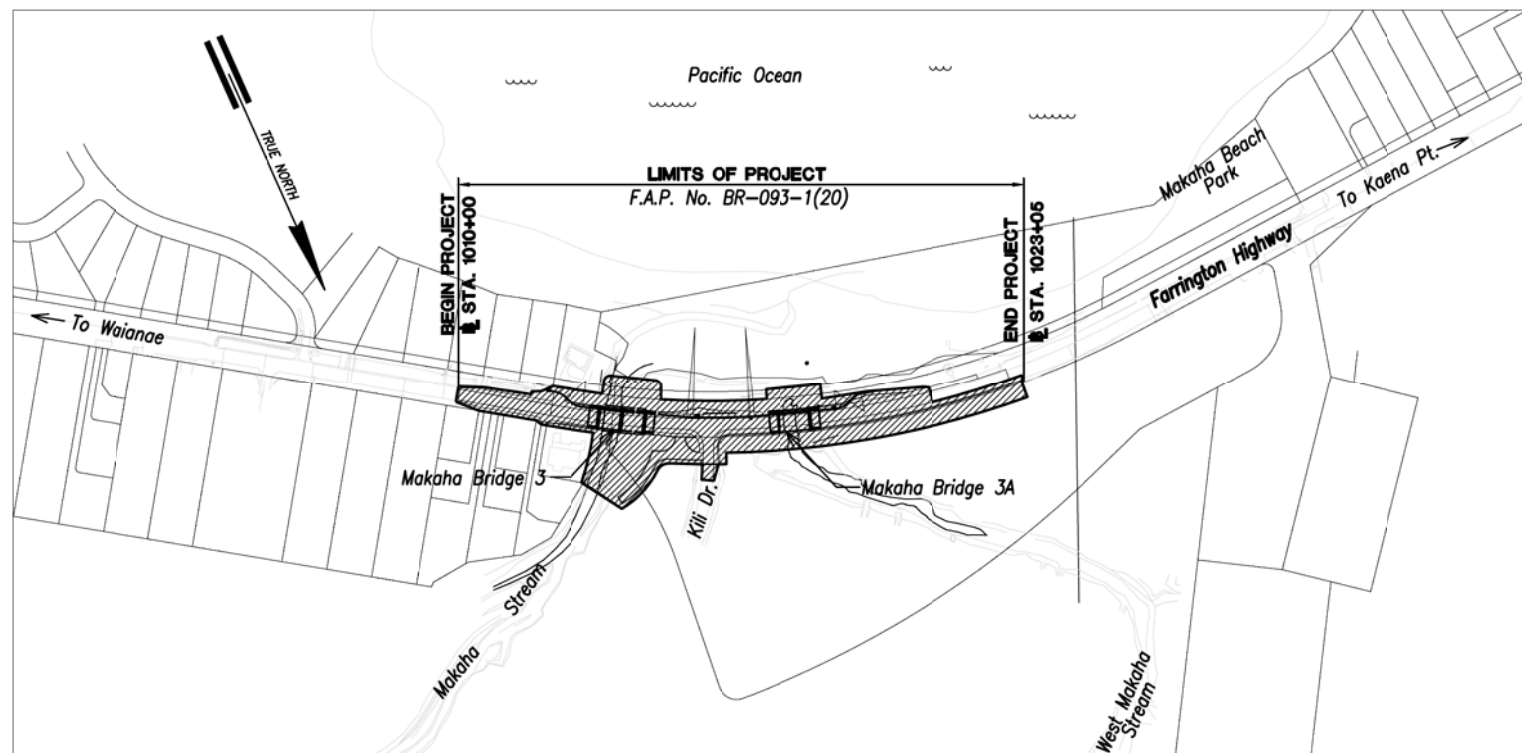
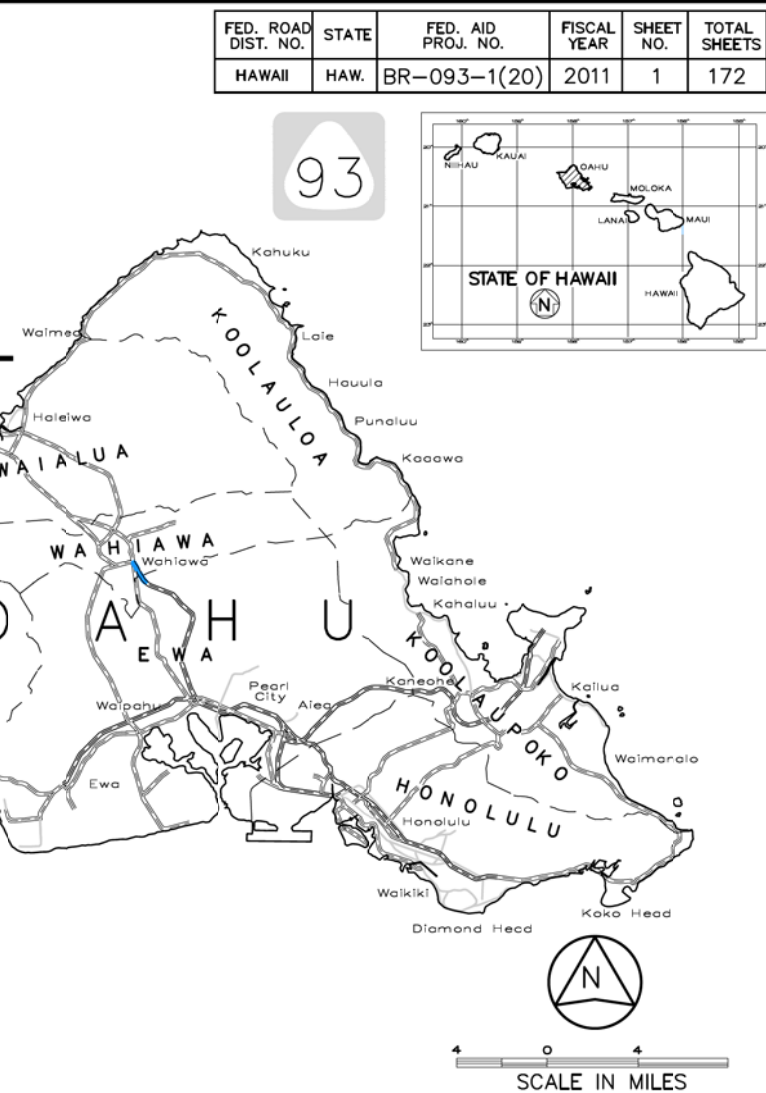


**Attachment A-1**  
**Erosion and Sediment Control Plan Sheets**

| INDEX TO DRAWINGS |                           |
|-------------------|---------------------------|
| SHEET NO.         | DESCRIPTION               |
| 1                 | TITLE SHEET               |
| 2-3               | SHEET INDEX               |
| 4-75              | CIVIL DRAWINGS            |
| 76-142            | STRUCTURAL DRAWINGS       |
| 143-159           | ELECTRICAL DRAWINGS       |
| 160-172           | BORING LOCATIONS AND LOGS |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |
| X                 | X                         |

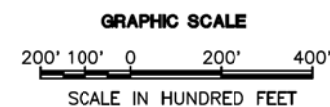
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
HONOLULU, HAWAII

PLANS FOR  
FARRINGTON HIGHWAY  
REPLACEMENT OF MAKAHA BRIDGE NO. 3  
AND MAKAHA BRIDGE NO. 3A  
FEDERAL AID PROJECT NO. BR-093-1(20)  
DISTRICT OF WAIANAE  
ISLAND OF OAHU



### LAYOUT PLAN

NET LENGTH OF PROJECT = 0.25 MILES  
GROSS LENGTH OF PROJECT = 0.25 MILES



DEPARTMENT OF TRANSPORTATION  
STATE OF HAWAII  
APPROVED:  

DIVISION ADMINISTRATOR
DATE

DEPARTMENT OF TRANSPORTATION  
STATE OF HAWAII  
APPROVED:  

DIR. OF TRANSPORTATION
DATE

X  
DATE

692-7545  
PHONE

HWY-05  
MANAGED BY

R.M. TOWILL CORPORATION  
DESIGNED BY

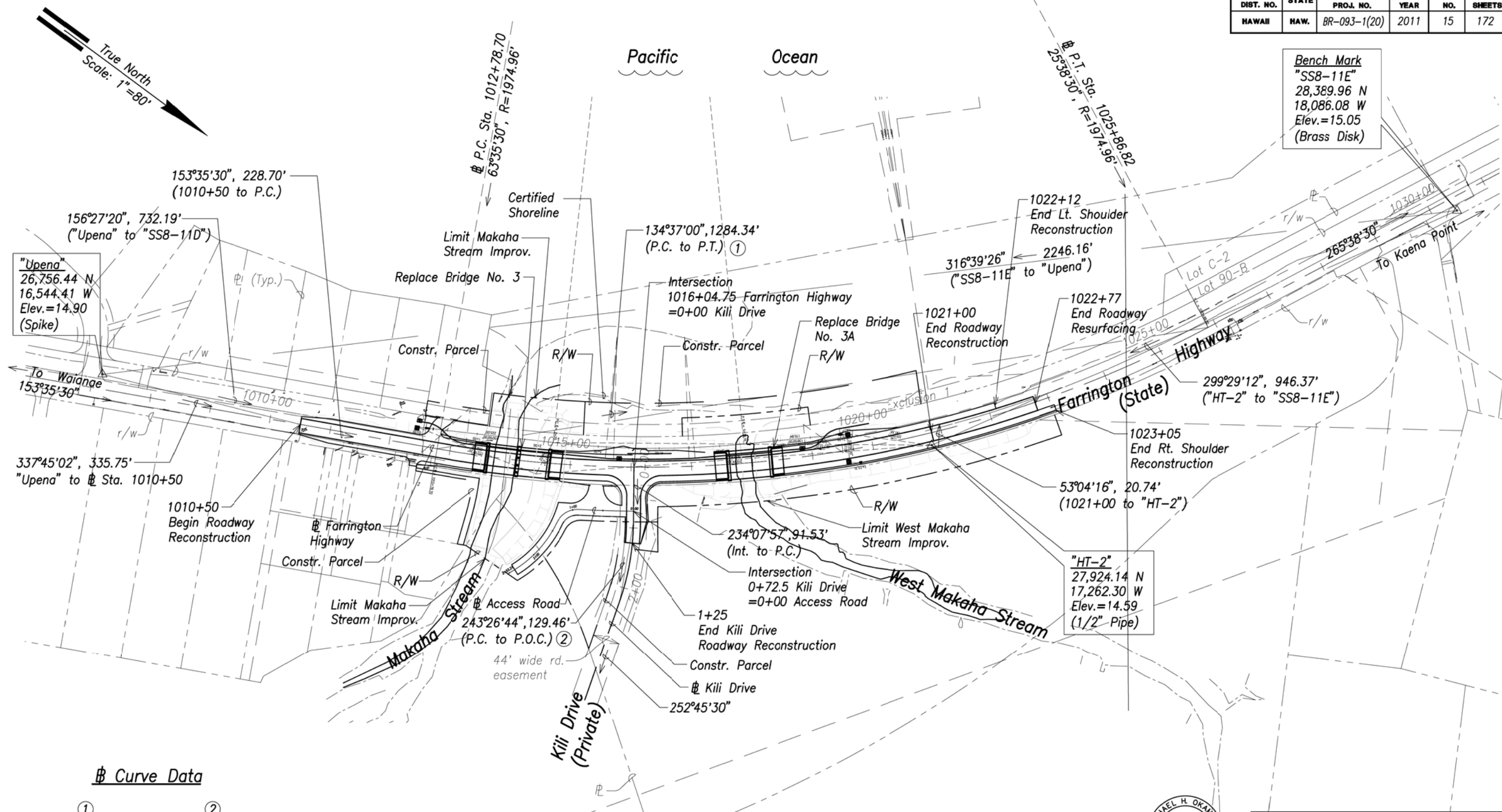
MILE POST 13.95 TO MILE POST 14.20

### DESIGN DESIGNATION

ADT (2012) .....5,600  
DESIGN ADT (2032) .....6,600  
DHV .....530  
D (DESIGN) .....55/45  
T (DESIGN) .....3.5%  
T24 .....4.5%  
V .....45 MPH

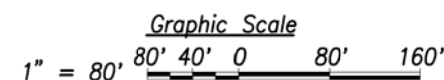
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 15        | 172          |

Bench Mark  
"SS8-11E"  
28,389.96 N  
18,086.08 W  
Elev.=15.05  
(Brass Disk)



### Curve Data

| ①                              | ②                             |
|--------------------------------|-------------------------------|
| ⊙ Farrington<br>P.C. to P.T.   | ⊙ Kili Drive<br>P.C. to P.T.  |
| $\Delta = 37^{\circ}57'00''$   | $\Delta = 18^{\circ}37'33''$  |
| $\Delta/2 = 18^{\circ}58'30''$ | $\Delta/2 = 9^{\circ}18'46''$ |
| $R = 1974.96'$                 | $R = 400.00'$                 |
| $T = 679.07'$                  | $T = 65.59'$                  |
| $C = 1284.34'$                 | $C = 129.46'$                 |
| $Lc = 1308.12'$                | $Lc = 130.03'$                |



THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION AND  
CONSTRUCTION OF THIS PROJECT  
WILL BE UNDER MY OBSERVATION.

April 30, 2012  
SIGNATURE EXPIRATION DATE  
OF THE LICENSE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

### GENERAL PLAN

FARRINGTON HIGHWAY

Replacement of Makaha Bridge

No. 3 and Makaha Bridge 3A

F. A. Project No. BR-093-1(20)

Scale: 1" = 80'

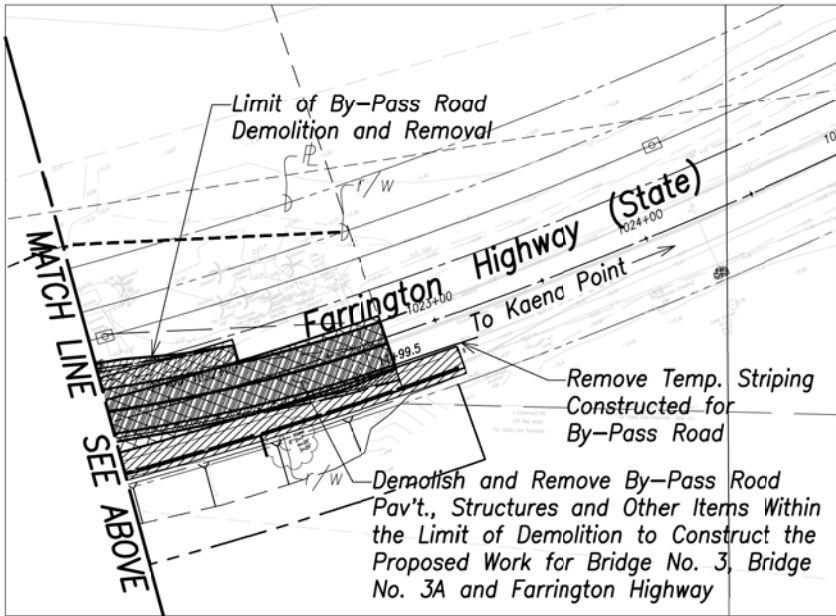
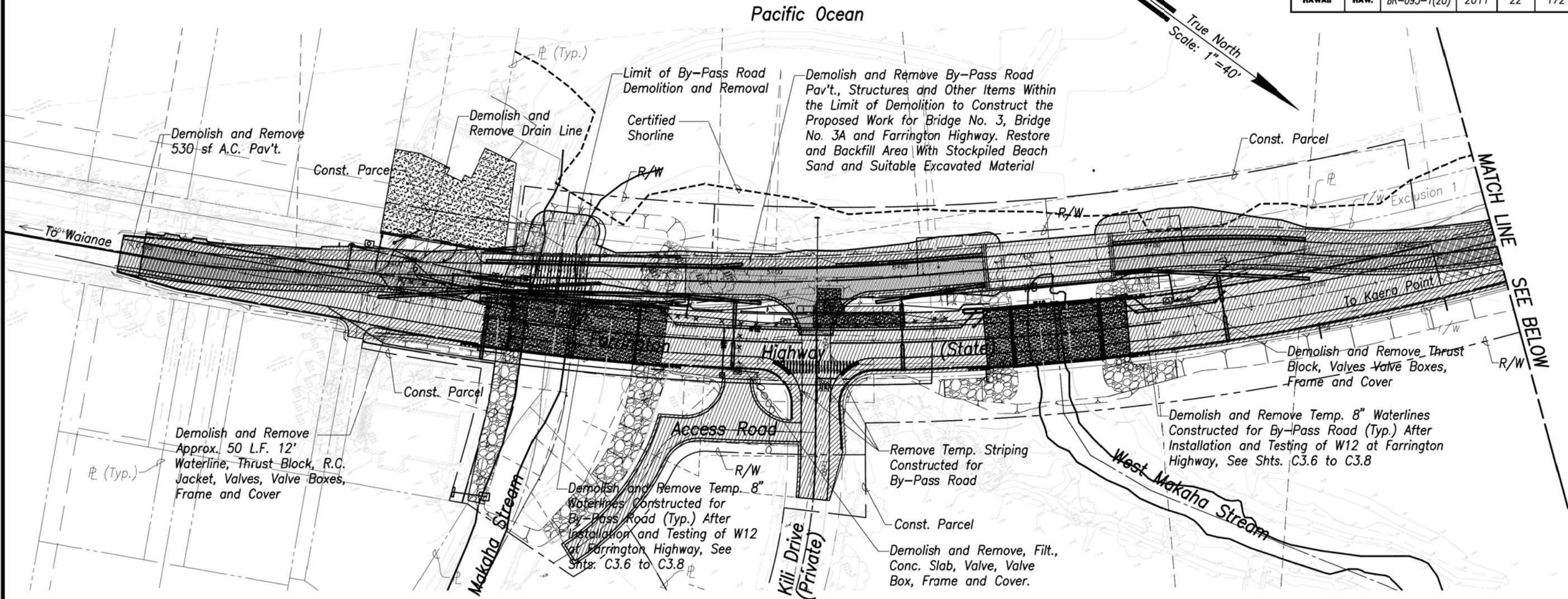
Date: May 2010

SHEET No. C0.14 OF 172 SHEETS





| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 22        | 172          |



Notes:

1. All Utilities to Remain Unless Called Out for Demolition in These Plans.
2. See Electrical Drawings for Electrical Demolition Work
3. The Contractor Shall Remove all Pavement, Concrete and Utilities Required to Reconstruct Bridge No. 3, Bridge No. 3A and Farrington Highway.
4. See Construction Phasing Plans for Additional Information Regarding the Sequence of Work.
5. The Contractor Shall Provide All Required Temporary A.C. Pavement Transitions Between Existing and Proposed Pavement Required for a Smooth Riding Connection.

