

**ROUTINE BRIDGE INSPECTION REPORT  
FEDERAL-AID PROJECT NO. BRIS-NBIS(080)  
CONTRACT NO. SC-DDC-2200014**

**FARRINGTON HIGHWAY BRIDGE OVER HONOULIULI STREAM  
BRIDGE NO. 922  
STRUCTURE NO. 003922001100001**

**DATE OF INSPECTION: September 01, 2021**



Prepared For:

City and County of Honolulu  
Department of Design and Construction

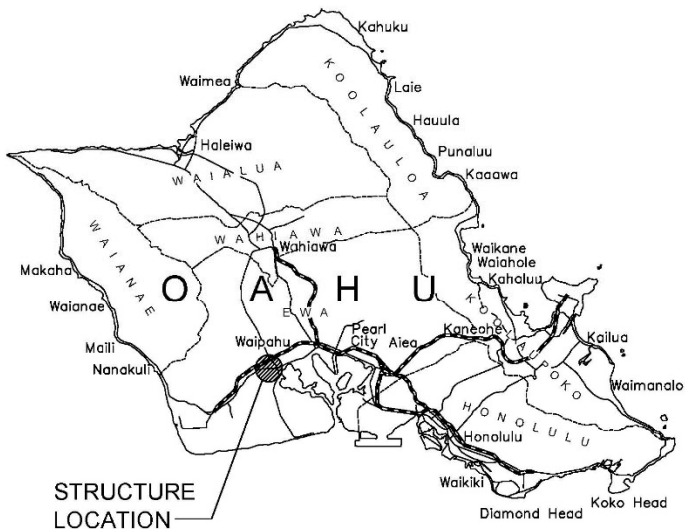
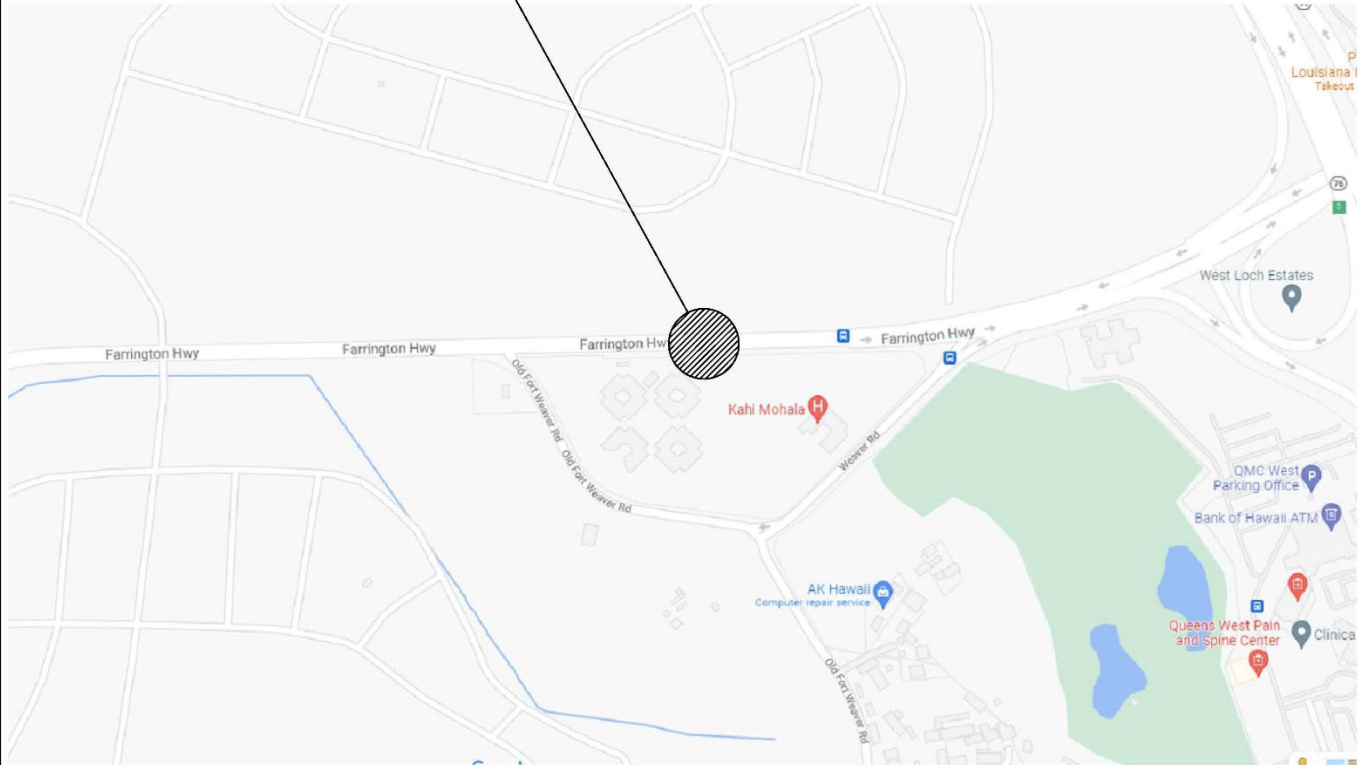
Prepared By:  
Team Leader:  
Glenn Miyasato  
(Certification Date: 06/15/2017)

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Telephone: (808) 488-7579

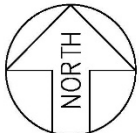
Stamp &  
Signature if  
Team Leader  
is licensed

FARRINGTON HIGHWAY BRIDGE  
 BRIDGE NO. 922  
 STRUCTURE NO. 003922001100001  
 GPS: 21°22'28" N,  
 158°02'01" W

FARRINGTON HIGHWAY BRIDGE



STRUCTURE  
 LOCATION



NOT TO SCALE

LOCATION AND VICINITY MAP  
 FARRINGTON HIGHWAY BRIDGE

FIGURE

1

SCALE: NTS

DATE: SEPTEMBER 2021

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## SECTION 1.0 – INSPECTION SUMMARY

### 1.1 BRIDGE DESCRIPTION

Year Built	1939
Lanes on Bridge	2 vehicle lanes
Sidewalk(s)	3'-0" wide upstream and downstream sidewalks
No. of Spans	1
Bridge Posting Sign(s)	Weight Limit: 32 tons Sign Locations: - Upstream east approach - Downstream west approach
Approach Slab Material and Location	N/A
Deck Wearing Surface	Asphalt Wearing Surface
Culvert Material and Type	N/A
Deck Material and Type	Reinforced concrete top flange
Superstructure Material and Type	4 Reinforced concrete girders
Substructure Material and Type	Reinforced concrete abutments with wingwalls
Bearing Type	Fixed bearings at Abutment 1 Moveable expansion bearings at Abutment 2
Bridge Railing Material	Reinforced concrete railing system
Bridge Railing Height	2'-10"

Record drawings on file at the City and County of Honolulu, Department of Design and Construction, Civil Division, include the following:

- Job Number: 4-C
- Structure Name: Honouliuli Bridge
- Project Name: Honouliuli Bridge
- Year Approved: 1938
- File Number: 4449.36 – 4449.41

Abutment 1 and Abutment 2 are at the east and west ends of the bridge, respectively.

Girder count starts from the upstream side of the bridge.



## 1.2 PARKING, BRIDGE ACCESS, AND SAFETY HAZARDS

Parking to Perform Bridge Inspection	Along shoulder of Farrington Highway at downstream east approach to bridge
Access to Underside of Bridge	Upstream west side of bridge
Equipment Used to Access Underside of Bridge	None
Traffic Control	N/A
Water Depth at Time of Inspection	0"-1'

## 1.3 OVERALL CONDITION

The bridge structure is in fair condition. Periodic bridge inspections are recommended to occur within 24-month intervals as specified in the National Bridge Inspection Standards (NBIS). National Bridge Inspection (NBI) Ratings for the previous inspection and the current inspection are as follows:

NBI ITEM		NBI RATINGS	
		PREVIOUS INSPECTION	CURRENT INSPECTION
#36	Traffic Safety Features (Bridge Railings, Transitions, Approach Guardrail, Approach Guardrail Ends) <small>(Per BrM Database)</small>	0, 0, 0, 0	0, 0, 0, 0
#58	Deck	6	6
#59	Superstructure	5	5
#60	Substructure	5	5
#61	Channel & Channel Protection	6	6
#62	Culvert	N	N
#67	Structural Condition	4	4
#71	Waterway Adequacy Comments: Observed conditions appear similar to the previous inspection. No analysis was performed to evaluate flood/overtopping risk.	7	7
#113	Scour Comments: No scour observed	3	3

## **SECTION 2.0 – LOAD RATING SUMMARY**

The bridge is currently posted for reduced load carrying capacity. Load posting signs were observed at bridge approaches. Based on visual observations at the time of this inspection, there appears to be no immediate signs of overstress or increased distress for the bridge that would affect rating calculations since the last inspection report dated November 19, 2019 by Nagamine Okawa Engineers Inc. The most recent load rating was performed on December 2, 2019 by Nagamine Okawa Engineers Inc. See the following load rating summary sheets.

