



Craig Olden, Inc.  
TEXAS ENGINEERING FIRM  
REGISTRATION NO. 10899

a Division of Hayward Baker, Inc.



661 E SHAHAN PRAIRIE RD  
LITTLE ELM, TEXAS 75068  
TEL (972) 294-5000  
FAX (972) 294-2664

- CONSTRUCTION
- ENGINEERING
- DESIGN / BUILD

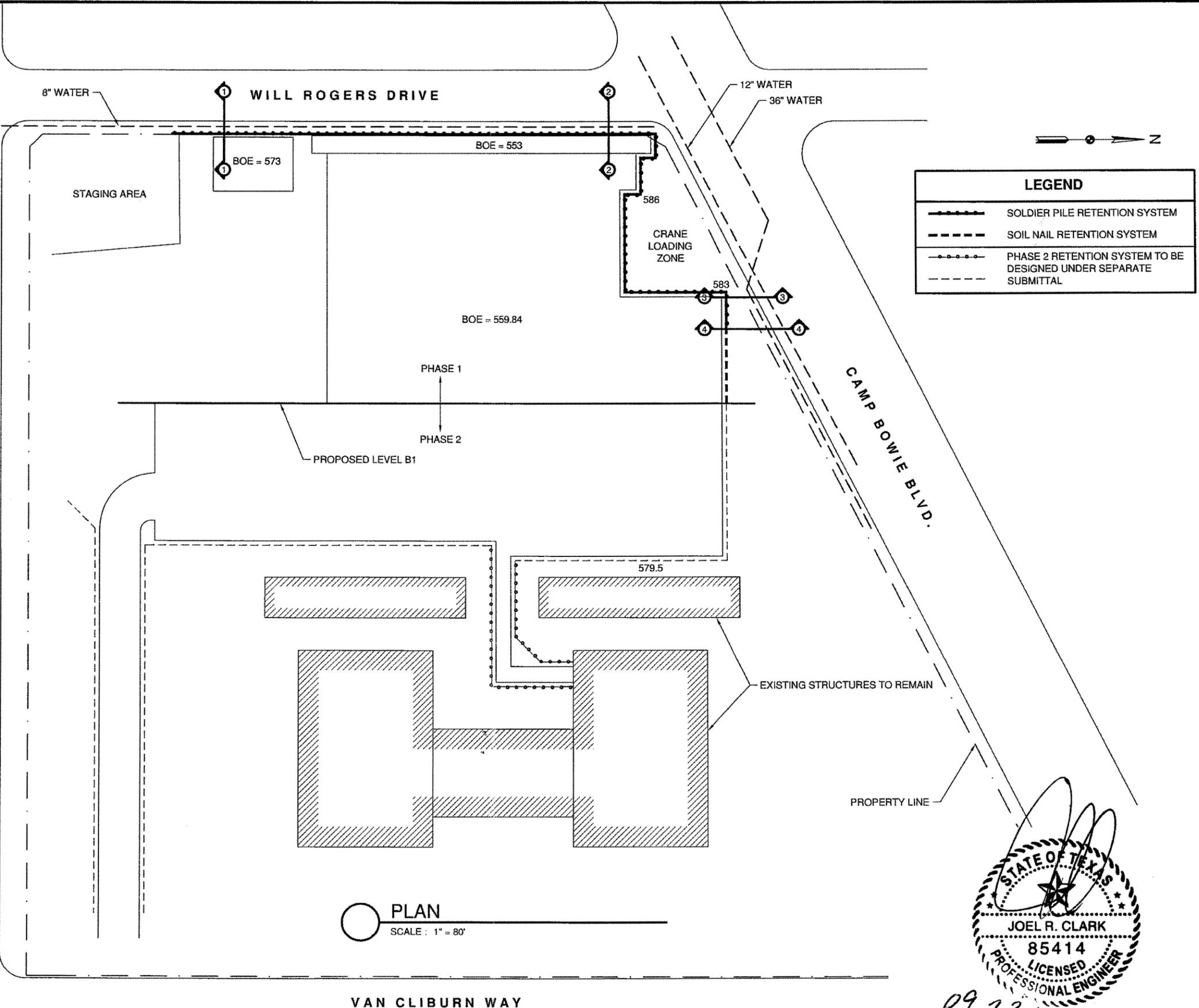
EARTH RETENTION  
SPECIALISTS FOR  
OVER 35 YEARS

KIMBELL ART MUSEUM  
TEMPORARY RETENTION SYSTEM  
FORT WORTH, TEXAS

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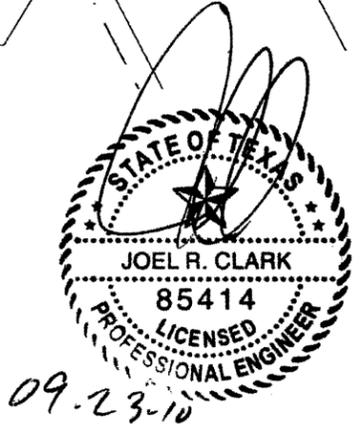
DESIGNED BY: COI  
CHECKED BY: JRC  
DRAWN BY: RW  
SCALE: SHOWN  
PROJECT NO: 40232  
DATE: 09-23-10

PLAN  
1 OF 7  
SHEET NO.



