



## Iowa Department of Transportation

### SPECIAL PROVISIONS FOR EXCAVATION FOR STRUCTURES IN LEVEE CRITICAL AREA

Pottawattamie County  
IM-NHS-029-3(80)52--03-78

Effective Date  
April 17, 2012

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

#### **090195.01 DESCRIPTION.**

The work under this contract is located adjacent to federally constructed levees along the Missouri River. As such, no improvement shall be passed over, under, or through the levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the levees other than the construction under this contract and these special provisions without prior approval of the U.S. Army Corps of Engineers (USACE). The limits of the levee critical area are 300 feet riverward and 500 feet landward of the levee. The following foundation elements fall within these limits:

North Abutment  
Pier No's. 1 through 4

#### **090195.02 WORK ZONE REQUIREMENTS.**

Areas within these limits disturbed by excavation, sheet piles, other intrusions or disturbances of the soil shall be restored as described in this special provision. Any construction within the levee critical area limits that is not directly related to the construction of the abutments and piers noted above shall not commence without prior approval of the Engineer and the USACE.

#### **090195.03 CONSTRUCTION.**

##### **A. Abutment Construction.**

Abutments shall be constructed upon embankments placed within the levee critical area limits as per the contract documents. As such, no excavation or penetration of the existing ground will be permitted with the exception of the abutment piling.

##### **B. Pier Foundation Construction.**

No pier excavation shall be performed until a method of excavation and excavation support and dewatering has been submitted and approved by the Engineer.

Pier foundation construction within the levee critical area limits may be constructed by means of a braced excavation for select piers utilizing sheet piles or by open excavation to the bottom of footing.

**1. Open Excavation.**

- a. Permitted at Pier No.'s 1 through 4
- b. Open excavation shall consist of 2:1 side slopes (see Figures 1 through 4).
- c. Clay backfill shall be used for all backfill material as specified in section C.

**2. Braced Excavation.**

- a. Braced excavation is permitted at Pier No's 1 & 4 only.
- b. Braced excavation shall consist of sheet pile excavation support (see Figures 1 & 4).
- c. The top of the clay blanket location shall be determined by the Engineer.
- d. Excavation within the sheet pile limits shall extend to a minimum depth of the bottom of footing elevation. If the top of clay blanket is below the bottom of footing elevation, the excavation shall extend to the top of the clay blanket and then backfilled with clay backfill to the bottom of footing elevation prior to commencing footing construction.
- e. The sheet piles shall be completely removed following the construction of the foundation. Following the removal of the sheet piles, all material outside the sheet piles not previously removed shall be excavated using 2:1 side slopes to the top of ground surface and as shown in Figures 1 & 4.
- f. The clay backfill shall then be placed in the excavation as shown in Figures 1 & 4.

**C. Materials.**

All backfill shall be comprised of lean or fat clay (CL,CH). Lean or fat clay shall consist of cohesive materials having at least 50% passing the U.S. Standard 200 mesh sieve size. Cohesive materials include materials classifying as fat (or lean) clay (CL,CH), having a Plasticity Index of 10 or greater, and falling between the "U" line and the "A" line on Figure 3 in ASTM D 2487 – Standard Tests for Classifications of Soils for Engineering Purposes.

Moisture and density control of the backfill shall be based on the standard Proctor compaction test (Materials I.M. 309). Cohesive materials shall be compacted to a density of at least 95% of the maximum dry density and be within -1% to +4% of the optimum moisture content at the time of compactive effort is applied which may require the addition of water or aeration of materials. Sampling and testing of borrow shall be in accordance with I.M. 204.

**D. Quality Control Program.**

Contractor shall provide and maintain a Quality Control Program, defined as all activities of sampling, testing, process control inspection, and necessary adjustments for construction of footing backfill to meet the requirements of this Special Provision.

Ensure the Quality Control Technician is present on the project when backfill is being placed with 'Compaction with Moisture and Density Control.'

Provide a laboratory facility and all the necessary calibrated equipment to perform the required tests.

Test for proctor optimum moisture content and maximum density and backfill moisture content and density at the minimum frequencies in Materials I.M. 204 for roadway and borrow excavation and embankments. Samples will be randomly selected.

