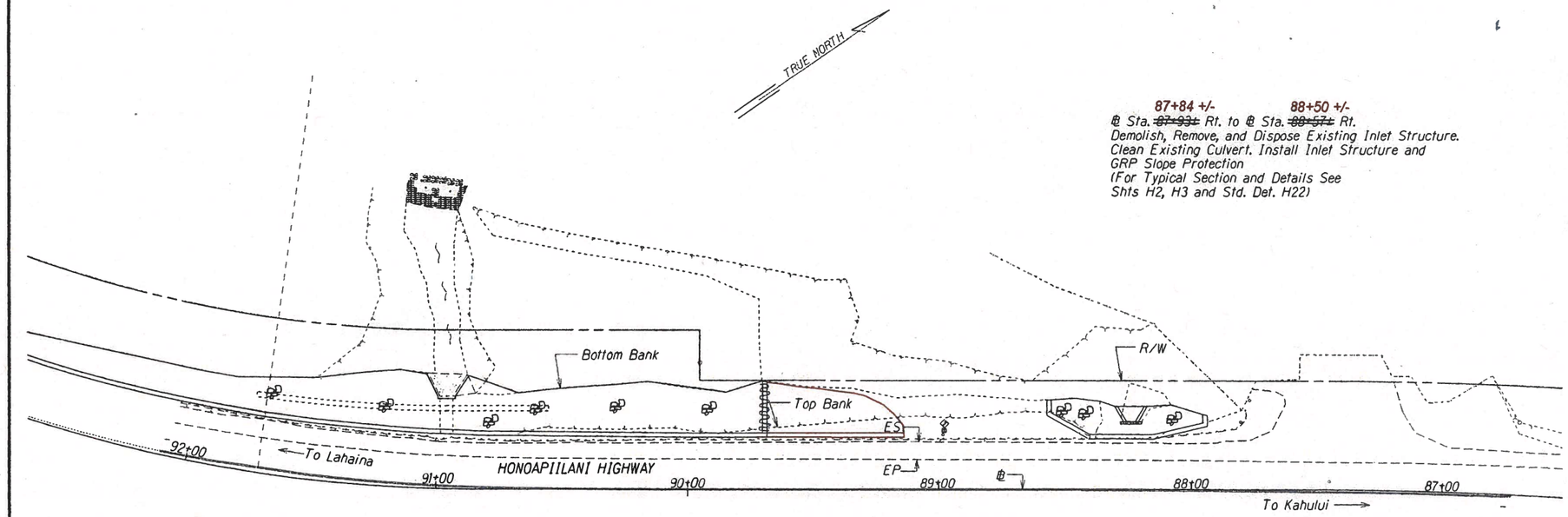
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(45)	2019	26	48



87+84 +/- 88+50 +/-
℄ Sta. ~~87+93±~~ Rt. to ℄ Sta. ~~88+57±~~ Rt.
Demolish, Remove, and Dispose Existing Inlet Structure.
Clean Existing Culvert. Install Inlet Structure and
GRP Slope Protection
(For Typical Section and Details See
Shts H2, H3 and Std. Def. H22)

89+15 +/- 93+00 +/-
℄ Sta. ~~89+66±~~ Rt. to ℄ Sta. ~~93+03±~~ Rt.
Install GRP Slope Protection,
Clean Existing Culvert and Drainage Structure,
Repair Existing Culvert and Drainage Structure
(For Typical Section and Details See
Shts. H2 and H3. For Repair Details
See Sht. H6)

Note:
1) The Contractor shall not divert runoff entering into the existing culvert at ℄ Sta. 90+93± Rt. Any diversion shall require consultation with the Army Corps of Engineers and compliance with permitting requirements.

2) Demolishing, removing, and disposing existing drainage structure at Sta. 88+24± Rt. shall not be paid for separately, but shall be considered incidental to the new Inlet Structure.

DRAINAGE PLAN

LEGEND FOR AS-BUILT POSTINGS	
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~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
Kapoli Street to Papalaua Beach Park
Federal Aid Project No. HSIP-030-1(45)

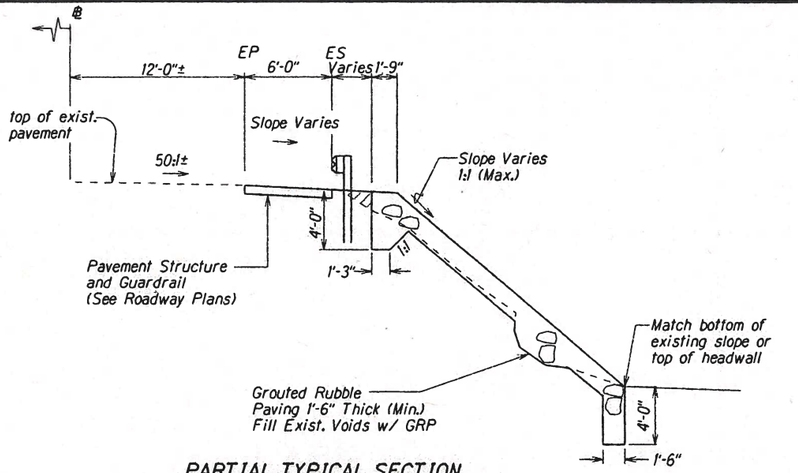
Scale: 1" = 20' Date: August 2018

SHEET No. H1 OF 6 SHEETS

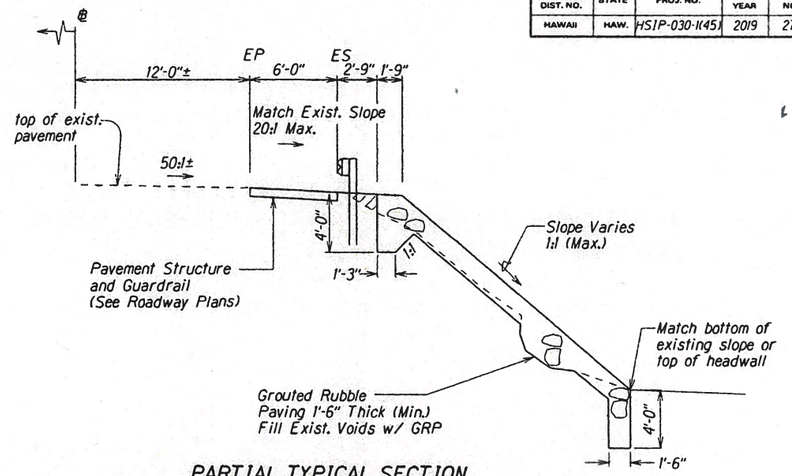
ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
NOTE BOOK
No.

"AS-BUILT"

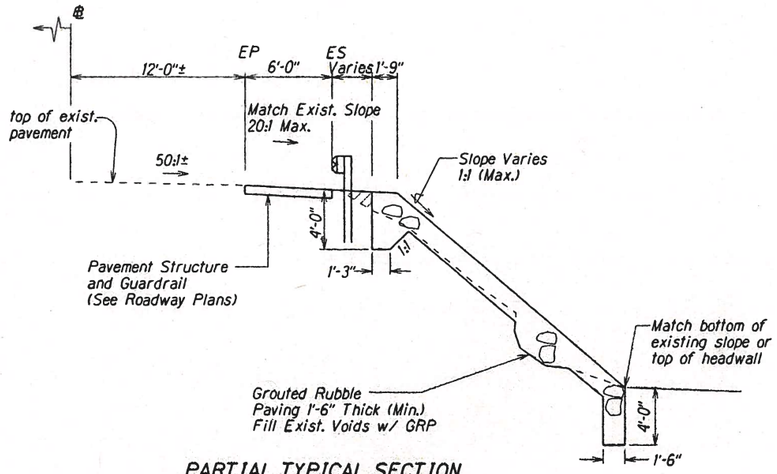
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(45)	2019	27	48



PARTIAL TYPICAL SECTION
℄ STA. ~~87+93±~~ 87+84 +/- RT. TO ℄ STA. 88+03± RT.



PARTIAL TYPICAL SECTION
℄ STA. 88+13± RT. TO ℄ STA. 88+40± RT.



PARTIAL TYPICAL SECTION
℄ STA. 88+03± RT. TO ℄ STA. 88+13± RT.

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

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

LEGEND FOR AS-BUILT POSTINGS

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~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

"AS-BUILT"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

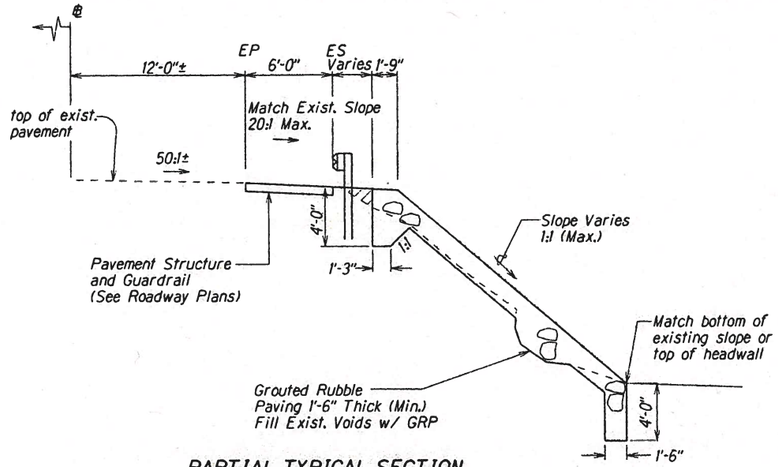
TYPICAL SECTION

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
Kapoli Street to Papalaua Beach Park
Federal Aid Project No. HSIP-030-1(45)

