

GENERAL STRUCTURAL NOTES

GENERAL

1. THESE GENERAL NOTES SUPPLEMENT THE REQUIREMENTS OF THE PROJECT SPECIFICATIONS. IN CASE OF CONFLICT WITH THE SPECIFICATIONS, CONTACT THE OWNER'S REPRESENTATIVE PRIOR TO PROCEEDING WITH THE WORK.
2. THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE SITE AND LOCAL CONDITIONS.
3. CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH LOCAL BUILDING CODES, CODES OF APPLICABLE REGULATORY AGENCIES, AND WITH PROJECT SPECIFICATIONS AND DRAWINGS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF ALL TRADES AND FOR CHECKING ALL DIMENSIONS. REPORT DISCREPANCIES TO THE OWNER'S REPRESENTATIVE FOR CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK.
5. THE CONTRACTOR SHALL COMPLY WITH LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY BEARING UPON THE PERFORMANCE OF THE WORK.
6. SUBJECT TO THE STRUCTURAL ENGINEER'S ACCEPTANCE, UTILIZE DETAILS FOR SIMILAR CONDITIONS WHEN DETAILS FOR CONSTRUCTION ARE NOT INDICATED FOR A SPECIFIC CONDITION.
7. DETAILS ON SHEETS TITLED "TYPICAL DETAILS" APPLY TO SITUATIONS OCCURRING ON THE PROJECT THAT ARE THE SAME OR SIMILAR TO THOSE SPECIFICALLY REFERENCED. TYPICAL DETAILS ARE NOT NOTED AT EACH LOCATION AT WHICH THEY ARE APPLICABLE.
8. WHERE NOT INDICATED ON THE STRUCTURAL DRAWINGS, SEE THE ARCHITECTURAL, CIVIL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION, AND ANY OTHER DRAWINGS FOR:

ELEVATIONS AND SLOPES,
SIZE, LOCATION AND EXTENT OF CURBS, FLOOR DEPRESSIONS, AND TOPPING SLABS,
SIZE AND LOCATION OF DRAINS, TRENCHES, SLAB OPENINGS, AND WALL OPENINGS,
SIZE, TYPE AND LOCATION OF NON-LOAD BEARING PARTITIONS,
CONCRETE AND STEEL FINISHES,
SIZE AND LOCATION OF SLEEVES AND HANGERS,
ITEMS EMBEDDED IN THE STRUCTURE OR PENETRATING THE STRUCTURE,
CONNECTION OF ARCHITECTURAL, CIVIL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE
PROTECTION OR ANY OTHER ITEMS TO THE STRUCTURE AND CONNECTION OF ITEMS
NOT TYPICALLY DETAILED ON THE STRUCTURAL DRAWINGS,
WATERPROOFING AND DAMP PROOFING,
SITE AND SUBGRADE DRAINAGE SYSTEMS AND DETAILS.

9. CONNECTIONS OF ALL TRADES TO THE STRUCTURE SHALL BE DESIGNED AND DETAILED BY THE CONTRACTOR. CONNECTIONS TO STRUCTURAL MEMBERS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW. RESPONSIBILITY FOR THE PERFORMANCE OF THE SUPPLIED SYSTEM AND ASSOCIATED CONNECTIONS SHALL REMAIN THAT OF THE CONTRACTOR. ALL CONNECTIONS SHALL BE DESIGNED BY AN ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED. OPENINGS AND PENETRATIONS THROUGH STRUCTURAL ELEMENTS AND ITEMS EMBEDDED IN STRUCTURAL ELEMENTS THAT ARE NOT INDICATED ON THE STRUCTURAL DRAWINGS SHALL BE REVIEWED BY STRUCTURAL ENGINEER PRIOR TO IMPLEMENTING WORK.

10. DO NOT SCALE DRAWINGS TO DETERMINE DIMENSIONAL INFORMATION.

11. DO NOT PLACE MATERIALS OR EQUIPMENT ON UNFINISHED FLOORS OR ROOFS IN EXCESS OF 20 PSF NOR ON FINISHED FLOORS OR ROOFS IN EXCESS OF THE INDICATED DESIGN LIVE LOADS. AVOID IMPACT LOADING.

12. THE STRUCTURE WAS DESIGNED FOR THE IN-SERVICE CONDITIONS ONLY. THE METHODS, PROCEDURES AND SEQUENCES OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN AND ENSURE THE INTEGRITY OF THE STRUCTURE AT ALL STAGES OF CONSTRUCTION.

13. DRAWINGS DO NOT INDICATE TEMPORARY REQUIREMENTS. NEED FOR TEMPORARY SHORING AND BRACING, TEMPORARY DEWATERING, TEMPORARY EARTH RETENTION, TEMPORARY WATER CUTOFF OR OTHER TEMPORARY MEASURES MAY BE INDICATED ON DRAWINGS AT SELECTED AREAS AS SUGGESTIONS FOR THE CONTRACTOR'S CONVENIENCE. THE DRAWINGS DO NOT IDENTIFY AREAS OR CONDITIONS REQUIRING TEMPORARY MEASURES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM TEMPORARY MEASURES INDICATED ON THE DRAWINGS, IDENTIFY OTHER AREAS OR CONDITIONS REQUIRING TEMPORARY MEASURES, DETERMINE MOST EFFICIENT TEMPORARY SYSTEMS, AND DESIGN AND CONSTRUCT REQUIRED TEMPORARY SYSTEMS. ALL TEMPORARY SYSTEMS SHALL BE DESIGNED BY A LICENSED ENGINEER IN THE STATE IN WHICH THE PROJECT IS LOCATED.

