


HUDSON YARDS TOWER D

OWNER
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ARCHITECT
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STRUCTURAL ENGINEER
WSP CANTOR SEINUK

| Job No. 2012068 | | Hudson Yards - Tower D. | |  WSP CANTOR SEINUK STRUCTURAL ENGINEERS <small>200 East 40th Street, 3rd Floor New York, N.Y. 10017-3903 Tel: 212-687-9888 Fax: 646-487-5501 www.cantorseinuk.com</small> | |
|--------------------------------|------------------------------------|-------------------------|-----|---|-------------------------|
| STRUCTURAL DRAWING LIST | | | | | |
| SHEET NUMBER | SHEET NAME | SCALE | NO. | DATE | ISSUE |
| FO-201 | GENERAL NOTES & LEGEND | | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-100 | FOUNDATION PLAN (CELLAR) | 1/8"=1'-0" | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-101 | MAT FOUNDATION PLAN | 1/4"=1'-0" | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-200 | FOUNDATION TYPICAL DETAILS 1 | N.T.S | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-201 | FOUNDATION TYPICAL DETAILS 2 | N.T.S | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-202 | FOUNDATION TYPICAL DETAILS 3 | N.T.S | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-203 | FOUNDATION TYPICAL DETAILS 4 | N.T.S | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-300 | FOUNDATION SECTIONS 1 | 1/8"=1'-0" | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-301 | FOUNDATION SECTIONS 2 | 1/8"=1'-0" | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-302 | FOUNDATION SECTIONS 3 | 1/2"=1'-0" | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| FO-303 | FOUNDATION SECTIONS 4 | 1/2"=1'-0" | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |
| S-340 | SHEAR WALL REINFORCEMENT DETAILS 1 | | | 4-Feb-14 | FOUNDATION PERMIT ISSUE |



ABBREVIATIONS:

Table of abbreviations and their corresponding full names, organized in columns. Includes terms like ANCHOR BOLT, AIR CONDITIONER, AMERICAN CONCRETE INSTITUTE, etc.

FOUNDATION NOTES:

- A. EXCAVATION
1. ALL COLUMNS AND SHEAR WALL FOUNDATION SHALL BEAR ON DRILLED-IN CAISSONS (SEE CAISSON NOTES.)
2. REFER TO SUPPORT OF EXCAVATION DRAWINGS FOR ALL RELEVANT CONDITIONS AND DETAILS.
3. ALL SECANT PILING, UNDERPINNING, SHEETING, SHORING OR OTHER CONSTRUCTION REQUIRED FOR THE SUPPORT OF ADJACENT PROPERTIES, BUILDINGS, SIDEWALKS, UTILITIES, ETC., SHALL BE SUBJECT TO SPECIAL INSPECTION AS REQUIRED BY THE CODE. THE CONTRACTOR SHALL RETAIN A LICENSED PROFESSIONAL ENGINEER ACCEPTABLE TO THE ENGINEER OF RECORD TO PROVIDE THE NECESSARY DESIGN AND THE REQUIRED INSPECTION. THE CONTRACTOR'S PROFESSIONAL ENGINEER SHALL PREPARE AND FILE THE REQUIRED FORMS FOR THE WORK WITH THE BUILDING DEPARTMENT.

CAISSON NOTES:

- 1. FOUNDATION DESIGN AND CAISSON STRENGTH ARE BASED ON THE FOLLOWING INFORMATION PROVIDED BY LANGAN ENGINEERING ENVIRONMENTAL AND LANDSCAPE SURVEY ARCHITECTURE, EPC - GEOTECHNICAL ENGINEERING REPORT DATED 31 OCTOBER 2013
2. THE DESIGN AND INSTALLATION OF CAISSON (PILES) PILES, PILE CAPS, AND RELATED CONSTRUCTION IS TO CONFORM TO THE REQUIREMENTS SET FORTH IN THE CURRENT NEW YORK CITY BUILDING CODE AND SPECIFICATIONS.
3. CAISSON CAPACITIES TO BE:
A. 7000 TONS IN COMPRESSION U.O.N. ON CAISSON SCHEDULE ON FO-202.
THE PROPOSED FILE IS AS FOLLOWS:
A.1 FOR CAISSON DETAILS REFER TO FO-202.
- SOCKET LENGTH INTO NYC BLDG CODE CLASS IC OR BETTER ROCK PER CAISSON SPECS.
B. WHERE INDICATED ON PLAN CAISSON CAPACITY OF 8500 TON IN COMPRESSION REQ'D LATERAL AND TENSION LOAD CAPACITY ARE TO BE PROVIDED FOR ABOVE.
(LANGAN ENGINEERING TO VERIFY CAISSON DESIGN AND DETAILS)

LEGEND:

- a. [] INDICATES THE BOTTOM OF FOUNDATION WALL ELEVATION (1'-0" BELOW TOP OF S.O.G. EL. U.O.N. ON PLAN).
b. <-> INDICATES THE TOP OF FOUNDATION WALL ELEVATION.
c. [] INDICATES REQUIRED DIMENSION IS MISSING AND TO BE SUPPLIED BY ARCH.
d. [] INDICATES DIMENSIONS SHOWN TO BE VERIFIED BY ARCH.
e. [] INDICATES MISSING COORDINATE TO BE SUPPLIED BY ARCH.
f. Fxxx INDICATES FOOTING MARK 8/20 1/5F
g. [] INDICATES 6" PERFORATED PIPE, FOR UNDERGROUND DRAINAGE SYSTEM, REFER TO GEOTECHNICAL CONSULTANT DOCUMENTS.
h. [] INDICATES CLEANOUT
i. [] INDICATES CHANGE IN ELEVATION
j. [] INDICATES ADDITIONAL TOP REINFORCING
k. [] INDICATES ADDITIONAL TOP REINFORCEMENT CONTINUOUS BETWEEN SUPPORTS
l. [] INDICATES ADDITIONAL BOTTOM REINFORCING
m. [] 1ST & 4TH LAYERS
INDICATES ORDER OF BAR PLACEMENT AS SHOWN ON PLAN 2ND & 3RD LAYERS
n. [] INDICATES 4" CONC. PAD REINF. W/6#6-W2.0xW2.0 W.W.F. (1" FROM TOP OF PAD), SEE TYPICAL DETAIL ON DWG. FO-200. FOR LOCATION SEE ARCH'L DWGS.
o. [XXX] INDICATES EQUIPMENT LOADS IN LBS
p. [] INDICATES CONCRETE COLUMN/FOUNDATION WALL/SHEARWALL
q. [] INDICATES COLUMN/SHEARWALL BELOW
r. [] INDICATES CONCRETE WALL
s. [] INDICATES CONCRETE INFILL
t. [] INDICATES CMU WALL
u. [] INDICATES SLAB OPENING
v. [SWX] INDICATES SHEARWALL DESIGNATION
w. [P] INDICATES POST NUMBER
x. [XX] INDICATES COLUMN NUMBER
y. [] INDICATES COLUMN/POST ABOVE OR BELOW
z. SC INDICATES SHEAR CONNECTION
aa. MID-DEPTH INDICATES WALKING COLUMN MID-DEPTH SLAB REINFORCEMENT.
bb. [] INDICATES 60 LENTON TERMINATOR.
cc. + INDICATES CAMBER ALL MEASURED FROM SLAB ELEVATION AT COLUMN LOCATIONS.

STEEL LEGEND:

- a. [] INDICATES STEEL MOMENT CONNECTION.
b. [] INDICATES STRUCTURAL STEEL BEAMS
c. [] INDICATES CAMBER
d. <-> INDICATES STUFS

C. CODES AND TESTS

- 1. THIS STRUCTURE HAS BEEN DESIGNED UNDER THE PROVISIONS OF THE 2008 NEW YORK CITY BUILDING CODE AS AMENDED AND A.C.I. 318.
2. ALL CONTROLLED CONCRETE SHALL COMPLY WITH THE A.C.I. 318 BUILDING CODE. APPLICATION FOR CONTROLLED CONCRETE WITH CONCRETE TESTS AND CURVES OF TESTS FOR THE PRELIMINARY DESIGN MIX PREPARED BY AN APPROVED LABORATORY MUST BE SUBMITTED TO THE ENGINEER FOR FILING WITH THE BUILDING DEPARTMENT. NO CONCRETE SHALL BE PLACED WITHOUT THE DESIGN MIX BEING APPROVED BY THE BUILDING DEPARTMENT.
3. DESIGN AND CONSTRUCTION OF FORMWORK IS TO COMPLY WITH THE A.C.I. 318 BUILDING CODE AND NEW YORK CITY BUILDING CODE AS AMENDED.

NON-STRUCTURAL ITEMS SHOWN ON THE STRUCTURAL/FOUNDATION DRAWINGS

THE FOLLOWING NON-STRUCTURAL ITEMS MAY BE SHOWN ON THE STRUCTURAL AND/OR FOUNDATION DRAWINGS FOR THE PURPOSE OF CLARITY IN INTERFACE WITH STRUCTURAL AND/OR FOUNDATION WORK. ITEMS BELOW MAY NOT BE FULLY DEFINED ON THE STRUCTURAL/FOUNDATION DRAWINGS. THE INFORMATION FOR NON-STRUCTURAL ELEMENTS IS FURNISHED BY OTHER CONSULTANTS AS LISTED BELOW. ALL RFI AND SHOP DRAWINGS RELATED TO THESE NON-STRUCTURAL ITEMS SHALL BE SUBMITTED TO THE CONSULTANTS LISTED BELOW FOR THEIR REVIEW AND APPROVAL.

- GEOTECHNICAL ENGINEER/OTHERS
- FOUNDATION/UNDERSLAB WATERPROOFING, DAMPPROOFING SYSTEMS
- CAISSONS AND PILES, INCLUDING REINFORCEMENT
- UNDER GROUND DRAINAGE SYSTEM
ARCHITECT OF RECORD
- SUMP PITS WATERPROOFING/DAMPPOOFING APPLIED TO EXPOSED SURFACES, ELEVATOR OR SUMP PIT INTERIOR SURFACES
- DRAINAGE TRENCHES AND GRATINGS
- PAINT
- FIREPROOFING
- CONCRETE CURBS: HEIGHT, WIDTH, EXTENT, LOCATION
- BRICK, BLOCK, TILE MASONRY, METAL PANELS, PRECAST PANELS, CURTAIN WALLS, AND ALL OTHER FACADE SYSTEMS
- ROOFING SYSTEMS, DRAIN LOCATIONS, SLOPES TO DRAINS, FILLS, INSULATION, PAVERS, OR GRAVEL
- FLOATING/SECONDARY SLABS

DESIGN FLOOD CRITERIA:
1. THE DESIGN FLOOD ELEVATION (DFE) HAS BEEN ESTABLISHED AT EL. +15'-0" (NAVD)/+13'-4" (BPMD).
2. THE STRUCTURE HAS BEEN DESIGNED TO RESIST THE FORCES GENERATED BY A DFE AT +13'-4" BPMD AND AS DEFINED BY ASCE-7.

ROCK ANCHOR GENERAL NOTES

- 1. ROCK ANCHORS SHALL BE IN CONFORMANCE WITH CLASS 1 (DOUBLE CORROSION PROTECTION) OF LATEST PITI (POST - TENSIONING INSTITUTE) "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" FOR SIZES AND LOCATIONS SEE FOUNDATION DRAWINGS.
2. ALL ROCK ANCHORS SHALL BE GRADE 150 THREADED BARS CONFORMING TO ASTM A-722. THREADED BARS SHALL BE PROVIDED WITH SHOP FABRICATED DOUBLE CORROSION PROTECTION. THREADED BARS, ANCHORAGES, CENTRALISES, ACCESSORIES, CORROSION PROTECTION SYSTEM, ETC. SHALL BE PROVIDED BY SAS STRESSTEEL OR APPROVED EQUAL.
3. THREADED BARS SHALL BE ENCAPSULATED WITH HIGH STRENGTH PVC CORRUGATED SHEATHING (COMPRESSIVE STRENGTH = 7,000 PSI) AND SHALL BE PRE-GROUTED BY THE MANUFACTURER.
4. PLATES SHALL CONFORM TO ASTM A-36, UNLESS GRADE 50 IS CALLED FOR IN THE DETAILS.
5. ANCHOR NUTS AND COUPLERS SHALL BE CAPABLE OF DEVELOPING 100% OF THE ULTIMATE STRENGTH OF THE THREADED BAR.
6. CARE MUST BE TAKEN NOT TO DAMAGE THE TENDONS. KEEP ALL COMPONENTS OF THE SYSTEM FREE OF DIRT OR OTHER DELETERIOUS SUBSTANCES.
7. DO NOT WELD IN THE VICINITY OF THE THREADED BARS.
8. DO NOT USE ANCHORS AS A GROUND FOR WELDING.
9. TEN PERCENT OF THE ANCHORS INSTALLED SHALL BE PERFORMANCE TESTED. ALL OTHER ANCHORS SHALL BE PROOF TESTED. ALL TESTS SHALL BE PERFORMED USING A CALIBRATED CENTER HOLE JACK.
10. PERFORMANCE TESTS SHALL BE MADE BY CYCLICALLY AND INCREMENTALLY LOADING AND UNLOADING THE ANCHOR IN ACCORDANCE WITH THE FOLLOWING SCHEDULE, WHERE AL=ALIGNMENT LOAD AND P= DESIGN LOAD:
10.1. AL, 25P
10.2. AL, 25P, 50P
10.3. AL, 25P, 50P, 75P
10.4. AL, 25P, 50P, 75P, 1.00P
10.5. AL, 25P, 50P, 75P, 1.00P, 1.20P
10.6. AL, 25P, 50P, 75P, 1.00P, 1.20P, 1.33P (TEST LOAD)
HOLD 1.33P FOR (CREEP) TEST. RECORD MOVEMENTS AT EACH INCREMENT USING A DIAL INDICATOR CAPABLE OF READING INCREMENTS OF .001 INCH. ALL IN CONFORMANCE WITH PITI RECOMMENDATIONS. RECORD READINGS AT 0, 1, 2, 3, 4, 5, 6, AND 10 MINUTES UP TO 60 MINUTES REDUCE LOAD TO "TRANSFER LOAD" AND LOCK OFF ANCHOR NUT AT "TRANSFER LOAD"
11. PROOF TESTS SHALL BE MADE BY INCREMENTALLY LOADING THE ANCHOR: AL, 25P, 50P, 75P, 1.00P, 1.20P, 1.33P (TEST LOAD, TEN MINUTE HOLD). RECORD MOVEMENTS AT EACH INCREMENT IN CONFORMANCE WITH PITI RECOMMENDATIONS. REDUCE LOAD TO "TRANSFER LOAD" AND LOCK OFF ANCHOR NUT AT "TRANSFER LOAD"
12. CONTRACTOR SHALL SUBMIT ANCHOR SHOP DRAWING(S) FOR APPROVAL PRIOR TO COMMENCING ANCHOR INSTALLATION. SHOP DRAWING(S) SHALL CONTAIN ANCHOR DETAILS, AND INSTALLATION AND TESTING PROCEDURES.

D. SEISMIC AND WIND CRITERIA

- 1. THE STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE 2008 NEW YORK CITY BUILDING CODE (NYCBC 2008).
2. WIND DESIGN DATA:
BASED ON INTERIM WIND TUNNEL TESTING REPORT BY ROWAN WILLIAMS DAVIES & IRWIN INC.(RWDI) DATED 09/12/2013
3. EARTHQUAKE DESIGN DATA:
AS PER LANGAN GEOTECHNICAL REPORT DATED OCTOBER 31, 2013
- S_{DS} = 0.195, S_{D1} = 0.038
- SITE CLASS A
- SEISMIC DESIGN CATEGORY = B
- SEISMIC FORCE RESISTING SYSTEM = ORDINARY REINFORCED CONCRETE SHEARWALLS
- DESIGN BASE SHEAR (V): E/W = 2400 kips
N/S = 2400 kips
= 0.0086
- SEISMIC RESPONSE COEFFICIENT (C): N/S = 0.0086
- RESPONSE MODIFICATION FACTORS: R = 5.0
- ANALYSIS PROCEDURE USED = EQUIVALENT LATERAL FORCE PROCEDURE
THE PRIMARY STRUCTURE HAS BEEN ANALYZED AND DESIGNED IN ACCORDANCE WITH SUBSECTION 1626 "THE SPECIFIC LOCAL RESISTANCE METHOD" UNDER SECTION BC 1626 "STRUCTURAL INTEGRITY - KEY ELEMENT ANALYSIS" OF THE 2008 NEW YORK CITY BUILDING CODE.
UNDER THE PROVISIONS OF SECTION BC 1627 OF THE 2008 NEW YORK CITY BUILDING CODE, THE PRIMARY STRUCTURE IS SUBJECT TO A STRUCTURAL PEER REVIEW.
THE STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH NYC BC LL 17/95
BUILDING SEPARATION HAS BEEN PROVIDED IN ACCORDANCE WITH NYC BC 1617.3.2. AND IFCN 2/96 - 1" PER 50 FT. IN HT.

LOADING SCHEDULE table with columns: OCCUPANCY, PARTITION/FILL &/OR FINISHES (PSF), CEL. & MECH. (PSF), LIVE LOAD. Rows include ROOF, MECHANICAL ROOF/TERRACES, LOBBIES/STAIRS/CORRIDORS, MECHANICAL ROOMS, OFFICE, GYM, LIGHT STORAGE, RESIDENTIAL.

SPECIAL INSPECTIONS table with columns: SPECIAL INSPECTION, CURRENT CODE REFERENCES. Rows include CONCRETE - CAST IN PLACE, CONCRETE TEST CYLINDERS (TR2), CONCRETE DESIGN MIX (TR3), SOILS - SITE PREPARATION, SOILS - INVESTIGATIONS (BORINGS/TEST PITS) (TR4), PILE FOUNDATIONS & DRILLED PIER INSTALLATION (TR5), SPRAYED FIRE RESISTANT MATERIALS, EXCAVATION - SHEETING, SHORING AND BRACING, STRUCTURAL SAFETY - STRUCTURAL STABILITY.

THESE TEST MUST BE PERFORMED BY A LICENSED CONCRETE TESTING LAB.
NOTES:
1. REFER TO THE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION ON SCOPE AND DETAILED REQUIREMENTS FOR INSPECTIONS.
2. ALL SPECIAL INSPECTIONS SHALL BE PERFORMED UNDER THE SUPERVISION OF A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW YORK.
3. REPORTS OF RESULTS SHALL BE SUBMITTED TO THE OWNER AND ARCHITECT FOR REVIEW. SIGNED COPIES OF ALL TESTS AND INSPECTION REPORTS SHALL BE FILED WITH THE BUILDING DEPARTMENT (THROUGH THE APPLICANT).
4. REPORTS SHALL STATE WHETHER RESULTS COMPLY WITH CONTRACT REQUIREMENTS. SUMMARIZE THE TYPE OF TEST, THE LOCATION OR COMPONENT TESTED, AND RECOMMEND ANY REMEDIAL MEASURES REQUIRED. REPORT SHOULD NOTE ANY OTHER DEVIATIONS FROM THE CONTRACT DOCUMENTS.

HUDSON YARDS TOWER D

OWNER: Related Companies
60 Columbus Circle
New York, NY 10023
T: 212.801.1000
EXECUTIVE ARCHITECT:
Himmel+Reinhold Architects
48 West 37th Street
New York, NY 10018
T: 212.290.1444

DESIGNER:
Diller Scofidio+Renfro
601 West 88 Street-1915
New York, New York 10001
T: 212.260.7971

ENGINEER:
Rockwell Group
5 Union Square, West
New York, New York 10003
T: 212-463-0334

STRUCTURAL ENGINEER:
WSP Cantor Seimuk
228 E 49th Street
New York, NY 10017
212-687-0888

MEP ENGINEER:
Jaros Baum & Bolles Consulting Engineers
80 Pine Street
New York, NY 10005
T: 212-269-5884

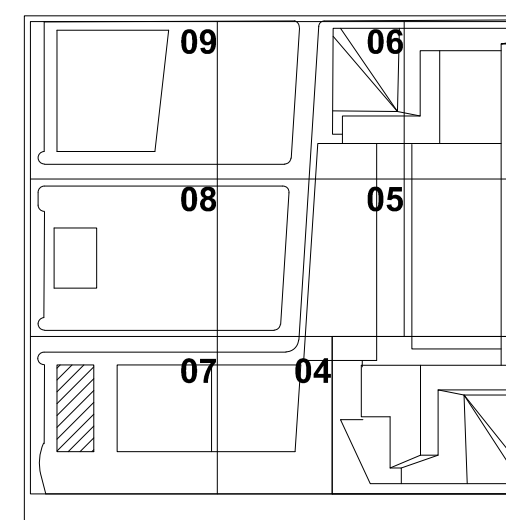
EXTERIOR WALL CONSULTANT:
Haral Berger & Associates
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 212-689-9368

VERTICAL TRANSPORTATION:
Van Dusen & Associates
5 Right Street, Suite 324
LIVINGSTON, NJ 07039
T: 973-994-9220

LEED CONSULTANT:
Vivian
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 203-296-1411

ACUSTICAL CONSULTANTS:
CERAMI & ASSOCIATES INC.
404 4th Avenue #8
New York, NY 10018
T: 212-370-1776

LANDSCAPE ARCHITECT:
200 Park Avenue South, Suite 920
New York, NY 10003
T: 212-690-2270



PRINTING DATE table with columns: PRINTING, DATE. Rows include EARLY FOUNDATION PACKAGE 02-01-13, 100% SD ISSUE 02-15-13, REVISED SD ISSUE 05-06-13, REVISED SD ISSUE 06-21-13, CAISSON PRICING SET 11-08-13, FINAL SD ISSUE 11-25-13, FOUNDATION BID PACKAGE 01-10-14, FOUNDATION PERMIT ISSUE 02-04-14, FOUNDATION PERMIT ISSUE 03-19-14, FOUNDATION BID SET 06-02-14, REVISED AS NOTED 06-27-14, FOUNDATION BID SET 07-11-14, REVISED AS NOTED 07-23-14.



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GENERAL NOTES
ABBREVIATIONS AND LEGENDS
DRAWING NO.

FO-001.00

HUDSON YARDS TOWER D

OWNER:
Related Companies
60 Columbus Circle
New York, NY 10023
T: 212.891.1000

EXECUTIVE ARCHITECT:
Harold Levy Architects
48 West 37th Street
New York, NY 10018
T: 212.290.1444

DESIGNER:
Diller Scofidio+Renfro
601 West 28 Street-1915
New York, New York 10001
T: 212.260.7971

DESIGNER:
Rockwell Group
5 Union Square, West
New York, New York 10003
T: 212-463-0334

STRUCTURAL ENGINEER:
WSP | Partner Seligson
232 E 45th Street
New York, NY 10017
T: 212.687.9888

MEP ENGINEER:
Jaros Baum & Bolles Consulting Engineers
80 Pine Street
New York, NY 10005
T: 212-269-5884

EXTERIOR WALL CONSULTANT:
Harold Berger & Associates
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 212-686-9388

VERTICAL TRANSPORTATION:
Van Deusen & Associates
5 Right Street, Suite 524
Livingston, NJ 07039
T: 973-994-9220

LEED CONSULTANT:
Vivian
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 203-296-1411

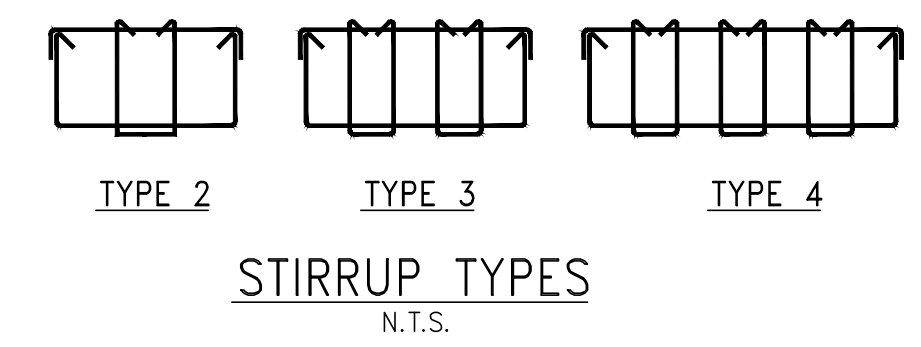
ACOUSTICAL CONSULTANTS:
CERAMI & ASSOCIATES INC.
434 5th Avenue #8
New York, NY 10018
T: 212-370-1776

LANDSCAPE DESIGNER:
Robert Byrne Note
200 Park Avenue South, Suite 920
New York, NY 10003
T: 212-260-2270

- NOTES:**
- ALL ELEVATIONS INDICATED ARE ABSOLUTE ELEVATIONS USING THE BOROUGH PRESIDENT OF MANHATTAN DATUM (BPMVD) WHICH IS 2.75' ABOVE THE U.S. COASTAL AND GEODETIC SURVEY DATUM - MEAN SEA LEVEL AT SANDY HOOK, NEW JERSEY, 1929.
 - TOP OF PRESSURE SLAB TO BE -4'-0" U.O.N. ON PLAN.
 - STRUCTURAL PRESSURE SLAB SHALL BE 20" THICK NORMAL WEIGHT CONC. U.O.N. ON PLAN. SEE TYPICAL DETAIL ON FO-200 FOR SLAB CONSTRUCTION.
 - SLAB REINF. SHALL BE #7@12 E.W. CONT. TOP & BOT. FOR 20" SLAB. #5@12 E.W. CONT. TOP & BOT. FOR 12" SLAB.
 - DOUBLE SLAB CONSTRUCTION (SEE TYPICAL DETAIL ON FO-200) TO BE USED THROUGHOUT, EXCEPT WHERE NOTED ON PLAN.
 - IN AREA HIGHLIGHTED AND/OR NOTED ON PLAN DOUBLE SLAB CONSTRUCTION NOT REQUIRED.
 - CONCRETE TO BE NORMAL WEIGHT WITH MIN. DESIGN STRENGTH, f_c (828 DAYS) AS FOLLOWS:
BEAMS + SLABS - 5000psi
FOUNDATION WALLS - 6000psi
SPREAD FOOTINGS AND MAT FOOTINGS - 10,000psi
 - RETAINING WALL VARIES IN HEIGHT - SEE PLAN. MAX RETAINED SOIL ELEVATION: +20'-0".
 - FOR MAT THICKNESS AND REINF. SEE FO-101.
 - CENTER OF FOOTING SHALL BE CENTER OF SINGLE COLUMN/WALL ABOVE U.O.N.
 - PROVIDE DOWELS IN FOOTING TO MATCH VERTICAL WALL/COLUMNS PIER REINFORCEMENT.
 - FOR LOCATION OF EDGE OF SLAB SEE ARCHITECTURAL DRAWINGS.
 - ALL SUBGRADE PREPARATION PER GEOTECH REPORT.
 - MAT FOUNDATION DIMENSIONS SHOWN ON FO-101
 - FOR NOTES, ABBREVIATIONS & LEGEND SEE DWG. FO-001
 - FOR TYP. FOUNDATION DETAILS SEE FO-200 SERIES DWGS
 - FOR FOUNDATION SECTIONS SEE FO-300 SERIES DRAWINGS
 - FOR SHEARWALL REINFORCEMENT AND DETAILS SEE S-940 SERIES DRAWINGS.
 - FOR COLUMN SIZE & DETAILS SEE S-950 SERIES DRAWINGS.
 - FOR HIGH & LOW POINTS IN SLAB SEE ARCH. DRAWINGS.