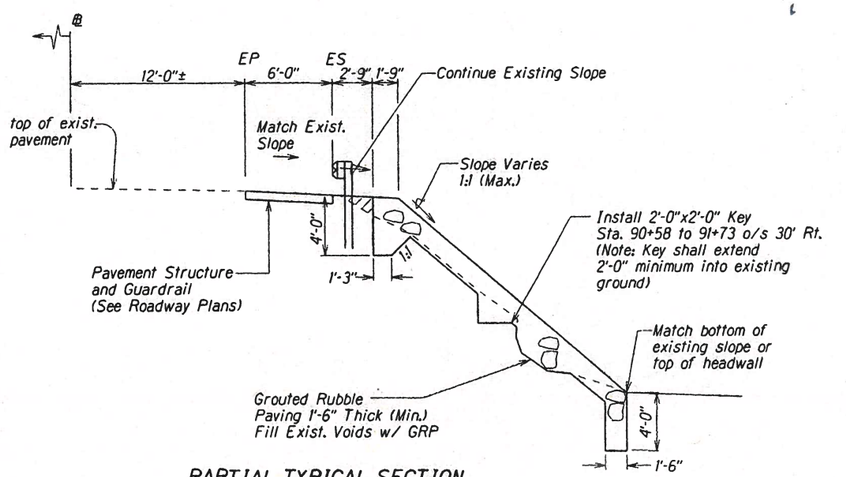
Scale: 1/4"=1'-0" Date: August 2018

SHEET No. H2 OF 6 SHEETS

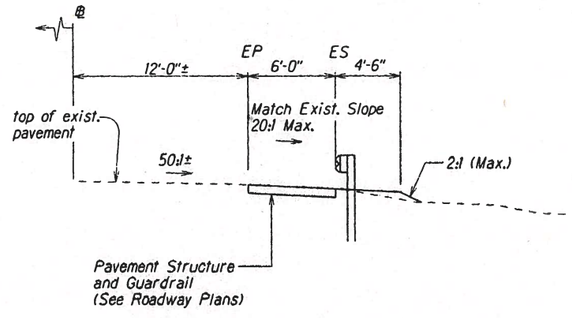
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(45)	2019	28	48



PARTIAL TYPICAL SECTION
℄ STA. 88+40± RT. TO ℄ STA. ~~88+57±~~ RT.
88+50 +/-



PARTIAL TYPICAL SECTION
℄ STA. ~~89+68±~~ RT. TO ℄ STA. ~~93+03±~~ RT.
89+15 +/- 93+00 +/-



PARTIAL TYPICAL SECTION
℄ STA. ~~88+57±~~ RT. TO ℄ STA. ~~89+72±~~ RT.
88+50 +/- 89+15 +/-

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

LEGEND FOR AS-BUILT POSTINGS	
~~^^^^~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTION

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
Kapoli Street to Papalaua Beach Park
Federal Aid Project No. HSIP-030-1(45)

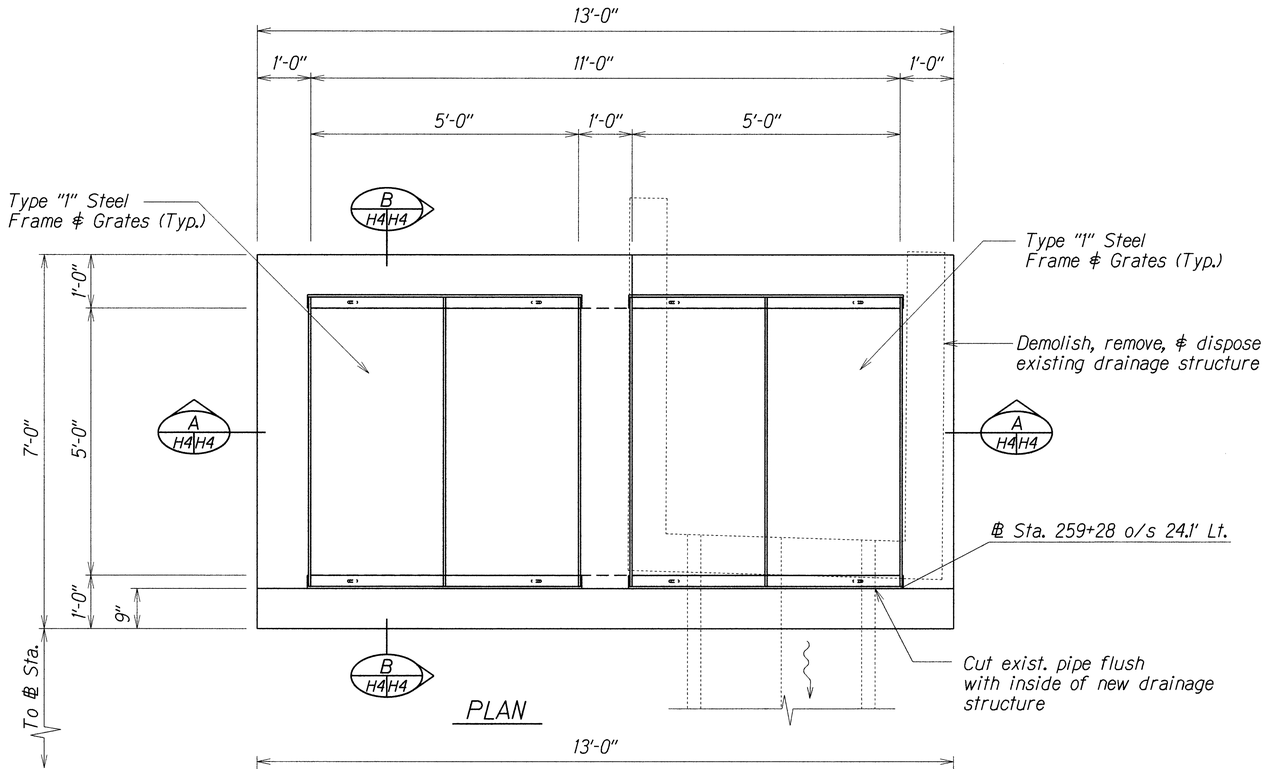
Scale: 1/4"=1'-0" Date: August 2018

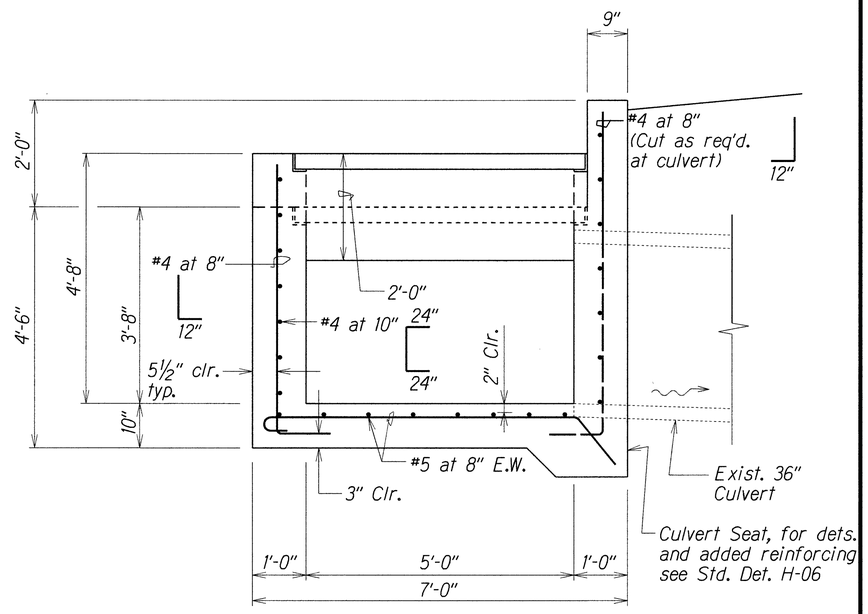
SHEET No. H3 OF 6 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NO. | NOTE BOOK

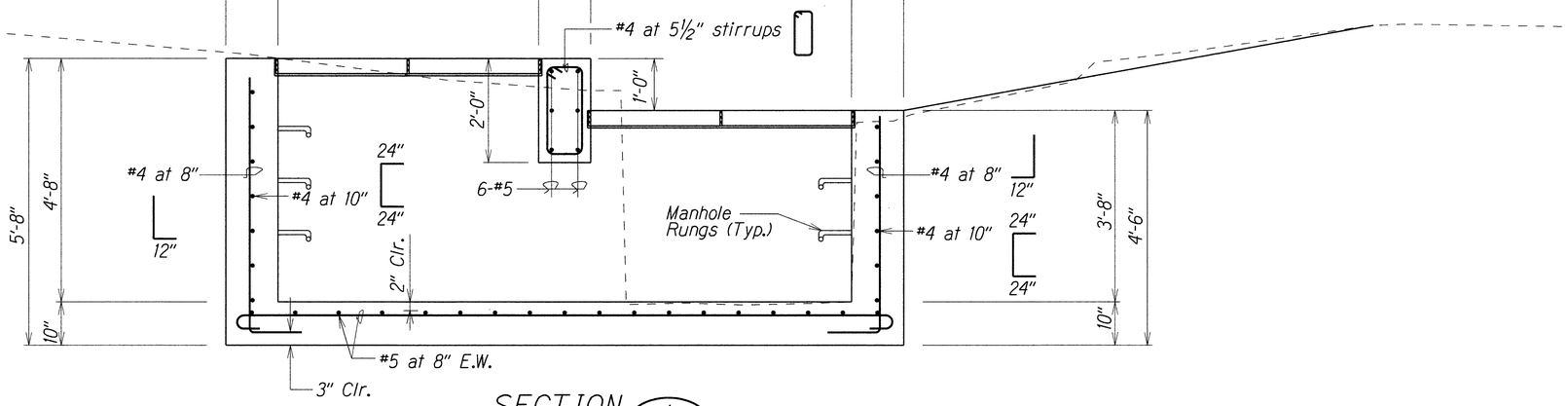
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(45)	2019	29	48





