

**FP** **FOUNDATION PARAMETERS**  
**FP1** SIZE AND BOTTOM ELEVATIONS OF FOOTINGS HAVE BEEN ESTABLISHED BASED ON THE ASSUMED MINIMUM ALLOWABLE BEARING PRESSURE OF 1500 PSF AS SHOWN IN IBC TABLE 1806.2. AS EXCAVATION PROGRESSES, UNANTICIPATED SOIL CONDITIONS MAY REQUIRE CHANGES. CONTACT STRUCTURAL ENGINEER OF RECORD FOR EVALUATION OF THESE CHANGES.

**FP2** ALLOWABLE SOIL BEARING PRESSURE  
CONTINUOUS FOOTINGS..... 1500 PSF  
SQUARE FOOTINGS..... 1500 PSF

**FP3** MINIMUM FOOTING DEPTH FOR FROST PROTECTION  
(BELOW FINISHED GRADE)..... 42 IN.

**FP4** DESIGN EARTH PRESSURES:  
ACTIVE ..... 35 PCF  
PASSIVE ..... 260 PCF  
AT REST ..... 60 PCF

**FP5** GEOTECHNICAL ENGINEER IS SOLE JUDGE OF THE SUITABILITY OF UNDERLYING MATERIAL TO SUPPORT FOUNDATIONS. BEARING MATERIAL SHALL BE APPROVED BY GEOTECHNICAL ENGINEER BEFORE FOUNDATION INSTALLATION. DO NOT PROCEED WITHOUT APPROVAL.

**FP6** PRIOR TO COMMENCING EARTHWORK, CONTRACTOR SHALL REVIEW AND BE FAMILIAR WITH ALL ASPECTS OF THE GEOTECHNICAL REPORT. CONTACT GEOTECHNICAL ENGINEER IF QUESTIONS OR DISCREPANCIES. **SUBMITTALS**

**SU**  
**SU1** GENERAL CONTRACTOR TO PROVIDE A SHOP DRAWING SUBMITTAL LOG ITEMIZING ALL PROPOSED SUBMITTALS FOR APPROVAL BY STRUCTURAL ENGINEER OF RECORD.

**SU2** ALL SHOP DRAWINGS SHALL BE CHECKED BY THE FABRICATOR AND APPROVED BY THE GENERAL CONTRACTOR PRIOR TO SUBMITTAL TO THE STRUCTURAL ENGINEER OF RECORD. SHOP DRAWING REVIEW BY ENGINEER IS LIMITED TO VERIFYING GENERAL CONFORMANCE TO THE CONTRACT DOCUMENTS. CONTRACTOR IS RESPONSIBLE FOR ANY CHANGES FROM THE CONTRACT DOCUMENTS, DIMENSIONAL ERRORS, COORDINATION ERRORS, OR OMISSIONS IN SHOP DRAWINGS.

**SU3** SHOP DRAWINGS SHALL BE SUBMITTED TO THE EOR PRIOR TO FABRICATION AND CONSTRUCTION REGARDING ALL STRUCTURAL ITEMS, INCLUDING THE FOLLOWING:

- CONCRETE MIX DESIGNS (5 DAYS BEFORE POUR, MIN.)
- CONCRETE REINFORCEMENT

**SU4** SHOP DRAWINGS SHALL INCLUDE CONNECTIONS AS WELL AS SIZE, SPACING, AND GRADE OF ALL MEMBERS. PLANS AND ANY DETAILING NECESSARY FOR DETERMINING FIT AND PLACEMENT SHALL ALSO BE INCLUDED.

**CN** **CONCRETE NOTES**  
**CN1** CONCRETE WORK SHALL CONFORM TO CHAPTER 19 OF THE IBC.

**CN2** WHERE NEW CONCRETE IS PLACED AGAINST EXISTING CONCRETE, THE EXISTING CONCRETE SURFACE SHALL BE CLEANED AND ROUGHENED TO A MINIMUM OF 1/4" AMPLITUDE.