Approved:

Chief, Capital Projects Division, B.W.S.

Date



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

Signature: \_\_\_\_\_  
April 30, 2012  
EXPIRATION DATE OF THE LICENSE

Graphic Scale

1" = 40' 40' 20' 0 40' 80'

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

DEMOLITION PLAN - 2

FARRINGTON HIGHWAY

Replacement of Makaha Bridge 3A

F. A. Project No. BR-093-1(20)

Scale: 1" = 40' Date: May 2010

SHEET No. C2.3 OF 172 SHEETS

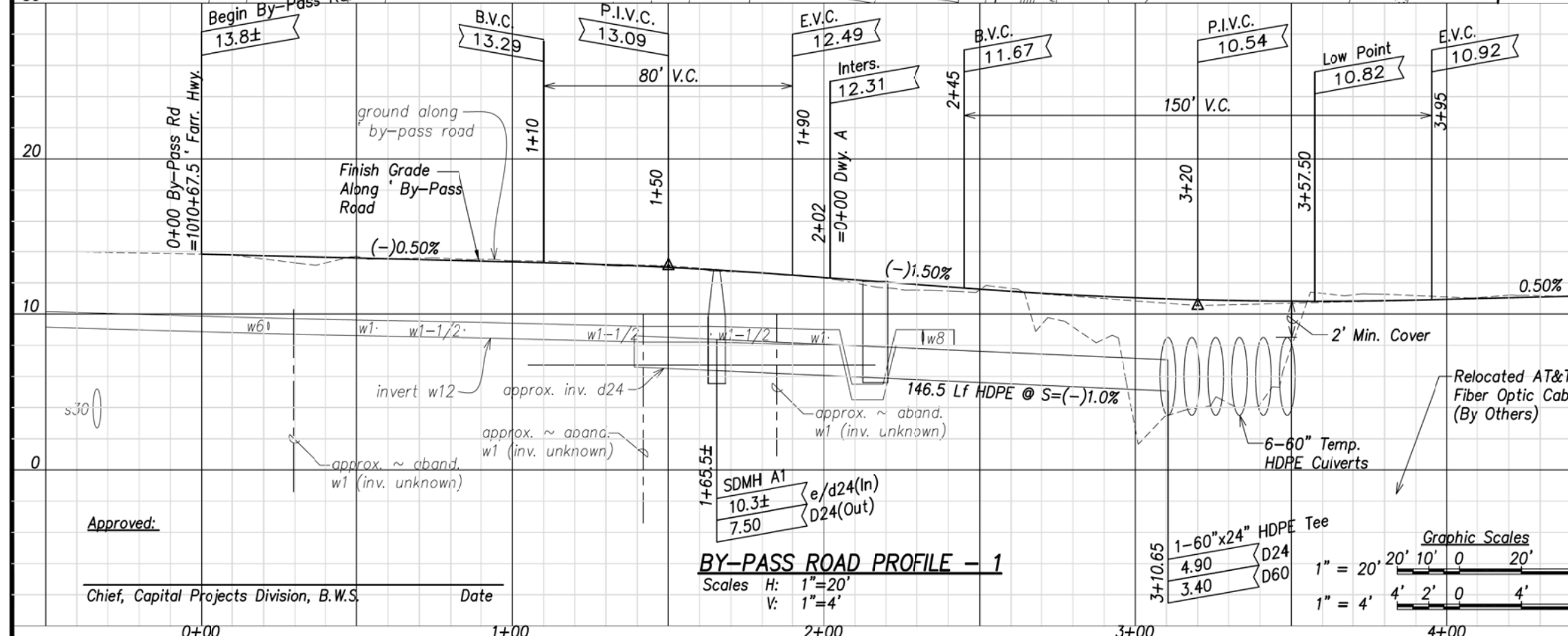
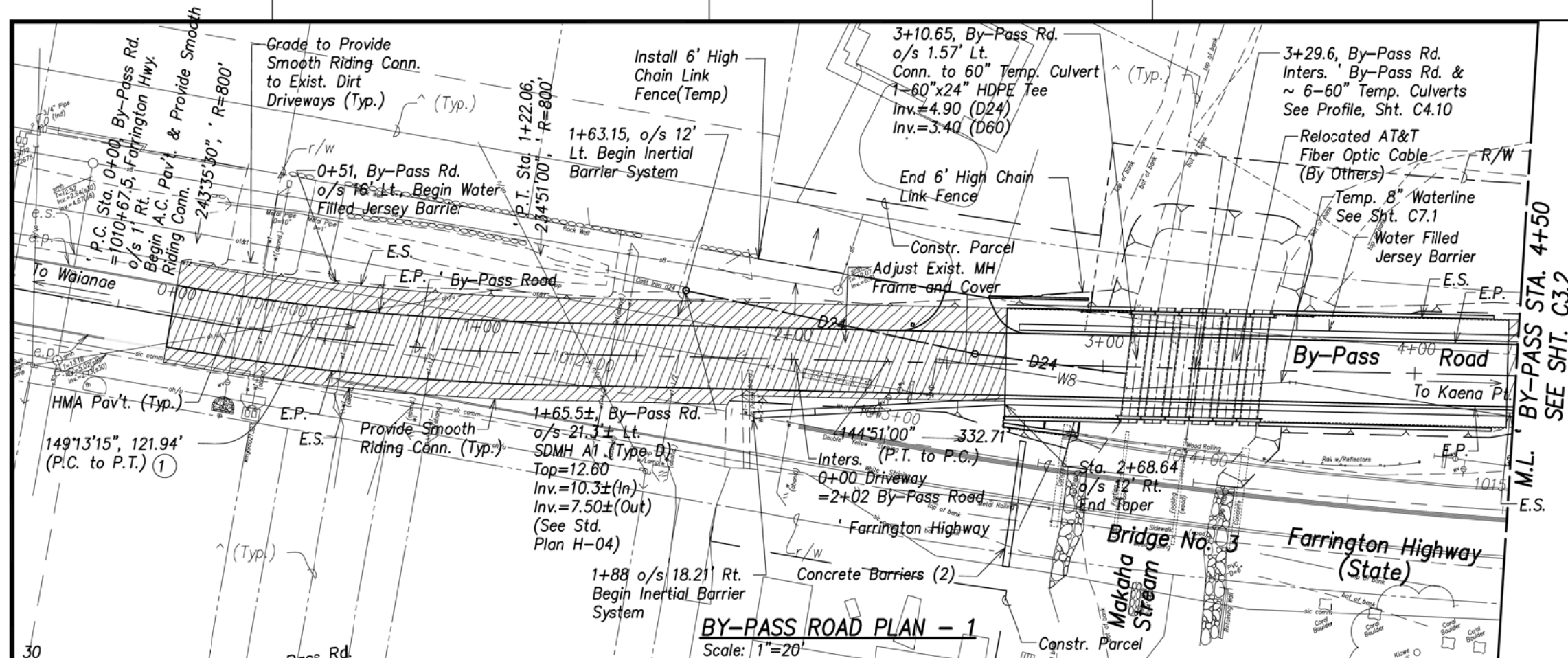
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 23        | 172          |

# By-Pass Road and Driveway Curve Data

①  
(P.C. Sta. 0+00 to P.T. Sta. 1+22.06)  
 $\Delta = 8^{\circ}44'30''$   
 $\Delta/2 = 4^{\circ}22'15''$   
 $R = 800.00'$   
 $T = 61.15'$   
 $C = 121.94'$   
 $L_c = 122.06'$

Notes:

- See Sht. C1.4 for By-Pass Road Typical Section.
- Inertial Barrier System (TAU-11, ABSORB or NCHRP 350 Approved) shall be installed per manufacturer's REcommendations.



M.L. BY-PASS STA. 4+50  
SEE SHT. C3.2



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

Signature: \_\_\_\_\_  
Expiration Date: April 30, 2012

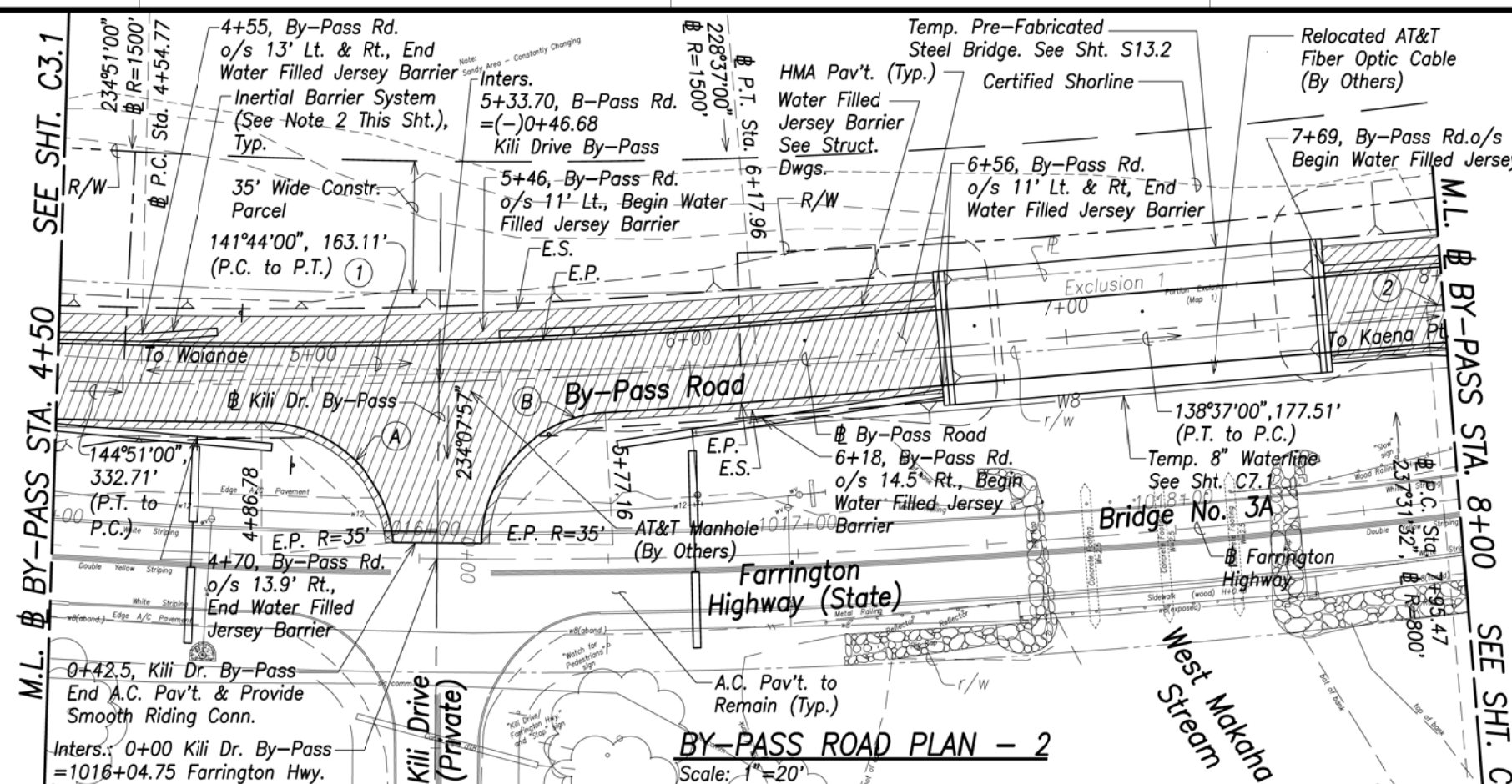
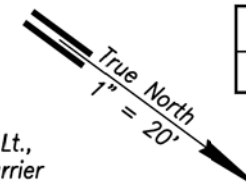
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**BY-PASS ROAD PLAN AND PROFILE - 1**  
FARRINGTON HIGHWAY  
Replacement of Makaha Bridge No. 3 and Makaha Bridge 3A  
F. A. Project No. BR-093-1(20)  
Scale: As Shown Date: Nov. 2015  
SHEET No. C3.1 OF \* SHEETS

|               |      |
|---------------|------|
| DESIGNED BY   | DATE |
| DRAWN BY      |      |
| CHECKED BY    |      |
| NOTED BY      |      |
| QUANTITIES BY |      |
| NO.           |      |

Approved:

Chief, Capital Projects Division, B.W.S. Date

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 24        | 172          |

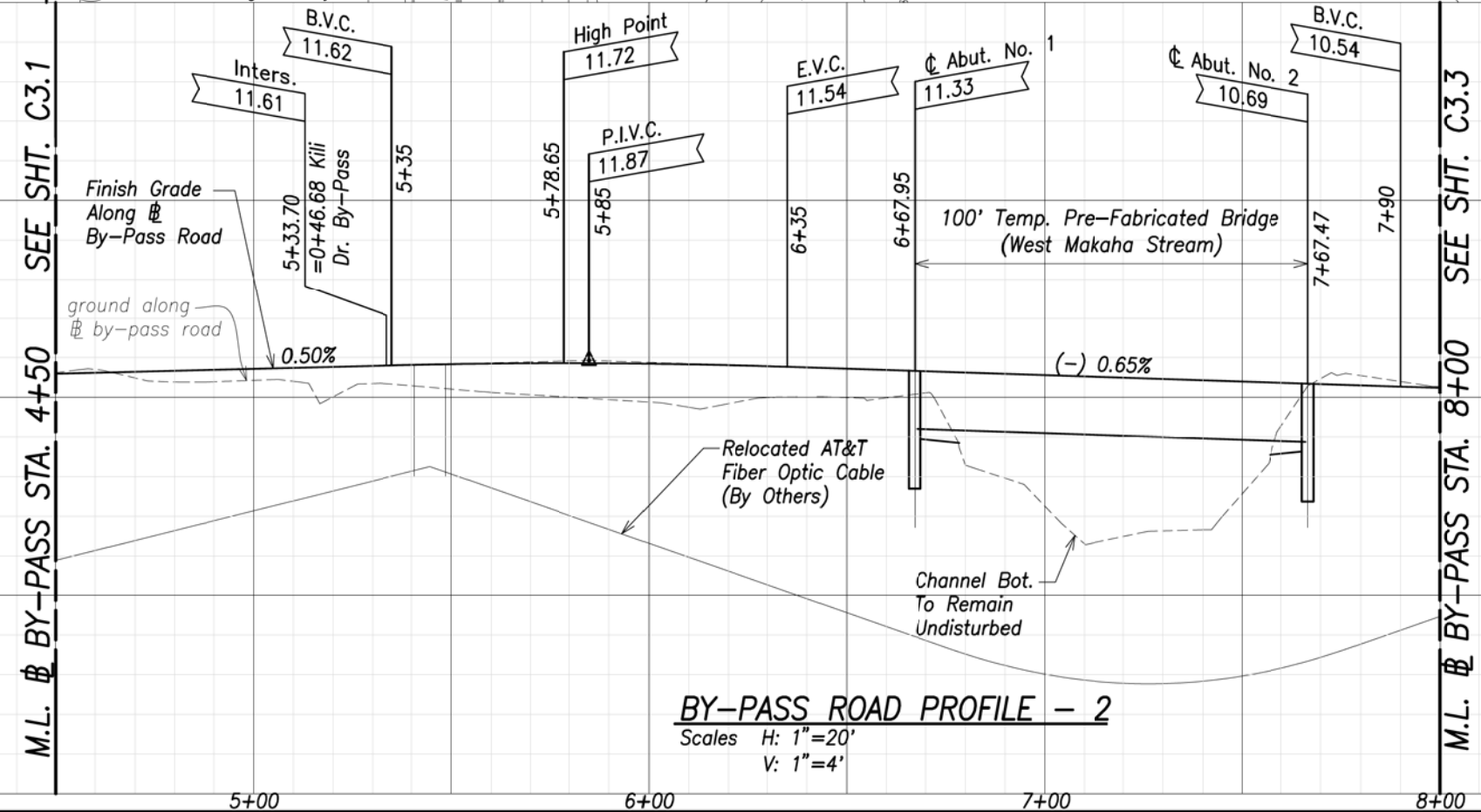


### By-Pass Road Curve Data

| ①                                        | ②                                        |
|------------------------------------------|------------------------------------------|
| (P.C. Sta. 4+54.77 to P.T. Sta. 6+17.96) | (P.C. Sta. 7+95.47 to P.T. Sta. 9+19.86) |
| $\Delta = 06^{\circ}14'00''$             | $\Delta = 8^{\circ}54'32''$              |
| $\Delta/2 = 03^{\circ}07'00''$           | $\Delta/2 = 4^{\circ}27'16''$            |
| $R = 1500.00'$                           | $R = 800.00'$                            |
| $T = 81.67'$                             | $T = 62.32'$                             |
| $C = 163.11'$                            | $C = 124.27'$                            |
| $Lc = 163.19'$                           | $Lc = 124.39'$                           |