- LEGEND:**
- INDICATES CAISSON WITH SIZE AND TENSION CAPACITY AS INDICATED ON FO-200 SERIES DWGS. FOR CAISSON TENSION DEVELOPMENT DETAIL SEE DWG. FO-202.
 - INDICATES CAISSON WITH SIZE AND COMPRESSION CAPACITY AS INDICATED ON FO-200 SERIES DWGS. FOR CAISSON REINFORCING DEVELOPMENT DETAIL SEE DWG. FO-202.

| BEAM MARK | SIZE | | REINFORCEMENT | | | STIRRUPS | | | REMARKS |
|-----------|----------|-------|-------------------|----------------|---------------------------|----------|------|---------|----------------------------------|
| | WIDTH | DEPTH | BOTTOM CONTINUOUS | TOP CONTINUOUS | TOP ADD'L BARS AT SUPPORT | TYPE | SIZE | SPACING | |
| GB1 | | | | | | | | | |
| GB2 | NOT USED | | | | | | | | |
| GB3 | | | | | | | | | |
| GB4 | | | | | | | | | |
| GB5 | | | | | | | | | |
| GB6 | 36 | 36 | 4-#11 | 4-#11 | 2-#11 @ INTERIOR MCHL | 2 | #4 | @12 | TOP REINF. IN 2 LAYERS @ SUPPORT |
| GB7A | 36 | 36 | 6-#11 | 6-#11 | 4-#11 @ RIGHT SUPPORT | 2 | #4 | @12 | TOP REINF. IN 2 LAYERS @ SUPPORT |
| GB7B | 36 | 36 | 6-#11 | 6-#11 | | 2 | #4 | @12 | |
| GB8 | 42 | 52 | 12-#11 | 6-#11 | | 2 | #4 | @12 | BOTT. REINF. IN 2 LAYERS |
| GB9 | 32 | 36 | 4-#11 | 4-#11 | 2-#11 @ INTERIOR MCHL | 2 | #4 | @8 | |
| GB11 | 72 | 54 | 6-#11 | 54-#11 | | 4 | #4 | @12 | TOP REINF. IN 3 LAYERS |



DESIGN FLOOD CRITERIA:

- THE DESIGN FLOOD ELEVATION (DFE) HAS BEEN ESTABLISHED AT EL. +15'-0" (NAV)/+13'-4" (BPMVD).
- THE STRUCTURE HAS BEEN DESIGNED TO RESIST THE FORCES GENERATED BY A DFE AT +13'-4" BPMVD AND AS DEFINED BY ASCE-7.

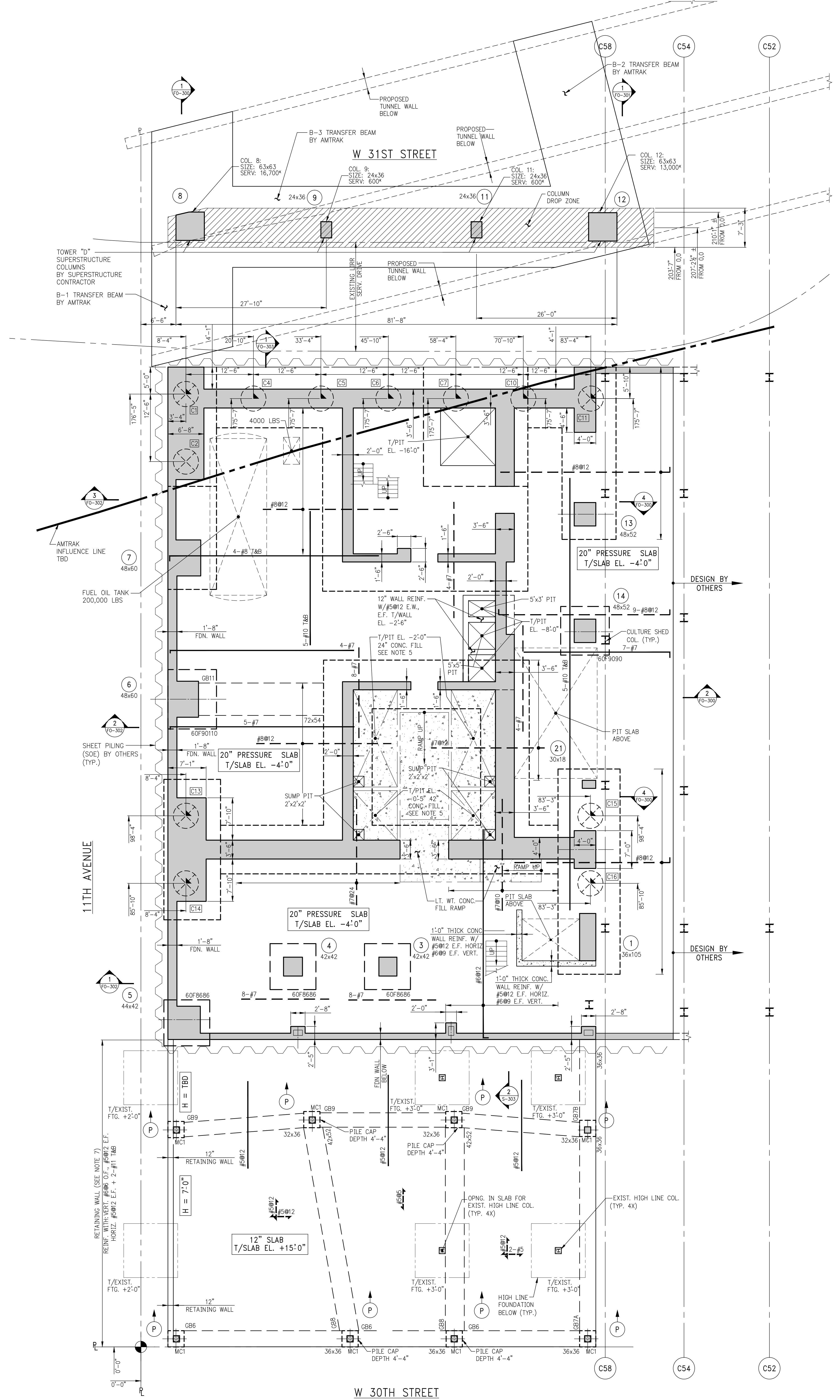
VERTICAL COLUMN DOWELS AT FOUNDATION LEVEL [$f_c=12,000$ PSI]

| COLUMN # | COLUMN SIZE | VERTICAL REINF. |
|----------|----------------------|----------------------|
| 01 | 36 x 105 | 36-#11 |
| 03 | 42 x 42 | 40-#11 |
| 04 | 42 x 42 | 40-#11 |
| 05 | 44 x 42 | 36-#11 |
| 06 | 48 x 60 | 48-#11 |
| 07 | 48 x 60 | 48-#11 |
| 08 & 12 | SEE FO-200 + F20-200 | SEE FO-200 + F20-200 |
| 9 & 11 | 24 x 36 | 6-#11 |
| 13 | 48 x 52 | 48-#11 |
| 14 | 48 x 52 | 48-#11 |
| 21 | 30 x 18 | 6-#11 |
| P | 12x20/20x12 | 6-#7 |

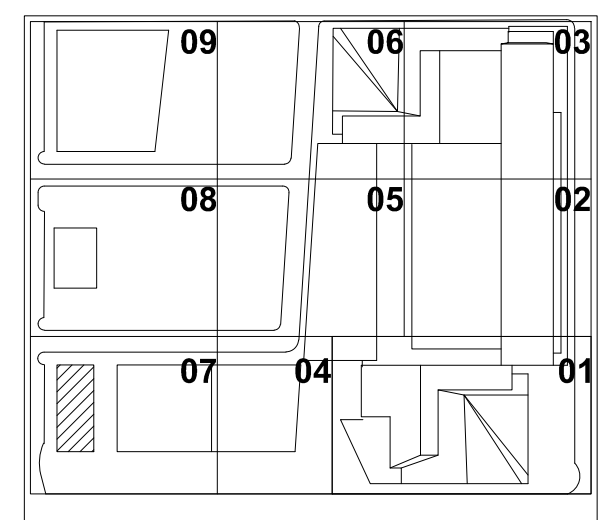
FOOTING SCHEDULE
CONCRETE: $f_c = 10$ ksi ALLOWABLE BEARING PRESSURE = 60 TONS/SF

| MARK | SIZE | THICKNESS (DEPTH IN INCHES) | BOTTOM REINFORCING LONG BARS | SHORT BARS | REMARKS |
|----------|--------------|-----------------------------|------------------------------|------------|---------|
| 60F8686 | 8'-0"x8'-6" | 54 | 16-#11 | 16-#11 | |
| 60F9090 | 9'-0"x9'-0" | 48 | 18-#11 | 18-#11 | |
| 60F90110 | 9'-0"x11'-0" | 54 | 17-#11 | 20-#11 | |

- NOTES:**
- FOOTING MARK DENOTES SIZE OF FOOTING IN FEET AND INCHES.
 - FIRST FOOTING DIMENSION ON PLAN IS IN EAST-WEST DIRECTION SHORT AND LONG BARS MATCH FOOTING ORIENTATION.



1 FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



PRINTING DATE

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New York, NY 10023
T: 212.801.1000

EXECUTIVE ARCHITECT:
Samuel Levy Architects
48 West 37th Street
New York, NY 10018
T: 212.290.1444

DESIGNER:
Diller Scofidio+Renfro
601 West 88 Street, 1815
New York, New York 10001
T: 212.260.7971

DESIGNER:
Rockwell Group
5 Union Square, West
New York, New York 10003
T: 212.463.0334

STRUCTURAL ENGINEER:
WSP Cantor Seinuk
228 E 49th Street
New York, NY 10017
T: 212.687.9888

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Jaros Baum & Bolles Consulting Engineers
80 Pine Street
New York, NY 10005
T: 212.269.5894

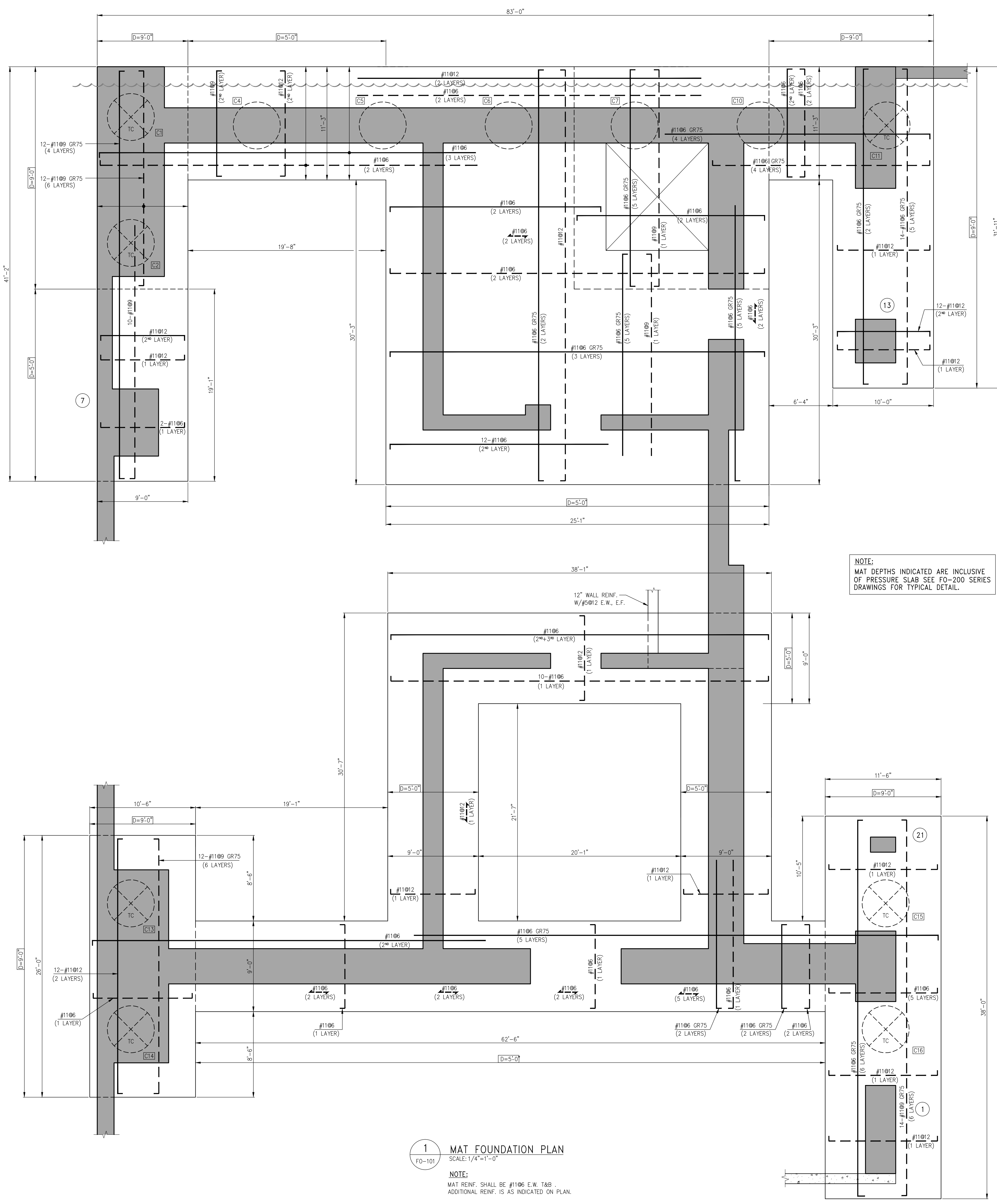
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5 Regent Street, Suite 324
Livingston, NJ 07039
T: 973-994-9220

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Vividian
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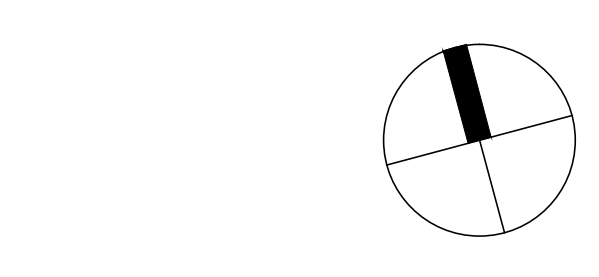
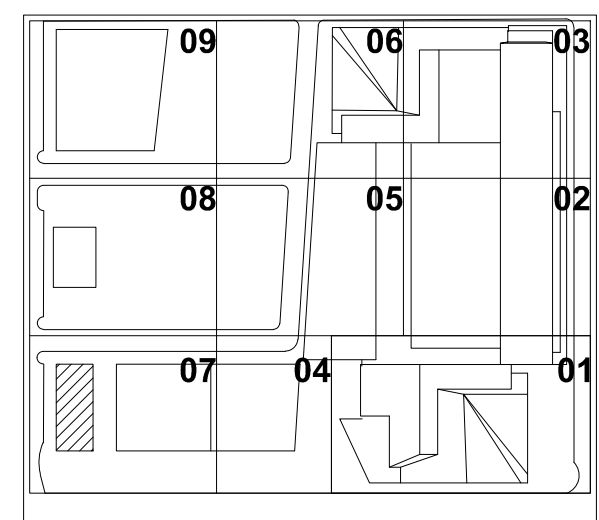
LANDSCAPE DESIGNER:
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New York, NY 10003
T: 212-260-2270



1 MAT FOUNDATION PLAN
SCALE: 1/4"=1'-0"

NOTE:
MAT REIN. SHALL BE #1106 E.W. 1&6
ADDITIONAL REIN. IS AS INDICATED ON PLAN.

LEGEND:
--- INDICATES ADDITIONAL BOTTOM REINFORCEMENT
— INDICATES ADDITIONAL TOP REINFORCEMENT



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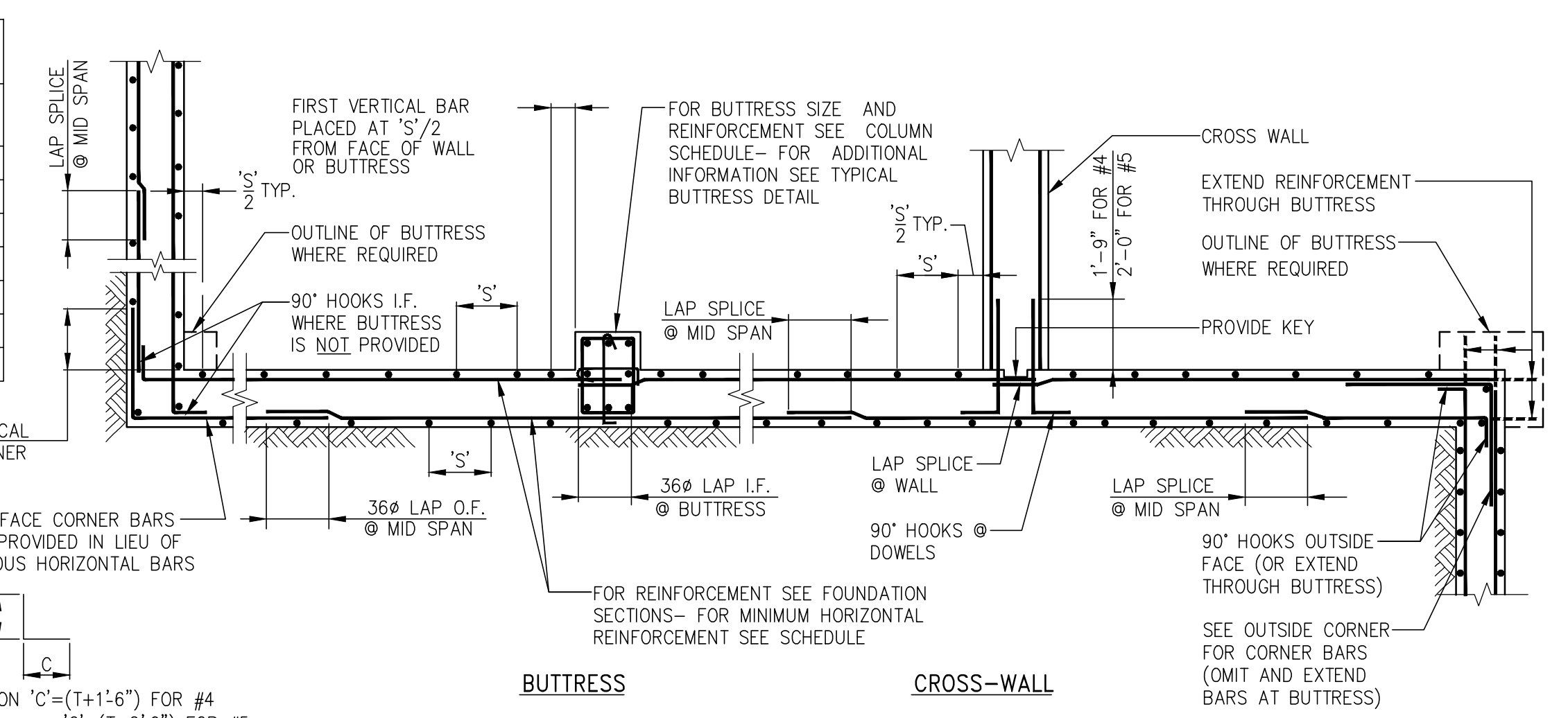
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SHEET TITLE:
MAT FOUNDATION PLAN

DRAWING NO.:
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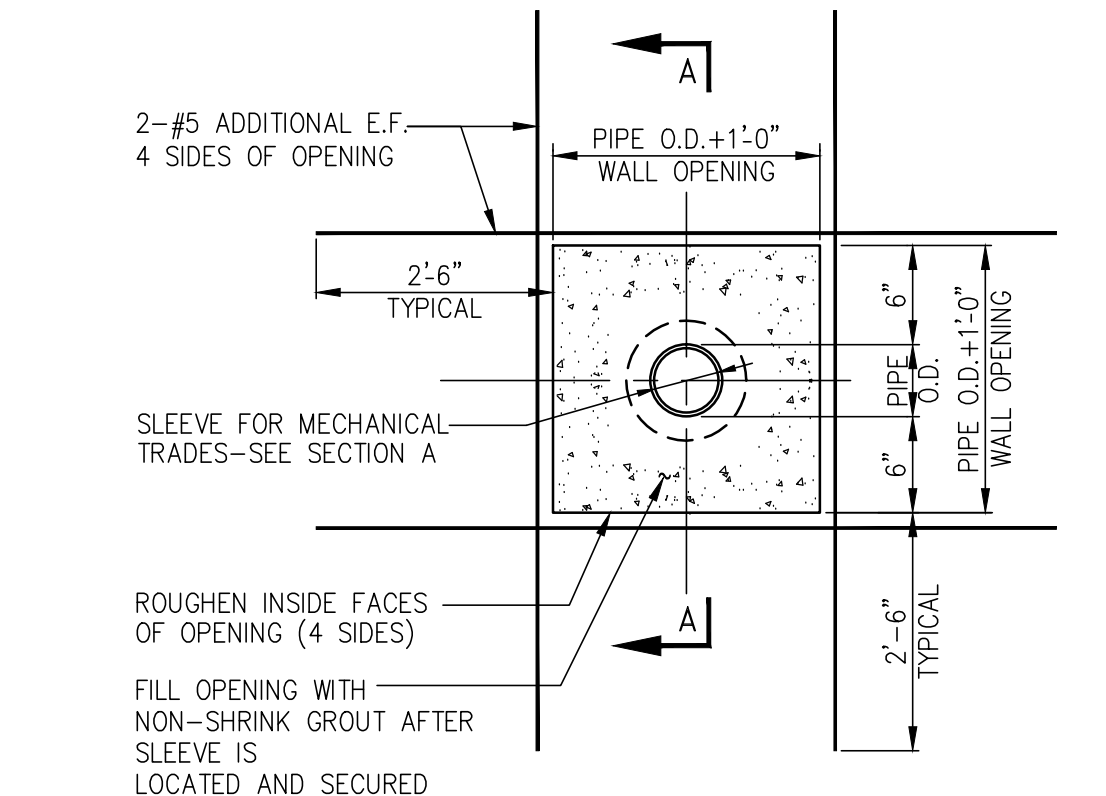
FO-101.00

| T = WALL THICKNESS | HORIZONTAL REINFORCEMENT |
|--------------------|--------------------------|
| UP TO 10" | #4@18 E.F. |
| 11" TO 12" | #4@16 E.F. |
| 13" TO 16" | #4@12 E.F. |
| 17" TO 20" | #4@10 OR #5@15 E.F. |
| 21" TO 22" | #4@9 OR #5@12 E.F. |
| 23" TO 24" | #4@8 OR #5@10 E.F. |
| OVER 24" | SEE PLANS AND SECTIONS |

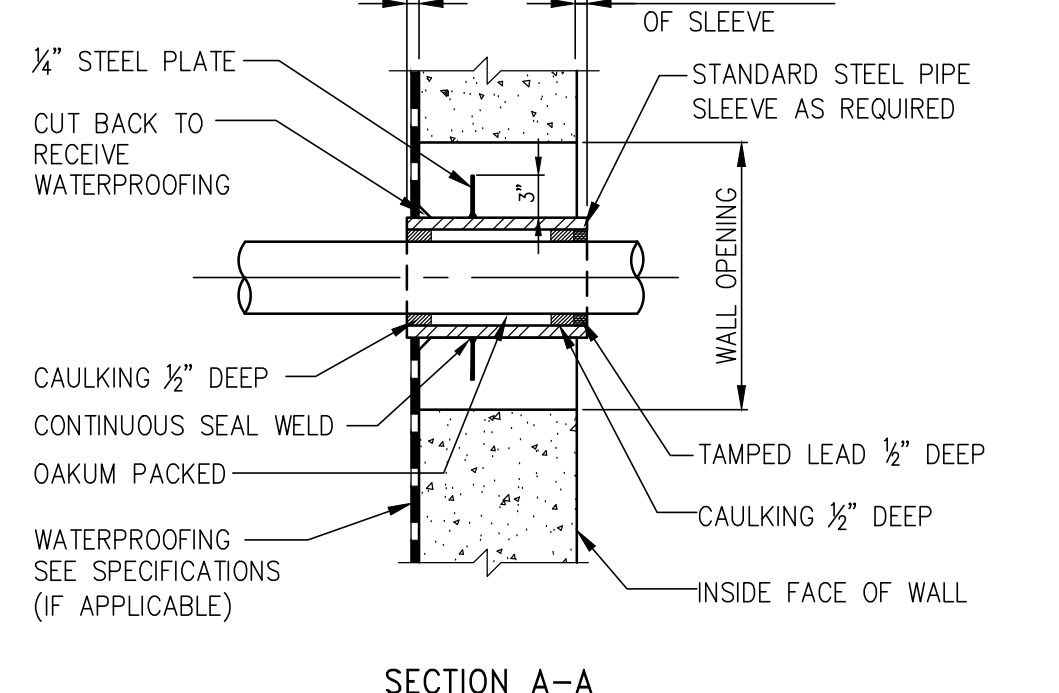


HORIZONTAL SECTION SHOWING PLACEMENT OF FOUNDATION WALL REINFORCEMENT

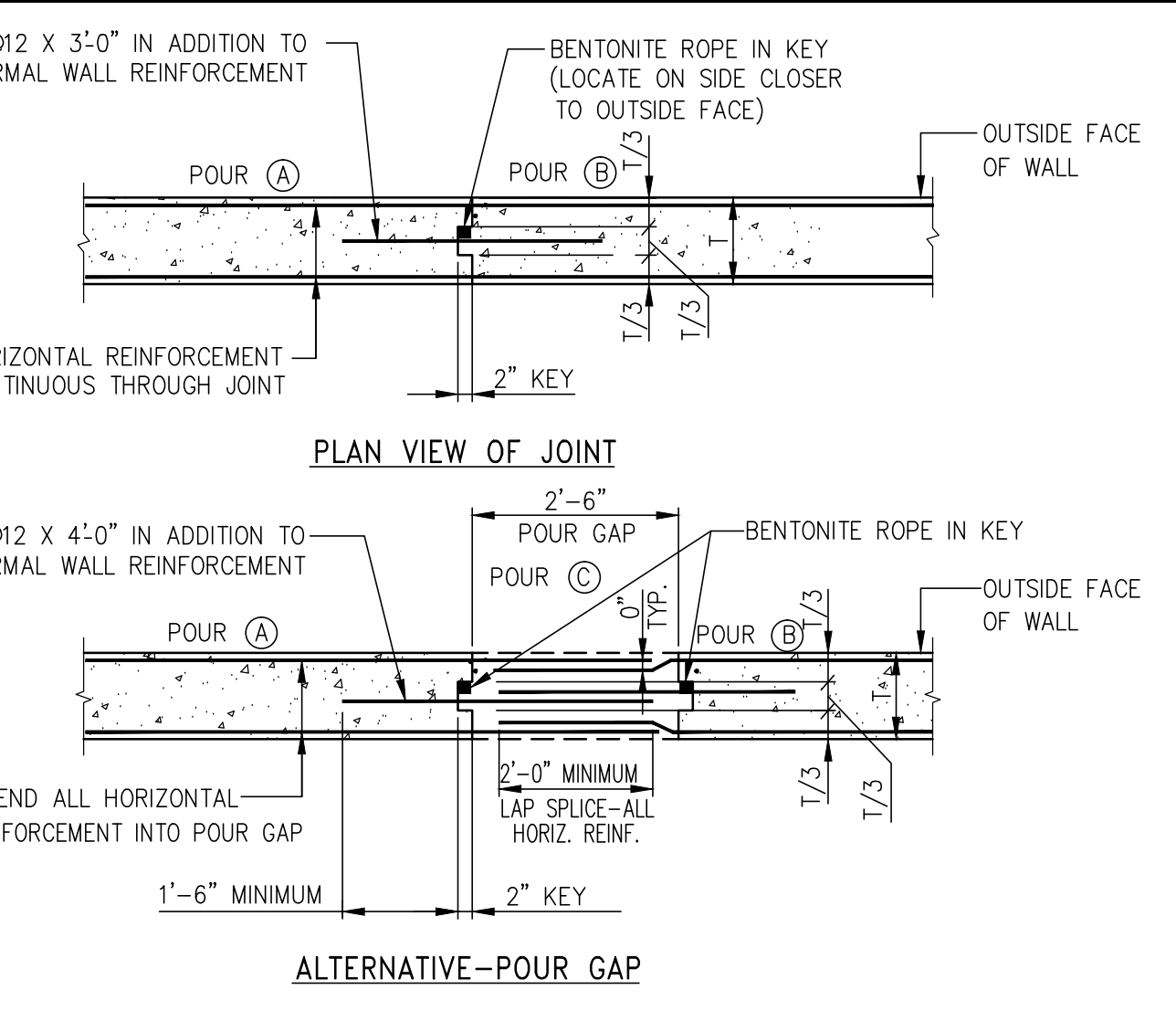
NOTE: VERTICAL CONSTRUCTION JOINT IN WALL IS NOT SHOWN HERE - SEE TYPICAL CONSTRUCTION JOINT DETAIL.