**CN3** ALL EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE CHAMFERED 3/4" U.N.O.

**CN4** CONCRETE FORMWORK:  
**CN4.1** SLEEVES, OPENINGS, CONDUIT, AND OTHER EMBEDDED ITEMS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER PRIOR TO POURING CONCRETE. CONDUITS EMBEDDED IN SLABS SHALL NOT BE LARGER IN OUTSIDE DIMENSION THAN ONE THIRD OF THE THICKNESS OF THE SLAB AND SHALL NOT BE SPACED CLOSER THAN THREE DIAMETERS ON CENTER.  
**CN4.2** VERIFY ALL BLOCK OUTS WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING REQUIREMENTS PRIOR TO POURING.

**CN5** CONCRETE REINFORCEMENT:  
**CN5.1** DETAILING, FABRICATION, AND PLACEMENT OR REINFORCEMENT SHALL CONFORM TO ACI-315.  
**CN5.2** ALL REINFORCEMENT TO BE ASTM A615 GRADE 60 U.N.O. WELDED WIRE FABRIC TO BE ASTM A185 WITH WIRE CONFORMING TO ASTM A82. REINFORCING STEEL SHALL BE SECURELY TIED IN PLACE USING #16 ANNEALED IRON WIRE. REINFORCEMENT SHALL BE CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS UNLESS NOTED OTHERWISE.  
**CN5.3** ALL CONTINUOUS REINFORCING SHALL BE SPLICED USING CLASS B TENSION SPLICES, U.N.O.

**CN6** COVERAGE FOR REINFORCEMENT:  
**CN6.1** CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH ..... 3"  
**CN6.2** CONCRETE EXPOSED TO EARTH AND WEATHER:  
#6 THRU #18 BARS ..... 2"  
#5 BAR, W31 OR D31 WIRE AND SMALLER ..... 1 1/2"  
**CN6.3** CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:  
SLABS, WALLS, JOISTS:  
#11 BAR AND SMALLER ..... 3/4"

**CN7** CONCRETE COMPRESSIVE STRENGTHS SHALL BE VERIFIED BY STANDARD 28-DAY CYLINDER TESTS PER ASTM C39 AND SHALL BE AS FOLLOWS:  
FOOTINGS..... f<sub>c</sub> = 3,000 PSI  
WALLS/PIERS/COLUMNS..... f<sub>c</sub> = 4,000 PSI

**CN8** SPECIAL INSPECTOR SHALL BE NOTIFIED IF ANY WATER IS TO BE ADDED IN FIELD.

**CN9** CONCRETE FOUNDATIONS:  
**CN9.1** ALL FOUNDATION EXCAVATIONS MUST BE REVIEWED AND APPROVED BY THE SOILS ENGINEER PRIOR TO PLACEMENT OF CONCRETE.  
**CN9.2** ACCURATELY SET AND SECURELY SUPPORT REINFORCING, DOWELS, AND ANCHOR BOLTS PRIOR TO PLACEMENT OF CONCRETE. WET-STICKING OR FLOATING OF REINFORCING, DOWELS, AND ANCHOR RODS IS NOT ALLOWED.  
**CN9.3** PROVIDE CONSTRUCTION JOINTS, INSERTS, SLEEVES, DOWELS, ANCHORS, ETC., AS SHOWN. ITEMS SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND ACCORDING TO USUAL ACCEPTED STANDARDS OF THE TRADE. ANCHOR RODS PER ASTM F1554 AS SHOWN.  
**CN9.4** ALL FOUNDATION COLD JOINTS SHALL BE KEYED. CONTINUOUS REINFORCING SHALL EXTEND ONE DEVELOPMENT LENGTH PLUS 6". LOCATE FOUNDATION COLD JOINTS AT EXPANSION JOINTS IN MASONRY VENEER WHEN POSSIBLE.  
**CN9.5** REINFORCING SHOWN ON DETAILS IS THE REQUIRED MINIMUM. AT CONTRACTOR'S OPTION AND EXPENSE, ADDITIONAL REINFORCING MAY BE PERMITTED TO ASSIST IN EASE OF CONSTRUCTABILITY. ADDITIONAL REINFORCING MUST BE SUBMITTED FOR REVIEW ON SHOP DRAWINGS.

