SECTION 02200 -EARTHWORK

A. SUMMARY

1. This Section includes the following:
   a. Preparing and grading subgrades for slabs-on-grade.
   b. Excavating and backfilling for buildings and structures.
   c. Drainage and moisture-control fill course for slabs-on-grade.

B. DEFINITIONS

1. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
2. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below drainage fill, or topsoil materials.
3. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
4. Drainage Fill: Course of washed granular material supporting slab-on-grade placed to cut off upward capillary flow of pore water.
5. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

C. SUBMITTALS

1. Submit Test Reports required under field quality control.

D. QUALITY ASSURANCE

1. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.
2. Testing and Inspection Service: Owner will employ a qualified independent geotechnical engineering testing agency to perform required field and laboratory testing.

E. SOIL MATERIALS

1. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.
2. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GC, GW, GP, GM, SC, SW, SP, and SM; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter, with a liquid limit and plasticity index of 35 and 15 respectively.
3. Backfill and Fill Materials: Satisfactory soil materials.
4. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate grading size 57, with 100 percent passing a 1-1/2-inch sieve and not more than 5 percent passing a No. 8 sieve.

F. DEWATERING

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

G. EXCAVATION FOR STRUCTURES

1. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.
   a. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

H. BACKFILL

1. Backfill excavations promptly, but not before completing the following:
   a. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
   b. Surveying locations of underground utilities for record documents.
   c. Testing, inspecting, and approval of underground utilities.
   d. Concrete formwork removal.
   e. Removal of trash and debris from excavation.
   f. Removal of temporary shoring and bracing, and sheeting.
   g. Installing permanent or temporary horizontal bracing on horizontally supported walls.

I. FILL

1. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.
2. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.
3. Place fill material in layers to required elevations:
   a. Under building slabs, use drainage fill material.

J. MOISTURE CONTROL

1. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
   a. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

K. COMPACTION

1. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
2. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.
3. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D-698:
   a. Under structures and building slabs, compact each layer of backfill or fill material at 95 percent maximum dry density and compact the top 12 inches at 98 percent maximum dry density.

L. DRAINAGE FILL

1. Under slabs-on-grade, place drainage fill course on prepared subgrade.
   a. Compact drainage fill to required cross sections and thickness.
   b. When compacted thickness of drainage fill is 6 inches or less, place materials in a single layer.
   c. When compacted thickness of drainage fill exceeds 6 inches thick, place materials in equal layers with no layer more than 6 inches thick nor less than 3 inches thick when compacted.

M. FIELD QUALITY CONTROL

1. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
   a. Perform field in-place density tests according to ASTM D 1556 (sand cone method), or ASTM D 2937 (drive cylinder method), as applicable.
      (1) Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D 3017.
      (2) When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.
   b. Footing Subgrade: At footing subgrades, perform at least one test of each soil stratum to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Engineer.
   c. Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2000 sq. ft. of building slab, but in no case fewer than three tests.
2. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.

END OF SECTION 02200

SECTION 03300 -CAST-IN-PLACE CONCRETE

A. SUMMARY

1. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
2. Cast-in-place concrete includes the following:
   a. Foundations and footings.
   b. Slabs-on-grade.
   c. Equipment pads and bases.
   d. Fill for steel pan stairs.

B. SUBMITTALS

1. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Engineer.
2. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 'Manual of Standard Practice for Detailing Reinforced Concrete Structures' showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.
3. Shop drawings for formwork indicating fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.
4. Engineer's review is for general architectural applications and features only. Designing formwork for structural stability and efficiency is Contractor's responsibility.
5. Laboratory test reports for concrete materials and mix design test.

C. QUALITY ASSURANCE

1. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
2. American Concrete Institute (ACI) 301, 'Specifications for Structural Concrete for Buildings.'
3. ACI 318, 'Building Code Requirements for Reinforced Concrete.'
4. Concrete Reinforcing Steel Institute (CRSI) 'Manual of Standard Practice.'
5. Concrete Testing Service: Owner will engage a testing agency acceptable to Engineer to perform material evaluation tests and to design concrete mixes.

