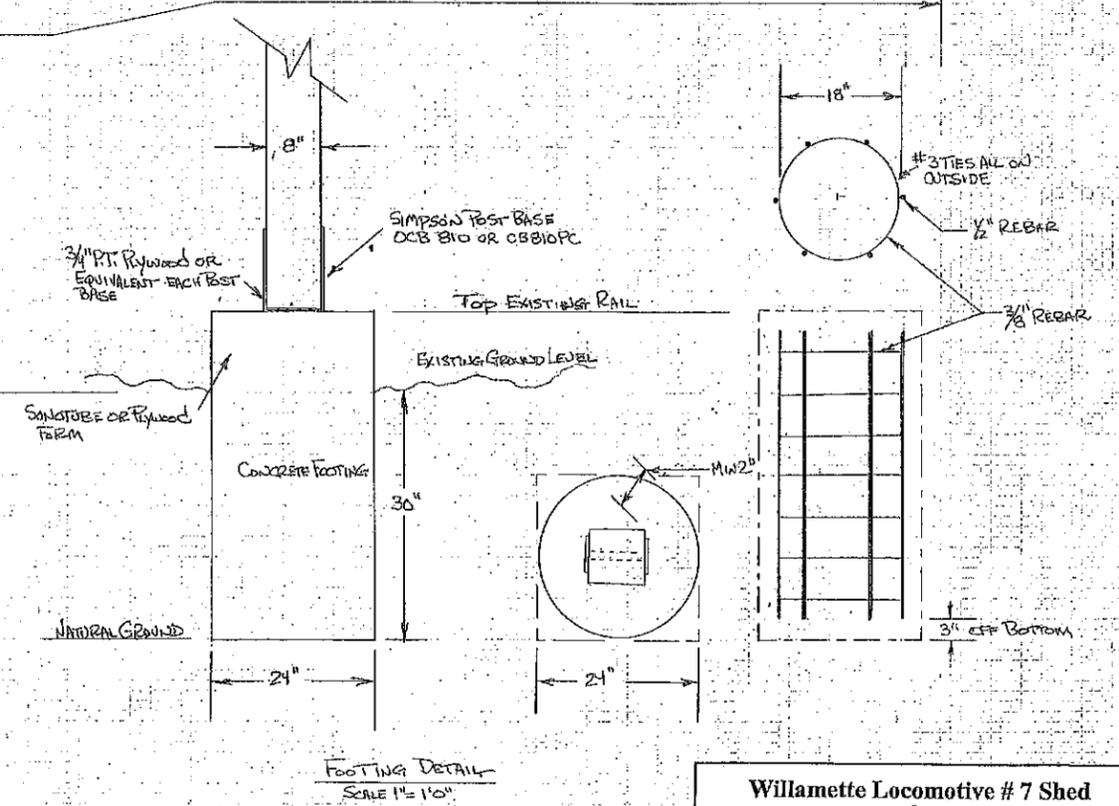
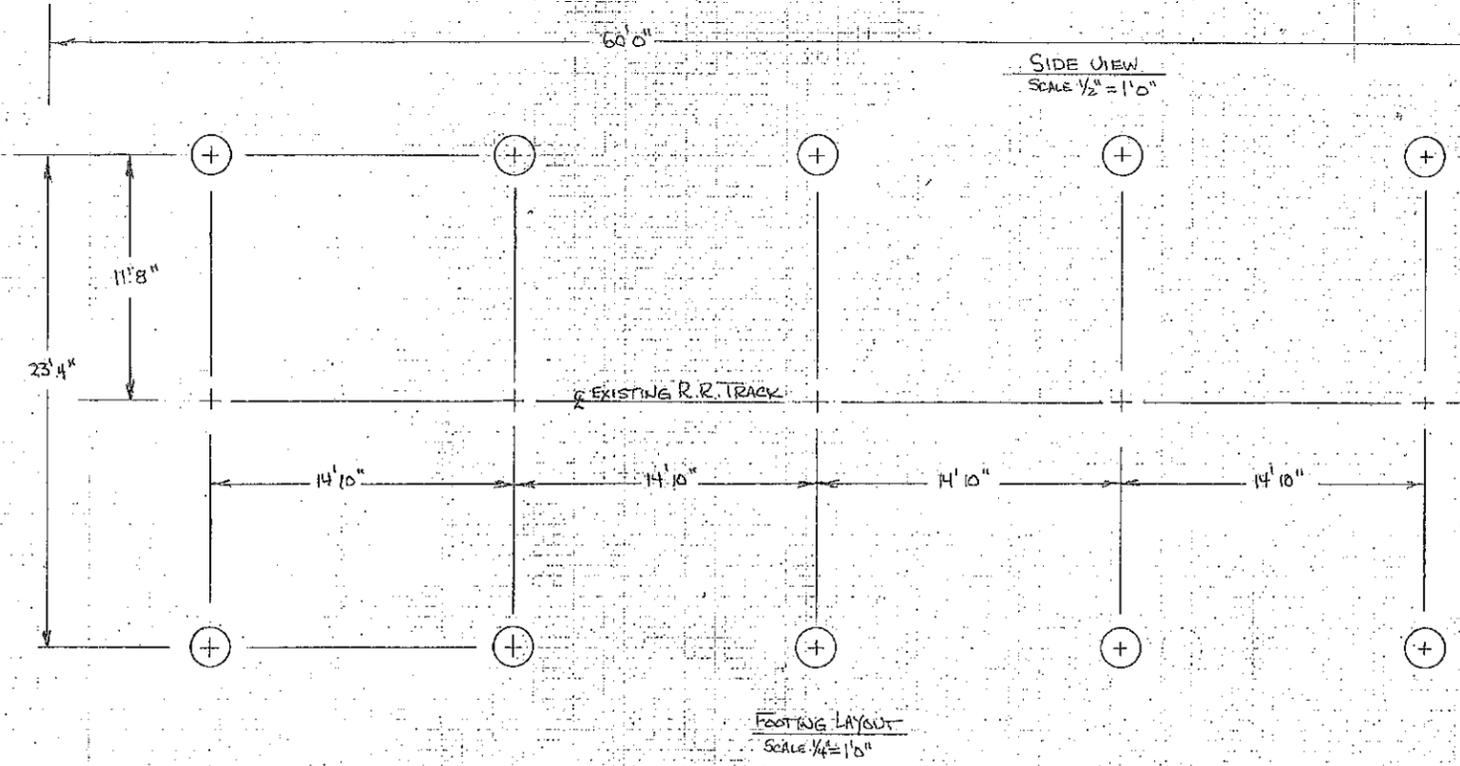
