



CONSTRUCTION SERVICES

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## 322 RIVERVIEW – SHORING WALL

### ADDENDUM SPRMU231828

#### PROCESS OF EVENTS

- UTILITY LOCATES AND POT HOLING TO IDENTIFY DEPTH AND LOCATION OF EXISTING UTILITIES.
- FIRST 5' BENCH CUT EXCAVATED ALONG EDGE OF ALLEY.
- FIRST SET OF HOLLOW SOIL NAILS WERE DRILLED. SPACED ROUGHLY 5' OC, 30" BELOW GRADE. FIRST ROW OF NAILS WERE REDUCED TO 9' TO AVOID CONFLICT WITH EXISTING GAS LINE IN ALLEY WAY. NAILS ENCASED WITH PNEUMATICALLY APPLIED GROUT. NAILS DRIVEN AT 15 DEGREE ANGLE.
- DRAIN BOARD INSTALLED BETWEEN NAILS. WIRE MESH AND REBAR INSTALLED OVER DB AND TIE ALL NAILS TOGETHER.
- SHOTCRETE SPRAYED OVER MESH AND REBAR TO A THICKNESS +/- 4". ANCHOR PLATE AND NUT PLACED ON ENDS OF NAILS.
- THIS SEQUENCE REPEATED FOR AN ADDITIONAL 3 LIFTS UNTIL REACHING A DEPTH OF 13' OR 6714'. 2<sup>ND</sup> AND 3<sup>RD</sup> ROW OF NAILS WERE BOTH 14' LONG.
- DURATION – 16 WORKING DAYS.

SEE ATTACHED SHOP DRAWINGS PROVIDED BY KELLER NORTH AMERICA – DATED 5/23/24 FOR ADDITIONAL INFORMATION.

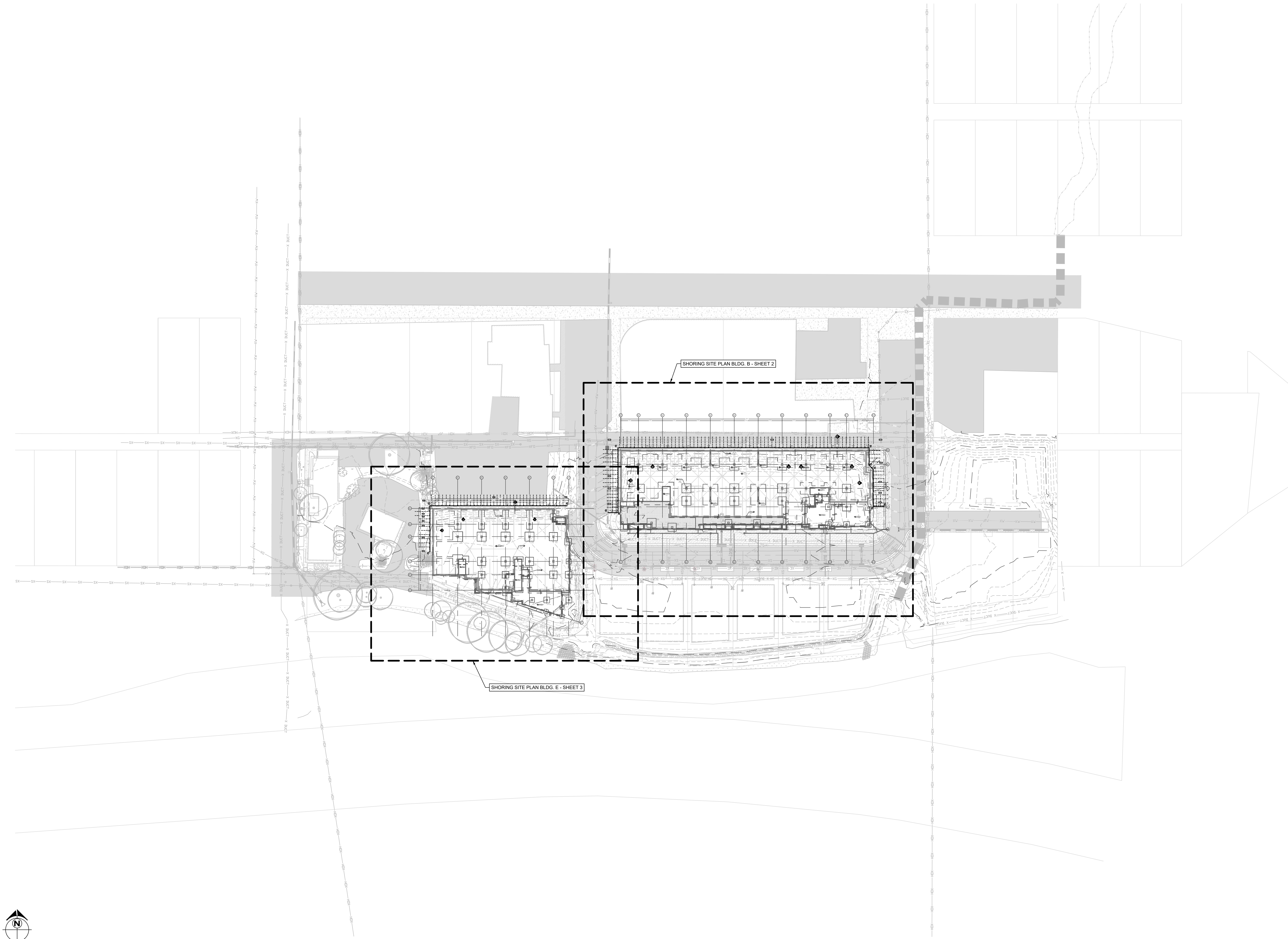
PLEASE REACH OUT WITH ANY QUESTIONS.

