

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

**FARRINGTON HIGHWAY BRIDGE NO. 1 OVER KALOI GULCH  
BRIDGE NO. 923  
STRUCTURE NO. 003923001100001**

**DATE OF INSPECTION: September 1, 2021**



Prepared For:

City and County of Honolulu  
Department of Design and Construction

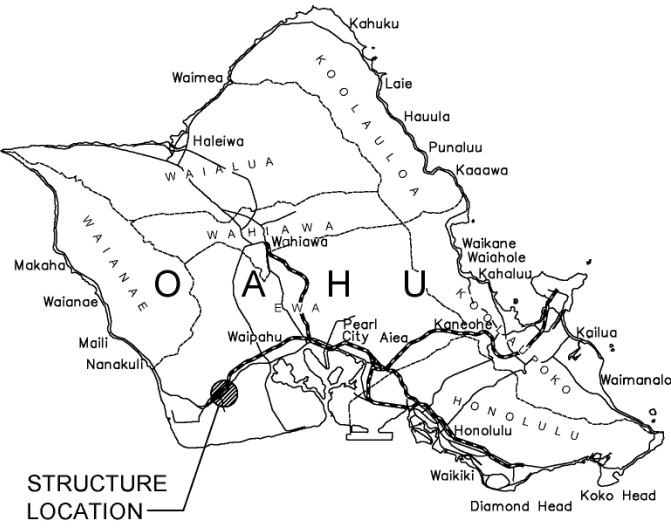
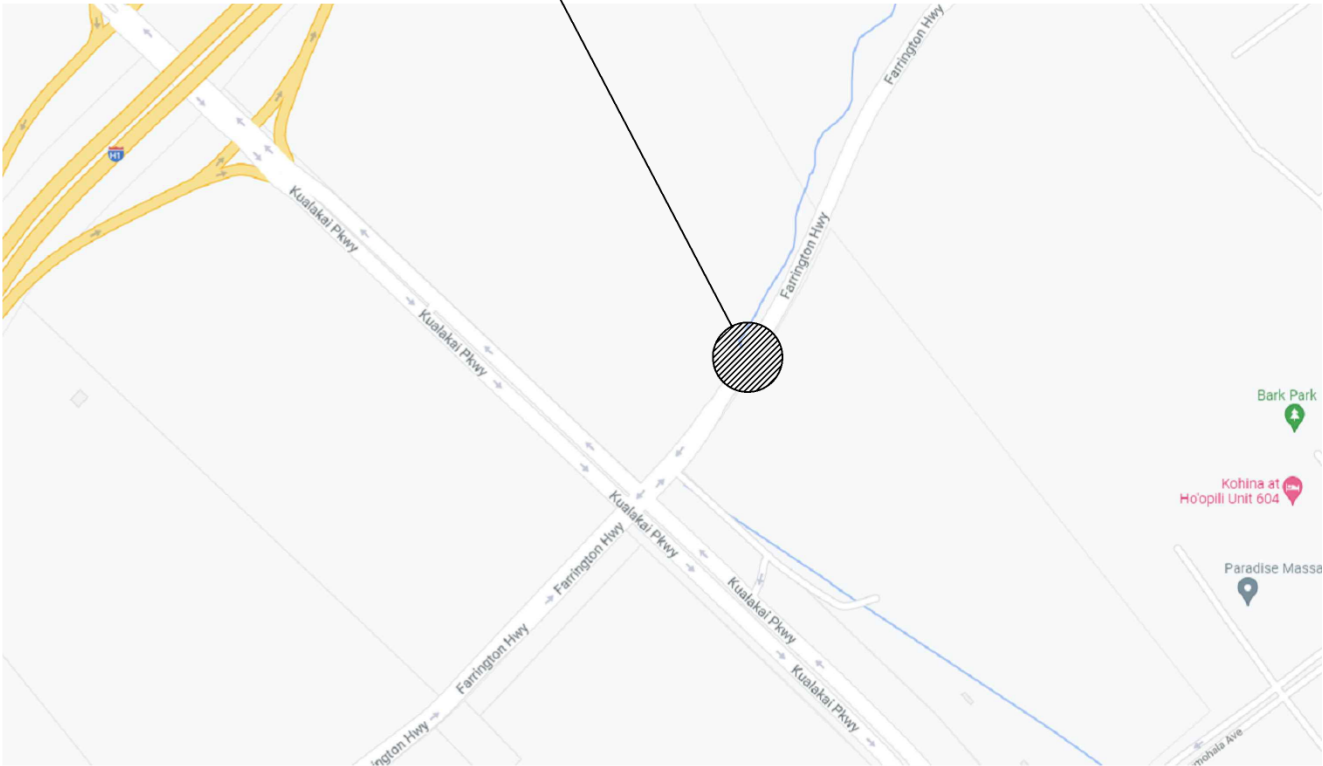
Prepared By:  
Team Leader:  
Glenn Miyasato  
(Certification Date: 06/15/2017)

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Stamp and  
Signature if  
Team Leader  
is Licensed

FARRINGTON HIGHWAY BRIDGE NO. 1  
 BRIDGE NO. 923  
 STRUCTURE NO. 003923001100001  
 GPS: 21°21'49" N,  
 158°03'15" W

FARRINGTON HIGHWAY BRIDGE NO. 1



STRUCTURE LOCATION



NOT TO SCALE

LOCATION AND VICINITY MAP  
 FARRINGTON HIGHWAY BRIDGE NO. 1

FIGURE

1

SCALE: NTS

DATE: SEPTEMBER 2021

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## SECTION 1.0 – INSPECTION SUMMARY

### 1.1 BRIDGE DESCRIPTION

|                                     |   |
|-------------------------------------|---|
| Year Built                          | 1940  |
| Lanes on Bridge                     | 2 vehicle lanes   |
| Sidewalk(s)                         | None  |
| No. of Spans                        | 1   |
| Bridge Posting Sign(s)              | Posting on Signs:<br>- Weight Limit: 18 tons<br>- EV Weight Limits: 16 tons (single axle), 20 tons (tandem), 28 tons (gross)<br><br>Sign Locations:<br>- East approach on Farrington Highway<br>- West approach on Farrington Highway |
| 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 slab  |
| Superstructure Material and Type    | Reinforced concrete slab  |
| Substructure Material and Type      | Reinforced concrete abutments   |
| Bearing Type                        | Roofing paper above Abutment 1  |
| Bridge Railing Material             | Reinforced concrete railing   |
| Bridge Railing Height               | 1'-6" upstream concrete railing<br>2'-2" downstream concrete railing  |

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

- Job Number: F.A.P. 4-D(1)
- Structure Name: Farrington Highway Bridge No. 1
- Project Name: Bridge No. 1: Sta. 92+14.78 to 92+41.22, Waianae Road
- Year Approved: 1940
- File Number: 4468.9A, 4468.10A, 4468.11A, 4468.12, and 4468.13