**CITY AND COUNTY OF HONOLULU  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
CIVIL DESIGN AND ENGINEERING DIVISION**

**Existing Bridge Data**

**Bridge Load Rating Summary**

Structure Number:	003922001100001	Last Load Rating Date:	2/27/2015
Bridge Name:	Farr Hwy Bridge	Last Inspection Date:	11/19/2019
Bridge Number:	922	Inspected By:	Nagamine Okawa
District:	Waianae	Fracture Critical Member (Y/N):	N
Span Type:	RC T Beam	Item 58, Deck Rating:	6
Bridge Plans Available (Y/N):	Y	Item 59, Superstructure Rating:	5
Design Loading:	-	Item 60, Substructure Rating:	5
Past Inventory Rating (HL93):	0.54	Bridge Load Posted (Y/N):	N
Past Operating Rating (HL93):	0.70	Posted Weight Limit:	N/A

**Bridge Load Rating Summary**

<b>Dead Load Data</b>		<b>LRFR Evaluation Factors</b>	
Overlay Type:	AC	Surface Roughness Rating:	3
Overlay Depth (IN):	2	Condition Factor:	0.95
Was Overlay Depth Measured (Y/N):	Y	System Factor:	1.00
Weight of Utilities:	0.003 k/ft	ADTT (one way):	Unknown
Weight of other Non-Structural Attachments:	n/a		

**Superstructure/Deck Rating Summary**

	Vehicle Type	Vehicle GVW (Kips)	Rating Factor	Controlling Member	Controlling Load Effect	Live Load Distribution	
						IM	Factor
Design Load	HL-93 (INV)	N/A	0.69	Interior Girder	Flexure	33%	0.717
	HL-93 (OPR)	N/A	0.89	Interior Girder	Flexure	33%	0.717
	Type 3	50.0	1.64	Interior Girder	Flexure	10%	0.717
Legal Load	Type 3S2	72.0	1.79	Interior Girder	Flexure	10%	0.717
	Type 3-3	80.0	1.95	Interior Girder	Flexure	10%	0.717
	NRL	80.0	1.05	Interior Girder	Flexure	10%	0.717
	SU4	54.0	1.43	Interior Girder	Flexure	10%	0.717
	SU5	62.0	1.32	Interior Girder	Flexure	10%	0.717
	SU6	69.5	1.19	Interior Girder	Flexure	10%	0.717
	SU7	77.5	1.10	Interior Girder	Flexure	10%	0.717
	EV2	57.5	2.30	Interior Girder	Shear	10%	0.779
	EV3	86.0	1.55	Interior Girder	Shear	10%	0.779
	Permit Load	HP1	120.0	1.56	Interior Girder	Flexure	10%
HP2		157.1	1.64	Interior Girder	Shear	10%	0.779
HP3		209.9	2.12	Interior Girder	Shear	10%	0.779

**Substructure Rating Summary**

Substructure Rated (Y/N):	N
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Vehicle Type	Vehicle GVW (Kips)	Rating Factor	Controlling Member	Controlling Load Effect	Live Load Distribution	
					IM	Factor
HL-93 (INV)	N/A					
HL-93 (OPR)	N/A					
Legal Load						
Permit Load						

**Posting Analysis Summary**

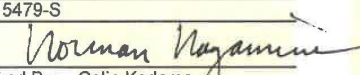
Legal Load	Governing Legal Load Rating Factor:	1.10
	Governing Legal Load Model:	SU7
	Posting Recommended (Y/N):	N
	Recommended Posting Load:	-
EV	EV2 Rating Factor	2.30
	EV3 Rating Factor	1.55
	Recommended Single Axle Posting	-
	Recommended Tandem Posting	-
	Recommended GVW Posting	-

**Please check the following boxes that apply:**

- Bridge load rating is not governed by deck rating
- Bridge load rating is not governed by substructure rating
- Connections do not control the bridge load rating
- Exterior girder controls the bridge load rating
- Bridge plans do not exist - Rating based on judgement and current loading

**Remarks/Recommendations for Bridges without Plans**

**Quality Control/Quality Assurance**

Load Rating Engineer	
- Name:	Norman Nagamine
- License No.:	5479-S
- Signature:	
Load Rating Checked By:	Colin Kodama
Quality Assurance By:	Karl Umemoto
Load Rating Date:	12/2/2019

**CITY AND COUNTY OF HONOLULU  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
CIVIL DESIGN AND ENGINEERING DIVISION  
Bridge Load Rating Summary**

**Existing Bridge Data**

Structure Number:	003922001100001	Last Load Rating Date:	2/27/2015
Bridge Name:	Farr Hwy Bridge	Last Inspection Date:	11/19/2019
Bridge Number:	922	Inspected By:	Nagamine Okawa
District:	Waianae	Fracture Critical Member (Y/N):	N
Span Type:	RC T Beam	Item 58, Deck Rating:	6
Bridge Plans Available (Y/N):	Y	Item 59, Superstructure Rating:	5
Design Loading:	-	Item 60, Substructure Rating:	5
Past Inventory Rating (HL-93):	0.54	Bridge Load Posted (Y/N):	N
Past Operating Rating (HL-93):	0.70	Posted Weight Limit:	N/A

**Bridge Load Rating Summary**

<b>Dead Load Data</b>		<b>LRFR Evaluation Factors</b>	
Overlay Type:	AC	Surface Roughness Rating:	3
Overlay Depth (IN):	2	Condition Factor:	0.95
Was Overlay Depth Measured (Y/N):	Y	System Factor:	1.00
Weight of Utilities:	0.003 k/ft	ADTT (one way):	Unknown
Weight of other Non-Structural Attachments:	n/a	ADT:	-

**Superstructure/Deck Rating Summary**

	Vehicle Type	Vehicle GVW (Kips)	Rating Factor	Travel	Controlling Member	Controlling Load Effect	Live Load Distribution	
							iM	Factor
Refuse Vehicles	REF1	51.00	1.70	Yes	Interior Girder	Flexure	10%	0.717
	REF2	57.18	1.47	Yes	Interior Girder	Flexure	10%	0.717
	REF3	45.94	1.64	Yes	Interior Girder	Flexure	10%	0.717
	REF4	57.50	1.47	Yes	Interior Girder	Flexure	10%	0.717
Buses	BUS1	30.99	2.46	Yes	Interior Girder	Flexure	10%	0.717
	BUS2	39.60	1.97	Yes	Interior Girder	Flexure	10%	0.717
	BUS3	39.60	2.11	Yes	Interior Girder	Shear	10%	0.779
	BUS4	64.38	2.09	Yes	Interior Girder	Shear	10%	0.779
	BUS5	67.24	1.90	Yes	Interior Girder	Shear	10%	0.779
	BUS6	67.78	1.89	Yes	Interior Girder	Shear	10%	0.779
	BUS7	66.79	1.92	Yes	Interior Girder	Shear	10%	0.779
	BUS8	39.90	2.05	Yes	Interior Girder	Shear	10%	0.779
	BUS9	39.60	2.23	Yes	Interior Girder	Shear	10%	0.779
	BUS10	39.60	2.23	Yes	Interior Girder	Shear	10%	0.779
	BUS11	42.54	2.06	Yes	Interior Girder	Shear	10%	0.779
Honolulu Fire Department Trucks	HFD1	38.40	2.48	Yes	Interior Girder	Shear	10%	0.779
	HFD2	42.74	2.30	Yes	Interior Girder	Shear	10%	0.779
	HFD3	43.50	2.27	Yes	Interior Girder	Shear	10%	0.779
	HFD4	49.80	2.01	Yes	Interior Girder	Shear	10%	0.779
	HFD5	49.80	2.04	Yes	Interior Girder	Shear	10%	0.779
	HFD6	49.80	2.01	Yes	Interior Girder	Shear	10%	0.779
	HFD7	52.20	1.97	Yes	Interior Girder	Shear	10%	0.779
	HFD8	62.74	1.63	Yes	Interior Girder	Flexure	10%	0.717
	HFD9	73.50	1.41	Yes	Interior Girder	Flexure	10%	0.717
	HFD10	59.24	2.23	Yes	Interior Girder	Shear	10%	0.779
	HFD11	60.00	1.67	Yes	Interior Girder	Flexure	10%	0.717
	HFD12	51.18	1.86	Yes	Interior Girder	Flexure	10%	0.717
	HFD13	58.00	1.60	Yes	Interior Girder	Flexure	10%	0.717
	HFD14	44.00	2.17	Yes	Interior Girder	Shear	10%	0.779
	HFD15	44.00	2.21	Yes	Interior Girder	Shear	10%	0.779
HFD16	44.00	2.27	Yes	Interior Girder	Shear	10%	0.779	
HFD17	42.74	2.50	Yes	Interior Girder	Shear	10%	0.779	
HFD18	76.60	1.76	Yes	Interior Girder	Flexure	10%	0.717	
HFD19A	77.56	1.95	Yes	Interior Girder	Shear	10%	0.779	
HFD19B	77.56	1.37	Yes	Interior Girder	Flexure	10%	0.717	
HFD20A	87.56	1.86	Yes	Interior Girder	Shear	10%	0.779	
HFD20B	87.56	1.37	Yes	Interior Girder	Flexure	10%	0.717	
HFD21	42.00	2.40	Yes	Interior Girder	Shear	10%	0.779	
HFD22	37.00	2.78	Yes	Interior Girder	Shear	10%	0.779	

