DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	50C-01-19M	2020	ADD. 11	19

STRUCTURAL NOTES:

1. General:
   A. Workmanship and materials shall conform to the AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017 including its subsequent interim specifications, HDOT Design Criteria for Bridges and Structures, August 8, 2014 and the Hawaii Standard Specifications for Bridge and Road Construction, 2005 as modified by the State of Hawaii Department of Transportation.
   B. The Contractor shall compare all the contract documents with each other and report in writing to the Engineer all inconsistencies or omissions.
   C. The Contractor shall take field measurements and verify field conditions and shall compare such field measurements and conditions with the drawings before commencing the work. Report in writing to the Engineer all inconsistencies or omissions.
   D. The Contractor shall be responsible for coordinating the work of all trades.
   E. The Contractor shall be responsible for means and methods of construction, workmanship and job safety.
   F. The Contractor shall provide temporary shoring and bracing as required for stability of structural members and systems.
   G. Construction loading shall not exceed design live load unless special shoring is provided. Permitted construction loads shall be properly reduced in areas where the structure has not attained full design strength.
   H. The Contractor shall be responsible for protection of the adjacent properties, structures, streets, and utilities during the construction period. Any damage or deteriorated property shall be restored to the condition prior to the beginning of work or better at no cost to the County of Kauai.
   I. Details noted as typical on structural drawings shall apply in all conditions unless specifically shown or noted otherwise.
   J. Elevations and details of the existing bridge as shown on these plans are based on notes on field measurements and conditions. The contractor shall be responsible for verifying all existing elevations and existing structure details and shall notify the engineer of any discrepancies for further action.

2. Design Criteria:
   A. Dead load
      Weight of all components of the structures, appurtenances attached thereto, and earth covers.
   B. Live load ---------- 90 psf
   C. Seismic
      0.2-second spectral response acceleration coefficient ---------- S_s = 0.131
      1.0-second spectral response acceleration coefficient ---------- S_1 = 0.038
      Horizontal peak ground acceleration coefficient ---------- PGA = 0.06
      Site class ---------- D
      Seismic design zone ---------- 1
   D. Bridge railing ---------- 0.05 klf transverse and vertical + 0.2 kip in any direction

3. Concrete:
   A. Concrete shall be regular weight and shall have the following minimum 28-day compressive strengths:
      1. Deck slab ---------- 4,000 psi
      2. Stair Extension ---------- 4,000 psi
      3. All other concrete ---------- Class "A"
      All concrete except Class "A" concrete shall have maximum w/c ratio of 0.45.
   B. Concrete delivery tickets shall record all free water in the mix at batching plant, added for consistency by driver, and any additional request by Contractor up to the maximum amount allowed by the mix design.
   C. All inserts, anchor bolts, plates, and other items to be cast in the concrete shall be hot-dipped galvanized according to ASTM A153 unless otherwise noted.
   D. Reinforcing bars, anchor bolts, inserts, and other items to be cast in the concrete shall be secured in position prior to placement of concrete.
   E. Conduits, pipes, and sleeves passing through a slab or footing that do not conform to typical details shall be located and the proposed construction detail submitted to the Engineer for approval.
   F. Conduits, pipes, and sleeves shall not be placed through or embedded in a beam unless specifically detailed.

Concrete continued:

   H. The Contractor shall locate construction joints not shown on the drawings, so as not to impair the strength of the structure and to minimize shrinkage stresses. Submit proposed locations of construction joints to the Engineer for approval. All construction joints shall be cleaned, laitance removed and wetted. see Typical Details for specific requirements.
   I. Unless otherwise noted, chamfer all exposed concrete edges ¾".
   J. Non-shrink grout shall be a premixed non-metallic formula, capable of developing a minimum compressive strength of 4,000 psi in 1 day and 7,000 psi in 28 days.
   K. Tetraguard AS20 shrinkage reducing admixture, Eclipse Plus shrinkage reducing admixture, or an approved equal, shall be included in the concrete mix for the concrete slab. The required dosage shall be 128 ounces per cubic yard of concrete or as recommended by the manufacturer. Addition of shrinkage reducing admixture shall be as recommended by the manufacturer.
   L. A corrosion inhibiting admixture shall be included in the concrete mix for all concrete. The admixture shall be RHEOCRETE CNI Corrosion Inhibitor from BASF, DCI S corrosion inhibitor from Grace Construction products or an approved equal. Addition of corrosion inhibiting admixture shall be as recommended by the Manufacturer.
   M. Before pouring cast-in-place slab, coat the mating concrete surface with a crystalline waterproofing compound. The waterproofing system shall be of the crystalline type that is a blend of portland cement, fine treated silica sand and active chemicals that, when mixed with water and applied as a cementitious coating, the active chemicals diffuse into the concrete and cause a catalytic reaction which generates a non-soluble crystalline structure within the pores and capillary tracts of concrete. Acceptable products include Xypex cementitious crystalline, or approved substitute. 1

4. Reinforcing Steel:
   A. Reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60 unless otherwise noted.
   B. Clear concrete coverage for reinforcing bars shall be as follows, unless otherwise noted:
      1. Deck slabs
         i. Top bars ---------- 2½"
         ii. Bottom bars ---------- 1½"
      2. Footings cast against earth ---------- 3"
      3. Footings and Walls formed and exposed to earth or weather ---------- 2"
      4. All others ---------- 2"
   C. Splices:
      a. Reinforcing steel shall be spliced only where indicated on plans. Provide lap splice length per typical details and schedule, sheet 13, unless otherwise noted.
   D. Bar bends and hooks shall be "standard hooks" in accordance with Typical Details Sheet 13.

5. Structural Steel:
   A. Fabrication and erection of structural steel shall conform to the AASHTO LRFD bridge construction specifications, 4th edition, 2017 including its subsequent interim specifications.
   B. All anchor bolts, plates, and other items to be cast in concrete shall be hot-dip galvanized according to ASTM A153, unless otherwise noted.
   C. All steel members shall be hot-dipped galvanized after fabrication, including, but not limited to girders, all connection elements, handrail posts, rails and pickets.
   D. Structural steel shall conform to ASTM A36 unless otherwise noted.
   E. Steel wide flange sections shall conform to ASTM A709, Grade 50.
   F. Steel pipes shall conform to ASTM A53, Grade B.
   G. Steel tubes (HSS) shall conform to ASTM A500, Grade B.
   H. Stainless steel shall conform to ASTM A240, Type 316L.
   I. Plates and bars shall conform to ASTM A36 or ASTM A588, unless noted otherwise.
   J. Thru bolts for guardrail connection shall conform to AASHTO M164 (ASTM A325), unless otherwise noted.
   K. Welds and welding procedures shall conform to the AWS D1.5 Bridge Welding Code and AWS D1.6 Structural Welding Code - Stainless Steel of the American Welding Society.

Structural Steel Continued:

   L. Welding shall be performed by welders prequalified for welding procedures to be used.
   M. Welding electrodes shall be E70XX or E316.
   N. High-strength bolts, nuts, and washers shall conform to section 718.02, 718.03, and 718.04 respectively of the standard specification. Bolts shall be installed with the heads on exterior or exposed side whenever possible.
   O. Anchor bolts shall conform to ASTM F1554, grade 55.
   P. Headed stud shear connectors shall conform to ASTM 108, grade 1015, 1018 or 1020 unless otherwise noted.