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



## 1.2 PARKING, BRIDGE ACCESS, AND SAFETY HAZARDS

|  |                                      |
|--|--------------------------------------|
| Parking to Perform Bridge Inspection         | On shoulder along Farrington Highway |
| 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"                                   |

## 1.3 OVERALL CONDITION

The bridge structure is generally in satisfactory condition. Periodic bridge inspections are recommended to not exceed 24-month intervals as specified in the National Bridge Inspection Standards. 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<br>(Bridge Railings, Transitions, Approach Guardrail, Approach Guardrail Ends)<br><small>(Per BrM Database)</small>             | 0, N, 0, 0          | 0, N, 0, 0         |
| #58      | Deck  | 6                   | 6                  |
| #59      | Superstructure  | 6                   | 6                  |
| #60      | Substructure  | 6                   | 6                  |
| #61      | Channel & Channel Protection  | 6                   | 6                  |
| #62      | Culvert   | N                   | N                  |
| #67      | Structural Evaluation   | 3                   | 3                  |
| #71      | Waterway Adequacy<br>Comments: Observed conditions appear similar to previous inspection. No analysis was performed to evaluate flood/overtopping risk. | 6                   | 6                  |
| #113     | Scour<br>Comments: No scour observed.   | 8                   | 8                  |

## 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 October 18, 2019 by Nagamine Okawa Engineers, Inc. The most recent load rating was performed on June 8, 2020 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:             | 003923001100001      | Last Load Rating Date:          | 2/27/2015      |
| Bridge Name:                  | Farr Hwy Bridge No.1 | Last Inspection Date:           | 10/18/2019     |
| Bridge Number:                | 923                  | Inspected By:                   | Nagamine Okawa |
| District:                     | Waianae              | Fracture Critical Member (Y/N): | N              |
| Span Type:                    | RC Slab              | Item 58, Deck Rating:           | 6              |
| Bridge Plans Available (Y/N): | Y                    | Item 59, Superstructure Rating: | 6              |
| Design Loading:               | -                    | Item 60, Substructure Rating:   | 6              |
| Past Inventory Rating (HL93): | 0.44                 | Bridge Load Posted (Y/N):       | N              |
| Past Operating Rating (HL93): | 0.57                 | Posted Weight Limit:            | -              |

**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:              | 1.00    |
| Was Overlay Depth Measured (Y/N):           | Y   | System Factor:                 | 1.00    |
| Weight of Utilities:                        | n/a | 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 | IM  | Live Load Distribution Factor |
|-------------|--------------|--------------------|---------------|--------------------|-------------------------|-----|-------------------------------|
| Design Load | HL-93 (INV)  | N/A                | 0.46          | Int Strip          | Flexure                 | 33% | 0.091                         |
|             | HL-93 (OPR)  | N/A                | 0.60          | Int Strip          | Flexure                 | 33% | 0.091                         |
| Legal Load  | Type 3       | 50.0               | 0.94          | Int Strip          | Flexure                 | 33% | 0.091                         |
|             | Type 3S2     | 72.0               | 0.98          | Int Strip          | Flexure                 | 33% | 0.091                         |
|             | Type 3-3     | 80.0               | 1.14          | Int Strip          | Flexure                 | 33% | 0.091                         |
|             | NRL          | 80.0               | 0.66          | Int Strip          | Flexure                 | 33% | 0.091                         |
|             | SU4          | 54.0               | 0.79          | Int Strip          | Flexure                 | 33% | 0.091                         |
|             | SU5          | 62.0               | 0.73          | Int Strip          | Flexure                 | 33% | 0.091                         |
|             | SU6          | 69.5               | 0.67          | Int Strip          | Flexure                 | 33% | 0.091                         |
|             | SU7          | 77.5               | 0.66          | Int Strip          | Flexure                 | 33% | 0.091                         |
|             | EV2          | 57.5               | 1.09          | Ext Strip          | Flexure                 | 33% | 0.600                         |
|             | EV3          | 86.0               | 0.69          | Ext Strip          | Flexure                 | 33% | 0.600                         |
| Permit Load | HP1          | 120.0              | 0.84          | Ext Strip          | Flexure                 | 33% | 0.600                         |
|             | HP2          | 157.1              | 0.63          | Ext Strip          | Flexure                 | 33% | 0.600                         |
|             | HP3          | 209.9              | 1.03          | Ext Strip          | Flexure                 | 33% | 0.600                         |

**Substructure Rating Summary**

Substructure Rated (Y/N): N

|  | Vehicle Type | Vehicle GVW (Kips) | Rating Factor | Controlling Member | Controlling Load Effect | IM | Live Load Distribution 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: | 0.66    |
|            | Governing Legal Load Model:         | SU6     |
|            | Posting Recommended (Y/N):          | Y       |
|            | Recommended Posting Load:           | 18 Tons |
| EV         | EV2 Rating Factor                   | 1.09    |
|            | EV3 Rating Factor                   | 0.69    |
|            | Recommended Single Axle Posting     | 16 Tons |
|            | Recommended Tandem Posting          | 21 Tons |
|            | Recommended GVW Posting             | 29 Tons |

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

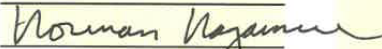
- Bridge load rating is not governed by deck rating
- Bridge load rating is not governed by substructure rating
- Connections do not control the bridge load rating
- Exterior girder controls the bridge load rating
- Bridge plans do not exist - Rating based on judgement and current loading

**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: 6/8/2020

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

**Existing Bridge Data**

|                                |                      |                                 |                |
|--------------------------------|----------------------|---------------------------------|----------------|
| Structure Number:              | 003923001100001      | Last Load Rating Date:          | 2/27/2015      |
| Bridge Name:                   | Farr Hwy Bridge No.1 | Last Inspection Date:           | 10/18/2019     |
| Bridge Number:                 | 923                  | Inspected By:                   | Nagamine Okawa |
| District:                      | Waianae              | Fracture Critical Member (Y/N): | N              |
| Span Type:                     | RC Slab              | Item 58, Deck Rating:           | 6              |
| Bridge Plans Available (Y/N):  | Y                    | Item 59, Superstructure Rating: | 6              |
| Design Loading:                | -                    | Item 60, Substructure Rating:   | 6              |
| Past Inventory Rating (HL-93): | 0.44                 | Bridge Load Posted (Y/N):       | N              |
| Past Operating Rating (HL-93): | 0.57                 | Posted Weight Limit:            | -              |

