# JULIA MARTIN WEST STAIR STRUCTURAL REPAIR & REMEDIATION PPA#22-0656 MONTANA STATE UNIVERSITY, BOZEMAN, MONTANA

# PROJECT ADDRESS:

JULIA MARTIN WEST JULIA MARTIN DRIVE BOZEMAN, MT 59717

# PROJECT DESCRIPTION

REMOVE AND REPLACE EXISTING PRE-CAST CONCRETE STAIRS WITH NEW STEEL STAIRS AS SHOWN. 3 STAIRS PER BUILDING. TOTAL OF 16 'END' STAIRS AND 8 'MIDDLE' STAIRS.

# **OWNER**

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# STRUCTURAL

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# JULIA MARTIN STAIR - STRUCTURAL REPAIR & REMEDIATION

### STRUCTURAL DRAWINGS

0.1 STRUCTURAL - GENERAL NOTES

S1.1 STRUCTURAL - FOUNDATION & FRAMING PLANS - MIDDLE STAIR
S2.0 STRUCTURAL - FOUNDATION & FRAMING PLANS - END STAIR

2.1 STRUCTURAL - DETAILS

STRUCTURAL - DETAILS

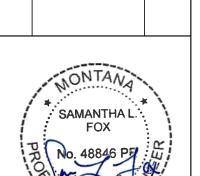
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PLANNING, DESIGN
& CONSTRUCTION
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
BOZEMAN, MONTANA

DRAWN BY : CAD
REVIEWED BY: MH
REV. DESCRIPTION DATE



PPA#22-0656

SHEET TITLE
COVER SHEET

SHEET

COVER

12-1-2023

#### **ABBREVIATIONS**

L	Angle	EXT	Exterior	PSF	Pounds per Square
AB	Anchor Bolt	FD	Floor Drain		Foot
ADDL	Additional	FDN	Foundation	PSI	Pounds Per Square
ADH	Adhesive	FIN	Finish		Inch
ALT	Alternate	FLR	Floor	PSL	Parallel Strand
ARCH	Architectural	FRP	Fiberglass Reinforced Plastic	102	Lumber
B or BOT	Bottom	FRT	Fire Retardant Treated	P-T	Post-Tensioned
B/	Bottom Of	FTG	Footing	PT	Pressure Treated
BLDG	Building	F/	Face of	R	Radius
BLKG	Blocking	GA	Gage	RD	Roof Drain
BMU	Brick Masonry Unit	GALV	Galvanized	REF	Refer/Reference
BP BIVIO		GEOTECH	Geotechnical	REINF	
BRBF	Baseplate	GLOTECH			Reinforcing
DNDF	Buckling Restrained Braced Frame	GWB	Glue Laminated Timber	REQD RET	Required
BRG		HDR	Gypsum Wall Board Header	SCBF	Retaining
	Bearing	HF		SCDF	Special Concentric
BTWN	Between		Hem-Fir	COLLED	Braced Frame
C	Camber	HGR	Hanger	SCHED	Schedule
CL	Centerline	HD	Hold-down	SFRS	Seismic Force-
CLT	Cross-Laminated	HORIZ	Horizontal	OUTUO	Resisting System
OD	Timber	HP	High Point	SHTHG	Sheathing
СВ	Castellated Beam	HSS = TS	(Hollow Structural Section)	SIM	Similar
CIP	Cast in Place	IBC	International Building	SMF	Special Moment
CJ	Construction or		Code		Frame
0.15	Control Joint	ID	Inside Diameter	SOG	Slab on Grade
CJP	Complete Joint	IE	Invert Elevation	SP	Southern Pine
	Penetration	IF	Inside Face	SPEC	Specification
CLR	Clear	INT	Interior	SQ	Square
CLG	Ceiling	k	Kips	SR	Studrail
CMU	Concrete Masonry	KSF	Kips Per Square Foot	SF	Square Foot
	Unit	LF	Lineal Foot	SST	Stainless Steel
COL	Column	LL	Live Load	STAGG	Stagger/Staggered
CONC	Concrete	LLH	Long Leg Horizontal	STD	Standard
CONN	Connection	LLV	Long Leg Vertical	STIFF	Stiffener
CONST	Construction	LP	Low Point	STL	Steel
CONT	Continuous	LONGIT	Longitudinal	STRUCT	Structural
C'SINK	Countersink	LSL	Laminated Strand Lumber	SWWJ	Solid Web Wood
CTRD	Centered	LVL	Laminated Veneer Lumber		Joist
DIA	Diameter	MAS	Masonry	SYM	Symmetrical
DB	Drop Beam	MAX	Maximum	T	Тор
DBA	Deformed Bar Anchor	MECH	Mechanical	T/	Top Of
DBL	Double	MEZZ	Mezzanine	T&B	Top & Bottom
DEMO	Demolish	MFR	Manufacturer	TC AX LD	Top Chord Axial Load
DEV	Development	MIN	Minimum	TCX	Top Chord Extension
DF	Douglas Fir	MISC	Miscellaneous	TDS	Tie Down System
DIAG	Diagonal	NIC	Not In Contract	T&G	Tongue & Groove
DIST	Distributed	NLT	Nail-Laminated	THKND	Thickened
DL	Dead Load		Timber	THRD	Threaded
DN	Down	NTS	Not To Scale	THRU	Through
DO	Ditto	OC	On Center	TRANSV	Transverse
DP	Depth/Deep	OCBF	Ordinary Concentric Braced	TYP	Typical
DWG	Drawing		Frame	UBC	Uniform Building
(E)	Existing	OD	Outside Diameter		Code
EA	Each	OF	Outside Face	UNO	Unless Noted
EF	Each Face	OPNG	Opening		Otherwise
EL	Elevation	OPP	Opposite	URM	Unreinforced
ELEC	Electrical	OWSJ	Open Web Steel Joist		Masonry Unit
ELEV	Elevator	OWWJ	Open Web Wood Joist	VERT	Vertical
EMBED	Embedment	PL	Plate	W	Wide
EQ	Equal	PAF	Powder Actuated Fastener	W/	With
EQUIP	Equipment	PC	Precast	W/O	Without
EW	Each Way	PERP	Perpendicular	WHS	Welded Headed Stud
EXP	Expansion	PLWD	Plywood	WP	Working Point
EXP JT	Expansion Joint	PP	Partial Penetration	WWF	Welded Wire Fabric
I	•	DDEEAD	Profebricated		Plus or Minus

STRUCTURAL SHEET LIST		
SHEET NUMBER	SHEET TITLE	
COVER	COVER SHEET	
S0.1	GENERAL NOTES	
S0.2	GENERAL NOTES	
S1.1	FOUNDATION & FRAMING PLANS - MIDDLE STAIR	
S1.2	FOUNDATION & FRAMING PLANS - LEFT STAIR	
S2.1	DETAILS	
S2.2	DETAILS	

Plus or Minus

PREFAB Prefabricated

DEMO

SD1.1

#### **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, and the "International Existing Building Code (IEBC)", 2021 Edition, here after referred to as the IEBC, as adopted and modified by the City of Bozeman, MT, 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.