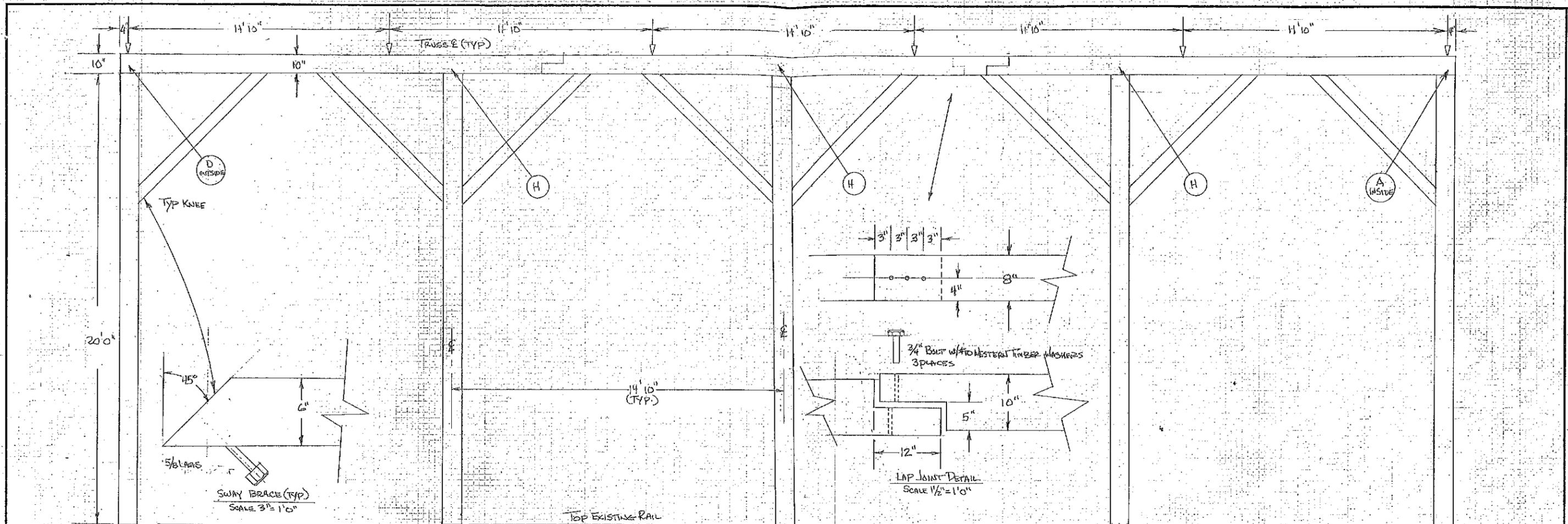