ERIC REHNBERG

SUPERINTENDENT

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REFERENCES

REVISIONS

OVERALL SITE PLAN

RIVERVIEW  
TEMPORARY SHORING

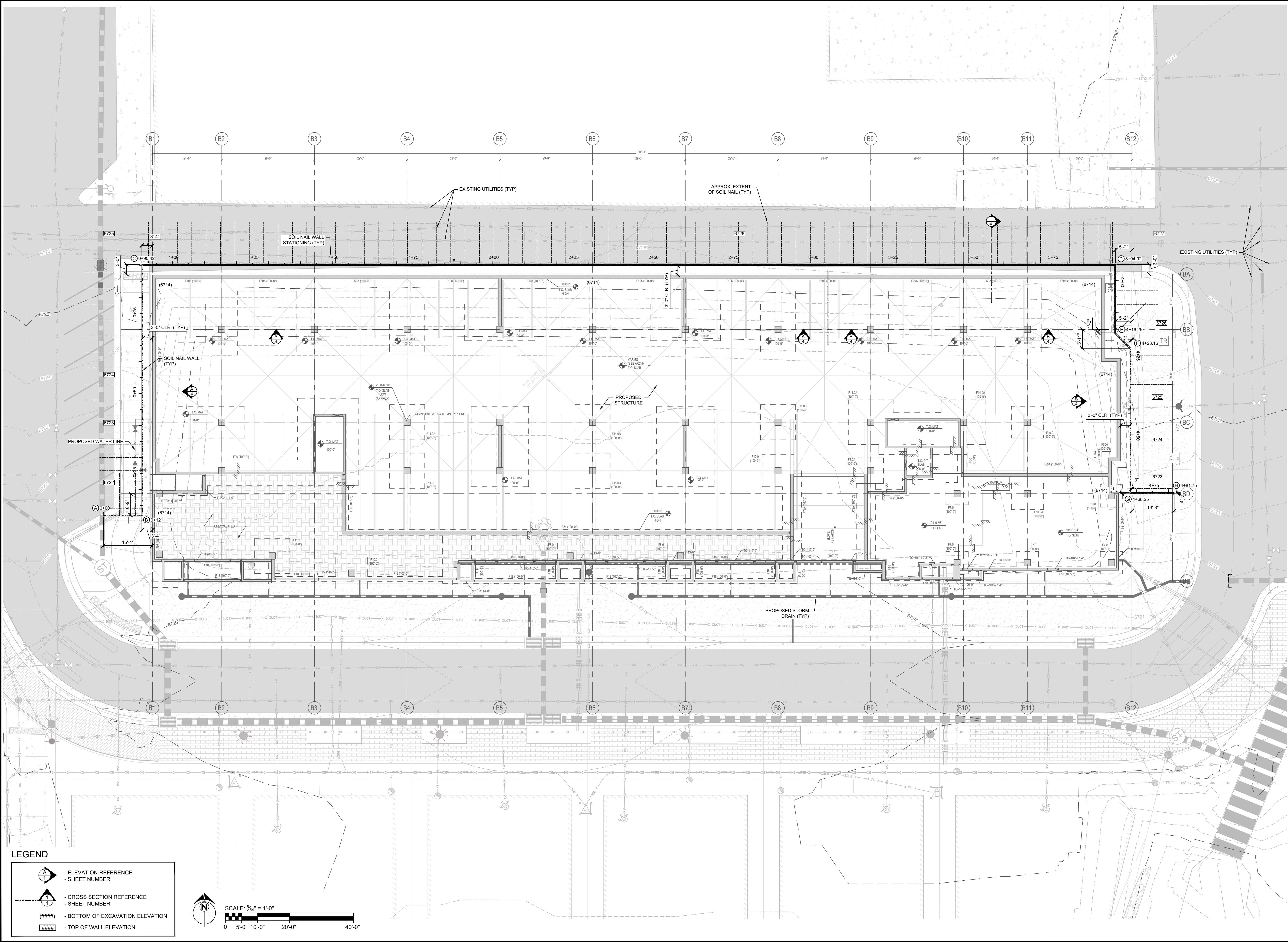
STEAMBOAT SPRINGS, COLORADO

PROJECT NUMBER ISSUE DATE  
5/23/2024

SHEET NUMBER  
1 OF 5



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REFERENCES

REVISIONS

SHORING SITE PLAN  
BLDG. B

RIVERVIEW  
TEMPORARY SHORING

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## REFERENCES

**Figure 1**

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**Figure 1**

*Journal of Management Inquiry* 18(6)

