1) GENERAL INFORMATION

A. GOVERNING BUILDING CODE: IBC-2018 "INTERNATIONAL BUILDING CODE".

B. BUILDING RISK CATEGORY: THE BUILDING RISK CATEGORY ACCORDING TO IBC-2018 TABLE 1604.5 AND ASCE 7-16 TABLE 1.5-1 IS CATEGORY II.

C. ELEVATIONS: REFERENCE FINISHED FLOOR ELEVATIONS OF 100'-0" EQUALS ACTUAL EXISTING FINISH FLOOR ELEVATION OF 1218.90'.

D. CONTRACT DOCUMENTS:

1) THE CONTRACT DOCUMENTS CONSIST OF THE AGREEMENT BETWEEN THE OWNER AND CONTRACTOR, CONDITIONS OF THE CONTRACT, DRAWINGS, SPECIFICATIONS, ADDENDA ISSUED PRIOR TO EXECUTION OF THE CONTRACT, OTHER DOCUMENTS LISTED IN THE AGREEMENT AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT.

2) THE GENERAL CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND DISSEMINATING ALL CONTRACT DOCUMENTS AND LATEST ADDENDA TO ALL SUB-CONTRACTORS PRIOR TO DETAILING, FABRICATION, OR INSTALLATION OF WORK.

3) CORRELATION OF THE CONTRACT DOCUMENTS: THE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ONE SHALL BE AS BINDING AS IF REQUIRED BY ALL. IF CONFLICTING REQUIREMENTS ARE FOUND BETWEEN THE DRAWINGS, SPECIFICATIONS AND/OR THESE GENERAL NOTES, THE MORE STRINGENT AND HIGHEST COST REQUIREMENT SHALL CONTROL UNLESS DIRECTED OTHERWISE IN WRITING BY THE OWNER'S REPRESENTATIVE.

4) THE GENERAL CONTRACTOR SHALL COMPARE THE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR DISCREPANCIES BETWEEN EACH SET, AND WITHIN EACH SET OF DRAWINGS, AND REPORT DISCREPANCIES, IF ANY, TO THE OWNER'S REPRESENTATIVE PRIOR TO THE DETAILING, FABRICATION, AND INSTALLATION OF AFFECTED WORK.

5) GENERAL CONTRACTOR SHALL COORDINATE SIZES AND LOCATIONS OF OPENINGS THROUGH FLOORS, ROOF, AND WALLS SHOWN ON ELECTRICAL, PLUMBING, AND FIRE SUPPRESSION SYSTEM DESIGN DOCUMENTS WITH ASSOCIATED SUBCONTRACTORS.

6) ALTHOUGH NOT NECESSARILY SPECIFICALLY REFERENCED IN THE CONTRACT DOCUMENTS, TYPICAL DETAILS AND GENERAL NOTES APPLY TO THE ENTIRE PROJECT WHEREVER CONDITIONS SIMILAR TO THOSE DETAILED OR NOTED EXIST.

7) THE USE OF ELECTRONIC FILES OR REPRODUCTION OF CONTRACT DOCUMENTS BY ANY TRADE OR MATERIAL SUPPLIER IN LIEU OF COMPLETELY INDEPENDENT PREPARATION OF SHOP DRAWINGS SIGNIFIES THE SUPPLIER'S CERTIFICATION THAT ALL INFORMATION SHOWN IN THE SHOP DRAWINGS IS CORRECT, AND ASSIGNS THEMSELVES TO RESPONSIBILITY FOR ANY JOB EXPENSE ARISING DUE TO ANY ERRORS OCCURRING THEREIN.

E. FIELD MODIFICATIONS: CONTRACTOR OR SUBCONTRACTOR FIELD MODIFICATIONS TO THE STRUCTURE WITHOUT THE PRIOR WRITTEN CONSENT OF THE STRUCTURAL ENGINEER ARE EXPRESSLY PROHIBITED AND MAY REQUIRE SUBSEQUENT REMEDIATION DIRECTED BY THE STRUCTURAL ENGINEER AT CONTRACTOR'S EXPENSE.

2) DESIGN LOADS

A. GOVERNING STANDARD FOR DESIGN LOADS: ASCE 7-16 "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES"

B. DEAD LOAD: SELF WEIGHT OF MATERIALS, UNLESS NOTED OTHERWISE

C. ROOF DEAD LOAD:
1) BUILT-UP ROOFING SYSTEM....................................6 PSF
2) RIGID INSULATION...2 PSF
3) METAL ROOF DECK..3 PSF
4) JOIST SELF-WEIGHT..2 PSF
5) CEILING SYSTEM...2 PSF
6) ROOF COLLATERAL (MEP, BRIDGING & MISC. FRAMING).............5 PSF
7) TOTAL...20 PSF

D. UNIFORM LIVE LOADS:
1) ROOF LIVE LOAD (REDUCIBLE)................................20 PSF
2) SLAB-ON-GRADE..250 PSF

E. CONCENTRATED LIVE LOADS:
1) ALL FLOORS (ON AN AREA 2.5 FT. X 2.5 FT.)...... ....2,000 LBS
2) ROOFS (ON AN AREA 2.5 FT. X 2.5 FT.)......................300 LBS

F. WIND LOADS:
1) RISK CATEGORY: II
2) EXPOSURE CATEGORY:..C
3) ENCLOSURE CLASSIFICATION................................ENCLOSED
4) INTERNAL PRESSURE COEFFICIENT, GCPI:....... ....+/- 0.18
5) TOPOGRAPHIC FACTOR, KZT:......................................1.0
6) DIRECTIONALITY FACTOR, KD:...................................0.85
7) ULTIMATE DESIGN WIND SPEED, Vult:.........................109 MPH

G. SNOW LOADS:
1) SNOW IMPORTANCE FACTOR, Is:...................................1.0
2) GROUND SNOW LOAD, Pg:.......................................10 PSF
3) EXPOSURE OF ROOF: ....PARTIALLY EXPOSED
4) SURFACE ROUGHNESS CATEGORY:.....................................C
5) EXPOSURE FACTOR, Ce:..1.0
6) THERMAL FACTOR, Ct:...1.0
7) ROOF SLOPE FACTOR, Cs:..1.0
8) CALCULATED FLAT ROOF SNOW LOAD, Pf:........................7.0 PSF
9) MINIMUM FLAT ROOF SNOW LOAD, I*Pg:..........................10 PSF
10) RAIN ON SNOW SURCHARGE LOAD:................................5 PSF
11) DRIFT LOADS:...PER ASCE 7-16

H. RAIN LOADS:
1) 15-MINUTE RAIN INTENSITY.........................7.84 INCHES/HOUR
2) 60-MINUTE RAIN INTENSITY.........................3.98 INCHES/HOUR
3) DEPTH OF WATER ON THE UNDEFLECTED ROOF UP TO THE INLET OF THE SECONDARY DRAINAGE SYSTEM WHEN THE PRIMARY DRAINAGE SYSTEM IS BLOCKED (I.E., THE STATIC HEAD), ds....................4.0 INCHES
4) ADDITIONAL DEPTH OF WATER ON THE UNDEFLECTED ROOF ABOVE THE INLET OF THE SECONDARY DRAINAGE SYSTEM AT ITS DESIGN FLOW (I.E., THE HYDRAULIC HEAD), dh..................................2.0 INCHES

I. SEISMIC DESIGN CRITERIA:
1) RISK CATEGORY: II
2) SEISMIC IMPORTANCE FACTOR, Ie:...............................1.00
3) SOIL SITE CLASSIFICATION:.......................................C
4) 0.2 SEC. MAPPED SPECTRAL ACCELERATION, Ss:..................0.327
5) 1.0 SEC. MAPPED SPECTRAL ACCELERATION, S1:..................0.083
6) SITE COEFFICIENT, 0.2 SEC. PERIOD, Fa:.......................1.30
7) SITE COEFFICIENT, 1.0 SEC. PERIOD, Fv:.......................1.50
8) 0.2 SEC. DESIGN SPECTRAL ACCELERATION, Sds:.................0.283
9) 1.0 SEC. DESIGN SPECTRAL ACCELERATION, Sd1:.................0.083
10) SEISMIC DESIGN CATEGORY:.......................................B
11) SEISMIC PARAMETERS FOR BUILDING:
A) SEISMIC FORCE RESISTING SYSTEM: ORDINARY REINFORCED MASONRY SHEAR WALLS
B) RESPONSE MODIFICATION COEFFICIENT, R:......................2.00
C) SYSTEM OVERSTRENGTH FACTOR, O:.............................2.00
D) DEFLECTION AMPLIFICATION FACTOR, Cd:.......................1.75
E) ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE METHOD.
F) SEISMIC RESPONSE COEFFICIENT, Cs:.........................0.142
G) TOTAL LATERAL BASE SHEAR, V:.............................118 KIPS

3) MATERIAL DESIGN VALUES

A. CONCRETE (MIN. COMPRESSIVE STRENGTH AT 28 DAYS, NORMAL WEIGHT U.N.O.)
1) FOUNDATIONS:...3,500 PSI
2) WALLS:...4,000 PSI
3) SLABS-ON-GRADE.......................................4,000 PSI
4) ELEVATED SLABS ON METAL DECK.........................4,000 PSI
5) ALL OTHER STRUCTURAL CONCRETE, U.N.O:................4,000 PSI

B. REINFORCED CONCRETE MASONRY
1) DETERMINATION OF COMPRESSIVE STRENGTH:........UNIT STRENGTH METHOD
2) DESIGN COMPRESSIVE STRENGTH OF CONCRETE MASONRY, f'm:....2,000 PSI
3) NET AREA COMPRESSIVE STRENGTH OF CONCRETE MASONRY UNITS (ASTM C90)...2,000 PSI
4) MORTAR (ASTM C270, PROPORTION SPECIFICATION, TYPE S).....1,800 PSI
5) GROUT (ASTM C476, PROPORTION SPECIFICATION).............2,000 PSI

C. CONCRETE AND MASONRY REINFORCEMENT (MINIMUM YIELD STRENGTH)
1) ALL PLAIN AND DEFORMED BARS (ASTM A615, GRADE 60)......FY = 60 KSI
2) WELDED PLAIN WIRE REINFORCEMENT (ASTM A1064)...........FY = 65 KSI
3) WELDED DEFORMED WIRE REINFORCEMENT (ASTM A1064)........FY = 70 KSI
4) WELDABLE REINFORCING BARS (ASTM A706) ....FY = 60 KSI

D. STRUCTURAL STEEL (MINIMUM YIELD STRENGTH)
1) ALL WIDE FLANGE SHAPES (ASTM A992)....................FY = 50 KSI
2) SQUARE AND RECTANGULAR HSS (ASTM A500, GRADE C)........FY = 50 KSI
3) ROUND HSS (ASTM A500, GRADE C).........................FY = 46 KSI
4) PIPES (ASTM A53, GRADE B)..............................FY = 35 KSI
5) ANCHOR RODS (ASTM F1554, GRADE 55, SUPPLEMENTARY REQUIREMENT S1, WELDABLE)...FY = 55 KSI
6) DEFORMED BAR ANCHORS (AWS D1.1 TYPE C, ASTM A1064).....FY = 70 KSI
7) HEADED STUD ANCHORS (AWS D1.1 TYPE B, ASTM A29, GRADES 1010 THROUGH 1020)...FY = 51 KSI
8) ALL OTHER SHAPES AND PLATES UNLESS NOTED (ASTM A36)....FY = 36 KSI (FABRICATOR MAY OPTIONALLY USE ASTM A572-50 PLATE MATERIAL)

E. COLD FORMED STEEL (MINIMUM YIELD STRENGTH)
1) ROOF DECK (ASTM A653, SS GRADE 33, G-60 GALVANIZED)....FY = 33 KSI
2) COMPOSITE FLOOR DECK (ASTM A653, SS GRADE 40, G-60 GALVANIZED)...FY = 40 KSI
3) COLD FORMED METAL STUDS, 43 MIL AND LIGHTER (ASTM A1003/A, GRADE ST33H, G-60 GALVANIZED)...............................FY = 33 KSI
4) COLD FORMED METAL STUDS, 54 MIL AND HEAVIER (ASTM A1003/A, GRADE ST50H, G-60 GALVANIZED)...............................FY = 50 KSI
5) COLD FORMED METAL CLIPS (ASTM A653, SS GRADE 50,G-90 GALVANIZED)...FY = 50 KSI

4) CONSTRUCTION LOADS AND STABILITY

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL TEMPORARY CONSTRUCTION LOADS CAN BE SAFELY SUPPORTED BY THE STRUCTURE DURING CONSTRUCTION.

B. THE STRUCTURAL FRAMING SYSTEM AND FOUNDATIONS HAVE BEEN DESIGNED AS A COMPLETE STRUCTURAL SYSTEM FOR SUPPORT OF THE LOADS INDICATED IN THE CONSTRUCTION DOCUMENTS. THE STRUCTURE HAS NOT BEEN DESIGNED OR CHECKED FOR TEMPORARY CONSTRUCTION LOADS NOR HAS IT BEEN DESIGNED OR CHECKED FOR ADEQUACY OR STABILITY AS A PARTIALLY ERECTED STRUCTURE.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFIRMING THE ABILITY OF THE PARTIALLY COMPLETED OR FULLY COMPLETED STRUCTURE TO RESIST ALL CONSTRUCTION LOADS INCLUDING BUT ARE NOT NECESSARILY LIMITED TO MATERIAL STAGING, PERSONNEL, AND EQUIPMENT.

D. THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORES, GUYS, BRACES, AND OTHER SUPPORTS DURING CONSTRUCTION TO KEEP STRUCTURAL FRAMING COMPONENTS SECURE, PLUMB, AND IN ALIGNMENT AGAINST TEMPORARY CONSTRUCTION LOADS AND LOADS EQUAL IN INTENSITY TO DESIGN LOADS. THE TEMPORARY SUPPORTS SHALL BE SUFFICIENT TO SECURE THE PARTIALLY ERECTED STRUCTURE OR ANY PORTION THEREOF AGAINST LOADS THAT ARE LIKELY TO BE ENCOUNTERED DURING CONSTRUCTION, INCLUDING THOSE DUE TO WIND AND THOSE THAT RESULT FROM CONSTRUCTION OPERATIONS.

E. THE CONTRACTOR SHALL NOT REMOVE TEMPORARY SUPPORTS UNTIL THE INSTALLATION OF ALL STRUCTURAL ELEMENTS IS COMPLETE AND HAS BEEN ACCEPTED AS COMPLETE BY THE ENGINEER. FOR THE PURPOSES OF THIS PARAGRAPH, "ALL STRUCTURAL ELEMENTS" INCLUDES, BUT IS NOT NECESSARILY LIMITED TO, THE FOLLOWING STRUCTURAL ELEMENTS:
1) FOUNDATIONS
2) CAST-IN-PLACE CONCRETE COLUMNS, BEAMS WALLS AND ELEVATED SLABS
3) LOAD-BEARING MASONRY WALLS
4) MASONRY SHEAR WALLS
5) STRUCTURAL STEEL FRAMING WITH COMPLETED STEEL CONNECTIONS, INCLUDING PERMANENT VERTICAL AND/OR HORIZONTAL BRACING
6) STEEL JOISTS INCLUDING JOIST BRIDGING
7) ROOF DECK
8) CONCRETE SLABS ON METAL DECK

5) DEFERRED SUBMITTALS

A. SOME STRUCTURAL AND/OR OTHER BUILDING ELEMENTS ARE DESIGNATED AS VENDOR-DESIGNED IN THE CONSTRUCTION DOCUMENTS. THESE ELEMENTS HAVE NOT BEEN INCLUDED IN THE BUILDING PERMIT ISSUED BY THE BUILDING OFFICIAL AND REQUIRE THEIR DESIGN BE SUBSTANTIATED BY DEFERRED SUBMITTALS.

B. DEFERRED DESIGN SUBMITTALS ARE TO BE SUBMITTED TO THE OWNER'S REPRESENTATIVE AND SHALL INCLUDE BOTH SHOP DRAWINGS AND SIGNED AND SEALED CALCULATIONS PERFORMED BY AN ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED AND EXPERIENCED IN THE DESIGN OF THE SPECIFIC BUILDING ELEMENT BEING SUBMITTED. THE FOLLOWING ITEMS ARE CONSIDERED DEFERRED SUBMITTALS:
1) FORMWORK SHORING AND RESHORING
2) STEEL STAIRS AND LANDINGS
3) GUARDRAILS AND HANDRAILS
4) STEEL JOISTS
5) COLD-FORMED METAL FRAMING SYSTEMS
6) TEMPORARY BRACING OF RETAINING WALLS AND BASEMENT WALLS.
7) ROOF MOUNTED EQUIPMENT AND ASSOCIATED ANCHORAGES
8) ANALYSIS OF CONCRETE SLABS FOR SUPPORT OF PROPOSED LIFT EQUIPMENT (FOR KFC FILE ONLY, WILL NOT BE REVIEWED AND RETURNED)

C. DOCUMENTS FOR DEFERRED SUBMITTAL ITEMS SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE WHO SHALL REVIEW THEM AND FORWARD THEM TO THE BUILDING OFFICIAL WITH A NOTATION INDICATING THAT THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED AND FOUND TO BE IN GENERAL CONFORMANCE TO THE DESIGN OF THE BUILDING.

D. THE DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY BOTH THE OWNER'S REPRESENTATIVE AND THE BUILDING OFFICIAL.

E. ADDITIONAL ITEMS IMPACTING STRUCTURAL DESIGN, INCLUDING BUT NOT LIMITED TO, ELEVATORS AND MECHANICAL EQUIPMENT WEIGHTS, SHALL BE SUBMITTED TO OWNER'S REPRESENTATIVE FOR EVALUATION

6) FOUNDATION NOTES:

A. GEOTECHNICAL REPORT: A GEOTECHNICAL ENGINEERING SERVICES REPORT FOR THE ASC BOARDROOM STORM SHELTER FOR MOORE PUBLIC SCHOOLS, MOORE, OK WAS PERFORMED BY PROFESSIONAL SERVICE INDUSTRIES, INC., DATED MARCH 15, 2019 (PROJECT NO. 05471500).

B. SITE SUB-GRADE PREPARATION:

1) STRIPPING: SITE PREPARATION FOR THE BUILDING PAD SHALL INCLUDE REMOVING ANY SOFT OR UNSUITABLE MATERIALS ENCOUNTERED DURING CONSTRUCTION. VEGETATION ROOTS, PAVEMENTS, UTILITIES, GRAVEL, EXISTING FOOTINGS, EXISTING SLABS AND ANY TOPSOIL WILL REQUIRE REMOVAL DURING INITIAL SITE STRIPPING. REMOVAL DEPTHS SHALL BE DETERMINED BY A GEOTECHNICAL ENGINEER.

2) UNDERCUTTING: AFTER STRIPPING AND MAKING ANY REQUIRED CUTS, THE BUILDING PAD SHALL BE UNDERCUT TO A MINIMUM OF 2 FEET AND REPLACED WITH LOW VOLUME CHANGE STRUCTURAL FILL AS OUTLINED BELOW.

3) PROOF-ROLLING: AFTER MAKING ANY REQUIRED CUTS, THE BUILDING PAD SHALL BE PROOF-ROLLED (UNDER OBSERVATION OF A GEOTECHNICAL ENGINEER) WITH A TWENTY FIVE (25) TON LOADED, TANDEM AXLE DUMP TRUCK TO LOCATE ANY SOFT OR UNSTABLE AREAS. THE PROOF-ROLLING SHALL BE PERFORMED WITH OVERLAPPING PASSES IN MUTUALLY PERPENDICULAR DIRECTIONS. SOILS IN AREAS WHERE RUTTING (DEFLECTIONS GREATER THAN 1 INCH) OR PUMPING OCCURS DURING PROOF-ROLLING SHALL BE OVER-EXCAVATED, MOISTURE CONDITIONED AND REPLACED WITH PROPERLY COMPACTED LOW VOLUME CHANGE SOILS AS DIRECTED BY A GEOTECHNICAL ENGINEER.

4) SCARIFICATION: AFTER STRIPPING, EXCAVATING AND PROOF-ROLLING, THE EXPOSED SOILS SHALL BE SCARIFIED TO A DEPTH OF 12 INCHES AND THEN ADJUSTED TO WITHIN 2% POINTS OF THE SOILS OPTIMUM VALUE PRIOR TO BEING COMPACTED TO AT LEAST 95 PERCENT OF THE SOILS MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST METHOD (ASTM D-698).

5) ACCEPTABLE FILL: STRUCTURAL FILL MATERIALS SHALL BE FREE OF ORGANIC OR OTHER DELETERIOUS MATTER AND BE A LOW VOLUME CHANGE SOIL OF COHESIVE MATERIALS HAVING A LIQUID LIMIT OF LESS THAN 35 AND A PLASTICITY INDEX BETWEEN 5 AND 15 WITH AT LEAST 60% PASSING THE #200 U.S. STANDARD SIEVE.

6) FILL PLACEMENT: AFTER IN-SITU SOIL PREPARATION AND INSPECTION IS COMPLETE, FILL PLACEMENT TO ESTABLISH SITE DESIGN GRADES MAY BEGIN. THE ZONE OF FILL COMPACTED TO MEET THESE CRITERIA SHALL EXTEND BEYOND THE BUILDING FOOTPRINT AT LEAST 1 FOOT LATERALLY FOR EACH FOOT OF FILL REQUIRED TO DEVELOP DESIGN GRADE, BUT UNDER NO CIRCUMSTANCE SHALL IT BE LESS THAN 5 FEET. THE FILL SHALL BE PLACED IN MAXIMUM LOOSE LIFTS OF 8 INCHES, ADJUSTED TO 1% POINT BELOW TO 2% POINTS ABOVE OF ITS OPTIMUM MOISTURE CONTENT AND COMPACTED TO 95 PERCENT OF THE SOIL'S STANDARD PROCTOR MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-698.

7) DEPTH OF FILL: THE FLOOR SLAB SHALL BE GRADE SUPPORTED ON A MINIMUM DEPTH OF 2'-0" OF MOISTURE CONDITIONED LOW-PLASTICITY STRUCTURAL FILL.

8) FILL PLACEMENT TESTING: EACH LIFT OF COMPACTED FILL SHALL BE TESTED BY A GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF SUBSEQUENT LIFTS. FIELD DENSITY TESTS SHALL BE TAKEN AT A MINIMUM OF ONE PER EVERY 2500 SF, BUT AT LEAST TWO SETS OF DENSITY TESTS SHALL BE TAKEN FOR EACH LIFT.

9) SITE DRAINAGE: THE CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM THE AREAS OF EXCAVATION DURING CONSTRUCTION TO PREVENT PONDING UNDER FUTURE FLOOR SLABS AND FOOTINGS. THE CONTRACTOR SHALL PROVIDE POSITIVE CUTOFF IN UTILITY TRENCHES AS REQUIRED TO PREVENT WATER MIGRATION INTO AREAS OF EXCAVATIONS AND FUTURE FLOOR SLABS AND FOOTINGS.

10) MAINTENANCE OF SOIL MOISTURE: SOIL MOISTURE SHALL BE MAINTAINED UP UNTIL CONCRETE PLACEMENT TO PREVENT SHRINKAGE AND SUBSEQUENT POST-CONSTRUCTION SWELL OF SUBGRADE SOILS.

C. SHALLOW FOUNDATIONS:

1) FOOTING DESIGN PARAMETERS: THE PROPOSED BUILDING SHALL BE SUPPORTED ON CONVENTIONAL SHALLOW SPREAD FOOTINGS BASED ON THE FOLLOWING DESIGN PARAMETERS:
A) BEARING MATERIAL: PROPERLY COMPACTED ENGINEERED FILL AS OUTLINED ABOVE
B) ALLOWABLE BEARING PRESSURE FOR CONT. FOOTINGS: 2500 PSF
C) ALLOWABLE BEARING PRESSURE FOR SPREAD FOOTINGS: 2000 PSF

2) OBSERVATION OF BEARING CONDITIONS: A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHALL OBSERVE THE FOUNDATION EXCAVATIONS PRIOR TO STEEL OR CONCRETE PLACEMENT TO DETERMINE IF THE FOUNDATION MATERIALS ARE CAPABLE OF SUPPORTING THE DESIGN LOADS AND ARE CONSISTENT WITH THE MATERIALS DISCUSSED ABOVE.

3) IMPROVEMENT OF BEARING CONDITIONS: SOFT OR LOOSE SOIL ZONES ENCOUNTERED AT THE BOTTOM OF THE FOOTING EXCAVATIONS SHALL BE REMOVED TO THE LEVEL OF STIFF OR DENSE SOIL AS DIRECTED BY THE GEOTECHNICAL ENGINEER. CAVITIES FORMED AS A RESULT OF EXCAVATION OF SOFT OR LOOSE SOIL ZONES SHALL BE BACKFILLED WITH ENGINEERED FILL, LEAN CONCRETE OR FLOWABLE FILL, AS DETERMINED BY THE GEOTECHNICAL ENGINEER. CARE SHALL BE TAKEN TO PREVENT WETTING OR DRYING OF THE BEARING MATERIALS DURING CONSTRUCTION. ANY EXTREMELY WET OR DRY MATERIAL, OR ANY LOOSE OR DISTURBED MATERIAL IN THE BOTTOM OF THE FOOTING EXCAVATIONS SHALL BE REMOVED PRIOR TO PLACING CONCRETE.

4) ANTICIPATED SETTLEMENT: IT IS ESTIMATED THAT FOUNDATIONS CONSTRUCTED IN ACCORDANCE WITH THE ABOVE RECOMMENDATIONS WILL EXPERIENCE TOTAL SETTLEMENTS GENERALLY LESS THAN 1-INCH.

5) TRENCHED FOOTINGS: EARTH-FORMED TRENCHED FOOTINGS ARE PERMITTED, EXCEPT WHERE BRICK LEDGES OR EXPOSED SURFACES REQUIRE FORMING AND/OR WHERE SOIL SIDE WALLS SLOUGH INTO THE TRENCH. IN ORDER TO ACHIEVE 3" MINIMUM CONCRETE COVER OVER STEEL REINFORCING ON SIDEWALLS, EARTH FORMED TRENCHES SHALL BE A MINIMUM OF 2" WIDER THAN THE FORMED DIMENSIONS SHOWN IN ALL SECTIONS AND DETAILS.

6) PIPE PENETRATIONS: ALL HORIZONTAL PIPE OR SIMILAR PENETRATIONS OR SLEEVES THROUGH FOOTINGS SHALL PREFERABLY OCCUR WITHIN THE MIDDLE 1/3 OF THE FOOTING DEPTH AND SHALL HAVE A MAXIMUM OPENING DIAMETER OF ONE-FOURTH THE FOOTING DEPTH. AT PENETRATIONS, PROVIDE (4) #5 DIAGONAL BARS AT EACH FOOTING FACE (3" CLEAR BETWEEN BAR AND PENETRATION AND 3" CLEAR FROM FOOTING BEARING). IF PENETRATION MUST OCCUR NEAR THE BOTTOM OF FOOTING, REFER TYPICAL DETAILS FOR STANDARD DETAIL TO TRANSITION & THICKEN FOOTING TO ACCOMMODATE PENETRATION.

D. SLAB-ON-GRADE CONSTRUCTION

1) SLAB THICKNESS AND REINFORCING: SLABS-ON-GRADE SHALL BE 4" THICK CONCRETE REINFORCED WITH #3 BARS AT 15" ON CENTER EACH WAY. REINFORCING BARS SHALL BE PLACED 1½" CLEAR FROM TOP OF SLAB USING CHAIRS OR SLAB BOLSTERS COMPLYING WITH CRSI'S "MANUAL OF STANDARD PRACTICE".

2) SLAB SUBGRADE: THE FLOOR SLAB SHALL BE GRADE-SUPPORTED AS OUTLINED IN THE SITE SUB-GRADE PREPARATION NOTES SHOWN ABOVE.

3) CONSTRUCTION MONITORING: CONSTRUCTION ACTIVITY MAY CAUSE DAMAGE AND DETERIORATION TO THE PREPARED SUBGRADE. A FIELD REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHALL OBSERVE THE FINAL SUBGRADE PRIOR TO PLACEMENT OF THE SLAB ON GRADE, PERFORM FURTHER TESTING AS NECESSARY, AND DETERMINE IF ANY REMEDIAL MEASURES ARE NECESSARY PRIOR TO SLAB PLACEMENT.

4) AGGREGATE BASE COURSE: A 4-INCH THICK, FREE-DRAINING AGGREGATE BASE COURSE SHALL BE PLACED BENEATH THE FLOOR SLAB TO ENHANCE DRAINAGE AND PROVIDE INCREASED SUBGRADE STRENGTH. AT THE TIME OF THE SLAB PLACEMENT, THE GRANULAR BASE SHALL BE MOIST, BUT FREE OF ANY STANDING OR SELF-DRAINING WATER. THE AGGREGATE BASE COURSE MATERIAL SHALL MEET THE FOLLOWING CRITERIA:
A) 100 PERCENT SHALL PASS THE 1½" SIEVE
B) LESS THAN 5 PERCENT SHALL PASS THE #8 SIEVE
C) PLASTICITY INDEX, PI, SHALL BE LESS THAN OR EQUAL TO 6
D) COMPACTED TO 98% STANDARD PROCTOR MAXIMUM DRY DENSITY.

5) VAPOR RETARDER: A 15 MIL VAPOR RETARDER SHALL BE PLACED IMMEDIATELY BELOW THE CONCRETE SLAB. VAPOR RETARDER SHALL BE SEALED AT ALL LAPS AND SEALED TO PREVIOUSLY PLACED CONCRETE AS RECOMMENDED BY VAPOR RETARDER MANUFACTURER. BEFORE PLACING CONCRETE, PATCH AND SEAL ANY RIPS, TEARS OR HOLES IN VAPOR RETARDER INCURRED DURING CONSTRUCTION.

6) EVAPORATION RETARDER: UNIFORMLY APPLY EVAPORATION RETARDER TO CONCRETE SURFACES IF HOT, DRY, OR WINDY CONDITIONS CAUSE MOISTURE LOSS DUE TO EVAPORATION APPROACHING 0.2 LB/SQ.FT./H BEFORE AND DURING FINISHING OPERATIONS. APPLY ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AFTER PLACING, SCREEDING, AND BULL FLOATING OR DARBYING CONCRETE, BUT BEFORE FLOAT FINISHING. A METHODOLOGY FOR CALCULATING THE MOISTURE LOSS DUE TO EVAPORATION IS PROVIDED IN ACI 305.1-14 "SPECIFICATION FOR HOT WEATHER CONCRETING."

7) MOIST CURING OF SLAB: SLABS-ON-GRADE SHALL BE WATER CURED FOR A MINIMUM OF 7 DAYS BY PONDING, SPRAYING, SPRINKLING OR BY USE OF SATURATED COVERINGS. CURING COMPOUNDS ARE EXPRESSLY PROHIBITED.

8) ISOLATION JOINTS: PROVIDE SLAB ISOLATION AROUND COLUMNS PENETRATING THE SLAB-ON-GRADE. PROVIDE 1/2 INCH PREMOLDED EXPANSION JOINT MATERIAL AROUND PERIMETER OF ISOLATION JOINTS. REFER TO TYPICAL DETAILS AND ADDITIONAL INFORMATION.