LEGEND	
	SOLDIER PILE RETENTION SYSTEM
	SOIL NAIL RETENTION SYSTEM
	PHASE 2 RETENTION SYSTEM TO BE DESIGNED UNDER SEPARATE SUBMITTAL

PLAN  
SCALE: 1" = 80'





Craig Olden, Inc.  
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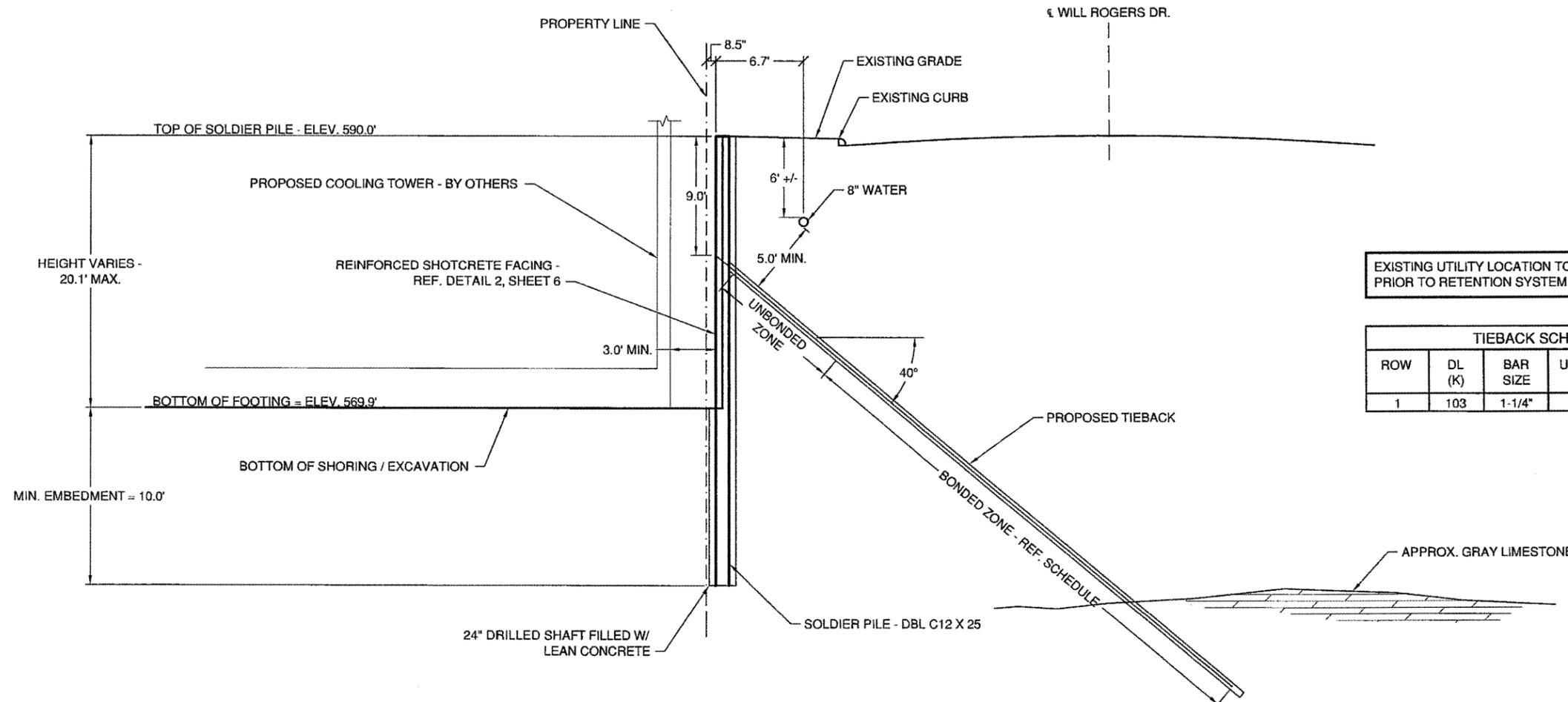
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- CONSTRUCTION
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EARTH RETENTION  
SPECIALISTS FOR  
OVER 35 YEARS



EXISTING UTILITY LOCATION TO BE FIELD VERIFIED  
PRIOR TO RETENTION SYSTEM INSTALLATION

TIEBACK SCHEDULE				
ROW	DL (K)	BAR SIZE	UNBONDED LENGTH	BONDED LENGTH
1	103	1-1/4"	10'	40'

SECTION 1-1  
SCALE: 1" = 10'



09.23.10

KIMBELL ART MUSEUM  
TEMPORARY RETENTION SYSTEM  
FORT WORTH, TEXAS

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DESIGNED BY: COI  
CHECKED BY: JRC  
DRAWN BY: HW  
SCALE: SHOWN  
PROJECT NO: 40232  
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TYPICAL SECTION  
2 OF 7  
SHEET NO.