**Substructure Rating Summary**

Substructure Rated (Y/N):	N
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**Recommended Refuse Vehicle**

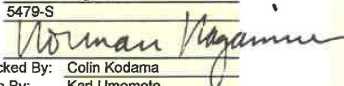
Recommended Refuse LR Factor:	1.70
Recommended Refuse Load Model:	REF1
Recommended Max Payload:	FULL

**Please check the following boxes that apply:**

- Bridge load rating is not governed by deck rating
- Bridge load rating is not governed by substructure rating
- Connections do not control the bridge load rating
- Exterior strip controls the bridge load rating
- Bridge plans do not exist - Rating based on judgement and current loading

\*Payload is the Allowable Vehicle Load Carrying Capacity

**Quality Control/Quality Assurance**

Load Rating Engineer	
- Name:	Norman Nagamine
- License No.:	5479-S
- Signature:	
Load Rating Checked By:	Colin Kodama
Quality Assurance By:	Karl Umemoto
Load Rating Date:	12/2/19

**Remarks/Recommendations for Bridges without Plans**

\*Refuse (REF) vehicles may travel over the bridge at the reduced allowable payload indicated.

## **SECTION 3.0 – BrM ELEMENT AND SI&A REPORTS**

BrM Element and SI&A Reports for this inspection cycle are provided on the following pages.

STATE OF HAWAII  
CITY & COUNTY OF HONOLULU  
BRIDGE INSPECTION REPORT

Inspection Date: September 01, 2021

Bridge Number: 003922001100001 Bridge Name: FARRINGTON HWY BRIDGE

County Oahu Route No: 09107 Milepost: 0 Facility: FARR HWY

NBI ITEM 36 - TRAFFIC SAFETY FEATURES		List any maintenance work required: (ie: defects, missing bolts, collision damage, etc.)
36A	Bridge Railings	36A: See Element Defects below.
36B	Transitions	
36C	Approach Guardrail	
36D	Approach Guardrail Ends	

ELEMENT INSPECTION								
ELEM NO.	ELEMENT / DEFECT DESCRIPTION	ENV.	TOTAL QUANTITY	UNIT	CS 1 (Good)	CS 2 (Fair)	CS 3 (Poor)	CS 4 (Severe)
DEFECT								
16	Re Conc Top Flange	1	1,607	sq.ft	1,594	13	0	0
1120	Efflorescence/Rust Staining		13	sq.ft	0	13	0	0
510	Wearing Surfaces		1,607	sq.ft	1,607	0	0	0
Defect No. 1120: - Moderate width cracks with surface white efflorescence (13SF CS2) on top flange soffit (Photos 19 – 21)								
110	Re Conc Opn Girder/Beam	1	204	ft	194	10	0	0
1080	Delamination/Spall/Patched		1	ft	0	1	0	0
1090	Exposed Rebar		1	ft	0	1	0	0
1130	Cracking (RC and Other)		8	ft	0	8	0	0
Defect No. 1080: - 6"x2"x2" edge spall (1FT CS2) on girder G4 (Photo 22)								
Defect No. 1090: - 4"x4" edge spall with exposed rebar without section loss (1 FT CS2) on girder G3 (Photo 23)								
Defect No. 1130: - Moderate width diagonal cracks (8FT CS2) on all girders (Photo 24)								
215	Re Conc Abutment	1	173	ft	42	129	2	0
1130	Cracking (RC and Other)		32	ft	0	30	2	0
1190	Abrasion(PSC/RC)		99	ft	0	99	0	0
Defect No. 1130: - Wide vertical crack (1FT CS3) on Abutment 2 below girder G2 (Photo 27) - Wide vertical crack (1FT CS3) on downstream west wingwall (Photo 28) - Moderate width cracks (30FT CS2) on both abutments and all wingwalls (Photo 29)								
Defect No. 1190: - Partial abrasion (99FT CS2) along entire length of Abutment 1 and wingwalls (Photo 30)								

311	Moveable Bearing	1	4	each	4	0	0	0
313	Fixed Bearing	1	4	each	4	0	0	0
331	Re Conc Bridge Railing	1	103	ft	32	71	0	0
1080	Delamination/Spall/Patched		25	ft	0	25	0	0
1090	Exposed Rebar		1	ft	0	1	0	0
1130	Cracking (RC and Other)		45	ft	0	45	0	0

Defect No. 1080:

- Typical delaminations and spalls (25FT CS2) on pickets, top and bottom rails of both bridge railings (Photos 10 - 14)

Defect No. 1090:

- Exposed rebar without section loss (1FT CS2) on downstream bridge railing (Photo 15)

Defect No. 1130:

- Typical moderate width cracks (45FT CS2) on both bridge railings (Photo 16)

NBI ITEM CONDITION RATINGS			Describe defects noted during bridge inspection. Provide sketches, diagrams, and photographs where possible.
58	Deck	6	See bridge element/defect notes and descriptions listed for defects noted during inspection. See also report, photographs and figures for defects noted during inspection.
59	Superstructure	5	
60	Substructure	5	
61	Channel and Channel Protection	6	
62	Culvert	N	
71	Waterway Adequacy	7	

NBI ITEM 93 - CRITICAL FEATURE INSPECTION		REQUIRED	FREQUENCY	CURRENT	NEXT
93A	Fracture Critical Details	N			
93B	Underwater Inspection	N		12/21/11	

OTHER FEATURES		REMARKS
Posted Status (NBI Item 41)	P - Posted for load	Bridge posted for 32 tons at east and west approaches. Bridge posting not required according to previous load rating summary sheet.
Posted Weight Limit	(Posted limit (Tons) or 'N' if not applicable) 32	
Signing for Posting Legible/Visible? (Provide 2 pictures of signs. 1 on each end of bridge)	(Y or N) Y	
Riding Surface (Roughness) Rating	(3 - smooth, 2 - Avg, 1 - Poor) 3	

REPAIRS, IMPROVEMENTS AND RECOMMENDATIONS
List all work done to this bridge since last inspection (ie: structural repair work, cleaning, maintenance work, etc.)
List proposed and/or recommended work for this bridge including estimated cost (ie: structural repair work, cleaning, maintenance, etc.)



- Upgrade bridge railings to current acceptable standards (Est. Cost = \$250,000)
- Upgrade guardrail transitions and guardrail ends to meet current acceptable standards ( Off-Bridge Repair Item)
- Repair spalls/delamiantions on bridge railings (Est. Cost = \$15,000)
- Repair cracks on abutments and wingwalls (Est. Cost = \$1,000)

Other comments or observations.

**Inspector:**                      **Signature:** \_\_\_\_\_ **Phone:** 808-488-7579  
Amar P Jaishi

**Inspector:**                      **Signature:** \_\_\_\_\_ **Phone:** 808-488-7579  
Noe Lum

**Team Leader:**                  **Signature:** \_\_\_\_\_ **Phone:** 808-488-7579  
Glenn Miyasato

**Office:** MKE Associates LLC      **Certification Date:** 06/15/2017

**BIP Leader:**                      **Signature:** \_\_\_\_\_ **QC Date:** \_\_\_\_\_  
Stanley Katsura

**Office:** C&C of Honolulu

Attachments:

Structural Inventory & Appraisal (SI&A) Sheet

Photos

State of Hawaii  
Department of Transportation  
Structure Inventory and Appraisal Sheet (English Units)

