INDEX TO DRAWINGS	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2 - 3	DETAILED INDEX TO DRAWINGS
4	STANDARD PLANS SUMMARY
5	LOCATION PLAN
6 - 7	TOPOGRAPHIC MAPS
8 - 15	BORING LOGS AND LEGEND
16 - 18	CIVIL GENERAL NOTES
19	TYPICAL ROAD SECTION
20 - 24	GUARDRAIL DETAILS
25	MISCELLANEOUS DETAILS
26	DEMOLITION PLAN
27	SITE PLAN
28 - 30	GRADING AND EROSION CONTROL
31	STRIPING AND SIGNAGE PLAN
32 - 34	TRAFFIC CONTROL PLANS
35-137	STRUCTURAL DRAWINGS

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

HONOLULU, HAWAII

PLANS FOR

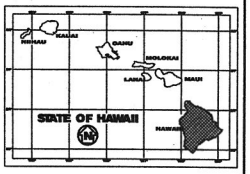
HAWAII BELT ROAD

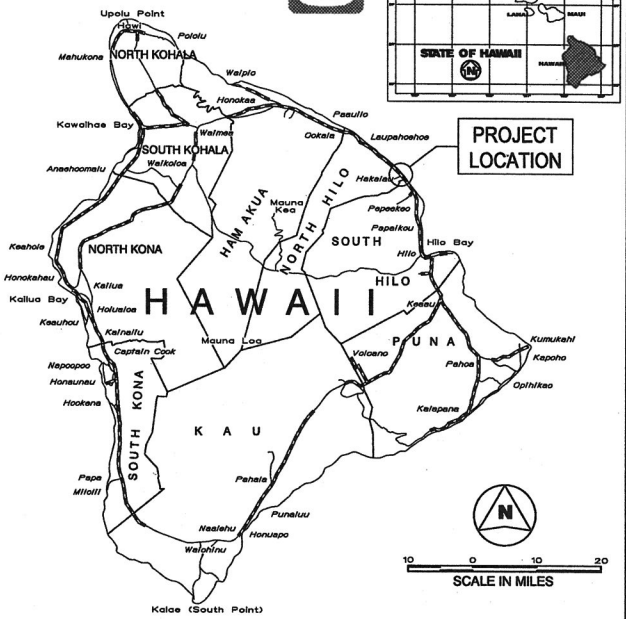
REHABILITATION OF UMAUMA STREAM BRIDGE
FEDERAL AID PROJECT NO. BR-019-2(61)

DISTRICT OF NORTH HILO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	1	137

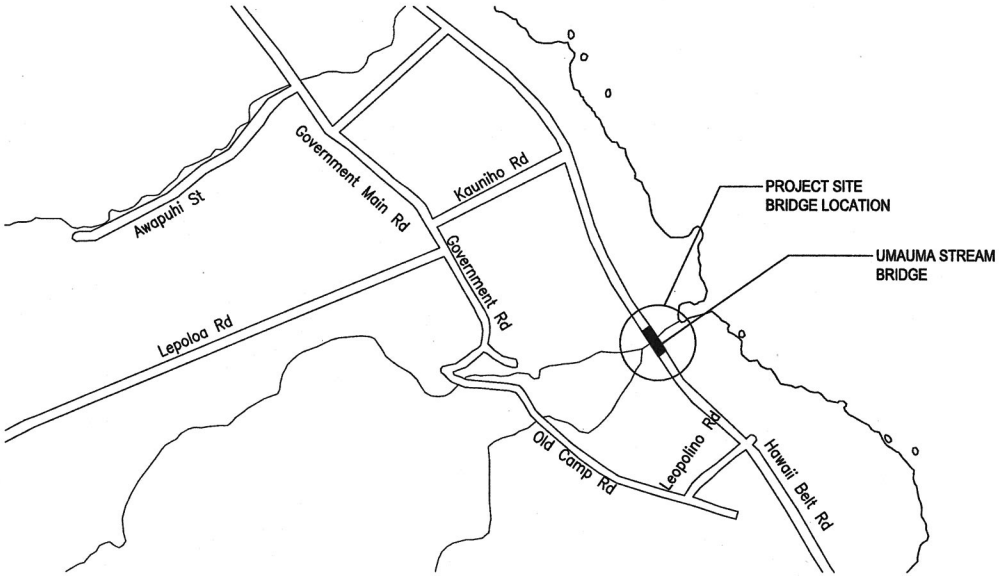
19





FEDERAL AID PROJECTS PREVIOUSLY CONSTRUCTED OR UNDER CONSTRUCTION

UMAUMA STREAM BRIDGE MILE POST 15.80 TO MILE POST 16.30



VICINITY MAP
NOT TO SCALE

DESIGN DESIGNATION

ADT (2011) 8,100
ADT (2013) 11,300
DHV 960
D 55/45
T 6.5%
V ..... 60 mph

DEPARTMENT OF TRANSPORTATION STATE OF HAWAII	
APPROVED:	
DIR. OF TRANSPORTATION	DATE

NAGAMINE OKAWA ENGINEERS INC. DESIGNED BY
HWY-DS MANAGED BY
692-7547 PHONE
July 2012 DATE

Enclosure 1: POH-2011-98, NWP#14 Umauma Bridge Replacement

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	2	137

DETAILED INDEX TO DRAWINGS

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

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.

LICENSE EXPIRES: 4/30/14
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DETAILED INDEX TO DRAWINGS

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. T2 OF 15 SHEETS

DETAILED INDEX TO DRAWINGS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	3	137

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

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

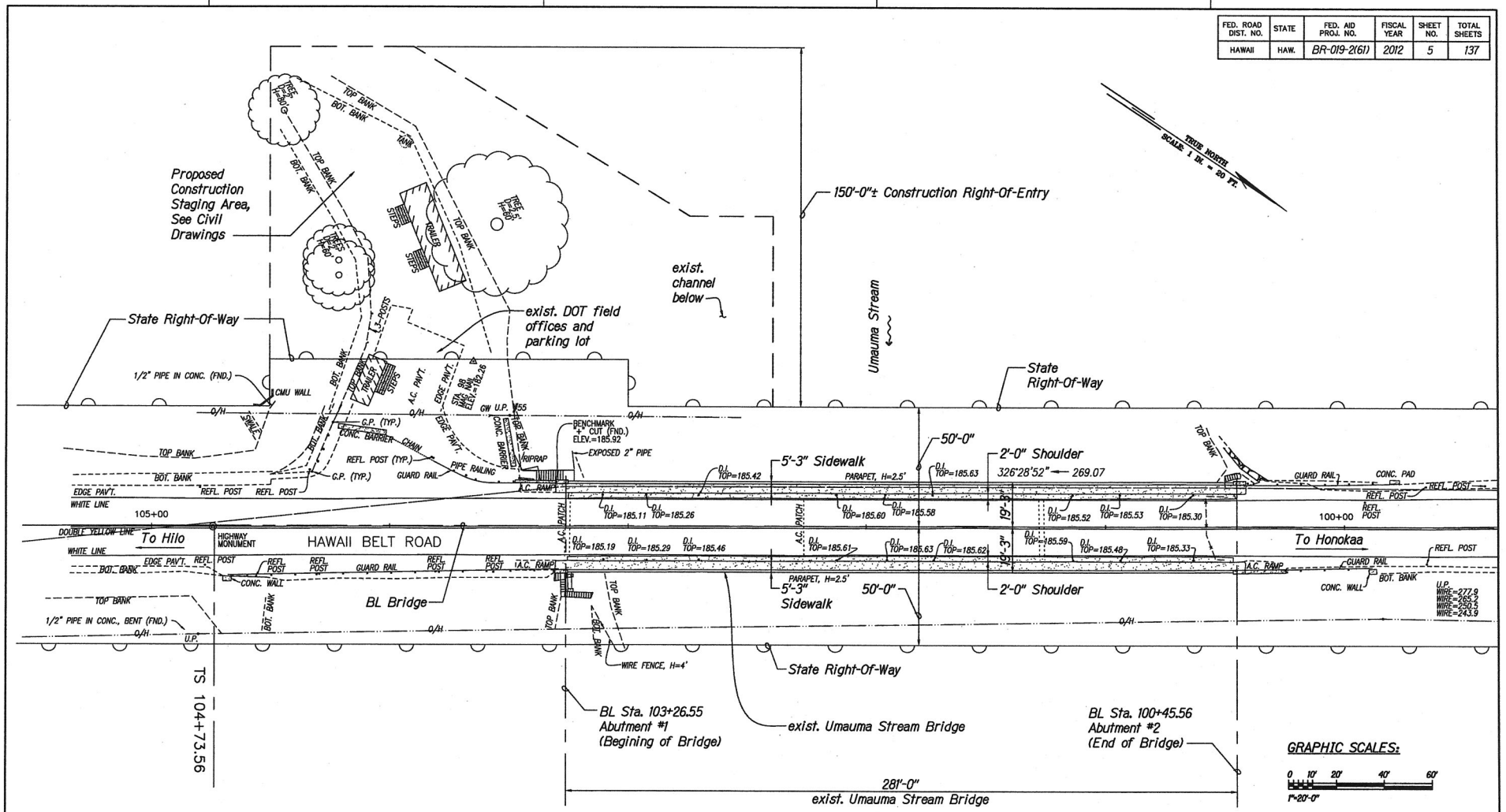
DETAILED INDEX TO DRAWINGS

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. T3 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	5	137



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

ORIGINAL PLAN
NOTEBOOK
No.

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/14
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

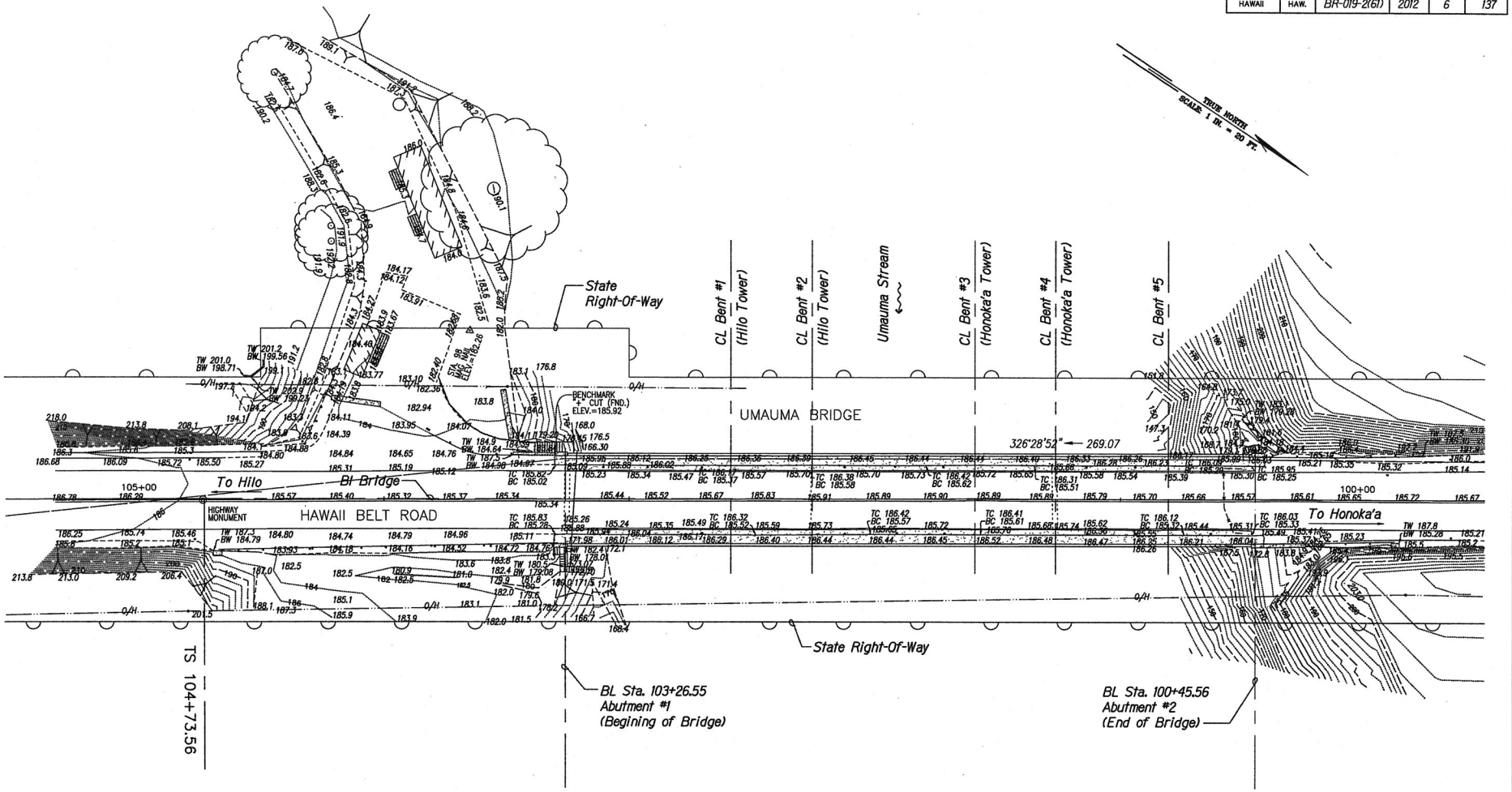
LOCATION PLAN

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1" = 20'-0" Date: July 18, 2012

SHEET No. T5 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	6	137



A T6 T6 TOPOGRAPHIC MAP OF AREA ON EXISTING BRIDGE
SCALE: 1" = 20'-0"

Reference elevation - Mean sea Level

Reference:
ControlPoint Surveying topographic map dated 02/23/2010

GRAPHIC SCALES:
0 10' 20' 40' 60'
1"=20'-0"

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

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LICENSE EXPIRES: 4/30/14
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

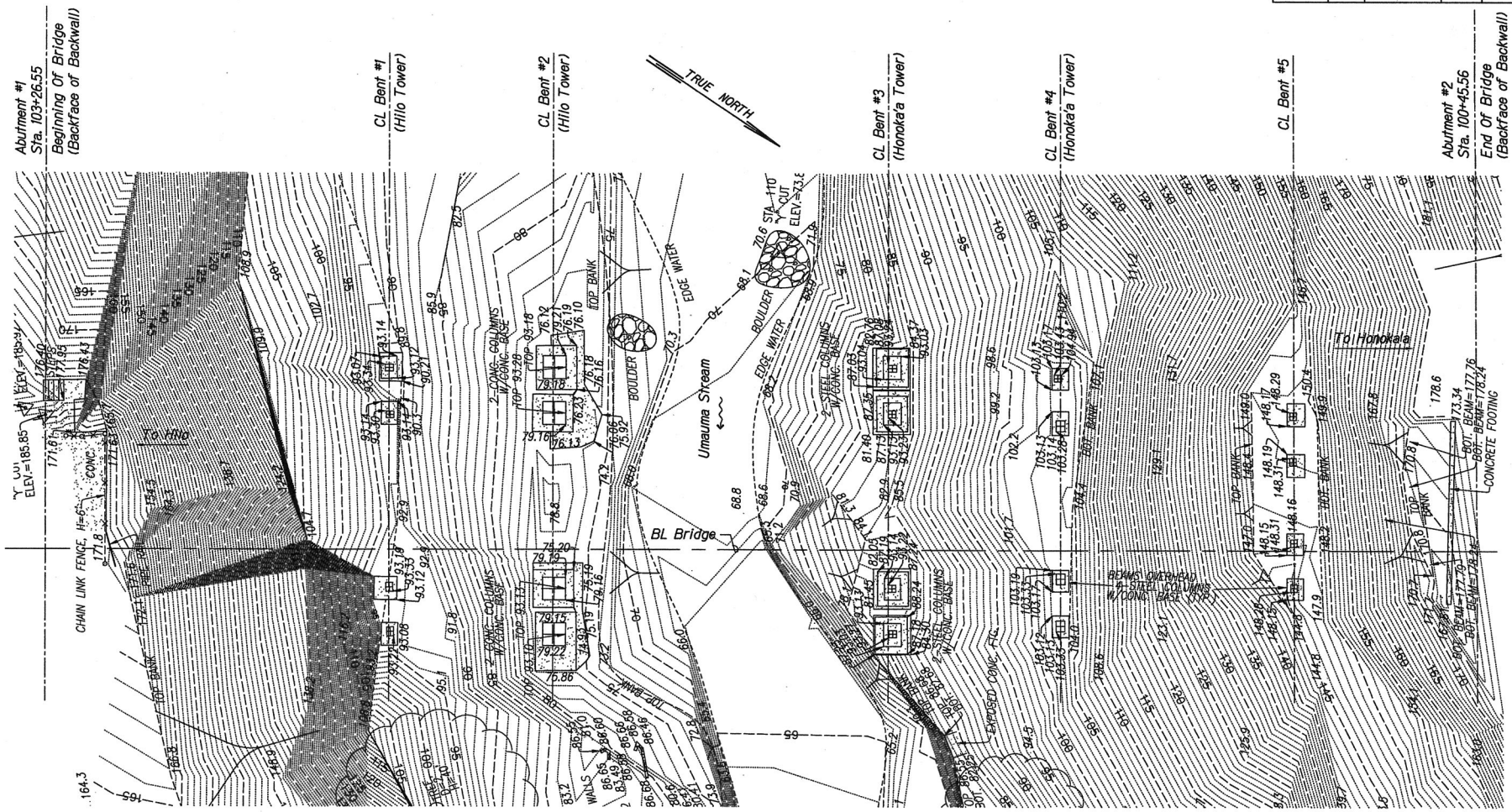
TOPOGRAPHIC MAP OF AREA ON BRIDGE

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1" = 20'-0" Date: July 18, 2012

SHEET No. T6 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	7	137



Reference elevation - Mean sea Level

Reference:
ControlPoint Surveying topographic map dated 02/23/2010

A
T7|T7
TOPOGRAPHIC MAP OF AREA BELOW EXISTING BRIDGE
SCALE: 1" = 10'-0"

GRAPHIC SCALES:
0' 5' 10' 20' 30'
1"=10'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTEBOOK	DESIGNED BY	
NO.	QUANTITIES BY	
	CHECKED BY	

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.
LICENSE EXPIRES 4/30/14
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TOPOGRAPHIC MAP OF AREA BELOW BRIDGE

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1" = 10'-0" Date: July 18, 2012

SHEET No. T7 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	16	137

GENERAL NOTES

1. The scope of work for this project consists of rehabilitation of Uma'uma Stream bridge along Hawaii Belt Road, including bridge widening, new concrete piers, approach roads, earthwork, guardrails, signs, and striping.
2. All construction work is to be constructed in accordance with the publications "Hawaii Standard Specifications for Road and Bridge Construction, 2005" and its amendments.
3. The Contractors attention is directed to the following Sections of the Special Provisions: Subsection 107.06 - Contractor Duty Regarding Public Convenience; Subsection 107.12 - Protection of Persons and Property; and Section 645 - Work Zone Traffice Control.
4. The existence and location of underground utilities, manholes, monuments and structures as shown on the plans are from the latest available data but the accuracy is not guaranteed. The encountering of other obstacles during the course of work is possible. The Contractor shall be held liable for any damages incurred to the existing facilities and/or improvements as a result of his operations.
5. The exact locations of limits or areas to be reconstructed shall be determined in the field by the Engineer.
6. The Contractor shall notify the Engineer in writing, two (2) weeks prior to starting paving operations.
7. Smooth riding connections shall be constructed at all limits of resurfacing, including the beginning and end of project, connecting approaches, side streets and driveways as shown on the plans and/or as directed by the Engineer.
8. The Contractor shall provide for access to and from all existing driveways at all times.
9. All saw cutting work shall be considered incidental to Roadway Excavation.
10. No section of incomplete guardrail, footing, and/or excavation shall be left unshielded at the end of each work day.
11. All construction signs shall be left in place until all construction items have been completed. Contractor shall obtain prior approval from the Engineer to remove construction signs.
12. The Contractor shall exercise care to minimize damages to existing highway improvements. All damages shall be repaired by the Contractor, at his expense, to the satisfaction of the District Engineer.
13. For Benchmark, see sheet C-12.