**Craig Olden, Inc.**  
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REGISTRATION NO. 10899

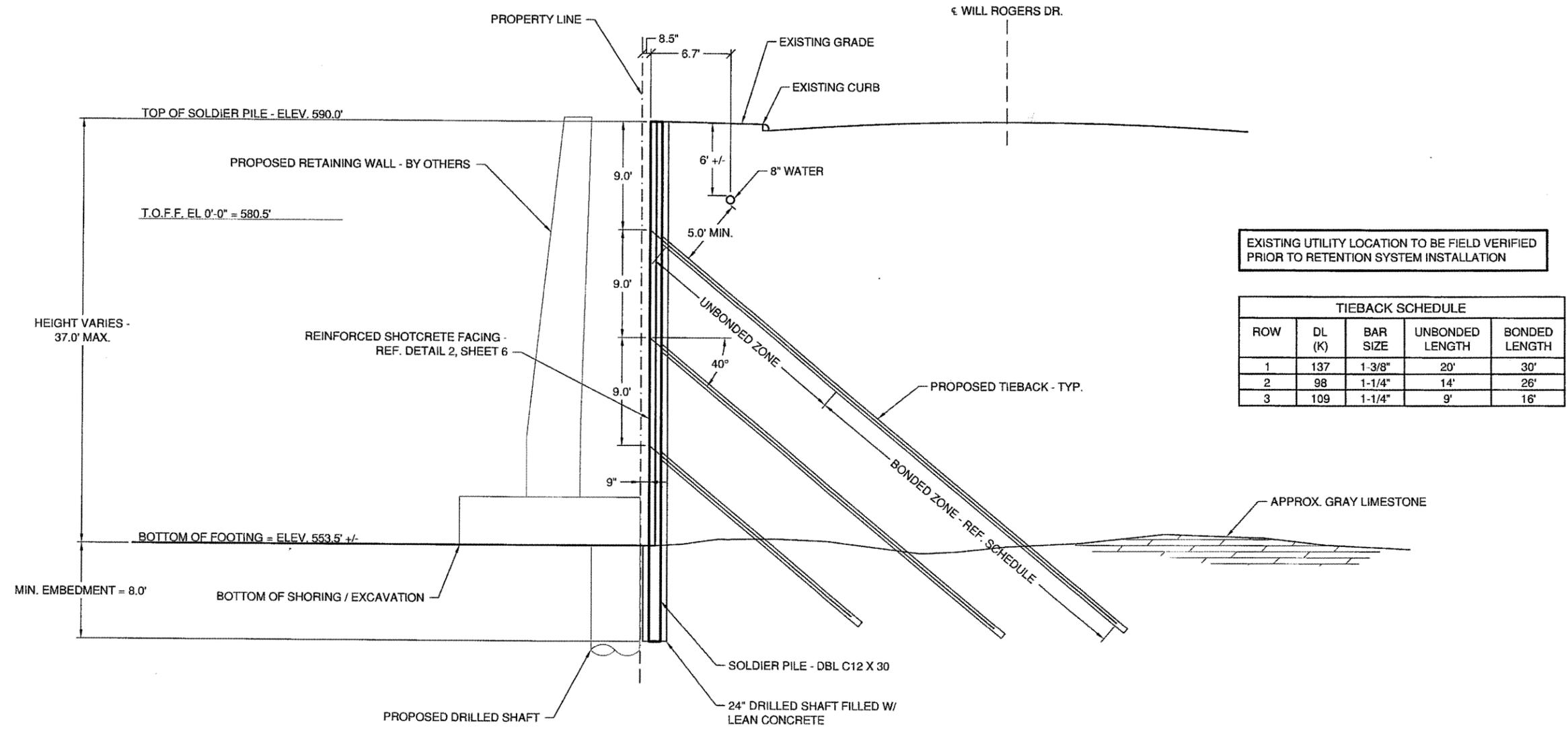
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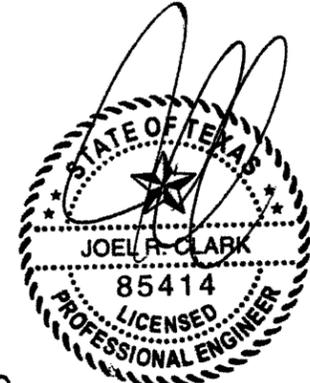
**EARTH RETENTION  
SPECIALISTS FOR  
OVER 35 YEARS**



EXISTING UTILITY LOCATION TO BE FIELD VERIFIED  
PRIOR TO RETENTION SYSTEM INSTALLATION

TIEBACK SCHEDULE				
ROW	DL (K)	BAR SIZE	UNBONDED LENGTH	BONDED LENGTH
1	137	1-3/8"	20'	30'
2	98	1-1/4"	14'	26'
3	109	1-1/4"	9'	16'