Name: **FARRINGTON HWY BRIDGE**

Bridge No: **003922001100001**

Inspection Date: **09/01/2021**

IDENTIFICATION										
Rte.(On/Under)	<b>5A:</b>	Route On Structure	State	<b>1:</b>	15 Hawaii					
Rte. Signing Prefix	<b>5B:</b>	5 City Street	Facility Carried	<b>7:</b>	FARR HWY					
Level of Service	<b>5C:</b>	0 None of the below	Place Code	<b>4:</b>						
Route Number	<b>5D:</b>	09107	SHD District	<b>2:</b>	25 Oahu					
Directional Suffix	<b>5E:</b>	0 N/A (NBI)	Feature Intersected	<b>6:</b>	FARR HWY/HONOULIULI STRM					
Border Bridge Code	<b>98:</b>	Unknown (P)	County Code	<b>3:</b>	Oahu					
Border Bridge Number	<b>99:</b>	NA	Location	<b>9:</b>	TMK=9-1-17					
Mile Post	<b>11:</b>	NA	Latitude	<b>16:</b>	21° 22' 28"					
Struc Num	<b>8:</b>	003922001100001	Longitude	<b>17:</b>	158° 02' 01"					
INSPECTION										
Inspection Date	<b>90:</b>	9/1/2021	Frequency	<b>91:</b>	24 months	Next Inspection:	9/1/2023			
FC Inspection Date	<b>93A:</b>	NA	FC Frequency	<b>92A:</b>		Next FC Inspection:				
UW Inspection Date	<b>93B:</b>	NA	UW Frequency	<b>92B:</b>		Next UW Inspection:				
CONDITION										
Deck	<b>58:</b>	6 Satisfactory	Super	<b>59:</b>	5 Fair	Sub	<b>60:</b>	5 Fair	SD/FO:	ND
Culvert	<b>62:</b>	N N/A (NBI)	Channel/Channel Protection	<b>61:</b>	6 Bank Slumping	SUFF RATE:	49.1			
LOAD RATING AND POSTING										
Inventory Rating Method	<b>65:</b>	8 LRFR (HL93)	Operating Rating Method	<b>63:</b>	8 LRFR (HL93)					
Inventory Rating	<b>66:</b>	0.69	Operating Rating	<b>64:</b>	0.89					
Design Load	<b>31:</b>	5 MS 18 (HS 20)	Posting	<b>70:</b>	5 At/Above Legal Loads					
Posting Status	<b>41:</b>	A - Open, no restriction								
GEOMETRIC DATA										
Length Max Span	<b>48:</b>	40.03 ft	Structure Length	<b>49:</b>	54.13 ft					
Width Curb to Curb	<b>51:</b>	23.95 ft	Curb/Sdwk Width L	<b>50A:</b>	2.95 ft					
Approach Roadway width (w/ shoulders)	<b>32:</b>	28.87 ft	Curb/Sidewalk Width R	<b>50B:</b>	2.95 ft					
Deck Area:		1,743.75 sq. ft	Width Out to Out	<b>52:</b>	32.15 ft					
Skew	<b>34:</b>	33.00°	Median	<b>33:</b>	0 No median					
Vertical Clearance	<b>10:</b>	99.99 ft	Structure Flared	<b>35:</b>	0 No flare					
Min. Vert. Cl. Over Bridge	<b>53:</b>	99.99 ft	Horizontal Clearance	<b>47:</b>	23.95 ft					
Min. Vert. Undercl. Ref.	<b>54A:</b>	N Feature not hwy	Min. Lat. Undercl. Ref. R	<b>55A:</b>	N Feature not hwy or RR					
Min. Vert. Undercl.	<b>54B:</b>	0.00 ft	Min. Lat. Undercl. R	<b>55:</b>	0.00 ft					
			Min. Lat. Undercl. L	<b>56:</b>	0.00 ft					
AGE AND SERVICE										
Year Built	<b>27:</b>	1939	ADT	<b>29:</b>	7,587					
Type of Service on	<b>42A:</b>	5 Highway-pedestrian	Year Reconstructed	<b>106:</b>	-1					
Type of Service under	<b>42B:</b>	5 Waterway	Detour Length	<b>19:</b>	9.9 mi					
Lanes on	<b>28A:</b>	2	Truck ADT	<b>109:</b>	0%					
Lanes under	<b>28B:</b>	0	Year of ADT	<b>30:</b>	1987					
STRUCTURE TYPE AND MATERIALS										
Deck Type	<b>107:</b>	1 Concrete-Cast-in-Place	Number of Spans Main Unit	<b>45:</b>	1					
Wearing Surface	<b>108A:</b>	6 Bituminous	Main Span Material Design	<b>43A:</b>	1 Concrete					
Membrane	<b>108B:</b>	0 None	Main Span Material Design	<b>43B:</b>	04 Tee Beam					
Deck protection	<b>108C:</b>	None	Number of Approach Spans	<b>46:</b>	0					

State of Hawaii  
 Department of Transportation  
 Structure Inventory and Appraisal Sheet (English Units)

APPRAISAL					
Bridge Rail	36A:	0 Substandard	Approach Rail	36C:	0 Substandard
Transition	36B:	0 Substandard	Approach Rail Ends	36D:	0 Substandard
Str Evaluation	67:	5 Above Min Tolerable	Deck Geometry	68:	2 Intolerable - Replace
Waterway Adequacy	71:	7 Above Minimum	Approach Alignment	72:	8 Equal Desirable Crit
Scour Critical	113:	3 SC - Unstable	Vert. & Horiz. Undercl.	69:	N Not applicable (NBI)
CLASSIFICATION					
Defense Highway	100:	0 Not a STRAHNET hwy	Parallel Structure	101:	No    bridge exists
Direction of Traffic	102:	2 2-way traffic	Temporary Structure	103:	Unknown (NBI)
Highway System	104:	3 On free road	NBIS Length	112:	Long Enough
Defense Hwy	110:	0 Not on NHS	Functional Class	26:	17 Urban Collector
Toll Facility	20:	0 Not a STRAHNET hwy	Historical Significance	37:	5 Not eligible for NRHP
Owner	22:	County Hwy Agency	Custodian	21:	County Hwy Agency
PROPOSED IMPROVEMENTS					
Bridge Cost	94:	\$0	Type of Work	75:	38 Other Structural
Roadway Cost	95:	\$19,000	Length of Improvement	76:	76.8 ft
Total Cost	96:	\$282,000	Future ADT	114:	9,484
Year of Cost Estimate	97:	2004	Year of Future ADT	115:	2025
NAVIGATION DATA					
Navigation Control	38:	Permit Not Required	Horizontal Clearance	40:	0.0 ft
Vertical Clearance	39:	0.0 ft	Lift Bridge Vert. Cl.	116:	
Pier Protection	111:	Unknown (NBI)			