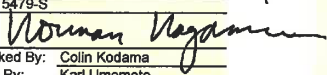
**Bridge Load Rating Summary**

|   |     |                               |         |
|---|-----|-------------------------------|---------|
| <b>Dead Load Data</b>                       |     | <b>LRF Evaluation Factors</b> |         |
| Overlay Type:                               | AC  | Surface Roughness Rating:     | 3       |
| Overlay Depth (IN):                         | 2   | Condition Factor:             | 1.00    |
| Was Overlay Depth Measured (Y/N):           | Y   | System Factor:                | 1.00    |
| Weight of Utilities:                        | n/a | 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 | IM  | Live Load Distribution Factor |
|--|--------------------|---------------|--------|--------------------|-------------------------|-----|-------------------------------|
| <b>Refuse Vehicles</b>                 |                    |               |        |                    |                         |     |                               |
| REF1                                   | 51.00              | 1.01          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| REF2                                   | 57.18              | 0.81          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| REF3                                   | 45.94              | 0.91          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| REF4                                   | 57.50              | 0.89          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| <b>Buses</b>                           |                    |               |        |                    |                         |     |                               |
| BUS1                                   | 30.99              | 1.34          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS2                                   | 39.60              | 1.08          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS3                                   | 39.60              | 1.08          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS4                                   | 64.38              | 1.07          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS5                                   | 67.24              | 0.94          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS6                                   | 67.78              | 0.98          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS7                                   | 66.79              | 0.98          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS8                                   | 39.90              | 1.00          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS9                                   | 39.60              | 1.08          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS10                                  | 39.60              | 1.08          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| BUS11                                  | 42.54              | 0.98          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| <b>Honolulu Fire Department Trucks</b> |                    |               |        |                    |                         |     |                               |
| HFD1                                   | 38.40              | 1.36          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD2                                   | 42.74              | 1.36          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD3                                   | 43.50              | 1.36          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD4                                   | 49.80              | 1.21          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD5                                   | 49.80              | 1.21          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD6                                   | 49.80              | 1.21          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD7                                   | 52.20              | 1.04          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD8                                   | 62.74              | 0.89          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD9                                   | 73.50              | 0.75          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD10                                  | 59.24              | 1.31          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD11                                  | 60.00              | 0.98          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD12                                  | 51.18              | 1.03          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD13                                  | 58.00              | 0.91          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD14                                  | 44.00              | 1.09          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD15                                  | 44.00              | 1.09          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD16                                  | 44.00              | 1.36          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD17                                  | 42.74              | 1.36          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD18                                  | 76.60              | 1.00          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD19A                                 | 77.56              | 0.96          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD19B                                 | 77.56              | 0.76          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD20A                                 | 87.56              | 0.96          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD20B                                 | 87.56              | 0.76          | No     | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD21                                  | 42.00              | 1.36          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |
| HFD22                                  | 37.00              | 1.42          | Yes    | Interior Strip     | Flexure                 | 33% | 0.091                         |

**Substructure Rating Summary**

|  |   |
|--|---|
| Substructure Rated (Y/N):  | N   |
| <b>Recommended Refuse Vehicle</b>  |   |
| Recommended Refuse LR Factor:  | 1.01  |
| Recommended Refuse Load Model:   | REF1  |
| Recommended Max Payload:   | FULL  |
| *Payload is the Allowable Vehicle Load Carrying Capacity   |   |
| <b>Quality Control/Quality Assurance</b>   |   |
| 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:  | 6/8/20  |
| <b>Please check the following boxes that apply:</b><br><input type="checkbox"/> Bridge load rating is not governed by deck rating<br><input type="checkbox"/> Bridge load rating is not governed by substructure rating<br><input type="checkbox"/> Connections do not control the bridge load rating<br><input type="checkbox"/> Exterior strip controls the bridge load rating<br><input type="checkbox"/> Bridge plans do not exist - Rating based on judgement and current loading |   |
| <b>Remarks/Recommendations for Bridges without Plans</b><br>*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: 003923001100001

Bridge Name: FARRINGTON HWY BRIDGE # 1

County Oahu

Route No: 09107

Milepost: 0

Facility: FARR HWY

| NBI ITEM 36 - TRAFFIC SAFETY FEATURES |                         | List any maintenance work required:<br>(ie: defects, missing bolts, collision damage, etc.) |
|---------------------------------------|-------------------------|---|
| 36A                                   | Bridge Railings         | 36A: See Element Defects below.<br>36C, 36D: See Appendix A.                                |
| 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  |                              |      |                |       |             |             |             |               |
| 38  | Re Concrete Slab             | 1    | 1,126          | sq.ft | 1,108       | 18          | 0           | 0             |
| 1080  | Delamination/Spall/Patched   |      | 8              | sq.ft | 0           | 8           | 0           | 0             |
| 1120  | Efflorescence/Rust Staining  |      | 10             | sq.ft | 0           | 10          | 0           | 0             |
| 510   | Wearing Surfaces             |      | 623            | sq.ft | 623         | 0           | 0           | 0             |
| Defect No. 1080:<br>- 8'x1' delamination (8SF CS2) at upstream edge of slab soffit, adjacent to Abutment 2 (Photo 17) |                              |      |                |       |             |             |             |               |
| Defect No. 1120:<br>- Longitudinal crack with surface white efflorescence (10SF CS2) on slab soffit (Photo 18)        |                              |      |                |       |             |             |             |               |
| 215   | Re Conc Abutment             | 1    | 138            | ft    | 131         | 7           | 0           | 0             |
| 1080  | Delamination/Spall/Patched   |      | 3              | ft    | 0           | 3           | 0           | 0             |
| 1130  | Cracking (RC and Other)      |      | 4              | ft    | 0           | 4           | 0           | 0             |
| Defect No. 1080:<br>- 3'x2' delamination (3FT CS2) on Abutment 1 (Photo 22)   |                              |      |                |       |             |             |             |               |
| Defect No. 1130:<br>- Moderate width cracks (4FT CS2) on both abutments (Photo 23)                                    |                              |      |                |       |             |             |             |               |
| 313   | Fixed Bearing                | 1    | 1              | each  | 1           | 0           | 0           | 0             |
| 316   | Other Bearing                | 1    | 1              | each  | 1           | 0           | 0           | 0             |
| 331   | Re Conc Bridge Railing       | 1    | 57             | ft    | 55          | 2           | 0           | 0             |
| 1080  | Delamination/Spall/Patched   |      | 2              | ft    | 0           | 2           | 0           | 0             |
| 7000  | Damage                       |      | 2              | ft    | 0           | 2           | 0           | 0             |
| Defect No. 1080/7000:<br>- 1'-6"x6" spall (2FT CS2) on downstream railing at east end of bridge (Photo 15)            |                              |      |                |       |             |             |             |               |