**<u>DEFINITIONS</u>**: The following definitions cover the meanings of certain terms used in these notes:

- (1) "Architect/Engineer" The Architect of Record and the Structural Engineer of Record.
- (2) "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 Sys-
- (3) "Submit for review" Submit to the Architect/SER for review prior to fabrication or construction.
- (4) "Per Plan" Indicates references to the structural plans, elevations and structural general notes.

SPECIFICATIONS: Refer to the project specifications issued as part of the contract documents for information supplemental to these drawings.

OTHER DRAWINGS: Refer to the architectural, mechanical, electrical, civil and plumbing drawings for additional information including but not limited to dimensions, elevations, slopes, door and window openings, non-bearing walls, stairs, finishes, drains, waterproofing, railings, mechanical unit locations, and other nonstructural items.

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 SER. Do not deviate from the contract documents without written direction from the architect and/or SER. All existing dimensions and information shall be field verified prior to fabrication as required to coordinate with new construction.

**NEW CONSTRUCTION:** The contractor shall remove all interfering items for new construction and shall repair or replace all removed items to match the existing conditions in accordance with the architectural drawings. New construction elements shall be designed and installed per current International Building Code 2021, hereafter referred to as IBC as allowed by IEBC.

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 their 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 adjust-

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

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.

ADDITIONS/ALTERATIONS/REPAIRS: Additions, alterations, and/or repairs to the existing structure has been analyzed for additional loading and/or modification due to the addition, the alteration or the repair. All affected existing member have been analyzed or reinforced as required per IEBC.

All Demolition or removal of architectural, mechanical or structural elements shall not damage structural items to

#### **DESIGN CRITERIA AND LOADS**

Snow Drift Loading required by Authority Having Jurisdiction?		Yes
Snow Load Importance Factor	I <sub>s</sub> =	1.0 (3)
Ground Snow Load, (PSF)	p <sub>g</sub> =	46 <sup>(2)</sup>

Risk Category of Building per 2021 IBC Table 1604.5 =

Snow Exposure Factor

Thermal Factor

- (1) Snow Load is un-reducible and includes 5 psf rain-on-snow surcharge where ground snow load is greater than zero and 20 psf or less per ASCE 7-16 Section 7.10.
- (2) Snow Load based on City of Bozeman Design Criteria. (3) Snow Load Importance Factor per ASCE 7-16 Table 1.5-2.

DESIGN LIVE LOADS	<u>AREA</u>	LIVE LOADS (PSF) UNO	REMARKS & FOOT- NOTES (3)
	Handrails & Pedestrian Guardrails	50 PLF or 200 LB	(1)
	Stairs & Exits	100 PSF or 300 LB	Stair treads per note (2)
	Balconies & Decks		1.5 times the live load for area served. Not req'd to exceed 100 psf.

- (1) 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. (2) Stair loading requirements:
  - a. Treads: Stair treads shall be designed for 100 PSF live load or a 300 lb. concentrated load placed to produce maximum stress, whichever controls. The 300 lb concentrated load shall be placed 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.
  - b. Stringers and Landings: Stringers and landings shall be designed for 100 PSF live load. Live load deflection shall not exceed 1/360 of the span.
  - c. Railings: The completed handrail, guardrail, and supporting structure and their connections shall be designed to resist loads as specified in IBC Section 1607.8.
- (3) 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.

#### SUBMITTALS |

SUBMIT FOR REVIEW: SUBMITTALS of shop drawings, and product data are required for items noted in the individual materials sections and for bidder designed elements.

SUBMITTAL REVIEW PERIOD: Submittals shall be made in time to provide a minimum of TWO WEEKS or 10 WORKING DAYS for review by the Architect/Engineer prior to the onset of fabrication.

GENERAL CONTRACTOR'S PRIOR REVIEW: Prior to submission to the Architect/Engineer, the Contractor shall review the submittal for completeness. Dimensions and quantities are not reviewed by the SER, and therefore, must be verified by the General Contractor. Contractor shall provide any necessary dimensional details requested by the Detailer and provide the Contractor's review stamp and signature before forwarding to the Architect/ Engineer.

SHOP DRAWING REVIEW: Once the contractor has completed their review, the SER will review the submittal for general conformance with the design concept and the contract documents of the building and will stamp the submittal accordingly. Markings or comments shall not be construed as relieving the contractor from compliance with the project plans and specifications, nor departures there from. The SER will return submittals in the form they are submitted in (either hard copy or electronic). For hard copy submittals, the contractor is responsible for submitting the required number of copies to the SER for review.

SHOP DRAWING DEVIATIONS: When shop drawings (component design drawings) differ from or add to the requirements of the structural drawings they shall be designed and stamped by the responsible SSE.

#### CAST-IN-PLACE CONCRETE

REFERENCE STANDARDS: Conform to:

- (1) ACI 301-20 "Specifications for Structural Concrete" (2) IBC Chapter 19 "Concrete"
- (3) ACI 318-19 "Building Code Requirements for Structural Concrete" (4) ACI 117-10 "Specifications for Tolerances for Concrete Construction and Materials"

cations for Structural Concrete (ACI 301) with Selected ACI and ASTM References."

FIELD REFERENCE: The contractor shall keep a copy of ACI Field Reference manual, SP-15, "Standard Specifi-

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:

(1) 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

# 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 Con- tent	Notes (1 to 9 Typical UNO)
Footings	4000	28	1"	-	0.55	-	-
Exterior Slabs on Grade & Sidewalks	4500	28	1"	F2	0.45	6%	-

#### Table of Mix Design Requirements Notes:

(1) 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. W/C ratios may be exceeded with approval of SER as long as potential shrinkage impacts are accounted for.

