

PRESTRESSING CALCULATIONS

FTL = FACTORED TEST LOAD IN KIPS = 48 KIPS

$$A_s = \text{TOTAL STEEL AREA} = \frac{1.0 \text{ FTL}}{0.75 f_{pu}} = \frac{1.0 \times 48}{0.75 \times 270 \text{ KSI}} = 0.24 \text{ IN}^2$$

WHERE f_{pu} = MIN. ULTIMATE STRENGTH OF PRESTRESSING STEEL

$$N = \text{NUMBER OF STRANDS} = \frac{0.24 \text{ IN}^2}{0.217 \text{ IN}^2} = 1.09 \quad \text{USE: 2 STRANDS}$$

0.217 IN² IS AREA OF ONE 0.6" DIA. STRAND,
 f_{pu} = 270 KSI PER ASTM A416

SHIM THICKNESS CALCULATIONS

GROUND ANCHORS AT FIRST PANEL OF FIRST LEVEL SHOWN, OTHERS SIMILAR

Δ_1 = ELONGATION AT 100% OF FTL (48 KIPS)

Δ_2 = ELONGATION AT LOCK OFF LOAD (33 KIPS)

SHIM THICKNESS = $\Delta_1 - \Delta_2 - 3/8"$ ANCHOR SET

$$\Delta_1 = \frac{(FTL)(L)}{(A)(E)} = \frac{(48)(31)(12)}{(2 \times 0.217)(28,000)} = 1.469"$$

$$\Delta_2 = \frac{(LL)(L)}{(A)(E)} = \frac{(33)(31)(12)}{(2 \times 0.217)(28,000)} = 1.010"$$

$$\Delta_1 - \Delta_2 = 1.469" - 1.010" - 3/8" = 0$$

USE: NO SHIM REQ'D

RBF CONSULTING
SHOP DRAWING REVIEW

Proj. No. 129942 Shop Dwg. No. 64283
 Date 10-31-13 By FSD

- NO EXCEPTIONS TAKEN
- MAKE CORRECTIONS NOTED
- SUBMIT SPECIFIED ITEM
- REVISE AND RESUBMIT
- REJECTED

Review is only for general conformance with the design concept of the project and general compliance with the information included in this Contract Document(s). Any action shown is subject to the requirements of the drawings and specifications. Contractor is responsible for correlating and confirming dimensions at the job site; Techniques of construction; coordination of his/her work with that of other trades; and performing the work in a safe and satisfactory manner.