# **APPENDIX A: PHOTOGRAPHS**



**PHOTO 1** EAST APPROACH LOOKING WEST



**PHOTO 2** WEST APPROACH LOOKING EAST





**PHOTO 3** UPSTREAM ELEVATION



**PHOTO 4** DOWNSTREAM ELEVATION

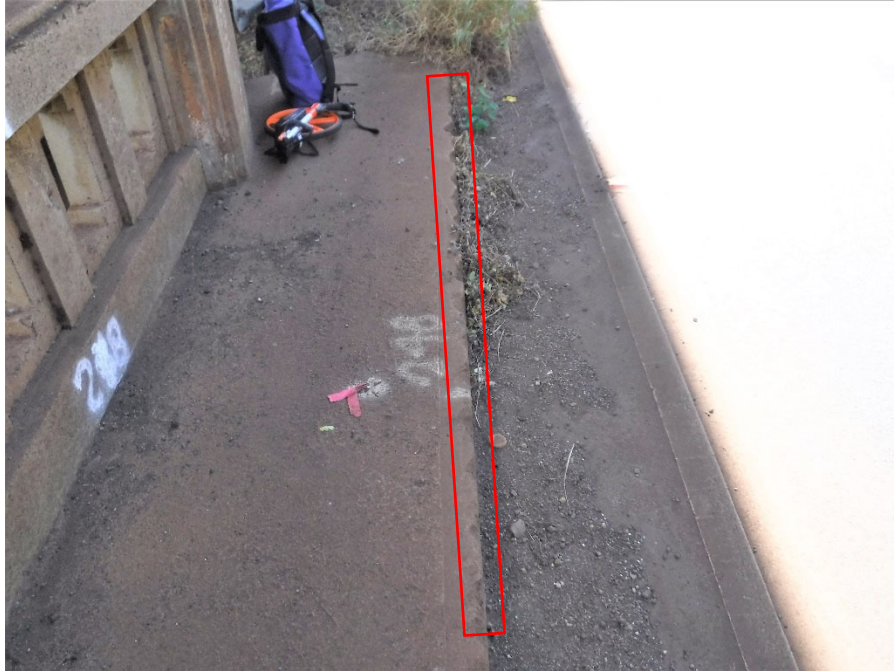


**PHOTO 5** LOAD POSTING SIGN ON FARRINGTON HIGHWAY AT UPSTREAM EAST APPROACH TO BRIDGE



**PHOTO 6** LOAD POSTING SIGN ON FARRINGTON HIGHWAY AT DOWNSTREAM WEST APPROACH TO BRIDGE





**PHOTO 7** CURB SPALLS AT EAST END OF UPSTREAM SIDEWALK



**PHOTO 8** 3-1/2" VERTICAL DIFFERENTIAL AT WEST APPROACH TO UPSTREAM SIDEWALK



**PHOTO 9** 3" VERTICAL DIFFERENTIAL AND 1/2" GAP AT WEST APPROACH TO DOWSTREAM SIDEWALK AND 6"X6" EDGE SPALL ON CURB



**PHOTO 10** 3'X4" DELAMINATION (3FT 1080 CS2) ON EXTERIOR FACE OF UPSTREAM BOTTOM RAIL NEAR WEST END OF BRIDGE





**PHOTO 11** TYPICAL DELAMINATION (1080 CS2) ON EXTERIOR FACE OF UPSTREAM RAILING PICKET



**PHOTO 12** TYPICAL DELAMINATION (1080 CS2) ON UPSTREAM TOP RAIL



**PHOTO 13** 2 FT LONG HORIZONTAL CRACK AND DELAMINATION (2FT 1080 CS2) ON INTERIOR FACE OF UPSTREAM EAST END POST



**PHOTO 14** 4FT LONG HORIZONTAL CRACK AND DELAMINATION (4FT 1080 CS2) ON EXTERIOR FACE OF DOWNSTREAM EAST END POST





**PHOTO 15** EXPOSED REBAR WITHOUT SECTION LOSS (1FT 1090 CS2) ON DOWNSTREAM BRIDGE RAILING



**PHOTO 16** TYPICAL MODERATE WIDTH CRACK (1130 CS2) ON BOTH BRIDGE RAILINGS





**PHOTO 17** 1'X6" SPALL WITH EXPOSED ANCHOR BOLT ON CONCRETE SPACER BLOCK AT DOWNSTREAM WEST END POST



**PHOTO 18** WEARING SURFACE



**PHOTO 19** MODERATE WIDTH CRACK WITH EFFLORESCENCE (2SF 1120 CS2) ON TOP FLANGE SOFFIT AND DIAPHRAGM AT ABUTMENT 2 NEAR GIRDER G2



**PHOTO 20** MODERATE WIDTH DIAGONAL CRACK WITH EFFLORESCENCE (8SF 1120 CS2) ON TOP FLANGE SOFFIT BETWEEN GIRDERS G3 AND G4 NEAR ABUTMENT 1





**PHOTO 21** MODERATE WIDTH TRANSVERSE CRACKS WITH EFFLORESCENCE (3SF 1120 CS2) ON UPSTREAM CANTILEVER TOP FLANGE SOFFIT NEAR ABUTMENT 2



**PHOTO 22** 6"X2"X2" EDGE SPALL (1FT 1080 CS2) ON GIRDER G4



**PHOTO 23** 4"X4" EDGE SPALL WITH EXPOSED REBAR WITHOUT SECTION LOSS (1FT 1090 CS2) ON GIRDER G3



**PHOTO 24** TYPICAL MODERATE WIDTH DIAGONAL CRACK (1130 CS2) ON ALL GIRDERS





**PHOTO 25** ABUTMENT 1



**PHOTO 26** ABUTMENT 2



**PHOTO 27** WIDE VERTICAL CRACK (1FT 1130 CS3) ON ABUTMENT 2  
BELOW GIRDER G2



**PHOTO 28** WIDE VERTICAL CRACK (1FT 1130 CS3) ON  
DOWNSTREAM WEST WINGWALL





**PHOTO 29** TYPICAL MODERATE WIDTH CRACKS (1130 CS2) ON BOTH ABUTMENTS AND ALL WINGWALLS



**PHOTO 30** PARTIAL ABRASION (1190 CS2) ALONG ENTIRE LENGTH OF ABUTMENT 1 AND WINGWALLS



**PHOTO 31** JOINT FILLER PROTRUDING FROM JOINT AT DOWNSTREAM EAST WINGWALL AND 1/2" GAP BETWEEN DOWNSTREAM EAST WINGWALL AND CHANNEL WALL