**CN10** PROVIDE VERTICAL WALL JOINTS AS FOLLOWS, U.N.O.:  
**CN10.1** WALLS TALLER THAN 12'..... H (H = WALL HEIGHT)  
**CN10.2** WALLS 8' - 12'..... 2"H  
**CN10.3** WALLS SHORTER THAN 8'..... 3"H  
**CN10.4** PROVIDE WALL JOINT WITHIN 10' OF ALL CORNERS AND IN LINE WITH EDGES OF ALL WALL OPENINGS.  
**CN10.5** MAXIMUM WALL JOINT SPACING SHALL NOT EXCEED 25 FEET.

**CN11** EXPOSED CONCRETE:  
**CN11.1** CONTRACTOR SHALL PARTICIPATE IN A PRE-CONSTRUCTION MEETING PRIOR TO ANY CONCRETE POURS WHERE THE CONCRETE SHALL BE PERMANENTLY EXPOSED TO VIEW.  
**CN11.2** CONCRETE MIXES USED FOR CONCRETE SURFACES PERMANENTLY EXPOSED TO VIEW SHALL NOT INCLUDE DELETERIOUS MATERIAL WHICH MAY CAUSE FINISHED SURFACE IRREGULARITIES.  
**CN11.3** CONCRETE FINISHES PERMANENTLY EXPOSED TO VIEW SHALL BE PLACED AND FINISHED ACCORDING TO ACI 347.3R.

**CN12** PERMANENTLY EXPOSED EMBEDDED PLATES AND ANGLES TO BE HOT-DIP GALVANIZED AFTER FABRICATION, U.N.O. NO LOADS OR WELDS SHALL BE PLACED ON EMBEDDED PLATES OR ANGLES FOR A MINIMUM OF 7 DAYS AFTER CASTING.

**CN13** EPOXY REPAIR ADHESIVE SHALL CONFORM TO ASTM C881 AND SHALL BE A TWO-COMPONENT, LIQUID EPOXY WITH NON-SAG CONSISTENCY AND A LONG POT LIFE. THE EPOXY ADHESIVE SHALL BE SUITABLE FOR USE IN DRY OR DAMP CONDITIONS. MINIMUM SHEAR STRENGTH SHALL BE 5,000 PSI; MINIMUM TENSILE STRENGTH SHALL BE 4,000 PSI. HOLE SIZES AND INSTALLATION SHALL BE IN STRICT COMPLIANCE WITH THE APPROVED ICC REQUIREMENTS. DO NOT CUT REINFORCING IN NEW OR EXISTING CONCRETE DURING PLACEMENT.

**SP** **SPECIAL INSPECTION**  
**SP1** SPECIAL INSPECTION PROGRAM SHALL CONFORM TO CHAPTER 17 OF THE IBC.

**SP2** THE OWNER SHALL EMPLOY A SPECIAL INSPECTOR TO PERFORM THE REQUIRED TESTS AND SPECIAL INSPECTIONS WITH QUALIFICATIONS DESCRIBED PER IBC CHAPTER 17 AND THE PROJECT SPECIFICATIONS.

**SP3** SPECIAL INSPECTION REPORTS SHALL BE FURNISHED TO BUILDING OFFICIAL, OWNER, ARCHITECT, STRUCTURAL ENGINEER, AND CONTRACTOR.

**SP4** SPECIAL INSPECTOR SHALL SUBMIT A FINAL REPORT STATING THAT THE STRUCTURAL WORK WAS, TO THE BEST OF THE SPECIAL INSPECTOR'S KNOWLEDGE, PERFORMED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.

