

STRUCTURAL GENERAL NOTES

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1. GENERAL

- a. Provide construction conforming to the 2012 International Building Code with the latest State Amendments. Reference to other standards, specifications, or codes means the latest standard or code published and adopted.
b. The structural general notes apply except where indicated otherwise on the drawings or in the specifications. A detail shown for one condition applies for all like or similar conditions even though not specifically indicated on the drawings.
c. Verify all existing conditions, dimensions, and elevations before starting work. Notify the Architect and Structural Engineer of Record in writing of any discrepancy.
d. The structure is able to resist design loads only when structural work is complete. During construction, the structure is not self-supporting. The Contractor is solely responsible for the design, adequacy, and safety of erection bracing, shoring, temporary supports, and all other means, methods, techniques, sequences, and procedures of construction.
e. Coordinate the structural contract documents with documents from architectural, mechanical, electrical, plumbing, civil, and all other consultants. Notify the Architect and Structural Engineer of Record in writing of any conflict and/or omission.
f. Coordinate and verify floor and roof opening sizes and locations with architectural, mechanical, plumbing, and electrical drawings. For additional openings not shown on the structural drawings refer to the architectural and mechanical drawings.
g. Review of the submittals and/or shop drawings by the Structural Engineer of Record is only for general conformance with the contract documents and does not relieve the Contractor of the responsibility to review and check shop drawings before submission to the Structural Engineer of Record. The Contractor must review and stamp all submittals prior to submission. The Contractor remains solely responsible for errors and omissions associated with the preparation of shop drawings as they pertain to member sizes, details, and dimensions specified in the contract documents. Do not begin fabrication until shop drawings are completed and reviewed by the Structural Engineer of Record.
h. Electronic drawing files or model files will not be provided to the Contractor or subcontractors, unless agreed to otherwise for additional costs.
i. Do not make shop drawings using reproductions of the contract documents or referencing the contract documents. Provide an allowance of 5% of all structural materials including labor to be fabricated and placed during progress of work as may be directed by the Structural Engineer of Record in addition to all structural materials indicated on the contract documents. Credit any unused quantity to the owner at the end of the project.

2. REINFORCED CONCRETE

- a. Provide reinforced concrete conforming to the following standards:
- ACI 301-10, Specifications for Structural Concrete for Buildings
- ACI 318-11, Building Code Requirements for Structural Concrete
- ACI 302.1R-04, Guide for Concrete Floor and Slab Construction
- ACI 360R-10, Guide to Design of Slabs-On-Ground
b. All concrete shall be normal weight 3000 psi compressive strength at 28 days unless noted otherwise. Provide concrete with maximum water-to-cementitious material ratio of 0.50.
c. Unless noted otherwise, provide concrete with the following minimum Exposure Classes, Type, minimum 28-day compressive strengths, and maximum water-to-cementitious materials ratio:

Table with 4 columns: Location, Exposure Class, Type, Strength, w/cm. Rows include Foundations, Ext. Slabs on Grade, Int. Slabs on Grade, Slabs on Metal Deck.

- d. For Exposure Classes F1, F2, and F3, provide entrained air by volume in concrete based on ACI 318 Table 4.4.1, shown below:

Table with 3 columns: Nominal Maximum Aggregate Size, in., Exposure Class F1, Exposure Class F2 and F3. Rows include 3/8, 1/2, 3/4, 1, 1 1/2, 2, 3.