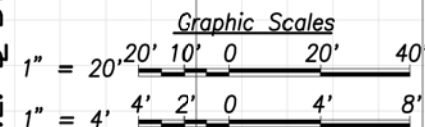
### Curve Return Data

| A                              | B                              |
|--------------------------------|--------------------------------|
| $\Delta = 84^{\circ}12'04''$   | $\Delta = 86^{\circ}02'34''$   |
| $\Delta/2 = 42^{\circ}06'02''$ | $\Delta/2 = 43^{\circ}01'17''$ |
| $R = 33.00'$                   | $R = 33.00'$                   |
| $T = 29.82'$                   | $T = 30.80'$                   |
| $C = 44.25'$                   | $C = 45.03'$                   |
| $Lc = 48.50'$                  | $Lc = 49.56'$                  |



### BY-PASS ROAD PROFILE - 2

Scales H: 1"=20'  
V: 1"=4'



- Notes:
- See Sht. C1.4 for By-Pass Road Typical Section.
  - Inertial Barrier System (TAU-11, ABSORB or NCHRP 350 Approved) shall be installed per manufacturer's REcommendations.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

Signature: \_\_\_\_\_  
Expiration Date of the License: April 30, 2012

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

BY-PASS ROAD PLAN

AND PROFILE - 2

FARRINGTON HIGHWAY

Replacement of Makaha Bridge

No. 3 and Makaha Bridge 3A

F. A. Project No. BR-093-1(20)

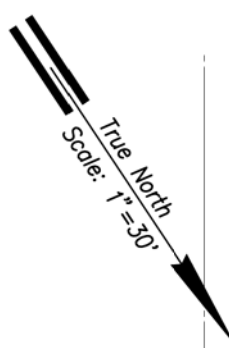
Scale: As Shown

Date: May 2010

SHEET No. C3.2 OF 172 SHEETS

|               |      |
|---------------|------|
| DESIGNED BY   | DATE |
| DRAWN BY      |      |
| CHECKED BY    |      |
| NOTED BY      |      |
| QUANTITIES BY |      |
| NO.           |      |

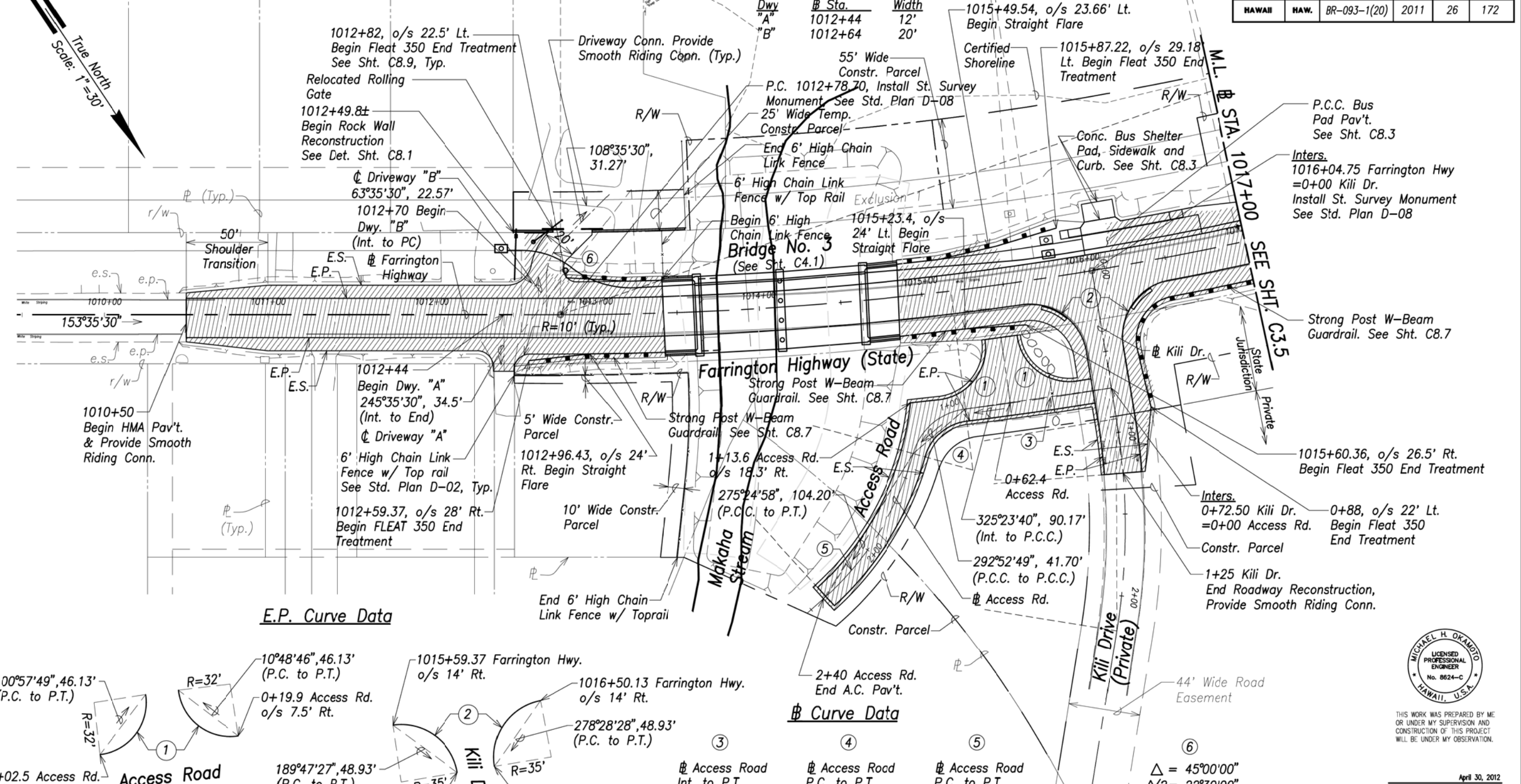




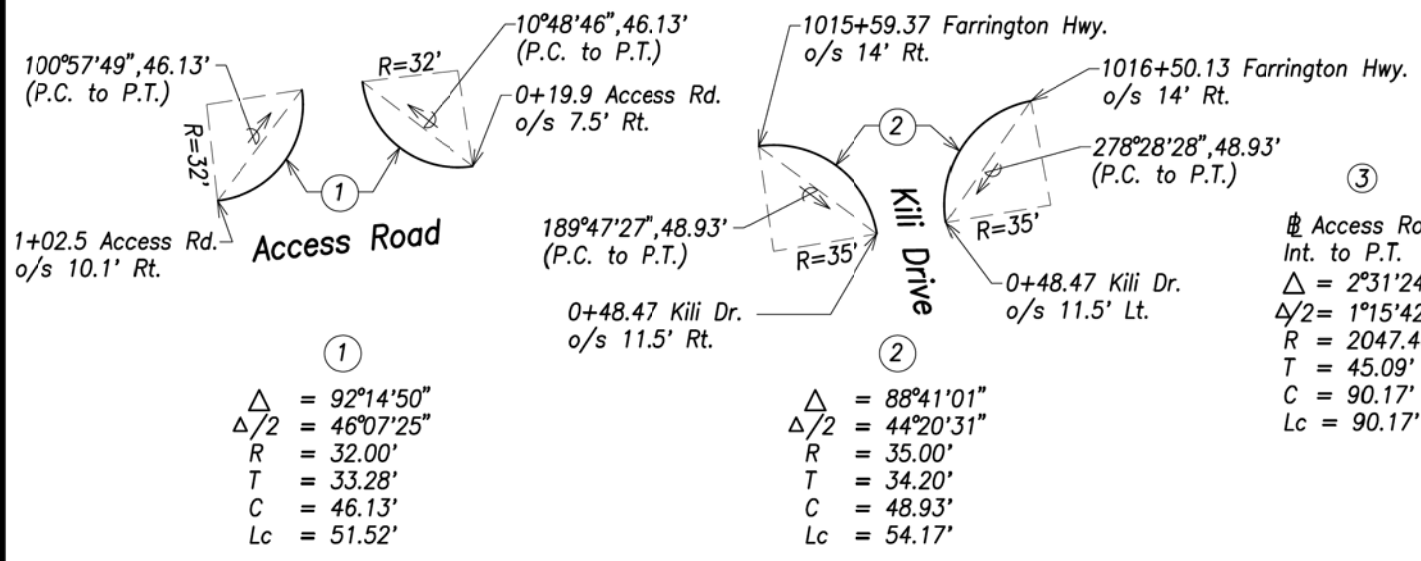
Driveway Schedule

| Dwy | # Sta.  | Width |
|-----|---------|-------|
| "A" | 1012+44 | 12'   |
| "B" | 1012+64 | 20'   |

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 26        | 172          |



E.P. Curve Data



Curve Data

| # | Access Road Int. to P.T. | Access Road P.C. to P.T. | Access Road P.C. to P.T. | Access Road P.C. to P.T. |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | Δ = 92°14'50"            | Δ = 2°31'24"             | Δ = 67°33'04"            | Δ = 32°37'22"            |
| 2 | Δ/2 = 46°07'25"          | Δ/2 = 1°15'42"           | Δ/2 = 33°46'32"          | Δ/2 = 16°18'41"          |
| 3 | R = 32.00'               | R = 2047.46'             | R = 37.50'               | R = 185.50'              |
| 4 | T = 33.28'               | T = 45.09'               | T = 25.08'               | T = 54.28'               |
| 5 | C = 46.13'               | C = 90.17'               | C = 41.70'               | C = 104.20'              |
| 6 | Lc = 51.52'              | Lc = 90.17'              | Lc = 44.21'              | Lc = 105.62'             |

Graphic Scale  
1" = 30' 30' 15' 0 30' 60'



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

Signature: \_\_\_\_\_  
April 30, 2012  
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

SITE AND GEOMETRIC PLAN - 1

FARRINGTON HIGHWAY  
Replacement of Makaha Bridge  
No. 3 and Makaha Bridge 3A  
F. A. Project No. BR-093-1(20)  
Scale: 1"=30' Date: May 2010

SHEET No. C3.4 OF 172 SHEETS

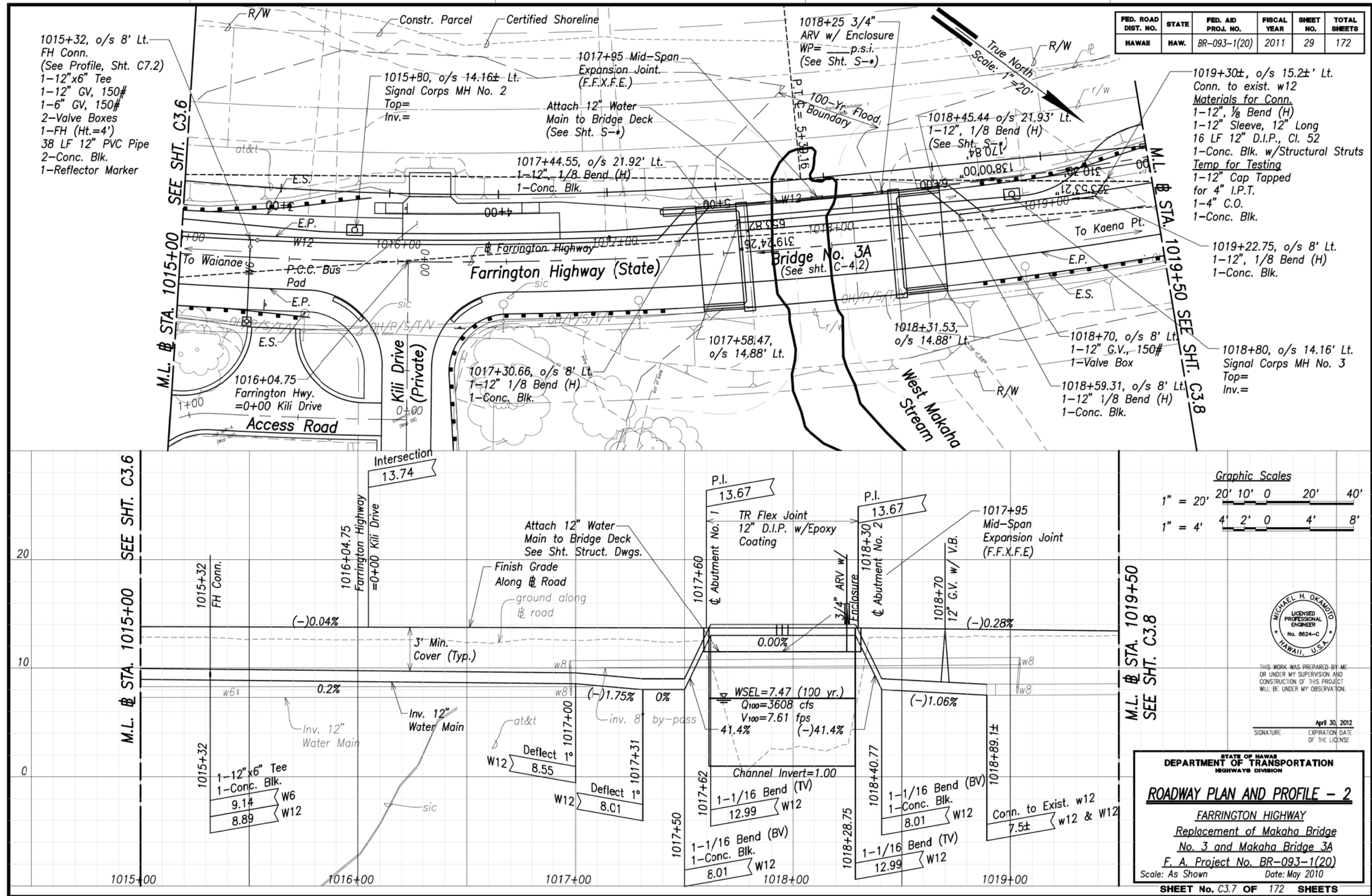
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|-------------|-------|
| DESIGNED BY | _____ |
| DRAWN BY    | _____ |
| CHECKED BY  | _____ |
| DATE        | _____ |
| NO.         | _____ |





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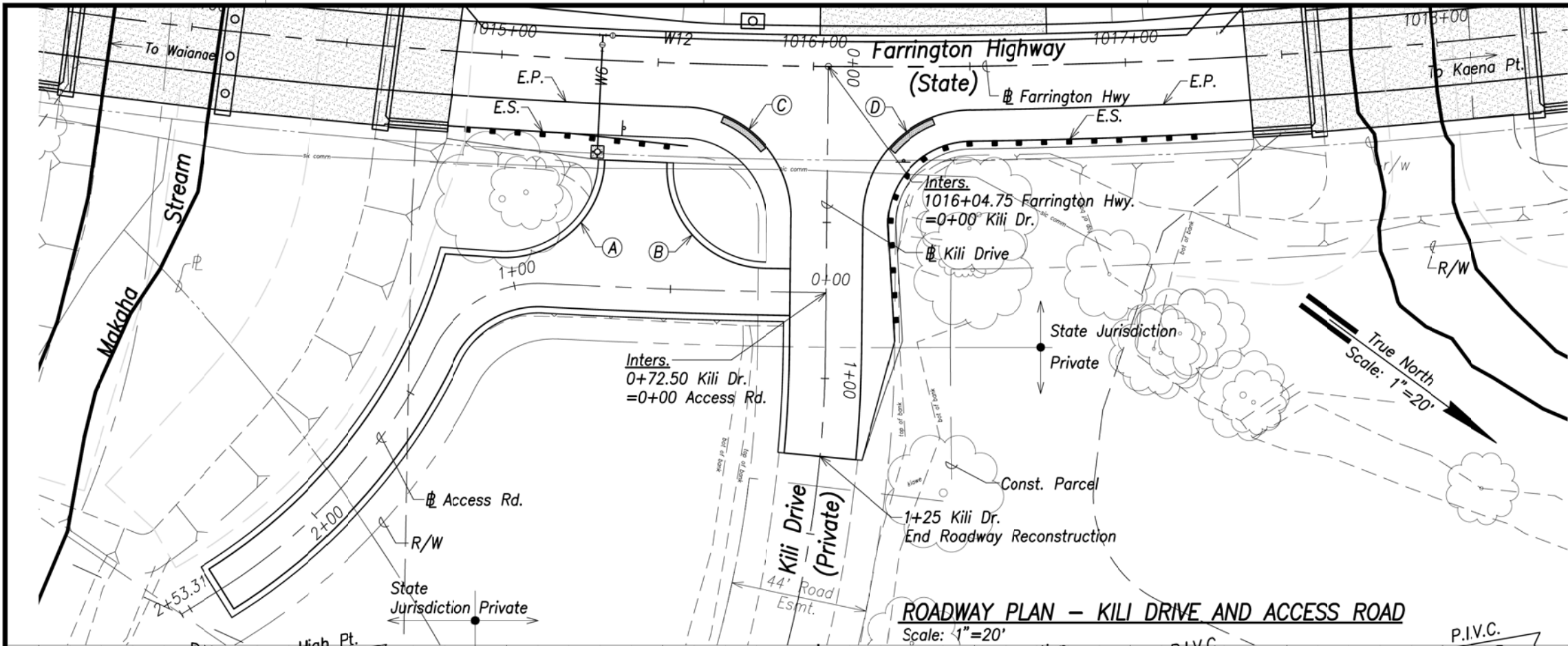
|               |      |
|---------------|------|
| DESIGNED BY   | DATE |
| DRAWN BY      |      |
| CHECKED BY    |      |
| IN CHARGE     |      |
| NOTED BY      |      |
| QUANTITIES BY |      |
| CHECKED BY    |      |
| NO.           |      |



