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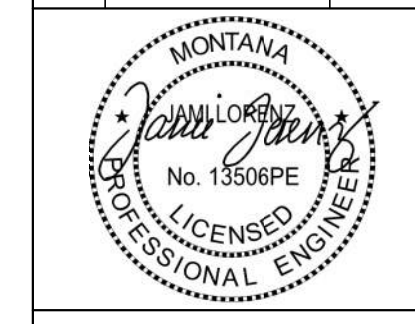
100% CONSTRUCTION DOCUMENTS

**ATKINSON QUAD
FIRE ESCAPE
STRUCTURAL REPAIR & REMEDIATION**



DRAWN BY: JNH
REVIEWED BY: SLF

REV.	DESCRIPTION	DATE



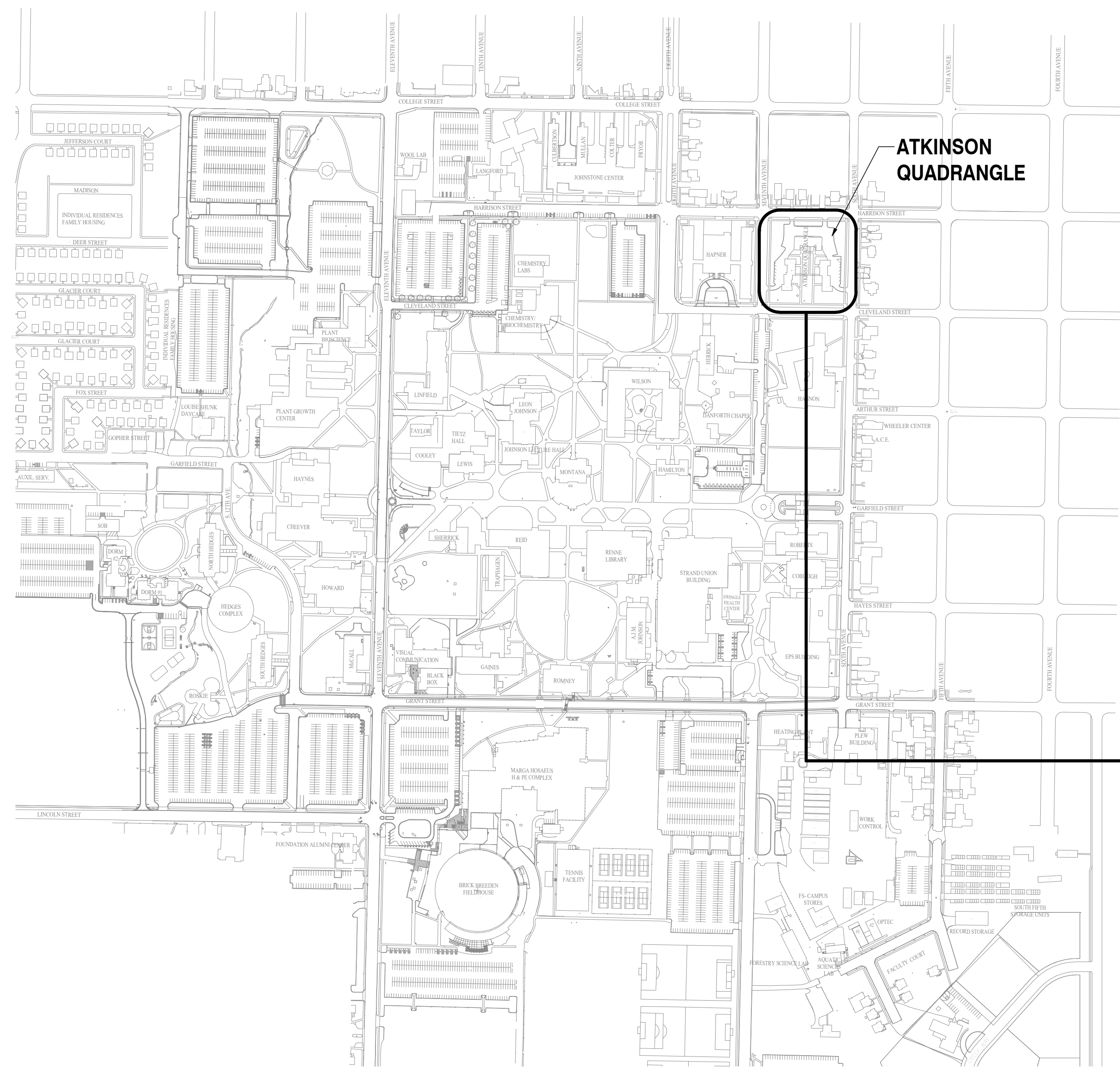
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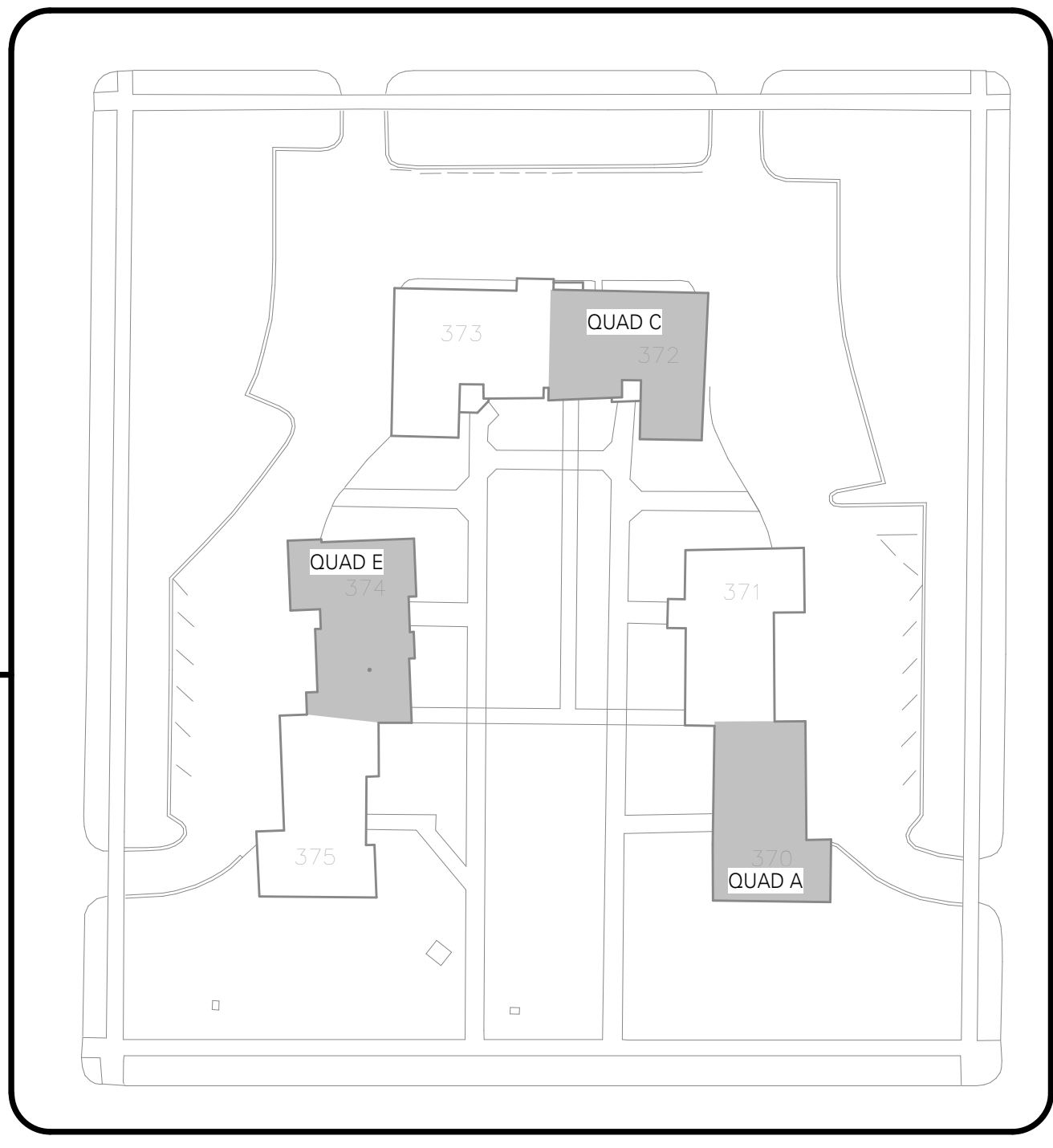
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09-02-2022



ATKINSON QUAD FIRE ESCAPES - STRUCTURAL REPAIR & REMEDIATION

STRUCTURAL DRAWINGS

- S1.0 STRUCTURAL - GENERAL NOTES
- S1.1 STRUCTURAL - STATEMENT OF SPECIAL INSPECTIONS
- S2.0 STRUCTURAL - STAIR PROFILES
- S2.1 STRUCTURAL - STAIR REPAIR DETAILS



ATKINSON QUAD FIRE ESCAPES STRUCTURAL REPAIR & REMEDIATION PPA#19-0193 MONTANA STATE UNIVERSITY, BOZEMAN, MONTANA

PROJECT ADDRESS:

ATKINSON QUADRANGLE
S. 7TH AVE & W CLEVELAND ST
BOZEMAN, MT 59717

PROJECT DESCRIPTION

STRUCTURAL REPAIR AND REMEDIATION OF THREE
EXISTING EXTERIOR METAL FIRE ESCAPES AND
RELATED WORK AT HISTORIC DORMITORY BUILDINGS
ON MONTANA STATE UNIVERSITY'S CAMPUS.

OWNER

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STRUCTURAL

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STRUCTURAL - GENERAL NOTES

GENERAL REQUIREMENTS

GOVERNING CODE: The design and construction of this project is governed by the "International Building Code (IBC)", 2021 Edition, hereafter referred to as the IBC, as adopted and modified by the State of Montana understood to be the Authority Having Jurisdiction (AHJ).

REFERENCE STANDARDS: Refer to Chapter 35 of 2021 IBC. Where other Standards are noted in the drawings, use the latest edition of the standard unless a specific date is indicated. Reference to a specific section in a code does not relieve the contractor from compliance with the entire standard.