SECTION B H4|H4



SECTION A H4|H4

TYPE 1 GRATED DROP INLET AT ℄ STA. 259+28 O/S 24.1 LT.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY X	
	TRACED BY	
NOTE BOOK dd.x	DESIGNED BY X	
No. X.dgn	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

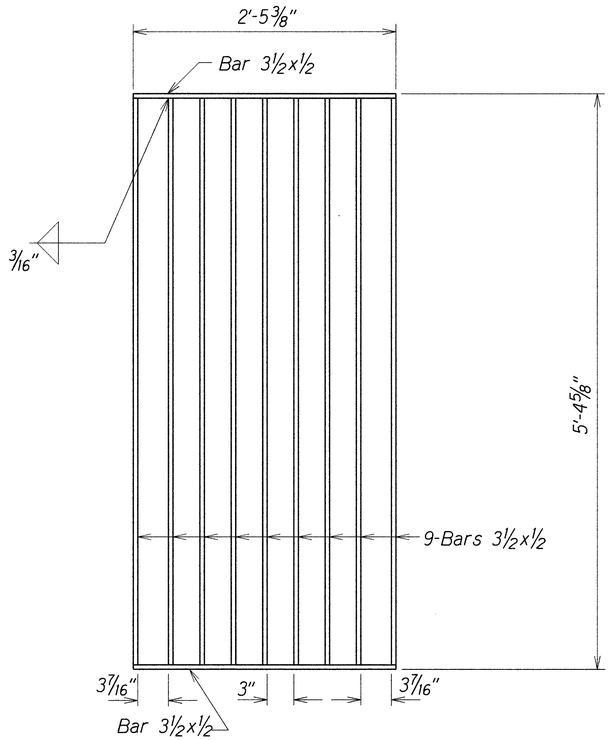
DRAINAGE DETAIL

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
Kapoli Street to Papalaua Beach Park
Federal Aid Project No. HSIP-030-1(45)

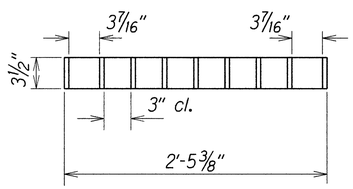
Scale: ¾" = 1'-0" Date: August 2018

SHEET No. H4 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(45)	2019	30	48



PLAN

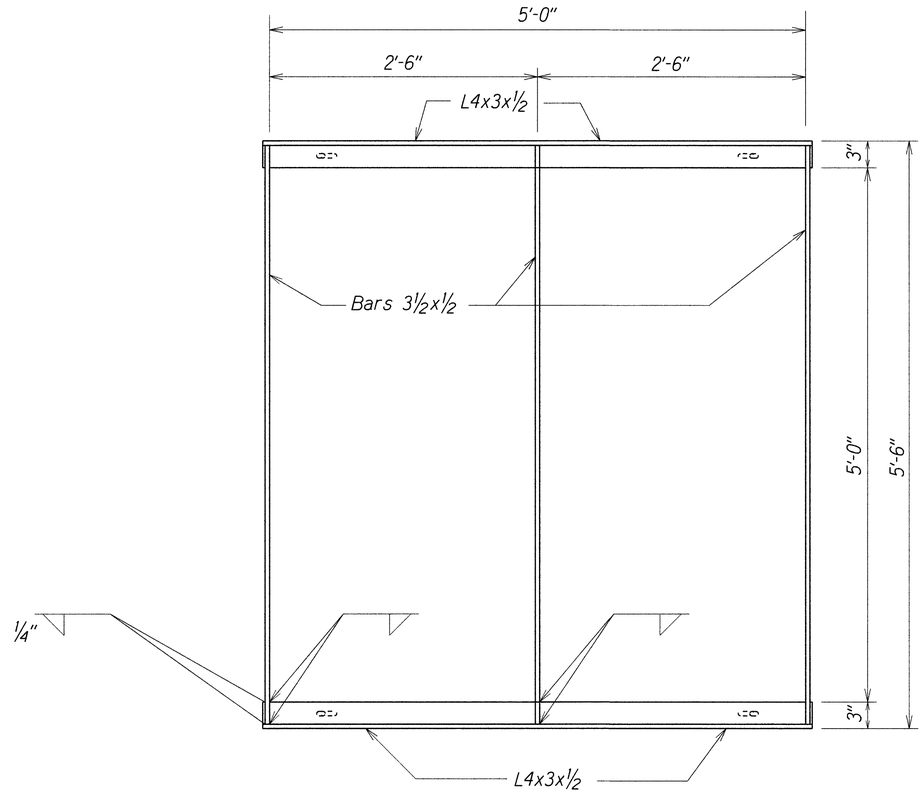


SECTION

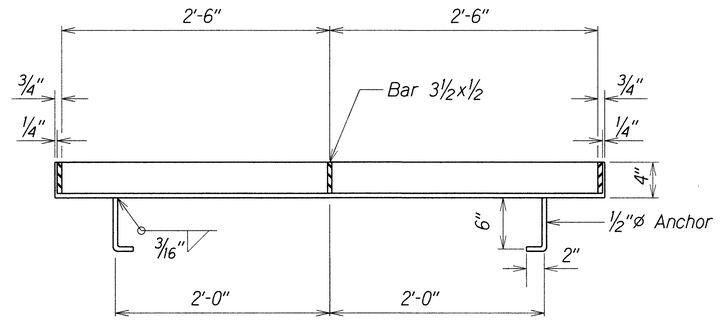
GRATE

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

NOTE:
All welds 3/8" unless otherwise noted.



PLAN



SECTION

FRAME

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

TYPE "1" STEEL FRAME AND GRATES

ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
NOTE BOOK
No. drd2.dgn

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

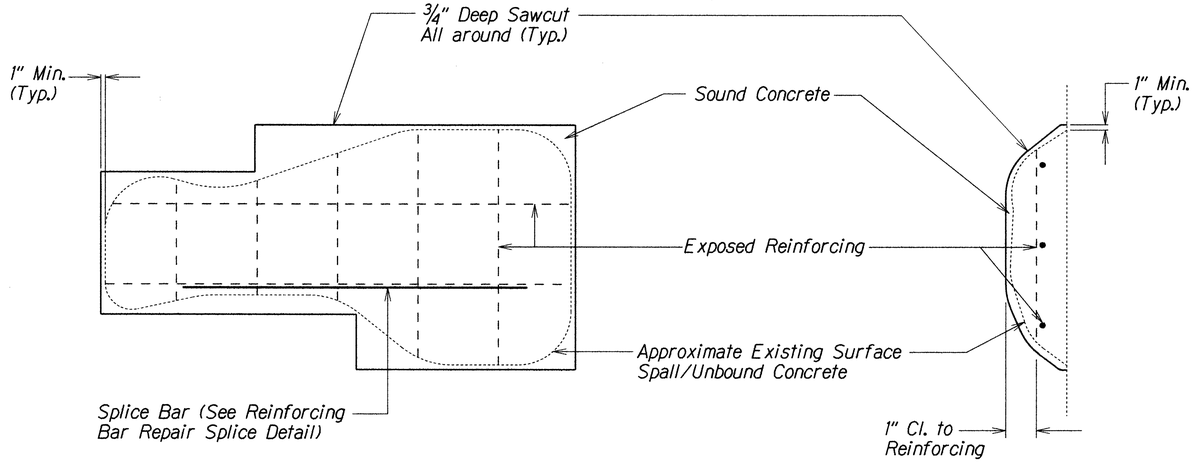
DRAINAGE DETAILS

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
Kapoli Street to Papalaua Beach Park
Federal Aid Project No. HSIP-030-1(45)

Scale: As Shown Date: August 2018

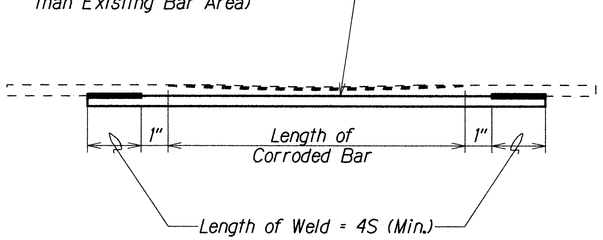
SHEET No. H5 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HSIP-030-1(45)	2019	31	48

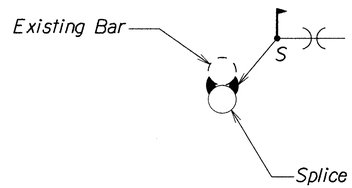


TYPICAL SPALL REPAIR DETAIL

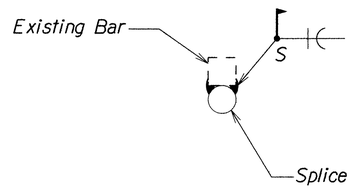
Not to Scale



S= Radius of Existing Bar



EXISTING BAR ROUND



EXISTING BAR SQUARE

REINFORCING BAR REPAIR SPLICE DETAIL

Not to Scale

GENERAL SPALL REPAIR NOTES:

1. CONTRACTOR SHALL PROTECT EXISTING SURFACES AND OBJECTS TO REMAIN FROM DAMAGE. ANY ITEM TO REMAIN THAT IS DAMAGED BY THE CONTRACTOR SHALL BE REPLACED OR REPAIRED TO MATCH THE EXISTING ADJACENT SURFACES AT NO ADDITIONAL COST TO THE STATE.
2. EDGES OF SPALL REPAIRS SHALL NOT BE FEATHERED. PROVIDE A ¾" DEEP SQUARE CUT ALONG PERIMETER OF SPALL REPAIRS.
3. SURFACE PREPARATION OF REPAIR AREA, AND MIXING AND APPLICATION OF REPAIR MATERIAL SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
4. SPALLS AND DELAMINATIONS ARE CALLED OUT AS "SPALLS". NO SEPARATE DISTINCTION IS MADE BETWEEN THEM SINCE THE REPAIRS ARE THE SAME.