- e. Fully document and submit for review the proposed materials and mix design for all concrete. The Contractor is responsible for obtaining the required design strength. All concrete test data must be available at the job site.
f. The use of calcium chloride, chloride ions, or other salts is not permitted.
g. Place concrete at a slump of 5" ± 1".
h. Unless noted otherwise, provide construction or contraction joints in slabs-on-grade such that the maximum area between joints does not exceed 225 square feet with the length not exceeding twice the width.
i. The location of construction joints requires the approval of the Structural Engineer of Record. Unless noted otherwise, thoroughly roughen by mechanical means and clean construction joints.
j. Chamfer or round all exposed corners a minimum of 3/4".
k. Detail concrete reinforcement according to ACI SP-66 detailing manual. Submit shop drawings for approval, showing all fabrication dimensions and locations for placing concrete reinforcing and accessories. Do not begin fabrication until shop drawings are completed and reviewed by the Structural Engineer of Record. Unless specifically approved otherwise, detail all concrete walls and beams in elevation.
l. Unless noted otherwise, provide reinforcing steel conforming to ASTM A615, Grade 60.
m. Provide welded wire fabric mesh in flat sheets conforming to ASTM A1064. Rolls are not permitted. Lap welded wire fabric a minimum of 6" at each splice.
n. Fiber reinforcing may be substituted for welded wire fabric in slabs-on-grade with the approval of the Structural Engineer of Record. Provide macro fiber reinforcing conforming to ASTM C1116, Type III. Use Strux 90/40, Forta Ferro, or Fibermesh 550, 100% virgin polypropylene fibrillated fibers as directed by the fiber reinforcing manufacturer with approval of the Structural Engineer of Record.
o. Tie all reinforcing steel and embedded items securely in place prior to placing concrete. Provide sufficient supports to maintain the position of the reinforcement within specified tolerances during all construction activities. "Sticking" dowels, anchor rods, or other embedded items into wet concrete is not permitted.
p. Provide corner bars at all corners and intersections of all footings, beams, and walls.
q. The placement of all reinforcing steel must be reviewed by a Professional Engineer registered in the Project State or by a representative responsible to him per ACI 318, 1.3.1.
r. Unless noted otherwise, provide the following concrete cover on all reinforcing steel:
- Concrete against earth (not formed): 3"
- Formed concrete exposed to earth or weather:
 - #5 bars and smaller: 1 1/2"
 - Formed concrete not exposed to earth or weather: 3/4"
 - Slabs, joists, and walls: 3/4"
 - Beams stirrups and Columns ties: 1 1/2"
s. Do not place pipes or ducts with a maximum dimension exceeding one-third the slab or wall thickness within the slab or wall unless specifically shown and detailed on the structural drawings.
t. Do not weld or tack weld reinforcing steel unless approved or directed by the Structural Engineer of Record. Provide reinforcing steel conforming to ASTM A706, Grade 60, when welding is approved or directed.

3. MASONRY

- a. Provide concrete masonry conforming to the following standards:
- ACI 530-11, Building Code Requirements for Masonry Structures
- ACI 530.1-11, Specifications for Masonry Structures
b. Load bearing masonry walls are designed in accordance with Chapters 1 and 2 of ACI 530.
c. Provide brick veneer in accordance with Chapter 6 of ACI 530.
d. Provide light-weight, hollow, load bearing concrete masonry units conforming to ASTM C90 with a compressive strength of masonry (fm) of 1500 PSI and a net strength of 2000 PSI on the net cross-sectional area of CMU determined in accordance with ASTM C140.
e. Provide mortar conforming to ASTM C270, Type M or S. Standard mortar bed joint thickness is 3/8" and must not exceed 5/8".
f. Unless noted otherwise, provide grout for reinforced masonry conforming to ASTM C476 with minimum compressive strength of 2500 PSI. Pea gravel concrete with a minimum compressive strength of 3000 PSI may be substituted for grout only with approval of the Structural Engineer of Record.
g. Unless noted otherwise, lay masonry units in running bond.
h. Provide ladder type horizontal joint reinforcing conforming to ASTM A1064. Unless noted otherwise, place 9 gage or heavier, zinc coated ladder type horizontal joint reinforcing at 16" on center. Lap horizontal joint reinforcing minimum 12". Use prefabricated 'L's and 'T's at corners and intersections.
i. For grouted walls, the maximum height of grout lifts must not exceed 5'-0". Refer to Table 7 of ACI 530.1 for the maximum ungrouted height of CMU walls thinner than 8". Consolidate and reconsolidate grout in accordance with paragraph 3.5.E of ACI 530.1. Walls higher than 5'-0" must have inspection holes at the base of the wall.
j. Lap vertical CMU wall reinforcing as shown in the "CMU Lap Splice Length Schedule."
k. Provide vertical control joints in all masonry walls not retaining earth. Unless noted otherwise on the architectural drawings, place vertical control joints at three times the wall height, but not closer than 25'-0" on center or farther than 50'-0" on center.
l. Unless noted otherwise, provide minimum (1) #5 vertical bar, grouted full height, at each side of openings and at all corners and ends of walls, including both sides at ends of wall panels at vertical control joints.
m. Unless noted otherwise, anchor sides and tops of masonry wall panels to the structure by dovetail anchors, metal straps, or equivalent.