D. REINFORCING MATERIALS

1. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
2. Steel Wire: ASTM A 82, plain, cold-drawn steel.
3. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

E. CONCRETE MATERIALS

1. Portland Cement: ASTM C 150, Type I.
2. Fly Ash: ASTM C 618, Type F.
3. Normal-Weight Aggregates: ASTM C 33 and as specified.
   a. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
   b. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer.
4. Water: Potable.
5. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
6. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
7. Water-Reducing Admixture: ASTM C 494, Type A, D, E, F, or G as required.

F. RELATED MATERIALS

1. Vapor Barrier: Use Stego Wrap 15 mil polyolefin vapor barrier with Stego Wrap Polyethylene Tape, by Stego Industries. Install per manufacturer's instructions.
2. Membrane Curing Compound: ASTM C 309.
3. Bonding Agent: Polyvinyl acetate (interior only) or Acrylic or Styrene Butadiene.

G. PROPORTIONING AND DESIGNING MIXES

1. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.
2. Limit use of fly ash to not exceed 25 percent of cement content by weight.
3. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Engineer.
4. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
   a. 28 day strength: 3000 psi
   b. Cement: Type I or II
   c. Aggregates: Normal Weight
   d. Admixtures: Air Entrainer (Exterior), Water Reducer
   e. Water-Cement Ratio:
      (1) Slabs on grade that receive floor coverings: 0.45 max.
      (2) Air-Entrained concrete: 0.50 max.
      (3) All other concrete: 0.55 max.
   f. Minimum Cement Content: 470 lbs.
   g. Slump: 3" to 5"
   h. Air Content - Exterior Only: 4 to 7 percent

H. JOINTS

1. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Engineer.
2. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.

I. CONCRETE PLACEMENT

1. General: Comply with ACI 304, 'Guide for Measuring, Mixing, Transporting, and Placing Concrete,' and as specified.
2. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   a. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   b. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
3. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

J. MONOLITHIC SLAB FINISHES

1. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
   a. Finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155.
   b. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps.

K. CONCRETE CURING AND PROTECTION

1. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
2. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
3. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows.
   a. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

L. QUALITY CONTROL TESTING DURING CONSTRUCTION

1. General: The Owner will employ a testing agency to perform tests and to submit test reports.
2. Sampling and testing for quality control during concrete placement may include the following, as directed by Engineer.
   a. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
      (1) Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
      (2) Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
      (3) Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
      (4) Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
      (5) Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
   b. Test results will be reported in writing to Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests.

END OF SECTION 03300

SECTION 06192 -PREFABRICATED METAL-PLATE-CONNECTED WOOD TRUSSES

A. SUMMARY

1. This Section includes the following:
   a. Gable-shaped trusses.
   b. Hip and girder trusses at hip ends of roof.

B. SUBMITTALS

1. Truss shop drawings indicating the following minimum information:
   a. span, depth or slope and spacing of trusses;
   b. required bearing width;
   c. design loads, as applicable:
   d. top chord live load;
   e. top chord dead load;
   f. bottom chord live load;
   g. bottom chord dead load;
   h. concentrated loads and their points of application; and
   i. wind and seismic criteria;
   j. adjustment to lumber and plate design loads for condition of use;
   k. reactive forces, their points of occurrence and direction;
   l. plate type, gage, size and location of plate at each joint;
   m. lumber size, species and grade for each member;
   n. location of any required continuous lateral bracing;
   o. calculated deflection ratio and/or maximum deflection for live and total load;
   p. maximum axial compressive forces in truss members;
   q. location of joints;
   r. connection requirements for:
      (1) truss to truss girders;
      (2) truss ply to ply; and
      (3) field splices.
2. Provide shop drawings that have been signed and sealed by a qualified professional engineer registered in the state of North Carolina.

