STRUCTURAL NOTES – CONTINUED

SLABS ON GRADE – Except where otherwise noted, shall be 4" or 6" thick, see plan for reinf. For all exterior slabs on grade air entrained cement with entrained air of 6% ± 1% or equivalent, air entraining agent shall be used. Provide control joints at 20'–0" o.c. each way in all exterior slabs on grade. Pour all interior slabs on grade in panels (alternate) with approximately 600 s.f. per bay and control joints at 30'–0" o.c. max. Interior slabs shall be laid on a layer of 10 mil. Polyethylene over a 6" layer of washed gravel, unless noted. See soil consultant's recommendations for preparation of sub grade.

LINTELS – Provide, unless noted otherwise, precast lightweight concrete lintels for all openings and recesses in concrete masonry unit walls:
a) One 4"x8" lintel for each 4" of wall thickness
b) One 6"x8" lintel for each 6" of wall thickness
Reinforce each lintel unit with one #4 bar top and one #4 bar bottom, with #2 tie bars spaced at 8" o.c. Concrete lintel units shall have 8" minimum bearing at ends and may be used for openings up to 8'–0". For all openings and recesses in brick walls, provide one steel angle for each 4" of wall thickness as follows:
L 3 1/2 x 3 1/2 x 5/16" for openings up to 4'–0"
L 4 x 3 1/2 x 5/16" for openings 4'–1" to 5'–11"
Provide W8x18 with suspended 1/4" plate same width as wall for openings greater than 6'–0" for steel angle lintels and 8'–0" for precast lintels unless noted. Provide 6" minimum bearing at each end or as shown on plan.

WALL PROPPING – Extreme care and proper preventative measures must be taken so as not to damage, bulge or tip walls, due to equipment and/or earth pressure or wind. Shoring, back–propping or other suitable methods of protection shall be employed until the full load of the building is on the walls and the walls are braced.

BACKFILL – Shall not be placed against walls until slabs on grade and framed floor slabs have been poured and reached their design strength and approval received from the Engineer. Where backfill is required on both sides of walls, backfill both sides simultaneously. Where backfill is required on one side of wall and the framed floor is not in place, shore the wall before backfill is placed.

SOIL FILL COMPACTION – Is to be controlled fill. Compact fill to 95% in accordance with ASTM D–1557. Laboratory tests are to be performed on the fill material prior to placing to determine if the material is suitable to achieve 95% compaction. Provide field testing during backfill to determine that the fill is compacted to 95%. See soil consultant's recommendations.

LIGHT GAGE STEEL STUDS – Design and construction shall conform to AISI specifications. All steel shall be galvanized and shall have minimum yield strength of 33 ksi in accordance with ASTM A–446. Provide temporary and permanent wind bracing. Submit shop drawings and calculation to the engineer of record for review. All shop drawings and calculations shall be signed and sealed by a professional engineer registered in the project jurisdiction.

MISCELLANEOUS – Provide all clips, inserts, ties, anchor straps, hangers, bolts and other fasteners required for this project. Verify all floor and roof openings with Architectural, Mechanical and Electrical plans; detail and size to suit equipment furnished. Verify all depressions and slopes from Architectural plans. The contractor shall verify all dimensions prior to starting construction and any discrepancy shall be brought to the attention of the Architect.

STRUCTURAL NOTES

BUILDING CODE – IBC 2000.

LIVE LOADS
Roof (minimum). . . . . 30 psf
Roof snow load (Pg) . . . . . 30 psf
Flat – roof snow load (Pf). . . . . 21 psf
Snow Exposure Factor (Ce). . 0.7
Importance factor (I) 1.1
Snow drift where applicable
Floor . . . . . 100 psf
Stairways & Corridors . . . . . 100 psf

WIND LOAD – Based on: 90 mph, exposure C and importance factor, I = 1.15
Main Frame design pressure P = 33 psf

EARTHQUAKE DESIGN
Design Spectral Response Acceleration at Short Period,Sds = 0.2931
Design Spectral Response Acceleration at 1 Sec. Period, Sd1 = 0.1291
Seismic Use Group . . . . . II Seismic Design Category . . . . . B
Site Class . . . . . D (to be verified) Response Coefficient Factor (R) . . 6
Deflection Amp. Factor (Cd) . . 4.0 System Over–strength Factor 3
Basic Structural System – Light Frame Walls with Shear Panels.
Analysis Procedure Utilized – Equivalent Lateral Force Procedure

SOIL BEARING – 2000 psf (Assumed, soil report will be provided)
Horizontal earth pressure on basement walls = 60 psf (At rest condition)
Horizontal earth pressure on cantilever retaining walls = 45 psf (Active condition)

CONCRETE – All concrete construction shall conform to the ACI Code 318–99. 28–day concrete strength shall be
f'c = 3000 psi Stone Concrete: Coarse aggregate shall conform to ASTM C33.
All concrete exposed to the weather shall be air entrained with 6% +/– 1%.