**SP5** SPECIAL INSPECTION PROGRAM:

VERIFICATION AND INSPECTION	FREQUENCY / TASK
<b>CONCRETE</b>	
1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, & VERIFY PLACEMENT.	PERIODIC
2. INSPECT ANCHORS CAST IN CONCRETE.	PERIODIC
3. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS:	
A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESISIT SUSTAINED TENSION LOADS.	CONT.
B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A.	PERIODIC
4. VERIFY USE OF REQUIRED DESIGN MIX.	PERIODIC
5. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP & AIR CONTENT TESTS AND DETERMINE CONCRETE TEMPERATURE.	CONT.
6. INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	CONT.
7. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE & TECHNIQUES.	PERIODIC
8. INSPECT PRECAST CONCRETE FOR:	
A. APPLICATION OF PRESTRESSING FORCES.	CONT.
B. GROUTING OF BONDED PRESTRESSING TENDONS.	CONT.
9. INSPECT FORMWORK FOR SHAPE, LOCATION & DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	PERIODIC
<b>SOILS</b>	
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	PERIODIC
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH & HAVE REACHED PROPER MATERIAL.	PERIODIC
3. PERFORM CLASSIFICATION & TESTING OF COMPACTED FILL MATERIALS.	PERIODIC
4. VERIFY USE OF PROPER MATERIALS, DENSITIES & LIFT THICKNESSES DURING PLACEMENT & COMPACTION OF COMPACTED FILL.	CONT.
5. PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE & VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	PERIODIC

**PROGRAM FOOTNOTES**

1. THE ITEMS INDICATED ABOVE SHALL BE INSPECTED IN ACCORDANCE WITH CHAPTER 17 OF THE IBC BY A CERTIFIED SPECIAL INSPECTOR FROM AN ESTABLISHED TESTING AGENCY. FOR MATERIAL SAMPLING AND TESTING REQUIREMENTS, REFER TO THE PROJECT SPECIFICATIONS & THE SPECIFIC STRUCTURAL NOTES SECTIONS. THE TESTING AGENCY SHALL SEND COPIES OF ALL STRUCTURAL TESTING & INSPECTION REPORTS DIRECTLY TO THE ARCHITECT, STRUCTURAL ENGINEER, CONTRACTOR, & BUILDING OFFICIAL. ANY MATERIALS WHICH FAIL TO MEET THE PROJECT SPECIFICATIONS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. SPECIAL INSPECTION TESTING REQUIREMENTS APPLY EQUALLY TO ALL BIDDER DESIGNED COMPONENTS.
2. **CONT.** - CONTINUOUS SPECIAL INSPECTION. SPECIAL INSPECTOR IS PRESENT WHEN & WHERE THE WORK TO BE INSPECTED IS BEING PERFORMED. (IBC SECTION 1702).
3. **PERIODIC** - PERIODIC SPECIAL INSPECTION. SPECIAL INSPECTOR IS INTERMITTENTLY PRESENT WHERE THE WORK TO BE INSPECTED HAS BEEN OR IS BEING PERFORMED.
4. **OBSERVE** - SPECIAL INSPECTOR SHALL OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS (AISC 360 SECTION N5).
5. **PERFORM** - SPECIAL INSPECTOR SHALL PERFORM THESE TASKS FOR EACH JOINT, CONNECTION, ELEMENT OR MEMBER (AISC 360 SECTION N5).



Des Moines, Iowa  
Iowa City, Iowa  
Fort Collins, Colorado  
Kansas City, Missouri

