

STRUCTURAL GENERAL NOTES

STRUCTURAL GENERAL NOTES ARE INTENDED TO HIGHLIGHT OR IN SOME CASES SUPPLEMENT PROJECT SPECIFICATIONS. REFER TO THE PROJECT SPECIFICATIONS FOR COMPLETE WORK COVERAGE.

A. GOVERNING CODES

- 1) INTERNATIONAL BUILDING CODE (IBC), 2012 EDITION.
- 2) BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 318-11.
- 3) SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS, AISC 360-10.

B. DESIGN LOADS AND CRITERIA

- 2) WIND CRITERIA:
3 SEC GUST WIND SPEED (V_{ult}) = 120 mph
NOMINAL DESIGN WIND SPEED (V_{asd}) = 93 mph
BUILDING CATEGORY: IV
EXPOSURE C
INTERNAL PRESSURE COEFFICIENT: 0.18 ±
- 3) SEISMIC CRITERIA:
 $S_s = 0.6750$ / $S_1 = 0.1986$ MAPPED VALUES FOR SITE CLASS B
PROJECT SITE CLASS D
 $I_e = 1.5$ / SEISMIC USE GROUP IV
 $S_{DS} = 0.567$ / $S_{D1} = 0.285$ DESIGN RESPONSE COEFF
SEISMIC DESIGN CATEGORY D

- 4) FOOTING BEARING PRESSURE: 1500 psi (ASSUMED BEARING ON NATIVE SOILS)
- 5) FROST DEPTH: 42 inches

C. MATERIALS

- 1) CLASS A CONCRETE: PORTLAND CEMENT ASTM C150 TYPE III
(USE UNLESS NOTED OTHERWISE)
FLY ASH ASTM C618, 10% - 25% BY WEIGHT
WATER / CEMENT + FLY ASH = 0.40 MAXIMUM
28 DAY $f_c = 4000$ psi
TOTAL AIR CONTENT 4.5% - 7.0%
3/4" NORMAL WEIGHT AGGREGATE
- 2) PRECAST CONCRETE
PORTLAND CEMENT ASTM C150 TYPE III
FLY ASH ASTM C618, 25% MAX BY WEIGHT
WATER/CEMENT + FLY ASH = 0.45 MAXIMUM
28 DAY $f_c = 5000$ psi
Total air content 4.5%-7%
3/4" NORMAL WEIGHT AGGREGATE
- 3) REINFORCING BARS: ASTM A615, GRADE 60
ASTM A708, GRADE 60 (WHERE INDICATED TO BE WELDED)
- 4) WELDED WIRE FABRIC: ASTM A185, FLAT SHEET MATERIAL - SMOOTH OR DEFORMED WIRE
ASTM F1554 GRADE 36 OR 55 W/ ASTM A563 HEAVY HEX NUTS
- 5) ANCHOR RODS: ASTM C1107, NON-METALLIC NON-SHRINK, 3 DAY $f_c = 4000$ psi
- 6) GROUT: ASTM C1107, NON-METALLIC NON-SHRINK, 3 DAY $f_c = 4000$ psi
- 7) STRUCTURAL STEEL:
W & WT SHAPES: ASTM A992, $F_y = 50$ ksi
HP SHAPES (PILING): ASTM A572, $F_y = 50$ ksi
OTHER ROLLED SHAPES: ASTM A36, $F_y = 36$ ksi
PLATES: ASTM A36, $F_y = 36$ ksi
HSS - SQUARE OR RECT: ASTM A500 GRADE B, $F_y = 46$ ksi
HSS - ROUND: ASTM A500 GRADE B, $F_y = 42$ ksi
8) HIGH STRENGTH BOLTS: ASTM A325 TYPE 1 UNCOATED; STEEL TO STEEL CONNECTIONS
ASTM A307, WOOD OR WOOD TO STEEL CONNECTIONS OR ERECTION ONLY
- 9) BOLTS: ASTM A108 GRADE 1010 - 1020 TYPE B, $F_u = 60$ ksi
F7X-EXXX OR E70XX OR AS APPROVED
- 10) HEADED ANCHOR STUDS: ASTM A633 $F_y = 33$ ksi - GALVANIZED COATING G60
ASTM A36 SHANK W/ EXPANSION CONE SUCH AS HILTI KWIK BOLT 3 OR AS APPROVED
- 11) WELD METAL: THREADED ROD W/ CHISEL POINT & INJECTABLE ADHESIVE SUCH AS HILTI HIT HY-150 FOR CONCRETE & SOLID MASONRY OR HIT HY-20 W/ SCREEN TUBE FOR HOLLOW MASONRY OR AS APPROVED
- 12) STEEL ROOF AND NON-COMPOSITE DECK: ASTM A36 SHANK W/ EXPANSION CONE SUCH AS HILTI KWIK BOLT 3 OR AS APPROVED
- 13) EXPANSION ANCHORS: THREADED ROD W/ CHISEL POINT & INJECTABLE ADHESIVE SUCH AS HILTI HIT HY-150 FOR CONCRETE & SOLID MASONRY OR HIT HY-20 W/ SCREEN TUBE FOR HOLLOW MASONRY OR AS APPROVED
- 14) ADHESIVE ANCHORS: ASTM C877
- 15) EXTERNAL JOINT WRAP: ASTM C877