6. Construction Sequence:
   A. The new girders and deck shall be fabricated off-site such that the new girders and deck can be dropped into position to minimize road closure duration

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1	10/20/20	Added approved product
	DATE	REVISION

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
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HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL NOTES

KAUMUALII HIGHWAY
ELEELE PEDESTRIAN OVERPASS
IMPROVEMENTS
PROJECT NO.: 50C-01-19M

Scale: As Shown Date: May, 2020

SHEET No. S0.1 OF 9 SHEETS

ADD. 11

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DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	50C-01-19M	2020	12	19

7. Paint:
   1. Contractor shall shop coat all members. Field coating shall consist of touch ups only.
   2. The touch up paint shall consist of the following:
      A. Prepare surface per SSPC-SP1, solvent cleaning.
      B. Apply first and second coat according to paint schedule
   3. Color for top coat shall be green, as proposed by the contractor and approved by the engineer. Finish for top coat shall not be gloss or high gloss.
   4. Multiple coats may be required to obtain minimum dry film thickness (DFT).
   5. All hot-dip galvanized coating that is damaged shall be repaired. The repairs shall consist of the following:
      A. Prepare surface per SSPC-SP1, solvent cleaning.
      B. Apply (2) coats of cold applied, galvanizing compound containing 95% metallic zinc content by weight in dry film and 52% solids content by volume.
      C. Application rate shall be 1.5 mils dry film thickness per coat.
      D. Rust scale shall be cleaned per SSPC-SP3.
      E. The coating shall be applied at sufficient wet film thickness to achieve a minimum dry film.
      F. The coating shall be well stirred before use so that it is completely homogeneous during application.
      G. Minimum dry film build is 3 mils, using manufacturer's recoat time directions.
      H. After galvanizing repairs are complete, apply touch-up paint system according to paint schedule.
   6. Cost of galvanizing and painting is incidental to the structural steel.
   7. The preparation of newly-galvanized steel surfaces shall conform to ASTM D6386. If the paint is to be applied beyond 48 hours after galvanizing, the surface preparation of the galvanized surface shall be according to the paint schedule. All galvanized surfaces shall be lightly abraded and the surfaces roughened before following surface preparation instructions in paint schedule. If over abraded or roughened, follow guideline from #5 above and repeat the process.

PAINT SCHEDULE *

	Option 1	Option 2	Option 3	Option 4
Preparation for Galvanized Surfaces:	Carboline Thinner #2 Or Surface Cleaner #3, Per SSPS-SP1, Apply Rustbond Penetrating Sealer.	Solvent Clean Per SSPC-SP1, and as Recommended by the Manufacturer	Solvent Clean Per SSPC-SP1, and as Recommended by the Manufacturer	Solvent Clean Per SSPC- SP1. Apply Galvanized Zinc Treatment (acid Etching)
Preparation for Existing Steel:	Prepare all existing metal surfaces in accordance with SSPC-SP 1 Solvent Cleaning. After all oil, grease and other impurities are removed, power tool clean all surfaces in accordance with SSPC-SP 3 Power Tool Cleaning For all steel with any amount of corrosion exhibited, including anchor bolts and base plates, shall be prepared in accordance with SSPC-SP 11 Power Tool Cleaning to Bare Metal, after being prepared according to SSPC-SP 1.			
1st Coat:	Carboline Carboguard 890 Epoxy Dft 5 Mil (min) Wft 7 Mil (min)	Tnemec High-build Epoxoline II Series N69 Dft 5 Mil (min) Wft 7 Mil (min)	Sherwin Williams Tile Clad High Solids B62 Series Dft 4 Mil (min) Wft 7 Mil (min)	Ameron Amercoat 385 Epoxy Dft 5 Mil (min) Wft 8 Mil (min)
Recoating Time:	8 Hrs (min) 2 Days (max)	10 Hrs (min) 2 Days (max)	8 Hrs (min) 2 Days (max)	8 Hrs (min) 2 Days (max)
Top Coat:	Carboline Carbothane 133hb Alyphatic Polyurethane Dft 5 Mil (min) Wft 7 Mil (max)	Tnemec Endura-shield Series 75 Dft 4 Mil (min) Wft 7 Mil (min)	Sherwin Williams Corothane II B65 W200 Series/b60v2 Dft 4 Mil (min) Wft 7 Mil (min)	Ameron Amercoat 450 Sa Polyurethane Dft 4 Mil Wft 7 Mil
Top Coat Color:	Green for Steel Girders, Railing, Railing Posts, Submit Color Chips for Approval.			

* For Paint Schedule, Use the Brand Names Listed, or Equal as Approved by the Engineer.

ABBREVIATIONS

ABUT	Abutment	Ftg	Footing
℄	Baseline	Galv	Galvanized
Bot	Bottom	Horiz	Horizontal
Btwn	Between	HSB	High Strength Bolt
℄	Centerline	I.D.	Inside Diameter
C.I.	Cast Iron	LS	Lap Splice
CJ	Construction Joint	Max	Maximum
Clr	Clear	Mech	Mechanical
Conc	Concrete	Min	Minimum
Cont	Continuous	Misc	Miscellaneous
Dbl	Double	No. or #	Number
Dia	Diameter	N.T.S.	Not to Scale
Dwg	Drawing	O.C.	On center
Ea	Each	O.D.	Outside Diameter
E.F.	Each Face	O.H.W.M.	Ordinary High Water Mark
Elev	Elevation	Opng	Opening
Eq	Equal	Opp	Opposite
E.W.	Each Way	PL or ℙ	Plate
Exist	Existing	Prefab	Prefabricated
Expn	Expansion	Ref	Reference
Ext	Exterior	Reinf	Reinforced or Reinforcing
Fin	Finish	Sim	Similar
Fix	Fixed	Sp	Spaces or Spacing
Ft	Foot or Feet	ss	Stainless Steel

LEGEND

- Demolition Area
- Existing Concrete
- Existing CRM
- Structural Backfill
- New Concrete
- New AC Overlay
- New CLSM Backfill
- TREE — Existing Tree

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ORIGINAL PLAN
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No.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL NOTES AND ABBREVIATIONS AND LEGEND

KAUMUALII HIGHWAY
ELEELE PEDESTRIAN OVERPASS IMPROVEMENTS
PROJECT NO.: 50C-01-19M

Scale: As Shown Date: May, 2020

SHEET No. S0.2 OF 9 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	50C-01-19M	2020	13	19

MINIMUM SPLICE & EMBEDMENT LENGTHS

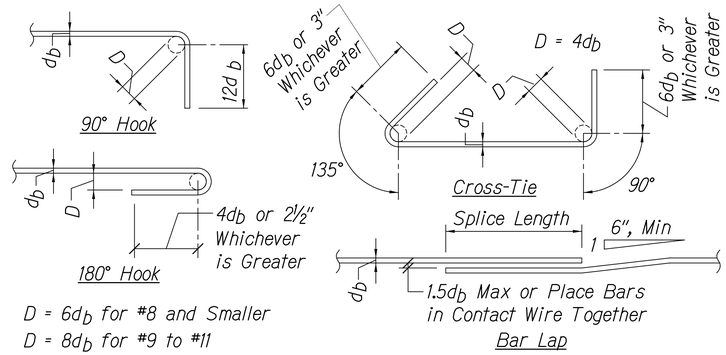
Bar Size	Concrete Strength = 4,000 psi				
	Lap Splice		Embedment		
			Straight		with Standard 90° Hook
	Top Bars	Other Bars	Top Bars	Other Bars	
#3, #4	29"	21"	17"	12"	10"
#5	36"	26"	21"	15"	12"
#6	43"	31"	26"	18"	16"
#7	54"	39"	32"	23"	18"
#8	71"	51"	42"	30"	20"
#9	90"	64"	53"	38"	22"
#10	114"	81"	67"	48"	26"
#11	140"	100"	82"	59"	28"

Note:
"Top Bars" are horizontal bars with 12" or more of concrete cast below.

