#### DESIGN PARAMETERS

#### . <u>BUILDING CODE</u>: 2018 INTERNATIONAL BUILDING CODE . DEAD LOADS: SELF WEIGHT SELF WEIGHT B. FLOOR --LIVE LOADS: - 20 PSF (UNIFORM A. ROOF B. FLOOR --40 PSF SNOW LOADS A. GROUND SNOW LOAD, Pg--WIND LOADS: A. BASIC WIND SPEED (3 SECOND GUST)---B. RISK CATEGORY---EXPOSURE CLASSIFICATION--INTERNAL PRESSURE COEFFICIENT----BASIC WIND PRESSURE (gh, UNFACTORED)---F. DESIGN WIND PRESSURE ON EXTERIOR WALLS (C&C LOAD BASED ON 100 FT² AREA) -- 22.1 PSF END ZONES, (a=10'-0")----- INTERIOR ZONES-------- 19.9 PSF G. DESIGN UPLIFT PRESSURE ON ROOFS (C&C LOAD BASED ON 100 FT<sup>2</sup> AREA) CORNER ZONES, (a=10'-0")---- EDGE ZONES, (a=10'-0")------- 17.2 PSF INTERIOR ZONES---- 13.3 PSF A. SPECTRAL RESPONSE ACCELERATION; (SHORT PERIOD), Ss------B. SPECTRAL RESPONSE ACCELERATION; (1-SEC. PERIOD), S1-------- 0.068 SPECTRAL RESPONSE COEFFICIENT; (SHORT PERIOD), Sds--------- 0 139 SPECTRAL RESPONSE COEFFICIENT: (1-SEC. PERIOD), Sd1----SITE CLASS---F. IMPORTANCE FACTOR, I G. SEISMIC DESIGN CATEGORY H. BASIC STRUCTURAL SYSTEM AND SEISMIC RESISTING SYSTEM------ LIGHT FRAME WOOD WALLS WITH STRUCTURAL WOOD SHEAR PANELS . RESPONSE MODIFICATION FACTOR, R ----J. SYSTEM OVER-STRENGTH FACTOR, $\Omega$ K. DEFLECTION AMPLIFICATION FACTOR, Cd --L. ANALYSIS PROCEDURE --- EQUIVALENT LATERAL FORCE ISOLATED AND CONTINUOUS FOUNDATIONS HAVE BEEN DESIGNED FOR AN ASSUMED ALLOWABLE NET BEARING PRESSURE OF 1500 PSF. THE OWNER AND/OR CONTRACTOR IS RESPONSIBLE FOR VERIFYING THESE ASSUMPTIONS WITH ACTUAL CONDITIONS PRIOR TO CONSTRUCTION OR BUILD AT THEIR OWN RISK. ACHIEVING AN ALLOWABLE BEARING PRESSURE DOES NOT PRECLUDE THE BUILDING FROM BEING SUBJECT TO DIFFERENTIAL

#### **GENERAL**

 STRUCTURAL DRAWINGS ARE NOT STAND-ALONE DOCUMENTS AND ARE INTENDED TO BE USED IN CONJUNCTION WITH CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND DRAWINGS FROM OTHER DISCIPLINES. THE CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS INTO THE SHOP DRAWINGS AND FIELD WORK.

MOVEMENT. SHOULD THE OWNER BE CONCERNED, THEY SHALL ENGAGE THE SERVICES OF A LICENSED GEOTECHNICAL ENGINEER TO INVESTIGATE

- 2. WHERE CONFLICT EXISTS AMONG VARIOUS PARTS OF THE STRUCTURAL CONTRACT DOCUMENTS, STRUCTURAL DRAWINGS, GENERAL NOTES, AND SPECIFICATIONS, THE STRICTEST REQUIREMENTS, AS INDICATED BY THE ENGINEER, SHALL GOVERN.
- 3. WHERE MEMBER LOCATIONS ARE NOT SPECIFICALLY DIMENSIONED, THE FOLLOWING RULES SHALL APPLY:
- A. DO NOT SCALE DRAWINGS.

AND PROVIDE RECOMMENDATIONS.