**PHOTO 32** UPSTREAM CHANNEL WITH HEAVY VEGETATION GROWTH

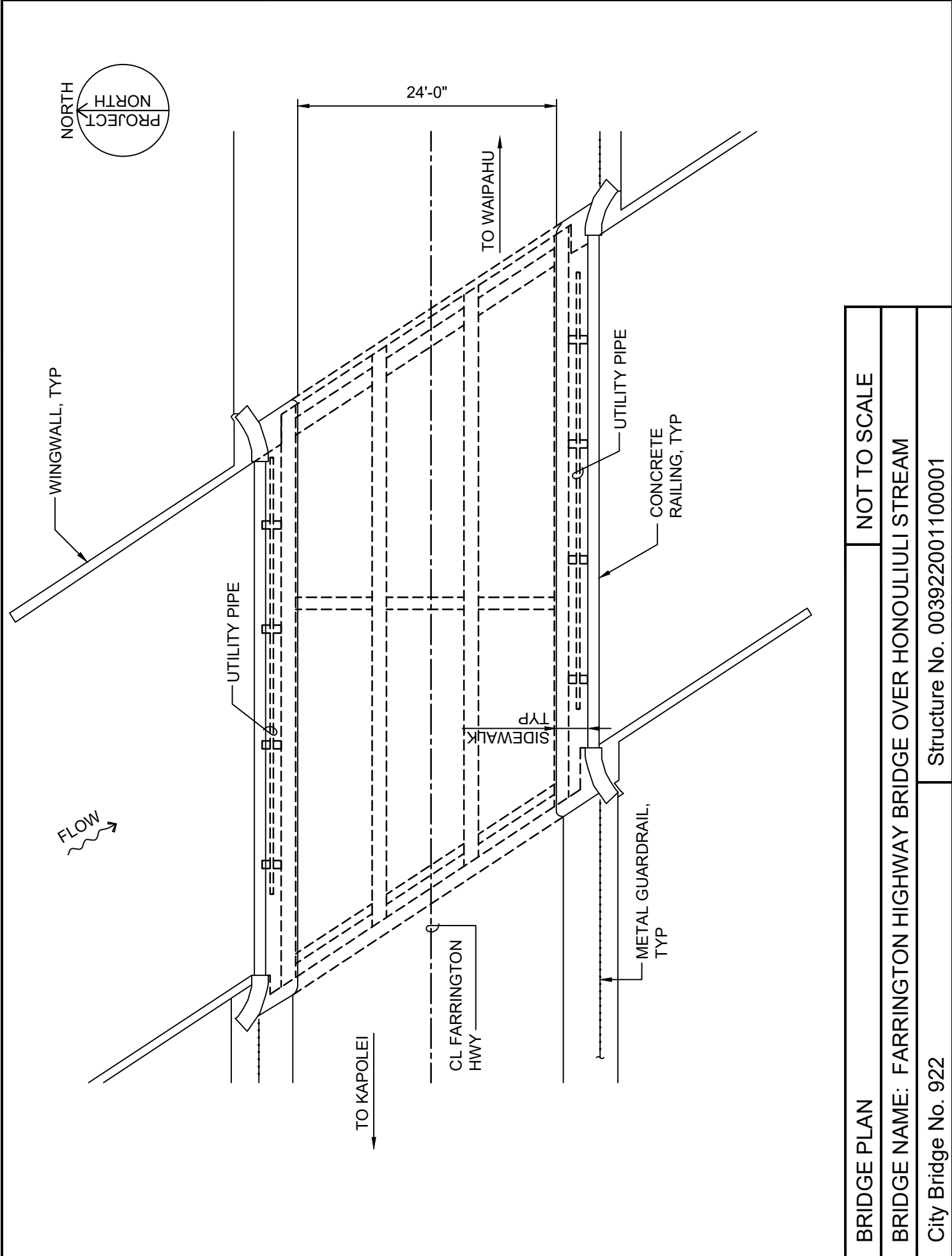




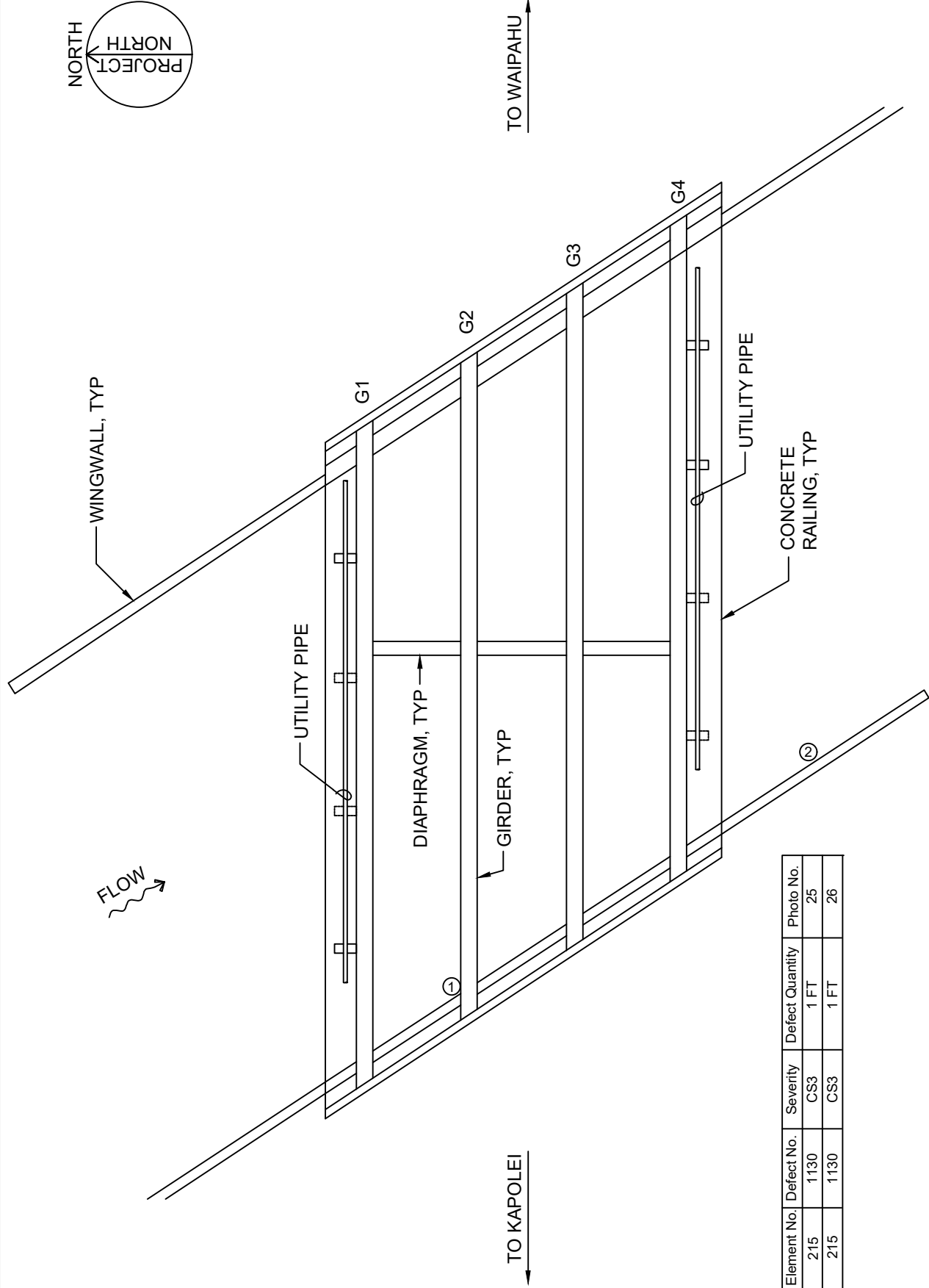
**PHOTO 33** DOWNSTREAM CHANNEL WITH VEGETATION GROWTH



# **APPENDIX B: FIGURES**

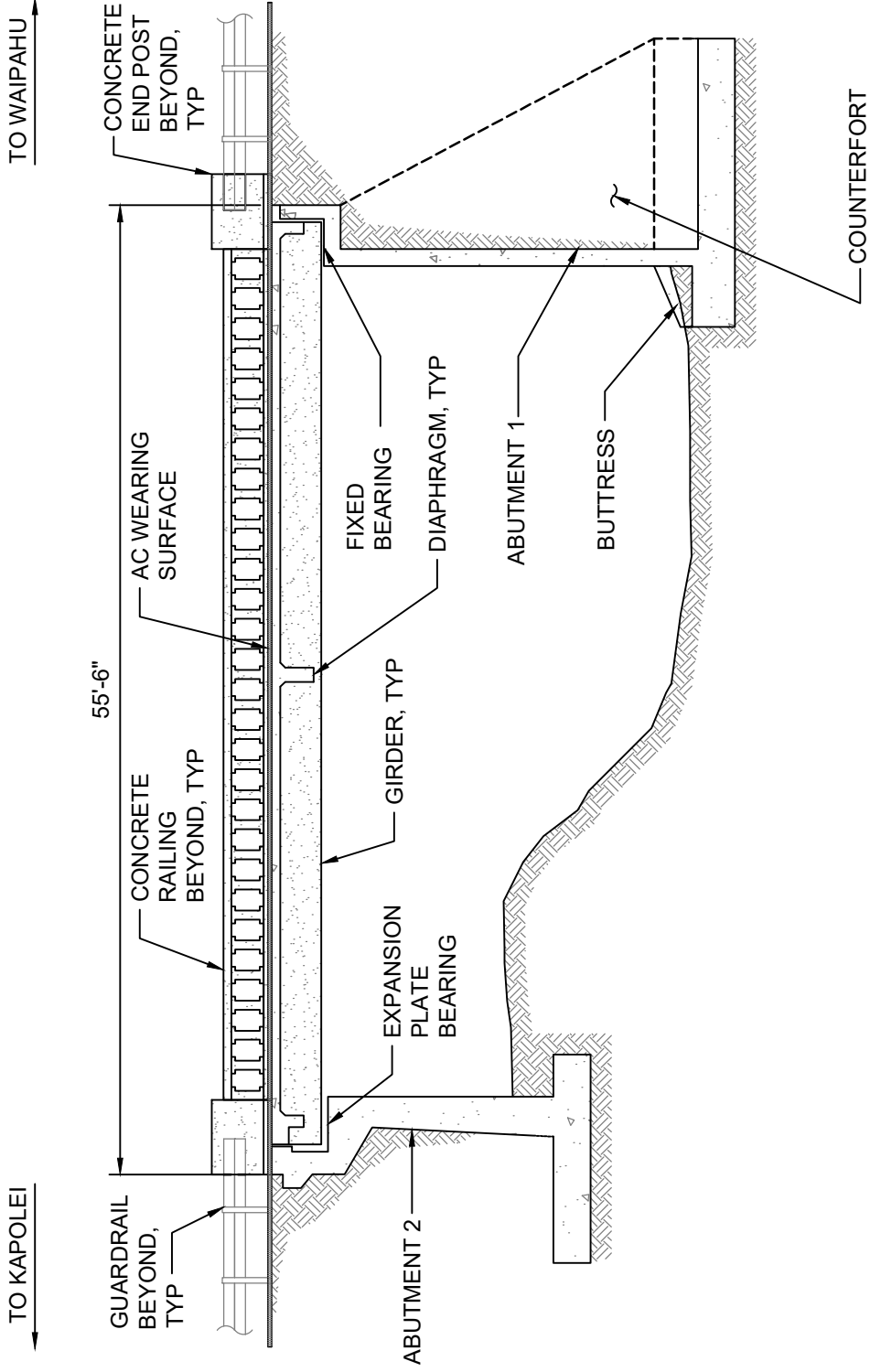


BRIDGE PLAN	NOT TO SCALE
BRIDGE NAME: FARRINGTON HIGHWAY BRIDGE OVER HONOULIULI STREAM	
City Bridge No. 922	Structure No. 003922001100001



Symbol	Element No.	Defect No.	Severity	Defect Quantity	Photo No.
①	215	1130	CS3	1 FT	25
②	215	1130	CS3	1 FT	26

SOFFIT PLAN	NOT TO SCALE
BRIDGE NAME: FARRINGTON HIGHWAY BRIDGE OVER HONOULIULI STREAM	
City Bridge No. 922	Structure No. 003922001100001