9) SLAB JOINTS: SLAB JOINTS SHALL BE PROVIDED AS SHOWN ON THE PLANS AND TYPICAL DETAILS AND AS DESCRIBED FURTHER IN THE SLAB-ON-GRADE SCHEDULE. THE FOLLOWING JOINT TYPES ARE SHOWN ON THE DRAWINGS:
A) CJ = CONSTRUCTION JOINT
B) SJ = SAWED CONTRACTION JOINT

E. FOUNDATION MISCELLANEOUS

1) GROUNDWATER CONDITIONS: GROUNDWATER WAS ENCOUNTERED IN SOME OF THE BORINGS AT THE TIME OF DRILLING. IT IS POSSIBLE THAT TRANSIENT OVER-SATURATED GROUND CONDITIONS COULD DEVELOP ADDITIONALLY AT SHALLOWER DEPTHS AT A LATER TIME DUE TO PERIODS OF HEAVY PRECIPITATION, LANDSCAPE WATERING, LEAKING WATER LINES, OR OTHER UNFORESEEN CAUSES. THE CONTRACTOR SHALL DETERMINE THE ACTUAL GROUNDWATER LEVELS AT TIME OF CONSTRUCTION. IF GROUNDWATER ISSUES ARE ENCOUNTERED DURING CONSTRUCTION, THE GEOTECHNICAL ENGINEER SHALL BE CONTACTED AND REQUESTED TO ASSESS THE POSSIBLE NEED FOR REMEDIAL MEASURES.

2) DRAINAGE CONSIDERATIONS DURING CONSTRUCTION: DUE TO ADVERSE EFFECT ON STRUCTURES, WATER SHALL NOT BE ALLOWED TO COLLECT IN THE FOUNDATION EXCAVATION OR ON PREPARED SUBGRADE OF THE CONSTRUCTION AREA EITHER DURING OR AFTER CONSTRUCTION. UNDERCUT OR EXCAVATED AREAS SHALL BE SLOPED TOWARD ONE CORNER TO FACILITATE REMOVAL OF ANY COLLECTED RAINWATER, OR POSITIVE RUNOFF SHALL BE PROVIDED. THE CONTRACTOR SHALL EXERCISE CARE IN CREATING DRAINAGE PATHS FOR WATER DURING THE CONSTRUCTION PHASE OF THE PROJECT. TO REDUCE INFILTRATION OF SURFACE WATER AROUND THE PERIMETER OF THE BUILDING AND BENEATH THE FLOOR SLABS, POSITIVE DRAINAGE SHALL BE PROVIDED DURING ALL PHASES OF CONSTRUCTION.

3) FINAL SITE GRADING: PER SECTION 1804.4 OF IBC, THE GROUND IMMEDIATELY ADJACENT TO THE FOUNDATION SHALL BE SLOPED AWAY FROM THE BUILDING AT A SLOPE OF NOT LESS THAN ONE UNIT VERTICAL IN 20 UNITS HORIZONTAL (5-PERCENT SLOPE) FOR A MINIMUM DISTANCE OF 10 FEET PERPENDICULAR TO THE FACE OF THE WALL. IF PHYSICAL OBSTRUCTIONS OR LOT LINES PROHIBIT 10 FEET OF HORIZONTAL DISTANCE, A 5-PERECNT SLOPE SHALL BE PROVIDED TO AN APPROVED ALTERNATIVE METHOD OF DIVERTING WATER AWAY FROM THE FOUNDATION. SWALES USED FOR THIS PURPOSE SHALL BE SLOPED A MINIMUM OF 2-PERECNT WHERE LOCATED WITHIN 10 FEET OF THE BUILDING FOUNDATION. IMPERVIOUS SURFACES WITHIN 10 FEET OF THE BUILDING SHALL BE SLOPED A MINIMUM OF 2-PERCENT AWAY FROM THE BUILDING.

4) EXCAVATION AND TEMPORARY SLOPES: THE CONTRACTOR, DESIGNATED AS "RESPONSIBLE PERSON" IN OSHA CONSTRUCTION STANDARDS FOR EXCAVATIONS, 29 CFR PART 1926, IS SOLELY RESPONSIBLE FOR PLANNING AND IMPLEMENTING ALL SAFETY PROCEDURES DURING CONSTRUCTION. ALL EXCAVATION HEIGHT, SLOPE, AND DEPTH MUST ADHERE TO ALL SPECIFICATIONS OUTLINED IN LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS. THE STRUCTURAL ENGINEER DOES NOT ASSUME ANY RESPONSIBILITY FOR CONSTRUCTION SITE SAFETY OR ANY PARTY'S, INCLUDING THE CONTRACTOR'S, COMPLIANCE WITH THE APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS OR ANY OTHER APPLICABLE REGULATIONS.

5) TRENCH BACKFILL: ALL REQUIRED TRENCH BACKFILL SHALL BE ACCEPTABLE FILL MATERIAL AS DEFINED ABOVE AND SHALL BE MECHANICALLY COMPACTED IN LAYERS TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 698. SOME SETTLEMENT OF THE BACKFILL MAY BE EXPECTED AND ANY UTILITIES WITHIN THE TRENCHES SHALL BE CONSTRUCTED TO ALLOW THESE DIFFERENTIAL MOVEMENTS. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

6) CONSTRUCTION MONITORING: A GEOTECHNICAL ENGINEER SHALL BE RETAINED TO PROVIDE OBSERVATIONS AND TESTING OF SOILS EXPOSED DURING PROJECT CONSTRUCTION IN ORDER TO VERIFY THAT SOIL CONDITIONS ARE AS ANTICIPATED. CONSTRUCTION ACTIVITIES PERTAINING TO EARTHWORK AND OTHER RELATED ACTIVITIES SHALL ALSO BE OBSERVED BY THE GEOTECHNICAL ENGINEER AS OUTLINED ABOVE.

7) CONCRETE CONSTRUCTION NOTES

A. GOVERNING CODES AND STANDARDS: IN ADDITION TO THE REQUIREMENTS OF THE GOVERNING INTERNATIONAL BUILDING CODE, ALL CONCRETE SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.
1) ACI 117-10 "SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS"
2) ACI 301-10 "SPECIFICATIONS FOR STRUCTURAL CONCRETE"
3) ACI 318-14 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE"
4) ACI 347-04 "GUIDE TO FORMWORK FOR CONCRETE"
5) ACI SP-66(04) "ACI DETAILING MANUAL"
6) AWS D1.4-2011 "STRUCTURAL WELDING CODE - REINFORCING STEEL".
7) CRSI MSP-2018 "CRSI MANUAL OF STANDARD PRACTICE"

B. CONCRETE MIXTURES:

1) CEMENTITIOUS MATERIALS
A) OPTION 1 - ORDINARY PORTLAND CEMENT (OPC): ASTM C150 TYPE I OR II UNLESS SPECIFICALLY NOTED OTHERWISE.
B) OPTION 2 - PORTLAND LIMESTONE CEMENT (PLC): ASTM C595 TYPE IL UNLESS SPECIFICALLY NOTED OTHERWISE.
C) FLY ASH: ASTM C618 CLASS C OR F. THE MAXIMUM PERCENTAGE OF FLY ASH SHALL NOT EXCEED 25 PERCENT OF THE TOTAL CEMENTITIOUS MATERIAL.

2) ALL CONCRETE MIXES SHALL BE COMPRISED OF NORMAL WEIGHT AGGREGATES CONFORMING TO ASTM C33, EXCEPT WHERE SPECIFICALLY INDICATED AS LIGHTWEIGHT, IN WHICH CASE AGGREGATES SHALL CONFORM TO ASTM C330.

3) MIXING WATER SHALL CONFORM TO ASTM C1062. MIXING WATER, INCLUDING THAT PORTION OF MIXING WATER CONTRIBUTED IN THE FORM OF FREE MOISTURE ON AGGREGATES, SHALL NOT CONTAIN DELETERIOUS AMOUNTS OF CHLORIDE IONS.

4) ADMIXTURES, IF USED, SHALL CONFORM TO THE FOLLOWING:
A) WATER REDUCTION AND SETTING TIME MODIFICATION: ASTM C494.
B) PRODUCING FLOWING CONCRETE: ASTM C1017.
C) AIR ENTRAINMENT: ASTM C260.
D) INHIBITING CHLORIDE INDUCED CORROSION: ASTM C1582.
E) MOISTURE VAPOR REDUCTION ADMIXTURE, MVRA: ASTM C494

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5) MIX DESIGNS SHALL BE PROPORTIONED BASED ON THE FOLLOWING MIX CHARACTERISTICS:

A) FOUNDATIONS
1) FREEZING AND THAWING EXPOSURE CATEGORY (F): CLASS F1
2) SULFATE EXPOSURE CATEGORY (S): CLASS S0
3) WATER EXPOSURE CATEGORY (W): CLASS W0
4) CORROSION PROTECTION CATEGORY (C): CLASS C1
5) 28-DAY COMPRESSIVE STRENGTH: 3,500 PSI
6) MAXIMUM WATER/CEMENT RATIO: 0.55
7) MAXIMUM AGGREGATE SIZE: 1 1/2 INCHES
8) TARGET AIR CONTENT: 4.5 PERCENT PLUS OR MINUS 1.5 PERCENT
9) MAXIMUM WATER-SOLUBLE CHLORIDE ION CONTENT IN CONCRETE, PERCENT BY WEIGHT OF CEMENTITIOUS MATERIALS: 0.30

B) WALLS
1) FREEZING AND THAWING EXPOSURE CATEGORY (F): CLASS F2
2) SULFATE EXPOSURE CATEGORY (S): CLASS S0
3) WATER EXPOSURE CATEGORY (W): CLASS W0
4) CORROSION PROTECTION CATEGORY (C): CLASS C1
5) 28-DAY COMPRESSIVE STRENGTH: 4,000 PSI
6) MAXIMUM WATER/CEMENT RATIO: 0.45
7) MAXIMUM AGGREGATE SIZE: 1 1/2 INCHES
8) TARGET AIR CONTENT: 5.5 PERCENT PLUS OR MINUS 1.5 PERCENT
9) MAXIMUM WATER-SOLUBLE CHLORIDE ION CONTENT IN CONCRETE, PERCENT BY WEIGHT OF CEMENTITIOUS MATERIALS: 0.30

C) SLABS-ON-GRADE
1) FREEZING AND THAWING EXPOSURE CATEGORY (F): CLASS F0
2) SULFATE EXPOSURE CATEGORY (S): CLASS S0
3) WATER EXPOSURE CATEGORY (W): CLASS W0
4) CORROSION PROTECTION CATEGORY (C): CLASS C0
5) 28-DAY COMPRESSIVE STRENGTH: 4,000 PSI
6) MAXIMUM WATER/CEMENT RATIO: 0.45
7) MAXIMUM AGGREGATE SIZE: 1 1/2-INCHES
8) MVRA REQUIRED IN ALL SLABS-ON-GRADE.
9) TARGET AIR CONTENT: DO NOT ALLOW AIR CONTENT OF TROWEL-FINISHED FLOORS TO EXCEED 3 PERCENT
10) MAXIMUM WATER-SOLUBLE CHLORIDE ION CONTENT IN CONCRETE, PERCENT BY WEIGHT OF CEMENTITIOUS MATERIALS: 1.00

D) ELEVATED SLABS ON METAL DECK
1) FREEZING AND THAWING EXPOSURE CATEGORY (F): CLASS F0
2) SULFATE EXPOSURE CATEGORY (S): CLASS S0
3) WATER EXPOSURE CATEGORY (W): CLASS W0
4) CORROSION PROTECTION CATEGORY (C): CLASS C0
5) 28-DAY COMPRESSIVE STRENGTH: 4,000 PSI
6) MAXIMUM WATER/CEMENT RATIO: 0.45
7) MAXIMUM AGGREGATE SIZE: 3/4-INCHES
8) TARGET AIR CONTENT: DO NOT ALLOW AIR CONTENT OF TROWEL-FINISHED FLOORS TO EXCEED 3 PERCENT
9) MAXIMUM WATER-SOLUBLE CHLORIDE ION CONTENT IN CONCRETE, PERCENT BY WEIGHT OF CEMENTITIOUS MATERIALS: 1.00

6) CONCRETE MIX PROPORTIONS SHALL BE ESTABLISHED IN ACCORDANCE WITH ARTICLE 4.2.3 OF ACI 301 SO THAT THE CONCRETE SATISFIES THE FOLLOWING THREE REQUIREMENTS:
A) THE CONCRETE CAN BE PLACED READILY WITHOUT SEGREGATION INTO FORMS AND AROUND REINFORCEMENT UNDER ANTICIPATED PLACEMENT CONDITIONS. THE CONCRETE PRODUCER SHALL DETERMINE WHETHER ADMIXTURES ARE NECESSARY FOR WATER REDUCTION, SET TIME, OR SLUMP REQUIREMENTS.
B) THE CONCRETE SHALL MEET REQUIREMENTS FOR THE ASSIGNED EXPOSURE CLASSES OUTLINED HEREIN.
C) THE CONCRETE SHALL CONFORM TO STRENGTH TEST REQUIREMENTS FOR STANDARD-CURED SPECIMENS.

7) DOCUMENTATION OF CONCRETE MIXTURE CHARACTERISTICS SHALL BE SUBMITTED FOR REVIEW BEFORE THE MIXTURE IS USED. EVIDENCE OF THE ABILITY OF THE PROPOSED MIXTURE TO COMPLY WITH THE CONCRETE MIXTURE REQUIREMENTS IN THE CONSTRUCTION DOCUMENTS SHALL BE INCLUDED IN THE SUBMITTAL. THE EVIDENCE SHALL BE BASED ON FIELD TEST RECORDS OR LABORATORY TRIAL BATCHES.

C. CONCRETE REINFORCING:

1) ALL DETAILING, FABRICATION, AND PLACING OF REINFORCING STEEL, UNLESS OTHERWISE NOTED, SHALL FOLLOW ALL SECTIONS OF ACI MNL-66, ACI 318, AND THE CRSI MSP.

2) UNLESS OTHERWISE NOTED, LAP SPLICES OF DEFORMED REINFORCING BARS SHALL CONFORM TO ACI REQUIREMENTS FOR CLASS B TENSION SPLICES. REFER TO LAP LENGTH SCHEDULES FOR TYPICAL LAP REQUIREMENTS.

3) PROVIDE CORNER BARS IN BOTH FACES OF ALL CONTINUOUS GRADE BEAMS, FOOTINGS AND WALLS. NUMBER, SIZE, AND SPACING OF CORNER BARS SHALL BE EQUAL TO NUMBER, SIZE AND SPACING OF HORIZONTAL REINFORCING WITH WHICH THEY LAP AND SHALL HAVE CLASS B TENSION LAP SPLICES IN EACH DIRECTION. REFER TO TYPICAL DETAILS FOR ADDITIONAL INFORMATION.

4) AT INTERSECTING FOUNDATIONS, EXTEND ALL HORIZONTAL REINFORCING OF THE INTERSECTING MEMBERS BEYOND THE POINT OF INTERSECTION TO THE OPPOSITE FACE. BEND TO A STANDARD 90 DEGREE HOOK OR PROVIDE BENT DOWELS OF EQUAL SIZE AND SPACING AND LAP AS REQUIRED FOR A CLASS B TENSION SPLICE (BUT NOT LESS THAN 12") IN EACH DIRECTION. REFER TO TYPICAL DETAILS FOR ADDITIONAL INFORMATION.

5) PROVIDE TIES COMPLYING WITH ACI 318 IN ALL CONCRETE COLUMNS AND PILASTERS. EVERY CORNER AND ALTERNATING LONGITUDINAL BAR SHALL HAVE A LATERAL SUPPORT PROVIDED BY THE CORNER OF A TIE WITH AN INCLUDED ANGLE ON NOT MORE THAN 135-DEGREES. NO UNSUPPORTED LONGITUDINAL BAR SHALL BE FARTHER THAN 6-IN. CLEAR ON EACH SIDE ALONG THE TIE FROM A LATERALLY SUPPORTED BAR.

6) CONCRETE COVER OVER STEEL REINFORCING FOR NON-PRESTRESSED CAST-IN-PLACE CONSTRUCTION SHALL CONFORM TO THE "MINIMUM CONCRETE COVER FOR CAST-IN-PLACE NON-PRESTRESSED CONCRETE MEMBERS" TABLE PROVIDED IN THE TYPICAL DETAILS.

D. OPENINGS IN CONCRETE STRUCTURES:

1) ALL OPENINGS IN CONCRETE WALLS LARGER THAN 1'-0" IN SIZE SHALL HAVE A MINIMUM OF (2)#5 BARS PLACED AT ALL SIDES OF OPENING AND EXTENDED 2'-6" BEYOND EDGE OF OPENING. IN ADDITION, DIAGONAL CORNER BARS SHALL EXTEND 2'-6" EACH WAY BEYOND CORNER OF OPENING. REFER TYPICAL DETAILS FOR MORE INFORMATION.

2) THE SIZE AND LOCATION OF ALL FLOOR PITS, TRENCH DRAINS, AND OPENINGS FOR ALL DUCTS AND PIPES THROUGH WALLS, FLOORS, AND FOUNDATION WORK SHALL BE VERIFIED WITH THE MECHANICAL, PLUMBING, FIRE PROTECTION AND ELECTRICAL CONTRACTOR'S REQUIREMENTS PRIOR TO THE START OF ANY CONCRETE WORK.

E. JOINTS IN CONCRETE CONSTRUCTION:

1) CONCRETE SLABS-ON-GRADE: REFER TO SLAB-ON-GRADE SCHEDULE FOR INFORMATION REGARDING JOINTS.

2) ELEVATED STRUCTURAL SLABS: CONSTRUCTION JOINTS IN ELEVATED STRUCTURAL SLABS SHALL BE LOCATED NEAR THE 1/3 POINTS OF THE CLEAR-SPAN AND SHALL HAVE A HORIZONTAL KEY. WHERE CONSTRUCTION JOINTS OCCUR, THE TOP SCHEDULED TOP REINFORCING STEEL SHALL EXTEND FOR THE FULL SPAN OF THAT BAY.

3) CONCRETE WALLS:

A) VERTICAL CONTRACTION OR CONSTRUCTION JOINTS SHALL BE INSTALLED IN WALLS AND RETAINING WALLS AT THE MAXIMUM JOINT SPACINGS SHOWN IN THE TABLE BELOW. IN ADDITION, A CONTRACTION OR CONSTRUCTION JOINT SHALL BE INSTALLED WITHIN 10 TO 15 FT. OF A WALL CORNER.

WALL CLASSIFICATION	WALL HEIGHT, H	MAXIMUM JOINT SPACING
SHORT	H < 8'-0"	3 X H
INTERMEDIATE	8'-0" < H < 12'-0"	2 X H
HIGH	H > 12'-0"	1 X H

B) VERTICAL EXPANSION JOINTS SHALL BE INSTALLED IN STRAIGHT WALLS AND RETAINING WALLS AT A MAXIMUM SPACING OF 200 FT UNLESS SHOWN OTHERWISE IN CONSTRUCTION DOCUMENTS.

4) CURING AT CONSTRUCTION JOINTS: CONCRETE POURS EITHER SIDE OF CONSTRUCTION JOINTS SHALL NOT BE CONCURRENT. CONCRETE SHALL BE ALLOWED TO CURE A MINIMUM OF 7 DAYS PRIOR TO PLACEMENT OF ADJACENT CONCRETE.

F. FORMWORK FOR CAST-IN-PLACE CONCRETE:

1) THE DESIGN AND REMOVAL OF FORMWORK SHALL COMPLY WITH THE RECOMMENDATIONS OF ACI 347.

2) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, FABRICATION, INSTALLATION, AND REMOVAL OF FORMWORK. FORMWORK DESIGN SHALL CONSIDER THE FOLLOWING:
A) METHOD OF CONCRETE PLACEMENT.
B) RATE OF CONCRETE PLACEMENT.
C) CONSTRUCTION LOADS, INCLUDING VERTICAL, HORIZONTAL AND IMPACT.
D) AVOIDANCE OF DAMAGE TO PREVIOUSLY CONSTRUCTED MEMBERS.

3) FORMWORK FABRICATION AND INSTALLATION SHALL RESULT IN A FINAL STRUCTURE THAT CONFORMS TO SHAPES, LINES, AND DIMENSIONS OF THE MEMBERS AS REQUIRED BY THE CONSTRUCTION DOCUMENTS.

4) FORMWORK SHALL BE SUFFICIENTLY TIGHT TO INHIBIT LEAKAGE OF PASTE AND MORTAR.

5) FORMWORK SHALL BE BRACED OR TIED TOGETHER TO MAINTAIN SAFETY, POSITION AND SHAPE.

6) REMOVAL OF FORMWORK

A) BEFORE STARTING CONSTRUCTION, THE CONTRACTOR SHALL DEVELOP A PROCEDURE AND SCHEDULE FOR REMOVAL OF FORMWORK AND INSTALLATION OF RESHORES, AND SHALL CALCULATE THE LOADS TRANSFERRED TO THE STRUCTURE DURING THIS PROCESS.

B) STRUCTURAL ANALYSIS AND CONCRETE STRENGTH REQUIREMENTS USED IN PLANNING AND IMPLEMENTING THE FORMWORK REMOVAL AND RESHORE INSTALLATION SHALL BE FURNISHED BY THE CONTRACTOR TO THE LICENSED DESIGN PROFESSIONAL AND TO THE BUILDING OFFICIAL.

C) NO CONSTRUCTION LOADS SHALL BE PLACED ON, NOR ANY FORMWORK REMOVED FROM, ANY PART OF THE STRUCTURE UNDER CONSTRUCTION EXCEPT WHEN THAT PORTION OF THE STRUCTURE IN COMBINATION WITH REMAINING FORMWORK HAS SUFFICIENT STRENGTH TO SUPPORT SAFELY ITS WEIGHT AND LOADS PLACED THEREON AND WITHOUT IMPAIRING SERVICEABILITY.

D) SUFFICIENT STRENGTH SHALL BE DEMONSTRATED BY STRUCTURAL ANALYSIS CONSIDERING ANTICIPATED LOADS, STRENGTH OF FORMWORK, AND AN ESTIMATE OF IN-PLACE CONCRETE STRENGTH.

E) THE ESTIMATE OF IN-PLACE CONCRETE STRENGTH SHALL BE BASED ON TESTS OF FIELD-CURED CYLINDERS OR ON OTHER PROCEDURES TO EVALUATE CONCRETE STRENGTH APPROVED BY THE LICENSED DESIGN PROFESSIONAL AND, WHEN REQUESTED, APPROVED BY THE BUILDING OFFICIAL.

F) FORMWORK SHALL BE REMOVED IN SUCH A MANNER NOT TO IMPAIR SAFETY AND SERVICEABILITY OF THE STRUCTURE.

G) CONCRETE EXPOSED BY FORMWORK REMOVAL SHALL HAVE SUFFICIENT STRENGTH NOT TO BE DAMAGED BY THE REMOVAL.

H) FORMWORK SUPPORTS FOR POST-TENSIONED MEMBERS SHALL NOT BE REMOVED UNTIL SUFFICIENT POST-TENSIONING HAS BEEN APPLIED TO ENABLE POST-TENSIONED MEMBERS TO SUPPORT THEIR DEAD LOAD AND ANTICIPATED CONSTRUCTION LOADS.

I) NO CONSTRUCTION LOADS EXCEEDING THE COMBINATION OF SUPERIMPOSED DEAD LOAD PLUS LIVE LOAD INCLUDING REDUCTION SHALL BE PLACED ON ANY UNSHORED PORTION OF THE STRUCTURE UNDER CONSTRUCTION, UNLESS ANALYSIS INDICATES ADEQUATE STRENGTH TO SUPPORT SUCH ADDITIONAL LOADS AND WITHOUT IMPAIRING SERVICEABILITY.

G. CONCRETE MISCELLANEOUS:

1) WATERSTOPS AND WATERPROOFING: ALL CONSTRUCTION JOINTS (VERTICAL AND HORIZONTAL) IN BELOW-GRADE CONCRETE WALLS, TRENCHES AND PITS SHALL BE KEYED AND HAVE BENTONITE WATERSTOPS INSTALLED UNLESS NOTED OTHERWISE. ALL BELOW-GRADE CONCRETE WALLS, PITS AND TRENCHES SHALL BE WATERPROOFED AS SHOWN IN ARCHITECTURAL DRAWINGS, UNLESS NOTED OTHERWISE.

2) EQUIPMENT PADS: PROVIDE CONCRETE EQUIPMENT PADS OF SIZE REQUIRED FOR EQUIPMENT FURNISHED. SEE MECHANICAL, PLUMBING, FIRE PROTECTION AND ELECTRICAL DRAWINGS FOR NUMBER, SIZE, AND LOCATION OF SUCH PADS. UNLESS OTHERWISE SHOWN, MINIMUM PAD THICKNESS SHALL BE 4" AND SHALL EXTEND A MINIMUM OF 6" BEYOND THE FACE OF THE EQUIPMENT. MINIMUM REINFORCING SHALL BE #4 BARS AT 12" O.C. EACH WAY. TOOLED OR CHAMFERED EDGES SHALL BE PROVIDED AT ALL EQUIPMENT PADS. ANCHORAGE TO SUPPORTING SLAB SHALL BE MADE. REFER TO TYPICAL DETAILS.

3) CHAMFERED EDGES: UNLESS NOTED OTHERWISE ON ARCHITECTURAL DRAWINGS, PROVIDE 3/4" CHAMFER ON ALL EXPOSED CONCRETE EDGES.

4) SURFACE FINISH: ALL HORIZONTAL CONCRETE SURFACES SHALL HAVE A TROWELED FINISH UNLESS NOTED OTHERWISE IN ARCHITECTURAL DRAWINGS OR FLOORING SPECIFICATIONS. AT STAIR TREAD PLACEMENTS PROVIDE A FINE BROOM FINISH TRANSVERSE TO THE RISERS UNLESS NOTED OTHERWISE.

5) MOIST CURING OF SLABS: SLABS-ON-GRADE AND SLABS-ON-DECK SHALL BE WATER CURED FOR A MINIMUM OF 7 DAYS BY PONDING, SPRAYING, SPRINKLING OR BY USE OF SATURATED COVERINGS. CURING COMPOUNDS ARE EXPRESSLY PROHIBITED.

6) VAPOR EMISSION LIMITS: IT IS THE CONTRACTOR'S RESPONSIBILITY TO PLAN AND DETERMINE THE MEANS AND METHODS NECESSARY FOR LIMITING VAPOR EMISSIONS TO AN ACCEPTABLE RANGE AS REQUIRED BY FLOOR FINISH MANUFACTURERS.

8) REINFORCED HOLLOW CONCRETE MASONRY NOTES

A. GOVERNING CODES AND STANDARDS: IN ADDITION TO THE REQUIREMENTS OF THE GOVERNING INTERNATIONAL BUILDING CODE, ALL MASONRY SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.
1) TMS 402-2016, "BUILDING CODE FOR MASONRY STRUCTURES"
2) TMS 602-2016, "SPECIFICATION FOR MASONRY STRUCTURES"

B. MASONRY DIMENSIONS: REFER TO ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS RELEVANT TO ALL CONCRETE MASONRY CONSTRUCTION.

C. CONCRETE MASONRY UNITS:

1) ALL CONCRETE MASONRY UNITS SHALL BE 1 OR 2-CELL LIGHTWEIGHT CONCRETE BLOCK WITH AN OVEN DRY WEIGHT OF LESS THAN 105 LBS PER CUBIC FOOT.

2) ALL CONCRETE MASONRY UNITS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI ON THE NET AREA (INDIVIDUAL STRENGTH PER ASTM C 90).

D. MORTAR:

1) MORTAR MATERIALS: CONCRETE MASONRY SHALL BE CONSTRUCTED WITH PORTLAND CEMENT/LIME, TYPE S MORTAR CONFORMING TO THE PROPORTION SPECIFICATION OF ASTM C270.

2) MORTAR SUBMITTAL REQUIREMENTS: BECAUSE THE PROPORTION SPECIFICATION FOR MORTAR IS PRESCRIPTIVE, THERE ARE NO MORTAR TESTS REQUIRED. SUBMITTAL INFORMATION SHALL INCLUDE THE PROPORTIONS OF MORTAR MATERIALS AND CERTIFICATES OF COMPLIANCE FOR EACH RAW MATERIAL USED.

3) MORTAR MIX PROPORTIONS: MORTAR MATERIAL PROPORTIONS BY VOLUME SHALL BE AS FOLLOWS:
A) PORTLAND CEMENT: 1
B) HYDRATED LIME OR LIME PUTTY: OVER 0.25 TO 0.50
C) AGGREGATE RATIO (MEASURED IN DAMP LOOSE CONDITIONS): NOT LESS THAN 2.25 AND NOT MORE THAN 3.0 TIMES THE SUM OF THE VOLUMES OF CEMENT AND LIME MATERIALS.

4) MORTAR MIXING: MIX CEMENTITIOUS MATERIALS AND AGGREGATES BETWEEN 3 AND 5 MINUTES IN A MECHANICAL BATCH MIXER WITH A SUFFICIENT AMOUNT OF WATER TO PRODUCE A WORKABLE CONSISTENCY. UNLESS SPECIFICALLY ALLOWED BY THE OWNER'S REPRESENTATIVE, DO NOT HAND MIX MORTAR. MAINTAIN WORKABILITY OF MORTAR BY REMIXING OR RETEMPERING. DISCARD MORTAR WHICH HAS BEGUN TO STIFFEN OR IS NOT USED WITHIN 2.5 HOURS AFTER INITIAL MIXING.

5) MORTAR PROTRUSIONS: REMOVE MORTAR PROTRUSIONS EXTENDING ½-INCH OR MORE INTO CELLS OR CAVITIES TO BE GROUTED.

6) ADMIXTURES: DO NOT USE ADMIXTURES CONTAINING MORE THAN 0.2 PERCENT CHLORIDE IONS.

7) MORTAR QUALITY ASSURANCE: TESTING AGENCY SHALL PERIODICALLY OBSERVE AND CONFIRM THAT THE PROPORTIONS OF SITE-PREPARED MORTAR COMPLY WITH THE PROPORTIONS OUTLINED ABOVE.

E. GROUT:

1) GROUT MATERIALS: GROUT USED IN THE CONSTRUCTION OF MASONRY SHALL CONFORM TO THE PROPORTION SPECIFICATION OF ASTM C476. GROUT AGGREGATES SHALL COMPLY WITH ASTM C404.

2) GROUT SUBMITTAL REQUIREMENTS: BECAUSE THE PROPORTION SPECIFICATION FOR GROUT IS PRESCRIPTIVE, THERE ARE NO GROUT TESTS REQUIRED. SUBMITTAL INFORMATION SHALL INCLUDE THE PROPORTIONS OF GROUT MATERIALS AND CERTIFICATES OF COMPLIANCE FOR EACH RAW MATERIAL USED.