- B. COLUMNS ARE CENTERED ON GRID LINES.C. FOOTINGS ARE CENTERED BENEATH COLUMNS.
- C. FOOTINGS ARE CENTERED BENEATH COLUMNS.D. CONTINUOUS FOOTINGS ARE CENTERED BENEATH WALLS.
- E. FRAMING MEMBERS ARE EITHER LOCATED ON GRID LINES OR ARE EQUALLY SPACED BETWEEN LOCATED MEMBERS
- 4. ALL STRUCTURAL ELEMENTS OF THE PROJECT HAVE BEEN DESIGNED BY THE STRUCTURAL ENGINEER TO RESIST THE REQUIRED CODE VERTICAL AND LATERAL FORCES THAT COULD OCCUR IN THE FINAL COMPLETED STRUCTURE ONLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL REQUIRED BRACING DURING CONSTRUCTION TO MAINTAIN THE STABILITY AND SAFETY OF ALL STRUCTURAL ELEMENTS DURING THE CONSTRUCTION PROCESS UNTIL THE LATERAL LOAD RESISTING OR STABILITY-PROVIDING SYSTEM IS COMPLETELY INSTALLED AND THE STRUCTURE IS COMPLETELY TIED TOGETHER.
- 5. THE STRUCTURE HAS BEEN DESIGNED FOR THE LOADS IDENTIFIED WITHIN THESE STRUCTURAL DRAWINGS THAT ARE ANTICIPATED TO BE APPLIED TO THE FINAL STRUCTURE ONCE COMPLETED AND OCCUPIED. THE CONTRACTOR SHALL NOT OVERLOAD THE STRUCTURE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING THE ADEQUACY OF THE STRUCTURE TO SUPPORT ANY APPLIED CONSTRUCTION LOADS, INCLUDING THOSE DUE TO CONSTRUCTION VEHICLES OR EQUIPMENT, MATERIAL HANDLING OR STORAGE, SHORING AND RESHORING, OR ANY OTHER PROPOSED CONSTRUCTION LOADS THAT ARE IN EXCESS OF THE STATED DESIGN LOADS. THE STRUCTURAL ENGINEER IS NOT RESPONSIBLE TO DESIGN OR CHECK THE STRUCTURE FOR LOADS APPLIED TO THE STRUCTURE FOR ANY CONSTRUCTION ACTIVITY.
- 6. WEIGHTS OF MECHANICAL EQUIPMENT SHOWN ON THE STRUCTURAL PLANS ARE FOR UNITS SPECIFIED BY THE MECHANICAL ENGINEER. CONTRACTOR SHALL VERIFY THE WEIGHTS. ANY SUBSTITUTIONS THAT RESULT IN INCREASED WEIGHT SHALL BE APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.
- 7. THE SIZE AND LOCATION OF EQUIPMENT PADS AND PENETRATIONS THROUGH THE STRUCTURE FOR MECHANICAL, ELECTRICAL, AND PLUMBING WORK SHALL BE VERIFIED BY THE CONTRACTOR. OPENINGS AND PENETRATIONS NOT SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE SUBJECT TO APPROVAL BY THE STRUCTURAL ENGINEER OF RECORD.
- B. PRIOR TO FABRICATION AND/OR ERECTION OF ANY MATERIALS, THE CONTRACTOR SHALL FIELD VERIFY ALL PERTINENT EXISTING DIMENSIONS, ELEVATIONS, AND CONDITIONS AND SHALL REPORT ANY DISCREPANCIES TO THE STRUCTURAL ENGINEER OF RECORD OR THE ARCHITECT IMMEDIATELY UPON DISCOVERY.
- 9. BACKFILL BOTH SIDES OF ALL FOUNDATION AND RETAINING WALLS EQUALLY UNTIL LOW SIDE IS UP TO FINISH GRADE. DO NOT BACKFILL ANY WALLS UNTIL CONCRETE HAS REACHED ITS SPECIFIED 28-DAY COMPRESSIVE STRENGTH.
- 10. CONNECTIONS OF SYSTEMS DESIGNED BY THE CONTRACTOR'S ENGINEER SUCH AS, BUT NOT LIMITED TO, CLADDING, STAIRS, ELEVATORS AND MEP LOADS ARE ASSUMED TO IMPOSE VERTICAL AND/OR HORIZONTAL LOADS ON THE BASE BUILDING STRUCTURAL MEMBERS WITHOUT GENERATING TORSION IN THE SUPPORTING STRUCTURAL MEMBERS. CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING ALL SUPPLEMENTARY BRACING MEMBERS AS REQUIRED TO PREVENT TORSION ON THE BASE BUILDING STRUCTURE.
- ANY MATERIALS OR PRODUCTS SUBMITTED FOR APPROVAL THAT ARE DIFFERENT FROM THE MATERIAL OR PRODUCTS SPECIFIED IN THE STRUCTURAL CONTRACT DOCUMENTS WILL BE APPROVED ONLY IF THE FOLLOWING CRITERIA ARE SATISFIED:

   A. A COST SAVINGS TO THE OWNER IS DOCUMENTED AND SUBMITTED WITH THE REQUEST.
- B. THE MATERIAL OR PRODUCT HAS BEEN APPROVED BY THE INTERNATIONAL CODE COUNCIL (ICC) AND THE ICC REPORT IS SUBMITTED WITH
- 12. THE ENGINEER SHALL NOT HAVE CONTROL NOR CHARGE OF, AND SHALL NOT BE RESPONSIBLE FOR, CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES, FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSION OF THE CONTRACTOR, SUBCONTRACTOR, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- PERIODIC SITE OBSERVATION BY FIELD REPRESENTATIVES OF 360 ENGINEERING GROUP, PLLC. IS SOLELY FOR THE PURPOSE OF BECOMING GENERALLY FAMILIAR WITH THE PROGRESS AND QUALITY OF THE WORK COMPLETED AND DETERMINING, IN GENERAL, IF THE WORK OBSERVED IS BEING PERFORMED IN A MANNER INDICATING THAT THE WORK, WHEN FULLY COMPLETED, WILL BE IN ACCORDANCE WITH THE STRUCTURAL CONTRACT DOCUMENTS. THIS LIMITED SITE OBSERVATION SHOULD NOT BE CONSTRUED AS AN EXHAUSTIVE OR CONTINUOUS CHECK OF THE QUALITY OR QUANTITY OF THE WORK, BUT RATHER PERIODIC IN AN EFFORT TO GUARD THE OWNER AGAINST DEFECTS OR DEFICIENCIES IN THE WORK OF THE CONTRACTOR.

