

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-06-19M	2020	7	14

STRUCTURAL GENERAL NOTES

4. Materials (Cont.):

C. Repair Mortar, for defective concrete repairs, shall be a factory blended, rapid setting, non-sag, shrinkage compensated cementitious patching material (containing no gypsum) combined with a polymer type admixture, water, and a penetrating corrosion inhibitor. It shall meet the following minimum material properties:

- (1) 7-day compressive strength - 5,000 psi
- (2) 28-day compressive strength - 6,000 psi
- (3) 28-day permeability - < 1,000 coulombs (ASTM C1202)
- (4) 28-day Bond strength - 1,500 psi (ASTM C882)

D. Spall repair bonding agent shall be a three-component, preproportioned, water-based epoxy-modified Portland cement bonding agent and anti- corrosion coating. Bond strength shall exceed 2,400 PSI in accordance with ASTM C882.

E. Curing compound shall be Sinak Lithium Core 1000 curing compound.

5. Construction Notes:

A. The contractor shall be solely responsible for the protection of adjacent properties, utilities and existing structures from damage due to construction.

B. Existing reinforcing shall not be damaged during demolition work, unless otherwise permitted.

C. All exposed concrete edges shall be chamfered 3/4" x 3/4", unless as otherwise noted.

D. Drilling procedures, equipment, material and certifications shall be submitted to the Engineer for approval.

E. Drilled holes in existing concrete for anchors and dowels shall not be left unfilled for more than 8 hours. Adhesive material in drilled holes shall fully cure prior to pouring concrete around reinforcing steel dowels.

F. Any drilled holes, inserts, or brackets needed for construction including, but not limited to, falsework for deck and beam overhang, and work platform scaffolding shall be approved by the Engineer. Expansion or wedge type anchors shall not be used. Location of drilled holes shall be coordinated with FRP work and shall not interfere with installation of FRP. Drilling of holes through FRP is prohibited.

G. All holes drilled into concrete that go unused shall be completely filled with a polymer-modified cementitious repair mortar.

H. The temporary work platform shall be positioned above the ordinary high water mark of the stream. The temporary work platform may be suspended by the bridge structure above or by temporary supports in the stream bed.

4. Construction Notes (Cont.):

I. Designated repair locations are not necessarily inclusive of all repair work required. The Contractor shall inspect the soffit and identify any and all cracks wider than 0.010" and all defective concrete. Problematic areas should be reported to the Engineer for review. If approved, the Engineer will pay for the repair of the areas as "additional work" under the respective specification section.

J. Prior to application of the FRP composite system, all cracks wider than 0.010" on the soffit shall be prepared and pressure injected with epoxy and all defective concrete shall be repaired so as to satisfy FRP manufacturer's requirements.

K. Demolition work shall be coordinated with construction of new work. Contractor shall submit proposed schedule and sequence of demolition work for Engineer's review prior to commencing with demolition work.

L. All connections between concrete substrate and FRP composite system shall be considered "bond critical" and shall be prepared to a concrete surface profile (CSP) 3 in accordance with the ICRI examples.

1. General Specifications:

A. Hawaii Department of Transportation (HDOT), Standard Specifications for Road and Bridges, Construction, 2005, together with Special Provisions prepared for this project.

2. Design Specifications:

A. AASHTO 2017 LRFD Bridge Design Specifications, Eighth Edition, including subsequent interim specifications with interim supplements and modifications by the HDOT Highways Division.

B. HDOT document dated August 8, 2014 with subject title "Design Criteria for Bridges and Structures".

C. AASHTO 2012 Guide Specifications for Design of Bonded FRP Systems for Repair and Strengthening of Concrete Bridge Elements, 1st Edition, including all subsequent interim revisions and editions.

3. General:

A. The contract documents are complementary. Any requirement occurring in one document is as binding as though occurring in all. A stricter requirement prevails over any less strict requirement. The stricter requirement will be the requirement that provides the greater product life, durability, strength, and function.

B. Existing conditions are shown on the drawings to the best of the designer's knowledge and are intended to aid the contractor during construction. Dimensions and member sizes where shown on the drawings are based on field measurements. Existing dimensions shown may not be exact and are provided for information only. Contractor shall field verify all existing dimensions prior to construction. All discrepancies shall be promptly called to the attention of the Engineer and shall be resolved prior to proceeding with any construction work.

4. Materials:

A. Where welded connections are required, reinforcing steel shall be ASTM A706 deformed bars.

B. The fiber reinforced polymer (FRP) composite system shall consist of a uni-directional high-strength carbon fiber fabric bonded to the existing concrete substrate using a structural epoxy via the wet-layup method. The FRP shall meet the following minimum test value material properties:

- (1) Composite Gross Laminate Properties of one layer
 - (a) Tensile Strength - 143,000 psi - ASTM D3039
 - (b) Tensile Modulus - 13.9 x 10⁶ psi - ASTM D3039
 - (c) Elongation at Break - 1% - ASTM D3039
 - (d) Nominal Laminate Thickness - 0.08 in. - ASTM D1777

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	DESIGNED BY	
	CHECKED BY	
NOTE BOOK		
No.		

DRAWING NAME: Z:\000\ONGONG\A18-001.4.03 PAPANAHOA BR LOAD RTG-DOT\A18-001.4.03 DEL INDEX\PSB-SC001 STRUCT NOTES.DWG PLOT TIME: 12-31-19 11:05 AM



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Signature: David K. Fujiwara
EXPIRATION DATE OF THE LICENSE: 4-30-20

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

PAPANAHOA STREAM BRIDGE
MAINTENANCE REPAIRS
Proj. No. HWY-M-06-19M

Scale: None Date: Dec. 2019

SHEET No. 501 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-06-19M	2020	8	14

STRUCTURAL GENERAL NOTES (CONTINUED)

5. Construction Notes (Cont.):

N. Load Rating:

New governing load rating results as follows:

		Rating Factor	Live Load Distribution Factor	Load Effect	Controlling Member
Design Loads	HL-93 (Inv.)	1.15	0.403	Moment	Exterior Plank
	HL-93 (Opr.)	1.49	0.403	Moment	Exterior Plank
Legal Loads	Type 3	2.59	0.403	Moment	Exterior Plank
	Type 3S2	2.88	0.391	Moment	Exterior Plank
	Type 3-3	3.15	0.403	Moment	Exterior Plank
	NRL	2.01	0.383	Moment	Exterior Plank
	SU4	2.25	0.393	Moment	Exterior Plank
	SU5	2.18	0.377	Moment	Exterior Plank
	SU6	2.03	0.378	Moment	Exterior Plank
	SU7	2.01	0.383	Moment	Exterior Plank

Load rating is based on a current, one-way ADTT of 545 and current superstructure condition rating of 6.