**SECTION 2-2**  
SCALE: 1" = 10'



09-23-10

**KIMBELL ART MUSEUM  
TEMPORARY RETENTION SYSTEM  
FORT WORTH, TEXAS**

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TYPICAL SECTION

3 OF 7  
SHEET NO.



**Craig Olden, Inc.**  
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REGISTRATION NO. 10859

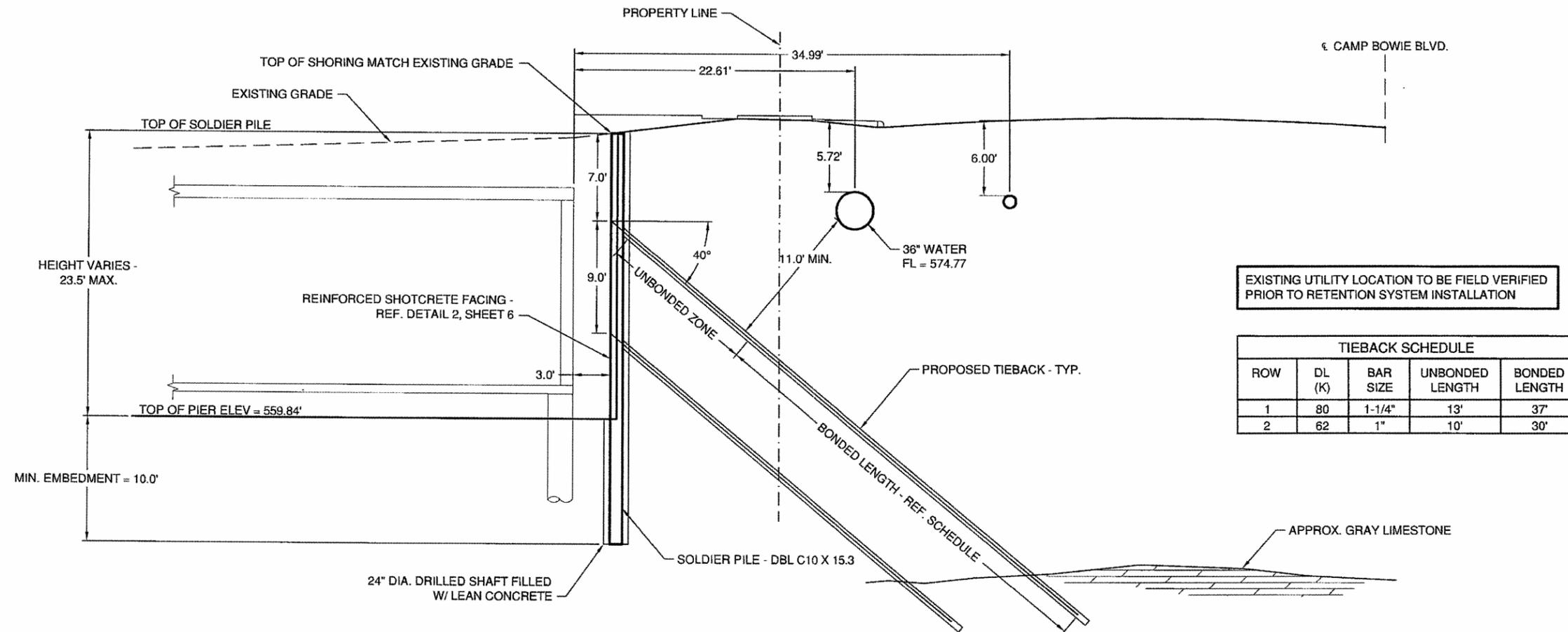
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EXISTING UTILITY LOCATION TO BE FIELD VERIFIED  
PRIOR TO RETENTION SYSTEM INSTALLATION

TIEBACK SCHEDULE				
ROW	DL (K)	BAR SIZE	UNBONDED LENGTH	BONDED LENGTH
1	80	1-1/4"	13'	37'
2	62	1"	10'	30'

SECTION 3-3  
SCALE: 1" = 10'



09.23.10

**KIMBELL ART MUSEUM  
TEMPORARY RETENTION SYSTEM  
FORT WORTH, TEXAS**

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TYPICAL SECTION  
4 OF 7  
SHEET NO.



