## GENERAL STRUCTURAL NOTES

1. GOVERNING BUILDING CODE:
   2018 NORTH CAROLINA STATE BUILDING CODE

2. DESIGN LOADS:
   DEAD LOADS:
   ROOF: ..... 20 PSF

   FLOOR: ..... PER PRECAST SUPPLIER

   ELEVATOR HOIST BEAM (E.G. TO VERIFY WITH SUPPLIER): ..... 5000 LBS

   LIVE LOADS (PER GOVERNING CODE):
   ROOF (REDUCE BASED ON TRIBUTARY AREA PER GOVERNING CODE):
   A. WITHOUT MECHANICAL UNITS: ..... 20 PSF
   B. WITH MECHANICAL UNITS (VERIFY WITH UNIT WEIGHTS): ..... 60 PSF

   FLOOR (REDUCE PER GOVERNING CODE):
   A. SLAB-ON-GRADE: ..... 125 PSF
   B. PUBLIC AREAS (UNREDUCABLE): ..... 100 PSF
   C. PARKING GARAGE: .....5000 LBF OR 40 PSF

   ROOF SNOW LOADS (PER ASCE)*:
   A. GROUND SNOW LOAD ($P_g$): ..... 5 PSF
   B. FLAT-ROOF SNOW LOAD ($P_f$): ..... 4 PSF
   C. SNOW EXPOSURE FACTOR ($C_e$): ..... 1.0
   D. SNOW IMPORTANCE FACTOR ($I_s$): ..... 1.0
   E. ROOF THERMAL FACTOR ($C_t$): ..... 1.0
   * ALL SNOW LOAD COMBINATIONS; SUCH AS UNBALANCED SNOW LOADS, DRIFT SNOW LOADS, SLIDING SNOW LOADS, ETC.; (PER ASCE 7) MUST BE INCLUDED IN TRUSS SUPPLIER'S DESIGN.

   STAIR LOADS (PER GOVERNING CODE):
   A. LIVE LOAD: ..... 100 PSF
   B. CONCENTRATED LIVE LOAD: ..... 300 LB MID-TREAD

   HANDRAILS AND GUARDRAILS LOADS (PER GOVERNING CODE):
   A. CONCENTRATED LOAD (APPLIED IN ANY DIRECTION AT ANY POINT AT TOP OF GUARDRAIL): ..... 200 LBS
   B. UNIFORM LOAD (APPLIED IN ANY DIRECTION AT TOP OF GUARDRAIL) 50 PLF

   WIND LOADS (PER ASCE):
   A. ULTIMATE WIND SPEED (THREE SECOND GUST): ..... 90 MPH
   B. RISK CATEGORY: ..... II
   C. WIND EXPOSURE: ..... B
   D. INTERNAL PRESSURE COEFFICIENT ($GC_{pi}$): ..... +/-0.18
   E. MWFRS DESIGN WIND PRESSURE ($Gh$): ..... 16 PSF

SEISMIC DESIGN DATA (PER GOVERNING CODE):
   A. SEISMIC IMPORTANCE FACTOR, $I_E$: ..... 1.00
   B. RISK CATEGORY: ..... II
   C. MAPPED SPECTRAL RESPONSE ACCELERATION, $S_s$: ..... 0.19g
   D. MAPPED SPECTRAL RESPONSE ACCELERATION, $S_1$: ..... 0.09g
   E. SITE CLASS: ..... B
   F. SPECTRAL RESPONSE COEFFICIENT, $S_{DS}$: ..... 0.196g
   G. SPECTRAL RESPONSE COEFFICIENT, $S_{D1}$: ..... 0.144g
   H. SEISMIC DESIGN CATEGORY: ..... B
   I. BASIC SEISMIC FORCE RESISTING SYSTEM: ..... PER PRECAST SUPPLIER
   J. DESIGN BASE SHEAR: ..... PER PRECAST SUPPLIER
   K. SEISMIC RESPONSE COEFFICIENT, $C_s$: ..... PER PRECAST SUPPLIER
   L. RESPONSE MODIFICATION FACTOR, R: ..... PER PRECAST SUPPLIER
   M. ANALYSIS PROCEDURE USED: ..... PER PRECAST SUPPLIER