DEFINITIONS: The following definitions cover the meanings of certain terms used in these notes:

- "Architect/Engineer" – The Architect of Record and the Structural Engineer of Record.
- "Structural Engineer of Record" (SER) – The structural engineer who is licensed to stamp & sign the structural documents for the project. The SER is responsible for the design of the Primary Structural System.
- "Submit for review" - Submit to the Architect/Engineer for review prior to fabrication or construction.
- "Per Plan" – Indicates references to the structural plans, elevations and structural general notes.
- "Seismic Force Resisting System (SFRS)" – A recognized structural system of components (beams, braces, drags, struts, collectors, diaphragms, columns, walls, etc) of the primary structure that are specially designed and proportioned to resist earthquake-induced ground motions and maintain stability of the structure. Fabrication and installation of components designated as part of the SFRS require the general contractor, subcontractor, or supplier who is responsible for any portion of SFRS fabrication or installation to comply with special requirements (including, but not limited to, material control, compliance certifications, personnel qualifications, documentation, reporting requirements, etc) and to provide the required Quality Control including the required coordination of Special Inspections (Quality Assurance – QA). Special provisions apply to any member designated as part of the SFRS. Refer to plans, elevations, details, Design Criteria and Symbols and Legends for applicable members and connections.
- "Specialty Structural Engineer" (SSE) – A professional engineer (PE or SE), licensed in the State where the project is located, (typically not the SER), who performs specialty structural engineering services for selected specialty-engineered elements identified in the Contract Documents, and who has experience and training in the Specialty. Documents stamped and signed by the SSE shall be completed by or under the direct supervision of the SSE.
- "Bidder-designed" – Components of the structure that require the general contractor, subcontractor, or supplier who is responsible for the design, fabrication and installation of specialty-engineered elements identified in the Contract Documents to retain the services of an SSE. Submittals of "Bidder-designed" elements shall be stamped and signed by the SSE.

STRUCTURAL DETAILS: The structural drawings are intended to show the general character and extent of the project and are not intended to show all details of the work. Use entire detail sheets and specific details referenced in the plans as "typical" wherever they apply. Similarly, use details on entire sheets with "typical" in the name wherever they apply.

STRUCTURAL RESPONSIBILITIES: The structural engineer (SER) is responsible for the strength and stability of the primary structure in its completed form.

COORDINATION: The Contractor is responsible for coordinating details and accuracy of the work; for confirming and correlating all quantities and dimensions; for selecting fabrication processes; for techniques of assembly; and for performing work in a safe and secure manner.

EXISTING CONDITIONS: Information shown on the drawings related to existing conditions represent the present knowledge, but without guarantee of accuracy. Report conditions that conflict with contract documents to the architect or SEOR. Do not deviate from the contract documents without written direction from the architect and/or SEOR. All existing dimensions and information shall be field verified prior to fabrication as required to coordinate with new construction.

MEANS, METHODS and SAFETY REQUIREMENTS: The contractor is responsible for the means and methods of construction and all job related safety standards such as OSHA and DOSH (Department of Occupational Safety and Health). Contractor is responsible to adhere to OSHA regulations regarding steel erection items specifically addressed in the latest OSHA regulations. Bolting and field welding at all member connections is to be completed prior to the release of the member from the hoisting mechanism unless reviewed and approved by the General Contractor's temporary bracing and shoring design engineer. The construction documents represent the completed structure. The contractor is responsible for means and methods of construction related to the intermediate structural conditions (i.e. movement of the structure due to moisture and thermal effects; construction sequence; temporary bracing, etc).

BRACING/SHORING DESIGN ENGINEER: The contractor shall, at his or her discretion, employ an SSE, a registered professional engineer for the design of any temporary bracing and shoring.

TEMPORARY SHORING, BRACING: The contractor is responsible for the strength and stability of the structure during construction and shall provide temporary shoring, bracing and other elements required to maintain stability until the structure is complete. It is the contractor's responsibility to be familiar with the work required in the construction documents and the requirements for executing it properly.

CONSTRUCTION LOADS: Loads on the structure during construction shall not exceed the design loads as noted in DESIGN CRITERIA & LOADS below or the capacity of partially completed construction as determined by the Contractor's SSE for Bracing/Shoring.

CHANGES IN LOADING: The contractor has the responsibility to notify the SER of any architectural, mechanical, electrical, or plumbing load imposed onto the structure that differs from, or that is not documented on the original Contract Documents (architectural / structural / mechanical / electrical or plumbing drawings). Provide documentation of location, load, size and anchorage of all undocumented loads in excess of 400 pounds. Provide marked-up structural plan indicating locations of any new equipment or loads. Submit plans to the Architect/Engineer for review prior to installation.

NOTE PRIORITIES: Plan and detail notes and specific loading data provided on individual plans and detail drawings supplements information in the Structural General Notes.

DISCREPANCIES: In case of discrepancies between the General Notes, Specifications, Plans/Details or Reference Standards, the Architect/Engineer shall determine which shall govern. Discrepancies shall be brought to the attention of the Architect/Engineer before proceeding with the work. Should any discrepancy be found in the Contract Documents, the Contractor will be deemed to have included in the price the most expensive way of completing the work, unless prior to the submission of the price, the Contractor asks for a decision from the Architect as to which shall govern. Accordingly, any conflict in or between the Contract Documents shall not be a basis for adjustment in the Contract Price.

SITE VERIFICATION: The contractor shall verify all dimensions and conditions at the site. Conflicts between the drawings and actual site conditions shall be brought to the attention of the Architect/Engineer before proceeding with the work.

ADJACENT UTILITIES: The contractor shall determine the location of all adjacent underground utilities prior to earthwork, foundations, shoring, and excavation. Any utility information shown on the drawings and details is approximate and not necessarily complete.

ALTERNATES: Alternate products of similar strength, nature and form for specified items may be submitted with adequate technical documentation (proper test report, etc.) to the Architect/Engineer for review. Alternate materials that are submitted without adequate technical documentation or that significantly deviate from the design intent of materials specified may be returned without review. Alternates that require substantial effort to review will not be reviewed unless authorized by the Owner.

DESIGN CRITERIA AND LOADS

DESIGN LIVE LOADS	AREA	LIVE LOADS (PSF) UNO	REMARKS & FOOT-NOTES (4)
	Handrails & Pedestrian Guardrails	50 PLF or 200 LB (3)	(1)
	Stairs & Exits	100 PSF or 300 LB	Stair treads per note (2)

- Top rail shall be designed to resist 50 PLF line load or 200 lb point load applied in any direction at any point. Intermediate rails (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 LB on an area not to exceed 1 ft square. These three loads are to be considered separately with worst case used for design.
- Place 300 lb concentrated load over 2'x2' area at any point to produce maximum stress. Area load and concentrated load are to be considered separately with worst case used for design.
- Need not apply concurrently with other handrail and guardrail loads; applied over not more than 1 square foot.
- Unless otherwise noted, point loads to be distributed over a 2.5ft x 2.5ft area and located to produce maximum load effects on structural members.

CAST-IN-PLACE CONCRETE

REFERENCE STANDARDS: Conform to:

- ACI 301-10 "Specifications for Structural Concrete"
- IBC Chapter 19 "Concrete"
- ACI 318-14 "Building Code Requirements for Structural Concrete"
- ACI 117-10 "Specifications for Tolerances for Concrete Construction and Materials"

FIELD REFERENCE: The contractor shall keep a copy of ACI Field Reference manual, SP-15, "Standard Specifications for Structural Concrete (ACI 301)" with Selected ACI and ASTM References."

CONCRETE MIXTURES: Conform to ACI 301 Section 4 "Concrete Mixtures" and IBC Section 1904.1.

MATERIALS: Conform to ACI 301 Section 4.2.1 "Materials" for requirements for cementitious materials, aggregates, mixing water and admixtures.

SUBMITTALS: Provide all submittals required by ACI 301 Section 4.1.2. Submit mix designs for each mix in the table below. Substantiating strength results from past tests shall not be older than 24 months per ACI 318 Section 26.4.3.1 (b).

TABLE OF MIX DESIGN REQUIREMENTS

Member Type/Location	Strength f _c (psi)	Test Age (days)	Nominal Maximum Aggregate	Exposure Class	Max W/C Ratio	Air Content	Notes (1 to 8 Typical UNO)
Foundations	4000	28	1"	F0	-	-	-

Table of Mix Design Requirements Notes:

- W/C Ratio: Water-cementitious material ratios shall be based on the total weight of cementitious materials. Maximum ratios are controlled by strength noted in the Table of Mix Design Requirements and durability requirements given in ACI 318 Section 19.3.
- Cementitious Materials:
 - The use of fly ash, other pozzolans, silica fume, or slag shall conform to ACI 318 Sections 19.3.2 and 26.4.2.2. Maximum amount of fly ash shall be 25% of total cementitious content unless reviewed and approved otherwise by SER.
 - For concrete used in elevated floors, minimum cementitious-materials content shall conform to ACI 301 Table 4.2.2.1. Acceptance of lower cement content is contingent on providing supporting data to the SER for review and acceptance.
 - Cementitious materials shall conform to the relevant ASTM standards listed in ACI 318 Section 26.4.1.1.1(a).
- Air Content: Conform to ACI 318 Section 19.3.3.1. Minimum standards for exposure class are noted in the table. If freezing and thawing class is not noted, air content given is that required by the SER. Tolerance is ±1-½%. Air content shall be measured at point of placement.
- Aggregates shall conform to ASTM C33.
- Slump: Conform to ACI 301 Section 4.2.2.2. Slump shall be determined at point of placement.
- Chloride Content: Conform to ACI 318 Table 19.3.2.1.
- Non-chloride accelerator: Non-chloride accelerating admixture may be used in concrete placed at ambient temperatures below 50°F at the contractor's option.
- ACI 318, Section 19.3.1.1 exposure classes shall be assumed to be F0, S0, W0, and C0 unless different exposure classes are listed in the Table of Mix Design Requirements that modify these base requirements.

FORMWORK & RESHORING: Conform to ACI 301 Section 2 "Formwork and Form Accessories." Removal of Forms shall conform to Section 2.3.2 except strength indicated in Section 2.3.2.5 shall be 0.75 f_c.

MEASURING, MIXING, AND DELIVERY: Conform to ACI 301 Section 4.3.