GRADING NOTES

1. All grading work shall conform to Chapter 10 of the Hawaii County Code and the Soils Report by Hirata & Associates, dated April 28, 2011.
2. The Contractor, at his expense, shall keep the project and surrounding areas free from dust nuisances. The work shall be in conformance with the Air Pollution Control Rules of the State Department of Health, HAR 11-60. 1, fugitive dust.
3. The Contractor shall remove all silt and debris deposited in drainage facilities, roadways, and other areas resulting from his work. The costs incurred for any necessary remedial action by the Department of Public Works shall be payable by the Contractor.
4. All grading operations shall be performed in conformance with the applicable Provisions of the Hawai'i Administrative Rules, Title II, Chapter 55, Water Pollution Control Rules of the State Department of Public Works, County of Hawai'i.
5. The Contractor shall sod or plant all slopes and exposed areas immediately after the grading work has been completed. Grassing shall be in accordance with the Standard Specifications for Public Works Construction, dated September 1986, as applicable to the County of Hawaii. Payment shall be incidental to the various items of the proposal.
6. Fills on slopes steeper than 5:1 shall be keyed.
7. The Contractor shall inform the Department of Public Works of the location of the disposal and/or borrow site(s) required for this project when an application for a grading permit is made. The disposal and/or borrow site(s) must also fulfill the requirements of the Grading Ordinance.
8. No grading work shall be done on Saturdays, Sundays, holidays, and furlough days anytime without prior approval from the Department of Public Works. Grading work on normal working days shall be between the hours of 8:00 a.m. to 4:30 p.m.
9. Fills shall be compacted to 90 percent (90%) of maximum density per ASTM D1557 test.
10. The Contractor shall remove all vegetation before placing fills on natural ground surface.
11. No material and/or equipment shall be stockpiled or otherwise stored within the highway right-of-way, except at locations designated in writing and approved by the District Engineer.

HISTORICAL PRESERVATION NOTES

1. Should historic remains such as artifacts, burials, concentrations of shell or charcoal be encountered during construction activities, work shall cease immediately in the immediate vicinity of the find. The Contractor shall immediately notify the Planning Department (808) 961-8288 and State Historic Preservation Division at (808) 933-7650, which will assess the significance of the find and recommend the appropriate mitigation measures, if necessary.

WILLIAM H. Q. BOW
LICENSED PROFESSIONAL ENGINEER
NO. 4904-C
HAWAII USA

LICENSE EXPIRES: 4/30/12
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL NOTES

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. C-1 OF 19 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	17	137

WATER POLLUTION AND EROSION CONTROL NOTES:

A. GENERAL:

1. See Section 209 - Temporary Water Pollution, Dust, and Erosion Control. Section 209 describes but is not limited to: submittal requirements; scheduling of a waterpollution and erosion control conference with the Engineer; construction requirements; method of measurement; and basis of payment.

2. Effective October 1, 2008, follow the guidelines in the "Construction Best Management Practices Field Manual", dated January 2008 in developing, installing and maintaining the Best Management Practices (BMP) for the project.

3. Follow the guidelines in the Honolulu's City and County "Rules Relating to Soil Erosion Standards and Guidelines" along with applicable Soil Erosion Guidelines for projects on Maui, Molokai, Kauai, and Hawaii.

4. The Engineer may assess liquidated damages of up to $27,500 for non-compliance of each BMP requirement and each requirement stated in Section 209, for every day of non-compliance. There is no maximum limit on the amount assessed per day.

5. The Engineer will deduct the cost from the progress payment for all citations received by the Department for non-compliance, or the Contractor shall reimburse the State for the full amount of the outstanding cost incurred by the State.

6. For projects that require an NPDES Permit from the Department of Health, install a rain gage prior to any field work including the installation of any site-specific best management practices. The rain gage shall have a tolerance of at least 0.05 inches of rainfall, and have an opening of at least one-inch in diameter. Install the rain gage on the project site in an area that will not deter rainfall from entering the gage opening. The rain gage installation shall be stable and plumbed. Do not begin field work until the rain gage is installed and site-specific best management practices are in-place.

B. WASTE DISPOSAL:

1. Waste Materials

   Collect and store all waste materials in a securely lidded metal dumpster. The dumpster shall meet all local and State solid waste management regulations. Deposit all trash and construction debris from the site in the dumpster. Empty the dumpster a minimum of twice per week or as often as is deemed necessary. Do not bury construction waste materials onsite. The Contractor's supervisory personnel shall be instructed regarding the correct procedure for waste disposal. Post notices stating these practices in the office trailer and the Contractor shall be responsible for seeing that these procedures are followed.

2. Hazardous Waste

   Dispose all hazardous waste materials in the manner specified by local or State regulations and by the manufacturer. The Contractor's site personnel shall be instructed in these practices and shall be responsible for seeing that these practices are followed.

3. Sanitary Waste

   Collect all sanitary waste from the portable units a minimum of once per week, or as required.

C. EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES:

1. Inspect all control measures at least once each week and within 24 hours of any rainfall event of 0.5 inches or greater within a 24 hour period.

2. Maintain all measures in good working order. If repair is necessary, it shall be initiated within 24 hours after the inspection.

3. Remove built-up sediment from silt fence when it has reached one-third the height of the fence.

4. Inspect silt screen or fence for depth of sediment, tears, to verify that the fabric is securely attached to the fence posts or concrete slab, and to verify that the fence posts are firmly in the ground. Inspect and verify the bottom of the silt screen is buried a minimum of 6 inches below the existing ground.

5. Inspect temporary and permanent seeding and planting for bare spots, washouts, and healthy growth.

6. Make a maintenance inspection report promptly after each inspection. Submit a copy to the Engineer no later than one week from the date of the inspection.

7. Provide a stabilized construction entrance to reduce vehicle tracking of sediments. Include stabilized construction entrance in the Water Pollution, Dust, and Erosion Control submittals. Minimum length should be 50 feet. Minimum width should be 30 feet. Minimum depth should be 12 inches or as recommended by the soils engineer and underlain with geo-textile fabric. Clean the paved street adjacent to the site entrance daily or as required to remove any excess mud, cold planed materials, dirt, or rock tracked from the site. Cover dump trucks hauling material from the construction site with a tarpaulin.

8. Include designated Concrete Washout Area(s) in the Water Pollution, Dust, and Erosion Control submittals.

9. Submit the name of a specific individual designated responsible for inspections, maintenance and repair activities and filling out the inspection and maintenance report.

10. Personnel selected for the inspection and maintenance responsibilities shall receive training from the Contractor. They shall be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

11. Contain, remove, and dispose slurry generated from saw cutting of pavement in accordance with approved BMP practices. Payment for confinement, removal, and disposal of slurry shall be considered incidental to the various contract items.

D. GOOD HOUSEKEEPING BEST MANAGEMENT PRACTICES:

1. Materials Pollution Prevention Plan

   a. Applicable materials or substances listed below are expected to be present onsite during construction. Other materials and substances not listed below shall be added to the inventory.

Concrete	Fertilizers
Detergents	Petroleum Based Products
Paints (enamel and latex)	Cleaning Solvents
Metal Studs	Wood
Tar	Masonry Block

   b. Use Material Management Practices to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff. Make an effort to store only enough product as is required to do the job.
   c. Store all materials stored onsite in a neat, orderly manner in their appropriate containers and if possible under a roof or other enclosure.
   d. Keep products in their original containers with the original manufacturer's label.
   e. Do not mix substances with one another unless recommended by the manufacturer.
   f. Whenever possible, use a product up completely before disposing of the container.
   g. Follow manufacturer's recommendations for proper use and disposal.
   h. Conduct a daily inspection to ensure proper use and disposal of materials onsite.

2. Hazardous Material Pollution Prevention Plan

   a. Keep products in original containers unless they are not resealable.
   b. Retain original labels and material safety data sheets (MSDS).
   c. Dispose of surplus products according to manufacturer's instructions and local and State regulations.

WILLIAM H. Q. BOW
LICENSED PROFESSIONAL ENGINEER
NO. 4904-C
HAWAII, USA

LICENSE EXPIRES: 4/30/12
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER POLLUTION AND EROSION CONTROL NOTES

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. C-2 OF 19 SHEETS

3. Onsite and Offsite Product Specific Plan
The following product specific practices shall be followed onsite:
   a. Petroleum Based Products:
   Monitor all onsite vehicles for leaks and perform regular preventive maintenance to reduce the chance of leakage. Store petroleum products in tightly sealed containers which are clearly labeled. Apply asphalt substances used onsite according to the manufacturer's recommendation.
   b. Fertilizers:
   Apply fertilizers used only in the minimum amounts recommended by the manufacturer. Once applied, work fertilizer into the soil to limit exposure to storm water. Storage shall be in a covered shed. Transfer the contents of any partially used bags of fertilizer to a sealable plastic bin to avoid spills.
   c. Paints:
   Seal and store all containers when not required for use. Do not discharge excess paint to the highway drainage system. Dispose properly according to manufacturer's instructions or State and local regulations.
   d. Concrete Trucks:
   Wash out or discharge concrete truck drum wash water only at a designated site. Do not discharge water in the highway drainage system or waters of the United States. Contact Drinking Water Branch, Department of Health at 586-4258 to receive permission to designate a disposal site. Clean disposal site as required or as requested by the Owner's representative.

4. Spill Control Plan
   a. Post a spill prevention plan to include measures to prevent and clean up each spill.
   b. The Contractor shall be the spill prevention and cleanup coordinator. Designate at least three site personnel who shall receive spill prevention and cleanup training. These individuals shall each become responsible for a particular phase of prevention and cleanup. Post the names of responsible spill personnel in the material storage area and in the office trailer onsite.
   c. Clearly post manufacturers' recommended methods for spill cleanup. Make site personnel aware of the procedures and the location of the information and cleanup supplies.
   d. Keep materials and equipment necessary for spill cleanup in the material storage area onsite.
   e. Clean up all spills immediately after discovery.
   f. Keep the spill area well ventilated. Personnel shall wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
   g. Report spills of toxic hazardous material to the appropriate State or local government agency, regardless of the size.

E. Permit Requirements:
   1. If a National Pollutant Discharge Elimination System (NPDES) Permit is required for construction activities of one acre or more, submit to the Engineer six sets of the Water Pollution and Erosion Control submittals as detailed in Subsection 209.03 of the specifications.

   2. If an NPDES Permit for Construction Dewatering is required, the Contractor shall be responsible to obtain the Permit from the Department of Health, Clean Water Branch.

   3. Comply with all applicable State and Federal Permit conditions. Permits may include but are not limited to the following:

      a. Section 401 Water Quality Certification
      b. Stream Channel Alteration Permit
      c. Section 404 Army Corps of Engineer Permit

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

WILLIAM H. Q. BOW
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NO. 4904-C
HAWAII, USA

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

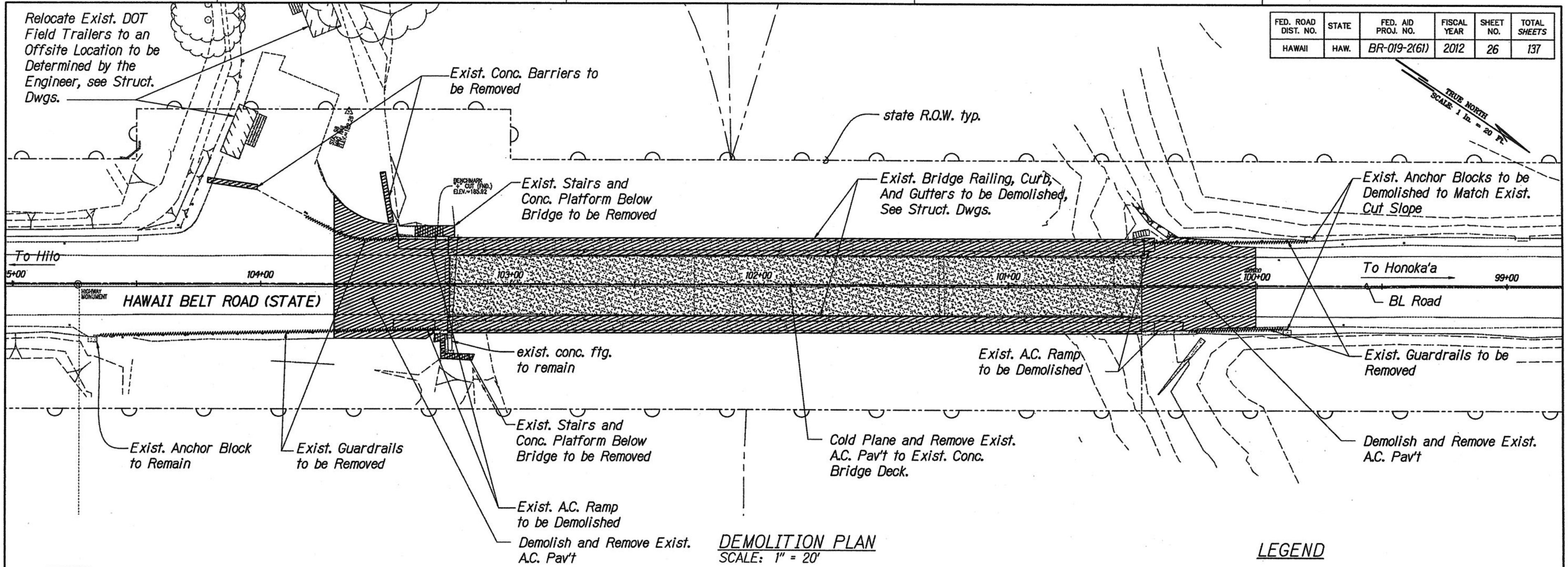
WATER POLLUTION AND EROSION CONTROL NOTES

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None   Date: July 18, 2012

SHEET No. C-3 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	26	137



DEMOLITION PLAN

SCALE: 1" = 20'

NOTE:

1. Contractor to Coordinate Phasing of Bridge Demolition Work With Structural Sheet S15.1
2. Contractor to Provide Temporary A.C. Transitions Between Cold Planing Phases to Provide a Smooth Riding Transition for Vehicles.

LEGEND

Demolish Guardrail

Demolish Pavement/Structure

GRAPHIC SCALE:

20 10 0 20 40

1" = 20'

WILLIAM H. Q. BOW
LICENSED PROFESSIONAL ENGINEER
NO. 4904-C
HAWAII USA

LICENSE EXPIRES: 4/30/12
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

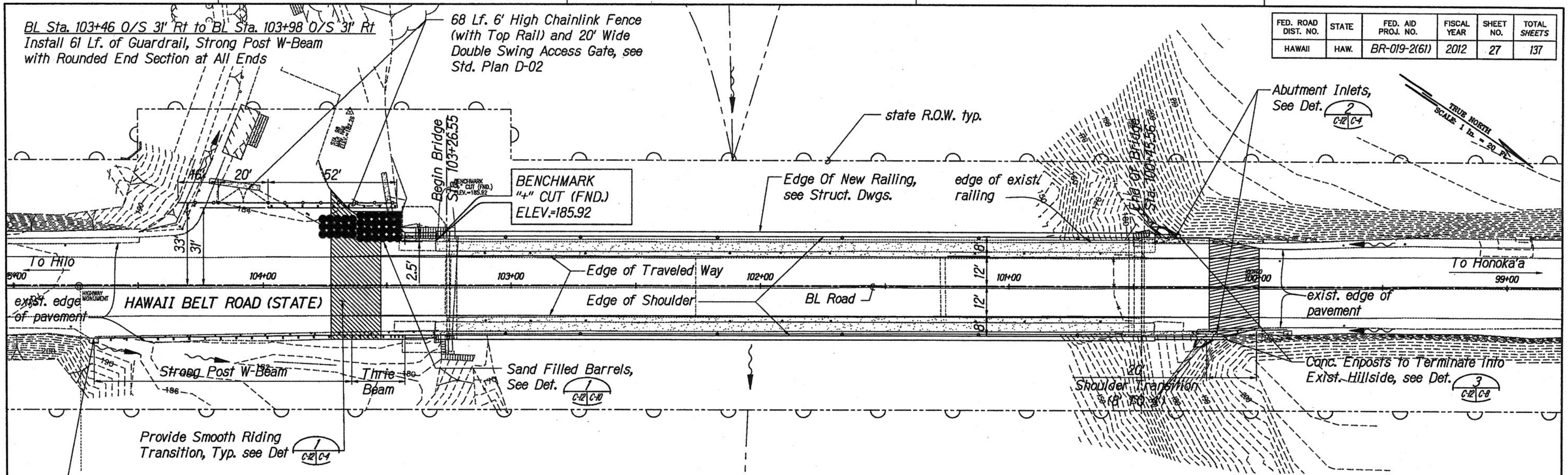
DEMOLITION PLAN

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1" = 20'   Date: July 18, 2012

SHEET No. C-11 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	27	137



SITE PLAN
SCALE: 1" = 20'

GRAPHIC SCALE:
20 10 0 20 40
1" = 20'

WILLIAM H. Q. BOW — LICENSED PROFESSIONAL ENGINEER — NO. 4904-C — HAWAII USA
LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

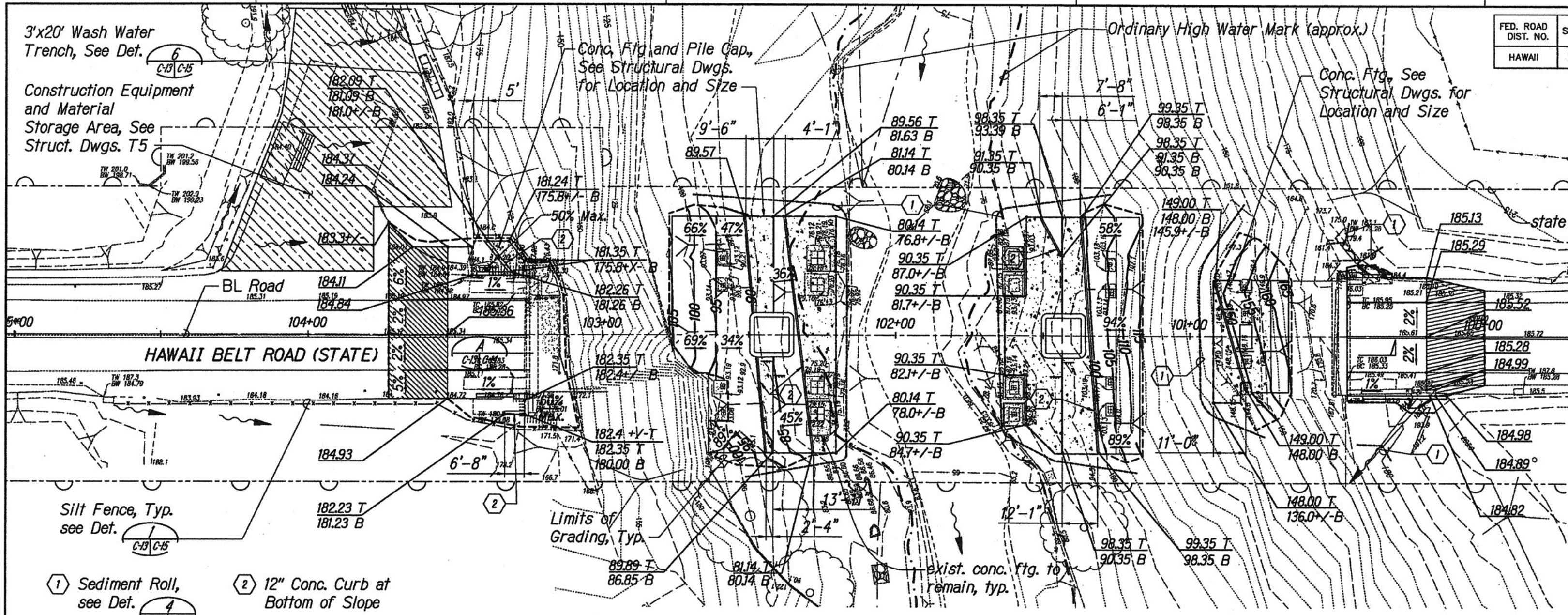
SITE PLAN

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1" = 20'   Date: July 18, 2012

SHEET No. C-12 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	28	137



LEGEND

- Silt Fence
- Limits of Clearing, Grubbing, & Grading
- Sediment Roll
- Drainage Pattern
- 80 Finish Contour
- Ordinary High Water Mark (approx.)