D. FOUNDATIONS

- 1) PLACE FOOTINGS ON UNDISTURBED NATURAL SOILS OR ENGINEERED FILL PLACED OVER UNDISTURBED NATURAL SOILS. ENGINEERED FILL MATERIAL SHALL BE MINUS 3" GRADED GRANULAR, APPROVED BY THE GEOTECHNICAL ENGINEER. PLACE ENGINEERED FILL IN UNIFORM LIFTS AND COMPACT TO 98% STANDARD PROCTOR ACCORDING TO ASTM D698. PLAN LIMITS OF ENGINEERED FILL MUST EXTEND AT LEAST 2'-0" BEYOND ALL FOOTING EDGES. IF ENCOUNTERED, EXISTING FILL SHALL BE REMOVED TO AN APPROVED DEPTH AND REPLACED WITH ENGINEERED FILL AS DESCRIBED ABOVE, PLACED AND COMPACTED AS DESCRIBED ABOVE.
- 2) DO NOT BACKFILL WALLS WITH UNBALANCED SOIL LEVELS UNLESS ADEQUATELY SHORED OR PERMANENT FLOOR PLATES ARE INSTALLED AND CONNECTIONS ARE COMPLETE - THIS DOES NOT INCLUDE RETAINING WALLS. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY SHORING DESIGN AND INSTALLATION.
- 3) BACKFILL AND COMPACT BURIED WALLS OR GRADE BEAMS EVENLY ON EACH SIDE TO AVOID UNBALANCED LOADS. COMPACT LAYERS TO 98% STANDARD PROCTOR ACCORDING TO ASTM D698 EXCEPT 85% UNDER NON-PAYED AREAS.
- 4) ALWAYS PROVIDE POSITIVE SURFACE WATER DRAINAGE AWAY FROM THE STRUCTURE TOWARD STORM DRAINS.

E. CONCRETE

- 1) PERFORM CONCRETE WORK IN ACCORDANCE WITH ACI 301-02 "STANDARD SPECIFICATION FOR STRUCTURAL CONCRETE" UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED.
- 2) MINIMUM REINFORCING BAR COVER FOR CAST-IN-PLACE CONCRETE:
3" AT UNFORMED SURFACES EXPOSED TO EARTH
2" AT FORMED SURFACES EXPOSED TO EARTH OR WEATHER FOR #6 AND LARGER
1 1/2" AT FORMED SURFACES EXPOSED TO EARTH OR WEATHER FOR #3-#5 AND NOT EXPOSED TO EARTH OR WEATHER FOR REINFORCEMENT OF BEAMS OR COLUMNS
1" AT SLABS OR WALLS NOT EXPOSED TO EARTH OR WEATHER
- 3) SPLICE REINFORCING BARS BY LAPPING ACCORDING TO THE SCHEDULE INDICATED. SPLICE WWF SHEETS BY LAPPING AT LEAST ONE PANEL WIDTH (TWO LONGITUDINAL BARS IN CONTACT) OR 10 INCHES MINIMUM. PLACE MECHANICAL CONNECTORS WHERE SHOWN.
- 4) ADD #5X8'-0" DIAGONAL EACH FACE AT ALL WALL OPENING CORNERS AND #5X6'-0" DIAGONAL MID-DEPTH AT ALL RE-ENTRANT SLAB CORNERS UNLESS SHOWN OTHERWISE.
- 5) SECURE ALL REINFORCING, INCLUDING WWF, IN POSITION WITH CHAIRS BEFORE CONCRETE PLACEMENT. CONCRETE DOBIES MAY BE USED TO POSITION SLAB ON GRADE REINFORCEMENT.
- 6) THE DOBIES IN PLACE BEFORE PLACING CONCRETE. DO NOT STAB OR "WET-SET" DOBIES.
- 7) INSTALL AND SECURE EMBEDMENTS SUCH AS ANCHOR RODS AND EMBEDMENT PLATES WITHIN SPECIFIED TOLERANCES BEFORE CONCRETE PLACEMENT.
- 8) ROUND ISOLATION JOINTS SHOWN AT COLUMN LOCATIONS MAY BE SIMILAR SIZE DIAMOND SHAPED JOINTS AT THE CONTRACTOR'S DISCRETION.
- 9) WHERE TOP SURFACES OF CONCRETE SLABS ARE SHOWN TO BE RECESSED MORE THAN 1/2", THICKEN SLAB TO MAINTAIN INDICATED SLAB THICKNESS.
- 10) MECHANICALLY VIBRATE ALL CONCRETE PLACEMENTS EXCEPT SLABS LESS THAN 5" THICK.
- 11) WHERE SLAB CONTRACTION JOINTS ARE SHOWN ON THE DRAWINGS, CONSTRUCTION JOINTS MAY BE SUBSTITUTED TO ACCOMMODATE THE CONTRACTOR'S PLACEMENT STRATEGY.
- 12) FREE WATER ON THE SLAB SURFACE DURING FINISHING OPERATIONS IS PROHIBITED. SOFT CUT CONTRACTION JOINTS AS SOON AS POSSIBLE - GENERALLY WITHIN 6 HOURS AFTER FINISHING.
- 13) PROTECT AND CURE ALL CONCRETE SURFACES. BEGIN CURING WALLS IMMEDIATELY AFTER STRIPPING FORMS AND FLATWORK IMMEDIATELY AFTER FINISHING.
- 14) CONCRETE SURFACES TO RECEIVE GROUT UNDER COLUMN BASEPLATES MUST BE PREPARED BY LIGHT BUSH HAMMERING (1/4" AMPLITUDE) THE GROUTED AREA AND PRE-SOAKING
- 15) SEAL COAT ALL CONCRETE WITH CLEAR SEALER FOR SALT PROTECTION.