15. INFORMATION RELATED TO EXISTING CONDITIONS REPRESENTS KNOWLEDGE BASED UPON INFORMATION PROVIDED BY THE OWNER BUT WITHOUT GUARANTEE OF ACCURACY. REPORT EXISTING CONDITIONS THAT VARY FROM THOSE SHOWN ON THE CONTRACT DOCUMENTS TO THE OWNER'S REPRESENTATIVE. DO NOT DEVIATE FROM THE CONTRACT DOCUMENTS WITHOUT WRITTEN DIRECTION FROM THE OWNER'S REPRESENTATIVE.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING CONSTRUCTION WHILE PERFORMING WORK. THE CONTRACTOR SHALL PROPERLY REINSTATE EXISTING FINISHES, FIREPROOFING OR ITEMS THAT ARE REMOVED OR DAMAGED WHILE PERFORMING WORK.

17. UNLESS NOTED OTHERWISE, ELEVATIONS ON THE DRAWINGS ARE RELATIVE TO THE ELEVATION OF THE FIRST FLOOR, WHICH IS PROJECT ELEVATION 0'-0". ELEVATION 0'-0" CORRESPONDS TO U.S.G.S. DATUM 000.00 FEET.

DESIGN CRITERIA

1. ALL CONSTRUCTION SHALL CONFORM TO THE MORE RESTRICTIVE OF THE FOLLOWING CODES, THE MOST RECENT EDITIONS OF THE STANDARDS ADOPTED BY THE AUTHORITY HAVING JURISDICTION AS REFERENCED THROUGHOUT THE STRUCTURAL GENERAL NOTES, AND THE FOLLOWING DESIGN CRITERIA:

2. BUILDING CODE: 2022 CALIFORNIA BUILDING CODE

3. BUILDING RISK CATEGORY (IBC TABLE 1604.5): II

4. DESIGN DEAD LOADS: SELF-WEIGHT OF MATERIALS AND SYSTEMS
ROOFS: 19 PSF SUPERIMPOSED TO STRUCTURE (INCLUDES 4 PSF PV PANELS)
FLOORS: 15 PSF SUPERIMPOSED TO STRUCTURE

5. DESIGN LIVE LOADS (REDUCIBLE WHERE ALLOWED PER BUILDING CODE):
ROOFS: 20 PSF
FLOORS (TYPICAL): 100 PSF
FLOORS AT SERVER ROOM: 150 PSF
FLOORS AT STORAGE ROOM: 125 PSF

6. DESIGN WIND LOADS:
LATERAL LOAD RESISTANCE SYSTEM (BUILDING CODE):
BASIC WIND SPEED: 92 MILES PER HOUR
WIND EXPOSURE: C
INTERNAL PRESSURE COEFFICIENT: +0.18, -0.18

7. DESIGN SEISMIC LOADS:
SITE CLASS: D
SEISMIC IMPORTANCE FACTOR, Ie: 1.0
MAPPED SPECTRAL RESPONSE ACCELERATION, Ss: 2.395g
MAPPED SPECTRAL RESPONSE ACCELERATION, S1: 0.839g
SPECTRAL RESPONSE COEFFICIENT, Sds: 1.597g
SPECTRAL RESPONSE COEFFICIENT, Sd1: 0.951g
SEISMIC DESIGN CATEGORY: E
BASIC SEISMIC-FORCE-RESISTING SYSTEM: SPECIAL REINFORCED MASONRY SHEAR WALLS
STEEL SPECIAL MOMENT FRAME
SEISMIC RESPONSE COEFFICIENT, Cs: 0.319
DESIGN BASE SHEAR: 0.319W
RESPONSE MODIFICATION FACTOR, R: 5
ANALYSIS PROCEDURE USED: EQUIVALENT LATERAL FORCE (ASCE 7 SECTION 12.8)
NON-STRUCTURAL COMPONENTS: PER ASCE7, THE SEISMIC DESIGN CATEGORY OF D
REQUIRES SEISMIC DESIGN FOR ARCHITECTURAL, MECHANICAL AND ELECTRICAL COMPONENTS. REFER TO RESPECTIVE DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

MODIFICATIONS TO EXISTING CONSTRUCTION

1. THE EXISTING CONSTRUCTION SHOWN ON THESE DRAWINGS IS PROVIDED FOR REFERENCE ONLY. EXISTING CONSTRUCTION SHALL BE VERIFIED IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ALL NEW CONSTRUCTION.

2. ANY EXISTING FINISHES REMOVED OR DAMAGED TO ACCOMPLISH ANY STRUCTURAL MODIFICATIONS SHALL BE REINSTATED AT THE COMPLETION OF MODIFICATION WORK, TYPICAL UNLESS NOTED OTHERWISE.

3. ANY STRUCTURAL STEEL OR REINFORCING BARS THAT HAVE BEEN CUT AND GROUND FLUSH WITH A CONCRETE SURFACE SHALL BE FINISHED WITH EPOXY PAINT.