#### (2) Cementitious Materials:

II

C<sub>e</sub>= B

C,= 1.2

- DCI encourages the reduction of cement content and/or the use of alternate cementitious materials. Where requirements of this section prohibit inclusion of any of these mixes, contact DCI for further co-
- 26.4.1.1.1(a). c. For concrete used in elevated floors, minimum cementitious-materials content shall conform to ACI

b. Cementitious materials shall conform to the relevant ASTM standards listed in ACI 318 Section

- 301 Table 4.2.1.1.(b) Acceptance of lower cement content is contingent on providing supporting data to the SER for review and acceptance.
- 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. Supplemental cementitious material (SCM) quantities shall meet requirements outlined in the table below. Approaching maximum cement replacement limits may affect concrete setting time and strength gain. Contractor and supplier shall coordinate on mix designs with regard to schedule, workability, shrinkage and finishability requirements. Where SCM quantities do not meet the following requirements, submit for SER approval. Concerns by the construction team with the mix design provided herein shall be brought to the SER's attention in the mix design submittal prior to pouring concrete.
- (3) General contractor shall coordinate means and methods necessary to support extended test ages including, but not limited to, delayed strength gain, shoring sequencing, modulus of elasticity requirements, deflection, and appearance.
- (4) 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 ±1-1/2%. Air content shall be measured at point of placement.
- Aggregates shall conform to ASTM C33.
- (6) Slump: Conform to ACI 301 Section 4.2.2.1. Slump shall be determined at point of placement.
- (7) Chloride Content: Conform to ACI 318 Table 19.3.2.1.

- (8) Non- chloride accelerator: Non-chloride accelerating admixture may be used in concrete placed at ambient temperatures below 50°F at the contractor's option.
- (9) 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 require-
- (10)Recycled carbon dioxide (CO2) is permissible to be injected into the mix as an ingredient during mixing, such that CO2 is chemically mineralized into concrete. Carbon dioxide injected into the mix must be post-industrial

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 2.3.2.4 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-20 and cold weather concreting shall conform to ACI 306R-16.

CONCRETE SEALER: Polyurethane Traffic Coating Fluis-applied coating with slip-reducing aggregate surface be applied to the top surface of new and existing elevated slabs. Basis of Design:

- a. Tremco Commercial Sealants and Waterproofing; 360NF/951NF/951/NF.
- Other acceptable Manufactureres:
- a. Neogard Division of Jones-Blair Company; Auto-Gard FC: www.neogard.com/#sle b. Polycoat USA; Polydeck 180

CONSTRUCTION JOINTS: Conform to ACI 301 Sections. 2.2.2.5 and 5.3.2.6. Construction joints shall be located and detailed as on the construction drawings. Submit alternate locations per ACI 301 Section 5.1.2.3(a) for review and approval by the SER two weeks minimum prior to forming. Use of an acceptable adhesive, surface retardant, portland cement grout or roughening the surface is not required unless specifically noted on the drawings.

EMBEDDED ITEMS: Position and secure in place expansion joint material, anchors and other structural and nonstructural 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.

SHRINKAGE: Conventional and post-tensioned concrete slabs will continue to shrink after initial placement and stressing of concrete. Contractor and subcontractor shall coordinate jointing and interior material finishes to provide adequate tolerance for expected structural frame shrinkage and shall include, but not be limited to curtain wall, dryvit, storefront, skylight, floor finish, and ceiling suppliers. Contact Engineer for expected range of shrink-

#### MODULUS OF ELASTICITY TESTING AND ACCEPTANCE:

Obtain samples and conduct tests of mix designed specified in accordance with ACI 318 Section 19.2.2, ACI 318 R19.2.2, ACI 301 Section 1.7.3.3, ASTM C42 and ASTM C469. Tests data shall be performed at the 28-day compressive test age. Provide a minimum of (2) tests for each mix design used in the following elements: Floor Slabs. Provide a minimum of (1) test for all other elements. The average of the tests shall equal or exceed the specified Modulus of Elasticity. If (2) or more tests are performed, no individual test shall fall below the specified Modulus of Elasticity by more than 20 percent. A "test" for acceptance is the average strength of two 6 by 12 in. cylinders or three 4 by 8 in. cylinders tested at the specified test age.

#### STRENGTH TESTING AND ACCEPTANCE

Testing: Obtain samples and conduct tests in accordance with ACI 301 Section 1.7.3.3. Additional samples may be required to obtain concrete strengths at alternate intervals than shown below and should be standard cured per ACI Section 26.5.3.2.

- (1) Cure 4 cylinders for 28-day test age. Test 1 cylinder at 7 days, test 2 cylinders at 28 days, and hold 1 cylinder in reserve for use as the Engineer directs. After 56 days, unless notified by the Engineer to the contrary, the reserve cylinder may be discarded without being tested for specimens meeting 28-day strength requirements
- (2) The number of cylinders indicated above reference 6 by 12 in cylinders. If 4 by 8 in cylinders are to be used, additional cylinders must be cured for testing of 3 cylinders at test age per the table of mix design requirements.
- Acceptance. Strength is satisfactory when:
- (1) The averages of all sets of 3 consecutive tests equal or exceed the specified strength.
- (2) No individual test falls below the specified strength by more than 500 psi.
- A "test" for acceptance is the average strength of two 6 by 12 in. cylinders or three 4 by 8 in. cylinders tested at the specified test age.
- <u>CONCRETE PLACEMENT TOLERANCE</u>: Conform to ACI 117-10 for concrete placement tolerance.

#### POST-INSTALLED ANCHORS (INTO CONCRETE AND MASONRY)

quirements. Anchor type, diameter and embedment shall be as indicated on drawings.