F. PRECAST CONCRETE

- 1) PRECAST CONCRETE PRODUCTS INDICATED SHALL BE IN ACCORDANCE WITH MONTANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATION SECTION 554.
- 2) THE PRECAST FABRICATOR SHALL PERFORM THE DESIGN OF ALL PRECAST COMPONENTS FOR AN HS20 VEHICULAR LOADING IN ADDITION TO THE GENERAL LOADS INDICATED ABOVE TO PROVIDE A COMPLETE PRECAST SYSTEM COMPATIBLE WITH CAST IN PLACE CONCRETE ELEMENTS INDICATED.
- 3) PRECAST CONCRETE PRODUCTS MAY BE SUBSTITUTED FOR THE CAST IN PLACE ELEMENTS INDICATED PROVIDED THAT THEY MEET THE REQUIREMENTS INDICATED ABOVE.
- 4) ALL JOINTS BETWEEN ADJACENT PRECAST SECTIONS OR BETWEEN CAST IN PLACE CONCRETE AND PRECAST SECTIONS SHALL BE WRAPPED ON ALL FOUR SIDES WITH EXTERNAL JOINT WRAP.
- 5) ALL PRODUCTS INDICATED ABOVE SHALL BE INSTALLED IN ACCORDANCE W/ MANUFACTURE'S WRITTEN INSTRUCTIONS.

G. STRUCTURAL STEEL

- 1) DETAIL, FABRICATE AND ERECT STRUCTURAL STEEL IN ACCORDANCE WITH AISC 303-05 "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES."
- 2) ALL STEEL TO STEEL BOLTED CONNECTIONS SHALL CONFORM TO THE RCSC "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS" DATED 2004 AS ENDORSED BY AISC.
- 3) GENERALLY, BEAM CONNECTIONS HAVE BEEN DESIGNED AS BEARING TYPE AND BOLTS MAY BE INSTALLED TO A SNUG-TIGHT CONDITION UNLESS INDICATED TO BE PRE-TENSIONED. BRACE OR MOMENT FRAME AND DRAG / CHORD CONNECTIONS HAVE BEEN DESIGNED AS SLIP CRITICAL AND MUST BE FULLY-TENSIONED. INSTALL TENSION BOLTS INDICATED AS SUCH BY EMPLOYING ONE OF THE FOLLOWING METHODS: TENSION CONTROLLED BOLTS (TWIST-OFF BOLTS) PREFERRED; DIRECT TENSION INDICATOR (TENSION INDICATING WASHERS), OR TURN-OF-THE-NUT WITH COLOR MATCH MARKING. COORDINATE BOLT TENSIONING WITH ENGINEER / INSPECTOR.
- 4) PERFORM SHOP AND FIELD WELDING IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY'S STRUCTURAL WELDING CODE. SHOP OR FIELD WELDS AT NON-BOLTED CONNECTIONS THAT ARE NOT SPECIFICALLY DETAILED SHALL BE 3/4" CONTINUOUS FILLETS AT EACH CONTACT EDGE OR SURFACE.
- 5) ALL WELDERS SHALL HAVE EVIDENCE OF PASSING THE AWS STANDARD QUALIFICATION TEST FOR THE TYPE OF WORK BEING PERFORMED.
- 6) HEADED ANCHOR STUD WELDING MUST CONFORM TO INSTALLATION SPECIFICATIONS PROVIDED BY THE AWS WELDING CODE AND THE STUD MANUFACTURER.
- 7) NON-DESTRUCTIVE WELD TESTS MAY BE PERFORMED. DEFICIENT WELDS WILL BE CORRECTED BY THE CONTRACTOR AND RE-TESTED AT THEIR EXPENSE.
- 8) DO NOT SHOP PAINT FAYING SURFACES OF PRE-TENSIONED BOLTED CONNECTIONS OR SURFACES SCHEDULED TO RECEIVE SHOP OR FIELD INSTALLED HEADED ANCHOR STUDS.
- 9) THE ERECTOR SHALL NOT EMPLOY FIT-UP MEANS BEYOND THE USE OF DRIFT PINS OR MINOR HOLE REAMING. CORRECTION OF FIT-UP ERRORS OR MODIFICATIONS, INCLUDING ANCHOR RODS, OF ANY DEGREE SHALL BE DISCUSSED WITH THE FABRICATOR AND ENGINEER AND METHODS APPROVED BY THEM BEFORE ACTIONS ARE TAKEN.
- 10) GROUT UNDER COLUMN BASEPLATES AFTER THE STRUCTURE IS ERECT AND PLUMB BUT BEFORE PLACEMENT OF ELEVATED SLABS OR ROOFING.