4. THE FACE OF ALL NEW PERMANENT CONCRETE SURFACES CUT FROM EXISTING CONCRETE SHALL BE CLEANED WITH A HIGH PRESSURE WATER SPRAY. ALLOW SURFACES TO DRY THOROUGHLY. COAT THE CONCRETE SURFACES WITH A BONDING AGENT AND FINISH WITH AN ACCEPTABLE PATCHING COMPOUND. ALL EXPOSED REINFORCEMENT SHALL BE GROUND FLUSH WITH THE NEW CONCRETE SURFACE.

5. WHERE EXISTING CONCRETE REINFORCEMENT IS TO BE REUSED IN-PLACE, THE CONCRETE SHALL BE REMOVED IN A MANNER THAT MINIMIZES DAMAGE TO THE REINFORCEMENT. DAMAGED REINFORCEMENT SHALL BE REPLACED BY A METHOD ACCEPTABLE TO THE STRUCTURAL ENGINEER.

6. WHERE NEW CONCRETE IS TO BE CAST AGAINST EXISTING CONCRETE, THE CONTACT SURFACE SHALL BE ROUGHENED AND CLEANED WITH A HIGH PRESSURE WATER SPRAY. ALLOW TO DRY THOROUGHLY PRIOR TO APPLICATION OF EPOXY BONDING AGENT.

7. ANY NEW STRUCTURAL STEEL REINFORCEMENT BEAMS ADJACENT TO NEW SLAB OPENINGS SHALL BE FULLY INSTALLED PRIOR TO ANY CUTTING FOR THE OPENINGS.

8. PRIOR TO CUTTING OPENINGS IN ENTIRE SLAB SPANS, ALL ADJACENT SPANS SHALL BE SHORED TEMPORARILY OR AS INDICATED.

9. ANY EXISTING WALL OPENINGS TO BE INFILLED SHALL BE REINFORCED WITH BARS TO MATCH THOSE IN THE ADJACENT EXISTING CONCRETE. DOWELS FOR THOSE BARS SHALL BE PLACED INTO ADJACENT CONCRETE.

10. PRIOR TO CUTTING OPENINGS IN EXISTING WALLS, ANY ADJACENT IN-FILL WORK SHALL BE COMPLETED AND THE IN-FILL CONCRETE SHALL HAVE REACHED ITS REQUIRED 28-DAY COMPRESSIVE STRENGTH.

11. SAWCUTS FOR NEW WALL OPENINGS SHALL NOT EXTEND PAST THE REQUIRED DIMENSIONS FOR THE OPENING. CORE DRILL THE CORNERS AND EXTEND SAW CUTS INTO THE CORED AREAS AND NOT BEYOND IT. CHIP OUT THE REMAINDER AT THE CORNERS TO ACHIEVE A CLEAN 90 DEGREE CORNER.

12. THE LOCATION AND LENGTH OF ANY NEW STEEL FRAMING SHALL BE COORDINATED WITH THE EXISTING STEEL DECK SLABS AND ROOF DECK SUCH THAT THE NEW STRUCTURAL STEEL BEAM CENTERLINES CORRESPOND WITH THE RIBS OF THE STEEL DECK.

13. THE CONTRACTOR SHALL SUBMIT COORDINATED SHOP DRAWINGS TO THE STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO CUTTING OR ERECTION OF ANY NEW STRUCTURAL STEEL.

14. VERIFY ACCESSIBILITY TO THE BUILDING AND MAXIMUM WORKABLE MEMBER LENGTHS BEFORE COMMENCING WITH FABRICATION. IF THE NEW STRUCTURAL ELEMENTS CANNOT BE SHIPPED AND INSTALLED AS CONTINUOUS MEMBERS, ANY SPLICES SHALL CONSIST OF COMPLETE PENETRATION WELDING OF THE FLANGES AND PARTIAL PENETRATION WELDING OF THE WEB OF THE NEW BEAM. THE CONTRACTOR SHALL SUBMIT PROPOSED SPlice DETAILS AND LOCATIONS TO THE STRUCTURAL ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.

15. REMOVE ALL LOADS FROM THE SLAB DIRECTLY ABOVE THE AREAS WHERE NEW STEEL BEAMS ARE TO BE INSTALLED. PROVIDE SHORING UNDER EXISTING SLABS AND BEAMS PRIOR TO AND DURING CONSTRUCTION. ALL NEW STRUCTURAL STEEL SHALL BE IN PLACE PRIOR TO THE REMOVAL OF ANY EXISTING SLABS AND/OR SHORING.

16. PROVIDE NON-SHRINK GROUT AS REQUIRED FOR FULL BEARING OF THE EXISTING SLAB ON THE NEW BEAMS, UNLESS NOTED OTHERWISE.

17. REMOVE EXISTING FIREPROOFING LOCALLY AND CLEAN AREAS OF EXISTING STEEL TO BE WELDED. INSTALL NEW ULL APPROVED FIREPROOFING MATERIAL ON ALL NEW STEEL AND ANY AREAS WHERE FIREPROOFING WAS REMOVED OR DAMAGED DURING THE INSTALLATION OF THE WORK. NEW STEEL SHALL HAVE A FIRE RATING TO MATCH THE ADJACENT EXISTING STEEL, TYPICAL UNLESS NOTED OTHERWISE. REFER TO ARCHITECTURAL DOCUMENTS FOR REQUIRED FIRE RATINGS.