## DIVISION 2 - FOUNDATIONS

- FOOTINGS SHALL BEAR EITHER ON COMPETENT NATIVE SOIL OR COMPACTED STRUCTURAL FILL.
   EXTERIOR AND EXTERIOR PERIMETER FOOTINGS SHALL BEAR NOT LESS THAN 24 INCHES BELOW FINISH GRADE UNLESS
  OTHERWISE SPECIFIED BY A GEOTECHNICAL ENGINEER AND/OR BUILDING OFFICIAL. IF THE SOIL AT THE BEARING ELEVATIONS
  SHOWN IS OF QUESTIONABLE BEARING VALUE, THE STRUCTURAL ENGINEER OF RECORD OR ARCHITECT SHALL BE NOTIFIED
- 3. PROVIDE A MINIMUM OF A 4-INCH CLEAN, FREE-DRAINING GRANULAR SUBBASE FILL BELOW ALL INTERIOR SLABS-ON-GRADE UNLESS NOTED OR DETAILED OTHERWISE. SUBBASE SHALL MEET GRADATION REQUIREMENTS OF ASTM C-33 SIZE NO. 67, UNLESS SPECIFICALLY NOTED OTHERWISE.
- 4. A 15-MIL MINIMUM POLYETHYLENE FILM VAPOR RETARDER, MEETING THE REQUIREMENTS IN THE SPECIFICATIONS, SHALL BE PLACED BELOW ALL INTERIOR SLABS-ON-GRADE.
- 5. THE CONTRACTOR IS CAUTIONED AGAINST LOADING SLAB-ON-GRADE WITH CONSTRUCTION EQUIPMENT. THE SLAB HAS NOT BEEN DESIGNED FOR CONSTRUCTION EQUIPMENT AND MAY REQUIRE AN INCREASE IN SLAB THICKNESS AND/OR REINFORCEMENT. IF THE CONSTRUCTION LOADING EXCEEDS THE DESIGN LOADS SHOWN IN THE DESIGN CRITERIA, THE CONTRACTOR IS REQUIRED TO SUBMIT CALCULATIONS SIGNED AND SEALED BY A REGISTERED STRUCTURAL, CIVIL, OR GEOTECHNICAL ENGINEER IN THE STATE WHERE THE PROJECT IS LOCATED VERIFYING THE ADEQUACY OF THE SLAB.
- EXTERIOR FOOTINGS FOR STAIRS AND RAMPS SHALL BEAR AT OR BELOW MINIMUM BEARING DEPTH.
   FOUNDATION WALLS SHALL HAVE ADEQUATE TEMPORARY BRACING INSTALLED BY THE CONTRACTOR BEFORE BACKFILL IS PLACED AGAINST THEM. TEMPORARY BRACING SHALL NOT BE REMOVED UNTIL WALL IS PERMANENTLY BRACED.

#### **DIVISION 4 - MASONRY**

- 1. CONCRETE MASONRY UNITS SHALL MEET ASTM SPECIFICATION C90, GRADE N TYPE 1 BLOCK WITH A MINIMUM UNIT COMPRESSIVE STRENGTH OF 1900 PSI. THE SPECIFIED DESIGN COMPRESSIVE STRENGTH OF THE CONCRETE MASONRY
- ASSEMBLY SHALL BE 1,900 PSI.

  2. MORTAR SHALL MEET ASTM SPECIFICATION C270 FOR TYPE "S" MORTAR.
- GROUT SHALL MEET ASTM SPECIFICATION C476 AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2,000 PSI.
   GROUT PLACED BY THE LOW LIFT GROUTING METHOD SHALL BE MECHANICALLY CONSOLIDATED USING A VIBRATOR WITH A
- MAXIMUM 3/4 INCH DIAMETER HEAD.

  5. HORIZONTAL JOINT REINFORCEMENT SHALL BE LADDER TYPE (REFERENCE SPECIFICATION). JOINT REINFORCEMENT SHALL BE SPACED AT 8 INCHES ON CENTER BELOW FINISHED FLOOR AND IN PARAPETS, AND 16 INCHES ON CENTER ABOVE FINISHED FLOOR.
- CONCRETE MASONRY SHALL BE LAID IN RUNNING BOND.
- 7. CONCRETE MASONRY BELOW FINISHED FLOOR SHALL BE NORMAL WEIGHT UNITS AND SHALL HAVE ALL THE CELLS FULLY GROUTED. CONCRETE MASONRY ABOVE FINISHED FLOOR SHALL BE MEDIUM WEIGHT OR LIGHT WEIGHT AND IS TO BE
- GROUTED AT REINFORCED CELLS AND BOND BEAMS. ALL CELLS WITH REINFORCING SHALL BE GROUTED SOLID.

  8. REFER TO WALL SECTIONS AND DETAILS FOR MISCELLANEOUS BOND BEAM LOCATIONS AND EMBEDDED ITEMS. USE OPEN KNOCK OUT BOND BEAM BLOCK. DO NOT USE THROUGH TYPE BLOCKS FOR BOND BEAMS. DO NOT CONTINUE BOND BEAM
- REINFORCING THROUGH CONTROL JOINTS.

  9. REINFORCING STEEL SHALL MEET ASTM SPECIFICATION A615, GRADE 60.
- 10. ANCHORS INSTALLED IN GROUT FILLED CONCRETE MASONRY UNITS SHALL BE USED WHERE SPECIFIED ON THE DRAWINGS. ANCHORS MUST BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS. USE HILTI HY-270 ADHESIVE ANCHORING SYSTEM OR HILTI KWIK BOLT 3 EXPANSION ANCHOR, REFERENCE DETAILS FOR ANCHOR SIZE AND EMBEDMENT. SUBSTITUTIONS TO THE SPECIFIED ANCHORS MUST BE APPROVED BY THE ENGINEER OF
- 11. CONSTRUCTION BRACING FOR MASONRY WALLS SHALL BE DESIGNED AND DETAILED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED.