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**Figure 1**

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## REVISIONS

## SHORING SITE PLAN

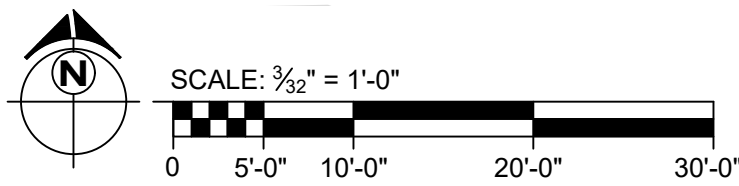
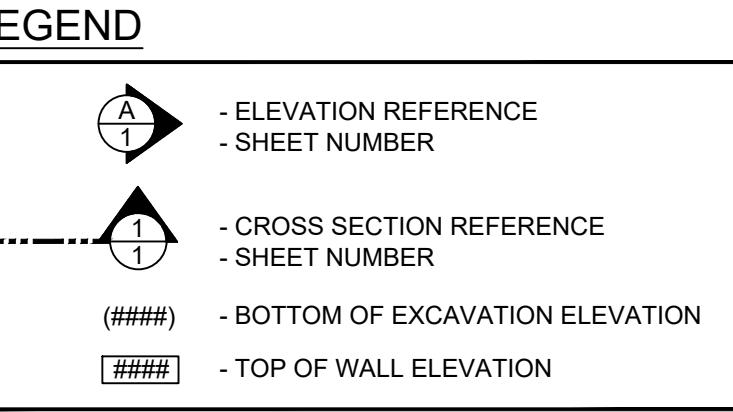
## RIVERVIEW

## STEAMBOAT SPRINGS, COLORADO

## 5/23/2024

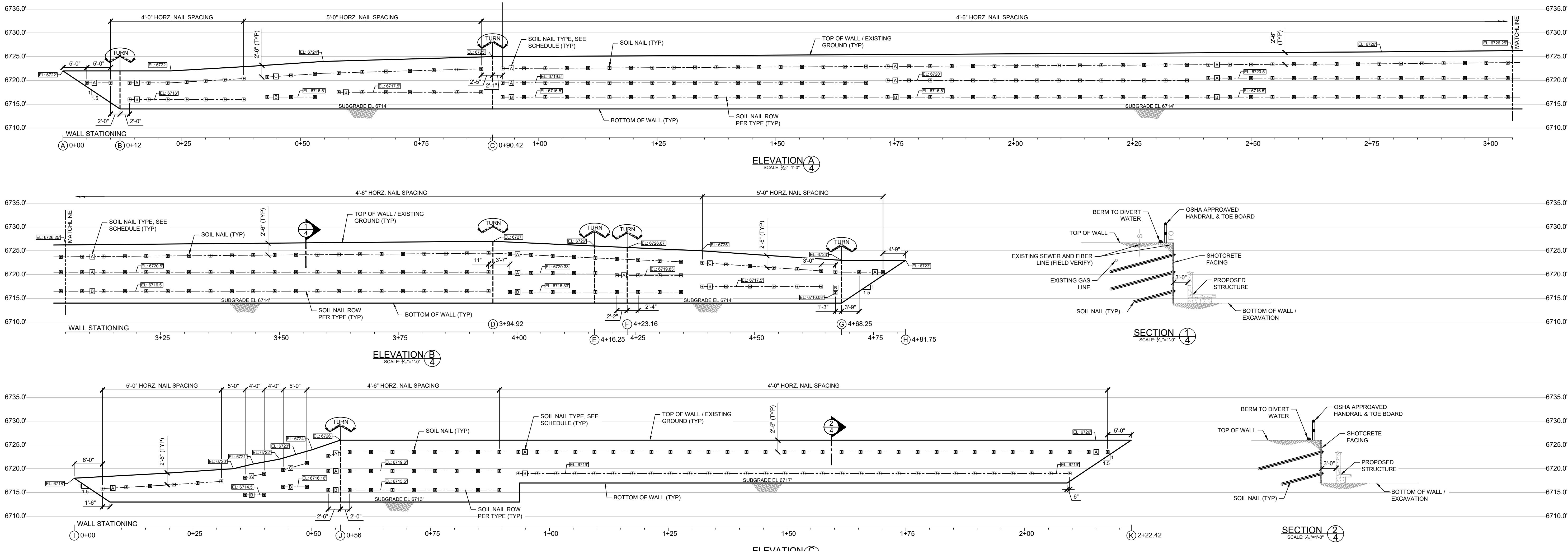
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SOIL NAIL SCHEDULE

SYMBOL	BAR SIZE	DRILLING ANGLE (°)	BONDED LENGTH (ft)
A	T40N HOLLOW BAR	15°	14'
B	T40N HOLLOW BAR	15°	9'
C	T40N HOLLOW BAR	15°	19'



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REFERENCES

REVISIONS

ELEVATION & SECTION VIEWS

RIVERVIEW  
TEMPORARY SHORING

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SOIL NAIL GENERAL NOTES:

THIS SET OF PLANS SHOWS THE INFORMATION NECESSARY FOR CONSTRUCTION OF THE SOIL NAIL AND SHOTCRETE EARTH RETENTION SYSTEM REQUIRED FOR THE RIVERVIEW PROJECT LOCATED IN STEAMBOAT SPRINGS, COLORADO. THOSE PORTIONS OF THE PLANS NECESSARY TO CLARIFY THE SOIL NAIL WALL ARE SHOWN.