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

Name: **FARRINGTON HWY BRIDGE # 1** Bridge No: **003923001100001**

Inspection Date: 09/01/2021

| IDENTIFICATION                        |              |                          |                                     |
|---------------------------------------|--------------|--------------------------|-------------------------------------|
| Rte.(On/Under)                        | <b>5A:</b>   | Route On Structure       | State                               |
| Rte. Signing Prefix                   | <b>5B:</b>   | 5 City Street            | Facility Carried                    |
| Level of Service                      | <b>5C:</b>   | 0 None of the below      | Place Code                          |
| Route Number                          | <b>5D:</b>   | 09107                    | SHD District                        |
| Directional Suffix                    | <b>5E:</b>   | 0 N/A (NBI)              | Feature Intersected                 |
| Border Bridge Code                    | <b>98:</b>   | Unknown (P)              | County Code                         |
| Border Bridge Number                  | <b>99:</b>   | NA                       | Location                            |
| Mile Post                             | <b>11:</b>   | NA                       | Latitude                            |
| Struc Num                             | <b>8:</b>    | 003923001100001          | Longitude                           |
|                                       |              |                          | <b>1:</b> 15 Hawaii                 |
|                                       |              |                          | <b>7:</b> FARR HWY                  |
|                                       |              |                          | <b>4:</b>                           |
|                                       |              |                          | <b>2:</b> 25 Oahu                   |
|                                       |              |                          | <b>6:</b> FARR HWY/KALOI GULCH      |
|                                       |              |                          | <b>3:</b> Oahu                      |
|                                       |              |                          | <b>9:</b> TMK=8-1-17                |
|                                       |              |                          | <b>16:</b> 21° 21' 49"              |
|                                       |              |                          | <b>17:</b> 158° 03' 15"             |
| INSPECTION                            |              |                          |                                     |
| Inspection Date                       | <b>90:</b>   | 9/1/2021                 | Frequency                           |
| FC Inspection Date                    | <b>93A:</b>  | NA                       | FC Frequency                        |
| UW Inspection Date                    | <b>93B:</b>  | NA                       | UW Frequency                        |
|                                       |              |                          | Next Inspection:                    |
|                                       |              |                          | 9/1/2023                            |
|                                       |              |                          | Next FC Inspection:                 |
|                                       |              |                          | NA                                  |
|                                       |              |                          | Next UW Inspection:                 |
|                                       |              |                          | NA                                  |
| CONDITION                             |              |                          |                                     |
| Deck                                  | <b>58:</b>   | 6 Satisfactory           | Super                               |
| Culvert                               | <b>62:</b>   | N N/A (NBI)              | Channel/Channel Protection          |
|                                       |              |                          | Sub                                 |
|                                       |              |                          | SD/FO:                              |
|                                       |              |                          | SUFF RATE:                          |
|                                       |              |                          | ND                                  |
|                                       |              |                          | 63.5                                |
|                                       |              |                          | <b>59:</b> 6 Satisfactory           |
|                                       |              |                          | <b>60:</b> 6 Satisfactory           |
|                                       |              |                          | <b>61:</b> 6 Bank Slumping          |
| LOAD RATING AND POSTING               |              |                          |                                     |
| Inventory Rating Method               | <b>65:</b>   | 8 LRFR (HL93)            | Operating Rating Method             |
| Inventory Rating                      | <b>66:</b>   | 0.46                     | Operating Rating                    |
| Design Load                           | <b>31:</b>   | 2 M 13.5 (H 15)          | Posting                             |
| Posting Status                        | <b>41:</b>   | P - Posted for load      |                                     |
|                                       |              |                          | <b>63:</b> 8 LRFR (HL93)            |
|                                       |              |                          | <b>64:</b> 0.60                     |
|                                       |              |                          | <b>70:</b> 1 30.0-39.9%below        |
| GEOMETRIC DATA                        |              |                          |                                     |
| Length Max Span                       | <b>48:</b>   | 23.95 ft                 | Structure Length                    |
| Width Curb to Curb                    | <b>51:</b>   | 40.03 ft                 | Curb/Sdwk Width L                   |
| Approach Roadway width (w/ shoulders) | <b>32:</b>   | 37.07 ft                 | Curb/Sidewalk Width R               |
| Deck Area:                            |              | 1,108.68 sq. ft          | Width Out to Out                    |
| Skew                                  | <b>34:</b>   | 10.00°                   | Median                              |
| Vertical Clearance                    | <b>10:</b>   | 99.99 ft                 | Structure Flared                    |
| Min. Vert. Cl. Over Bridge            | <b>53:</b>   | 99.99 ft                 | Horizontal Clearance                |
| Min. Vert. Undercl. Ref.              | <b>54A:</b>  | N Feature not hwy        | Min. Lat. Undercl. Ref. R           |
| Min. Vert. Undercl.                   | <b>54B:</b>  | 0.00 ft                  | Min. Lat. Undercl. R                |
|                                       |              |                          | Min. Lat. Undercl. L                |
|                                       |              |                          | <b>49:</b> 25.92 ft                 |
|                                       |              |                          | <b>50A:</b> 8.86 ft                 |
|                                       |              |                          | <b>50B:</b> 8.86 ft                 |
|                                       |              |                          | <b>52:</b> 42.65 ft                 |
|                                       |              |                          | <b>33:</b> 0 No median              |
|                                       |              |                          | <b>35:</b> 0 No flare               |
|                                       |              |                          | <b>47:</b> 21.98 ft                 |
|                                       |              |                          | <b>55A:</b> N Feature not hwy or RR |
|                                       |              |                          | <b>55:</b> 0.00 ft                  |
|                                       |              |                          | <b>56:</b> 0.00 ft                  |
| AGE AND SERVICE                       |              |                          |                                     |
| Year Built                            | <b>27:</b>   | 1941                     | ADT                                 |
| Type of Service on                    | <b>42A:</b>  | 1 Highway                | Year Reconstructed                  |
| Type of Service under                 | <b>42B:</b>  | 5 Waterway               | Detour Length                       |
| Lanes on                              | <b>28A:</b>  | 2                        | Truck ADT                           |
| Lanes under                           | <b>28B:</b>  | 0                        | Year of ADT                         |
|                                       |              |                          | <b>29:</b> 5,213                    |
|                                       |              |                          | <b>106:</b> -1                      |
|                                       |              |                          | <b>19:</b> 9.9 mi                   |
|                                       |              |                          | <b>109:</b> 0%                      |
|                                       |              |                          | <b>30:</b> 1980                     |
| STRUCTURE TYPE AND MATERIALS          |              |                          |                                     |
| Deck Type                             | <b>107:</b>  | 1 Concrete-Cast-in-Place | Number of Spans Main Unit           |
| Wearing Surface                       | <b>108A:</b> | 6 Bituminous             | Main Span Material Design           |
| Membrane                              | <b>108B:</b> | 0 None                   | Main Span Material Design           |
| Deck protection                       | <b>108C:</b> | None                     | Number of Approach Spans            |
|                                       |              |                          | <b>45:</b> 1                        |
|                                       |              |                          | <b>43A:</b> 1 Concrete              |
|                                       |              |                          | <b>43B:</b> 01 Slab                 |
|                                       |              |                          | <b>46:</b> 0                        |