#### REFERENCE STANDARDS: Conform to:

- (1) IBC Chapter 19 "Concrete" (2) ACI 318-19 "Building Code Requirements for Structural Concrete"
- (3) IBC Chapter 21 "Masonry" (4) TMS 402-16 "Building Code Requirements for Masonry Structures"
- POST-INSTALLED ANCHORS: Install only where specifically shown in the details or allowed by SER. All post-Installed anchors types and locations shall be approved by the SER and shall have a current ICC-Evaluation Service Report that provides relevant design values necessary to validate the available strength exceeds the required strength. Submit current manufacturer's data and ICC ESR report to SER for approval regardless of whether or not it is a pre-approved anchor. Anchors shall be installed in strict accordance with ICC-ESR and the manufacturer's printed installation instructions (MPII) in conjunction with edge distance, spacing and embedment depth as indicated on the drawings. The contractor shall arrange for a manufacturer's field representative to provide installation training for all products to be used, prior to the commencement of work. Only trained installer shall perform post installed anchor installation. A record of training shall be kept on site and be made available to the SER as requested. Adhesive anchors installed in horizontally or upwardly inclined orientation shall be performed by a certi-

fied adhesive anchor installer (AAI) as certified through ACI/CRSI or approved equivalent. Proof of current certification shall be submitted to the engineer for approval prior to commencement of installation. No reinforcing bars

shall be damaged during installation of post-installed anchors. Special inspection shall be per manufacturers re-

- (1) ADHESIVE ANCHORS: The following Adhesive-type anchoring systems have been used in the design and shall be used for anchorage to CONCRETE as applicable and in accordance with corresponding current ICC ESR report. Reference the corresponding ICC ESR report for required minimum age of concrete, concrete temperature range, moisture condition, light weight concrete, and hole drilling and preparation requirements. Drilled-in anchor embedment lengths shall be as shown on drawings, or not less than 7 times the anchor nominal diameter (7D). Adhesive anchors are to be installed in concrete aged a minimum of 21 days, unless otherwise specified in the ICC ESR report.
  - a. SIMPSON "SET-3G" ICC ESR 4057 for anchorage to CONCRETE only
- (2) EXPANSION ANCHORS: The following Expansion type anchors are pre-approved for anchorage to CONCRETE or MASONRY in accordance with corresponding current ICC ESR report:
  - a. HILTI "KB TZ2" ICC ESR-4266 for anchorage to CONCRETE



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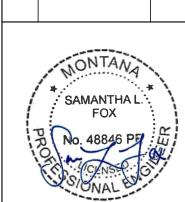
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DRAWN BY: CAD REVIEWED BY: MH REV. DESCRIPTION DATE

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PPA#22-0656 SHEET TITLE

GENERAL

SHEET

DATE 12-1-2023

#### STRUCTURAL STEEL

- (1) IBC Chapter 22 "Steel" (2) ANSI/AISC 303-16 – "Code of Standard Practice for Steel Buildings & Bridges"
- (3) AISC "Manual of Steel Construction", Fifteenth Edition (2016)
- (4) ANSI/AISC 360-16 "Specification for Structural Steel Buildings"
- (5) AWS D1.1:2015 "Structural Welding Code Steel"
- (6) 2014 RCSC "Specification for Structural Joints using High-Strength Bolts"
- <u>SUBMITTALS</u>: Submit the following documents to the SER for review:
- (1) SHOP DRAWINGS complying with AISC 360 Sections M1and N3 and AISC 303 Section 4. (2) ERECTION DRAWINGS complying AISC 360 Sections M1and N3 and AISC 303 Section 4.

Make copies of the following documents "Available upon Request" to the SER or Owner's Inspection Agency in electronic or printed form prior to fabrication per AISC 360 Section N3.2 requirements:

- (1) Fabricator's written Quality Control Manual that includes, as a minimum:
  - a. Material Control Procedures
  - Inspection Procedures Non-conformance Procedures
- (2) Steel & Anchor Rod suppliers' Material Test Reports (MTR's) indicating the compliance with specifications.
- (3) Fastener manufacturer's Certification documenting conformance with the specification. (4) Filler metal manufacturer's product data for SMAW, FCAW and GMAW indicating:
- a. Product specification compliance
- Recommended welding parameters
- c. Recommended storage and exposure requirements including baking d. Limitations of use
- (5) Welded Headed (Shear) Stud Anchors Manufacturer's certification indicating the meet specifications.
- (6) Weld Procedure Specifications (WPS's) for shop and field welding.
- (7) Manufacturer's Certificates of Conformance for electrodes, fluxes and gases (welding consumables).
- (8) <u>Procedure Qualification Records (PQR's)</u> for WPS's that are not prequalified in accordance with AWS. (9) Welding personnel Performance Qualification Records (WPQR) and continuity records conforming to AWS standards.

#### MATERIALS:

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

..ASTM A992 Fy = 50 ksi Wide Flange (W), Tee (WT) Shapes.. ...ASTM A36, Fy = 36 ksi Structural (S), (M) & (HP) Shapes.. ..ASTM A36, Fy = 36 ksi Channel (C) & Angle (L) Shapes.... ...ASTM A36. Fy = 36 ksi Structural Plate (PL)... High Strength Plate (Gr 50 PL) .... ...ASTM A572, Fy = 50 ksi Hollow Structural Section – Square/Rect (HSS)..ASTM A500, Grade C Fy = 50 ksi Structural Pipe, (PIPE) 12" dia. and less ......ASTM A53, Grade B Fy = 35 ksi

High Strength, Heavy Hex Structural Bolts .........ASTM F3125 Gr. A325/F1852, Type 1 or 3, Plain ..ASTM A563, Grade and Finish per RCSC Table 2.1 Heavy Hex Nuts ... Washers (Hardened Flat or Beveled).. .. ASTM F436, Grade and Finish per RCSC Table 2.1 Anchor Rods (Anchor Bolts, typical). ..ASTM F1554, Gr. 36

..ASTM F1554, Gr. 55 (weldable) per Supplement S1 Anchor Rods (High Strength).. Welded Headed Stud Anchors. ...ASTM A108 - Nelson/TRW S3L Welded Headed Stud Anchors. ...ASTM A108 - Nelson/TRW H4L

- (1) EMBEDDED STEEL PLATES for Anchorage to Concrete: Plates (PL) embedded in concrete with studs (WHS) or dowel bar anchors (DBA) shall be of the sizes and lengths as indicated on the plans with minimum 1/2" dia. WHS x 6" long but provide not less than 3/4" interior cover or 1 1/2" exterior cover to the opposite face of concrete, unless noted otherwise.
- (2) COLUMN ANCHOR RODS and BASE PLATES: All columns (vertical member assemblies weighing over 300 pounds) shall be provided with a minimum of four 3/4" diameter anchor rods. Column base plates shall be at least 3/4" 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).

- (1) Conform to AISC 360 Section M2 "Fabrication" and AISC 303 Section 6 "Shop Fabrication"
- (2) Quality Control (QC) shall conform to:
- a. AISC 360 Chapter N "Quality Control and Quality Assurance" and AISC 303 Section 8 "Quality Control".
- c. Fabricator and Erector shall establish and maintain written Quality Control (QC) procedures per AISC 360 section N3.
- d. 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.
- e. 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:

- (1) Welding shall conform to AWS D1.1 with Prequalified Welding Processes except as modified by AISC
- 360 section J2 .Welders shall be qualified in accordance with AWS D1.1 requirements. (2) Use 70ksi strength, low-hydrogen type electrodes (E7018) or E71T as appropriate for the process se-
- (3) Welding of high strength anchor rods is prohibited unless approved by Engineer. (4) Welding of headed stud anchors shall be in accordance with AWS D1.1 Chapter 7 "Stud Welding".