FOUNDATIONS - GENERAL

1. FOUNDATION DESIGN IS BASED ON RECOMMENDATIONS INCLUDED IN GEOTECHNICAL FOUNDATIONS REPORT NO. 04.62140143 BY FUGRO CONSULTANTS, INC DATED APRIL 2015.

2. ALL SUBGRADES AND EXCAVATIONS SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACING REINFORCING AND CONCRETE. NOTIFY THE GEOTECHNICAL ENGINEER WHEN THE SUBGRADES AND EXCAVATIONS ARE READY FOR INSPECTION.

3. ALL SUBGRADES SHALL BE PREPARED AND ALL FILL SHALL BE COMPACTED, AND MOISTURE CONTROLLED AS SPECIFIED IN THE GEOTECHNICAL REPORT AND THE PROJECT SPECIFICATIONS.

4. NO FOUNDATIONS SHALL BE PLACED ONTO OR AGAINST SUBGRADES CONTAINING FREE WATER, FROST OR ICE.

5. PLACE BACKFILL BEHIND RETAINING WALLS AFTER CONCRETE OR MASONRY HAS ATTAINED FULL DESIGN STRENGTH. BRACE RETAINING WALLS UNTIL ATTACHED FLOORS AND SLABS ON GRADE ARE COMPLETE AND HAVE ATTAINED FULL DESIGN STRENGTH. NO HEAVY EQUIPMENT SHALL BE ALLOWED WITHIN A 1H:1V SLOPE AS MEASURED FROM THE BASE OF THE WALL.

6. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE IMMEDIATELY IN THE EVENT THAT THE SOILS CONDITIONS ENCOUNTERED VARY FROM THOSE SHOWN ON THE BORING LOGS OF THE GEOTECHNICAL ENGINEERING REPORT.

7. THE CONTRACTOR SHALL DESIGN AND CONSTRUCT ALL TEMPORARY CASING, PROTECTION, SHORING, BRACING, DEWATERING, AND UNDERPINNING NECESSARY TO COMPLETE THE WORK. ALL TEMPORARY SYSTEMS SHALL BE DESIGNED BY AN ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED.

8. LOCATE AND PROTECT EXISTING UTILITIES TO REMAIN DURING AND AFTER CONSTRUCTION.

9. REMOVE ABANDONED FOUNDATIONS AND UTILITIES WHICH INTERFERE WITH NEW CONSTRUCTION UNLESS OTHERWISE INDICATED.

10. CONCRETE WORK BELOW GRADE SHALL BE DETAILED AS WATERTIGHT CONSTRUCTION. CONSTRUCTION JOINTS BELOW GRADE SHALL BE WATERTIGHT.

DRILLED PIERS

1. CONSTRUCTION OF DRILLED PIERS SHALL BE IN ACCORDANCE WITH ACI 336.1 "SPECIFICATION FOR THE CONSTRUCTION OF DRILLED PIERS".

2. THE PIER LENGTH NOTED ON THE DRAWINGS IS FOR ESTIMATING PURPOSES ONLY. THE FINAL BEARING ELEVATION IS TO BE DETERMINED IN THE FIELD BY THE GEOTECHNICAL ENGINEER. EACH DRILLED PIER SHALL BE INSPECTED FOR PROPER DIAMETER, ELEVATION, DESIGN BEARING MATERIAL, AND REINFORCING BEFORE PLACING ANY CONCRETE.

3. THE BOTTOMS OF PIER HOLES SHALL BE SMOOTH, DRY AND FREE OF ALL LOOSE MATERIAL BEFORE POURING CONCRETE, OR TREMIE PUMPING METHODS SHOULD BE USED TO PLACE CONCRETE FROM THE BOTTOM OF THE DRILLED SHAFTS AND TO DISPLACE GROUNDWATER OR SLURRY DURING CONCRETE PLACEMENT.

4. THE CONTRACTOR SHALL VERIFY THE DEPTH OF THE PIER PRIOR TO CUTTING PIER REINFORCING CAGES. VERTICAL PIER REINFORCING SHALL BE SPLICED WITH A CLASS B TENSION LAP SPlice. REINFORCING STEEL CAGES SHALL BE ADEQUATELY SUPPORTED TO PROVIDE CONCRETE COVER AND CLEARANCES INDICATED ON THE DRAWINGS.

5. THE CONTRACTOR SHALL MAKE ACCURATE MEASUREMENTS OF THE DEPTH OF THE BEARING STRATA AND THE DISTANCE OF PENETRATION INTO THE BEARING STRATA. A PIER LOG SHALL BE SUBMITTED TO THE ENGINEER OF RECORD INDICATING DEPTH OF PIERS AND THE DEPTH OF PENETRATION.

6. STEEL CASINGS SHALL BE USED WHERE NEEDED TO PREVENT EARTH FROM FALLING INTO THE EXCAVATION AND TO PREVENT GROUND WATER FROM INFILTRATING THE EXCAVATION. STEEL CASINGS MAY BE REMOVED, BUT A FIVE FOOT HEAD OF CONCRETE MUST BE MAINTAINED ABOVE THE BOTTOM OF THE CASING.

DRILLED PIERS CONTINUED

7. PIER HOLES SHALL BE CONCRETED WITHIN THE AMOUNT OF TIME AFTER DRILLING AS SPECIFIED IN THE GEOTECHNICAL REPORT. ANY HOLE LEFT OPEN FOR A LONGER AMOUNT OF TIME SHALL BE RE-DRILLED. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING SAFE CONDITIONS WITH OPEN PIER EXCAVATIONS.