HANDLING, PLACING, CONSTRUCTING AND CURING: Conform to ACI 301 Section 5. In addition, hot weather concreting shall conform to ACI 305R-10 and cold weather concreting shall conform to ACI 306R-10.

EMBEDDED ITEMS: Position and secure in place expansion joint material, anchors and other structural and non-structural embedded items before placing concrete. Contractor shall refer to mechanical, electrical, plumbing and architectural drawings and coordinate other embedded items.

GROUT: Use 7000 psi non-shrink grout under column base plates.
BONDING AGENT: Use MasterEmaco ADH 326. Apply in accordance with manufacturer's instructions.

CONCRETE PLACEMENT TOLERANCE: Conform to ACI 117-10 for concrete placement tolerance.

CONCRETE REINFORCEMENT

REFERENCE STANDARDS: Conform to:

- ACI 301-10 "Standard Specifications for Structural Concrete", Section 3 "Reinforcement and Reinforcement Supports."
- ACI SP-66(04) "ACI Detailing Manual"
- CRSI MSP-09, 28th Edition, "Manual of Standard Practice."
- ANSI/AISC D1.4: 2005, "Structural Welding Code - Reinforcing Steel."
- IBC Chapter 19-Concrete.
- ACI 318-14 "Building Code Requirements for Structural Concrete."
- ACI 117-10 "Specifications for Tolerances for Concrete Construction and Materials"

SUBMITTALS: Conform to ACI 301 Section 3.1.1 "Submittals." Submit placing drawings showing fabrication dimensions and placement locations of reinforcement and reinforcement supports.

MATERIALS:

Reinforcing Bars.....ASTM A615, Grade 60, deformed bars.

FABRICATION: Conform to ACI 301, Section 3.2.2. "Fabrication", and ACI SP-66 "ACI Detailing Manual."

WELDING: Bars shall not be welded unless authorized. When authorized, conform to ACI 301, Section 3.2.2.2. "Welding", AWS D1.4, and provide ASTM A706, grade 60 reinforcement.

PLACING: Conform to ACI 301, Section 3.3.2 "Placing." Placing tolerances shall conform to ACI 117.

CONCRETE COVER: Conform to the following cover requirements unless noted otherwise in the drawings.

Concrete cast against earth.....'3'

Concrete exposed to earth or weather.....'2'

SPICES: Conform to ACI 301, Section 3.3.2.7, "Splices". Refer to "Typical Lap Splice and Development Length Schedule" for typical reinforcement splices. Splices indicated on individual sheets shall control over the schedule. Mechanical connections may be used when approved by the SER.

FIELD BENDING: Conform to ACI 301 Section 3.3.2.8. "Field Bending or Straightening." Bar sizes #3 through #5 may be field bent cold the first time. Subsequent bends and other bar sizes require preheating. Do not twist bars. Bars shall not be bent past 45 degrees.

STRUCTURAL STEEL

REFERENCE STANDARDS: Conform to:

- IBC Chapter 22 – "Steel"
- ANSI/AISC 303-10 – "Code of Standard Practice for Steel Buildings & Bridges"
- AISC – "Manual of Steel Construction", Fourteenth Edition (2010)
- ANSI/AISC 360-10 – "Specification for Structural Steel Buildings"
- AWS D1.1:2010 – "Structural Welding Code – Steel"
- 2009 RCSC – "Specification for Structural Joints using High-Strength Bolts"
- ANSI/AISC 341-10 – "Seismic Provisions for Structural Steel Buildings"
- ANSI/AISC 358-10/358s1-11/358s2-14 – "Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications Including Supplement No. 1 and Supplement No. 2"
- AWS D1.8:2009 – "Structural Welding Code – Seismic Supplement"

MATERIALS: Structural steel materials shall conform to materials and requirements listed in AISC 360 section A3 including, but not limited to:

- Wide Flange (W), Tee (WT) Shapes.....ASTM A992 F_y = 50 ksi
- Channel (C) & Angle (L) Shapes.....ASTM A36 F_y = 36 ksi
- Structural Plate (PL).....ASTM A36 F_y = 36 ksi
- High Strength Plate (Gr 50 PL).....ASTM A572 F_y = 50 ksi
- Hollow Structural Section – Square/Rect (HSS).....ASTM A500, Grade B F_y = 46 ksi
- High Strength, Heavy Hex Structural Bolts.....ASTM A325F1552, Type 1 or 3, Plain
- High Strength, Heavy Hex Structural Bolts.....ASTM A490F2280, Type 1 or 3, Plain
- Heavy Hex Nuts.....ASTM A563, Grade and Finish per RCSC Table 2.1
- Washers (Hardened Flat or Beveled).....ASTM F436, Grade and Finish per RCSC Table 2.1

Anchor Rods (Anchor Bolts, typical).....ASTM F1554, Gr. 36
 Anchor Rods (High Strength).....ASTM F1554, Gr. 55 (weldable) per Supplement S1
 Anchor Rods (High Strength).....ASTM F1554, Gr. 105

ANCHORAGE TO CONCRETE:

- COLUMN ANCHOR RODS and BASE PLATES:** All columns (vertical member assemblies weighing over 300 pounds) shall be provided with a minimum of four 1" diameter anchor rods. Column base plates shall be at least ½" thick, unless noted otherwise. Cast-in-place anchor rods shall be provided unless otherwise approved by the Engineer. Unless noted otherwise, embedment of cast-in-place anchor rods shall be 12 times the anchor diameter (12D).

FABRICATION:

- Conform to AISC 360 Section M2 "Fabrication" and AISC 303 Section 6 "Shop Fabrication".
- Quality Control (QC) shall conform to:
 - AISC 360 Chapter N "Quality Control and Quality Assurance" and
 - AISC 303 Section 8 "Quality Control",
 - Fabricator and Erector shall establish and maintain written Quality Control (QC) procedures per AISC 360 section N3.
 - Fabricator shall perform self-inspections per AISC 360 section N5 to ensure that their work is performed in accordance with Code of Standard Practice, the AISC Specification, Contract Documents and the Applicable Building Code.
 - QC inspections may be coordinated with Quality Assurance inspections per Section N5.3 where fabricators QA procedures provide the necessary basis for material control, inspection, and control of the workmanship expected by the Special Inspector.

WELDING:

- Welding shall conform to AWS D1.1 and D1.8 as applicable for Seismic elements with Prequalified Welding Processes except as modified by AISC 360 section J2 and AISC 341 as applicable. Welders shall be qualified in accordance with AWS D1.1 requirements.
- Use 70ksi strength, low-hydrogen type electrodes (E7018) or E71T as appropriate for the process selected.
- Welding of high strength anchor rods is prohibited unless approved by Engineer.
- Welding of headed stud anchors shall be in accordance with AWS D1.1 Chapter 7 "Stud Welding".

ERECTION:

- Conform to AISC 360 Section M4 "Erection" and AISC 303 Section 7 "Erection".
- Conform to AISC 360 Chapter N "Quality Control and Quality Assurance" and AISC 303 Section 8.
 - The Erector shall maintain detailed erection quality control procedures that ensure that the work is performed in accordance with these requirements and the Contract Documents.
- Steel work shall be carried up true and plumb within the limits defined in AISC 303 Section 7.13.
- High strength bolting shall comply with the RCSC requirements including RCSC Section 7.2 "Required Testing", as applicable and AISC 360 Chapter J, Section M2.5 and Section N5.6.
- Welding of HEADED STUD ANCHORS shall be in accordance with AWS D1.1 Chapter 7 "Stud Welding."
- Provide Headed (Shear) Stud Anchors welded through the metal deck to tops of beams denoted in plans.
- The contractor shall provide temporary bracing and safety protection required by AISC 360 Section M4.2 and AISC 303 Section 7.10 and 7.11.

PROTECTIVE COATING REQUIREMENTS:

- SHOP PAINTING: Conform to AISC 360 Section M3 and AISC 303 Section 6.5 unless otherwise specified by the project specifications.
 - Paint with an exterior multi-coat system as per the project specifications. Field touch-up painting shall be per the project specifications.
- EXTERIOR STEEL: Exposed exterior steel shall be protected by either:
 - Galvanizing: Unless protected with a paint system, exposed steel (outside the building envelope) shall be hot-dipped galvanized, where noted on the plans or otherwise indicated by the finishes specified by the Architect. Apply field touch-ups per project specifications.
- Steel need not be primed or painted unless noted otherwise on the drawings or in the project specifications. Conform to AISC 360 Section M3 and AISC 303 Section 6.5 unless a multi-coat system is required per the project specifications.

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SPECIAL INSPECTIONS

The following Statement and Schedules of Inspections are those Special Inspections and Tests that shall be performed for this project. Special Inspectors shall reference these plans and IBC Chapter 17 for all special inspection requirements. The owner shall retain an "approved agency" per IBC 1703 to provide special inspections for this project. Special Inspectors shall be qualified persons per IBC 1704.2.1. Special inspection reports shall be provided on a weekly basis. Submit copies of all inspection reports to the Architect/Engineer and the Authority Having Jurisdiction for review. In addition to special inspection reports and tests, submit reports and certificates noted in IBC 1704.5 to the Authority Having Jurisdiction. Final special inspection reports will be required by each special inspection firm per IBC 1704.2.4.

STATEMENT OF SPECIAL INSPECTIONS:

This statement of Special Inspections has been written with the understanding that the Building Official will:

- Review and approve the qualifications of the Special Inspectors
- Monitor the special inspection activity on the project site to assure that Special Inspectors are qualified and performing their duty as state within this statement.
- Review all Special Inspection Reports submitted to them by the Special Inspector
- Perform Inspections as required by IBC Section 110.3.

The following Special Inspections are applicable to this project:

- Special Inspections for Standard Buildings (per IBC 1705.1) **REQUIRED**
- Special Inspections for Seismic Resistance (per IBC 1705.13) **NOT REQUIRED**
- Testing for Seismic Resistance (per IBC 1705.14) **NOT REQUIRED**
- Special Inspections for Wind Resistance (per IBC 1705.12) **NOT REQUIRED**

SPECIAL INSPECTION OF SHOP FABRICATED GRAVITY LOAD-BEARING MEMBERS AND ASSEMBLIES:

Special Inspection of shop fabricated Gravity Load Bearing Members & Assemblies shall be verified by the Special Inspector as stated in Section 1704.2.5

STRUCTURAL STEEL per IBC 1705.2.1

A qualified Special Inspector of an "approved agency" providing Quality Assurance (QA) Special Inspections for the project shall review and confirm the Fabricator and Erector's Quality Control (QC) procedures for completeness and adequacy relative to AISC 360-16 Chapter N, AISC 303-16 Code of Standard Practice, AWS D1.1-2015 Structural Welding Code and 2021 IBC code requirements for the fabricator's scope of work.