C. QUALITY ASSURANCE

1. Trusses shall be designed in accordance with these specifications and where any applicable design feature is not specified herein, design shall be in accordance with applicable provisions of latest edition of National Design Specifications for Wood Construction (NDS) American Forest and Paper Association (AFPA), and Design Specifications for Metal Plate Connected Wood Trusses (ANSI/TPI 1), Truss Plate Institute (TPI), and code of jurisdiction.
2. Connector Plate Manufacturer's Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality control procedures for manufacture of connector plates published in TPI 'Quality Standard for Metal Connector Plate Manufacture.'
3. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation of metal-plate-connected wood trusses similar to those of this Project and with a record of successful in-service performance.
4. Fabricator's Qualifications: A firm that participates in a recognized quality assurance program that involves inspection by SPIB; Timber Products Inspection, Inc.; Truss Plate Institute; or other independent inspection and testing agency acceptable to Architect and authorities having jurisdiction.

D. DELIVERY, STORAGE, AND HANDLING

1. Handle and store trusses with care and comply with manufacturer's instructions and TPI recommendations to avoid damage from bending, overturning, or other cause which trusses are not designed to resist or endure.

E. MATERIALS

1. Lumber: Provide dressed lumber, S4S, manufactured to actual sizes required by PS 20.
   a. Factory mark each piece of lumber with type, grade, mill, and grading agency.
   b. Lumber Standard: Manufacture lumber to comply with PS 20 'American Softwood Lumber Standard' and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
   c. Lumber used for truss members shall be in accordance with published Values of lumber rules writing agencies approved by board of review of American Lumber Standards Committee. Lumber shall be identified by Grade mark of a lumber inspection bureau or agency approved by that Board, and shall be as shown on design drawings.
      (1) Moisture content of lumber shall be no less than 7 percent nor greater than 19 percent at time of fabrication.
      (2) Adjustment of values for duration of load or conditions of use shall be in accordance with National Design Specifications for Wood Construction (NDS).
      (3) Minimum Grade for Chord Members: No. 2.
      (4) Minimum Grade for Web Members: No. 3 or Stud grade.
2. Metal connector plates shall be not less than .036 inches in thickness (20 gage) and shall meet or exceed ASTM A653-94 grade 37, and shall be hot dipped galvanized according to ASTM A653-94, coating designation G60. Working stresses in steel are to be applied to effective ratios for plates as determined by test in accordance with Appendix E and F of ANSI/TPI 1-1995.
   a. In highly corrosive environments, special applied coatings or stainless steel may be required.
3. Metal Framing Anchors: Provide products for which manufacturer publishes allowable design loads that are determined from testing performed by a qualified independent testing laboratory.

F. FABRICATION

1. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints with wood-to-wood bearing in assembled units.
2. Fabricate metal connector plates to size, configuration, thickness, and anchorage details required to withstand design loadings for types of joint designs indicated.
3. Assemble truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances specified in TPI 'Quality Standard for Metal Plate Connected Wood Trusses.' Position members to produce design camber indicated.
4. Connect truss members by means of metal connector plates accurately located and securely fastened to each side of wood members by means indicated or approved.

G. INSTALLATION

1. General: Erect and brace trusses to comply with applicable requirements of referenced TPI standards.
2. Where trusses do not fit, return them to fabricator and replace with trusses of correct size; do not alter trusses in the field.
3. Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately at design spacings indicated.
4. Hoist trusses in place by means of lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
5. Anchor trusses securely at all bearing points to comply with methods and details indicated.
6. Install permanent bracing and related components to enable trusses to maintain design spacing, withstand live and dead loads including lateral loads, and to comply with other indicated requirements.
7. Do not cut or remove truss members.