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DES MOINES PUBLIC SCHOOL

STOWE ELEM. RETAINING WALL

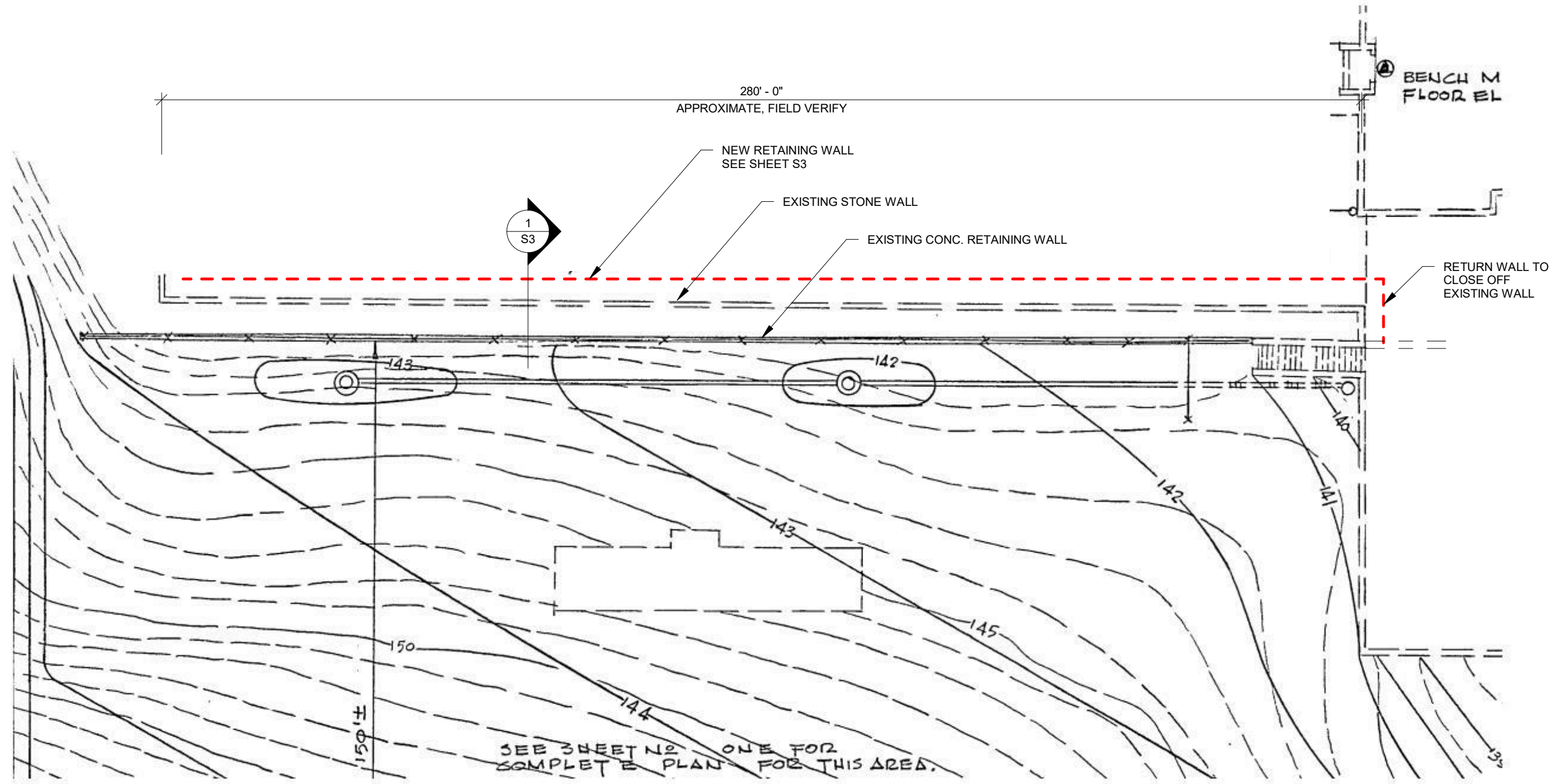
East 33rd & Cleveland  
Des Moines, Iowa

No.	Description	Date
1	BID SET	03/20/18

Job No. RRE18064  
Mgr. JJJH

Sheet Title  
**STRUCTURAL NOTES**

Sheet No.  
**S1**



**A** EXISTING SITE PLAN  
NOT TO SCALE

**PLAN NOTES:**

- 1) CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS & DIMENSION.
- 2) DO NOT UNDERMINE EXISTING RETAINING WALLS.
- 3) COORDINATE DRAIN TILE ELEVATIONS w/ EXISTING CIVIL DRAWINGS.
- 4) EXISTING PLAYGROUND TO REMAIN, DO NOT DAMAGE.
- 5) SEE SHEET S4 FOR TYPICAL FOUNDATION DETAILS NOT SHOWN ON PLAN.

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PROFESSIONAL SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF IOWA

THIS NOTICE COVERS DWGS: ALL S-SERIES SHEETS

SIGNATURE: \_\_\_\_\_

NAME: \_\_\_\_\_ ERIK RAKER, P.E.