4. STRUCTURAL STEEL

- a. Provide structural steel detailing, fabrication, and erection conforming to the following standards:
- AISC 303-05, Code of Standard Practice for Structural Steel Buildings and Bridges
- AISC 325-11, Steel Construction Manual, 14th Edition
- AISC 326-09, Detailing for Steel Construction, 3rd Edition
- AISC 360-10, Specification for Structural Steel Buildings
- AWS D1.1-10, Structural Welding Code - Steel
b. Provide steel shapes made of material conforming to the following standards, unless noted otherwise:
- Wide Flange Shapes and WT Shapes: ASTM A992
- Angles and Channels: ASTM A36
- Plates: ASTM A572, Grade 50
- Hollow Structural Sections (HSS): ASTM A500, Grade C
- Steel Pipe: ASTM A53, Type E or S, Grade B
- Headed Studs: ASTM A108, Grade 1010 - 1020
- Deformed Bar Anchors: ASTM A1064
c. Unless noted otherwise, provide anchor rods for cast-in-place conditions in concrete that conform to ASTM F1554, Grade 55-S1. Unless noted otherwise, install connections so they are snug-tight.
d. Unless noted otherwise, provide anchors for post-installed conditions in concrete that conform to manufacturer's requirements. Install connections so they are pre-tensioned per manufacturer's specifications.
e. Unless noted otherwise, make all connections with 3/4" minimum diameter ASTM F3125 Grade A325 bolts with threads included in the shear plane. Unless noted otherwise, install connections so they are pre-tensioned. Calibrate tightening methods used so they are in conformance with Section 8, Installation and Tightening of High-Strength Bolts, 2009. Use one of the following tightening methods: calibrated wrench, direct tension indicator, or alternative bolt with twist off element. Do not use turn of the nut method, unless continuously observed by testing agency.
f. Make all welded connections in accordance with AWS D1.1, using type E70XX electrode. Use only certified welders. Proof of certification must be maintained at the job site.
g. Unless specifically detailed on the plans or on the "Steel Beam Reaction Shear Connection Schedule", provide the following beam connections:
- Where beam reactions are shown, provide connections to develop the reactions shown.
- Where beam reactions are not shown, provide connections to develop one-half of the total uniform load capacity shown in the Maximum Total Uniform Load Tables, in Part 3 of the Steel Construction Manual.
- Where reactions are subject to eccentricity, the eccentricity must be accounted for.
h. Submit shop drawings prepared in accordance with AISC 326. Provide complete welding information using AWS symbols. Use prequalified welded joints per the Steel Construction Manual and AWS D1.1. Do not begin fabrication until shop drawings are completed and reviewed by the Structural Engineer of Record.
i. The design of special connections between steel framing components (including but not limited to braced end connections, moment-resisting connections, moment-resisting seat connections, and member splice connections) not designed by the Structural Engineer of Record must be performed by a Professional Engineer registered in the Project State.
j. Do not use gas cutting torches to correct fabrication errors on structural steel framing.
k. Provide temporary bracing for structural steel framing until all permanent bracing, moment connections, and floor/roof decks (diaphragms) are completely installed.
l. Unless noted otherwise, specifications on drawings, coat steel as follows:
- Steel lintels and brick ledges: G60 galvanized finish
- Steel encased in concrete: steel enclosed in walls, surfaces to receive fireproofing, connections designated as friction surfaces, surfaces to be painted, or surfaces receiving welded studs or DBAs in the field: Cleaned bare steel remaining primed with exterior or interior steel shop coating to 3 mils thickness.
- Unless noted otherwise, the Architect, consider steel that is exposed to the public to be Architecturally Exposed Structural Steel (AESS) and should be fabricated per those requirements.

5. WEB STEEL JOISTS AND JOIST GIRDERS

- a. Provide steel joists and joist girders conforming to the following standards:
- AISC K-10, Standard Specification for Open Web Steel Joists, K-Series
- SJI LH/DLH-10, Standard Specification for Longspan Steel Joists, LH Series and Deep Longspan Steel Joists, DLH Series.
- SJI JG-10, Standard Specification for Joist Girders.
b. Unless noted otherwise, design steel joists for a minimum net service uplift per the Joist Uplift Diagram.
c. Provide bridging in accordance with SJI recommendations. For roof decking, add 'X' bridging to the second panel at each end of each run of horizontal bridging, and every sixth panel in between. Provide one continuous run of 'X' bridging near mid-span where four or more rows of bridging are required. For floor decking, all bridging to be 'X' bridging.
d. Install bridging immediately after erection and permanent fastening of joists. Install bridging before construction loads are applied to joists. Permanently attach lines of bridging to walls or beams where bridging terminates. Weld bridging to joists.
e. Coordinate joist spacing with mechanical openings. The average space between any three joists must not exceed the spacing shown on the drawings, and the spacing between any two roof joists must not exceed 5'-0".
f. Provide double joists under masonry walls parallel to the joist framing for masonry walls supported on steel framed floors.
g. Submit shop drawings for approval showing identification, layout, connection details, and fastening for joists and joist girders. Do not begin fabrication until the shop drawings are completed and reviewed by the Structural Engineer of Record.