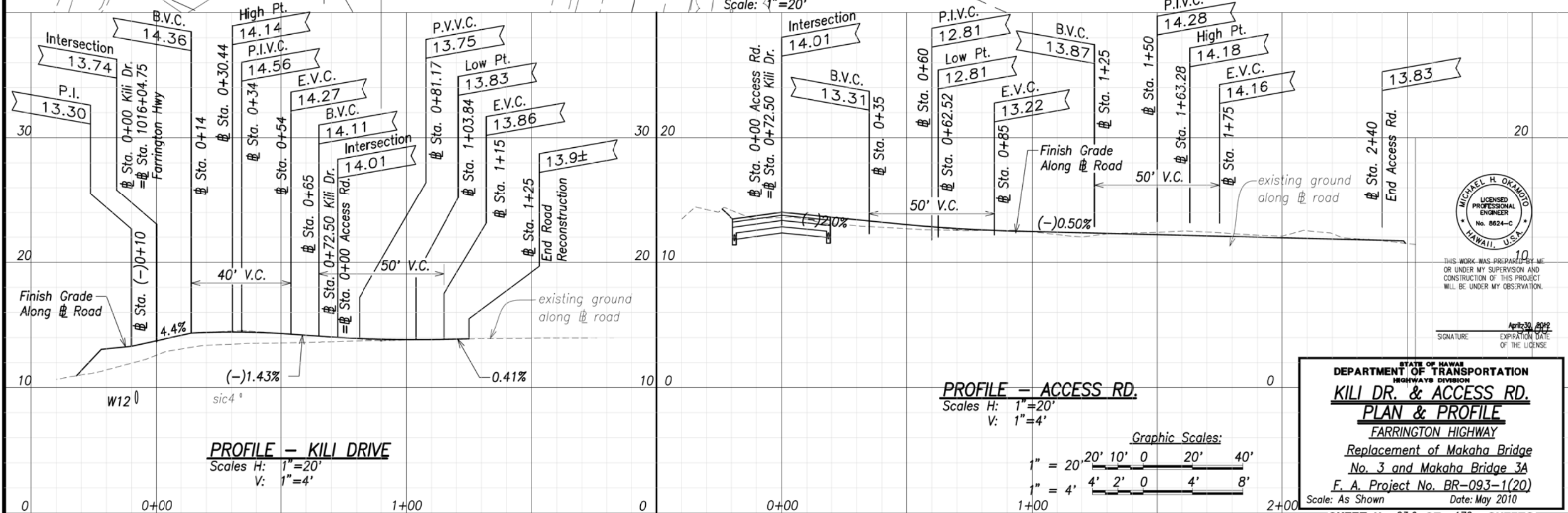
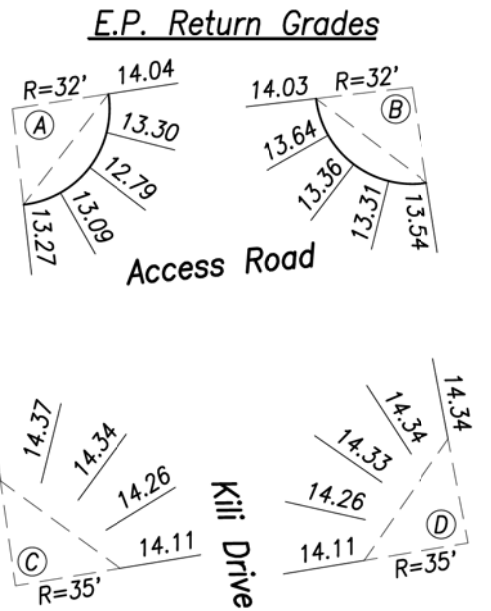


FILE: K:\CWA\1999\Maaha Bridges\dwg\C3.9\_Kil Dr PAP.dwg saved July 31, 2012

|             |      |
|-------------|------|
| DESIGNED BY | DATE |
| DRAWN BY    |      |
| CHECKED BY  |      |
| IN CHARGE   |      |
| NOTED BY    |      |
| DATE        |      |



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 31        | 172          |

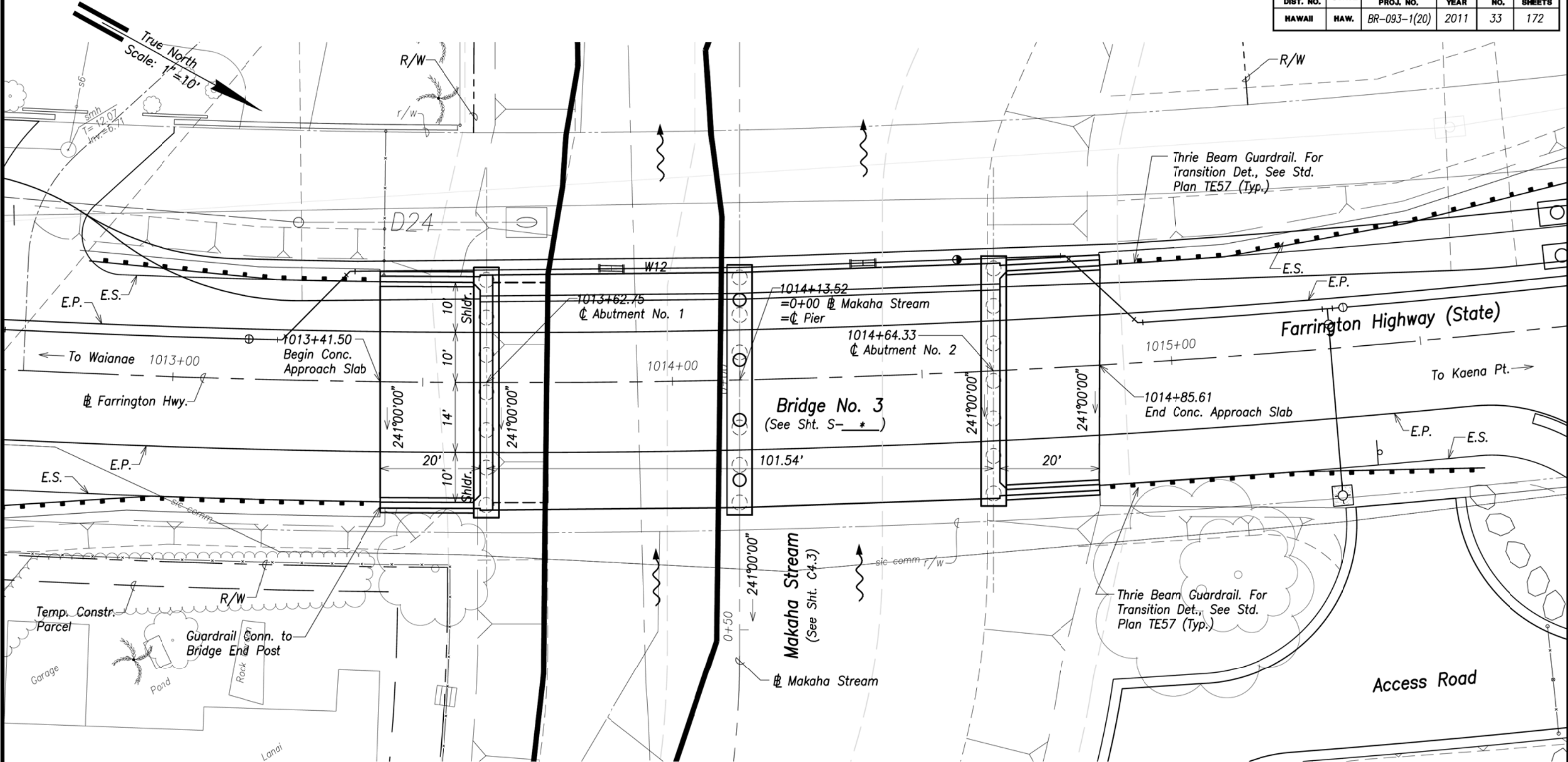


THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

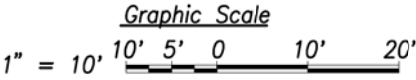
SIGNATURE: \_\_\_\_\_ EXPIRATION DATE OF THE LICENSE: April 30, 2012

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**KILI DR. & ACCESS RD.  
PLAN & PROFILE**  
FARRINGTON HIGHWAY  
Replacement of Makaha Bridge  
No. 3 and Makaha Bridge 3A  
F. A. Project No. BR-093-1(20)  
Scale: As Shown Date: May 2010  
**SHEET No. C3.9 OF 172 SHEETS**

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 33        | 172          |



**Makaha Bridge No. 3 Plan**  
 Scale: 1"=10'



THIS WORK WAS PREPARED BY ME  
 OR UNDER MY SUPERVISION AND  
 CONSTRUCTION OF THIS PROJECT  
 WILL BE UNDER MY OBSERVATION.

Signature: \_\_\_\_\_  
 April 30, 2012  
 EXPIRATION DATE  
 OF THE LICENSE

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

**MAKAHA BRIDGE NO. 3 PLAN**

FARRINGTON HIGHWAY

Replacement of Makaha Bridge

No. 3 and Makaha Bridge 3A

F. A. Project No. BR-093-1(20)

Scale: 1" = 10'

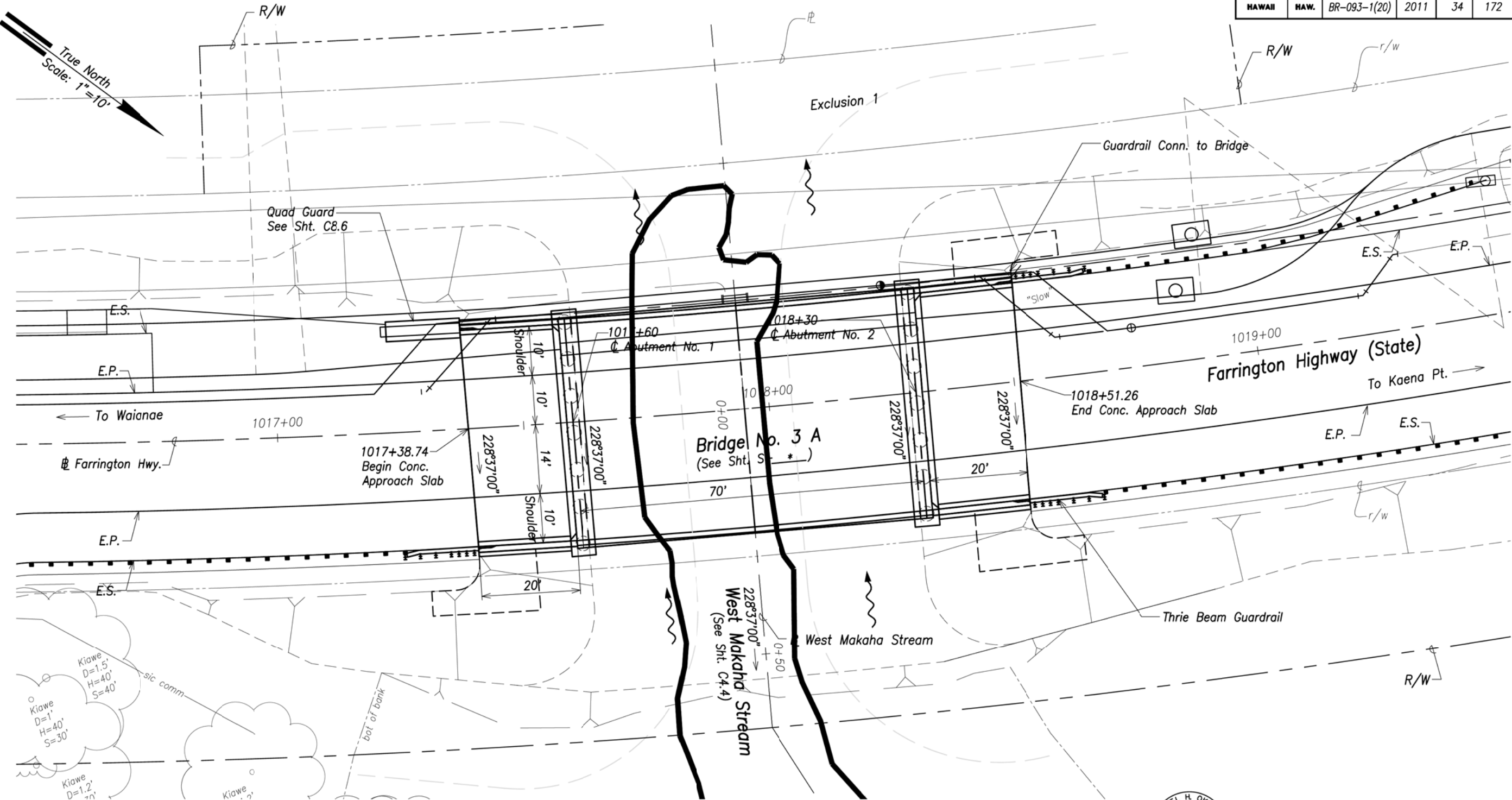
Date: May 2010

SHEET No. C4.1 OF 172 SHEETS

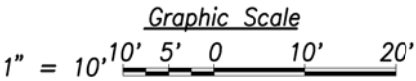
|             |      |
|-------------|------|
| DESIGNED BY | DATE |
| DRAWN BY    |      |
| CHECKED BY  |      |
| NOTED BY    |      |
| NO.         |      |

FILE: K:\civ\1999 Makaha Bridges\dwg\C4.1\_Bridge No.3 Plan.dwg saved July 31, 2012

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 34        | 172          |



**Makaha Bridge No. 3A Plan**  
 Scale: 1"=10'



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 OR UNDER MY SUPERVISION AND  
 CONSTRUCTION OF THIS PROJECT  
 WILL BE UNDER MY OBSERVATION.

SIGNATURE: \_\_\_\_\_  
 EXPIRATION DATE OF THE LICENSE: April 30, 2012

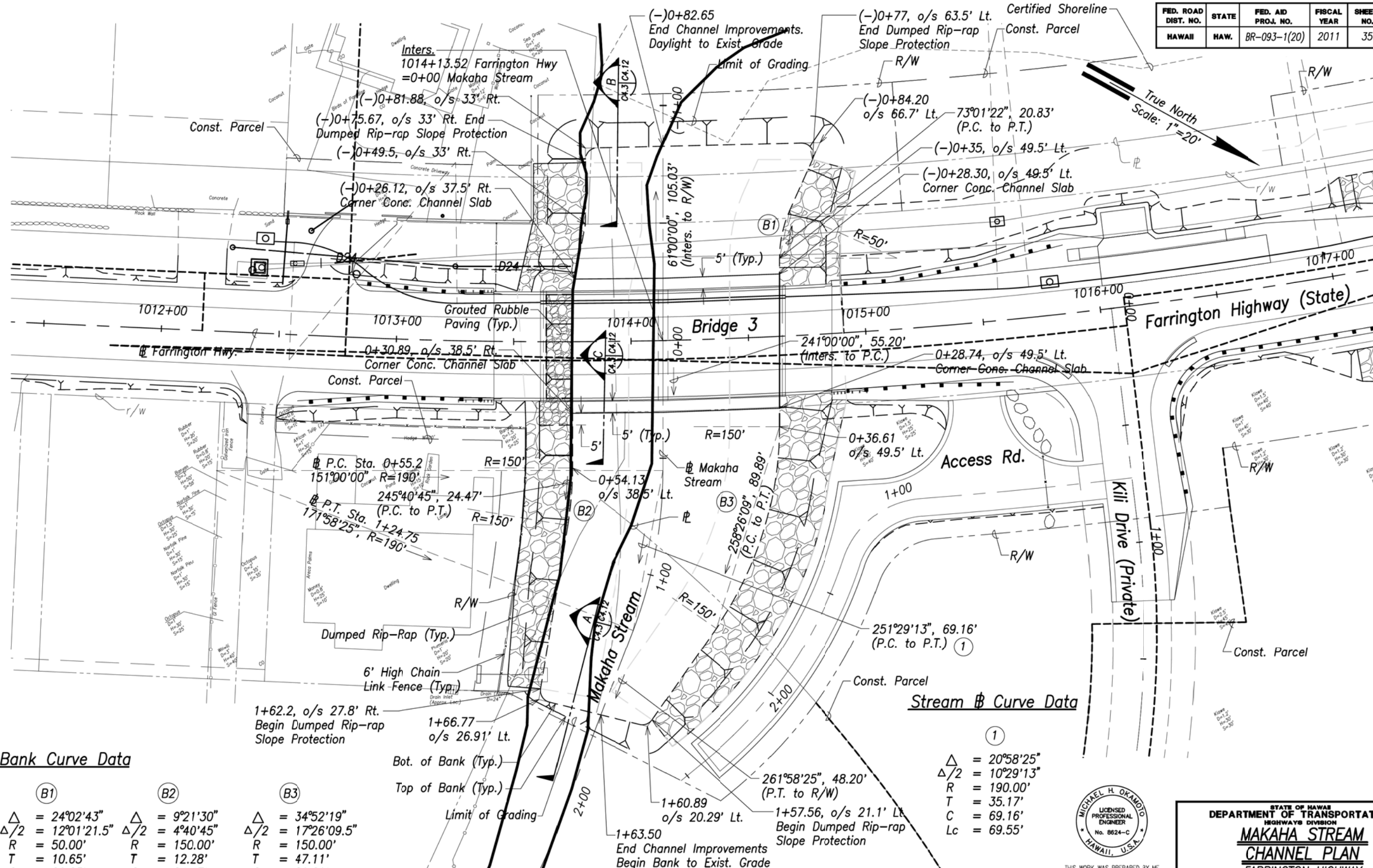
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**MAKAHA BRIDGE NO. 3A PLAN**  
 FARRINGTON HIGHWAY  
 Replacement of Makaha Bridge  
 No. 3 and Makaha Bridge 3A  
 F. A. Project No. BR-093-1(20)  
 Scale: 1" = 10'      Date: May 2010