A. CONSTRUCTION SEQUENCE FOR TEMPORARY SOIL NAIL WALL

THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE CAREFULLY FOLLOWED:

1. PRIOR TO THE START OF WORK, THE ELEVATIONS AT AND AROUND THE EXCAVATION SHALL BE VERIFIED WITH THOSE SHOWN ON THESE PLANS
2. CALL COLORADO ONE CALL AT 1-800-922-1987 OR 811 PRIOR TO DOING ANY EXCAVATION OR DRILLING TO EXPOSE (BY OTHERS) ANY UTILITIES NEAR THE EARTH RETENTION SYSTEM. UTILITIES TO BE LEFT IN PLACE SHALL BE CLEARLY STAKED (BY OTHERS), AND THEIR DEPTH BELOW GRADE DETERMINED (BY OTHERS).
3. ESTABLISH SOIL NAIL WALL LINE LOCATIONS, OFFSETS, AND KEY LAYOUT POINTS (BY OTHERS) REQUIRED FOR THE CONSTRUCTION OF THE SOIL NAIL WALL.
4. EXCAVATE (BY OTHERS) THE FIRST LIFT TO FIVE (5) FEET. EXCAVATE (BY OTHERS) EACH PROCEEDING LIFT AS NOT TO EXCEED FIVE (5) FEET TO ELEVATIONS REQUIRED FOR INSTALLATION OF SOILS NAILS (LESS IF SOIL DOES NOT STAND AFTER CUTTING) AS DIRECTED BY KELLER'S SUPERINTENDENT. PERFORM FINAL SOIL TRIMMING (BY OTHERS) TO WITHIN ONE (1) INCH OF THE BACK OF THE SHOTCRETE FACING LINE.
5. LAYOUT THE TIER OF SOIL NAILS.
6. INSTALL THE TIER OF SOIL NAILS USING THE INSTALLATION PROCEDURE DETAILED BELOW. SOIL NAILS MAY BE SHIFTED ONE (1) FOOT IN ANY DIRECTION TO MISS UTILITIES, TO ACCOMMODATE DRILLING POSITIONS, ETC.
5. HANG DRAIN BOARD & WIRE MESH. APPLY A NOMINAL FOUR (4) INCH LAYER OF SHOTCRETE TO THE EXCAVATION FACE.
6. REPEAT STEPS 3 THROUGH 6 ABOVE UNTIL THE BOTTOM OF WALL ELEVATION IS REACHED AS SHOWN OF THESE DRAWINGS. EXCAVATION AND DRILLING OF EACH ADDITIONAL LIFT CAN PROCEED ONCE THE SHOTCRETE FROM THE PRIOR LIFT HAS ACHIEVED A MINIMUM STRENGTH OF 2,000 PSI.
7. AT NO TIME SHALL THE EXCAVATION PROCEED LOWER THAN THE BOTTOM OF EXCAVATION ELEVATIONS SHOWN ON THESE DRAWINGS.

B. SOIL NAIL INSTALLATION PROCEDURE

THE FOLLOWING PROCEDURE SHALL BE USED FOR INSTALLING SOIL NAILS:

1. DRILL TO THE DEPTH INDICATED ON THESE DRAWINGS.
2. INSERT THE SOIL NAIL TENDON WITH CENTRALIZERS.
3. FOR SOLID BARS INSERT TREMIE PIPE TO THE BOTTOM OF THE HOLE AND PUMP GROUT THROUGH THE TREMIE UNTIL GROUT FLOWS OUT THE TOP OF THE SOIL NAIL HOLE.

C. SOIL NAIL TESTING

PROOF TESTS:

FOUR (4) SOIL NAILS SHALL BE PROOF TESTED. INSTALL THE NAILS USING THE SAME PROCEDURE AS ABOVE, EXCEPT GROUT ONLY THE BOND LENGTH SPECIFIED FOR THE TEST. IF PRODUCTION NAILS ARE USED AS TEST NAILS, LEAVE A THREE (3) INCH DIAMETER GAP (FOR THE TREMIE PIPE) INTO THE SHOTCRETE FACING SO THAT THE UNGROUTED LENGTH CAN BE GROUTED AFTER AFTER TESTING THE NAIL.

THE BOND LENGTH SHALL NOT EXCEED THE LENGTH AS SPECIFIED IN THESE DRAWINGS. SOIL NAIL TESTING SHALL PROCEED WHEN GROUT ACHIEVES REQUIRED STRENGTH.