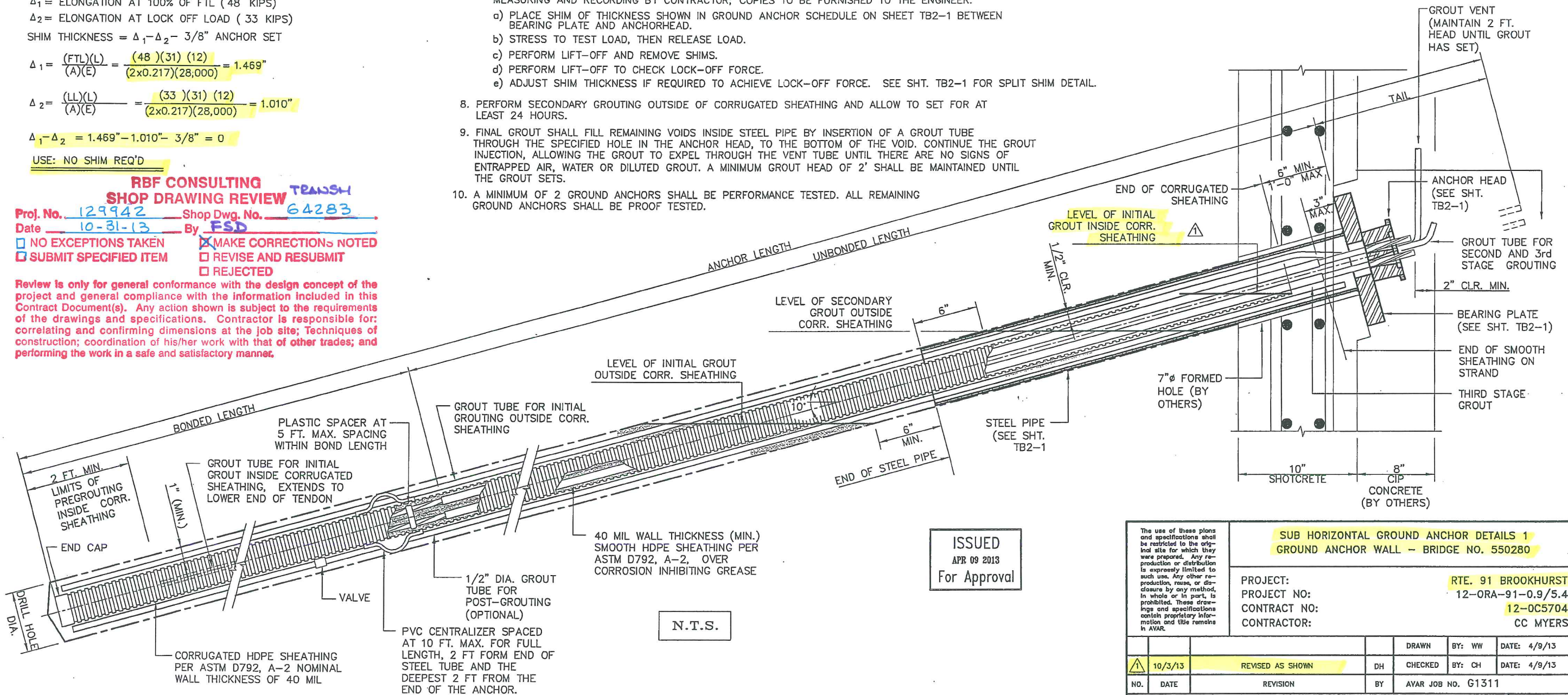
GENERAL NOTES

- GROUND ANCHORS SHALL BE FABRICATED IN ACCORDANCE WITH APPROVED SHOP DRAWINGS.
- HOLES WILL BE DRILLED TO THE REQUIRED DEPTH WITH KLEMM KR-806 DRILL RIG OR EQUAL, USING ROTARY OR ROTARY PERCUSSION DRILLING METHOD, WITH OR WITHOUT CASING. MINIMUM BENCH WIDTH TO BE 17 FT.
- INSTALL CENTRALIZERS ON GROUND ANCHOR. INSTALL GROUND ANCHOR INTO DRILL HOLE, THEN PLACE INITIAL GROUT WITHIN CORRUGATED SHEATHING.
- PLACE GROUT OUTSIDE OF CORRUGATED SHEATHING TO LEVEL OF INITIAL GROUT.
 GROUT MIX DESIGN: CEMENT TYPE II/V 94 LBS.
 WATER 5 GAL. MAX. PER BAG
 PLACE WATER IN CG500 OR SIMILAR GROUT MIXER, FOLLOWED BY CEMENT.
 LOG GROUT VOLUMES AND PRESSURES ON AVAR GROUTING RECORD FORM.
 GROUT TESTING TO BE PROVIDED BY OWNER. GROUND ANCHORS SHALL NOT BE STRESSED UNTIL SHOTCRETE FACING HAS ATTAINED COMPRESSIVE STRENGTH OF AT LEAST 2,880 PSI OR HAS CURED FOR AT LEAST 7 DAYS.
- POST GROUT IF REQUIRED BY AVAR.
- INSTALL PERMANENT BEARING PLATE, THEN PROOF OR PERFORMANCE TEST AGAINST PERMANENT BEARING PLATE, IN ACCORDANCE WITH SPECIAL PROVISIONS. DO NOT CUT-OFF TAILS UNTIL GROUND ANCHOR HAS BEEN ACCEPTED BY OWNER'S ENGINEER.
- STRESSING PROCEDURE:
 MEASURING AND RECORDING BY CONTRACTOR; COPIES TO BE FURNISHED TO THE ENGINEER.
 - PLACE SHIM OF THICKNESS SHOWN IN GROUND ANCHOR SCHEDULE ON SHEET TB2-1 BETWEEN BEARING PLATE AND ANCHORHEAD.
 - STRESS TO TEST LOAD, THEN RELEASE LOAD.
 - PERFORM LIFT-OFF AND REMOVE SHIMS.
 - PERFORM LIFT-OFF TO CHECK LOCK-OFF FORCE.
 - ADJUST SHIM THICKNESS IF REQUIRED TO ACHIEVE LOCK-OFF FORCE. SEE SHT. TB2-1 FOR SPLIT SHIM DETAIL.
- PERFORM SECONDARY GROUTING OUTSIDE OF CORRUGATED SHEATHING AND ALLOW TO SET FOR AT LEAST 24 HOURS.
- FINAL GROUT SHALL FILL REMAINING VOIDS INSIDE STEEL PIPE BY INSERTION OF A GROUT TUBE THROUGH THE SPECIFIED HOLE IN THE ANCHOR HEAD, TO THE BOTTOM OF THE VOID. CONTINUE THE GROUT INJECTION, ALLOWING THE GROUT TO EXPEL THROUGH THE VENT TUBE UNTIL THERE ARE NO SIGNS OF ENTRAPPED AIR, WATER OR DILUTED GROUT. A MINIMUM GROUT HEAD OF 2' SHALL BE MAINTAINED UNTIL THE GROUT SETS.
- A MINIMUM OF 2 GROUND ANCHORS SHALL BE PERFORMANCE TESTED. ALL REMAINING GROUND ANCHORS SHALL BE PROOF TESTED.