3. MATERIALS:
   CONCRETE (NORMAL WEIGHT - 28 DAY COMPRESSIVE STRENGTH):
   SLAB ON GRADE AND FOOTINGS: ..... 4000 PSI
   WALLS AND PILASTERS: ..... 4000 PSI
   REINFORCING: ..... ASTM A615, GRADE 60
   REINFORCING TO BE WELDED: ..... ASTM A706, GRADE 60
   WELDED WIRE FABRIC: ..... ASTM A1064
   GROUT: ..... 5,000 PSI, NON-SHRINK

4. FIELD VERIFY ALL EXISTING ABOVE AND BELOW GROUND CONDITIONS PRIOR TO FABRICATION AND CONSTRUCTION.

5. THE STRUCTURAL DESIGN OF BUILDING IS BASED ON THE FULL INTERACTION OF ALL ITS COMPONENT PARTS, WITH NO PROVISION FOR CONDITION OCCURRING DURING CONSTRUCTION. THEREFORE, CONTRACTOR SHALL PROVIDE ADEQUATE BRACING DURING CONSTRUCTION.

6. OWNER SHALL RETAIN THE SERVICES OF A QUALIFIED INSPECTOR TO PROVIDE SPECIAL INSPECTIONS FOR ALL CONCRETE, MASONRY, REINFORCING STEEL, STRUCTURAL STEEL, COLD-FORMED (LIGHT GAGE) STEEL AND WOOD MATERIALS AS REQUIRED PER IBC CHAPTER 17.

7. STRUCTURAL DRAWINGS INDICATE TYPICAL AND CERTAIN SPECIFIC CONDITIONS ONLY. SHOP DRAWINGS SHALL DETAIL ALL CONDITIONS IN ACCORDANCE WITH SPECIFIED STANDARDS AND SPECIFIC REQUIREMENTS OF THIS PROJECT AS INDICATED ON THE DRAWINGS.

8. MINIMUM REQUIRED TURN-AROUND TIME FOR SHOP DRAWING APPROVAL BY STRUCTURAL ENGINEER IS TEN WORKING DAYS. SHOP DRAWINGS MUST BE APPROVED BY THE THE GENERAL CONTRACTOR AND THE ARCHITECT OF RECORD PRIOR TO REVIEW BY ENGINEER OF RECORD. PLEASE SCHEDULE ACCORDINGLY TO AVOID DELAYS. ONE SET OF THE FOLLOWING SHOP DRAWINGS SHALL BE SUBMITTED PRIOR TO CONSTRUCTION:

   CONCRETE MIX DESIGN
   CONCRETE REINFORCING
   PRECAST CONCRETE PLANS, DETAILS AND SEQUENCE/ERECTION

   REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

## CONCRETE AND FOUNDATION NOTES

1. CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF ACI 301 "SPECIFICATION FOR STRUCTURAL CONCRETE", EXCEPT AS MODIFIED BY THE REQUIREMENTS OF THESE CONTRACT DOCUMENTS.

2. THE FOLLOWING FOUNDATION DESIGN VALUES WERE USED BASED ON THE GEOTECHNICAL EXPLORATION REPORT BY TERRACON, INC. DATED DECEMBER 30, 2011 (PROJECT NO. 70115114). THESE VALUES SHALL BE FIELD VERIFIED BY THE GEOTECHNICAL ENGINEER PRIOR TO POURING THE FOOTINGS.
   SAFE SOIL BEARING PRESSURE - PARKING DECK: ..... _____ PSF

   THE FOLLOWING VALUES WERE ASSUMED FOR BASEMENT, STEM AND RETAINING WALL DESIGN. THESE VALUES SHALL BE FIELD VERIFIED BY THE GEOTECHNICAL ENGINEER PRIOR TO POURING THE FOOTINGS.
   PASSIVE PRESSURE: ..... ___ PSF/FT
   ACTIVE PRESSURE: ..... ____ PCF
   AT REST PRESSURE: ..... ____ PCF
   COEFFICIENT OF FRICTION: ..... ___