- o QA Agency providing Special Inspections shall provide personnel meeting the minimum qualification requirements for Inspection and Nondestructive Testing NDT per AISC 360 Section N4.
- o Verify Fabricator and Erector QC Program per AISC 360 Section N2.
- o Inspection of welds and bolts by both QC and QA personnel shall be per the Schedule of Special Inspections below. All provisions of AWS D1.1 Structural Welding Code for statically loaded structures shall apply.
- o Nondestructive Testing (NDT) of welds:
 - Non-Destructive Testing (NDT) of welded joints per AISC 360 N5.5.
 - Risk Category for determination of extent of NDT per AISC 360 N5.5b is noted in the Design Criteria and Loads section of these General Requirements.
 - NDT performed shall be documented and reports shall identify the tested weld by piece mark and location of the piece.
 - For field work, the NDT report shall identify the tested weld by location in the structure, piece mark and location of the piece.
- o Additional Inspection tasks per AISC 360 Section N5.8.
- o Inspection for Composite Construction shall be done per AISC 360 Section N6.

POST-INSTALLED ANCHORS TO CONCRETE AND MASONRY: shall comply with IBC Section 1703. Inspections shall be in accordance with the requirements set forth in the approved ICC Evaluation Report and as indicated by the design requirements specified on the drawings. Refer to the POST INSTALLED ANCHORS section of these notes for anchors that are the basis of the design. Special inspector shall verify anchors are as specified in the POST INSTALLED ANCHORS section of these notes or as otherwise specified on the drawings. Substitutions require approval by the SER and require substantiating calculations and current 2021 IBC recognized ICC Evaluation Services (ES) Report. Special Inspector shall document in their Special Inspection Report compliance with each of the elements required within the applicable ICC Evaluation Services (ES) Report.

PREFABRICATED CONSTRUCTION: All prefabricated construction shall conform to IBC Section 1703.

SCHEDULES OF SPECIAL INSPECTIONS:

**TABLE 1705.3
REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION**

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD	IBC REFERENCE
1. Inspection, reinforcement, including pre-stressing tendons, and verify placement.	-	X	ACI 318 Ch. 20, 25.2, 25.3, 26.6.1-26.6.3	-
4. Inspect anchors post-installed in hardened concrete members:				
a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads	X	-	ACI 318: 17.8.2.4	-
b. Mechanical anchors and adhesive anchors not defined in 4.a	-	X	ACI 318: 17.8.2	-
5. Verify use of required design mix	-	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2
6. Prior to concrete placement, fabricate specimens, for strength tests, perform slump and air content tests, and determine the temperature of the concrete	X	-	ASTM C172 ASTM C31 ACI 318: 26.5, 26.12	1908.10
7. Inspect concrete and shotcrete placement for proper application techniques	X	-	ACI 318: 26.5	-
12. Inspect formwork for shape, location and dimensions of the concrete member being formed	-	X	ACI 318: 26.11.1.2 (b)	-

MINIMUM REQUIREMENTS FOR INSPECTIONS OF STRUCTURAL STEEL CONSTRUCTION

INSPECTION TASKS	QC	QA	REFERENCED STANDARD
INSPECTION TASKS PRIOR TO WELDING			
1. Welder qualification records and continuity records	P	O	AISC 360 TABLE N5.4-1
2. Welding procedure specifications (WPSs) available	P	P	AISC 360 TABLE N5.4-1
3. Manufacturing certifications for welding consumables available	P	P	AISC 360 TABLE N5.4-1
4. Material identification (type/grade)	O	O	AISC 360 TABLE N5.4-1
5. Welder identification system	O	O	AISC 360 TABLE N5.4-1
6. Fit-up of groove welds (including joint geometry) <ul style="list-style-type: none"> • Joint preparation • Dimensions (alignment, root opening, root face, bevel) • Cleanliness (condition of steel surfaces) • Tacking (tack welding quality and location) • Backing type and fit (if applicable) 	O	O	AISC 360 TABLE N5.4-1
7. Fit-up of fillet welds <ul style="list-style-type: none"> • Dimensions (alignment, gaps at root) • Cleanliness (condition of steel surfaces) • Tacking (tack weld quality and location) 	O	O	AISC 360 TABLE N5.4-1
8. Check welding equipment	O	-	AISC 360 TABLE N5.4-1
INSPECTION TASKS DURING WELDING			
1. Use of qualified welders	O	O	AISC 360 TABLE N5.4-2
2. Control and handling of welding consumables <ul style="list-style-type: none"> • Packaging • Exposure control 	O	O	AISC 360 TABLE N5.4-2
3. No welding over cracked tack welds	O	O	AISC 360 TABLE N5.4-2
4. Environmental conditions <ul style="list-style-type: none"> • Wind speed within limits • Precipitation and temperature 	O	O	AISC 360 TABLE N5.4-2
5. WPS followed <ul style="list-style-type: none"> • Settings on welding equipment • Travel speed • Selected welding materials • Shielding gas type/flowrate • Preheat applied • Interpass temperature maintained (min/max) • Proper position (F, V, H, OH) 	O	O	AISC 360 TABLE N5.4-2
6. Welding techniques <ul style="list-style-type: none"> • Interpass and final cleaning • Each pass within profile limitations • Each pass meets quality requirements 	O	O	AISC 360 TABLE N5.4-2
INSPECTION TASKS AFTER WELDING			
1. Welds cleaned	O	O	AISC 360 TABLE N5.4-3
2. Size, length, and locations of welds	P	P	AISC 360 TABLE N5.4-3
3. Welds meet visual acceptance criteria <ul style="list-style-type: none"> • Crack prohibition • Weld/base-metal fusion • Crater cross section • Weld profiles • Weld size • Undercut • Porosity 	P	P	AISC 360 TABLE N5.4-3
4. Arc strikes	P	P	AISC 360 TABLE N5.4-3
5. k-area	P	P	AISC 360 TABLE N5.4-3
6. Weld access holes in rolled heavy shapes and built-up heavy shapes	P	P	AISC 360 TABLE N5.4-3
7. Backing removed and weld tabs removed (if required)	P	P	AISC 360 TABLE N5.4-3
8. Repair activities	P	P	AISC 360 TABLE N5.4-3
9. Document acceptance or rejection of welded joint or member	P	P	AISC 360 TABLE N5.4-3
10. No prohibited welds have been added without the approval of the EOR	P	P	AISC 360 TABLE N5.4-3

INSPECTION TASKS PRIOR TO BOLTING			
1. Manufacturer's certifications available for fastener materials	O	P	AISC 360 TABLE N5.6-1
2. Fasteners marked in accordance with ASTM requirements	O	O	AISC 360 TABLE N5.6-1
3. Correct fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)	O	O	AISC 360 TABLE N5.6-1
4. Correct bolting procedure selected for joint detail	O	O	AISC 360 TABLE N5.6-1
5. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements	O	O	AISC 360 TABLE N5.6-1
6. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used.	P	O	AISC 360 TABLE N5.6-1
7. Proper storage provided for bolts, nuts, washers and other fasteners components	O	O	AISC 360 TABLE N5.6-1
INSPECTION TASKS DURING BOLTING			
1. Fastener assemblies, of suitable condition, placed in all holes and washers are positioned as required	O	O	AISC 360 TABLE N5.6-2
2. Joint brought to the snug-tight condition prior to the pre-tensioning operation	O	O	AISC 360 TABLE N5.6-2
3. Fastener component not turned by the wrench prevented from rotating	O	O	AISC 360 TABLE N5.6-2
4. Fasteners are pre-tensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges	O	O	AISC 360-10 TABLE N5.6-2
INSPECTION TASKS AFTER BOLTING			
1. Document acceptance or rejection of bolted connections	P	P	AISC 360 TABLE N5.6-3
INSPECTION OF STEEL ELEMENTS OF COMPOSITE CONSTRUCTION PRIOR TO CONCRETE PLACEMENT			
1. Placement and installation of steel deck	P	P	AISC 360 TABLE N6.1
2. Placement and installation of steel headed stud anchors	P	P	AISC 360 TABLE N6.1
3. Document acceptance or rejection of steel elements	P	P	AISC 360 TABLE N6.1

O - Observe these items on a random basis. Operations need not be delayed pending these inspections
P - Perform these tasks for each welded joint or member, each bolted connection, or each steel element

100% CONSTRUCTION DOCUMENTS

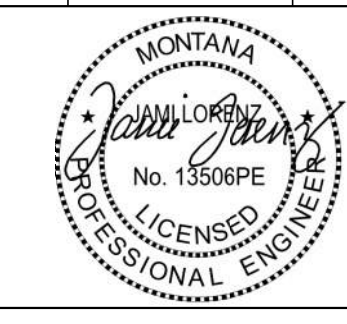
ATKINSON QUAD
FIRE ESCAPE
STRUCTURAL REPAIR & REMEDIATION



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DRAWN BY: JNH
REVIEWED BY: SLF
REV. DESCRIPTION DATE



PPA#19-0193

20151-0046

SHEET TITLE
STRUCTURAL -
SPECIAL INSPECTIONS

SHEET
S1.1

DATE
09-02-2022



1 QUAD A STAIR PROFILE
SCALE: 1" = 1'-0"



2 QUAD C STAIR PROFILE
SCALE: 1" = 1'-0"



3 QUAD E STAIR PROFILE
SCALE: 1" = 1'-0"

REPAIR KEY

TYPICAL DETAIL - APPLIES TO ALL QUADS:

- 1 HANDRAIL CONNECTION RETROFIT - DETAIL 1/S2.1
- 2 KNEE BRACE CONNECTION RETROFIT - DETAIL 2/S2.1
- 3 (N) CONCRETE PIER FDN BELOW EA STRINGER - DETAIL 7/S2.1