SHEET No. C4.2 OF 172 SHEETS

|               |       |
|---------------|-------|
| DESIGNED BY   | NO. 1 |
| CHECKED BY    | NO. 2 |
| QUANTITIES BY | NO. 3 |
| TRACED BY     | NO. 4 |
| DRAWN BY      | NO. 5 |
| IN CHARGE     | NO. 6 |
| APPROVED BY   | NO. 7 |
| DATE          | NO. 8 |

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 35        | 172          |



### Bank Curve Data

| (B1)                            | (B2)                         | (B3)                            |
|---------------------------------|------------------------------|---------------------------------|
| $\Delta = 24^{\circ}02'43"$     | $\Delta = 9^{\circ}21'30"$   | $\Delta = 34^{\circ}52'19"$     |
| $\Delta/2 = 12^{\circ}01'21.5"$ | $\Delta/2 = 4^{\circ}40'45"$ | $\Delta/2 = 17^{\circ}26'09.5"$ |
| $R = 50.00'$                    | $R = 150.00'$                | $R = 150.00'$                   |
| $T = 10.65'$                    | $T = 12.28'$                 | $T = 47.11'$                    |
| $C = 20.83'$                    | $C = 24.47'$                 | $C = 89.89'$                    |
| $Lc = 20.98'$                   | $Lc = 24.50'$                | $Lc = 91.29'$                   |

### Stream Curve Data

|                               |                             |
|-------------------------------|-----------------------------|
| (1)                           | $\Delta = 20^{\circ}58'25"$ |
| $\Delta/2 = 10^{\circ}29'13"$ |                             |
| $R = 190.00'$                 |                             |
| $T = 35.17'$                  |                             |
| $C = 69.16'$                  |                             |
| $Lc = 69.55'$                 |                             |

### MAKAHA STREAM CHANNEL PLAN

Scale: 1"=20'

### Graphic Scale



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

April 30, 2012  
EXPIRATION DATE OF THE LICENSE  
SIGNATURE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

### MAKAHA STREAM CHANNEL PLAN FARRINGTON HIGHWAY

Replacement of Makaha Bridge

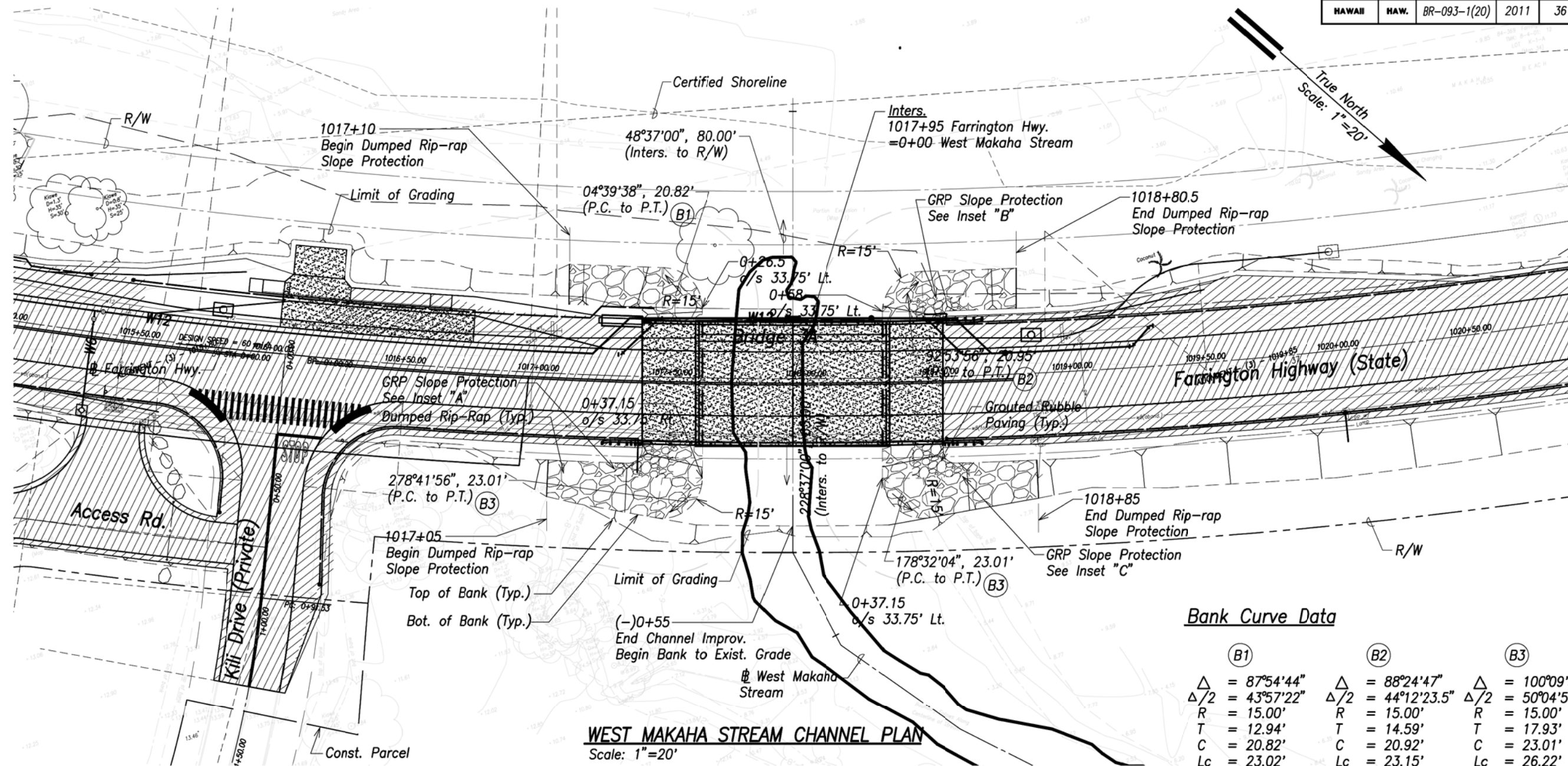
No. 3 and Makaha Bridge 3A

F. A. Project No. BR-093-1(20)

Scale: 1"=20' Date: May 2010

SHEET No. C4.3 OF 172 SHEETS

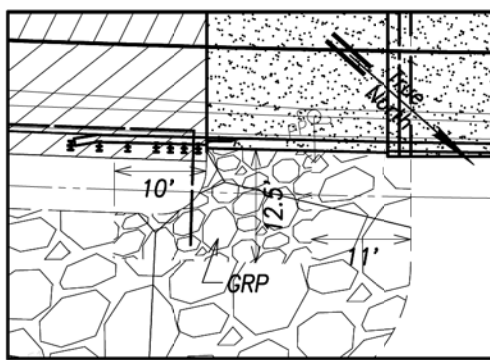
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 36        | 172          |



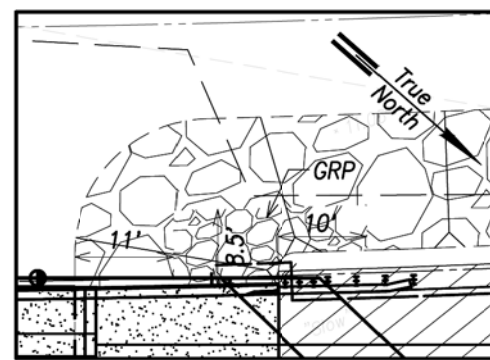
**Bank Curve Data**

| (B1)                           | (B2)                             | (B3)                           |
|--------------------------------|----------------------------------|--------------------------------|
| $\Delta = 87^{\circ}54'44''$   | $\Delta = 88^{\circ}24'47''$     | $\Delta = 100^{\circ}09'52''$  |
| $\Delta/2 = 43^{\circ}57'22''$ | $\Delta/2 = 44^{\circ}12'23.5''$ | $\Delta/2 = 50^{\circ}04'56''$ |
| $R = 15.00'$                   | $R = 15.00'$                     | $R = 15.00'$                   |
| $T = 12.94'$                   | $T = 14.59'$                     | $T = 17.93'$                   |
| $C = 20.82'$                   | $C = 20.92'$                     | $C = 23.01'$                   |
| $Lc = 23.02'$                  | $Lc = 23.15'$                    | $Lc = 26.22'$                  |

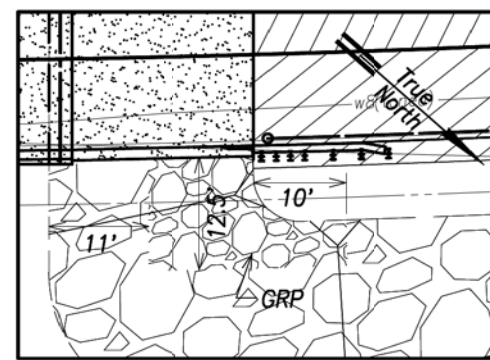
**WEST MAKAHA STREAM CHANNEL PLAN**  
Scale: 1"=20'



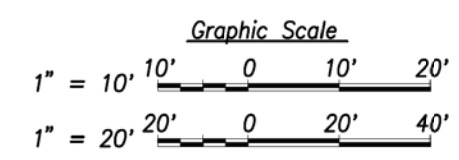
**INSET "A"**  
Scale: 1"=10'



**INSET "B"**  
Scale: 1"=10'



**INSET "C"**  
Scale: 1"=10'



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April 30, 2012  
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**WEST MAKAHA STREAM  
CHANNEL PLAN**  
FARRINGTON HIGHWAY

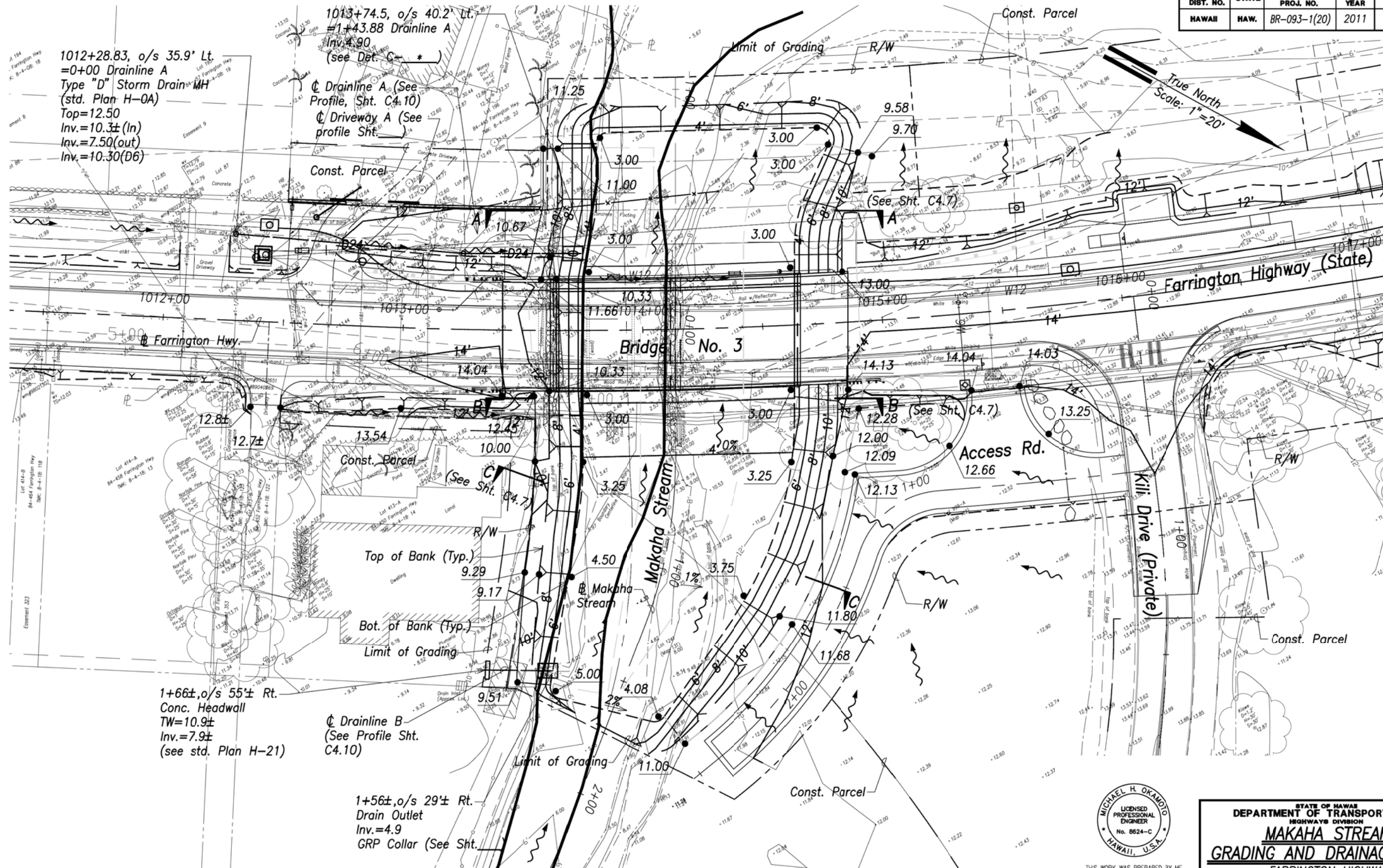
Replacement of Makaha Bridge  
No. 3 and Makaha Bridge 3A  
F. A. Project No. BR-093-1(20)

Scale: 1"=20' Date: May 2010

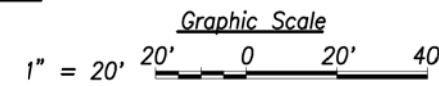
**SHEET No. C4.4 OF 172 SHEETS**

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| QUANTITIES BY |      |
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| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 37        | 172          |



**MAKAHA STREAM GRADING AND DRAINAGE PLAN**  
Scale: 1"=20'



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Michael H. Okamoto  
Licensed Professional Engineer  
No. 8624-C  
HAWAII, U.S.A.

Signature: \_\_\_\_\_  
April 30, 2012  
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**MAKAHA STREAM**  
**GRADING AND DRAINAGE PLAN**  
FARRINGTON HIGHWAY

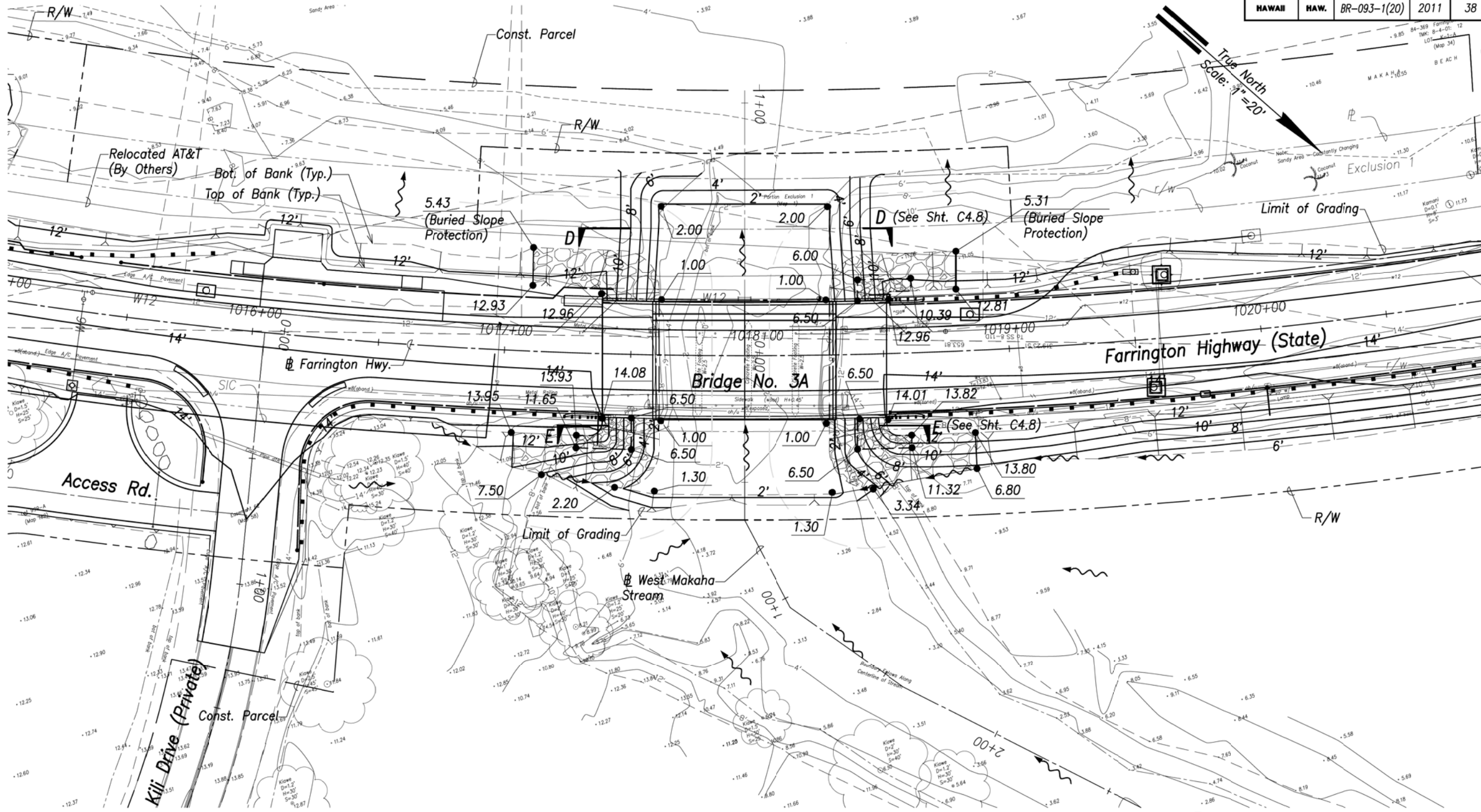
Replacement of Makaha Bridge  
No. 3 and Makaha Bridge 3A  
F. A. Project No. BR-093-1(20)  
Scale: 1"=20' Date: May 2010