BOX-OUT OPENING THROUGH FOUNDATION WALL



WATERPROOFED SLEEVE THROUGH WALL WITH WATERPROOFING



ALTERNATIVE-POUR GAP VERTICAL CONSTRUCTION JOINT IN FOUNDATION WALL

NOTES:
 1. CONSTRUCTION JOINTS IN WALLS SHALL BE LOCATED AT LEAST FOUR FEET FROM FACE OF SUPPORTING PIER, FOOTING, PILE CAP, ETC. OR FROM WALL OPENING.
 2. MAXIMUM SPACING BETWEEN JOINTS SHALL BE FORTY FEET UNLESS NOTED OTHERWISE ON THE FOUNDATION DRAWINGS.
 3. CONCRETE SHALL NOT BE PLACED IN THE POUR GAP UNTIL 24 HOURS AFTER PLACEMENT OF THE MOST RECENT ADJACENT SECTION.
 4. FOR JOINTS IN SHEARWALLS SEE DETAILS SEE S-940 SERIES DRAWINGS

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 Related Companies
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 New York, NY 10023
 T: 212.801.1000

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 HOK
 48 West 37th Street
 New York, NY 10018
 T: 212.290.1444

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 601 West 66th Street, 1815
 New York, New York 10021
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DESIGNER:
 Rockwell Group
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 New York, New York 10003
 T: 212.463.0334

STRUCTURAL ENGINEER:
 WSP Cantor Seinuk
 228 E 49th Street
 New York, NY 10017
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 80 Pine Street
 New York, NY 10005
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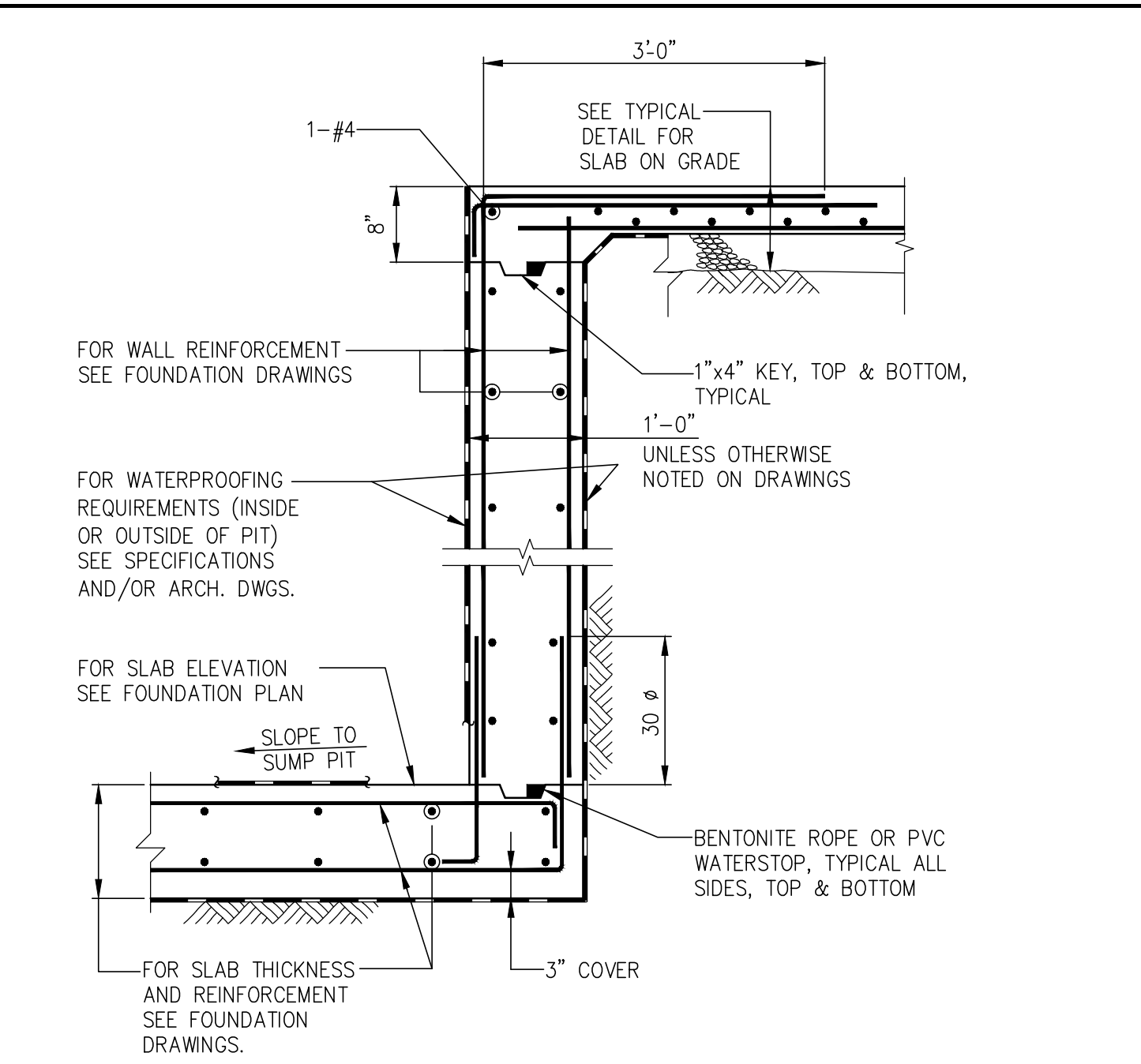
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 5 Right Street, Suite 324
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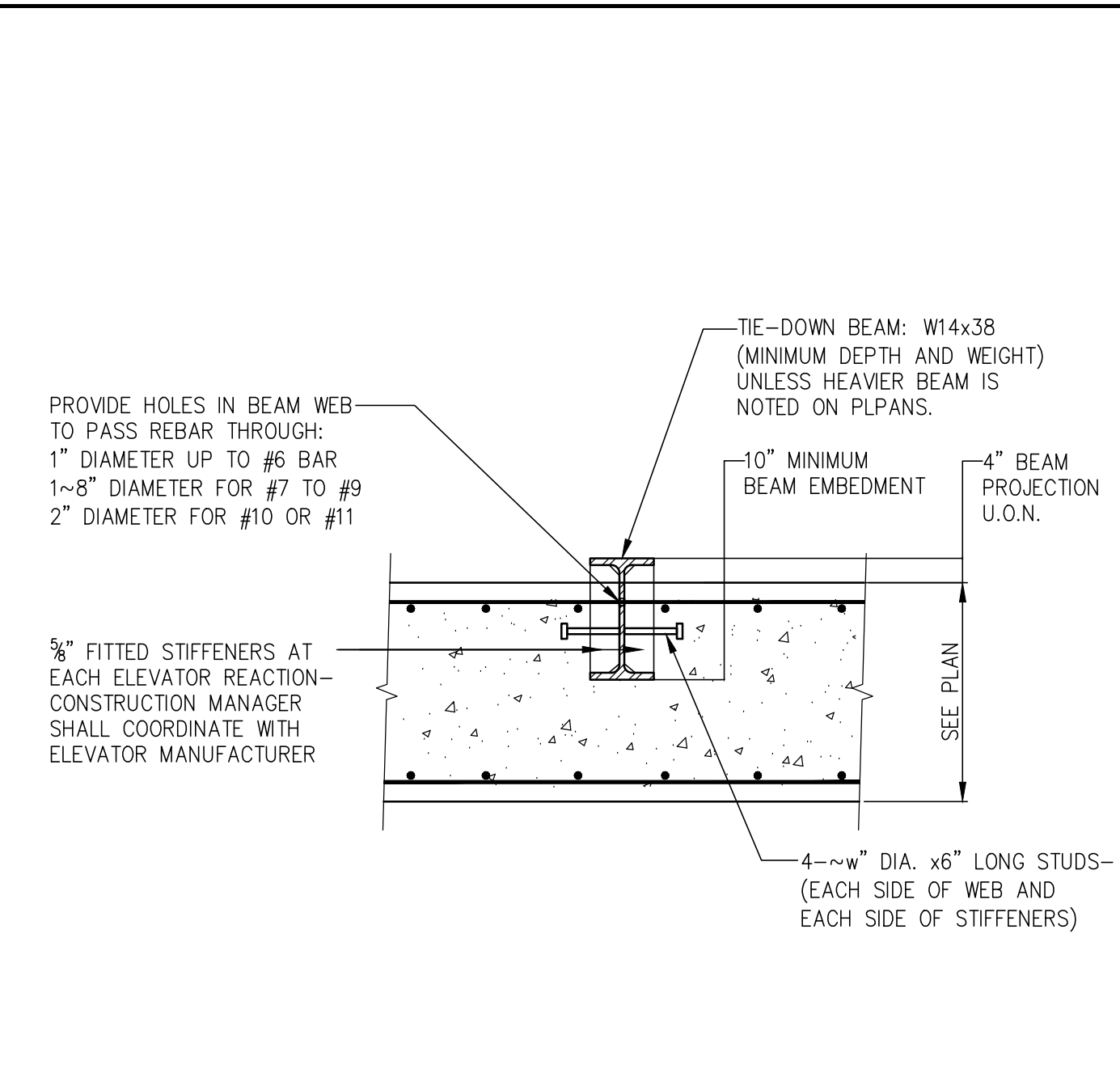
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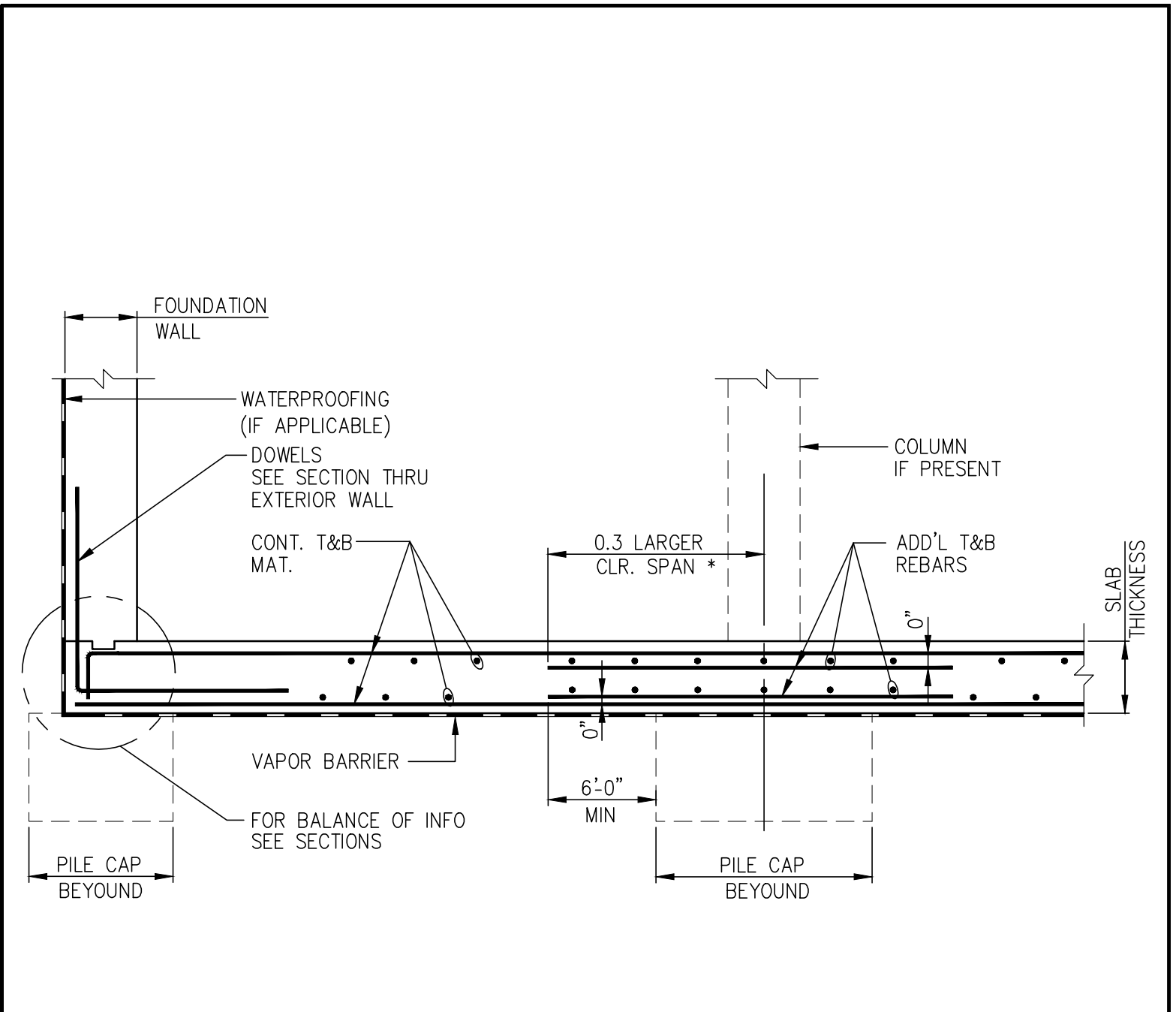


TYPICAL PIT DETAIL

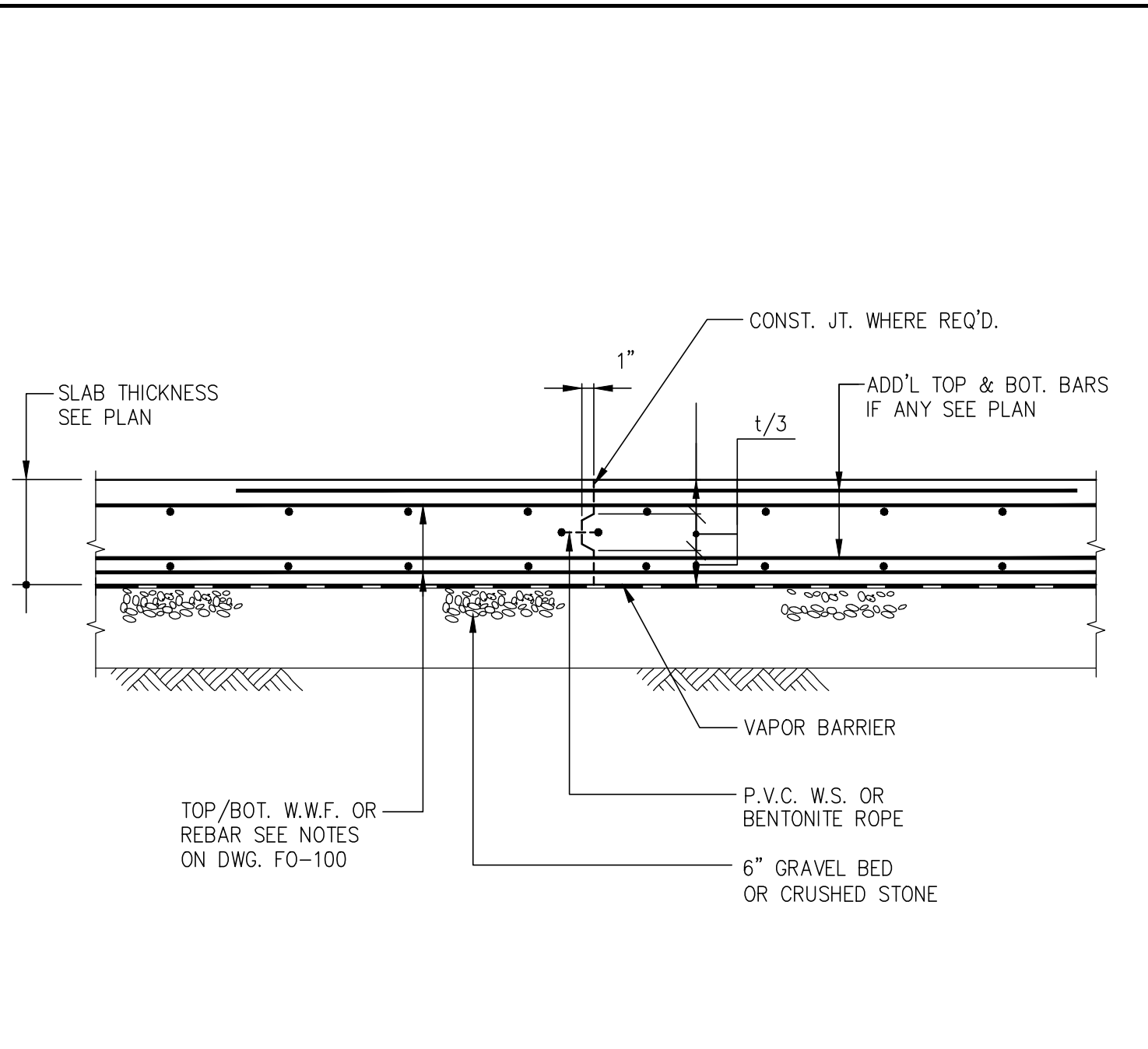
NOTE: PROVIDE ELEVATOR TIE-DOWN BEAM AS REQUIRED. SEE PLAN AND "ELEVATOR TIE-DOWN BEAM" DETAIL.



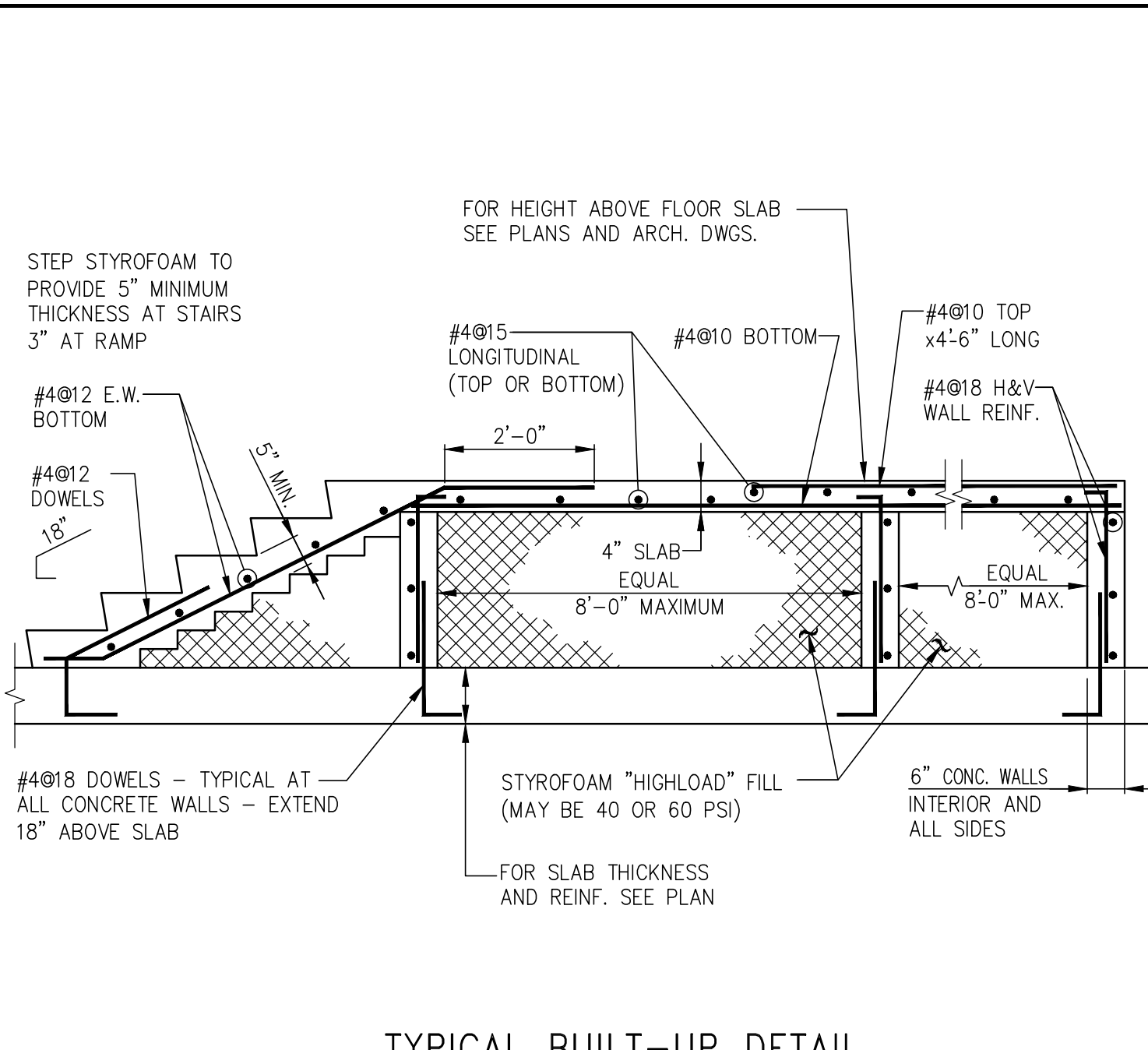
ELEVATOR TIE-DOWN BEAM



TYPICAL ONE WAY AND TWO WAY BASEMENT PRESSURE SLAB

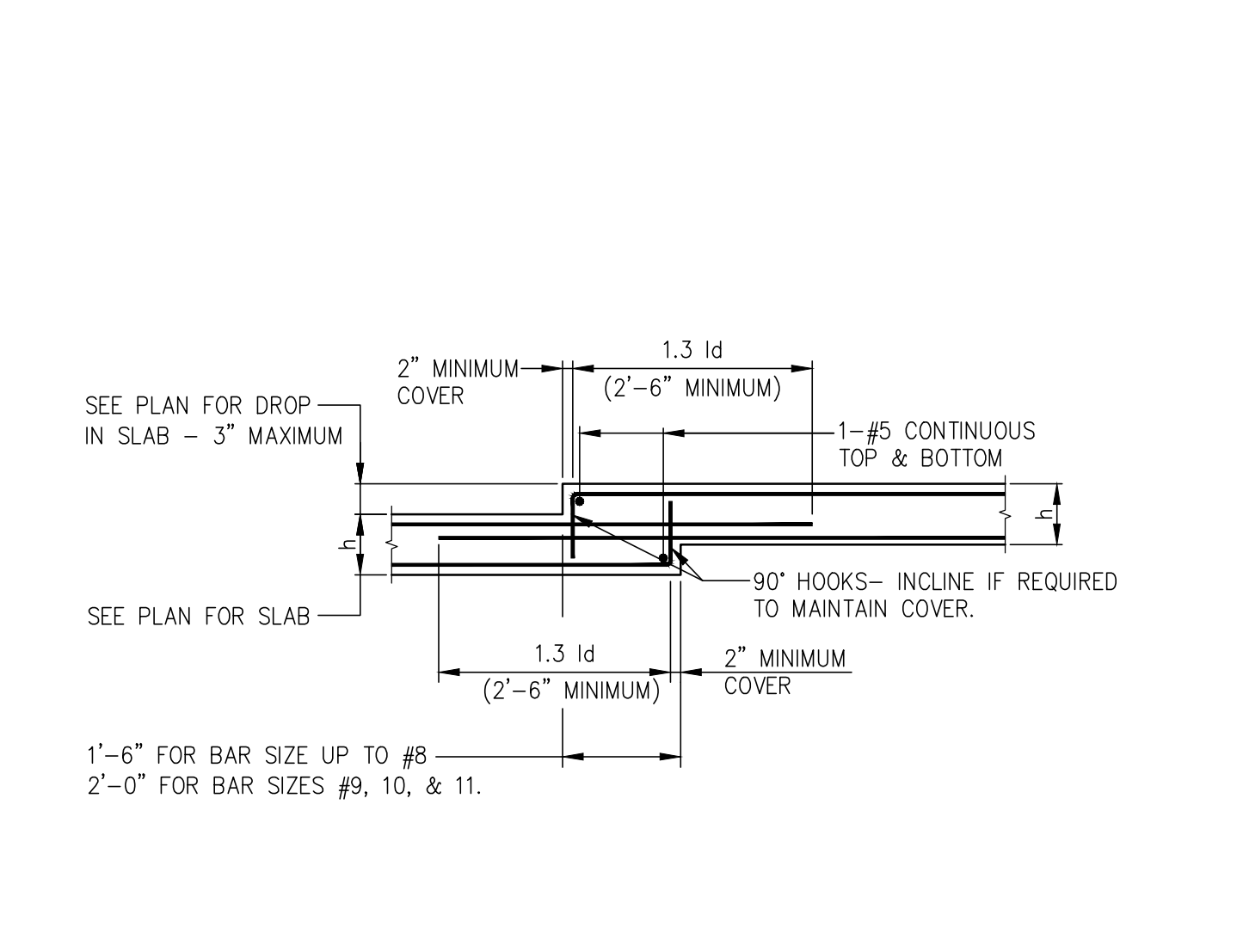
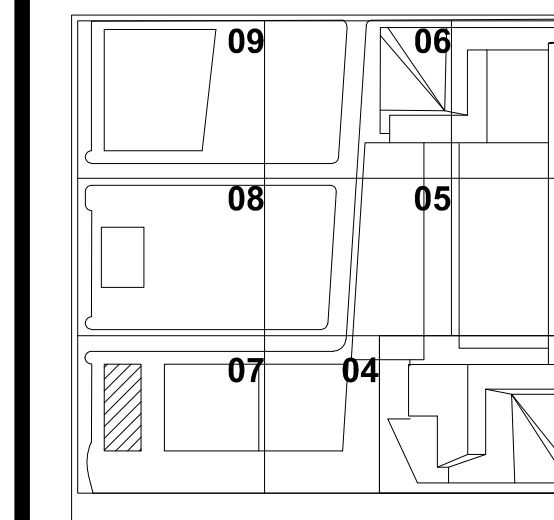


TYPICAL FRAMED SLAB DETAIL ON GRADE

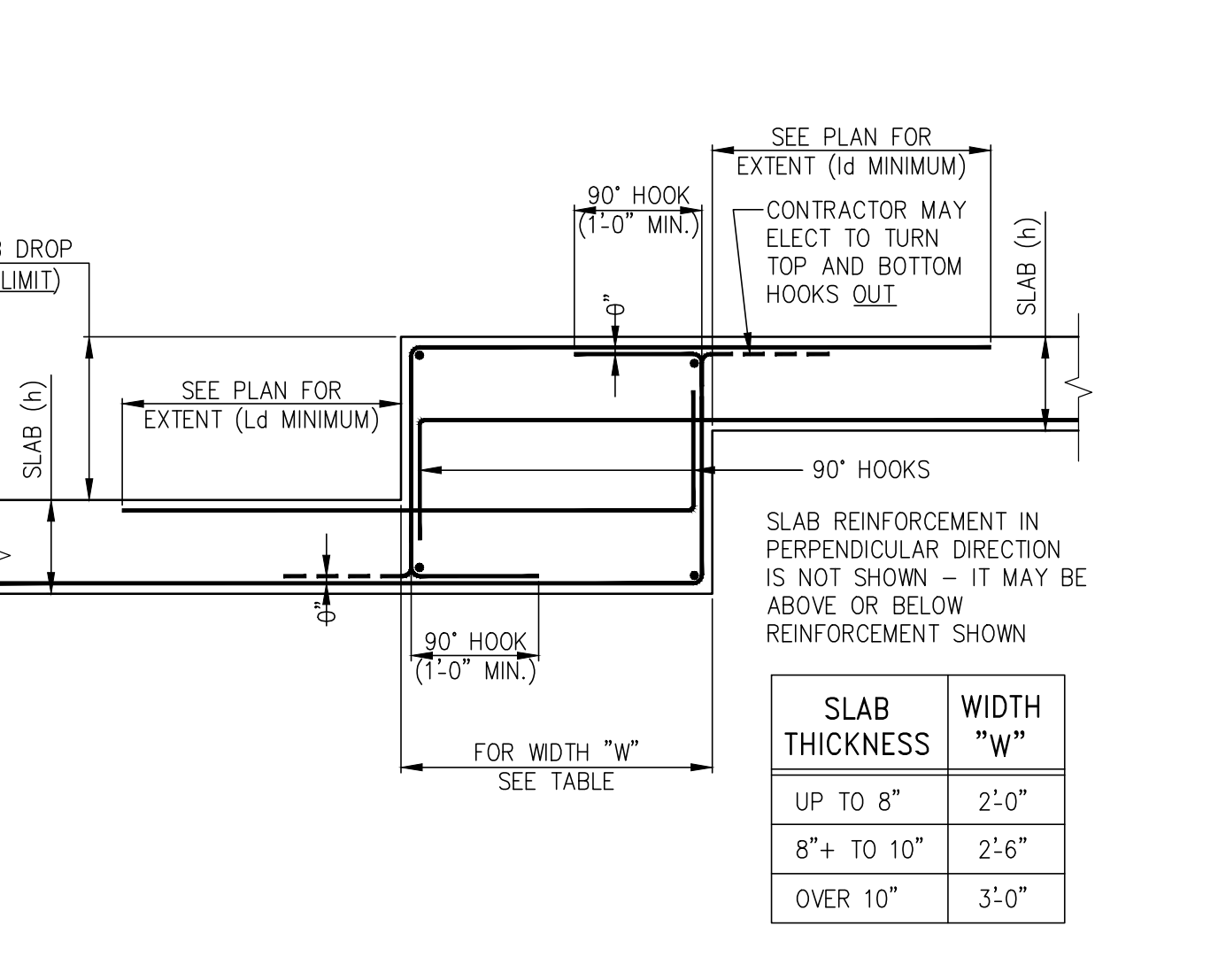


TYPICAL BUILT-UP DETAIL

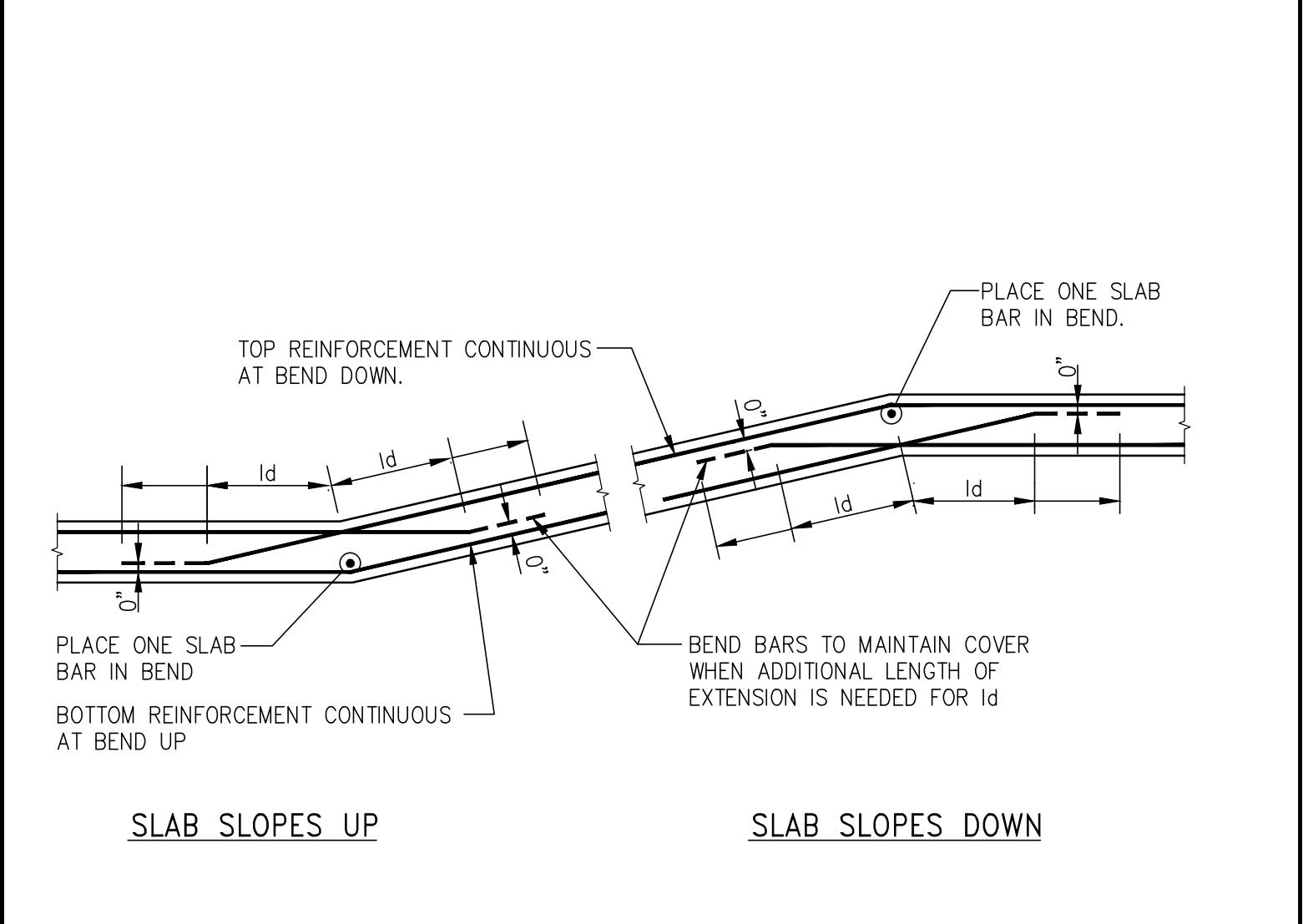
NOTE: FOR STAIR TREADS, RISERS, AND WIDTH SEE ARCH. DWGS.