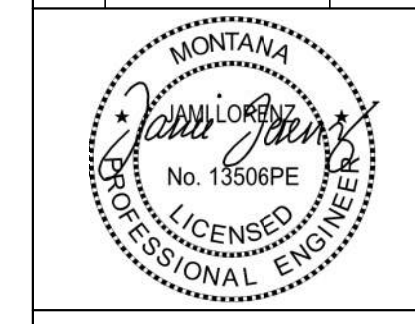
QUAD SPECIFIC DETAILS:

- 4 (N) WINDOW HEAD (QUAD A) - DETAIL 4/S2.1
- 5 CORRODED STEEL REPAIR (QUAD C) - DETAIL 5/S2.1
- 6 SPALLING CONCRETE REPAIR (QUAD C) - DETAIL 9/S2.1

PLAN NOTES:

1. STRUCTURAL GENERAL NOTES AND INSPECTION REQUIREMENTS PER S1.0.
2. BUILDINGS WILL REMAIN OCCUPIED DURING CONSTRUCTION. CONTRACTOR IS REQUIRED TO COORDINATE CLOSURE OF FIRE ESCAPES WITH OWNER AND CAMPUS FIRE MARSHAL TO ENSURE LIFE SAFETY OF BUILDING OCCUPANTS IS MAINTAINED DURING CONSTRUCTION.
3. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO WORK. DO NOT SCALE FROM DRAWINGS.
4. CONTRACTOR IS RESPONSIBLE FOR SHORING OF EXISTING STRUCTURE DURING REPAIRS.
5. CONTACT DCI ENGINEERS IF CONDITIONS VARY FROM THOSE SHOWN ON PLAN.
6. TYPICAL REPAIR DETAILS OCCUR AT ALL (3) STAIR LOCATIONS, AND AT ALL INSTANCES.
7. QUAD SPECIFIC DETAILS ARE UNIQUE TO INDIVIDUAL STAIR LOCATIONS. REFER TO STAIR PROFILE FOR LOCATION OF REPAIR.
8. ALL STAIRS TO BE SANDBLASTED, CLEANED OF SURFACE RUST, AND COATED WITH CORROSION RESISTANT PAINT. PROTECT ADJACENT SURFACES DURING WORK. COORDINATE WITH OWNER. COORDINATE PRODUCT SELECTION AND PRODUCT FINISH WITH OWNER.
9. PROTECT ALL ADJACENT SURFACES DURING WORK.
10. THE FOLLOWING ABBREVIATIONS ARE USED:
(E) - EXISTING
(N) - NEW
(V) - VERIFY

DRAWN BY: JNH		
REVIEWED BY: SLF		
REV.	DESCRIPTION	DATE



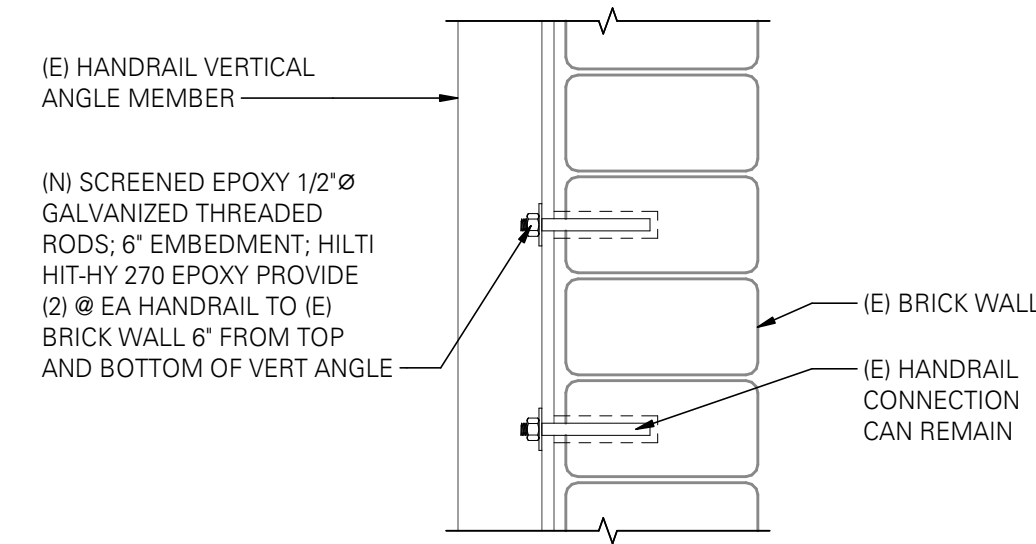
PPA#19-0193

20151-0046

SHEET TITLE
STRUCTURAL - STAIR
PROFILES

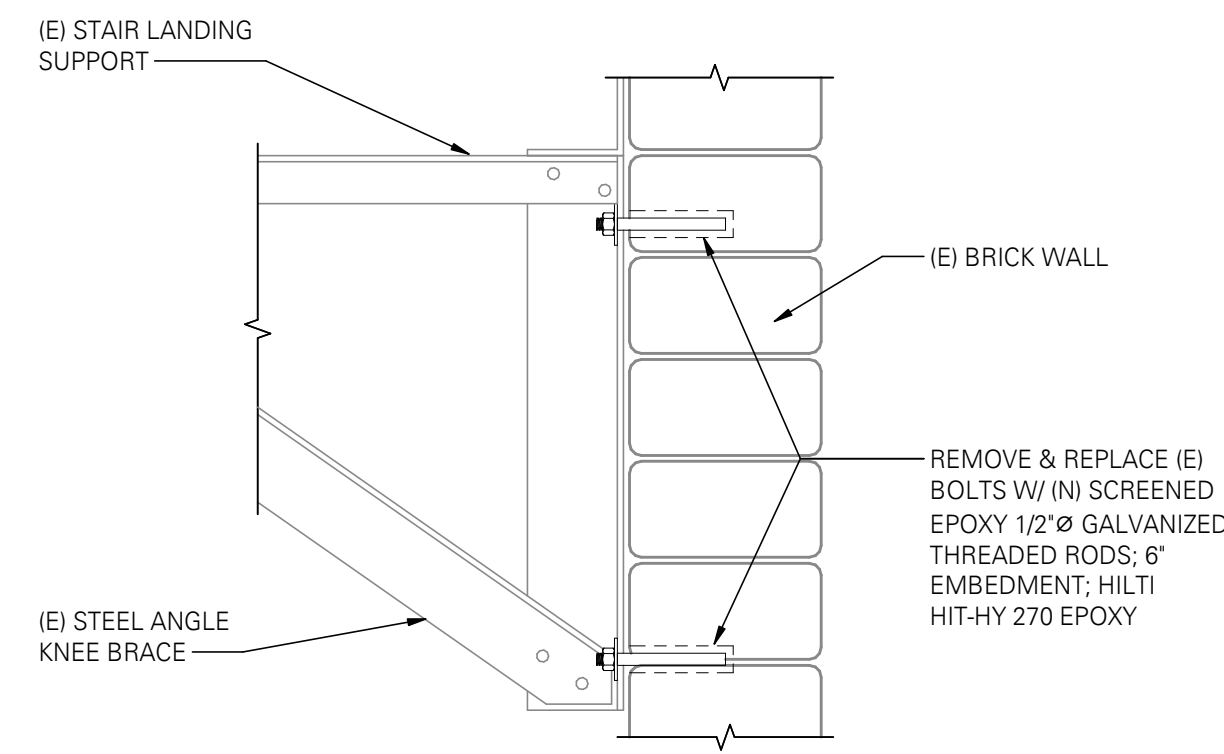
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S2.0

DATE
09-02-2022



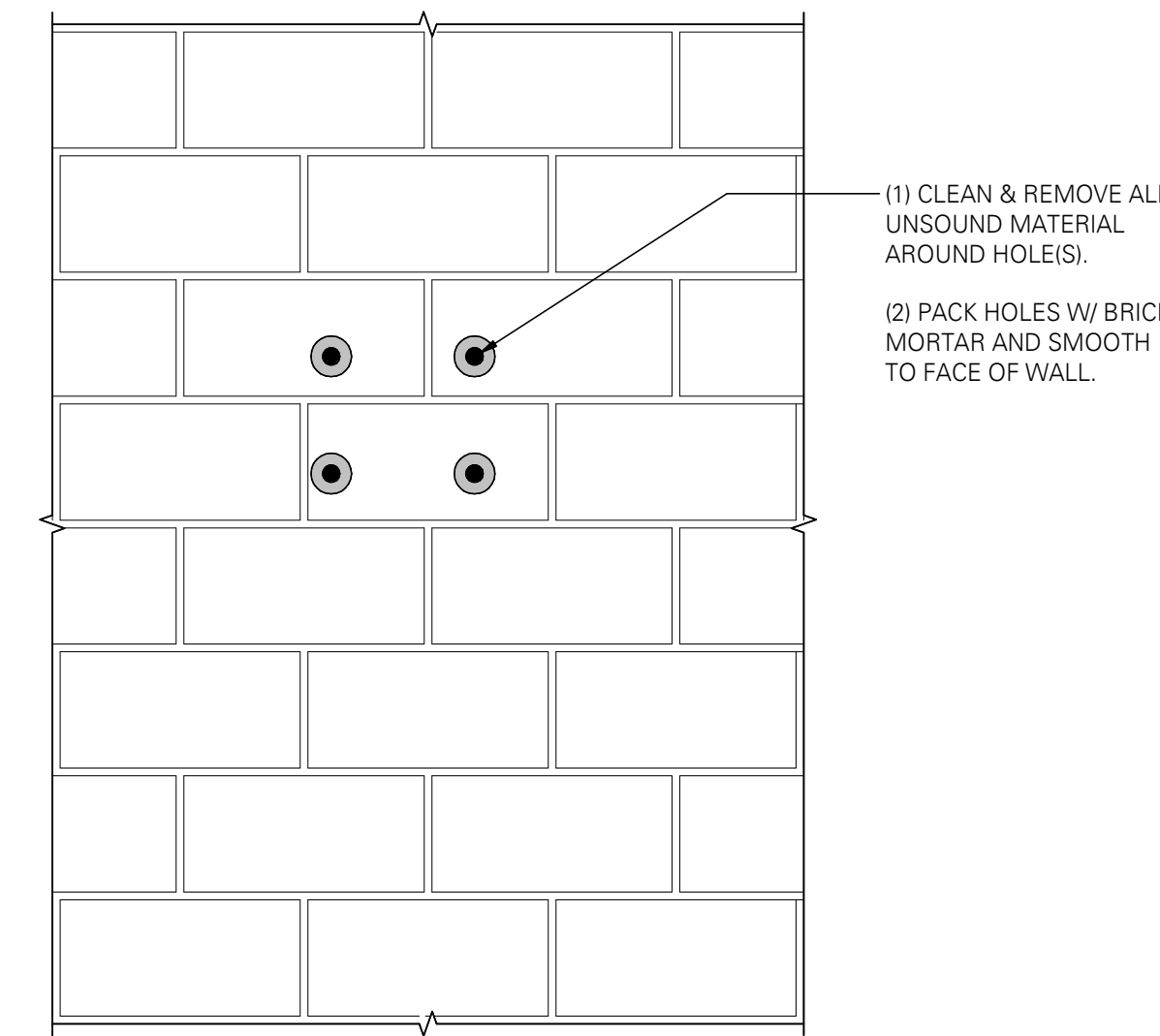
NOTE:
IF EXISTING BOLT HOLES ARE INTO UNSOUND MATERIAL, PATCH HOLES PER 3/52.1 AND DRILL NEW HOLES IN NEXT SOUND BRICK.