TYPICAL REBAR SPLICE AND EMBEDMENT LENGTH SCHEDULE

Not to Scale

1 | S0.3 | S0.3

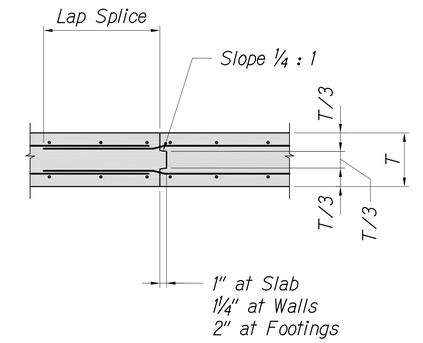


D = $6d_b$ for #8 and Smaller
D = $8d_b$ for #9 to #11

STANDARD HOOKS AND CROSS-TIE DETAIL

Not to Scale

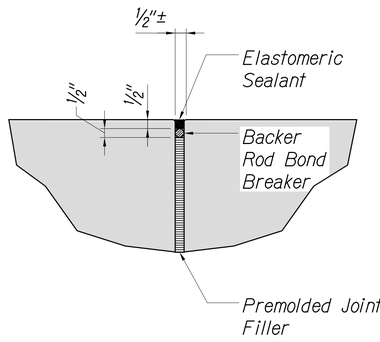
2 | S0.3 | S0.3



TYPICAL REBAR CONSTRUCTION JOINT DETAIL

Not Scale

3 | S0.3 | S0.3



EXPANSION JOINT DETAIL

No Scale

4 | S0.3 | S0.3

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HIGHWAYS DIVISION

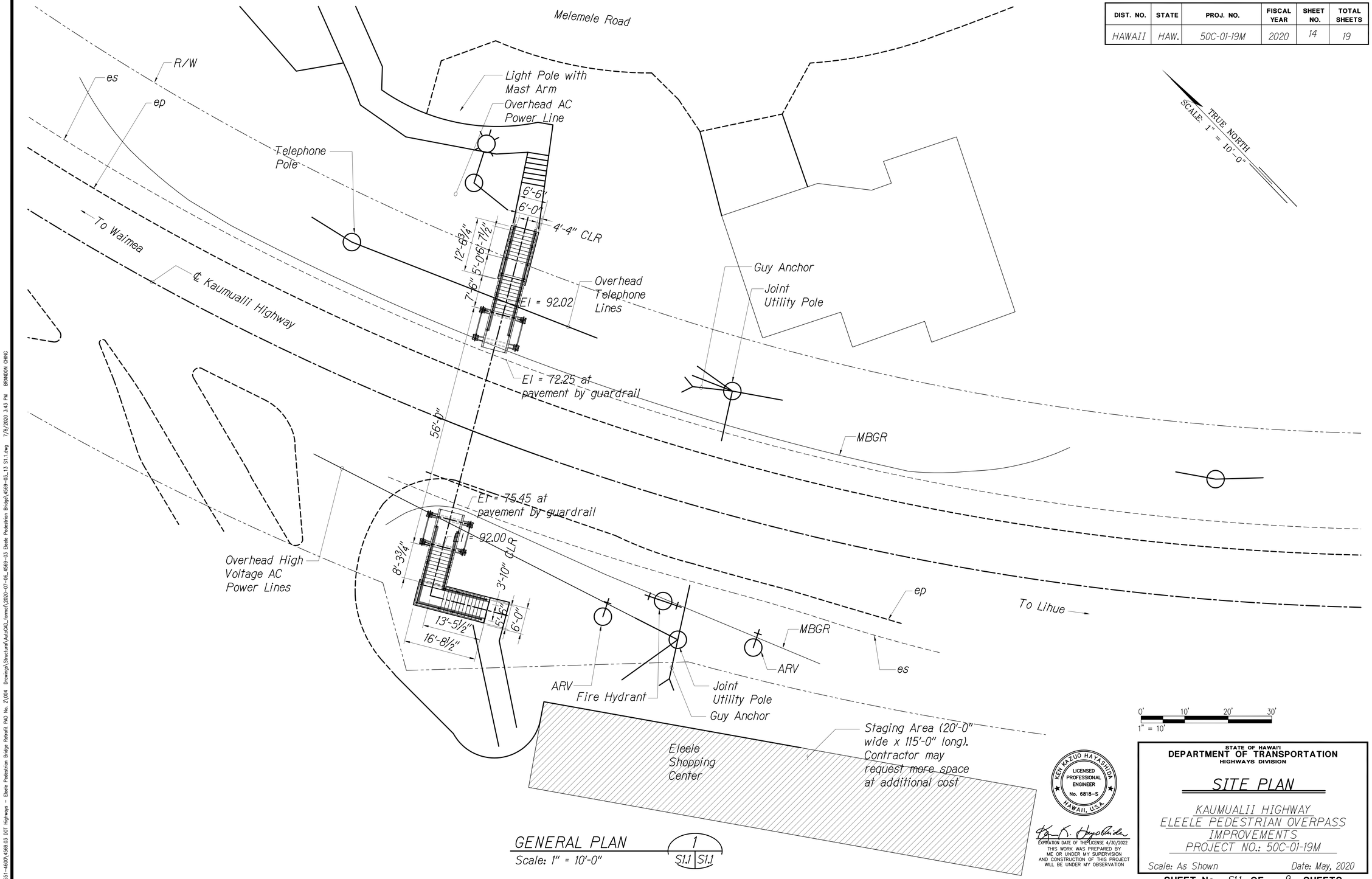
TYPICAL STRUCTURAL DETAILS

KAUMUALII HIGHWAY
ELEELE PEDESTRIAN OVERPASS IMPROVEMENTS
PROJECT NO.: 50C-01-19M

Scale: As Shown Date: May, 2020

SHEET No. S0.3 OF 9 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	50C-01-19M	2020	14	19



GENERAL PLAN — 1 (S1.1 | S1.1)
Scale: 1" = 10'-0"

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SITE PLAN

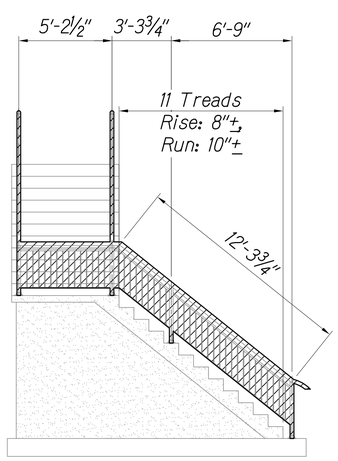
KAUMUALII HIGHWAY
ELEELE PEDESTRIAN OVERPASS
IMPROVEMENTS
PROJECT NO.: 50C-01-19M