THE PROOF TEST SHALL BE PERFORMED BY INCREMENTALLY LOADING THE SOIL NAIL IN ACCORDANCE WITH THE SCHEDULE LISTED BELOW. AT EACH LOAD INCREMENT, THE MOVEMENT OF THE END OF THE SOIL NAIL RELATIVE TO AN INDEPENDENT FIXED REFERENCE SHALL BE MEASURED WITH A DIAL GAUGE READING TO 0.001" AND RECORDED. AN ALIGNMENT LOAD (AL) OF UP TO 10% OF TEST LOAD (TL) SHALL BE USED TO ELIMINATE SLACK AND HOLD THE TEST EQUIPMENT IN PROPER ALIGNMENT. ALL MOVEMENT WILL BE REFERENCED TO THE ALIGNMENT LOAD BEING THE ZERO REFERENCE MOVEMENT. THE INCREMENTS OF LOAD SHALL BE:

AL, 0.25xTL, 0.50xTL, 1.00xTL, 1.25xTL, & 1.50xTL

PROOF TEST SOIL NAIL ACCEPTABILITY:

AT THE MAXIMUM LOAD OF 1.50xTL SOIL NAIL MOVEMENT SHALL BE MEASURED AND RECORDED AT 0, 1, 2, 3, 4, 5, 6 AND 10 MINUTES. A PROOF TEST SOIL NAIL IS ACCEPTABLE IF THE MOVEMENT OF THE END IS LESS THAN OR EQUAL TO 0.04" FOR THE TIME PERIOD FROM 1 TO 10 MINUTES IMMEDIATELY FOLLOWING APPLICATION OF LOAD INCREASING FROM 1.25xTL TO 1.50xTL. IF THE SOIL NAIL MOVEMENT EXCEEDS 0.04" FOR THIS PERIOD, THE LOAD OF 1.00xTL SHALL BE MAINTAINED UNTIL THE RATE OF MOVEMENT IS LESS THAN OR EQUAL TO 0.08" FOR A LOG CYCLE OF TIME. LOG CYCLES OF TIME INCLUDE 2 TO 20 MINUTES, 3 TO 30 MINUTES, 4 TO 40 MINUTES, ETC.

IF A PROOF TESTED SOIL NAIL FAILS TO ATTAIN THE TEST LOAD, DETERMINE THE MAXIMUM LOAD THAT IT WILL HOLD WITHOUT CONTINUOUS MOVEMENT. TO DETERMINE THE MAXIMUM LOAD, ALLOW THE LOAD TO STABILIZE FOR TEN (10) MINUTES AFTER THE SOIL NAIL HAS FAILED TO MEET THE REQUIRED CRITERIA. INFORM KELLER'S ENGINEER-OF-RECORD FOR EVALUATION. WORK SHALL PROCEED UNINTERRUPTED DURING ANY RE-EVALUATION OF THE SOIL NAIL SYSTEM UNLESS KELLER'S ENGINEER DETERMINES IT IS NECESSARY TO STOP WORK.

D. MATERIALS

THE FOLLOWING MATERIALS WILL BE USED IN THE CONSTRUCTION OF THE SOIL NAIL WALL:

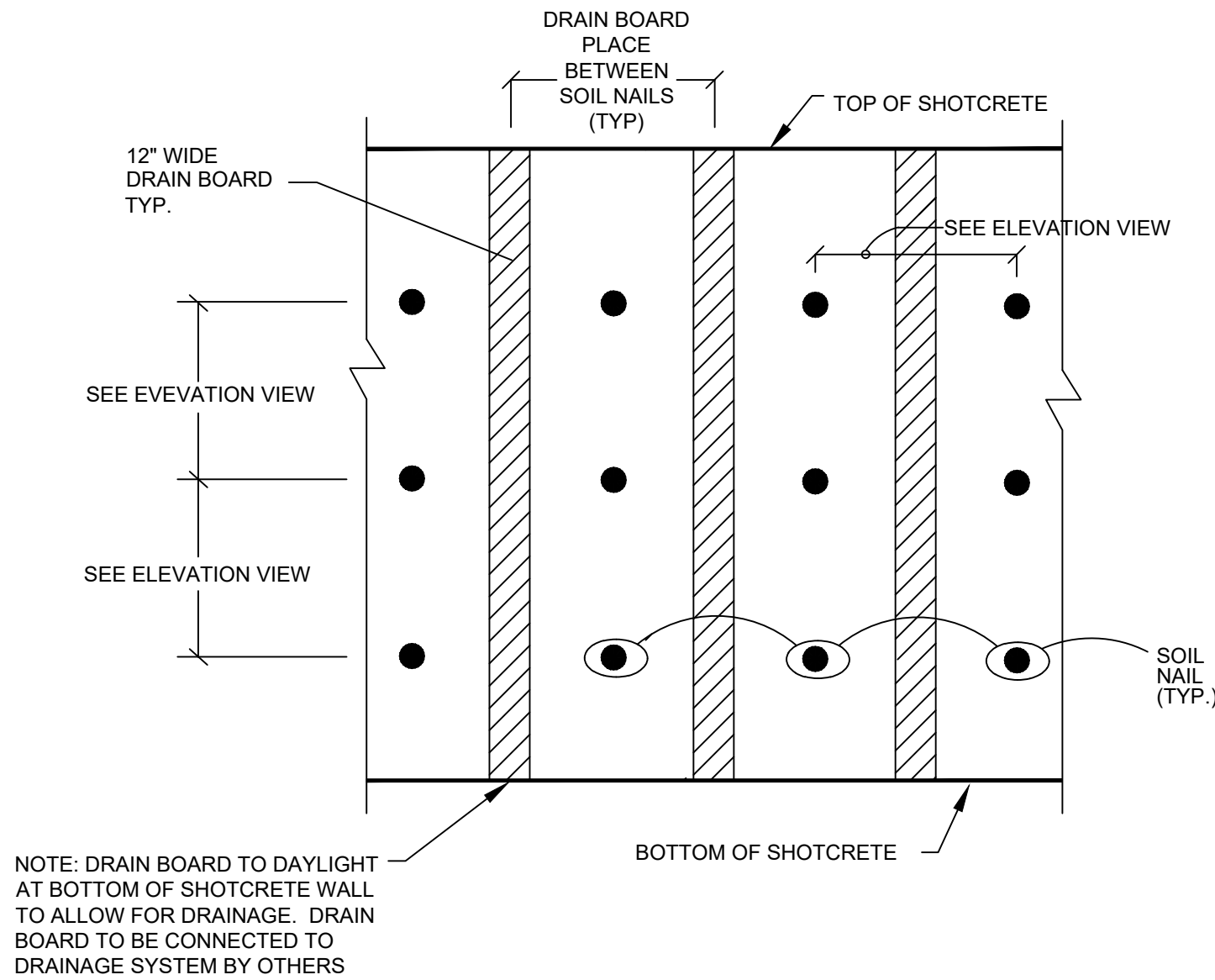
1. SOIL NAILS - GRADE 75 #8 NON-EPOXY COATED THREADED BARS OR EQUIVALENT, NO SHEATHING REQUIRED.
2. WIRE MESH - ASTM A185 WELDED WIRE MESH
3. SHOTCRETE: F<sub>c</sub> = 4,000 PSI MINIMUM
4. CEMENT: ASTM 150, TYPE III
5. GROUT: GROUT FOR SOIL NAILS SHALL BE EITHER OF THE FOLLOWING:
  - A. NEAT CEMENT GROUT WITH A WATER/CEMENT RATIO NO TO EXCEED 6 GALLONS OF WATER PER SACK OF CEMENT WITH