REINFORCEMENT STEEL – All reinforcing steel shall conform to ASTM–A615, Grade 60. Welded wire mesh to conform to ASTM–A185. Fabricate and provide standard supporting accessories in accordance with the ACI Manual of Standard Practice for Detailing Reinforced Concrete Structures ACI 315 latest addition. All continuous reinforcing shall be spliced with type 'B' splice and staggered, unless noted otherwise. Submit for approval shop drawing showing all reinforcing steel and locations of cold joints for extent of the concrete pour.

CONCRETE PROTECTION FOR REINFORCEMENT – Reinforcing bars and mesh to have concrete cover as follows:
Footings and other concrete poured against earth – 3"
Formed concrete exposed to earth – 2" for bars larger than #5 – 1 1/2" for #5 and smaller bars
Interior faces of walls – 1"
Slabs on ground, unless otherwise noted, to have reinforcement at mid–depth

STRUCTURAL STEEL – Shall be in accordance with the latest AISC Specs. for "Design, Fabrication and Erection of Structural Steel for Buildings". Shop and field connections shall be welded or made with 3/4" diameter minimum high strength bolts in accordance with ASTM–A325 or A490. Anchor bolts shall conform to ASTM F1554 Grade 36 unless noted. Steel beams bearing on masonry or concrete wall shall have standard angle wall anchors, unless noted. All miscellaneous steel (plates, angles and channels) shall conform to ASTM A36. Steel beams and columns (W sections) shall conform to ASTM–A992 grade 50, or ASTM A572 grade 50. Structural tubing (HSS), shall conform to ASTM A500 grade B. Steel pipe columns (P), shall conform to ASTM A53 grade B or ASTM A501. All welding shall conform to AWS Specifications. All welds to be 3/16" fillet min. 3" long unless otherwise required. Establish special procedures for welds larger than 3/8" to prevent lamellar tearing. The owner shall retain the services of a qualified inspector to inspect erected steel and connections. All full penetration welds shall be tested by ultrasonic method. See specifications for painting. No field cutting of steel members shall be permitted without prior authorization of the structural engineer. Submit for approval all steel shop drawings and calculations for connections, signed and sealed by a professional engineer registered in the building's jurisdiction. All steel permanently exposed to weather or soil shall be hot dip galvanized (G90).

HANDRAILS, GUARDRAILS AND STEEL STAIRS, – Handrails, guardrails and steel stairs shall be designed and detailed by supplier. The design shall be based on loading requirements as per IBC 2000. Submit shop drawings and calculations signed and sealed by a professional engineer registered in the building's jurisdiction.

MASONRY – Concrete masonry units shall conform to ASTM C–90 Grade 1. Solid masonry units maybe 75% solid, unless otherwise noted. Concrete masonry units shall be made with light weight concrete, f'm = 1500 psi minimum. See specs for brick. All mortar shall be Type 'S' conforming to ASTM C–270 for above grade construction. Use Type 'M' for below grade. Provide a minimum of 3 courses of solid brick or one course 100% solid block under wall bearings ends of slabs the full width of the wall, unless noted. Provide 100% solid masonry down to footings under all beams and lintels bearing on masonry, unless noted. Provide solid brick or 100% solid concrete block extending 8" beyond wall openings the full wall thickness down to the foundation, unless noted. Provide horizontal masonry reinforcing at 16" o.c. in all masonry walls unless noted. Provide vertical control joints in all masonry walls @ 30'–0" o.c., unless noted. All mortar joints in masonry walls (horizontal & vertical) shall be filled 100% with mortar. All CMU walls to be reinforced with #5 @ 24" on center, full height, grouted with pea gravel concrete and with dowels to match unless noted otherwise on drawings. Splice vertical reinforcing with 48 bar diameter at splice location typical, unless noted. For all composite masonry walls, without cavity, fill collar joints 100% with mortar. Provide masonry ties between 4" brick veneer wall and masonry wall or steel stud wall. Space ties @ 16" vertical and at 24" horizontal. Design of masonry is based on inspected construction. Owner shall have inspection of the construction of the masonry.

REINFORCED MASONRY – Fill cells containing reinforcing with 3000 psi pea gravel concrete. Build walls so that all cells line up. Provide clean–out holes above footings in block cells to be reinforced. Break all mortar protruding into block cells with the reinforcing rod and remove loose mortar. Build wall with maximum 4'–0" lift for the placement of reinforcing and concrete fill.