	BRICK LINTEL SCHEDULE		
CLEAR SPANS (S)	ANGLE SIZE	BEARING (EACH EN	
S ≤ 7'-0"	L3 1/2x3 1/2x1/4	4"	
7'-0" < S ≤ 9'-0"	L5x3 1/2x1/4 (LLV)	6"	
9'-0" < S ≤ 10'-8"	L6x3 1/2x5/16 (LLV)	6"	
10'-8" < S ≤ 12'-0"	BENT PL 5/16x3 1/2x7 (LLV)	6"	

## **DIVISION 3 - CONCRETE**

- 1. ALL CONCRETE SHALL CONFORM TO THE SPECIFICATIONS FOR STRUCTURAL CONCRETE, ACI 301.
- CONTRACTOR SHALL FOLLOW ACI 306.1 FOR COLD WEATHER CONCRETE PLACEMENT AND CURING GUIDELINES.
   ARRANGEMENTS AND DETAIL OF REINFORCING BENDS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF PUBLICATION SP-66, "ACI DETAILING MANUAL" AND ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE."
- 4. UNLESS NOTED OTHERWISE, BAR SPLICES SHALL BE CLASS B TENSION LAPS AND SHALL BE LAPPED WITH MINIMUM LENGTHS A LISTED IN THE LAP LENGTH SCHEDULE, WHERE REQUIRED IN REINFORCING. SHORTER LAPS MAY BE ACCEPTABLE IF SPECIFIC LOCATIONS OF ALTERNATE LAPS ARE SHOWN ON THE REINFORCING PLACEMENT DRAWINGS AND CALCULATIONS ARE SUBMITTED BY A REGISTED PROFESSIONAL ENGINEER, LICENSED TO PRACTICE IN THE STATE IN WHICH THE PROJECT IS
- LOCATED, JUSTIFYING THE ALTERNATE LAP LENGTHS.

  PROVIDE SUITABLE WIRE SPACERS, CHAIRS, TIES, ETC. FOR SUPPORTING REINFORCING STEEL IN THE PROPER POSITION
- BEFORE PLACING CONCRETE. DO NOT "WET STICK" DOWELS.

  6. ALL WELDED WIRE FABRIC SHALL BE LAPPED A MINIMUM OF 12" AT THE SIDES AND ENDS.
- 7. LOCATIONS AND SIZES OF OPENINGS, SLEEVES, ETC. REQUIRED FOR OTHER TRADES MUST BE VERIFIED BY THESE TRADES BEFORE PLACING CONCRETE.
- ALL SLOTS, SLEEVES, TRENCHES AND OTHER EMBEDDED ITEMS SHALL BE SET AND SECURED AGAINST MOVEMENT BEFORE T CONCRETE IS PLACED. SEE ARCHITECTURAL, ELECTRICAL, MECHANICAL, PLUMBING, AND VENDOR DRAWINGS FOR SIZES, AND LOCATIONS. COORDINATE LOCATIONS, SPACINGS, AND SIZES WITH THE STRUCTURAL ENGINEER OF RECORD PRIOR TO PLAC CONCRETE.
- 9. AS PART OF THE SUBMITTAL PROCESS, THE ELECTRICAL AND MECHANICAL CONTRACTOR(S) SHALL SUBMIT PROPOSED ROUTING PLAN FOR ALL PIPES, CONDUITS, OR OTHER DEVICES TO BE EMBEDDED IN THE CONCRETE. THE SUBMITTAL SHALL SHOW SPECIFIC SIZES AND LOCATIONS OF ALL PROPOSED EMBED ITEMS REFERENCING PROXIMITY TO BEAM, COLUMN, AND SLAB EDGES. NO ITEMS SHALL BE ALLOWED TO BE EMBEDDED IN THE CONCRETE WITHOUT PRIOR WRITTEN APPROVAL FROM
- SLAB EDGES. NO ITEMS SHALL BE ALLOWED TO BE EMBEDDED IN THE CONCRETE WITHOUT PRIOR WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER OF RECORD.

  10. CONDUITS AND PIPES EMBEDDED IN CONCRETE SLABS MAY BE NO LARGER THAN 1/3 OF THE SLAB THICKNESS (BASED ON THE MAYIMUM OUTSIDE DIAMETER) AND SHALL HAVE A CENTER TO CENTER SPACING NO LESS THAN THREE (3) CONDUIT DIAMETER.
- MAXIMUM OUTSIDE DIAMETER) AND SHALL HAVE A CENTER-TO-CENTER SPACING NO LESS THAN THREE (3) CONDUIT DIAMETER REGARDLESS OF DIAMETER, THE MINIMUM CLEAR SPACING BETWEEN CONDUITS OR REINFORCING SHALL BE (1) INCH.

  11. NO MORE THAN FOUR CONDUITS MAY BE PLACED ADJACENT TO EACH OTHER WITHOUT PRIOR APPROVAL IN WRITING FROM TH
- STRUCTURAL ENGINEER OF RECORD.