THE OPTION TO ADD 2 TO 10 OZ PER 100 LBS CEMENT OF WATER REDUCING AGENT.

B. GROUT CONSISTING OF TYPE I, II, OR III PORTLAND CEMENT WITH AN F<sub>c</sub> = 4,000 PSI MINIMUM.

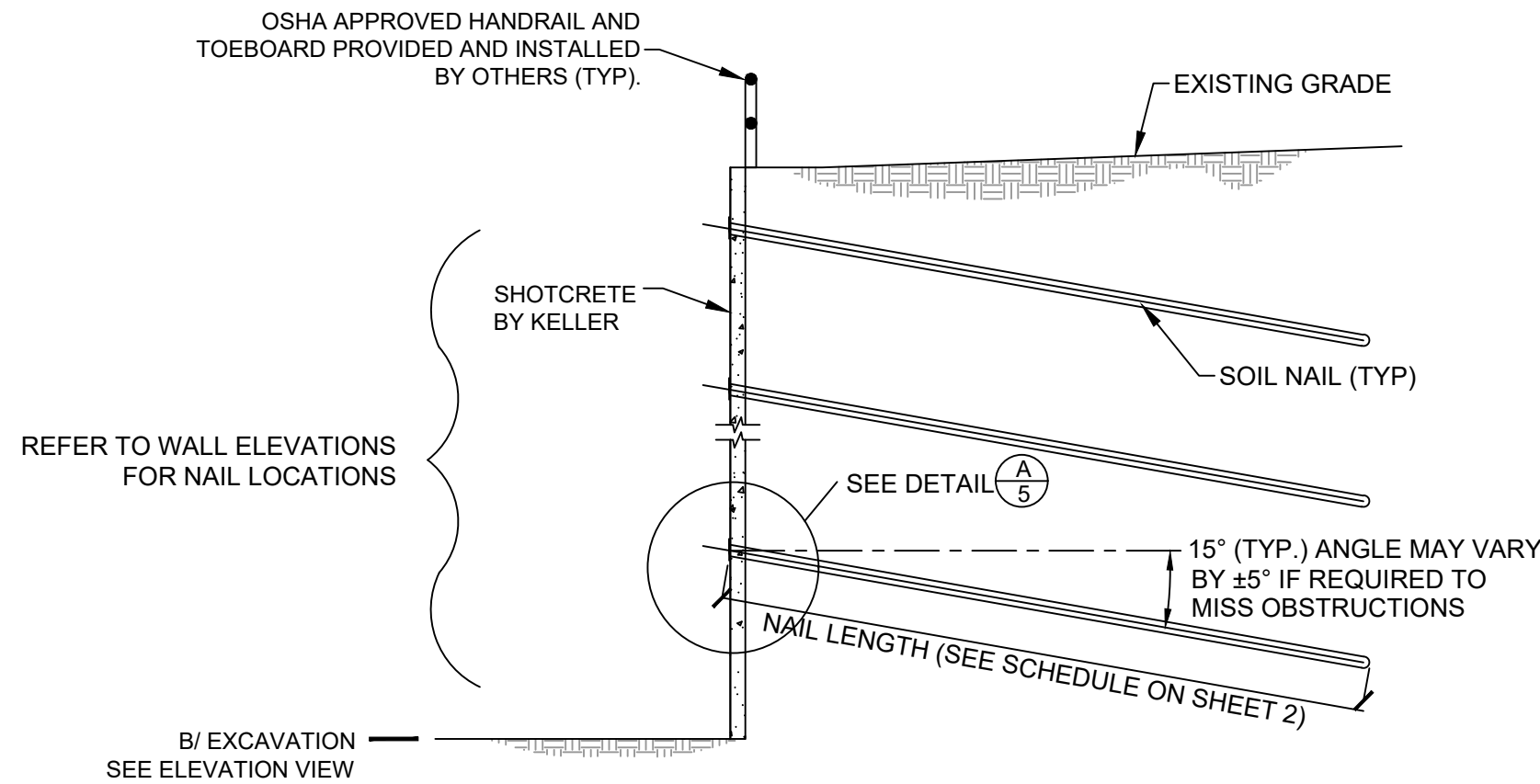
FOR BOTH NEAT CEMENT AND TRANSIT MIXED GROUTS, WATER REDUCING AGENTS OR OTHER ADMIXTURES TO IMPROVE PUMPABILITY MAY BE ADDED. SINCE WATER IS DRIVEN OFF FOR WHILE PUMPING, ADDITION OF WATER TO GROUT SHALL BE PERMITTED IN THE FIELD. GROUT MIXES USED IN THE CONSTRUCTION OF THIS SOIL NAIL WALL ARE PROPRIETARY AND MAY BE CHANGED OR ADJUSTED TO SUIT FIELD CONDITIONS. AS SUCH NO MIX DESIGNS WILL BE SUBMITTED.