DROP IN TOP AND BOTTOM OF SLAB (MAXIMUM DROP = 3")



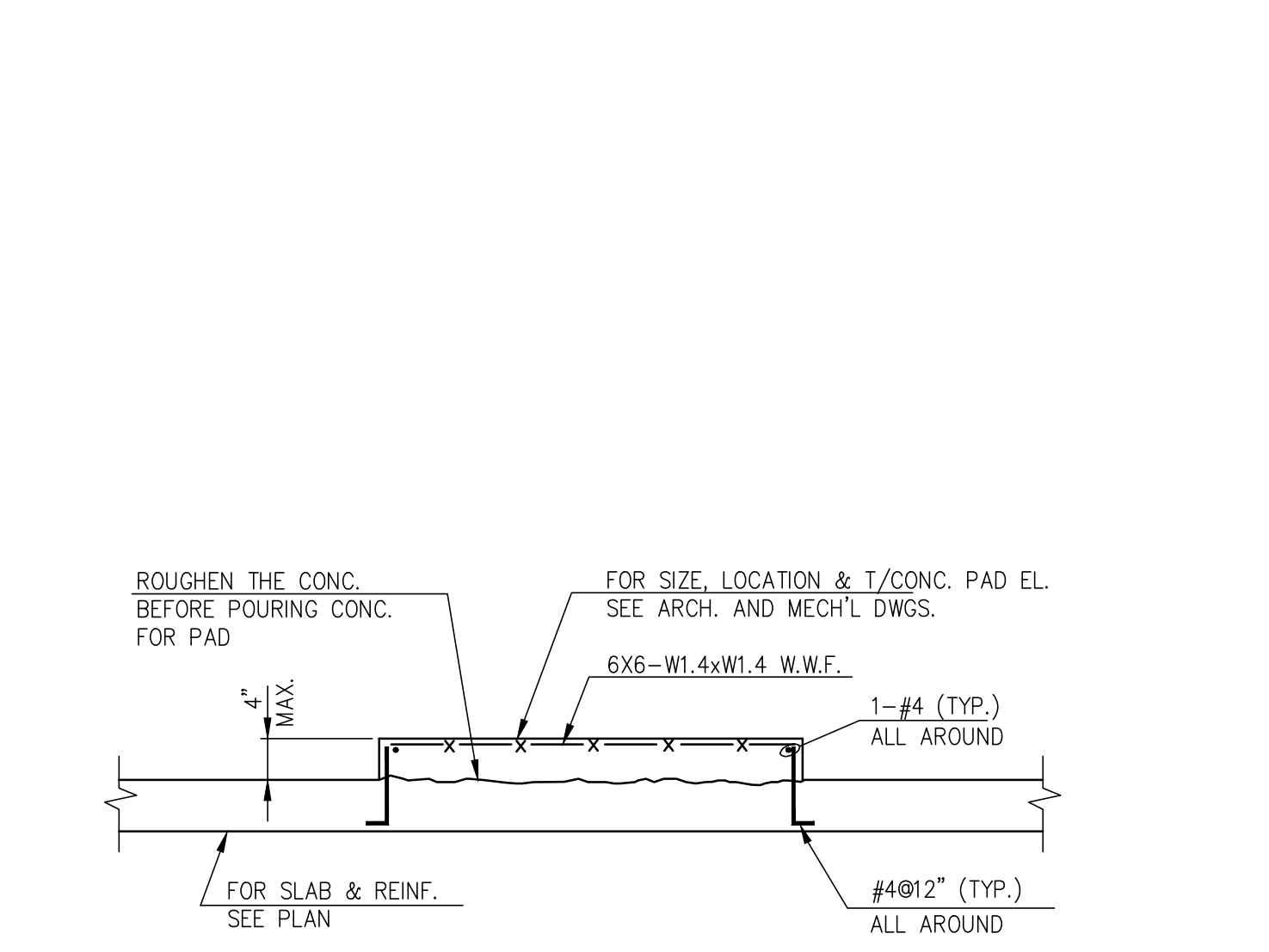
DROP IN TOP AND BOTTOM OF SLAB (DROP GREATER THAN 3")



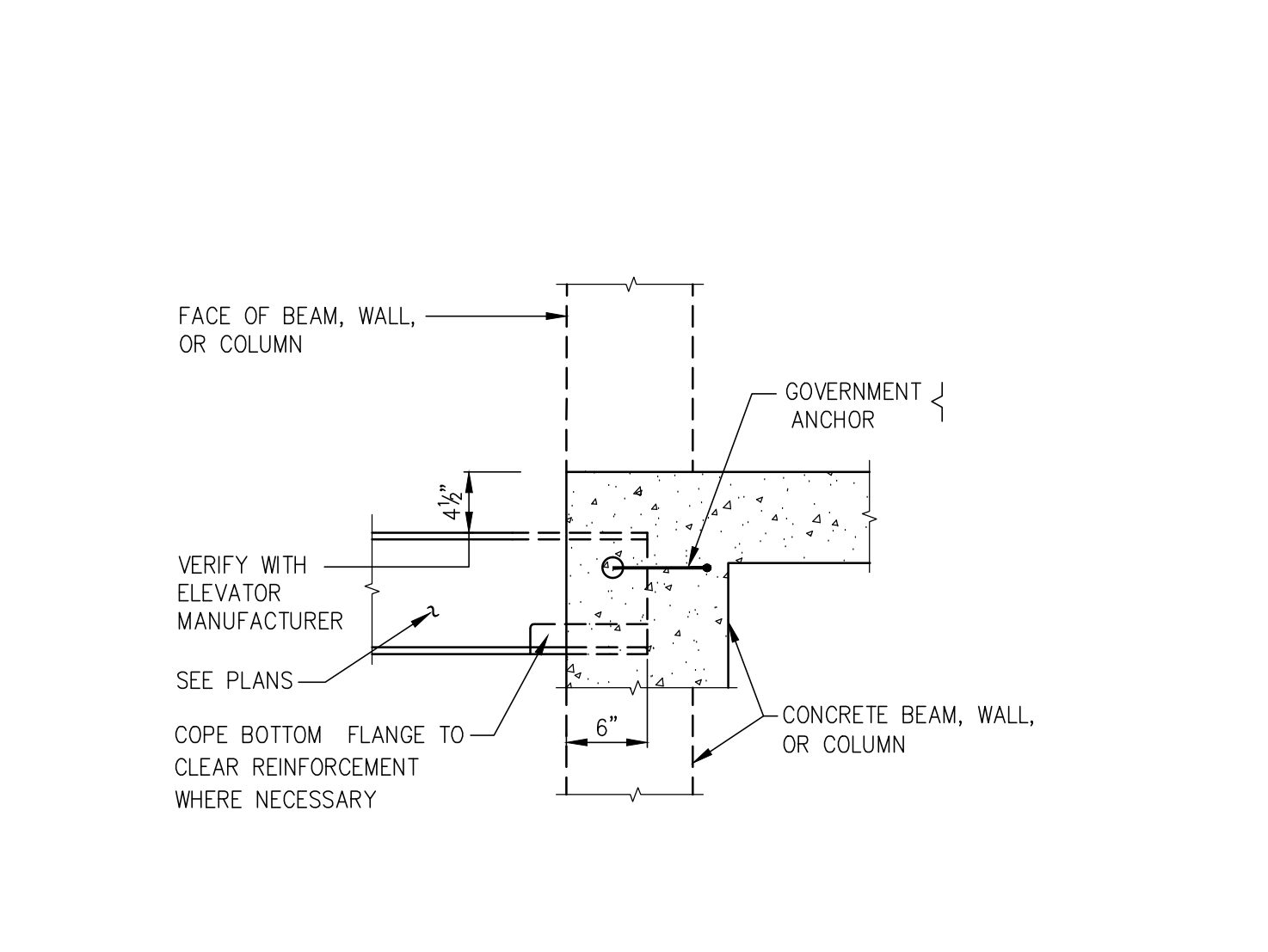
SLAB SLOPES UP SLAB SLOPES DOWN

BEND IN SLAB

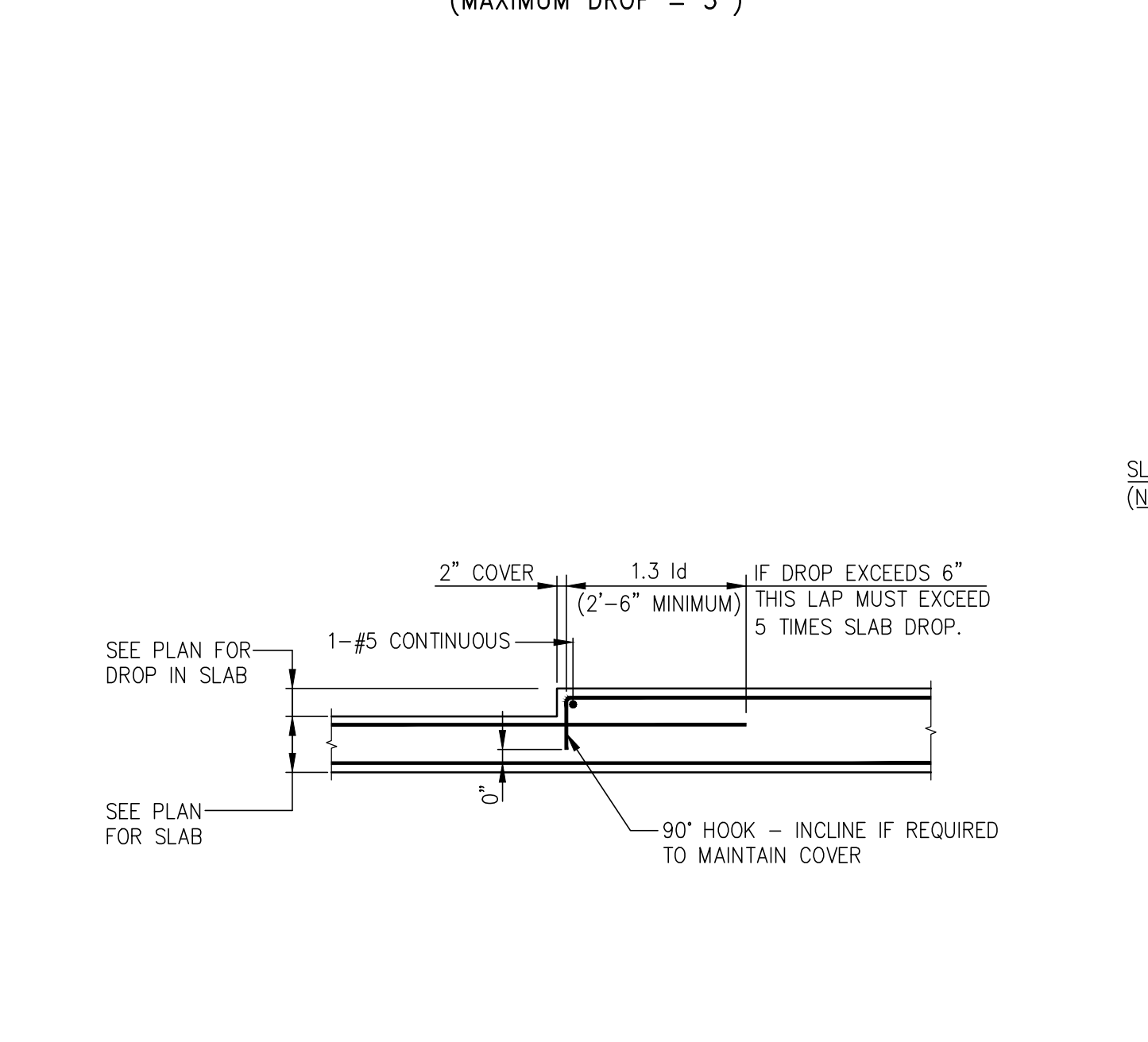
NOTE: BARS IN OTHER DIRECTION ARE NOT SHOWN - SEE PLANS.



TYP. CONC. PAD DETAIL

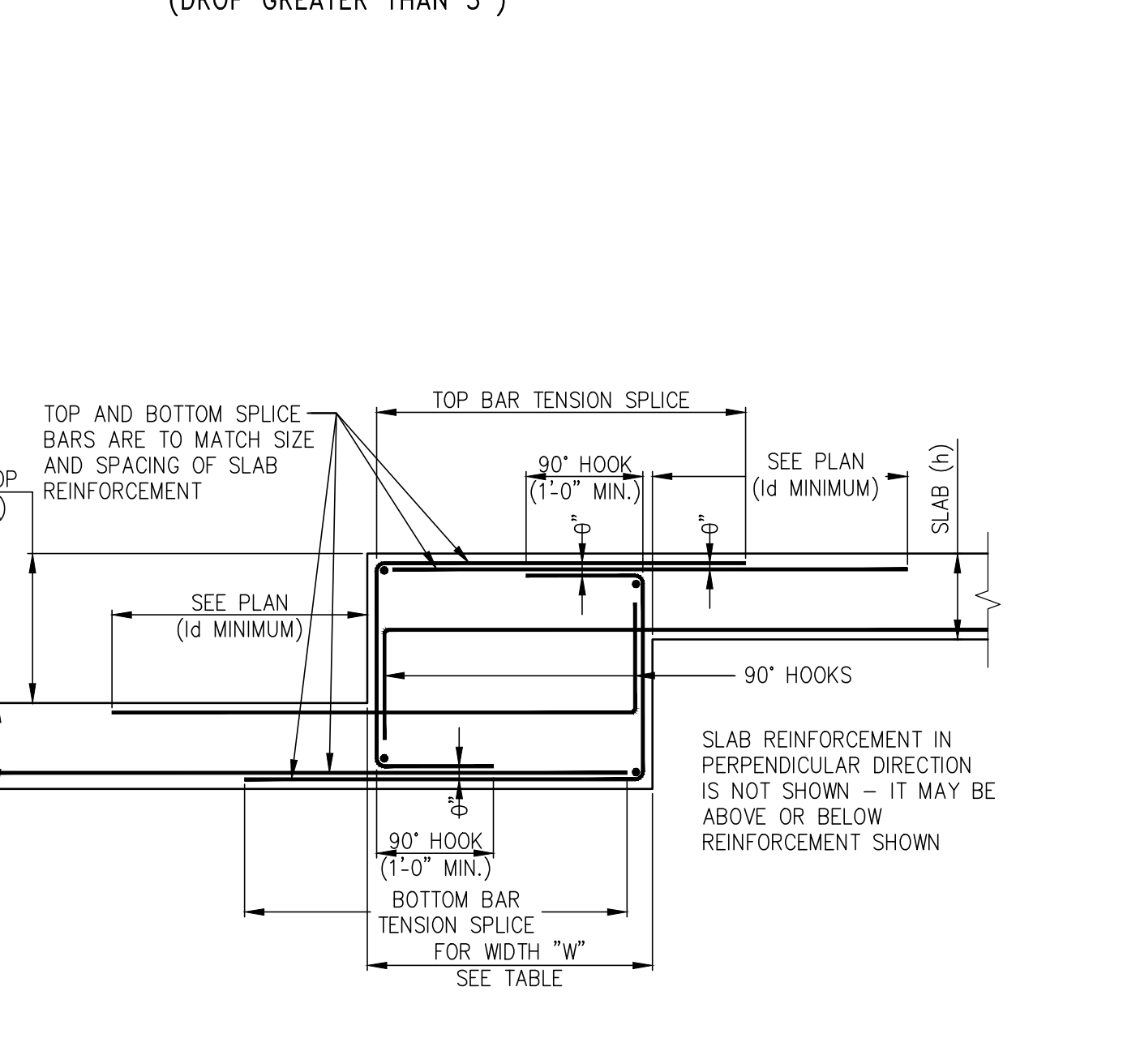


ELEVATOR DIVIDER BEAM CONNECTION

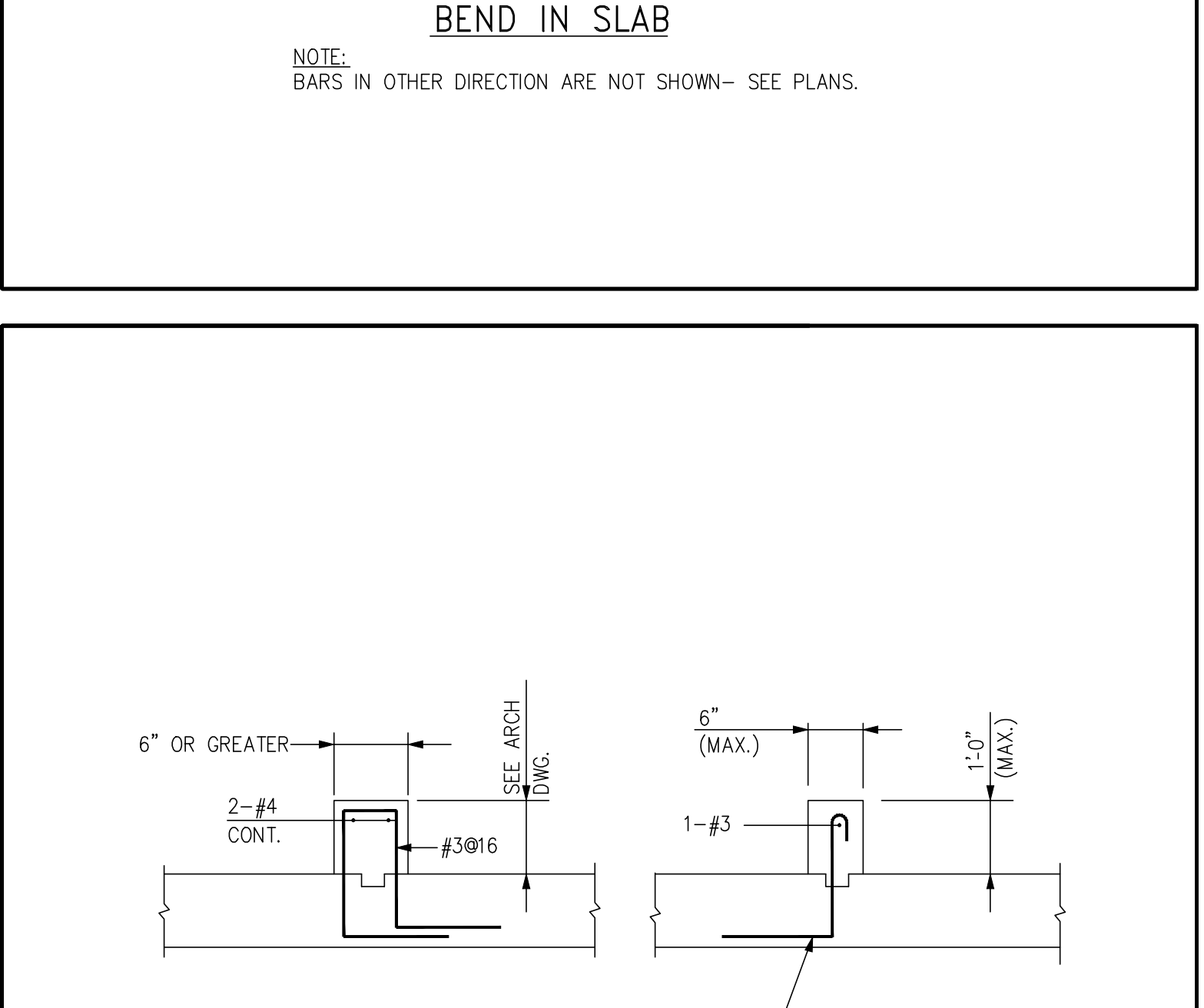


DROP IN TOP OF SLAB

NOTE: BARS IN OTHER DIRECTION ARE NOT SHOWN - SEE PLANS.

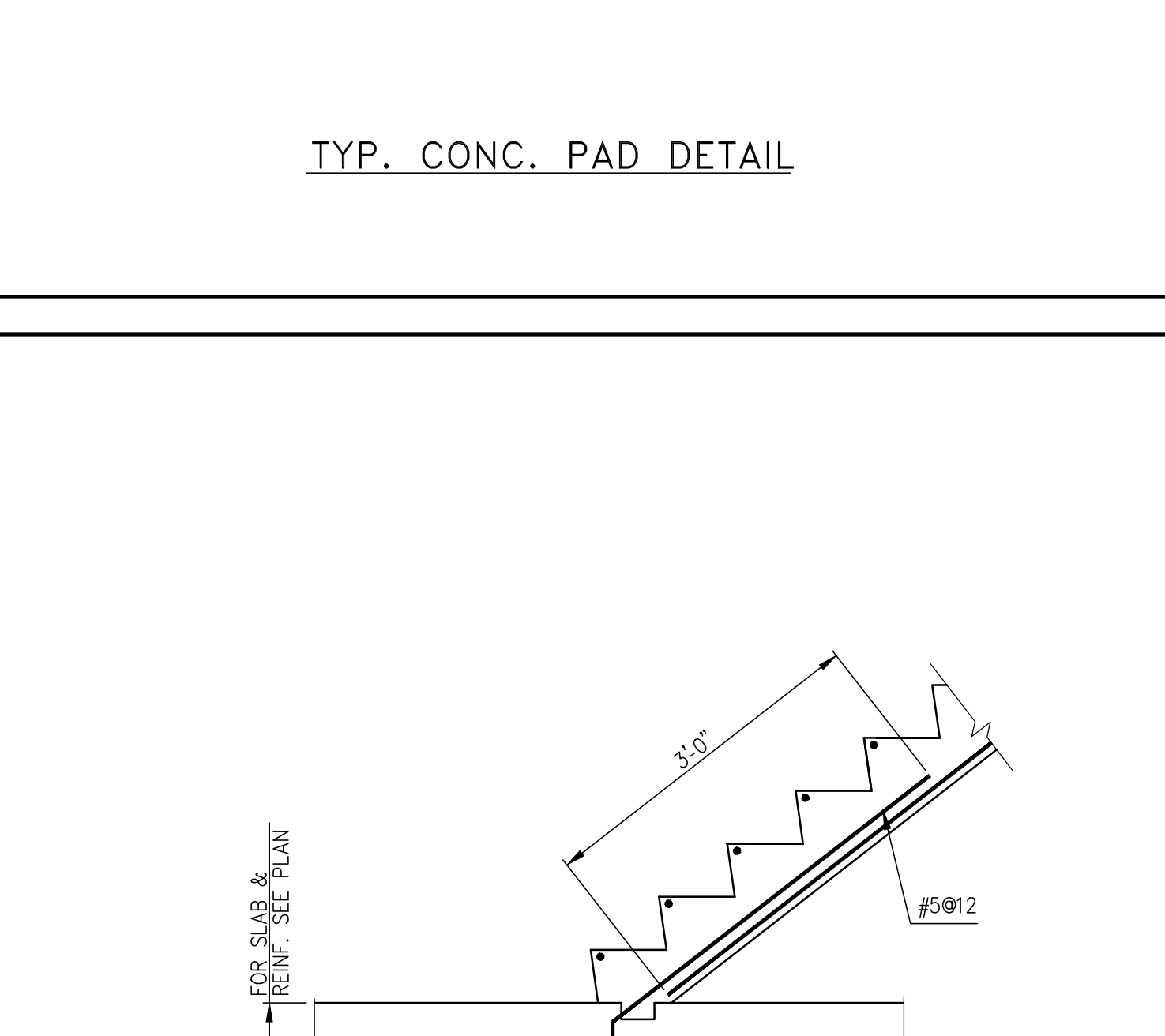


ALTERNATIVE DROP IN TOP AND BOTTOM OF SLAB USING SPLICE BARS (DROP GREATER THAN 3")

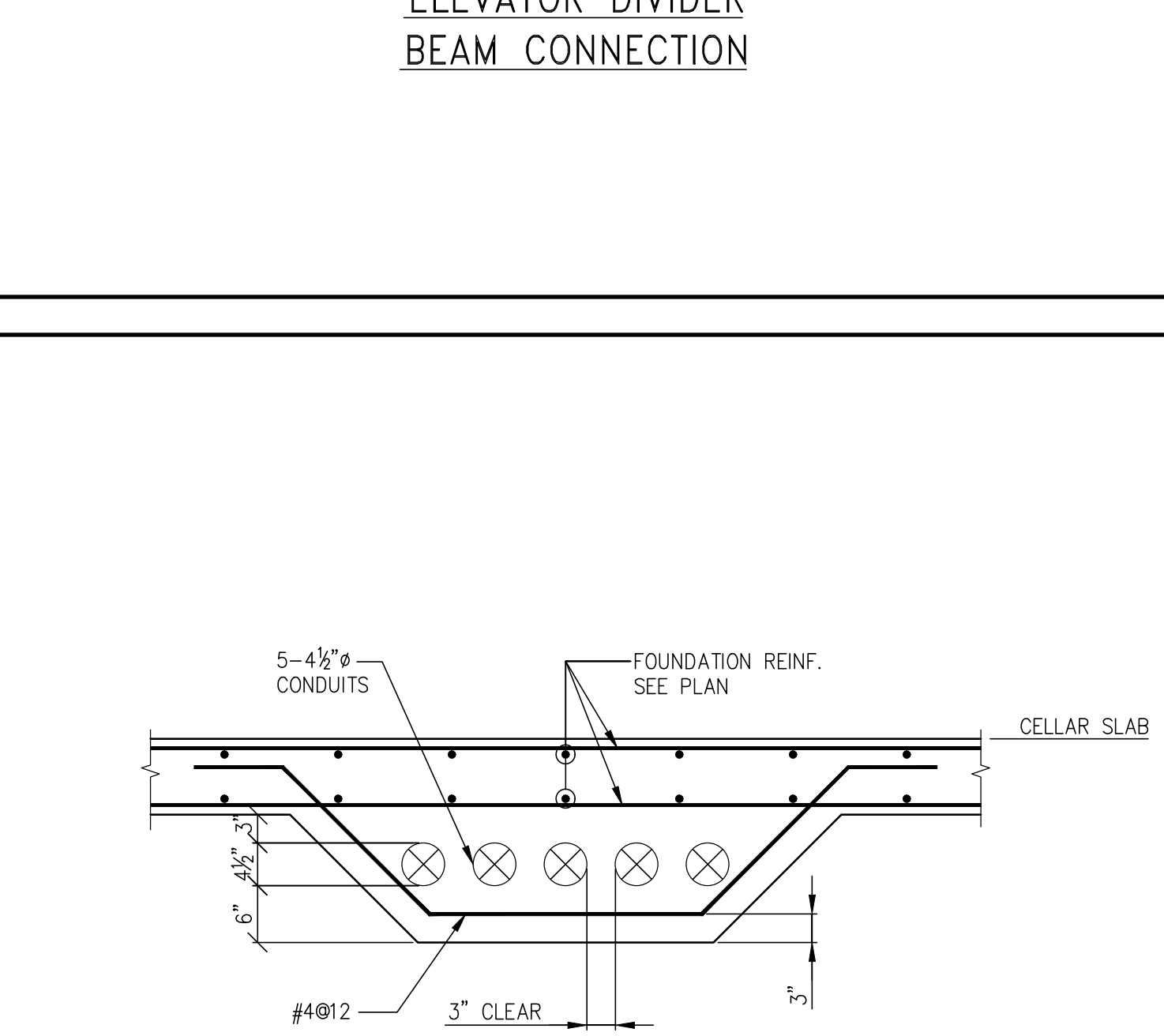


TYPICAL CONCRETE CURB DETAILS

NOTE: FOR LOCATION SEE ARCH./MECH. DWGS.