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

| APPRAISAL               |      |           |                       |
|-------------------------|------|-----------|-----------------------|
| Bridge Rail             | 36A: | 0         | Substandard           |
| Transition              | 36B: | N         | N/A or not required   |
| Str Evaluation          | 67:  | 3         | Intolerable - Correct |
| Waterway Adequacy       | 71:  | 6         | Equal Minimum         |
| Scour Critical          | 113: | 8         | Stable Above Footing  |
| Approach Rail           | 36C: | 0         | Substandard           |
| Approach Rail Ends      | 36D: | 0         | Substandard           |
| Deck Geometry           | 68:  | 5         | Above Tolerable       |
| Approach Alignment      | 72:  | 7         | Above Min Criteria    |
| Vert. & Horiz. Undercl. | 69:  | N         | Not applicable (NBI)  |
| CLASSIFICATION          |      |           |                       |
| Defense Highway         | 100: | 0         | Not a STRAHNET hwy    |
| Direction of Traffic    | 102: | 2         | 2-way traffic         |
| Highway System          | 104: | 3         | On free road          |
| Defense Hwy             | 110: | 0         | Not on NHS            |
| Toll Facility           | 20:  | 0         | Not a STRAHNET hwy    |
| Owner                   | 22:  |           | County Hwy Agency     |
| Parallel Structure      | 101: |           | No    bridge exists   |
| Temporary Structure     | 103: |           | Unknown (NBI)         |
| NBIS Length             | 112: |           | Long Enough           |
| Functional Class        | 26:  | 02        | Rural Other Princ     |
| Historical Significance | 37:  | 5         | Not eligible for NRHP |
| Custodian               | 21:  |           | County Hwy Agency     |
| PROPOSED IMPROVEMENTS   |      |           |                       |
| Bridge Cost             | 94:  | \$0       |                       |
| Roadway Cost            | 95:  | \$15,000  |                       |
| Total Cost              | 96:  | \$231,000 |                       |
| Year of Cost Estimate   | 97:  | 2000      |                       |
| Type of Work            | 75:  | 38        | Other Structural      |
| Length of Improvement   | 76:  | 0.0       | ft                    |
| Future ADT              | 114: | 6,516     |                       |
| Year of Future ADT      | 115: | 2025      |                       |
| NAVIGATION DATA         |      |           |                       |
| Navigation Control      | 38:  |           | Permit Not Required   |
| Vertical Clearance      | 39:  | 0.0       | ft                    |
| Pier Protection         | 111: |           | Unknown (NBI)         |
| Horizontal Clearance    | 40:  | 0.0       | ft                    |
| Lift Bridge Vert. Cl.   | 116: |           |                       |

# **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 SIGNS AND BENT TRUCK CROSSING SIGN ON FARRINGTON HIGHWAY AT EAST APPROACH TO BRIDGE

There is total of 5 Weight limit sign for this bridge.



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





**PHOTO 7** HEAVY VEGETATION AT UPSTREAM EAST APPROACH GUARDRAIL



**PHOTO 8** UPSTREAM WEST APPROACH GUARDRAIL COVERED BY HEAVY VEGETATION





**PHOTO 9** HEAVY VEGETATION AT DOWNSTREAM EAST APPROACH GUARDRAIL



**PHOTO 10** DOWNSTREAM WEST APPROACH GUARDRAIL WITH VEGETATION AND IMPACT DAMAGE (SEE PHOTO 11)





**PHOTO 11** IMPACT DAMAGE AT DOWNSTREAM WEST APPROACH  
GUARDRAIL



**PHOTO 12** TYPICAL TRANSVERSE CRACK ON DOWNSTREAM CURB





**PHOTO 13** 1/2" WIDE TRANSVERSE CRACK ON DOWNSTREAM CURB, AT WEST END



**PHOTO 14** TYPICAL IMPACT DAMAGE AT DOWNSTREAM GUARDRAIL POSTS (SEE PHOTO 15)





**PHOTO 15** 1'-6"X6" SPALL (2FT 1080 CS2) ON DOWNSTREAM CONCRETE BRIDGE RAILING AT EAST END OF BRIDGE AND IMPACT DAMAGE AT GUARDRAIL POST