GRADING AND EROSION CONTROL PLAN

SCALE: 1" = 20'

Site Specific Best Management Practices Notes:

1. Refer to Sht. C-2 and C-3 for general "Water Pollution and Erosion Control Notes".
2. All work shall be done in such a way as to isolate all work from the stream so that no material removed or replaced during the construction process will fall into or reach the stream.
3. The contractor shall install a rain gage prior to any field work including the installation of any site-specific best management practices. The rain gage shall have a tolerance of at least 0.05 inches of rainfall, and have an opening of at least one-inch in diameter. Install the rain gage on the project site in an area that will not deter rainfall from entering the gage opening. The rain gage installation shall be stable and plumbed. Do not begin field work until the rain gage is installed and site-specific best management practices are in-place.
4. Work within Ordinary High Water Mark (OHWM) as shown on the grading plans:
   a. The work shall be conducted in the dry season or when any affected stream has minimal or no flow, to the extent practicable. The work shall be discontinued during flooding, intense rainfall, storm surge, or high surf conditions where runoff and turbidity cannot be controlled.
   b. The contractor shall install a stream gage in line with the upstream edge of the proposed footings. The gage shall be closely monitored by designated personnel or by an automated alarm system. In the event that the stream elevation reaches 72 feet above mean sea level (MSL) or the stream depth rises more than 1 foot in 30 minutes all work shall be discontinued and personnel, loose construction materials, and equipment shall be relocated to higher ground (minimum of 10 feet above the OHWM) until the stream levels have subsided to the acceptable level. The above BMP represents a minimum measure and the contractor shall improve upon it as necessary to ensure personnel safety and minimize potential for pollutant and debris discharge to the stream.
   c. The contractor shall closely monitor the site rain gage. All work shall be discontinued and personnel/loose construction materials and equipment shall be relocated to higher ground (minimum of 10 feet above the OHWM) during intense rainfall of 0.5 inches or greater within a 24 hour period.
   d. The contractor shall check with the National Weather Service to keep abreast of approaching severe weather in order to take appropriate precautionary measures to secure the project site.
   e. At the end of each work day all loose construction material and equipment shall be relocated to higher ground (minimum of 10 feet above the OHWM).
   f. All footing form braces shall be constructed within the footing limits and shall not be located on the stream side of the forms. The contractor shall design the forms to withstand stream flow forces resulting from a 1-year recurrence interval storm which is estimated to have a stream flow elevation of 79.5 MSL at the upstream edge of the proposed footings and a stream flow velocity of 35 feet per second.
5. No project-related materials (fill, revetment rock, pipe etc.) shall be stockpiled within the stream banks.
6. No fueling of project-related vehicles and equipment shall take place within the stream banks.
7. The contractor shall not allow personnel or equipment to enter or cross the wetted portions of the stream bed.
8. Dewatering effluent shall not be discharged to the stream or any other tributary that will discharge to a stream, pond, or the ocean. Every effort should be made to allow ground water or storm water to naturally percolate into the ground. In the event that dewatering activities are absolutely necessary, dewatering effluent shall be hauled and disposed of at South Hilo Sanitary Landfill.
9. During work being performed above the stream banks and/or stream (e.g. chipping, removal of concrete or iron, painting, concrete pouring, etc.) netting, filter cloth, or similar materials shall be suspended below the work area in such a fashion as to capture any falling debris and prevent contamination of the stream and/or stream banks.
10. Refer to Special Provisions for information on lead removal and testing.

GRAPHIC SCALE: 20 10 0 20 40 — 1" = 20'

WILLIAM H. Q. BOW — LICENSED PROFESSIONAL ENGINEER — NO. 4904-C — HAWAII, USA

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GRADING AND EROSION CONTROL PLAN

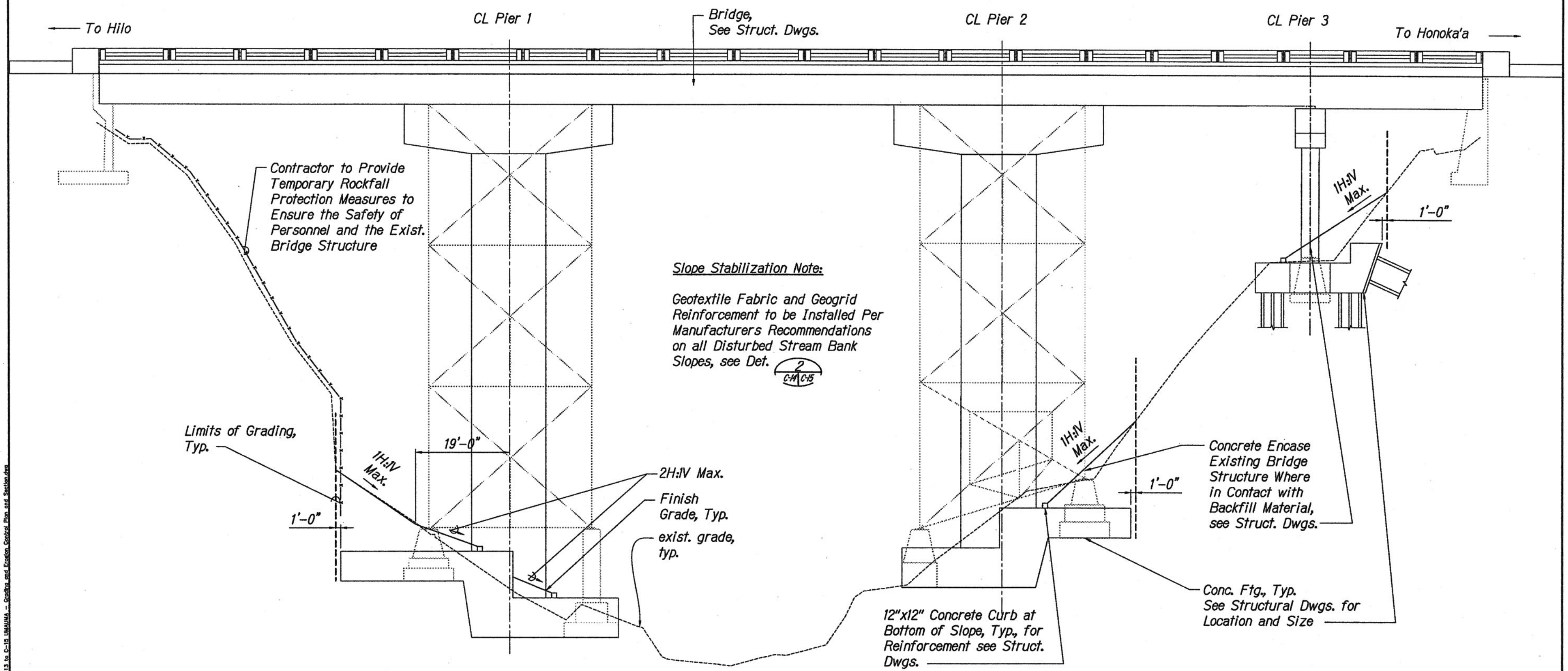
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1" = 20' Date: July 18, 2012

SHEET No. C-13 OF 19 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	29	137



To Hilo
CL Pier 1
Bridge, See Struct. Dwgs.
CL Pier 2
CL Pier 3
To Honoka'a
Contractor to Provide Temporary Rockfall Protection Measures to Ensure the Safety of Personnel and the Exist. Bridge Structure
Slope Stabilization Note:
Geotextile Fabric and Geogrid Reinforcement to be Installed Per Manufacturers Recommendations on all Disturbed Stream Bank Slopes, see Det. 2 C-14 C-15
1H:1V Max.
1'-0"
Limits of Grading, Typ.
19'-0"
2H:1V Max.
Finish Grade, Typ.
exist. grade, typ.
Concrete Encase Existing Bridge Structure Where in Contact with Backfill Material, see Struct. Dwgs.
Conc. Ftg., Typ. See Structural Dwgs. for Location and Size
12"x12" Concrete Curb at Bottom of Slope, Typ., for Reinforcement see Struct. Dwgs.

A C-13 C-14 SECTION
Not To Scale

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

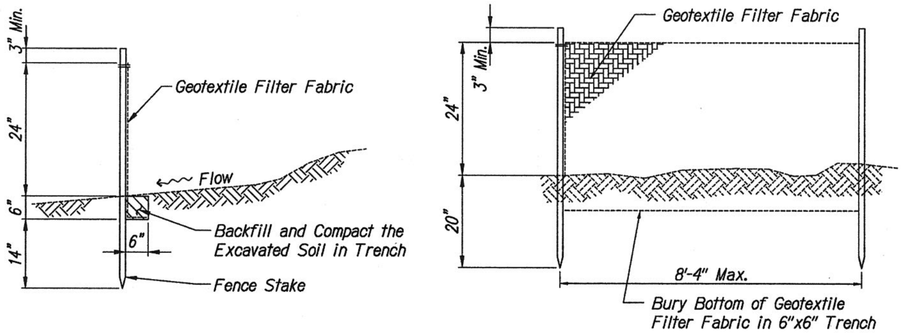
SECTION

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

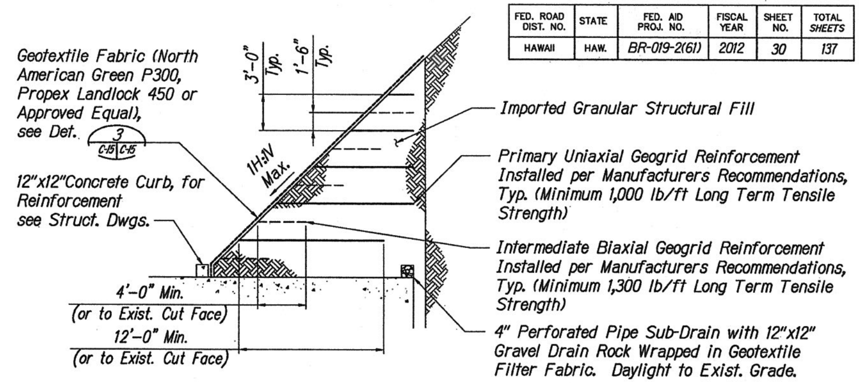
Scale: None Date: July 18, 2012

SHEET No. C-14 OF 19 SHEETS

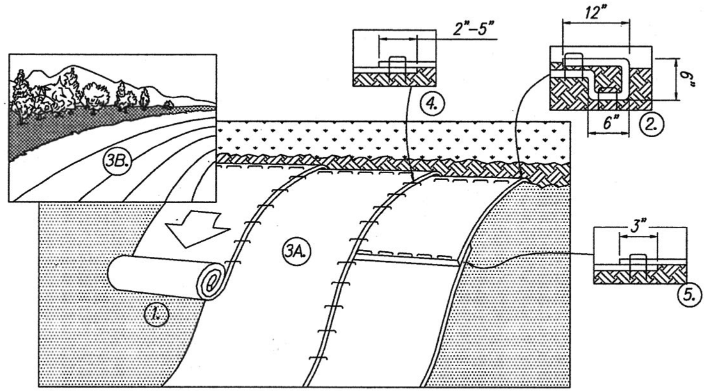
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	30	137



1 C-13 C-15 TYPICAL SILT FENCE DETAIL
Not To Scale

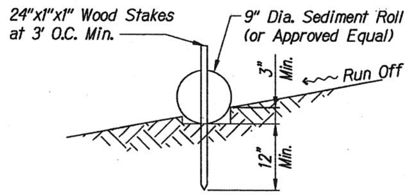


2 C-14 C-15 TYPICAL SLOPE STABILIZATION DETAIL
NOT TO SCALE



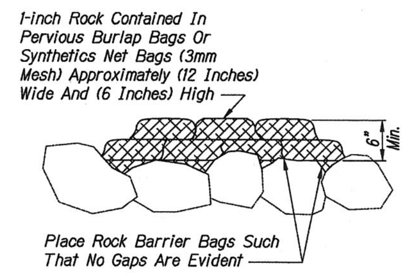
1. Prepare Soil Before Installing Rolled Erosion Control Products (Recp's), Including Any Necessary Application Of Lime, Fertilizer, And Seed.
2. Begin At The Top Of The Slope By Anchoring The Recp's In A 6" Deep X 6" Wide Trench With Approximately 12" (30cm) Of Recp's Extended Beyond The Up-slope Portion Of The Trench. Anchor The Recp's With A Row Of Staples/stakes Approximately 12" Apart In The Bottom Of The Trench. Backfill And Compact The Trench After Stapling. Apply Seed To Compacted Soil And Fold Remaining 12" Portion Of Recp's Back Over Seed And Compacted Soil. Secure Recp's Over Compacted Soil With A Row Of Staples/stakes Spaced Approximately 12" Apart Across The Width Of The Recp's.
3. Roll The Recp's (a.) Down Or (b.) Horizontally Across The Slope. Recp's Will Unroll With Appropriate Side Against The Soil Surface. All Recp's Must Be Securely Fastened To Soil Surface By Placing Staples/stakes In Appropriate Locations As Shown In The Staple Pattern Guide. When Using The Dot System, Staples/stakes Should Be Placed Through Each Of The Colored Dots Corresponding To The Appropriate Staple Pattern.
4. The Edges Of Parallel Recp's Must Be Stapled With Approximately 2" - 5" Overlap Depending On Recp's Type.
5. Consecutive Recp's Spliced Down The Slope Must Be Placed End Over End (shingle Style) With An Approximate 3" Overlap. Staple Through Overlapped Area, Approximately 12" Apart Across Entire Recp's Width. Note: *in Loose Soil Conditions, The Use Of Staple Or Stake Lengths Greater Than 6". May Be Necessary To Properly Secure The Recp's.

3 C-14, C-15 C-15 GEOTEXTILE FABRIC INSTALLATION DETAIL
NOT TO SCALE

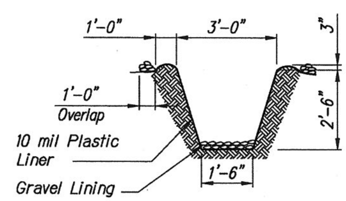


NOTE:
If the site topography does not allow for bottom of sediment roll to be continuously installed 3" below adjacent grade, contractor shall use rock barrier bags per detail 5 C-15 C-15

4 C-13 C-15 SEDIMENT ROLL DETAIL
Not To Scale



5 C-15 C-15 ROCK BARRIER BAG DETAIL
Not To Scale



6 C-13 C-15 WASH WATER TRENCH DETAIL
Not To Scale

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EROSION CONTROL DETAILS

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

WILLIAM H. G. BOW LICENSED PROFESSIONAL ENGINEER NO. 4904-C HAWAII USA

Scale: None Date: July 18, 2012

SHEET No. C-15 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	35	137

GENERAL

1. All materials shall conform to the drawings, Hawaii Standard Specifications for Road and Bridge Construction (2005 Edition) and Special Provisions.
2. The Contractor shall verify the location of all existing utility lines and notify the respective owners before commencing the work of excavation or the drilling of the micropile and/or drilled shaft foundation, including any temporary piling or sheeting.
3. Standard detail drawings refer to all structures in general except for modifications as may be required for special conditions. For such modifications refer to corresponding detailed drawings.
4. The Contractor shall provide all measures necessary to protect the structure during construction. Such measures shall include, but not be limited to, bracing, shoring for loads due to construction equipment, winds, seismic, etc.
5. The Contractor shall be solely responsible for all excavation and dewatering procedures including lagging, shoring and protection of streets, highways and utilities, including treatment and discharge of pumped water. For other dewatering notes, refer to site specific BMP notes on civil sheet C-13.
6. The Contractor shall be solely responsible for coordinating the work of all trades and shall check all dimensions for existing and new construction. All discrepancies shall be called to the attention of the Engineer and be resolved before proceeding with the work.
7. Shop drawings required by the standard specifications and special provisions shall be submitted to the Engineer for review prior to fabrication or ordering of materials.

SPECIAL NOTE

Should there be any conflict between Plans (drawings), Special Provisions and Standard Specifications, the most stringent requirement shall govern.

CONCRETE

1. Schedule of structural concrete 28-day strength and types:

Bridge Railings and Endposts	4,000 PSI
Bridge Deck Slabs	5,000 PSI w/ 0.40 max w/c ratio
Approach Slabs	5,000 PSI
Abutment Walls and Wingwalls	4,000 PSI, Unless Otherwise Noted
Abutment Foundations (Pile Caps)	5,000 PSI
Pier Foundations (Footings, Pile Caps, and Grade Beams)	6,000 PSI w/ 0.40 max w/c ratio
Pier Columns and Caps	6,000 PSI w/ 0.40 max w/c ratio
Other Elements	4,000 PSI
Micropiles - See sheet S3.1	
Drilled Shafts - See sheet S3.3	

Notes:

a. Maximum cement content shall be 800 Lbs. per cubic yard.

b. Color of concrete for pier columns and pier caps shall be standard concrete gray.

c. Corrosion inhibitors shall be provided at manufacturer's recommended dosage. See special provisions.

d. Shrinkage reducing admixture shall be provided in concrete for bridge deck slabs, railings and endposts. See special provisions for type and dosage.

e. Maximum size of coarse aggregate shall be 3/4 inch for Pier #3 column, cap and grade beams.

2. Concrete mixes shall be submitted to the Engineer for review.
3. Clear coverage of concrete over outer reinforcing bars shall be as follows, unless otherwise noted.

Bridge Railings and Endposts	2"
Bridge Deck Slabs	2" to top steel 2" to bottom steel
Approach Slabs	2-1/2" to top steel 3" to bottom steel
Abutment Walls and Wingwalls	2"
Pier Caps	2-1/2"
Pier Columns (above ordinary high-water)	2-1/2"
Pier Columns (below ordinary high-water)	3"
Pier Column Base	3"
Spread Footings	3"
Pile Caps and Grade Beams	3"
Cast-In-Place Micropiles	See Sheet S3.1
Cast-In-Place Drilled Shafts	3-1/2"
Cast directly against earth	3"

Note:
For bridge deck slabs, placement tolerance on concrete cover shall be as follows:

Top Bars:	+0" and -3/8"
Bot Bars:	+0" and -1/4"

For other elements, see standard specifications.

4. Concrete admixtures containing chloride salts shall not be used.
5. All intentionally roughened surfaces in concrete shall be made with a minimum amplitude of 1/4" and shall be clean before pouring adjacent concrete.
6. Nonshrinking grout shall have a minimum compressive strength of 5,000 PSI at 28 days, and shall be nonmetallic and nonstaining.
7. Unless otherwise noted on drawings, all exterior corners and re-entrant angles 90 degrees or less in concrete work shall be chamfered 3/4"x3/4".

REINFORCING STEEL

1. Reinforcing steel bars shall be ASTM A615 Grade 60, unless otherwise noted. Where noted on drawings, reinforcing steel bars shall be ASTM A706, Grade 60.
2. Reinforcing steel bars shall be uncoated, unless otherwise noted. Where noted on drawings, reinforcing steel shall be stainless steel conforming to ASTM A955.
3. Reinforcing steel splices shall be located only where indicated on the drawings.
4. Lap splice length for reinforcing steel shall be as indicated on drawings. Where not indicated, minimum splice length shall be 52 bar diameters or 2'-4", whichever is longer.
5. All reinforcing steel bars, anchor bolts, dowels and other embedded items shall be securely tied in place before concrete pour.
6. All reinforcing steel bar bends shall be made cold.
7. Reinforcing steel shall be detailed in accordance with the AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, Fifth Edition, 2010, including Interim revisions, unless otherwise noted.
8. Welding of reinforcing steel shall not be permitted unless otherwise shown on the drawings. Welding of reinforcing steel shall conform to AWS D1.4-05 "AWS Structural Welding Code - Reinforcing Steel" of the American Welding Society.

STRUCTURAL STEEL

1. All structural steel shall conform to AASHTO M270 (ASTM A709), Grade 50, unless otherwise noted.
2. Unless otherwise noted, all structural steel shall be hot dip zinc coated after fabrication. Steel plate girders shall be sand-blasted to SSPC SP-10 and shop primed with an organic epoxy zinc rich primer, intermediate coated with epoxy paint, and top coated with polyurethane paint. All holes shall be prepunched before shop priming and coating steel. Touch-up paint steel in field. All structural steel shall be painted. Color shall be black.
3. All anchor bolts, threaded rods and other hardware, including nuts and washers, which connect steel to concrete shall be high-strength bolts conforming to ASTM F 1554, Grade 105, unless otherwise noted. All hardware shall be hot dip zinc coated.
4. All bolts which connect steel to steel shall be high-strength bolts conforming to ASTM A325, Type 1, unless otherwise noted. Provide direct tension indicator washers for all high-strength bolts. All bolts, nuts and washers shall be hot dip zinc coated.
5. All welds shall be in conformity with the structural welding code AWS D1.1-08 of the American Welding Society. Electrodes shall be E70.
6. Field welding to existing steel shall not be permitted unless specifically shown or noted on drawings. See standard specifications and special provisions for pre-heat and other requirements.

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | NOTEBOOK | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL STRUCTURAL NOTES

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. S0.1 OF 4 SHEETS

DESIGN CRITERIA

AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, Fifth Edition, 2010, including Interim revisions.