Scale: As Shown Date: May, 2020

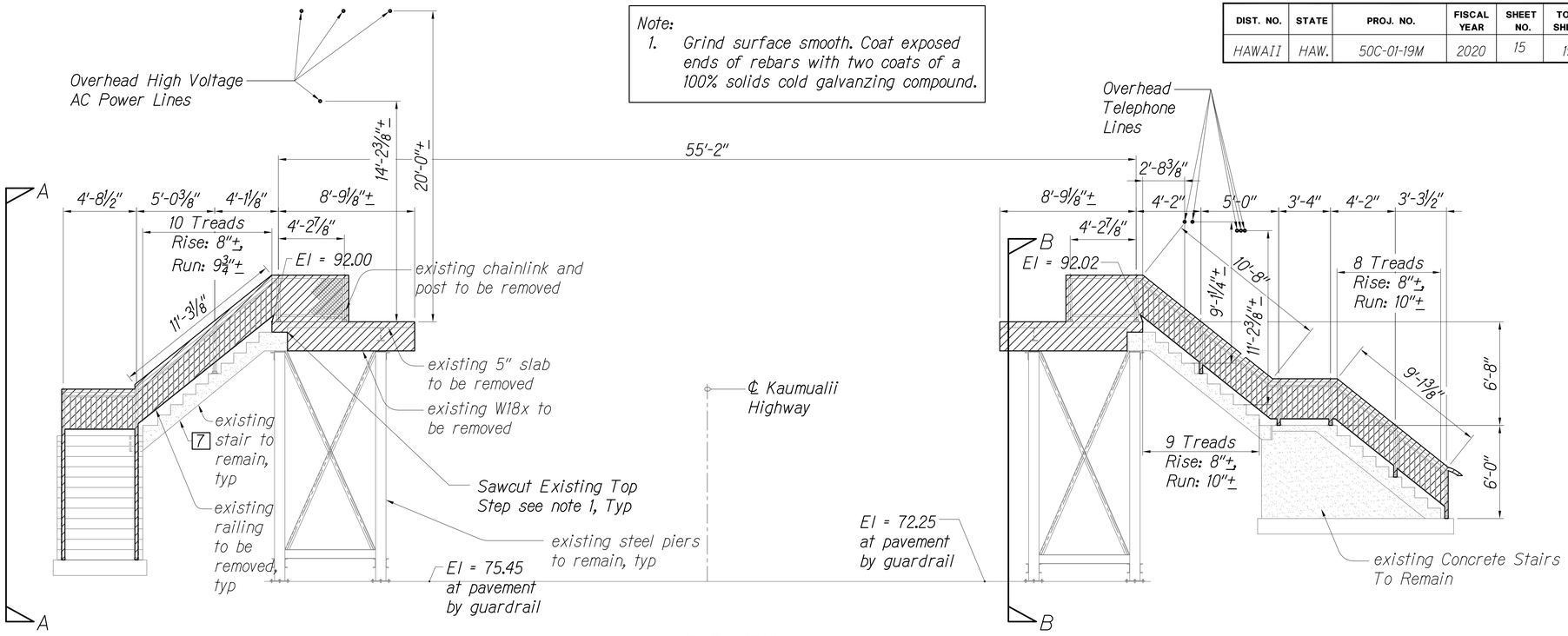
SHEET No. S1.1 OF 9 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	50C-01-19M	2020	15	19

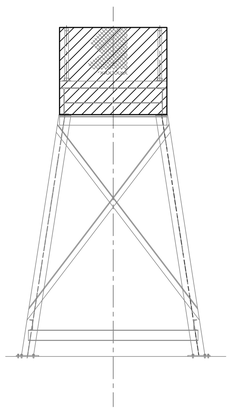
Note:
1. Grind surface smooth. Coat exposed ends of rebars with two coats of a 100% solids cold galvanzing compound.



SECTION A-A



ELEVATION



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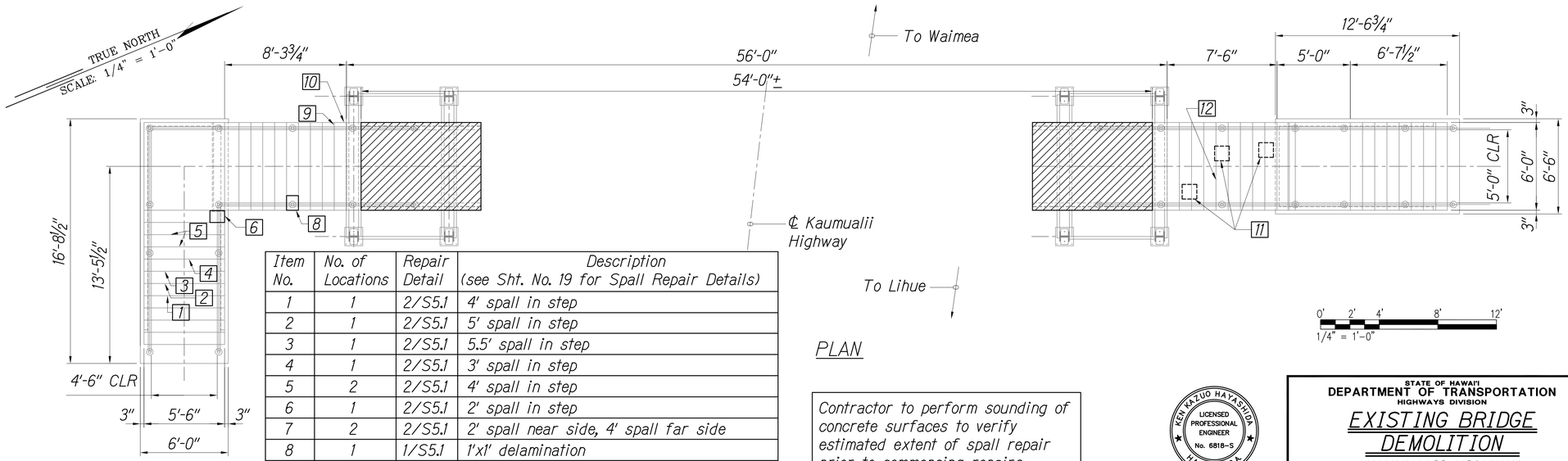

PLAN

0' 2' 4' 8' 12'
1/4" = 1'-0"

Item No.	No. of Locations	Repair Detail	Description (see Sht. No. 19 for Spall Repair Details)
1	1	2/S5.1	4' spall in step
2	1	2/S5.1	5' spall in step
3	1	2/S5.1	5.5' spall in step
4	1	2/S5.1	3' spall in step
5	2	2/S5.1	4' spall in step
6	1	2/S5.1	2' spall in step
7	2	2/S5.1	2' spall near side, 4' spall far side
8	1	1/S5.1	1'x1' delamination
9	1	2/S5.1	0.5' spall in step
10	1	2/S5.1	1' spall at bottom edge of stairs
11	3	1/S5.1	1'x1' delamination in stair slab soffit
12	1	2/S5.1	2' spall in step
13	1	2/S5.1	2' spall in top landing of mauka approach

Contractor to perform sounding of concrete surfaces to verify estimated extent of spall repair prior to commencing repairs.