**SHEET No. C4.5 OF 172 SHEETS**

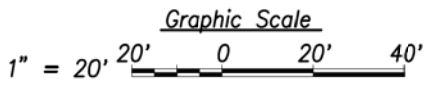
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| CHECKED BY  | _____ |
| DATE        | _____ |
| NOTED BY    | _____ |
| NO.         | _____ |

FILE: K:\1999\1999 Makaha Bridge\1999 Makaha Stream Grading and Drainage Plan.dwg saved December 26, 2013

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 38        | 172          |



WEST MAKAHA GRADING AND DRAINAGE PLAN  
Scale: 1"=20'



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APRIL 30, 2012  
EXPIRATION DATE OF THE LICENSE

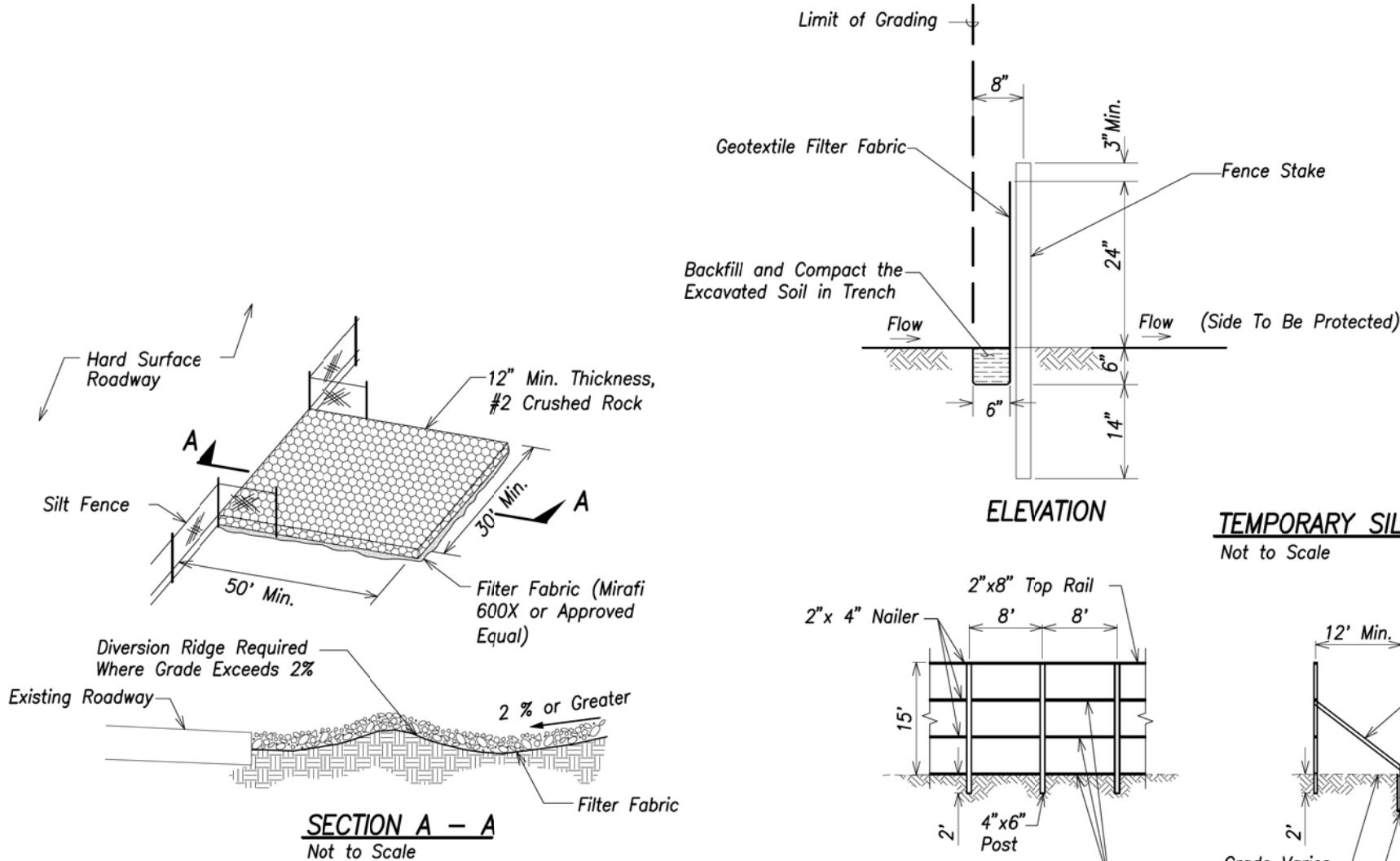
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**WEST MAKAHA STREAM**  
**GRADING AND DRAINAGE PLAN**  
FARRINGTON HIGHWAY  
Replacement of Makaha Bridge  
No. 3 and Makaha Bridge 3A  
F. A. Project No. BR-093-1(20)  
Scale: 1"=20' Date: May 2010  
SHEET No. C4.6 OF 172 SHEETS

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| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 53        | 172          |

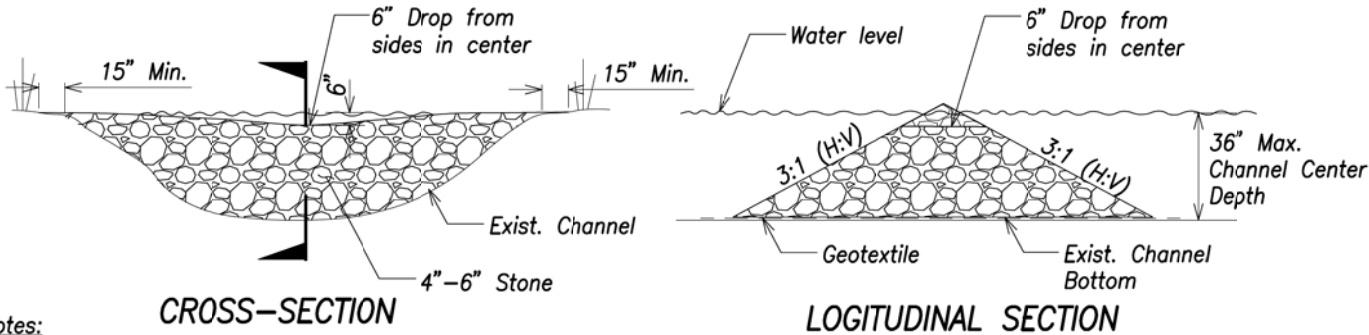
Notes:

- The Filter Fabric Shall be Minimum of 36 Inches Wide.
- If Silt Fence is Obtained From Manufacturer as a Package (i.e. Fabric Attached to Post)the Manufacturer's Installation Instruction Shall be adhered to.
- Fence Stakes May be Wood or Metal, Must be Capable of Supporting Anticipated Loads.



TEMPORARY SILT FENCE  
Not to Scale

DUST FENCE DETAIL  
Not to Scale



ROCK CHECK DAM DETAIL  
Not To Scale

Notes:

- Check for sediment after significant rainfall.
- Sediment shall be removed when it reaches one third of the original height.
- Remove check dam and accumulated sediment when no longer needed.
- Rocks shall be hand laid or by mechanical means. No Dumping method.

Notes: Using Gravel Bags for Check Dam

- Bag Material: Bags shall be either polypropylene, polyethylene or polyimide woven fabric, minimum unit weight 4oz per sq. yd. mullen burst strength exceeding 300 psi in conformance with the requirements in ASTM D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM D4355.
- Bag Size: Each gravel filled bag shall have be 18"x12"x3" (LxWxT) with a mass of 33 Lb. Bag size are nominal, and may vary based on locally available materials.
- Fill Material: Fill material shall be between 0.4 and 0.8 inch in diameter, and and shall be clean and free of clot balls, organic matter, and other deleterious materials. Secure bags such that gravel will not escape. Gravel-filled bags shall be between 28 and 48 Lbs in mass..



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April 30, 2012  
SIGNATURE: EXPIRATION DATE  
OF THE LICENSE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EROSION AND SEDIMENT CONTROL**  
**DETAILS**  
FARRINGTON HIGHWAY  
Replacement of Makaha Bridge  
No. 3 and Makaha Bridge 3A  
F. A. Project No. BR-093-1(20)  
Scale: NTS Date: May 2010  
SHEET No. C6.2 OF 172 SHEETS

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| DRAWN BY      |      |
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EROSION AND SEDIMENT CONTROL NOTES

- 1. The grading operations shall be performed in conformance with the applicable provisions of the water quality and water pollution control standards contained in Hawaii Administrative Rules, Chapter 11-54, "Water Quality Standards," Chapter 11-55, "Water Pollution Control," and if applicable, the NPDES permit for the project.
- 2. The Contractor shall not perform any grading operation which would cause falling rocks, soil or debris, in any form, to fall, slide or flow onto adjoining properties, streets or natural watercourses. Should such violations occur, the Contractor may be cited and shall immediately make all remedial actions necessary.
- 3. The Contractor shall remove all silt and debris resulting from his work and deposited in drainage facilities, roadways and other areas. The costs incurred for any necessary remedial action by the Engineer shall be payable by the Contractor.
- 4. The Contractor, at his own expense, shall keep the project area and surrounding area free from dust and other nuisance. The work shall be in conformance with the air pollution control standards contained in the Hawaii Administrative Rules, Chapter 11-60, "Air Pollution Control."
- 5. Adequate provisions shall be made to prevent surface waters from damaging the cut face of an excavation or the sloped surfaces of a fill. Furthermore, adequate provisions shall be made to prevent sediment-laden runoff from leaving the site.
- 6. Fills on slopes steeper than 5:1 shall be keyed and benched.
- 7. No grading work shall be done on Saturdays, Sundays and holidays at any time without prior written notice to the Engineer.
- 8. The limits of the area to be graded shall be flagged by the Contractor before the commencement of the grading work. The maximum surface area of earth material exposed at anytime is 300,000 square feet.
- 9. Where applicable and feasible, the measures to control erosion and other pollutants shall be in place before any earth moving phase of the grading is initiated.
- 10. Temporary erosion control procedures shall be submitted by the contractor for approval by the Engineer prior to the start of actual grading operations.
- 11. Temporary erosion controls shall not be removed before permanent erosion controls are in-place and established.
- 12. Soil stabilization:
  - A. Pre-construction vegetative ground cover shall not be destroyed, removed, or disturbed more than twenty calendar days prior to site disturbance.
  - B. Disturbed areas left unworked or unfinished for more than 30 calendar Days will be stabilized as necessary according to soil conditions.
  - C. In disturbed areas where surface conditions consist of erodible soils, the surface will be stabilized with grassing.
  - D. In disturbed areas where surface conditions are bare rock, or Non-erodible soils, no additional stabilization will be applied.

- 13. Erosion control measures shall remain in place until all disturbed areas are reestablished with ground vegetation or other means of ground stabilization.
- 14. Contractor shall stop all construction activities in the work area when storm runoff is present except to prevent and control soil erosion. All cost to repair the erosion control measures due to storm runoff and/or regular maintenance shall be done at no cost to the State.

TEMPORARY SILT FENCE NOTES

- 1. Filter fabric shall be approved by the Engineer, and shall be installed with a support net of polyester netting or approved equal. The filter fabric shall be a minimum of 36" wide and the support net a minimum of 30".
- 2. If silt fence is obtained from a manufacturer as a package (i.e., fabric attached to posts), the manufacturer's installation instructions shall be adhered to.
- 3. Posts shall be metal, cross section of posts shall be substantial enough to support a loaded silt fence without bending.
- 4. Temporary silt fence shall be installed prior to beginning of grading work, and shall not be removed until exposed areas are stabilized.
- 5. Location of silt fence is provided as general guideline only. Provide breaks in fence as necessary to ensure clear access into and out of existing road. Adjust limits of fence to conform to existing features as necessary to ensure protection from sediment and erosion damage.

STREAM PROTECTION NOTES

- 1. Contractor to submit dewatering shop drawings for each area that requires dewatering to engineer.
- 2. Stream flow shall not be pumped.
- 3. Equipment to be used in-stream shall be cleaned prior to work below ordinary high water.
- 4. Equipment fueling, maintenance and staging will occur at least 100 feet from the stream.
- 5. Contractor shall submit a spill prevention plan. Contractor shall have on site absorbent pads and certified personnel during equipment operation.

CONSTRUCTION ACCESS NOTES

- 1. The entrance will be maintained in a condition that will prevent tracking or flowing of sediment onto public rights-of-way. This may require top dressing, repair and/or cleanout of any measures used to trap sediment.
- 2. When necessary, wheels shall be cleaned prior to entrance onto public right-of-way.
- 3. When washing is required, it shall be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin.

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 52        | 172          |

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| DESIGNED BY | DATE |
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| NO. 1       |      |
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| NO. 5       |      |
| NO. 6       |      |
| NO. 7       |      |
| NO. 8       |      |
| NO. 9       |      |
| NO. 10      |      |

MICHAEL H. OKANO

LICENSED PROFESSIONAL ENGINEER

No. 8624-C

HAWAII, U.S.A.

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APR 30, 2012

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STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

EROSION AND SEDIMENT CONTROL

NOTES

FARRINGTON HIGHWAY

Replacement of Makaha Bridge

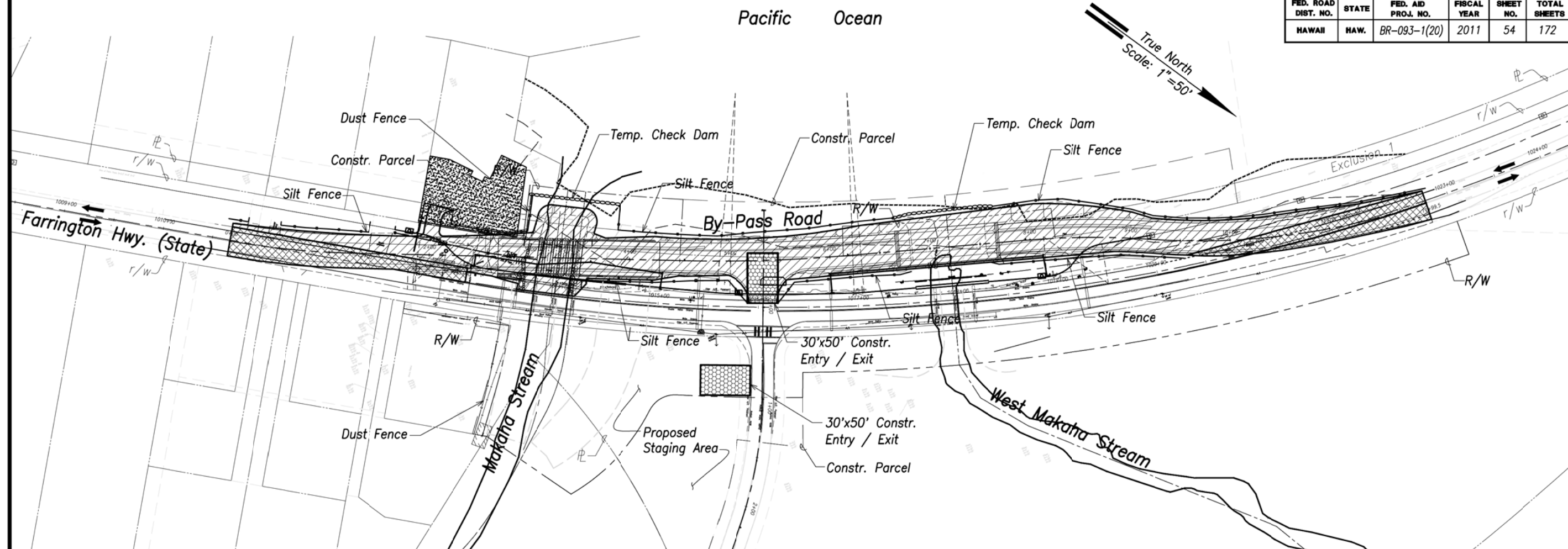
No. 3 and Makaha Bridge 3A

F. A. Project No. BR-093-1(20)

Scale: None Date: May 2010

SHEET No. 06.1 OF 172 SHEETS

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 54        | 172          |



### Construction Phasing

#### Phase 1A

1. Install erosion control measures as shown on this plan prior to construction of By-pass Road.
2. Provide traffic controls for two-way traffic flow along Farrington Highway during Phase 1A work. See Traffic Control Plans on sheets C9.1, C9.2 and C9.3.
3. Clear and grub and demolish and remove existing improvements (See sheet C2.1).
4. Construct temporary By-Pass Road, pre-fabricated steel bridge, culverts and utilities in Phase 1A. See By-Pass Road Plans.
5. Construct By-Pass waterline and relocate electrical utilities (See sht. C7.1 and Electrical drawings).