DESIGN LOADS

1. Dead Loads:
   - A. An allowance of 25 PSF (from curb-to-curb) for A.C. wearing surface has been provided for in the design.
   - B. An allowance of 150 PLF (at each side of the bridge) for future utilities has been provided for in the design.
2. Live Load: HL-93 Design Truck or Design Tandem, and Design Lane Load
3. Wind: Base Design Wind Velocity = 105 MPH
4. Earthquake:
   - A. Horizontal Peak Ground Acceleration, PGA = 45%
   - B. Horizontal Spectral Acceleration Coefficients
     S_S = 95%
     S_1 = 40%
   - C. Seismic Zone = 4
   - D. Soil Site Class = C
   - E. Operational Classification = Essential Bridge
5. Traffic Railing Test Level = TL-4

CONSTRUCTION NOTES

1. See Standard Specifications and Special Provisions.
2. All items noted as incidental will not be paid for separately.
3. In general, top of concrete deck slab shall be constructed to follow the slopes shown on the drawings.
4. Except as otherwise noted, all vertical dimensions are measured plumb.
5. Contractor shall field verify all dimensions.
6. For concrete finish, see Standard Specifications, and for architectural treatment of columns, see details.
7. Construction joints shown on the drawings may be relocated or additional ones added, subject to the approval of the Engineer.
8. Where new concrete is poured against existing concrete, existing interface surface shall be cleaned and intentionally roughened to a minimum amplitude of 1/4".
9. New bridge rail shall be installed after new widened bridge deck structure is cast and cured 14 days minimum, and all shoring is removed.
10. Contractor shall follow "Construction Phasing Sheet" as shown on sheet S15.1.
11. Contractor shall submit detailed 3-week work schedules to the Engineer. See Standard Specifications.
12. For falsework or temporary shoring, Contractor shall refer to the current version of the AASHTO "Guide Specification for Temporary Works" and the "Construction Handbook for Bridge Temporary Works", including interim revisions.

FOUNDATION NOTES

1. Foundation design is based on a geotechnical investigation by Hirata and Associates, Inc., "Foundation Investigation Umauma Stream Bridge Rehabilitation Route 19, M.P. 16.02, North Hilo, Hawaii." dated April 28, 2011.
2. Unless otherwise indicated, refer to special provisions and Standard Specifications for foundation preparation, compaction requirements, and other requirements.
3. Unless otherwise noted, spread footings shall be excavated and poured neat against undisturbed ground. In case of over excavation, space between footing and ground shall be filled with concrete at the Contractor's expense and as directed by the Engineer. The minimum quality of the fill concrete shall be Class D. For spread footings bearing on rock (hard basalt), see sheet S5.1.
4. Soil Design Parameters

   a. New Pier #1 and Pier #2

Soil Bearing Pressures:	
Service Limit State	= 10,000 PSF
Strength Limit State	= 13,000 PSF
Extreme Event Limit State	= 30,000 PSF
Coefficient of Friction:	
Strength Limit State	= 0.60
Extreme Event Limit State	= 0.70
Passive Earth Pressure:	
Strength Limit State	= 400 PCF
Extreme Event Limit State	= 800 PCF

   b. New Pier #3

Micropiles, see sheet	S3.1
Ground Anchors, see sheet	S5.12

   c. Abutments (Existing and New Widened Sections)

Soil Bearing Pressures:	
Service Limit State	= 4,000 PSF
Strength Limit State	= 6,000 PSF
Extreme Event Limit State	= 13,000 PSF
Coefficient of Friction:	
Strength Limit State	= 0.45
Extreme Event Limit State	= 0.53
Passive Earth Pressure:	
Strength Limit State	= 220 PCF
Extreme Event Limit State	= 440 PCF
Active Earth Pressure:	
Free-Standing, Level Backfill	= 40 PCF
Restrained, Level Backfill	= 55 PCF
Dynamic Lateral Earth Force	= 22 x H squared
Drilled Shafts:	see sheet S3.3

   d. Approach Slabs

Soil Bearing Pressures:	
Service Limit State	= 4,000 PSF
Strength Limit State	= 6,000 PSF

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	36	137

GENERAL NOTES FOR EPOXY GROUTED DOWELS & BOLTS

1. See Special Provisions and Standard Specifications Section 656 for reinforcing steel dowels.
2. Contractor shall locate existing reinforcing prior to drilling holes for new epoxy grouted reinforcing steel dowels and steel anchor bolts. Do not damage existing reinforcing.
3. Epoxy grout for reinforcing steel dowels and steel anchor bolts shall conform to Standards Specifications Section 712.04(B).
4. Clean holes of all dust and residue before filling holes with epoxy grout.
5. Where noted on drawings, installation of epoxy grout and reinforcing dowels and steel anchor bolts shall be inspected by the Engineer.
6. After epoxy grout has cured, dowels shall be pull-tested as directed by the Engineer.
7. Epoxy grouted reinforcing steel dowels shall be incidental to Section 602 reinforcing steel and will not be paid for separately.
8. Epoxy grouted steel anchor bolts shall be incidental to Section 501 Steel Structures and will not be paid for separately.
9. All drilled holes shall be cleaned, filled with epoxy, and reinforcing dowels and anchor bolts installed prior to end of work day.

INSPECTION REQUIREMENTS

1. Contractor shall refer to Standard Specifications Section 105.11 - "Inspection of the Work and Materials."
2. The work items that will require inspection by the Engineer shall be, but not be limited to, the following items:
   - a. Reinforcing steel
   - b. Concrete
   - c. Epoxy grouted reinforcing dowels and steel anchor bolts
   - d. Anchor bolts cast-in concrete
   - e. High-strength bolting
   - f. Field welding

   Contractor shall notify the Engineer at least 7 working days prior to the above inspections.

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HIGHWAYS DIVISION

GENERAL STRUCTURAL NOTES (CONTINUATION)

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. S0.2 OF 4 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	37	137

PAINTING OF EXISTING STEEL TRESTLES

Portions of existing steel trestles (or towers and bents) that are not embedded in new concrete structure shall be clean and painted. For details, see sheet S17.1.

EXISTING STEEL ENCASED IN NEW STRUCTURES

Portion of existing structural steel to be encased in new concrete structures shall be blast cleaned, coated with 2 coats of epoxy, and cured prior to pouring concrete. This work shall be incidental to Section 503 - "Concrete Structures".

ABBREVIATIONS:

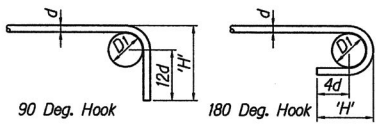
℄	And
A.B.	Anchor Bolt
Abut.	Abutment
A.C.	Asphalt Concrete
Approx.	Approximate
Ave.	Average
BL	Baseline
Blk.	Block
Bm	Beam
BOF	Bottom of Footing
Bot., (B)	Bottom
Brg.	Bearing
Bw	Bottom of Wall
c.c.	Center to Center
CL	Centerline
Clr.	Clear
Col.	Column
Conc.	Concrete
Conn.	Connection
Const. Jt.	Construction Joint
Cont.	Continuous
C.P.	Complete Penetration
Dbl.	Double
Deg.	Degrees
Demo	Demolish
Det.	Detail
Dia	Diameter
Dwg	Drawing

ABBREVIATIONS (CONTINUE):

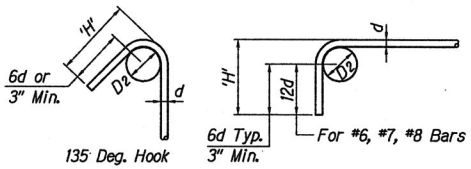
Ea.	Each
E.F.	Each Face
El, Elev.	Elevation
Eq.	Equal
Est.	Estimated
E.W.	Each Way
Exist.	Existing
Exp.	Expansion
Ext.	Exterior
Fin.	Finish
Fin. Gr.	Finish Grade
Ft.	Feet, Foot
Ftg.	Footing
Galv	Galvanized
Hk.	Hook
Horiz., (H)	Horizontal
H.S.	High Strength
ID	Inside Diameter
in.	Inch
Int.	Interior
Jt.	Joint
L.F.	Linear Foot (Feet)
Lg.	Long
Longit.	Longitudinal
Max.	Maximum
Min.	Minimum
No.	Number
N.T.S.	Not to Scale
O.C.	On Center
Opn'g	Opening
Opp.	Opposite
Pavt.	Pavement
Ped.	Pedestal
PL	Plate
Qty.	Quantity
Ref.	Reference
Reinf	Reinforcing

ABBREVIATIONS (CONTINUE):

Std.	Standard
Sht.	Sheet
Sim.	Similar
SL	Slope
Spc.	Spacing
Sta.	Station
Stiff.	Stiffener
Stl.	Steel
Struct.	Structural
Symm.	Symmetrical
T℄B	Top and Bottom
Thk.	Thick
TOC	Top of Cap
TOF	Top of Footing
(T)	Top
Tw	Top of Wall
Typ.	Typical
UON	Unless Otherwise Noted
Vert., (V)	Vertical
w/	With
WP	Working Point



PRINCIPAL REINFORCING



TIE OR STIRRUP

Notes:

1. All bends shall be made cold.
2. #14 ℄ #18 bars shall be bend-tested and approved prior to bending.
3. Bar bend dimension (hook length) where shown on drawings shall govern if dimension is greater than shown in table.

HOOK LENGTHS (H) (IN INCHES), UON

Bar Size	Standard Hooks		Stirrup or Tie Hook			
	90 Deg. Hook	180 Deg. Hook	90 Deg. Hook	135 Deg. Hook	D2	D1
#3	6	4	3-1/2	4	1-1/2	2-1/4
#4	8	4-1/2	4-1/2	4-1/2	2	3
#5	10	5	5-1/2	5-1/2	2-1/2	3-3/4
#6	12	6	12	7-1/2	4-1/2	4-1/2
#7	14	7	14	9	5-1/4	5-1/2
#8	16	8	16	10	6	6
#9	19	10	-	-	-	9
#10	22	11-1/2	-	-	-	10
#11	24	13	-	-	-	11-1/4
#14	31	-	-	-	-	18-1/4
#18	41	-	-	-	-	24

REINFORCING STEEL BAR BENDS ℄ HOOKS

NOT TO SCALE

ORIGINAL PLAN | NOTEBOOK No. | SURVEY PLOTTED BY | DRAWN BY | CHECKED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

LICENSE EXPIRES: 4/30/14
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL STRUCTURAL NOTES
(CONT.) LEGEND ℄ ABBREVIATIONS

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. S0.3 OF 4 SHEETS

ESTIMATED QUANTITIES (STRUCTURAL)			
ITEM NO.	ITEM	QUANTITY	UNIT
202.1000	Removal of existing bridge railings, endposts and sidewalks, portion of existing deck slabs and deck drains, portion of existing abutments, wingwalls, fins, parapets and brackets, existing wood stairs and concrete stair on grade, and lead based paint	L.S.	L.S.
202.2000	Relocate existing DOT trailer and field house	L.S.	L.S.
205.1000	Structure excavation for abutments and wingwalls	L.S.	L.S.
205.2000	Structure excavation for Piers #1, #2, and #3	L.S.	L.S.
205.3000	Shoring, bracing and/or underpinning of existing bridge foundations	L.S.	L.S.
205.4000	Structure backfill for abutments and wingwalls	L.S.	L.S.
205.5000	Structure backfill for Piers #1, #2, and #3	L.S.	L.S.
212.1000	Probing and grouting at Pier #1 and Pier #2	460	L.F.
501.1000	Structural steel - welded plate girders (primed and painted)	L.S.	L.S.
501.2000	Structural steel - bracing and other members (zinc hot dip galvanized and painted)	L.S.	L.S.
501.3000	Structural steel - longitudinal strut, bumper and strut/bumper (zinc hot-dip galvanized and painted)	L.S.	L.S.
503.1000	Concrete in bridge deck slab widening	L.S.	L.S.
503.2000	Concrete in pier columns and caps - Piers #1, #2, and #3	L.S.	L.S.
503.3000	Concrete in abutments and wingwalls	L.S.	L.S.
503.4000	Concrete in abutment foundations (pile caps)	L.S.	L.S.
503.5000	Concrete in pier foundations (footings and pile caps)	L.S.	L.S.
503.6000	Concrete in approach slabs behind abutments	L.S.	L.S.
503.7000	Concrete in bridge deck new and existing - joint seals	L.S.	L.S.
506.1000	Bearing and expansion plates under new and existing steel plate girders (including new anchor bolts)	L.S.	L.S.
507.1000	Concrete traffic railing and endposts	L.S.	L.S.
511.1000	Furnishing drilled shaft drilling equipment	L.S.	L.S.
511.2000	Furnishing instrumentation and collecting data	L.S.	L.S.
511.3000	Drilled shafts	330	L.F.
511.4000	Standard excavation	330	L.F.
512.1000	Furnishing micropile drilling and grouting equipment	L.S.	L.S.
512.2000	Preproduction micropile load tests	L.S.	L.S.
512.3000	Production micropiles - uncased length of micropile	720	L.F.
512.4000	Production micropiles - cased length of micropile	800	L.F.
602.1000	Reinforcing steel for bridge (except foundations)	L.S.	L.S.
602.2000	Reinforcing steel for foundations	L.S.	L.S.
604.1000	Steel frame and hatch cover in concrete pier column	L.S.	L.S.
628.1000	Shotcrete for Pier #3 ground anchors	L.S.	L.S.
654.1000	Longitudinal cable restrainer	L.S.	L.S.
670.1000	Draped wire mesh	180	S.Y.
681.1000	Furnishing specialty equipment for ground anchors	L.S.	L.S.
681.2000	Ground anchors for Pier #3	10	Ea.
681.3000	Reinstallation of ground anchors due to grout loss and additional performance tests or proof tests	F.A.	F.A.
694.1001	Repair to structural steel members - type 1	20	Ea.
694.1002	Repair to structural steel members - type 2	500	Ea.
694.1003	Repair to structural steel members - type 3	100	Ea.
694.1004	Repair to structural steel members - type 4	100	Ea.
694.1005	Repair to structural steel members - type 5	1,000	L.F.
694.1006	Repair to structural steel members - type 6	1,000	L.F.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	38	137

ESTIMATED QUANTITIES (STRUCTURAL)			
ITEM NO.	ITEM	QUANTITY	UNIT
694.2000	Clean and paint existing steel towers and bents	L.S.	L.S.
694.3000	Clean and paint existing steel superstructure	L.S.	L.S.
695.1000	Certified industrial hygienist	F.A.	F.A.
695.2000	Industrial hygienist technician	F.A.	F.A.
696.1000	Field office trailer (not to exceed $100,000.00)	L.S.	L.S.
696.2000	Maintenance of trailers	F.A.	F.A.

ORIGINAL PLAN
NOTEBOOK No.
SURVEY PLOTTED BY
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QUANTITIES BY
CHECKED BY
DATE

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5478-S
HAWAII, U.S.A.

LICENSE EXPIRES: 4/30/14
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ESTIMATED QUANTITIES (STRUCTURAL)

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. S0.4 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	39	137

EXISTING & DEMOLITION GENERAL NOTES

1. See general structural notes on sheet S0.1, S0.2 and S0.3 for additional information.
2. Existing bridge occurs over a deep valley with steep sloped terrain on both sides. There are no existing access roads below the bridge. Refer to topographic map on sheet T7 and elevation view of bridge on sheet S1.4.
3. Existing bridge must remain open to traffic during the construction period.
4. Demolition work shall be coordinated with construction of new work. See construction phasing on sheet S15.1. Contractor shall submit proposed schedule and sequence of demolition work for Engineer's review prior to commencing with demolition work.
5. Existing conditions are shown on the drawings to the best of our knowledge. Dimensions and member sizes where shown on the drawings are based on available as-built bridge plans. Existing dimensions shown may not be exact and are provided for information only. Contractor shall field verify all existing dimensions prior to construction. All discrepancies shall be promptly called to the attention of the Engineer and shall be resolved prior to proceeding with the demolition work.
6. As-built plans of the existing bridge are available for review from the State of Hawaii Department of Transportation, Highways Division, Design Branch, Kakuhihewa Building Room 609, 601 Kamokila Boulevard, Kapolei, Hawaii 96707, Phone no. 808-692-7586.
7. Protect from damage existing structures to remain. Protect from damage and clean existing reinforcing steel to be incorporated in new concrete work. See Standard Specifications Section 202 "Removal of Structures and Obstructions".
8. Where existing reinforcing steel is not required to be incorporated in new concrete work, cut ends of reinforcing steel shall be recessed 1-1/2" minimum below existing concrete surface. Resulting pockets in existing concrete shall be filled with non-shrink grout. This work shall be incidental to Section 202 "Removal of Structures and Obstructions".

HAZARDOUS MATERIALS NOTES

1. Portions of existing bridge structure are known to contain lead-based paint. Portions of existing grade around existing pedestal footings are known to contain lead impacted soil. Contractor shall refer to the report prepared by Bureau Veritas North America, Inc. and entitled "Hazardous Materials Assessment with Soil and Sediment Sampling and Analysis, Rehabilitation of Umauma Stream Bridge, Hawaii Belt Road, Route 19, District of North Hilo, Island of Hawaii", dated April 16, 2010.
2. Refer to Special Provisions Section 695 "Lead in Construction" for removal and disposal of lead in construction.
3. Removal and disposal of lead-based paint on existing concrete structures shall be paid for under Section 202 "Removal of Structures and Obstructions".
4. Remediation of lead-impacted soil shall be paid for under Section 205 "Excavation and Backfill for Bridge and Retaining Structures".

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QUANTITIES BY
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DATE

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

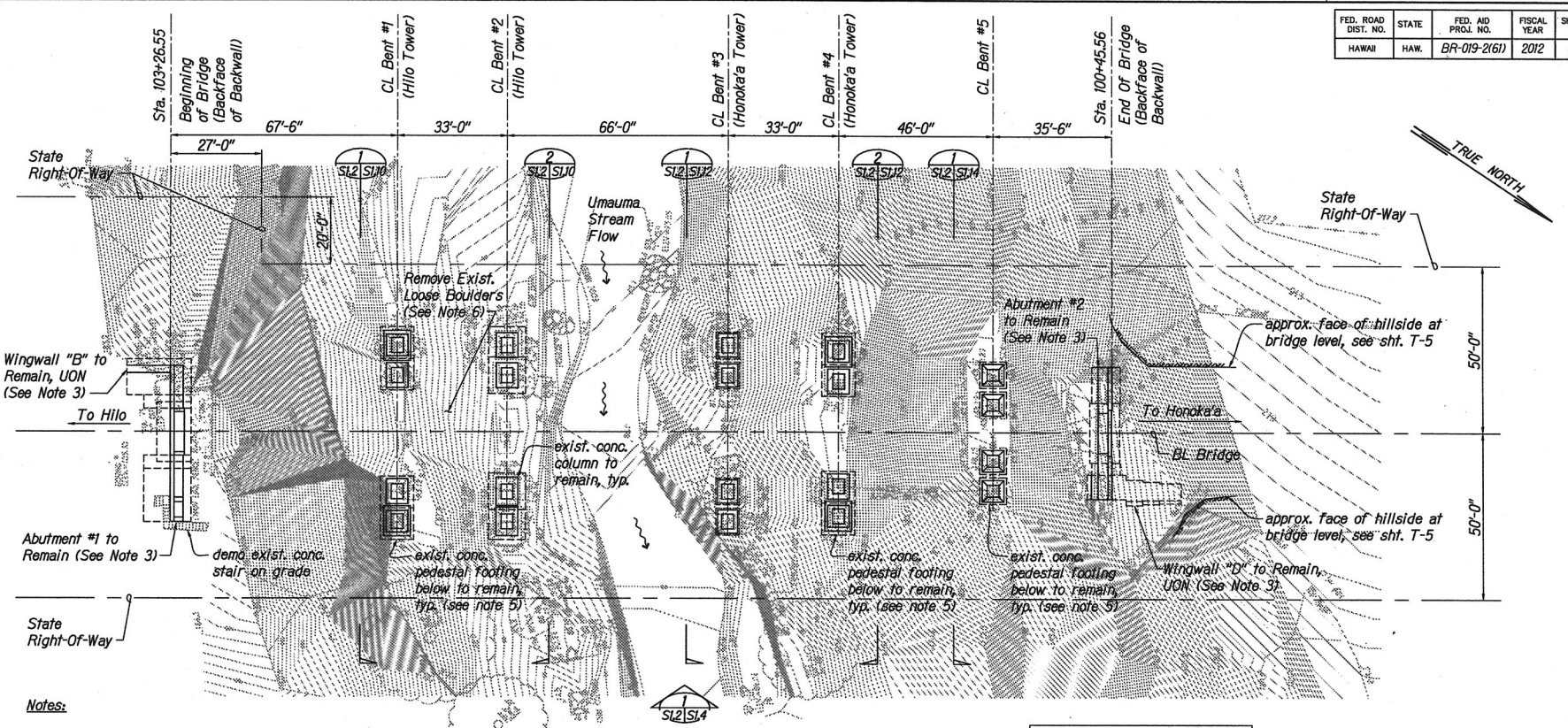
EXISTING & DEMOLITION GENERAL NOTES

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. S1.1 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	40	137



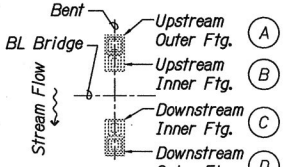
A S1.2 | S1.2 EXISTING FOUNDATION PLAN
SCALE: 1/16" = 1'-0"

Notes:

1. Contractor shall field verify existing dimensions and conditions.
2. All work shall be contained within State Right-Of-Way.
3. For existing and demolition plans and details of abutment #1 and wingwall "B", see sheets S1.6 and S1.7. For existing and demolition plans and details of abutment #2 and wingwall "D", see sheets S1.8 and S1.9.
4. For existing elevations of towers and bents, see sheets S1.10 to S1.14.
5. Abate and dispose of lead impacted soil around existing pedestal footings. See Hazardous Materials notes on sheet S1.1.
6. Use extreme caution when removing loose boulders. Do not damage existing footings, pedestals, columns and steel structures. Do not undermine existing footings.
7. For construction phasing, see sheet S15.1.
8. Work within ordinary high-water mark shall be conducted during "dry season" or during minimal stream flow. See civil sheet C-13.
9. Refer to Site Specific BMP Notes on sheet C-13.

