DESIGN CRITERIA

A. CODES AND STANDARDS

BOCA – BASIC BUILDING CODE – 1996
AISC – SPECIFICATIONS FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS – NINTH EDITION.
ACI – BUILDING CODE REQUIREMENT FOR REINFORCED CONCRETE – (ACI318-95).
ACI – BUILDING CODE REQUIREMENTS FOR CONCRETE MASONRY – 530-95/ASCE 5-95.
ACI – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI301).

B. WIND

BASIC WIND SPEED — 70 MPH
EFFECTIVE VELOCITY PRESSURE — 19 PSF
EXPOSURE CLASSIFICATION — "C"
IMPORTANCE FACTOR — 1.0

C. SEISMIC:

1. THE PEAK VELOCITY – RELATED ACCELERATION — Av=0.13
2. THE PEAK ACCELERATION – RELATED ACCELERATION — Aa=0.12
3. SEISMIC HAZARD EXPOSURE GROUP — I
4. THE SEISMIC PERFORMANCE CATEGORY — C
5. SITE COEFFICIENT — S=1.0
6. SEISMIC RESISTING SYSTEM:
   ORDINARY MOMENT FRAMES OF STEEL
   – RESPONCE MODIFICATION FACTOR — R=4.5
   – DEFLECTION — Cd=4.0
7. ANALYSIS PROCEDURE — EQUIVALENT LATERAL FORCE PROCEDURE

D. IN CASE OF CONFLICT BY GOVERNING CODES, THE MOST STRINGENT REQUIREMENT SHALL GOVERN.

FOUNDATIONS:

DESIGN:

1. THE FOUNDATION HAS BEEN DESIGNED IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE "GEOTECHNICAL INVESTIGATION" BY "REITZ & JENS, INC." DATED APRIL 26,1999.
2. ALL UNDERLAYING MATERIAL SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO CONCRETE PLACEMENT.
3. THE FOUNDATION IS DESIGNED BASED ON AN ALLOWABLE BEARING PRESSURE OF 5.0 KSF FOR INDIVIDUAL FOOTINGS AND 4.0 KSF FOR CONTINUOUS FOOTINGS.
4. IF TIE BEAMS OR GRADE BEAMS ARE EARTH FORMED, ADD 2" TO SCHEDULE OF DETAILED SECTION DIMENSIONS.

CONCRETE:

1. CONCRETE SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH AND DENSITY, IN ACCORDANCE WITH THE FOLLOWING:

	STRENGTH PSI	DENSITY PCF
ALL CONCRETE U.N.O.	4000	145

2. REINFORCING SHALL CONFORM TO ASTM A615, GR60, INCLUDING TIES AND STIRRUPS AND FOR WELDED BARS USE A.S.T.M. A706 WELDABLE STEEL.
3. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
4. ALL REINFORCING SHALL BE DETAILED, FABRICATED AND PLACED, IN ACCORDANCE WITH ACI DETAILING MANUAL 1988 (SP-66).
5. ALL REINFORCING SHALL BE SUPPORTED IN FORMS, SPACED WITH NECESSARY ACCESSORIES AND SHALL BE SECURELY WIRED TOGETHER, IN ACCORDANCE WITH CRSI "MANUAL OF STANDARD PRACTICE" NEWEST EDITION.
6. MINIMUM CONCRETE COVER, UNLESS NOTED OTHERWISE:
   A. UNFORMED SURFACE IN CONTACT WITH THE GROUND — 3 IN.
   B. FORMED SURFACES EXPOSED TO EARTH OR WEATHER — 2 IN.
   C. FORMED SURFACES NOT EXPOSED TO EARTH OR WEATHER:
      1. WALLS, SLABS — 1 IN.
      2. BEAMS, GIRDERS AND COLUMNS (TO TIES OR STIRRUPS) — 1 1/2 IN.
7. LAP SPLICES SHALL BE IN ACCORDANCE WITH THE ACI CODE. WHERE CLASSES ARE NOT CALLED OUT ON DRAWINGS, USE CLASS "B" SPLICES.
8. ALL CONSTRUCTION JOINTS SHOWN ON DRAWINGS SHALL BE INCORPORATED INTO THE STRUCTURE, UNLESS THEIR ELIMINATION IS APPROVED BY THE ARCHITECT. ADDITIONAL CONSTRUCTION JOINTS, REQUIRED TO FACILITATE CONSTRUCTION, SHALL BE LOCATED AT POINTS OF MINIMUM SHEAR AND SHALL BE DETAILED ON SHOP DRAWINGS. REINFORCEMENT SHALL PASS CONTINUOUSLY THROUGH THE JOINT.
9. ALL ABUTTING CONCRETE MEMBERS SHALL BE DOWELED TOGETHER, UNLESS POURED MONOLITHICALLY. DOWELS SHALL BE EQUAL IN SIZE AND SPACING TO THE REINFORCING IN THE ADJACENT MEMBER.
10. UNLESS OTHERWISE SHOWN IN THE ARCHITECTURAL DRAWINGS, PROVIDE 3/4" CHAMFERS CHAMFERS AT ALL EDGES THAT ARE EXPOSED TO VIEW IN THE FINISHED STRUCTURE.
11. SEE ARCHITECTURAL DRAWINGS FOR DOOR AND WINDOW OPENINGS, DRIP SLOTS, REGLETS, MASONRY ANCHORS, BRICK LEDGE ELEVATIONS AND FOR MISCELLANEOUS EMBEDDED PLATES, BOLTS, ANCHORS, ANGLES, ETC.
12. REFER TO ARCHITECTURAL DRAWINGS FOR CONCRETE FINISHES. WHERE FINISH IS NOT SPECIFIED, CONFORM TO REQUIREMENTS OF ACI 301.
13. MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS SHALL BE REFERRED TO FOR DRAINS, SLEEVES, OUTLET BOXES, CONDUIT, ANCHORS, ETC. THE VARIOUS TRADES ARE RESPONSIBLE FOR PLACING THEIR ITEMS.
14. REFER TO MECHANICAL DRAWINGS FOR HOUSEKEEPING PADS AND INERTIA BASES AT MECHANICAL EQUIPMENT.
15. REFER TO MECHANICAL OR PLUMBING DRAWINGS FOR UNDERFLOOR AND PERIMETER FOUNDATION DRAINS.
16. BASE PLATES, ANCHOR BOLTS, SUPPORT ANGLES, ETC., BELOW GRADE SHALL BE COATED WITH 1/8" OF MASTIC AND COVERED WITH A MINIMUM OF 3" CONCRETE U.N.O..

STRUCTURAL STEEL:

1. STEEL SHALL CONFORM TO THE FOLLOWING GRADES:
   A. ALL ANGLE, BASE PLATES, CONN. PLATES (UNO) — A36
   B. ALL W-SHAPES — A572 GRADE 50 UNLESS NOTED THUS (*), A36
   C. STRUCTURAL PIPE — A53 (fy=35)
   STRUCTURAL TUBE — A500 (fy=46)
2. ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE AISC CODE OF STANDARD PRACTICE (1986), EXCEPT AS MODIFIED IN THESE NOTES AND THE PROJECT SPECIFICATIONS.
3. CONNECTIONS MAY BE BOLTED OR WELDED. THE FABRICATOR IS RESPONSIBLE FOR THE DESIGN OF CONNECTIONS WHERE THE DESIGN IS NOT SHOWN ON THE DRAWINGS. GENERALLY, CONNECTION DETAILS SHOWN ON THE STRUCTURAL DRAWINGS ARE SCHEMATIC AND ARE ONLY INTENDED TO SHOW THE RELATIONSHIP OF MEMBERS CONNECTED. ANY CONNECTION THAT IS NOT SHOWN OR IS NOT COMPLETELY DETAILED ON THE STRUCTURAL DRAWINGS SHALL BE DESIGNED BY A STRUCTURAL ENGINEER, REGISTERED IN THE STATE OF MISSOURI, RETAINED BY THE FABRICATOR. IT IS THE RESPONSIBILITY OF THE FABRICATOR TO PROVIDE ALL PLATES, ETC. THAT MAY BE REQUIRED IN ADDITION TO THOSE SHOWN IN THE STRUCTURAL SCHEMATIC DETAILS TO ENSURE THAT MEMBERS CONNECTED TOGETHER HAVE ADEQUATE STRENGTH AT THE CONNECTION. COMPLETELY DETAILED MEANS THE FOLLOWING INFORMATION IS SHOWN ON THE DETAIL DRAWINGS:
   A. ALL PLATE DIMENSIONS AND GRADES.
   B. ALL WELD SIZES, LENGTHS, PITCHES, AND RETURNS.
   C. ALL HOLE SIZES AND SPACINGS.
   D. NUMBER AND TYPES OF BOLTS: WHERE BOLTS ARE SHOWN BUT NO NUMBER IS GIVEN, THE CONNECTION HAS NOT BEEN COMPLETELY DETAILED.
   E. WHERE PARTIAL INFORMATION IS GIVEN, IT SHALL BE THE MINIMUM REQUIREMENT FOR THE CONNECTION.

   DESIGN CALCULATIONS PREPARED BY REGISTERED PROFESSIONAL ENGINEER IN MISSOURI FOR ALL BEAM AND GIRDER CONNECTIONS AND ALL PRIMARY BRACING AND HANGER CONNECTIONS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO FRBRICATION. FABRICATION.
4. CONNECTIONS SHALL BE DESIGNED FOR ONE-HALF OF THE ALLOWABLE LOAD ON THE MEMBER, AS DEFINED IN THE AISC TABLES FOR ALLOWABLE LOADS ON BEAMS.
5. MOMENT CONNECTIONS ARE SHOWN THUS ON THE DRAWINGS WHERE MOMENT MAGNITUDE IS NOT SHOWN, THE CONNECTIONS SHALL BE DESIGNED FOR THE FULL MOMENT CAPACITY OF THE BEAM AND THE SHEAR VALUE OBTAINED FROM NOTE 4 ABOVE.
6. THE MINIMUM PLATE THICKNESS SHALL BE 3/8", THE MINIMUM BOLT DIAMETER SHALL BE 3/4", THE MINIMUM WELD SHALL BE 1/4" AND THE MINIMUM DESIGN LOAD ON ANY CONNECTION SHALL BE 10K. THE MINIMUM ANGLE THICKNESS FOR CONNECTIONS SHALL BE 5/16".
7. PROVIDE WELDED STIFFENER PLATES ON BOTH SIDES OF THE WEB OF BEAMS AT POINTS OF CONCENTRATED LOADS INCLUDING BEAMS SUPPORTING COLUMNS OR RUNNING OVER THE TOPS OF COLUMNS OR GIRDERS, AT THE LOCATION OF CHANGE OF SLOPE (KINKS) AT ANY MEMBER. MINIMUM STIFFENER PLATE THICKNESS SHALL BE 5/8" OR FLANGE THICKNESS OF THE COLUMN ABOVE AND BELOW WHICHEVER IS GREATER.
8. BOLTED CONNECTIONS:
   A. SLIP-CRITICAL CONNECTIONS OF A325SC OR A490SC BOLTS SHALL BE USED FOR ALL BOLTED CONNECTIONS OF BRACING MEMBERS, MOMENT CONNECTIONS, CANTILEVERS, COLUMN SPLICES, TENSION MEMBERS, AND AS SHOWN ON THE DRAWINGS. OVERSIZED AND LONG-SLOTTED HOLES ARE ALLOWED FOR SLIP-CRITICAL CONNECTIONS.
   B. ALL OTHER BOLTED CONNECTIONS SHALL BE BEARING TYPE USING A325N OR A490N BOLTS. OVERSIZED HOLES AND LONG-SLOTTED HOLES ARE NOT ALLOWED UNLESS SHOWN ON THE DRAWINGS.
   C. A307 BOLTS MAY BE USED WHERE INDICATED ON THE DRAWINGS.
   D. PROTRUDING BOLT HEADS, SHAFTS OR NUTS SHALL NOT EXTEND INTO NOR PROHIBIT THE APPLICATION OF ARCHITECTURAL FINISHES AND THEY SHALL NOT EXTEND INTO NOR PROHIBIT THE PLACEMENT OF STEEL DECKING TO THE CORRECT LINE AND ELEVATION.
   E. THE FABRICATOR IS RESPONSIBLE FOR VERIFYING THE TENSION CAPACITY OF AXIALLY LOADED MEMBERS AFTER A SECTION IS REDUCED FOR BOLT HOLES. MEMBER SIZE MAY BE INCREASED OR CONNECTIONS PLATES ADDED AS REQUIRED.
   F. SHOP DRAWINGS SHALL INDICATE THE TYPE OF BOLT USED IN EACH CONNECTION AND THE ALLOWABLE VALUES USED FOR THE VARIOUS BOLT TYPES.
   G. THE FABRICATOR SHALL PROVIDE FILLER PLATES BETWEEN ALL DOUBLE ANGLES AT INTERVALS SUCH THAT THE SLENDERNESS RATIO OF SINGLE ANGLE DOES NOT CONTROL.
9. WELDED CONNECTIONS:

   ALL WELDING SHALL BE IN ACCORDANCE WITH THE "STRUCTURAL WELDING CODE" (AWS D.1) PUBLISHED BY THE AMERICAN WELDING SOCIETY. ELECTRODES FOR WELDING SHALL COMPLY WITH THE REQUIREMENTS OF TABLE 4.4.1 OF (AWS D.1.1).
10. SPLICING OF STEEL MEMBERS, UNLESS SHOWN ON THE DRAWINGS, IS PROHIBITED WITHOUT WRITTEN APPROVAL OF THE ARCHITECT.
11. NO CHANGE IN SIZE OR POSITION OF THE STRUCTURAL ELEMENTS SHALL BE MADE AND HOLES, SLOTS, CUTS, ETC., ARE NOT PERMITTED THROUGH ANY MEMBER UNLESS THEY ARE DETAILED ON THE APPROVED SHOP DRAWINGS.
12. NO FINAL BOLTING OR WELDING SHALL BE MADE UNTIL AS MUCH OF THE STRUCTURE AS WILL BE STIFFENED THEREBY HAS BEEN PROPERLY ALIGNED.
13. UNLESS NOTED OTHERWISE, BEAMS SHALL BEAR 8" MINIMUM ON CONCRETE OR MASONRY. ANCHOR BEAMS TO MASONRY WITH A GOVERNMENT-TYPE ANCHOR.
14. FABRICATE ALL BEAMS WITH THE MILL CAMBER UP U.N.O..
15. ALL GROOVE WELDS SHALL BE COMPLETE PENETRATION U.N.O.
16. WELDS ARE CONTINUOUS U.N.O.
17. EXPANSION BOLTS:

   UNLESS NOTED OTHERWISE, EXPANSION BOLTS SHALL HAVE THE FOLLOWING MINIMUM SERVICE LOAD CAPACITIES WHEN DRILLED INTO CONCRETE WITH A MINIMUM DESIGN STRENGTH OF 4000 PSI. SERVICE LOAD CAPACITIES SHALL PROVIDE FOR A MINIMUM FACTOR OF SAFETY OF 4.

DIAMETER	SHEAR	TENSION
1/2"	2080 LBS.	1380 LBS.
3/4"	4280 LBS.	2540 LBS.