**Craig Olden, Inc.**  
 TEXAS ENGINEERING FIRM  
 REGISTRATION NO. 10863

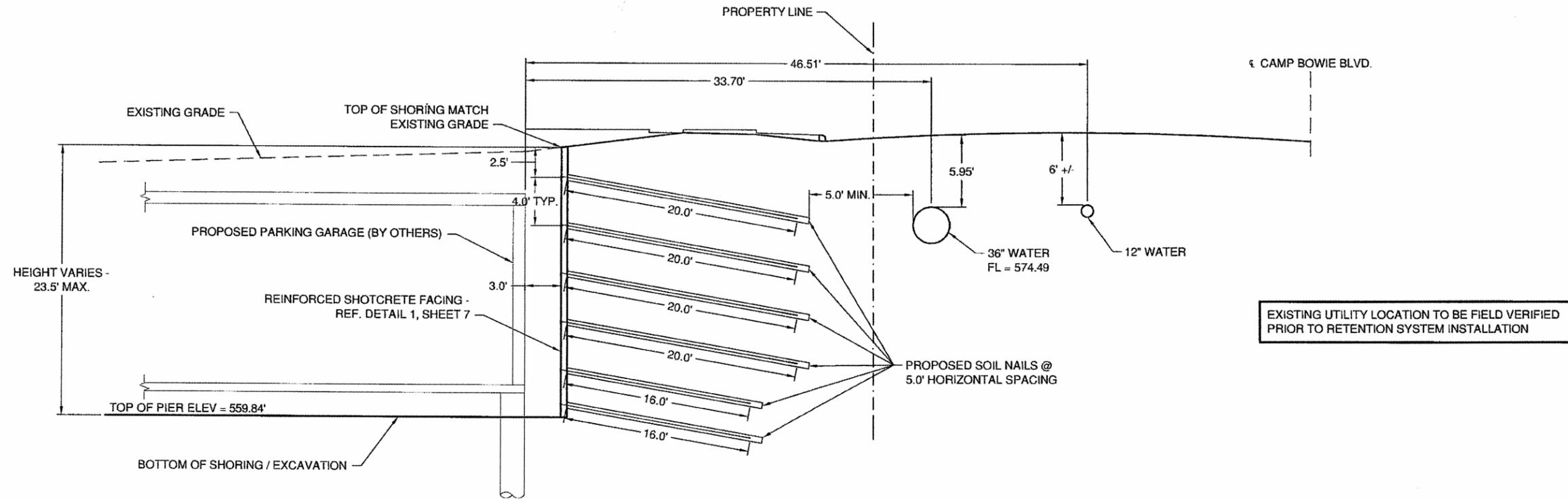
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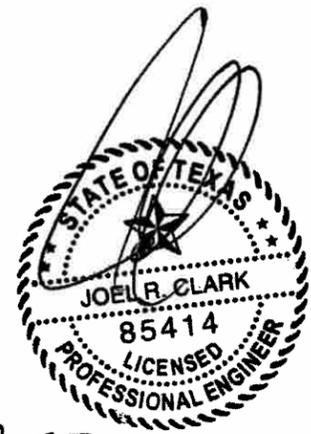
- CONSTRUCTION
- ENGINEERING
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**EARTH RETENTION  
 SPECIALISTS FOR  
 OVER 35 YEARS**



EXISTING UTILITY LOCATION TO BE FIELD VERIFIED  
 PRIOR TO RETENTION SYSTEM INSTALLATION

SECTION 4-4  
 SCALE: 1" = 10'



09-23-10

**KIMBELL ART MUSEUM  
 TEMPORARY RETENTION SYSTEM  
 FORT WORTH, TEXAS**

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 SCALE: SHOWN  
 PROJECT NO: 40232  
 DATE: 09-23-10

TYPICAL  
 SECTION  
 5 OF 7  
 SHEET NO.



**Craig Olden, Inc.**  
TEXAS ENGINEERING FIRM  
REGISTRATION NO. 10889

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**EARTH RETENTION  
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**KIMBELL ART MUSEUM  
TEMPORARY RETENTION SYSTEM  
FORT WORTH, TEXAS**

