

- 1.1 "2018 North Carolina State Building Code" and "International Building Code", 2015.
- 1.2 "Minimum Design Loads for Buildings and other Structures" SEI/ASCE 7-10.
- 1.3 "Building Code Requirements for Structural Concrete (ACI 318-14)" American Concrete Institute 2014.
- 1.4 "Manual of Standard Practice", Concrete Reinforcing Steel Institute, latest edition.
- 1.5 "Specification for Structural Steel Buildings (AISC 360-10)" American Institute of Steel Construction, 2011 – 14th Edition
- 1.6 "Structural Welding Code – Steel (AWS D1.1)" and "Structural Welding Code – Reinforcing Steel (AWS D14)", American Welding Society.
- 1.7 "Building Code Requirements for Masonry Structures", ACI 530-13, ASCE 5-13, TMS 402-13.
- 1.8 "Design Manual For Floor Decks and Roof Decks", Steel Deck Institute, latest edition.
- 1.9 "Standard Specifications for Joist Girders (JG-10)", "Standard Specifications for Open Web Steel Joists, K-Series (K-10)", "Standard Specifications for Long Span Steel Joist, LH Series and Deep Longspan Steel Joists, DLH Series (LH/DLH-1.1)", Steel Joist Institute

2.0 DESIGN LOADS:  
Project Located in: Town of Shallotte, County of Brunswick, State of North Carolina.

2.1 Gravity Loads: (Reduced where allowed)

GRAVITY LOADS		
Location	Uniform (psf)	Concentrated (k) (Over 2.5'x2.5')
Roof Loads:		
Dead Load	20	
Live Load	20	300
Soffit Dead Load	7	
Floor Loads:		
Dead Loads:	67	
Floor Live Loads:		
First Floor	100	2,000
Classrooms	40	1000
Second Floor Corridor	80	1000
Stairs	100	
Media Center	150	1000
Light Storage	125	

2.2 Drifting Snow Loads per N.C. Building Code.

P<sub>g</sub> = 10 psf  
I = 1.1  
C<sub>e</sub> = 0.9  
C<sub>t</sub> = 1.0

2.3 Risk Category = III

2.4 Wind Loads per N.C. State Building Codes, 2018 edition (IBC 2015) & ASCE 7-10 (3-second gust)

Main Wind Force Resisting System:  
V = 156 mph  
Exposure Category "B"

Building is enclosed & Internal Pressure coefficient (GC<sub>pi</sub>) = +0.18 & -0.18  
Topographic Factor K<sub>zt</sub> = 1.0  
Wind Directionality Factor, K<sub>d</sub> = 0.85

Calculated Wind Base Shear (For MWFRS)  
V<sub>x</sub> = 106K V<sub>y</sub> = 131K

Components and Cladding:  
V = 156 mph  
Exposure Category "B"

Components and Cladding Wind Pressure (psf)										
Walls	Area < 10ft <sup>2</sup>		< 20ft <sup>2</sup>		Area < 50ft <sup>2</sup>		Area < 100ft <sup>2</sup>		Area < 500ft <sup>2</sup>	
Zone 4	43.9	-47.5	41.9	-45.6	39.2	-43.0	37.3	-41.0	32.7	-36.4
Zone 5	43.9	-58.7	41.9	-54.7	39.2	-49.5	37.3	-45.6	32.7	-36.4
Roof	Area < 10ft <sup>2</sup>		Area < 20ft <sup>2</sup>		Area < 50ft <sup>2</sup>		Area < 100ft <sup>2</sup>		Area < 500ft <sup>2</sup>	
Zone 1	17.8	-43.9	16.7	-42.7	15.3	-41.3	14.1	-40.1	14.1	-40.1
Zone 2	17.8	-73.6	16.7	-65.7	15.3	-55.3	14.1	-47.5	14.1	-47.5
Zone 3	17.8	-110.7	16.7	-91.7	15.3	-66.6	14.1	-47.5	14.1	-47.5

Notes:

- Areas noted are effective wind areas as per ASCE 7-10, 26.2 definitions.
- See figures below for Zone locations.
- Plus and minus signs signify pressures acting toward and away from surfaces, respectively.
- Design pressures shown in table are strength design wind pressures. Allowable stress design wind pressures may be calculated by factoring the pressures by 0.6.
- Design pressures for effective wind areas between those noted in schedule may be interpolated.
- Tripartite area = greater of LxW or LxL/3.
- Deflections may be calculated based on 42% of these loads.
- Seismic Loads per 2018 North Carolina State Building Code (IBC 2015) & ASCE 7-10