6. EQUIVALENT MEMBERS MAY BE SUBSTITUTED FOR THOSE SHOWN AT OPTION OF KELLER. MATERIAL MAY BE NEW OR USE.



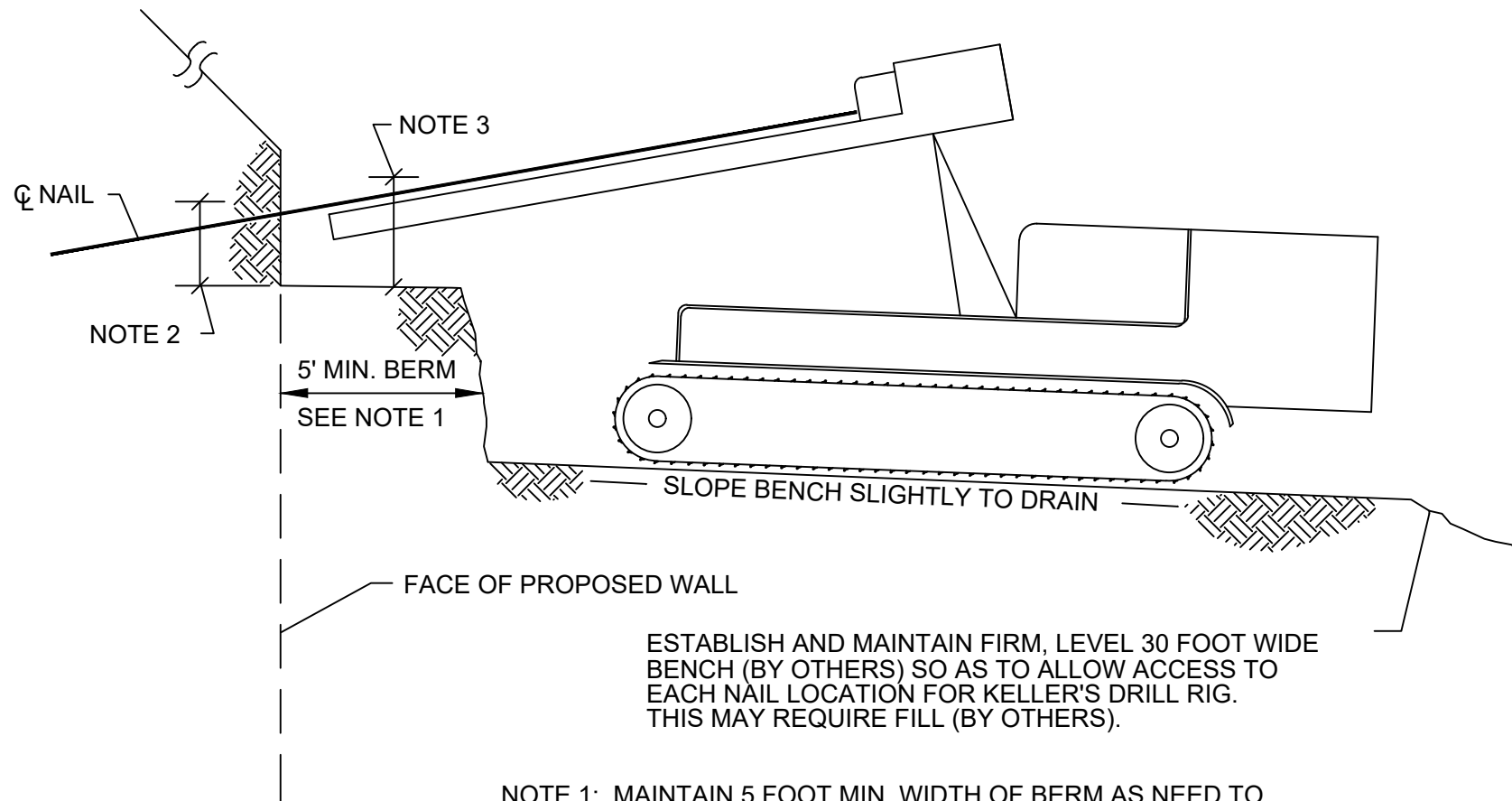
TYPICAL SOIL NAIL, SHOTCRETE & DRAIN BOARD DETAIL

(NO SCALE)



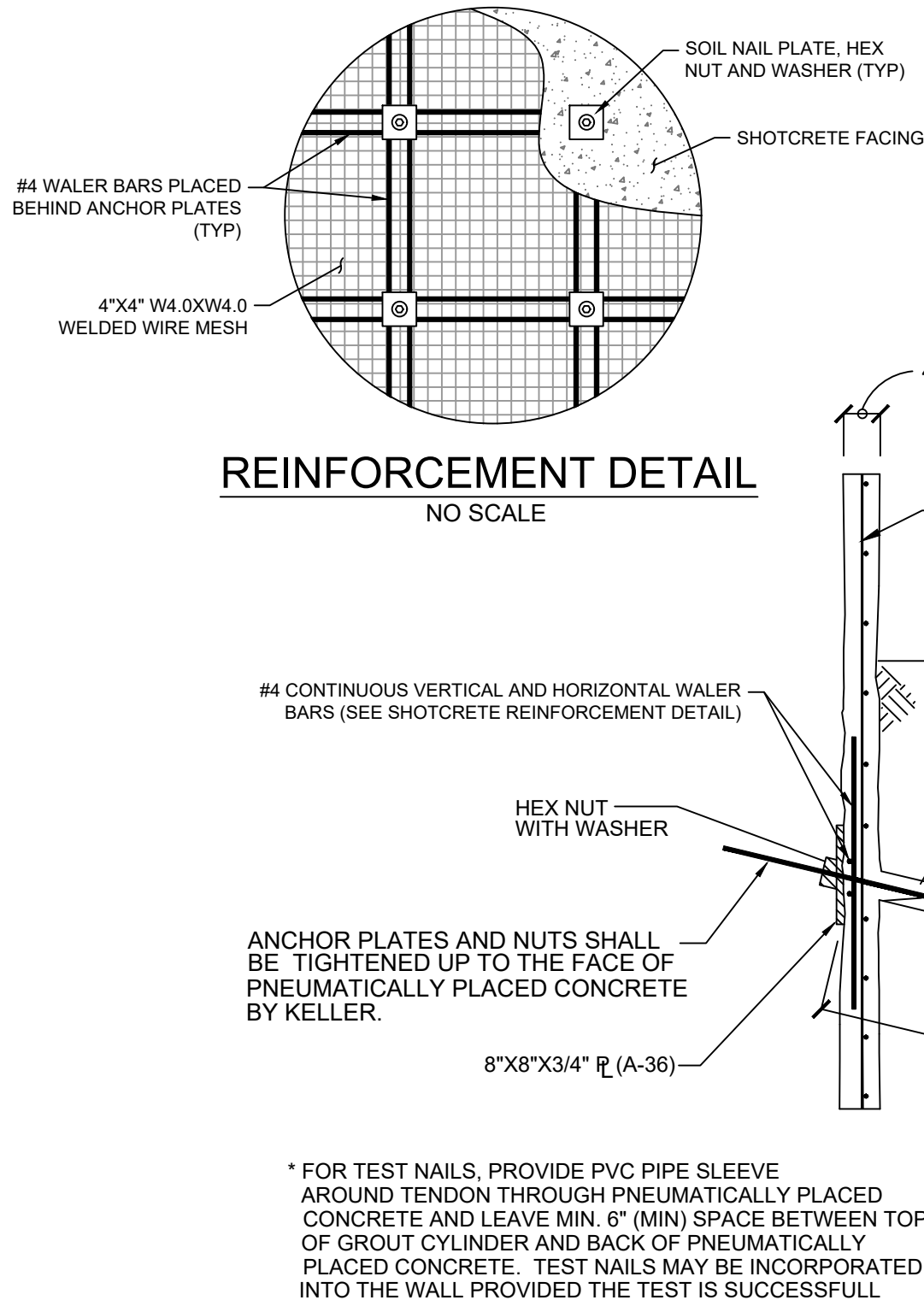
TYPICAL SECTION FOR TEMPORARY WALL

NO SCALE



DETAIL - TYPICAL BENCH REQUIREMENTS

NO SCALE



REINFORCEMENT DETAIL

NO SCALE

DETAIL A 5 (NO SCALE)



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REFERENCES

REVISIONS

CONSTRUCTION NOTES & DETAILS

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