WOOD FRAMING – Framing lumber for beams and joists shall be minimum No1 / No2 Grade SPF (NLGA grading rule, E = 1,400 ksi) or approved equal, Solid posts shall be No 2 grade Southern Pine (SPIB grading rule, E = 1,600 ksi) or approved equal. Non – Bearing wall partition shall be stud grade SPF (NLGA grading rules, E = 1,200 ksi) or approved equal.
Provide cross–bridging for joists at 8'–0" intervals. Joists shall have minimum 4" bearing on masonry with fire–cut (beveled) end and every second joist to have 'T' shaped steel anchors. Joists or trusses running parallel to masonry wall to be anchored with 3/16"x2" steel strap anchors at 4'–0" o.c. and extended to engage 3 joists. Wood plates receiving roof trusses or joists on masonry wall to be bolted to wall with 5/8" diameter bolts, 18" long and at 4'–0" o.c. Wood joists and beams shall not be cut or drilled unless so authorized by the architect. Provide approved hurricane connections between framing members. Use balloon construction for stud partitions and posts. Lumber in contact with masonry or concrete shall be pressure treated against decay. Framing lumber shall have 19% maximum moisture content. Brush preservative solution on all edges that are cut in members that are in contact with concrete or masonry. Provide manufacturer's standard joist or standard beam hangers at all wood to wood connections which require joists or beams framing into the side or face of the supporting member. The capacity of the hanger shall be for the reaction shown on plans. If no reaction is shown, the capacity of the hanger shall be for the maximum shear capacity of the joist or beam.

TRUSSED RAFTERS – Wood trussed rafters shall be fabricated with hydraulically pressed metal plates or nailed steel gusset plates. Connections shall be capable of transmitting the stresses plus all eccentricities. Design shall conform to Truss Plate Institute Specifications. Shop drawings shall be submitted for approval showing the design of the truss rafters capable to sustain total load of 45 psf and mechanical equipment. Truss rafters running parallel to masonry wall to be anchored with 3/16" x 2" steel strap anchors at 4'–0" o.c. and extended to engage 2 rafters. Wood plates receiving trussed rafters on masonry wall to be bolted to wall with 5/8" diameter bolts, 18" long and at 4'–0" o.c. Trussed rafters shall not be cut or drilled unless so authorized by the Engineer. Provide cross–bracing 8'–0" o.c. Erection and bracing during construction shall be in accordance with Truss Plate Institute recommendations. Shop drawings and calculations shall be signed and sealed by a professional engineer registered in the building's jurisdiction.

GLUED LAMINATED STRUCTURAL MEMBERS – Materials, manufacture, and quality control shall be in accordance with the proposed Commercial Standard "Structural Glued Laminated Timber" of the AITC and current WCLA glued laminated standards. Adhesive shall meet the requirements for wet conditions of service. Appearance of members shall be "Architectural Appearance Grade". A coat of end sealer shall be applied to ends of all members as soon as practicable after end trimming. Surfaces of members shall be sealed with penetrating sealer and members shall be individually wrapped. The fabricator shall furnish connecting and supporting hardware exclusive of anchorage embedded in masonry or concrete or welded to structural steel. Submit complete shop drawings and calculations signed and sealed by a professional engineer registered in the building's jurisdiction for approval.
Glue laminated members and their connections' design shall consider lateral forces, temperature changes, deflection, and forces due to components (permanent or temporary) attached to the members. Glue laminated members which provide lateral support for masonry walls shall be designed for deflection index of L/600 or better. Members embedded in masonry or concrete shall be treated against termites and decay.

PLYWOOD SHEATHING – All plywood sheathing shall be CD–Grade, unless otherwise shown, with exterior glue manufactured in accordance with Product Standard PS183, latest edition.

Roof sheathing . . . . . 3/4" index 32/16
Wall sheathing . . . . . 5/8"
Plywood sheathing shall be laid with end joint staggered.
Block all wall sheathing with 2x4 flat blocking at all edges.
Layout plywood to eliminate any width less than 1'–0".

LAMINATED VENEER LUMBER (LVL) – Shall have Fb = 2800 psi, E = 2,000,000 psi.
PARALLEL STRAND LUMBER (PSL) – Shall have Fb = 2900 psi, E = 2,000,000 psi.
LVL and PSL beams shall have min. 3" bearing and lateral support at bearing point. LVL and PSL lumber shall be protected from weather during job site storage and after installation.

FOUNDATION – All footings shall project at least 1'–0" into undisturbed natural soil or the compacted controlled fill having a bearing value at least equal to that specified above. See soil report for sub grade preparation. Bottoms of all exterior footings and footings in unheated spaces (such as garages, crawl spaces) shall be at least 2'6" below finished grade. Wall footings shall be 12" deep and project 6" beyond each face of wall, unless noted. Elevations of bottoms of footings have been established from available information and shall not be construed as waiving any of the minimum requirements stated above. All masonry wall footings in controlled fill are to be reinforced with 3#5 longitudinal continuous top and bottom bars, unless noted. All disturbed earth under footings shall be replaced with concrete. f'c = 2000 psi All bearing strata shall be adequately drained before foundation concrete is placed. No excavation shall be closer than at a slope of 2:1 (2 horizontal to one vertical) to a footing. Do not place concrete over frozen soil. The owner shall retain the services of a soil consultant approved by the Architect to check and verify the required soil bearing pressure of each footing.

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STRUCTURAL NOTES

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