Document all observations, records and inspection, changes in soil type, soil moisture, fill placement procedures, and test results on a weekly basis. Note the results of the observations and records of inspection in a permanent field record as they occur. Submit copies of field moisture and density tests to the Engineer on a weekly basis. Submit the original testing records

(raw field and lab data sheets) and control charts to the Engineer in a neat and orderly manner within five calendar days after completion of the project.

#### **E. Quality Assurance.**

##### **1. Required Testing.**

The Contractor's Quality Control Technician shall perform all field testing and data analysis. The Quality Control Technician shall retain split samples of Materials I.M. 309 testing when requested by the Engineer. The Engineer may select any or all of the Contractor-retained split samples for independent assurance and verification testing.

The Engineer will determine the random location of verification tests and will test at the minimum frequencies in Materials I.M. 204 for roadway and borrow excavation and embankments. The Contractor Quality Control Technician shall obtain a sample at the same location as directed by the Engineer and provide the results to the Engineer. Verification test results will be provided to the Contractor within one working day after the Contractor's quality control test results have been reported.

The Engineer will periodically witness field testing being performed by the Contractor. If the Engineer observes the quality control field tests are not being performed according to the applicable test procedures, the Engineer may stop production until corrective action is taken. The Engineer will notify the Contractor of observed deficiencies, promptly, both verbally and in writing. The Engineer will document all witnessed testing.

##### **2. Verification and Independent Assurance Testing.**

The Contractor's quality control test results will be validated by the Engineer's verification test results using the criteria in Materials I.M. 216. If the Engineer's verification test results validate the Contractor's test results, the Contractor's results will be used for material acceptance.

In the event that the Contractor's results can't be validated, the Engineer will investigate the reason immediately. The Engineer's investigation may include:

- Testing of other locations,
- Observations of the Contractor's testing procedures and equipment, and
- Comparison of test results of the Contractor with those of the Engineer.

Personnel and laboratories performing tests used in the acceptance of material shall participate in the independent assurance program covered in Materials I.M. 205.

##### **3. Referee Testing.**

If a difference in procedures for sampling and testing and/or test results exists between the Contractor and the Engineer which they cannot resolve, the Iowa DOT's Central Materials Laboratory will provide referee testing. The Engineer and the Contractor will abide by the results of the referee testing.

#### **F. Acceptance.**

The Engineer will base final acceptance of tests and materials on the results of the Contractor's quality control testing as verified by the Engineer's quality assurance.