6. STEEL DECKING

- a. Provide fabrication and erection of steel decking conforming to the following standards:
- ANSI/SDI RD, Standard for Steel Roof Deck
- ANSI/SDI NC, Standard for Non-Composite Steel Floor Deck
- ANSI/SDI C, Standard for Composite Steel Floor Deck
- SDI COSP, Code of Standard Practice
- SDI Manual of Construction with Steel Deck (No. MOC2)
b. Provide steel deck of the type and gage indicated on the design documents.
c. Unless noted otherwise, provide steel decking with a G60 galvanized coating.
d. Install steel decking in accordance with the manufacturer's recommendation. Do not install steel decking until supporting joists are braced, bridged, and permanently fastened.
e. Install decking such that it is continuous over a minimum of three spans.
f. Submit shop drawings for approval showing identification, layout, connection details, and fastening for steel deck. Do not begin fabrication until the shop drawings are completed and reviewed by the Structural Engineer of Record.

7. COLD FORMED STEEL FRAMING

- a. Provide cold formed steel framing detailing, fabrication, and erection conforming to the following standards:
- AISI S100, North American Specification for the Design of Cold-formed Steel Structural Members
- AISI S200, North American Standard for Cold-formed Steel Framing - General Provisions
- AWS D1.1-10, Structural Welding Code - Steel
- AWS D1.3-08, Structural Welding Code - Sheet Steel
b. Provide studs, runner track, and associated accessories of the type and thickness indicated on the drawings, recommended by the manufacturer for the indicated application.
c. Provide studs, joists, runner track, and accessories manufactured of hot dip galvanized ASTM A1009 steel with the following yield strength:
- 33,000 PSI 33-mil and 43-mil members
- 50,000 PSI 54-mil, 68-mil, and 97-mil members
d. Provide minimum #12 (S-12) cadmium or zinc coated screws.
e. Install all cold-formed steel framing in accordance with the manufacturer's recommendation.
f. Provide reinforcement for any member cut for the installation of plumbing wiring such that the member equal strength to the member prior to cutting.
g. Provide lateral bridging in load bearing walls consisting of 1 1/2" cold-rolled channels at 4'-0" on center vertically. Insert channels through stud web holes and screw or weld to each end using 1 1/2" x 1" x 54-mil (16 gage) clip angles. Provide clip angles 1/4" less than the stud width.
h. Provide joist bridging at 8'-0" on center maximum between joist bridging in accordance with the manufacturer's recommendations.
i. Provide unpunctured material for all joists and headers.
j. Provide solid blocking behind all horizontal panel joints of exterior wall sheathing and interior shear wall sheathing.
k. Design of exterior walls subject to wind pressures is based on lateral bracing of stud flanges provided by sheathing. If sheathing is not applied to both faces of the wall, provide bracing in accordance with SSMA Technical Note No. 2, published March 2000.

8. STEEL STAIRS

- a. Steel stair runner is responsible for the lateral stability of all steel stairs. Any attachment to the structure must be certified and approved by the Structural Engineer of Record.
b. All steel stairs installed on the drawings must be made of steel stringers with steel pans filled with concrete.
c. Submit shop drawings and calculations showing plans, elevations, sections, and details describing the complete fabrication, erection, and anchorage of steel stairs. Shop drawings and calculations must be sealed by a Professional Engineer registered in the Project State. Do not begin fabrication until the shop drawings and calculations are completed and reviewed by the Structural Engineer of Record.

9. OTHER COMPONENTS

- a. Provide shop drawings for construction of all applicable specialty items including but not limited to concrete pilings, curtain wall glazing systems, light gage steel framing, ornamental guardrails, guards, handrails, pre-engineered wood trusses, skylights, and signage. Shop drawings must indicate the required materials, sizes, and locations for all posts and pickets including anchorage at the base of the posts. Shop drawings must be sealed by a Professional Engineer registered in the Project State.
b. Provide curtain wall glazing system shop drawings that clearly indicate the attachment to the structure on all sides of the exterior glazing system required to adequately resist the applicable wind design pressures.
c. The Glazing Contractor must provide engineering calculations to document compliance with 2012 International Building Code, Sections 2403.2 through 2403.4 for butt joined glazing.