SITE PLAN
 Scale 1" = 100'
 (Do not Scale Drawing)

Legal Description: TR S in SE ¼ NE ¼ & NE ¼ SE ¼
 36-13-20

NOTE:
 THIS SITE PLAN AND LOCUS HAVE BEEN COMPILED FROM
 SCALED AERIAL PHOTOGRAPHY (COURTESY OF THE CITY OF
 MISSOULA) AND BASE MAPS (COURTESY OF THE COUNTY OF
 MISSOULA) REGISTERED TO THE SAME U.S.G.S. DATUM AND
 MAY NOT BE TOTALLY ACCURATE WITH REGARD TO SCALE
 OR IN INDICATING THE LOCATIONS OF BUILDINGS ON THE
 SITE.

A New Locomotive Shed For
 Willamette Steam Locomotive # 7
 At
HISTORICAL MUSEUM FORT
MISSOULA
 3400 Captain Rawn Way
 Missoula, MT 59804



Willamette Locomotive # 7 Shed
 for
Historical Museum Fort Missoula
 3400 Captain Rawm Way
 Missoula, MT 59804



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January 13, 2020

Mark Buck
Bauer & Buck Construction
2512 Glen Drive
Missoula, MT. 59804

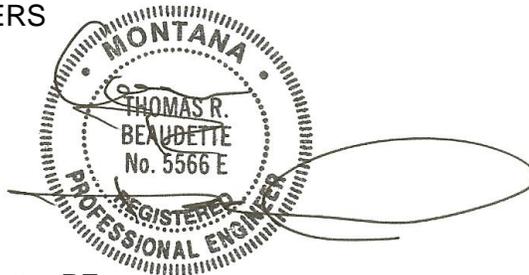
Re: Structural Justification
Building for Locomotive #7
Fort Missoula

Mark:

This letter confirms our participation in justifying the structure for the proposed building to cover Locomotive #7 at Fort Missoula. Drawings for the nominal 24' x 60' building were completed by others. We completed a review of the drawings with minor modifications and have confirmed the final drawings. The open structure has heavy timber frames (7:12 pitch) at approximately 12' o/c. The frames have knee braces in both directions for lateral justification. The eave height is 20'. The timber frames are supported by 24" diameter concrete piers. We are attaching the base structural specifications to be combined with the drawings.

Please call with any questions.

Sincerely,
DCI ENGINEERS



Tom R. Beaudette, PE

Attachment: Structural notes.

cc: Brian – City of Missoula

OPEN STRUCTURE FOR LOCOMOTIVE #7 – FORT MISSOULA
BAUER & BUCK CONSTRUCTION

GENERAL NOTES

1. Contractor shall verify all dimensions and job site conditions before commencing work and shall report any discrepancies to the Engineer.
2. Use written dimensions. Do not use scaled dimensions. Where no dimension is provided, consult the Engineer for clarification before proceeding with the work.
3. The Contractor is responsible for implementing job site safety and construction procedures in accordance with national, state, and local safety requirements. The design, adequacy and safety of erection bracing, shoring, temporary supports, etcetera is the sole responsibility of the Contractor and has not been considered by the Engineer. The Contractor is responsible for the stability of the structure prior to the completion of all gravity and lateral framing, roof and floor diaphragms and finish materials.
4. The Contractor is responsible for locating and the protection of all existing utilities and adjacent structures throughout all phases of construction.

DESIGN CRITERIA

1. CODE: International Building Code, 2012 - 2018 Edition (IBC).
2. DESIGN LOADS:
ROOF LOADS:
DEAD = 15 PSF
SNOW $P_f = 30$ PSF ($P_g = 30$ PSF)
FLOOR LOADS: NA
LATERAL LOADS:
WIND - 115 MPH (3 Second Gust), Exposure C
SEISMIC - Site Class D, Design Category D,
3. ALLOWABLE SOIL BEARING PRESSURE = 2000 PSF

FOUNDATION

1. The foundation type and design criteria are based on assumed soil conditions and presumptive values from Section 1806 of the IBC. DCI suggests a professional geotechnical consultant should be hired by the Owner and/or Contractor to verify these assumptions.
2. The building is supported on isolated piers bearing on competent sub-grade. The bottom of all exterior piers to bear 3'-6" minimum below finished grade.
3. The bottom of all piers to bear on solid native, inorganic, undisturbed soil or approved compacted fill.
4. A Geotechnical Engineer shall perform an open excavation inspection prior to placing piers to ensure the bearing capacity is satisfactory IF any questionable or differential soils conditions are encountered. .
5. No concrete shall be placed in excavation containing water or on frozen soil.
6. Backfill shall be placed against all sides of piers simultaneously. All footings shall be centered under walls and columns, unless noted otherwise.