3) GROUT MIX PROPORTIONS: GROUT MATERIAL PROPORTIONS BY VOLUME SHALL BE AS FOLLOWS:

GROUT TYPE	CEMENT	LIME	AGGREGATE (DAMP, LOOSE)*	
			FINE	COARSE
FINE	1	0 TO 1/10	2.25 TO 3	-
COARSE	1	0 TO 1/10	2.25 TO 3	1 TO 2

*TIMES THE SUM OF THE VOLUMES OF THE CEMENT & LIME MATERIALS

4) GROUT SLUMP: SITE-MIX GROUT TO A CONSISTENCY THAT HAS A SLUMP BETWEEN 8 AND 11 INCHES. DISCARD GROUT THAT DOES NOT MEET THE SPECIFIED SLUMP WITHOUT ADDING WATER AFTER INITIAL MIXING.

5) GROUT QUALITY ASSURANCE: TESTING AGENCY SHALL PERIODICALLY OBSERVE AND CONFIRM THAT THE PROPORTIONS AND SLUMP OF SITE-PREPARED GROUT COMPLY WITH THE REQUIREMENTS OUTLINED ABOVE.

F. INSPECTION: PRIOR TO THE START OF MASONRY CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE FOLLOWING:

1) VERIFY FOUNDATIONS ARE CONSTRUCTED WITHIN A LEVEL ALIGNMENT TOLERANCE OF PLUS OR MINUS 1/2 IN.

2) VERIFY REINFORCING DOWELS ARE POSITIONED IN ACCORDANCE WITH THE PROJECT DRAWINGS.

3) IF STATED CONDITIONS ARE NOT MET, NOTIFY THE OWNER'S REPRESENTATIVE PRIOR TO PROCEEDING.

G. PREPARATION:

1) CLEANING:
A) CLEAN REINFORCEMENT AND SHANKS OF ANCHOR BOLTS BY REMOVING MUD, OIL, OR OTHER MATERIALS THAT WILL ADVERSELY AFFECT OR REDUCE BOND AT THE TIME MORTAR OUR GROUT IS PLACED.
B) PRIOR TO PLACING MASONRY, REMOVE LAITANCE, LOOSE AGGREGATE, AND ANYTHING ELSE THAT WOULD PREVENT MORTAR FROM BONDING TO THE FOUNDATION.

2) WETTING: DO NOT WET CONCRETE MASONRY UNITS BEFORE LAYING. WET CUTTING IS PERMITTED.

3) DEBRIS: CONSTRUCT GROUT SPACES FREE OF MORTAR DROPPING, DEBRIS, LOOSE AGGREGATES, AND ANY MATERIAL DELETERIOUS TO MASONRY GROUT.

4) REINFORCEMENT: PLACE REINFORCEMENT AND TIES IN GROUT SPACES PRIOR TO GROUTING.

5) CLEANOUTS: PROVIDE CLEANOUTS IN THE BOTTOM COURSE OF MASONRY FOR EACH GROUT POUR WHEN THE GROUT POUR HEIGHT EXCEEDS 5 FT 4 IN.
A) CONSTRUCT CLEANOUTS SO THAT THE SPACE TO BE GROUTED CAN BE CLEANED AND INSPECTED. IN SOLID GROUTED MASONRY, SPACE CLEANOUTS HORIZONTALLY A MAXIMUM OF 32 IN. ON CENTER.
B) CONSTRUCT CLEANOUTS WITH AN OPENING OF SUFFICIENT SIZE TO PERMIT REMOVAL OF DEBRIS. THE MINIMUM OPENING DIMENSION SHALL BE 3 IN.
C) AFTER CLEANING, CLOSE CLEANOUTS WITH CLOSURES BRACED TO RESIST GROUT PRESSURE.

H. MASONRY ERECTION:

1) BOND PATTERN: UNLESS OTHERWISE INDICATED, LAY MASONRY IN RUNNING BOND.

2) PLACING MORTAR UNITS: COMPLY WITH ARTICLE 3.3 B OF TMS 602, INCLUDING BUT NOT LIMITED TO THE FOLLOWING;
A) BED JOINTS AT FOUNDATIONS: IN THE STARTING COURSE ON FOUNDATIONS AND OTHER SUPPORTING MEMBERS, CONSTRUCT BED JOINTS SO THAT THE BED JOINT THICKNESS IS AT LEAST 1/4 IN. AND NOT MORE THAN:
(i) 3/4 IN. WHEN THE MASONRY IS UNGROUTED OR PARTIALLY GROUTED
(ii) 1-1/4 IN. WHEN THE FIRST COURSE OF MASONRY IS SOLID GROUTED AND SUPPORTED BY A CONCRETE FOUNDATION.

B) OPENINGS IN TROUGH BLOCKS: AT ALL VERTICAL REINFORCING LOCATIONS, THE BOTTOM OF TROUGH BLOCKS SHALL BE CUT TO PROVIDE A MINIMUM 2-INCH DIAMETER HOLE TO ALLOW PLACEMENT OF VERTICAL REINFORCING AND PLACEMENT OF GROUT THROUGH THE HOLE.

3) EMBEDDED ITEMS AND ACCESSORIES: COMPLY WITH ARTICLE 3.3 D OF TMS 602.

4) TEMPORARY BRACING OF MASONRY: DESIGN, PROVIDE, AND INSTALL TEMPORARY BRACING THAT WILL ASSURE STABILITY OF MASONRY DURING CONSTRUCTION.

5) SITE TOLERANCES: ERECT MASONRY WITHIN THE TOLERANCES DEFINED IN ARTICLE 3.3 F OF TMS 602.

6) PLACING REINFORCING: COMPLY WITH ALL PROVISIONS OF ARTICLE 3.4 OF TMS 602. MAINTAIN CLEAR DISTANCE BETWEEN REINFORCING BARS AND ANY FACE OF MASONRY UNIT OR FORMED SURFACE, BUT NOT LESS THAN 1/4-IN FOR FINE GROUT OR 1/2-IN. FOR COARSE GROUT.

7) CONTROL JOINTS: LOCATION AND DETAILS OF CONTROL JOINTS SHALL BE AS DEFINED ON ARCHITECTURAL DRAWINGS. IF NOT SHOWN ON THE ARCHITECTURAL DRAWINGS, THE LOCATION OF CONTROL JOINTS SHALL BE DETAILED BY THE MASONRY CONTRACTOR AND SUBMITTED FOR REVIEW AND APPROVAL BY THE ARCHITECT AND ENGINEER. THE DISTANCE BETWEEN CONTROL JOINTS SHOULD NOT EXCEED THE LESSER OF 1.5 TIMES THE WALL HEIGHT OR 25 FT. IN ADDITION, CONTROL JOINTS SHOULD TYPICALLY BE PROVIDED AT THE FOLLOWING LOCATIONS:
A) AT CHANGES IN WALL HEIGHT.
B) AT PILASTERS AND CHANGES IN WALL THICKNESS.
C) DIRECTLY OVER EXPANSION JOINTS IN SUPPORTING FOUNDATIONS.
D) AT EXPANSION JOINTS IN ROOFS AND FLOORS THAT BEAR ON THE WALL.
E) NEAR ONE SIDE OF OPENINGS LESS THAN 6 FT. WIDE. REFER TYPICAL MASONRY OPENING DETAILS.
F) NEAR BOTH SIDES OF OPENINGS GREATER THAN 6 FT. WIDE. REFER TYPICAL MASONRY OPENING DETAILS.
G) AT INTERSECTING WALLS.
H) AT MAXIMUM OF ONE-HALF THE TYPICAL CONTROL JOINTS SPACING FROM CORNERS.

8) PENETRATIONS: OPENINGS FOR ALL DUCTS AND PIPES PENETRATING MASONRY WALLS SHALL BE VERIFIED AND COORDINATED WITH MECHANICAL AND ELECTRICAL CONTRACTORS' REQUIREMENTS. PENETRATIONS THROUGH WALLS SHALL HAVE ADDITIONAL REINFORCING AS SHOWN ON IN THE TYPICAL DETAILS.

9) LINTELS: LINTELS SHALL BE PROVIDED WHERE REQUIRED ACCORDING TO TYPICAL LINTEL DETAILS AND SCHEDULE OR AS INDICATED ON PLAN SHEETS. SOLID BOTTOM TROUGH BLOCKS SHALL BE USED AT THE HEADS OF ALL OPENINGS.

10) PERMANENT BRACING: UNLESS BRACED BY ATTACHMENT TO A STRUCTURAL SLAB OR METAL DECK, THE TOP OF MASONRY WALLS SHALL BE BRACED IN ACCORDANCE WITH THE TYPICAL DETAILS SHOWN IN THE DRAWINGS.

I. CONCRETE MASONRY REINFORCING:

1) MINIMUM HORIZONTAL AND VERTICAL REINFORCING IN CMU WALLS SHALL BE PROVIDED AS FOLLOWS:

MINIMUM REINFORCING IN CMU WALLS

WALL TYPE	CMU TYPE	GROUTED VERTICAL CELL REINFORCING		HORIZONTAL BOND BEAM REINFORCING	
		BARS	SPACING OF GROUTED CELLS	BARS	SPACING OF BOND BEAMS
INTERIOR	8"	(1)-#5	48" O.C.	(2)-#4	48" O.C.
EXTERIOR	8"	(1)-#5	32" O.C.	(2)-#4	48" O.C.
EXTERIOR	12"	(2)-#5	32" O.C.	(2)-#4	48" O.C.

NOTES:
1. ALL SINGLE BAR REINFORCING IN VERTICAL CELLS SHALL BE CENTERED IN CELL UNLESS NOTED OTHERWISE.
2. FOR DOUBLE BAR REINFORCING IN VERTICAL CELLS:
a. THE CLEAR DISTANCE BETWEEN PARALLEL BARS SHALL NOT BE LESS THAT THE NOMINAL DIAMETER OF THE BAR, NOR LESS THAN 1 IN.
b. REINFORCING BARS SHALL HAVE A THICKNESS OF GROUT BETWEEN THE BARS AND MASONRY UNITS NOT LESS THAN 1/4 IN. FOR FINE GROUT OR 1/2 IN. FOR COARSE GROUT.
3. AN ADDITIONAL VERTICAL BAR OF THE SAME SIZE AND LENGTH AS THE NORMAL REINFORCING BAR SHALL BE PLACED IN GROUTED CELLS:
a. IN FIRST TWO JAMB CELLS ON EACH SIDE OF WALL OPENINGS.
b. IN CELLS ON EACH SIDE OF CONTROL JOINTS OR EXPANSION JOINTS.
c. IN CELL AT ALL WALL INTERSECTIONS AND FIRST ADJACENT CELL IN EACH DIRECTION.
4. ADDITIONAL BOND BEAMS SHALL BE PROVIDED FOR ALL MASONRY LINTELS AND WALL OPENINGS AS SHOWN IN TYPICAL DETAILS.

2) THE MINIMUM LENGTH OF LAP SPLICES OF REINFORCING STEEL IN MASONRY SHALL BE AS SHOWN IN THE CMU REINFORCING LAP SCHEDULE.

3) FOUNDATION DOWELS:
A) THERE SHALL BE A FOUNDATION DOWEL FOR EACH VERTICAL WALL REINFORCING BAR.
B) THE MINIMUM REQUIRED EMBEDMENT OF DOWELS IN CONCRETE FOUNDATIONS SHALL BE AS REQUIRED FOR A CLASS B SPLICE FOR THE SPECIFIED COMPRESSIVE STRENGTH FOR THE FOUNDATION. REFER TO CONCRETE LAP LENGTH SCHEDULES FOR TYPICAL LAP REQUIREMENTS. ALTERNATIVELY, THE FOUNDATION DOWELS MAY BE DEVELOPED WITH A STANDARD ACI 90 DEGREE HOOK INTO THE FOUNDATION.
C) MASONRY DOWELS SHOWN CAST-IN-PLACE IN DOCUMENTS SHALL BE TIED IN PLACE TO FOUNDATION REINFORCING. WET STICKING OF MASONRY DOWELS IS NOT PERMITTED. MASONRY CONTRACTOR SHALL VERIFY PLACEMENT AND LOCATION OF DOWELS PRIOR TO CONCRETE PLACEMENT. EPOXY EMBEDDING DOWELS SHALL NOT BE PERMITTED WITHOUT APPROVAL BY THE OWNER'S REPRESENTATIVE.
D) AT CONTRACTOR'S OPTION, FOUNDATION DOWELS MAY BE DRILLED AND GROUTED WITH EPOXY MATERIAL TO DEVELOP THE TENSILE CAPACITY OF THE BAR IN ACCORDANCE WITH POST-INSTALLED ANCHORS AND DOWEL NOTES BELOW. EPOXY MANUFACTURER INFORMATION AND EMBEDMENT DEPTH SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE PRIOR TO PLACEMENT OF WALL FOUNDATIONS.
E) FOUNDATION DOWELS SHALL EXTEND UP INTO THE GROUTED CELLS TO PROVIDE THE MINIMUM LAP SPLICE LENGTH SHOWN IN THE CMU REINFORCING LAP SCHEDULE.
F) FOUNDATION DOWELS THAT INTERFERE WITH UNIT WEBS ARE PERMITTED TO BE BENT A MAXIMUM OF 1 IN. HORIZONTALLY FOR EVERY 6 IN. OF VERTICAL HEIGHT. REFER TYPICAL DETAIL FOR PERMITTED BENDING OF FOUNDATION DOWELS.

4) NORMAL VERTICAL WALL REINFORCING SHALL EXTEND CONTINUOUSLY FROM THE TOP OF FOUNDATION TO EMBED WITH A STANDARD HOOK INTO THE TOP BOND BEAM.

5) BOND BEAM REINFORCING STEEL FOR INTERIOR AND EXTERIOR WALLS SHALL BE CONTINUOUS THROUGHOUT, EXCEPT AT CONTROL JOINTS. AT CONTROL JOINTS, INTERMEDIATE BOND BEAM REINFORCEMENT SHALL BE CUT, BUT SHALL BE CONTINUOUS AT DIAPHRAGM BOND BEAMS. EXTEND REINFORCING BARS NOT LESS THAN THAT SPECIFIED ON LAP SCHEDULE. REFER TO TYPICAL DETAILS AND LAP SCHEDULE FOR ADDITIONAL INFORMATION.

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J. GROUT PLACEMENT:

1) GROUT PLACING TIME: PLACE GROUT WITHIN 1-1/2 HOURS FROM INTRODUCING WATER IN THE MIXTURE AND PRIOR TO INITIAL SET.

2) GROUT POUR HEIGHT: DO NOT EXCEED THE MAXIMUM GROUT POUR HEIGHT GIVEN IN THE TABLE BELOW. THE GROUT POUR HEIGHT IS DEFINED AS THE TOTAL HEIGHT OF MASONRY TO BE GROUTED PRIOR TO ERECTION OF ADDITIONAL MASONRY. A GROUT POUR CONSISTS OF ONE OR MORE GROUT LIFTS.

GROUT SPACE REQUIREMENTS PER TMS 602-16 BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES, TABLE 3.2.1			
GROUT TYPE1	MAXIMUM GROUT POUR HEIGHT, FT.	MINIMUM CLEAR WIDTH OF GROUT SPACE,2,3 IN.	MINIMUM CLEAR GROUT SPACE DIMENSIONS FOR GROUTING CELLS OF HOLLOW UNITS,3,4 IN. X IN.
FINE	1	3/4	1-1/2 X 2
FINE	5.33	2	2 X 3
FINE	12.67	2-1/2	2-1/2 X 3
FINE	24	3	3 X 3
COARSE	1	1-1/2	1-1/2 X 3
COARSE	5.33	2	2-1/2 X 3
COARSE	12.67	2-1/2	3 X 3
COARSE	24	3	3 X 4

FOOTNOTES:
1. FINE AND COARSE GROUTS ARE DEFINED IN ASTM C476.
2. FOR GROUTING BETWEEN MASONRY WYTHES.
3. MINIMUM CLEAR WIDTH OF GROUT SPACE AND MINIMUM CLEAR GROUT SPACE DIMENSION ARE THE NET DIMENSION OF THE SPACE DETERMINED BY SUBTRACTING MASONRY PROTRUSIONS AND THE DIAMETERS OF HORIZONTAL BARS FROM THE AS-BUILT CROSS-SECTION OF THE GROUT SPACE. SELECT THE GROUT TYPE AND MAXIMUM GROUT POUR HEIGHT BASED ON THE MINIMUM CLEAR SPACE.

3) GROUT LIFT HEIGHT: PLACE GROUT IN LIFTS NOT EXCEEDING 5 FT. 4 IN. A GROUT LIFT IS DEFINED AS AN INCREMENT OF GROUT HEIGHT WITHIN A TOTAL GROUT POUR.

4) GROUT CONSOLIDATION: CONSOLIDATE GROUT POURS BY MECHANICAL VIBRATION, AND RECONSOLIDATE BY MECHANICAL VIBRATION AFTER INITIAL WATER LOSS AND SETTLEMENT HAS OCCURRED.

5) GROUT KEY: WHEN GROUTING, FORM GROUT KEYS BETWEEN GROUT POURS. FORM GROUT KEYS BETWEEN GROUT LIFTS WHEN THE FIRST LIFT IS PERMITTED TO SET PRIOR TO PLACEMENT OF THE SUBSEQUENT LIFT.
A) FORM A GROUT KEY BY TERMINATING THE GROUT A MINIMUM OF 1-1/2 IN. BELOW A MORTAR JOINT.
B) DO NOT FORM GROUT KEYS WITHIN BOND BEAMS.
C) AT BOND BEAMS OR LINTELS LAID WITH CLOSED BOTTOM UNITS, TERMINATE THE GROUT POUR AT THE BOTTOM OF THE BEAM OR LINTEL WITHOUT FORMING A GROUT KEY.

9) POST-INSTALLED ANCHORS AND DOWELS

A. GOVERNING CODES AND STANDARDS: IN ADDITION TO THE REQUIREMENTS OF THE GOVERNING INTERNATIONAL BUILDING CODE, ALL POST-INSTALLED ANCHORS AND DOWELS SHALL BE DETAILED, FABRICATED, AND INSTALLED IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.
1) ACI 318-14 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE."
2) ACI 355.2-07 "QUALIFICATION OF POST-INSTALLED MECHANICAL ANCHORS IN CONCRETE."
3) ACI 355.4-11 "QUALIFICATION OF POST-INSTALLED ADHESIVE ANCHORS IN CONCRETE."

B. QUALIFICATION REQUIREMENTS FOR INSTALLERS

1) CONTRACTOR SHALL REQUEST, SCHEDULE AND FACILITATE THE ANCHOR AND/OR ADHESIVE MANUFACTURER'S REPRESENTATIVE TO PROVIDE ONSITE INSTALLATION TRAINING FOR ALL THE MANUFACTURER'S SPECIFIED ANCHORING PRODUCTS. THE ENGINEER MUST RECEIVE DOCUMENTED CONFIRMATION THAT ALL OF THE CONTRACTOR'S ANCHOR INSTALLATION PERSONNEL ARE TRAINED PRIOR TO COMMENCEMENT OF ANCHOR INSTALLATION OPERATIONS.

2) INSTALLATION OF ADHESIVE ANCHORS HORIZONTALLY OR UPWARDLY INCLINED SHALL BE PERFORMED BY PERSONNEL CERTIFIED BY AN APPLICABLE CERTIFICATION PROGRAM. CERTIFICATION SHALL INCLUDE WRITTEN AND PERFORMANCE TESTS IN ACCORDANCE WITH THE ACI/CRSI ADHESIVE ANCHOR INSTALLER (AAI) CERTIFICATION PROGRAM, OR EQUIVALENT. WHEN APPLICABLE, SOME DOWN-HOLE INSTALLATIONS SHOWN ON DRAWINGS SUPPORTING SUSTAINED TENSION LOADS ARE DESIGNATED WITH A (CERT) AFTER THE ANCHOR CALLOUT AND SHALL ALSO REQUIRE INSTALLER CERTIFICATION AS OUTLINED ABOVE.

C. QUALIFICATION REQUIREMENTS FOR PRODUCTS

1) POST-INSTALLED EXPANSION AND UNDERCUT ANCHORS SHALL MEET THE ASSESSMENT CRITERIA OF ACI 355.2.

2) POST-INSTALLED ADHESIVE ANCHORS SHALL MEET THE ASSESSMENT CRITERIA OF ACI 355.4.

D. APPROVED ANCHORING PRODUCTS: THE ANCHORING SYSTEMS SHOWN BELOW HAVE BEEN USED IN THE ANCHOR DESIGNS SHOWN IN THE CONSTRUCTION DOCUMENTS. SUBSTITUTION REQUESTS FOR ALTERNATE PRODUCTS MUST BE APPROVED IN WRITING BY THE ENGINEER OF RECORD PRIOR TO USE. CONTRACTOR SHALL PROVIDE CALCULATIONS DEMONSTRATING THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING THE PERFORMANCE VALUES OF THE SPECIFIED PRODUCT. SUBSTITUTIONS WILL BE EVALUATED BY THEIR HAVING AN ICC ESR SHOWING COMPLIANCE WITH THE RELEVANT BUILDING CODE FOR SEISMIC USES, LOAD RESISTANCE, INSTALLATION CATEGORY, AND AVAILABILITY OF COMPREHENSIVE INSTALLATION INSTRUCTIONS. ADHESIVE ANCHOR EVALUATION WILL ALSO CONSIDER CREEP, IN-SERVICE TEMPERATURE, AND INSTALLATION TEMPERATURE.

1) ANCHORAGE TO CONCRETE

A) ADHESIVE ANCHORS:
(1) HILTI HIT-HY 200 SYSTEM WITH HILTI HIT-Z ROD OR HAS-E THREADED ROD [ICC ESR-3187].
(2) HILTI HIT-RE 500 V3 SYSTEM WITH HILTI HAS-E THREADED ROD [ICC ESR-3814].

B) MEDIUM DUTY MECHANICAL ANCHORS:
(1) HILTI KWIK HUS-EZ AND KWIK HUS-EZ I SCREW ANCHORS [ICC ESR-3027]
(2) HILTI KWIK BOLT-TZ EXPANSION ANCHORS [ICC ESR-1917].
(3) HILTI KWIK BOLT 3 EXPANSION ANCHORS (UNCRACKED CONCRETE ONLY) [ICC ESR-2302]

C) HEAVY DUTY MECHANICAL ANCHORS:
(1) HILTI HDA UNDERCUT ANCHORS [ICC ESR-1546]
(2) HILTI HSL-3 EXPANSION ANCHORS [ICC ESR-1545]

2) REBAR DOWELING INTO CONCRETE

A) ADHESIVE ANCHORS:
(1) HILTI HIT-HY 200 SYSTEM WITH CONTINUOUSLY DEFORMED REBAR [ICC ESR-3187].
(2) HILTI HIT-RE 500 V3 SYSTEM WITH CONTINUOUSLY DEFORMED REBAR [ICC ESR-3814].

3) ANCHORAGE TO SOLID GROUTED MASONRY

A) ADHESIVE ANCHORS:
(1) HILTI HIT-HY 270 MASONRY ADHESIVE ANCHORING SYSTEM WITH HILTI HAS-E CONTINUOUSLY THREADED ROD OR CONTINUOUSLY DEFORMED STEEL REBAR [ICC ESR-4143].

B) MECHANICAL ANCHORS:
(1) HILTI KWIK BOLT-3 EXPANSION ANCHORS [ICC ESR-1385].

4) ANCHORAGE TO HOLLOW / MULTI-WYTHE MASONRY

A) ADHESIVE ANCHORS:
(1) HILTI HIT-HY 270 MASONRY ADHESIVE ANCHORING SYSTEM WITH HILTI HAS-E CONTINUOUSLY THREADED ROD OR CONTINUOUSLY DEFORMED STEEL REBAR [ICC ESR-4143].
(2) THE APPROPRIATE SIZE SCREEN TUBE SHALL BE USED PER ADHESIVE MANUFACTURER'S RECOMMENDATION.

E. PREPARATION PRIOR TO INSTALLATION

1) CURING OF BASE MATERIAL: DO NOT DRILL OR CORE HOLES INTO SUPPORTING CONCRETE OR MASONRY MATERIALS UNTIL THE CONCRETE, MORTAR AND/OR GROUT HAVE BEEN ADEQUATELY CURED TO ACHIEVE FULL DESIGN STRENGTH. IN NO CASE SHALL ANCHORS BE INSTALLED PRIOR TO THE CONCRETE HAVING AN AGE OF LESS THAN 21 DAYS.

2) TEMPERATURE OF BASE MATERIAL: THE CONCRETE TEMPERATURE AT THE TIME OF ADHESIVE ANCHOR INSTALLATION SHALL BE AT LEAST 50°F (10°C) UNLESS TESTING HAS BEEN CONDUCTED IN ACCORDANCE WITH RECOGNIZED CRITERIA TO VERIFY PERFORMANCE IN CONCRETE AT LOWER TEMPERATURES.

3) AVOIDANCE OF EMBEDDED ITEMS: PRIOR TO DRILLING OR CORING OPERATIONS, THE CONTRACTOR SHALL LOCATE AND MARK ALL POTENTIALLY CONFLICTING REINFORCING BARS, UTILITIES AND OTHER EMBEDDED ITEMS BY INDUCTION SCANNING, GROUND PENETRATING RADAR, X-RAY, OR OTHER APPROVED NON-DESTRUCTIVE METHOD. CONTRACTOR SHALL AVOID DRILLING OR CORING HOLES THAT MAY DAMAGE THESE EMBEDDED ITEMS. NOTIFY THE ENGINEER IF CONFLICTING EMBEDDED ITEMS DO NOT ALLOW INSTALLATION OF POST-INSTALLED ANCHORS IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND/OR APPROVED SHOP DRAWINGS.

4) CARTRIDGE STORAGE: ADHESIVE CARTRIDGES SHALL BE STORED UNDER CONDITIONS IN COMPLIANCE WITH MANUFACTURER RECOMMENDATIONS REGARDING TEMPERATURE, EXPOSURE TO SUNLIGHT, ETC. AND EVIDENCE OF COMPLIANCE SHALL BE MADE AVAILABLE UPON REQUEST. THE USE OF EXPIRED ADHESIVE, AS INDICATED BY THE EXPIRATION DATE ON THE CARTRIDGE, IS PROHIBITED.

5) INSTALLATION EQUIPMENT: THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT REQUIRED TO INSTALL THE EXPANSION AND/OR ADHESIVE ANCHOR INCLUDING, BUT NOT LIMITED TO, DRILLS, SETTING TOOLS, CLEAN-OUT BRUSHES, BLOWOUT BULBS, OIL-FREE COMPRESSED AIR, VACUUMS, WRENCHES, ETC.

F. INSTALLATION

1) ALL DRILLING AND CORING EQUIPMENT AND ALL METHODS FOR INSTALLATION OF POST-INSTALLED ANCHORS AND DOWELS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII).

2) UNLESS OTHERWISE SPECIFIED, ANCHORS SHALL BE INSTALLED IN HOLES DRILLED WITH A ROTARY IMPACT HAMMER DRILL OR, WHERE NOT OTHERWISE PROSCRIBED, A ROCK DRILL. IN ALL CASES, THE BIT DIAMETER SHALL BE IN ACCORDANCE WITH THE MPII.

3) EMBEDMENT DEPTH AND MINIMUM ANCHOR PROJECTION OF THE ANCHOR ELEMENT FROM THE CONCRETE SURFACE SHALL BE AS SHOWN ON THE DRAWING OR DETAIL FOR THE PARTICULAR ANCHOR OR GROUP OF ANCHORS BEING INSTALLED.

4) ANCHOR CAPACITY IS DEPENDENT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGES OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS. ANCHOR SPACING AND EDGE DISTANCE VALUES SHALL NOT BE LESS THAN RECOMMENDED BY THE ANCHOR MANUFACTURER.

5) HOLES FOR POST-INSTALLED ANCHORS:

A) UNLESS SPECIFICALLY SHOWN OTHERWISE, ALL HOLES SHALL BE INSTALLED PERPENDICULAR TO THE CONCRETE OR MASONRY SURFACE.

B) ANCHOR HOLES SHALL BE THOROUGHLY CLEANED IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN THE MPII PRIOR TO ADHESIVE INJECTION. AT A MINIMUM, THIS SHALL CONSIST OF CLEANING WITH OIL-FREE AND MOISTURE-FREE COMPRESSED AIR, USING A NOZZLE EXTENDED TO THE BOTTOM HOLE; SUPPLEMENTED WITH A BRUSH OR OTHER TOOL CLEANING TO REMOVE ALL CONCRETE DUST AND LOOSE MATERIAL; AND FOLLOWED BY A SECOND COMPRESSED AIR CLEANING. THIS IS COMMONLY KNOWN AS BLOW-BRUSH-BLOW OR BBB. SOME ANCHOR MANUFACTURERS HAVE DEVELOPED VACUUM SYSTEMS THAT REPLACE THE TRADITIONAL BBB APPROACH.

C) DRILLED AND CLEANED ANCHOR HOLES SHALL BE PROTECTED FROM CONTAMINATION AND WATER (E.G. RAIN) UNTIL THE ADHESIVE IS INSTALLED.

D) A DRILLED ANCHOR HOLE SHALL BE RE-CLEANED JUST PRIOR TO ADHESIVE INJECTION IF, IN THE OPINION OF THE ENGINEER, INSPECTOR, OR OWNER'S REPRESENTATIVE, THE HOLE HAS BECOME CONTAMINATED AFTER INITIAL CLEANING.

6) INSTALLATION OF ADHESIVE ANCHORS:

A) ADHESIVE ANCHORS WITH DIAMETER GREATER THAN 3/8-INCH INSTALLED IN ORIENTATIONS FROM HORIZONTAL TO VERTICAL SHALL EMPLOY A PISTON PLUG FOR THE ADHESIVE INJECTION.

B) ADHESIVE SHALL BE INJECTED IN ACCORDANCE WITH THE MPII USING EQUIPMENT AND PROCEDURES AS SPECIFIED THEREIN FOR THE SPECIFIC CONDITIONS ASSOCIATED WITH THE INJECTION. THIS SHALL BE CLEARLY SPECIFIED IN THE MPII, IF NOT, ANOTHER PRODUCT SHALL BE PROPOSED FOR USE.

C) ANCHOR ELEMENTS TO BE INSTALLED IN THE ADHESIVE SHALL BE CLEAN, OIL-FREE, AND FREE OF LOOSE RUST, PAINT, OR OTHER COATINGS.

D) THREADS ON THE PROJECTING PORTION OF THE ANCHOR ELEMENT SHALL BE PROTECTED FROM ADHESIVE CONTAMINATION.

E) UNLESS SPECIFICALLY SHOWN OTHERWISE ON THE DRAWINGS, ANCHORS SHALL BE INSTALLED PERPENDICULAR TO THE CONCRETE SURFACE.

F) INSTALLED ADHESIVE ANCHORS SHALL BE SECURELY FIXED IN-PLACE TO PREVENT DISPLACEMENT WHILE THE ADHESIVE CURES. ANCHORS DISPLACED BEFORE FULL ADHESIVE CURE SHALL BE CONSIDERED DAMAGED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

7) POST-INSTALLED ANCHORS AND DOWELS SHALL NOT BE BENT AFTER BEING INSTALLED UNLESS PERMITTED BY THE ENGINEER IN WRITING.

G. SPECIAL INSPECTION REQUIREMENTS

1) CONTINUOUS INSPECTIONS: ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS SHALL BE CONTINUOUSLY INSPECTED DURING INSTALLATION BY A CERTIFIED INSPECTOR SPECIFICALLY APPROVED FOR THAT PURPOSE BY THE BUILDING OFFICIAL.