Note:
For dimensions not shown, see elevations and enlarged plans.

Legend:



GRAPHIC SCALES:

0 1'2"4' 8' 16' 32'
1/16"=1'-0"

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING & DEMOLITION PLAN - FOUNDATION LEVEL

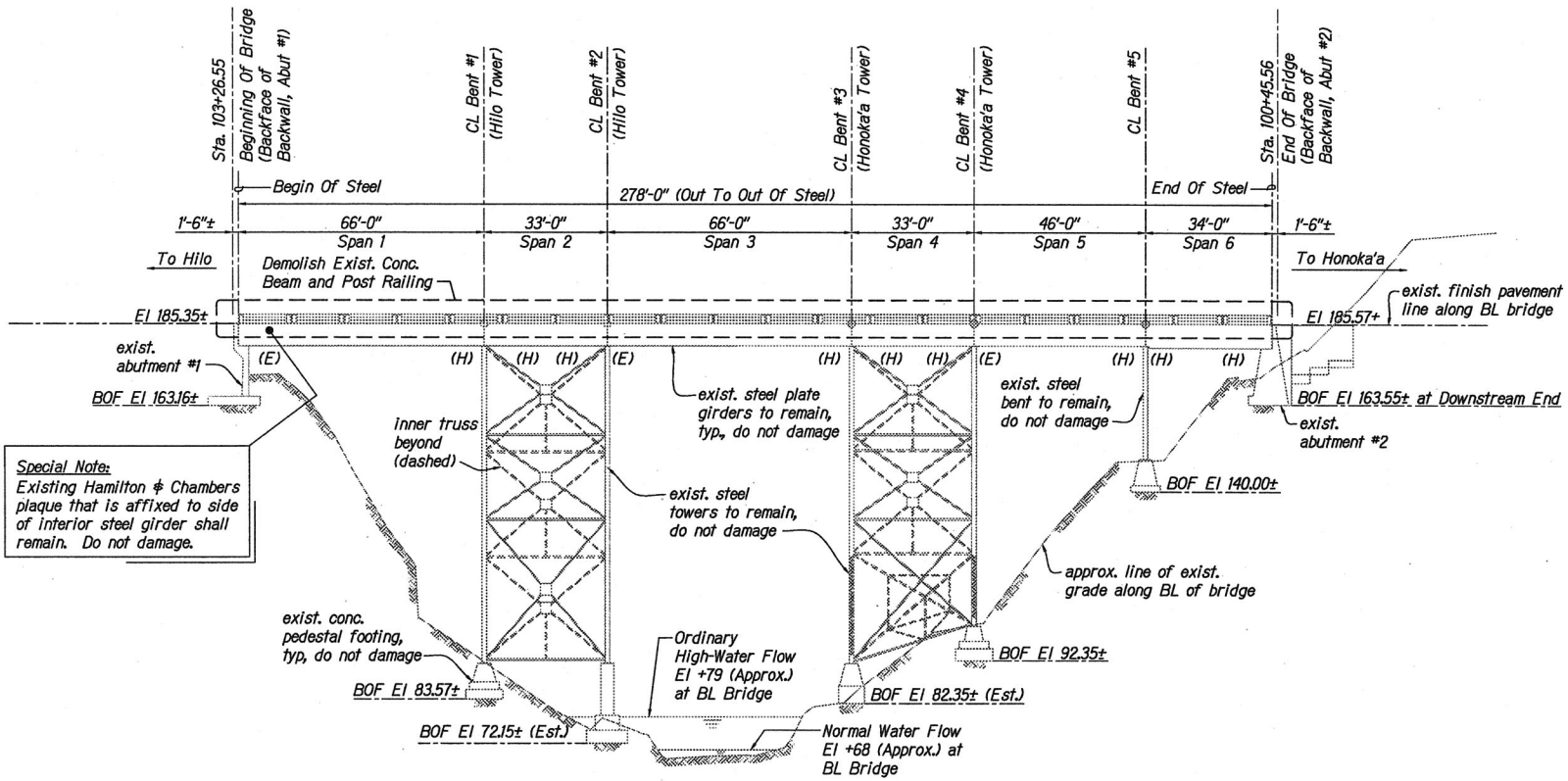
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/16" = 1'-0" Date: July 18, 2012

SHEET No. S1.2 OF 14 SHEETS

ORIGINAL PLAN | NOTEBOOK | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	42	137



Special Note:
Existing Hamilton & Chambers plaque that is affixed to side of interior steel girder shall remain. Do not damage.

1 EXISTING & DEMOLITION - EAST/DOWNSTREAM ELEVATION (WEST/UPSTREAM SIMILAR)

S1.2, S1.3, S1.4 SCALE: 1/16" = 1'-0"

Notes:

1. *All elevations denoted as "±" were estimated from as-built bridge drawings. Contractor shall field verify these elevations where applicable.*
2. *For construction phasing, see sheet S15.1.*
3. *Work within ordinary high-water mark shall be conducted during "dry season" or during minimal stream flow. See civil sheet C-13.*

Legend:

(E) = Expansion Bearing
(H) = Hinge Bearing

GRAPHIC SCALES:

0 1'2'4' 8' 16' 32'
1/16"=1'-0"

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

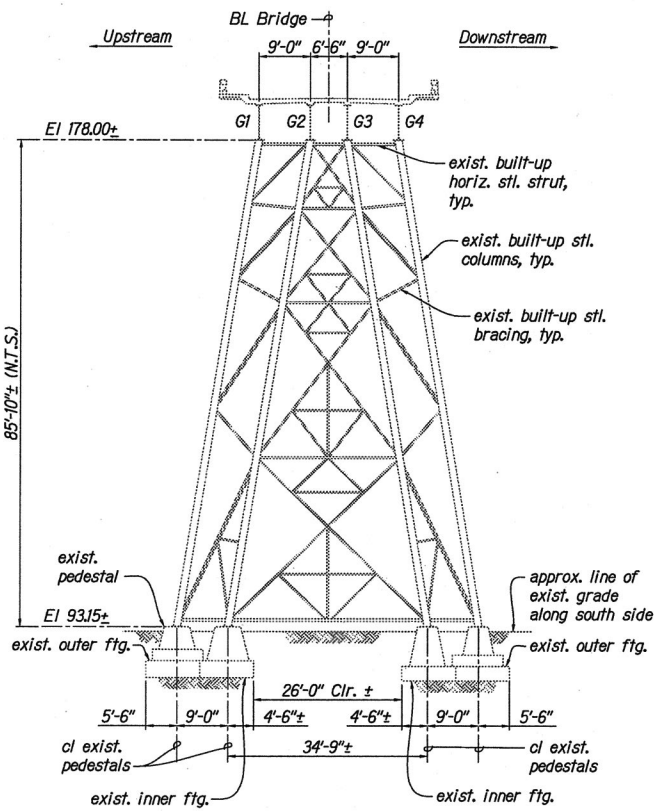
EXISTING & DEMOLITION - EAST (OR DOWNSTREAM) ELEVATION

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

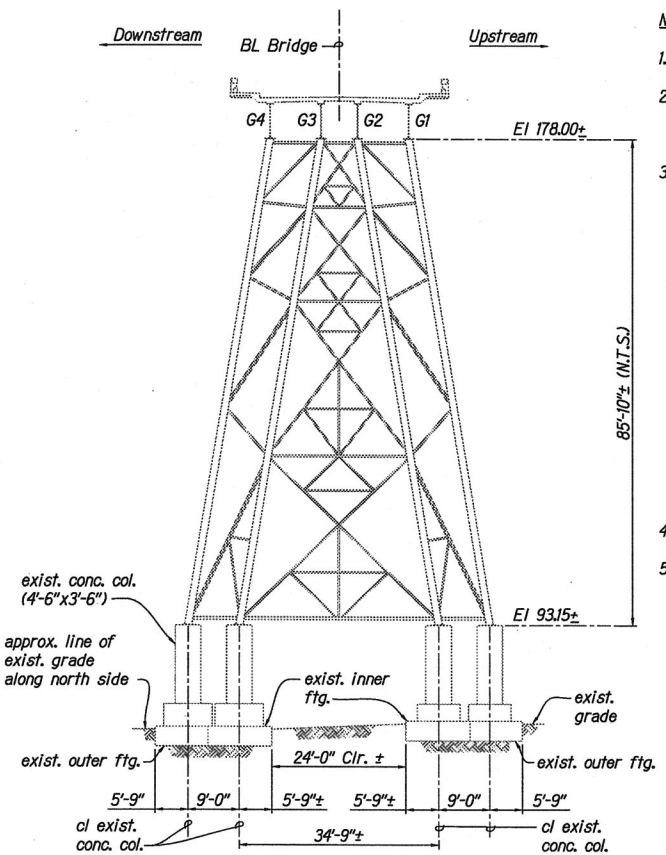
Scale: 1/16" = 1'-0" Date: July 18, 2012

SHEET No. S1.4 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	48	137



1 S1.2 ∉ S1.10 | S1.10 BENT #1 - SOUTH ELEVATION
SCALE: 3/32" = 1'-0"



2 S1.2 ∉ S1.10 | S1.10 BENT #2 - NORTH ELEVATION
SCALE: 3/32" = 1'-0"

EXISTING HILO TOWER BENT ELEVATIONS

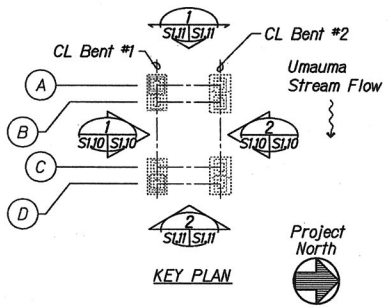
Notes:

1. See existing and demolition general notes on sheet S1.1.
2. Existing tower and foundation structures shall remain. Contractor shall protect existing structure from damage at all times during construction period.
3.

ESTIMATED FOUNDATION GRAVITY LOADS (KIPS)				
	BENT #1		BENT #2	
	DEAD	LIVE	DEAD	LIVE
OUTER FOOTINGS:	200	80	300	80
INNER FOOTINGS:	180	80	250	80

Estimated foundation gravity loads are shown for bidder's information only. Contractor shall retain a Hawaii licensed structural engineer to verify the foundation loads. Loads shall be per AASHTO LRFD Bridge Design Specifications and the "Design Criteria for Bridges and Structures", October 20, 2010, State of Hawaii, Department of Transportation, Highways Division, including subsequent revisions.

4. Refer to new pier foundation special notes on sheet S5.1.
5. Existing steel pipe structures attached to side of steel columns not shown. Contractor shall field verify as-built condition as necessary.



KEY PLAN

GRAPHIC SCALES:

0 1' 2' 4' 8' 16' 32'
3/32"=1'-0"

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING ELEVATION AT HILO TOWER - BENT #1 ∉ BENT #2

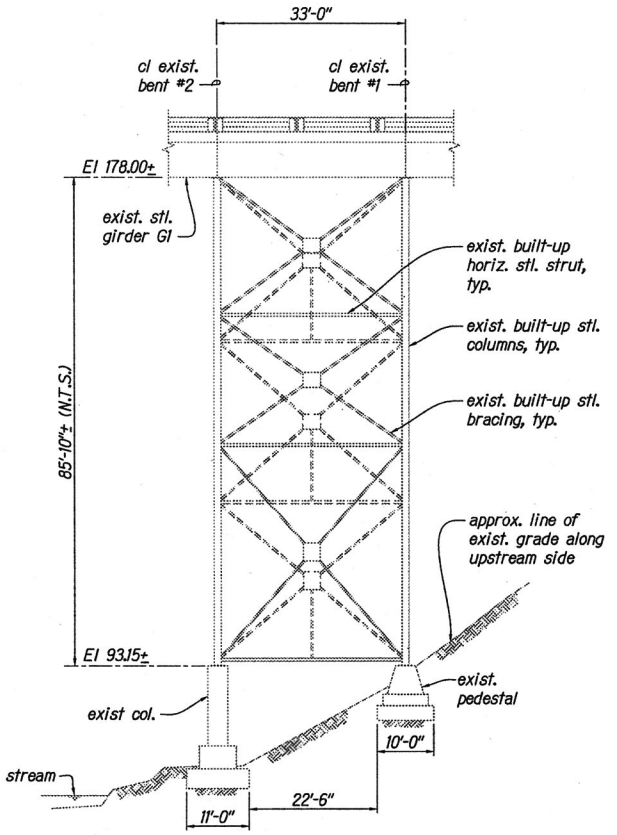
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 3/32" = 1'-0" Date: July 18, 2012

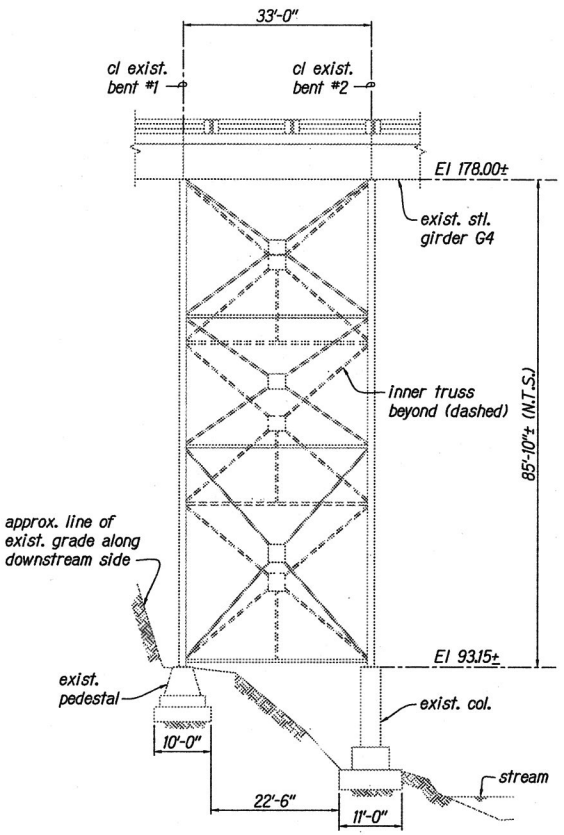
SHEET No. S1.10 OF 14 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	49	137



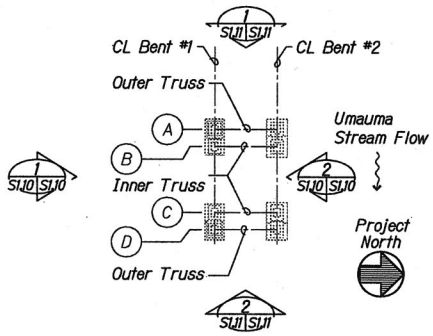
1 S1.11 | S1.11 WEST/UPSTREAM ELEVATION
SCALE: 3/32" = 1'-0"



2 S1.11 | S1.11 EAST/DOWNSTREAM ELEVATION
SCALE: 3/32" = 1'-0"

Notes:

1. See existing and demolition general notes on sheet S1.1.
2. Existing tower and foundation structures shall remain. Contractor shall protect from damage at all times during construction period.
3. For estimated foundation gravity loads, see sheet S1.10.
4. Refer to new pier foundation special notes on sheet S5.1.
5. Existing steel pipe structures attached to steel columns not shown. Contractor shall field verify as-built condition as necessary.



EXISTING HILO TOWER TRUSS ELEVATIONS

GRAPHIC SCALES:

0 1' 2' 4' 8' 16' 32'
3/32"=1'-0"

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING ELEVATION AT HILO TOWER - TRUSSES BETWEEN BENTS

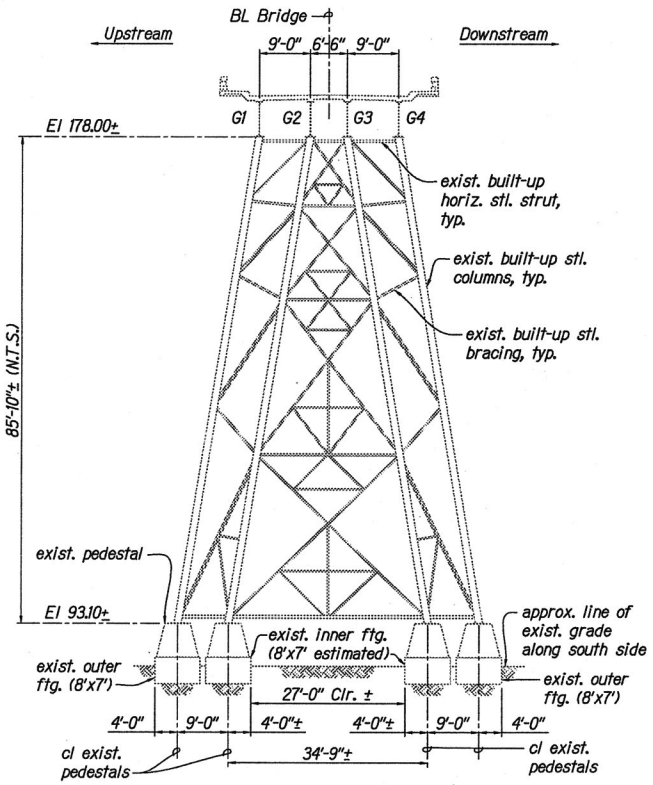
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 3/32" = 1'-0" Date: July 18, 2012

SHEET No. S1.11 OF 14 SHEETS

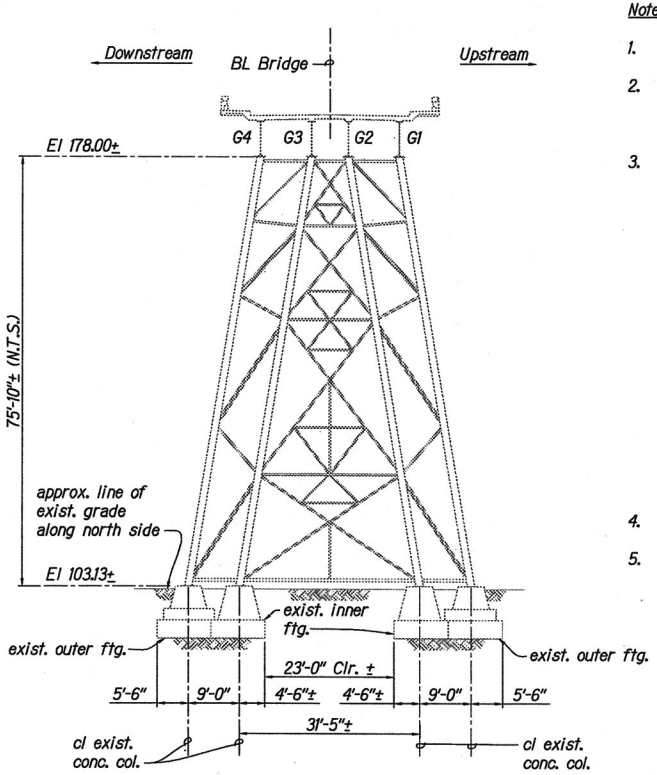
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | NOTEBOOK | QUANTITIES BY | CHECKED BY | DATE | No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	50	137



1 S1.2 ⊄ S1.12 | S1.12 BENT #3 - SOUTH ELEVATION

SCALE: 3/32" = 1'-0"



2 S1.2 ⊄ S1.12 | S1.12 BENT #4 - NORTH ELEVATION

SCALE: 3/32" = 1'-0"

EXISTING HONOKA'A TOWER BENT ELEVATIONS

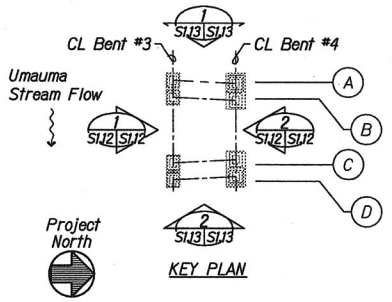
Notes:

1. *See existing and demolition general notes on sheet S1.1.*
2. *Existing tower and foundation structures shall remain. Contractor shall protect existing structure from damage at all times during construction period.*
3.