REPAIR PROCEDURE FOR CORRUGATED PVC & HDPE SHEATHING:

THE SHEATHING ENCAPSULATION HAS BEEN THOROUGHLY INSPECTED AT THE TIME OF SHIPPING.

- SMALL CRACKS MAX. 1" LONG AND 1/8" WIDE CAN BE FIELD REPAIRED BY WRAPPING THE DAMAGED AREA WITH 4 LAYERS OF 10 MIL THICK PIPE WRAP TAPE. THE TAPE SHALL OVERLAP THE UNDAMAGED SHEATHING AT LEAST 3".
- CRACKS IN CORRUGATED SHEATHING BETWEEN 1" AND 8" IN LENGTH AND 1/8" IN WIDTH CAN BE FIELD REPAIRED BY SEALING THE DAMAGED AREA WITH A HEAT SHRINK SLEEVE OR HEAT SHRINK TAPE WHICH SHALL OVERLAP THE UNDAMAGED SHEATHING BY 3". INSTALL HEAT SHRINK SLEEVE CENTERED OVER THE REPAIR AREA. USING A TORCH, HEAT THE SLEEVE AT THE UNDERSIDE CENTER AND MOVE UPWARD ON BOTH SIDES. WORK TOWARDS ONE END THEN MOVE TO THE OTHER END AS SHRINKAGE OCCURS.
- FOR DAMAGED AREAS GREATER THAN THAT IN B) ABOVE, THE DAMAGED SECTION OF SHEATHING SHALL BE REMOVED AND REPLACED. BUTT JOINTS BETWEEN SECTIONS OF SHEATHING SHALL BE SECURED AND SEALED WITH A HEAT SHRINK SLEEVE OR HEAT SHRINK TAPE. THE HEAT SHRINK SLEEVE OR HEAT SHRINK TAPE SHALL EXTEND EACH SIDE OF THE BUTT JOINT AT LEAST 3".



ISSUED
 APR 09 2013
 For Approval

N.T.S.

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SUB HORIZONTAL GROUND ANCHOR DETAILS 1
GROUND ANCHOR WALL - BRIDGE NO. 550280

PROJECT: RTE. 91 BROOKHURST
 PROJECT NO: 12-ORA-91-0.9/5.4
 CONTRACT NO: 12-OC5704
 CONTRACTOR: CC MYERS

NO.	DATE	REVISION	BY	AVAR JOB NO. G1311
10/3/13		REVISED AS SHOWN	DH	CHECKED BY: CH DATE: 4/9/13

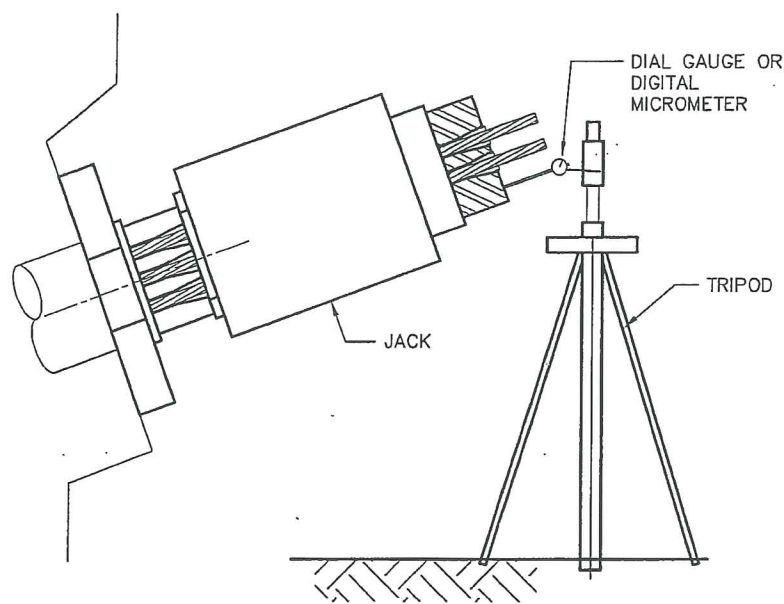
AVAR Construction, Inc.
 47375 Fremont Blvd.
 Fremont, CA 94538
 TEL: (510) 354-2000
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DRAWING NO.: TB1-1
 REV. 1