EXISTING BRIDGE
Scale: 1/4" = 1'-0"

1
S1.2 | S1.2

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING BRIDGE DEMOLITION

KAUMUALII HIGHWAY
ELEELE PEDESTRIAN OVERPASS IMPROVEMENTS
PROJECT NO.: 50C-01-19M

Scale: As Shown Date: May, 2020

SHEET No. S1.2 OF 9 SHEETS

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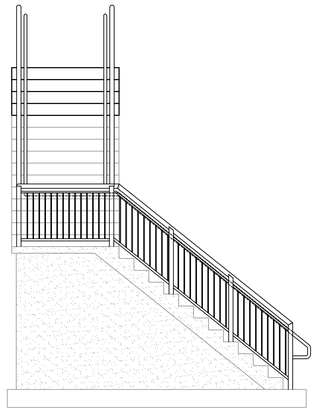
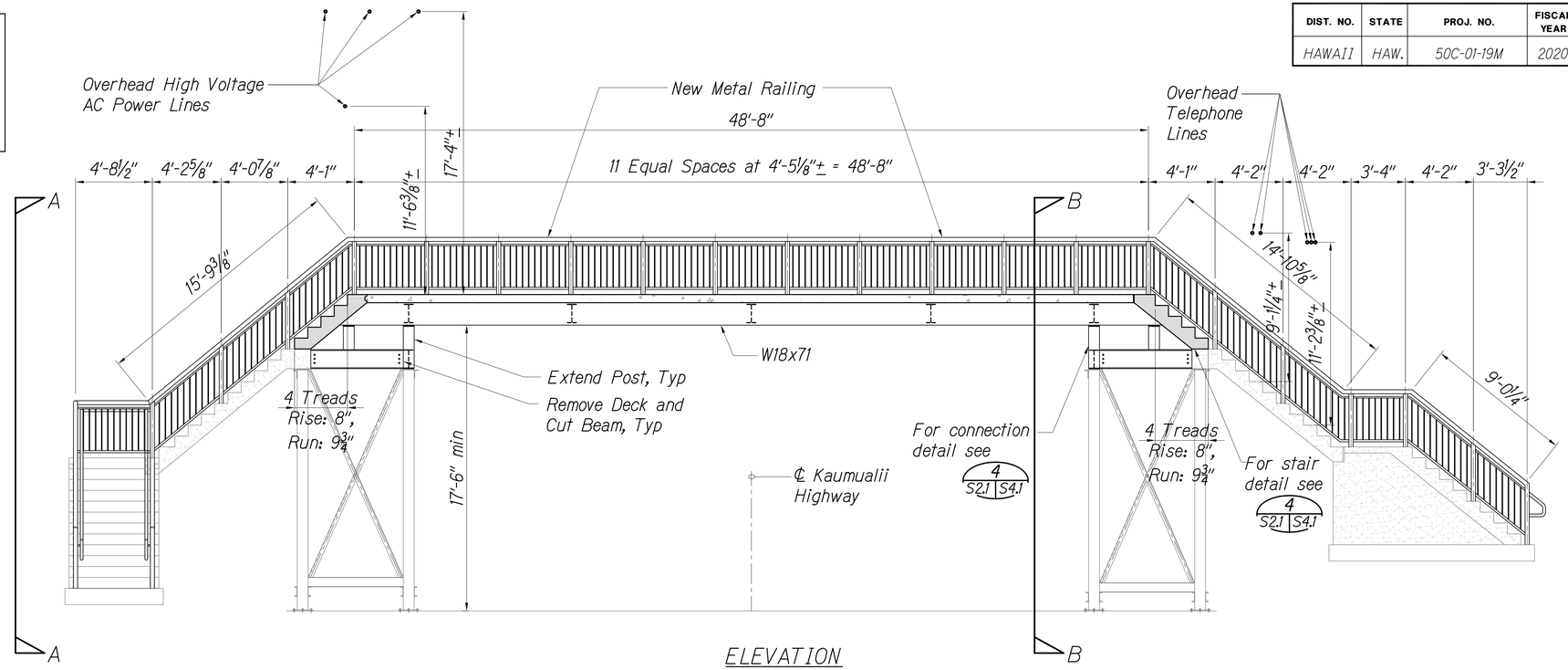
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	50C-01-19M	2020	16	19

LEGEND:

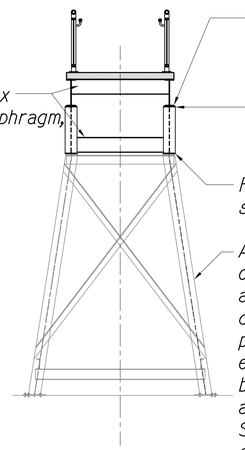
- Cast onto girders, lift into place
- Cast in place
- Existing



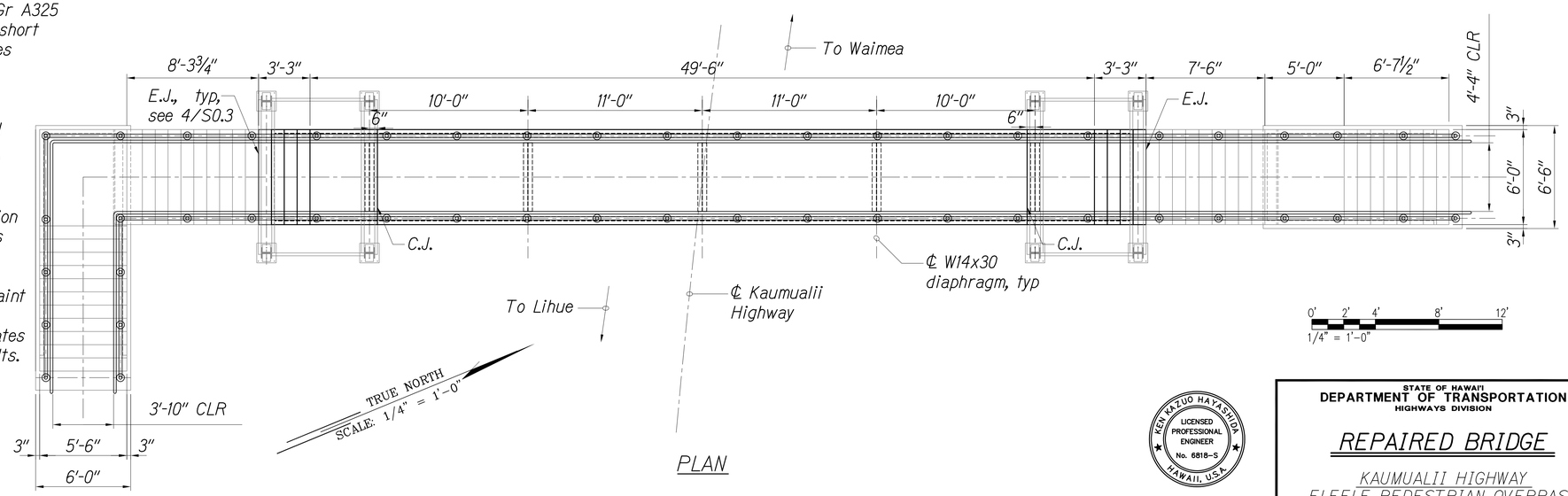
SECTION A-A



ELEVATION



SECTION B-B



PLAN

REPAIRED BRIDGE 1 S2.1 S2.1
Scale: 1/4" = 1'-0"

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HAWAII, U.S.A.