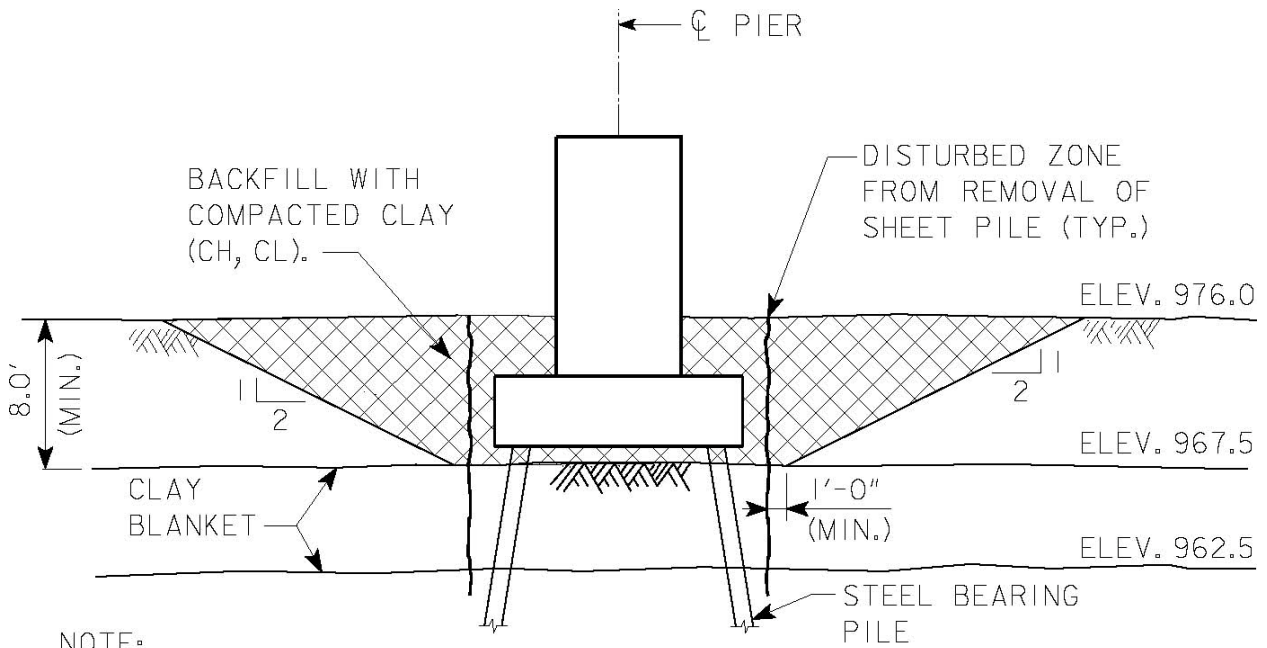
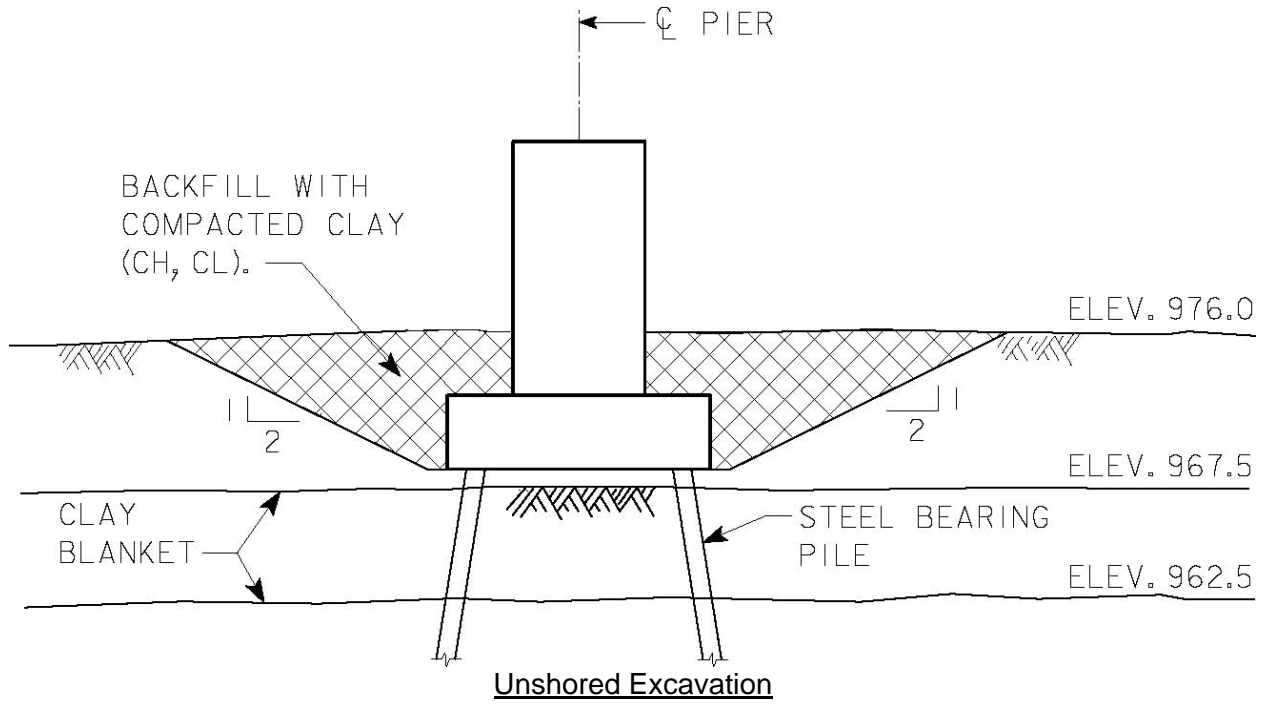
#### **090195.04 METHOD OF MEASUREMENT.**

Measurement will be as specified in the pay item "Excavate and Dewater".