**PHOTO 16** WEARING SURFACE



**PHOTO 17** 8'X1' DELAMINATION (8SF 1080 CS2) AT UPSTREAM  
EDGE OF SLAB SOFFIT, ADJACENT TO ABUTMENT 2



**PHOTO 18** LONGITUDINAL CRACK WITH SURFACE WHITE  
EFFLORESCENCE (10SF 1120 CS2) ON SLAB SOFFIT





**PHOTO 19** PROTRUDING ROOFING PAPER ALONG TOP OF ABUTMENT 1



**PHOTO 20** ABUTMENT 1

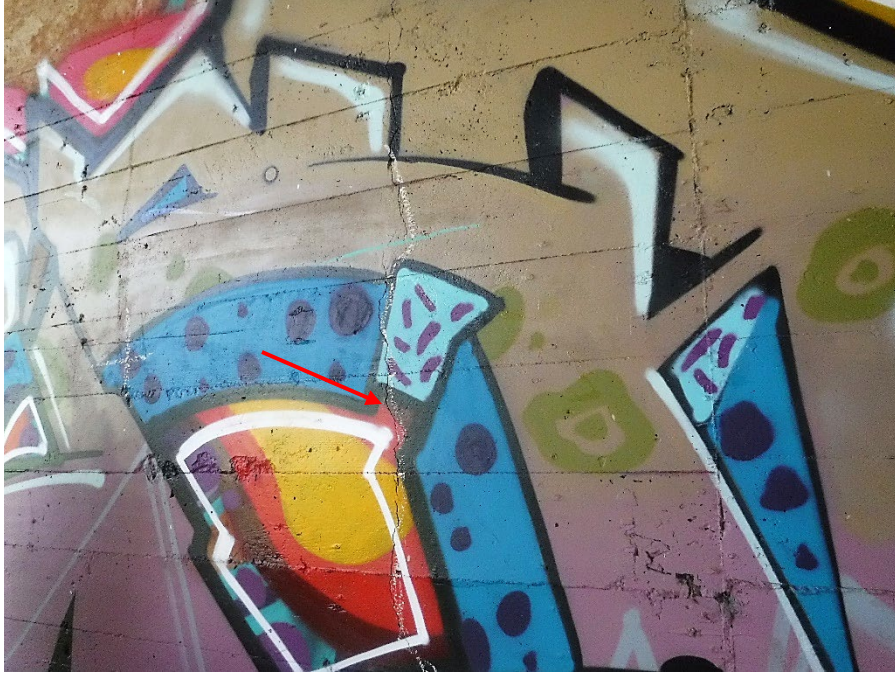


**PHOTO 21** ABUTMENT 2



**PHOTO 22** 3'X2' DELAMINATION (3FT 1080 CS2) ON ABUTMENT 1





**PHOTO 23** MODERATE WIDTH CRACK (1130 CS2) ON ABUTMENT 1, TYPICAL ON BOTH ABUTMENTS



**PHOTO 24** 2'X1' SPALL AT TOP OF DOWNSTREAM EAST WINGWALL





**PHOTO 25** UPSTREAM CHANNEL WITH HEAVY VEGETATION

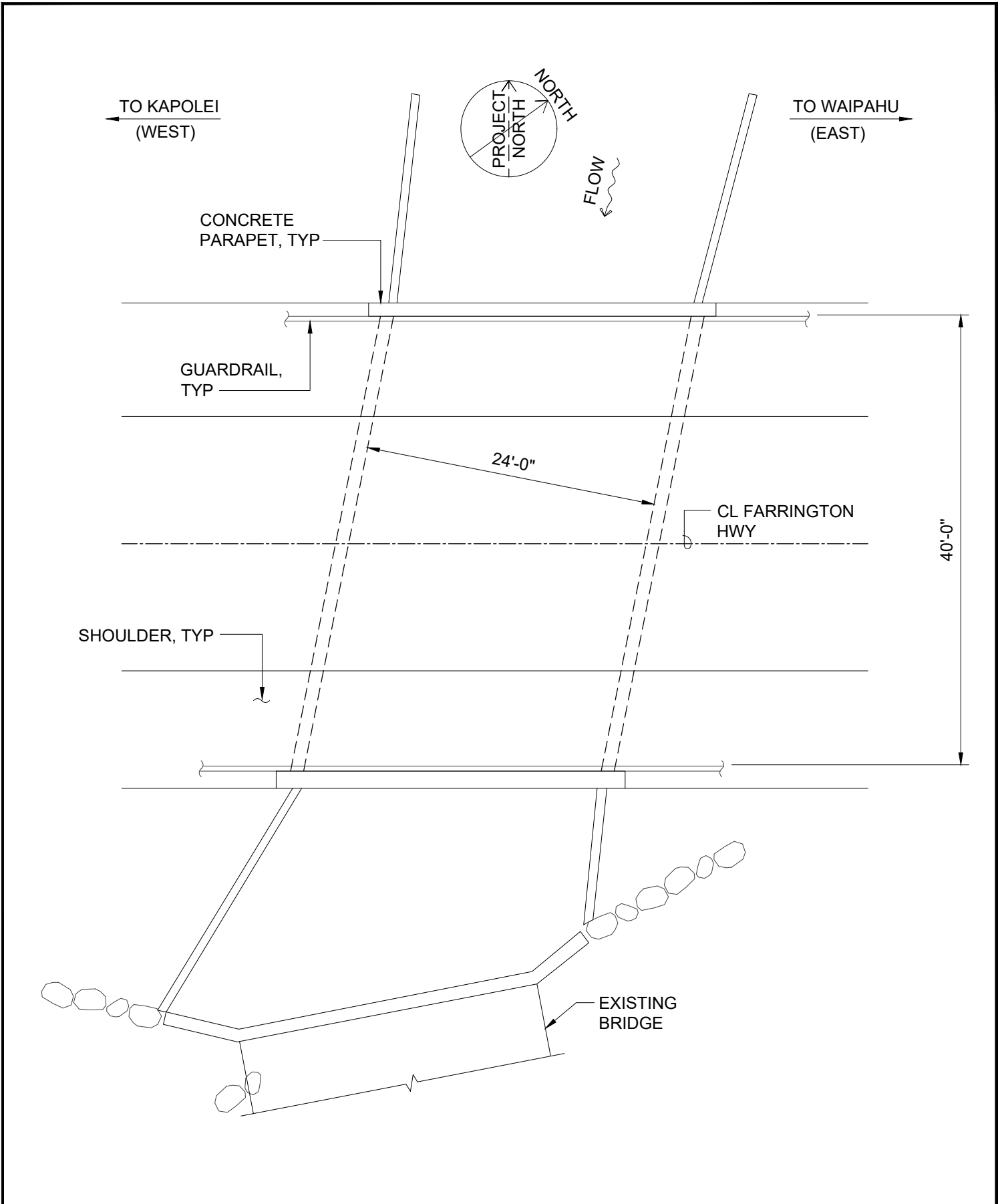


**PHOTO 26** DOWNSTREAM CHANNEL WITH HEAVY VEGETATION

# **APPENDIX B:**

## **FIGURES**





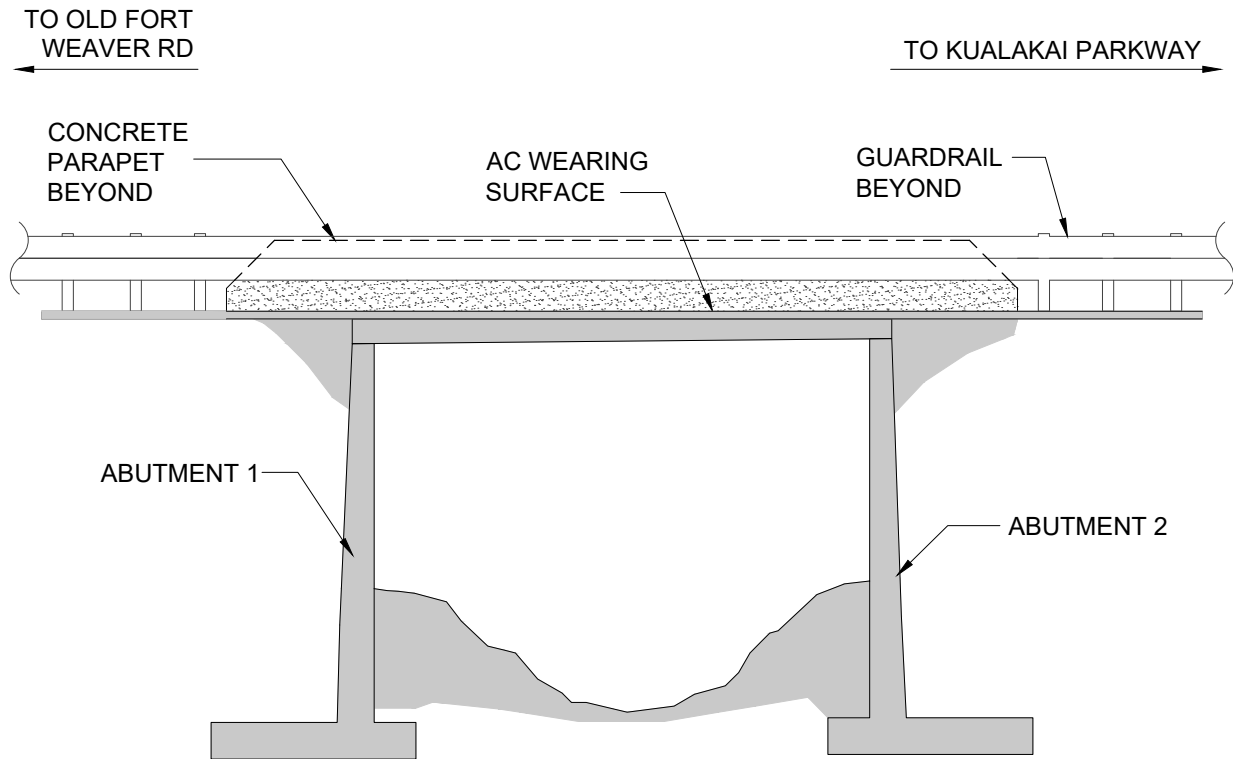
BRIDGE PLAN

NOT TO SCALE

Bridge Name: FARRINGTON HIGHWAY BRIDGE NO. 1 OVER KALO'I GULCH

City Bridge No. 923

Structure No. 003923001100001



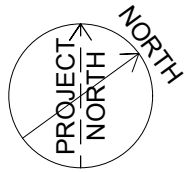
TRANSVERSE SECTION

NOT TO SCALE

Bridge Name: FARRINGTON HIGHWAY BRIDGE NO. 1 OVER KALOI GULCH

City Bridge No. 923

Structure No. 003923001100001



SOUNDINGS DATUM  
REFERENCE POINT  
ELEVATION = 0.00

-13.87 -15.73 -17.93 -15.55 -12.33

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

TO KAPOLEI  
(WEST)