2) PERIODIC INSPECTIONS: PERIODIC SPECIAL INSPECTIONS SHALL BE PROVIDED FOR ALL OTHER POST-INSTALLED ANCHORS NOT INCLUDED IN THE CONTINUOUS INSPECTIONS REQUIRED ABOVE.

3) REPORTING REQUIREMENTS: THE SPECIAL INSPECTOR SHALL FURNISH A REPORT TO THE ENGINEER AND BUILDING OFFICIAL THAT THE WORK COVERED BY THE REPORT HAS BEEN PERFORMED AND THAT THE MATERIALS AND INSTALLATION PROCEDURES USED CONFORM WITH THE APPROVED CONSTRUCTION DOCUMENTS AND THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII).

10) STEEL CONSTRUCTION NOTES

A. GOVERNING CODES AND STANDARDS: IN ADDITION TO THE REQUIREMENTS OF THE GOVERNING INTERNATIONAL BUILDING CODE, ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.
1) AISC 303-16 "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
2) AISC 341-16 "SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS"
3) AISC 360-16 "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS"
4) AWS D1.1-2015 "STRUCTURAL WELDING CODE - STEEL"
5) RCSC-2014 "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS"

B. STRUCTURAL BOLTS, ANCHOR RODS & BASE PLATES:

1) STEEL CONTRACTOR SHALL FURNISH ERECTION BOLTS AS REQUIRED FOR FIELD CONNECTIONS.

2) ALL BOLTS SHALL BE 3/4 IN. DIAMETER ASTM A325 WITH SUITABLE WASHERS AND NUTS UNLESS OTHERWISE SHOWN IN THE CONSTRUCTION DOCUMENTS OR APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.

3) ALL BOLTS SHALL BE TIGHTENED TO THE SNUG-TIGHTENED JOINT REQUIREMENTS OF RCSC-10 EXCEPT AT SLIP-CRITICAL JOINTS OR WHERE NOTED OTHERWISE IN CONSTRUCTION DOCUMENTS OR IN FABRICATOR'S CONNECTION DESIGN.

4) UNLESS OTHERWISE INDICATED IN THE DRAWINGS, ALL ANCHOR RODS SHALL CONFORM TO THE SPECIFIED MATERIAL GRADE SHALL BE A MINIMUM 3/4 INCH DIAMETER WITH A MINIMUM FOUNDATION EMBEDMENT AS INDICATED IN STRUCTURAL DETAILS. THE EMBEDDED END SHALL HAVE EITHER A STANDARD BOLT HEAD, A HEAVY HEX NUT WITH THE THREADS SPOILED ABOVE AND BELOW THE NUT, OR JAMMED DOUBLE NUTS.

5) PRIOR TO PLACING CONCRETE, STEEL PLATE TEMPLATES SHALL BE PROVIDED TO FACILITATE PLACEMENT OF ANCHOR RODS IN DETAILED PLAN POSITIONS AND ELEVATIONS.

6) BASE PLATES SHALL BE LEVELED WITH LEVELING NUTS AND OVERSIZED WASHER PLATES OR WITH SHIM PACKS AT THE ERECTOR'S OPTION.

7) AFTER FINAL BASE PLATE POSITIONING, ANCHOR ROD NUTS SHALL BE INSTALLED TO A SNUG-TIGHT CONDITION AND WASHER PLATES SHALL BE FIELD WELDED AS INDICATED IN THE CONSTRUCTION DOCUMENTS.

C. STEEL FABRICATION & FINISH:

1) SHOP DRAWINGS SHALL BE SUBMITTED TO AND REVIEWED BY THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCING FABRICATION. ANY FABRICATION INITIATED PRIOR TO APPROVAL OF SHOP DRAWINGS WILL BE AT THE SOLE RISK OF THE FABRICATOR.

2) ALL SHOP AND FIELD WELDS SHALL BE MADE IN ACCORDANCE WITH AWS D1.1. ALL WELDING SHALL USE LOW HYDROGEN PROCESSES.

3) ALL BEAMS THAT ARE REQUIRED TO HAVE CAMBER SHALL BE FABRICATED WITH CAMBER UPWARD. BEAMS WITHOUT SPECIFIED CAMBER SHALL BE FABRICATED SUCH THAT AFTER ERECTION, ANY NATURAL CAMBER DUE TO ROLLING OR SHOP FABRICATION IS UPWARD.

4) CUTS, HOLES, COPING, ETC. REQUIRED FOR WORK OF OTHER TRADES SHALL BE SHOWN ON THE SHOP DRAWINGS AND MADE IN THE SHOP. CUTS OR BURNING OF HOLES IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED.

5) THE FABRICATOR SHALL BE RESPONSIBLE FOR ALL ERECTION AIDS. ANY SUCH ERECTION AIDS SHALL BE REMOVED FROM THE COMPLETED STRUCTURE IF DIRECTED BY THE OWNER'S REPRESENTATIVE.

6) ALL EXTENSION BARS, RUN-OFF PLATES, AND BACKING BARS USED IN WELDED CONNECTIONS SHALL BE REMOVED AND THE JOINTS SHALL BE GROUND SMOOTH WHERE SUCH CONNECTION IS PERMANENTLY EXPOSED TO VIEW OR IS DESIGNATED AS ARCHITECTURALLY EXPOSED STRUCTURAL STEEL.

7) HEADED STUDS AND DEFORMED BAR ANCHORS

A) ALL HEADED STUDS AND DEFORMED BAR ANCHORS SHALL BE INSTALLED USING AUTOMATIC END-WELDING EQUIPMENT RECOMMENDED BY THE STUD OR ANCHOR MANUFACTURER. MANUAL WELDING OF HEADED STUDS OR DEFORMED BAR ANCHORS WILL NOT BE ALLOWED.
B) IF A VISUAL INSPECTION REVEALS ANY STUD THAT DOES NOT SHOW A FULL 360-DEGREE FLASH OR ANY STUD THAT HAS BEEN REPAIRED BY MANUAL WELDING, SUCH STUD SHALL BE BENT TO AN ANGLE APPROXIMATELY 15-DEGREES FROM ITS ORIGINAL AXIS. THE DIRECTION OF BENDING FOR STUDS WITH LESS THAN A 360-DEGREE FLASH SHALL BE OPPOSITE TO THE MISSING PORTION OF THE FLASH.
C) HEADED STUDS AND DEFORMED BAR ANCHORS THAT HAVE SUCCESSFULLY PASSED THE BEND TEST WITHOUT SIGN OF FAILURE SHALL BE ACCEPTABLE FOR USE AND LEFT IN THE BENT POSITION UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
D) WELDED STUDS NOT CONFORMING TO THE REQUIREMENTS OF AWS D1.1 SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR. THE CONTRACTOR SHALL REVISE THE WELDING PROCEDURE AS NECESSARY TO ENSURE THAT SUBSEQUENT STUD WELDING WILL MEET AWS D1.1 REQUIREMENTS.

8) STEEL EMBEDMENTS IN CONCRETE:

A) ALL STEEL COMPONENTS TO BE EMBEDDED IN CONCRETE SHALL HAVE COATINGS AS DEFINED IN THE TABLE BELOW.

COATINGS FOR STEEL EMBEDMENTS IN CONCRETE		
EXPOSURE	FIELD WELDING	FINISH
EXTERIOR	EITHER	GALVANIZED
INTERIOR	YES	UNPAINTED
	NO	GALVANIZED

FOOTNOTES:

1. ALL WELDING TO PREVIOUSLY GALVANIZED COMPONENTS WILL REQUIRE REMOVAL OF THE GALVANIZING WITH GRINDING FOR AT LEAST 3-INCHES FROM EITHER SIDE OF THE INTENDED WELD AND ON BOTH SIDES OF THE WORKPIECE.

2. FIELD WELDED AREAS AND OTHER AREAS WITH REMOVAL OF, OR DAMAGE TO, THE GALVANIZED COATING SHALL HAVE THEIR COATING RESTORED IN ACCORDANCE TO ASTM A780, USING PAINT CONTAINING ZINC DUST OR SIMILAR PERMITTED PRODUCTS CAPABLE OF PROVIDING A MINIMUM ZINC-RICH COATING THICKNESS OF 2.0 MILS IN A SINGLE APPLICATION.

B) IN ORDER TO REDUCE THE RISK OF HEAT-INDUCED CONCRETE SPALLING AT FIELD-WELDED EMBED PLATES:
i) ALLOW SUPPORTING CONCRETE TO CURE FOR A MINIMUM OF 14-DAYS PRIOR TO FIELD WELDING.
ii) PROVIDE THE WELD SIZE SHOWN IN DETAILS AND DO NOT OVER-WELD.

9) SHOP PRIMER
A) ALL STEEL EXPOSED TO EXTERIOR WEATHER OR AN UNCONTROLLED ENVIRONMENT SHALL BE BLAST CLEANED AND PRIMED WITH A SUBMITTED AND APPROVED ZINC-RICH PRIMER.
B) INTERIOR STEEL SHALL BE SHOP PRIMED WITH THE FABRICATORS STANDARD SHOP PRIMER.
C) SHOP PRIMER SHALL NOT BE APPLIED TO THE FOLLOWING AREAS:
i) SURFACES EMBEDDED IN CONCRETE OR MORTAR. EXTEND PRIMING OF PARTIALLY EMBEDDED MEMBERS TO A DEPTH OF 2 INCHES.
ii) SURFACES TO BE FIELD WELDED.
iii) SURFACES TO BE HIGH-STRENGTH BOLTED WITH SLIP-CRITICAL CONNECTIONS.
iv) SURFACES TO RECEIVE SPRAYED FIRE-RESISTIVE MATERIALS.
v) GALVANIZED SURFACES.

D. STEEL MISCELLANEOUS:

1) ALL EDGE ANGLES SUPPORTING ROOF OR FLOOR DECK SHALL BE CONTINUOUS BUTT-SPLICE WELDED OVER SUPPORTS.

2) ALL ELEVATED MECHANICAL EQUIPMENT SHALL BE SUPPORTED BY STEEL FRAMING. IF SPECIFIC FRAMING SIZES ARE NOT PROVIDED ON THE FRAMING PLAN, REFER TYPICAL DETAILS FOR ROOF AND FLOOR OPENING FRAME DETAILS.

3) SUBSTITUTION OF POST-INSTALLED ANCHORS FOR EMBEDDED ANCHORS SHOWN ON THE DRAWINGS WILL NOT BE PERMITTED UNLESS SPECIFICALLY APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.

4) WHERE POST-INSTALLED ANCHORS ARE USED IN CONTINUOUS ANGLES, FABRICATE ANGLE WITH OPTIONAL HOLE LOCATIONS TO ALLOW REMEDIATION OF CASES WHERE ANCHORS FOUL WITH REBAR. AS AN EXAMPLE, FOR A CONTINUOUS ANGLE WITH ANCHORS AT 24" ON CENTER, PROVIDE HOLES AT 6" ON CENTER.

5) GALVANIZED LOOSE LEDGE ANGLES SHALL BE PROVIDED OVER ALL MASONRY VENEER OPENINGS OR RECESSES DEEPER THAN 1". LINTELS SHALL HAVE 1" OF BEARING AT EACH END FOR EVERY FOOT OF SPAN, WITH A MINIMUM OF 4" AND SIZED AS FOLLOWS UNLESS SHOWN OTHERWISE IN THE DRAWINGS.
A) UP TO 5'-0"................................L7 x 4 x 3/8 (LLH)
B) 5'-1" to 8'-0".............................BENT PL3/8 x 7 x 7

11) STEEL JOIST AND BRIDGING NOTES

A. GOVERNING CODES AND STANDARDS: IN ADDITION TO THE REQUIREMENTS OF THE GOVERNING INTERNATIONAL BUILDING CODE, ALL STEEL JOIST, JOIST GIRDER, JOIST BRIDGING AND ASSOCIATED MATERIALS SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE FOLLOWING STEEL JOIST INSTITUTE (SJI) STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.
1) SJI 100-15 "STANDARD SPECIFICATION FOR K-SERIES, LH-SERIES, AND DLH-SERIES OPEN WEB STEEL JOISTS AND JOIST GIRDERS"
2) SJI 200-15 "STANDARD SPECIFICATION FOR CJ-SERIES COMPOSITE STEEL JOISTS"
3) SJI TECHNICAL DIGEST NO. 9 "HANDLING AND ERECTION OF STEEL JOISTS AND JOIST GIRDERS"

B. COORDINATION BY GENERAL CONTRACTOR:

1) THE GENERAL CONTRACTOR SHALL CONFIRM OR REVISE MECHANICAL EQUIPMENT SIZE AND WEIGHT AND PROVIDE THE JOIST MANUFACTURER THE POINT LOADS FOR WHICH SPECIAL JOISTS ARE TO BE DESIGNED. PRELIMINARY ROOF TOP UNIT (RTU) WEIGHTS ARE SHOWN ON THE ROOF PLANS. SHOULD WEIGHTS EXCEED THOSE SHOWN, CONTRACTOR SHALL CONTACT THE OWNER'S REPRESENTATIVE FOR REVIEW.

C. JOIST DESIGN BY MANUFACTURER

1) AS A MINIMUM REQUIREMENT, THE JOIST MANUFACTURER SHALL DESIGN ALL JOISTS FOR THE DESIGN LOADS SPECIFIED IN THE STEEL JOIST INSTITUTE'S LOAD TABLES. IN ADDITION, JOISTS SHALL BE DESIGNED TO CARRY ANY OTHER LOADS INDICATED ON THE DRAWINGS, INCLUDING BUT NOT LIMITED TO, EQUIPMENT AND/OR PIPING SUPPORTED ON OR SUSPENDED FROM THE ROOF STRUCTURE.

2) UNLESS SHOWN OTHERWISE IN THE DRAWINGS, JOISTS SHALL BE DESIGNED BY THE JOIST MANUFACTURER FOR A NET UPLIFT OF 10 PSF IN THE FIELD OF THE ROOF AND 15 PSF WITHIN 10 FEET OF ROOF EDGES.

3) BETWEEN PANEL POINTS OF STEEL JOISTS THE CHORD MEMBERS SHALL BE DESIGNED TO SUPPORT 100 LBS VERTICAL LOAD WITHOUT REINFORCEMENT OF THE JOIST. TYPICALLY, UNDERHUNG LOADS SHALL BE SUPPORTED AT JOIST PANEL POINTS. OFF-PANEL POINT LOADING IN EXCESS OF 100 POUNDS WILL REQUIRE JOIST REINFORCING. REFER TYPICAL DETAILS FOR JOIST REINFORCING DETAIL.

4) UNLESS MORE STRINGENT PROVISIONS ARE SHOWN IN THE CONTRACT DOCUMENTS, THE JOIST MANUFACTURER SHALL DESIGN ALL JOISTS FOR A MAXIMUM LIVE LOAD DEFLECTION OF L/360.

5) JOISTS SEATS SHALL HAVE STANDARD JOIST SEAT DEPTHS UNLESS NOTED OTHERWISE. HOWEVER, FLAT BEARING SEATS SHALL BE PROVIDED FOR ALL JOISTS BY INCREASING THE DEPTH OF THE SEAT AT THE HIGH END OF SLOPED JOISTS. CONTRACTOR SHALL VERIFY FINAL SEAT DEPTHS PRIOR TO DETAILING SUPPORTING STRUCTURE. STANDARD JOIST SEAT DEPTHS ARE AS FOLLOWS:
A) K-SERIES: 2-1/2"
B) LH-SERIES: 5"
C) G-SERIES: 7-1/2"

6) UNLESS SHEAR COLLECTOR ASSEMBLIES ARE SHOWN AND DETAILED IN THE DRAWINGS, AT ALL PERIMETER DECK DIAPHRAGM BOUNDARIES AND AT SHEAR TRANSFER BAYS OF INTERIOR BRACED FRAME OR MOMENT FRAME LINES, JOIST SEATS AND THEIR ANCHORAGE TO SUPPORTING STEEL SHALL BE DESIGNED FOR THE FOLLOWING LATERAL SEAT ROLLOVER FORCES:
A) FOR JOIST SEATS DEPTHS UP TO 3-1/2 INCHES, MINIMUM SERVICE LEVEL ROLLOVER CAPACITY SHALL BE 2,000 LBS.
B) FOR JOIST SEATS DEPTHS GREATER THAN 3-1/2 INCHES AND LESS THAN OR EQUAL TO 5 INCHES, MINIMUM SERVICE LEVEL ROLLOVER CAPACITY SHALL BE 1,200 LBS.

7) BOTTOM CHORDS ON ALL JOISTS SHALL BE EXTENDED TO RECEIVE CEILING OR POTENTIAL FUTURE CEILING.

8) IN STEEL FRAMES, WHERE COLUMNS ARE NOT FRAMED IN AT LEAST TWO DIRECTIONS WITH SOLID WEB STRUCTURAL STEEL MEMBERS, STEEL JOISTS SHALL BE FIELD-BOLTED TO THE COLUMNS TO PROVIDE LATERAL STABILITY TO THE COLUMNS DURING ERECTION AND BOTTOM CHORD STABILITY PLATES SHALL BE PROVIDED AS REQUIRED BY OSHA SAFETY STANDARDS.

D. JOIST BRIDGING

1) JOIST BRIDGING SHOWN ON FRAMING PLANS IS PRELIMINARY AND SHALL NOT BE USED AS THE BASIS FOR BID OR FOR ERECTION. ALL JOIST BRIDGING SHALL BE DESIGNED BY THE JOIST MANUFACTURER TO MEET OR EXCEED THE MINIMUM REQUIREMENTS OF CURRENT SJI SPECIFICATIONS AND ALL OSHA PROVISIONS REGARDING JOIST ERECTION.

2) ADDITIONAL BRIDGING LINES AT THE BOTTOM CHORD OUTSIDE PANEL POINT HAVE NOT BEEN SHOWN FOR CLARITY BUT ARE REQUIRED FOR THE SUPPORT OF UPLIFT LOADS. PROVIDE AS DESIGNED BY THE JOIST MANUFACTURER.

3) NO VERTICAL LOAD SHALL BE IMPOSED ON BRIDGING.

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4) HORIZONTAL BRIDGING ANGLES FOR TOP AND BOTTOM CHORDS OF JOISTS ARE SHOWN ON FRAMING PLANS THUS: - - - - -

5) DIAGONAL BRIDGING IS SHOWN AS AN "X" ALONG A LINE OF HORIZONTAL BRIDGING. DIAGONAL BRIDGING SHALL BE PROVIDED WHERE SHOWN AND AT ANY DISCONTINUITIES IN THE ROW OF BRIDGING.

6) ALL BRIDGING LINES SHALL BE TERMINATED WITH AN "X" OR ANCHORED TO A STRUCTURAL WALL. REFER TYPICAL DETAILS FOR JOIST BRIDGING DETAILS.

E. JOIST ERECTION

1) ERECTION OF JOISTS SHALL FOLLOW CURRENT SJI SPECIFICATIONS, SJI TECHNICAL DIGEST NO. 9 AND ALL APPLICABLE PROVISIONS OF OSHA SAFETY STANDARDS. JOISTS SHALL NOT BE FULLY LOADED UNTIL ALL BRIDGING LINES ARE SECURED AND METAL DECKING IS IN PLACE. THE JOIST MANUFACTURER AND ERECTOR SHALL PROVIDE ADDITIONAL BRIDGING DURING CONSTRUCTION SEQUENCING AS REQUIRED BY THE CURRENT SJI SPECIFICATIONS AND OSHA SAFETY STANDARDS.

2) NO LOAD APPLIED TO JOIST SHALL BE DONE IN A MANNER THAT EXCEEDS THE MOMENT OR SHEAR CAPACITY OF THE JOIST.

3) ANY HANGERS SUPPORTED FROM JOISTS SHALL BE CONNECTED WITHOUT FIELD WELDING OR DRILLING TO THE JOIST.

12) METAL DECK NOTES

F. GOVERNING CODES AND STANDARDS: IN ADDITION TO THE REQUIREMENTS OF THE GOVERNING INTERNATIONAL BUILDING CODE, ALL STEEL DECK AND ASSOCIATED MATERIALS SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE FOLLOWING STEEL DECK INSTITUTE (SDI) STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.
1) SDI NC-2017 "STANDARD FOR NONCOMPOSITE STEEL FLOOR DECK"
2) SDI RD-2017 "STANDARD FOR STEEL ROOF DECK"
3) SDI-C-2017 "STANDARD FOR COMPOSITE STEEL FLOOR DECK SLABS"
4) SDI-QA/QC-2017 "STANDARD FOR QUALITY CONTROL AND QUALITY ASSURANCE FOR INSTALLATION OF STEEL DECK"

G. ROOF DECK:

1) BASIS OF DESIGN: VULCRAFT TYPE 1.5B WIDE RIB DECK WITH THE CHARACTERISTICS AND STRUCTURAL PROPERTIES OUTLINED BELOW. WIDE RIB DECKS OF OTHER MANUFACTURERS ARE ACCEPTABLE IF THEY PROVIDE SIMILAR LOAD-CARRYING CAPACITY FOR THE DECK SPANS APPLICABLE TO THIS PROJECT.
A) SDI DECK TYPE: WIDE RIB (WR)
B) DEPTH: 1-1/2 IN.
C) THICKNESS: 20 GAGE
D) FINISH: GALVANIZED
E) I = 0.212 IN4/FT
F) Sp = 0.234 IN3/FT
G) Sn = 0.247 IN3/FT
H) Fy = 33 KSI
I) SIDE LAPS: OVERLAPPED

2) SUPPORT FASTENERS: ROOF DECK SHALL BE CONNECTED TO SUPPORTS WITH #12 MECHANICAL FASTENERS AT 12" O.C. (36/4 PATTERN).
A) FASTENERS SHALL PENETRATE ALL PLIES OF DECKING INTO SUPPORTING SUBSTRATE OR 2 LINES OF FASTENERS SHALL BE PROVIDED.
B) #12 MECHANICAL FASTENERS ARE CAPABLE OF SELF-TAPPING INTO A 1/2-INCH MAXIMUM SUPPORTING STEEL THICKNESS. IF SUPPORTING STEEL THICKNESS EXCEEDS 1/2-INCH OR IF SUPPORT IS AN EMBED PLATE, PROVIDE (1) 5/8-INCH DIAMETER PUDDLE WELD IN LIEU OF EACH #12 FASTENER.

3) SIDE LAP FASTENERS: ROOF DECK SIDE LAPS SHALL BE FASTENED WITH #10 SIDE LAP FASTENERS AT 12" ON CENTER.

4) MINIMUM BEARING LENGTH AND LAP LENGTH: MINIMUM BEARING LENGTH ON SUPPORTS AT DISCONTINUOUS ENDS OF ROOF DECK IS 1.5-INCHES. MINIMUM BEARING LENGTH AND LAP LENGTH OF CONTINUOUS ROOF DECK OVER INTERIOR SUPPORTS IS 3-INCHES.

H. COMPOSITE ROOF DECK:

1) COMPOSITE ROOF SYSTEM: COMPOSITE ROOF SYSTEM SHALL BE AS NOTED ON FLOOR PLAN DRAWINGS AND AS SHOWN IN TYPICAL DETAILS.

2) BASIS OF DESIGN: VULCRAFT TYPE 2VLI COMPOSITE METAL DECK WITH THE CHARACTERISTICS AND STRUCTURAL PROPERTIES OUTLINED BELOW. COMPOSITE DECKS OF OTHER MANUFACTURERS ARE ACCEPTABLE IF THEY PROVIDE SIMILAR LOAD-CARRYING CAPACITY FOR THE DECK SPANS APPLICABLE TO THIS PROJECT.
A) SDI DECK TYPE: COMPOSITE
B) DEPTH: 2 IN.
C) THICKNESS: 18 GAGE
D) FINISH: GALVANIZED
E) Ip = 0.558 IN4/FT
F) In = 0.558 IN4/FT
G) Sp = 0.485 IN3/FT
H) Sn = 0.500 IN3/FT
I) Fy = 50 KSI
J) SIDE LAPS: OVERLAPPED
K) UNIT WEIGHT OF NORMAL WEIGHT CONCRETE FILL: 145 PCF

3) NON-COMPOSITE STRENGTH REQUIRED: THE COMPOSITE DECK SHALL BE CAPABLE OF SAFELY AND NON-COMPOSITELY SUPPORTING THE WET WEIGHT OF CONCRETE, INCLUDING AN ADDITIONAL CONCRETE PONDING WEIGHT OF 4 PSF DUE TO DEFLECTION OF DECK AND SUPPORTING STEEL FRAMING, PLUS TEMPORARY CONSTRUCTION LOADS WITHOUT REQUIRING SHORING. THE DECK SUPPLIER SHALL INFORM OWNER'S REPRESENTATIVE IF ANY PROJECT SPAN CONDITIONS DO NOT COMPLY WITH THIS REQUIREMENT AND SHALL RECOMMEND AREAS THAT MUST BE TEMPORARILY SHORED UNTIL CONCRETE HAS CURED FOR A MINIMUM OF 7 DAYS.

4) DECK ORIENTATION: COMPOSITE FLOOR DECK SHALL BE PLACED WITH RIBS PERPENDICULAR TO SUPPORTING STEEL FRAMING EXCEPT AT SKEWED FRAMING MEMBERS.

5) SUPPORT FASTENERS: ENDS OF COMPOSITE METAL DECKING SHALL BE BUTTED AND CONNECTED TO SUPPORTS WITH MINIMUM 5/8" DIAMETER PUDDLE WELDS AT MAXIMUM 12" SPACING.(EACH SIDE OF BUTTED JOINT)

6) SIDE LAP FASTENERS: PROVIDE BUTTON PUNCHED SIDE LAPS 12" ON CENTER. SIDE LAP CONNECTIONS ARE DECK TO DECK CONNECTIONS.

7) MINIMUM BEARING LENGTH: MINIMUM EXTERIOR AND INTERIOR BEARING LENGTHS SHALL BE AS RECOMMENDED BY THE DECK MANUFACTURER FOR THE SPECIFIC DECK TYPE, GAGE AND SLAB THICKNESS USED.

I. SUBSTITUTION OF WELDING OR PINS FOR MECHANICAL SCREW ANCHORS WILL NOT BE PERMITTED.

J. SUPPORTS FOR DECKING ARE DEFINED AS MEMBERS PROVIDING DIRECT TRANSVERSE SUPPORT AS WELL AS CONTINUOUS PARALLEL EDGE SUPPORT.

K. ALL DECKING SHALL BE PLACED WITH RIBS PERPENDICULAR TO SUPPORTING ROOF OR FLOOR MEMBERS AND SHALL SPAN A MINIMUM OF 3 SPANS UNLESS SHOWN OTHERWISE IN STRUCTURAL DRAWINGS.

L. METAL DECKING SHALL NOT BE USED TO SUPPORT ANY HANGING LOADS INCLUDING, BUT NOT LIMITED TO, SUSPENDED MECHANICAL, ELECTRICAL, OR PLUMBING EQUIPMENT, CABLE TRAYS OR RACEWAYS, CEILING FINISHES OR CEILING FRAMING.

M. ALL DECK OPENINGS UP TO 8-IN. SHALL BE REINFORCED WITH A MINIMUM 16-GAGE PLATE AS SHOWN IN TYPICAL ROOF DECK REINFORCING DETAIL.

N. ALL DECK OPENINGS GREATER THAN 8-IN. SHALL BE SUPPORTED BY AN ANGLE FRAME. IF SPECIFIC FRAMING SIZES ARE NOT PROVIDED ON THE FRAMING PLAN, REFER TYPICAL DETAILS FOR ROOF OPENING FRAME DETAIL.

O. PROVIDE SHEET STEEL COLUMN CLOSURES, Z-CLOSURES, CELL CLOSURES, POUR STOPS AND GIRDER FILLERS OF SAME MATERIAL AND FINISH AS DECK WITH THICKNESS AND PROFILE RECOMMENDED IN SDI FLOOR DECK DESIGN MANUAL, SECOND EDITION (JUNE 2020). WELD TO SUPPORTING STRUCTURE ACCORDING TO SDI RECOMMENDATIONS AND AS CONCEPTUALLY SHOWN IN TYPICAL FLOOR DECK CLOSURE DETAILS.

P. ALL FLOOR DECK EDGES SHALL BE SUPPORTED WITH POUR STOPS OR BENT PLATES. IF BENT PLATES ARE NOT SHOWN IN THE STRUCTURAL DRAWINGS, PROVIDE GAGE METAL POUR STOPS COMPLYING WITH SDI FLOOR DECK DESIGN MANUAL, SECOND EDITION (JUNE 2020), SECTION 5, TABLE 11 AND AS SHOWN IN TYPICAL DETAILS.

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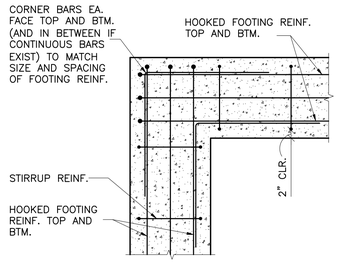
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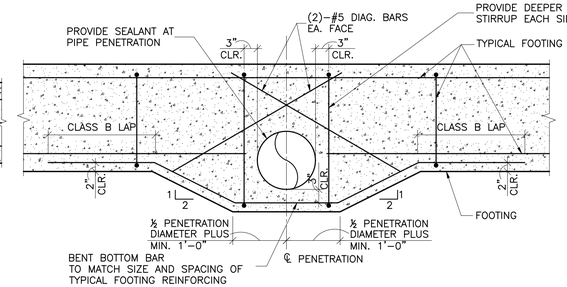
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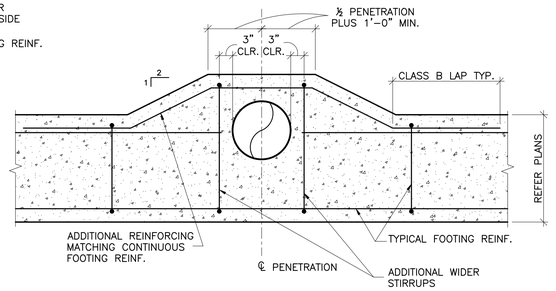
1 TYP. FOOTING CORNER REINF.