  12. NO ALUMINUM CONDUITS, DEVICES, OR FIXTURES MAY BE EMBEDDED INTO THE CONCRETE SO THAT THE ALUMINUM IS IN DIRECT CONTACT WITH THE CONCRETE.
- 13. CORNER BARS SHALL BE PROVIDED FOR ALL HORIZONTAL REINFORCING BARS AT THE INTERSECTIONS AND CORNERS OF ALL STRIP FOOTINGS, BEAMS, AND WALLS UNLESS NOTED OTHERWISE. CORNER BARS SHALL BE OF THE SAME SIZE AND GRADE AS THE HORIZONTAL REINFORCING THEY CONNECT. MINIMUM LAP LENGTHS SHALL BE AS INDICATED ABOVE UNLESS NOTED OTHERWISE.
- 14. CONTINUE HORIZONTAL WALL BARS THROUGH PILASTERS, COLUMNS AND INTERSECTING WALLS. AT SLAB AND WALL OPENINGS PROVIDE A MINIMUM OF TWO #5 BARS OVER, UNDER AND AT THE SIDES OF THE OPENINGS. EXTEND THESE BARS LAP DISTANCI OR A MINIMUM OF 2'-0" PAST THE OPENING. PROVIDE ONE #5 FOR SINGLE-LAYER REINFORCING AND TWO #5 FOR DOUBLE-LAYER REINFORCING, 4'-0" LONG, DIAGONALLY AT EACH CORNER OF ALL OPENINGS. REFER TO TYPICAL DETAILS FOR DISPOSITION OF CORNER BARS AND BARS IN SMALL WALL SECTIONS. SLAB BARS SHALL BE HOOKED INTO WALLS, OR HOOKED DOWELS SHALL BE PROVIDED TO MATCH SLAB REINFORCING. PROVIDE TWO #4, 4'-0" LONG DIAGONALLY AT EACH RE-ENTRANT CORNER IN SLABS. PROVIDE HOOKED DOWELS FROM FOOTINGS TO MATCH VERTICAL WALL REINFORCING.
- 15. FOR EXTERIOR RETAINING WALLS AND BUILDING STEM WALLS EXPOSED TO VIEW ACROSS THE LENGTH OF WALL, PROVIDE FORMED "V" CONTROL JOINTS AT 15'-0" OC MAX, SEE CONTROL JOINT DETAIL.
- 16. HEADED SHEAR STUDS SHALL BE NELSON HEADED ANCHORS WITH FLUXED ENDS (ICC ESR-2856) OR APPROVED. DEFORMED BAR ANCHORS (D.B.A.) SHALL BE NELSON, TYPE D2L (ICC ESR-2907), OR APPROVED. STUDS AND D.B.A. SHALL BE AUTOMATICALLY END-WELDED WITH THE MANUFACTURER'S STANDARD EQUIPMENT IN ACCORDANCE WITH THEIR RECOMMENDATIONS. PERMANENTLY EXPOSED EMBEDDED PLATES AND ANGLES SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION, UNLESS OTHERWISE NOTED. NO LOADS OR WELDS SHALL BE PLACED ON EMBEDDED PLATES OR ANGLES FOR A MINIMUM OF 7 DAYS AFTER CASTING.
- 17. ANCHORS INSTALLED IN HARDENED CONCRETE SHALL BE USED WHERE SPECIFIED ON THE CONTRACT DRAWINGS. ALL ANCHORS SHALL BE INSTALLED IN STRICT CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS. DO NOT CUT REINFORCING IN NEW OR EXISTING CONCRETE DURING INSTALLATION. ANCHORS EXPOSED TO EARTH OR WEATHER SHALL BE PROTECTED FROM CORROSION BY HOT-DIP GALVANIZING OR USE OF STAINLESS STEEL. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER-OF-RECORD PRIOR TO INSTALLING POST-INSTALLED ANCHORS IN PLACE OF MISSING OR MISPLACED CAST-IN-PLACE ANCHORS. SUBSTITUTION REQUESTS FOR PRODUCTS OTHER THAN THOSE SPECIFIED ON

# MISPLACED CAST-IN-PLACE ANCHORS. SUBSTITUTION REQUESTS FOR PRODUCTS OTHER THAN THOSE SPECIFIED ON CONTRACT DRAWINGS SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER-OF-RECORD ALONG WITH CALCULATION THAT ARE SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR PREPARATION AND LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED.

					CONCRETE CO	MPRESSION ST	TRENGTH (PSI)	
				3,000	4,000	5,000	8,000	
	CASE #1	BARS <u>&lt;</u> #6	TOP OTHER	<u>57 DB</u> 44 DB	<u>49 DB</u> 38 DB	<u>44 DB</u> 34 DB	<u>35 DB</u> 27 DB	
CLASS A	CAS	BARS <u>&gt;</u> #7	TOP OTHER	<u>71 DB</u> 55 DB	<u>62 DB</u> 47 DB	<u>55 DB</u> 42 DB	<u>44 DB</u> 34 DB	
CLA	CASE #2	BARS <u>&lt;</u> #6	<u>TOP</u> OTHER	<u>85 DB</u> 66 DB	<u>74 DB</u> 57 DB	66 DB 51 DB	<u>53 DB</u> 41 DB	
	CAS	BARS <u>&gt;</u> #7	TOP OTHER	<u>107 DB</u> 82 DB	92 DB 71 DB	83 DB 64 DB	66 DB 51 DB	
	CASE #1	BARS <u>&lt;</u> #6	TOP OTHER	<u>74 DB</u> 57 DB	64 DB 49 DB	<u>57 DB</u> 44 DB	46 DB 35 DB	
SS B	CAS	BARS <u>&gt;</u> #7	TOP OTHER	<u>93 DB</u> 71 DB	80 DB 62 DB	<u>72 DB</u> 55 DB	<u>57 DB</u> 44 DB	
CLASS B	CASE #2	BARS <u>&lt;</u> #6	TOP OTHER	<u>111 DB</u> 85 DB	<u>96 DB</u> 74 DB	86 DB 66 DB	68 DB 53 DB	
	CAS	BARS <u>&gt;</u> #7	TOP OTHER	139 DB 107 DB	120 DB 92 DB	108 DB 83 DB	86 DB 66 DB	