CL FARRINGTON  
HWY

ABUTMENT 2 BELOW

ABUTMENT 1 BELOW

TO WAIPAHU  
(EAST)

-15.63 -16.84 -17.05 -14.43 -11.98

EXISTING  
BRIDGE

KEY  
0.00  
ELEVATION  
IN FEET

BRIDGE PLAN - SOUNDINGS

NOT TO SCALE

Bridge Name: FARRINGTON HIGHWAY BRIDGE NO. 1 OVER KALOI GULCH

City Bridge No. 923

Structure No. 003923001100001

SOUNDINGS DATUM  
REFERENCE POINT  
ELEVATION = 0.00

CONCRETE  
PARAPET, TYP

ABUTMENT 1

ABUTMENT 2

KEY

(0.00)

ELEVATION IN FEET (2019  
ELEVATIONS BY OTHERS)

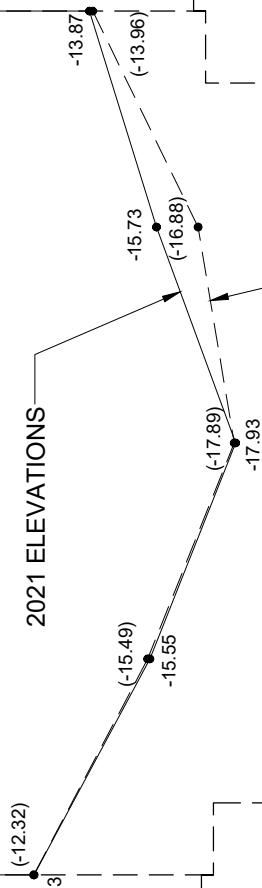
0.00

ELEVATION IN FEET  
(2021 ELEVATIONS)

2021 ELEVATIONS

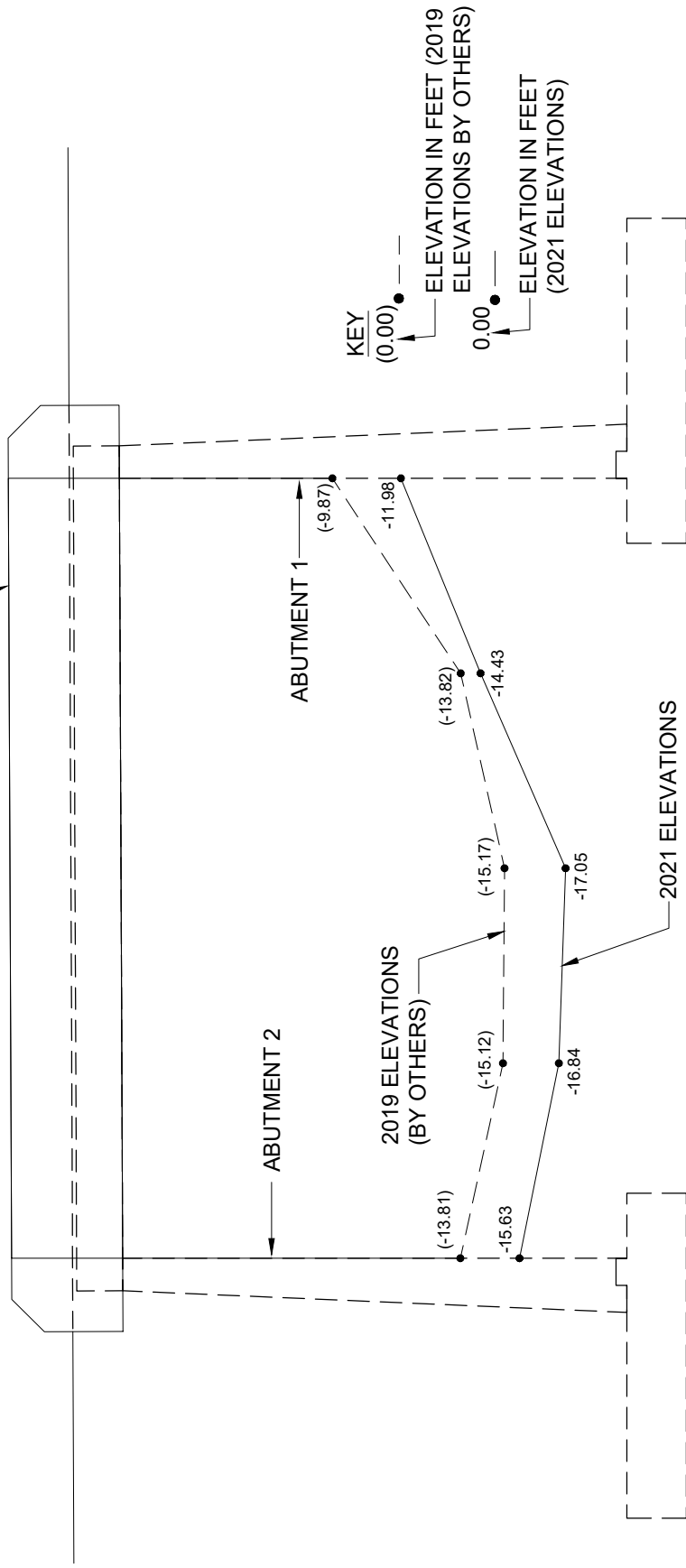
2019 ELEVATIONS  
(BY OTHERS)

|  |
|--|
| <p>BASED ON 1940 AS-BUILTS<br/>BOTTOM OF SPREAD<br/>FOOTING ELEVATION:</p> |
| <p>ABUTMENT 1 = -19.15</p>   |
| <p>ABUTMENT 2 = -19.15</p>   |