ESTIMATED FOUNDATION GRAVITY LOADS (KIPS)				
	BENT #3		BENT #4	
	DEAD	LIVE	DEAD	LIVE
OUTER FOOTINGS:	200	80	180	70
INNER FOOTINGS:	180	80	160	70

Estimated foundation gravity loads are shown for bidder's information only. Contractor shall retain a Hawaii licensed structural engineer to verify the foundation loads. Loads shall be per AASHTO LRFD Bridge Design Specifications and the "Design Criteria for Bridges and Structures", October 20, 2010, State of Hawaii, Department of Transportation, Highways Division, including subsequent revisions.

4. *Refer to new pier foundation special notes on sheet S5.1.*
5. *Existing steel pipe structures attached to side of steel columns not shown. Contractor shall field verify as-built condition as necessary.*



KEY PLAN

GRAPHIC SCALES:

0 1' 2' 4' 8' 16' 32'

3/32"=1'-0"

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

LICENSE EXPIRES: 4/30/14

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING ELEVATION AT HONOKA'A TOWER - BENT #3 & BENT #4

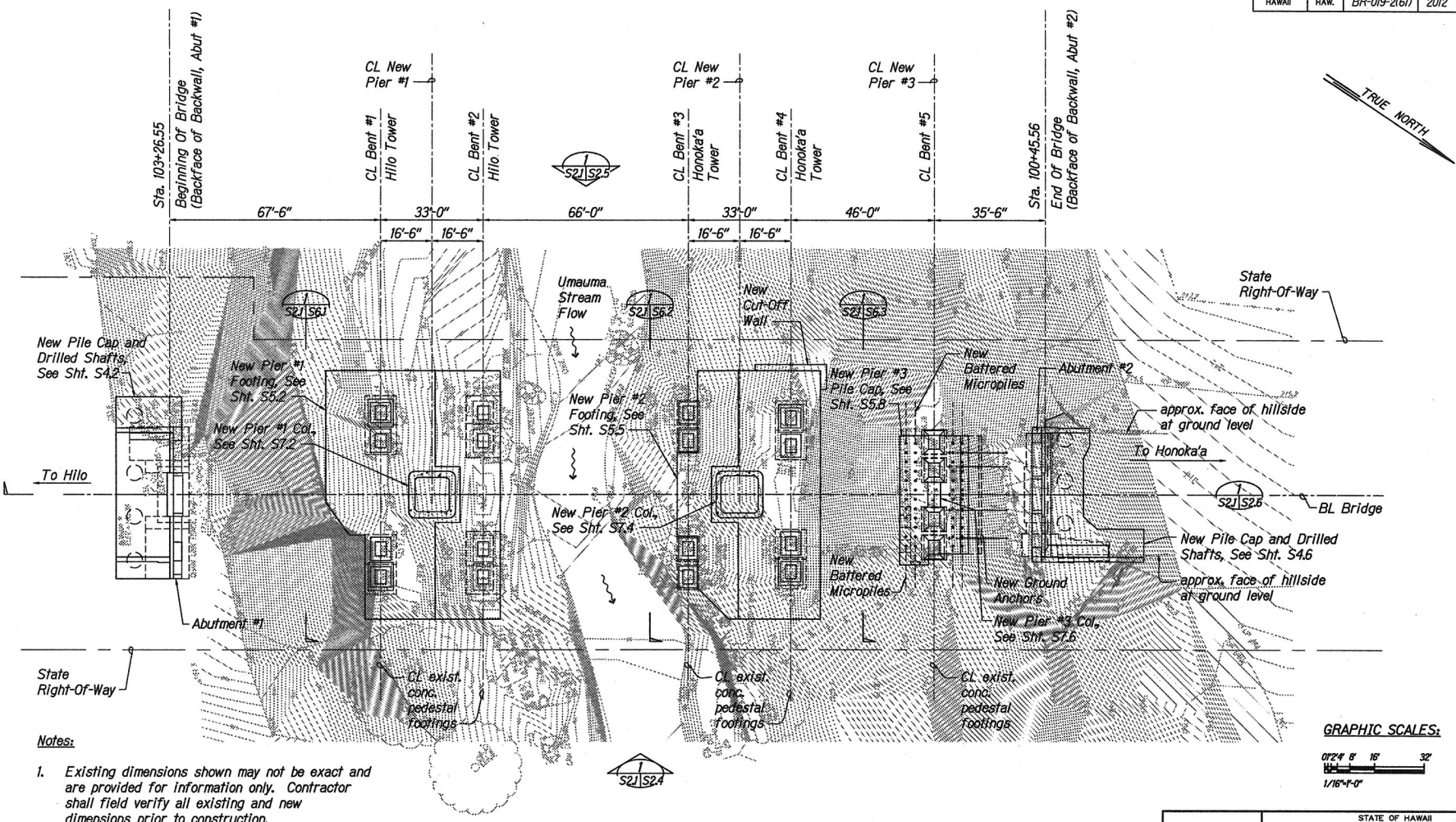
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 3/32" = 1'-0" Date: July 18, 2012

SHEET No. S1.12 OF 14 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	53	137



A S2|S2 NEW WIDENED BRIDGE FOUNDATION PLAN
SCALE: 1/16" = 1'-0"

GRAPHIC SCALES:
0 1'2'4' 8' 16' 32'
1/16"=1'-0"

Notes:

1. Existing dimensions shown may not be exact and are provided for information only. Contractor shall field verify all existing and new dimensions prior to construction.
2. For construction phasing, see sheet S15.1.
3. Work within ordinary high-water mark shall be conducted during "dry season" or during minimal stream flow. See Civil sheet C-13.
4. Refer to Site Specific BMP Notes on sheet C-13.

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

NORMAN K. HAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/14
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

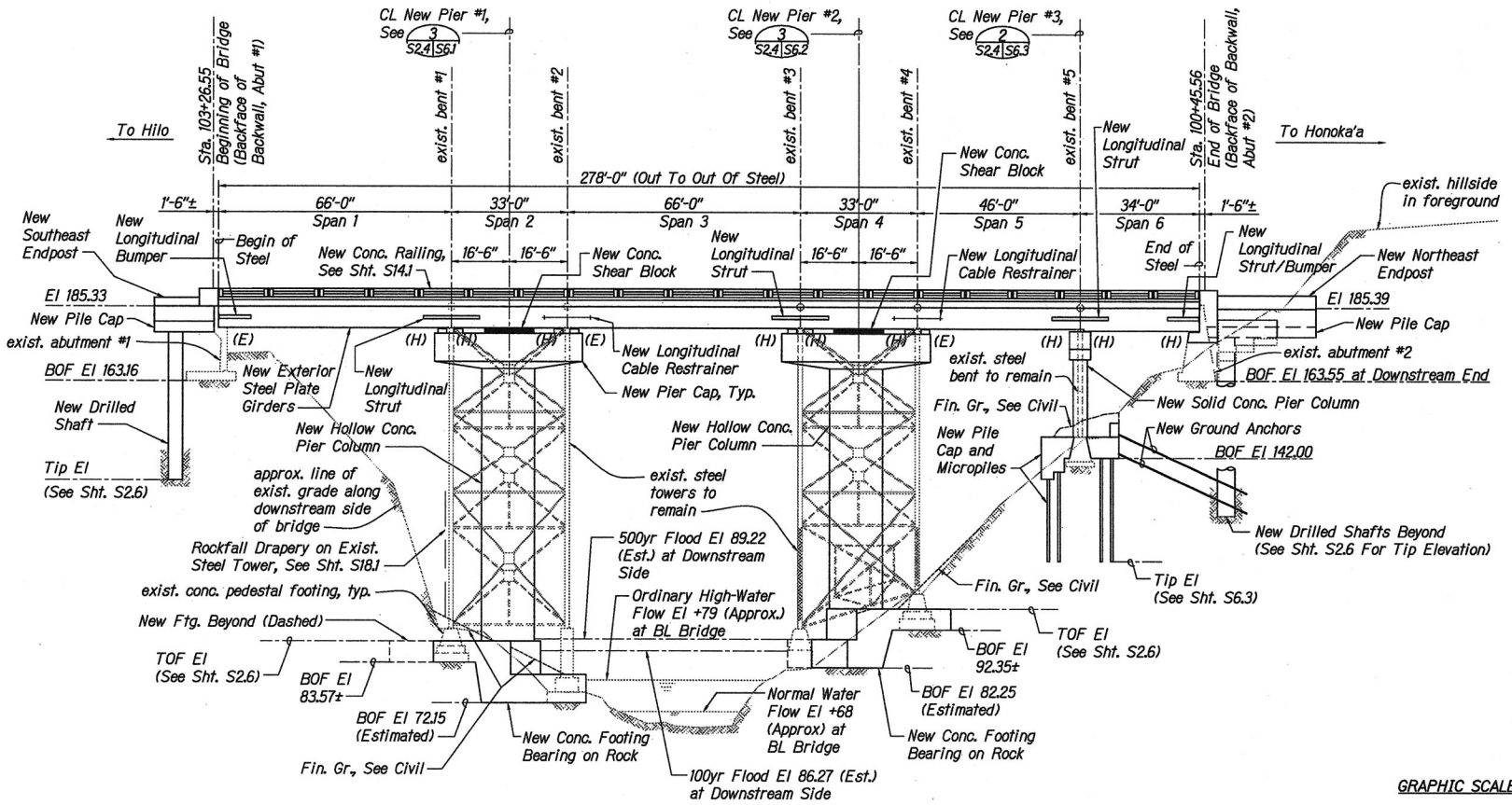
NEW WIDENED BRIDGE FOUNDATION LEVEL

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/16" = 1'-0" Date: July 18, 2012

SHEET No. S2.1 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	56	137



1 NEW WIDENED BRIDGE ELEVATION - EAST/DOWNSTREAM

S2.1, S2.2 & S2.3 S2.4 SCALE: 1/16" = 1'-0"

GRAPHIC SCALES:

0' 1' 2' 4' 8' 16' 32'

1/16"=1'-0"

Legend:

(E) = Expansion Bearing
(H) = Hinge Bearing

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

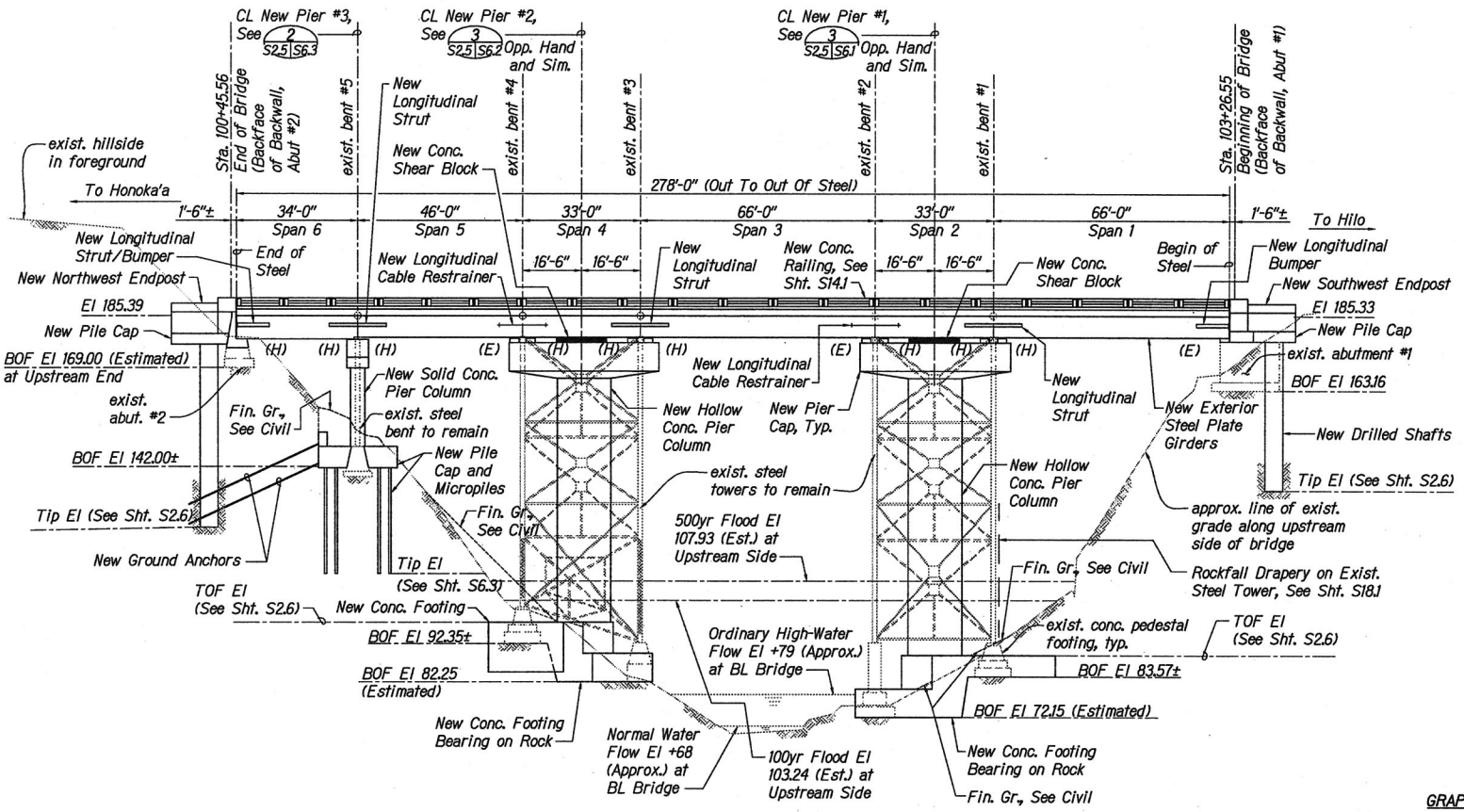
NEW WIDENED BRIDGE ELEVATION - EAST/DOWNSTREAM

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/16" = 1'-0" Date: July 18, 2012

SHEET No. S2.4 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	57	137



1 NEW WIDENED BRIDGE ELEVATION - WEST/UPSTREAM

S2.1, S2.2 & S2.3 S2.5 SCALE: 1/16" = 1'-0"

GRAPHIC SCALES:

0' 2' 4' 8' 16' 32'

1/16"=1'-0"

Legend:

(E) = Expansion Bearing
(H) = Hinge Bearing

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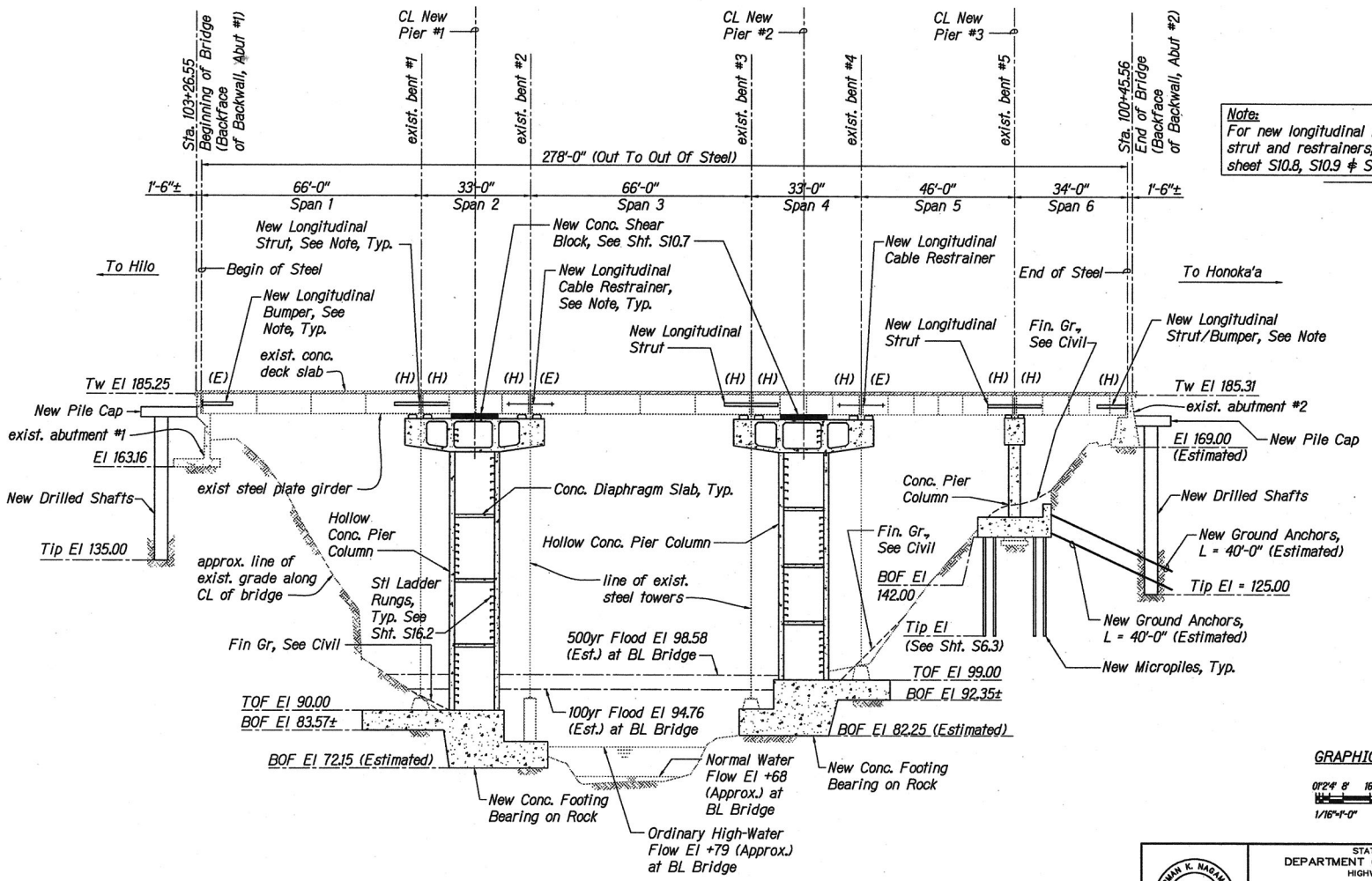
NEW WIDENED BRIDGE ELEVATION - WEST/UPSTREAM

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/16" = 1'-0" Date: July 18, 2012

SHEET No. S2.5 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	58	137



Note:
For new longitudinal bumper, strut and restrainers, see sheet S10.8, S10.9 & S10.10

1 LONGITUDINAL SECTION THRU BRIDGE (ALONG BASELINE)

S2.1, S2.2 & S2.3 | S2.6

SCALE: 1/16" = 1'-0"

Legend:

(E) = Expansion Bearing
(H) = Hinge Bearing

GRAPHIC SCALES:

0 1'2'4' 8' 16' 32'
1/16"=1'-0"