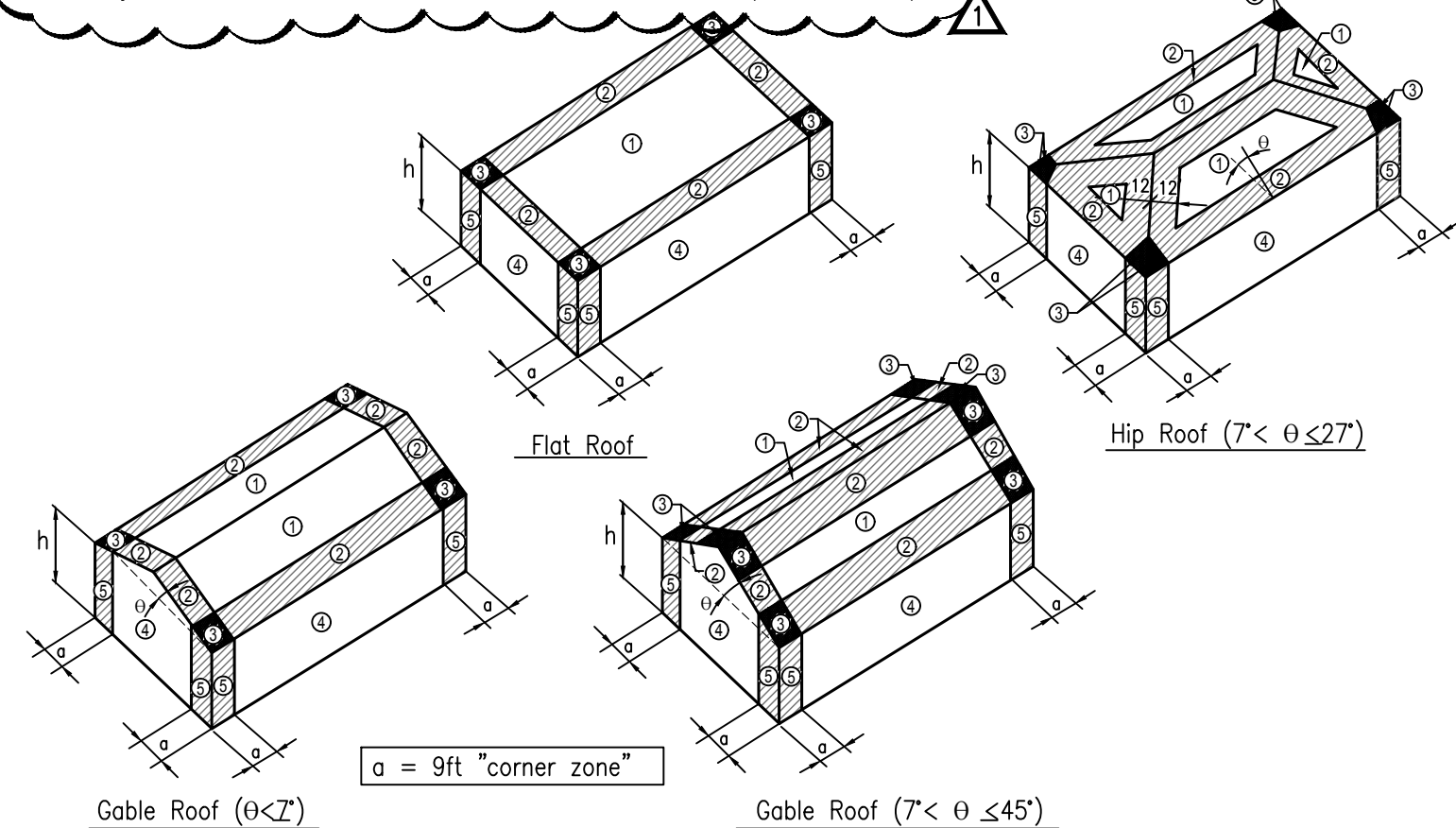
Risk Category = III  
Site class = "F" (Per Geotechnical Report – spectral response based on site class 'D' per IBC 2015 exception.)  
Spectral Response Coefficients:  
S<sub>DS</sub> = 0.311g  
S<sub>D1</sub> = 0.182g