SPALL REPAIR MATERIALS:

1. SPLICE BARS TO BE WELDED TO EXISTING STEEL REINFORCING BARS SHALL BE DEFORMED REINFORCING BARS CONFORMING TO ASTM A706, GRADE 60. WELDING OF STEEL REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED AWS D1.4 - STRUCTURAL WELDING CODE - REINFORCING STEEL.
2. ALL EXPOSED STEEL REINFORCING BARS (INCLUDING WELDED SPLICE BARS) SHALL BE COATED WITH "VpCI CORRVERTER" RUST PRIMER AS SUPPLIED BY CORTEC CORPORATION. SURFACE PREPARATION AND APPLICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
3. REPAIR MORTAR FOR PATCHING SPALL REPAIRS SHALL BE "MCI-2702" POLYMER-MODIFIED REPAIR MORTAR BY CORTEC CORPORATION. SURFACE PREPARATION, MIXING, AND APPLICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
4. MIGRATING CORROSION INHIBITOR TO BE APPLIED TO THE CONCRETE SURFACE AFTER SPALL REPAIR SHALL BE "MCI-2020 V/O" SURFACE APPLIED CORROSION INHIBITOR FOR VERTICAL AND OVERHEAD APPLICATIONS BY CORTEC CORPORATION. SURFACE PREPARATION AND APPLICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

PROCEDURES FOR SPALL REPAIR:

1. PRIOR TO START OF REPAIR WORK, CONTRACTOR SHALL SOUND THE EXISTING CONCRETE SURFACES WITH A HAMMER OR OTHER SUITABLE DEVICE. THE SURFACE SHALL BE MARKED TO IDENTIFY THE PERIMETER OF THE REPAIR AREA.
2. PROVIDE ¾" DEEP SQUARE CUT EDGES AROUND THE PERIMETER OF THE REPAIR AREA (SEE "SPALL REPAIR DETAIL") AND CHIP TO SOUND CONCRETE.
3. ALL EXPOSED STEEL REINFORCING BARS THAT HAVE CORRODED MORE THAN 25% OF THE ORIGINAL CROSS-SECTIONAL AREA SHALL BE STRENGTHENED AS SHOWN ON "REINFORCING BAR REPAIR SPLICE DETAIL".
4. SPLICE BARS SHALL BE ROUND DEFORMED REINFORCING BARS WITH A CROSS-SECTIONAL AREA THAT IS EQUAL TO OR GREATER THAN THE CROSS-SECTIONAL AREA OF THE EXISTING BAR.
5. ALL EXISTING STEEL REINFORCING BARS THAT ARE EXPOSED AFTER CHIPPING AND WELDED SPLICE BARS SHALL BE CLEANED AND COATED WITH A RUST PRIMER.
6. CLEAN THE SPALL REPAIR AREA AND PATCH WITH REPAIR MORTAR.
7. APPLY MIGRATING CORROSION INHIBITOR TO THE ENTIRE EXPOSED CONCRETE SURFACE. COVERAGE RATE DURING APPLICATION SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

ORIGINAL PLAN

NOTE BOOK

SURVEY PLOTTED BY _____ DATE
DRAWN BY _____
TRACED BY _____
DESIGNED BY _____
QUANTITIES BY _____
CHECKED BY _____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTION

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
Kapoli Street to Papalaua Beach Park
Federal Aid Project No. HSIP-030-1(45)

Scale: ¼"=1'-0" Date: August 2018

SHEET No. H6 OF 6 SHEETS

STRUCTURE REPAIR DETAIL

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-1	48

STRUCTURAL GENERAL NOTES:

General:

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

Concrete:

A. Concrete shall be regular weight with a maximum water to cement ratio of 0.45 and shall have aminimum 28-day compressive strength of 4,000 psi.
B. The use of any calcium chloride in any concrete is prohibited.
C. Concrete delivery tickets shall record all free water in the mix at batching plant, added for consistency by driver, and any additional request by contractor up to the maximum amount allowed by the mix design.
D. Construction joints may be relocated by the contractor and submitted to the structural engineer for approval. Construction joints shall be made and relocated as not to impair the strength of the structure and to minimize shrinkage stresses. All construction joints shall be cleaned, laitance removed and wetted. See typical details for specific requirements.
E. Unless otherwise noted, chamfer all exposed concrete edges 3/4".
F. Reinforcing bars, anchor bolts, inserts and other items to be cast in the concrete shall be secured in position prior to placement of concrete.
G. All inserts, anchor bolts, plates, and other structural items to be cast in the concrete shall be hot-dipped galvanized according to ASTM A153 unless otherwise noted.
H. Non-shrink grout shall be a premixed non-metallic formula, capable of developing a minimum compressive strength of 4,000 psi in 1 day and 7,000 psi in 28 days.
I. Stay-in-place forms shall not be allowed.

Reinforcing Steel:

A. Reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60 unless otherwise noted. Low-Alloy reinforcing steel for welding shall conform to ASTM A706, Grade 60 unless otherwise noted.
B. Clear concrete coverage for reinforcing bars shall be as follows, unless otherwise noted:
   1. Footings, etc. cast against earth ---------- 3"
   2. Footings, walls, etc. formed and exposed to earth or weather ---------- 2"
C. Reinforcing steel shall be spliced only where indicated on plans. Provide lap splice length per typical details and schedule, Sheet S0.2, unless otherwise noted.
D. Bar bends and hook shall be "standard hooks" in accordance with typical details Sheet S0.2.

Existing Concrete:

A. Contractor shall not damage, cut or drill through existing reinforcing that is to remain and as noted on plans. If reinforcing is damaged, the contractor shall inform the engineer immediately and shall be responsible for repairing the damage at contractor's sole expense and to the satisfaction of the engineer.
B. All holes which need to be abandoned due to the presence of reinforcing, shall be filled with epoxy or non-shrink grout.
C. The contractor will not be paid for the holes which need to be filled and abandoned. the engineer shall review and approve all relocated holes prior to installing dowels.
D. All drilled holes for anchors shall be brushed to remove loose material then cleaned with compressed air, prior to injecting the epoxy.
E. Anchoring adhesive shall be a two-component 100% solids epoxy based system supplied in manufacturer's standard side-by-side cartridge and dispensed through a static-mixing nozzle supplied by the manufacturer. Epoxy shall meet the minimum requirements of ASTM C-881 specification for Type IV, Grade 3, class c and must develop a minimum of 12,650 psi compressive yield strength after 7 day cure. Epoxy shall be formulated for optimum performance in both cracked and uncracked concrete.

Surface Preparation Notes for Spall Repairs:

A. Deteriorated concrete shall be removed down to sound substrate, or to the specified depth as noted in the spall repair details. Sawcut all edges minimum of 1" deep, no feathering of patching material is allowed. Avoid cutting any reinforcing steel when sawcutting. The exposed concrete shall be roughened to a 1/4" amplitude and shall be cleaned and free of laitance, dust and other bond inhibiting materials.
B. All reinforcing steel damaged due to the contractor's operations shall be repaired by the contractor at his/her expense and to the satisfaction of the engineer.
C. All loose, soft, honey-combed, disintegrated concrete, plus 3/4" minimum depth of concrete beyond the back face of the rebar within the spall area shall be removed.
D. After completion of the removal operation, the engineer will resound the areas to ensure that only sound concrete remains.
E. Cleaning shall precede application of the patching material by not more than 24 hours.

Bonding Agent:

A. After the concrete surfaces have been prepared and cleaned, and immediately before placing the concrete patching, a coat of bonding agent shall be applied. The surface shall receive a thorough and even coating, and excess bonding agent shall not be permitted to collect in pockets. The rate of progress in applying the bonding agent shall be limited so that it does not become dry before it is covered with the concrete patching. Should the surface of the bonding agent dry, the dried bonding agent shall be completely removed and fresh bonding agent applied. Removal shall be by sandblasting or by another procedure approved by the engineer. The removal of bonding agent shall be at the expense of the contractor.
B. The bonding agent shall provide corrosion protection to the reinforcing steel and shall act as a bonding agent for the fresh patching mortar. All exposed reinforcing steel shall receive two (2) coats at 20 mils each, total of 40 mils. the concrete surface shall receive one (1) coat at 20 mils. Follow manufacturer's specifications for recommended time between application of bonding agent and patching mortar. The minimum bond strength provided by the bonding agent shall be 2,000 psi after 14 days (ASTM C-882).

Polymer Modified Patching Mortar:

A. Patching mortar shall be a polymer modified mortar, have high abrasion resistance and shall be suitable for horizontal, vertical and overhead surfaces. The minimum bond strength provided by the patching mortar shall be 2,000 psi after 28 days (ASTM C-882). The minimum compressive strength provided by the patching mortar shall be 4,000 psi after 28 days. Refer to manufacturer's specifications for preparation and application guidance.

Curing:

A. As per ACI recommendations for portland cement concrete, curing is required. follow the manufacturer's recommendation for curing material and procedure.

Multiple Lifts:

A. Follow the manufacturer's limitations for maximum thickness for application of patching mortar. if the required thickness of a repair is greater than the single application limit, multiple lifts are required. large, unconfined or overhead repairs may also require multiple lifts. if successive lifts are to be applied, roughen the surface of the previous lift and apply subsequent lifts within the time period, both as recommended by the manufacturer.