ORIGINAL PLAN

NOTE BOOK

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DRAWING NAME: Z:\000_06G06\018-001\4.03_PAPANAOHA BR LOAD RIG-DOHA\01 CAD\12-31-19 DEL INDEX.PSB-S0002 STRUCT NOTES.DWG PLOT TIME: 12-31-19, 11:06 AM



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Expiration Date: 4-30-20

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

PAPANAOHA STREAM BRIDGE
MAINTENANCE REPAIRS
Proj. No. HWY-M-06-19M

Scale: None Date: Dec. 2019

SHEET No. S02 OF 3 SHEETS

SYMBOLS AND ABBREVIATIONS

¢	And	Demo	Demolish, Demolition	H	Height	P(e)	Effective or Working	Stirr.	Stirrup
@	At	Det.	Detail	(H)	Hinge		Prestressing Force	Str.	Straight
Ø	Diameter	Dia.	Diameter	Horiz.	Horizontal	PP	Precast Plank	Struct.	Structure
#	Number, Pound	Dim.	Dimension	HS	High strength	Perf.	Perforated	SE	Super Elevation
		Dist.	Distance	HSS	Hollow Structural Section	PL	Plate	Symm.	Symmetrical
		DO	Ditto	HECO	Hawaiian Electric Company	PCC	Portland Cement Concrete		
Abut.	Abutment	Dwls.	Dowels			PC	Point of Curvature		
Abbr.	Abbreviation	Dn.	Down			PCF	Pounds per Cubic Foot	Tan.	Tangent
Add.	Additional, Added	Db.	Double	IB, Inbnd.	Inbound	PSF	Pounds per Square Foot	Temp.	Temporary
Alt.	Alternate	DI	Drain Inlet, Ductile Iron	In.	Inch	PSI	Pounds per Square Inch	Thk.	Thick
AB	Anchor Bolt	Dwg., Dwgs.	Drawing, Drawings	ID	Inside Diameter	PLF	Pounds per Linear Foot	T	Top
AC	Asphaltic Concrete	DS	Drilled Shaft	IF	Inside Face	PI	Point of Intersection	T&B	Top and Bottom
Approx.	Approximate			Int.	Interior		of Tangents	TOD	Top of Deck
Az.	Azimuth			Inv.	Invert	PIVC	Point of Intersection of Vertical Curve	TFE	Top of Footing Elevation
		EA, Ea, ea.	Each			PT	Point of Tangency, Post Tensioned	TOW	Top of Wall
Bk.	Back	EF	Each Face	Jt.	Joint		Point, Points	Tot.	Total
Bal.	Balance	EFH	Each Face Horizontal			Pt, Pts.	Point, Points	Transv.	Transverse
℄	Baseline	EFV	Each Face Vertical			PRC	Point of Reverse Curvature	TS	Structural Tubing
Bm.	Beam	EW	Each Way			PVC	Polyvinyl Chloride	Typ.	Typical
Brg., Brgs.	Bearing, Bearings	EP	Edge of Pavement	K	Kips	Pestr.	Prestressed		
BVC	Beginning of Vertical Curve	EPS	Expanded Polystyrene	KF	Kip Foot	P/S	Prestressed Strands	Undergrd.	Underground
BMP	Best Management Practices	E	East	KSF	Kips Per Square Foot	PB	Pull Box	UNO	Unless Noted Otherwise
Bet.	Between	Elec.	Electrical	KSI	Kips Per Square Inch				
BF	Both Faces, Back Face	EMH	Electrical Manhole	KLF	Kips Per Linear Foot				
BW	Both Ways	El., Elev.	Elevation			Q	Flow Rate	Var.	Varies
BFE	Bottom of Footing Elevation	Emb.	Embankment					Vert., V	Vertical
Bot., Bott., B	Bottom	Embed.	Embedded, Embedment	L	Length	Rad., R	Radius	VC	Vertical Curve
Br.	Bridge	EVC	End of Vertical Curve	lb., lbs., LBS.	Pound, Pounds	RF	Rear Face		
Blt.	Bolt	Eq.	Equal	Ltg. Std.	Lighting Standard	Rebar	Reinforcing Bar	W/C	Water/Cement Ratio
		Est.	Estimated	LF	Linear Feet/Foot	Ref.	Reference	w/	With
		Exc.	Excavation	Lin. Ft.	Linear Feet/Foot	Reinf.	Reinforced, Reinforcing, Reinforcement	W	West
		Excl.	Excluding	LS	Lump Sum			WWR	Welded Wire Reinforcing
Cant.	Cantilever	Exist., Ex.	Existing	Longit.	Longitudinal	Req'd.	Required	WW	Wing Wall
C.B.	Catch Basin	Exp., (E)	Expansion			Ref.	Retaining	WP	Work Point, Working Point
CIP	Cast-in-Place	EJ	Expansion Joint			ROW	Right of Way	WS	Water Surface
℄	Centerline	Ext.	Exterior			Rdwy.	Roadway		
CG	Center of Gravity			M	Modified				
cgs	Center to Gravity of Strands			MH	Manhole	Sch.	Schedule	Yr.	Year
cc	Center to Center			Max.	Maximum	Sect.	Section		
Cl.	Class			Mech.	Mechanical	SDMH	Sewer Drain Manhole		
Clr.	Clearance	FF	Far Face, Front Face	Min.	Minimum	Sht.	Sheet		
Col.	Column	F'c	Specified Strength of Concrete	Misc.	Miscellaneous	SRA	Shrinkage Reducing Admixture		
Conc.	Concrete		Strength of Concrete at Time of Initial Prestress	MPH	Miles Per Hour	Sl.	Slope		
Conn.	Connection					S	South		
Const.	Construction					Spc	Spacing		
CFCW	Continuous Flashing					Sprd.	Spread		
	Compound Waterproofing					Spec.	Specification		
CJ	Control Joint					SF	Square Feet		
Const. Jt.	Construction Joint					SY	Square Yard		
CLSM	Controlled Low Strength Material					SS, SSTL	Stainless Steel		
						Std.	Standard		
Cont.	Continuous					Sta.	Station		
CF	Cubic Feet					Stagg.	Staggered		
CY, Cu. Yd.	Cubic Yard					Stiff.	Stiffener		
CSL	Crosshole Sonic Logging								
		Ga.	Gage, Gauge	O/S	Offset				
		Galv.	Galvanized	oc	On Center				
		GFRP	Glass Fiber Reinforced Polymer	Opn'g	Opening				
		Gr.	Grade	OB, Outbnd.	Outbound				
		Grd.	Ground	OD	Outside Diameter				
		GRP	Grouted Rubble Pavement	OHWM	Ordinary High Water Mark				

DATE	_____
SURVEY PLOTTED BY	_____
DESIGNED BY	_____
TRACED BY	_____
NOTE BOOK	_____
QUANTITIES BY	_____
CHECKED BY	_____
No.	_____

DRAWING NAME: 2400-ONGONG-18-001-4-03 PAPANAOHIA BR. ROAD ETC. DOTH-01 2400-12-31-19 DEL. INDEX ESB-S0012 ABBREVIATING ESB-TIME 12-31-19, 11:56 AM



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SIGNATURE: *David K. Fujimura* 4-30-20
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