Seismic Design Category = C  
Seismic Importance Factor = 1.25  
Basic Seismic – Force – Resisting System  
Steel systems not specifically designed for seismic resistance and intermediate reinforced masonry shear walls  
R<sub>e</sub>=R<sub>s</sub>=3.0, QY=3.0, CDV=3.0  
C<sub>s</sub> = 0.130  
T = 0.25 seconds  
Design Base Shear V<sub>x</sub> = V<sub>y</sub> =118k  
Building Height Limit = NL  
Analysis Procedure = 12.8.1 ASCE 7-10  
Equivalent Lateral Force Procedure

2.6 Guardrail designed per North Carolina State Building Code, Section 1607.8

Guardrail:  
Uniform load = 50 plf, any direction – per 1607.8.1  
Concentrated load = 200 lbs, any direction – per 1607.8.1.1  
Intermediate Rail: (all those expect handrail) per 1607.8.1.2

2.7 Flood Loads:  
Project is located in an area with minimal flood hazard (Flood Zone X).



3.0 FOUNDATIONS:

3.1 Foundation design is based on geotechnical report #1306-19-016 by SMA&E Inc, Wilmington, NC dated August 21, 2019. This report is available in the project specifications book. The recommendations contained in this report are herein made part of the requirements of these contract documents.

- 3.2 Based on the Geotechnical Report by SMA&E Inc, this site has a low to moderate risk of liquefaction during the maximum considered earthquake (MCE). The MCE has a 2% probability of exceedance in 50 years or once every 2,500 years. Based on the estimated total and differential settlements of less than 4 inches and less than 3 inches, respectively, the structure should not collapse. During the design seismic event, the structure should not collapse, however extensive unreparable damage should be expected unless liquefaction mitigation (i.e earthquake drains) are implemented. The owner should be made aware of the risk associated and determine if liquefaction mitigation should be implemented.
- 3.3 New footings shall bear on strata capable of sustaining a minimum bearing pressure of 2,500 psf. The bearing capacity shall be verified by a qualified Geotechnical Engineer.
- 3.4 Top of footing (1/FTG) elevations are shown on the drawings or are to be determined by the Contractor in the field in accordance with the guidelines set forth in the drawings.
- 3.5 Bottom of exterior footings, grade beams and walls shall bear at a minimum depth of 1'-6" below final grade for frost protection.
- 3.6 Testing and Inspection:  
a. All areas to have slabs on grade shall be proof rolled in accordance with and under observation to the Geotechnical Engineer and approved prior to preparation for concrete placement.  
b. All foundation bearing strata shall be inspected and approved by the Geotechnical Engineer prior to any concrete placement.  
c. Geotechnical Engineer shall be the sole judge as to suitability of all foundation and/or slab bearing strata.  
d. Footing bearing elevations shall be adjusted in the field as required to meet the design bearing pressures by additional excavation or compaction and/or backfilling or by other means acceptable to the Geotechnical Engineer.

3.7 Undercutting to remove existing fill beneath footings and slab shall be performed at the direction of the Geotechnical Engineer.

3.8 Engineered Fill: All fill material shall be selected in accordance with the Geotechnical Report Material shall be a clean, low plastic soil with a plasticity index less than 30 (less than 15 is preferred), liquid limit less than 50, and unit weight of 120 pcf (± 5 pcf)

3.9 Compaction: All fill shall be placed in loose lifts not exceeding 8 inches in thickness and compacted to a minimum of 96 percent Standard Proctor (ASTM D-698) except that the top 12 inches shall be compacted to a minimum of 98 percent Standard Proctor. Moisture shall be controlled to within 3 percent above or below optimum content.

3.10 Remove all topsoil and organic materials. The stripping should extend at least 10' beyond the proposed construction limits.

3.11 Subsurface Water: Due to the relatively shallow groundwater encountered, (2'-3" noted during boring) temporary construction dewatering may be necessary to facilitate efficient below-grade construction. Dewatering operations for the majority of the site can be handled by the use of conventional submersible pumps directly in the excavation or temporary trenches or French drains.

3.12 Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level, if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by the surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 2 to 3-inch "mud mat" of "lean" concrete should be placed on the bearing soils before the placement of reinforcing steel.