WIILKE.	
DB:	DIAMETER OF REINFORCING BAR
CLASS A:	CLASS A TENSION SPLICE
CLASS B:	CLASS B TENSION SPLICE
CASE #1:	CLEAR SPACING GREATER THAN OR EQUAL TO 2*db AND COVER GREATER THAN OR EQUAL TO db.
CASE #2:	CLEAR SPACING LESS THAN 2*db OR COVER LESS THAN db.
TOP:	WHERE HORIZONTAL REINFORCEMENT IS PLACED SUCH THAT MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST BELOW THE DEVELOPMENT LENGTH OR SPLICE.
OTHER:	OTHER CONDITION NOT SATISFYING TOP QUALIFICATION (BOTTOM HORIZONTAL REINFORCING)

## GENERAL CONCRETE MIX NOTES I. ALL TENSION SPLICES SHALL BE CONTACT CLASS B SPLICES UNLESS NOTED OTHERWISE. SPLICE LENGTH SHALL NOT

- BE LESS THAN 12 INCHES.

  SPLICE LENGTHS IN TABLE ARE FOR SINGLE BAR SPLICES WITH MAXIMUM YIELD STRENGTH OF 60 KSI NON-EPOXY REINFORCING BARS.
- 3. FOR REINFORCING WITH A SPECIFIED YIELD STRENGTH GREATER THAN 60 KSI MULTIPLY SPLICE LENGTH BY (SPECIFIED YIELD STRENGTH/ 60 KSI)
- 4. FOR INDIVIDUAL BARS WITHIN A BUNDLE LAB LENGTHS SHALL BE MULTIPLIED BY 1.33 FOR FOUR BUNDLES AND 1.20 FOR THREE BAR BUNDLES. INDIVIDUAL SPLICES WITHIN A BUNDLE SHALL NOT OVERLAP. ENTIRE BUNDLE SHALL NOT BE LAP
- BARS LARGER THAN #11 SHALL NOT BE LAP SPLICED. FOR BARS LARGER THAN #11, MECHANICAL SPLICE SHALL BE USED. MECHANICAL SPLICES SHALL HAVE STRENGTH GREATER THAN OR EQUAL TO 125% THE YIELD STRENGTH OF THE REINFORCING BAR. MECHANICAL SPLICES SHALL BE STAGGERED.
   WHERE BAR OF DIFFERENT SIZE ARE LAP SPLICED IN TENSION THE MINIMUM SPLICE LENGTH SHALL BE THE LARGER
- 6. WHERE BAR OF DIFFERENT SIZE ARE LAP SPLICED IN TENSION THE MINIMUM SPLICE LENGTH SHALL BE THE LARGER OF THE LENGTH OF A CLASS B TENSION SPLICE OR THE SMALLER BAR, OR THE LENGTH OF A CLASS A TENSION LAP SPLICE OF THE LARGER BAR.
- LAP SPLICES ARE NOT PERMITTED WHERE MINIMUM CLEARANCE BETWEEN REINFORCING CANNOT BE MAINTAINED.
   LAP SPLICE LENGTH SHALL NOT BE LESS THAN THE LARGER OF 12 INCHES MULTIPLIED BY ALL APPLICABLE MULTIPLIERS OR THE TABLE LENGTH MULTIPLIED BY ALL APPLICABLE MULTIPLIERS.

REQUIRED CONCRETE COVER FOR NON-FIRE-RATED ASSEMBLIES			
ASSEMBLY	COVER (IN)		
		OOVER (IIV)	
CONCRETE CAST AGAINST & PERMANENTLY EXPOSED TO EARTH		3	
CONCRETE EXPOSED TO EARTH OR WEATHER	#6 AND GREATER	2	
	#5 AND SMALLER	1 1/2	
CONCRETE NOT EXPOSED TO EARTH OR WEATHER	WALLS, SLABS #14 AND GREATER	1 1/2	
	WALLS, SLABS #11 AND SMALLER	3/4	
	COLUMNS, BEAMS, GIRDERS	1 1/2	

PRIMARY REINFORCEMENT, TIES, STIRRUPS, AND SPIRALS

	CONCRETE	MATERIALS DESIGNATION
ON	MATERIAL	STANDARD
	PORTLAND CEMENT	ASTM C150, TYPE 1 OR TYPE II
IS AS	FLY ASH	ASTM C618, CLASS C OR F
IC	AGGREGATE	ASTM C33
	WATER	POTABLE
	WATER REDUCING ADMIXTURE	ASTM C494, TYPE A OR D
	HIGH RANGE WATER REDUCING ADMIXTURE	ASTM C494, TYPE F OR G
	ACCELERATOR ADMIXTURE	ASTM C290, TYPE C OR E
	AIR ENTRAINING ADMIXTURE	ASTM C260
'		
THE	CURING COMPOUND	ASTM C309, TYPE I, CLASS A
ND	REINFORCING BARS	ASTM A615 GRADE 60 (SPECIFIED YIELD STRENGTH = 60 KSI
CING	WELDED REINFORCING BARS	ASTM 706 GRADE 60 (SPECIFIED YIELD STRENGTH = 60 KSI)
	EPOXY COATED REINFORCING BARS	EPOXY COATED REINFORCING BARS