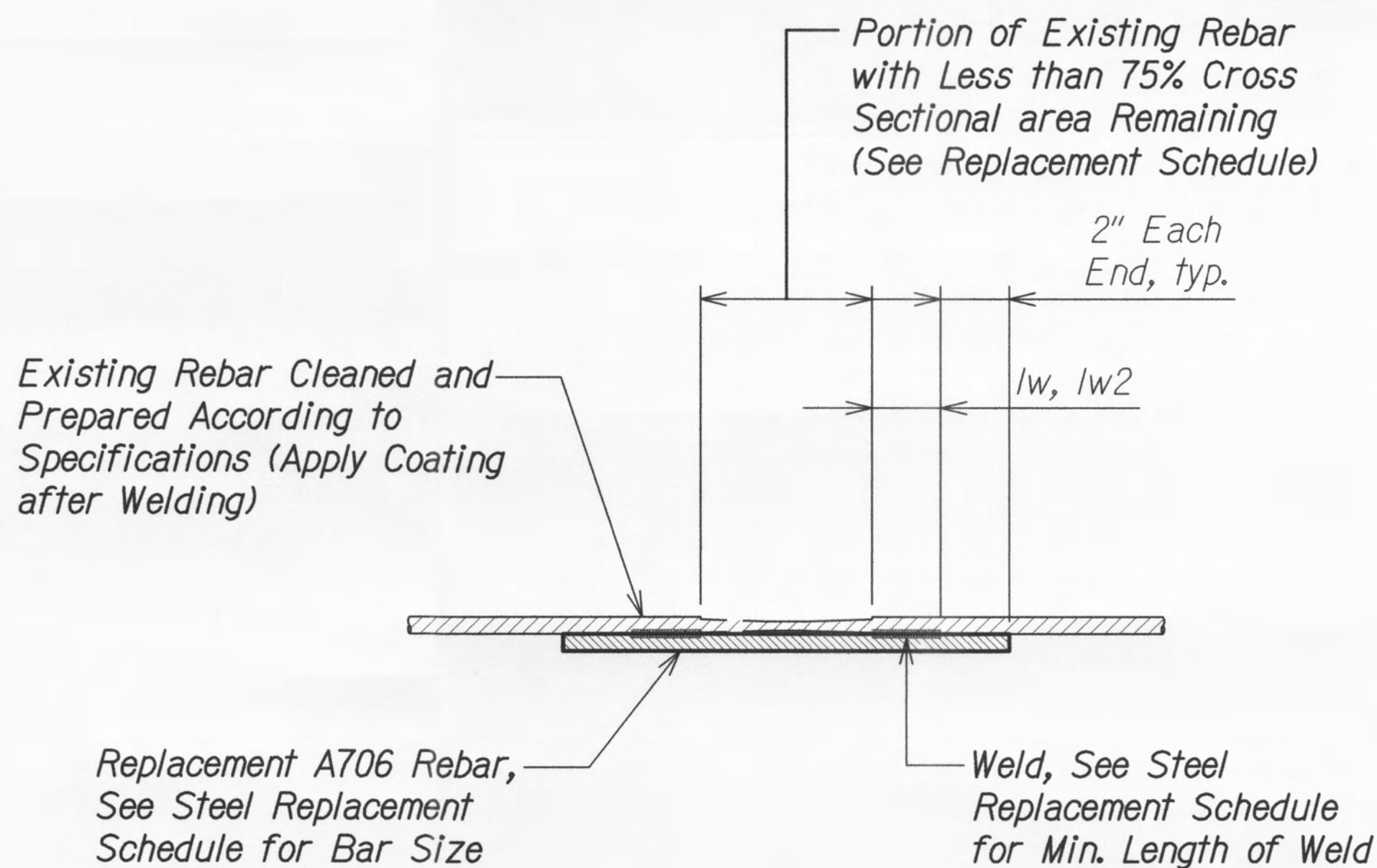
SYMBOLS AND ABBREVIATIONS

PAPANAOHIA STREAM BRIDGE
MAINTENANCE REPAIRS
Proj. No. HWY-M-06-19M

Scale: None Date: Dec. 2019

SHEET No. 503 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-06-19M	2020	10	14



REBAR REPLACEMENT ELEVATION



SECTION

LAP SPLICE FOR #8 BARS AND SMALLER
Not to Scale

REPLACEMENT SCHEDULE

SIZE OF EXISTING REINFORCING		MINIMUM SIZE (INCH)	SIZE OF NEW REPLACEMENT REINFORCING	MINIMUM LENGTH OF WELD EACH SIDE (lw)	MINIMUM LENGTH OF WELD ONE SIDE ($lw2$)
SQUARE	ROUND				
3/8"	#3	5/16"	#3	2"	4"
	#4	7/16"	#4	2"	4"
1/2"	#5	1/2"	#5	2 1/2"	5"
5/8"	#6	5/8"	#6	3 1/2"	-
3/4"	#7	3/4"	#7	4"	-
7/8" OR 1"	#8	7/8"	#8	5"	-

NOTES:

- Replacement A706 reinforcing shall be spliced to existing reinforcing on the opposite face of the concrete repair so as not to reduce the existing clear cover.
- For welding of #3, #4 and #5 replacement A706 reinforcing, welding may be performed on one side only, if lw is increased to $lw2$ as shown above.
- Welding of reinforcing steel shall be done in accordance with AWS D1.4.
- For bidding purposes, contractor shall assume 1 LB of rebar replacement required per FT^2 of defective concrete repair.

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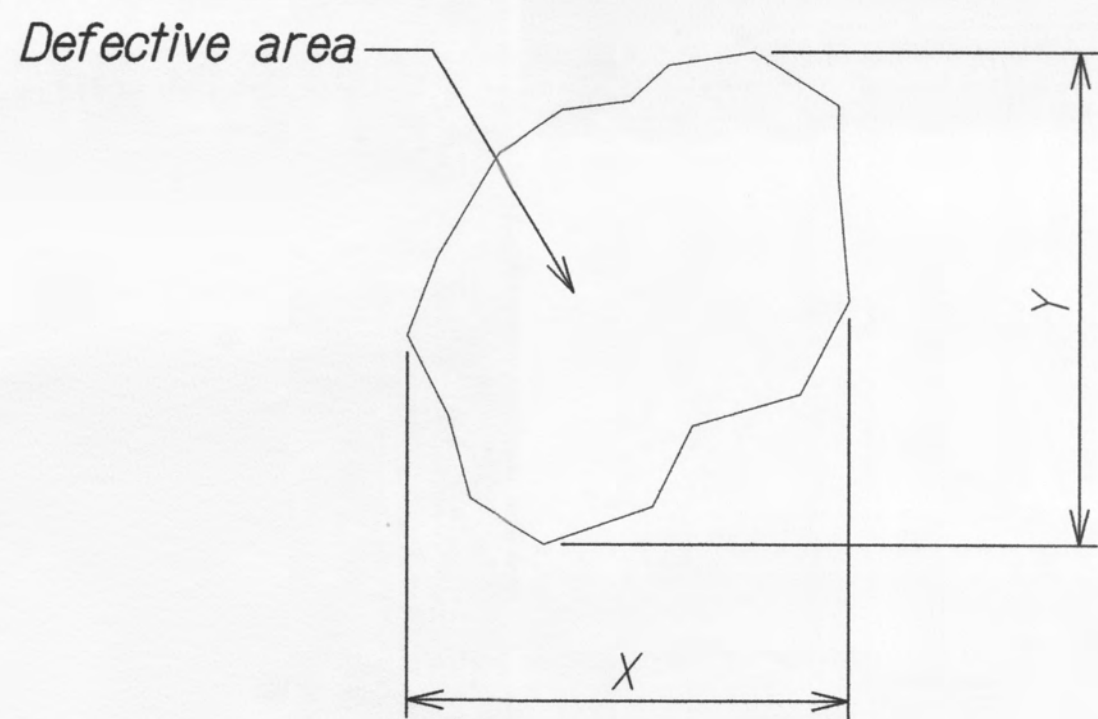
SPALL REPAIR DETAILS