10. FOUNDATIONS

- a. The design of foundations, retaining walls, and slabs-on-grade is based on the following presumed criteria:
- Allowable Soil Bearing Pressure: 2000 PSF
- Equivalent Lateral Fluid Pressure - Active Case: 40 PSF/FT
- Equivalent Lateral Fluid Pressure - At-Rest Case: 60 PSF/FT
- Equivalent Lateral Fluid Pressure - Passive Case: 150 PSF/FT
- Coefficient of Sliding Friction: 0.25
- Soil Density: 110 PCF
Redesign of foundations may be required if the actual conditions are different than the values listed above. The following conditions could also result in redesign of foundations: presence of expansive soils, high water table, potential for large settlements, or any other recommendations stated by a Geotechnical Engineer.
b. A Geotechnical Engineer must verify the condition and/or adequacy of all subgrades, fills, and backfills prior to the placement of foundations, footings, slabs, walls, etc.
c. If any interference appears between existing foundations and the specified design, notify the Architect so that the foundations may be redesigned as required.
d. Coordinate top of footing elevations with the requirements of other trades including but not limited to plumbing, mechanical, or electrical.
e. Place all column footings and wall footings monolithically with adjacent footings at the same elevation.
f. All footings must bear on original undisturbed soil where possible.
g. Remove all organic soils and replace with clean structural fill at the direction of the Geotechnical Engineer. Place fill soils in 10" maximum (loose) lifts at moisture contents within 4% of optimum moisture content. Compact all fill within 10'-0" of the building limit to the following minimum densities:
- Within 18" of finished grade: 98% of maximum Standard Proctor
- Below 18" of finished grade: 95% of maximum Standard Proctor
h. Field density tests must be made as described by the Geotechnical Engineer to verify adequate compaction and design bearing pressure.
i. Sides of foundations must be formed unless conditions permit earth forming. Foundations placed against the earth require the following precautions: slope sides of excavations as approved by the Geotechnical Engineer and clean up sloughing before and during concrete placement.
j. Where footing steps are necessary, slope no steeper than one vertical to two horizontal.
k. Unless noted otherwise, place all slabs on grade on a 10 mil polyethylene vapor retarder and a crushed stone base over a properly compacted subgrade. Lap joints of vapor retarder a minimum of 6 inches and seal watertight by taping edges and ends.

11. DESIGN LOADS

Table with 2 columns: Load Type and Value. Rows include Live Loads (Roof, Steel Stair, Mezzanine), Dead Loads (Roof, Mezzanine), Wind Design Data (Risk Category, Exposure Category, Ultimate Wind Speed, etc.), and Seismic Design Data (Risk Category, Seismic Importance Factor, etc.).

12. DESIGN LOADS PRE-ENGINEERED METAL BUILDING

Table with 2 columns: Load Type and Value. Rows include Live Loads (Roof, Collateral, Mezzanine, Stair), Dead Loads (Roof, Mezzanine), Wind Design Data (Risk Category, Exposure Category, Ultimate Wind Speed, etc.), and Seismic Design Data (Basic Seismic Force Resisting System, Response Modification Factor, etc.).

COMPONENTS AND CLADDING PRESSURES

Table with 3 columns: Zone, Roof, Wall, Parapet. Rows include 10 SF, 25 SF, 50 SF, 100 SF, 500 SF for Roof; 4 & 5, 4, 5 for Wall; 4, 5 for Parapet.

- NOTES:
1. LOADS BASED ON ASCE 7-10 SECTION 30.4. PRESSURES SHOWN ARE ULTIMATE LOADS. TO CONVERT TO AN ALLOWABLE LOAD, MULTIPLY VALUES BY 0.6.
2. CORNER ZONE WIDTH: a = R'-3"
3. TABULATE PRESSURES ARE IN POUNDS PER SQUARE FOOT OF EFFECTIVE WIND AREA SHOWN. FOR OTHER WIND AREAS, LINEARLY INTERPOLATE BETWEEN VALUES PROVIDED IN TABLE.
4. POSITIVE PRESSURES ACT TOWARDS THE BUILDING AND NEGATIVE PRESSURE ACT AWAY FROM THE BUILDING.

REVISIONS table with columns for No., Description, and Date.

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DATE: 11.06.2018 SCALE: AS SHOWN BY: TTN JOB ID:

STRUCTURAL GENERAL NOTES

DRAWING TITLE

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SHEET 1 OF 13

Order Plans