over-excavation.

#### 3.03 EXCAVATION

- A. All areas receiving fill materials shall be scarified 12 inch in depth, moisture conditioned and compacted as engineering fill.
- B. Excavate soil to finish subgrade of improvements or to finish surface grade where no improvements are to be placed thereon.
- C. Conform excavation to the grades and cross-sections shown on the plans.
- D. When excavating through tree roots, perform work by hand and cut the roots, where authorized, with a saw.
- E. Remove and stockpile excess soil not to be use as fill in the Work at the location designated by the School District, all at no additional costs to the Owner.

#### 3.04 FILLING

- A. Clear all debris, vegetable matter and any other material from areas to receive fill, per Sections; 31 11 00, and 31 14 00
- B. Compact existing ground to required relative compaction prior to placement of fill.
- C. Place and compact soil to finish subgrade of improvements or to finish surface grade where no improvements are to be placed thereon.
- D. Conform fill to grades and cross-section shown on the plans.
- E. Any fill layers shall not exceed 0.67 foot in un-compacted thickness.
- F. Maintain optimum moisture content of fill materials to attain required compaction density.
- G. Compact fill materials per Section 31 20 00/3-05.
- H. Provide imported soil materials conforming to Soil Type B per 31 14 00, as needed to attain finished grades of Work outside the limits of non-vegetative surface improvements.
- I. Provide imported soil materials conforming to Soil Type C per 31 14 00, as needed to attain finished subgrade of Work within the limits of non-vegetative surface improvements.
- J. When encountering soft spots (and/or pumping soil), Contractor shall over-excavate the existing soil to a minimum of three feet and allow the soil to air dry for 3 days and re-compact. No extra time or additional cost is allowed.

#### 3.05 COMPACTING

- A. Maintain optimum moisture content of materials to attain required compaction density.
- B. Compact in layers not exceeding 0.67 foot in un-compacted thickness.
- C. Obtain minimum 95% relative compaction of soil in areas to receive concrete, asphalt-concrete, aggregate base, or other non-vegetative surface improvements.

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- D. Obtain minimum 85% relative compaction of soil in areas to receive replacement sod, other replacement vegetation, or bare ground.

#### **3.06 PREPARATION FOR SUBGRADE FOR SURFACE IMPROVEMENTS:** (such as concrete, asphalt-concrete, aggregate base, and other non-vegetative surface)

- A. Blade or disk the soil to a depth of 8 inches, and remove and dispose of (off the project site) all unsuitable material over 2.5 inches in size.
- B. Thoroughly mix, water, roll, and compact to a relative compaction of no less than 95%.
- C. Prior to commencing construction of surface improvements make sure no soft or spongy areas require repair.
- D. Repair at no additional cost to the owner, any soft, spongy, or otherwise unstable areas encountered in the subgrade, by removing the material and replacing it with acceptable materials.
- E. Conform finished subgrade, grades shown on the plans.

#### **3.07 FINE GRADING**

- A. Fine grade all finished surfaces to grades shown on the plans.
- B. Rake and smooth all finished surfaces not to receive surface improvements.

#### **3.08 TOLERANCES**

- A. Plus or minus 0.05 foot from planned elevation.

#### **3.09 FIELD QUALITY CONTROL**

- A. Field inspection and testing will be performed as per Section 01 40 00.
- B. Compaction testing will be performed in accordance with ASTM D 1557.
- C. If tests indicate work does not meet specified requirements, re-compact, or remove and replace, and retest.

**END OF SECTION**