4.0 CONCRETE:

4.1 Concrete Strength:  
All concrete shall be in accordance with the American Concrete Institute (ACI) 301 and 318.

4.2 Concrete shall have a 28 day compressive strength and density as follows:  
a. Footings, 3,000psi, Density = ±145pcf  
b. Interior Slab on Grade, 3,000psi, Density = ±145pcf  
c. Slab on Deck, 3,000psi, Density = ±145pcf  
d. CMU Grout Fill, 3,000psi, Density = ±145pcf, Slump 8"-11" or per structural masonry note 6.5

e. Exterior Slab on Grade, 4,000psi, Density = ±145pcf

- 4.3 Concrete Mix Designs:  
a. Submittals: Submit written reports of each proposed concrete mix not less than 15 days prior to the start of work.  
b. Mix designs, including water, cement ratios and slumps, shall be prepared in accordance with ACI 301-05, Section 4. Cement shall conform to ASTM C 150 Type I or at contractor's option, ASTM C 595 Type IP where fly ash is permitted. Normal weight aggregate shall conform to ASTM C 33 and light weight aggregate shall conform to ASTM C 330. No admixtures containing calcium chloride shall be permitted in any concrete.  
f. Aggregate size shall be #57 stone for supported slabs or other formed concrete elements; #57 stone for slabs on grade and footings or other concrete elements formed from and poured against earth; #89 stone for masonry grout.  
g. Water reducing admixture shall be used in all concrete.  
h. Air entraining admixture in accordance with ACI 301 shall be used in all concrete exposed freezing and thawing during construction or service conditions.  
i. Concrete subjected to freezing/thawing shall have a maximum water/cement ratio of 0.45 and shall contain the amount of air entraining agent specified in ACI 301-05 Section 4.

4.4 Curing:  
See specifications for curing method options and apply within two (2) hours after completion of finishing to all concrete flatwork and walls, U.N.O., other than footings and grade beams.

4.5 Use a non-corrosive, non-chloride accelerating admixture in concrete exposed to temperatures below 40 degrees. Uniformly heat the water and aggregates to a temperature of not less than 50 degrees. Place and cure concrete in accordance with ACI 306.

4.6 When hot weather conditions exist, place and cure concrete in accordance with ACI 301. Cool ingredients before mixing to maintain concrete temp. at time of placement below 90 degrees.

4.7 Reinforcing in all abutting concrete, including footings shall be continuous through or around all corners or intersections. Dowels or splices shall be equal in size and spacing to the reinforcing in the abutting members.

4.8 Refer to architectural drawings for door and window openings, drips, reglets, washes, masonry anchors, brick ledge elevations, slab depressions and miscellaneous embedded plates, bolts, anchors, angles, etc.

4.9 Refer to plumbing, mechanical and electrical drawings for underfloor, perimeter and other drains and for sleeves, outlet boxes, conduit, anchors, etc. The various trades are responsible for their items.

4.10 Base plates, anchor rods, support angles and other steel exposed to earth or granular fill shall be covered with a minimum of 3" of concrete.

4.11 Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:  
a. Specified overall values of flatness, F(ℓ) 25; and of levelness, F(ℓ) 20; with minimum local values equal to ½ of the overall flatness and levelness values.  
b. The composite (F) and F(ℓ) numbers shall be measured and reported within 72 hours after completion of slab concrete finishing operations and before removal of any supporting shores.

4.12 Non-shrink grout shall be pre-mixed, non-corrosive, non-metallic, non-staining containing silica sands, Portland cement, shrinkage compensating and water reducing agents. Products shall require no addition of water. Minimum compressive strength shall be 2500 psi after one day and 7000 psi after 28 days. Grout shall be free of gas producing or air releasing and oxidizing agents and contain no corrosive iron, aluminum or gypsum.

4.13 Provide concrete grout – not mortar – for reinforced masonry lintel and bond beams where indicated on drawing or as scheduled.

4.14 Tolerance for anchor rods and other embedded items shall be per the AISC Code of Standard Practice Section 7.5.

4.15 Unless otherwise shown in the architectural drawings, provide 3/4-inch chamfers at all column, wall, slab or beam edges that are exposed to view in the finished structure.

4.16 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.....1½ inches  
Concrete not exposed to weather or in contact with ground:  
Slabs:  
No. 11 Bar and smaller.....¾ inches

5.0 REINFORCING STEEL:

5.1 Reinforcing shall be domestic new billet steel conforming to ASTM A615, Grade 60 or 60S including stirrups and ties, except that reinforcing which is required to be welded shall conform to ASTM A706.