TYP. STAIR DETAIL AT MAT



TYPICAL CONC. ENCASED DETAIL FOR ELECTRICAL CONDUITS BANK

NOTE: FOR LOCATION OF BANK SEE ELECTRICAL DWGS.

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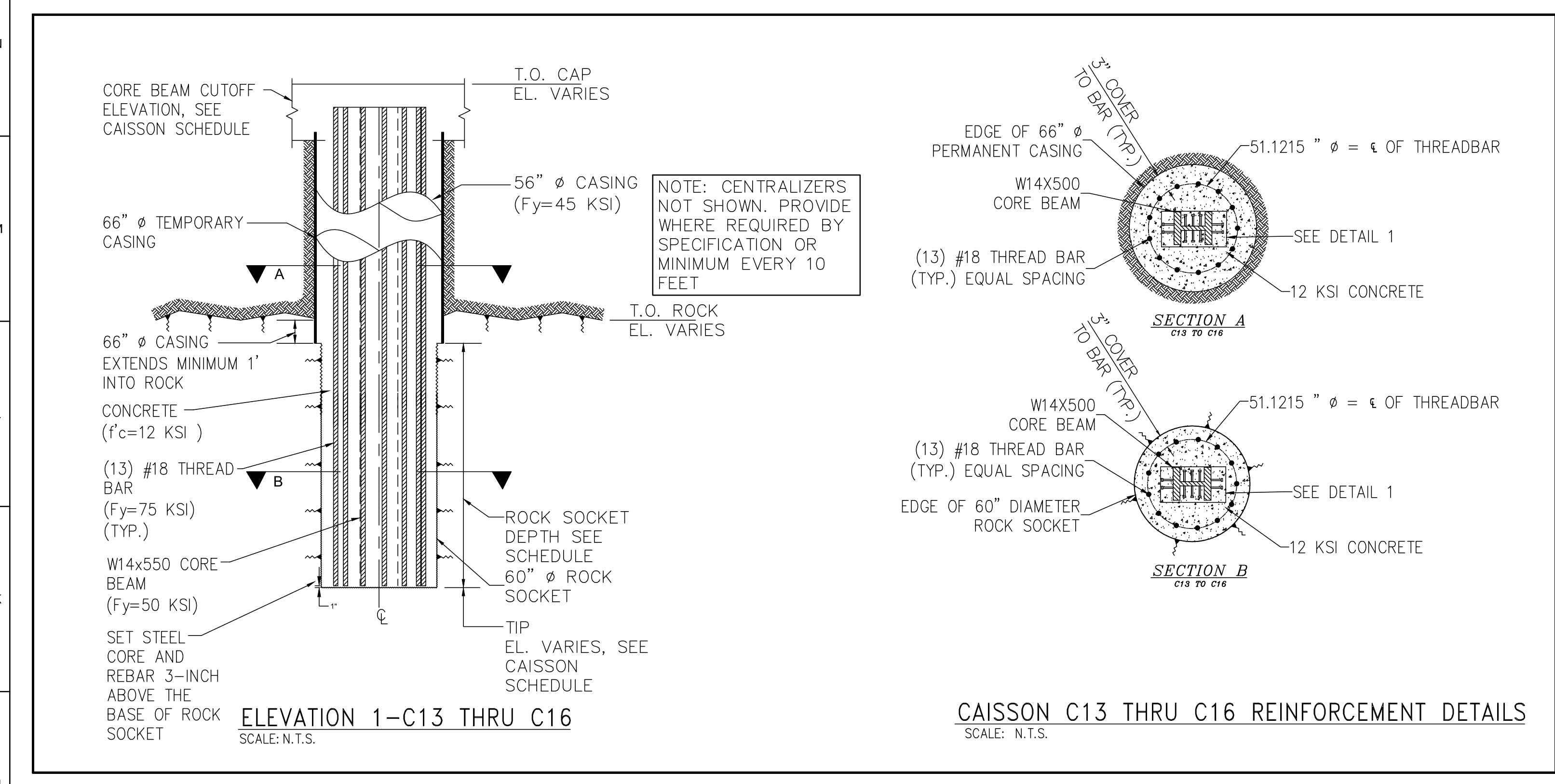
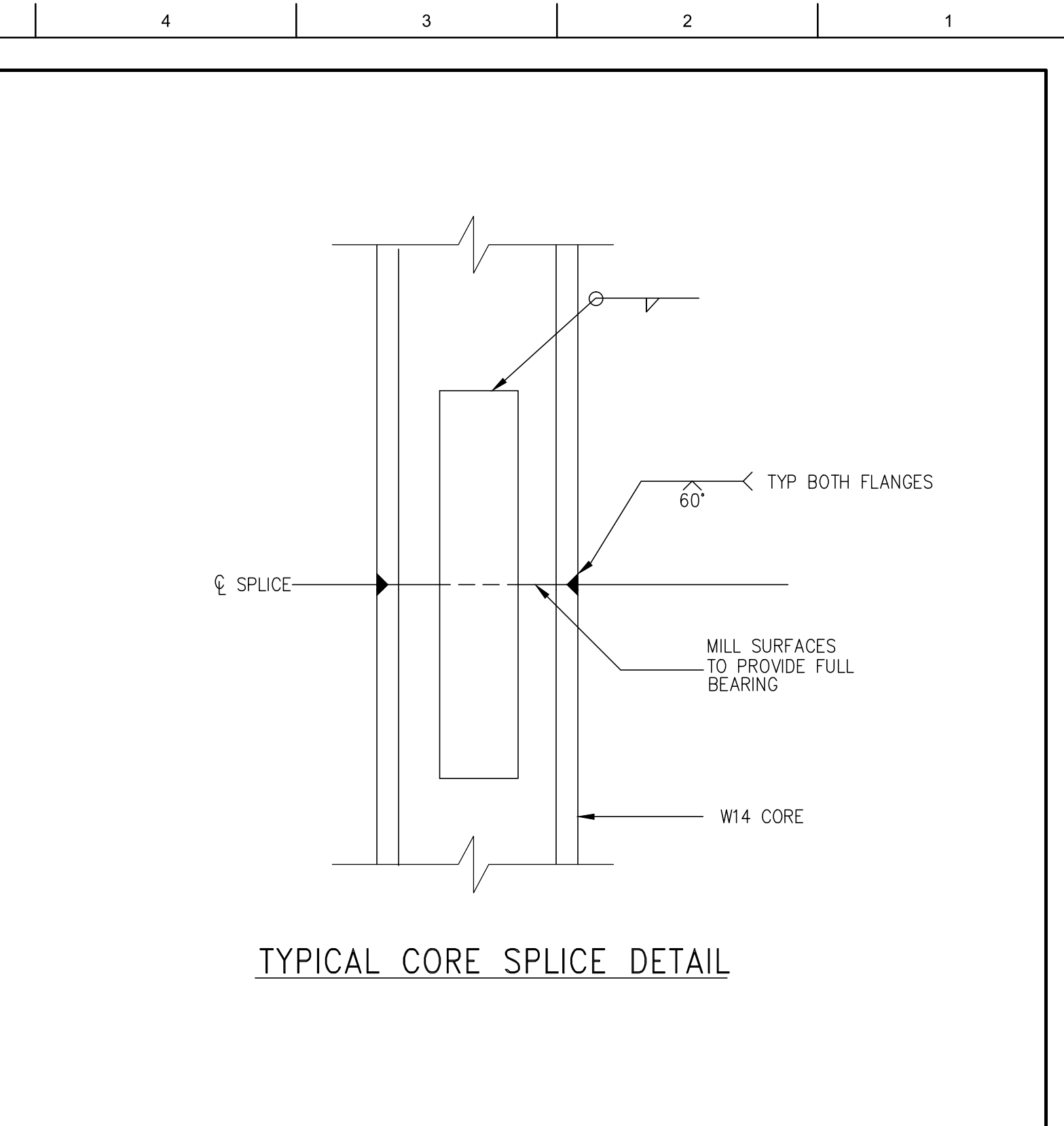
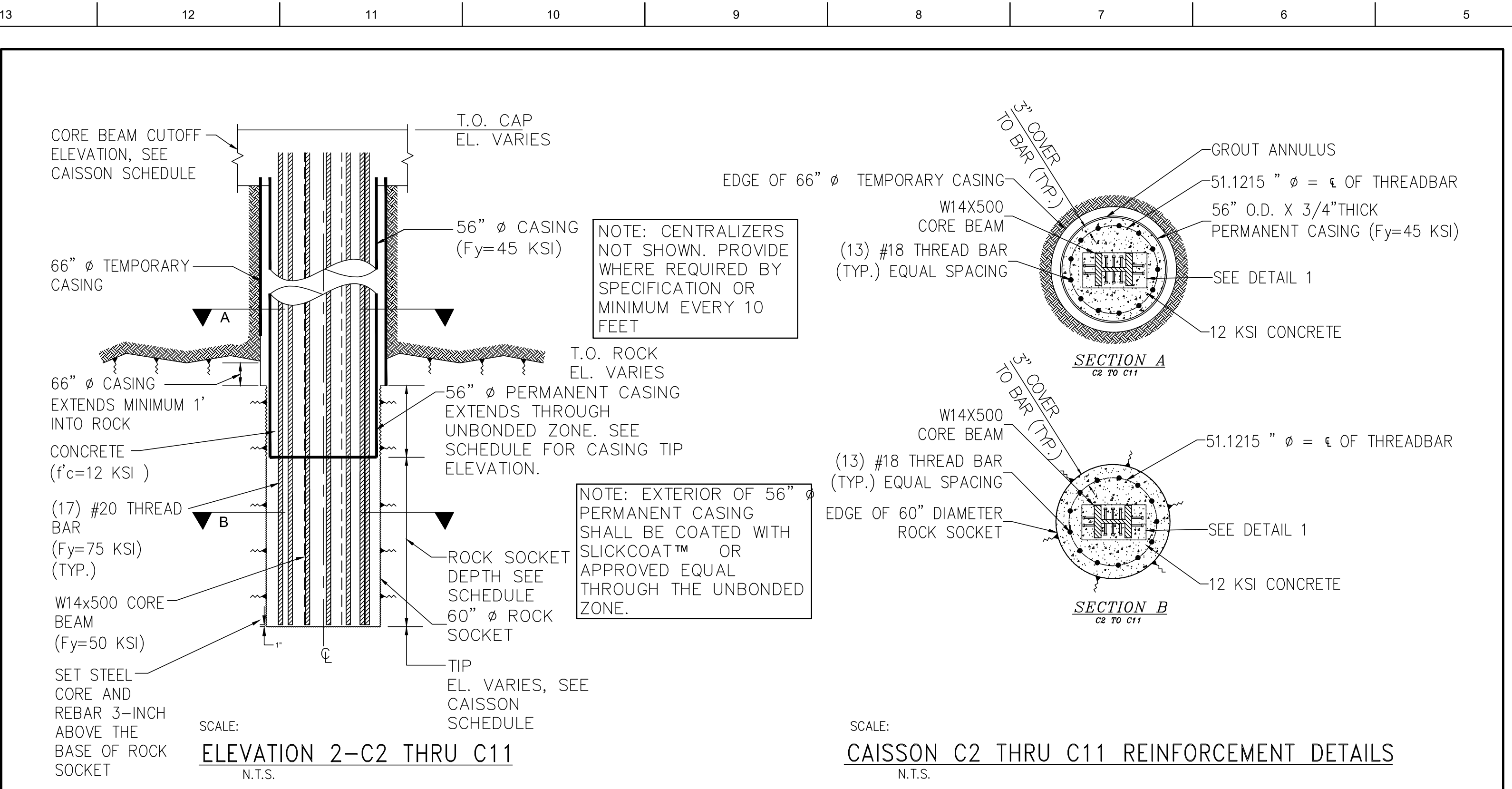
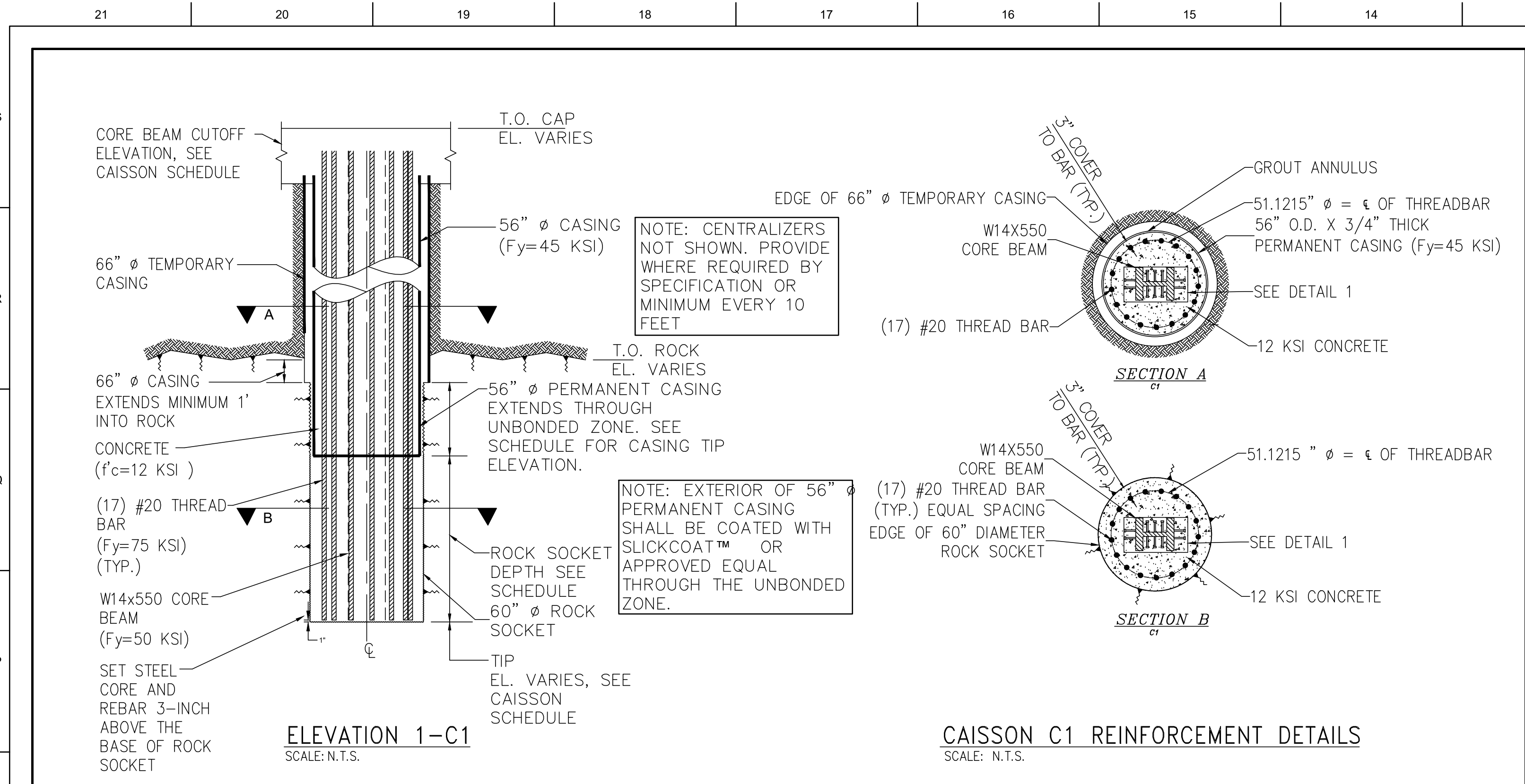
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 FOUNDATION TYPICAL DETAILS 2