1. TYPE III PORTLAND CEMENT MAY BE USED IF ACCEPTABLE TO THE ARCHITECT.

APOR RETARDER BELOW SLAB-ON-GRADE | ASTM E1745 CLASS A

	CONCRETE I	MIX DESI	GN RE	QUIRE	EMENTS		
ELEMENT	f'c (psi)	CEMENT TYPE	MAX W/C	MAX AGG	AIR CONTENT 1,2	SLUMP 4	EXPOSURE
DRILLED PIERS	3000, NW	II	0.59	1 1/2"		6"	F0,W0,C0,S0
FOOTINGS AND GRADE BEAMS	3000, NW	1/11	0.50	1 1/2"		4"	F0,W0,C0,S0
FOUNDATION WALLS AND PILASTERS SUPPORTING CONCRETE COLUMNS	5000, NW	I/II	0.40	1"		4"	F1,W0,C0,S0
INTERIOR SLAB ON GRADE	3500, NW	1/11	0.50	1"		4"	F0,W0,C0,S0
COLUMNS, SHEAR AND BEARING WALLS	5000 OR 8000, NW	1/11	0.40	1"		4"	F0,W0,C0,S0
STRUCTURAL SLABS, BEAMS AND JOISTS	5000, NW	1/11	0.45	1"		4"	F0,W0,C0,S0
STEEL STAIR PANS (SLABS ON NON-COMPOSITE DECK)	3000, NW	1/11	0.50	1/2"		4"	F0,W0,C0,S0
EXTERIOR STRUCTURAL CONCRETE (INCLUDING SITE RETAINING WALLS)	4500, NW	1/11	0.45	1"	6	4"	F1,W0,C0,S0
SIDEWALKS	3500, NW	1/11	0.55	1"	6	4"	F1,W0,C0,S0
TABLE FOOTNOTES							

1. MINIMUM AIR CONTENT EQUALS 5% IF CONCRETE IS EXPOSED TO FREEZING TEMPERATURE AND MOISTURE REGARDLESS OF VALUE INDICATED IN TABLE.

- 2. TOLERANCE ON AIR CONTENT AS DELIVERED SHALL BE+/-1.5% FOR f"c<= 5000 PSI, 1.0% FOR f"c>5000 PSI
- 3. REFER TO SPECIFICATIONS FOR MAXIMUM SHRINKAGE
- SLUMP TOLERANCES AS FOLLOWS (ACI 117) SPECIFIED SLUMP NOT GREATER THAN 4" = +/- 1"
- SPECIFIED SLUMP MORE THAN 4" = +/- 1"
- WHERE SLUMP IS SPECIFIED AS A RANGER = NO TOLERANCE SEE ACI 301 FOR SLUMP OF CONCRETE BEFORE ADDITION OF PLASTICIZERS OR HIGH-RANGE WATER
- REDUCING ADMIXTURES

#### GENERAL CONCRETE MIX NOTES

REQUIREMENTS

- STRENGTH (f'c) IS THE 28 DAY COMPRESSIVE STRENGTH AT 28 DAYS UNLESS NOTED OTHERWISE OR COMPRESSIVE STRENGTH AT THE SPECIFIED AGE.
- 2. CONCRETE IS NORMAL WEIGHT CONCRETE UNLESS NOTED OTHERWISE. NORMAL WEIGHT CONCRETE (NW) SHALL HAVE A DRY DENSITY OF 145 ± 5 PCF UNLESS NOTED OTHERWISE.
- MIX DESIGNS SHALL BE IN ACCORDANCE WITH ACI 301.
   EXPOSURE CLASS INDICATES THE SEVERITY OF THE ANTICIPATED EXPOSURE OF CONCRETE MEMBERS FOR EACH EXPOSURE INDICATED BELOW ACCORDING TO ACI 318/ACI 301
- FREEZE THAW EXPOSURE NOTED THUS: F0, F1, F2, F3
  WATER-SOLUBLE SULFATE IN SOIL EXPOSURE NOTED THUS: S0, S1, S2, S3
  PERMEABILITY REQUIREMENTS NOTED THUS: W0, W1
- 5. CORROSION PROTECTION OF REINFORCEMENT NOTED THUS: C0, C1,C2
  REFER TO ACI 301/ ACI 318 FOR SPECIFIC REQUIREMENTS BASED ON THE EXPOSURE CATEGORY
  INDICATED IN THE MIX DESIGN TABLE ABOVE.
- CORROSION PROTECTION OF REINFORCEMENT REQUIREMENTS (C0, C1, C2):
   MAXIMUM WATER-SOLUBLE CHLORIDE ION (CL-) CONTENT IN CONCRETE, BY % WEIGH
- MAXIMUM WATER-SOLUBLE CHLORIDE ION (CL-) CONTENT IN CONCRETE, BY % WEIGHT OF CEMENT REINFORCED CONCRETE C0= 1.0 C1= 0.3 C2= 0.15

  7. WHERE CONCRETE IS EXPOSED TO F3 FREEZE THAW EXPOSURE, RESTRICTIONS ON MAXIMUM FLY ASH AND/OR OTHER CEMENTITIOUS MATERIALS APPLY. REFER TO TABLE 4.4.2 IN ACI 318 FOR

CONCRETE REINFORCING TENSION CONTACT SPLICE LENGTHS

FOR CON	NCRETE COMPRESSI	ON STRENGTH 4000	) PSI CASE 1
BAR SIZE	LAP CLASS	TOP BARS	OTHER BARS
#3	A	19"	14"
#3	В	24"	19"
#4	A	25"	19"
#4	В	32"	25"
#5	A	31"	24"

#3	В	24"	19"
#4	Α	25"	19"
#4	В	32"	25"
#5	A	31"	24"
#5	В	40"	31"
#6	Α	37"	29"
#6	В	48"	37"
#7	Α	54"	42"
#7	В	70"	54"
#8	Α	62"	48"
#8	В	80"	62"

1. THE TABLE ABOVE IS FOR CONCRETE COMPRESSION STRENGTH OF 5000PSI AND CASE #1 REINFORCEMENT

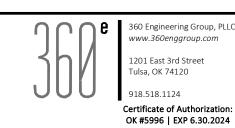
- 2. THE TABLE ABOVE IS FOR CASE #1 REINFORCEMENT WITH CLEAR SPACING GREATER THAN 2\*db AND COVER GREATER THAN OR EQUAL TO db
- 3. TOP BARS ARE HORIZONTAL REINFORCEMENT PLACED SUCH THAT MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST BELOW THE DEVELOPMENT LENGTH OR SPLICE. ALL TENSION SPLICES SHALL BE CLASS BISDLOGS LINESS NOTED OTHERWISE.