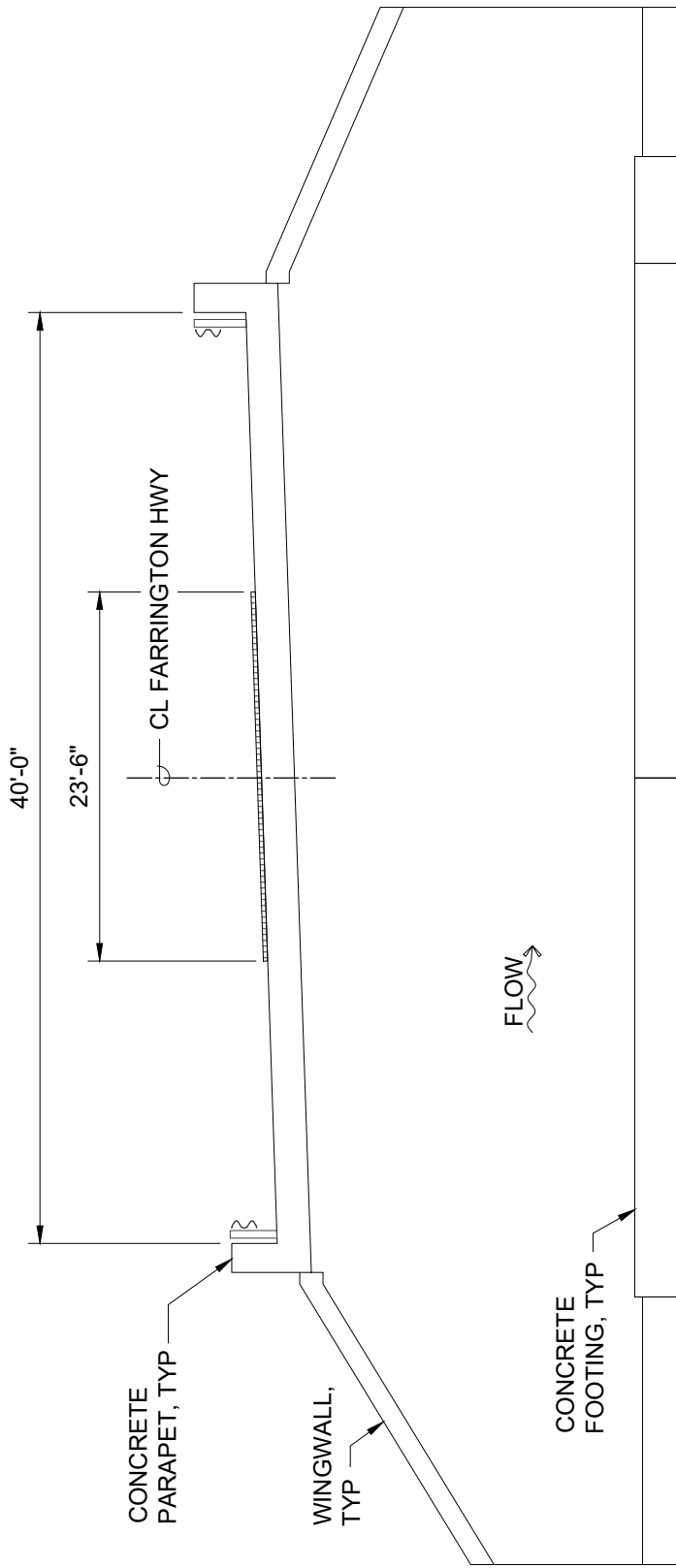
|   |                               |
|---|-------------------------------|
| UPSTREAM ELEVATION - SOUNDINGS                                | NOT TO SCALE                  |
| Bridge Name: FARRINGTON HIGHWAY BRIDGE NO. 1 OVER KALOI GULCH |                               |
| City Bridge No. 923   | Structure No. 003923001100001 |

CONCRETE  
PARAPET, TYP

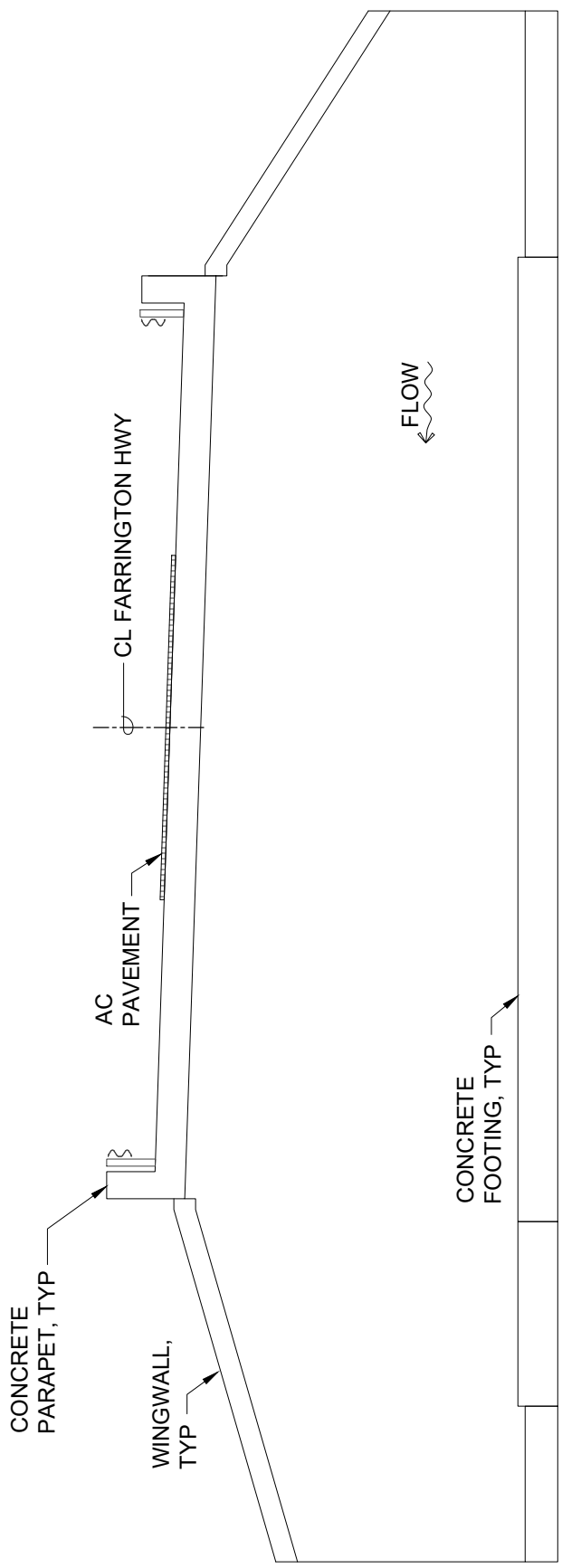


BASED ON 1940 AS-BUILTS  
BOTTOM OF SPREAD  
FOOTING ELEVATION:  
ABUTMENT 1 = -20.77  
ABUTMENT 2 = -20.77

|   |                               |
|---|-------------------------------|
| DOWNSTREAM ELEVATION - SOUNDINGS                              | NOT TO SCALE                  |
| Bridge Name: FARRINGTON HIGHWAY BRIDGE NO. 1 OVER KALOI GULCH |                               |
| City Bridge No. 923   | Structure No. 003923001100001 |



|   |                               |
|---|-------------------------------|
| ABUTMENT 1 ELEVATION  | NOT TO SCALE                  |
| Bridge Name: FARRINGTON HIGHWAY BRIDGE NO. 1 OVER KALOI GULCH |                               |
| City Bridge No. 923   | Structure No. 003923001100001 |



|   |                               |
|---|-------------------------------|
| ABUTMENT 2 ELEVATION  | NOT TO SCALE                  |
| Bridge Name: FARRINGTON HIGHWAY BRIDGE NO. 1 OVER KALOI GULCH |                               |
| City Bridge No. 923   | Structure No. 003923001100001 |