8. THE DRILLED PIERS SHALL BE SOLID CONCRETE WITH NO SOIL INTRUSION. CONCRETE PLACING OPERATIONS SHALL BE CONTINUOUS WITHOUT ANY COLD JOINTS WITHIN THE DRILLED PIER. NO OBSTRUCTIONS SHALL BE PERMITTED TO REDUCE THE DIAMETER OF THE DRILLED PIER. ALL OBSTRUCTIONS MUST BE REMOVED.

9. THE CONCRETE MAY FREE FALL THE ENTIRE DEPTH OF THE DRILLED PIERS PROVIDED THE FALL OF THE CONCRETE IS NOT OBSTRUCTED BY ANCHOR BOLTS OR REINFORCING CAGE. VIBRATION OF CONCRETE FREE FALLING MORE THAN 20 FT IS NOT REQUIRED.

10. SUBMIT A DRILLED PIER PLACEMENT PLAN OF OPERATION, INCLUDING INFORMATION ON EARTH EXCAVATION, ROCK EXCAVATION, STEEL CASING AND DEWATERING OPERATIONS. THIS INFORMATION SHALL BE SUBMITTED FOR APPROVAL PRIOR TO THE COMMENCEMENT OF DRILLED PIER INSTALLATION.

11. CONTRACTOR SHALL PROVIDE SAFE ACCESS FOR PERSONNEL TO INSPECT THE BOTTOM OF THE DRILLED PIER EXCAVATION.

CONCRETE

1. ALL CONCRETE SHALL BE IN ACCORDANCE WITH ACI 318 "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" AND WITH ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS".

2. CONCRETE DETAILING SHALL BE IN ACCORDANCE WITH THE ACI DETAILING MANUAL SP-66 AND ACI 315 "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT". SUBMIT SHOP DRAWINGS FOR REVIEW.

3. CONCRETE PLACEMENT AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS".

4. PROVIDE ASTM C150 TYPE I OR TYPE II CEMENT UNLESS NOTED OTHERWISE. THE CEMENTITIOUS MATERIAL CONTENT SHALL BE ADEQUATE FOR THE SPECIFIED REQUIREMENTS FOR STRENGTH, WATER-CEMENTITIOUS MATERIAL RATIO, DURABILITY, WORKABILITY, AND FINISHABILITY.

5. PROVIDE NORMAL-WEIGHT CONCRETE WITH 28-DAY COMPRESSIVE STRENGTHS AS INDICATED:

FOOTINGS: 3000 PSI
DRILLED PIERS: 4500 PSI
GRADE BEAMS: 4500 PSI
SLABS ON GRADE: 4500 PSI
WALLS: 4000 PSI
EQUIPMENT PADS: 4000 PSI
CONCRETE ON STEEL DECK: 4000 PSI

6. ALL CONCRETE SLABS ON GRADE SHALL HAVE A MAXIMUM WATER-CEMENTITIOUS MATERIAL RATIO OF 0.45.

7. CONCRETE SHALL HAVE, AT THE POINT OF DELIVERY, A SLUMP OF 4 INCHES AS DETERMINED BY ASTM C143. SLUMP TOLERANCES SHALL MEET THE REQUIREMENTS OF ACI 117. WHEN A PLASTICIZING ADMIXTURE OR HIGH-RANGE WATER-REDUCING ADMIXTURE CONFORMING TO ASTM C494 IS PERMITTED TO INCREASE THE SLUMP OF CONCRETE, CONCRETE SHALL HAVE BEEN PROPORTIONED TO A SLUMP OF 2 TO 4 IN. BEFORE THE ADMIXTURE IS ADDED AND A MAXIMUM SLUMP OF 8 IN. AT THE POINT OF DELIVERY AFTER THE ADMIXTURE IS ADDED.

8. ADDITION OF WATER TO A CONCRETE BATCH WITH INSUFFICIENT SLUMP WILL NOT BE PERMITTED, UNLESS THE SUPPLIER HAS SPECIFICALLY WITHHELD WATER FROM THE BATCH AT THE PLANT. IN SUCH CASE, THE MIX DESIGN AND TRUCK TICKET MUST CLEARLY STATE THE MAXIMUM AMOUNT OF WATER THAT CAN BE ADDED TO THE CONCRETE BATCH ON SITE. IN NO CASE SHALL THE MAXIMUM WATER-CEMENTITIOUS MATERIAL RATIO BE EXCEEDED.

9. NO CHLORIDES AND/OR ADMIXTURES CONTAINING CHLORIDES SHALL BE USED IN ANY CONCRETE.

10. UNLESS A GREATER CONCRETE COVER IS REQUIRED FOR FIRE RESISTANCE, THE MINIMUM CONCRETE COVER FOR CAST-IN-PLACE CONCRETE REINFORCING STEEL SHALL CONFORM TO THE COVERS AS INDICATED:

CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3 INCHES
CONCRETE EXPOSED TO EARTH OR WEATHER:
NO. 6 BAR AND LARGER: 2 INCHES
NO. 5 BAR AND SMALLER: 1-1/2 INCHES
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:
SLABS, WALLS, JOISTS:
NO. 11 BAR AND SMALLER: 3/4 INCHES
BEAMS, COLUMNS:
PRIMARY REINFORCEMENT, TIES, STIRRUPS, SPIRALS: 1-1/2 INCHES