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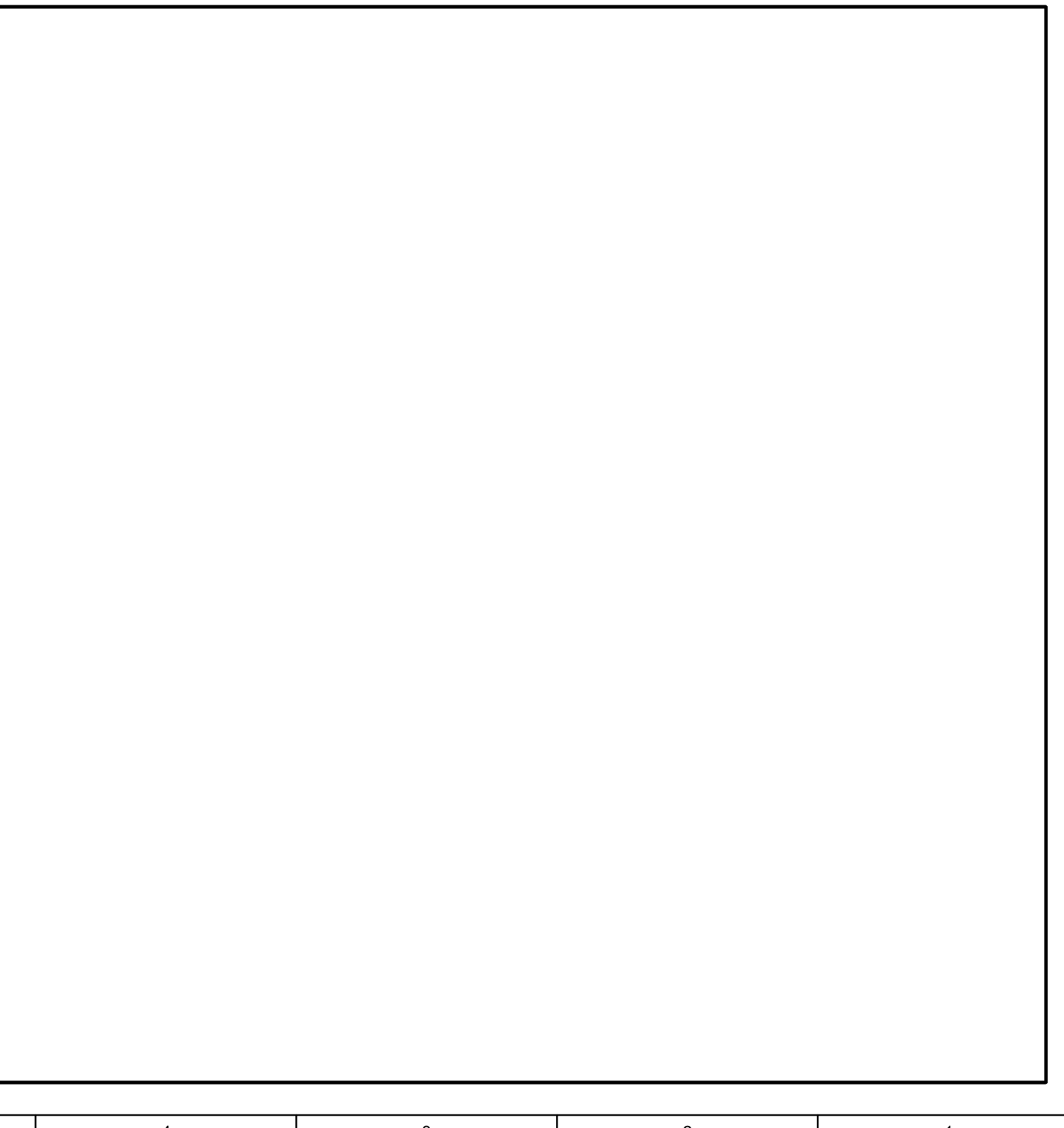
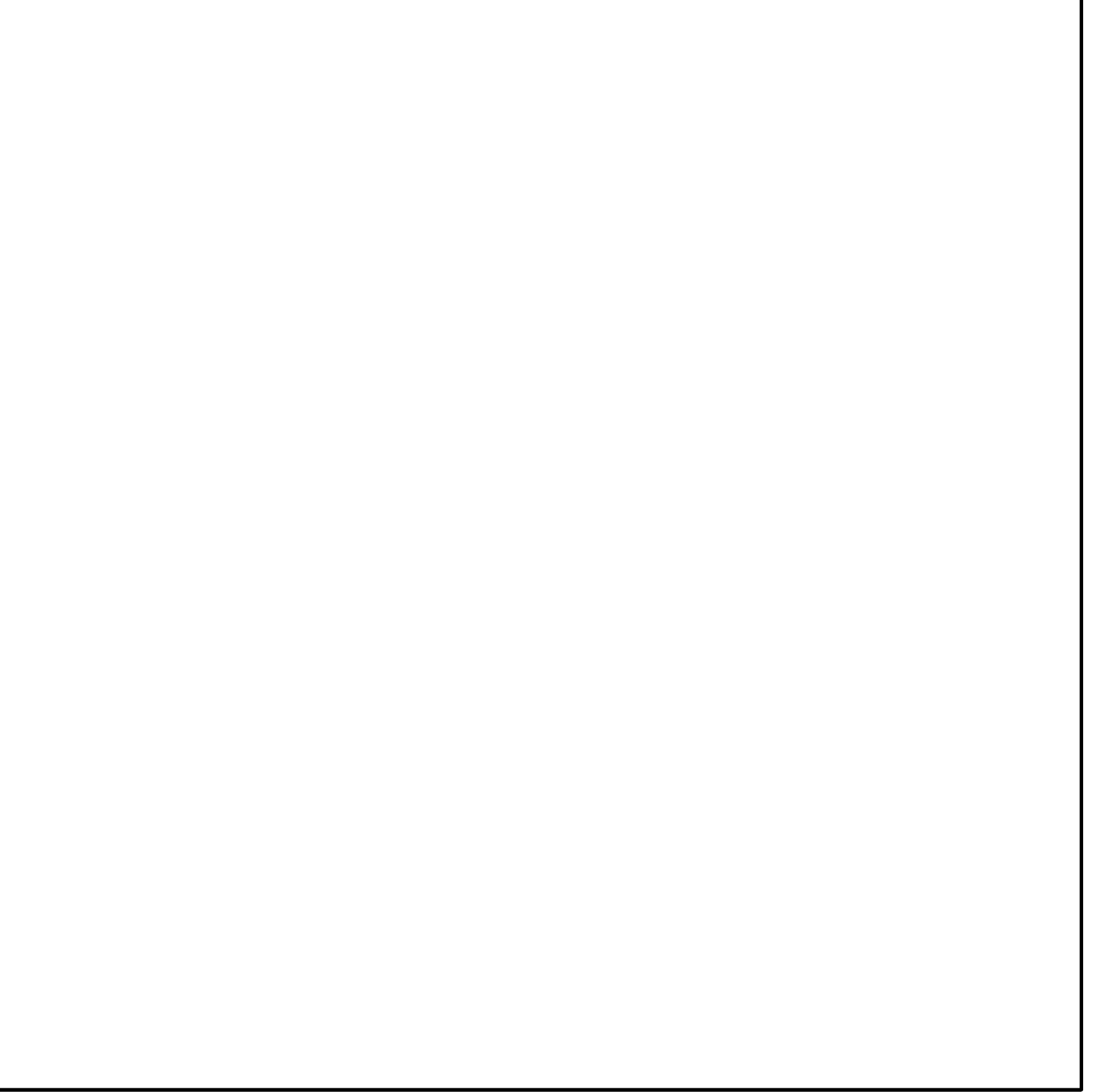
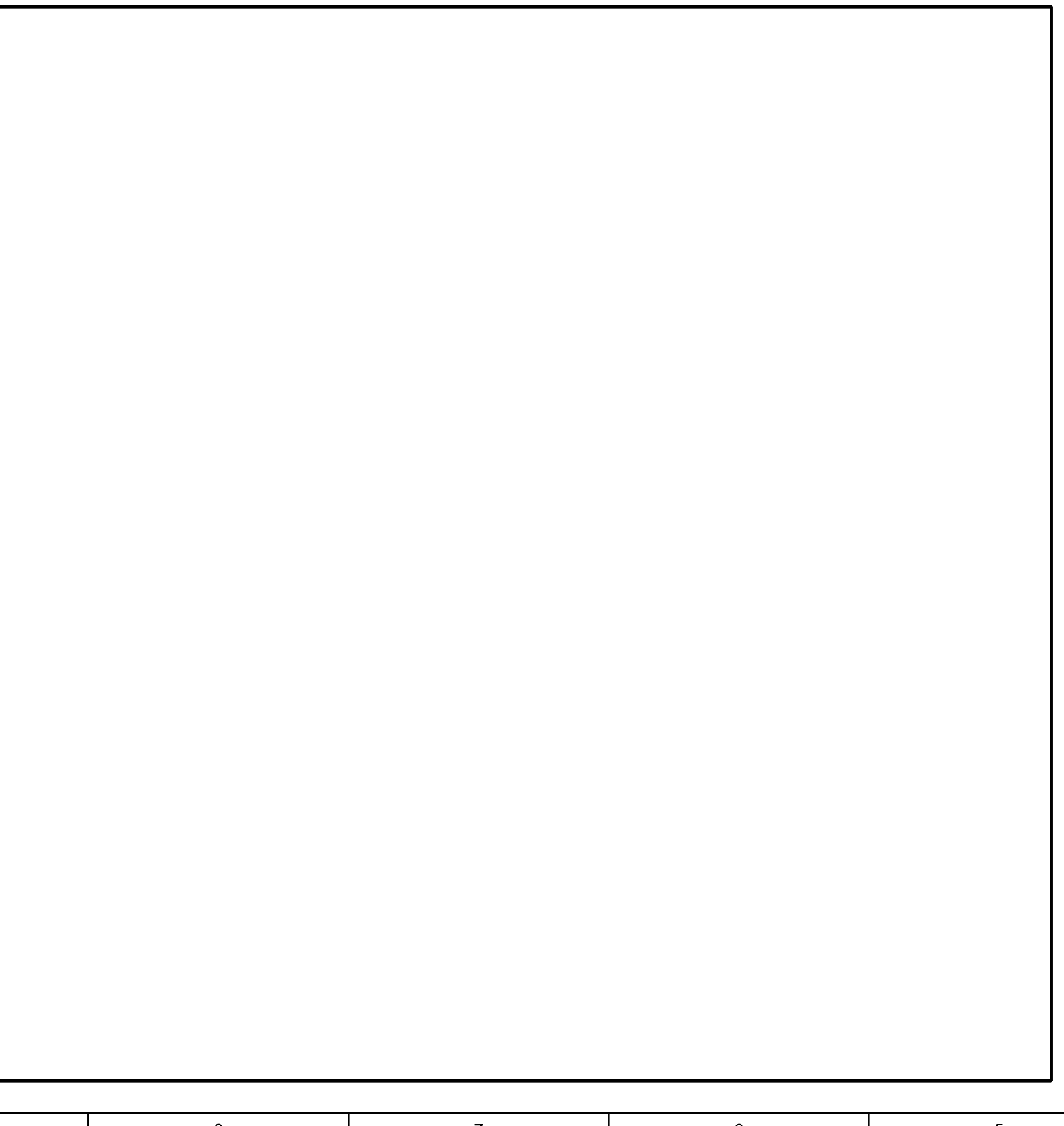
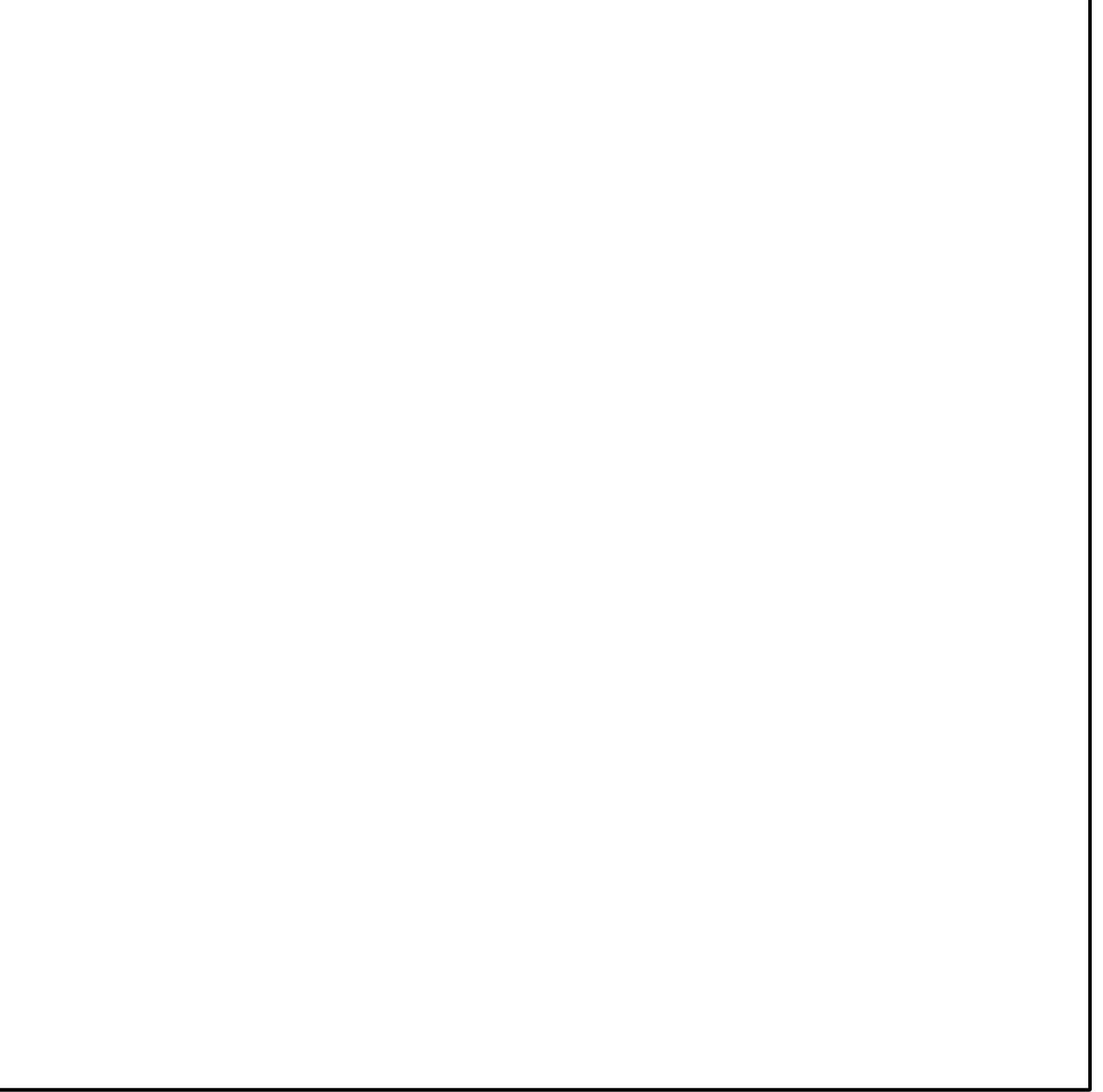
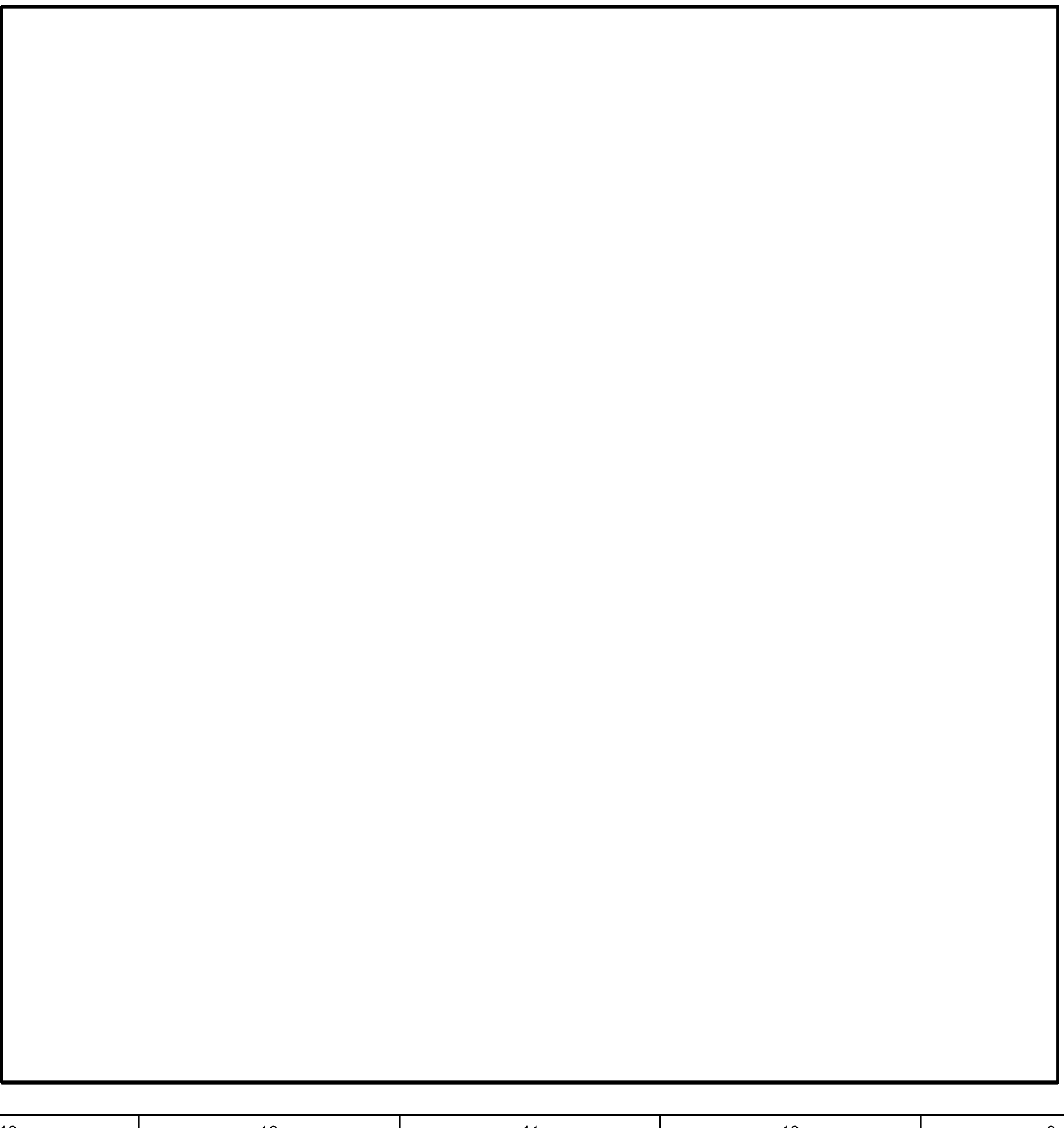
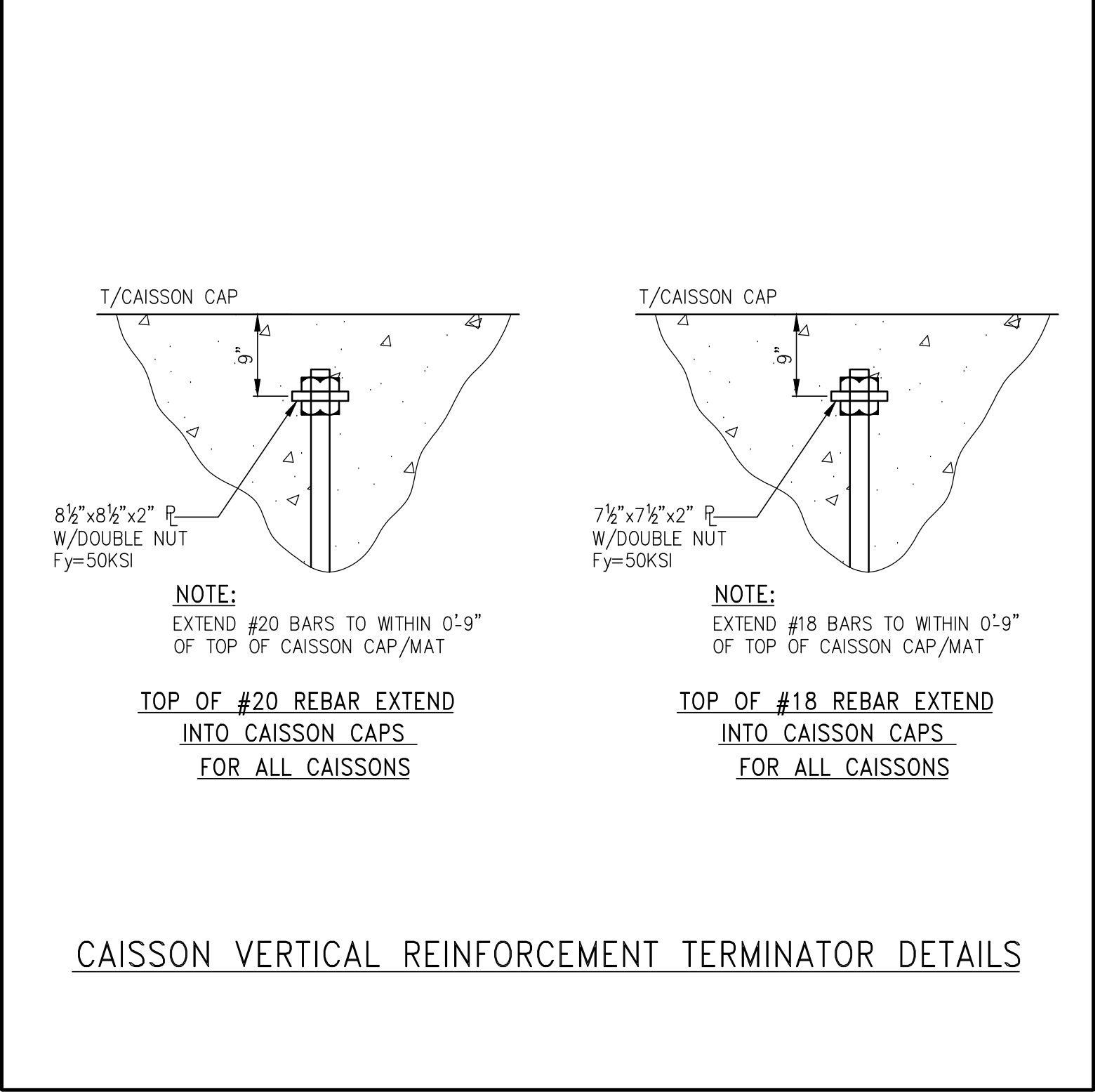
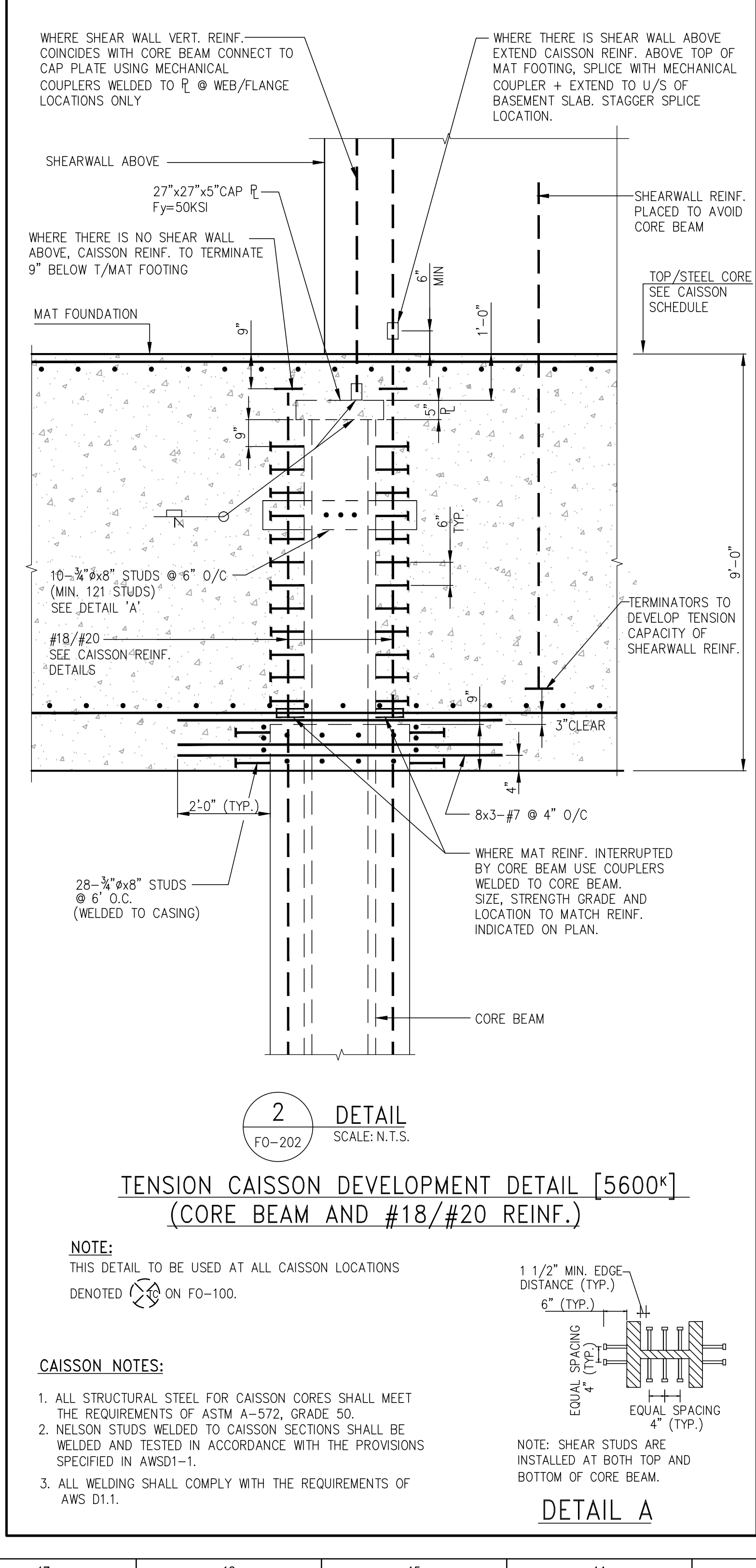
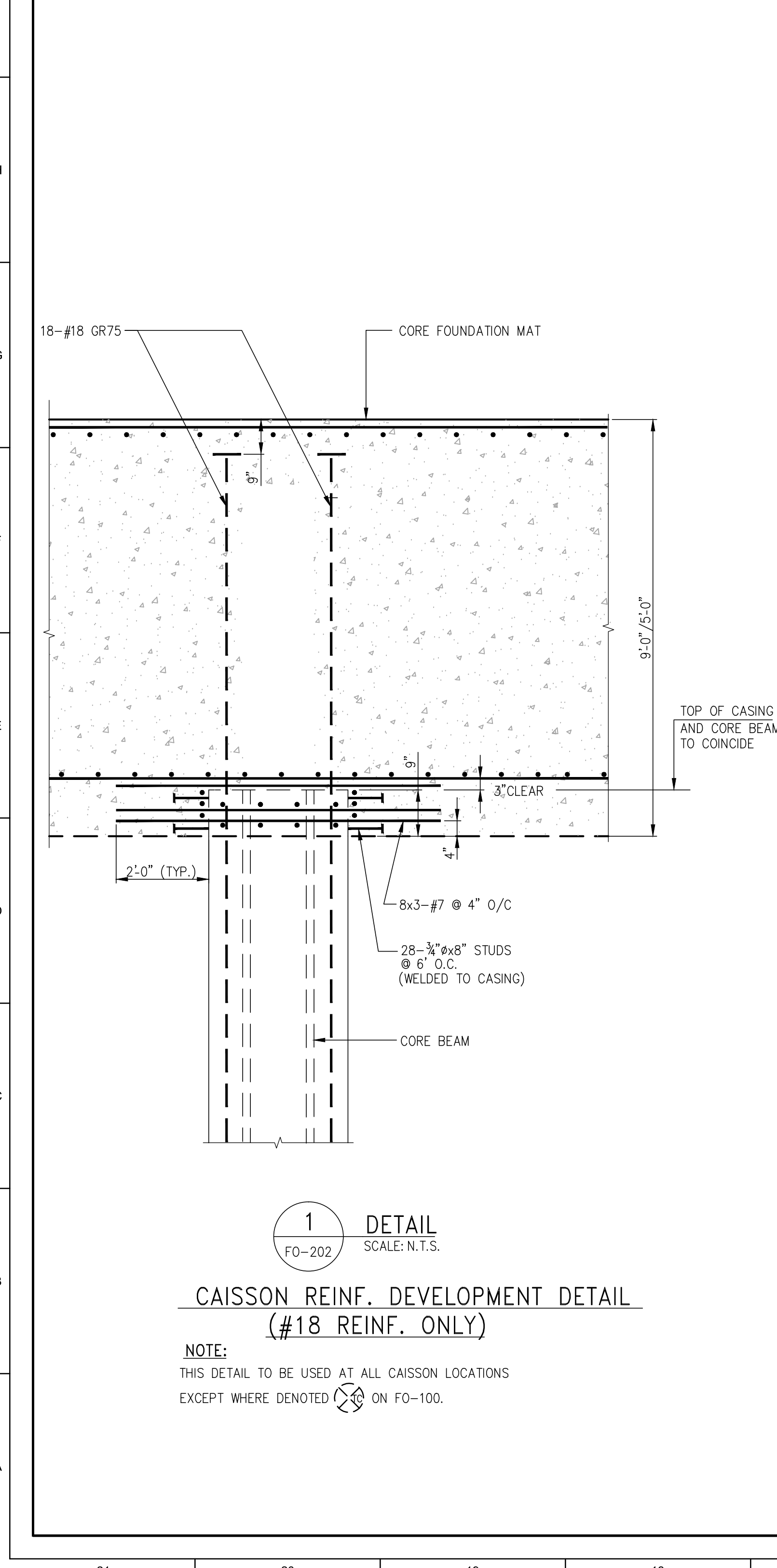
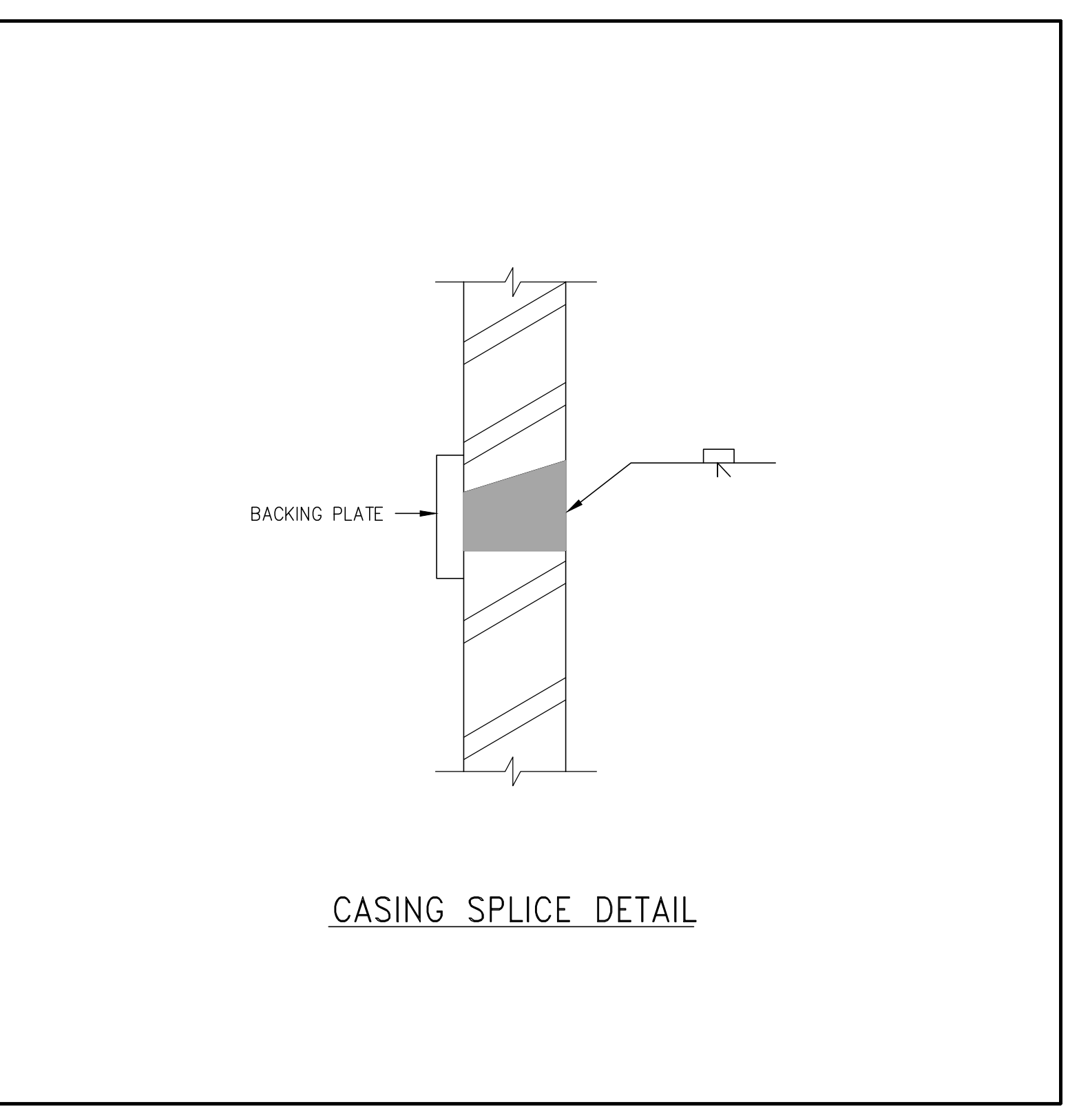
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CAISSON SCHEDULE

| CAISSON ID: | COMPRESSION CAPACITY (TONS) | TENSION CAPACITY (TONS) | CAISSON TIP ELEV. (FEET) | CORE BEAM CUT OFF ELEV. (FEET) | CASING CUT OFF ELEV. (FEET) |
|-------------|-----------------------------|-------------------------|--------------------------|--------------------------------|-----------------------------|
| C1 | 8500 | 2800 | -79.0 | -5.0 | -12.25 |
| C2 | 7000 | 2800 | -55.0 | -5.0 | -12.25 |
| C4 | 7000 | - | -63.0 | -8.25 | -8.25 |
| C5 | 7000 | - | -59.0 | -8.25 | -8.25 |
| C6 | 7000 | - | -55.0 | -8.25 | -8.25 |
| C7 | 7000 | - | -51.0 | -8.25 | -8.25 |
| C10 | 7000 | - | -47.0 | -8.25 | -8.25 |
| C11 | 7000 | 2800 | -47.0 | -5.0 | -12.25 |
| C13 | 7000 | 2800 | -57.5 | -5.0 | -12.25 |
| C14 | 7000 | 2800 | -57.5 | -5.0 | -12.25 |
| C15 | 7000 | 2800 | -36.0 | -5.0 | -12.25 |
| C16 | 7000 | 2800 | -39.0 | -5.0 | -12.25 |



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OWNER:
Related Companies
60 Columbus Circle
New York, NY 10023
T: 212.801.1000

EXECUTIVE ARCHITECT:
Harmon Levy Architects
48 West 37th Street
New York, NY 10018
T: 212.290.1444

DESIGNER:
Diller Scofidio+Renfro
601 West 88 Street-1815
New York, New York 10001
T: 212.260.7971

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5 Union Square, West
New York, New York 10003
T: 212.463.0334

STRUCTURAL ENGINEER:
WSP | Parsons
228 E 49th Street
New York, NY 10017
T: 212.687.9898

MEP ENGINEER:
Jaros Baum & Bolles Consulting Engineers
80 Pine Street
New York, NY 10005
T: 212.269.5894

EXTERIOR WALL CONSULTANT:
Harmon Berger & Associates
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 212.689.5380

VERTICAL TRANSPORTATION:
Van Dusen & Associates
8 Regent Street, Suite 920
Livingston, NJ 07039
T: 973-994-9220

LEED CONSULTANT:
Vibrant
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 203.299.1411

ACOUSTICAL CONSULTANTS:
CERAMI & ASSOCIATES INC.
404 8th Avenue #8
New York, NY 10018
T: 212-370-1776

LANDSCAPE DESIGNER:
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200 Park Avenue South, Suite 920
New York, NY 10003
T: 212-260-2270

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FOUNDATION TYPICAL DETAILS 3

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EXECUTIVE ARCHITECT: HOK Architects 48 West 37th Street New York, NY 10018 T: 212-290-1444
DESIGNER: Diller Scofidio+Renfro 601 West 98 Street, 1815 New York, New York 10001 T: 212-260-7971
ENGINEER: Rockwell Group 5 Union Square, West New York, New York 10003 T: 212-463-0334
STRUCTURAL ENGINEER: WSP Cantor Seinuk 22 E 49th Street New York, NY 10017 T: 212-687-9888
MEP ENGINEER: Jaroas Baum & Boles Consulting Engineers 80 Pine Street New York, NY 10005 T: 212-269-5884
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TABLE #3: TENSION DEVELOPMENT LENGTHS FOR STANDARD END HOOKS (ldh) (LENGTHS IN INCHES). Table with columns for BAR SIZE and CONCRETE STRENGTH (PSI) ranging from 3,000 to 10,000.