3. SUB GRADE AND UNDER SLAB DRAINAGE SYSTEM SHALL BE PREPARED PER GEOTECHNICAL ENGINEER'S REPORT.

4. SOIL BELOW INTERIOR CONCRETE SLABS ON GRADE AND ANY FILL WITHIN TEN FEET OF BUILDING LIMIT SHALL BE COMPACTED PER THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS FOR THIS PROJECT. ALL FOOTINGS SHALL BEAR ON ORIGINAL UNDISTURBED SOIL OR CONTROLLED FILL.

5. CONCRETE MIX DESIGNS SHALL BE ESTABLISHED BY THE SUPPLIER IN ACCORDANCE WITH ACI SPECIFICATIONS. MIX DESIGNS AND BACK-UP DATA SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO PLACEMENT OF CONCRETE.

6. ALL CONCRETE SHALL BE NORMAL WEIGHT (150 PCF), LIGHT WEIGHT (110 PCF) UNLESS NOTED OTHERWISE ON THE PLANS.

7. CONCRETE FOR FLOOR SLABS SHALL HAVE A MAXIMUM SLUMP OF 5 INCHES AT THE POINT OF DELIVERY.

8. AIR ENTRAINING AGENTS CONFORMING TO ASTM C260 SHALL BE ADDED TO ALL CONCRETE EXPOSED TO FREEZING AND THAWING TO PRODUCE 6-7% ENTRAINED AIR. AIR-ENTRAINING ADMIXTURES SHALL NOT BE ADDED TO CONCRETE USED FOR TROWEL-FINISHED INTERIOR SLABS-ON-GRADE OR INTERIOR ELEVATED SLABS.

9. SIZE OF AGGREGATES SHALL CONFORM TO ASTM C33.

10. NO CALCIUM CHLORIDE SHALL BE USED IN ANY CONCRETE.

11. CONTROL JOINTS (KEY-FORMED CONSTRUCTION JOINTS OR SAW-CUT CONTRACTION JOINTS), IF NOT SHOWN ON PLANS, SHALL BE SPACED WITHIN SLABS ON GRADE PER NOTE 12. SAW-CUT JOINTS SHALL BE 1/4 THE SLAB DEPTH (1" MINIMUM) AND SHALL BE INSTALLED WITHIN 24 HOURS OF SLAB PLACEMENT. CONTROL JOINTS SHALL BE PLACED BETWEEN ISOLATION JOINTS AT COLUMNS. CONTROL JOINTS SHALL NOT BE PLACED WITHIN ELEVATED SLABS. IT IS ADVISABLE TO NOT PLACE CONTROL JOINTS PARALLEL TO AND DIRECTLY ABOVE THICKENED SLABS. PROVIDE CONTROL JOINTS WITHIN POST-TENSIONED SLABS ON GRADE AS SPECIFIED BY POST-TENSION DESIGNER.

12. UNLESS NOTED OTHERWISE, ALL INTERIOR AND EXTERIOR SLABS ON GRADE SHOWN ON STRUCTURAL DRAWINGS, INCLUDING STEPS, SHALL BE 4" THICK (5" THICK FOR PARKING AREAS), AND CONFORM TO LATEST EDITION OF ACI 360. SLABS ON GRADE TO BE REINFORCED WITH 6x6-W1.4xW1.4 MWF (6x6-W2.9xW2.9 MWF AT PARKING AREAS) SUPPORTED AT 1" FROM TOP OF SLAB. MWF SHALL LAP 2 GROSS WIRES PLUS 2" (MINIMUM) AT SPLICES. CONTROL JOINTS ARE TO DIVIDE THE SLAB SUCH THAT CONCRETE WITHIN JOINTS IS NOT GREATER THAN 12'-0" IN EITHER DIRECTION.