EXPIRATION DATE OF THIS LICENSE 4/30/2022
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

REPAIRED BRIDGE

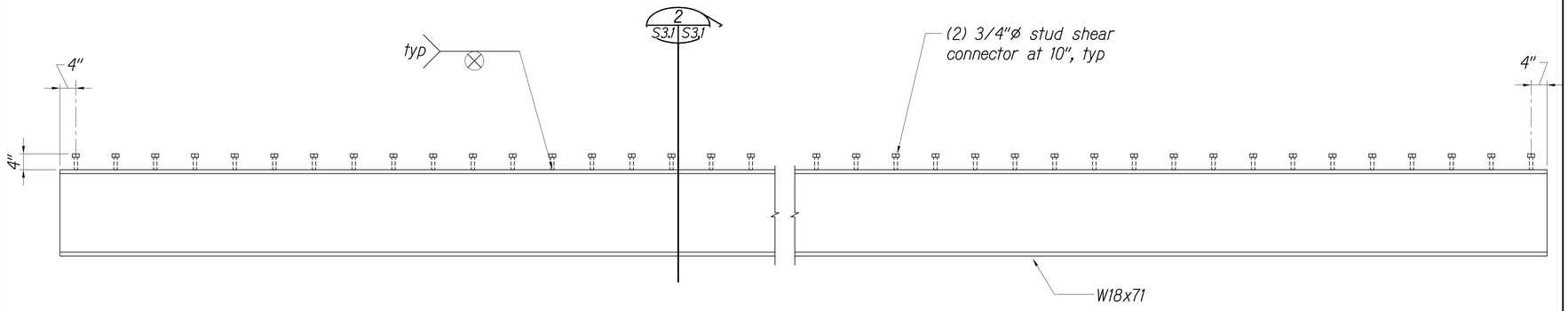
KAUMUALII HIGHWAY
ELEELE PEDESTRIAN OVERPASS
IMPROVEMENTS
PROJECT NO.: 50C-01-19M

Scale: As Shown Date: May, 2020

SHEET No. S2.1 OF 9 SHEETS

P:\4551-4600\4569.03 007 Highways - Eleele Pedestrian Bridge Retrofit PAO No. 2\004 Drawings\Structural\AutoCAD_format\2020-07-06_4569-03 Eleele Pedestrian Bridge\4569-03_14 S1.2_S1.3_S1.4.dwg 7/24/2020 3:39 PM BRANDON CHING

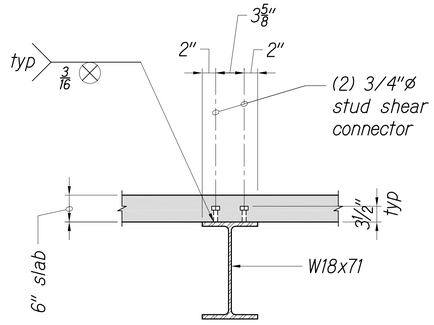
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	50C-01-19M	2020	17	19



TYPICAL HEADED STUD SCHEDULE

Scale: 3/4" = 1'-0"

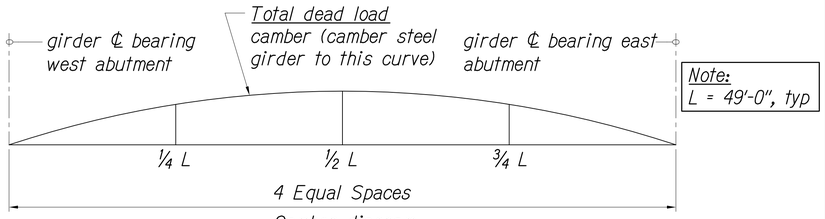
1 S3.1 S3.1



SECTION

Scale: 3/4" = 1'-0"

2 S3.1 S3.1



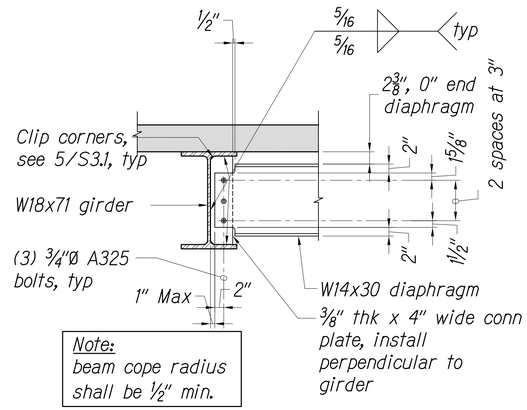
Camber diagram

CAMBER SCHEDULE				
Girder	Dead load components	camber (inches)		
		¼ L	½ L	¾ L
G-1	Steel girder + diaphragms	¼	⅜	¼
	Deck slab	⅜	⅝	⅜
	Total dead load	⅝	1	⅝

DEAD LOAD CAMBER SCHEDULE

Not to Scale

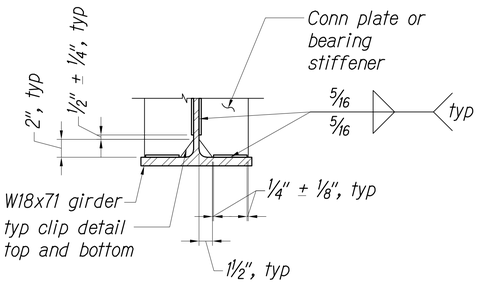
3 S3.1 S3.1



INTERMEDIATE DIAPHRAGM CONNECTION DETAIL

Scale: 3/4" = 1'-0"

4 S3.1 S3.1



TYPICAL FILLET WELD TERMINATION DETAIL

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

5 S3.1 S3.1

0' 1' 2' 3' 4'

3/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GIRDER DETAILS

KAUMUALII HIGHWAY
ELEELE PEDESTRIAN OVERPASS
IMPROVEMENTS
PROJECT NO.: 50C-01-19M

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SHEET No. S3.1 OF 9 SHEETS

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
HAWAII, U.S.A.

EXPIRATION DATE OF THIS LICENSE 4/30/2022

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ORIGINAL PLANS — NOTE BOOK — No.
SURVEY PLOTTED BY — DATE
DRAWN BY — DATE
TRACED BY — DATE
DESIGNED BY — DATE
QUANTITIES BY — DATE
CHECKED BY — DATE

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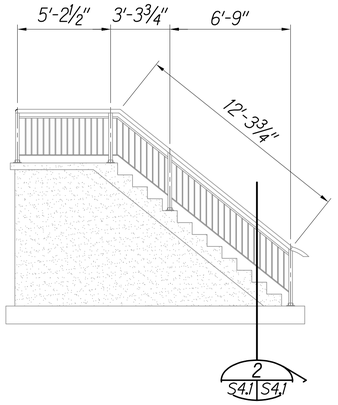
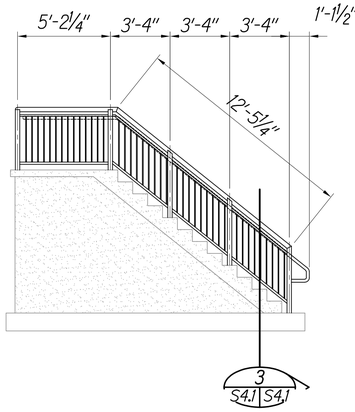
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	50C-01-19M	2020	18	19