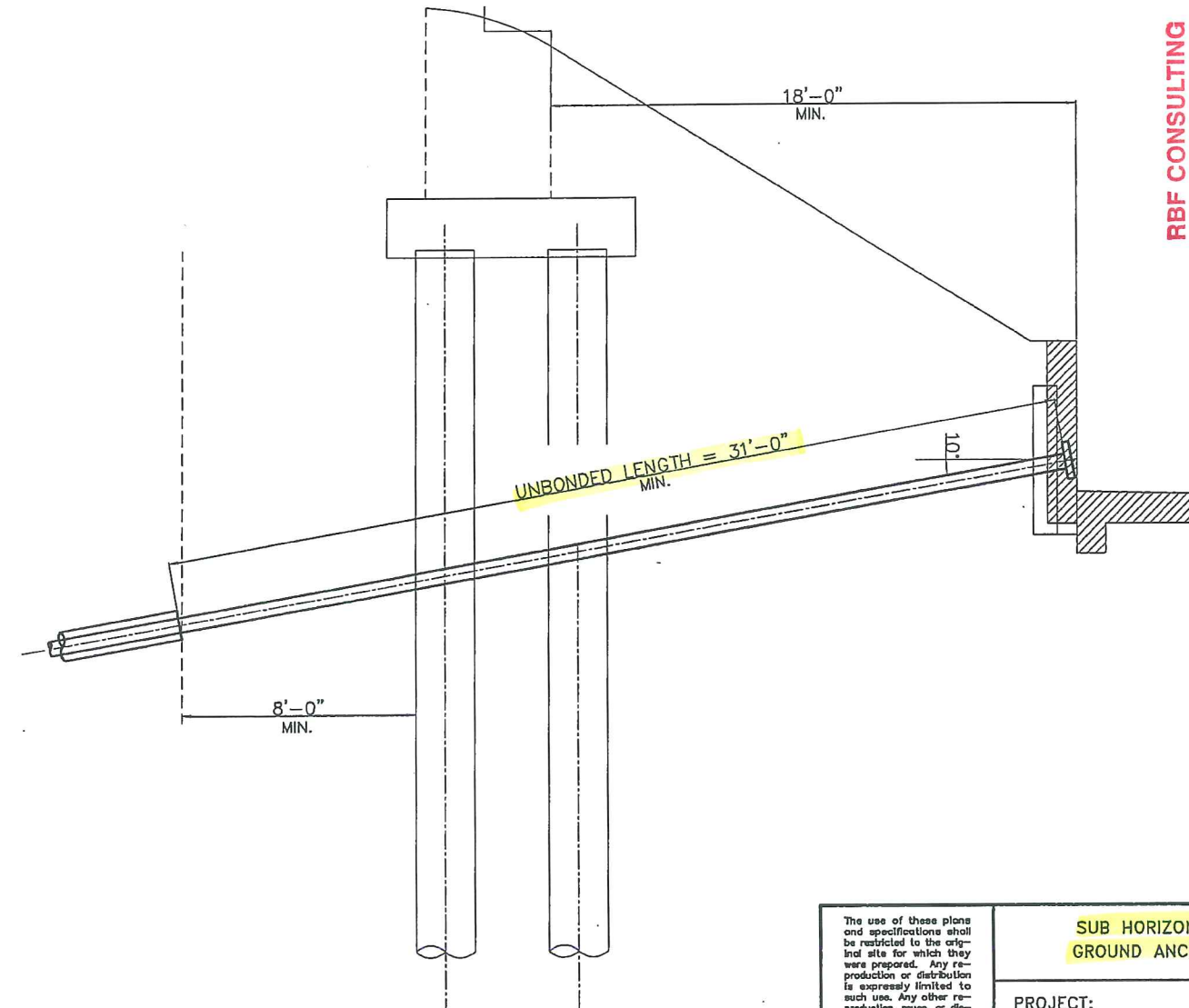
SUB HORIZONTAL GROUND ANCHOR SCHEDULE - EAST RET WALL																
GROUND ANCHOR LEVEL	GROUND ANCHOR NUMBER	BOND LENGTH MIN.	UNBONDED LENGTH MIN.	TAIL LENGTH MIN.	ANCHOR LENGTH MIN.	DRILL HOLE DIAMETER MIN.	INCLINATION ANGLE	FACTORED TEST LOAD	LOCK-OFF LOAD	NUMBER OF STRANDS	ANCHOR HEAD	BEARING PLATE	CORRUGATED SHEATHING	SHIM THICKN.	STEEL PIPE	NO. OF ANCHORS
1	1-3	20 FT.	31 FT.	5 FT.	56 FT.	6"	10°	48 KIPS	33 KIPS	2-0.6" ϕ	4.6	1 1/4"x12"x12" W/ 3 1/8" ϕ HOLE	2" ID/2.4" OD	0	4" STD.	3 EA.
1	4-5	20 FT.	31 FT.	5 FT.	56 FT.	6"	10°	30 KIPS	21 KIPS	1-0.6" ϕ	4.6	1 1/4"x12"x12" W/ 3 1/8" ϕ HOLE	2" ID/2.4" OD	0	4" STD.	2 EA.
															TOTAL	5 EA.