#### **090195.05 BASIS OF PAYMENT.**

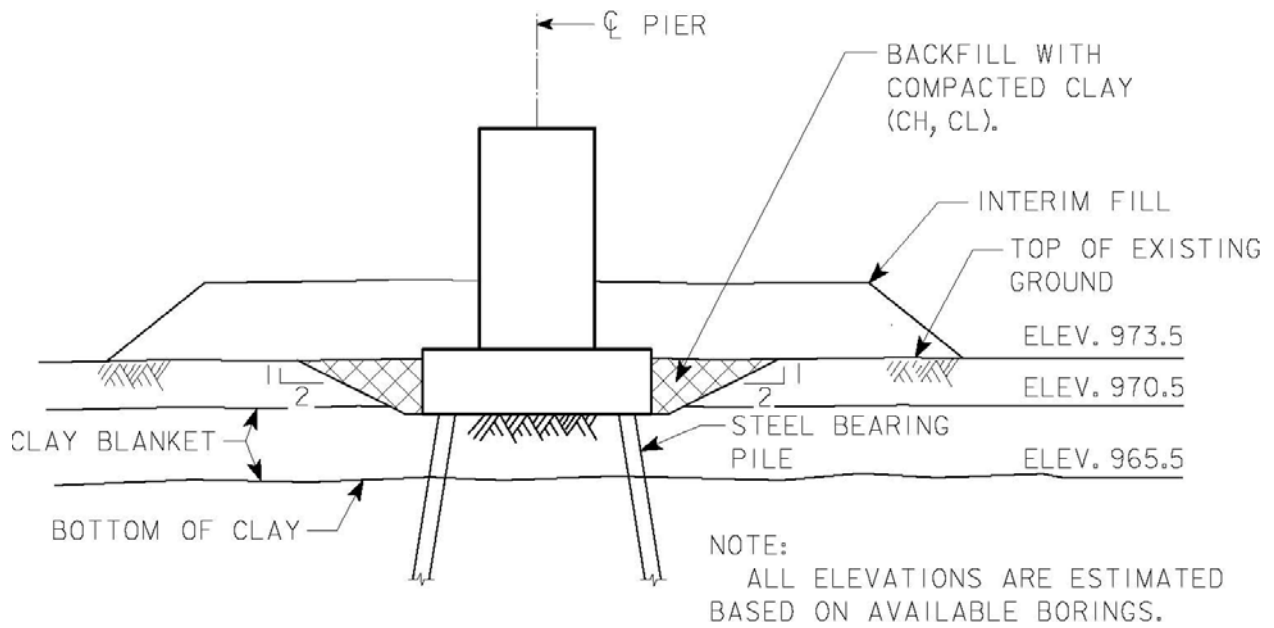
- A.** All work as described above is included in the pay item "Excavate and Dewater".

- B.** Payment is full compensation for furnishing a Quality Control Technician, sampling and testing, process control inspection, working of drying material, furnishing and applying water, controlling moisture content of the materials, and compacting the materials to the required density, as specified.