   SEE SPECIFICATIONS

METAL ROOF DECK:

1. METAL ROOF DECK SHALL COMPLY WITH THE REQUIREMENTS OF THE STEEL DECK INSTITUTE. SEE PLANS FOR DECK TYPES AND GAGES.
2. METAL ROOF DECK HAS BEEN DESIGNED TO FUNCTION AS A DIAPHRAGM FOR THE TRANSMISSION OF LATERAL LOADS. CONNECTION OF DECK UNITS TO EACH OTHER AND TO SUPPORTS SHALL BE DESIGNED BY THE DECK SUPPLIER CONSISTENT WITH THE DECK PROPERTIES AND MANUFACTURER'S RECOMMENDATIONS.
3. METAL ROOF DECK SHALL BE S.D.I. 3" DEEP RIB, TYPE "N", AND ROLLED OF A MINIMUM THICKNESS OF 18 GAUGE STEEL SHEETS, SEE PLAN FOR LOCATIONS, CONFORMING TO A.S.T.M. A653 AND ASTM A924 WITH A MINIMUM G90 COATING DESIGNATION. NO METAL ROOF DECK SHALL HAVE SECTION PROPERTIES PER FOOT OF WIDTH LESS THAN THE FOLLOWING:

   3" 18-GAUGE
   I — 1.334 INCHES (4)
   S (POSITIVE) — 0.688 INCHES (3)
   S (NEGATIVE) — 0.749 INCHES (3)
4. FABRICATE DECK UNITS IN LENGTH TO SPAN THREE OR MORE SUPPORT SPACING.
5. DECKING CONTRACTOR SHALL COORDINATE SIZE AND LOCATIONS OF ROOF OPENINGS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
6. DO NOT SUSPEND PIPES OR DUCTS FROM ROOF DECK. CONTRACTOR INSTALLING SUCH POINT LOADS SHALL PROVIDE SUB-FRAMING TO TRANSFER LOAD TO STRUCTURE SUPPORTING THE DECK.
7. SEE SPECIFICATIONS FOR THE WELDING OF THE ROOF DECK.

CONCRETE MASONRY UNIT

1. REFER TO SPECIFICATIONS FOR COMPLETE REQUIREMENTS.
2. MASONRY MATERIALS SHALL CONFORM TO THE FOLLOWING:
   CONCRETE BLOCK: ASTM C90, TYPE 1, GRADE N, NORMAL WEIGHT CMU. MINIMUM COMPRESSIVE STRENGTH = 2000 PSI
   ASTM C476 — ASTM C476 MINIMUM COMPRESS STRENGTH = 2500 PSI
   ATSM C270, TYPE S — ATSM C270, TYPE S MINIMUM COMPRESSIVE STREGTH = 2000 PSI
3. MASONRY STRENGTH, f'm = 1500 PSI
4. FILL ALL CELLS WITH REINFORCING AND GROUT U.N.O ON DRAWINGS.
5. MASONRY CONSTRUCTION SHALL HAVE CONTINUOUS SPECIAL INSPECTION.

MISCELLANEOUS:

1. STRUCTURAL DRAWINGS ARE INTENDED TO BE USED WITH ARCHITECTURAL AND MECHANICAL DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR COORDINATING SUCH REQUIREMENTS INTO THEIR SHOP DRAWINGS AND WORK.
2. NO OPENING SHALL BE MADE IN ANY STRUCTURAL MEMBER WITHOUT THE WRITTEN APPROVAL OF THE ARCHITECT.
3. NO CHANGE IN SIZE OR DIMENSION OF STRUCTURAL MEMBERS SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE ARCHITECT.
4. OPENINGS IN SLAB OF 1'-4" AND LESS ON A SIDE ARE GENERALLY NOT SHOWN ON THE STRUCTURAL DRAWINGS. REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS FOR SUCH OPENINGS.
5. THE CONTRACTOR IS RESPONSIBLE FOR LIMITING THE AMOUNT OF CONSTRUCTION LOAD IMPOSED UPON STRUCTURAL FRAMING. CONSTRUCTION LOADS SHALL NOT EXCEED THE DESIGN CAPACITY OF THE FRAMING AT THE TIME THE LOADS ARE IMPOSED.
6. THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL TEMPORARY BRACING AND/OR SUPPORT THAT MAY BE REQUIRED AS THE RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES.
7. UNLESS OTHERWISE NOTED, FIRE PROOFING METHODS AND MATERIALS FOR STRUCTURAL MEMBERS ARE NOT SHOWN ON STRUCTURAL DRAWINGS. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR FIRE RATING REQUIREMENTS, FIRE PROOFING METHODS AND MATERIALS.
8. DO NOT SCALE THESE DRAWINGS, USE DIMENSIONS.
9. CHECK ALL DIMENSIONS AGAINST REQUIREMENTS OF OTHER CONTRACT DOCUMENTS. FIELD VERIFY DIMENSIONS RELATING TO EXISTING CONDITIONS PRIOR TO ORDERING MATERIALS AND FABRICATION.
10. WHERE DIMENSIONS OR WEIGHTS OF EQUIPMENT OR SYSTEMS ARE VARIABLE FROM MANUFACTURER TO MANUFACTURER, VERIFY DIMENSIONS AND WEIGHTS SHOWN ON DRAWINGS WITH SELECTED MANUFACTURER PRIOR TO ORDERING MATERIALS. NOTIFY STRUCTURAL ENGINEER OF DISCREPANCY.
11. CONTRACTOR'S CONSTRUCTION AND/OR ERECTION SEQUENCES SHALL RECOGNIZE AND CONSIDER THE EFFECTS OF THERMAL MOVEMENTS OF STRUCTURAL ELEMENTS DURING THE CONSTRUCTION PERIOD. EXPANSION JOINTS SHOWN ON THE DRAWINGS HAVE BEEN DESIGNED TO ACCOMMODATE ANTICIPATED THERMAL MOVEMENT AFTER THE BUILDING IS COMPLETE.
12. THE CONTRACTOR SHALL INFORM THE ARCHITECT IN WRITING OF ANY DEVIATION FROM THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL NOT BE RELIEVED OF THE RESPONSIBILITY FOR SUCH DEVIATION BY THE ARCHITECT'S APPROVAL OF SHOP DRAWINGS, PRODUCT DATA, ETC., UNLESS HE HAS SPECIFICALLY INFORMED THE ARCHITECT OF SUCH DEVIATION AT THE TIME OF SUBMISSION, AND THE ARCHITECT HAS GIVEN WRITTEN APPROVAL TO THE SPECIFIC DEVIATION.
13. ALL THINGS WHICH, IN THE OPINION OF THE CONTRACTOR, APPEAR TO BE DEFICIENCIES, OMISSIONS, CONTRADICTIONS, OR AMBIGUITIES, IN THE PLANS AND SPECIFICATIONS SHALL SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. PLANS AND/OR SPECIFICATIONS WILL BE CORRECTED, OR WRITTEN INTERPRETATION OF THE ALLEGED DEFICIENCY, OMISSION, CONTRADICTION OR AMBIGUITY WILL BE MADE BY THE ARCHITECT BEFORE THE EFFECTED WORK PROCEEDS.
14. REFER TO MECHANICAL DRAWINGS FOR PIPE SUPPORTS AND SEISMIC RESTRAINTS.

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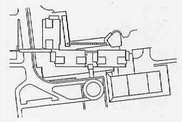
APR 09 2002

Issue

#	Date	Description	Drwn	Chk

North — Seal

Key Plan



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Drawn JJJ Checked JYK
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Scale

Original drawing sheet is 48" x 36"-Scale accordingly if reduced

GENERAL NOTES

Drawing Number
S1.1