END OF SECTION 06192

APPENDIX B
2018 BUILDING CODE SUMMARY
STRUCTURAL DESIGN

DESIGN LOADS:

IMPORTANCE FACTORS: SNOW (Is) = 1.0
SEISMIC (Ie) = 1.0

LIVE LOADS: (REFER TO DESIGN LOADS UNDER DESIGN CRITERIA BELOW)

GROUND SNOW LOAD: 15 PSF

WIND LOAD: ULTIMATE WIND SPEED = 115 MPH (ASCE 7)
EXPOSURE CATEGORY = B

SEISMIC DESIGN CATEGORY = B
RISK CATEGORY (TABLE 1604.5) = II
SPECTRAL RESPONSE ACCELERATION: Ss= 16.6 %g   S1= 8.1 %g
SITE CLASSIFICATION (ASCE 7)= D
DATA SOURCE: PRESUMPTIVE

BASIC STRUCTURAL SYSTEM (CHECK ONE)
X BEARING WALL — DUAL W/SPECIAL MOMENT FRAME
BUILDING FRAME — DUAL W/INTERMEDIATE R/C OR SPECIAL STEEL
MOMENT FRAME — INVERTED PENDULUM

ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE
ARCHITECTURAL, MECHANICAL, COMPONENTS ANCHORED? BY OTHERS

LATERAL DESIGN CONTROL: WIND

SOIL BEARING CAPACITIES:
FIELD TEST (PROVIDE COPY OF TEST REPORT) = N/A PSF
PRESUMPTIVE BEARING CAPACITY = 2000 PSF
PILE SIZE, TYPE, AND CAPACITY = N/A

DESIGN CRITERIA

1. DESIGN IS IN ACCORDANCE WITH THE 2018 EDITION OF THE NORTH CAROLINA BUILDING CODE (NC 2018), UNLESS OTHERWISE NOTED.
2. RISK CATEGORY PER TABLE 1604.5 .... CATEGORY II
3. DESIGN LOADS
   A. LIVE LOADS - NC 2018 TABLE 1607.1 (UNIFORM, CONCENTRATED):
      1. MECHANICAL PLATFORM .... 80 PSF
      2. ROOFS .... 20 PSF
   B. ROOF LIVE LOAD REDUCTION PER NC 2018 SECTION 1607.12.2.1
   C. ROOF SNOW LOAD - ASCE 7-10 (U.O.N.)
      1. Pg = 15 PSF (GROUND SNOW LOAD PER NC 2018 FIGURE 1608.2)
      2. I = 1.0
      3. SLOPED ROOFS - 5 : 12 PITCH
         a. Ce = 1.0
         b. Ct = 1.0
         c. Cs = 1.0
         d. Pf = 0.7(Pg)(Ce)(Ct)(I) = 10.5 PSF
         e. Ps = Pf(Cs) = 10.5 PSF(SLOPED ROOF SNOW LOAD)
   D. WIND LOADS - ASCE 7-10 (U.O.N.)
      1. MWFRS DESIGN:
         a. PER CHAPTERS 26 & 27 - DIRECTIONAL PROCEDURE
      2. COMPONENTS & CLADDING DESIGN:
         a. PER CHAPTER 30 PART 1 * LOW RISE BUILDINGS
      3. WIND-BORNE DEBRIS REGION (NC 2018 CHAPTER 2) .... NO
      4. DESIGN WIND SPEED:
         a. ULTIMATE (NC 2018 FIGURE 1609.3(1)) Vult .... 115 MPH
         b. NOMINAL (NC 2018 TABLE 1609.3.1 OR EQ. 16-33) Vasd ..... 90 MPH
      5. EXPOSURE CATEGORY .... B
      6. GCpi (TABLE 26.11-1 .... +0.18, -0.18
      7. COMPONENTS AND CLADDING WALL PRESSURES (FACTORED LOADS FOR USE WITH STRENGTH DESIGN), PSF:

EFFECTIVE WIND AREA	POSITIVE ZONE 4 & 5	NEGATIVE ZONE 4	NEGATIVE ZONE 5
10	23.8	-25.8	-31.9
20	22.7	-24.7	-29.7
50	21.3	-23.3	-26.9
100	20.2	-22.2	-24.7
200	19.2	-21.2	-22.6
500	17.7	-19.8	-19.8

(TO CONVERT THE ABOVE PRESSURES TO NOMINAL LOADS FOR USE WITH ALLOWABLE STRESS DESIGN, MULTIPLY BY 0.6)