- (1) Conform to AISC 360 Section M4 "Erection" and AISC 303 Section 7 "Erection".
- (2) Conform to AISC 360 Chapter N "Quality Control and Quality Assurance" and AISC 303 Section 8. a. 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. (3) Steel work shall be carried up true and plumb within the limits defined in AISC 303 Section 7.13.
- (4) 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.
- (5) Welding of HEADED STUD ANCHORS shall be in accordance with AWS D1.1 Chapter 7 "Stud Welding. (6) Provide Headed (Shear) Stud Anchors welded through the metal deck to tops of beams denoted in plans.
- (7) 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:

- (1) SHOP PAINTING: Conform to AISC 360 Section M3 and AISC 303 Section 6.5 unless otherwise specified by the project specifications
- (2) EXTERIOR STEEL: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7oz/sq ft galvanized coating. Touch up abraded areas after installation using compatible touch-up primer for galvanized surfaces.
  - a. Galvanized Exterior Steel: Satin Gloss; two finish coats over primer
    - i. Prep: SSPC SP-1, or manufacturer-recommended where passivated substrate used.

#### ii. Use: Exterior

II. OSC. Exterior		
MFG	PRIMER	FINISH COATS
PPG		Two coats BRP 1501 Ure-thane

# **BAR GRATING**

#### **DESIGN STANDARDS**: Conform to:

- (1) ANSI/AISC 360-16 "Specification for Structural Steel Buildings"
- (2) OSHA and similar state agency safety requirements in the layout, details, and construction of all handrail, ladders, cages and elevated platforms.

MATERIALS: Provide steel per ASTM A569 or A36.

- (1) Unless noted otherwise, provide welded steel grating conforming to ASTM A1011-10 at elevated platforms and stair treads consisting of 1-1/4" x 1/8" bearing bars spaced at 1/2" on centers with cross members spaced at 4" on centers.
- (2) Maximum design grating span is 6'-3" for aforementioned bearing bar sizes with a maximum 1/4" deflection under 100 psf loading".
- (3) Grating shall be "8-W-4" type as manufactured by "Grating Pacific", and grating bars shall be as specified
- with "Algrip Surface." Any grating substitutions shall meet equivalent performance requirements. (4) Provide banding at edges, pipe penetrations, cutouts, and stair and ladder landings with bar matching bearing bar strength or toe-plates where required for protection. Weld banding at each end and at every
- fourth bar where bearing bars are interrupted by penetrations. (5) Cut-outs around equipment shall maintain an even clearance of 2" between the toe-plate and the surface of equipment (insulation where applicable). Cut-outs for pipes shall center at the pipe's center and shall have a diameter of the flange for the pipe's size and weight plus 2" to provide a clearance of 1" around the
- flange to accommodate the pipe's passage. (6) Layout and fabricate grating panels such that bearing bars of adjacent panels align. Junctions of bearing
- bars and crossbars shall be fully fused with no deduction in the bearing bar. (7) Stair treads shall have non-skid nosing and shall be bolted to stringers with A307 bolts.

- (1) Non-removable grating shall be welded to support members with 2" long x 3/16" fillet welds at every eighth bearing bar and every other cross member at each side of grating panel. Field welding may be used at Contractor's option.
- (2) Repair damaged finishes as required.



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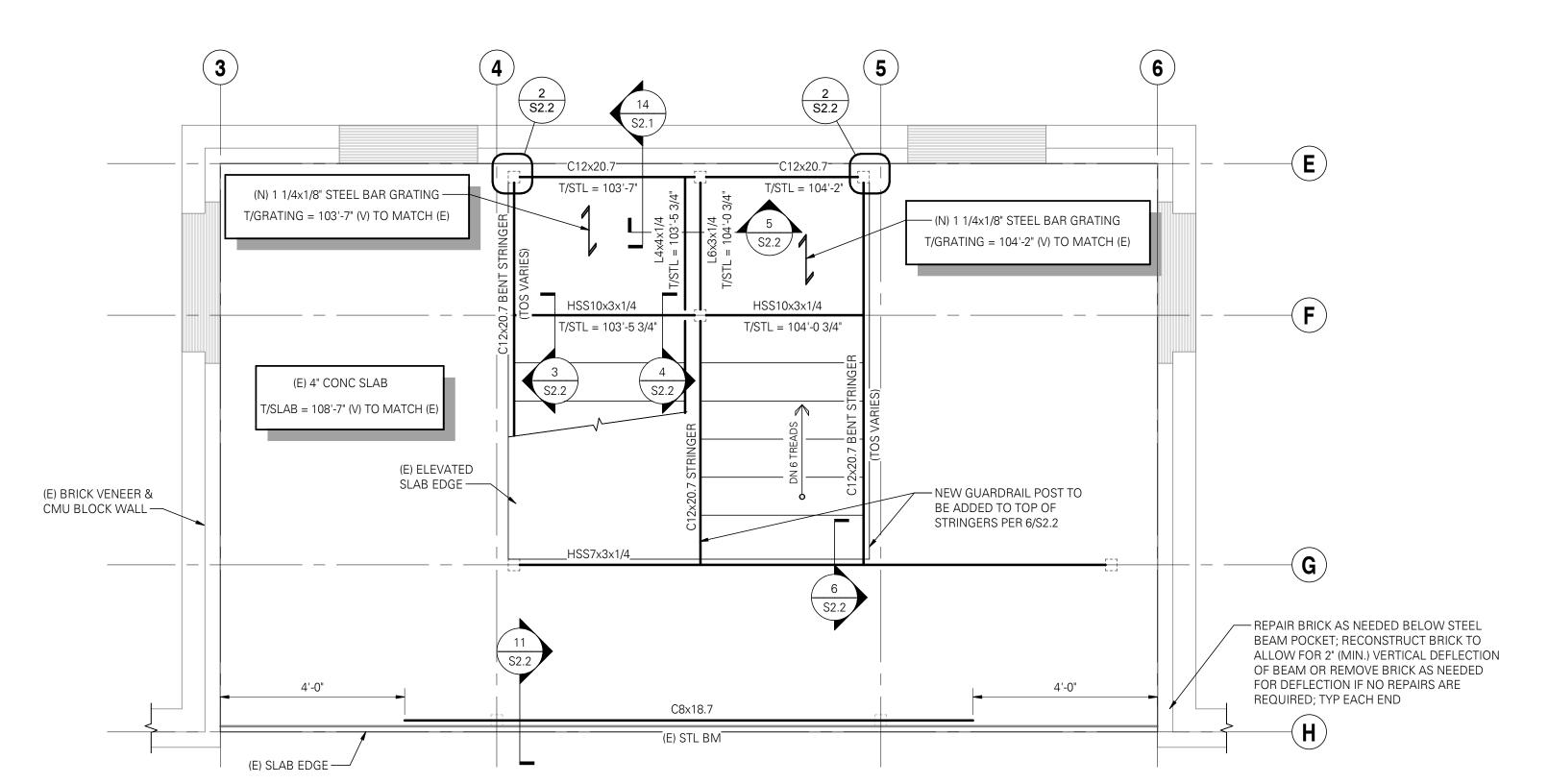
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2 LEVEL 2 AND INTERMEDIATE LANDING FRAMING PLAN - MIDDLE STAIR