SCALE: NONE



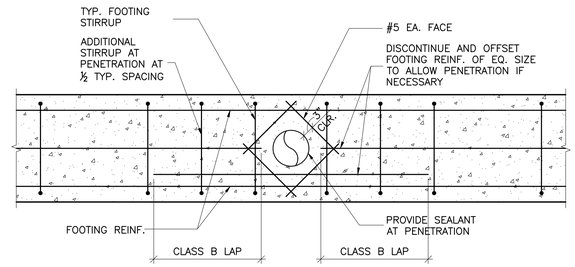
2 TYP. FOOTING PENETRATION

SCALE: NONE



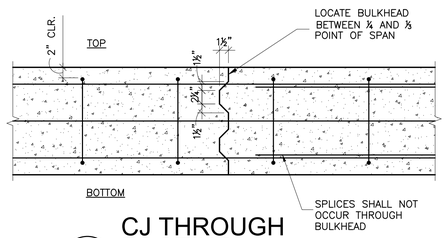
3 PLAN SECTION AT TYPICAL VERTICAL PENETRATION

SCALE: NONE



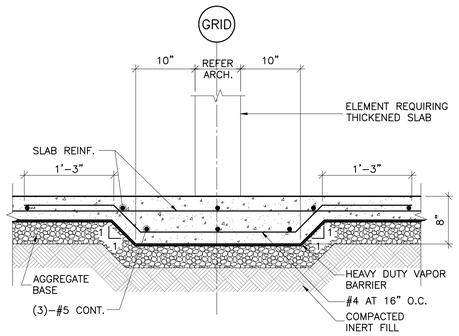
4 FOOTING PENETRATION

SCALE: NONE



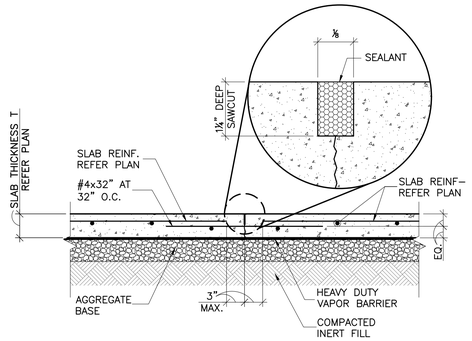
5 CJ THROUGH FOOTING

SCALE: NONE



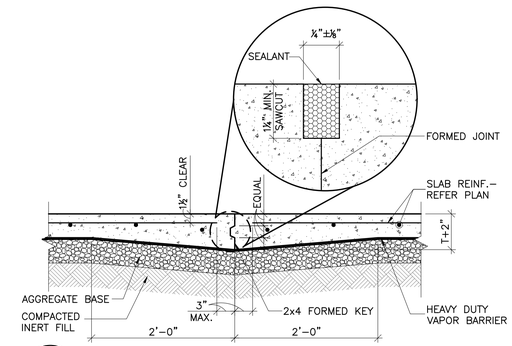
6 TYP. THICKENED SLAB

SCALE: NONE



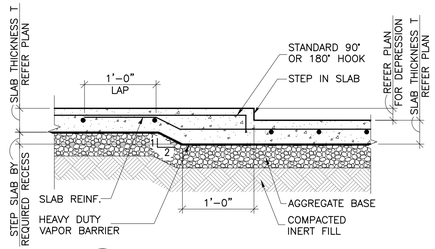
7 TYP. SAWED JOINT (SJ)

SCALE: NONE



8 TYP. CONSTRUCTION JOINT (CJ)

SCALE: NONE



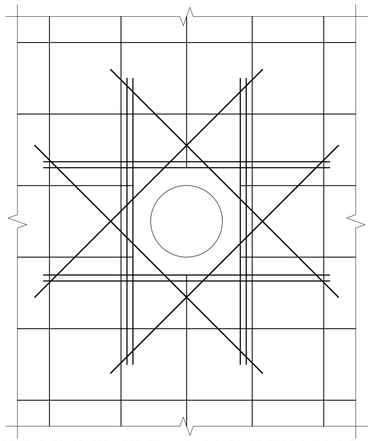
9 TYP. SLAB STEP

SCALE: NONE

CONCRETE EXPOSURE	MEMBER	REINFORCEMENTS	SPECIFIED COVER, IN.
CAST AGAINST AND PERMANENTLY IN CONTACT WITH GROUND	ALL	ALL	3
EXPOSED TO WEATHER OR IN CONTACT WITH GROUND	ALL	NO. 6 THROUGH NO. 18 BAR	2
		NO. 5 BAR, W31 OR D31 WIRE, AND SMALLER	1–1/2
NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND	SLAB, JOISTS, AND WALLS	NO. 14 AND NO. 18 AND SMALLER	1–1/2
		NO. 11 BAR AND SMALLER	3/4
	BEAMS, COLUMNS, PEDESTALS, AND TENSION TIES	PRIMARY REINFORCEMENT, STIRRUPS, TIES, SPIRALS, AND HOOPS	1–1/2

10 TYP. MIN. CONCRETE COVER

SCALE: NONE



REINF. BARS SPACED LESS THAN 12" O.C. TO BE SPREAD WITHOUT INTERRUPTION TO CLEAR PENETRATIONS LESS THAN 12" DIAM.
SIZE OF DIAGONAL AND EXTRA PARALLEL BARS TO EQUAL SIZE OF TYPICAL SLAB OR WALL REINFORCING BARS.
SEE DESIGN DRAWINGS FOR DIAMETER AND LOCATION OF PENETRATIONS
NUMBER OF EXTRA PARALLEL BARS PLACED EACH WAY AROUND PENETRATION TO BE EQUAL TO NUMBER OF BARS INTERRUPTED. (TYPICAL FOR EACH FACE OF SLAB OR WALL). MINIMUM OF ONE BAR EACH WAY, EACH FACE OF SLAB OR WALL
FOR PENETRATIONS LESS THAN 12"ø, PROVIDE 4–#4x4'–0" DIAGONAL BARS EACH FACE.

11 TYP. PENETRATION THRU CONC. SLAB OR WALL

SCALE: NONE

TENSION DEVELOPMENT AND LAP–SPLICE LENGTHS FOR UNCOATED REINFORCING BARS

BAR SIZE	LAP CLASS	LENGTHS (IN.) PER CONCRETE STRENGTH f'c=3500 psi (NORMAL WEIGHT) TOP BARS CASE 1	TOP BARS CASE 2	OTHER BARS CASE 1	OTHER BARS CASE 2
#3	A	20	30	16	23
	B	26	39	20	30
#4	A	27	40	21	31
	B	35	52	27	40
#5	A	33	50	26	39
	B	43	65	33	50
#6	A	40	60	31	46
	B	52	78	40	60
#7	A	58	87	45	67
	B	75	113	58	87
#8	A	66	99	51	77
	B	86	129	66	99
#9	A	75	112	58	86
	B	97	145	75	112
#10	A	84	126	65	97
	B	109	164	84	126
#11	A	93	140	72	108
	B	121	182	93	140
#14	N/A	112	168	86	129
#18	N/A	149	224	115	172

TENSION DEVELOPMENT AND LAP–SPLICE LENGTHS FOR UNCOATED REINFORCING BARS

BAR SIZE	LAP CLASS	LENGTHS (IN.) PER CONCRETE STRENGTH f'c=4000 psi (NORMAL WEIGHT) TOP BARS CASE 1	TOP BARS CASE 2	OTHER BARS CASE 1	OTHER BARS CASE 2
#3	A	19	28	15	22
	B	24	36	19	28
#4	A	25	37	19	29
	B	32	48	25	37
#5	A	31	47	24	36
	B	40	60	31	47
#6	A	37	56	29	43
	B	48	72	37	56
#7	A	54	81	42	63
	B	70	106	54	81
#8	A	62	93	48	71
	B	80	121	62	93
#9	A	70	105	54	81
	B	91	136	70	105
#10	A	79	118	61	91
	B	102	153	79	118
#11	A	87	131	67	101
	B	113	170	87	131
#14	N/A	105	157	81	121
#18	N/A	139	209	107	161

NOTES: 1 in.=25.4 mm.
1. TABULATED VALUES ARE BASED ON GRADE 60 REINFORCING BARS AND NORMAL WEIGHT CONCRETE. LENGTHS ARE IN INCHES.
2. TENSION DEVELOPMENT LENGTHS AND TENSION LAP–SPLICE LENGTHS ARE CALCULATED PER ACI 318, SECTIONS 25.4.2.2 AND 25.5.2.1, RESPECTIVELY. TABULATED VALUES FOR BEAMS OR COLUMNS ARE BASED ON TRANSVERSE REINFORCEMENT AND CONCRETE COVER MEETING MINIMUM CODE REQUIREMENTS.
3. CASES 1 AND 2, WHICH DEPEND ON THE TYPE OF STRUCTURAL ELEMENT, CONCRETE COVER, AND CENTER–TO–CENTER SPACING OF THE BARS, ARE DEFINED AS: BEAMS OR COLUMNS: CASE 1–COVER AT LEAST $1.0d_b$ AND CENTER–TO–CENTER SPACING AT LEAST $2.0d_b$ AND CASE 2–COVER LESS THAN $1.0d_b$ OR CENTER–TO–CENTER SPACING LESS THAN $2.0d_b$. ALL OTHERS: CASE 1–COVER AT LEAST $1.0d_b$ AND CENTER–TO–CENTER SPACING AT LEAST $3.0d_b$. CASE 2–COVER LESS THAN $1.0d_b$ OR CENTER–TO–CENTER SPACING LESS THAN $3.0d_b$.
4. LAP SPLICE LENGTHS ARE MULTIPLES OF TENSION DEVELOPMENT LENGTHS; CLASS A=$1.0l_d$ AND CLASS B=$1.3l_d$ (ACI 318, SECTION 25.5.2.1).
5. ACI 318 DOES NOT ALLOW TENSION LAP SPLICES OF #14 OR #18 BARS. THE TABULATED VALUES FOR THOSE BAR SIZES ARE THE TENSION DEVELOPMENT LENGTHS.
6. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 in. OF CONCRETE CAST BELOW THE BARS.
7. FOR LIGHTWEIGHT–AGGREGATE CONCRETE, MULTIPLY THE TABULATED VALUES BY 1.3.

12 REINFORCING LAP LENGTHS

SCALE: NONE

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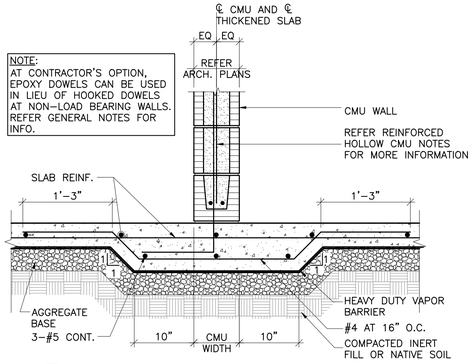
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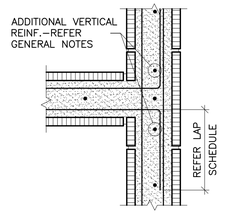
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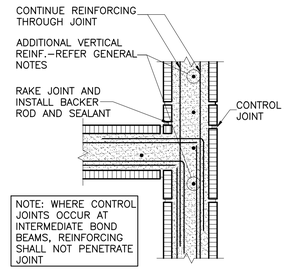
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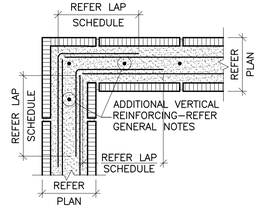
1 THICKENED SLAB AT CMU
SCALE: NONE



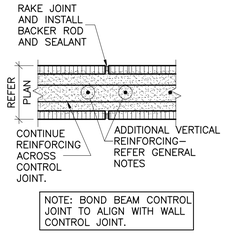
2 DETAIL AT BOND BEAM CORNER W/ NO CONTROL JT
SCALE: NONE



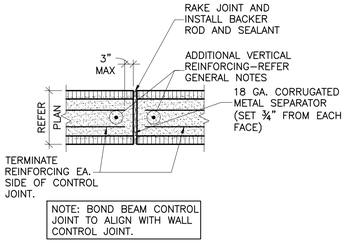
3 DETAIL AT FLOOR/ROOF BOND BEAM CORNER W/ CONTROL JT
SCALE: NONE



4 CORNER BOND BEAM WITH NO CONTROL JT
SCALE: NONE



5 CONTROL JT AT FLOOR/ROOF BOND BEAM
SCALE: NONE

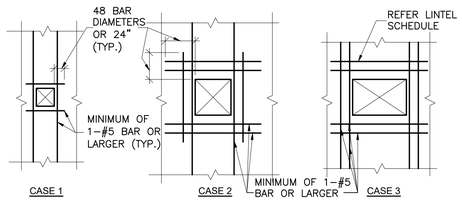


6 CONTROL JT AT INTERMEDIATE BOND BEAM
SCALE: NONE

BAR SIZE	LENGTH (in.)			
	CENTER			EDGE (2 IN CLEAR COVER)
	6" CMU	8" CMU	12" CMU	6", 8", 12" CMU
3	1'-0"	1'-0"	1'-0"	1'-6"
4	1'-6"	1'-6"	1'-0"	2'-0"
5	2'-6"	2'-0"	1'-6"	3'-0"
6	**	3'-6"	2'-0"	**
7	**	**	3'-0"	**
8	**	**	**	**

7 CMU REINFORCING LAP SCHEDULE
SCALE: NONE

NOTES:
1. f'm= 2000 psi
2. fy= 60,000 psi
*SCHEDULE ALSO APPLIES TO EMBEDMENT LENGTHS
**MECHANICAL SPLICES SHALL BE USED



CASE 1 APPLIES TO: ALL OPENINGS 2 FEET OR LESS BOTH WAYS.

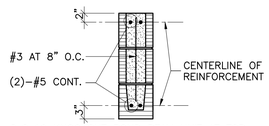
CASE 2 APPLIES TO: ALL OPENINGS EXCEEDING 2 FEET BUT NOT MORE THAN 4 FEET BOTH WAYS, WHERE NO LINTEL IS INDICATED

CASE 3 APPLIES TO: ALL OPENINGS EXCEEDING 4 FEET AND WIDER

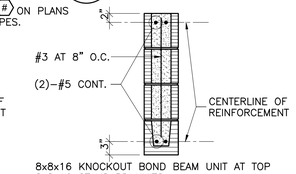
NOTE: 1.) WHERE VERTICAL REINFORCING CONSISTS OF 2 BARS OR MORE EACH BAR SHALL BE PLACED IN A SEPARATE CELL
2.) WHERE OPENING IS SUPPORTED BY A PERPENDICULAR WALL AND ONLY 8" OF WALL EXTENDS BEYOND THE OPENING, HOOK LINTEL AND SILL REINFORCING 90°

8 REINFORCING AROUND CMU WALL OPENING
SCALE: NONE

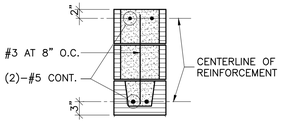
NOTE: REFER (#) ON PLANS FOR LINTEL TYPES.



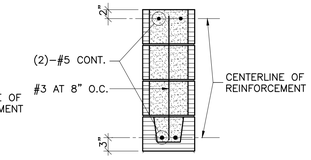
8x8x16 KNOCKOUT BOND BEAM UNIT AT TOP
8x8x16 STANDARD UNITS
8x8x16 SOLID BOTTOM BEAM UNIT AT BOTTOM
LINTEL TYPE 1



8x8x16 KNOCKOUT BOND BEAM UNIT AT TOP
8x8x16 STANDARD UNITS
8x8x16 SOLID BOTTOM BEAM UNIT AT BOTTOM
LINTEL TYPE 2



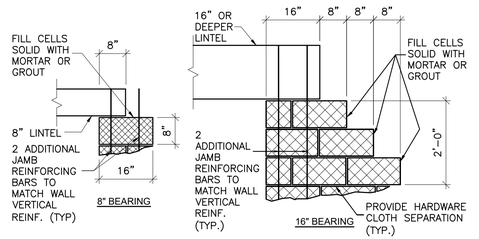
12x8x16 KNOCKOUT BOND BEAM UNIT AT TOP
12x8x16 STANDARD UNITS
12x8x16 SOLID BOTTOM BEAM UNIT AT BOTTOM
LINTEL TYPE 3



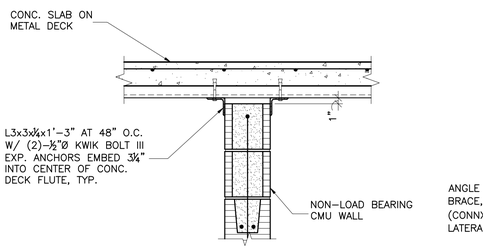
12x8x16 KNOCKOUT BOND BEAM UNIT AT TOP
12x8x16 STANDARD UNITS
12x8x16 SOLID BOTTOM BEAM UNIT AT BOTTOM
LINTEL TYPE 4

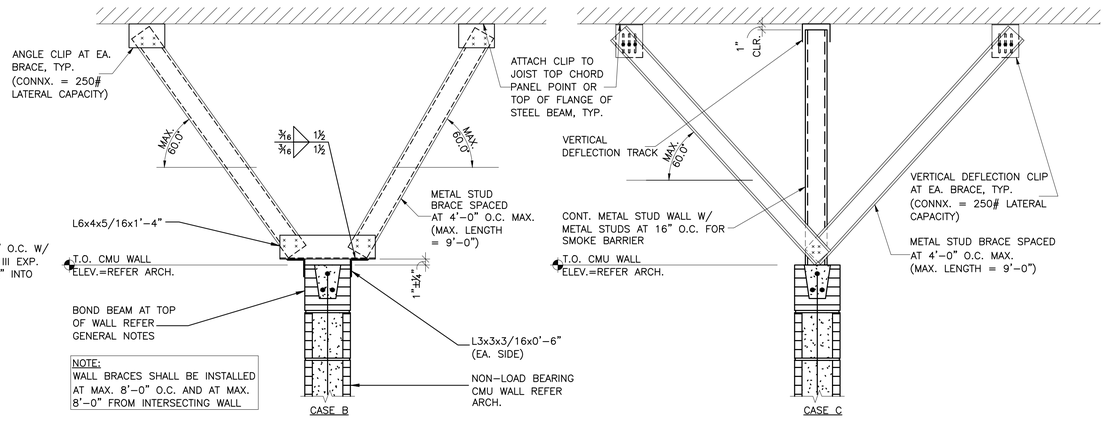
9 TYP. LINTEL TYPES
SCALE: NONE

NON-LOAD BEARING CMU LINTEL SCHEDULE	
TYPE	SPAN IN FEET
1	UP TO 6'-0"
2	6'-1" TO 8'-8"
3	UP TO 6'-0"
4	6'-1" TO 8'-8"

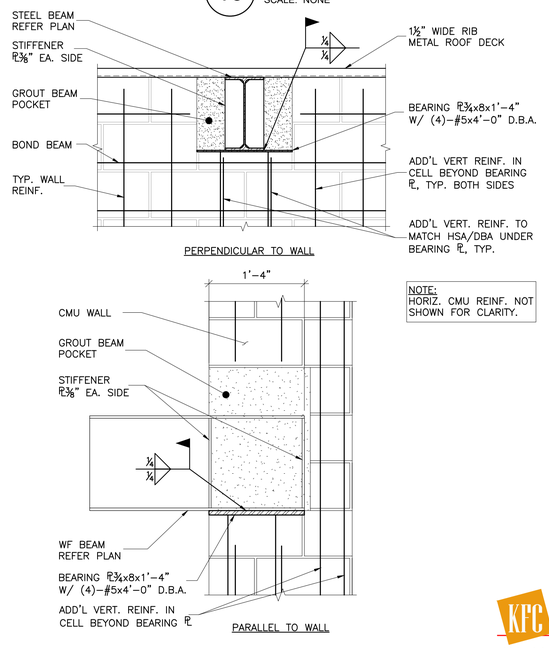


BEARING DETAILS
TYP. LINTEL TYPES
SCALE: NONE





11 TYP. BRACING AT TOP OF NON-LOAD BEARING CMU
SCALE: NONE



NOTE: HORIZ. CMU REINF. NOT SHOWN FOR CLARITY.

12 TYPICAL BEAM BEARING PLATE DETAILS
SCALE: NONE

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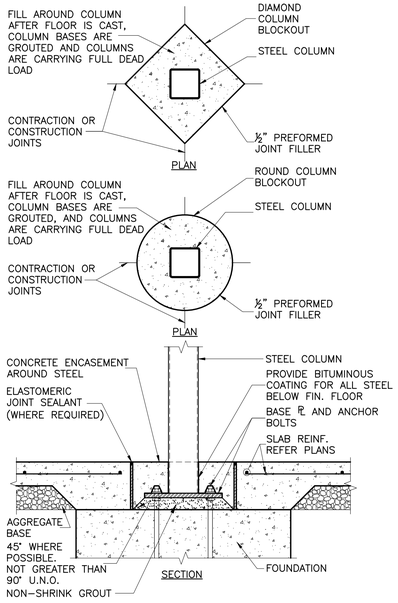
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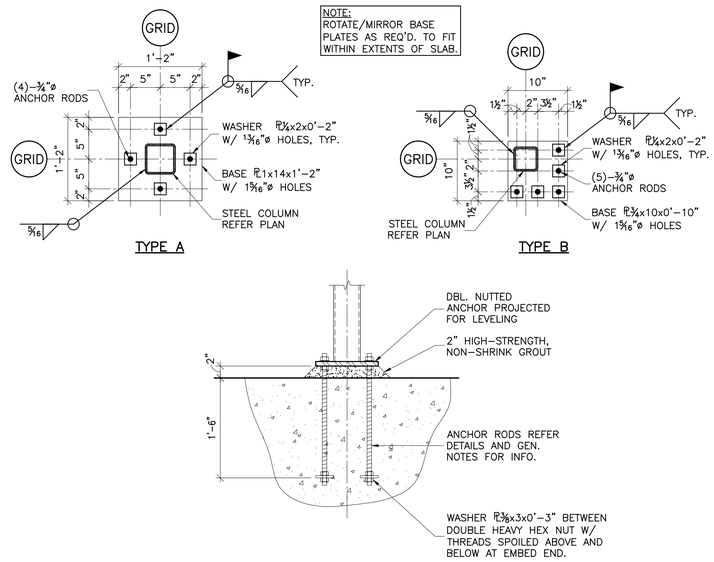
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1 TYP. ISOLATION JOINT DETAILS
SCALE: NONE

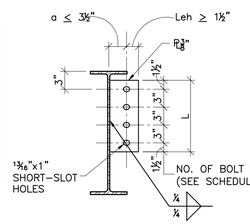


2 BASE PLATE DETAILS
SCALE: NONE

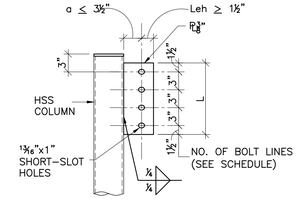
¾"ø A325-N BOLT SCHEDULE FOR SINGLE PLATE SHEAR TAB CONNECTIONS (FACTORED LOADS)	
END REACTION	NO. OF BOLTS
0 THRU 24.8 KIPS	2-¾ø
24.9 THRU 43.4 KIPS	3-¾ø
43.5 THRU 62.5 KIPS	4-¾ø
62.6 THRU 81.3 KIPS	5-¾ø
81.4 THRU 100 KIPS	6-¾ø
101 THRU 118 KIPS	7-¾ø
119 THRU 137 KIPS	8-¾ø

NOTES:
1. VALUES SHOWN ARE APPLICABLE FOR SINGLE PLATE SHEAR TAB CONNECTIONS
2. SEE PLAN FOR END REACTIONS
3. L = PLATE LENGTH ≥ T/2 OF CONNECTED BEAM.
4. AT HSS OR PIPE COLUMNS, A THROUGH-PLATE WITH EQUAL WELD ON THE BACK SIDE OF THE COLUMN IS REQUIRED UNDER EITHER OF THE FOLLOWING CIRCUMSTANCES:
   A. FOR SQUARE OR RECTANGULAR HSS:
      WHEN $\frac{B-2.79t}{0.93t} > 35.1$
   B. FOR ROUND HSS OR PIPE:
      WHEN $\frac{D}{t} > \frac{3,190}{Fy}$

WHERE:
B = NOMINAL COLUMN WIDTH ACROSS THE COLUMN FACE WITH THE SINGLE PLATE CONNECTION, IN.
D = OUTSIDE DIAMETER OF ROUND HSS OR PIPE, IN.
t = NOMINAL THICKNESS OF COLUMN,IN.
Fy = YIELD STRENGTH OF COLUMN, KSI

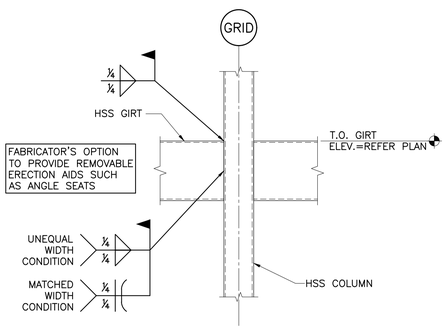


BEAM TO BEAM

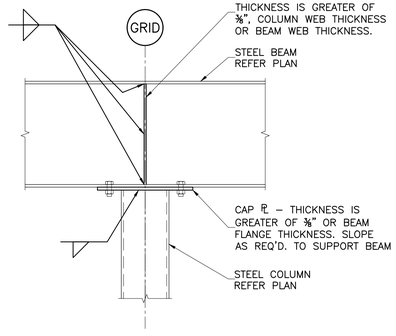


BEAM TO HSS COLUMN

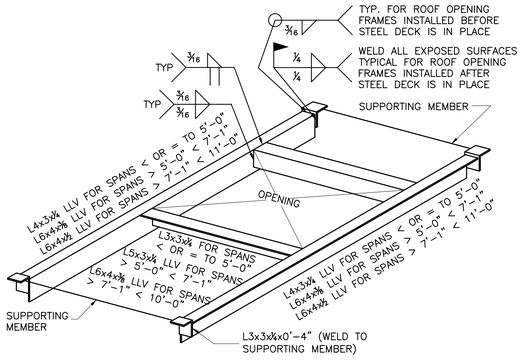
3 SINGLE PLATE SHEAR TAB CONNECTIONS (LRFD-AISC 14TH EDITION MANUAL)
SCALE: NONE



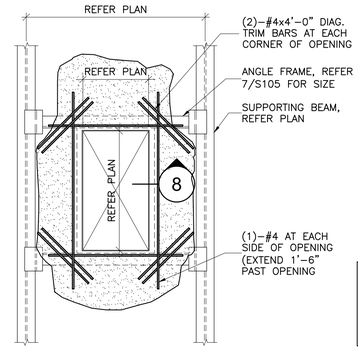
4 TYP. HSS GIRT TO HSS COLUMN CONNX.
SCALE: NONE



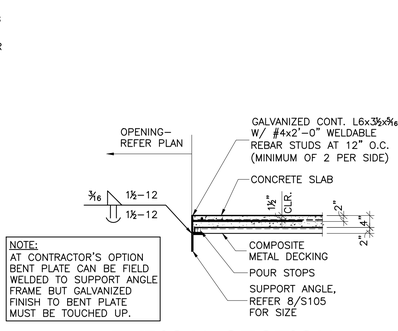
5 TYPICAL CONTINUOUS BEAM CONNECTION
SCALE: NONE



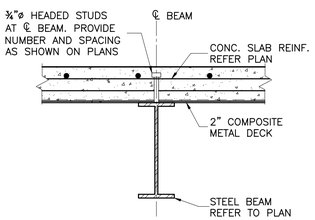
6 TYP. ROOF OPENING FRAME AND MECHANICAL UNIT SUPPORT
SCALE: NONE



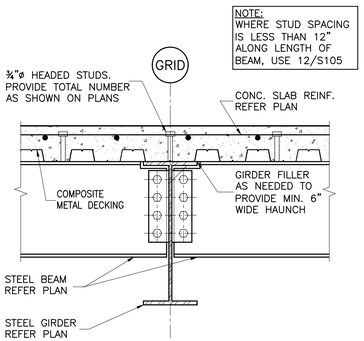
7 TYPICAL ANGLE DETAIL
SCALE: NONE



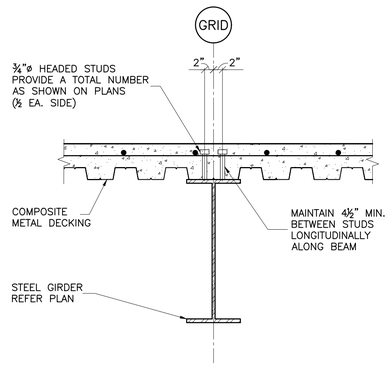
8 TYPICAL SECTION AT FLOOR OPENING
SCALE: NONE



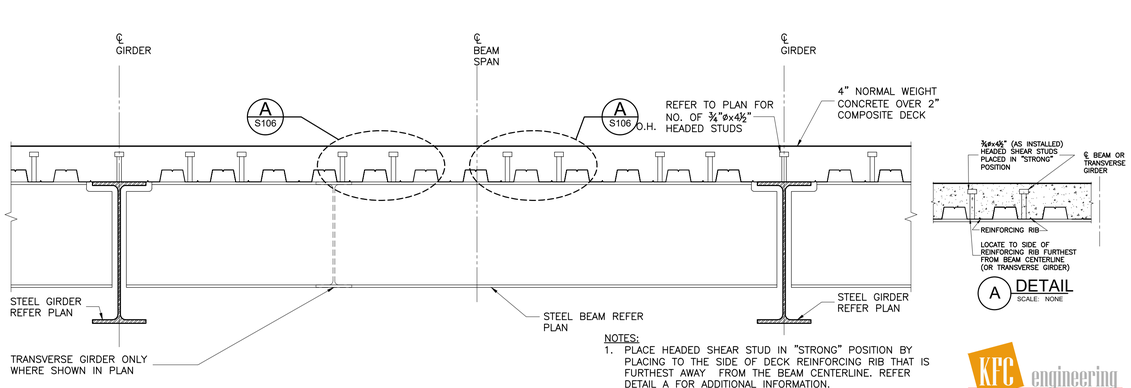
9 SECTION
SCALE: NONE



10 SECTION
SCALE: NONE



11 SECTION
SCALE: NONE



NOTES:
1. PLACE HEADED SHEAR STUD IN "STRONG" POSITION BY PLACING TO THE SIDE OF DECK REINFORCING RIB THAT IS FURTHEST AWAY FROM THE BEAM CENTERLINE. REFER DETAIL A FOR ADDITIONAL INFORMATION.
2. IN SOME CASES, TRANSVERSE GIRDERS FRAME INTO THE BEAM NOT AT CENTERLINE, BUT WITHIN A FEW FEET. AT THIS CONDITION, PLACE STUDS IN "STRONG" POSITION RELATIVE TO TRANSVERSE GIRDER AND NOT CENTERLINE OF BEAM.

