

Project: US 6 over Garrison Street

Project Sub Acct. No: 19478

July 31, 2014

Technical Requirements

Section 11 – Earthwork

Construction Requirements

Clearing and Grubbing

Trees, logs, limbs, stumps, brush, and trash and etc. cleared and grubbed from the Project shall be removed from the Site to an offsite location selected by the Contractor.

Removal of Existing Pavement

Existing pavement removed as part of this project, where required, shall first be saw cut vertically, full depth at the limits of removal. The cost of saw cutting and removal of the pavement, where required, shall be included in the cost of the work.

Excavations and Embankments

Embankment Material shall be in accordance to Technical Requirements Section 10 – Geotechnical and Roadway Pavements.

Benching Requirements

New embankment shall be benched into the existing slopes, where required in accordance with Section 203.06 of the Standard Specifications.

Compaction Requirements

The type of compaction for the Project shall be per Revision of Sections 203, 206, 304 and 613 – Compaction or as otherwise specified in the standard special provisions or by CDOT.

Depth of moisture-density control for this Project shall be as follows:

Full depth of all embankments

6 inches for bases of cuts and fills

Reuse of Existing Materials

Asphalt millings are allowed to be used for embankment material and shall be placed in accordance with the Standard Specifications. Recycled Asphalt Pavement (RAP), asphalt millings, or asphalt in any form whatsoever shall not be substituted for ABC Class 6 below HMA pavement.

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Project Special Provisions

REVISION OF SECTIONS 105, 106, AND 203 CONFORMITY TO THE CONTRACT OF EMBANKMENT

Sections 105, 106 and 203 of the Standard Specifications are hereby revised for this project as follows:

Subsection 105.03 shall include the following:

Conformity to the contract of embankment construction shall be determined in accordance with the following:

- (a) *Quality Control Plan.* The Contractor shall be responsible for Quality Control (QC) for all embankment material on this project. The Contractor shall submit a written Quality Control Plan (QCP), including a methods statement, to the Engineer for acceptance. The QCP shall include but not be limited to the following:
- (1) Maximum lift thickness of eight inches in accordance with subsection 203.06 or as directed.
 - (2) Compaction equipment capable of obtaining the specified compaction.
 - (3) Water trucks with an adequate distribution system that will apply water evenly.
 - (4) List of all inspection and materials testing forms and procedures to be utilized by the Contractor.
 - (5) Adherence to Table 106-4 requiring minimum testing frequency.

The Contractor shall submit the QCP at least five working days prior to the start of any embankment work. The Engineer's review of the QCP will not exceed two working days. Work shall not begin until the QCP has been accepted in writing by the Engineer.

(b) *Documentation.* The Contractor shall maintain current records of quality control operation activities, and tests performed. These records shall be on the forms shown in the QCP, and shall include as a minimum, the Contractor, or subcontractor, the number of personnel working, weather conditions, type of equipment being used, delays and their cause, and deficiencies along with corrective action taken. Such records shall cover both conforming and defective or deficient features. Additional documentation to the Engineer shall include all daily test results, daily inspection reports, daily non-compliance reports, and monthly certification reports. Copies of these records and a statement that work incorporated in the project complies with the Contract shall be submitted to the Engineer prior to payment for the work or upon request. Monthly certification reports shall be stamped with the seal of a Professional Engineer registered in Colorado. Failure to provide the Engineer with the necessary documentation shall result in the suspension of payments on embankment until the documentation has been completed and accepted by the Engineer. CDOT Quality Assurance documentation shall not be used as supporting documentation for the contractor's certification.

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REVISION OF SECTIONS 105, 106, AND 203 CONFORMITY TO THE CONTRACT OF EMBANKMENT

CDOT or CDOT's certified representative will be responsible for Quality Assurance (QA) and Independent Assurance Testing (IAT).

Subsection 106.03 shall include the following:

Testing of embankment construction shall conform to the following:

The supervisor responsible for the direct supervision for the process control sampling and testing shall be identified in the QCP and be qualified according to the requirements of CP-10 (Note: this will require a PE or a NICET Level III certification).