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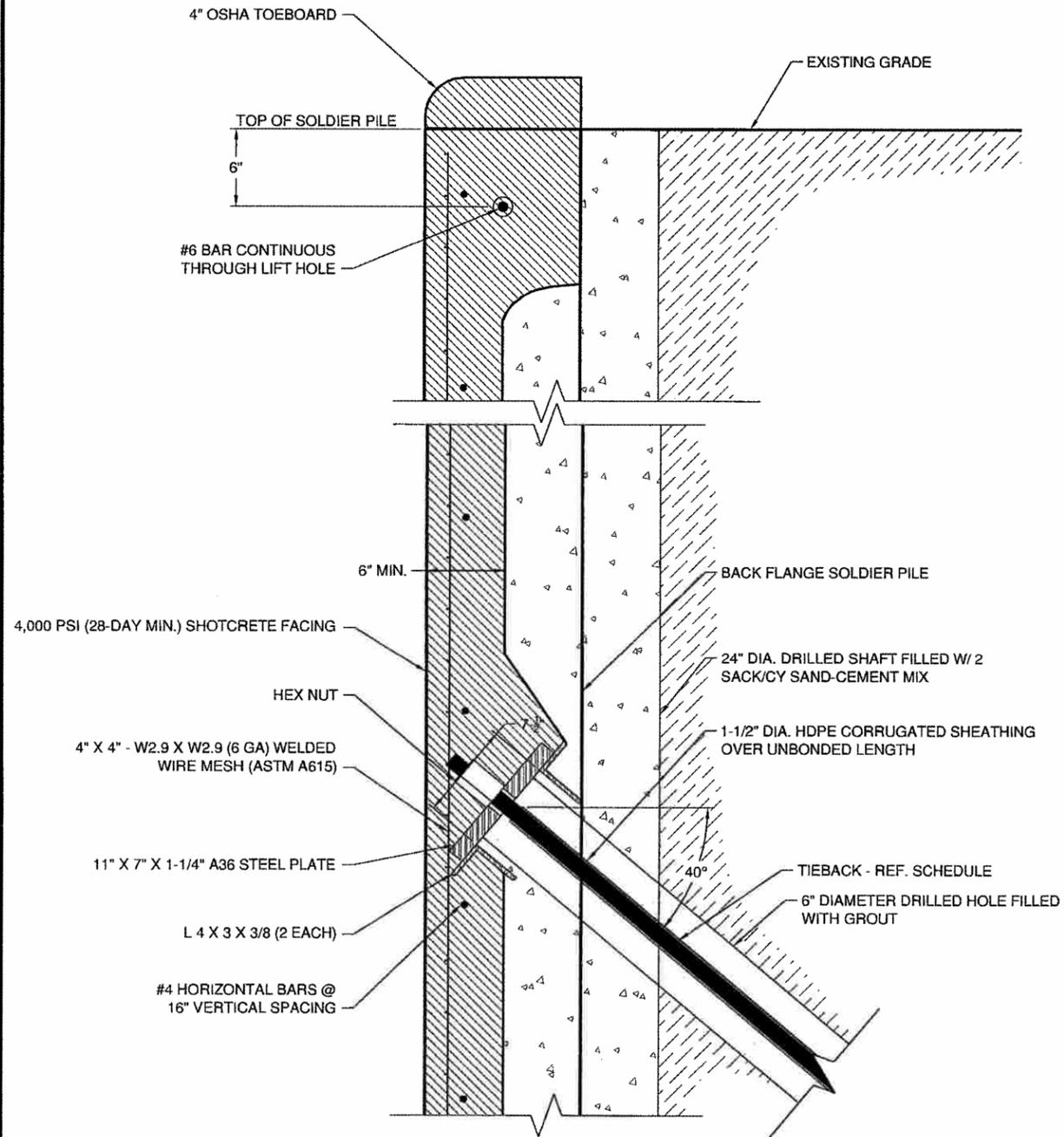
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SCALE: SHOWN  
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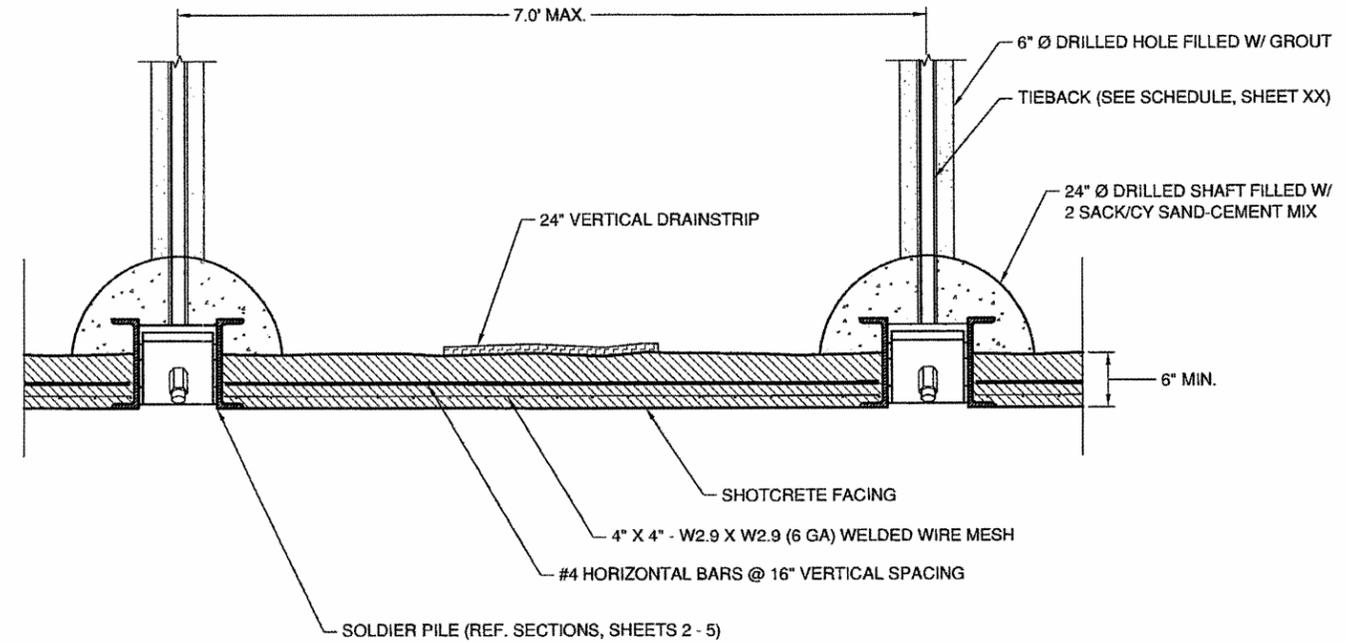
TYPICAL  
SECTION

6 OF 7

SHEET NO.