12 TYPICAL BEAM ELEVATION
SCALE: NONE

A DETAIL
SCALE: NONE

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08/14/2026

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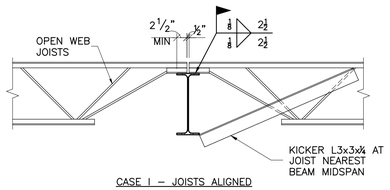
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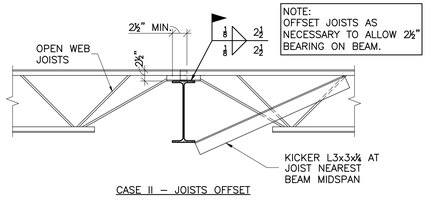
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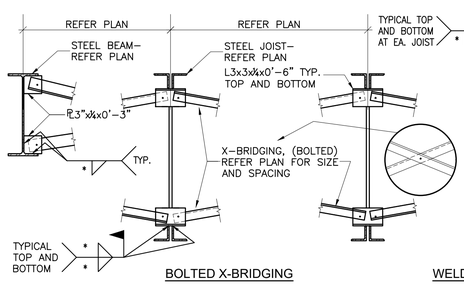
CASE I – JOISTS ALIGNED



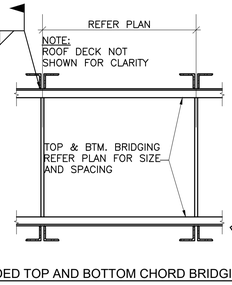
CASE II – JOISTS OFFSET

1 KICKER ANGLE AT BOTTOM FLANGE

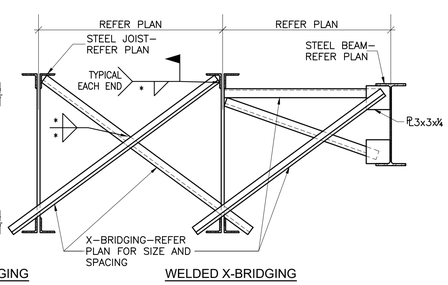
SCALE: NONE



BOLTED X-BRIDGING



WELDED TOP AND BOTTOM CHORD BRIDGING

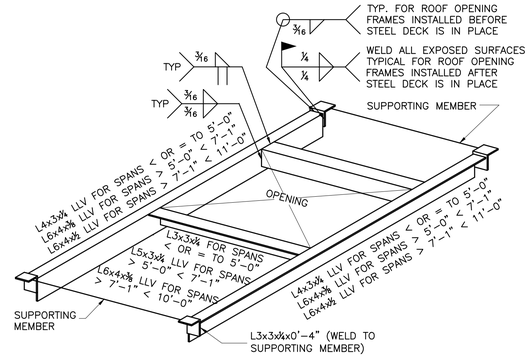


WELDED X-BRIDGING

*WELD AS REQUIRED BY JOIST MANUFACTURER

2 TYP. BRIDGING DETAILS AT JOISTS

SCALE: NONE



3 TYP. ROOF OPENING FRAME AND MECHANICAL UNIT SUPPORT

SCALE: NONE

4 BRACING DETAIL FOR STEEL JOISTS W/ POINT LOADS

SCALE: NONE

5 SPECIAL JOIST ELEVATION

SCALE: NONE

JOIST DESIGNATION	SPAN, FT.	UNIFORMLY DISTRIBUTED LOADS, PLF						TRAPEZOIDAL LOADS, PLF				CONCENTRATED LIVE LOADS, LBS								REMARKS
		DL	LR	SL (N.D.)	SL (W.D.)	WL (IN)	WL (OUT)	SL1	"A"	SL2	"B"	P1	"C"	P2	"D"	P3	"E"	P4	"F"	
36LH07-SP1	63' - 0"	200	200	60	35	55	180	180	6' - 6"	180	6' - 6"	375	12' - 0"	375	17' - 6"	375	42' - 0"	375	47' - 0"	
18K4-SP2	29' - 4"	200	200	60	35	50	165	165	6' - 0"	165	6' - 0"	375	13' - 6"	375	19' - 0"					

NOTES:
1. SPANS SHOWN ARE APPROXIMATE. MANUFACTURER SHALL DETERMINE EXACT DESIGN SPANS.
2. REFER TO THE SPECIAL JOIST DIAGRAM FOR CLARIFICATION OF ALL NOMENCLATURE.
3. SL (N.D.) IS THE UNIFORM BALANCED SNOW LOAD TO BE CONSIDERED WITHOUT DRIFT LOADS.
4. SL (W.D.) IS THE UNIFORM SNOW LOAD WITH DRIFT INCLUDED.
6. JOISTS SHALL BE DESIGNED FOR ALL LOAD COMBINATIONS SPECIFIED IN THE GOVERNING BUILDING CODE. REFER GENERAL NOTES FOR THE APPLICABLE CODE.

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1. SHELTER GENERAL INFORMATION

A. TYPE OF SHELTER: COMMUNITY TORNADO SHELTER.

B. SHELTER WIND DESIGN GUIDELINES: ICC/NSSA STANDARD FOR THE DESIGN AND CONSTRUCTION OF STORM SHELTERS - 2014 (ICC 500-2014).

C. ROOF SYSTEMS HAVE BEEN SELECTED IN ACCORDANCE WITH DEBRIS IMPACT TESTING IN ACCORDANCE WITH ASTM E 1886 AT TEXAS TECH UNIVERSITY (REFER SUMMARY REPORT DATED JUNE 2003 PREPARED BY WIND SCIENCE AND ENGINEERING RESEARCH CENTER). REFER SECTION A1 4" THICK CONCRETE-#4 REBAR REINFORCEMENT 12 INCHES ON CENTER EACH WAY (TESTED FOR DEBRIS IMPACT OF 162 MPH)-67 MPH REQUIRED.

D. WALL SYSTEMS HAVE BEEN SELECTED IN ACCORDANCE WITH DEBRIS IMPACT TESTING IN ACCORDANCE WITH ASTM E 1886 AT TEXAS TECH UNIVERSITY (REFER SUMMARY REPORT DATED JUNE 2003 PREPARED BY WIND SCIENCE AND ENGINEERING RESEARCH CENTER). REFER SECTION A1 8" REINFORCED CONCRETE WALLS (TESTED FOR DEBRIS IMPACT OF 135 MPH) - 100 MPH REQUIRED.

E. REFERENCE ELEVATION OF 100'-0" EQUALS DATUM FINISHED FLOOR ELEVATION OF 1218.90' FOR THE STORM SHELTER.

F. BASED ON THE FLOOD INSURANCE RATE MAPS (FIRM) FOR CLEVELAND COUNTY (MAP NUMBER 40027C0045H) THE FINISHED FLOOR ELEVATIONS OF 1218.90' FOR THE STORM SHELTER IS GREATER THAN THE HIGHEST FLOOD ELEVATION. THE SHELTER IS NOT LOCATED IN AN AREA SUSCEPTIBLE TO FLOODING.

G. REFER MECHANICAL DRAWINGS FOR LOCATIONS OF SHELTER VENTILATION.

H. FURNISH LOOSE CONNECTION HARDWARE AND ANCHORAGE ITEMS TO BE EMBEDDED IN OR ATTACHED TO OTHER CONSTRUCTION BEFORE STARTING THAT WORK. PROVIDE LOCATIONS, SETTING DIAGRAMS, TEMPLATES, INSTRUCTIONS, AND DIRECTIONS, AS REQUIRED, FOR INSTALLATION.

2. SHELTER DESIGN LOADS

A. DEAD LOAD: SELF WEIGHT OF MATERIALS, UNLESS NOTED OTHERWISE

B. ROOF DEAD LOAD:
1) BUILT UP ROOF.....6 PSF
2) RIGID INSULATION.....2 PSF
3) CONCRETE DECK (4" NW CONC. ON 2" COMP. - 6" TOTAL).....63 PSF
4) STEEL BEAMS.....7 PSF
5) MISC (LIGHTING, DUCTWORK, PIPING, ETC.).....7 PSF
6) TOTAL.....85 PSF

C. LIVE LOADS:
1) ROOF LIVE LOAD (SHELTER).....100 PSF

D. SHELTER WIND PARAMETERS:
1) GOVERNING CODE:.....ICC 500-2014
2) IMPORTANCE FACTOR, Iw:.....1.0
3) EXPOSURE CATEGORY:.....C
4) INTERNAL PRESSURE COEFFICIENTS, PARTIALLY ENCLOSED, GCPI...+/-0.55
5) TOPOGRAPHIC FACTOR, KZT.....1.0
6) DIRECTIONALITY FACTOR, KD.....1.0
7) WIND VELOCITY, V:.....250 MPH

E. EXTREME WIND PRESSURES-MAIN WIND FORCE RESISTING SYSTEM:
1) -GCPI
A) WINDWARD WALL:.....167 PSF IN
B) LEEWARD WALL:.....31 PSF IN
C) SIDE WALL:.....6 PSF OUT
2) +GCPI
A) WINDWARD WALL:.....18 PSF IN
B) LEEWARD WALL:.....132 PSF OUT
C) SIDE WALL:.....156 PSF OUT
3) WINDWARD PARAPET:.....207 PSF IN
4) LEEWARD PARAPET:.....138 PSF OUT
5) ROOF 0'-0" TO 13'-4" FROM LEADING EDGE:.....179 PSF OUT
6) ROOF 13'-4" TO 26'-8" FROM LEADING EDGE:.....132 PSF OUT
7) ROOF BEYOND 26'-8" FROM LEADING EDGE:.....109 PSF OUT
8) ROOF:.....54 PSF IN

F. SNOW LOADS:
1) GOVERNING CODE:.....ASCE 7-16
2) IMPORTANCE FACTOR, Is:.....1.10
3) GROUND SNOW LOAD, Pg:.....10 PSF
4) EXPOSURE FACTOR, Ce:.....1.0
5) THERMAL FACTOR, Ct:.....1.0
6) ROOF SLOPE FACTOR, Cs:.....1.0
7) CALCULATED FLAT ROOF SNOW LOAD, Pf:.....7.7 PSF
8) MINIMUM FLAT ROOF SNOW LOAD, I*Pf:.....11 PSF
9) RAIN ON SNOW SURCHARGE LOAD.....5 PSF
10) DRIFT LOADS:.....ASCE 7-10

G. SEISMIC DESIGN CRITERIA:
1) GOVERNING CODE:.....ASCE 7-16
2) IMPORTANCE FACTOR, Ie:.....1.25
3) SOIL SITE CLASSIFICATION:.....C
4) 0.2 SEC. MAPPED SPECTRAL ACCELERATION, Ss:.....0.327
5) 1.0 SEC. MAPPED SPECTRAL ACCELERATION, S1:.....0.083
6) SITE COEFFICIENT, 0.2 SEC. PERIOD, Fa:.....1.3
7) SITE COEFFICIENT, 1.0 SEC. PERIOD, Fv:.....1.5
8) 0.2 SEC. DESIGN SPECTRAL ACCELERATION, Sds:.....0.283
9) 1.0 SEC. DESIGN SPECTRAL ACCELERATION, Sd1:.....0.083
10) SEISMIC DESIGN CATEGORY:.....B
11) SEISMIC PARAMETERS:
A) SEISMIC FORCE RESISTING SYSTEM: ORDINARY REINFORCED CONCRETE SHEAR WALLS
B) RESPONSE MODIFICATION COEFFICIENT, R:.....4.00
C) SYSTEM OVERSTRENGTH FACTOR, O:.....2.50
D) DEFLECTION AMPLIFICATION FACTOR, Cd:.....4.00
E) ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE METHOD.
F) SEISMIC RESPONSE COEFFICIENT, Cs:.....0.0886
G) TOTAL SHELTER ONLY LATERAL BASE SHEAR, V:.....55 KIPS

H. IN ADDITION TO THE REQUIREMENTS OF THE SPECIAL INSPECTOR, THE OWNER SHALL EMPLOY A LICENSED PROFESSIONAL STRUCTURAL ENGINEER TO INSPECT THE FOLLOWING ELEMENTS OF THE MAIN WIND FORCE RESISTING SYSTEM OF THE SHELTER TO VERIFY CONFORMANCE WITH THE CONTRACT DOCUMENTS:
1) CONCRETE REBAR SIZE, SPACING, LAP LENGTHS AND EMBED PLATES
2) BEAM/COLUMN SIZE AND CONNECTIONS
3) HEADED STUD ANCHORS AND THE QUALITY OF THEIR CONNECTION TO THE TOP OF BEAM FLANGES
4) METAL DECKS SIZE AND ATTACHMENT

3. QUALITY ASSURANCE PLAN

A. DETAILED REQUIREMENTS: PER ICC 500, SECTION 107.3.1, DETAILS CONTAINED WITHIN THESE DOCUMENTS EXEMPLIFY THE FOLLOWING CRITERIA.

1) ROOF CLADDING, SOFFITS AND ROOF FRAMING CONNECTIONS.
A) COMPOSITE ROOF DECK ON STEEL BEAMS DETAILED REQUIREMENTS:
1. COMPOSITE DECK WELDED TO STEEL BEAMS.
2. HEADED STUDS CONNECTED TO STEEL BEAMS (THROUGH DECK) OR TO GIRDERS.
3. MINIMUM 4" CONCRETE THICKNESS OVER COMPOSITE METAL DECK.
4. REINFORCEMENT OF CONCRETE DECK WITH A MINIMUM OF #4 AT 12 INCHES ON CENTER EACH WAY.
5. STEEL BEAM CONNECTIONS TO WALL WITH EMBED PLATE.
6. STEEL BEAM CONNECTION TO BEAM SHEAR TAB PLATE.
7. STEEL BEAM TO INTERIOR COLUMN CONNECTION.

2) WALL CONNECTIONS TO ROOF DIAPHRAGM AND FRAMING.
A) DOWELS FROM CONCRETE WALL INTO SLAB.
B) EMBED PLATES IN CAST-IN-PLACE WALLS TO DECK ANGLES.

3) ROOF DIAPHRAGM SYSTEM, INCLUDING CONNECTORS, DRAG STRUTS AND BOUNDARY ELEMENTS.
A) CAST-IN-PLACE SLAB WITH MINIMUM #4 AT 12 INCHES ON CENTER AND MINIMUM CHORD STEEL OF 2 #6 BARS.

4) MAIN WIND FORCE RESISTING SYSTEMS INCLUDING BRACED FRAMES, MOMENT FRAMES AND SHEAR WALLS.
A) ORDINARY REINFORCED CAST-IN-PLACE CONCRETE SHEAR WALLS

5) MAIN WIND FORCE RESISTING SYSTEM CONNECTIONS TO THE FOUNDATION.
A) REINFORCING STEEL DOWELS.
B) ANCHOR BOLTS.
C) GROUT.

6) FABRICATION AND INSTALLATION OF COMPONENTS AND ASSEMBLIES OF THE SHELTER ENVELOPE REQUIRED TO MEET MISSILE IMPACT TEST REQUIREMENTS OF CHAPTER 3.
A) REFER TO ITEMS 1.D, 1.E, AND 1.F INDICATED ABOVE.
B) VERIFY DOOR TESTING AND ANCHORAGE REQUIREMENTS.
C) VERIFY SHUTTER TESTING AND ANCHORAGE REQUIREMENTS.
D) VERIFY OVERHEAD DOOR TESTING AND ANCHORAGE REQUIREMENTS.
E) VERIFY LOUVER TESTING AND ANCHORAGE REQUIREMENTS.

7) WALL CLADDING AND WALL CLADDING CONNECTIONS.
A) CAST-IN-PLACE - VERTICAL AND HORIZONTAL REINFORCING.

8) CORROSION RESISTANCE OR PROTECTION OF EXPOSED METAL CONNECTORS PROVIDING LOAD PATH CONTINUITY.
A) GALVANIZED EMBED PLATES.
B) ALL WELDS TO GALVANIZED EMBED PLATES MUST BE PROPERLY PREPPED PRIOR TO WELDING, SLAG REMOVED, WELD CLEANED AND COLD GALVANIZING PAINT ADDED.

9) FOUNDATION DESIGN:
A) SPOT AND CONTINUOUS SYSTEM WITH SLIDING AND PASSIVE RESISTANCE.
B) SLAB-ON-GRADE NOT USED AS DIAPHRAGM AND SUBGRADE DRAG.

B. MAIN WINDFORCE-RESISTING SYSTEMS AND WIND-RESISTING COMPONENTS
1) FOUNDATIONS
2) CONCRETE BEARING/SHEAR WALLS
3) COMPOSITE STEEL BEAMS
4) STEEL EMBEDS AND PERIMETER ANGLES
5) COMPOSITE METAL DECK
6) REINFORCING STEEL
7) STEEL PROTECTION DEVICES
8) SHELTER ROOM DOORS, WINDOWS, AND LOUVERS.

C. REQUIRED SPECIAL INSPECTIONS SHALL BE PROVIDED FOR CONSTRUCTION AND INSTALLATION OF MATERIALS AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION IN ACCORDANCE WITH THE APPLICABLE BUILDING CODE. TYPE AND FREQUENCY ARE IDENTIFIED ON S1.05.
1) ANCHORAGE OF ALL OPENING PROTECTIVE DEVICES (DOORS, WINDOWS, SHUTTERS, LOUVERS, AND AFFIXED COWLINGS) SHALL BE CONTINUOUSLY OBSERVED BY A SPECIAL INSPECTOR.

D. INSPECTION OF FABRICATORS: WHERE FABRICATION OF STRUCTURAL LOAD-BEARING AND DEBRIS-IMPACT-RESISTANT COMPONENTS AND ASSEMBLIES IS BEING PERFORMED ON THE PREMISES OF A FABRICATOR SHOP, SPECIAL INSPECTION OF THE FABRICATOR SHALL BE PROVIDED.
1) EXCEPTION: PREFABRICATED STORM SHELTER COMPONENTS THAT HAVE BEEN INSPECTED AND LABELED BY AN APPROVED AGENCY MEETING THE REQUIREMENTS OF THE APPLICABLE BUILDING CODE.

E. STRUCTURAL OBSERVATIONS: IN ADDITION TO THE REQUIREMENTS OF THE SPECIAL INSPECTOR, THE OWNER SHALL EMPLOY A LICENSED PROFESSIONAL STRUCTURAL ENGINEER TO INSPECT THE FOLLOWING ELEMENTS OF THE MAIN WIND FORCE RESISTING SYSTEM OF THE SHELTER TO VERIFY CONFORMANCE WITH THE CONTRACT DOCUMENTS AT SIGNIFICANT CONSTRUCTION STAGES AND AT THE COMPLETION OF THE STRUCTURAL SYSTEM. DEFICIENCIES SHALL BE REPORTED IN WRITING TO THE OWNER AND AHJ. AT THE CONCLUSION OF THE WORK, THE REGISTER DESIGN PROFESSIONAL SHALL SUBMIT TO THE AHJ A WRITTEN STATEMENT INDICATING SITE VISITS MADE AND IDENTIFYING ANY OUTSTANDING DEFICIENCIES THAT HAVE NOT BEEN RESOLVED.
1) DRILLED PIERS (IF APPLICABLE)
A) PIER DIAMETER, EMBEDMENT INTO ROCK, REBAR SIZE, SPACING, LAP LENGTHS AND REBAR DOWELS SIZE, QUANTITY AND LOCATION.
2) FOUNDATIONS
A) REBAR SIZE, SPACING AND LAP LENGTHS AND LOCATIONS
3) WALLS
A) REBAR SIZE, SPACING, LAP LENGTHS
B) EMBED SIZE AND LOCATIONS
4) ROOF
A) REBAR SIZE, SPACING, LAP LENGTHS
B) PERIMETER AND OPENING DECK EDGE INSTALLATION
C) METAL DECK SIZE AND ATTACHMENT
D) HEADED STUD ANCHORS SIZE, SPACING, AND ATTACHMENT
5) DOORS
A) VERIFY INSTALLATION OF EACH DOOR IS PER MANUFACTURER'S TESTED ASSEMBLY.
B) VERIFY ALL DOOR HARDWARE IS FULLY OPERATIONAL.
C) VERIFY DOORS HAVE PROPER LABELS INDICATING REQUIRED PRESSURE AND IMPACT RATING.
6) PROTECTION DEVICES
A) VERIFY INSTALLATION OF EACH STEEL PLATE PROTECTION DEVICES IS PER CONTRACT DRAWINGS.
B) VERIFY ALL OPENINGS REQUIRING PROTECTION HAVE PROTECTION DEVICE INSTALLED.

F. CONTRACTOR RESPONSIBILITY: EACH CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION, FABRICATION OR INSTALLATION OF A MAIN WIND FORCE-RESISTING SYSTEM OR ANY COMPONENT LISTED IN THE QUALITY ASSURANCE PLAN SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE AHJ, THE ARCHITECT/ENGINEER, AND THE OWNER PRIOR TO THE COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT. CONTRACTOR'S STATEMENT OF RESPONSIBILITY SHALL BE INCLUDED WITH THE FIRST SUBMITTAL/SHOP DRAWING. THE CONTRACTOR'S STATEMENT OF RESPONSIBILITY SHALL CONTAIN:
1) ACKNOWLEDGEMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THE QUALITY ASSURANCE PLAN.
2) ACKNOWLEDGEMENT THAT CONTROL WILL BE EXERCISED TO OBTAIN COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS.
3) PROCEDURES FOR EXERCISING CONTROL WITHIN THE CONTRACTOR'S ORGANIZATION, THE METHOD AND FREQUENCY OF REPORTING AND THE DISTRIBUTION OF REPORTS.
4) IDENTIFICATION AND QUALIFICATIONS OF THE PERSON(S) EXERCISING SUCH CONTROL AND THEIR POSITION(S) IN THE ORGANIZATION.

G. PRE-CONSTRUCTION MEETING: TO BE HELD PRIOR TO STARTING CONSTRUCTION AN INCLUDE THE CONSTRUCTION MANAGER, DESIGN TEAM, SPECIAL INSPECTOR, STRUCTURAL OBSERVER, AND THE CONTRACTORS RESPONSIBLE FOR FABRICATION AND INSTALLATION OF THE MAIN WIND FORCE-RESISTING SYSTEM AND COMPONENTS. AT A MINIMUM THE MEETING SHALL CONSIST OF THE FOLLOWING ITEMS:
1) REVIEW THE CONSTRUCTION DOCUMENTS AND QUALITY ASSURANCE PLAN.
2) REVIEW THE CONTRACTORS STATEMENT OF RESPONSIBILITY.
3) REVIEW THE CONSTRUCTION SCHEDULE AND SEQUENCE OF REQUIRED SPECIAL INSPECTIONS.

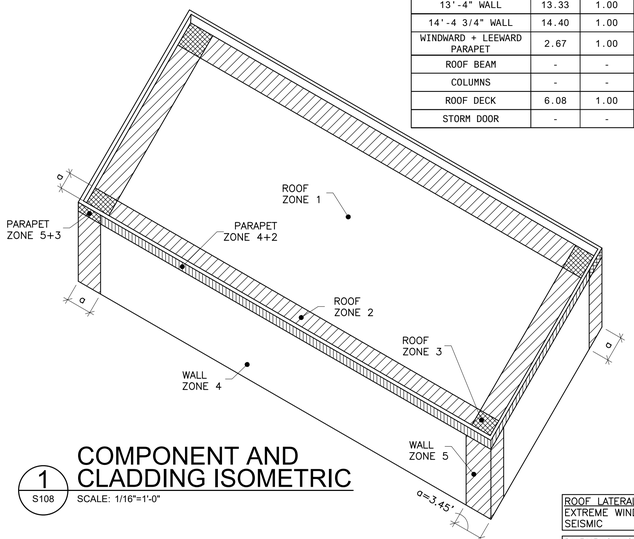
H. SHELTER PENETRATIONS: THE DESIGN TEAM, CONSTRUCTION MANAGER, MEP TRADES, PRECAST PROVIDER, AND SPECIAL INSPECTOR SHALL MEET TO IDENTIFY ALL ITEMS PENETRATING THE PRECAST SHELTER ENVELOPE. THE METHOD OF INSTALLATION (FIELD CORING VS. FORMING) AND APPROPRIATE PROTECTION DETAILS SHALL BE REVIEWED FOR EACH INSTANCE.

I. SHELTER SPECIAL INSPECTION
1) POST INSTALLED ANCHORAGE AT THE SHELTER IN CONCRETE SHALL BE CONTINUOUSLY INSPECTED.
2) INSTALLATION OF SHELTER DOORS OR AFFIXED COWLINGS SHALL BE CONTINUOUSLY INSPECTED.
3) WELDING OF SHELTER DOORS OR AFFIXED COWLINGS SHALL BE CONTINUOUSLY INSPECTED.
4) HEADED STUD ANCHORS AND THE QUALITY OF THEIR CONNECTION TO THE TOP OF BEAM FLANGES
5) COMPOSITE METAL DECK SIZE AND ATTACHMENT

NOTE: POSITIVE PRESSURES ARE DIRECTED INWARD ON THE EXTERIOR SURFACE. NEGATIVE PRESSURES ARE DIRECTED OUTWARD ON THE EXTERIOR SURFACE.

EXTREME WIND COMPONENTS AND CLADDING LOADS

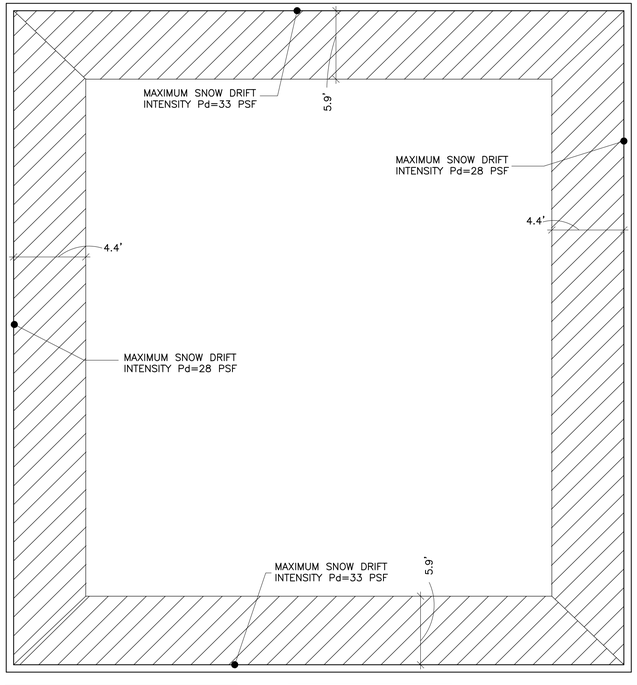
BUILDING ELEMENT	SPAN (FT)	WIDTH (FT)	AREA (FT^2)	WIND PRESSURE ZONE 1 (PSF)	WIND PRESSURE ZONE 2 (PSF)	WIND PRESSURE ZONE 3 (PSF)	WIND PRESSURE ZONE 4+2 (PSF)	WIND PRESSURE ZONE 5+3 (PSF)	WIND PRESSURE ZONE 4 (PSF)	WIND PRESSURE ZONE 5 (PSF)
13'-4" WALL	13.33	1.00	60						-192/180	-212/180
14'-4 3/4" WALL	14.40	1.00	69						-191/179	-210/179
WINDWARD + LEEWARD PARAPET	2.67	1.00	2.67				297	509		
ROOF BEAM	-	-	65+	-199/104	-242/104	-267/104				
COLUMNS	-	-	230+	-197/102	-224/102	-224/102				
ROOF DECK	6.08	1.00	12	-209/114	-311/114	-434/114				
STORM DOOR	-	-	10						-209/197	-246/197



1 S108 COMPONENT AND CLADDING ISOMETRIC
SCALE: 1/16"=1'-0"

ROOF LATERAL SHEAR FORCES
EXTREME WIND = 46.2 KIPS
SEISMIC = 24.8 KIPS

DIAPHRAGM CHORD FORCES
EXTREME WIND = 4.8 KIPS
SEISMIC = 2.6 KIPS



ROOF LATERAL SHEAR FORCES
EXTREME WIND = 29.7 KIPS
SEISMIC = 24.8 KIPS

DIAPHRAGM CHORD FORCES
EXTREME WIND = 18.4 KIPS
SEISMIC = 15.4 KIPS

ROOF LATERAL SHEAR FORCES
EXTREME WIND = 31.0 KIPS
SEISMIC = 24.8 KIPS

DIAPHRAGM CHORD FORCES
EXTREME WIND = 16.3 KIPS
SEISMIC = 13.1 KIPS

NOTES:
1. VERIFY FINAL LOCATION OF ALL ROOF PENETRATIONS AND HUNG EQUIPMENT.
2. REFER ARCHITECTURAL AND MECHANICAL DRAWINGS FOR ADDITIONAL HANGING LOADS NOT SHOWN.

ROOF LATERAL SHEAR FORCES
EXTREME WIND = 46.2 KIPS
SEISMIC = 24.8 KIPS

DIAPHRAGM CHORD FORCES
EXTREME WIND = 4.8 KIPS
SEISMIC = 2.6 KIPS

NORTH

2 S108 SHELTER LOAD PLAN
SCALE: 1/8"=1'-0"

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1. STATEMENT OF SPECIAL INSPECTIONS NOTES:

A. THIS STATEMENT OF SPECIAL INSPECTIONS IS INCLUDED AS REQUIRED BY SECTIONS 1704.1 AND 1705 OF THE 2018 INTERNATIONAL BUILDING CODE.

B. SPECIAL INSPECTIONS SHALL CONFORM TO CHAPTER 17 OF THE 2018 INTERNATIONAL BUILDING CODE AND AS SUMMARIZED HEREIN. GENERAL REQUIREMENTS ARE LISTED BELOW AND IN THE ATTACHED INSPECTION TABLES.

C. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL SPECIAL INSPECTION REQUIREMENTS. IF CONFLICTING REQUIREMENTS ARE FOUND BETWEEN THIS STATEMENT OF SPECIAL INSPECTIONS AND THE PROJECT SPECIFICATIONS, THE MORE STRINGENT PROVISION SHALL CONTROL UNLESS DIRECTED OTHERWISE IN WRITING BY THE STRUCTURAL ENGINEER OF RECORD.

D. THE CONTRACTOR SHALL EMPLOY ONE OR MORE SPECIAL INSPECTORS FOR THIS PROJECT. THE SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE BUILDING OFFICIAL, FOR THE INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION.

E. THE SPECIAL INSPECTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO THE BUILDING OFFICIAL DEMONSTRATING HIS OR HER COMPETENCE AND RELEVANT EXPERIENCE OR TRAINING. EXPERIENCE OR TRAINING SHALL BE CONSIDERED RELEVANT WHEN THE DOCUMENTED EXPERIENCE OR TRAINING IS RELATED IN COMPLEXITY TO THE SAME TYPE OF SPECIAL INSPECTION ACTIVITIES FOR PROJECTS OF SIMILAR COMPLEXITY AND MATERIAL QUALITIES.

F. THE SPECIAL INSPECTOR SHALL PROVIDE CONTINUOUS OR PERIODIC INSPECTIONS AS SHOWN IN THE ATTACHED INSPECTION TABLES

1) CONTINUOUS INSPECTION: THE SPECIAL INSPECTOR SHALL BE PRESENT AT ALL PROCEDURAL EVENTS.

2) PERIODIC INSPECTION: THE SPECIAL INSPECTOR SHALL BE PRESENT AT THE START OF THE WORK AND PERIODIC INSPECTION IS MADE TO VERIFY PROGRESS OF WORK IS IN COMPLIANCE.

G. INSPECTION OF FABRICATORS: WHERE FABRICATION OF STRUCTURAL LOADBEARING MEMBERS AND ASSEMBLIES IS BEING PERFORMED ON THE PREMISES OF A FABRICATOR'S SHOP, SPECIAL INSPECTION OF THE FABRICATED ITEMS SHALL BE REQUIRED BY SECTION 1704.2.5 OF THE 2018 INTERNATIONAL BUILDING CODE AND AS REQUIRED ELSEWHERE IN THE CODE.

H. FABRICATOR APPROVAL: SPECIAL INSPECTIONS REQUIRED BY SECTION 1704 ARE NOT REQUIRED WHERE THE WORK IS DONE ON THE PREMISES OF A FABRICATOR REGISTERED AND APPROVED TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION. APPROVAL SHALL BE BASED UPON REVIEW OF THE FABRICATOR'S WRITTEN PROCEDURAL AND QUALITY CONTROL MANUALS AND PERIODIC AUDITING OF FABRICATION PRACTICES BY AN APPROVED SPECIAL INSPECTION AGENCY. AT COMPLETION OF FABRICATION, THE APPROVED FABRICATOR SHALL SUBMIT A CERTIFICATE OF COMPLIANCE TO THE BUILDING OFFICIAL STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS.