H. SPECIAL INSPECTIONS

- 1) SPECIAL INSPECTIONS DESCRIBED BELOW WILL BE PERFORMED UNDER SEPARATE CONTRACT BY AGENCIES RETAINED BY THE PROJECT OWNER. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING THE ENGINEER APPRISED OF WORK PROGRESS AS IT PERTAINS TO SPECIAL INSPECTIONS AND ENSURING THAT NO WORK REQUIRING SPECIAL INSPECTIONS IS CONCEALED BEFORE SPECIAL INSPECTIONS OCCUR. SEE PROJECT SPECIFICATIONS FOR OTHER INSPECTIONS AND MATERIALS TESTING REQUIREMENTS.

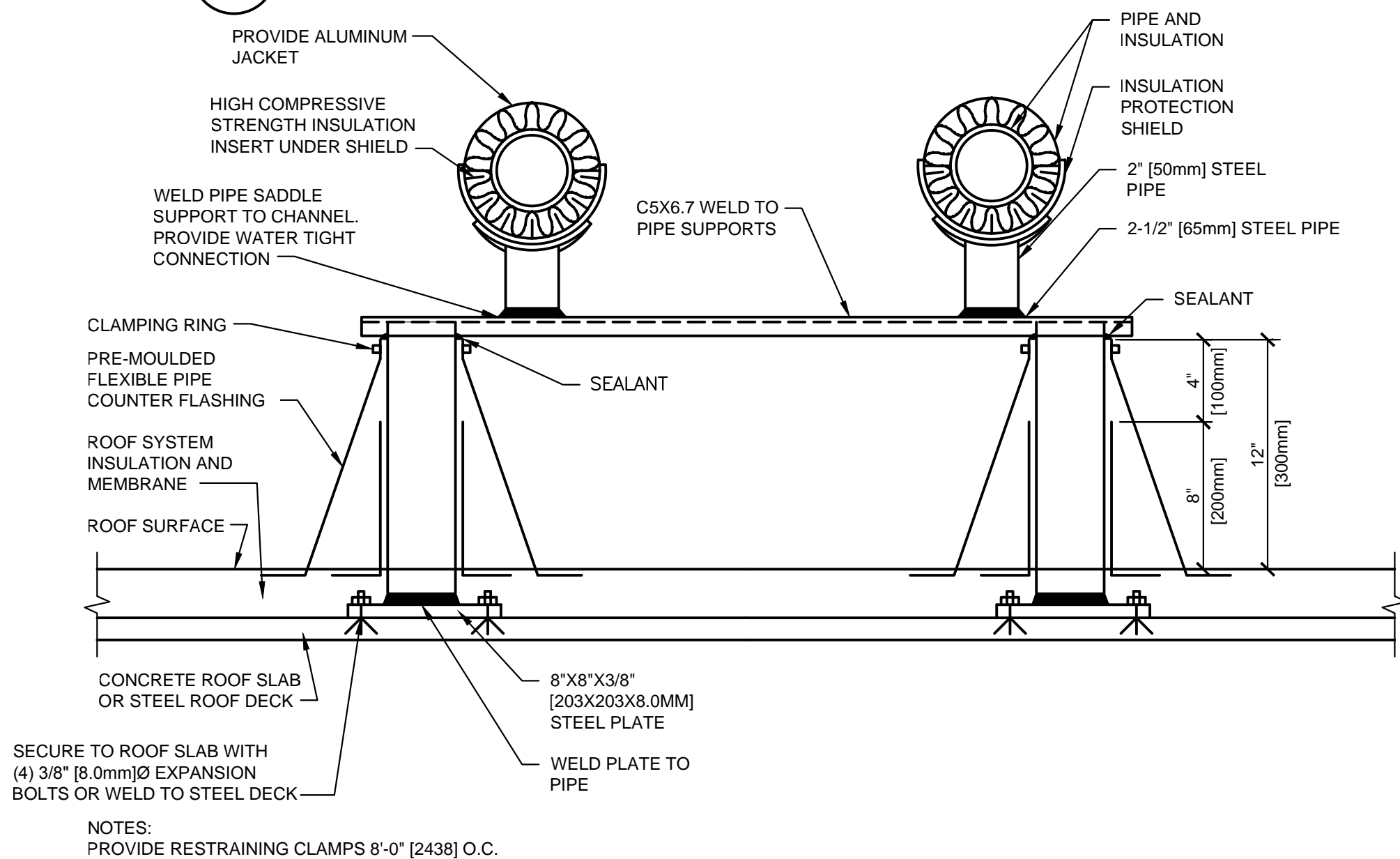
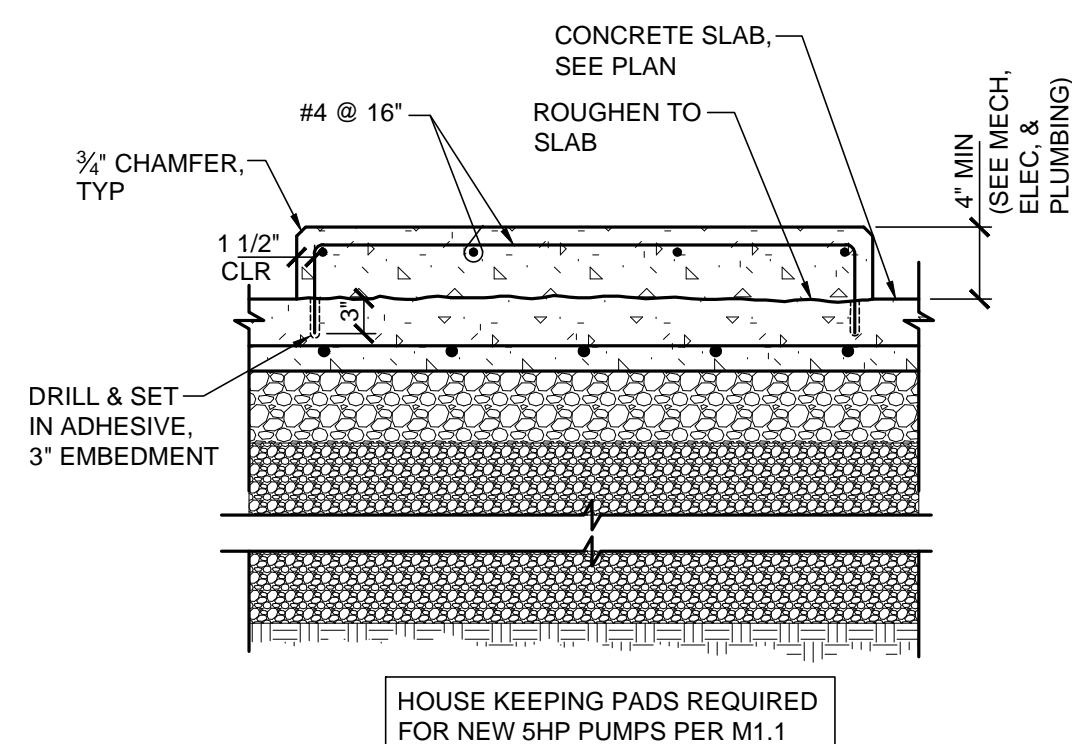
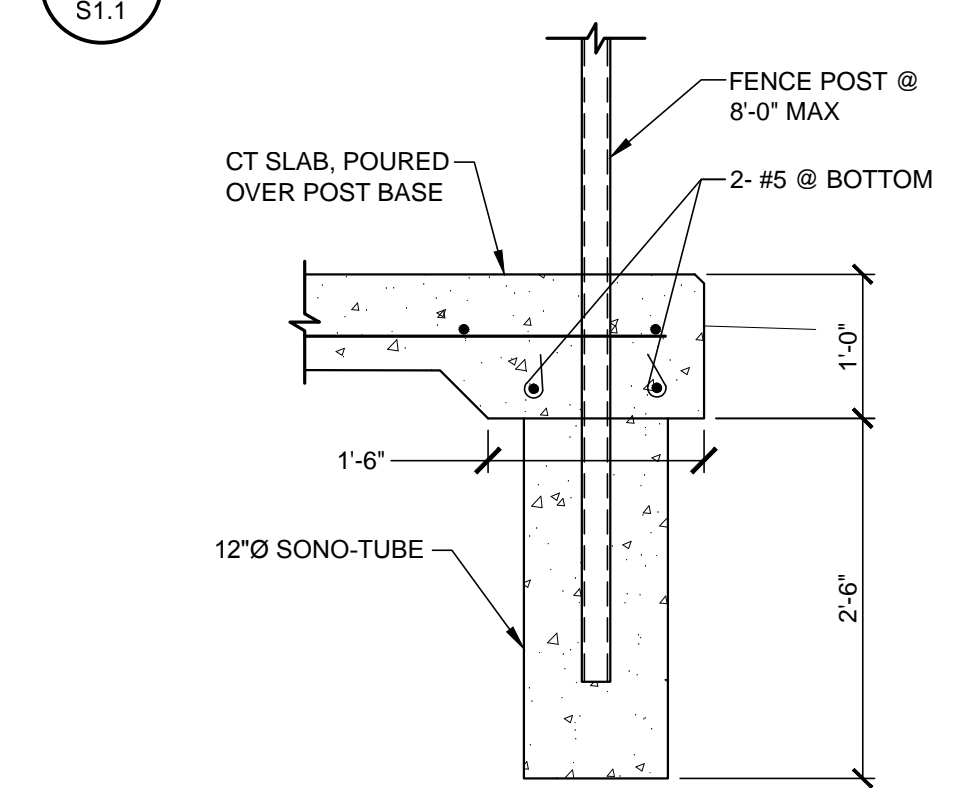
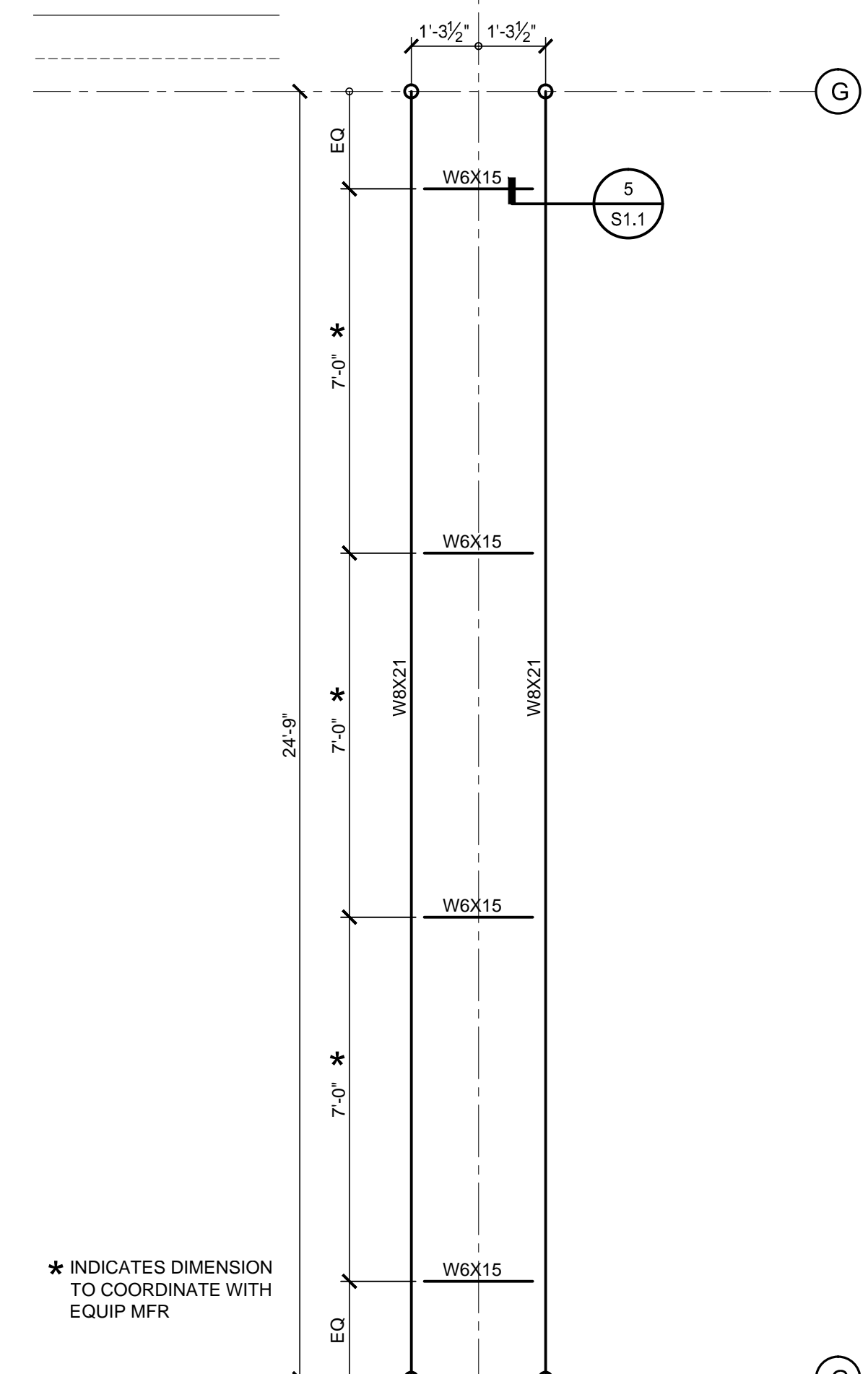
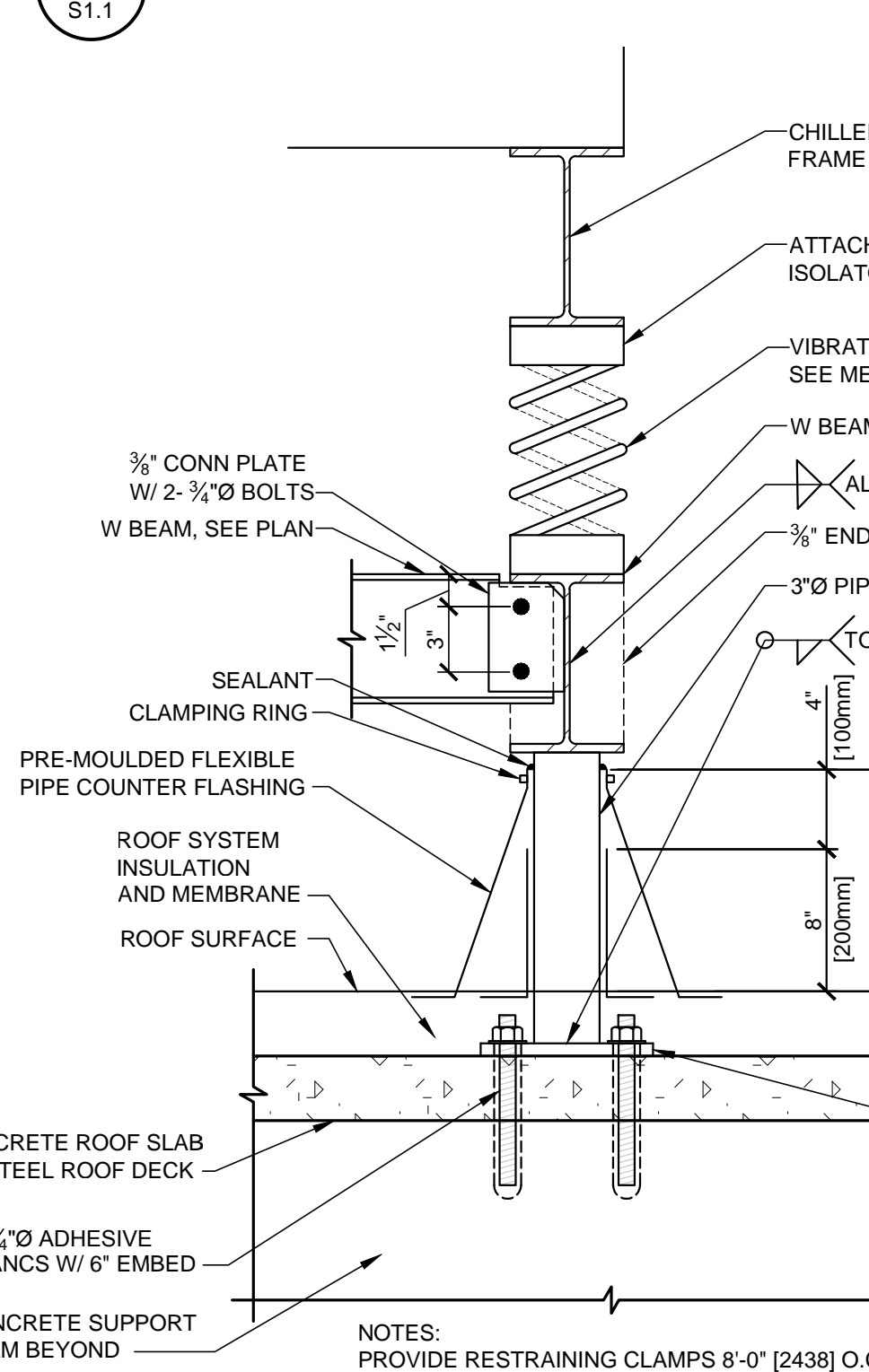
REINFORCING STEEL:	INSPECT BEFORE CONCRETE OR GROUT PLACEMENT. (INCLUDES SLABS-ON-GRADE AND ELEVATED SLABS)
REINFORCED CONCRETE:	CONTINUOUS INSPECTION DURING CONCRETE PLACEMENT EXCEPT PERIODIC INSPECTION FOR SLABS-ON-GRADE AND ELEVATED SLABS. (INCLUDES VERIFICATION OF PROPER MIX DESIGN AND CURING METHODS)
ANCHOR RODS:	INSPECT ALL BEFORE CONCRETE PLACEMENT.
ADHESIVE ANCHORS:	PERIODIC INSPECTION DURING OR AFTER INSTALLATION.
MECHANICAL COUPLERS:	INSPECT ALL BEFORE CONCRETE PLACEMENT.
STRUCTURAL STEEL:	PERIODIC INSPECTION DURING OR AFTER INSTALLATION.
WELDING:	PERIODIC INSPECTION OF ALL WELDS. (INCLUDES STRUCTURAL STEEL, STEEL JOIST AND DECK, HEADED ANCHOR STUDS, STAIRS & RAILING)