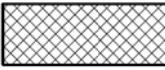
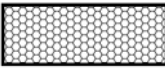
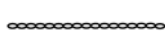
#### Phase 1B

1. Provide traffic controls along Farrington Highway during Phase 1B work. See Traffic Control Plan - 1 on sheet C9.1.
2. Demolish and remove existing improvements (See sheet C2.1). Construct By-Pass Road and temporary utilities.
3. See By-Pass Road Plans.

### EROSION AND SEDIMENT CONTROL/CONSTRUCTION PHASING - 1

Scale: 1"=50'

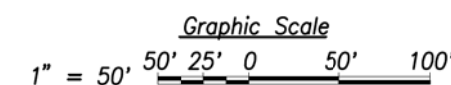
#### Legend:

-  Phase 1A Work Area
-  Phase 1B Work Area
-  Construction Entry/Exit
-  Silt Fence
-  Check Dam
-  Direction of Travel
-  Dust Fence



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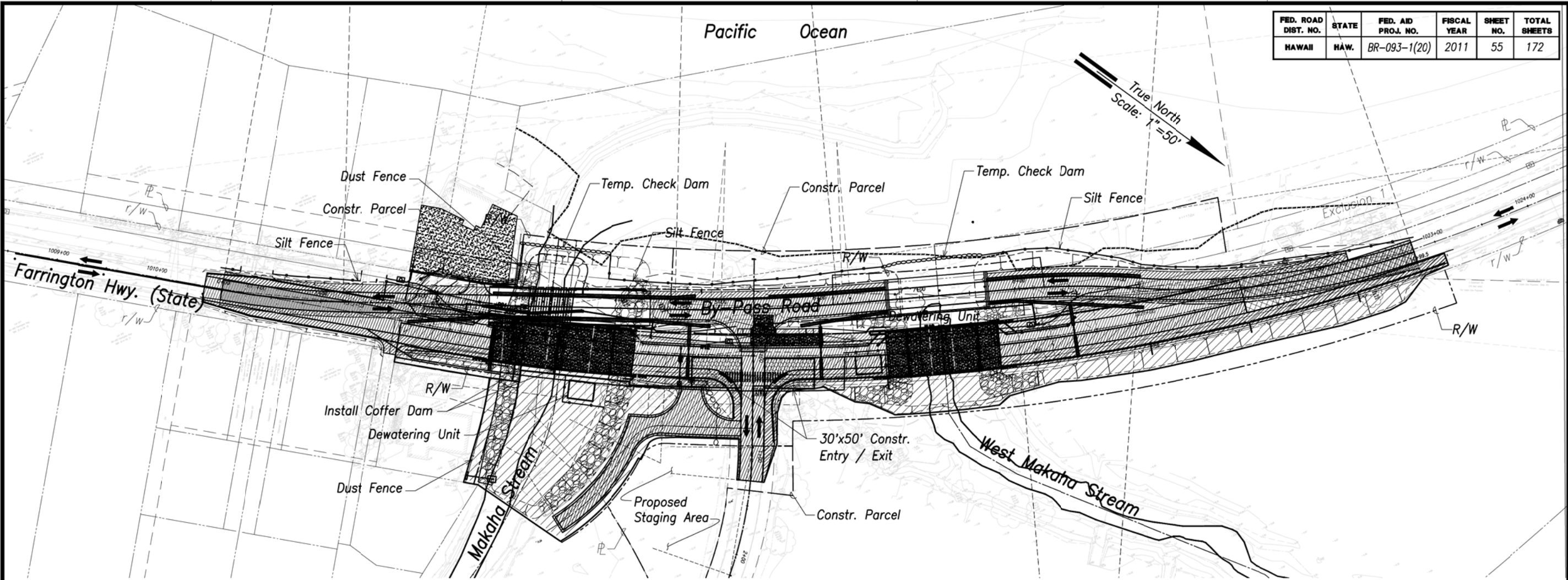
Signature: \_\_\_\_\_  
 EXPIRATION DATE OF THE LICENSE: April 30, 2012



STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION  
**EROSION AND SEDIMENT CONTROL/  
 CONSTRUCTION PHASING - 1**  
 FARRINGTON HIGHWAY  
 Replacement of Makaha Bridge  
 No. 3 and Makaha Bridge 3A  
 F. A. Project No. BR-093-1(20)  
 Scale: 1"=50' Date: May 2010  
**SHEET No. C6.3 OF 172 SHEETS**

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| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 55        | 172          |



**EROSION AND SEDIMENT CONTROL/CONSTRUCTION PHASING – 2**  
 Scale: 1"=50'

**Legend:**

- Bridge Work Area
- Roadway Work Area
- Construction Entry/Exit
- Silt Fence
- Check Dam
- Direction of Travel
- Dust Fence

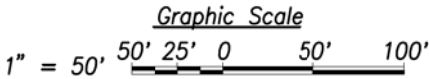
**Construction Phasing**

1. Install additional erosion control measures shown on this plan. Retain silt fence and check dams constructed in the previous construction phase. Contractor shall inspect and ensure re-used erosion control measures are in good working condition.
2. Provide traffic controls and re-direct all traffic from Farrington Highway and Kili Drive onto the By-Pass Road. See Traffic Control Plan on sheet C9.4.
3. Demolish and remove existing improvements (See sheet C2.2). Construct Roadway improvements and utilities shown within the approximate limits on this plan.
4. See Structural drawing for construction of Bridge No. 3.



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April 30, 2012  
 EXPIRATION DATE OF THE LICENSE



**STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION**

**EROSION AND SEDIMENT CONTROL/  
 CONSTRUCTION PHASING – 2**

**FARRINGTON HIGHWAY**

**Replacement of Makaha Bridge  
 No. 3 and Makaha Bridge 3A**

**F. A. Project No. BR-093-1(20)**

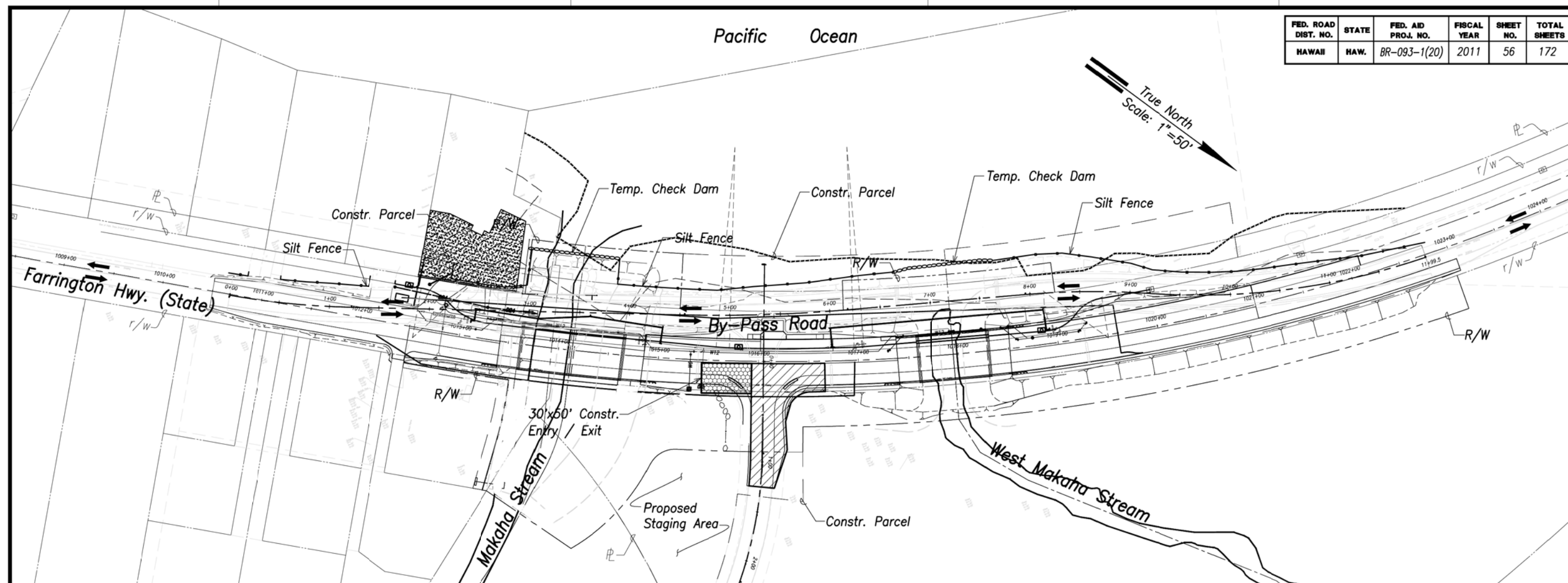
Scale: 1"=50' Date: May 2010

**SHEET No. C6.4 OF 172 SHEETS**

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| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
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| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 56        | 172          |

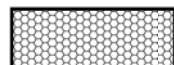


**EROSION AND SEDIMENT CONTROL/CONSTRUCTION PHASING - 3**  
Scale: 1"=50'

### Construction Phasing - 3

1. Install additional erosion control measures shown on this plan. Retain silt fence and check dams constructed in the previous construction as necessary. Contractor shall inspect and ensure re-used erosion control measures are in good working condition.
2. For Traffic Control Plan, see sheet C9.5.
3. Demolish and remove existing improvements (See sheet C2.2). Construct Kili Drive improvements and utilities shown within the approximate limits on this plan.
4. Re-direct traffic from the By-Pass Road and Kili Drive onto Farrington Highway.
5. Demolish and remove By-Pass Road (See sht. C2.2)
6. See Sht. C5.3 for Interim Signing and Striping and Site Improvements.

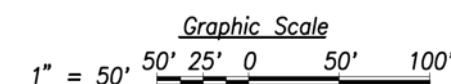
### Legend:

-  Bridge Work Area
-  Roadway Work Area
-  Construction Entry/Exit
-  Silt Fence
-  Check Dam
-  Direction of Travel



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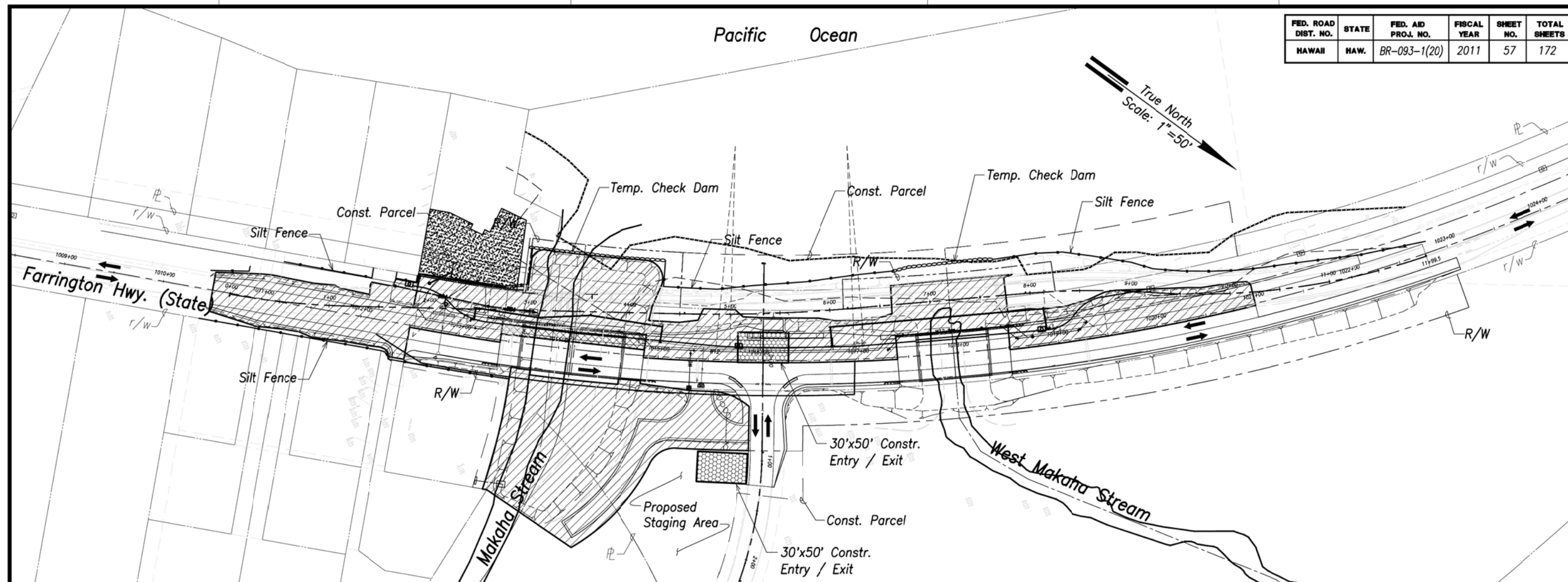
Signature: \_\_\_\_\_  
April 30, 2012  
EXPIRATION DATE OF THE LICENSE



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EROSION AND SEDIMENT CONTROL/  
CONSTRUCTION PHASING - 3**  
FARRINGTON HIGHWAY  
Replacement of Makaha Bridge  
No. 3 and Makaha Bridge 3A  
F. A. Project No. BR-093-1(20)  
Scale: 1"=50' Date: May 2010  
SHEET No. 6.5 OF 172 SHEETS

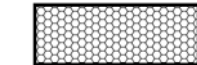
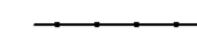
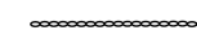
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| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2011        | 57        | 172          |



**EROSION AND SEDIMENT CONTROL/CONSTRUCTION PHASING - 4**  
Scale: 1"=50'

Legend:

-  Roadway Work Area
-  Bridge Work Area
-  Construction Entry/Exit
-  Silt Fence
-  Check Dam
-  Direction of Travel

### Construction Phasing - 4

1. Install additional erosion control measures shown on this plan. Retain silt fence and check dams constructed in previous construction as necessary. Contractor shall inspect and ensure re-used erosion control measures are in good working condition.
2. Provide traffic controls. For Traffic Control Plan, see sheet C9.6.
3. Follow Demolition Plans - 1 & 2 on sheet C2.2 and C2.3 and construct Roadway and utilities shown within the approximate limits on this plan.



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Signature: \_\_\_\_\_  
April 30, 2012  
EXPIRATION DATE OF THE LICENSE

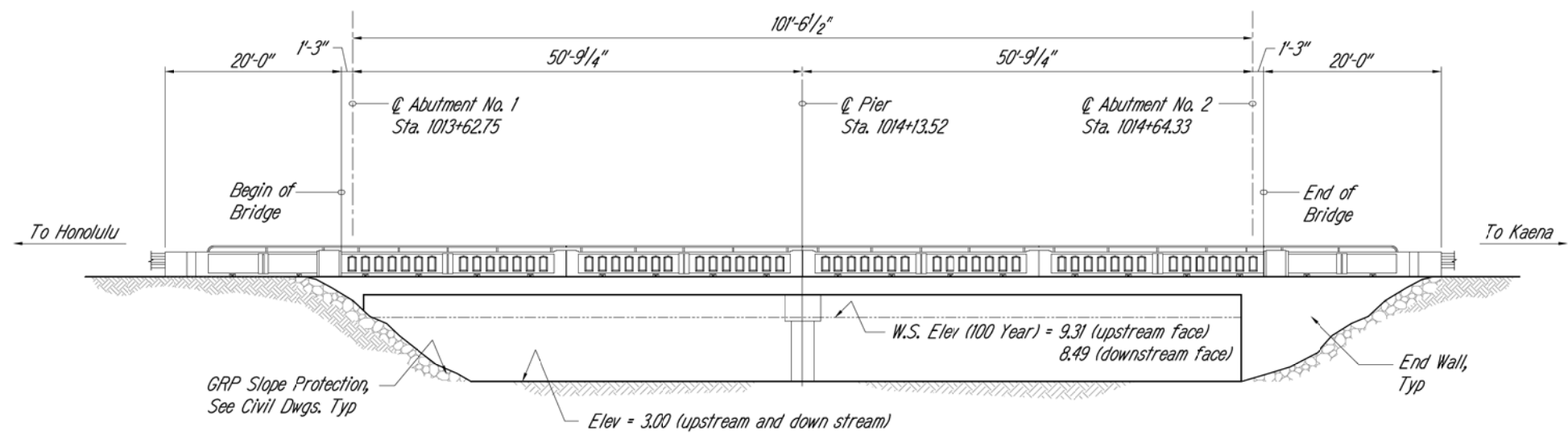
Graphic Scale  
1" = 50' 50' 25' 0 50' 100'

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**EROSION AND SEDIMENT CONTROL/  
CONSTRUCTION PHASING - 4**  
FARRINGTON HIGHWAY  
Replacement of Makaha Bridge  
No. 3 and Makaha Bridge 3A  
F. A. Project No. BR-093-1(20)  
Scale: 1"=50' Date: May 2010  
SHEET No. 6.6 OF 172 SHEETS