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

#### PLAN NOTES:

1. STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS, AND LEGEND PER S0.1 AND S0.2.

2. ALL EXISTING DIMENSIONS SHALL BE FIELD VERIFIED BEFORE STAIR DEMOLITION. ALL DIMENSIONS ARE BASED ON FIELD MEASUREMENTS OF THE EXISTING STAIRS AND ARE FOR PRICING PURPOSES ONLY. CONTRACTOR SHALL FIELD VERIFY THAT THE DIMENSIONS MATCH EXISTING.

3. STEEL GRATING PER PLAN AND STRUCTURAL GENERAL NOTES. GRATING ATTACHMENT REQUIREMENTS PER STRUCTURAL GENERAL NOTES.

4. TOP OF STEEL ELEVATIONS ARE RELATIVE AND BASED ON THE FIELD MEASURED ELEVATIONS AT THE LANDINGS.

5. HANDRAILS AND GUARDRAILS NOT SHOWN ON PLAN FOR CLARITY. GUARDRAIL LOCATION AND EXTENTS TO MATCH EXISTING HANDRAILS PER 7 & 8/S2.2.

PLAN NOTES:	
(E)	EXISTING
(N)	NEW
(V)	VERIFY TO MATCH (E) DIMENSION IN FIELD
	PRECAST CONCRETE PLANK OR METAL GRATING SPAN DIRECTION
◆ T/SLAB	TOP OF CONCRETE ELEVATION
◆ T/FTG	TOP OF FOOTING ELEVATION
CXXXX XX'-XX"	TOP OF CHANNEL ELEVATION

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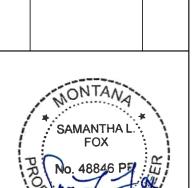
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SHEET TITLE
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FOUNDATION & FRAMING PLANS - MIDDLE STAIR

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**DATE** 12-1-2023

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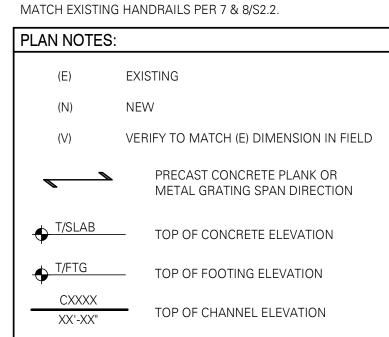
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 $(\mathbf{C})$ 

(E) HSS COLUMNS

CONTINUE TO ROOF —

(N) STEEL BAR GRATE

STAIR TREADS —

7'-10" (V)

(N) 1'-4"SQx10"DP -----CONC FTG, W/ (2)

#4 EA WAY,

SAWCUT &

AS REQ'D

COLUMNS

REMOVE (E) SLAB

T/FTG = 100'-0" TYP @ (N) HSS

> /— (N) STEEL BAR GRATE STAIR TREADS

> > T/FTG = 100'-0"

/-- (N) HSS3x3x1/4

(E) CONC WALL & FTG

- EDGE OF (E) BRICK

-(N) HSS1 1/2x1 1/2x3/16

CANE RAIL PER 9/S2.2

/─ (E) DOOR (V)

- (N) HSS3x3x1/4

PLAN VIEWS SHOW THE LEFT STAIR CONFIGURATION. EACH BUILDING'S RIGHT STAIR WILL BE CONSTRUCTED USING

THIS INFORMATION IN A MIRRORED CONFIGURATION

WALL ABOVE

TO REMAIN (V)

(N) HSS1 1/2x1 1/2x3/16 CANE RAIL PER 9/S2.2 —

← (E) HSS COL TO REMAIN,

— (E) FND WALL TO REMAIN

TYP 3 PLACES

/ T/FTG = 96'-0"

(ASSUMED)

(E) CONC FTG

TO REMAIN

\_\_\_\_\_T/PIER = XX'-XX" (V)

3,0,

3'-9"

 $^{\prime}$  (N) 2'-0"x12"DP CONT CONC FTG,

W/ #4 CONT & #4 @ 10"OC TRANSV W/ THICKENED EDGE @ (E) COL PER 17/S2.1, SAWCUT & REMOVE (E) SLAB AS REQ'D

(E) CONC SLAB ON GRADE

(N) 1'-4"SQx10"DP CONC FTG, W/ (2) #4 EA WAY,

7'-10"

SAWCUT & REMOVE (E) SLAB AS REQ'D —

4 1/2" (V)

(N) HSS1 1/2x1 1/2x3/16 CANE RAIL PER 9/S2.2 —

T/PIER (E) = 99'-0" (V) ----

T/FTG = 96'-0"

(E) HSS COL, PIER, -& FTG TO REMAIN

**FOUNDATION PLAN - LEFT STAIR** 

(ASSUMED)

LEVEL 2 AND INTERMEDIATE LANDING FRAMING PLAN - LEFT STAIR

- (E) BRICK VENEER & CMU BLOCK WALL

7'-10" 7'-2"

(N) 1 1/4x1/8" STEEL

**BAR GRATING** 

T/GRATING = 104'-2 1/4"

6'-10"

(N) C12x20.7

104' - 2 1/4"

C10x20

-(N) C15x33.9-

108' - 4 1/2"

5" PRECAST STAIR LANDING BY MFR

T/SLAB = 108'-4 1/2"