13. CONCRETE FINISH FLOORS SHALL HAVE A HARD STEEL TROWELED FINISH AND EXTERIOR SLABS, SIDEWALKS, PARKING, PADS AND RAMPS SHALL HAVE A LIGHT BROOM FINISH UNLESS NOTED OTHERWISE.

14. FLATNESS AND LEVELNESS TOLERANCES PER SPECIFICATIONS.

15. TEMPORARY EXCAVATION FOR FOOTINGS, PITS, PIPES AND OTHER PURPOSES SHALL BE SLOPED AND BRACED IN ACCORDANCE WITH O.S.H.A. REQUIREMENTS.

16. REINFORCING STEEL PLACEMENT SHALL BE INSPECTED BY A QUALIFIED INSPECTOR IN ACCORDANCE WITH ACI 318 SECTION 26.5.

17. PROVIDE BAR SUPPORTS AND SPACERS IN ACCORDANCE WITH ACI 315 "DETAILS AND DETAILING OF CONCRETE REINFORCING".

18. REFER TO SCHEDULE SHEETS FOR MINIMUM LAP SPLICE TABLES. SPLICES NOT SHOWN ON THE DRAWINGS SHALL BE SUBJECT TO APPROVAL.

19. WELDING OF REINFORCING STEEL SHALL NOT BE PERMITTED EXCEPT AS AUTHORIZED OR DIRECTED BY THE STRUCTURAL ENGINEER.

20. HORIZONTAL REINFORCEMENT IN FOOTINGS, TURNDOWN SLAB, CONCRETE BEAMS, AND WALLS SHALL BE CONTINUOUS AROUND CORNERS PER LAP SPLICE SCHEDULE.

21. ALL FIELD BENDING OF REINFORCING SHALL BE DONE COLD. HEATING OF BARS IS NOT PERMITTED.

22. PRINCIPAL OPENINGS ARE SHOWN ON STRUCTURAL DRAWINGS. REFER TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL OPENINGS, EMBEDS, SLEEVES, DEPRESSIONS, SLOPES, ETC...

23. ALL OPENINGS IN CONCRETE WALLS LESS THAN 2'-0" WIDE SHALL BE REINFORCED WITH 2#5 BARS, ALL SIDES, EXTENDED A MINIMUM OF 3'-0" BEYOND OPENING, UNLESS NOTED OTHERWISE. CONTACT ENGINEER OF RECORD FOR OPENINGS LARGER THAN 2'-0" WIDE IF NOT DETAILED ON DRAWINGS.

24. PROVIDE A MINIMUM OF 2#4 BARS x 4'-0" LONG AT RE-ENTRANT CORNERS OF SLABS-ON-GRADE (AT MID-DEPTH OF SLAB AND OUTSIDE OF THICKENED SLAB) AND 3#5 x 8'-0" LONG AT ELEVATED SLABS, CENTERED ABOUT CORNER, UNLESS NOTED OTHERWISE ON PLANS.

25. ALL DEBRIS SHALL BE REMOVED FROM FORMS PRIOR TO PLACEMENT OF CONCRETE.

26. UNLESS NOTED OTHERWISE, VERTICAL CONTROL JOINTS IN STEP WALLS, BASEMENT WALLS AND RETAINING WALLS SHALL BE PLACED NOT MORE THAN 25'-0" APART AND SHALL BE 3/4" DEEP "V" CHAMFERED ON BOTH SIDES. 50% OF THE SPECIFIED HORIZONTAL REINFORCEMENT SHALL STOP 3" EACH SIDE OF THE CONTROL JOINT. CONSTRUCTION JOINTS SHALL BE LOCATED BY CONTRACTOR PER CONSTRUCTION SCHEDULE, AND AT ALL EXPANSION JOINTS. CONSTRUCTION JOINTS TO BE KEYED, AND ALL HORIZONTAL REINFORCEMENT SHALL BE DISCONTINUOUS AT CONSTRUCTION JOINT.

