

GENERAL NOTES

This set of plans describes the Anchored Sheet Pile Retaining Wall at the I-74 Bridge over Jefferson St. near Morton, Illinois in Tazewell County. For more information see the Special Provision for "Permanent Ground Anchors".

GENERAL NOTES

1. Prior to earth retention work, call J.U.L.I.E.
2. Contractor to install Permanent Steel Sheet Piling to the limits shown on these plans.
3. Excavate (by Contractor) to approximately 2 feet below tieback grade in front of wall.
4. Install Permanent Ground Anchors as described in anchor installation procedures described below.
5. Excavate to finished ground line after completion of bridge in Stage 3.
6. Equivalent members may be substituted for those shown, all material used in construction of the wall shall be new, unused.

ANCHOR INSTALLATION PROCEDURE

Construct and maintain a 10-foot-wide bench approximately 2 feet below anchor elevation to allow for safe anchor operations. Anchor Schedule indicates anchor angle, tendon size, grade, length, and anchor design load. If admixtures are used in the cement, procedures below must be modified to suit properties of the admixture.

REGROUTABLE ANCHORS

1. Drill approximately a minimum 8-inch diameter hole to the lengths shown on the Anchor Schedule. Anchor locations and elevations are shown on plan and elevations. Tremie grout the anchor hole. Insert tendon after the anchor hole is filled with grout.
2. Regrout the bond length as necessary to develop the required anchor capacity.
3. Allow grout to harden a minimum of five (5) days. Then tension each anchor in accordance with the anchor testing procedures.

MATERIALS

Steel: ASTM A572, Grade 36 for walers and plates
 ASTM A572, Grade 50 for PZ-35 steel sheet piles.

Tendon: 1/4-inch-diameter, 150 ksi Grade, conforming to ASTM A722.

Grout: Neat cement grout having a 28-day compressive strength of 3,000 psi, consisting of portland cement Type I, II, or III, and conforming to Section 1001 of the Standard Specifications. Testing of grout is not required since grout will be tested with anchor stressing as part of system performance.

Welds: E70XX weld strength level, low hydrogen electrode. Testing of welds is not required since welds will be tested with tieback stressing as part of system performance.

Anchor And Waler Schedule							
Anchor No.	Anchor Elev.	Angle (Deg.)	Design Load (Kip)	Tendon Size Gr. 150	Unbonded Length (Ft.)	Bonded Length (Ft.)	Waler Size Grade 36
1	As Shown	35	93	1 1/4"	28	40	2-MC7x19.1
2	As Shown	35	58	1 1/4"	44	40	2-MC7x19.1
3 thru 36	As Shown	10	143	1 1/4"	15	40	2-MC7x19.1
37	As Shown	30	82	1 1/4"	15	40	2-MC7x19.1
38	As Shown	25	79	1 1/4"	15	40	2-MC7x19.1
39	As Shown	20	76	1 1/4"	15	40	2-MC7x19.1
40 thru 43	As Shown	10	72	1 1/4"	15	40	2-MC7x19.1
44	As Shown	35	93	1 1/4"	28	40	2-MC7x19.1
45	As Shown	35	58	1 1/4"	44	40	2-MC7x19.1
46 thru 79	As Shown	10	143	1 1/4"	15	40	2-MC7x19.1
80	As Shown	30	82	1 1/4"	15	40	2-MC7x19.1
81	As Shown	25	79	1 1/4"	15	40	2-MC7x19.1
82	As Shown	20	76	1 1/4"	15	40	2-MC7x19.1
83 thru 86	As Shown	10	72	1 1/4"	15	40	2-MC7x19.1

ANCHOR TESTING PROCEDURES

PERFORMANCE TEST

Two anchors at each abutment in Stage 1, one anchor at each abutment in Stage 2 and one anchor at each abutment in Stage 3 shall be tested in accordance with the following procedures. The remaining anchors must be tested according to the proof test procedures.

The performance test must be made by incrementally loading and unloading the anchor according to the following schedule. The load shall be raised from one increment to another immediately after recording the anchor movement. The anchor movement must be measured and recorded to the nearest 0.001 inches with respect to an independent fixed reference point at the alignment load and at each increment of load. The alignment load is a nominal load maintained on the anchor to keep the testing equipment in position. The load must be monitored with a pressure gauge. A reference gauge must be placed in series with the pressure gauge during the performance test. If the load determined by the reference pressure gauge and the load determined by the pressure gauge differ by more than ten (10) percent, the jack, pressure gauge and reference pressure gauge must be recalibrated. At load increments other than the maximum test load, the load shall be held long enough to obtain the movement reading, but no more than a minute.

PERFORMANCE TEST SCHEDULE

Load	Load
AL	AL
*0.17DL	0.17DL
AL	0.33DL
0.17DL	0.50DL
*0.33DL	0.67DL
AL	*0.80DL
0.17DL	AL
0.33DL	0.17DL
*0.50DL	0.33DL
AL	0.50DL
0.17DL	0.67DL
0.33DL	0.80DL
0.50DL	*0.89DL
*0.67DL	Reduce To Lock-Off Load (0.67DL)

Where: AL is the alignment load
 DL is the anchor design load

The maximum test load in a performance test shall be held for ten (10) minutes. The jack shall be re-pumped as necessary in order to maintain a constant load. The load-hold period shall start as soon as the maximum test load is applied and the anchor movement, with respect to a fixed reference, must be measured and recorded at 1 minute, 2, 3, 4, 5, 6, and 10 minutes. If the anchor movement between one (1) and ten (10) minutes exceeds 0.04 inches, the maximum test load shall be held for an additional 50 minutes. If the load hold is extended, the anchor movement must be recorded at 15 minutes, 20, 25, 30, 45, and 60 minutes.