DATE: \_\_\_\_\_

MY REGISTRATION EXPIRES IN IOWA: 12/31/19

**RE RAKER RHODES**  
Engineering  
Des Moines, Iowa  
Iowa City, Iowa  
Fort Collins, Colorado  
Kansas City, Missouri

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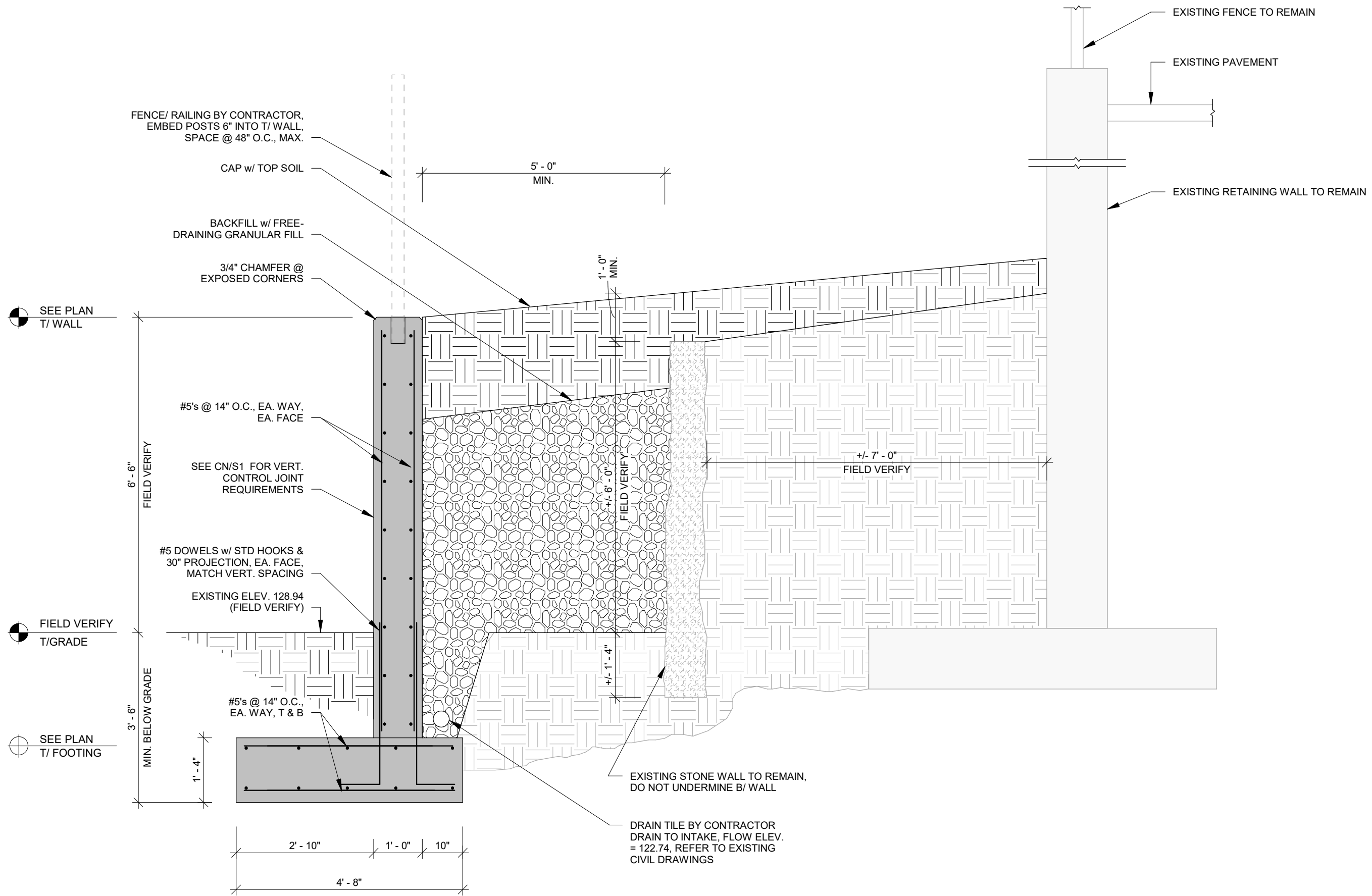
DES MOINES PUBLIC SCHOOL  
STOWE ELEM. RETAINING WALL  
East 33rd & Cleveland  
Des Moines, Iowa