**2** SOLDIER PILE DETAIL  
SCALE: N.T.S.



**1** SOLDER PILE PLAN DETAIL  
SCALE: N.T.S.





**Craig Olden, Inc.**  
TEXAS ENGINEERING FIRM  
REGISTRATION NO. 19389

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**EARTH RETENTION  
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KIMBELL ART MUSEUM  
TEMPORARY RETENTION SYSTEM  
FORT WORTH, TEXAS

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DRAWN BY: RW  
SCALE: SHOWN  
PROJECT NO: 40232  
DATE: 09-23-10

TYPICAL  
SECTION

7 OF 7  
SHEET NO.

**GENERAL NOTES:**

1. THESE DRAWINGS PROVIDE INFORMATION SPECIFIC TO THE DESIGN AND INSTALLATION OF THE TEMPORARY SPECIAL SHORING FOR KIMBELL ART MUSEUM, FORT WORTH, TEXAS. REFERENCE APPROVED PLANS DATED FOR ALL OTHER INFORMATION.
2. UNDER NO CIRCUMSTANCES SHALL ANY EXCAVATION BE MADE BELOW THE BASE OF SHORING WITHOUT PRIOR APPROVAL OF THE DESIGN ENGINEER (COINC).
3. CONTRACTOR SHALL TAKE SUITABLE MEASURES TO PREVENT THE PONDING OF WATER ADJACENT TO THE SHORING THROUGHOUT THE DURATION OF THE PROJECT. PROLONGED PONDING OF WATER ADJACENT TO THE SHORING MAY COMPROMISE THE INTEGRITY OF THE SHORING.
4. RESTRICTED LOADING ZONE LIMITS SHALL BE THE LESSER OF THE HEIGHT OF SHORING AND DEPTH FROM EXISTING GRADE TO A COMPETENT ROCK LAYER (I.E. A 45° ANGLE FROM BOTTOM OF SHORING OR ROCK LAYER). FROM 5.0' BEHIND TOP OF SHORING TO THE LIMITS OF THE RESTRICTED LOADING ZONE, SURCHARGE LOADING SHALL BE LIMITED TO 250 psf MAX. LOADING BEYOND THE RESTRICTED LOADING ZONE MAY EXCEED 250 psf. NO SURCHARGE LOADING SHALL BE APPLIED WITHIN 5.0' OF BACK OF SHORING. REF. DETAIL 3, THIS SHEET.

**MATERIALS**

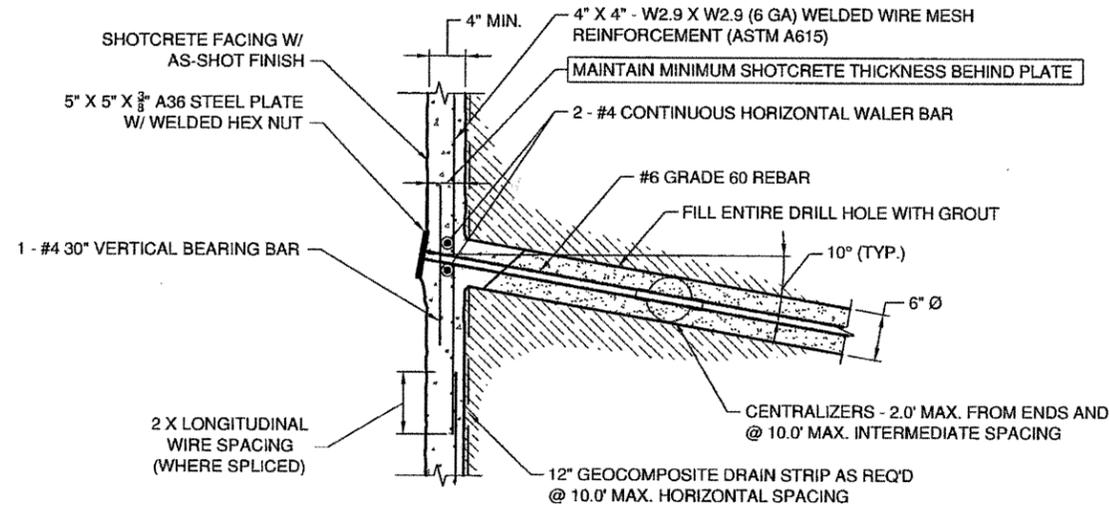
1. GRADE 60 SOIL NAIL BARS AND HARDWARE SHALL CONFORM TO ASTM A615 GRADE 60.
2. SOIL NAIL PLATES SHALL BE ASTM A36 STEEL.
3. ALL SOIL NAIL HEX NUTS SHALL BE CAPABLE OF DEVELOPING THE ULTIMATE TENSILE CAPACITY SOIL NAIL BARS.
4. GROUT SHALL BE COINC 528NS.
5. SHOTCRETE FOR TEMPORARY FACING SHALL ACHIEVE 4,000 PSI MINIMUM 28-DAY COMPRESSIVE STRENGTH.
6. STEEL REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60. ALL LAP SPLICES SHALL BE ACI CLASS "B" TENSION LAP SPLICES.
7. WELDED WIRE FABRIC REINFORCEMENT SHALL CONFORM TO ASTM A185 (Fy = 65,000 PSI).
8. GEOTEXTILE DRAIN MATERIAL SHALL BE AKWADRAIN HC12 OR EQUAL.
9. STEEL SOLDIER PILE SECTIONS SHALL BE HOT-ROLLED C SHAPES CONFORMING TO ASTM A572, GRADE 50.
10. ALL WELDING FOR SOLDIER PILE FABRICATION SHALL CONFORM TO AWS CODE USING E70 ELECTRODES.
11. SOLDIER SHAFTS SHALL BE FILLED WITH 3,000 PSI (MIN. 28-DAY COMPRESSIVE STRENGTH) CONCRETE.
12. TIEBACK BARS SHALL CONFORM TO ASTM A722, GRADE 150 AS MANUFACTURED BY DYWIDAG SYSTEMS INTERNATIONAL OR WILLIAMS FORM ENGINEERING.