11. CHAMFER ALL EXPOSED CORNERS WITH 3/4 INCH, 45 DEGREE CHAMFERS.

12. PROVIDE FINISHES AS INDICATED IN THE PROJECT SPECIFICATIONS AND IN THE ARCHITECTURAL DRAWINGS.

13. JOINTS NOT INDICATED SHALL BE MADE AND LOCATED TO LEAST IMPAIR THE STRENGTH AND APPEARANCE OF THE STRUCTURE. HORIZONTAL JOINTS ARE NOT PERMITTED IN CONCRETE EXCEPT WHERE THEY NORMALLY OCCUR OR WHERE INDICATED. VERTICAL JOINTS SHALL OCCUR ONLY AT LOCATIONS ACCEPTED BY STRUCTURAL ENGINEER.

14. ROUGHEN CONCRETE SURFACES OF CONSTRUCTION JOINTS TO 1/4" INCH AMPLITUDE AND CLEAN OF LAITANCE, FOREIGN MATTER, AND LOOSE PARTICLES. LOCATE CONSTRUCTION JOINTS AS SHOWN ON THE DRAWINGS. SUBMIT ALTERNATE JOINT LOCATIONS OR JOINTS NOT SHOWN TO THE OWNER'S REPRESENTATIVE FOR REVIEW AND APPROVAL PRIOR TO PROCEEDING WITH THE WORK.

15. AT LOCATIONS WHERE CONCRETE IS CAST AGAINST EXISTING CONCRETE, ROUGHEN CONTACT SURFACES TO 1/4 INCH AMPLITUDE AND CLEAN OF LAITANCE, FOREIGN MATTER, AND LOOSE PARTICLES.

16. AT LOCATIONS WHERE CONCRETE IS CAST AGAINST EXISTING MASONRY, THOROUGHLY ROUGHEN CONTACT SURFACES BY LIGHT SANDBLASTING OR OTHER SUITABLE MEANS AND CLEAN OF LAITANCE, FOREIGN MATTER, AND LOOSE PARTICLES.

17. PITCH CONCRETE SLABS AS REQUIRED TO FLOOR DRAINS. SLAB ON GRADE MINIMUM THICKNESS SHALL BE MAINTAINED AT SLOPED SLABS.

18. THE CONCRETE CONTRACTOR SHALL REVIEW ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND CONSULT WITH OTHER CONTRACTORS FOR OPENINGS, SLEEVES, ANCHORS, HANGERS, INSERTS, SLAB DEPRESSIONS AND OTHER ITEMS RELATED TO THE CONCRETE WORK AND SHALL ASSUME RESPONSIBILITY FOR THEIR PROPER LOCATION. NO CORING OF CAST-IN-PLACE CONCRETE IS ALLOWED WITHOUT PRIOR APPROVAL BY THE STRUCTURAL ENGINEER.

19. REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL, PROCESS AND PLUMBING DRAWINGS FOR MISCELLANEOUS PADS. FURNISH AND INSTALL AS REQUIRED.

20. NO STRUCTURAL CONCRETE SHALL BE PLACED UNTIL THE CONCRETE DESIGN MIXES, THE CONCRETE PLACEMENT PROCEDURE, THE LOCATION OF CONSTRUCTION JOINTS AND THE SETTING OF REINFORCING STEEL IS REVIEWED BY THE STRUCTURAL ENGINEER AND ARCHITECT AS APPLICABLE.

21. CHECKED SHOP DRAWINGS SHOWING REINFORCING DETAILS, INCLUDING STEEL SIZES, LAPS, SPACING AND PLACEMENT, LOCATIONS AND DETAILS OF ALL CONSTRUCTION JOINTS, SLAB DEPRESSIONS, OPENINGS, CURBS, AND ANY OTHER DETAILING REQUIRED TO DETAIL THE WORK SHALL BE SUBMITTED FOR REVIEW PRIOR TO FABRICATION.

22. NO ALUMINUM OF ANY TYPE SHALL BE ALLOWED IN THE CONCRETE, UNLESS COATED TO PREVENT ALUMINUM-CONCRETE REACTION. THIS INCLUDES PUMPING THROUGH ALUMINUM PIPE.

23. DO NOT REMOVE FORMWORK PRIOR TO CONCRETE BEING SUFFICIENTLY CURED TO PREVENT DAMAGE BY FORMWORK REMOVAL OR PRIOR TO CONCRETE ATTAINING 75% OF THE SPECIFIED 28-DAY COMPRESSIVE STRENGTH.

24. HEADED CONCRETE ANCHORS SHALL BE MANUFACTURED BY NELSON STUD WELDING CO., LORAIN, OHIO, OR OTHER MANUFACTURER ACCEPTABLE TO STRUCTURAL ENGINEER. SEE DRAWINGS FOR DIAMETER AND NOMINAL LENGTH. INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MATERIAL SHALL CONFORM TO ASTM A108.

25. DEFORMED BAR ANCHORS SHALL BE MANUFACTURED BY NELSON STUD WELDING CO., LORAIN, OHIO, OR OTHER MANUFACTURER ACCEPTABLE TO STRUCTURAL ENGINEER. INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MATERIAL SHALL CONFORM TO ASTM A496.