27. MINIMUM CONCRETE COVER FOR CAST-IN-PLACE CONCRETE REINFORCEMENT:

   CONCRETE CAST AGAINST & PERMANENTLY EXPOSED TO EARTH: ..... 3 Inches

   CONCRETE EXPOSED TO EARTH OR WEATHER:
   NO. 6 THROUGH NO. 18 BARS: ..... 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: ..... 1-1/2 Inches

28. REFER TO GEOTECHNICAL ENGINEER'S REPORT FOR SUBGRADE PREPARATION, INCLUDING CRUSHED AGGREGATE BASE AND VAPOR BARRIER REQUIREMENTS AND RECOMMENDATIONS.

29. CONCRETE TEST REPORTS SHALL BE AVAILABLE AT JOB SITE.

30. ALL FOUNDATION AND RETAINING WALLS SHALL BE BACKFILLED PER GEOTECHNICAL ENGINEERS RECOMMENDATIONS. HEAVY COMPACTION EQUIPMENT SHALL NOT BE USED TO COMPACT BACKFILL WITHIN 5 FEET LATERALLY BEHIND ANY WALL UNLESS THE WALL IS TEMPORARILY BRACED. THE DESIGN OF WALLS RETAINING EARTH ASSUMES DRAINAGE SYSTEM IS IN PLACE, AND DOES NOT INCLUDE HYDROSTATIC PRESSURE LOADS. THE GENERAL CONTRACTOR SHALL PROVIDE DRAINAGE SYSTEM IN ALL BACKFILL CONDITIONS (SEE CIVIL/ARCHITECTURAL DRAWINGS FOR DRAINAGE SPECIFICATIONS).

31. NO BACKFILL SHALL BE PLACED AGAINST CONCRETE WALLS UNTIL WALLS HAVE BEEN BRACED AGAINST LATERAL THRUST. SUCH BRACING SHALL REMAIN IN PLACE UNTIL SLAB AND FLOOR HAS BEEN PLACED AND CONCRETE HAS ATTAINED 28 DAY COMPRESSIVE DESIGN STRENGTH.

32. CONTRACTOR SHALL PROVIDE ALL NECESSARY SHORING AND BRACING FOR ALL STRUCTURAL ELEMENTS DURING CONSTRUCTION. SHORING MUST BE DESIGNED BY A STRUCTURAL ENGINEER THAT IS REGISTERED IN THE STATE THAT THIS PROJECT IS LOCATED. STRUCTURAL CONSULTING GROUP WILL NOT REVIEW SHORING SHOP DRAWINGS.

33. TOP REINFORCING BARS IN EXTERIOR CONCRETE SLABS ARE TO BE EPOXY COATED.

## PRECAST CONCRETE PARKING DECK

1. DESIGN, DETAILING, MATERIALS AND INSTALLATION OF PRECAST CONCRETE SUPER STRUCTURE SHALL MEET REQUIREMENTS AS SET FORTH BY THE PRECAST/PRE-STRESSED CONCRETE INSTITUTE, THE AMERICAN CONCRETE INSTITUTE, AND THE APPLICABLE BUILDING CODE. DESIGN SHALL BE PER LOADS INDICATED IN THESE GENERAL NOTES AS A MINIMUM. DESIGN AND DETAILING SHALL BE PERFORMED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED.

2. SHOP DRAWINGS SHALL BE SUBMITTED INDICATING COMPLETE INFORMATION REQUIRED FOR CONSTRUCTION OF THE PRECAST STRUCTURE. SHOP DRAWINGS SHALL INCLUDE LAYOUT AND DIMENSIONS OF STRUCTURE INCLUDING ANY OPENINGS, PRECAST COMPONENTS, CONNECTION DETAILS, REINFORCEMENT, LOADS TO THE FOUNDATIONS, AND RELATIONSHIP TO ADJACENT ITEMS. SHOP DRAWINGS AND CALCULATIONS SHALL BE SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED. DO NOT BEGIN FABRICATION UNTIL SHOP DRAWINGS AND CALCULATIONS ARE COMPLETED AND REVIEWED.