I. REPORT REQUIREMENTS: SPECIAL INSPECTORS SHALL KEEP RECORDS OF INSPECTIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE PRIOR TO THE COMPLETION OF THAT PHASE OF THE WORK. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS SHALL BE SUBMITTED AT A POINT IN TIME AGREED UPON PRIOR TO THE START OF WORK BY THE APPLICANT AND THE BUILDING OFFICIAL.

J. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING REASONABLE NOTICE TO THE SPECIAL INSPECTOR(S) REGARDING WHEN ELEMENTS OF THE PROJECT WILL BE READY FOR EFFICIENT IMPLEMENTATION OF SPECIAL INSPECTIONS.

K. THE CONTRACTOR SHALL PROVIDE ACCESS TO THE LATEST VERSION OF ALL APPROVED PLANS AND SHOP DRAWINGS FOR THE SPECIAL INSPECTOR'S USE IN PERFORMING SPECIAL INSPECTIONS.

L. CONTRACTOR SHALL GRANT ACCESS TO OWNER'S SPECIAL INSPECTOR AS IS REASONABLY NECESSARY FOR THE PROPER PERFORMANCE OF SPECIAL INSPECTIONS.

M. SPECIAL INSPECTIONS DO NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY TO COMPLY WITH ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS. CONSTRUCTION MEANS AND METHODS AND JOBSITE SAFETY ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

TABLE 1705.3
REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD	IBC REFERENCE
1) Inspect reinforcement, including prestressing tendon, and verify placement.	-	X	ACI 318 Ch. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
2) Reinforcing bar welding:				
a) Verify weldability of reinforcing bars other than ASTM A706;	-	X	AWS D1.4 ACI 318: 26.6.4	-
b) Inspect single-pass fillet welds, maximum 5/16"; and	-	X		
c) Inspect all other welds.	X	-		
3) Inspect anchors cast in concrete.	-	X	ACI 318:17.8.2	-
4) Inspect anchors post-installed in hardened concrete members.	-	-		
a) Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.	X	-	ACI 318: 17.8.2.4	-
b) Mechanical anchors and adhesive anchors not defined in 4.a.	-	X	ACI 318: 17.8.2	
5) Verify use of required design mix.	-	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6) Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X	-	ASTM C 172 ASTM C 31 ACI 318: 26.5, 26.12	1908.10
7) Inspect concrete and shotcrete placement for proper application techniques.	X	-	ACI 318: 26.5	1908.6, 1908.7, 1908.8
8) Verify maintenance of specified curing temperature and techniques.	-	X	ACI 318: 26.5.3-26.5.5	1908.9
9) Inspect formwork for shape, location and dimensions of the concrete member being formed.	-	X	ACI 318: 26.11.1.2(b)	-

TABLE 4 QUALITY ASSURANCE:
MINIMUM SPECIAL INSPECTION REQUIREMENTS FOR MASONRY

INSPECTION TASK	FREQUENCY[a]			REFERENCE FOR CRITERIA	
	Level 1	Level 2	Level 3	TMS 402	TMS 602
1. As masonry construction begins, verify that the following are in compliance:					
a. Proportions of site-prepared mortar	NR	P	P		Art. 2.1, 2.6 A, & 2.6 C
b. Grade and size of prestressing tendons and anchorages	NR	P	P		Art. 2.4 B & 2.4 H
c. Grade, type and size of reinforcement, connectors, anchor bolts, and prestressing tendons and anchorages	NR	P	P		Art. 3.4 & 3.6 A
d. Prestressing technique	NR	P	P		Art. 3.6 B
e. Properties of thin-bed mortar for AAC masonry	NR	C(b)/P(c)	C		Art. 2.1 C.1
f. Sample panel construction	NR	P	C		Art. 1.6 D
2. Prior to grouting, verify that the following are in compliance:					
a. Grout space	NR	P	C		Art. 3.2 D & 3.2 F
b. Placement of prestressing tendons and anchorages	NR	P	P	Sec. 10.8 & 10.9	Art. 2.4 & 3.6
c. Placement of reinforcement, connectors, and anchor bolts	NR	P	C	Sec. 6.1, 6.3.1, 6.3.6, & 6.3.7	Art. 3.2 E & 3.4
d. Proportions of site-prepared grout and prestressing grout for bonded tendons	NR	P	P		Art. 2.6 B & 2.4 G.1.b
3. Verify compliance of the following during construction:					
a. Materials and procedures with the approved submittals	NR	P	P		Art. 1.5
b. Placement of masonry units and mortar joint construction	NR	P	P		Art. 3.3 B
c. Size and location of structural members	NR	P	P		Art. 3.3 F
d. Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.	NR	P(e)	C	Sec. 1.2.1(e), 6.2.1, & 6.3.1	
e. Welding of reinforcement	NR	C	C	Sec.6.1.6.1.2	
f. Preparation, construction and protection of masonry during cold weather (temperature below 40° (4.4° C)) or hot weather (temperature above 90° (32.2°))	NR	P	P		Art. 1.8 C & 1.8 D
g. Application and measurement of prestressing force	NR	C	C		Art. 3.6 B
h. Placement of grout and prestressing grout for bonded tendons is in compliance	NR	C(d)	C		Art. 3.5 & 3.6 C
i. Placement of AAC masonry units and construction of thin-bed mortar joints	NR	C(b)/P(c)	C		Art. 3.3 B.9 & 3.3 F.1.b
4. Observe preparation of grout specimens, mortar specimens, and/or prisms	NR	P	C		Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, & 1.4 B.4

(a) Frequency refers to the frequency of inspection, which may be continuous during the listed task or periodically during the listed task, as defined in the table. NR=Not Required, P=Periodic, C=Continuous
(b) Required for the first 5000 square feet (465 square meters) of AAC masonry.
(c) Required after the first 5000 square feet (465 square meters) of AAC masonry.
(d) Continuous inspection of grouting is required for cmu walls in shelter.
(e) Continuous inspection of post-installed anchors in cmu walls in shelter.

REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	FREQUENCY OF INSPECTION: CONTINUOUS (inspect each joint/member)	FREQUENCY OF INSPECTION: PERIODIC (inspect random joint/members)	REFERENCED STANDARD
1. Material verification of high-strength bolts, nuts and washers:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	-	QC and QA	AISC 360, Section A3.3 and applicable ASTM material standards
b. Manufacturer's certifications available for fastener materials.	QA	QC	AISC 360, Table N5.6-1
c. Fasteners marked in accordance with ASTM requirements.	-	QC and QA	
d. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane).	-	QC and QA	
e. Proper bolting procedure selected for joint detail.	-	QC and QA	
f. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements.	-	QC and QA	
g. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used.	QC	QA	
h. Proper storage provided for bolts, nuts, washers and other fastener components.	-	QC and QA	
2. Inspection of high-strength bolting: • For bolts requiring pretensioning, the special inspector shall observe the preinstallation testing and calibration procedures; determine that all plies of connected materials have been drawn together and properly snugged prior to pretensioning and monitor the installation of bolts to verify that fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point to the free edges. • For joints required to be tightened only to the snug-tight condition, the special inspector need only verify that the connected materials have been drawn together and properly snugged.			
a. Snug-tight joints.	-	QC and QA	AISC 360, Section M2.5
b. Pretensioned and slip-critical joints using turn-of-nut with matchmarking, twist-off bolt or direct tension indicator methods of installation.	-	QC and QA	
c. Pretensioned and slip-critical joints using turn-of-nut without matchmarking or calibrated wrench methods of installation.	QC and QA	-	
d. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required.	-	QC and QA	AISC 360, Table N5.6-2
e. Fastener component not turned by the wrench prevented from rotating.	-	QC and QA	
f. Document acceptance or rejection of bolted connections.	QC and QA	-	AISC 360, Table N5.6-3
3. Material verification of structural steel and cold-formed steel deck U.N.O.:			
a. For structural steel, identification markings to conform to AISC 360.	-	QC and QA	AISC 360, Section M1
b. For other steel, identification markings to conform to ASTM standards specified in the approved construction documents.	-	QC and QA	Applicable ASTM material standards
4. Inspection prior to welding:			
a. Verify identification markings of weld filler materials conform to AWS specification in the approved construction documents.	-	QC and QA	AISC 360, Section A3.5 and applicable AWS AS documents
b. Welding procedure specifications are available.	QC and QA	-	AISC 360, Table N5.4-1
c. Manufacturer certifications for welding consumables available.	QC and QA	-	
d. Material identification (type/grade) and welded identification system.	-	QC and QA	
e. Fit-up of welds including but not limited to joint preparation, dimensions, cleanliness, tacking, and backing type/fit as applicable.	-	QC and QA	
f. Configuration and finish of access holes	-	QC and QA	
g. Check welding equipment.	-	QC	

REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	FREQUENCY OF INSPECTION: CONTINUOUS (inspect each joint/member)	FREQUENCY OF INSPECTION: PERIODIC (inspect random joint/members)	REFERENCED STANDARD
5. Inspection of welding:			
a. AISC 360 requirements for welding structural steel			
1) Use of qualified welders	-	QC and QA	AISC 360, Table N5.4-2 During Welding
2) Packaging and exposure control and handling of welding consumables.	-	QC and QA	
3) Welding over cracked tack welds	-	QC and QA	
4) Environmental conditions including but not limited to precipitation, temperature and wind.	-	QC and QA	
5) Verify settings on equipment, travel speeds, elected materials, shielding gas type/floow rate, preheating interpass temperatures and proper position meets WPS standards.	-	QC and QA	
6) Verify welding techniques for interpass, final cleaning, profile limitations, and quality requirements.	-	QC and QA	
7) Welds are cleaned and painted where required.	-	QC and QA	AISC 360, Table N5.4-2 After Welding
8) Verify size, length and locations of welds.	QC and QA	-	
9) Visually verify welds for crack prohibition, weld/base-metal fusion, crater cross section, weld profiles, weld size, undercutting, and porosity.	QC and QA	-	
10) Arc strikes, k-area cracks within 3" of weld, removal of backing, and repair activities as applicable.	QC and QA	-	
11) Documentation of acceptance or rejection of welded joint or member.	QC and QA	-	
b. American Welding Society requirements for structural steel and cold-formed steel deck:			
1) Complete and partial joint penetration groove welds.	X	-	AWS D1.1
2) Multipass fillet welds.	X	-	
3) Single-pass fillet welds > 5/ 16"	X	-	
4) Plug and slot welds.	X	-	
5) Single-pass fillet welds ≤ 5/ 16"	-	X	
6) Floor and roof deck welds.	-	X	AWS D1.3
7) Welded studs & deformed bar anchors (DBA's).	-	X	AWS D1.1
8) Welded sheet steel for cold-formed steel members	-	X	AWS D1.3
9) Welding of stairs & railing systems	-	X	AWS D1.1
c. Reinforcing steel:			
1) Verification of weldability of reinforcing steel other than ASTM A 706.	-	X	AWS D1.4, ACI 318: Section 3.5.2
2) Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X	-	
3) Shear reinforcement.	X	-	
4) Other reinforcing steel.	-	X	
6. Inspection of steel elements of composite construction prior to concrete placement:			
a. Placement and installation of steel deck.	QC and QA	-	AISC 360, Table N6.1
b. Placement and installation of steel HSA.	QC and QA	-	AISC 360, Table N6.1
c. Documentation of acceptance or rejection of steel elements.	QC and QA	-	AISC 360, Table N6.1

TABLE 1705.6
REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	-	X
2. Verify excavations are extended to proper depth and have reached proper material.	-	X
3. Perform classification and testing of compacted fill materials.	-	X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	X	-
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.	-	X

TABLE 1705.2.3
REQUIRED SPECIAL INSPECTIONS OF OPEN-WEB STEEL JOISTS AND JOIST GIRDERS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD
1. Installation of open-web steel joists and joist girders.			
a. End connections – welding or bolted.	-	X	SJI specification listed in Section 2207.1
b. Bridging – horizontal or diagonal.			
1. Standard bridging.	-	X	SJI specification listed in Section 2207.1
2. Bridging that differs from SJI specifications listed in Section 2207.1	-	X	

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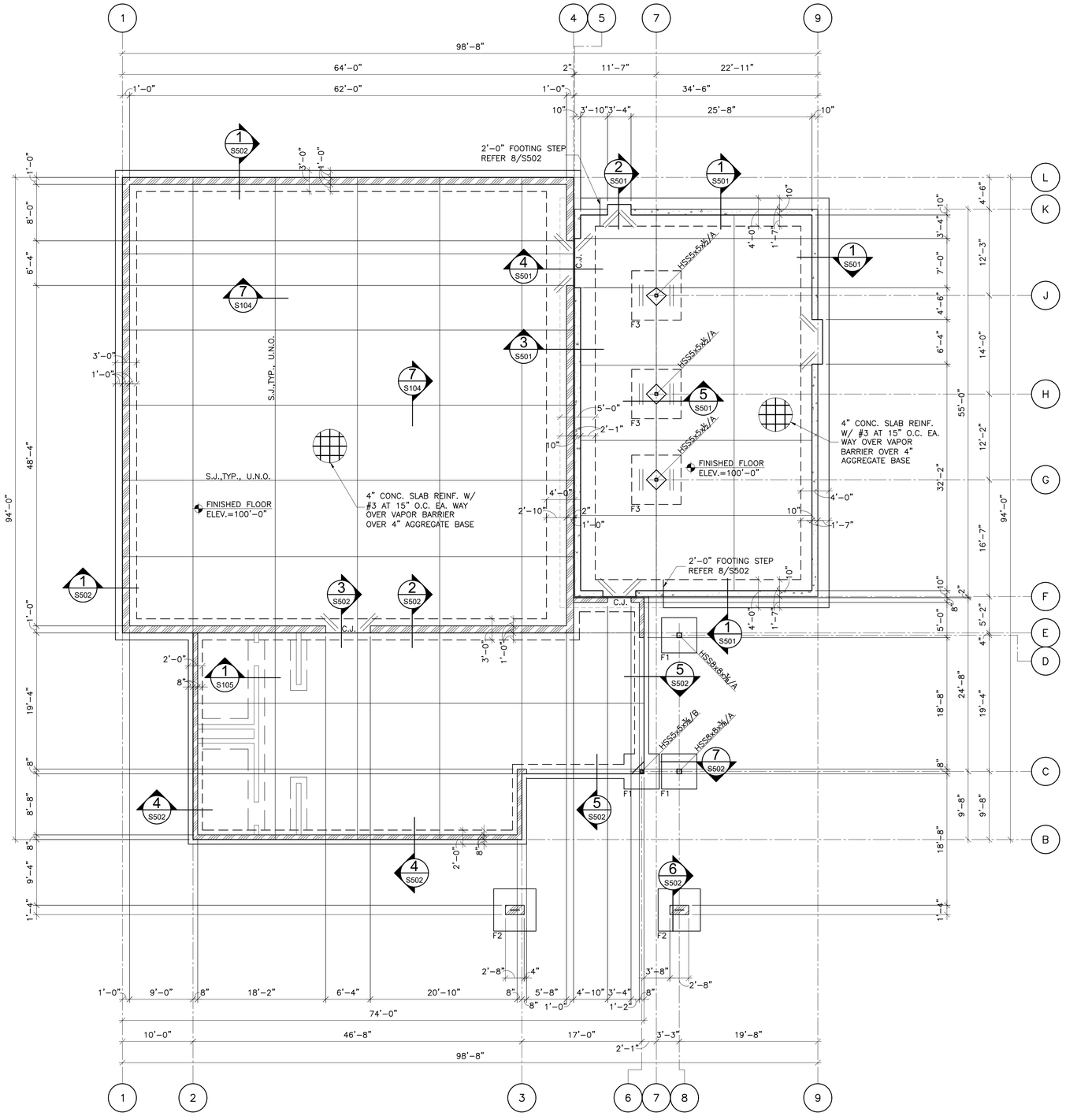
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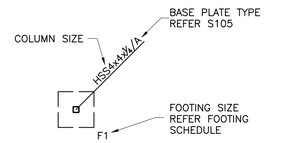


NORTH

1 S201 **FOUNDATION PLAN**

SCALE: 1/8"=1'-0"

FOUNDATION PLAN LEGEND:



= LOAD BEARING MASONRY WALLS

= CAST-IN-PLACE CONCRETE SHELTER LOAD BEARING WALLS

FOUNDATION PLAN NOTES:

1. FOUNDATION AND SLAB SUBGRADE SHALL BE PREPARED AS OUTLINED IN THE STRUCTURAL GENERAL NOTES.
2. REFERENCE ELEVATION OF 100'-0" EQUALS DATUM FINISHED FLOOR ELEVATION OF 1218.90 FEET FOR THE NEW BUILDING.
3. EXCEPT WHERE SHOWN OTHERWISE, SLABS-ON-GRADE SHALL BE 4" THICK CONCRETE REINFORCED WITH #3 BARS AT 15" ON CENTER EACH WAY OVER A 15 MIL VAPOR RETARDER OVER A 4" AGGREGATE BASE COURSE. REINFORCING BARS SHALL BE PLACED 1½" CLEAR FROM TOP OF SLAB USING CHAIRS OR SLAB BOLSTERS COMPLYING WITH CRSI'S "MANUAL OF STANDARD PRACTICE".
4. SLABS-ON-GRADE SHALL BE WATER CURED FOR A MINIMUM OF 7 DAYS BY PONDING, SPRAYING, SPRINKLING OR BY USE OF SATURATED COVERINGS. THE USE OF CURING COMPOUNDS FOR SLABS-ON-GRADE IS PROHIBITED.
5. SAWED JOINTS (SJ) AND REQUIRED CONSTRUCTION JOINTS (CJ) ARE SHOWN ON THE DRAWINGS. AT THE CONTRACTOR'S OPTION, ADDITIONAL CONSTRUCTION JOINTS MAY BE PLACED AT LOCATIONS INDICATED TO BE SAWED JOINTS.
6. // INDICATES (2)#4 BARSx4'-0" TO BE PLACED IN SLAB-ON-GRADE AT ALL RE-ENTRANT CORNERS. RE-ENTRANT CORNERS ARE DEFINED AS INTERIOR CORNERS WHERE JOINTS DO NOT OCCUR IN BOTH DIRECTIONS. SIMILAR BARS SHALL BE PLACED AT ANY DISCONTINUOUS ENDS OF SAWED JOINTS OR CONSTRUCTION JOINTS.
7. REFER MECHANICAL FOR FLOOR DRAIN (F.D.) INFORMATION.
8. EXTERIOR STAIRS CAN ATTACH TO 12" CMU WALL AND/OR USE POSTS FOR SUPPORT. GC TO COORDINATE WITH DELEGATED STAIR ENGINEER/STEEL FABRICATOR AND PROVIDE FOUNDATIONS PER DETAIL 4A/S502 FOR POSTS AS REQUIRED.

SPOT FOOTING SCHEDULE

MARK	SIZE			REINFORCEMENT
	WIDTH	LENGTH	DEPTH	
F1	5'-0"	5'-0"	2'-0"	(6) - #5 TOP AND BOT EA. WAY
F2	6'-0"	6'-0"	2'-0"	(7) - #5 TOP AND BOT EA. WAY
F3	7'-0"	7'-0"	3'-0"	(8) - #6 TOP AND BOT EA. WAY

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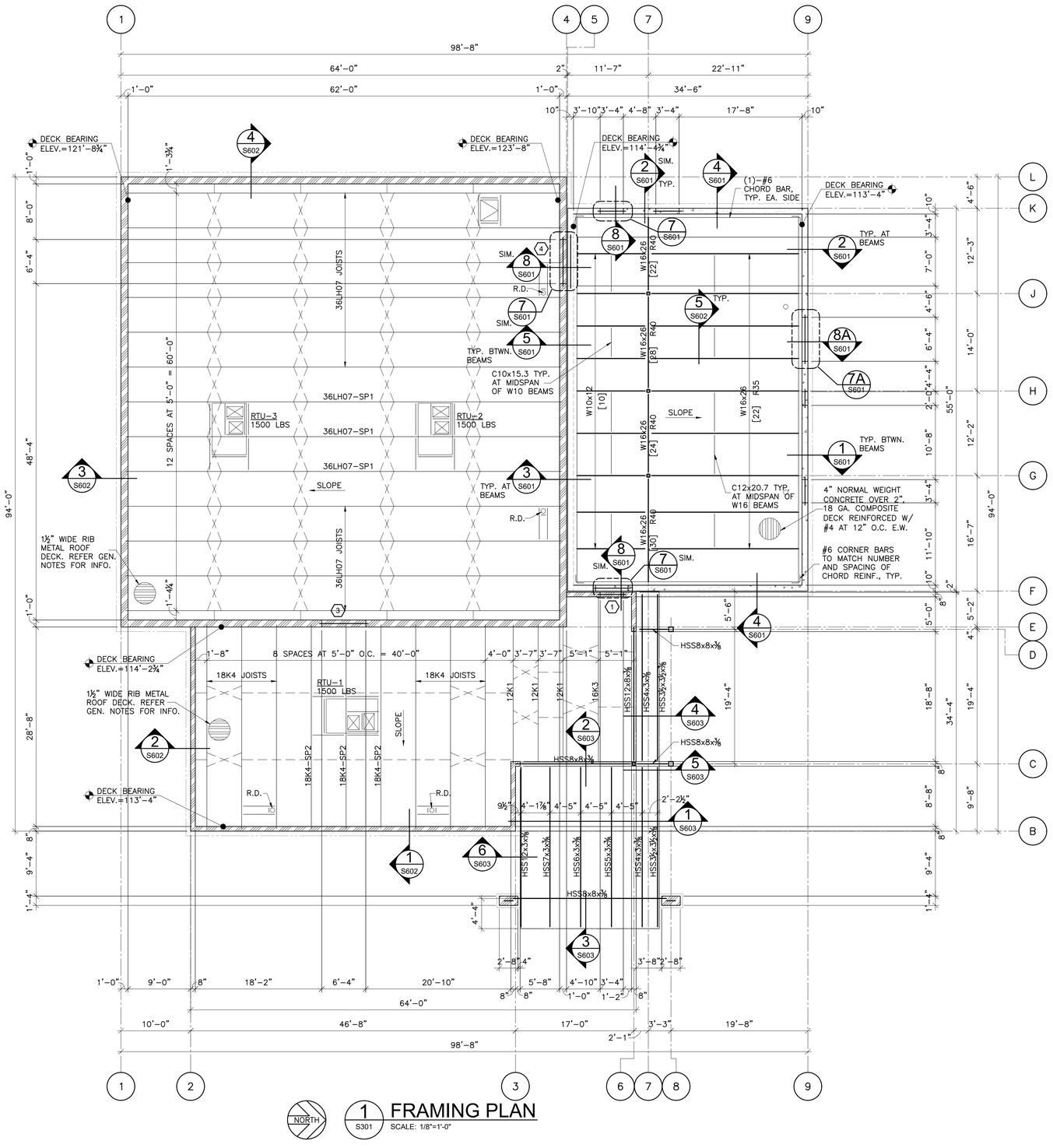
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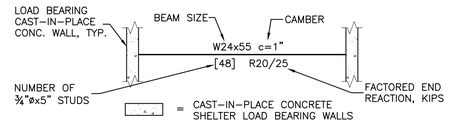
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NORTH

1 FRAMING PLAN
S301 SCALE: 1/8"=1'-0"

SHELTER FRAMING PLAN LEGEND:



NOTE:
IF ONLY ONE NUMBER IS PROVIDED FOR END REACTIONS, REACTION APPLIES TO BOTH ENDS. WHERE NO REACTION IS GIVEN, USE 10K.

SHELTER ROOF FRAMING PLAN NOTES:
1. ALL ELEVATIONS ARE REFERENCED FROM FINISHED FLOOR DATUM OF 100'-0". REFER GENERAL NOTES FOR ACTUAL ELEVATION.
2. [10] INDICATES THE NUMBER OF 3/4"ø x5" HEADED STUDS THAT ARE REQUIRED. AT BEAMS, HEADED STUDS ARE UNIFORMLY SPACED ALONG BEAM LENGTH. AT GIRDERS, STUDS ARE UNIFORMLY SPACED BETWEEN INTERSECTING TRANSVERSE BEAMS. LENGTH OF STUD IS THE FINAL INSTALLED LENGTH AFTER WELDING. SELECT LENGTH OF STUD PRIOR TO WELDING BASED ON BURN THROUGH CONDITIONS, I.E., THROUGH METAL DECK OR DIRECTLY TO STEEL.
3. AT COMPOSITE BEAMS, PLACE HEADED STUDS IN THE "STRONG" POSITION. REFER TYPICAL DETAILS.
4. PROVIDE [2]-#4x4'-0" DIAGONAL BARS AT ALL RE ENTRANT CORNERS.
5. ALL CONCRETE SLABS SHALL BE WET CURED FOR A MINIMUM OF 7 DAYS. USE OF SPRAY-ON OR ROLL-ON CURING COMPOUND IS PROHIBITED.
6. PROVIDE CONTINUOUS BUTT SPLICE WELDING IN FIELD AT DECK ANGLES.
7. ALL ROOF OPENINGS FOR MECHANICAL ROOF TOP UNITS ARE APPROXIMATELY LOCATED. EXACT SIZE AND LOCATIONS SHALL BE COORDINATED WITH THE SUCCESSFUL MECHANICAL CONTRACTOR. ALL ROOF/WALL OPENINGS SHALL BE SUPPORTED WITH TYPICAL ANGLE FRAME AND PENETRATION/SHROUD DETAILS.
8. DETAILING FOR CAST IN PLACE CONSTRUCTION ALLOWS FOR SHEAR WALLS TO BE PLACED VERTICALLY BEFORE PLACING ADDITIONAL FRAMING. THIS WILL REQUIRE TEMPORARY BRACING OF VERTICAL 10" WALLS UNTIL ROOF LEVELS ARE PLACED. COORDINATE BRACING OF WALLS WITH ARCHITECT IF BRACING TO EXPOSED STRUCTURE.
9. T.O. PARAPET REFERS TO THE TOP OF CONCRETE WALL ELEVATION WITH REFERENCE TO FINISH FLOOR ELEVATION SPECIFIED ON THE FOUNDATION PLAN U.N.O.
10. MECHANICAL OPENINGS SHALL NOT OCCUR WITHIN 24" OF EMBEDDED STUD ANCHORS.

ROOF FRAMING PLAN LEGEND:

= L1¾x1¾x7/64 MIN. HORIZONTAL JOIST BRIDGING BY JOIST MANUFACTURER

= L1¾x1¾x7/64 MIN. JOIST X-BRIDGING BY JOIST MANUFACTURER

NOTE:
IF ONLY ONE NUMBER IS PROVIDED FOR END REACTIONS, REACTION APPLIES TO BOTH ENDS. WHERE NO REACTION IS GIVEN, USE 10K.