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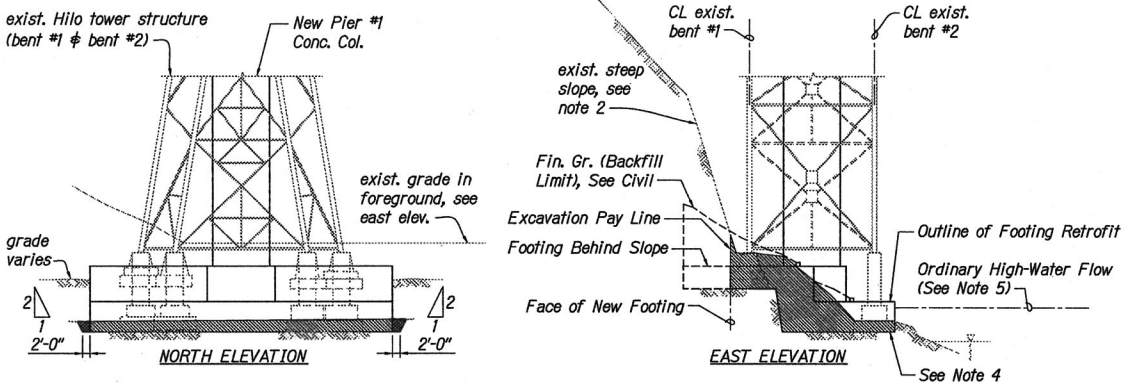
LONGITUDINAL SECTION THRU BRIDGE

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/16" = 1'-0" Date: July 18, 2012

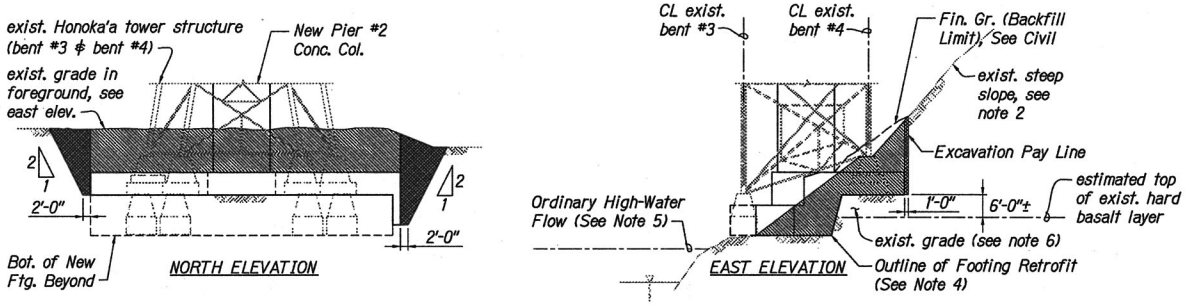
SHEET No. S2.6 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	73	137



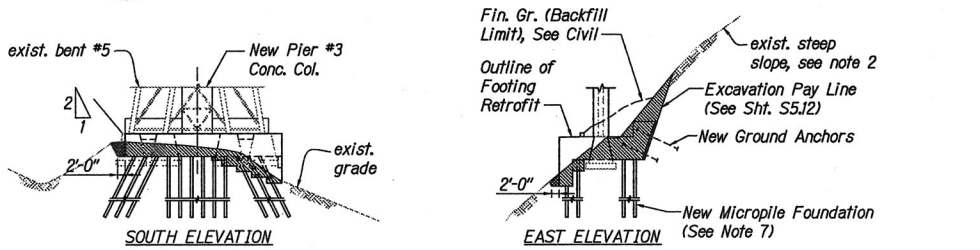
1 S5.1 | S5.1 NEW PIER #1 - STRUCTURE EXCAVATION/BACKFILL PAY LIMITS

SCALE: 1/16" = 1'-0"



2 S5.1 | S5.1 NEW PIER #2 - STRUCTURE EXCAVATION/BACKFILL PAY LIMITS

SCALE: 1/16" = 1'-0"



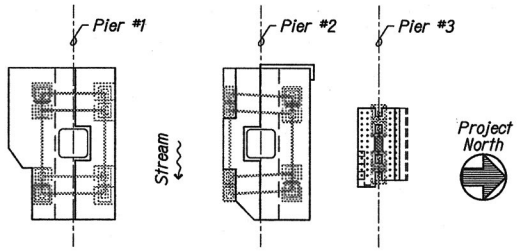
3 S5.1 | S5.1 NEW PIER #3 - STRUCTURE EXCAVATION/BACKFILL PAY LIMITS

SCALE: 1/16" = 1'-0"

New Pier Foundation Special Notes:

1. Existing bridge foundations shall be protected at all times from undermining. For elevations and notes of existing towers and bents, see sheets S1.10 to S1.14.
2. For excavation in existing steep slopes, contractor shall provide temporary measures to stabilize the cut in existing slopes for construction of new pier foundations. Contractor shall hire a Hawaii Licensed Professional Engineer with satisfactory experience in geotechnical engineering to monitor the slope stabilization measures and the excavation.
3. Contractor's proposed slope stabilization measures shall be submitted to the Engineer for information. Contractor and his Geotechnical Engineer shall be solely responsible for the temporary slope stabilization measures.
4. Pier #1 and Pier #2: New concrete footings shall bear on sound rock (hard basalt). Should existing rock surface at specified bottom of footing elevations be unsound, immediately notify the Engineer. Bottom of footing elevations shall be adjusted. See Standard Specs Section 205, sub-section 205.03 construction.
5. Contractor's formwork braces shall not extend into stream ordinary high-water flow (1-year flood). Formwork shall be designed to resist a 1-year flood. See Site Specific BMP Notes on civil sheet C-13. Wooden form boards shall not be chemically treated.

   Concrete within ordinary high-water flow shall only be poured during the "dry season" or during minimal stream flow. See civil sheet C-13.
6. At existing Bent #4, Contractor shall verify and report to the Engineer type of foundation material found at specified bottom of footing elevation. Should existing foundation material not be suitable, bottom of footing elevation shall be lowered as directed by the Engineer.
7. Excavation for micropiles will be paid for under Section 512 "Micropiles".



KEY PLAN

Legend:

= Structure Excavation

= Structure Backfill

GRAPHIC SCALES:

0 1'2'4' 8' 16' 32'

1/16"=1'-0"

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NEW PIER FOUNDATION - SPECIAL NOTES & TYPICAL PAY LIMITS

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/16" = 1'-0" Date: July 18, 2012

SHEET No. S5.1 OF 12 SHEETS

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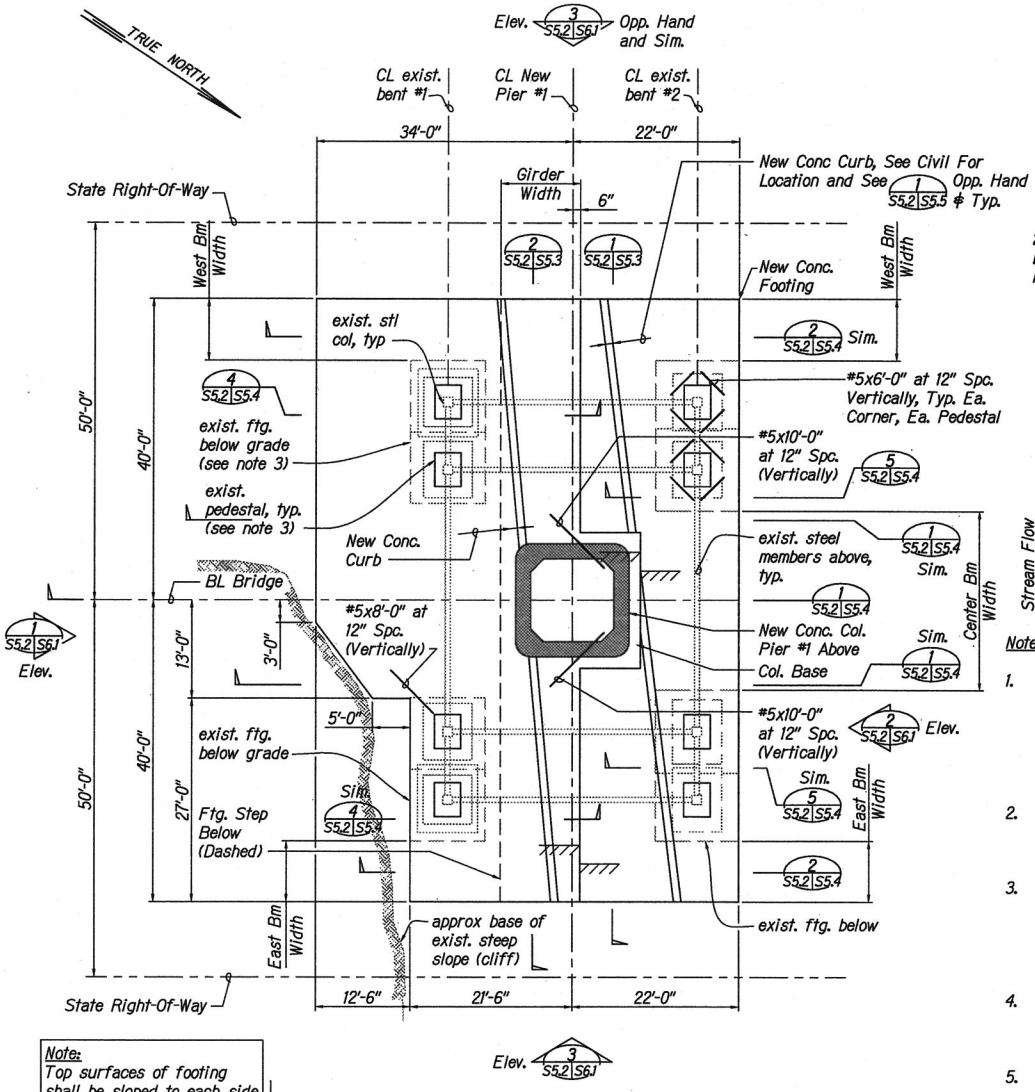
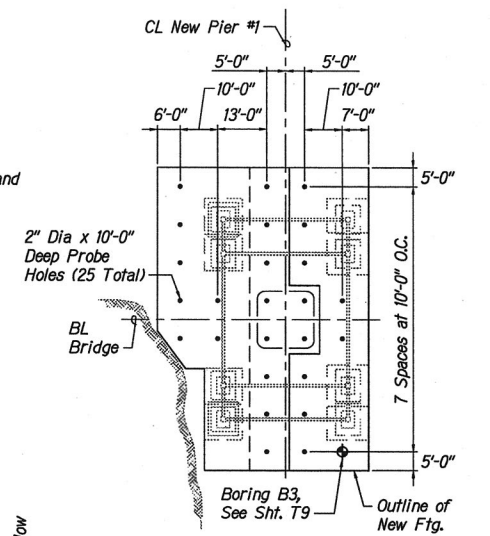


Note:
Top surfaces of footing shall be sloped to each side to avoid ponding water.

A S2.1 S5.2 NEW PIER #1 - FOUNDATION PLAN
SCALE: 1/8" = 1'-0"



B S5.2 S5.2 PROBING AND GROUTING PLAN
SCALE: 1/16" = 1'-0"

Notes:

1. Existing pedestal footings shall be strengthened, shored and/or under-pinned prior to excavating existing grade for new pier footing. Contractor shall submit proposed design for Engineer's review. Design shall be stamped by a licensed Hawaii Structural Engineer. See sheet S5.1.
2. For special notes and excavation pay limits, see sheet S5.1. For concrete pour restriction, see Special Note 5.
3. All bottom of footing elevations of existing and new footings shown on drawings shall be field verified by contractor. All discrepancies shall be reported to the Engineer and shall be resolved before proceeding with the work.
4. New concrete curb shall be incidental to concrete footings and will not be paid for separately.
5. Foundation shall be poured in layers with horizontal construction joints located as shown on drawings. Adjacent pours shall be staggered by at least 14 calendar days.
6. Vertical construction joints shall not be permitted unless approved by the Engineer.

Probing and Grouting Notes (Typical):

1. Prior to placing reinforcing steel, footing excavations shall be probed for possible cavities or voids in underlying basalt strata. Refer to Special Provisions Section 212 "Probing and Grouting Work at Structure Pier Footing".
2. Probe holes shall be minimum 2 inches in diameter and extend a minimum 10 feet below bottom of footings. See plan for location of probe holes.
3. Provide plastic pipes in probe holes as necessary to prevent holes from caving in.
4. Probe holes which encounter large pockets or voids, or which consume large quantities of grout shall require additional probe holes as directed by the Engineer.
5. Voids encountered at bottom of footing excavations shall be exposed and filled with Class D lean concrete (f'c = 1,500 psi).
6. Sand-cement grout for filling probe holes shall be high-slump (pump mix) with minimum f'c = 500 psi at 28 days.
7. All probing and grouting work shall be performed in the presence of the Engineer.

GRAPHIC SCALES:

0 1' 2' 4' 6' 10' 14' 22'
1/8"=1'-0"

0 1' 2' 4' 8' 16' 32'
1/16"=1'-0"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	74	137

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIER #1 - FOUNDATION PLAN

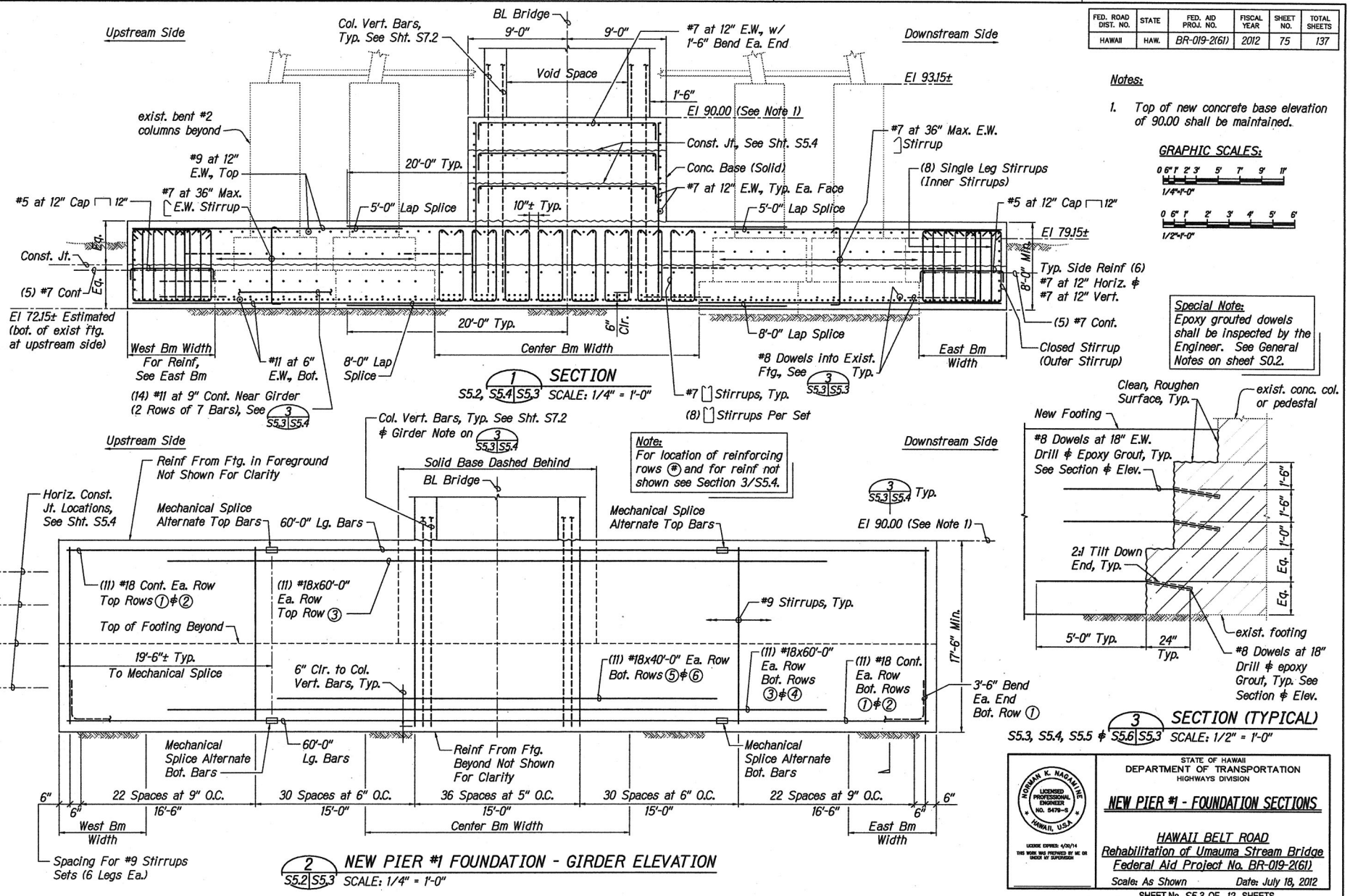
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: July 18, 2012

SHEET No. S5.2 OF 12 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	75	137



1 SECTION
S5.2, S5.4 S5.3 SCALE: 1/4" = 1'-0"

Notes:

1. Top of new concrete base elevation of 90.00 shall be maintained.

GRAPHIC SCALES:

0 6" 1' 2' 3' 5' 7' 9' 11"
1/4"=1'-0"

0 6" 1' 2' 3' 4' 5' 6'
1/2"=1'-0"

Special Note:
Epoxy grouted dowels shall be inspected by the Engineer. See General Notes on sheet S0.2.

Note:
For location of reinforcing rows (#) and for reinf not shown see Section 3/S5.4.

2 NEW PIER #1 FOUNDATION - GIRDER ELEVATION
S5.2 S5.3 SCALE: 1/4" = 1'-0"

3 SECTION (TYPICAL)
S5.3, S5.4, S5.5 & S5.6 S5.3 SCALE: 1/2" = 1'-0"

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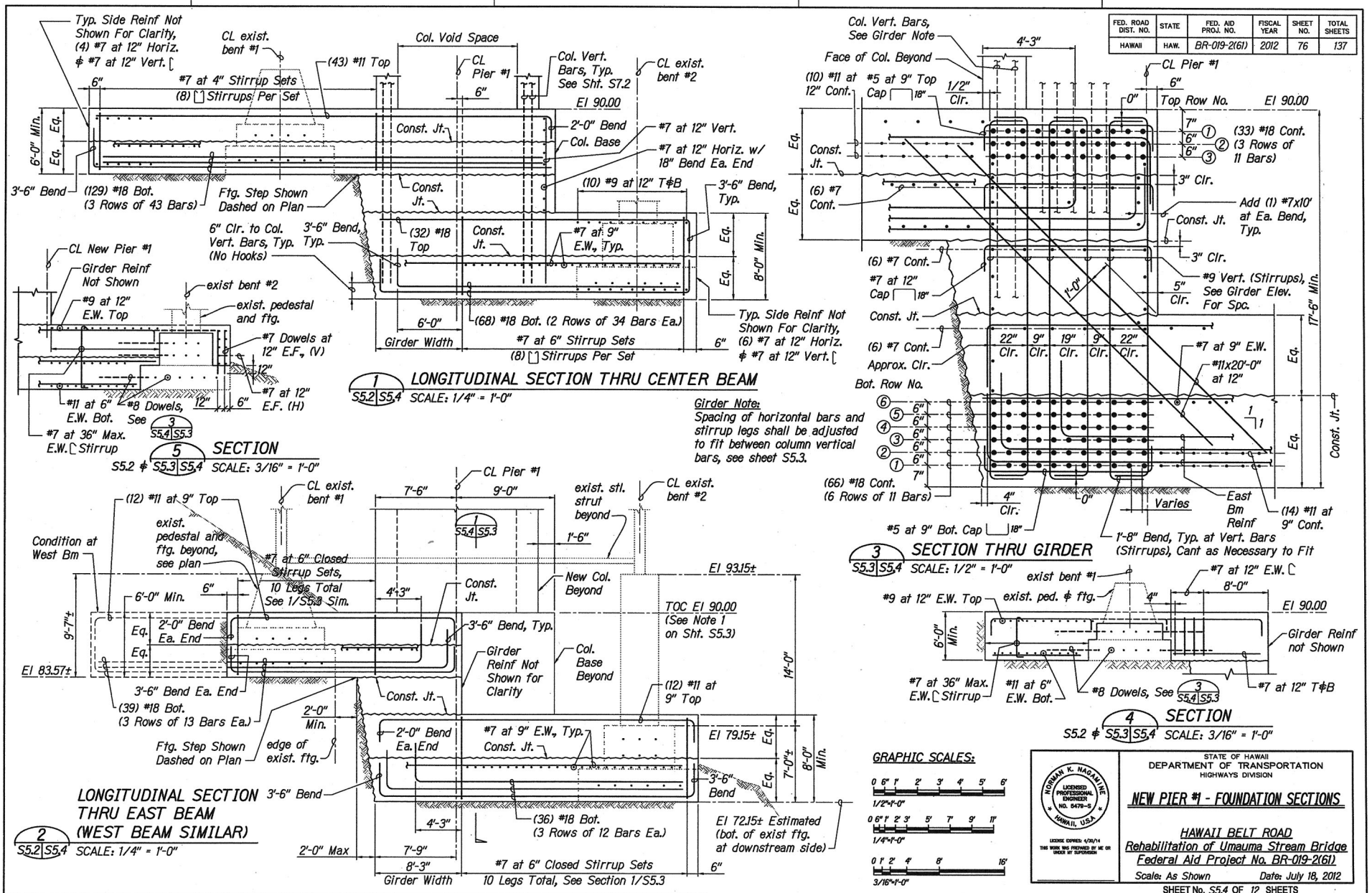
NEW PIER #1 - FOUNDATION SECTIONS