   E. SEISMIC LOADS - PER ASCE 7-10:
      1. ANALYSIS PROCEDURE .... SECTION 12.8 EQUIVALENT LATERAL FORCE
      2. MAPPED SPECTRAL RESPONSE ACCELERATION Ss .... 16.6% g
      3. MAPPED SPECTRAL RESPONSE ACCELERATION S1 .... 8.1% g
      4. DESIGN SPECTRAL ACCELERATION PARAMETER Sds .... 17.7% g
      5. DESIGN SPECTRAL ACCELERATION PARAMETER Sd1 .... 12.9% g
      6. SITE CLASS (PRESUMED) .... D
      7. IMPORTANCE FACTOR (TABLE 1.5-2), I 1.0
      8. SEISMIC DESIGN CATEGORY:
         a. MORE SEVERE OF TABLE 11.6-1 AND TABLE 11.6-2 .... B
      9. DESIGN COEFFICIENTS AND FACTORS PER TABLE 12.2-1:
         a. SEISMIC-FORCE-RESISTING SYSTEM:
            1) X & Y DIRECTION .... LIGHT-FRAMED WOOD WALLS W/ WOOD PANELS
         b. RESPONSE MODIFICATION COEFFICIENT - R
            1) X & Y DIRECTION 6.5
         c. SYSTEM OVER-STRENGTH FACTOR - OMEGA
            1) X & Y DIRECTION 3
         d. DEFLECTION AMPLIFICATION FACTOR - Cd
            1) X & Y DIRECTION 4
         e. BUILDING HEIGHT LIMIT .... N/A
      10. ALLOWABLE STORY DRIFT (TABLE 12.12-1) .... 0.025 hSX
4. CONCRETE: PER CURRENT EDITION OF ACI 318
   A. FOUNDATIONS .... F'C = 3000 PSI
   B. SLABS ON GRADE .... F'C = 3000 PSI
   C. ALL OTHER CONCRETE .... F'C = 3000 PSI
5. ALL REINFORCING STEEL ASTM A615 GRADE 60.
6. ALL WELDED WIRE FABRIC ASTM A185.
7. MASONRY COMPRESSIVE STRENGTH .... F'M = 2000 PSI
8. PRESUMPTIVE ALLOWABLE SOIL BEARING PRESSURE .... 2000 PSF
   A QUALIFIED GEOTECHNICAL ENGINEERING FIRM MUST INSPECT AND CONFIRM THE ADEQUACY OF THE ACTUAL BEARING CONDITIONS DURING CONSTRUCTION.