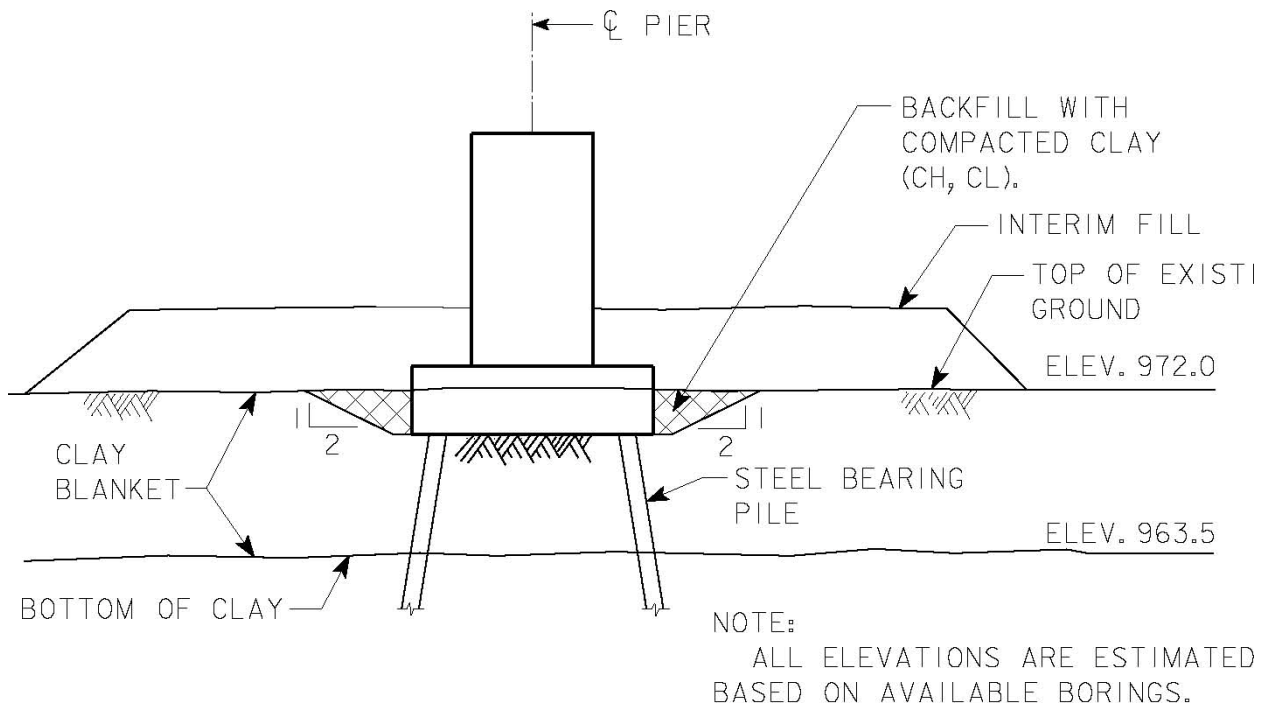
NOTE:  
ALL ELEVATIONS ARE ESTIMATED  
BASED ON AVAILABLE BORINGS.