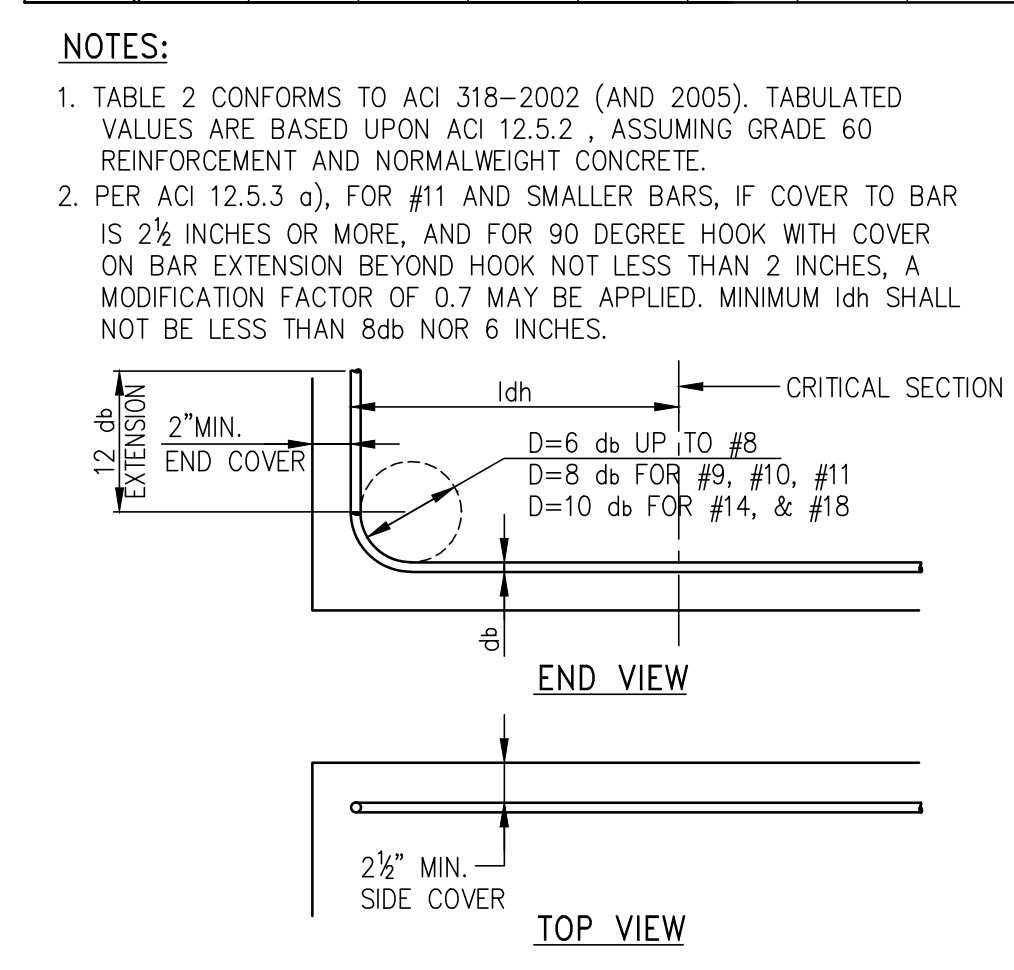


TABLE #4: COMPRESSION LAP SPLICES (LENGTHS IN INCHES). Table with columns for BAR SIZE and GRADE OF REINFORCEMENT (60 KSI, 75 KSI, 80 KSI).

NOTES: 1. LAP SPLICES ARE NOT PERMITTED... 2. LAP SPLICES OF #14 AND #18 BARS TO #11 AND SMALLER BARS ARE PERMITTED PER ACI 318 (12.16.2).

NOTES FOR TENSION DEVELOPMENT LENGTHS (ld): 1. REINFORCEMENT IS UNCOATED, WITH Fy=60,000 PSI. 2. CONCRETE IS NORMAL WEIGHT (144-150#/C.F.).

TABLE #2: TENSION DEVELOPMENT LENGTHS (ld) (IN INCHES). Tables 2.A, 2.C, 2.B, and 2.D showing development lengths for various bar sizes and concrete strengths.

NOTES FOR TENSION DEVELOPMENT LENGTHS (ld): 1. REINFORCEMENT IS UNCOATED, WITH Fy=60,000 PSI. 2. CONCRETE IS NORMAL WEIGHT (144-150#/C.F.).

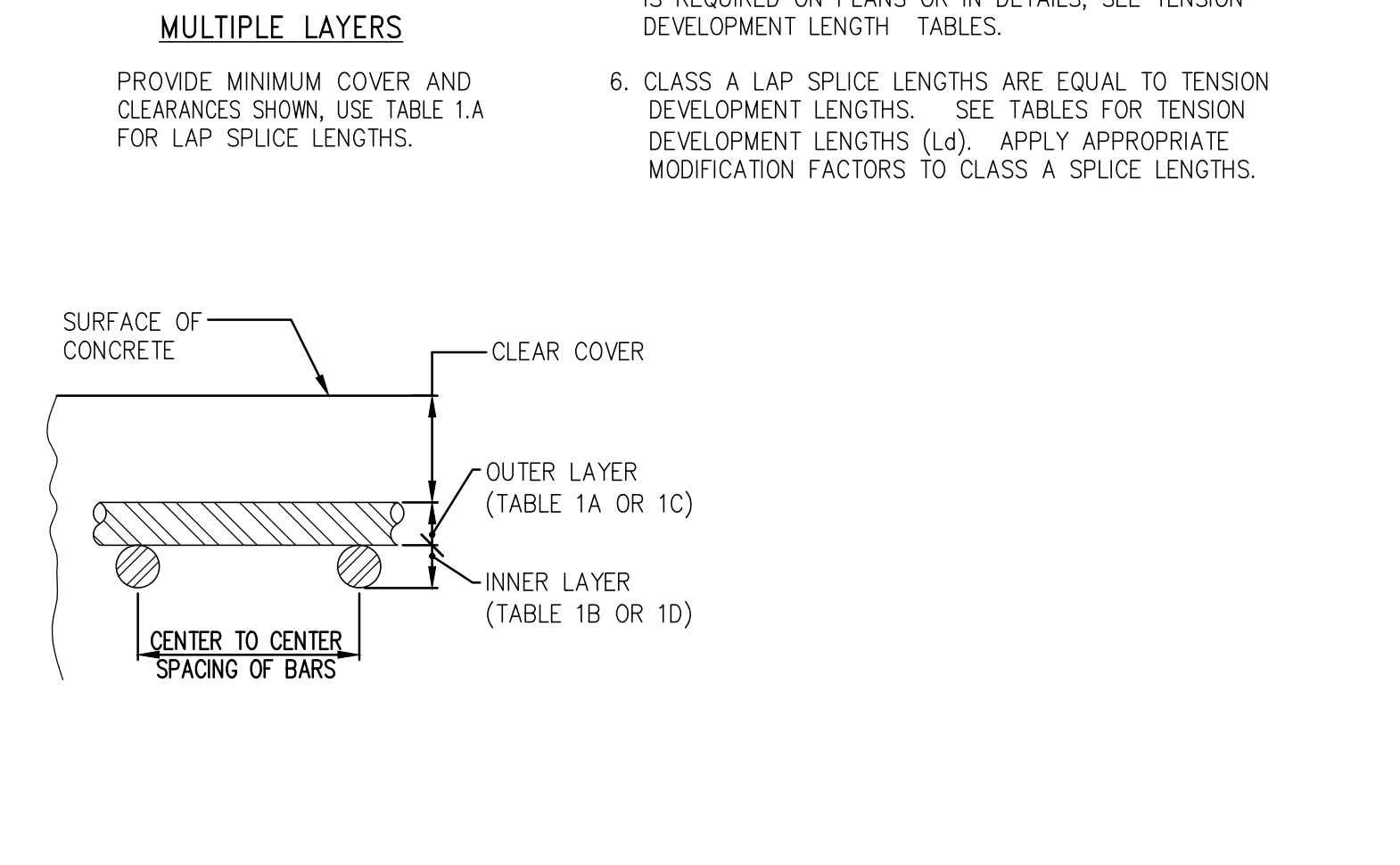
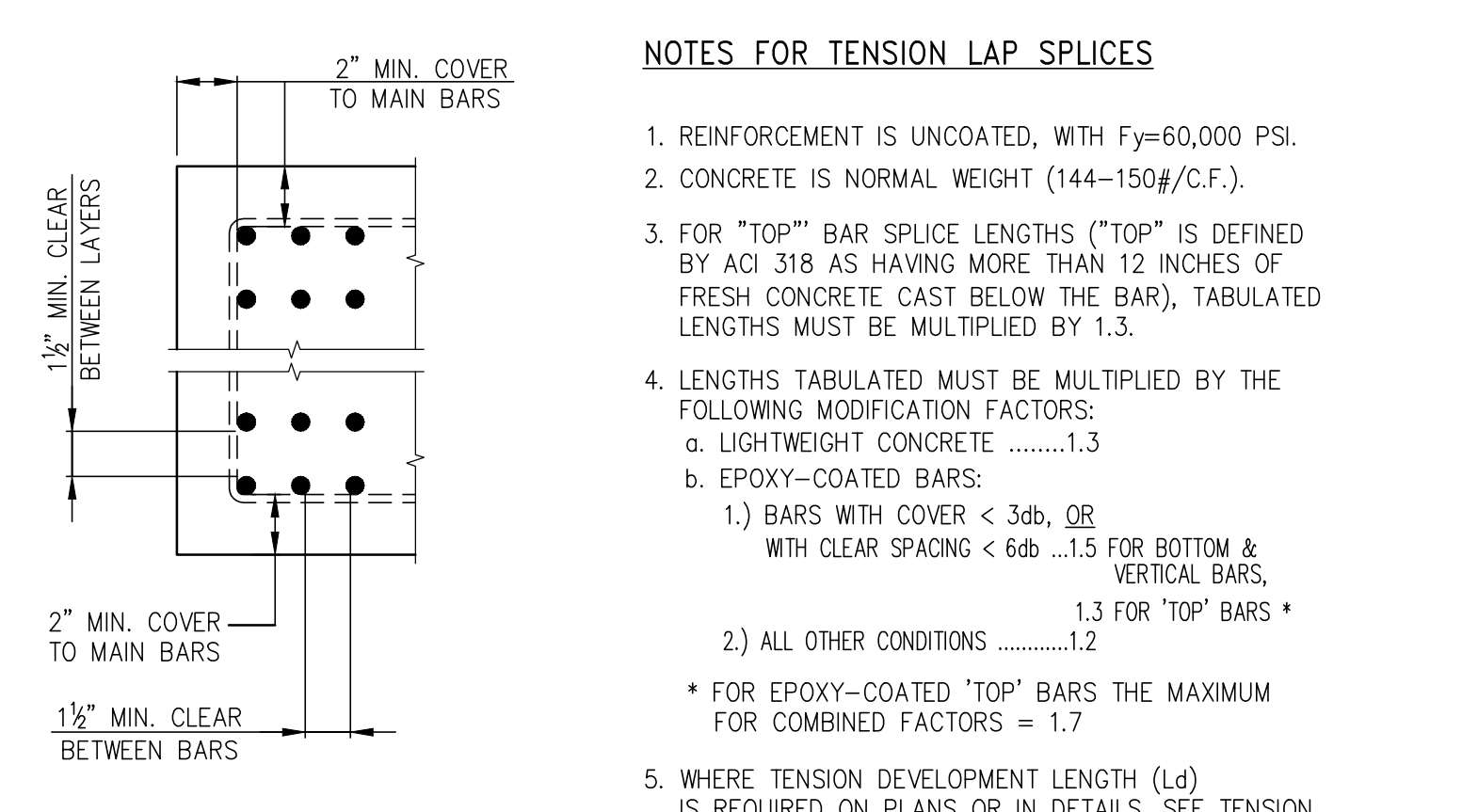
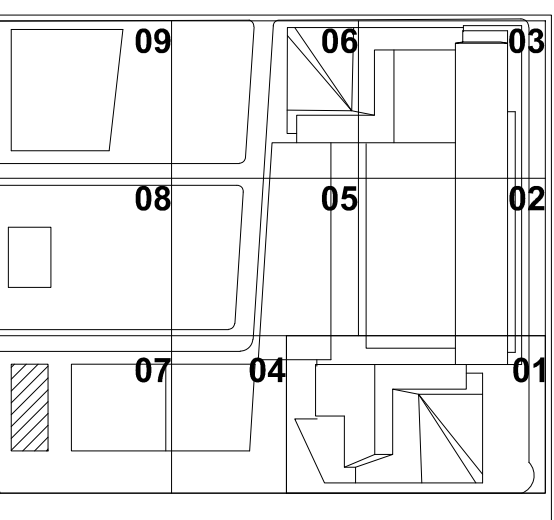


TABLE #1: TENSION LAP SPLICE LENGTHS (CLASS B MINIMUM). Tables 1.A, 1.C, 1.B, and 1.D showing lap splice lengths for various bar sizes and concrete strengths.

NOTES FOR TENSION LAP SPLICES: 1. REINFORCEMENT IS UNCOATED, WITH Fy=60,000 PSI. 2. CONCRETE IS NORMAL WEIGHT (144-150#/C.F.).

TABLE #5: DEVELOPMENT LENGTHS FOR BARS IN COMPRESSION (LENGTHS IN INCHES). Table with columns for BAR SIZE and fy (60,000 PSI, 75,000 PSI, 80,000 PSI).



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HUDSON YARDS TOWER D

OWNER:
 Related Companies
 60 Columbus Circle
 New York, NY 10023
 T: 212.801.1000

EXECUTIVE ARCHITECT:
 Samuel Levy Architects
 48 West 37th Street
 New York, NY 10018
 T: 212.290.1444

DESIGNER:
 Diller Scofidio+Renfro
 601 West 88 Street-1815
 New York, New York 10001
 T: 212.260.7971

DESIGNER:
 Rockwell Group
 5 Union Square, West
 New York, New York 10003
 T: 212.463.0334

STRUCTURAL ENGINEER:
 WSP Cantor Seinuk
 228 E 49th Street
 New York, NY 10017
 T: 212.687.9888

MEP ENGINEER:
 Jaro Baum & Bolles Consulting Engineers
 80 Pine Street
 New York, NY 10005
 T: 212.269.5894

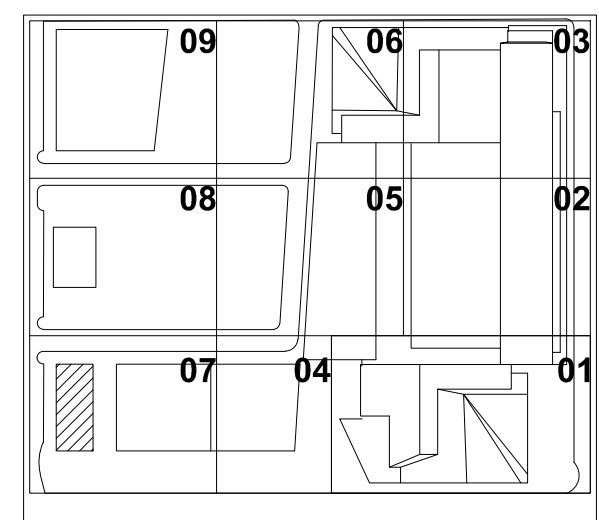
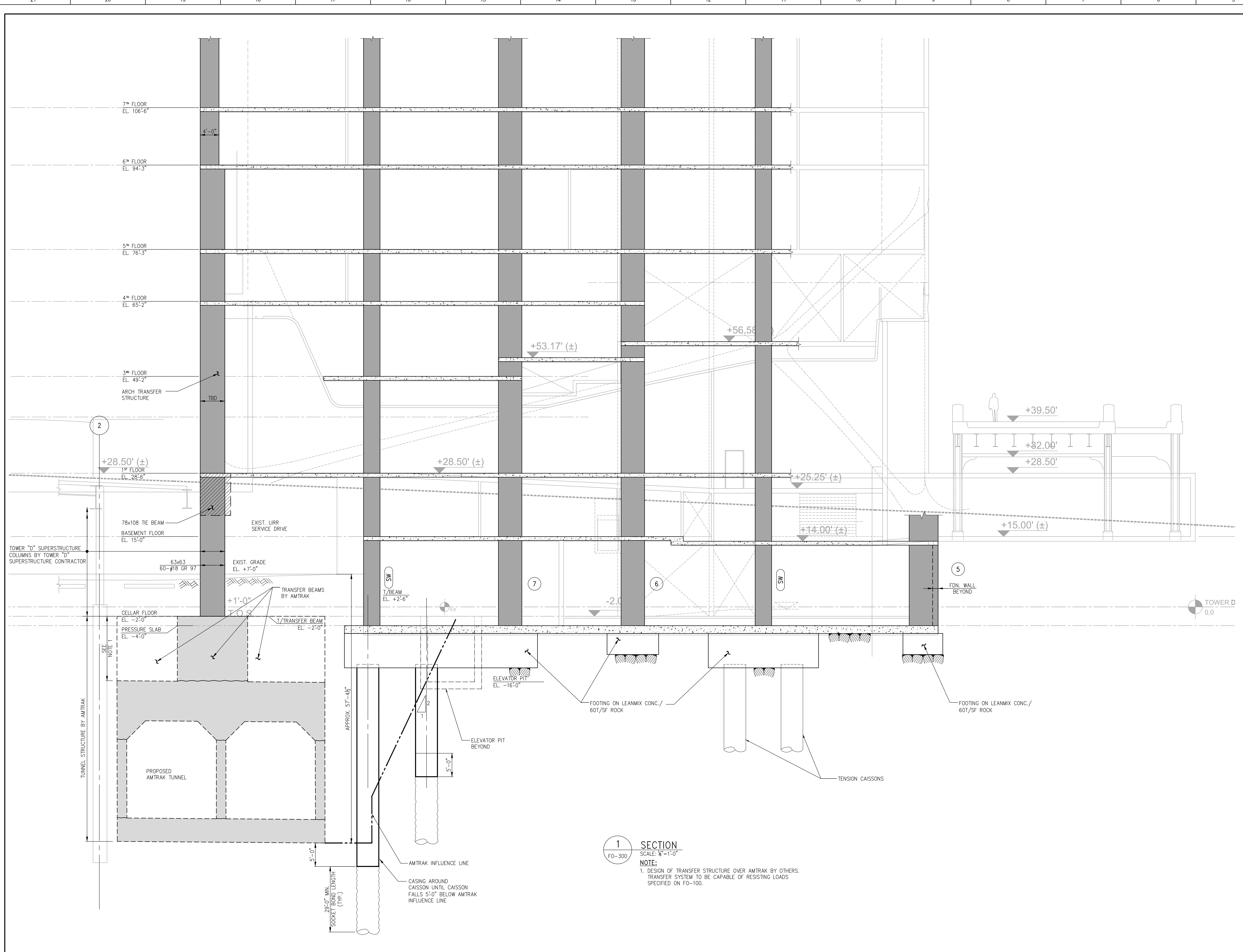
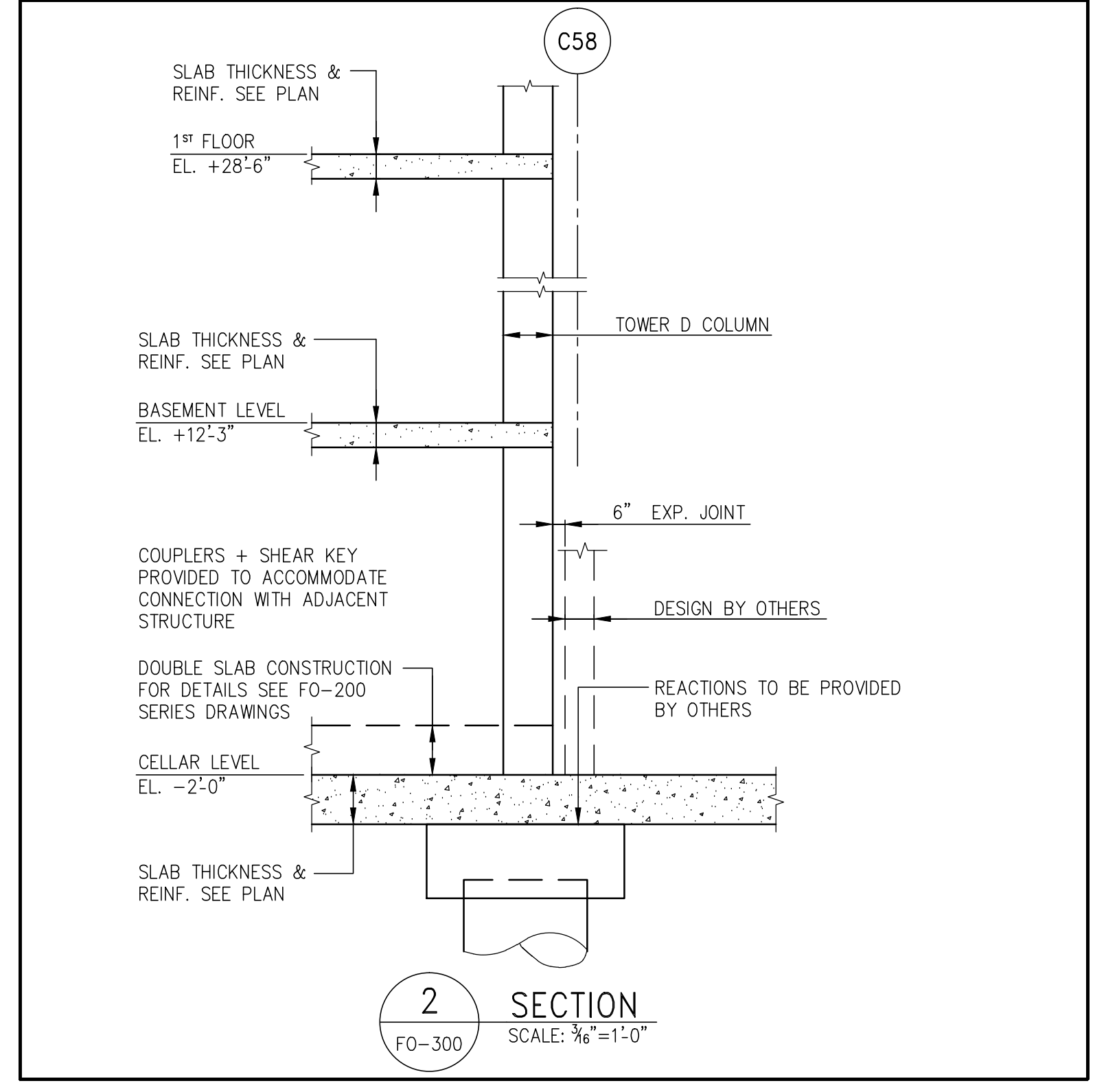
EXTERIOR WALL CONSULTANT:
 Brian Berger & Associates
 360 Park Avenue South, 15th Floor
 New York, NY 10010
 T: 212.699.5398

VERTICAL TRANSPORTATION:
 Van Deusen & Associates
 5 Regent Street, Suite 524
 Livingston, NJ 07039
 T: 973-994-9220

LEED CONSULTANT:
 Viridian
 360 Park Avenue South, 15th Floor
 New York, NY 10010
 T: 203.299.1411

ACOUSTICAL CONSULTANTS:
 CERAMI & ASSOCIATES INC.
 434 8th Avenue #8
 New York, NY 10018
 T: 212-370-1776

LANDSCAPE DESIGNER:
 Nelson Byrd Wolk
 200 Park Avenue South, Suite 920
 New York, NY 10003
 T: 212-260-2270



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| EARLY FOUNDATION PACKAGE | 02-01-13 |
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| REVISED AS NOTED | 01-30-14 |
| FOUNDATION PERMIT ISSUE | 02-04-14 |



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 2014-02-04

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PROJECT NUMBER
 2012068

SHEET TITLE
FOUNDATION SECTION 1

DRAWING NO.
FO-300.00

**HUDSON YARDS
TOWER D**

OWNER:
Related Companies
60 Columbus Circle
New York, NY 10023
T: 212.801.1000

EXECUTIVE ARCHITECT:
Daniel Libeskind Architects
48 West 37th Street
New York, NY 10018
T: 212.290.1444

DESIGNER:
Diller Scofidio+Renfro
601 West 88 Street-1815
New York, New York 10001
T: 212.260.7971

DESIGNER:
Rockwell Group
5 Union Square, West
New York, New York 10003
T: 212-463-0334

STRUCTURAL ENGINEER:
WSP|Parsons
228 E 49th Street
New York, NY 10017
T: 212.687.9888

MEP ENGINEER:
Jaros Baum & Bolles Consulting Engineers
80 Pine Street
New York, NY 10005
T: 212-269-5894

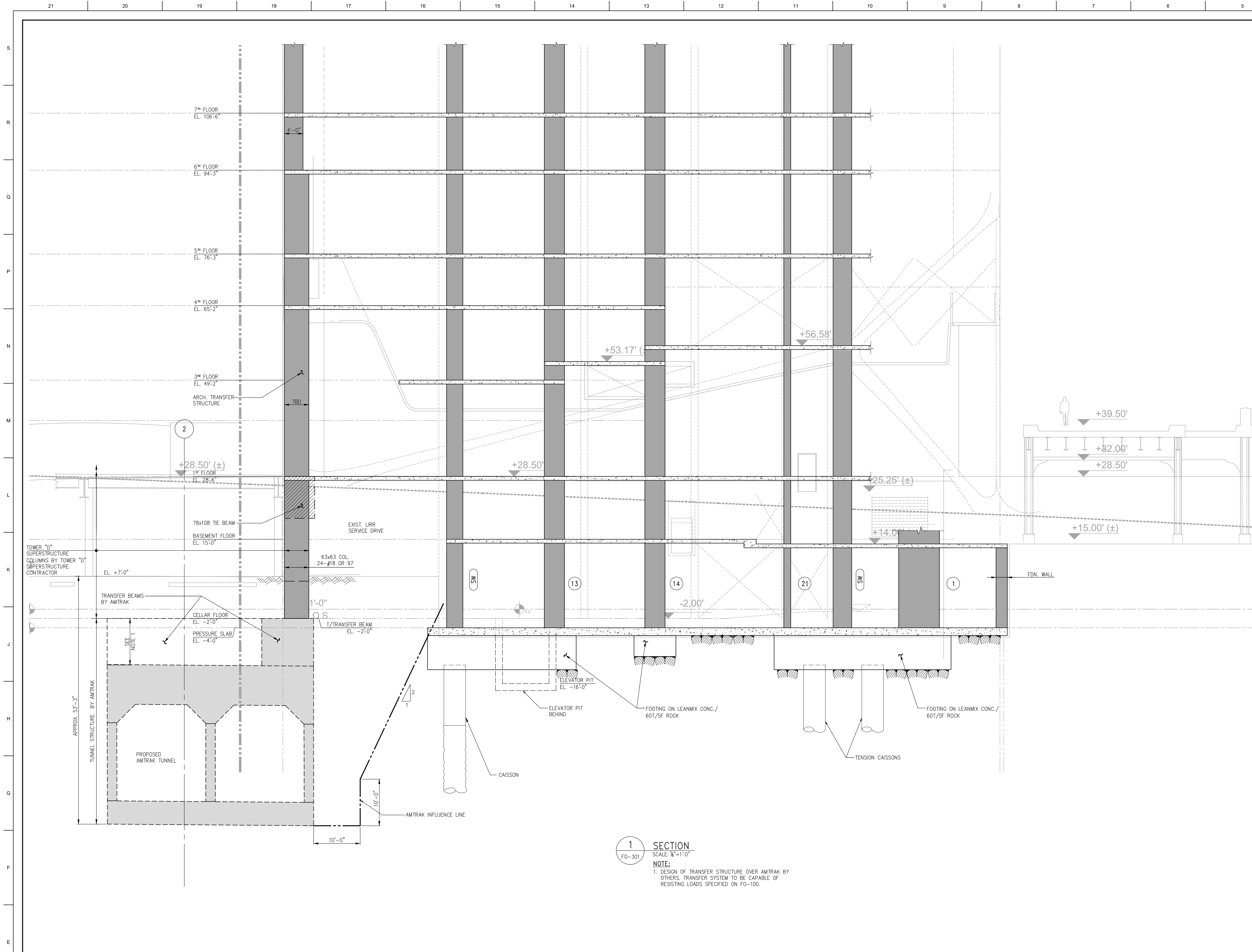
EXTERIOR WALL CONSULTANT:
Briant Berger & Associates
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 212-689-5388

VERTICAL TRANSPORTATION:
Van Dusen & Associates
5 Regent Street, Suite 324
Livingston, NJ 07039
T: 973-994-9220

LEED CONSULTANT:
Vivibar
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 203-299-1411

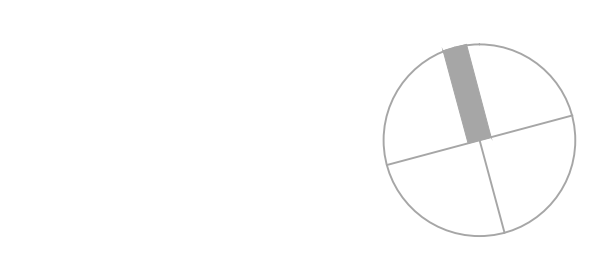
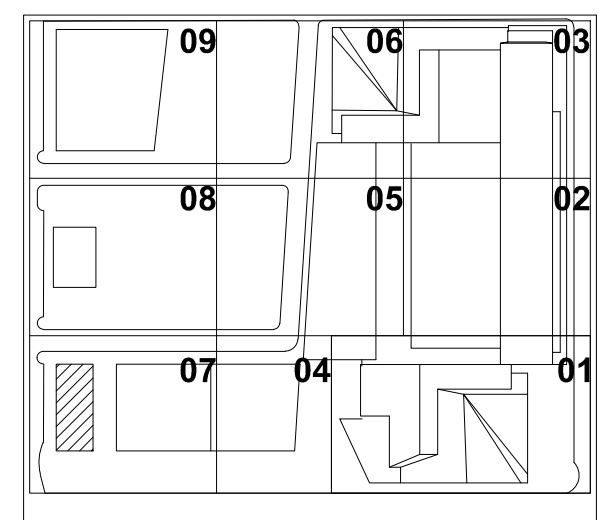
ACOUSTICAL CONSULTANTS:
CERAMI & ASSOCIATES INC.
434 5th Avenue #8
New York, NY 10018
T: 212-370-1776