3. THE PRECAST CONCRETE SUPER STRUCTURE DESIGNER IS RESPONSIBLE FOR ALL ASPECTS OF THE PRECAST SUPER STRUCTURE. THIS SHALL INCLUDE THE GRAVITY AND LATERAL DESIGN OF THE PRECAST STRUCTURE AND ANY OTHER ELEMENTS REQUIRED TO PROVIDE A COMPLETE STRUCTURAL SYSTEM. THIS ALSO INCLUDES THE DESIGN AND DETAILING OF STRUCTURAL DIAPHRAGMS, STRUCTURAL TOPPING SLABS, CABLE RAIL SUPPORTS AND CONNECTIONS OR EMBED PLATES OR OTHER EMBEDDED ELEMENTS OR REQUIRED NOTCHES IN CAST-IN-PLACE CONCRETE OR STRUCTURAL STEEL MEMBERS. THE DESIGN OF THE FOUNDATION SYSTEM IS NOT INCLUDED AS PART OF THE PRECAST DESIGNERS RESPONSIBILITY. HOWEVER, ANY INFORMATION THAT MIGHT AFFECT THE DESIGN OF THE FOUNDATION SYSTEM SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD AND SHOWN ON THE SHOP DRAWINGS.

4. THE PRECAST SYSTEM DESIGNER SHALL PERFORM THE DUTIES OF SPECIALTY STRUCTURAL ENGINEER WHO IS UNDER CONTRACT WITH THE CONTRACTOR AND IS RESPONSIBLE FOR STRUCTURAL ENGINEERING FUNCTIONS NECESSARY FOR THE COMPLETION OF THE STRUCTURE AS SPECIFIED IN THE CONTRACT DOCUMENTS. THIS INCLUDES THE DESIGN OF ALL PRECAST CONCRETE ELEMENTS UNDER ALL LOADS APPLICABLE TO THE SUPER STRUCTURE.

5. CONNECTIONS SHOWN ON CONTRACT DRAWINGS ARE SHOWN FOR LOCATION, GENERAL ARRANGEMENT AND MINIMUM CAPACITY REQUIRED. PRECAST CONCRETE LOAD BEARING CONNECTIONS SHALL BE MADE TO CAST-IN-PLACE CONCRETE OR STRUCTURAL STEEL MEMBERS AS INDICATED ON THE DRAWINGS.

6. ALL HOLES REQUIRED IN PRECAST MEMBERS SHALL BE PROVIDED BY THE PRECAST MANUFACTURER FOR DESIGN OF THE MEMBERS WITH HOLES AND FOR INCLUSION WITH THE CASTING FORMS. IF ANY HOLES ARE REQUIRED AFTER THE PRECAST MEMBERS ARE CAST, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST, LABOR AND MATERIALS REQUIRED TO ANALYZE THE EXISTING MEMBER THAT IS EFFECTED AND TO CUT THE HOLE(S) IN THAT MEMBER.

7. PRECAST DESIGNER IS RESPONSIBLE FOR PROVIDING ADEQUATE REQUIRED BETWEEN PRECAST AND RESIDENTIAL STRUCTURE FOR LATERAL MOVEMENT OF PRECAST STRUCTURE. TOTAL AIRSPACE BETWEEN PRECAST STRUCTURE AND RESIDENTIAL BUILDING SHOULD INCLUDE ADDITIONAL 1" FOR LATERAL MOVEMENT OF RESIDENTIAL STRUCTURE.



Structural Consulting Group, LLC
6250 shiloh road - suite 20 - alpharetta, ga 30005
phone (678) 513-4242 fax (678) 513-4232
SCG Project No. 191003
N.C. C.O.A.: P-0573

WLA
WATTS LEAF ARCHITECTS, PA
101 North McDowell Street Suite 112
Charlotte, North Carolina 28204
PH 704 376 1200 FX 704 376 8111

CRABTREE NORTH APTS.
2251 Charles es Drive
Raleigh, North Carolina
EYC COMPANIES

03FEB20
PRICING
SET

| | |
|---|---|
| PROJECT | 1915 |
| DATE | 06NOV19 |
| DRAWN BY | SCG |
| CHECKED BY | FSO |

GENERAL NOTES

SG1.0.0