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

AS-BUILT
HI BUILT, LLC
September 21, 2020
DF

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

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

April 30, 2020
SIGNATURE — EXPIRATION DATE OF THE LICENSE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

Scale: As Shown — Date: November 2, 2019

SHEET No. S-1 OF 10 SHEETS

31 S-1

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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-2	48

MINIMUM SPLICE & EMBEDMENT LENGTHS

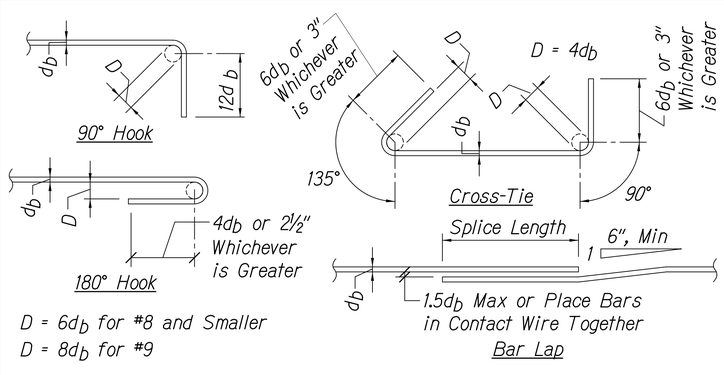
Bar Size	Lap Splice		Embedment		
			Straight		with Standard 90° Hook
	Top Bars	Other Bars	Top Bars	Other Bars	
#3, #4	29″	21″	17″	12″	8″
#5	36″	26″	21″	15″	10″
#6	43″	31″	26″	18″	12″
#7	54″	39″	32″	23″	14″
#8	71″	51″	42″	30″	16″
#9	90″	64″	53″	38″	18″

Notes:
1. "Top Bars" are horizontal bars with 12" or more of concrete cast below.
2. Splice lengths may be reduced by multiplying the tabulated values by 0.765 if the centerline of splice of adjacent bars are staggered 6'-0" o.c. for #9 bars and smaller.
3. Embedment lengths for straight bars may be reduced by multiplying the tabulated values by 0.80 if the bars are spaced laterally not less than 6" center-to-center, with not less than 3" clear cover measured in the direction of the spacing.
4. Embedment lengths for bars with 90° hook are bars with side cover, normal to plane of hook, of not less than 2½" and cover on bar extension beyond hook not less than 2". Increase embedment length by 43% for bars not meeting these requirements.

TYPICAL REBAR SPLICE AND EMBEDMENT LENGTH SCHEDULE

Not to Scale

1 | S-2 | S-2



STANDARD HOOKS AND CROSS-TIE DETAIL

Not to Scale

2 | S-2 | S-2

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HIGHWAYS DIVISION

TYPICAL DETAILS

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

Scale: As Shown — Date: November 2, 2019

SHEET No. S-2 OF 10 SHEETS

31 S-2

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

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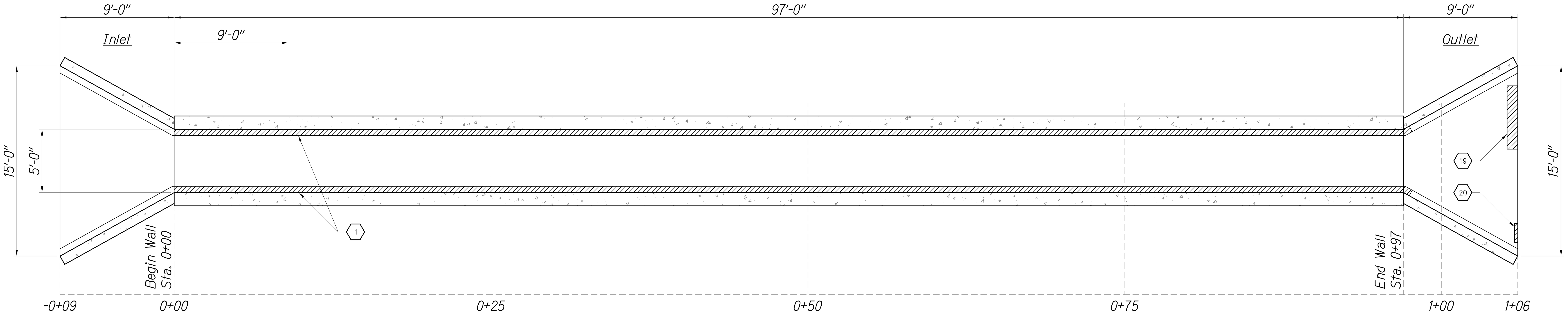
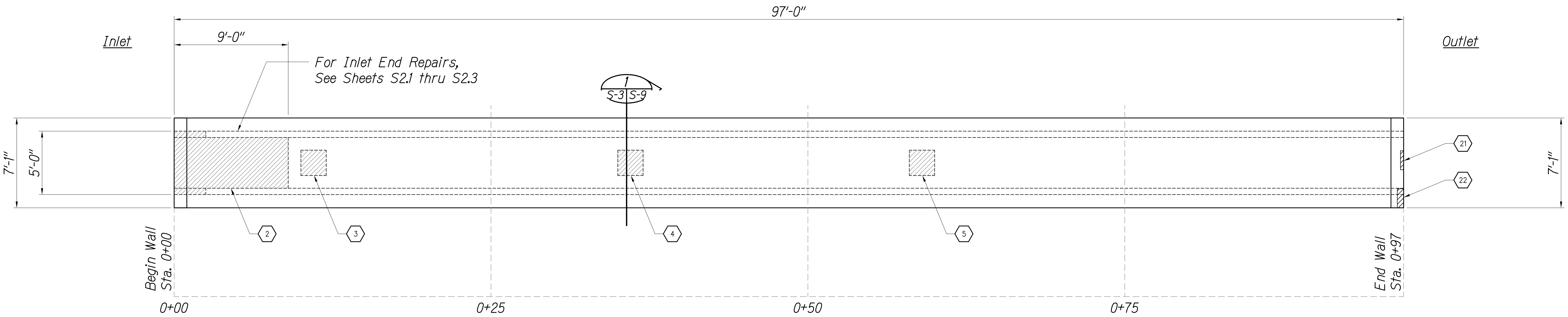
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-3	48



CULVERT INVERT SLAB - PLAN VIEW

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

1 S-3 | S-3



CULVERT ROOF SLAB - PLAN VIEW

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

2 S-3 | S-3

Notes:

1. For ⟨X⟩ Deteriorated Item Descriptions, Locations, and Approximate Repair Size and Type, See Sheet S-8.
2. For Typical Spall Repairs, See Sheet S-10.

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CULVERT ROOF AND INVERT SLABS - PLAN VIEW

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

Scale: As Shown   Date: November 2, 2019

SHEET No. S-3 OF 10 SHEETS

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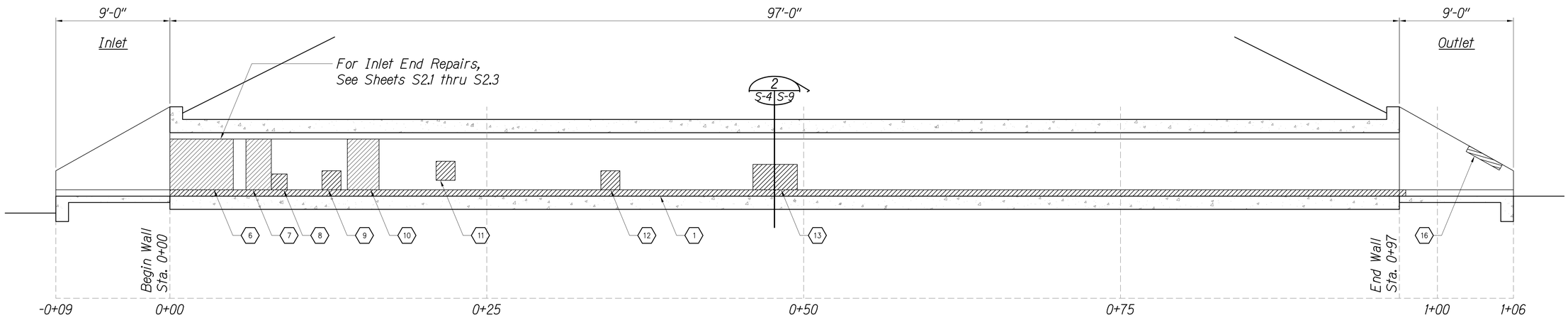
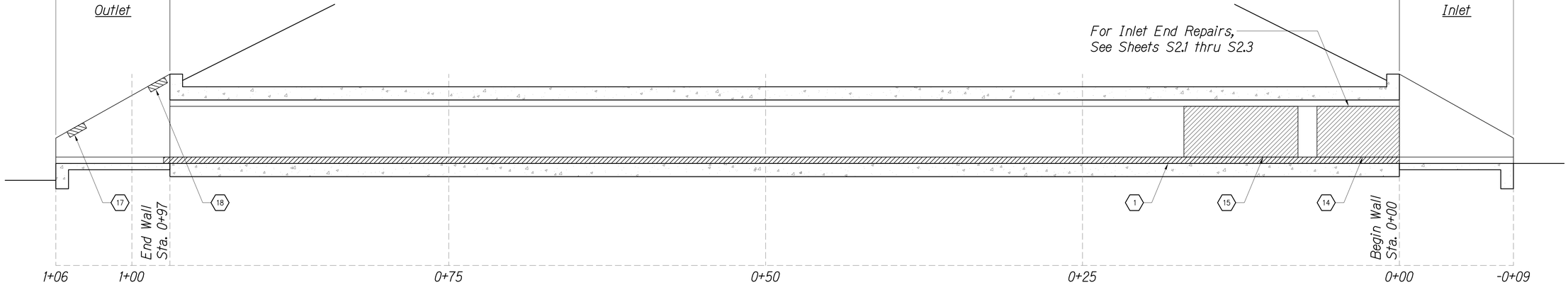
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-4	48



CULVERT NORTH WALL INTERIOR ELEVATION (1 / S-4 | S-4)

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



CULVERT SOUTH WALL INTERIOR ELEVATION (2 / S-4 | S-4)

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

Notes:

1. For ⟨X⟩ Deteriorated Item Descriptions, Locations, and Approximate Repair Size and Type, See Sheet S-8.
2. For Typical Spall Repairs, See Sheet S-10.