GENERAL STRUCTURAL NOTES

1. ALL REINFORCING SHALL BE HELD SECURELY IN POSITION WITH STANDARD ACCESSORIES IN CONFORMANCE WITH CRSI MANUAL OF STANDARD PRACTICE AND ACI 315 DURING THE PLACING OF CONCRETE.
2. UNLESS OTHERWISE NOTED, SPLICES IN REINFORCING, WHERE PERMITTED, SHALL BE AS FOLLOWS:
   A. WELDED WIRE FABRIC .... WIRE SPACING + 2"
   B. REINFORCING BARS .... 48 BAR DIAMETERS
3. ALL HOOKS IN REINFORCING BARS SHALL BE ACI STANDARD HOOKS, UNLESS OTHERWISE NOTED.
4. PROVIDE HALF-INCH PREMOLDED EXPANSION JOINT MATERIAL WHERE SLAB ON GRADE IS PLACED AROUND COLUMNS AND AGAINST WALLS, U.O.N.
5. STEPS IN WALL FOOTINGS SHALL NOT EXCEED A SLOPE OF 1 : 1.
6. IF FOOTINGS OCCUR IN A DISTURBED, UNSTABLE OR UNSUITABLE SOIL, THE ENGINEER SHALL BE NOTIFIED PRIOR TO PLACEMENT OF REINFORCING BAR.
7. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS OF EXISTING STRUCTURE AND SITE THAT ARE AFFECTED BY NEW WORK BEFORE PROCEEDING WITH FABRICATION AND CONSTRUCTION.
8. ALL STRUCTURAL OPENINGS AROUND OR AFFECTED BY MECHANICAL, ELECTRICAL, FIRE PROTECTION AND PLUMBING EQUIPMENT SHALL BE VERIFIED BY CONTRACTOR WITH EQUIPMENT PURCHASED BEFORE PROCEEDING WITH STRUCTURAL WORK AFFECTED.
9. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, FIRE PROTECTION AND PLUMBING DRAWINGS FOR OPENINGS, SLEEVES, ETC NOT SHOWN ON THE STRUCTURAL DRAWINGS.
10. THE BUILDING IS STRUCTURALLY SOUND ONLY IN ITS COMPLETED FORM. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING ADEQUATE SHORING AND BRACING OF THE STRUCTURE AND ITS COMPONENTS UNTIL COMPLETION.
11. ALL NAIL SIZES SHOWN ARE COMMON WIRE NAILS. SEE THE TABLE BELOW FOR NAIL DIAMETERS AND TYPICAL LENGTHS.
    A. 6d: 0.113 IN. (DIAMETER) x 2.0 IN. (LENGTH)
    B. 8d: 0.131 IN. (DIAMETER) x 2.5 IN. (LENGTH)
    C. 10d: 0.148 IN. (DIAMETER) x 3.0 IN. (LENGTH)
    D. 16d: 0.162 IN. (DIAMETER) x 3.5 IN. (LENGTH)
12. PRE-ENGINEERED WOOD TRUSSES SHALL BE DESIGNED BY A QUALIFIED PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NORTH CAROLINA ('TRUSS ENGINEER').
    A. DESIGN LIVE LOADS SHALL BE AS INDICATED ON THE DRAWINGS AND AS REQUIRED BY CODE, AND SHALL ACCOUNT FOR ANY EQUIPMENT SUPPORTED BY THE TRUSSES.
    B. DESIGN DEAD LOADS SHALL INCLUDE THE WEIGHT OF ACTUAL CONSTRUCTION COMPONENTS, INCLUDING ANY ROOF FRAMING OVERBUILD SUPPORTED BY THE TRUSSES.
    C. WIND, SEISMIC, SNOW AND OTHER LOADS SHALL BE AS REQUIRED BY CODE.
    D. COMPLY WITH APPLICABLE REQUIREMENTS AND RECOMMENDATIONS OF THE TRUSS PLATE INSTITUTE (TPI) PUBLICATIONS.
    E. ALL TRUSS-TO-TRUSS CONNECTIONS SHALL BE FULLY DESIGNED BY THE TRUSS ENGINEER.
    F. SHOP DRAWINGS AND DESIGN CALCULATIONS SHALL BE SIGNED AND SEALED BY THE TRUSS ENGINEER AND SUBMITTED FOR APPROVAL PRIOR TO FABRICATION.
13. THE FOLLOWING ITEMS SHALL BE SUBMITTED TO STRUCTURAL SOLUTIONS, P.A. FOR REVIEW PRIOR TO FABRICATION OR CONSTRUCTION:
    A. CONCRETE MIX DESIGNS
    B. SHOP DRAWINGS:
       1. STEEL REINFORCEMENT FOR CONCRETE
       2. PREFABRICATED WOOD TRUSSES
14. THE FOLLOWING QUALITY CONTROL TEST REPORTS SHALL BE SUBMITTED TO STRUCTURAL SOLUTIONS, P.A. DURING CONSTRUCTION:
    A. FILL AND BACKFILL COMPACTION TESTS
    B. FOOTING SUBGRADE TESTS
    C. CONCRETE SLUMP, AIR CONTENT, AND TEMPERATURE
    D. CONCRETE COMPRESSIVE STRENGTH TESTS

STRUCTURAL SOLUTIONS, P.A.
Structural Engineering • Investigations • Consulting
PROJECT NUMBER 19-070

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — THOMAS L. SHELMERDINE
STRUCTURAL SOLUTIONS, P.A. CORPORATE SEAL 1994 N.C.

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