1 HANDRAIL CONNECTION
SCALE: 1 1/2" = 1'-0"

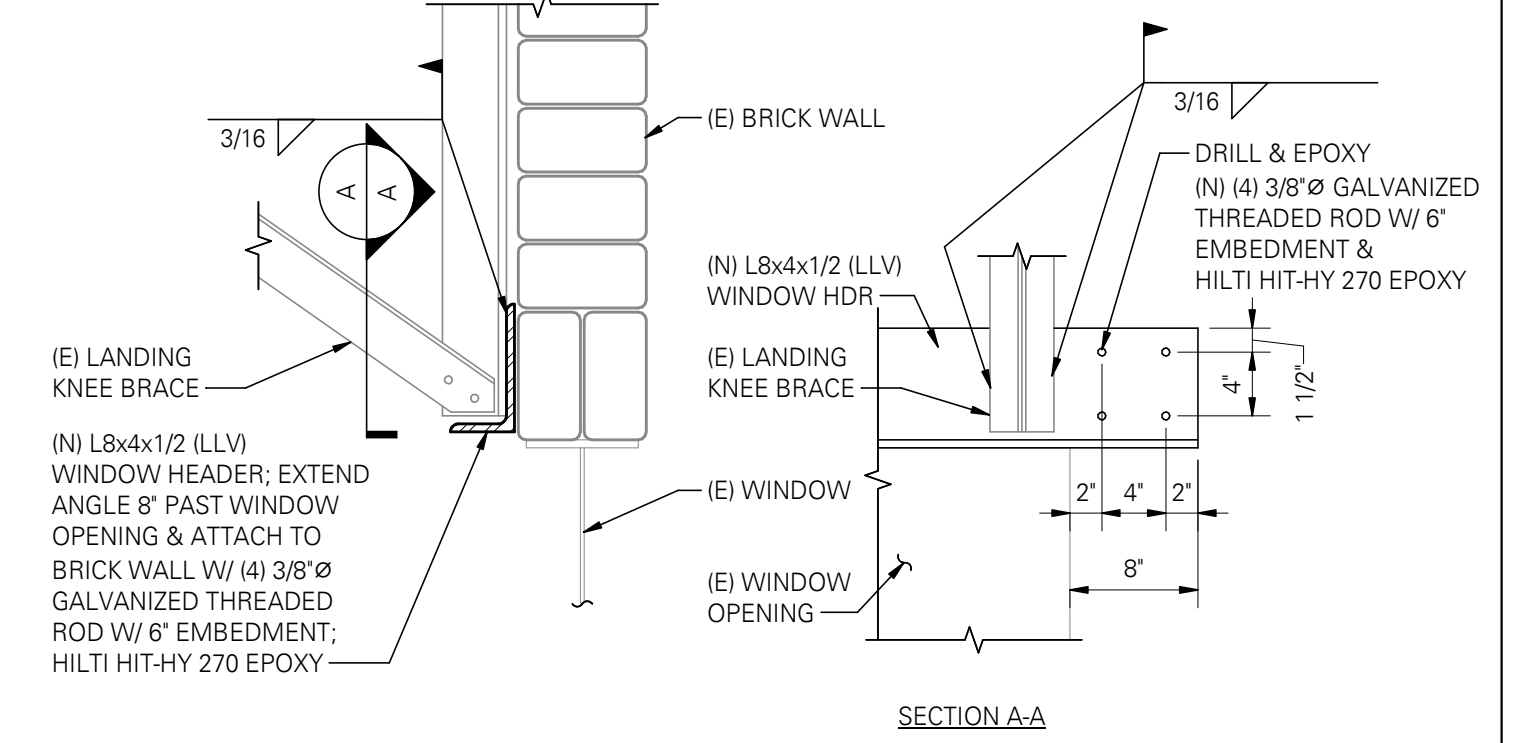


NOTE:
IF EXISTING BOLT HOLES ARE INTO UNSOUND MATERIAL, PATCH HOLES PER 3/52.1 AND DRILL NEW HOLES IN NEXT SOUND BRICK.

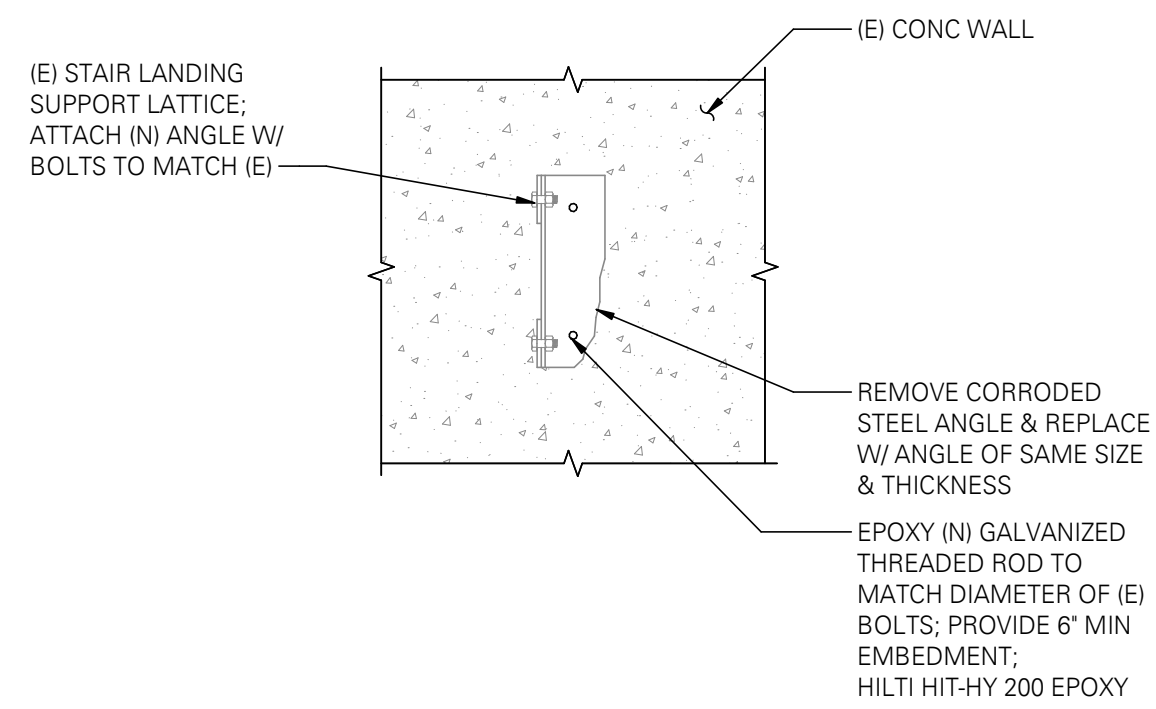
2 STAIR LANDING KNEE BRACE CONNECTION
SCALE: 1 1/2" = 1'-0"



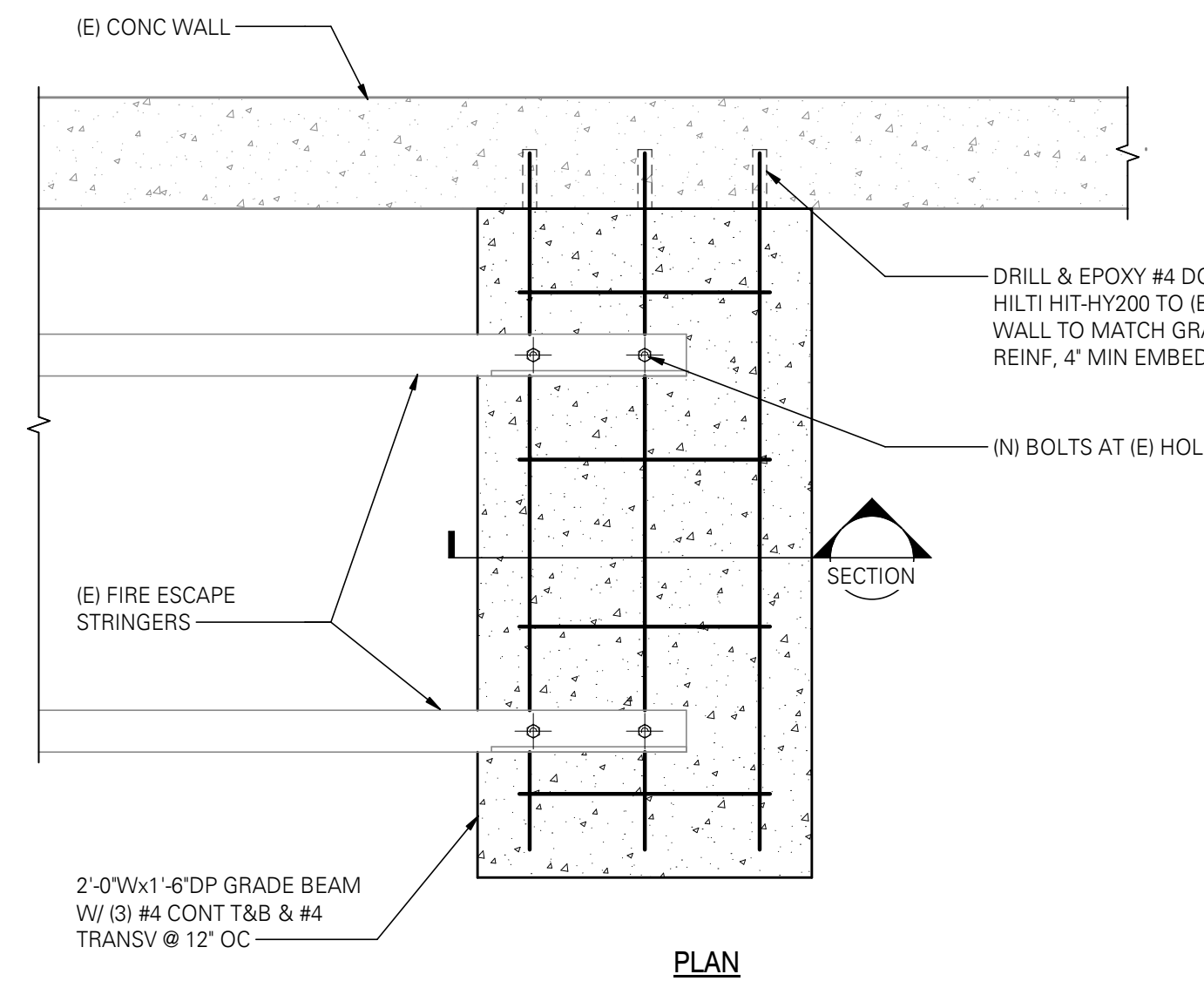
3 EXISTING BRICK HOLE REPAIR
SCALE: 1" = 1'-0"