**PAPANAHOA STREAM BRIDGE
MAINTENANCE REPAIRS
Proj. No. HWY-M-06-19M**

Scale: As Noted Date: Dec. 2019

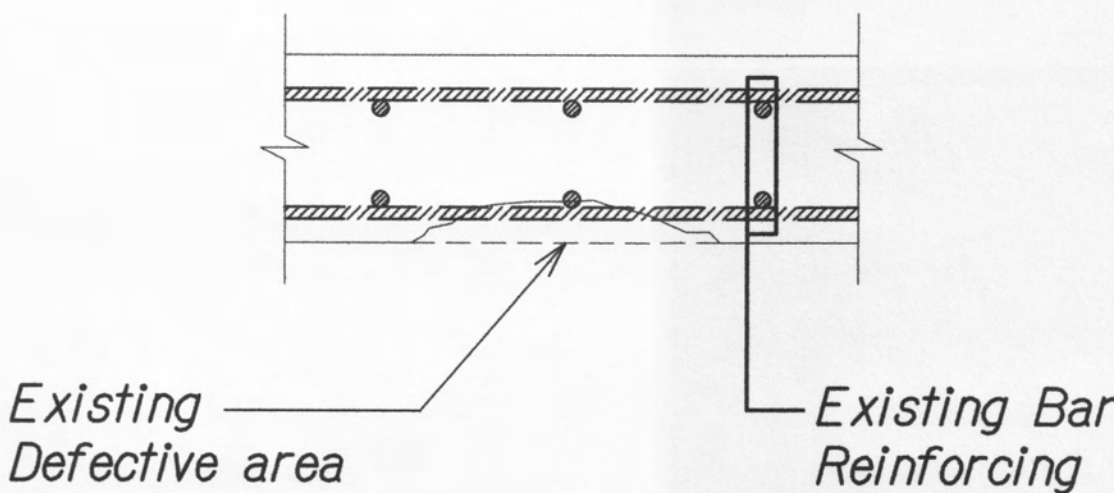
SHEET No. *SI1* OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-06-19M	2020	11	14