LONGITUDINAL SECTION

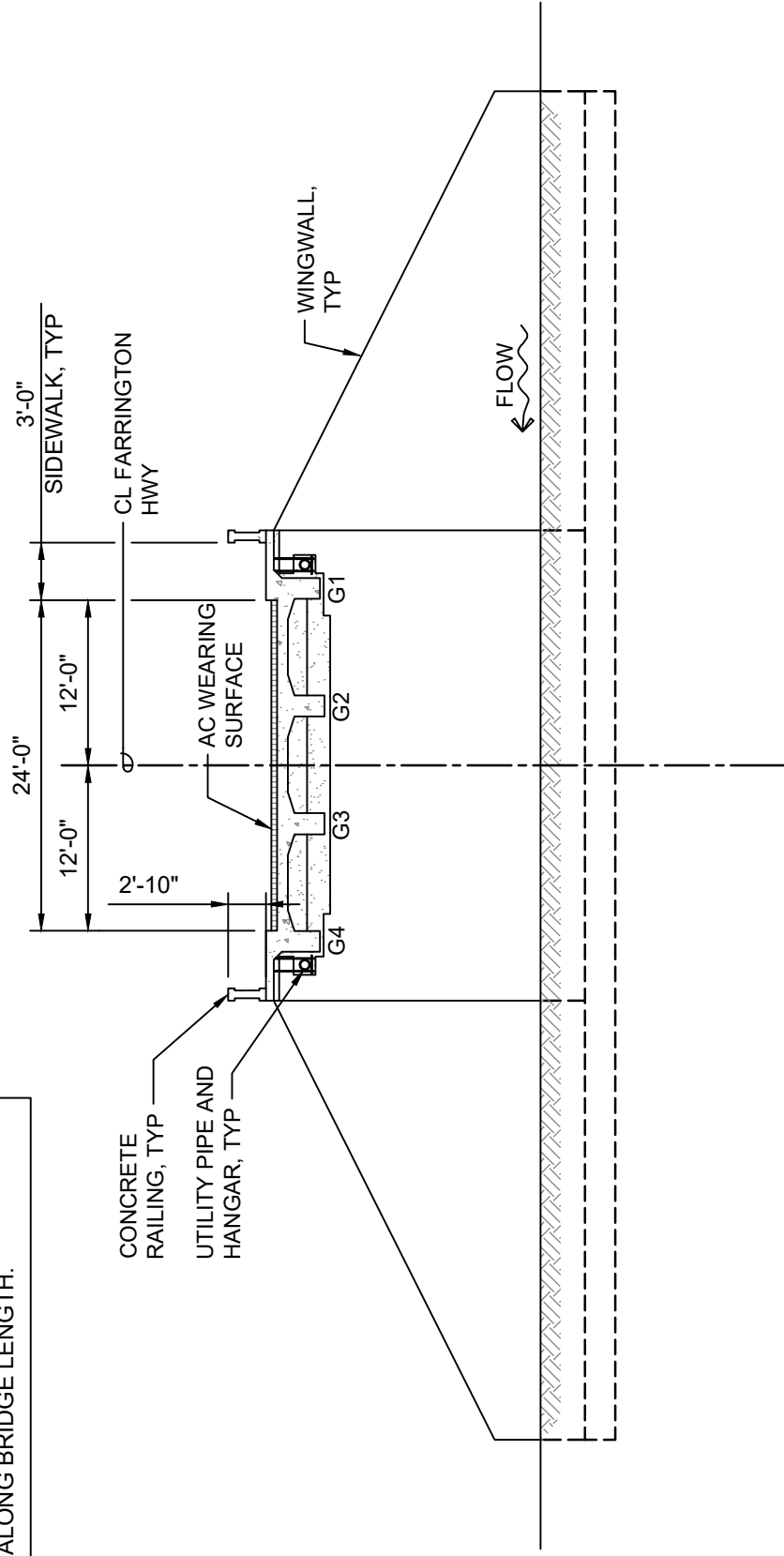
NOT TO SCALE

BRIDGE NAME: FARRINGTON HIGHWAY BRIDGE OVER HONOULIULI STREAM

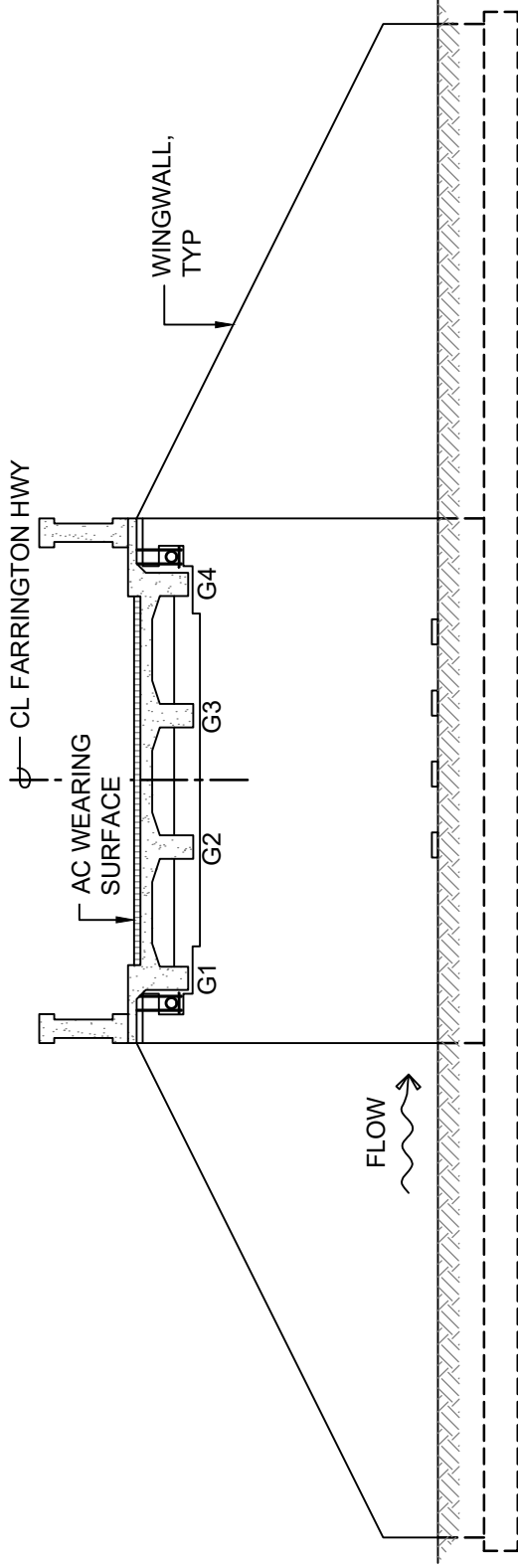
City Bridge No. 922

Structure No. 003922001100001

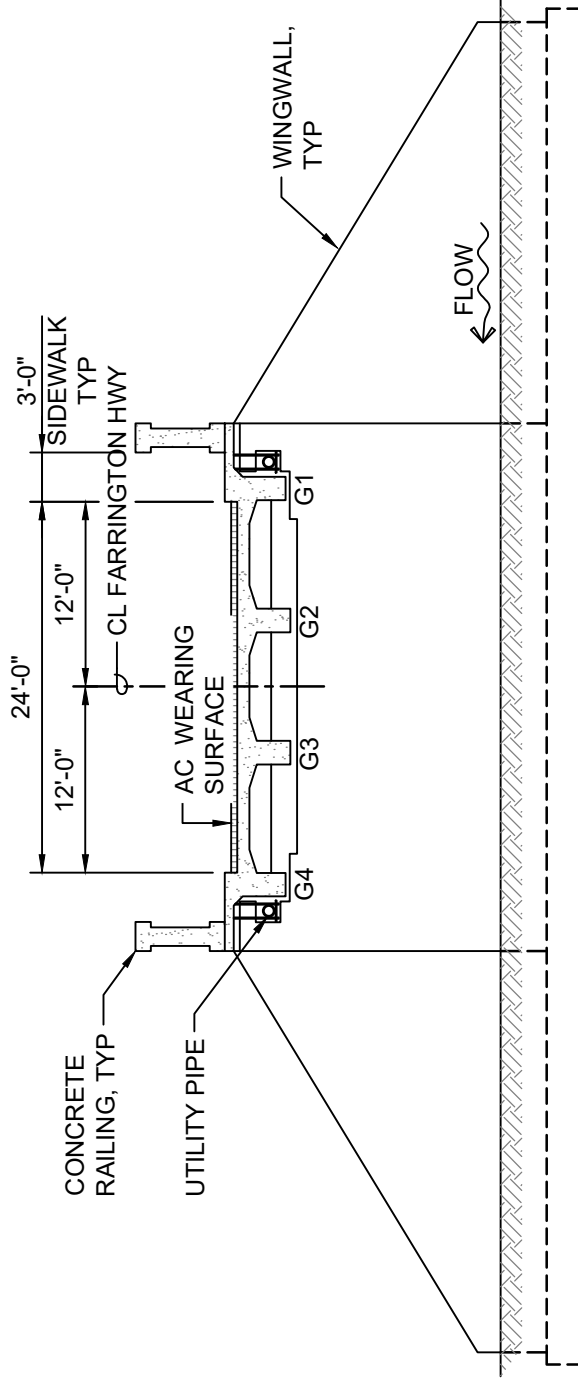
NOTE:  
 CONCRETE RAILING HEIGHT = 2'-10"  
 RAILING HEIGHT WAS TAKEN AT AN  
 ARBITRARY LOCATION AND MAY VARY  
 ALONG BRIDGE LENGTH.



TRANSVERSE SECTION	NOT TO SCALE
BRIDGE NAME: FARRINGTON HIGHWAY BRIDGE OVER HONOULIULI STREAM	
City Bridge No. 922	Structure No. 003922001100001



**ABUTMENT 1 ELEVATION**



**ABUTMENT 2 ELEVATION**

ABUTMENT ELEVATIONS	NOT TO SCALE
BRIDGE NAME: FARRINGTON HIGHWAY BRIDGE OVER HONOULIULI STREAM	
City Bridge No. 922	Structure No. 003922001100001

NORTH

PROJECT NORTH

FLOW

NOTE:  
ELEVATION 0.00 IS TAKEN AT TOP  
OF CONCRETE RAILING DIRECTLY  
ABOVE LEFT ABUTMENT (LOOKING  
DOWNSTREAM) IN-LINE WITH FACE  
OF BREASTWALL.

WINGWALL, TYP

19.53 -19.83 -19.96 -19.75 -19.64 -21.85 -24.60 -26.17 -26.91 -27.49 -27.14

TO KAPOLEI

CL FARRINGTON  
HWY

TO WAIPAHU

SOUNDINGS DATUM  
REFERENCE POINT  
ELEVATION = 0.00

Clarify, railing has  
a step at this  
location (End post/  
railing).