THE FOLLOWING DESIGN PARAMETERS WERE USED FOR THE SOIL NAIL WALL DESIGN:

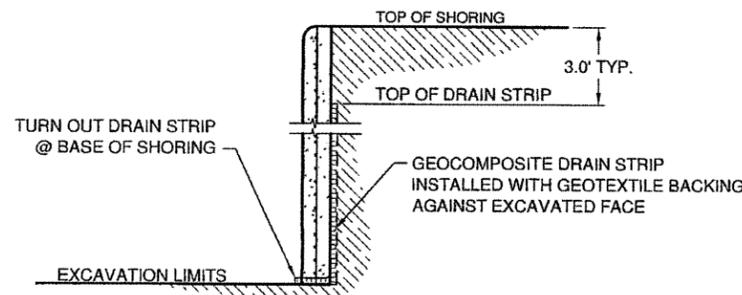
CLAY:  $\phi = 30^\circ$ ;  $c = 0$  psf;  $\gamma = 120$  pcf  
UNWEATHERED LIMESTONE:  $\phi = 45^\circ$ ;  $c = 0$  psf;  $\gamma = 140$  pcf

ALLOWABLE NAIL PULLOUT RESISTANCE: CLAY = 1,000 psf  
ULS = 8,000 psf

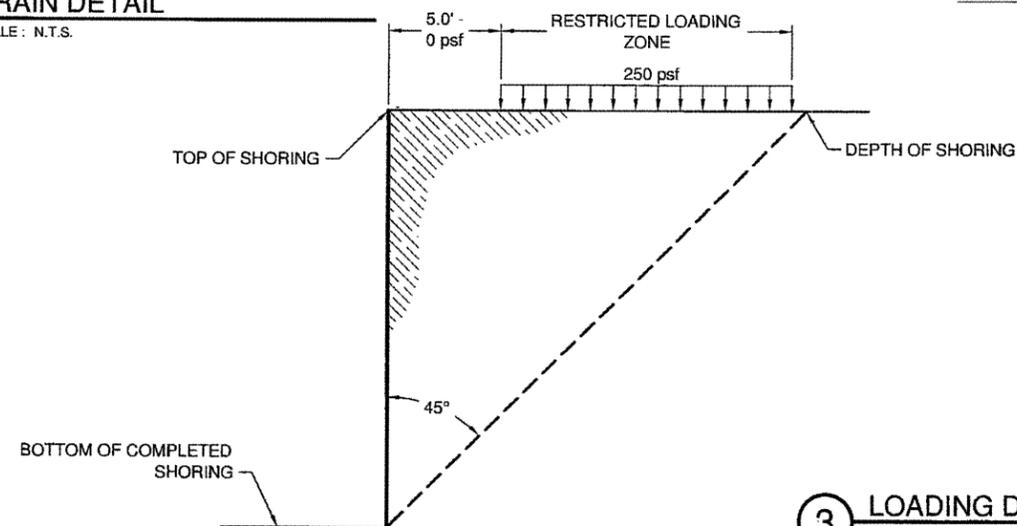
LIVE LOAD SURCHARGE: 250 psf



**1 SOIL NAIL DETAIL**  
SCALE: N.T.S.



**2 DRAIN DETAIL**  
SCALE: N.T.S.



**3 LOADING DETAIL**  
SCALE: N.T.S.