**Figure 1: Pier No. 1 Excavation and Backfill Detail**



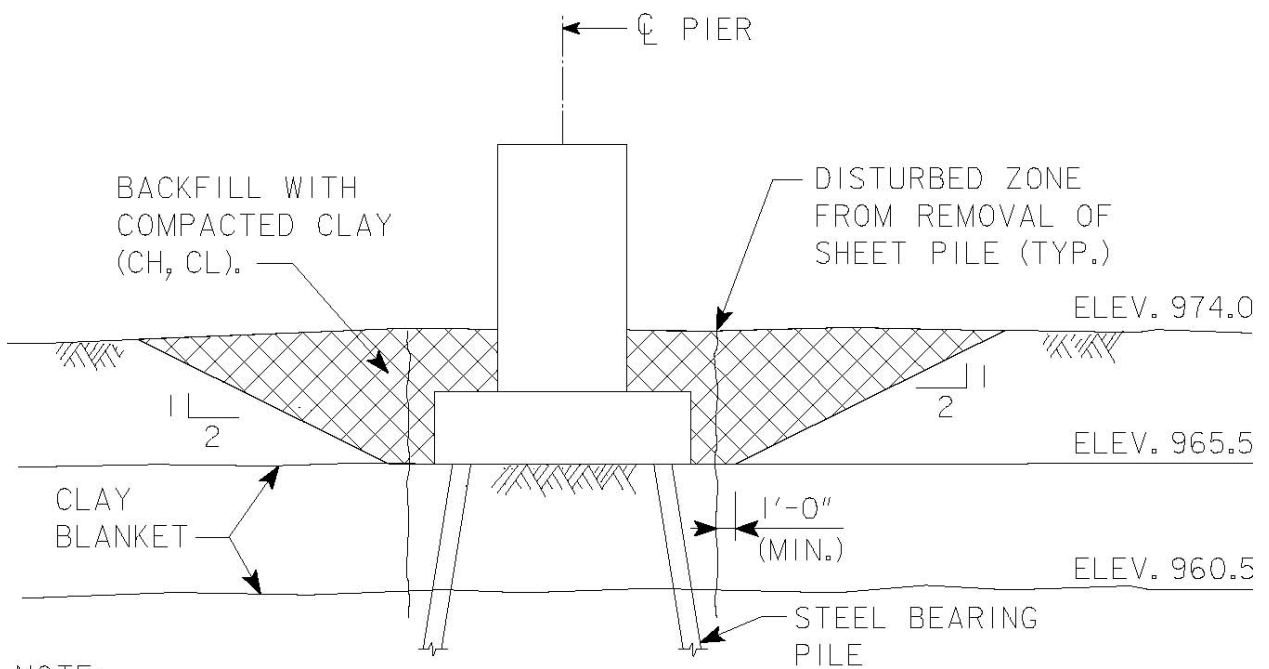
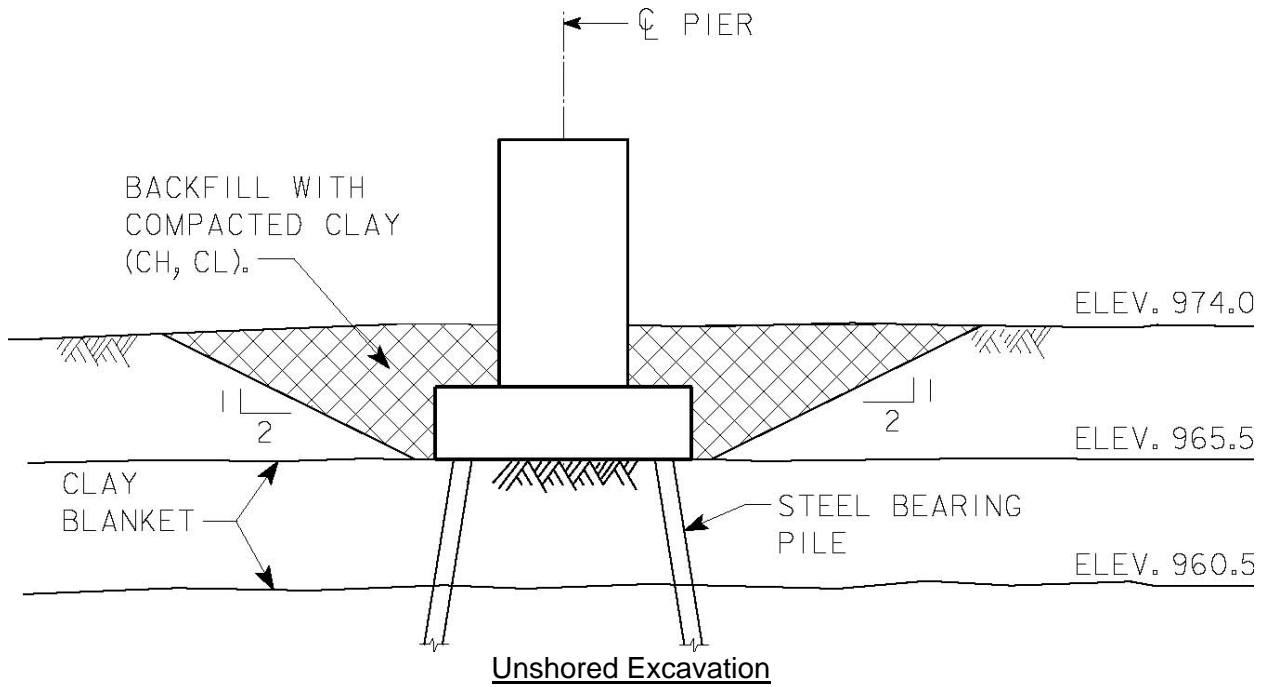
Unshored Excavation

**Figure 2: Pier No. 2 Excavation and Backfill Detail**



Unshored Excavation

**Figure 3: Pier No. 3 Excavation and Backfill Detail**



NOTE:  
ALL ELEVATIONS ARE ESTIMATED  
BASED ON AVAILABLE BORINGS.

**Figure 4: Pier No. 4 Excavation and Backfill Detail**