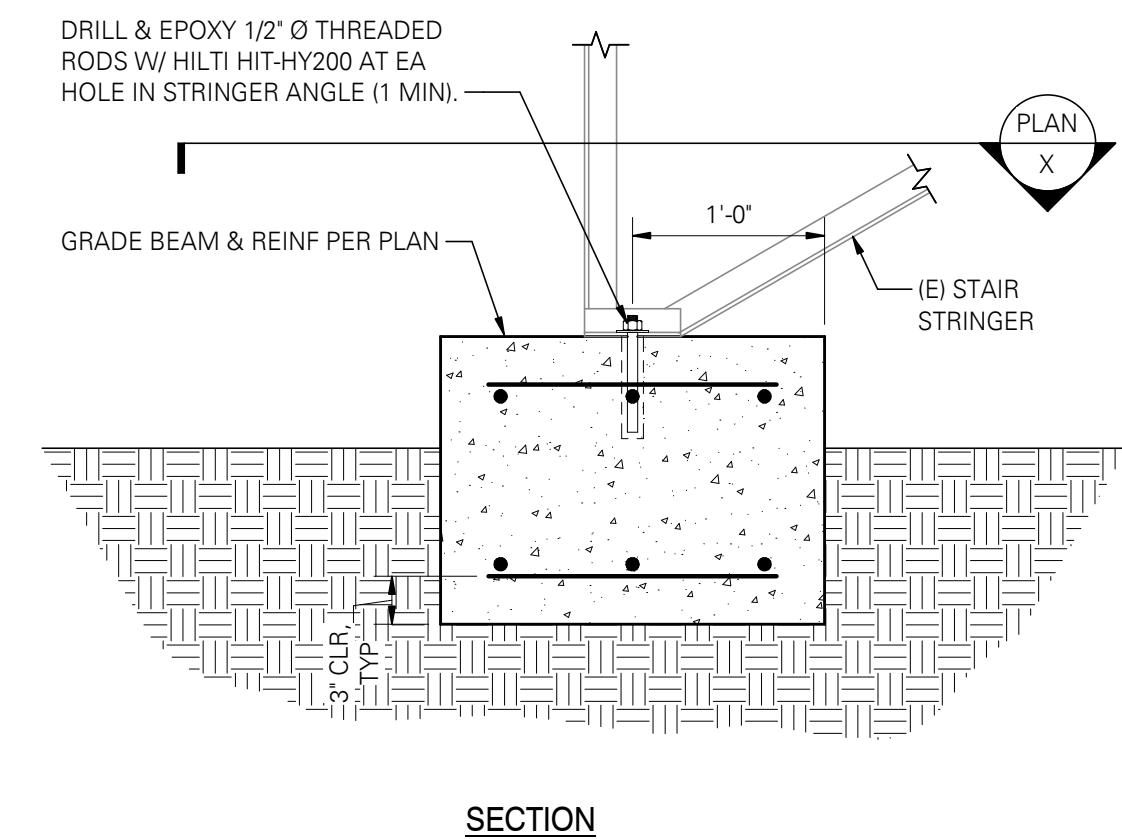
4 WINDOW HDR REPAIR
SCALE: 1" = 1'-0"