5.2 Field bending of concrete reinforcing steel is not permitted.

5.3 Welded wire mat and fabric shall conform to ASTM A184 and A185 respectively and shall be provided in flat sheets. Welded wire mat/fabric shall be lapped 6"-8" at all splices.

5.4 Bar Splices:

Bar Size	F <sub>c</sub> = 3,000psi		F <sub>c</sub> = 4,000psi		F <sub>c</sub> = 5,000psi	
	Ld (in)	Class "B" Lap Splice (in)	Ld (in)	Class "B" Lap Splice (in)	Ld (in)	Class "B" Lap Splice (in)
#3	17	22	15	19	13	17
#4	22	29	19	25	17	23
#5	28	36	24	31	22	28
#6	33	43	29	37	26	34
#7	48	63	42	54	38	49
#8	55	72	48	62	43	56

- Values are based on normal weight concrete.
- Ld = minimum embed of rebar
- Class "B" lap splice refers to minimum distance bars must be lapped for a full tension splice.
- Deck shall be 2" – 20 gauge, galvanized, composite floor deck. Vulcraft 2VL20 or approved equal.
- Deck shall be galvanized per ASTM A924-94 (G60)
- Fasten composite floor deck to supporting members by not less than 3/4-inch puddle welds or elongated welds of equal perimeter, spaced not more than 12" o.c. with a minimum 2 welds per unit at each support.

6.0 STRUCTURAL MASONRY:

6.1 All structural masonry shall conform to ACI 530 standards as appropriate to the material.

6.2 Concrete Masonry Units (CMU):

- Units shall be lightweight cellular units conforming to ASTM C 90, Grade N-2. Concrete masonry net area unit strength shall be no less than 2000 psi in accordance with ASTM C 140, with a unit weight not exceeding 95 pcf.
- Design compressive strength of CMU (f<sub>m</sub>) = 2000 psi.

6.3 Mortar shall conform to ASTM C 270. Mortar shall be type "S" and shall conform to the ASTM C270 proportion requirements.

6.4 Neither type "N" mortar nor masonry cement shall be used as port of the lateral force resisting system.

6.5 Grouting:

- Grout shall conform to ASTM C476 as specified by proportion. Masonry grout shall conform to the ASTM proportion requirements for coarse grout with a slump of 8 to 11 inches. Contractor may substitute grout with pea gravel concrete masonry fill, see note 4.2 this sheet.
- All bond beams shall be filled with grout and reinforced as indicated on the drawings (details or schedules). Mortar fill is not permitted.
- All masonry wall cells or cavities indicated as reinforced shall be grouted for the full height of the wall, unless specifically noted otherwise on the drawings. Unreinforced walls indicated as grouted shall be grouted full height, unless specifically noted otherwise. Mortar fill is not permitted.
- All masonry cells or cavities below grade shall be grouted solid unless specifically noted otherwise on the drawings. Mortar fill is not permitted.
- Vertical grouting shall be low lift or high lift as follows:
  - (1) Low lift grouting shall be used for all cavity walls and may be used for all walls at the option of the Contractor. Lifts shall not exceed 4'-0" in height.
  - (2) High lift grouting is permissible only for filling of cellular masonry units and shall not exceed 12'-8" in height. Clean out holes shall be provided at the base of each grouted cell.
- Grouting shall be stopped 1-1/2" below the top of a course to form a key at the joint.
- Grouting of masonry beams or lintels shall be done in one continuous operation.

6.6 Masonry Reinforcing:

- Foundation dowels may slope a maximum of 1:6 to align with wall cavities or vertical CMU cores. Greater slopes will require replacement of the foundation dowels.
- Spliced reinforcing shall be lapped a length calculated per IBC 2107.5 OR 15" OR as shown on drawings, whichever is greatest. All splices shall be wired together.
- Vertical reinforcing bars shall have a minimum clearance of ¼" from masonry and shall be held in position top and bottom and at intervals not exceeding 4'-0". Accessories for such support shall be used. Provide "AK Wire Products Company" (or approved equal) Rebar Positioner A4225 or A4239 for vertical bars and A4239 for horizontal bars or approved equal products from other suppliers.
- Horizontal joint reinforcing shall be lapped no less than 6" all splices, including corners and tees where no control joint is used.
- All horizontal joint reinforcing shall stop at control joints.
- Horizontal reinforcing in bond beams shall be continuous through control joints.
- All CMU walls shall have joint reinforcing @ 16" o.c. All joint reinforcing shall have (2) 9 gauge (0.148" or W1.7) side rods and cross rods @ 16" o.c.