((V) TO MATCH (E))

=108' - 4 1/2"=

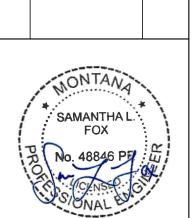
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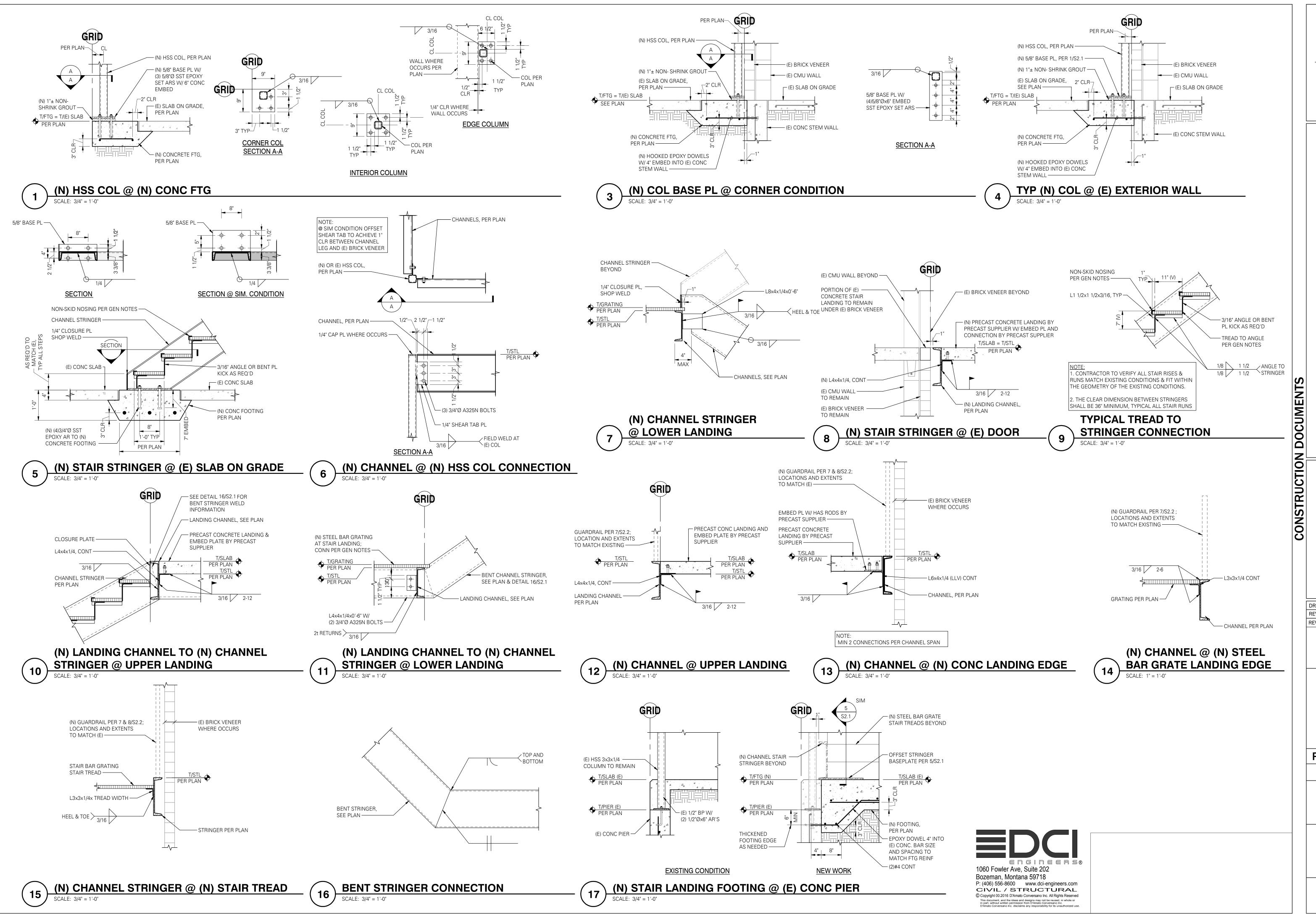
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FRAMING PLANS - LEFT STAIR

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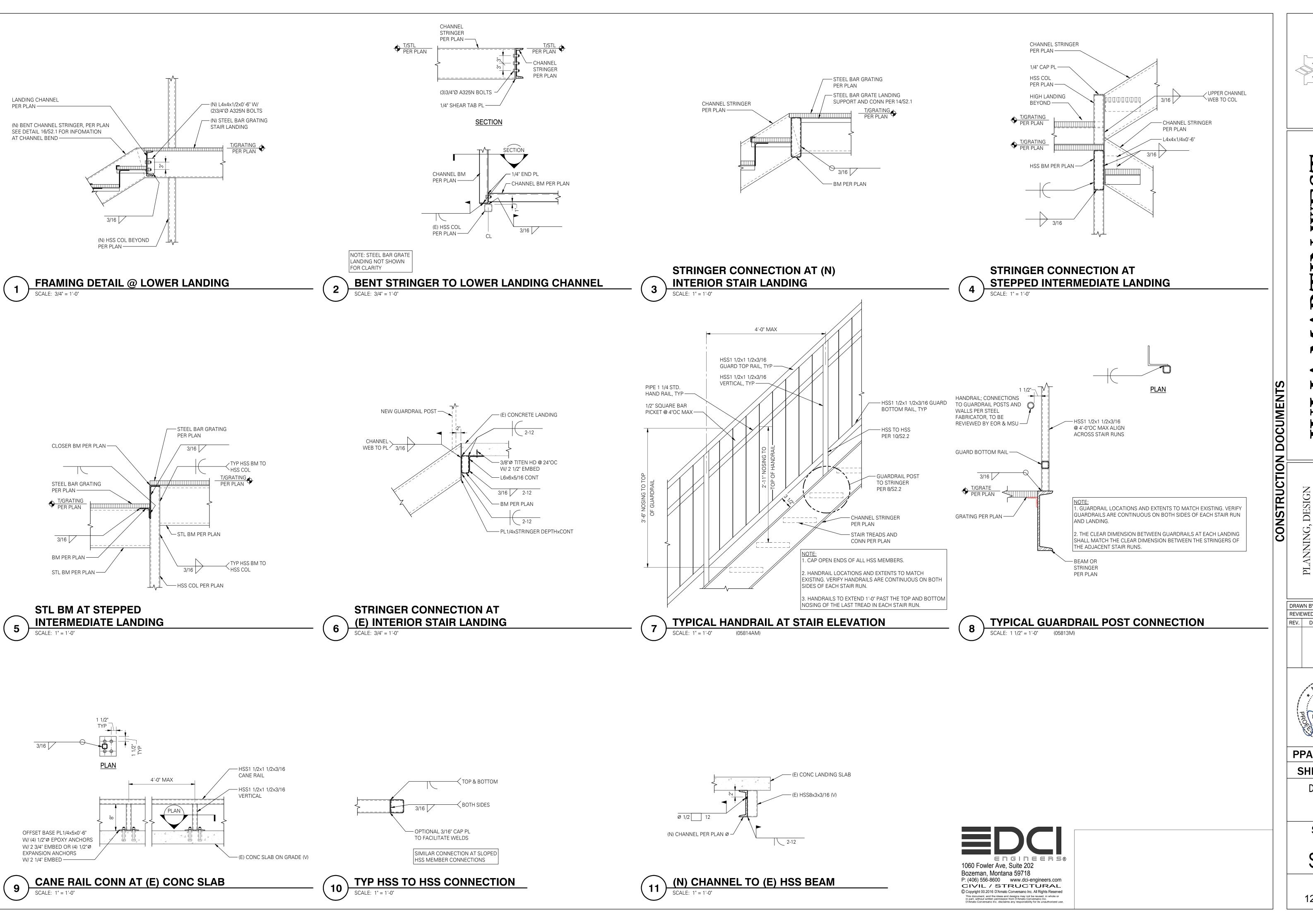
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REPAIR AND REPLACE BRICK VENEER AT EXISTING LANDING EDGE AS NEEDED -