No.	Description	Date
1	BID SET	03/20/18

Job No. \_\_\_\_\_ Proj. \_\_\_\_\_  
Mgr. RRE18064 JJJ

**Sheet Title**  
**OVERALL PLAN**

**Sheet No.**  
**S2**



FENCE/ RAILING BY CONTRACTOR,  
EMBED POSTS 6" INTO T/ WALL,  
SPACE @ 48" O.C., MAX.

CAP w/ TOP SOIL

BACKFILL w/ FREE-  
DRAINING GRANULAR FILL

3/4" CHAMFER @  
EXPOSED CORNERS

#5's @ 14" O.C., EA. WAY,  
EA. FACE

SEE CN/S1 FOR VERT.  
CONTROL JOINT  
REQUIREMENTS

#5 DOWELS w/ STD HOOKS &  
30" PROJECTION, EA. FACE,  
MATCH VERT. SPACING

EXISTING ELEV. 128.94  
(FIELD VERIFY)

#5's @ 14" O.C.,  
EA. WAY, T & B

EXISTING STONE WALL TO REMAIN,  
DO NOT UNDERMINE B/ WALL

DRAIN TILE BY CONTRACTOR  
DRAIN TO INTAKE, FLOW ELEV.  
= 122.74, REFER TO EXISTING  