KEY  
0.00

ELEVATION  
IN FEET

ITEM 113 RATING = 3  
FROM PREVIOUS  
INSPECTION DATED 11/6/17

BRIDGE PLAN - SOUNDINGS

NOT TO SCALE

BRIDGE NAME: FARRINGTON HIGHWAY BRIDGE OVER HONOULIULI STREAM

City Bridge No. 922

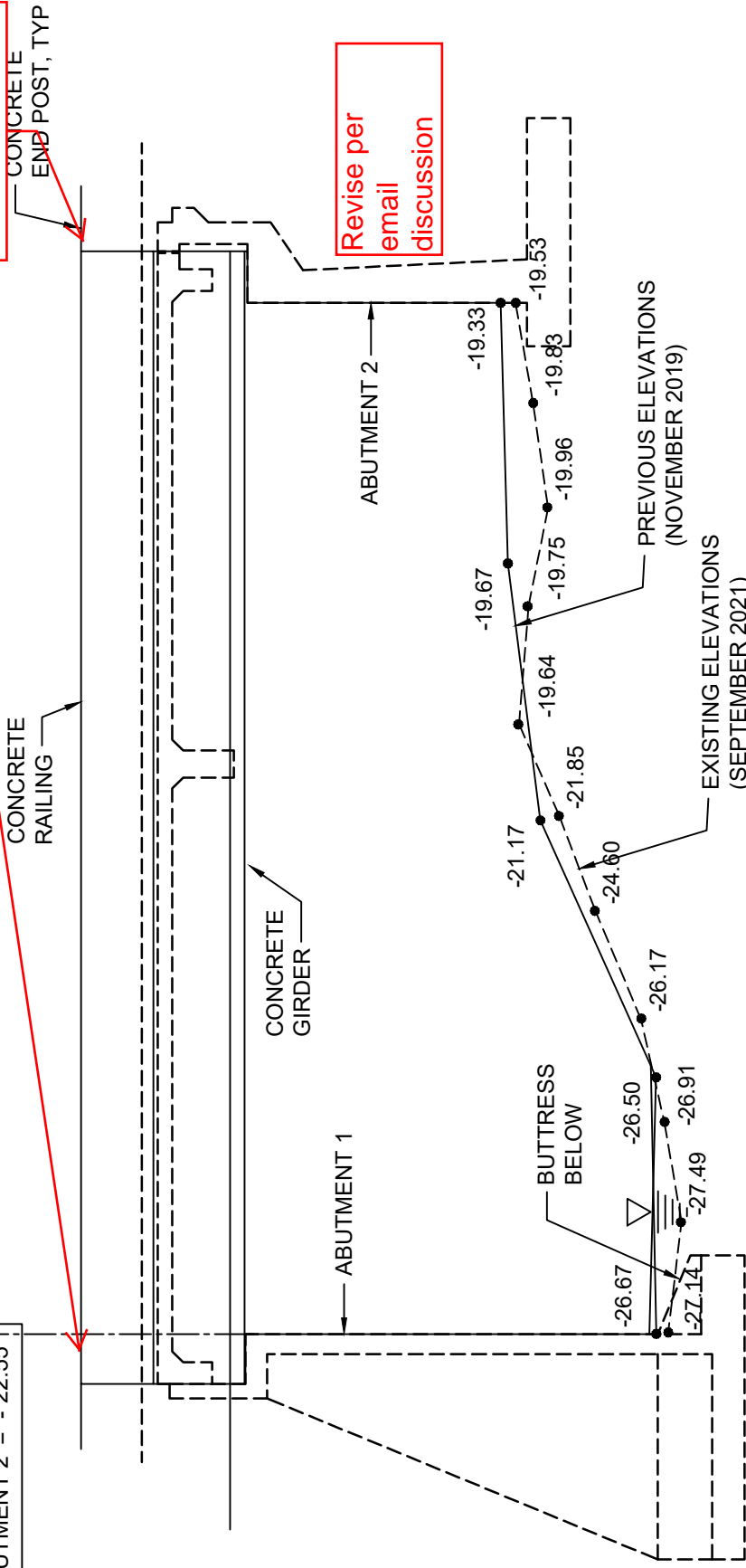
Structure No. 003922001100001



BASED ON 1938 AS-BUILTS  
 BOTTOM OF SPREAD  
 FOOTING ELEVATION:  
 ABUTMENT 1 = - 30.58  
 ABUTMENT 2 = - 22.55

Revise Sketch to  
 show end post  
 higher, copy from  
 Longitudinal  
 section

Revise per  
 email  
 discussion



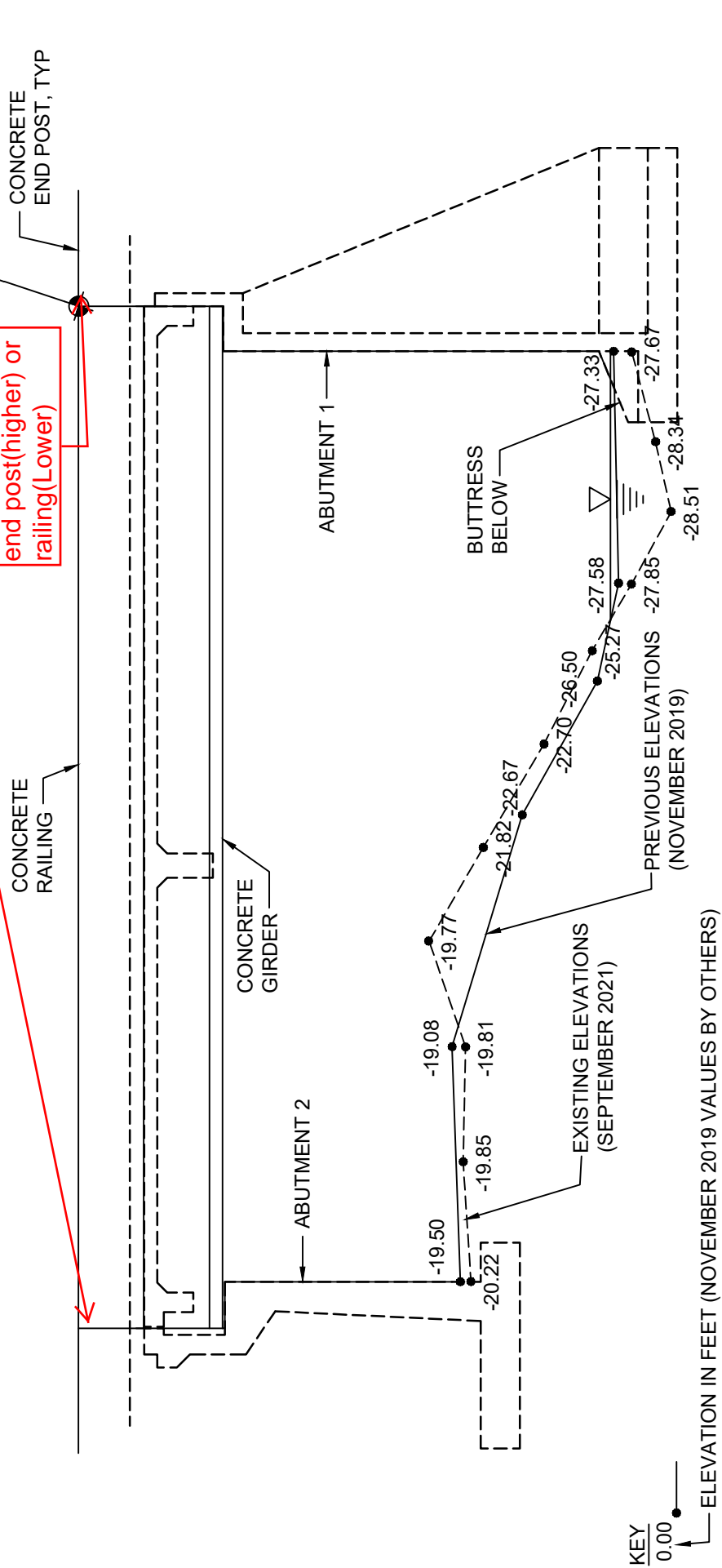
KEY  
 0.00 —●— ELEVATION IN FEET (NOVEMBER 2019 VALUES BY OTHERS)  
 0.00 —●--- ELEVATION IN FEET (SEPTEMBER 2021)

UPSTREAM ELEVATION - SOUNDINGS	NOT TO SCALE
BRIDGE NAME: FARRINGTON HIGHWAY BRIDGE OVER HONOULIULI STREAM	
City Bridge No. 922	Structure No. 003922001100001

BASED ON 1938 AS-BUILTS  
 BOTTOM OF SPREAD  
 FOOTING ELEVATION:  
 ABUTMENT 1 = - 30.79  
 ABUTMENT 2 = - 22.58

Revise to show end  
 post higher,  
 clarify if reference  
 point is located at  
 end post(higher) or  
 railing(Lower)

Revise per  
 email  
 discussion



DOWNSTREAM ELEVATION - SOUNDINGS	NOT TO SCALE
BRIDGE NAME: FARRINGTON HIGHWAY BRIDGE OVER HONOULIULI STREAM	
City Bridge No. 922	Structure No. 003922001100001