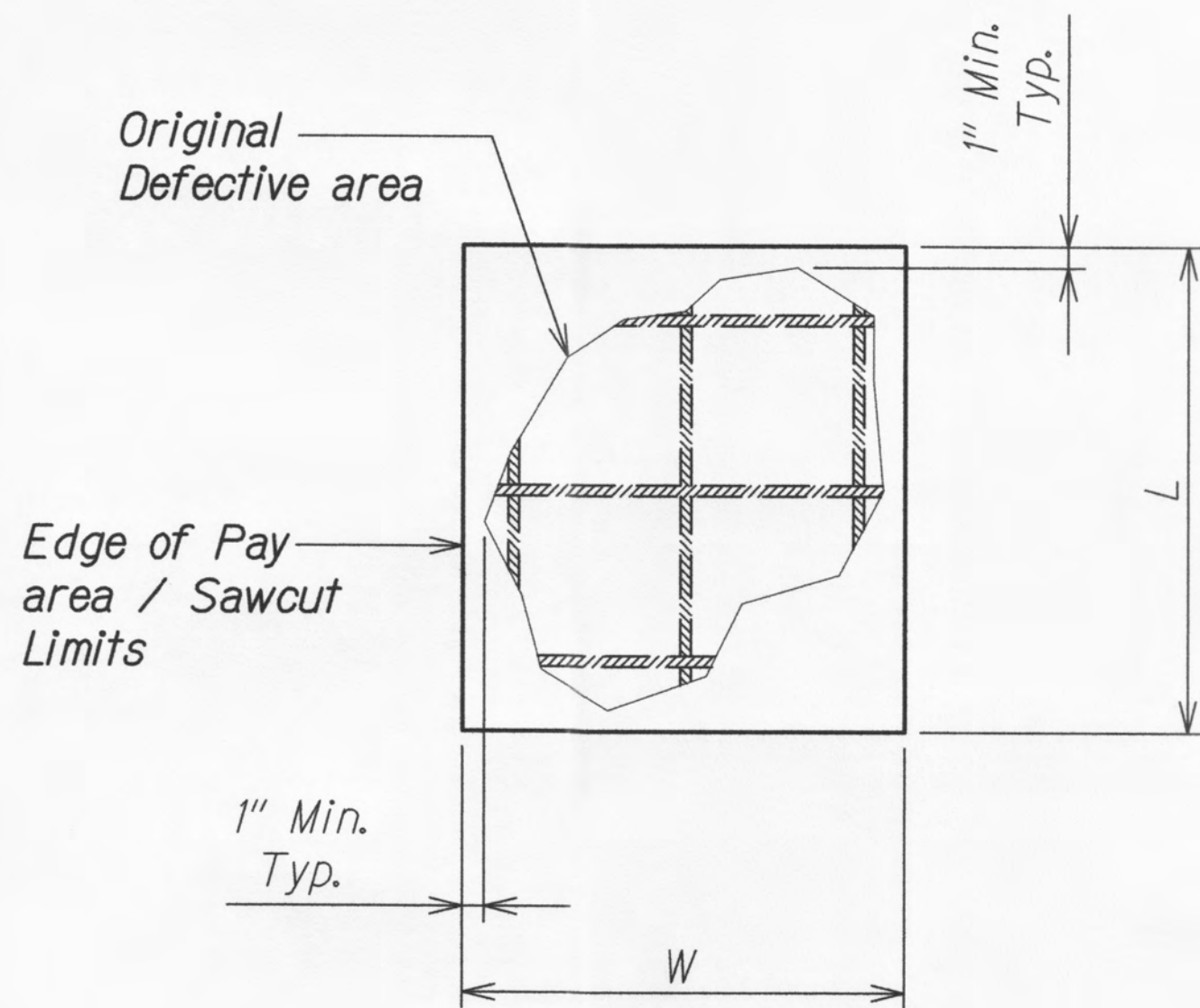


Existing defective area = $X \times Y$

DECK SOFFIT PLAN

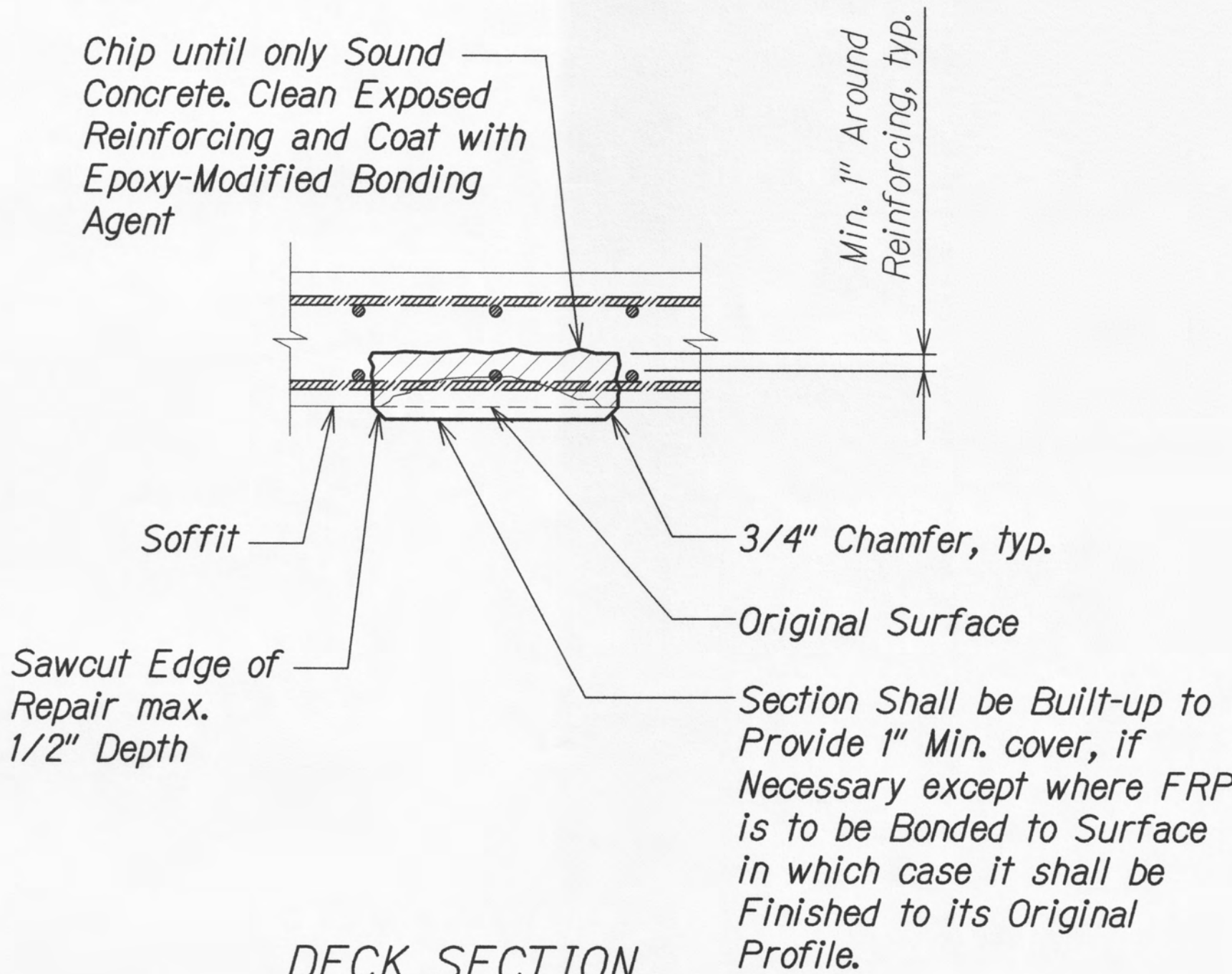


DECK SECTION



Pay area / Sawcut Limits = $W \times L$

DECK SOFFIT PLAN



DECK SECTION

CONCRETE SOFFIT REPAIR

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

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DRAWING NAME: 2A00-000000-18-001-4-03 PAPANAHOA BR. LOAD RTG-DOTW-01-240-12-31-19 DEL INDEX PGB-S0102 CONC DETAIL.DWG PLOT TIME: 12-31-19, 11:07 AM