The technicians taking samples and performing tests must be qualified according to requirements of CP 10 (Note: this will require WAQTC qualification).

A process control technician shall be required to be on-site full time whenever earthwork activities are taking place.

The following frequency guide schedule for minimum materials sampling, testing and inspection shall be used for the elements shown in Table 106-4. The project verification sampling and testing procedures shown in the CDOT Field Materials Manual under the frequency guide schedule for minimum materials sampling, testing and inspection shall be used for all other items not shown.

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 REVISION OF SECTIONS 105, 106, AND 203
 CONFORMITY TO THE CONTRACT OF EMBANKMENT

**Table 106-4
 EXCAVATION AND EMBANKMENT TESTING SCHEDULE**

Item	Minimum Testing Frequency Contractor's Process Control	Element	Minimum Testing Frequency CDOT verification Testing
203 EMBANKMENT	None Required	Soil Survey (Classification)	See CDOT Field Materials Manual for Frequency
	1 per soil type	Moisture – Density Curve	1 per soil type
	1 per 500 cubic yards or fraction thereof.	In-Place Density	1 per 1,000 cubic yards or fraction thereof.
	1 per 100 cubic yards or fraction thereof.	In-Place Density when within 100 ft. of Bridge Approach(s).	1 per 250 cubic yards or fraction thereof.
	1 per 5,000 cubic yards or fraction thereof.	1 Point Check	1 per 10,000 cubic yards or fraction thereof.

Qualifications for testing and personnel are contained in Section 203, Chapter 200 of the CDOT Field Materials Manual, CP-10, CP 13, CP 15, and CP 80, and the CDOT Inspectors Checklist.

Subsection 203.02 (a) shall include the following:

Unclassified Excavation shall include removal of unstable or unsuitable material within the roadway as determined and directed by the Engineer.

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REVISION OF SECTION 206 SHORING

Section 206 of the Standard Specifications is hereby revised for this project as follows:

Subsection 206.03 shall include the following:

Shoring is defined as any temporary construction used to support the loads adjacent to any excavation or embankment.

The Contractor shall be responsible for locating, sizing, designing, and constructing shoring which provides all necessary rigidity, and supports the loads as required to facilitate construction.

When the height of shoring exceeds 4 feet above the base of the footing excavation, the Contractor shall provide shoring drawings to the Engineer for information only. The drawings shall be prepared by, and contain the seal and signature of a Professional Engineer registered in the State of Colorado. These drawings shall be approved and signed by the Contractor, and shall be provided to the Engineer at least ten days prior to construction.

Prior to placing construction and/or traffic loads, the Contractor's Professional Engineer shall certify in writing that shoring materials and construction have been inspected, and that all shoring and construction are in conformity with the approved shoring drawings. A copy of the certification shall be provided to the Engineer.

If embankment, construction, traffic, or other surcharge loads in excess of the original shoring design are to be placed adjacent to any shoring, the Contractor shall provide a signed letter from the Contractor's Professional Engineer prior to the load placement stating that the shoring will support the additional loads.

Shoring drawings shall include as a minimum, the following:

1. The size and grade of all structural materials.
2. Design notes, including design assumptions, and construction details.
3. Where applicable, shoring drawings shall restrict heavy equipment placement at specific locations adjacent to the shoring.
4. The Contractor's Professional Engineer shall determine whether de-watering of the shored excavation will be required; and, if so, shall describe the requirements (i.e., head added by the pump, flow rate, minimum pump size, etc.) and methods to be used for dewatering.
5. All other information determined by the Contractor's Engineer to be pertinent to the design and construction of the shoring.

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**REVISION OF SECTION 206
SHORING**

It is up to the Contractor to provide necessary shoring in order to build the retaining walls safely and to keep the disturbance from adversely affecting the soil mass outside the CDOT right of way.

Whether shoring is planned for use or not, the Contractor shall have a shoring plan ready for implementation should shoring become necessary due to back slope failure or the appearance of instability. This shoring plan shall be presented to the Engineer prior to beginning excavation for the retaining wall work.