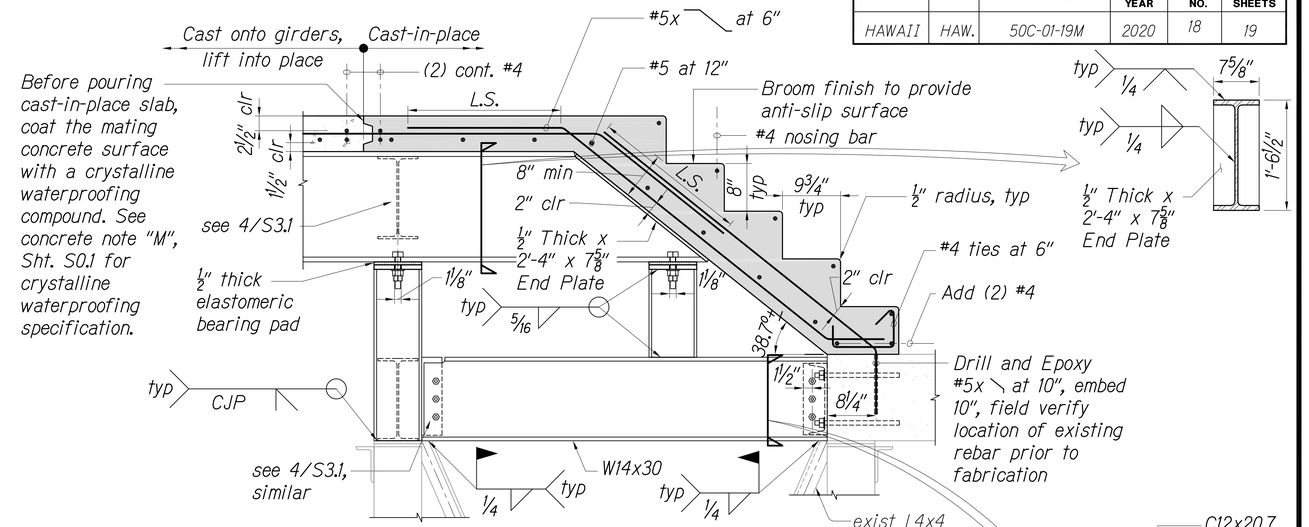
EXISTING



PROPOSED

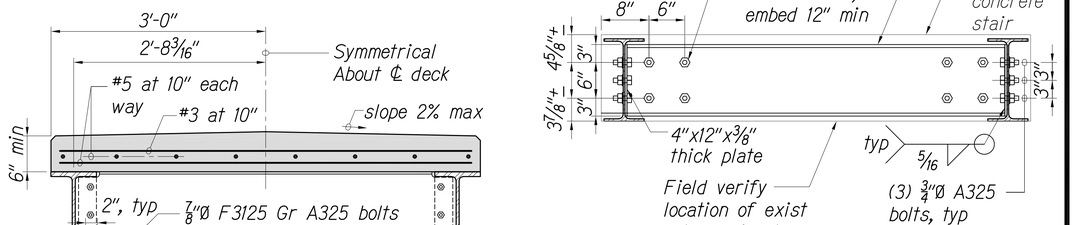
ELEVATION - HANDRAILING 1
S4.1 | S4.1

Scale: 1/4" = 1'-0"



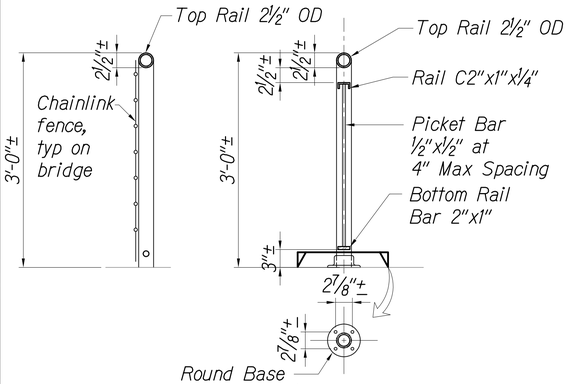
DETAIL 4
S4.1 | S4.1

Scale: 1" = 1'-0"



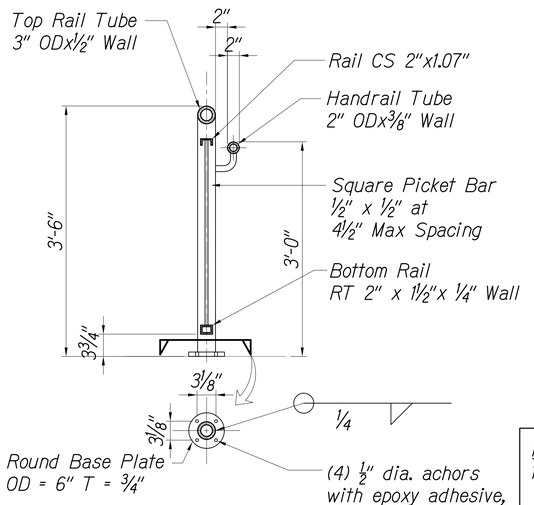
DETAIL 5
S4.1 | S4.1

Scale: 1" = 1'-0"



SECTION 2
S4.1 | S4.1

Scale: 1" = 1'-0"



SECTION 3
S4.1 | S4.1

Scale: 1" = 1'-0"

Notes:
1. All railing welds shall be 3/16" fillet, groove, or flare groove welds unless noted otherwise. Grind welds flush at faying surfaces.
2. Before installing new railing posts onto existing stairs, cut off all post anchor bolts 1" below the concrete surface and repair in accordance with spall repair detail Type I. Assume a repair area of 36 sq. in. for each post location.

0' 6" 1' 2' 3'
1" = 1'-0"

0' 2' 4' 8' 12'
1/4" = 1'-0"

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RAILING SECTION AND DETAILS

KAUMUALII HIGHWAY
ELEELE PEDESTRIAN OVERPASS IMPROVEMENTS
PROJECT NO.: 50C-01-19M

Scale: As Shown Date: May, 2020

SHEET No. S4.1 OF 9 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	50C-01-19M	2020	ADD. 19	19

Spall Repair Notes:

A. Existing concrete:

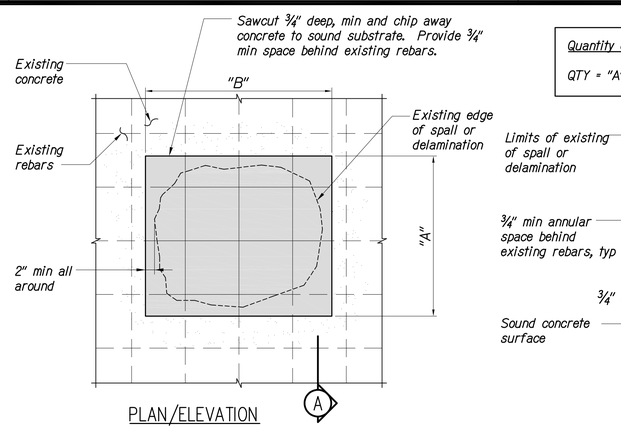
1. Contractor shall not damage, cut or drill through existing reinforcing. If reinforcing is damaged, the contractor shall inform the officer-in-charge immediately and shall be responsible for repairing the damage at contractor's sole expense and to the satisfaction of the officer-in-charge.
2. The contractor shall review as-built drawings prior to performing the work. Verify location of existing reinforcement with an electromagnetic rebar locator before drilling holes into existing concrete. Holes may need to be adjusted to avoid existing reinforcement.
3. All holes which need to be abandoned due to the presence of reinforcing steel shall be filled with non-shrink grout.
4. The contractor will not be paid for the holes which need to be filled and abandoned. The officer-in-charge shall review and approve all relocated holes prior to installing dowels.
5. All drilled holes for anchors shall be brushed to remove loose material then cleaned with compressed air, prior to injecting the epoxy.
6. Anchoring adhesive shall be a two-component 100% solids epoxy based system supplied in manufacturer's standard side-by-side cartridge and dispensed through a static-mixing nozzle supplied by the manufacturer. Epoxy shall meet the minimum requirements of ASTM C-881 specification for Type IV, grade 3, Class C and must develop a minimum of 12,650 psi compressive yield strength after 7 day cure. Epoxy must have a heat deflection temperature of a minimum 136°F (58°C). Epoxy shall be formulated for optimum performance in both cracked and uncracked concrete (Simpson set-xp or approved substitute).