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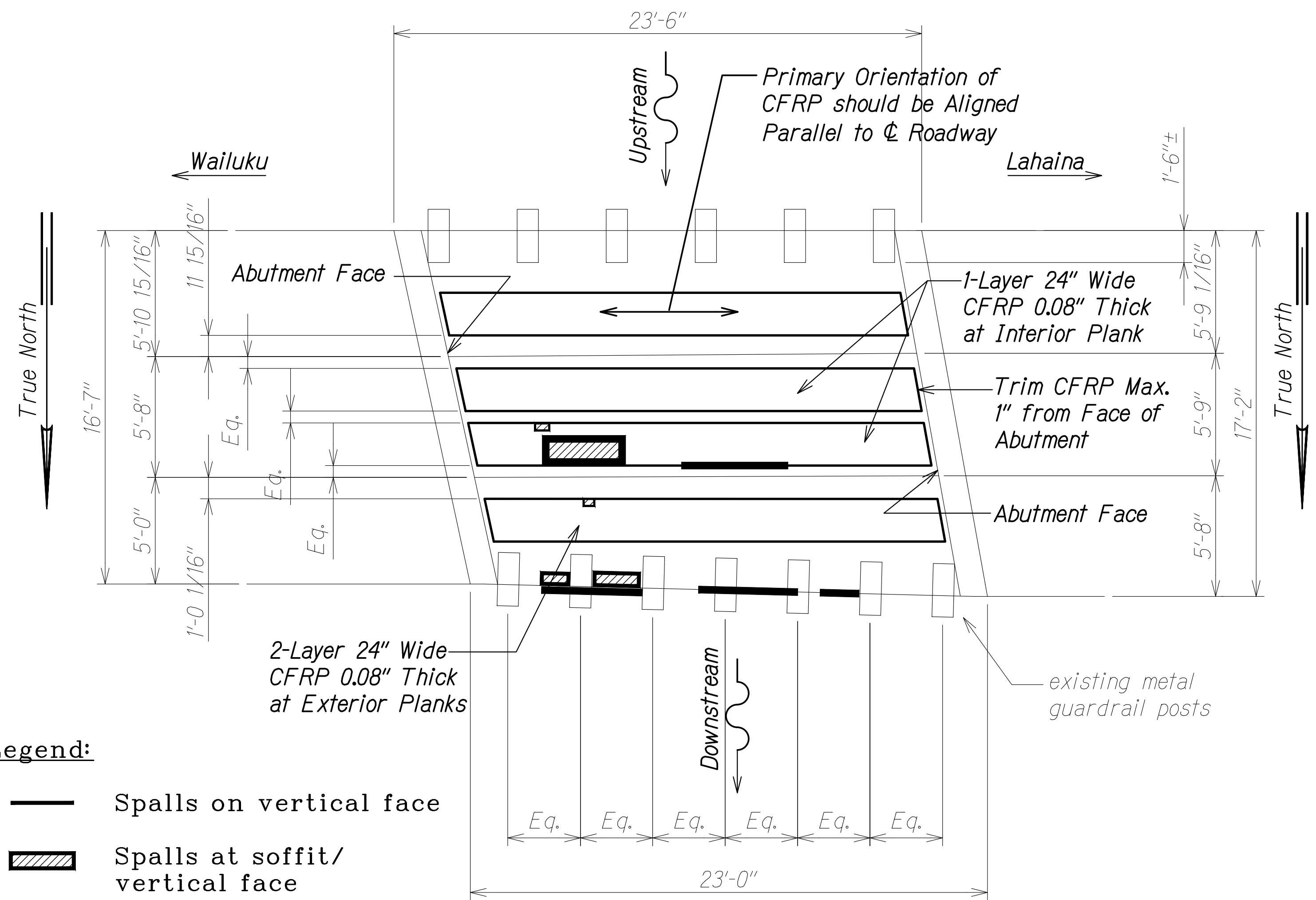
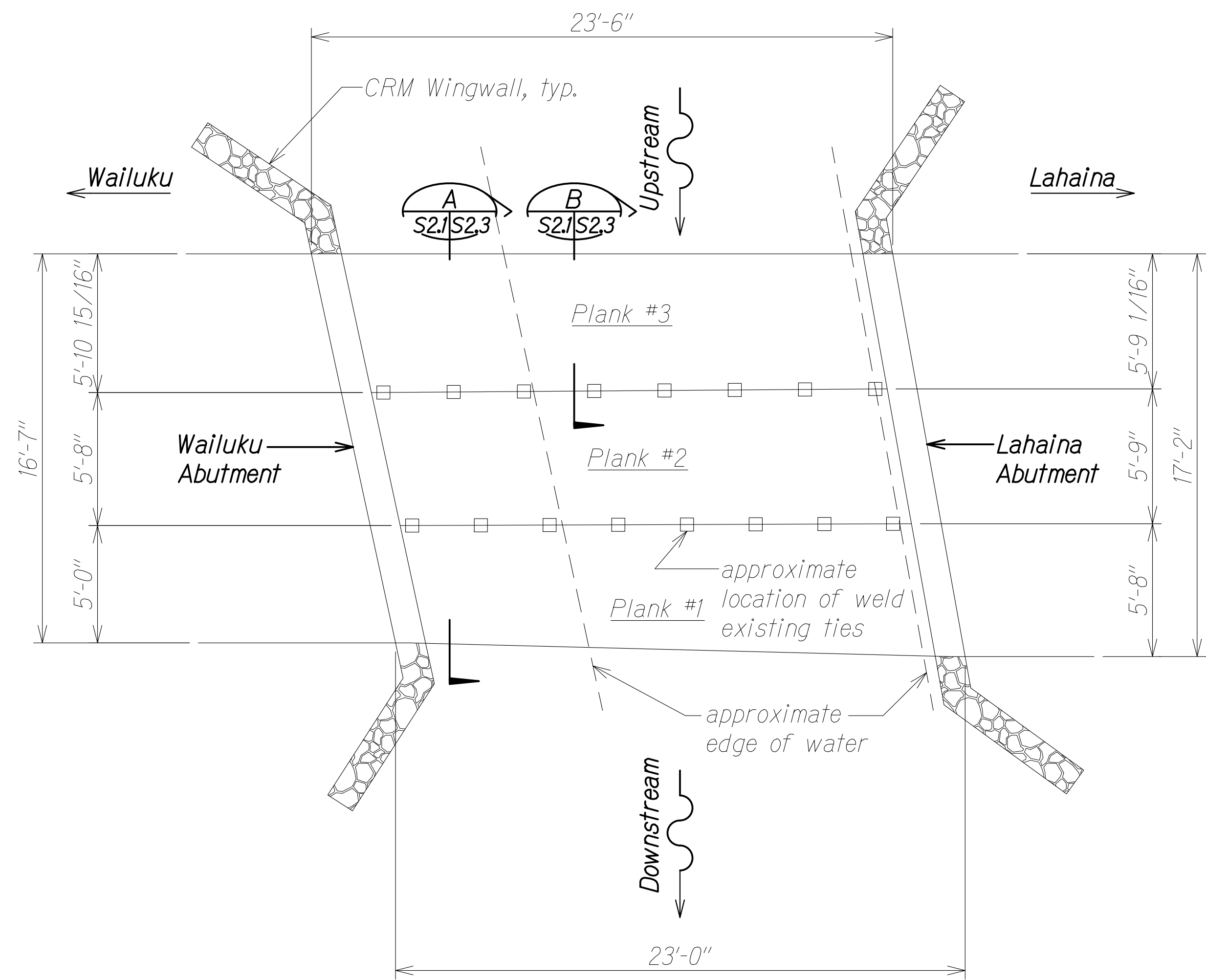
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TYPICAL CONCRETE
REPAIR DETAILS**
PAPANAHOA STREAM BRIDGE
MAINTENANCE REPAIRS
Proj. No. HWY-M-06-19M

Scale: As Noted
Date: Dec. 2019

SHEET No. 512 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-06-19M	2020	12	14



- Legend:
- Spalls on vertical face
 - Spalls at soffit/vertical face

Note:

Each layer of CFRP shall have an equivalent $E_xA = 26,688$ kips per 24" width based on material test values.

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting



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Expiration Date: _____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BRIDGE PLANS