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CULVERT INTERIOR WALL ELEVATIONS

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

Scale: As Shown — Date: November 2, 2019

SHEET No. S-4 OF 10 SHEETS

31 S-4

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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-5	48

Deteriorated Item Description:

(1) 6"x6" Fillet on Both Sides Exhibit Spalling (195 LF Total)

~~(2) 9'x5' Area on Soffit and Headwall with Spalling and Delaminating Concrete~~

(3) 2'x2' Delaminating Concrete on Soffit at Sta. 0+10

(4) 2'x2' Delaminating Concrete on Soffit at Sta. 0+35

(5) 2'x2' Delaminating Concrete on Soffit at Sta. 0+58

(6) 4'Hx5'W Spall on Wall at Sta. 0+00

(7) 4'Hx2'W Spall on Wall at Sta. 0+06

(8) 1.25'Hx1.25'W Spall on Wall at Sta. 0+08

(9) 1.5'Hx1.5'W Spall on Wall at Sta. 0+12

(10) 4'Hx2.5'W Spall on Wall at Sta. 0+14

(11) 1.5'Hx1.5'W Spall on Wall at Sta. 0+21

(12) 1.5'Hx1.5'W Spall on Wall at Sta. 0+34

(13) 2'Hx3.5'W Spall on Wall at Sta. 0+46

(14) 4'Hx6.5'W Spall on Wall at Sta. 0+00

(15) 4'Hx9'W Spall on Wall at Sta. 0+08

(16) 3'x6"x6" Spall on Wing Wall

(17) 1.5'x6"x6" Spall on Wing Wall

(18) 1.5'x6"x6" Spall on Wing Wall

(19) 5'x10"x10" Spall on Slab Edge

(20) 1.5'x10" Spall on Slab Edge

(21) 1.5'x3"x6" Spall on Headwall

(22) 1.5'x6"x6" Spall on Headwall

LEGEND FOR AS-BUILT POSTINGS

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~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

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STATE OF HAWAI'I
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HIGHWAYS DIVISION

INSPECTION ITEM DESCRIPTION

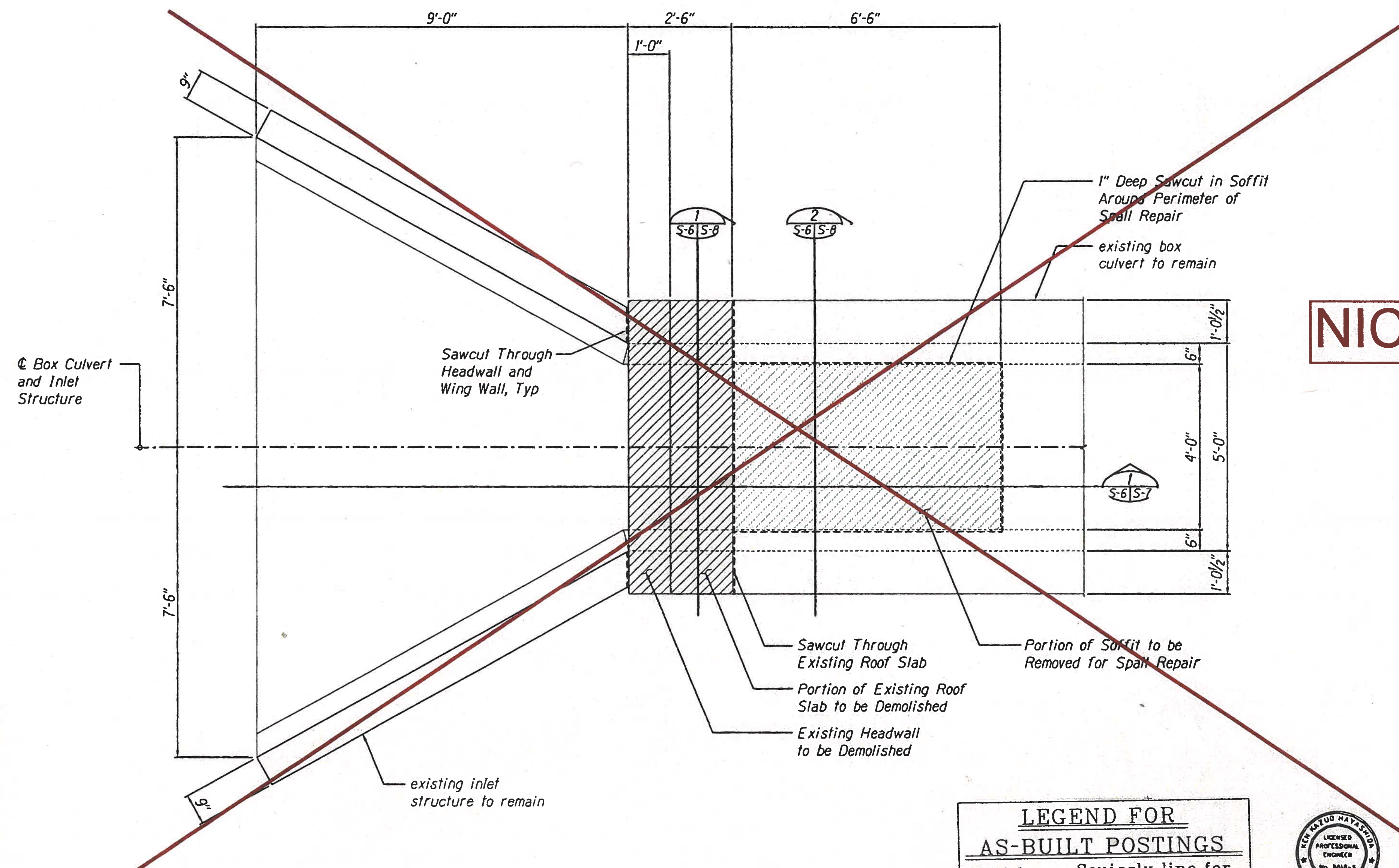
HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

Scale: As Shown — Date: November 2, 2019

SHEET No. S-5 OF 10 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-6	48



PLAN VIEW - INLET END
Scale: 3/4" = 1'-0"
1 S-6 S-6

LEGEND FOR AS-BUILT POSTINGS

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HIGHWAYS DIVISION

CULVERT INLET END REPAIR - PLAN VIEW

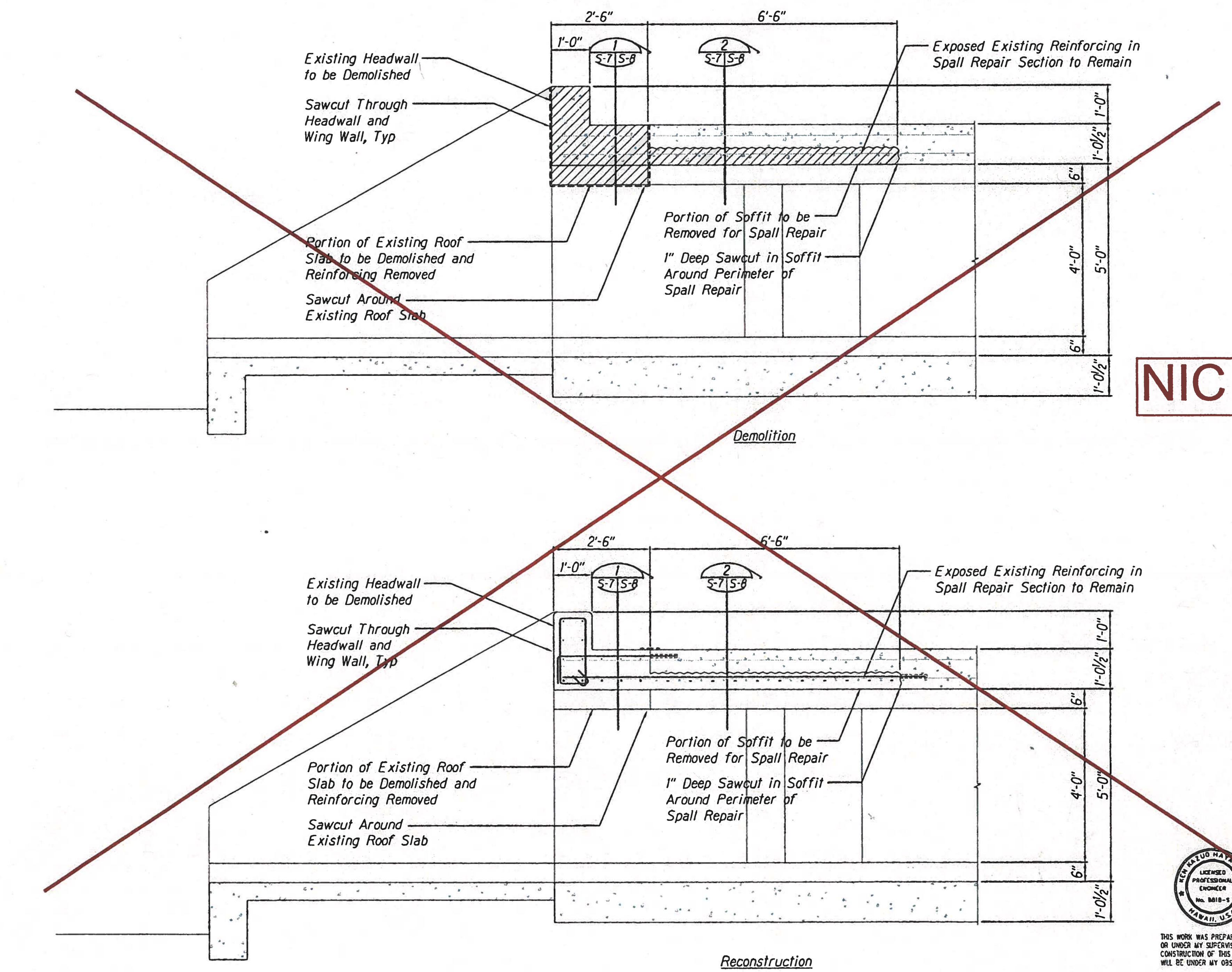
HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