LANDSCAPE DESIGNER:
Michael Byrne Note
200 Park Avenue South, Suite 920
New York, NY 10003
T: 212-260-2270



1 SECTION
SCALE: 1/4"=1'-0"

NOTE:
1. DESIGN OF TRANSFER STRUCTURE OVER AMTRAK BY OTHERS. TRANSFER SYSTEM TO BE CAPABLE OF RESISTING LOADS SPECIFIED ON FO-100.



| PRINTING | DATE |
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| REVISED SD ISSUE | 08-21-13 |
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| FINAL SD ISSUE | 11-25-13 |
| FOUNDATION BID PACKAGE | 01-10-14 |
| REVISED AS NOTED | 01-30-14 |
| FOUNDATION PERMIT ISSUE | 02-04-14 |



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PROJECT NUMBER: 2012068
SHEET TITLE: FOUNDATION SECTION 2
DRAWING NO.: FO-301.00

HUDSON YARDS TOWER D

OWNER:
Related Companies
60 Columbus Circle
New York, NY 10023
T: 212.801.1000

EXECUTIVE ARCHITECT:
Daniel Libeskind Architects
48 West 37th Street
New York, NY 10018
T: 212.290.1444

DESIGNER:
Diller Scofidio+Renfro
601 West 88 Street-1015
New York, New York 10001
T: 212.260.7971

DESIGNER:
Rockwell Group
5 Union Square, West
New York, New York 10003
T: 212-463-0334

STRUCTURAL ENGINEER:
WSP Cantor Seinuk
228 E 49th Street
New York, NY 10017
T: 212.867.9888

MEP ENGINEER:
Jaros Baum & Bolles Consulting Engineers
80 Pine Street
New York, NY 10005
T: 212-269-5894

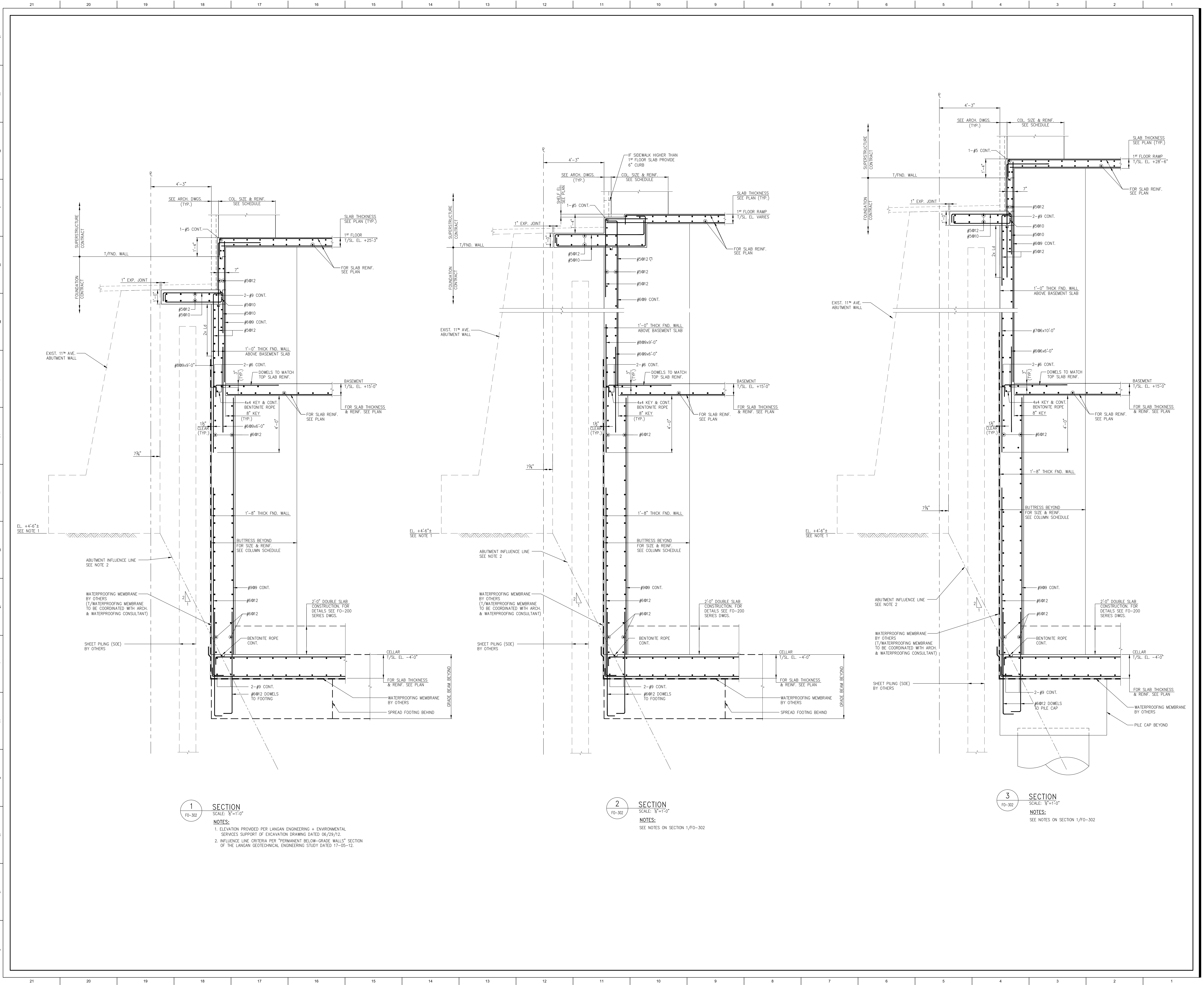
EXTERIOR WALL CONSULTANT:
Barry Berger & Associates
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 212-696-3368

VERTICAL TRANSPORTATION:
Van Dusen & Associates
5 Regent Street, Suite 324
Livingston, NJ 07039
T: 973-994-9220

LEED CONSULTANT:
Vividan
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 203-296-1411

ACOUSTICAL CONSULTANTS:
CERAMI & ASSOCIATES INC.
404 8th Avenue #8
New York, NY 10018
T: 212-370-1776

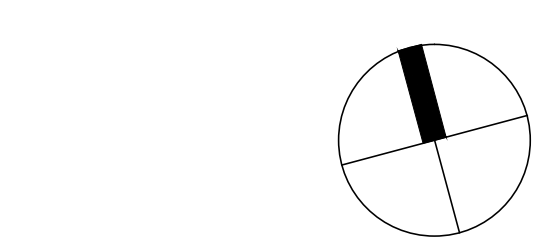
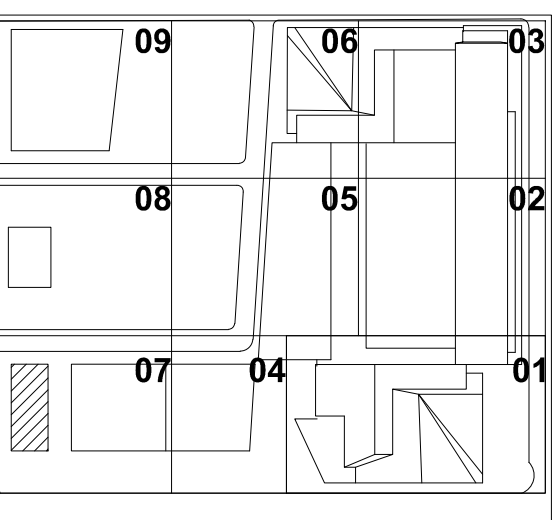
LANDSCAPE DESIGNER:
Nathan Yonkin
200 Park Avenue South, Suite 920
New York, NY 10003
T: 212-200-2270



1 SECTION
SCALE: 1/8"=1'-0"
NOTES:
1. ELEVATION PROVIDED PER LANGAN ENGINEERING + ENVIRONMENTAL SERVICES SUPPORT OF EXCAVATION DRAWING DATED 06/29/12.
2. INFLUENCE LINE CRITERIA PER "PERMANENT BELOW-GRADE WALLS" SECTION OF THE LANGAN GEOTECHNICAL ENGINEERING STUDY DATED 17-05-12.

2 SECTION
SCALE: 1/8"=1'-0"
NOTES:
SEE NOTES ON SECTION 1/F0-302

3 SECTION
SCALE: 1/8"=1'-0"
NOTES:
SEE NOTES ON SECTION 1/F0-302



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PROJECT NUMBER
2012068

SHEET TITLE
FOUNDATION SECTIONS 3

DRAWING NO.
FO-302.00

HUDSON YARDS TOWER D

OWNER:
 Related Companies
 60 Columbus Circle
 New York, NY 10023
 T: 212.801.1000

EXECUTIVE ARCHITECT:
 Samuel Levy Architects
 48 West 37th Street
 New York, NY 10018
 T: 212.290.1444

DESIGNER:
 Diller Scofidio+Renfro
 601 West 26 Street-1815
 New York, New York 10001
 T: 212.260.7971

ENGINEER:
 Rockwell Group
 5 Union Square, West
 New York, New York 10003
 T: 212.463-0334

STRUCTURAL ENGINEER:
 WSP|Parsons|Berntsen
 228 E 45th Street
 New York, NY 10017
 T: 212.687.9888

MEP ENGINEER:
 Jaros Baum & Bolles Consulting Engineers
 80 Pine Street
 New York, NY 10005
 T: 212-269-5894

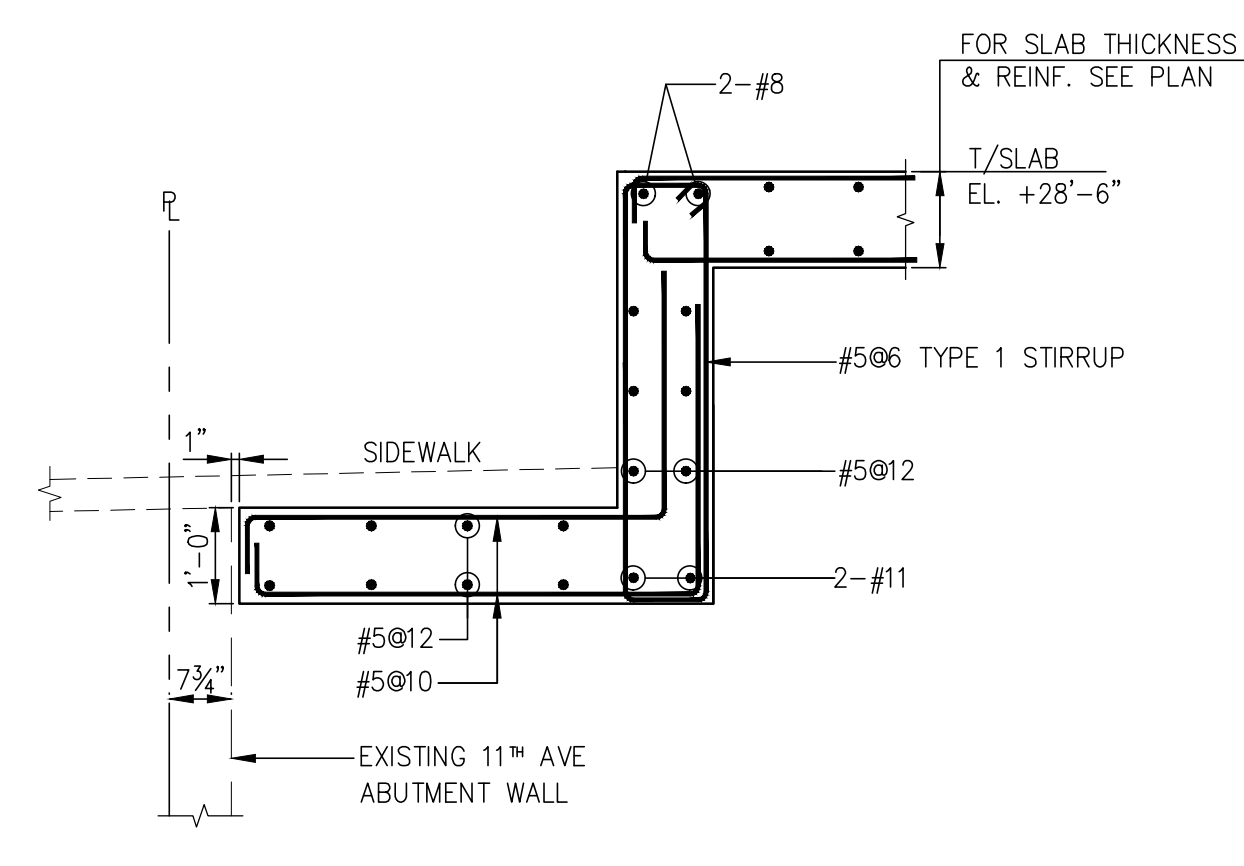
EXTERIOR WALL CONSULTANT:
 Brian Burger & Associates
 360 Park Avenue South, 15th Floor
 New York, NY 10010
 T: 212-699-5398

VERTICAL TRANSPORTATION:
 Van Dusen & Associates
 5 Regent Street, Suite 324
 Livingston, NJ 07039
 T: 973-994-9220

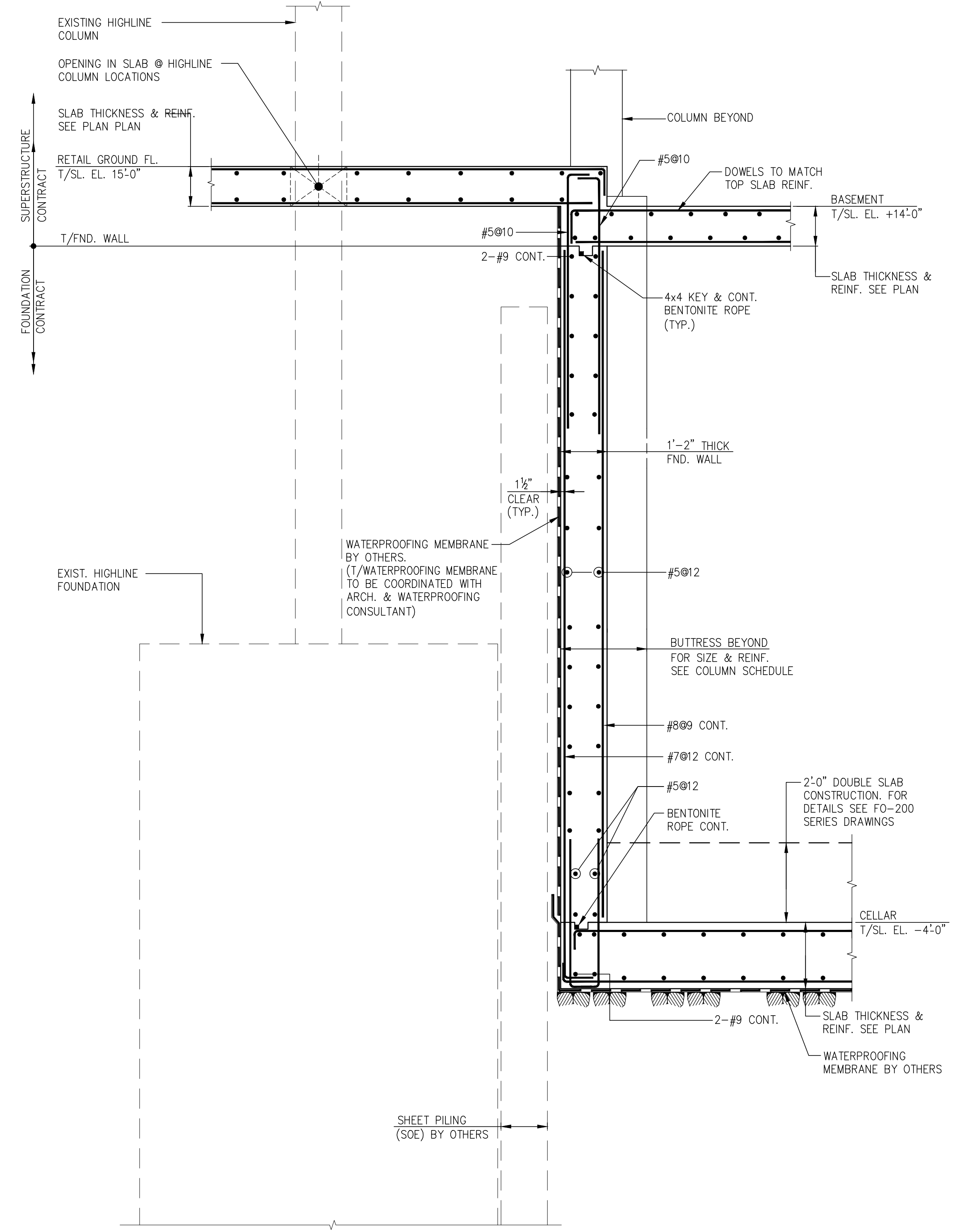
LEED CONSULTANT:
 Virebar
 360 Park Avenue South, 15th Floor
 New York, NY 10010
 T: 203-299-1411

ACOUSTICAL CONSULTANTS:
 CERAMI & ASSOCIATES INC.
 434 5th Avenue #8
 New York, NY 10018
 T: 212-370-1776

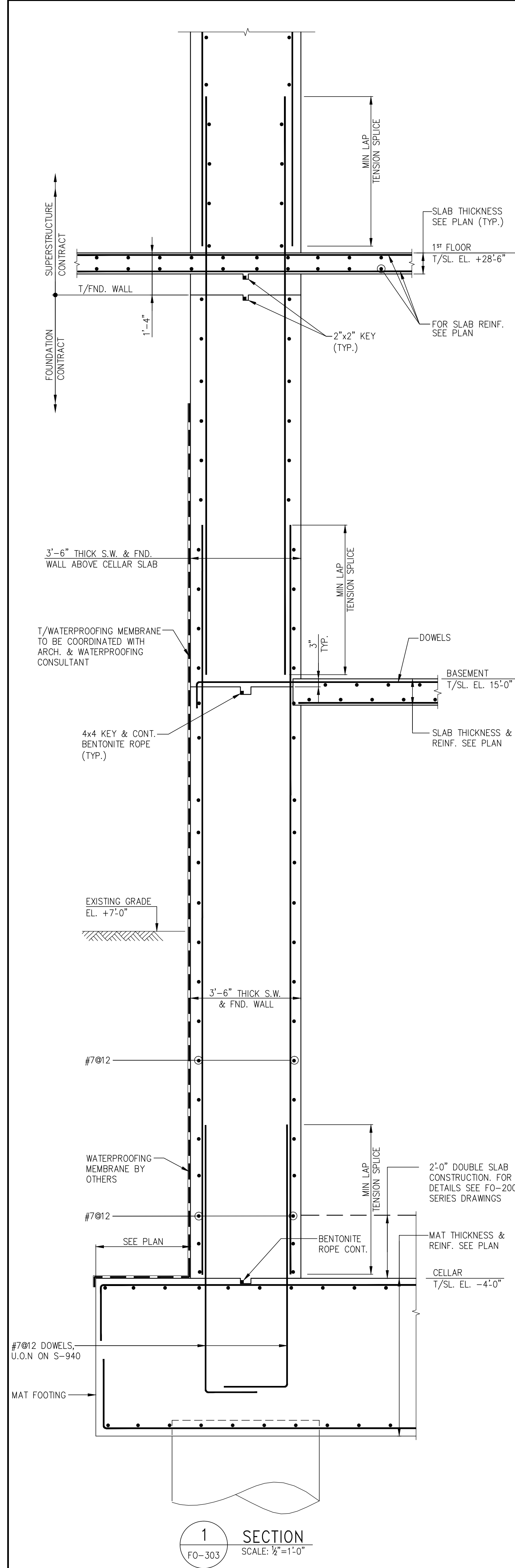
LANDSCAPE DESIGNER:
 Michael Mott
 200 Park Avenue South, Suite 920
 New York, NY 10003
 T: 212-260-2270



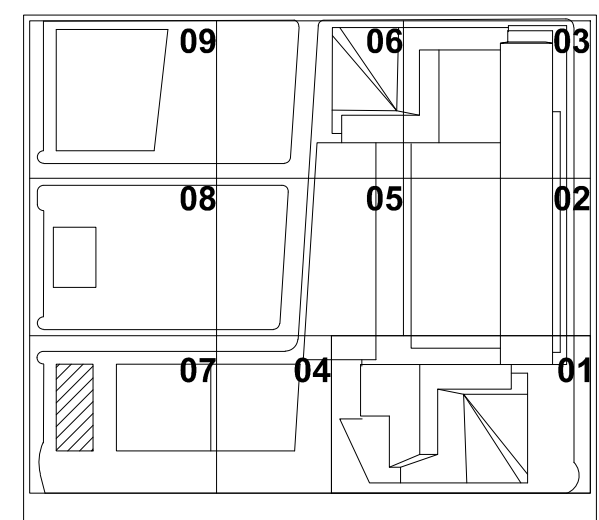
3 SECTION
 SCALE: 3/4"=1'-0"



2 SECTION
 SCALE: 3/4"=1'-0"



1 SECTION
 SCALE: 3/4"=1'-0"



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| FOUNDATION PERMIT ISSUE | 02-04-14 |



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PROJECT NUMBER
 2012068

SHEET TITLE
 FOUNDATION SECTIONS 4

DRAWING NO.
 FO-303.00

OWNER:
Related Companies
65 Columbus Circle
New York, NY 10023
T: 212.801.1000

EXECUTIVE ARCHITECT:
Harman Levin Architects
48 West 37th Street
New York, NY 10018
T: 212.290.1444

DESIGNER:
Diller Scofidio+Renfro
601 West 86 Street-1815
New York, New York 10001
T: 212.200.7971

DESIGNER:
Rockwell Group
5 Union Square, West
New York, New York 10003
T: 212.463.0334

DESIGNER:
WSP Cantor Seinuk
228 E 49th Street
New York, NY 10017
T: 212.687.9888

MEP ENGINEER:
Jaros Baum & Bolles Consulting Engineers
80 Pine Street
New York, NY 10005
T: 212-269-5894

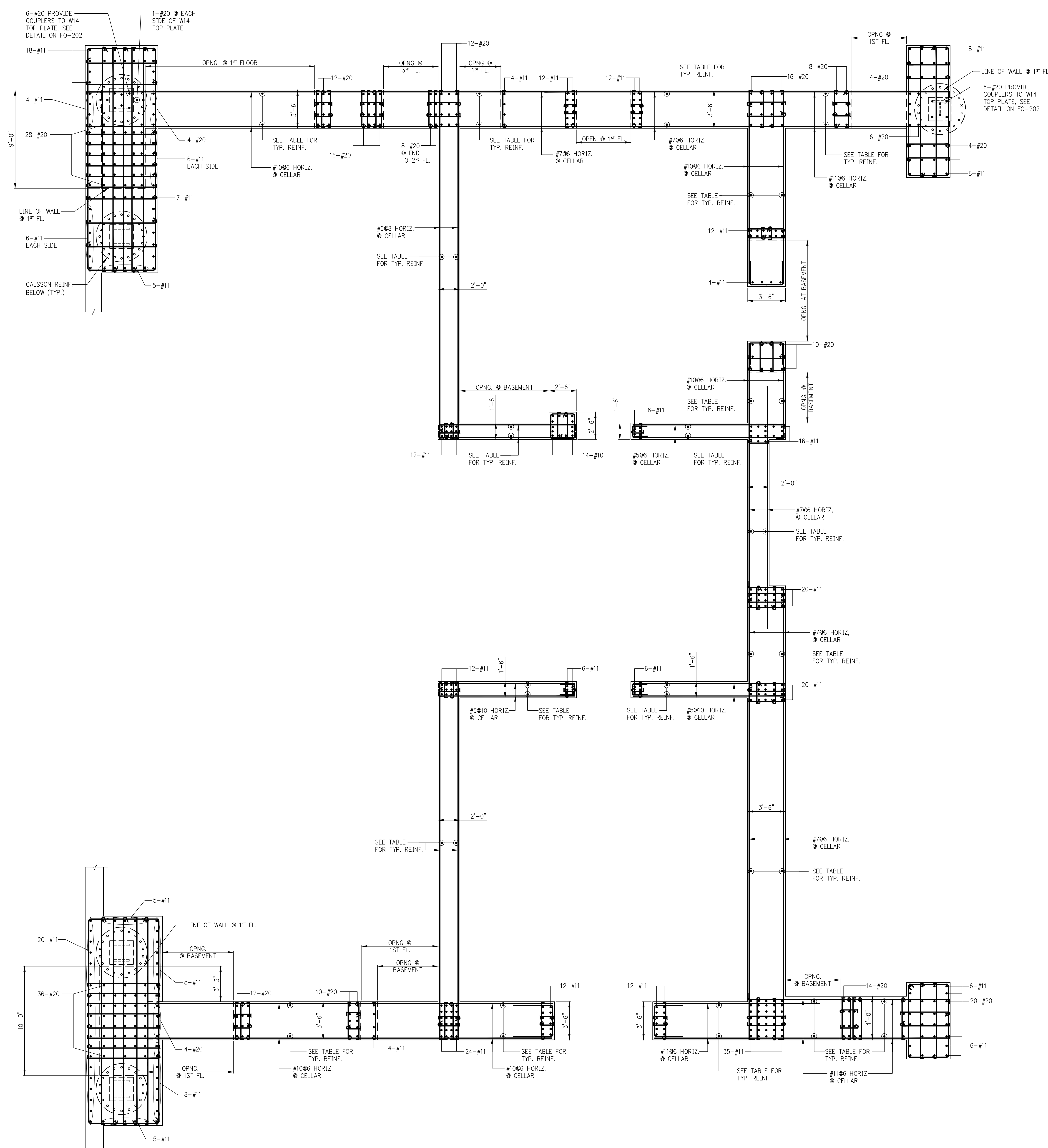
EXTERIOR WALL CONSULTANT:
Barnett Berger & Associates
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 212-688-5288

VERTICAL TRANSPORTATION:
Van Dusen & Associates
9 Regent Street, Suite 324
Livingston, NJ 07039
T: 973-994-9220

LEED CONSULTANT:
Vividian
360 Park Avenue South, 15th Floor
New York, NY 10010
T: 203-299-1411

ACOUSTICAL CONSULTANTS:
CERAMI & ASSOCIATES INC.
424 5th Avenue #8
New York, NY 10018
T: 212-370-1776

LANDSCAPE DESIGNER:
Nelson Byrd Woltz
200 Park Avenue South, Suite 920
New York, NY 10003
T: 212-260-2270



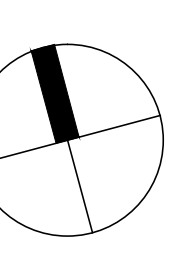
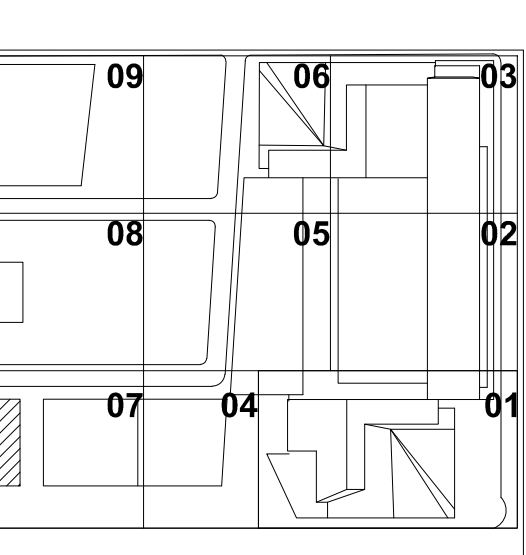
1
S-940
SHEARWALL REINFORCEMENT PLAN
SCALE: 1/4"=1'-0"

NOTES:

- REINFORCEMENT SHOWN ON SHEARWALL ELEVATION IS ADDITIONAL TO REINFORCEMENT SHOWN ON PLANS.
- SEE DWG. S-949 FOR LINK BEAM SCHEDULE
- SEE DWG. S-944 FOR TYPICAL SHEARWALL DETAIL AND TYPICAL WALL REINFORCEMENT SCHEDULE
- ALL REINFORCEMENT SHOWN ON PLAN SHALL BE GRADE 60, U.D.N.
- ALL #20 VERTICAL REINFORCEMENT SHALL BE GRADE 97.

LEGEND:

- INDICATES SHEARWALL VERTICAL REINF.
- INDICATES CAISSON REINF. DEVELOPED INTO SHEARWALL
- × INDICATES CAISSON VERTICAL REINF. TERMINATED IN MAT FOOTING



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SHEET TITLE
**SHEARWALL
REINFORCEMENT PLAN**

DRAWING NO.
S-940.00