= LOAD BEARING MASONRY WALLS

ROOF FRAMING PLAN NOTES:
1. ALL ELEVATIONS ARE REFERENCED FROM FINISHED FLOOR DATUM OF 100'-0". REFER GENERAL NOTES FOR ACTUAL ELEVATION.
2. ALL ROOF OPENINGS FOR MECHANICAL ROOF TOP UNITS ARE APPROXIMATELY LOCATED. EXACT SIZE AND LOCATIONS SHALL BE COORDINATED WITH THE SUCCESSFUL MECHANICAL CONTRACTOR. ALL ROOF/WALL OPENINGS SHALL BE SUPPORTED WITH TYPICAL ANGLE FRAME UNLESS NOTED OTHERWISE.
3. T.O. PARAPET REFERS TO THE TOP OF MASONRY WALL ELEVATION WITH REFERENCE TO FINISH FLOOR ELEVATION SPECIFIED ON THE FOUNDATION PLAN U.N.O.
4. (1) DENOTES MASONRY LINTEL TYPE. REFER TYPICAL MASONRY DETAILS FOR ADDITIONAL INFORMATION.
5. OFFSET STEEL JOISTS AS REQUIRED FOR CODE REQUIRED MINIMUM BEARING ON STEEL BEAMS

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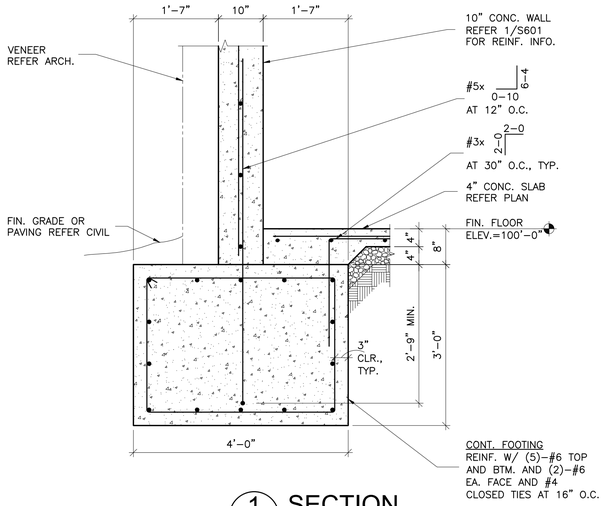
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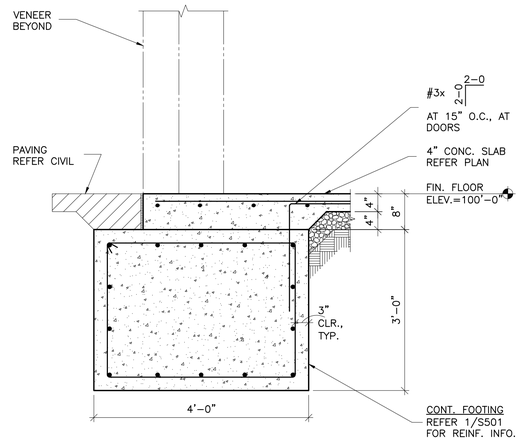
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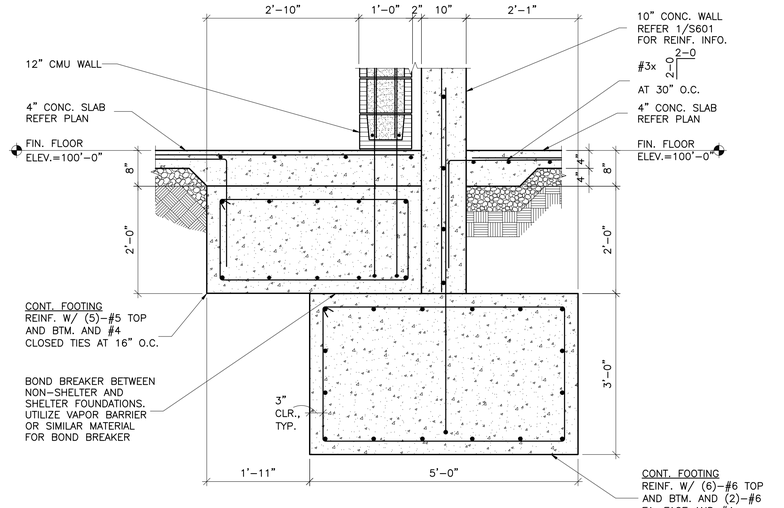
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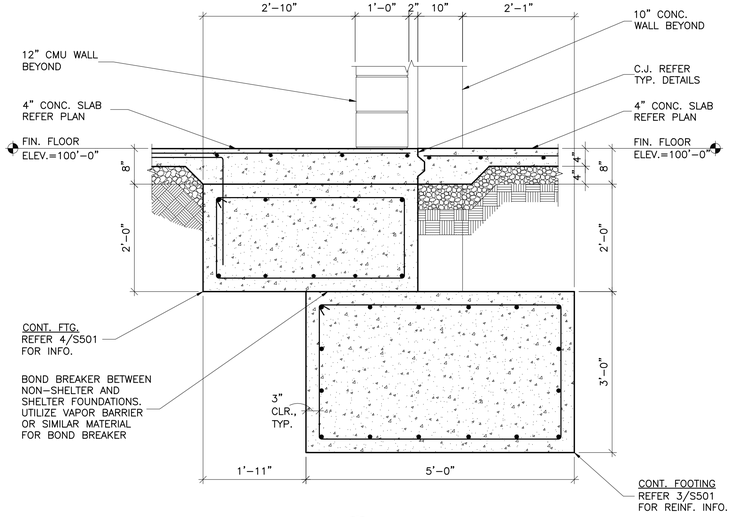
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S501 SCALE: 3/4"=1'-0"



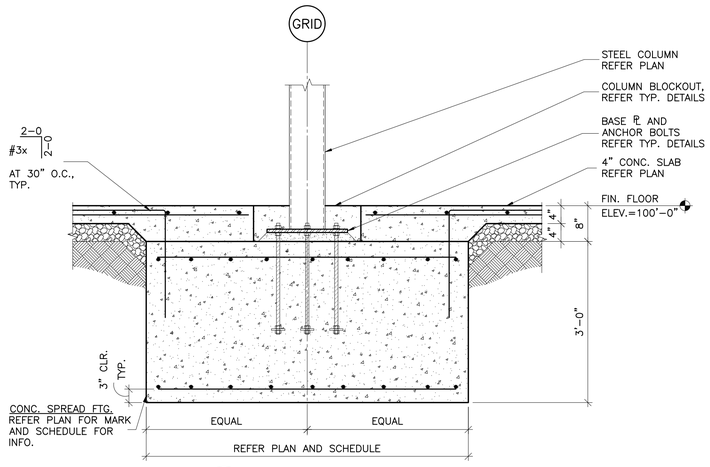
2 SECTION
S501 SCALE: 3/4"=1'-0"



3 SECTION
S501 SCALE: 3/4"=1'-0"



4 SECTION
S501 SCALE: 3/4"=1'-0"



5 SECTION
S501 SCALE: 3/4"=1'-0"

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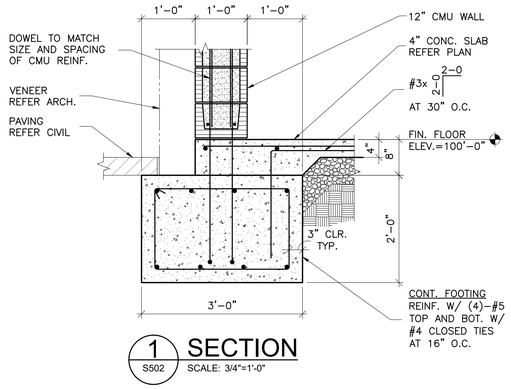
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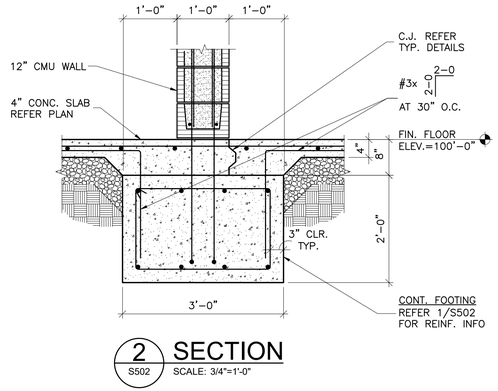
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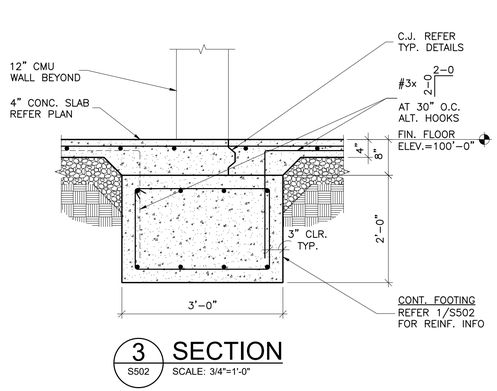
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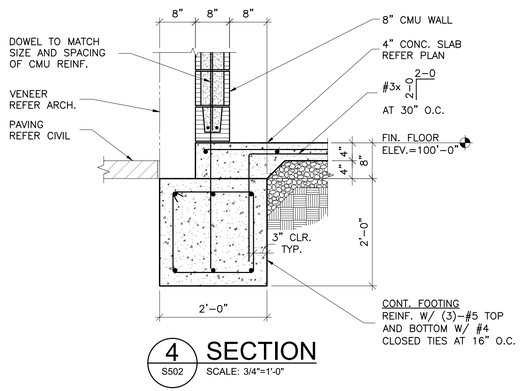
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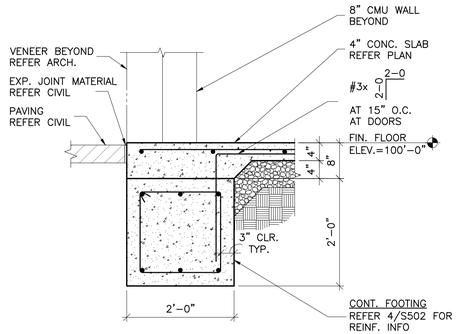
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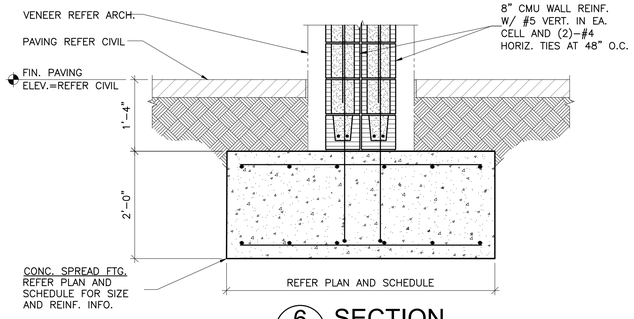
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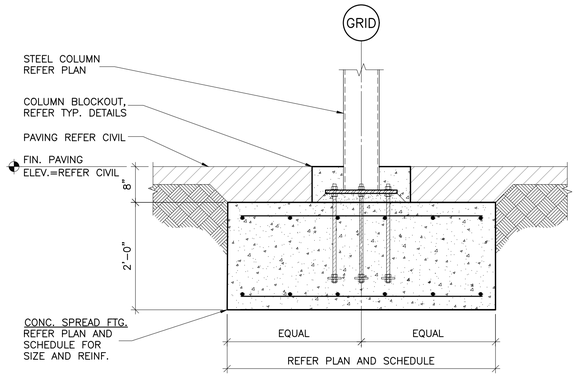
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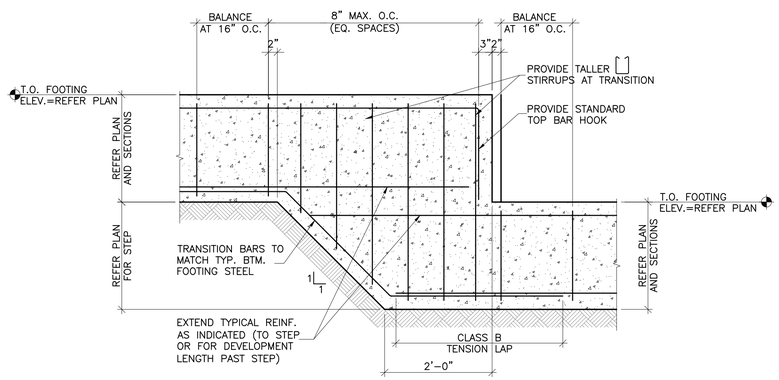
5 S502 SECTION
SCALE: 3/4"=1'-0"



6 S502 SECTION
SCALE: 3/4"=1'-0"



7 S502 SECTION
SCALE: 3/4"=1'-0"



8 5502 TYP. FOOTING STEP
SCALE: NONE

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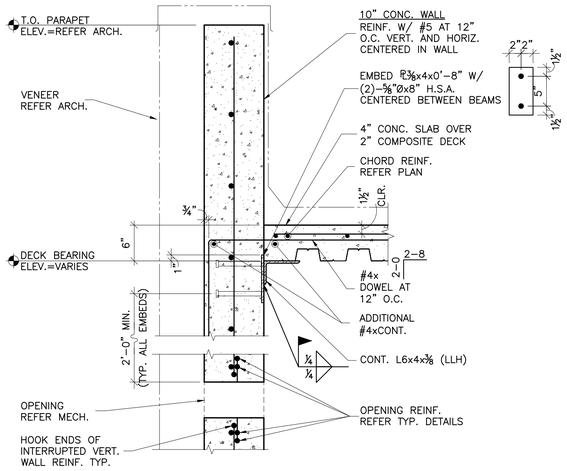
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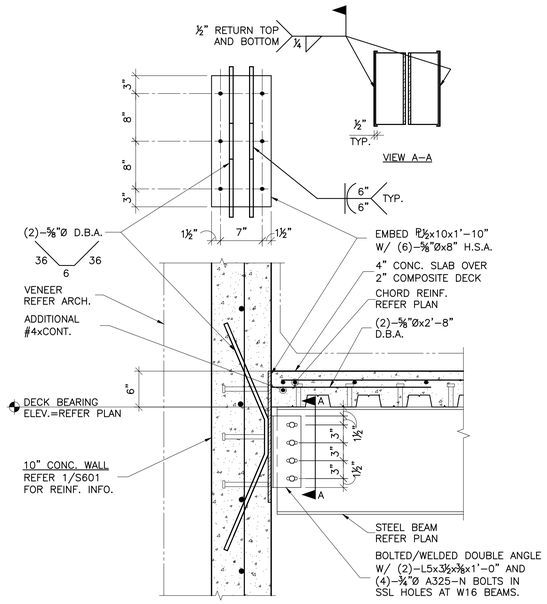
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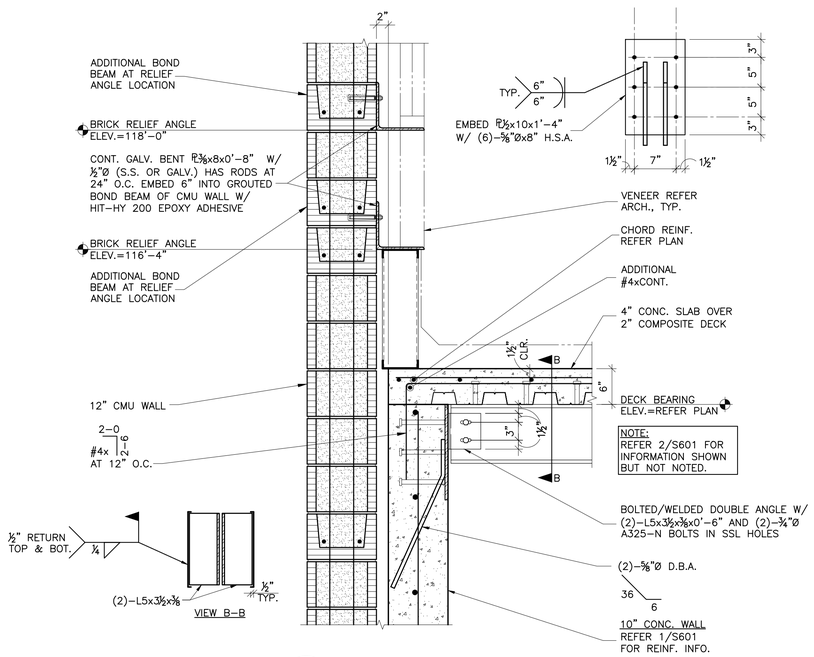
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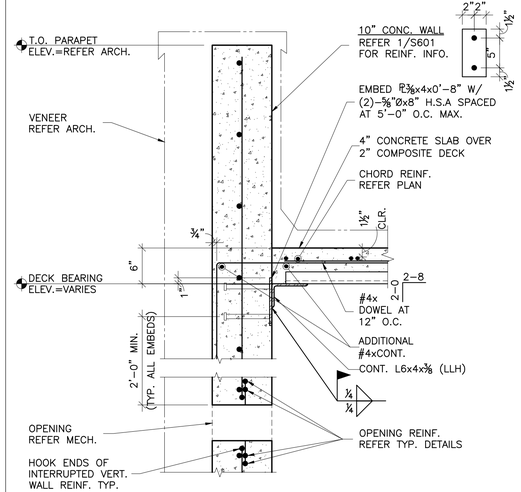
1 S601 **SECTION**
SCALE: 1"=1'-0"



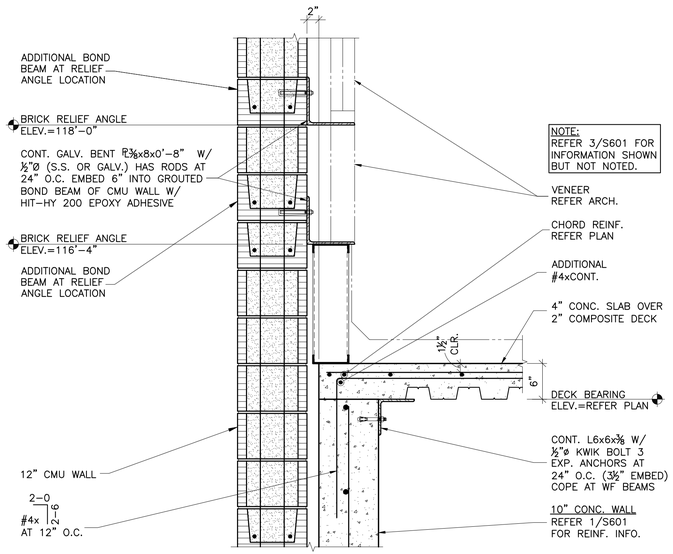
2 S601 **SECTION**
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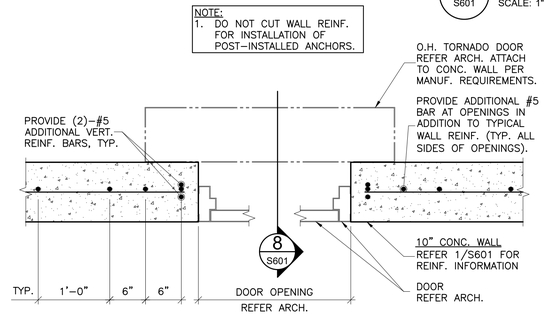
3 S601 **SECTION**
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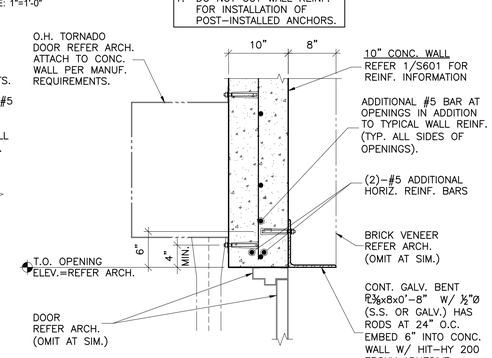
4 S601 **SECTION**
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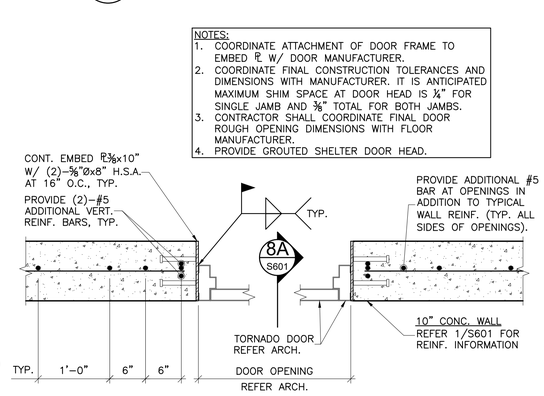
5 S601 **SECTION**
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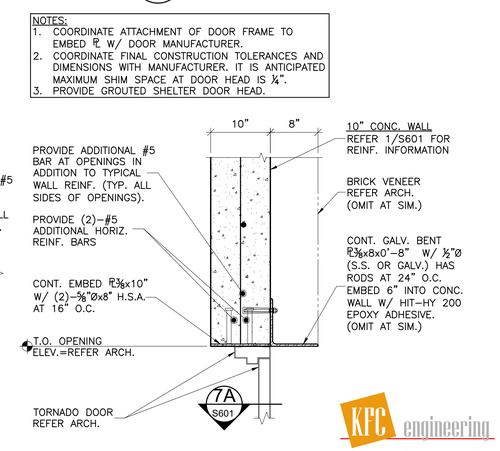
7 S601 **ENLARGED PLAN AT DOOR**
SCALE: 1"=1'-0"



8 S601 **DOOR HEAD**
SCALE: 1"=1'-0"



7A S601 **ENLARGED PLAN AT DOOR**
SCALE: 1"=1'-0"



8A S601 **DOOR HEAD**
SCALE: 1"=1'-0"

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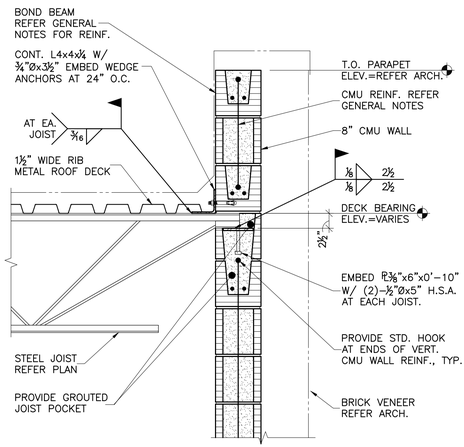
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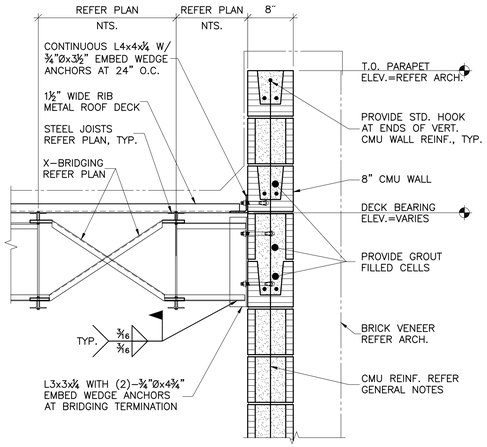
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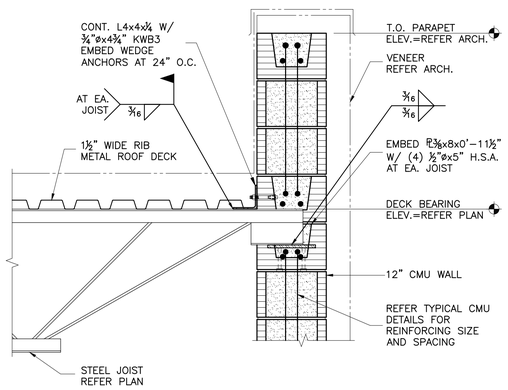
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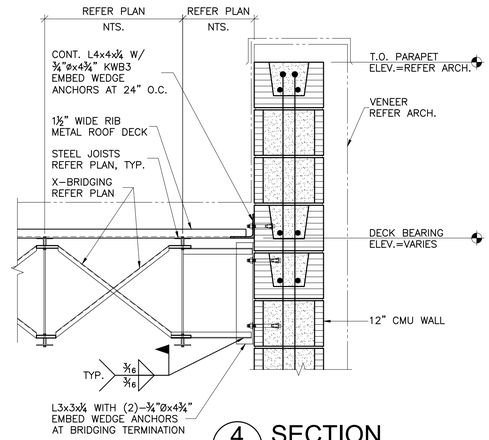
1 S602 **SECTION**
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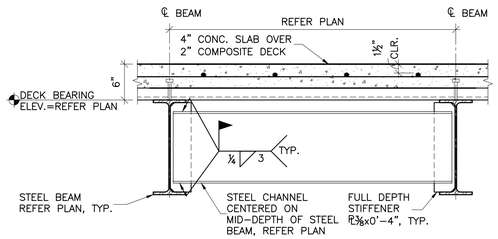
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SCALE: 1"=1'-0"



3 S602 **SECTION**
SCALE: 1"=1'-0"

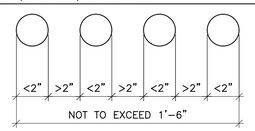


4 S602 **SECTION**
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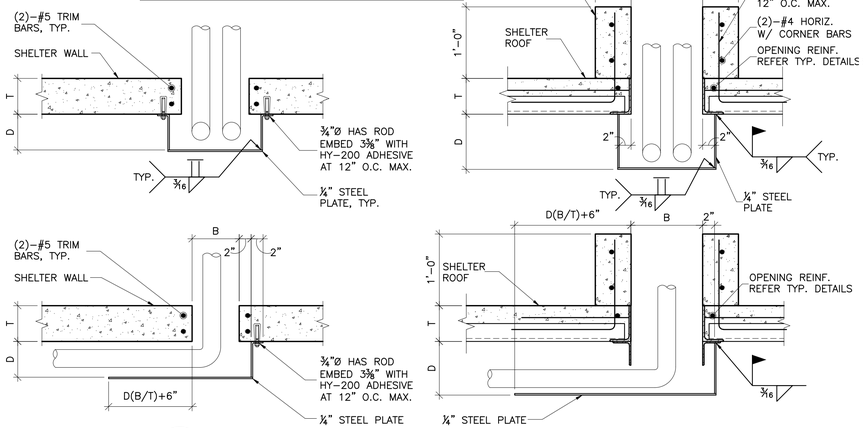
5 S602 **SECTION**
SCALE: 1"=1'-0"

NOTE:
OPENINGS 2" OR LESS MAY BE MADE IN THE SHELTER WALLS OR ROOF WITHOUT PROTECTION OR REGARD TO THE TYPICAL REINFORCING (SPECIAL REINFORCING AROUND OPENINGS SHALL NOT BE CUT). GROUPS OF UP TO 4 OPENINGS 2" OR LESS MAY BE MADE PROVIDED THE CLEAR SPACE BETWEEN OPENINGS EXCEEDS 2" AND THE TOTAL LENGTH OF THE GROUP DOES NOT EXCEED 18". OPENINGS CAN BE HORIZONTAL (AS SHOWN) OR VERTICAL



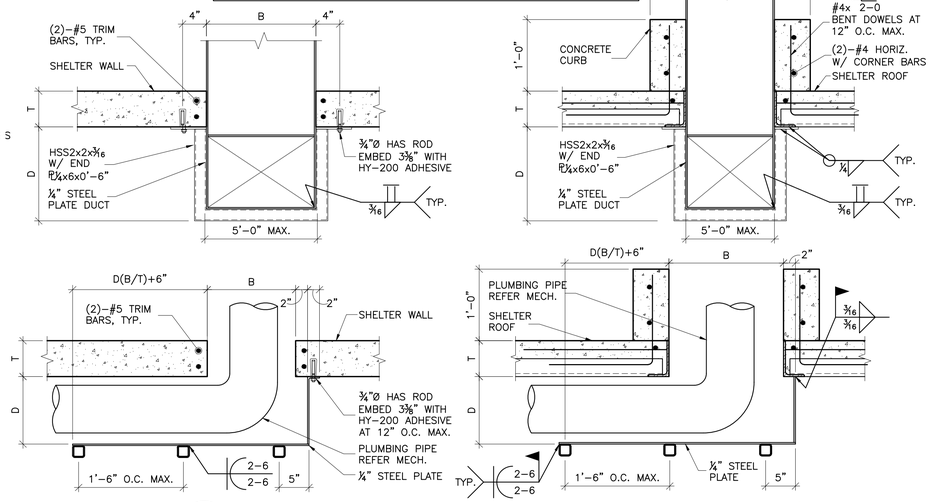
6 S602 **OPENINGS IN SHELTER 2" OR LESS**
SCALE: 1"=1'-0"

NOTES:
1. OPENINGS 18" OR LESS MAY BE MADE IN THE SHELTER WALLS OR ROOF AS SHOWN.
2. REFER OPENING DETAILS ON TYPICAL STEEL SHEET FOR ADDITIONAL INFORMATION.
3. DO NOT CUT WALL REINF. FOR INSTALLATION OF POST-INSTALLED ANCHORS.



7 S602 **OPENINGS IN SHELTER 2" TO 1'-6"**
SCALE: 1"=1'-0"

NOTES:
1. WE ARE NOT AWARE OF ANY OPENINGS LARGER THAN 5'-0", IF AN OPENING LARGER THAN 5'-0" IS REQUIRED, CONTACT ENGINEER IMMEDIATELY FOR EVALUATION AND FURTHER INSTRUCTIONS.
2. REFER OPENING DETAILS ON TYPICAL STEEL SHEET FOR ADDITIONAL INFORMATION.
3. DO NOT CUT WALL REINF. FOR INSTALLATION OF POST-INSTALLED ANCHORS.



8 S602 **OPENINGS IN SHELTER 1'-6" TO 5'-0"**
SCALE: 1"=1'-0"

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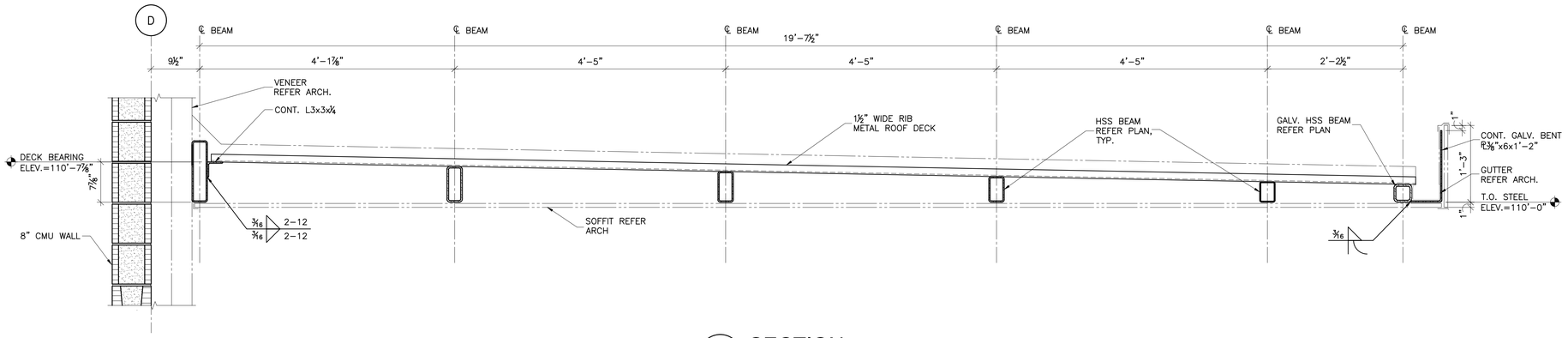
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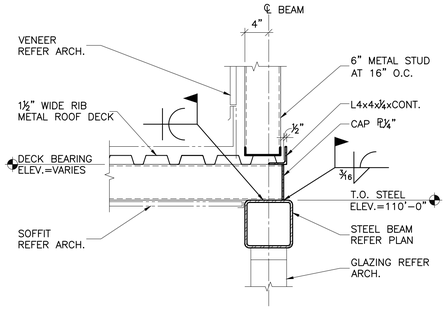
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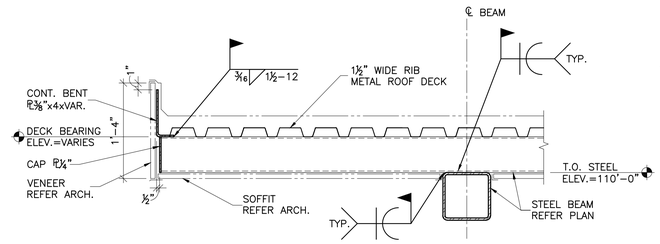
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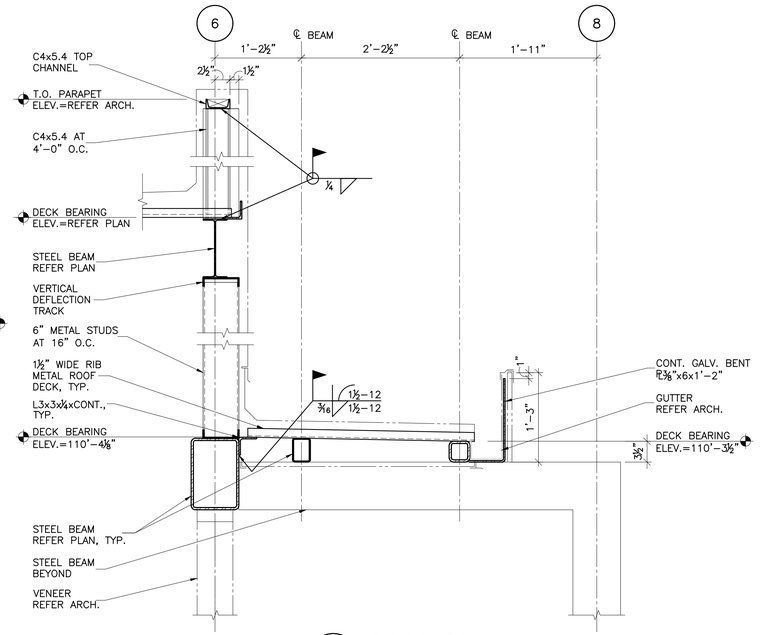
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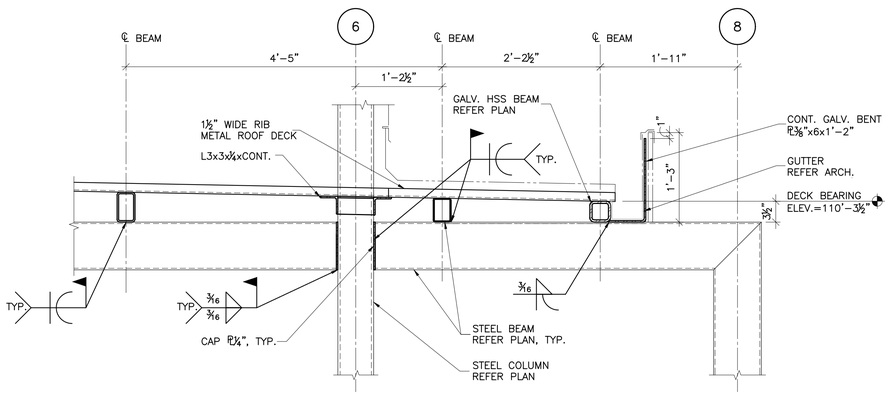
2 S603 **SECTION**
SCALE: 1"=1'-0"



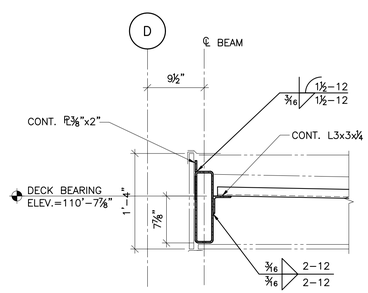
3 S603 **SECTION**
SCALE: 1"=1'-0"



4 S603 **SECTION**
SCALE: 1"=1'-0"



5 S603 **SECTION**
SCALE: 1"=1'-0"



6 S603 **SECTION**
SCALE: 1"=1'-0"

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