Scale: As Shown
Date: November 2, 2019

SHEET No. S-6 OF 10 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-7	48



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

LEGEND FOR AS-BUILT POSTINGS

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Roadway	Text for as-built posting

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CULVERT INLET END REPAIR SECTIONS

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

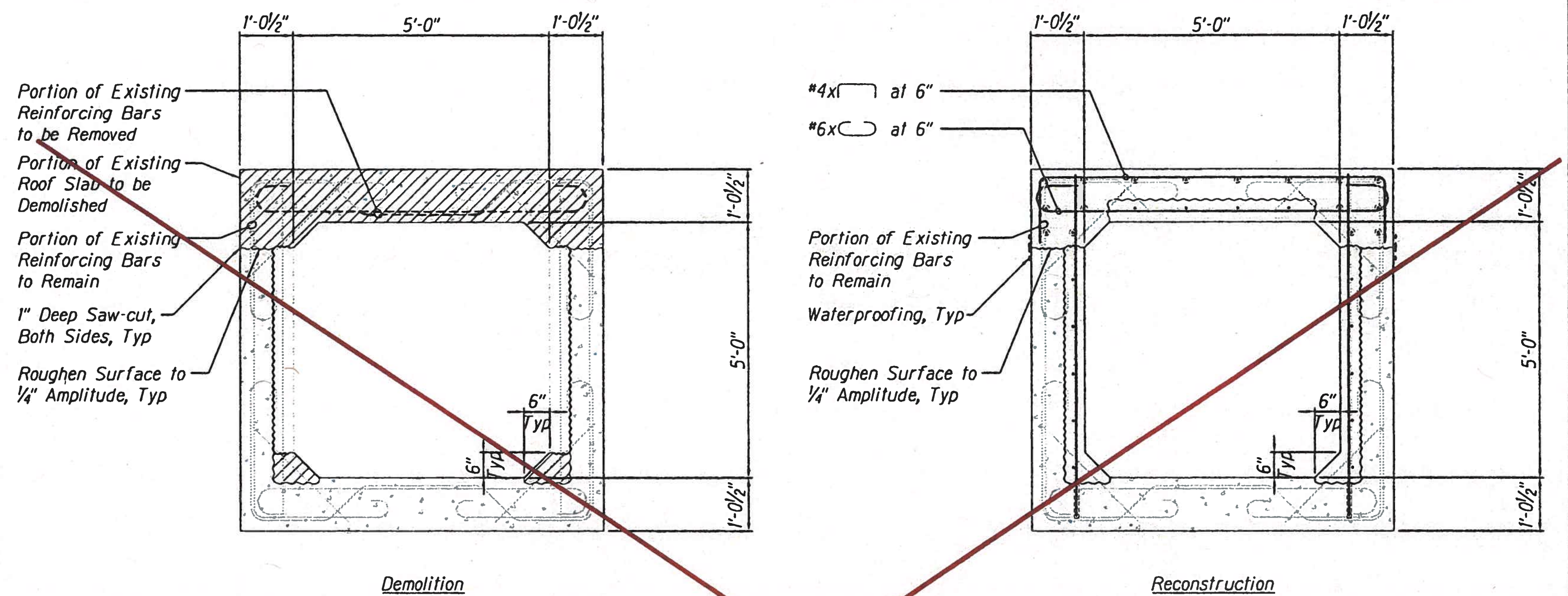
Scale: As Shown
Date: November 2, 2019

SHEET No. S-7 OF 10 SHEETS

"AS-BUILT"

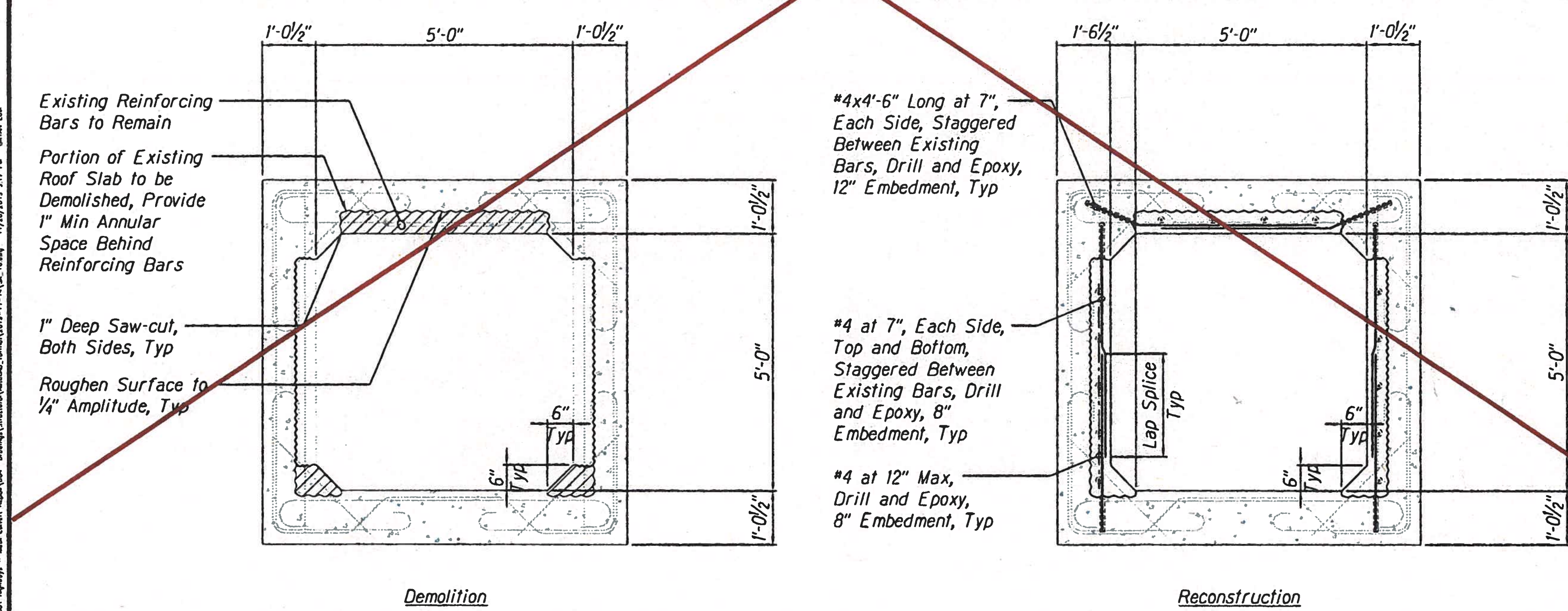
31 S-7

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-8	48



SECTION 1 S-8 | S-8

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



SECTION 2 S-8 | S-8

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

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LEGEND FOR AS-BUILT POSTINGS

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Roadway	Text for as-built posting

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HIGHWAYS DIVISION

CULVERT REPAIR
SECTIONS - 1

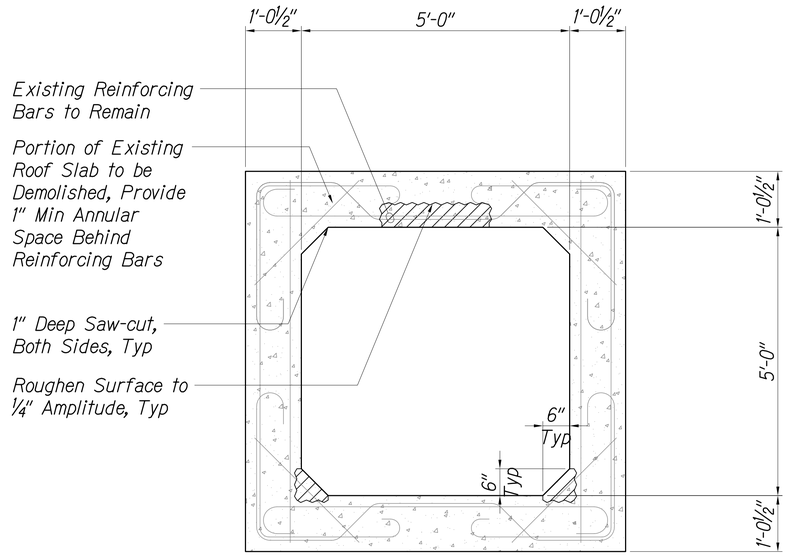
HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

Scale: As Shown   Date: November 2, 2019

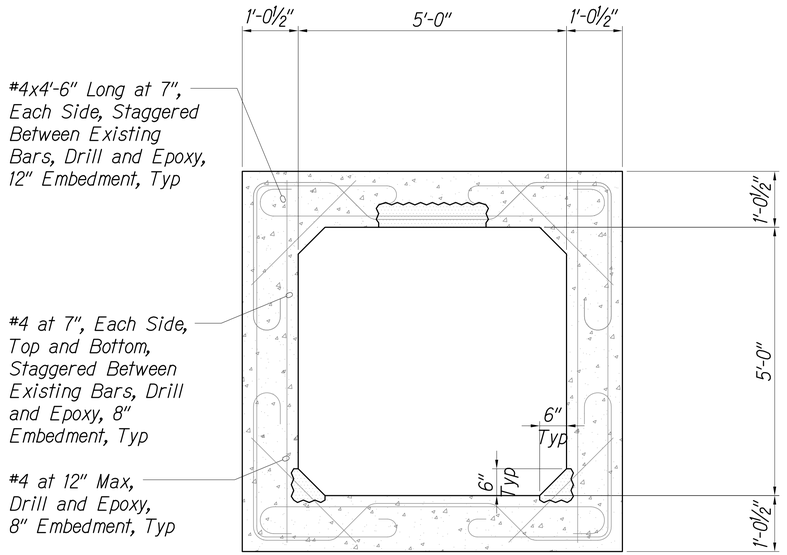
SHEET No. S-8 OF 10 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-9	48