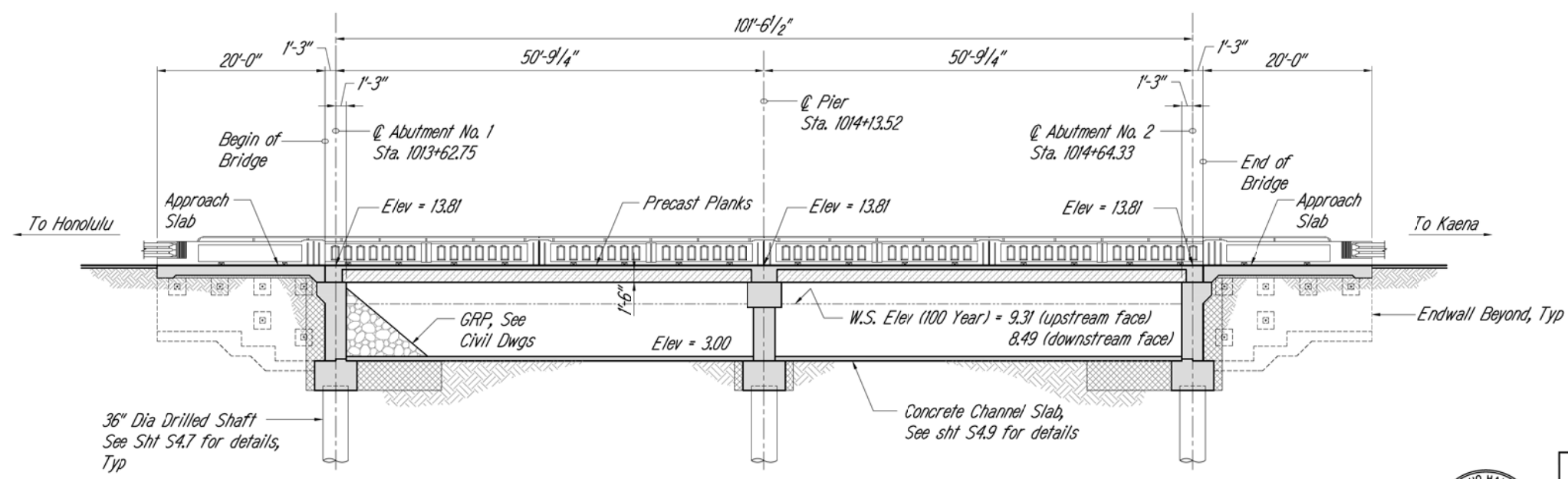
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|-------------|------|
| DESIGNED BY | DATE |
| DRAWN BY    |      |
| CHECKED BY  |      |
| IN CHARGE   |      |
| NOTED BY    |      |
| NO.         |      |



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2010        | 88        | 159          |



**BRIDGE NO. 3 - LONGITUDINAL ELEVATION**  
 Scale : 1/8" = 1'-0"  
 S3.1 S3.1



**BRIDGE NO. 3 - LONGITUDINAL SECTION ALONG BASELINE**  
 Scale : 1/8" = 1'-0"  
 S3.1 S3.1



STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

**BRIDGE NO. 3 - LONGITUDINAL ELEVATION AND SECTION**  
 Farrington Hwy - Replacement of Makaha Bridge No. 3 & Makaha Bridge No. 3A  
 Federal Aid Project No. BR-093-1(20)

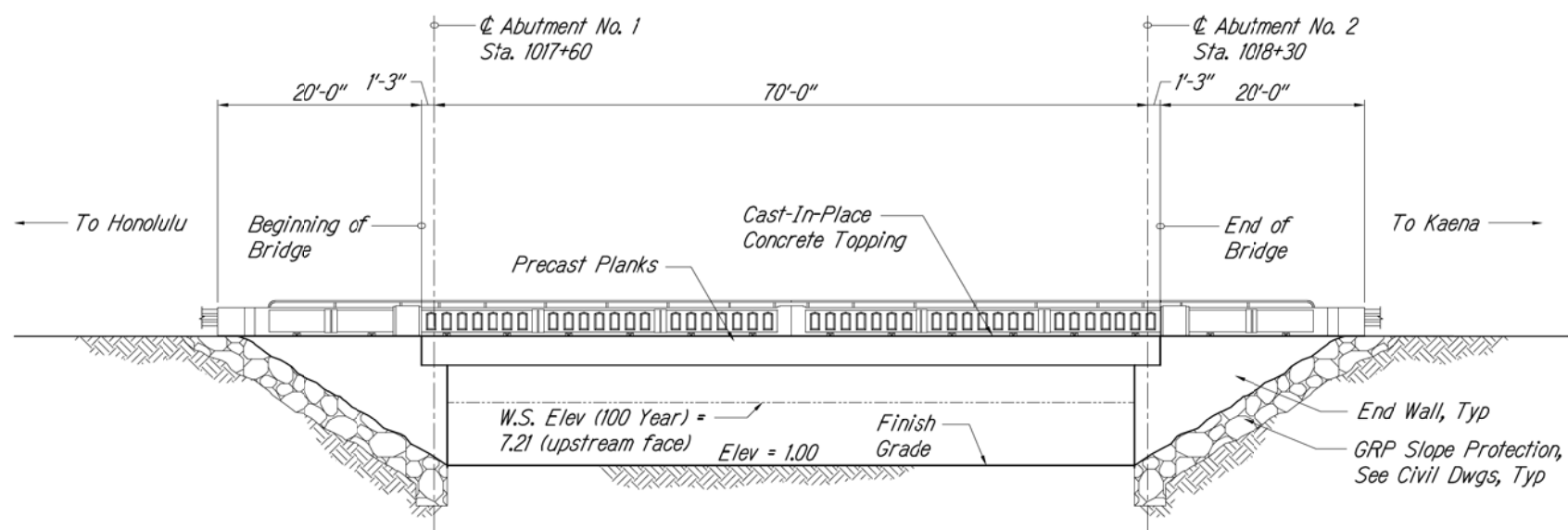
Scale: AS NOTED Date: May 2010

SHEET No. S3.1 OF 159 SHEETS

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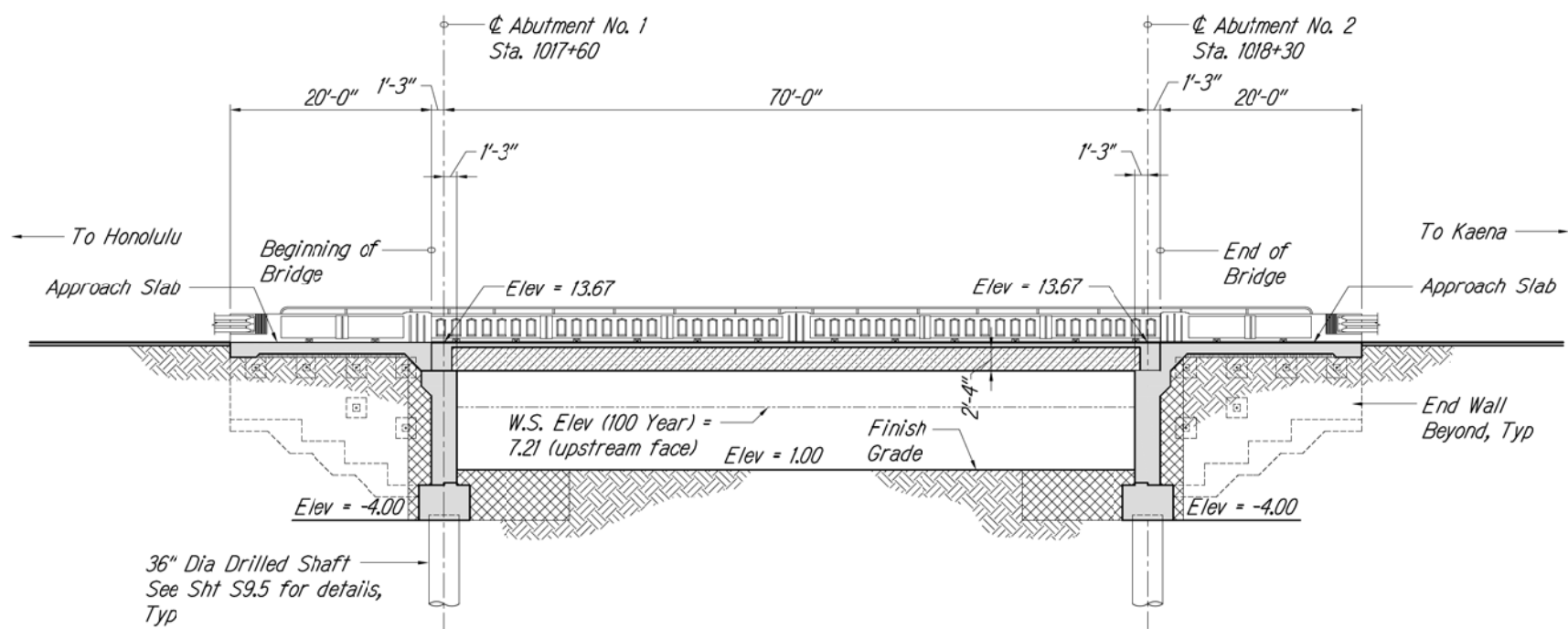


| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2010        | 115       | 159          |



**BRIDGE NO. 3A - LONGITUDINAL ELEVATION**  
Scale : 1/8" = 1'-0"

2  
S8.2 S8.2



**BRIDGE NO. 3A - LONGITUDINAL SECTION ALONG BASELINE**  
Scale : 1/8" = 1'-0"

1  
S8.2 S8.2



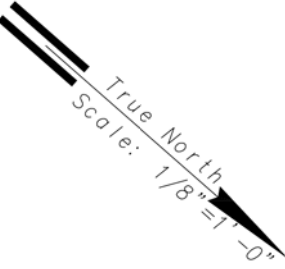
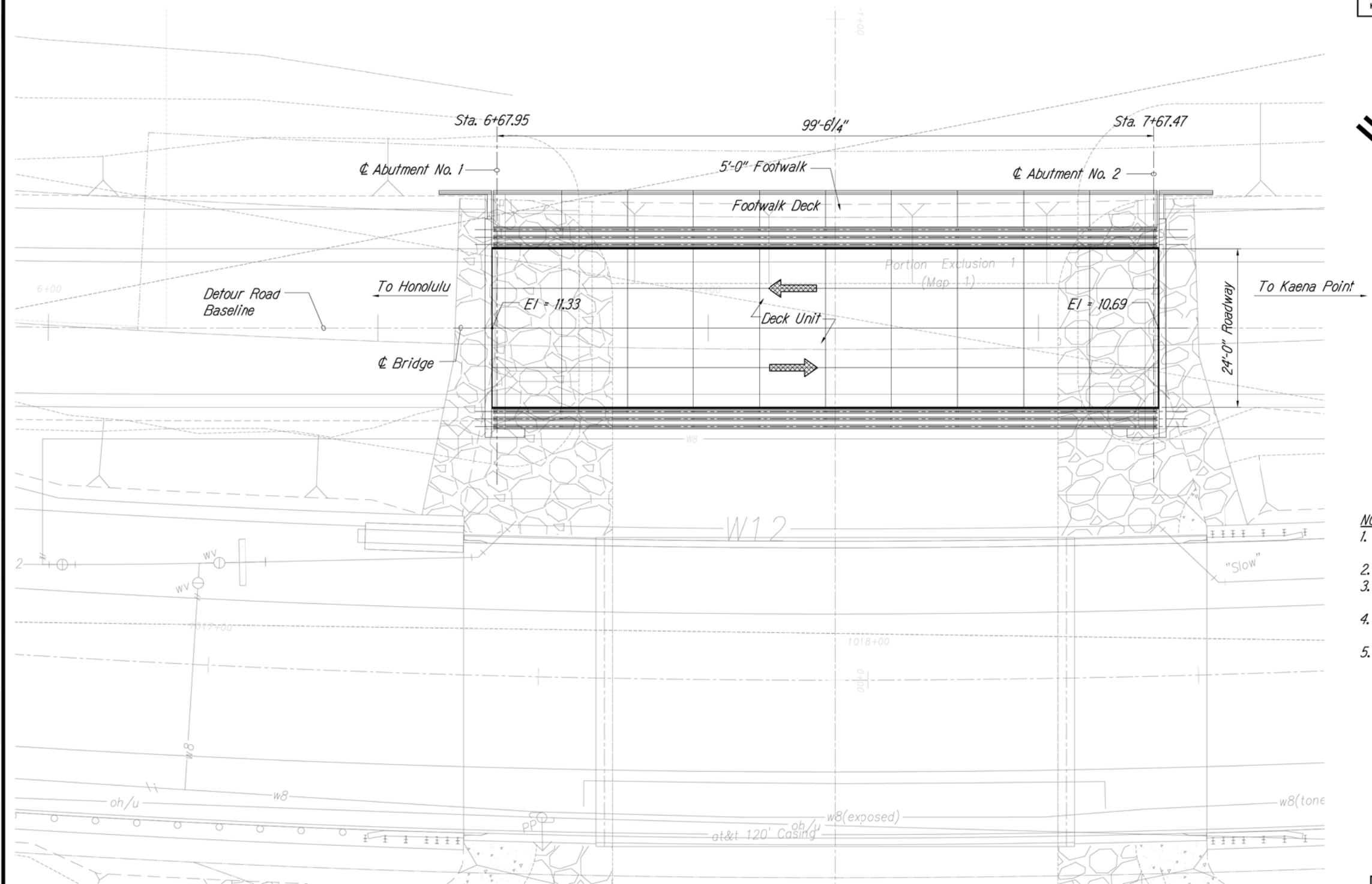
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BRIDGE NO. 3A - LONGITUDINAL ELEVATION AND SECTION**  
Farrington Hwy - Replacement of Makaha Bridge No. 3 & Makaha Bridge No. 3A  
Federal Aid Project No. BR-093-1(20)  
Scale: AS NOTED Date: May 2010

SHEET No. S8.2 OF 159 SHEETS

EXPIRATION DATE OF THE LICENSE 4/30/2012  
THIS WORK WAS PREPARED BY  
ME OR UNDER MY SUPERVISION  
AND CONSTRUCTION OF THIS PROJECT  
WILL BE UNDER MY OBSERVATION

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | BR-093-1(20)       | 2010        | 138       | 159          |



- NOTES:**
1. Detour bridge shall be capable of supporting HL-93 loading.
  2. Minimum lane width = 12'-0".
  3. Footwalk shall be capable supporting 75 PSF live load.
  4. Footwalk shall be coated with skid resistant surface.
  5. Bridge deck shall be covered with 2" asphalt overlay, see Civil dwgs for detail.

BRIDGE NO. 3A - DETOUR ROAD  
Scale: 1/8" = 1'-0"



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BRIDGE NO. 3A -  
DETOUR ROAD**

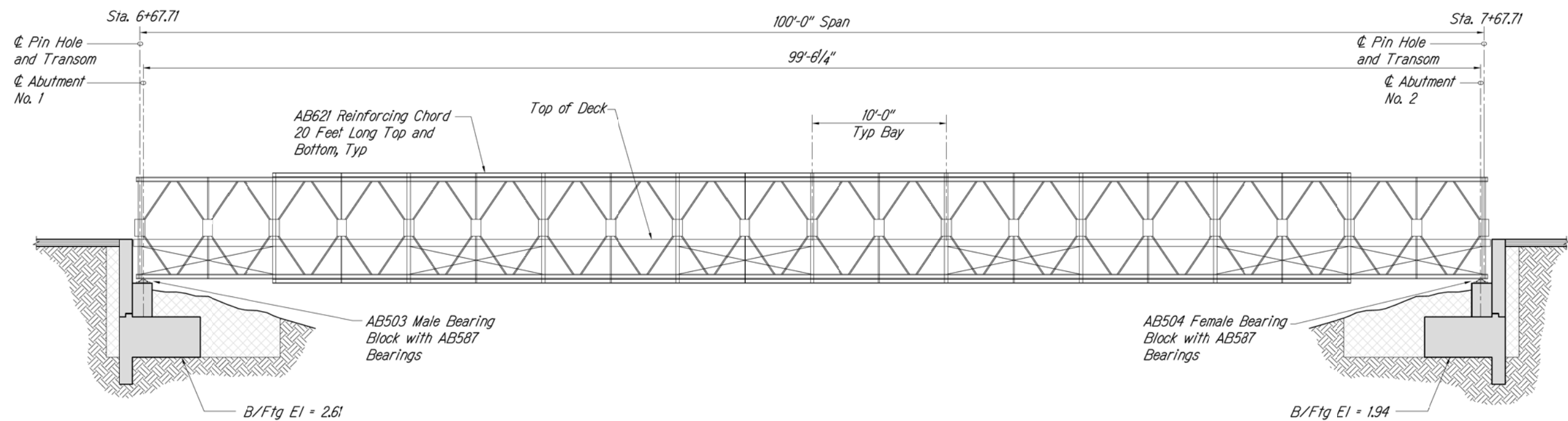
Farrington Hwy - Replacement of Makaha  
Bridge No. 3 & Makaha Bridge No. 3A  
Federal Aid Project No. BR-093-1(20)

Scale: AS NOTED Date: May 2010

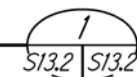
SHEET No. S131 OF 159 SHEETS

P:\Drafting\2010\04-14\_1185 Makaha Bridge\1185\_S131.dwg, 96, 5/27/2010 2:32:28 PM, tamamaha, 1:1

| FED. ROAD<br>DIST. NO. | STATE | FED. AID<br>PROJ. NO. | FISCAL<br>YEAR | SHEET<br>NO. | TOTAL<br>SHEETS |
|------------------------|-------|-----------------------|----------------|--------------|-----------------|
| HAWAII                 | HAW.  | BR-093-1(20)          | 2010           | 139          | 159             |



BRIDGE NO. 3A - DETOUR ROAD ELEVATION  
Scale 1/4" = 1'-0"



EXPIRATION DATE OF THE LICENSE 4/30/2012  
THIS WORK WAS PREPARED BY  
ME OR UNDER MY SUPERVISION  
AND CONSTRUCTION OF THIS PROJECT  
WILL BE UNDER MY OBSERVATION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BRIDGE NO. 3A -  
DETOUR ROAD ELEVATION**

Farrington Hwy - Replacement of Makaha  
Bridge No. 3 & Makaha Bridge No. 3A  
Federal Aid Project No. BR-093-1(20)

Scale: AS NOTED Date: May 2010

SHEET No. S13.2 OF 159 SHEETS