6.7 Masonry contractor shall provide for and coordinate with other trades for placement of all items to be embedded or built into the masonry.

MINIMUM SPLICING LENGTH (L <sub>d</sub> ) FOR MASONRY		
BAR SIZE	SPUCE LENGTH	
#3	16"	
#4	22"	
#5	26"	
#6	43"	
#7	60"	

7.0 STRUCTURAL STEEL:

7.1 All structural steel shall be of the grades indicated below, unless noted otherwise on plans or details.  
Rolled shapes ASTM A992 Gr. 50  
Steel pipe ASTM A53, Type E or S, Grade B, Fy=35ksi  
Structural tubing ASTM A500, Grade B, Fy=46ksi  
Plates and bars ASTM A36 U.N.O.  
Anchor rods ASTM F1554, Grade 36 U.N.O.  
Miscellaneous ASTM A36 U.N.O.

- 7.2 All structural steel shall be detailed, fabricated and erected in accordance with the AISC Code of Standard Practice. The fabricator is responsible for the design of connections not shown on the structural drawings. For the purpose of the connection design, the fabricator shall retain a professional engineer registered in the state where the project is located. The engineer shall seal and sign each shop drawing containing connection design. A note shall accompany the drawings stating that the seal is for "connection design only".
- 7.3 Connection Design:  
a. Generally, connections shown on the drawings are schematic and are intended to show the relationship of the members.  
b. Connections shall be designed for one-half (1/2) the allowable uniform load on the member, as defined in Part 3, "Allowable Loads on Beams" tables in the AISC "Manual of Steel Construction", 13th Edition, Allowable Stress Design or for the reactions as shown on the drawings or a minimum of 10 kips, whichever is greatest.

7.4 Bolted connections:

- Bearing type connections shall be snug tight with A325N or A490N bolts, U.N.O. Oversized and long-slotted holes are NOT permitted U.N.O. At single shear plate connections, provide bearing type fasteners with horizontal short slotted holes. All bolt shall be snug tight. DO NOT use torque bolts.
- Protruding bolt heads, shorts or nuts shall not extend nor prohibit the application of architectural finishes or placement of steel deck and electrical and elevation.
- Connection designer is responsible for verifying the axial capacity after a section is reduced for bolt holes. Member size may be increased or plates added to maintain required capacity.
- Bolted connections shall be assembled and inspected in accordance with RCSC-2009 (Specification for Structural Joints Using High-Strength Bolts).

7.5 Welded connections:

- All welding shall be in accordance with the "Structural Welding Code – Steel" (AWS D1.1) of the American Welding Society, Latest Edition.
- Electrodes for welding shall comply with the requirements of Table 4.1.1 of the AWS code.
- At Moment Connections and Braced Frames Provide Field Metal that has a minimum CWN Toughness of 20 ft-lbs at minus 20 degrees F, As determined by AWS classification or Manufacturer Certification.
- Proof of welder certification shall be available at the job site during times of inspection.

7.6 Minimum plate thickness shall be 3/8" U.N.O.; minimum bolt diameter shall be 3/4-inch U.N.O.; minimum shop weld shall be 3/16" and minimum field weld shall be 1/4-inch U.N.O.

7.7 All re-entrant corners (such as copes and blocks) shall be cut and shaped notch free with a radius of at least 1/2-inch.

8.0 COMPOSITE BEAMS:

8.1 Composite beams and girders DO NOT require temporary shoring for construction loads (wet concrete + 20 psf) U N O on the drawings. Contractor is responsible for verifying the construction load imposed on the structure. Where questions as to capacity arise, Contractor shall inform the Structural Engineer prior to proceeding with any work.

8.2 See details on SI.02 for typical stud layouts.

8.3 The number of shear connectors (studs) shown is based upon obtaining the full horizontal shear capacity indicated on the AISC "Load and Resistance Factor Design Specification for Steel Buildings" (LRFD) Chapter "I" for each stud for the strength and density of concrete where used. See composite steel deck notes also.

8.4 Studs shall be 3/4-inch diameter and shall extend not less than 1-1/2 inches above the top of the steel deck and shall not have less than 1/2-inch concrete cover above top of stud after welding and shall conform to ASTM A108.