CAST-IN-PLACE CONCRETE

1. Concrete properties shall be determined from designated Exposure Category F Class F2 as described in Section 4.2.1 of the latest edition of ACI 318, unless noted otherwise.
 - a. Minimum Compressive Strength: $f'_c = 3500$ psi at 28 days, normal weight.
 - b. Maximum water/cement ratio limit (w/cm): 0.45
 - c. Air Content w/ 3/4" aggregate size = 6% +/- 1.5%
2. Maximum slump per Section 2.5.1 ACI 117: 4" +/- 1".
3. Concrete shall be ready mixed in accordance w/ ASTM C94. Portland cement shall conform to ASTM C150, Type I or II. Normal weight aggregate shall conform to ASTM C33.
4. All concrete shall have a minimum cementitious materials content of 517 pounds per cubic yard, unless noted otherwise.
5. Calcium Chloride shall not be added to concrete.
6. Material, mixing, placement and workmanship shall be in accordance with the requirements of the latest edition of the "Building Code Requirements for Reinforced Concrete" (ACI 318) and Section 1905 of the IBC. Each proposed concrete mix shall include test data.
7. Concrete Placement: Cold weather is defined by ACI 306 as "The air temperature has fallen to, or is expected to fall below, 40°F"; when cold weather conditions exist, place concrete complying with ACI 306. Hot weather is defined by ACI 305 as "any combination of high air temperature, low relative humidity, and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise resulting in abnormal properties"; when hot weather conditions exist, place concrete complying with ACI 305.
8. All Detailing, Fabrication, and Erection of reinforcing shall conform to latest edition of ACI "Manual of Standard Practice for Detailing Reinforced Concrete Structures" (ACI 315) and the current "Building Code Requirements for Reinforced Concrete" (ACI 318).
9. Reinforcing Steel:

ASTM A615 - Grade 40 for #3, Grade 60 for #4 and larger.

STRUCTURAL STEEL

1. Structural steel construction, fabrication, and erection shall conform with the latest AISC "Code of Standard Practice for Steel Buildings and Bridges" and applicable provisions of AWS "Structural Welding Code".
2. Steel Materials shall conform to the following:
 - a. Plates: ASTM A36, $F_y = 36$ ksi
 - b. Bolts: ASTM F1554 Grade 36
 - c. Expansion anchors: Hilti "Kwik Bolt TZ" or approved equal
 - d. Adhesive Anchors: Installation and embedment per manufacturer's recommendation or as noted per plans.
 - i. Concrete Embedment: Hilti "HAS-E" Threaded Rod with "HIT-HY 200" Adhesive or approved equal.

WOOD

1. Framing lumber shall comply with the latest edition of the "National Design Specification" (NDS), American Forest & Paper Association / American Wood Council.
2. All sawn lumber shall be stamped with the grade work of a certified lumber grading agency. Moisture content shall not exceed 19%. All sawn lumber shall be Douglas Fir-Larch, unless noted otherwise.
3. Sawn Lumber:
Smaller dimension: 2x or 4x nominal: no. 2 & better
Larger dimension: >4x nominal: no. 1 & better
Simple span members - 24F-V4
4. Framing Anchors: "Simpson" or approved equal. Install as per manufacturer's recommendations.
5. For nailing not shown on these drawings, use IBC nailing schedule, Table 2304.9.1.
6. Structural members shall not be cut for pipes, ducts, etc., unless specifically noted, detailed or approved in writing by the Engineer.
7. All exposed members or members in contact with concrete shall be preservative-treated wood stamped by an approved agency.
8. All steel, fasteners, and connectors in contact with wood that has ACQ formulation preservative treatment without ammonia shall be galvanized (G185) per ASTM A653 and ASTM A153 or Type 316L stainless steel. All steel, fasteners, and connectors in contact with wood that has ACQ formulation preservative treatment with ammonia shall be Type 316L stainless steel.

HEAVY TIMBER CONSTRUCTION

1. Provide timber graded by a recognized agency complying with the NELMA grading rules. Timbers shall be Douglas Fir-Larch #1 or better, unless noted otherwise on the drawings.
2. Except as strictly approved otherwise by the Engineer in writing, provide new or re-cycled, stabled dry timber with a maximum moisture content of 16%.
3. Fabricate connections considering strict quality standards established by the Timber Framers' Guild of North America, including TFEC 1-07.
4. The timber frame fabrication and erection shall be under the direct supervision of a foreman with a minimum of 10 similar or larger timber projects.
5. The general Contractor & timber frame subcontractor shall fully coordinate the site conditions, work schedule, erection platform and all other items pertinent to the timber frame erection process.