CIVIL DRAWINGS

EXISTING FENCE TO REMAIN

EXISTING PAVEMENT

EXISTING RETAINING WALL TO REMAIN

SEE PLAN  
T/ WALL

FIELD VERIFY  
T/ GRADE

SEE PLAN  
T/ FOOTING

1 RETAINING WALL SECTION  
1/2" = 1'-0"

DES MOINES PUBLIC SCHOOL

STOWE ELEM. RETAINING WALL

East 33rd & Cleveland  
Des Moines, Iowa

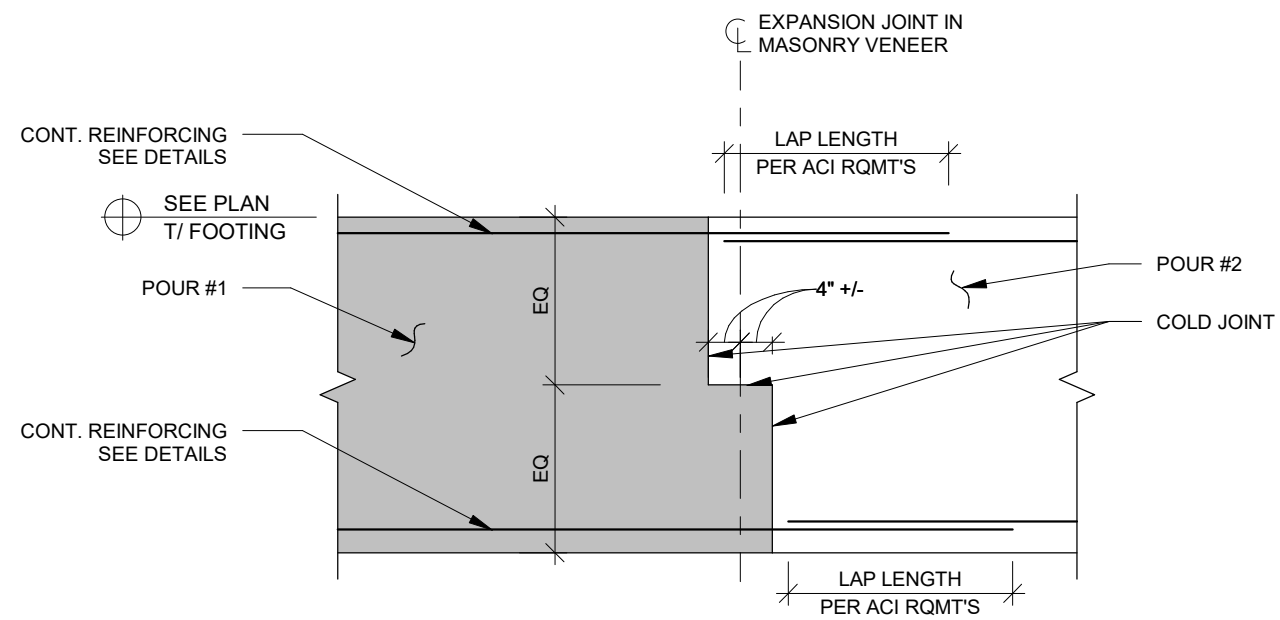
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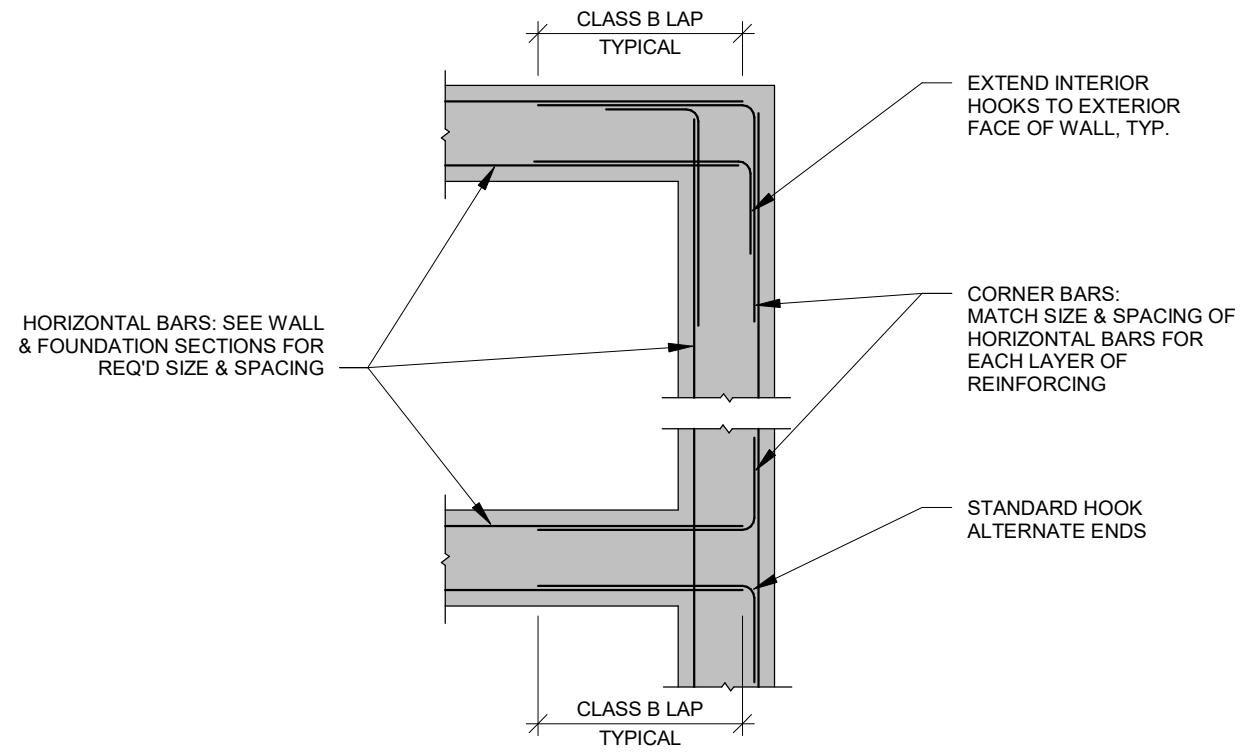
Sheet Title  
**RETAINING WALL**

Sheet No.  
**S3**





① COLD JOINT GRADE BEAM/FROST BEAM  
1/2" = 1'-0"



② TYP. REINFORCING @ CORNERS  
1/2" = 1'-0"

No.	Description	Date
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Sheet Title  
**FOUNDATION  
DETAILS**

Sheet No.  
**S4**