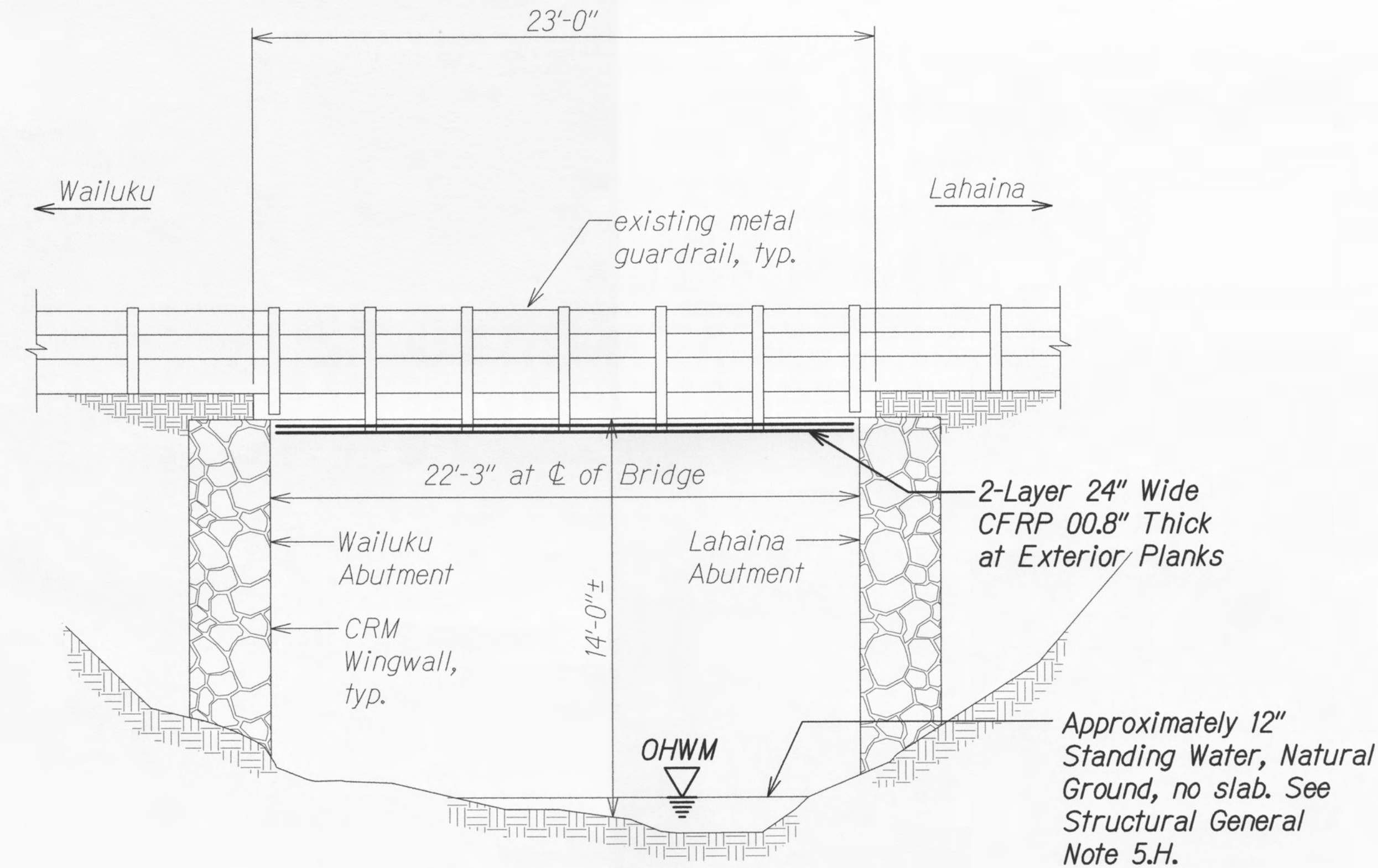
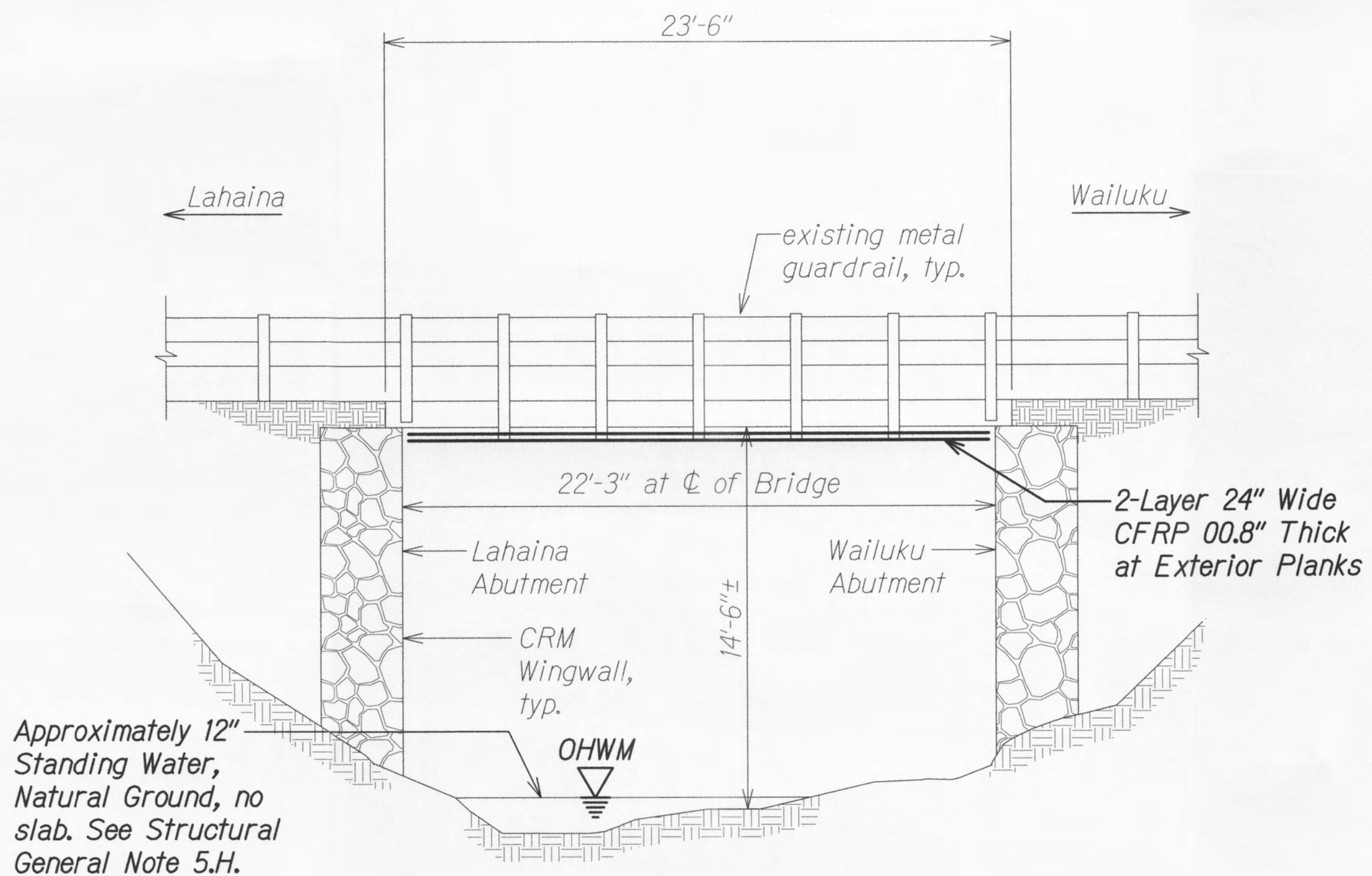
PAPANAHOA STREAM BRIDGE
MAINTENANCE REPAIRS
Proj. No. HWY-M-06-19M

Scale: As Noted Date: Dec. 2019

SHEET No. S21 OF 3 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-06-19M	2020	13	14



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DRAWING NAME: Z:\00 ONGOING\18-001.4 03 PAPANAHOA BR LOAD RTG-DOT\01 CAD\12-31-19 DEL INDEX\PSB-S0202 ELEV.DWG PLOT TIME: 12-31-19, 11:08 AM