	SHALL BE CLASS B SPLICES UNLESS NOTED OTHERWISE.
l.	OTHER BARS ARE REINFORCEMENT OTHER THAN TOP BARS.

APPROVED POST INSTALLED ANCHORS				
ANCHORS	TYPE	ALTERNATE		
EXPANSION	HILTI KWIK BOLT TZ (ICC ESR-1917)	SIMPSON STRONG BOLT 2 (ICC ESR-3037)		
CONCRETE SCREW	HILTI KWIK HUS-EZ (ICC-3027)	SIMPSON TITEN HD (ICC ESR-2713)		
FPOXY ADHESIVE	HILTLHIT RE-500 SD (ICC ESR-3814)	SIMPSON SET-XP (ICC ESR-2508)		

NOTE: THE SPECIFIC APPLICATION OF EACH POST INSTALLED TO BE APPROVED BY ENGINEER BEFORE

CONTRACTOR TO INCLUDE AN ALLOWANCE OF UP TO 2 TONS OF INSTALLED REINFORCING STEEL TO BE PLACED AT THE ENGINEERS DIRECTION.





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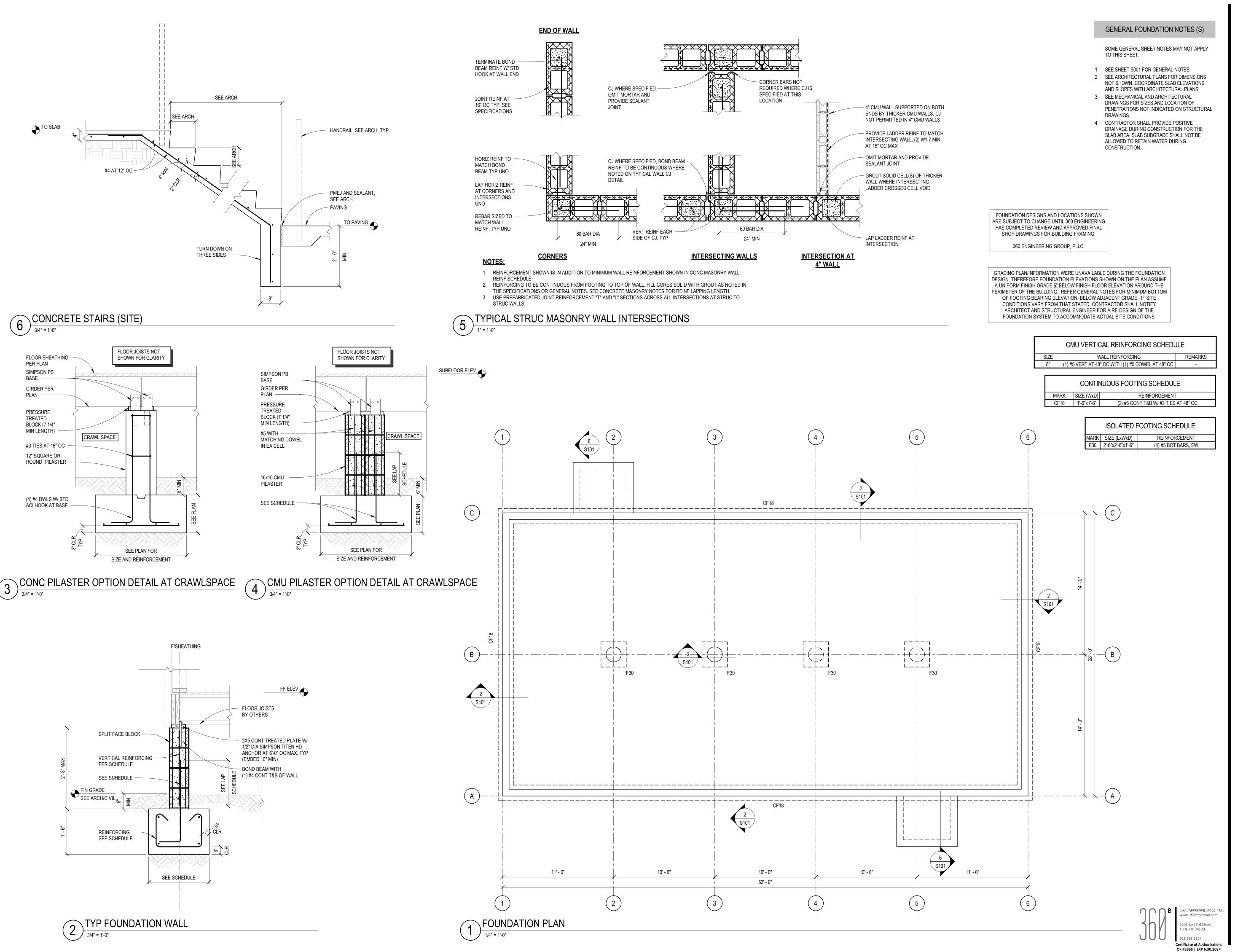
GENERAL NOTES

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