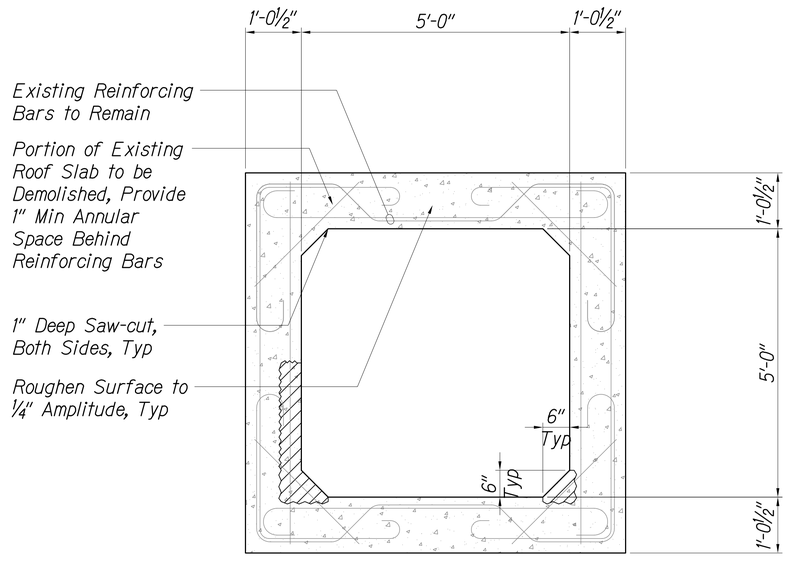


Demolition



Reconstruction

SECTION 1
Scale: 3/4" = 1'-0"
S-9 | S-9



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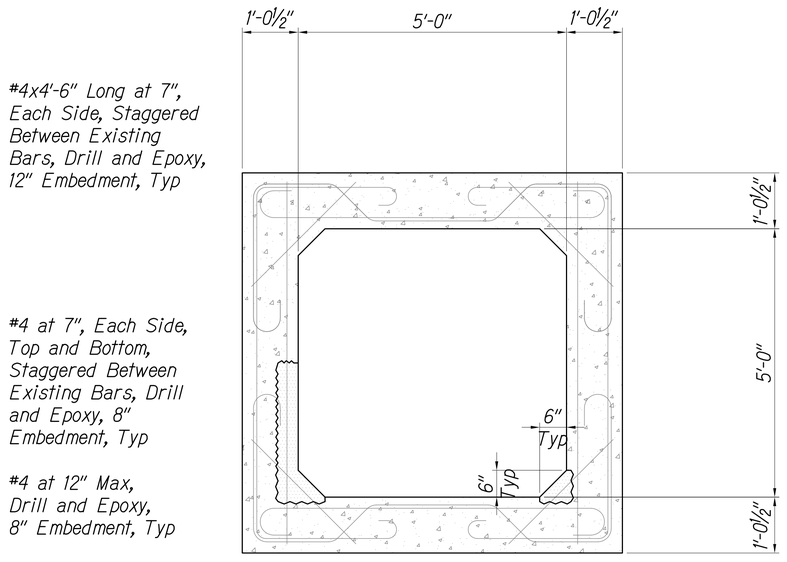

Reconstruction

SECTION 2
Scale: 3/4" = 1'-0"
S-9 | S-9

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CULVERT REPAIR SECTIONS - 2

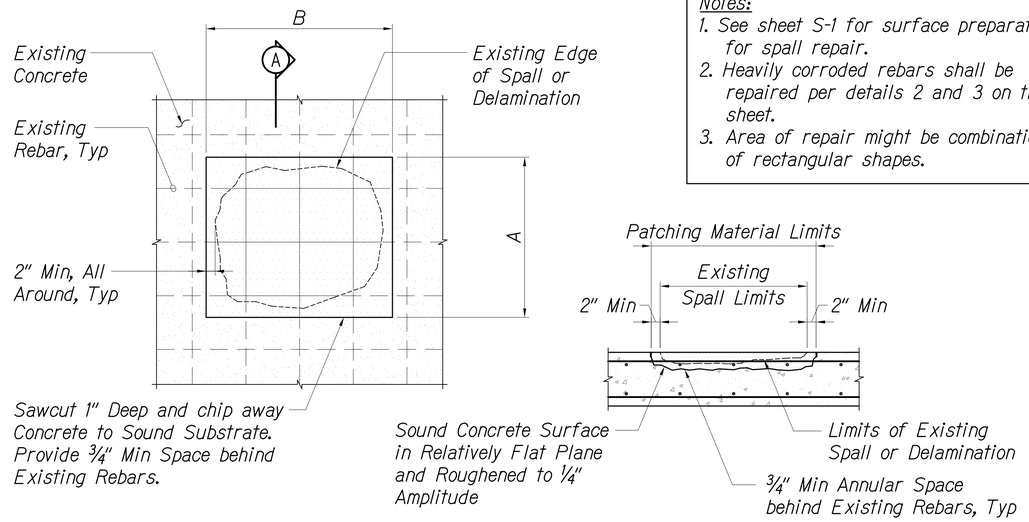
HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

Scale: As Shown
Date: November 2, 2019

SHEET No. S-9 OF 10 SHEETS

31 S-9

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	HSIP-030-1(45)	2019	31 S-10	48



PLAN/ELEVATION

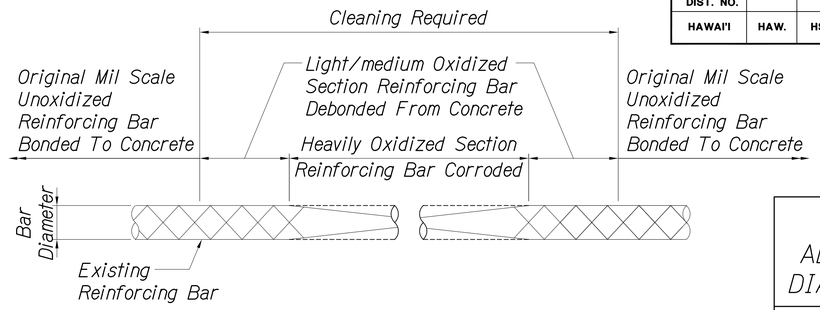
A SECTION

Notes:
1. See sheet S-1 for surface preparation for spall repair.
2. Heavily corroded rebars shall be repaired per details 2 and 3 on this sheet.
3. Area of repair might be combination of rectangular shapes.

TYPICAL SPALL REPAIR DETAIL

Not to Scale

1 S-10 | S-10



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

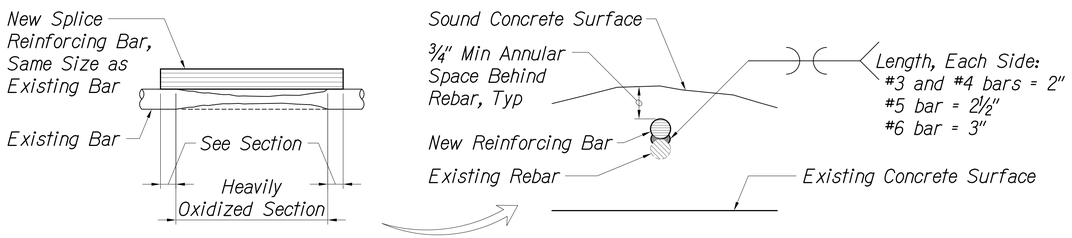
MINIMUM ALLOWABLE BAR DIAMETER CHART

Bar Size	Minimum Diameter
#3	5/16"
#4	3/8"
#5	1/2"
#6	5/8"
#7	11/16"
#8	13/16"

TYPICAL REINFORCING BAR REPAIR CRITERIA

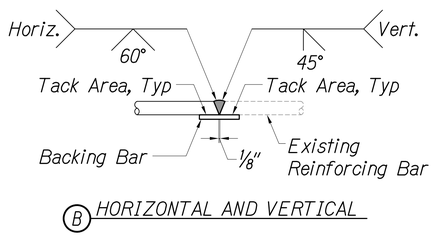
Not to Scale

2 S-10 | S-10



A LAP SPLICE (#6 Bar and Smaller)

SECTION



B HORIZONTAL AND VERTICAL

Notes:
1. Chip, grind, or gouge to sound metal before welding.
2. If material test reports or chemical composition data is unavailable for the existing rebar, the minimum preheat and interpass temperature requirements shall be as follows:
   a. Up to #6 bars inclusive 500°F (260°C)
   b. #7 bars and larger 300°F (150°C)
3. If material test reports or chemical composition data is available, refer to AWS D1.4 for minimum preheat and interpass temperature requirements.
4. Preheat the existing reinforcing bars such that the cross-section of the bar is at or above the minimum preheat temperature for at least six inches on each side of the joint to be welded.
5. Use E70 electrodes for stirrups, E90 electrodes for all others.
6. New reinforcing bars shall conform to ASTM A706.

TYPICAL REINFORCING BAR WELDED SPLICE DETAIL

Not to Scale

1 S-10 | S-10

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL REPAIR DETAILS

HONOAPIILANI HIGHWAY SAFETY IMPROVEMENTS
KAPOLI STREET TO PAPALAUA BEACH PARK
FEDERAL AID PROJECT NO. HSIP-030-1(45)

Scale: As Shown Date: November 2, 2019

SHEET No. S-10 OF 10 SHEETS

31 S-10

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