CONCRETE CONTINUED

26. MECHANICALLY VIBRATE ALL CONCRETE WHEN PLACED. ENSURE FULL CONSOLIDATION OF CONCRETE AROUND REINFORCING STEEL, POST-TENSIONING STEEL, DOWELS, ANCHOR BOLTS, DEFORMED BAR ANCHORS, HEADED CONCRETE ANCHORS AND OTHER SIMILAR ITEMS DURING CONCRETE PLACEMENT.

27. CONCRETE SLABS ON GRADE AND CONCRETE TOPPING SLABS SHALL BE CONSTRUCTED PER ACI 302.1R "GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION" AND ACI 302.2R "GUIDE FOR CONCRETE SLABS THAT RECEIVE MOISTURE-SENSITIVE FLOORING MATERIALS". THE SLABS SHALL BE PLACED IN STRIP POURS. CONCRETE AGGREGATE MATERIALS SHALL BE SUFFICIENTLY GRADED AND CONCRETE SLABS-ON-GRADE SHALL BE CURED AS REQUIRED TO MINIMIZE POSSIBILITY OF SLAB CURLING.

28. CONTINUOUSLY MOIST CURE CONCRETE SLABS ON GRADE FOR 7 DAYS MINIMUM. WATER FOG SPRAYS, PONDING, SATURATED ABSORPTIVE COVERS, OR MOISTURE RETAINING COVERS MAY BE USED. CURING COMPOUNDS ARE NOT ACCEPTABLE.

29. TEST CYLINDERS SHALL BE MADE AND TESTED IN ACCORDANCE WITH ACI 318 SECTION 5.6.

CONCRETE REINFORCING STEEL

1. FABRICATE AND PLACE REINFORCING STEEL IN ACCORDANCE WITH ACI 315 "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT" AND ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE".

2. UNLESS NOTED OTHERWISE, REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60. REINFORCING STEEL THAT IS TO BE WELDED SHALL CONFORM TO ASTM A706, GRADE 60.

3. WELDED WIRE REINFORCEMENT SHALL CONFORM TO ASTM A1064 AND SHALL BE PLAIN WIRE. SUPPLY IN FLAT SHEETS. ROLLS SHALL NOT BE PERMITTED, UNLESS NOTED OTHERWISE. LAPS OF WELDED WIRE REINFORCEMENT SHALL BE A MINIMUM OF TWO WIRE MESHES.

4. SMOOTH STEEL DOWELS IN SLABS ON GRADE SHALL CONFORM TO ASTM A36.

5. ALL FIELD BENDING OF REINFORCING SHALL BE PERFORMED COLD. HEATING OF BARS SHALL NOT BE PERMITTED.

6. UNLESS NOTED OTHERWISE, "CONTINUOUS" REINFORCEMENT SHALL HAVE MINIMUM TENSION LAP OF CLASS "B" PER ACI 318 AT SPLICES AND SHALL HOOK AT DISCONTINUOUS ENDS. REINFORCEMENT SPECIFIED AS CONTINUOUS SHALL BE CONTINUOUS THROUGH COLUMNS, PIERS, FOUNDATION CAPS OR OTHER INTERSECTING ELEMENTS. ALTERNATIVELY, REINFORCEMENT SPECIFIED AS CONTINUOUS SHALL BE LAP SPLICED WITH A CLASS "B" LAP SPlice TO DOWELS IN THE INTERSECTING ELEMENTS THAT DEVELOP THE FULL YIELD STRENGTH OF THE CONTINUOUS REINFORCEMENT. FOR REQUIRED LAP SPlice LENGTHS, SEE TYPICAL DETAIL.

7. REINFORCEMENT SHALL BE CONTINUOUS ACROSS JOINTS AND AROUND CORNERS OR SPlice BARS SHALL BE PROVIDED IN ACCORDANCE WITH THE LATEST EDITION OF ACI 315 OR ACI 315R. CORNER BARS SHALL BE PROVIDED AT ALL WALL CORNERS, EQUAL TO THE HORIZONTAL WALL REINFORCEMENT.

8. DO NOT CUT OR WELD REINFORCING STEEL WITHOUT PRIOR ACCEPTANCE OF STRUCTURAL ENGINEER. WHEN WELDING IS INDICATED ON THE DRAWINGS, PROCEDURES SHALL BE IN ACCORDANCE WITH AWS D1.4.

9. PROVIDE REBAR CHAIRS FOR REINFORCING STEEL. PROVIDE ADDITIONAL LONGITUDINAL SUPPORT BARS AS REQUIRED TO ASSURE PROPER SUPPORT FOR REINFORCING STEEL AND WELDED WIRE REINFORCEMENT.

10. PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCEMENT AT POSITIONS SHOWN ON THE PLANS AND DETAILS. PLASTIC COATED ACCESSORIES SHALL BE USED IN ALL EXPOSED CONCRETE WORK.

NON-SHRINK GROUT

1. ALL GROUT AT COLUMN BASE PLATES, BEAM BEARING PLATES, AND EQUIPMENT BASE PLATES SHALL BE NON-METALLIC, SHRINKAGE-RESISTANT GROUT CONFORMING TO ASTM C 1107/C 1107M.

2. GROUT SHALL BE FACTORY-PACKAGED WITH NONMETALLIC AGGREGATE, NONCORROSIVE AND NONSTAINING, MIXED WITH WATER TO CONSISTENCY SUITABLE FOR APPLICATION AND A 30-MINUTE WORKING TIME.