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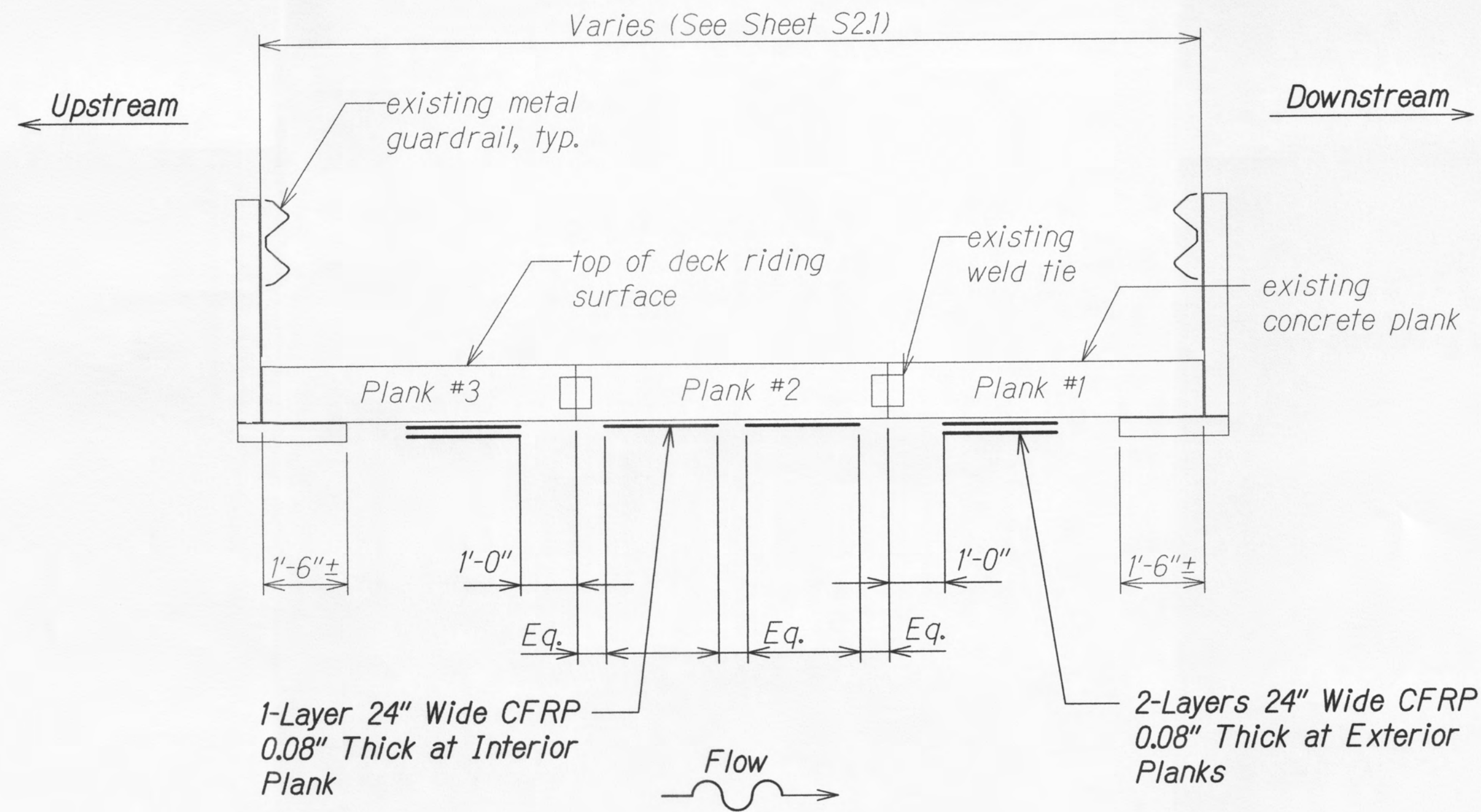
BRIDGE ELEVATIONS

**PAPANAHOA STREAM BRIDGE
MAINTENANCE REPAIRS
Proj. No. HWY-M-06-19M**

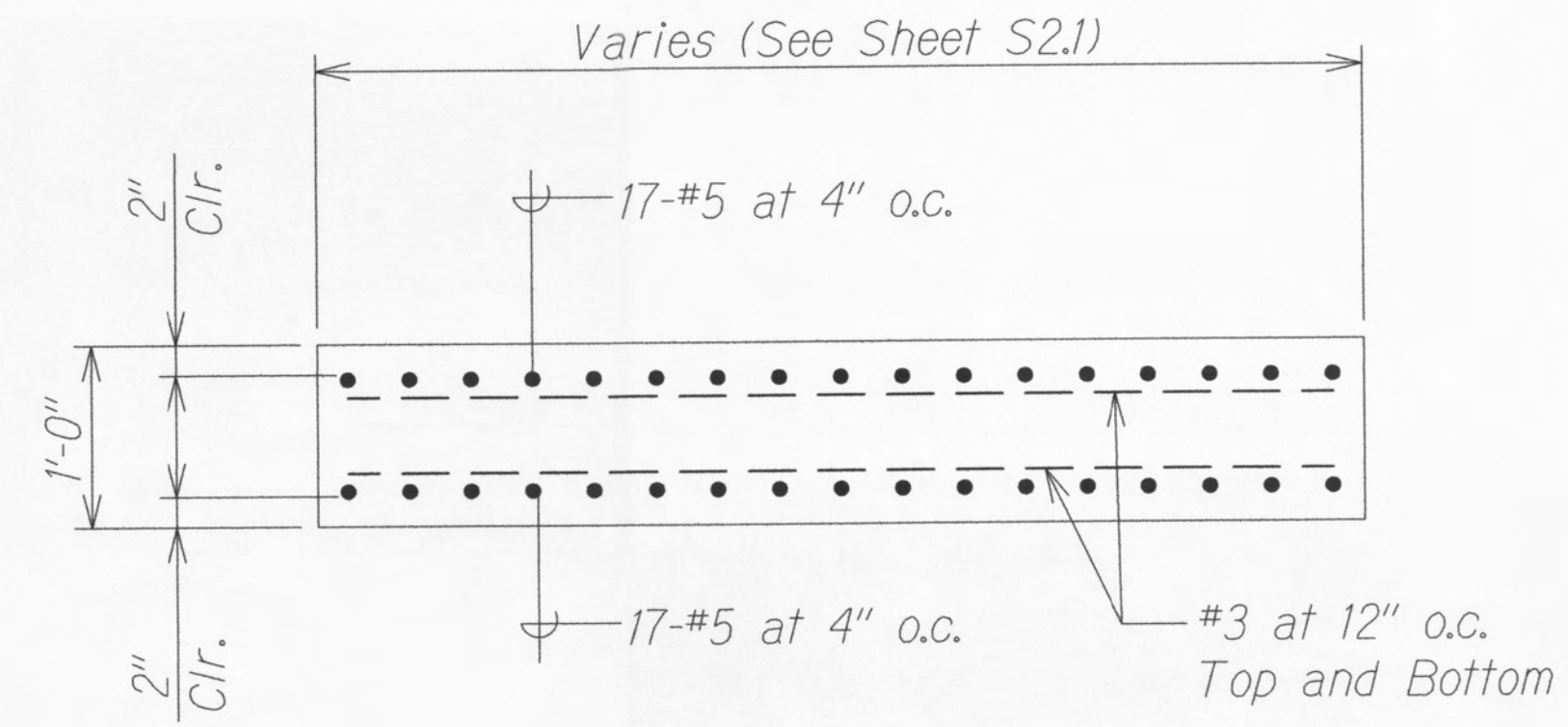
Scale: As Noted Date: Dec. 2019

SHEET No. S22 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-06-19M	2020	14	14



TRANSVERSE SECTION
 Scale: 1/2" = 1'-0"
 A
 S2.1 S2.3



TYPICAL EXISTING PLANK REINFORCING SECTION
 Scale: 1" = 1'-0"
 B
 S2.1 S2.3

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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DRAWING NAME: Z:\000 CNC\CONV\18-001.4 03 PAPANAHOA BR LOAD RTG-DOTH\01 CAD\12-31-19 DEL INDEX\PSB-50203 SECTION.DWG PLOT TIME: 12-31-19, 11:09 AM



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 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BRIDGE SECTIONS
PAPANAHOA STREAM BRIDGE
MAINTENANCE REPAIRS
Proj. No. HWY-M-06-19M

Scale: As Noted
Date: Dec. 2019

SHEET No. S23 OF 3 SHEETS