8.5 The number of studs on a beam or between any two connections along a beam is shown on the drawings. Spacing of studs within the length shown shall be as uniform as possible.

8.6 No shop point shall be applied to any studs nor to top flanges or surfaces of members receiving field welds.

8.7 Stud capacity varies with the type and length of the stud and with the properties of the composite deck. The deck supplier shall provide deck with a configuration that does not reduce the stud capacity per AISC requirements.

8.8 Stud type, length, shear value and detailed layout shall be submitted with the composite metal deck shop drawings.

8.9 Break ceramic ferrules (arc shields) loose and remove from deck.

8.10 A stud shear connector welded through the metal deck may take the place of a 3/4-inch puddle weld in order to secure the deck to the steel framing. Do not weld shear connectors through two layers (lapped ends) of deck units.

9.0 STEEL DECK:

9.1 Steel roof deck shall be galvanized, Type B, 1 1/2" deep, 20 gauge, U.N.O.

9.2 For steel roof deck spans, mechanically fasten side laps at mid-span using "Builder", self-tapping TEKS No. 10 or larger machine screws or as noted on plan. Provide additional sidelap fasteners where noted on plan. Fasten roof deck to supporting members as noted on plan.

9.3 Do not hang pipes or ducts from steel roof deck. Fasten roof deck to supporting members as noted on plan.

9.4 COMPOSITE FLOOR DECK:

- Deck shall be 2" – 20 gauge, galvanized, composite floor deck. Vulcraft 2VL20 or approved equal.
- Deck shall be galvanized per ASTM A924-94 (G60)
- Fasten composite floor deck to supporting members by not less than 3/4-inch puddle welds or elongated welds of equal perimeter, spaced not more than 12" o.c. with a minimum 2 welds per unit at each support.

10.0 LIGHT GAUGE STEEL FRAMING (DIETRICH):

10.1 All members shall be designed in accordance with the American Iron and Steel Institute (AISI) "Specifications for the Design of Cold-Formed Steel Structural Members", Latest Edition.

10.2 All framing members shall be formed from corrosion-resistant steel corresponding to the requirements of ASTM A446, with a minimum yield strength of 33 ksi for joists and studs and 33 ksi for runners. All exterior tracks, studs and roof trusses to have G90 galvanization.

10.3 All members shown are standard designations of "Dietrich Industries, Inc."

10.4 Design of members indicated in structural drawings is based on minimum properties of products produced by "Dietrich Industries". No substitution of materials is acceptable for use without prior approval of the structural engineer. Substitutions shall meet or exceed all properties produced by "Dietrich Industries, Inc."

10.5 All shop drawing submittals shall show layout, spacing, sizes, thicknesses and types of cold-formed metal framing, fabrication, and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details and attachment to adjoining work.

10.6 Shop drawings, design calculations and other structural data shall be prepared and sealed by a qualified engineer. The Structural Engineer shall be legally qualified to practice in the jurisdiction where the project is located and shall be experienced in providing engineering services of the kind indicated.

10.7 All framing components shall be cut square for attachment to perpendicular members or as required for an angular fit tight against abutting members. All load bearing stud/walls shall be factory assembled into panels with studs bearing squarely and fully in top and bottom tracks.

10.8 Fastening components shall be by self-drilling screws or by welding as defined below UNO on the drawings.

10.9 Screwed connections:  
a. Screws shall be type S-12 or type S-4 for all framing members per manufacturer's recommendations.  
b. A minimum of three (3) exposed threads shall penetrate through at joined materials.  
c. Corrosion-resistant cadmium-plated screws shall be used for screws attaching metal lath, masonry ties, and other exterior materials.

10.10 Welded connections:

- Gas metal arc welding (GMAW) shall be used for 20 ga. Or lighter members. AWS-705-3, E-705-E, E-705-6 wire electrodes (030"-035" diameter shall be used with carbon dioxide, argon-oxygen or argon-carbon dioxide shielding. Welding equipment 60-100 amperes at 25 volts using 220-volt 3-phase electric service.
- Shielded metal arc welding (SMAW) shall be used for 18 ga' and heavier members. AWS E-6012, E-6013, or E-7014 electrodes of 3/32" or 1/8" diameter shall be used. Welding equipment heat setting shall be varied dependent on material thickness.
- All welds shall be touched up with zinc rich paint, or paint similar to that used by the framing member manufacturer