B. Surface preparation notes for spall repairs:

1. Deteriorated concrete shall be removed down to sound substrate, or to the specified depth as noted in the spall repair details whichever is greater. Sawcut all edges a minimum of 3/4" deep, no feathering of patching material is allowed. Avoid cutting any reinforcing steel when sawcutting. The exposed concrete shall be roughened to a 1/8" amplitude and shall be cleaned and free of laitance, dust and other bond inhibiting materials.
2. All reinforcing steel damaged due to the contractor's operations shall be repaired by the contractor at his/her expense and to the satisfaction of the officer-in-charge.
3. Any exposed reinforcing steel, whether fully exposed or only partially exposed, shall be exposed all around, creating a minimum 3/4" annular space around rebar.
4. First layer of reinforcing steel, whether exposed or not, shall be exposed all around, creating a minimum 3/4" annular space around rebar.
5. Cleaning shall precede application of the patching material by not more than 24 hours.

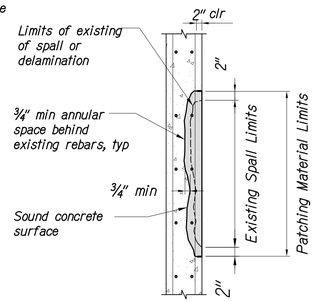
C. Bonding agent and Patching Material: (1)

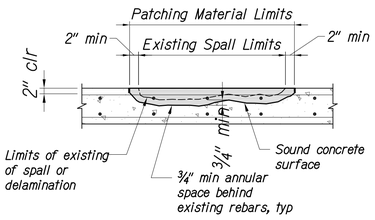
1. After the concrete surfaces have been prepared and cleaned, and immediately before placing the concrete patching, a coat of bonding agent shall be applied. The surface shall receive a thorough and even coating, and excess bonding agent shall not be permitted to collect in surface depressions. The area applied with bonding agent shall be limited so that it does not become dry before it is covered with the concrete patching. Should the surface of the bonding agent dry, the dried bonding agent shall be completely removed and fresh bonding agent applied. Removal shall be by abrasion blasting or by another procedure approved by the officer-in-charge. The removal of bonding agent shall be at the expense of the contractor.
2. The bonding agent shall be designed to provide corrosion protection to the reinforcing steel and shall act as a bonding agent for the fresh patching mortar. Acceptable products include Sika Armatec-110, or approved substitute. (1)
3. The patching material shall be a 2-part polymer modified, cementitious non-sag mortar. Acceptable products include SikaTop 123 Plus, or approved substitute.



Quantity calculation:

QTY = "A" x "B" = S.F.



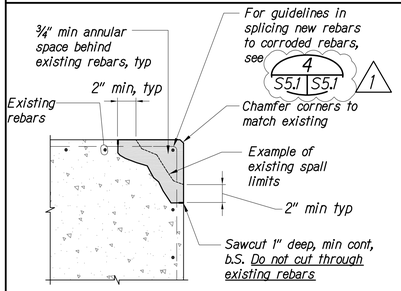


TYPE I SPALL REPAIR (1) S5.1 | S5.1

NOT TO SCALE

Notes:

1. Heavily corroded rebars shall be repaired per detail 3.
2. Area of repair may be a combination of rectangular shapes. No circular or rounded repairs shall be allowed.
3. The type I spall repair detail applies to all positions including vertical and over head.

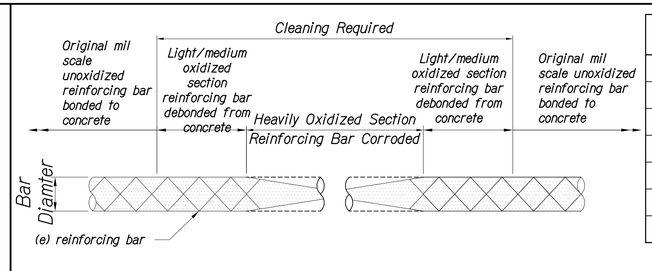


Quantity calculation:

QTY = length (L.F.)

TYPE II SPALL REPAIR (2) S5.1 | S5.1

NOT TO SCALE



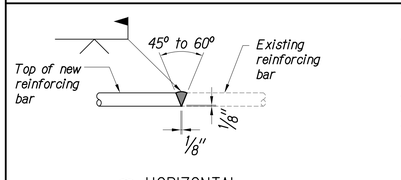
Minimum allowable bar diameter chart	
Bar size	min diameter
#4	3/8"
#5	1/2"
#6	5/8"
#7	11/16"
#8	13/16"
#9	7/8"

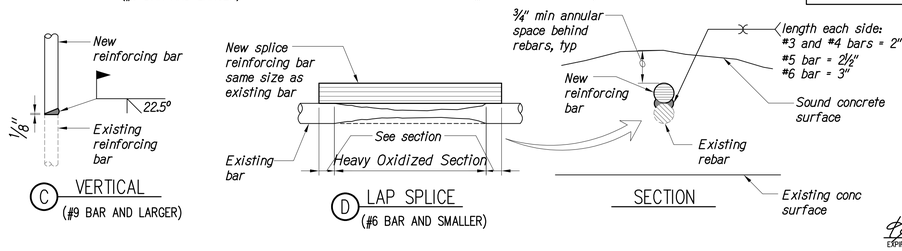
Notes:

1. All heavy oxides, corrosion, scale and bond inhibiting agents shall be removed from reinforcing bar by mechanical means. Abrasive blast shall be free of oil. Tightly bonded light oxide build-up on the surface may result after blast cleaning. This is acceptable unless coating manufacturer requires cleaner reinforcing bar surface.
2. Check remaining section in accordance with chart, when diameter is less than minimum, splice as required, see 4 S5.1 | S5.1.

TYPICAL REINFORCING BAR REPAIR CRITERIA (3) S5.1 | S5.1

NOT TO SCALE





Notes:

1. Chip, grind, or gouge to sound metal before welding.
2. If material test reports or chemical composition data is unavailable for the existing rebar, the minimum preheat and interpass temperature requirements shall be as follows:
   a. Up to #6 bars inclusive..... 300°F [150°C]
   b. #7 bars and larger..... 500°F [260°C]
3. If material test reports or chemical composition data are available, refer to aws d1.4 for minimum preheat and interpass temperature requirements.
4. Preheat the existing reinforcing bars such that the cross-section of the bar is at or above the minimum preheat temperature for at least six inches on each side of the joint to be welded.
5. Use E70 electrodes for stirrups, E90 electrodes for all others.
6. New reinforcing bars shall conform to ASTM A706.

TYPICAL REINFORCING BAR WELDED SPLICE DETAIL (4) S5.1 | S5.1

NOT TO SCALE

DATE	REVISION
10/20/20	Added approved product names

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SPALL REPAIR NOTES AND DETAILS

KAUMUALII HIGHWAY
ELEELE PEDESTRIAN OVERPASS
IMPROVEMENTS
PROJECT NO.: 50C-01-19M

Scale: As Shown Date: May, 2020

SHEET No. S5.1 OF 9 SHEETS

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ADD. 19