SLAB ON GRADE FOR

(N) 1'-4"SQ FTG -----

EXISTING COLUMNS

EXISTING MIDDLE LANDING GUARDRAIL TO BE REMOVED

- EXISTING LANDING AND STEEL BEAM TO BE DEMO'D AND REMOVED

**DEMOLITION EXTENTS - TYPICAL** "LEFT" STAIR ("RIGHT" STAIR SIM)

SLAB ON GRADE FOR (N) 2'-0"Wx3'-9"FTG -----

REPAIR AND REPLACE BRICK VENEER AT EXISTING LANDING EDGE AS NEEDED —

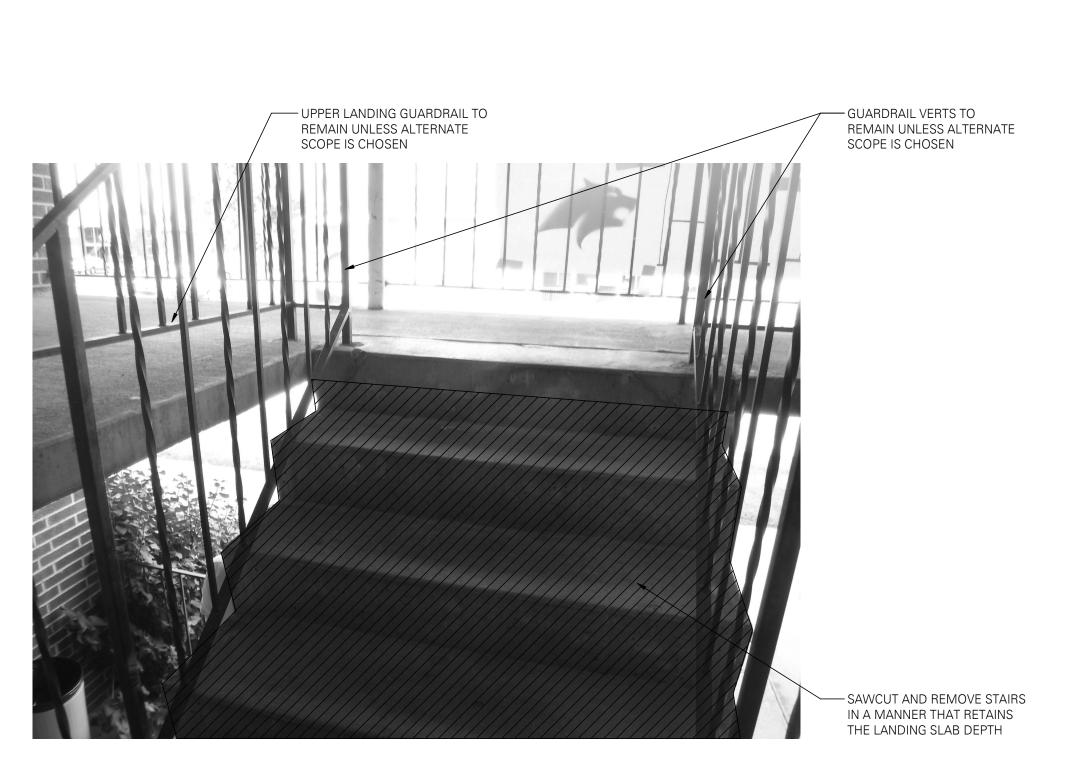
DEMO AND REMOVE

DEMO AND REMOVE (E) SLAB ON GRADE FOR (N) 2'-0"Wx4'-0" FTG ----

(E) SLAB ON GRADE FOR (N) 1'-4"SQ FTG ——

UPPER LANDING GUARDRAIL TO REMAIN UNLESS ALTERNATE SCOPE IS CHOSEN CENTER STAIRS ONL E) SLAB ON GRADE FOR DEMO AND REMOVE (E) SLAB ON GRADE FOR (N) 2'-0"Wx5'-0"FTG

**DEMOLITION EXTENTS - TYPICAL** "MIDDLE" STAIR



AT "MIDDLE" STAIR

PLAN NOTES:

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1. STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS, AND LEGEND PER S0.1 AND S0.2.

2. DEMO EXTENTS SHOWN ARE NOT TO SCALE AND ARE SHOWN FOR CLARIFICATION AND PRICING PURPOSES ONLY

3. CONTRACTOR TO FIELD VERIFY ALL MEASUREMENTS ON NEW CONSTRUCTION PLANS BEFORE DEMOLISHING STAIRS

4. SHORE UPPER LANDINGS AS NEEDED BEFORE DEMOLITION

DOCUMENTS

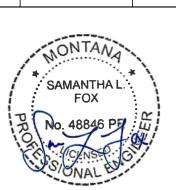
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**DEMOLITION EXTENTS - TOP OF STAIRS**