Plot the anchor movement versus load for each load increment marked with an (*) in the performance test schedule and plot the residual movement of the tendon at each alignment load versus the highest previously applied load.

PROOF TEST

The proof test shall be performed by incrementally loading the anchor according to the following schedule. The load shall be raised from one increment to another immediately after recording the anchor movement. The anchor movement shall be measured and recorded to the nearest 0.001 inches with respect to an independent fixed reference point at the alignment load and at each increment of load. The alignment load is a normal load maintained on the anchor to keep the testing equipment in position. The load shall be monitored with a pressure gauge. At load increments other than the maximum test load, the load must be held long enough to obtain the movement reading.

The maximum test load in a proof test shall be held for ten (10) minutes. The jack shall be re-pumped as necessary in order to maintain a constant load. The load-hold period shall start as soon as the maximum test load is applied and the anchor movement, with respect to a fixed reference, must be measured and recorded at 1 minute, 2, 3, 4, 5, 6, and 10 minutes. If the anchor movement between one (1) and ten (10) minutes exceeds 0.04 inches, the maximum test load must be held for an additional 50 minutes. If the load hold is extended, the anchor movement must be recorded at 15 minutes, 20, 25, 30, 45, and 60 minutes.

PROOF TEST SCHEDULE

Load	Load
AL	0.67DL
0.17DL	0.80DL
0.33DL	0.89DL
0.50DL	Reduce To Lock-Off Load (0.67DL)

Where: AL is the alignment load
 DL is the anchor design load

Plot the anchor movement versus load for each load increment in the proof test.

ANCHOR LOAD TEST ACCEPTANCE CRITERIA:

A performance-tested or proof-tested anchor with a 10 minute load hold is acceptable if:

1. The anchor resists the maximum test load with less than 0.04 inches of movement between 1 minute and 10 minutes; and
2. The total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length.

A performance-tested or proof-tested anchor with a 60 minute load hold is acceptable if:

1. The anchor resists the maximum load test with a creep rate that does not exceed 0.08 inches in the last log cycle of time; and
2. The total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length.

Anchors that have a creep rate greater than 0.08 inches per log cycle of time can be incorporated in the finished work at a load equal to one-half its failure load. The failure load is the load carried by the anchor after the load has been allowed to stabilize for ten (10) minutes.

When an anchor fails, the design and/or the construction procedures may be modified. These modifications may include, but are not limited to, installing replacement anchors, reducing the design load by increasing the number of anchors, modifying the installation methods, increasing the bond length or changing the anchor type.

Lock-off: Upon completion of the anchor test, the load must be reduced to the lock-off load indicated on the performance and proof test schedules and transferred to the anchorage device. The anchor may be completely unloaded prior to lock-off. After transferring the load, and prior to removing the jack, a lift-off reading shall be taken. The lift-off reading shall be within 10 percent of the specified lock-off load. If the load is not within 10 percent of the specified lock-off load, the anchorage shall be reset and another lift-off reading shall be made.

PERFORMANCE TEST DATA

% DL	Load	Press.	Dial	% DL	Load	Press.	Dial
AL				AL			
*17				17			
AL				33			
17				50			
*33				67			
AL				*80			
17				AL			
33				17			
*50				33			
AL				50			
17				67			
33				80			
50				*89			
*67				L.O.			

PERFORMANCE TEST REMARKS:

Anchor No. _____
 Design Load. _____

PERFORMANCE TEST DATA

% DL	Load	Press.	Dial	Defl.	Remarks
AL					
17					
33					
50					
67					
80					
89					
L.O.					

PROOF & CREEP REMARKS:

Anchor No. _____



Alfred Benesch & Company
 205 North Michigan Avenue, Suite 2400
 Chicago, Illinois 60601
 312-565-0450 Job No. 10056

FILE NAME = 0900167.68620.45.psh.tl.dgn	USER NAME = mbecker	DESIGNED - JJC/AMB	REVISED -
		CHECKED - LRB/MFB	REVISED -
	PLOT SCALE =	DRAWN - CBS	REVISED -
	PLOT DATE = 7/16/2012	CHECKED - MFB	REVISED -

**STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION**

**ANCHORED SHEET PILE WALL NOTES
 STRUCTURE NO. 090-0167**

SHEET NO. SB45 OF SB65 SHEETS

F.A.I. RTE. 74	SECTION 90-[14R(14HB-4,14,14HB)BR]	COUNTY TAZEWELL	TOTAL SHEETS 2433	SHEET NO. 1956
ILLINOIS FED. AID PROJECT			CONTRACT NO. 68620	

x:\10000s\10056\engineer-ing-documents\phase-1\174 over Jefferson\Final\0900167.68620.45.psh.tl.dgn 11:08:53 AM 7/16/2012