ISSUED
JUL 16 2013
For Approval

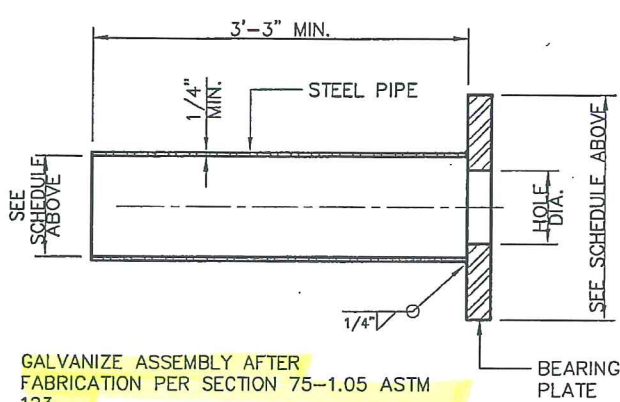
SUB HORIZONTAL GROUND ANCHOR SCHEDULE - WEST RET WALL																
GROUND ANCHOR LEVEL	GROUND ANCHOR NUMBER	BOND LENGTH MIN.	UNBONDED LENGTH MIN.	TAIL LENGTH MIN.	ANCHOR LENGTH MIN.	DRILL HOLE DIAMETER MIN.	INCLINATION ANGLE	FACTORED TEST LOAD	LOCK-OFF LOAD	NUMBER OF STRANDS	ANCHOR HEAD	BEARING PLATE	CORRUGATED SHEATHING	SHIM THICKN.	STEEL PIPE	NO. OF ANCHORS
1	6-8	20 FT.	31 FT.	5 FT.	56 FT.	6"	10°	48 KIPS	33 KIPS	2-0.6" ϕ	4.6	1 1/4"x12"x12" W/ 3 1/8" ϕ HOLE	2" ID/2.4" OD	0	4" STD.	3 EA.
1	9-10	20 FT.	31 FT.	5 FT.	56 FT.	6"	10°	30 KIPS	21 KIPS	1-0.6" ϕ	4.6	1 1/4"x12"x12" W/ 3 1/8" ϕ HOLE	2" ID/2.4" OD	0	4" STD.	2 EA.
															TOTAL	5 EA.



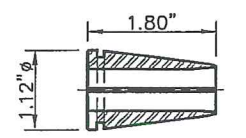
SETUP FOR GROUND ANCHOR TESTING EQUIPMENT



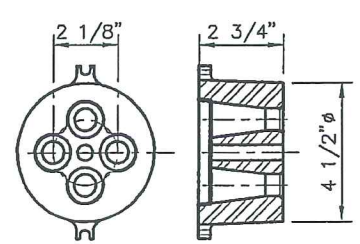
UNBONDED LENGTH DETAIL



GALVANIZE ASSEMBLY AFTER FABRICATION PER SECTION 75-1.05 ASTM 123
BEARING PLATE ASSEMBLY
MATERIAL: BEARING PLATE: ASTM A36
PIPE: ASTM A500 GR. B OR ASTM A53 GR. B



2-PART WEDGE
MATERIAL: AISI 12L14



AVAR 4.6 ANCHOR HEAD
MATERIAL: ASTM A536 GR. 80-55-06

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SUB HORIZONTAL GROUND ANCHOR DETAILS 2
GROUND ANCHOR WALL - BRIDGE NO. 550280

PROJECT: RTE. 91 BROOKHURST
PROJECT NO: 12-ORA-91-0.9/5.4
CONTRACT NO: 12-OC5704
CONTRACTOR: CC MYERS

10/3/13	REVISED AS SHOWN	DH	DRAWN	BY: WW	DATE: 4/9/13
7/16/13	REV. TIEBACK TABLE	WW	CHECKED	BY: CH	DATE: 4/9/13
NO.	DATE	REVISION	BY	AVAR JOB NO. G1311	

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DRAWING NO.: TB2-1
REV. 2