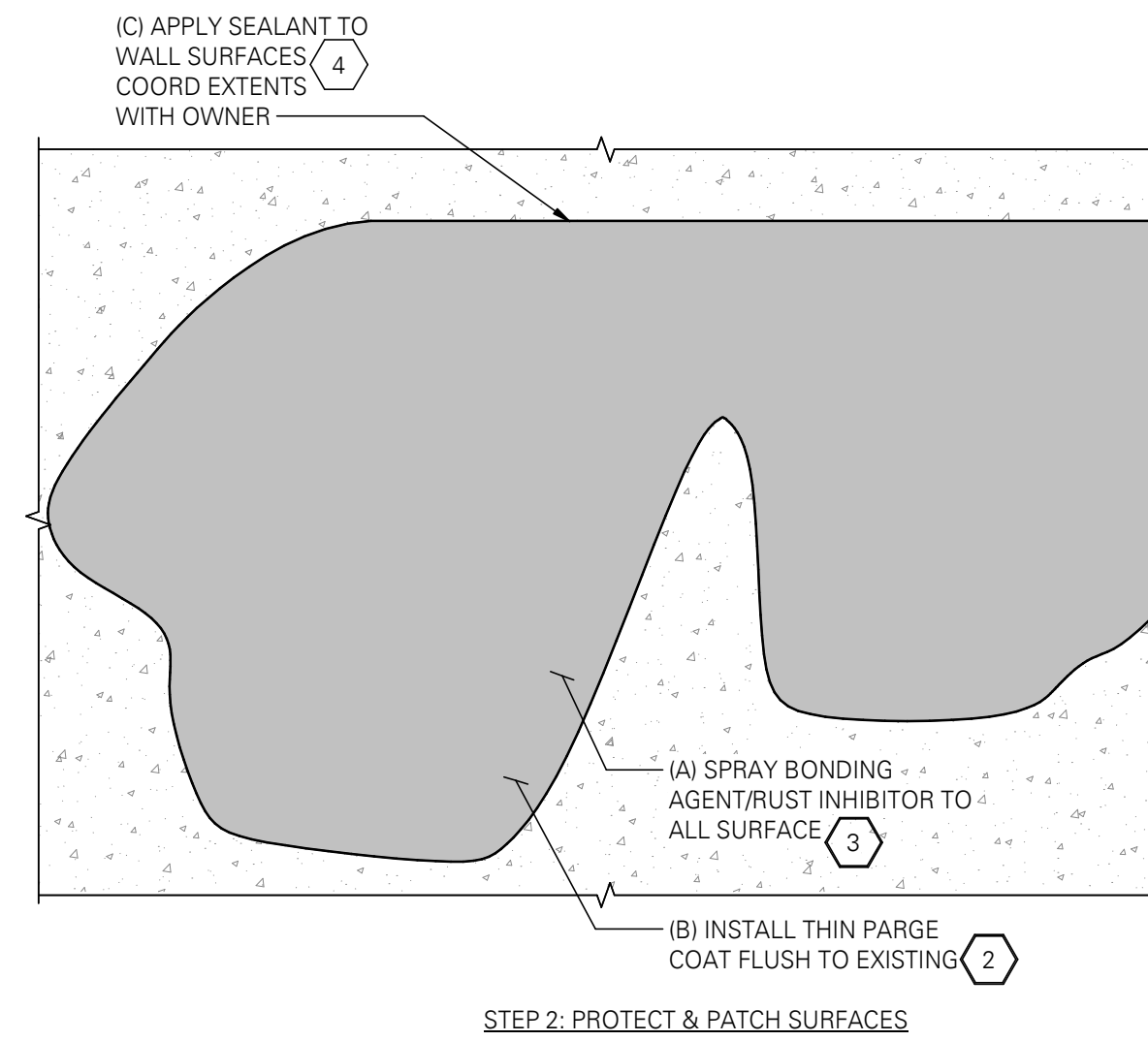
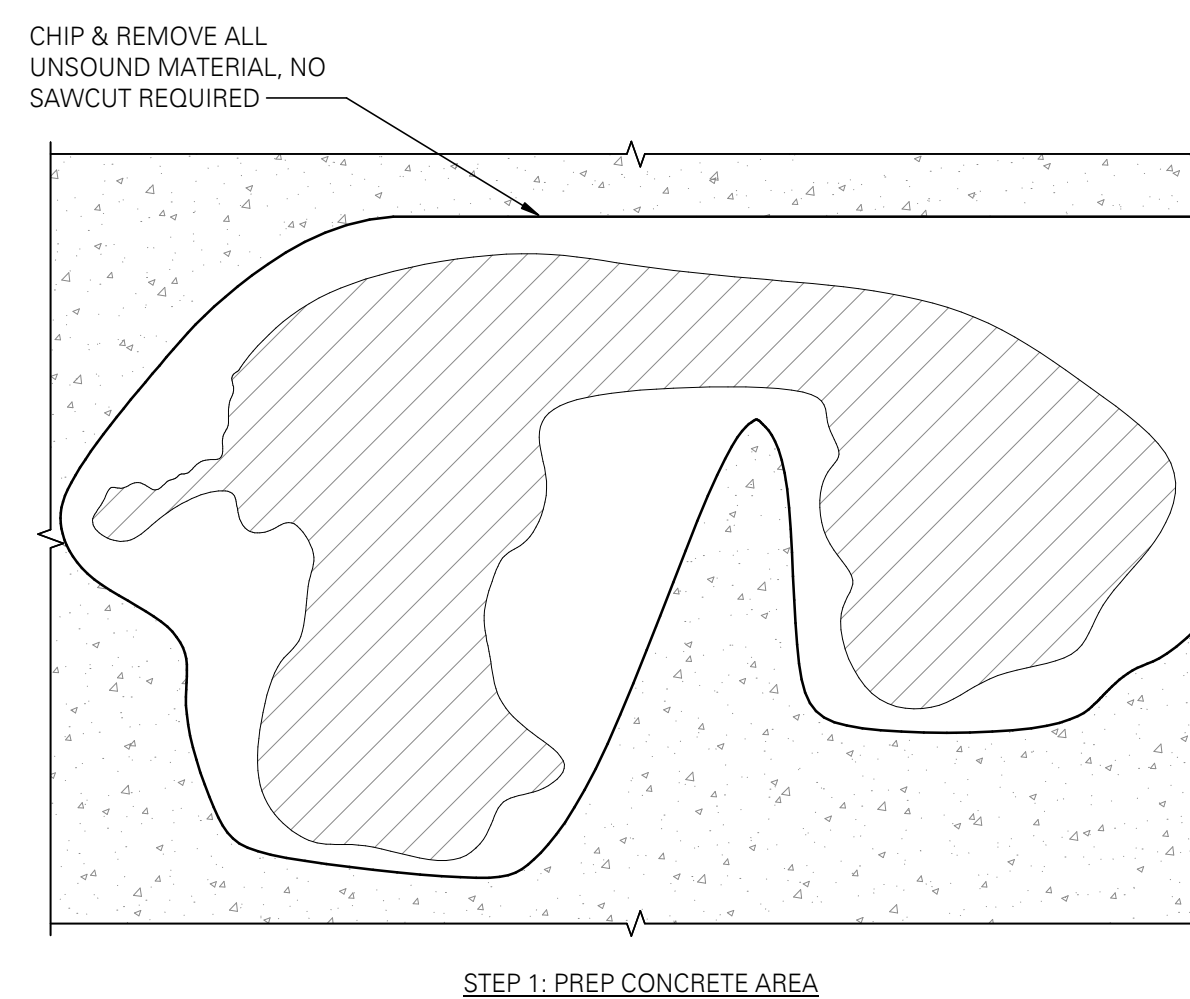
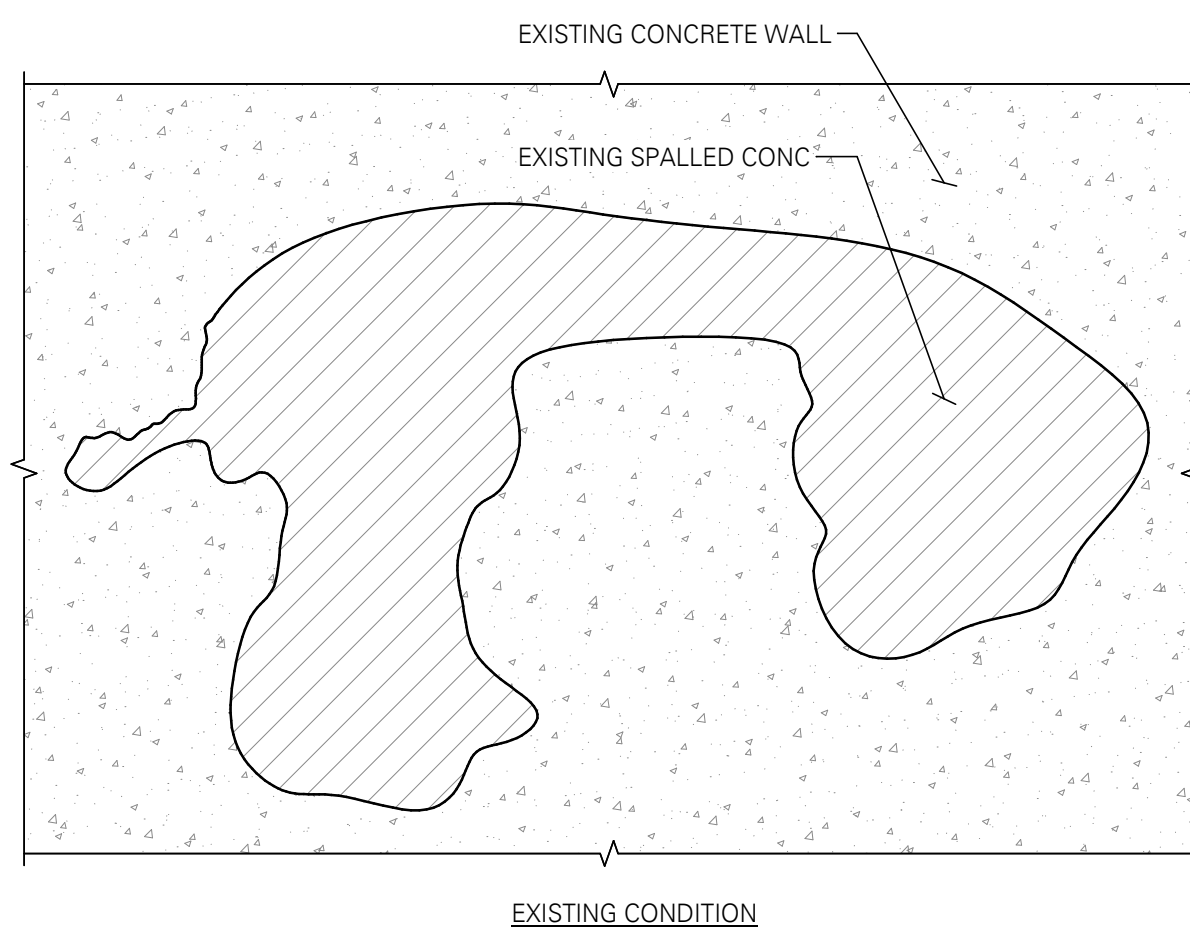
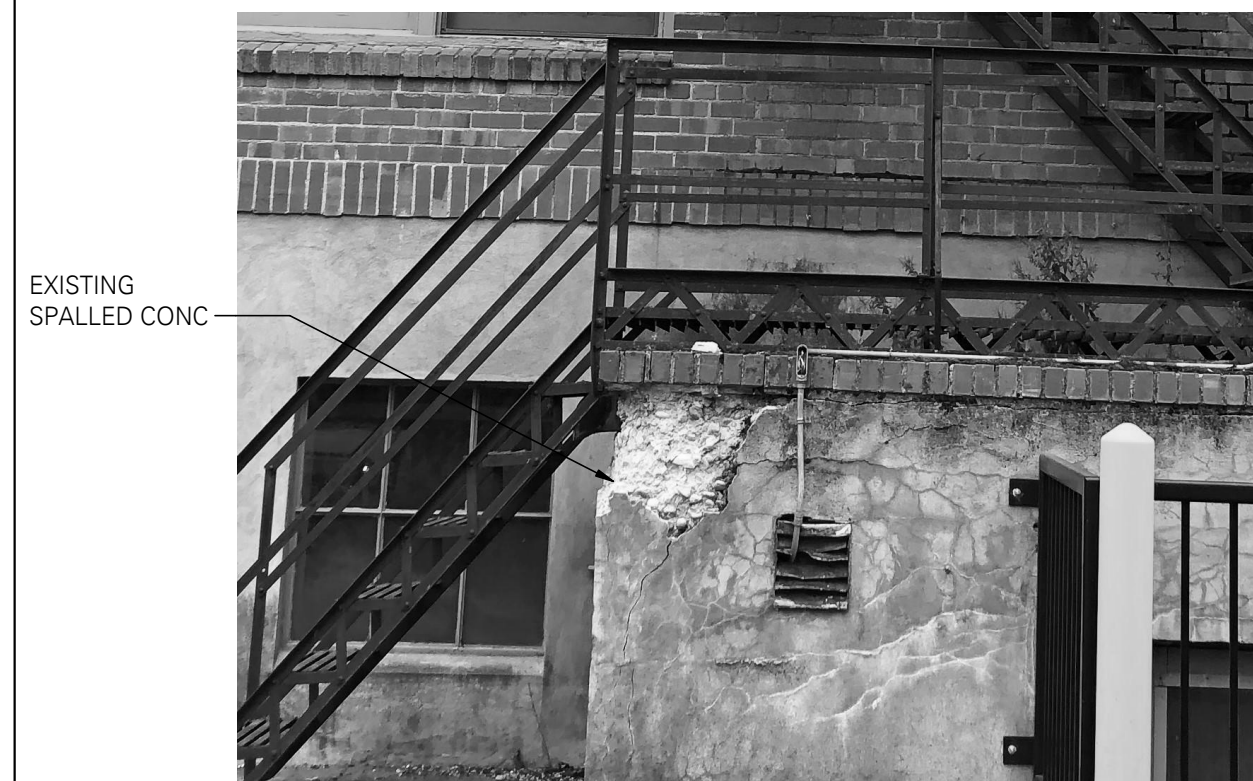
5 CORRODED STEEL REPLACEMENT
SCALE: 1" = 1'-0"



7 CONCRETE GRADE BEAM FOUNDATION
SCALE: 1" = 1'-0"



NOTE:
1. LOCATE ALL UTILITIES PRIOR TO EXCAVATION. COORDINATE W/ OWNER.
2. PROTECT EXISTING STRINGERS TO REMAIN DURING EXCAVATION AND CONCRETE POUR.



- PRODUCT GUIDE:**
- 1 EUCOPATCH - FAST-SETTING PATCHING AND REPAIR MATERIAL
 - 2 EUCOCRETE - FLOWABLE MEDIUM DEPTH PATCH MATERIAL
 - 3 DURAL PREP AC - BONDING AGENT & ANTI-CORROSION COATING
 - 4 TAMOSEAL - FINISH COAT TO BE APPLIED TO EXTERIOR CONCRETE SURFACES

NOTE:
ALL PRODUCTS NOTED ARE MANUFACTURED BY THE EUCLID CHEMICAL COMPANY. CONTRACTOR TO SUBMIT DATA SHEETS FOR ANY ALTERNATE PRODUCT OR MANUFACTURER. WRITTEN APPROVAL REQUIRED PRIOR TO BIDDING FOR ANY SUBSTITUTION

9 SPALLING CONCRETE REPAIR
SCALE: 3/4" = 1'-0"