I. ABBREVIATIONS LIST - (SOME OF THE LISTED ABBREVIATIONS MAY NOT APPEAR ON THE DRAWINGS)

ALT	ALTERNATE
ANC	ANCHOR
BLDG	BUILDING
BRG	BEARING
BTWN	BETWEEN
BOT	BOTTOM
CL	CENTERLINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CNTJ	CONTRACTION JOINT
COL	COLUMN
CONN	CONNECTION / CONNECTOR
CONT	CONTINUE / CONTINUOUS
CSJT	CONSTRUCTION JOINT
DBA	DEFORMED BAR ANCHOR
EXP	EXPANSION
HAS	HEADED ANCHOR STUD
HORZ	HORIZONTAL
HSS	HOLLOW STRUCTURAL SECTION (TUBE STEEL)
ISJT	ISOLATION JOINT
LF	LINEAL FOOT
LONG	LONGITUDINAL
MFG	MANUFACTURING
MFR	MANUFACTURER
PROJ	PROJECTION
REIN	REINFORCEMENT / REINFORCING
REQ	REQUIRED
SIM	SIMILAR
SPA	SPACE / SPACES
STIFF	STIFFENER
STR	STIRRUP
THK	THICK / THICKNESS
TRANS	TRANSVERSE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL

J. MISCELLANEOUS

- 1) DETAIL MARKS ANNOTATED ON PLANS ARE INTENDED TO INDICATE SPECIFIC CONFIGURATION(S) AND INFORMATION - FOR PLAN CLARITY. EVERY LOCATION WHERE A SPECIFIC DETAIL MAY APPLY IS NOT ANNOTATED. CONTACT THE ENGINEER IF CLARIFICATION IS NEEDED.
- 2) COORDINATE OPENINGS AND EMBEDDED ITEMS IN CONCRETE AND MASONRY WORK WITH ALL TRADES.
- 3) NOTIFY ENGINEER OF ANY DISCREPANCIES DISCOVERED WITH OTHER TRADES.
- 4) EQUIPMENT OPENINGS INDICATED ARE FOR REFERENCE ONLY. COORDINATE EXACT LOCATIONS, DIMENSIONS AND DETAILS WITH EQUIPMENT MANUFACTURERS AND TRADES.
- 5) TEMPORARILY BRACE THE STRUCTURE TO RESIST ALL LOADS OR COMBINATIONS OF LOADS UNTIL ALL PERMANENT ELEMENTS ARE IN PLACE AND ALL CONNECTIONS ARE COMPLETE AS SHOWN.
- 6) COST ASSOCIATED WITH STRUCTURAL DRAWING CHANGES RESULTING FROM USE OF ALTERNATES OR SUBSTITUTIONS, INCLUDING MECHANICAL EQUIPMENT, ARE THE CONTRACTOR'S RESPONSIBILITY.

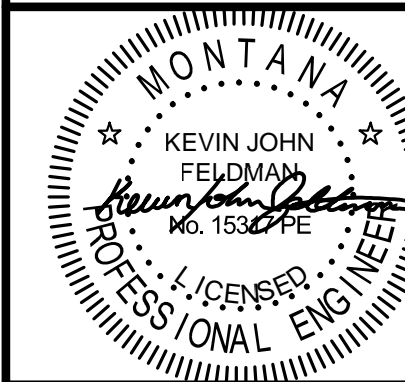
3
S1.1
SLAB EDGE / POST SUPPORT4
S1.1
CHILLER SUPPORT FRAMING PLAN

Revisions:	Date:
12-4-15 AMENDMENT-00002	



CONSULTANTS:

CTA ARCHITECTS ENGINEERS
316 N LAST CHANCE GULCH
HELENA, MONTANA 59601
PHONE (406) 248-7455



ARCHITECT/ENGINEERS:

TBST DESIGN, LLC
TOMORROW'S BEST SOLUTION TODAY

TBST DESIGN, LLC
16231 27TH DRIVE SE
MILL CREEK, WA 98012
PHONE (425) 407-2153

Drawing Title
STRUCTURAL GENERAL NOTES AND DETAILS

Approved: Project Chief, Construction/Engineering
ROY STEINER, PE, PMS PROJECT MANAGER
YAMC FORT HARRISON

Project Title
FORT HARRISON COOLING EQUIPMENT UPGRADE
100% DRAWINGS

Location
FORT HARRISON, MONTANA

Date
5/8/2015

Checked
KJF

Drawn
TRS

Project Number
VA259-14-C-0143
436-15-109

Building Number
154

Drawing Number
S1.1

Dwg
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Office of Construction and Facilities Management