3. COMPLY WITH MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS FOR SHRINKAGE-RESISTANT GROUTS.

4. NON-METALLIC, SHRINKAGE-RESISTANT GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF TWO TIMES THE COMPRESSIVE STRENGTH OF THE SUPPORTING CONCRETE FOUNDATIONS, 5000 PSI MINIMUM.

5. NON-METALLIC, SHRINKAGE-RESISTANT GROUT SHALL BE INSTALLED AT COLUMN BASE PLATES, BEAM BEARING PLATES, AND EQUIPMENT BASE PLATES PRIOR TO LOAD BEING APPLIED

POST-INSTALLED ANCHORS

1. POST-INSTALLED ANCHORS SHALL NOT BE SUBSTITUTED FOR CAST-IN ANCHORS WITHOUT PRIOR APPROVAL OF THE ENGINEER OF RECORD.

2. CONCRETE WEDGE EXPANSION ANCHORS, MADE OF STEEL, SHALL BE HILTI KWIK-BOLT T22 WEDGE ANCHOR (ICC-ES ESR-4286), SIMPSON STRONG-BOLT 2 WEDGE ANCHOR (ICC-ES ESR-3037), DEWALT POWER-STUD+SD2 WEDGE EXPANSION ANCHOR (ICC-ES ESR-2502) OR APPROVED EQUAL.

3. CONCRETE ADHESIVE ANCHORS SHALL BE HILTI HIT-RE 500 V3 ADHESIVE ANCHORAGE SYSTEMS (ICC-ES ESR-3814), SIMPSON SET-3G ADHESIVE ANCHORAGE SYSTEMS (ICC-ES ESR-4057), DEWALT PURE110+ ADHESIVE ANCHORAGE SYSTEMS (ICC-ES ESR-3298) OR APPROVED EQUAL. THREADED RODS USED IN ADHESIVE ANCHORAGE SYSTEMS SHALL MEET THE REQUIREMENTS OF ASTM F1554, GRADE 36 FOR BASE PLATE ANCHOR RODS AND ASTM A193, GRADE B7 FOR ALL OTHER THREADED RODS UNLESS NOTED OTHERWISE. REINFORCING BARS USED IN ADHESIVE ANCHORAGE SYSTEMS SHALL BE ASTM A615, GRADE 60 REINFORCING BARS. REMOVE GREASE, OIL, RUST, AND OTHER LAITANCE FROM RODS AND DOWELS PRIOR TO INSTALLATION.

4. CONCRETE SCREW ANCHORS, MADE OF STEEL, SHALL BE HILTI KH-EZ (ICC-ES ESR-3027), SIMPSON TITEN HD (ICC-ES ESR-2713), DEWALT SCREW-BOLT (ICC-ES ESR-3889) OR APPROVED EQUAL.

5. MASONRY WEDGE EXPANSION ANCHORS, MADE OF STEEL, INSTALLED IN GROUT-FILLED CONCRETE BLOCK SHALL BE HILTI KWIK BOLT 1 EXPANSION ANCHOR (IAMPO-UES ER-677), SIMPSON STRONG-BOLT 2 (IAMPO-UES ER-240), DEWALT POWER-STUD+SD1 EXPANSION ANCHOR (ICC-ES ESR-2966) OR APPROVED EQUAL.

6. MASONRY ADHESIVE ANCHORS TO BE INSTALLED IN GROUT-FILLED CONCRETE BLOCK SHALL BE HILTI HIT-HY 100 ADHESIVE ANCHORAGE SYSTEMS (IAMPO ER-547) OR APPROVED EQUAL. THREADED RODS USED IN ADHESIVE ANCHOR SYSTEMS SHALL MEET THE REQUIREMENTS OF ASTM A193, GRADE B7. REINFORCING BARS USED IN ADHESIVE ANCHORAGE SYSTEMS SHALL BE ASTM A615, GRADE 60 REINFORCING BARS. REMOVE GREASE, OIL, RUST, AND OTHER LAITANCE FROM RODS AND DOWELS PRIOR TO INSTALLATION.

7. MASONRY SCREW ANCHORS, MADE OF STEEL, INSTALLED IN GROUT-FILLED CONCRETE BLOCK SHALL BE HILTI KH-EZ (ICC-ES ESR-3056), SIMPSON TITEN HD (ICC-ES ESR-1056), DEWALT SCREW-BOLT+ (ICC-ES ESR-4042) OR APPROVED EQUAL.

8. PROVIDE STAINLESS STEEL FASTENERS FOR EXTERIOR USE OR WHEN EXPOSED TO WEATHER. PROVIDE GALVANIZED CARBON STEEL ANCHORS AT OTHER LOCATIONS, UNLESS OTHERWISE NOTED.

9. IF REINFORCEMENT IS ENCOUNTERED DURING DRILLING, ABANDON AND SHIFT THE HOLE LOCATION TO AVOID THE REINFORCEMENT. PROVIDE A MINIMUM OF 2 ANCHOR DIAMETERS OR 1 INCH, WHICHEVER IS LARGER, OF SOUND CONCRETE BETWEEN THE DOWEL AND THE ABANDONED HOLE. FILL THE ABANDONED HOLE WITH NON-SHRINK GROUT. IF THE ANCHOR OR DOWEL MAY NOT BE SHIFTED AS NOTED, THE ENGINEER WILL DETERMINE A NEW LOCATION.