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: July 18, 2012

SHEET No. S5.3 OF 12 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	76	137

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIER #1 - FOUNDATION SECTIONS

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: July 18, 2012

SHEET No. S5.4 OF 12 SHEETS

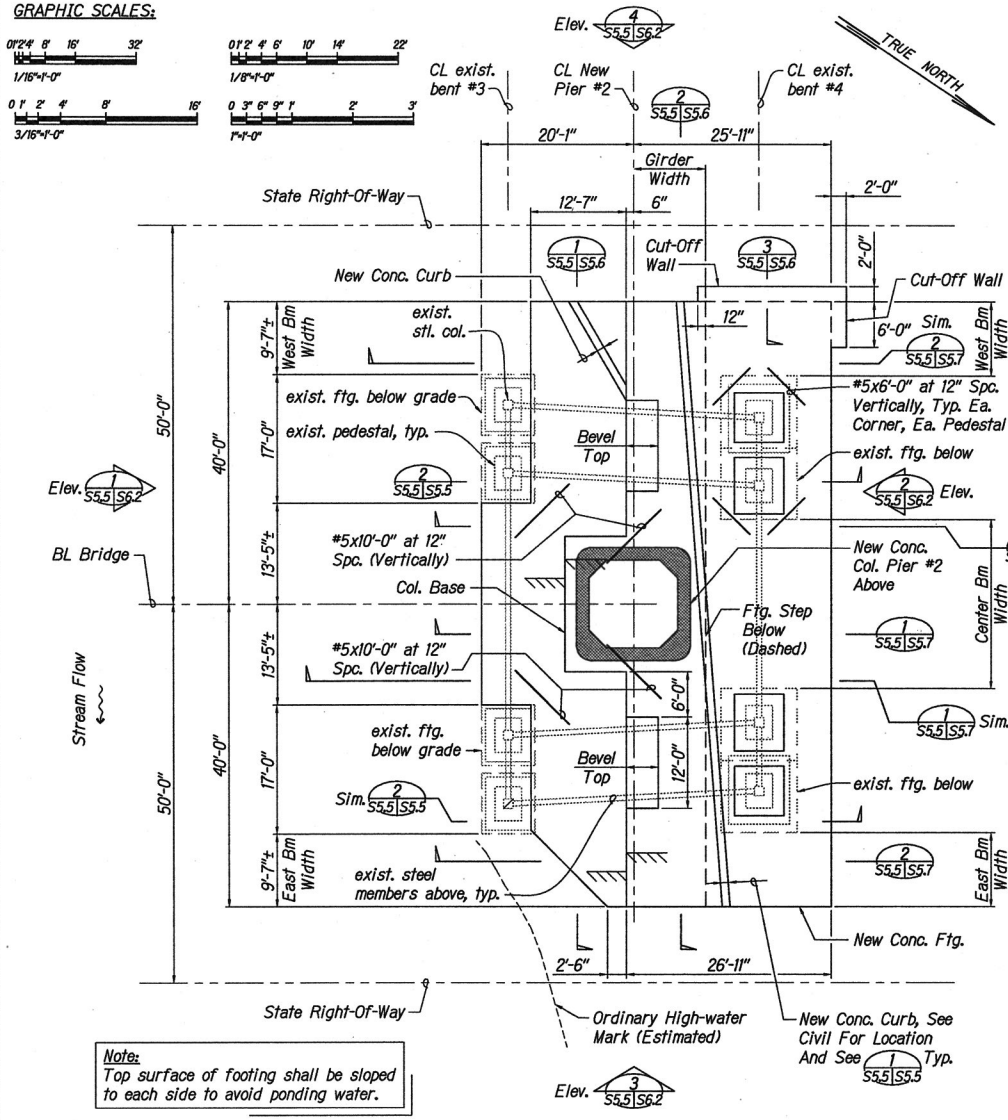
GRAPHIC SCALES:

1/16"=1'-0" 0 1' 2' 4' 8' 16' 32'

1/8"=1'-0" 0 1' 2' 4' 6' 10' 14' 22'

3/16"=1'-0" 0 1' 2' 4' 8' 16'

1"=1'-0" 0 3" 6" 9" 1' 2' 3'

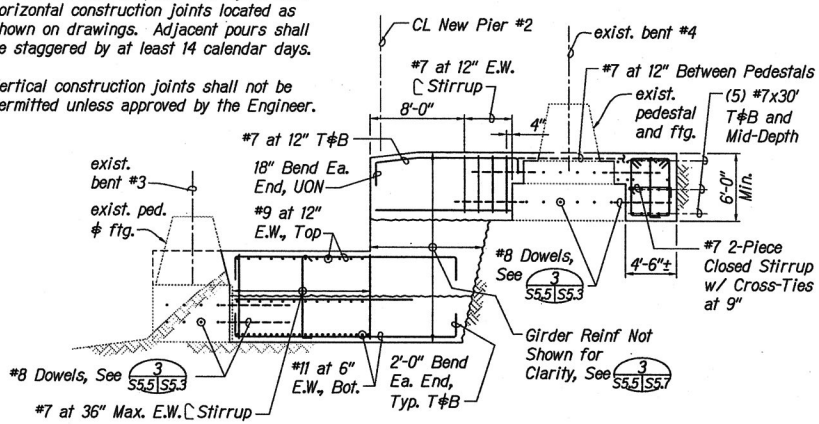


Note:
Top surface of footing shall be sloped to each side to avoid ponding water.

A S2.1 S5.5 NEW PIER #2 - FOUNDATION PLAN
SCALE: 1/8" = 1'-0"

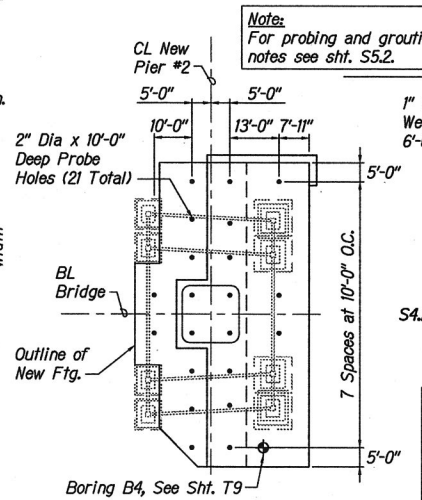
Notes:

1. For balance of notes, see notes on sheet S5.2.
2. Foundation shall be poured in layers with horizontal construction joints located as shown on drawings. Adjacent pours shall be staggered by at least 14 calendar days.
3. Vertical construction joints shall not be permitted unless approved by the Engineer.

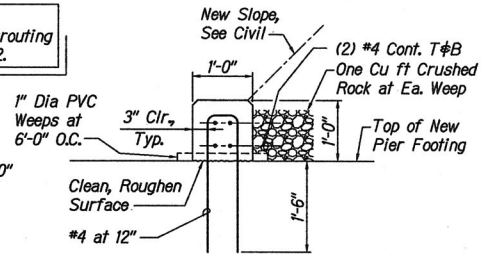


2 S5.5 S5.5 SECTION
SCALE: 3/16" = 1'-0"

Note:
For probing and grouting notes see sht. S5.2.



B S5.5 S5.5 PROBING AND GROUTING PLAN
SCALE: 1/16" = 1'-0"



1 S4.2, S5.2 & S5.5 S5.5 CURB SECTION
SCALE: 1" = 1'-0"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	77	137

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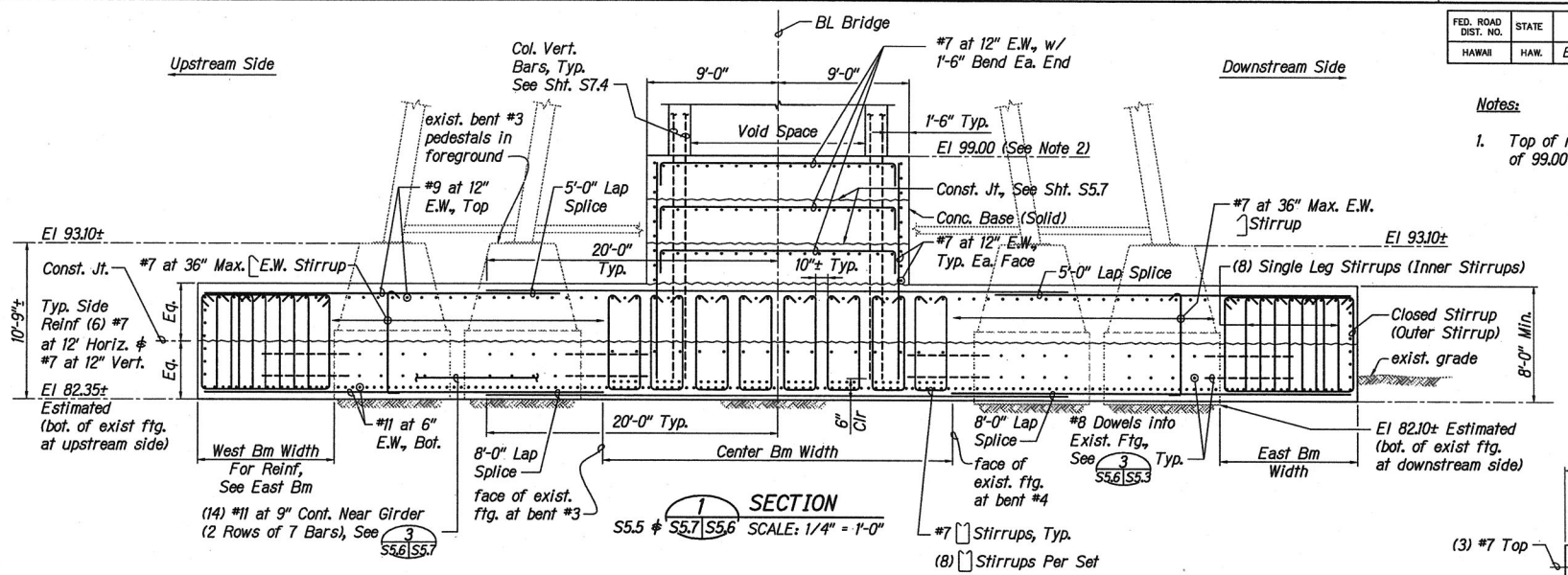
NEW PIER #2 - FOUNDATION PLAN

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: July 18, 2012

SHEET No. S5.5 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	78	137



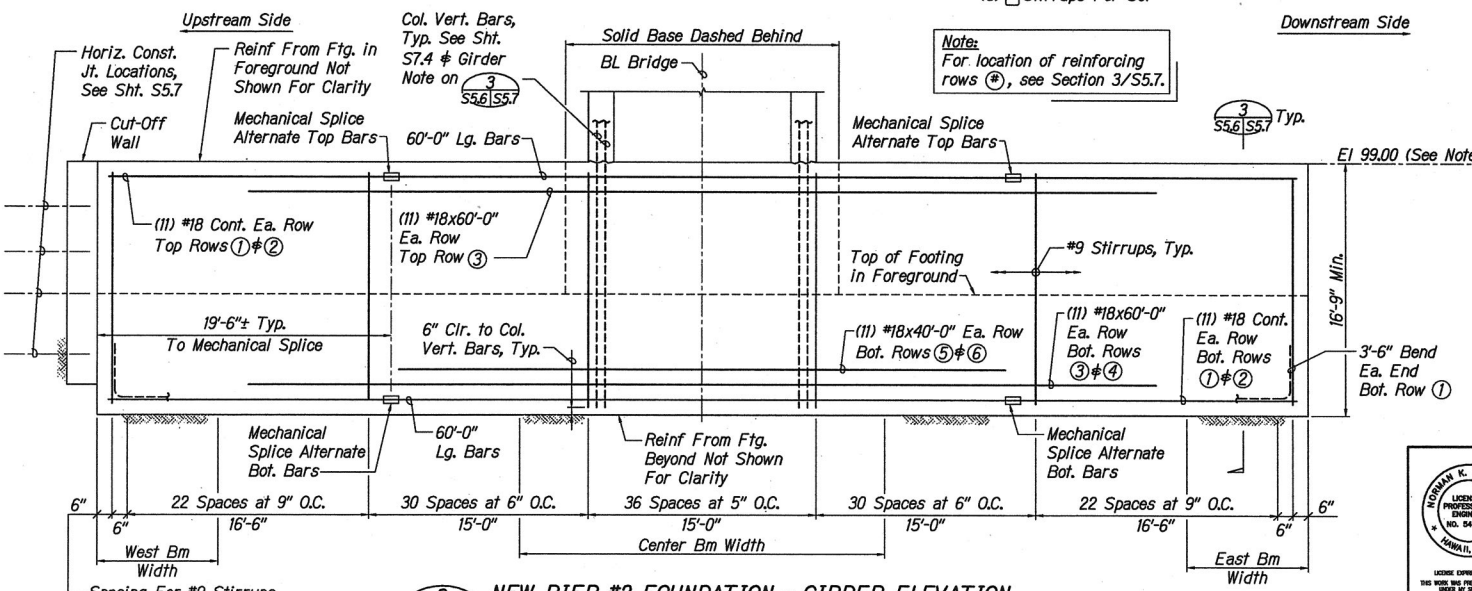
Notes:

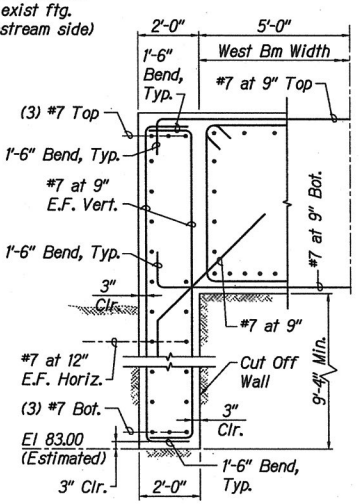
1. Top of new concrete base elevation of 99.00 shall be maintained.

GRAPHIC SCALES:

0 6" 1' 2' 3' 4' 5' 6'
1/2"=1'-0"

0 6" 1' 2' 3' 5' 7' 9' 11'
1/4"=1'-0"





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NEW PIER #2 - FOUNDATION SECTIONS

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: July 18, 2012

SHEET No. S5.6 OF 12 SHEETS

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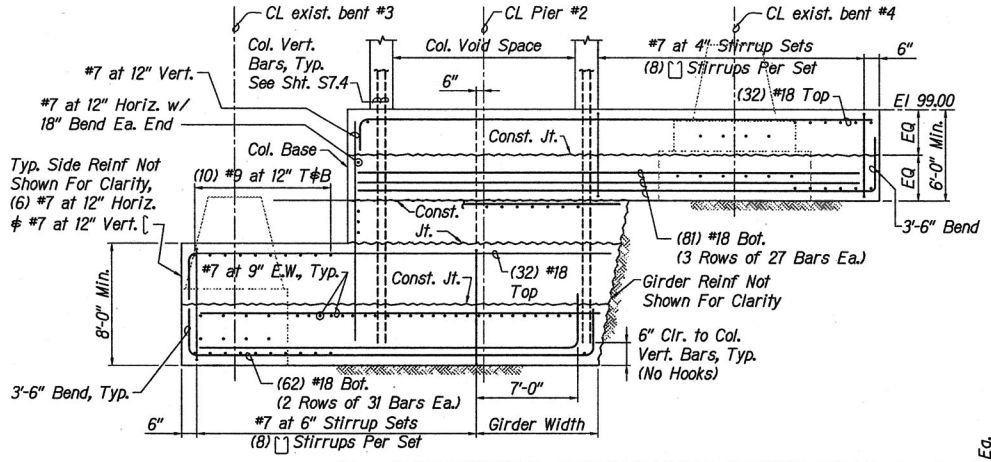
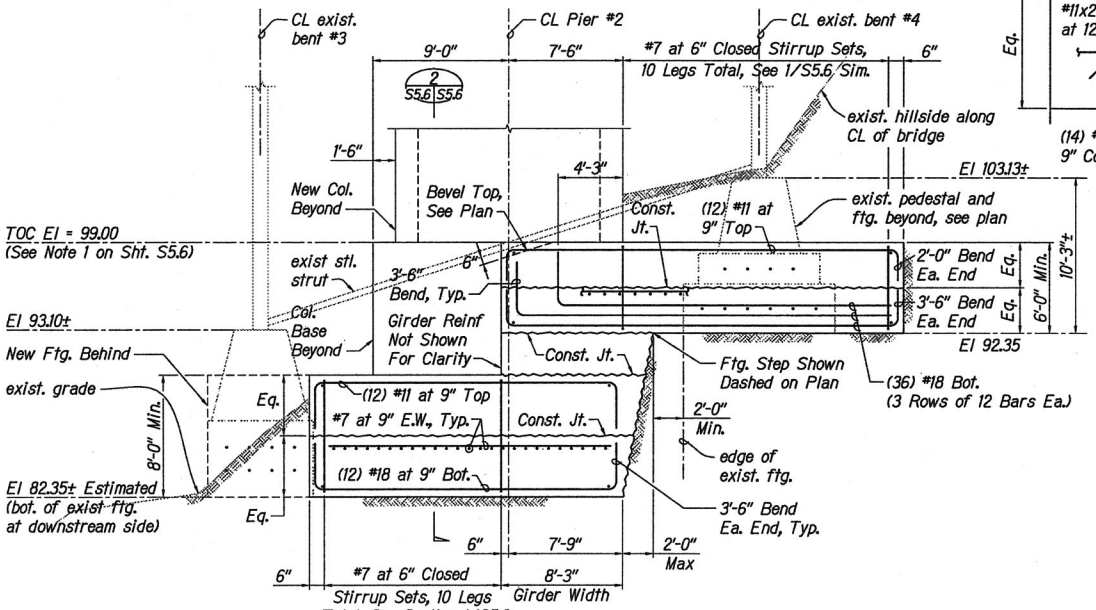
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	79	137



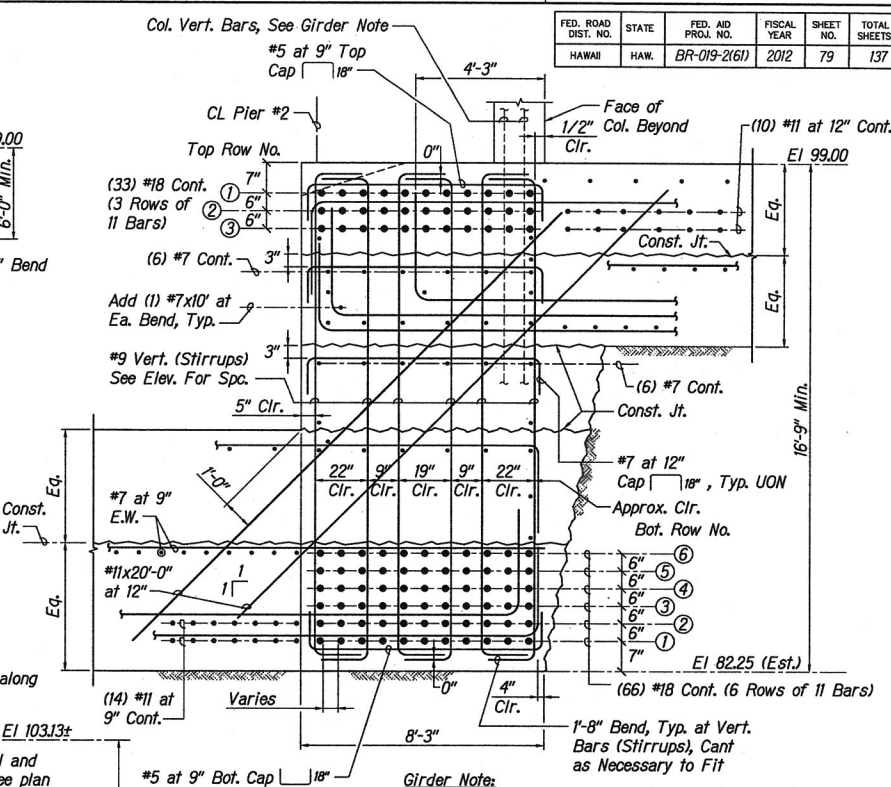
1 S5.5 | S5.7 **LONGITUDINAL SECTION THRU CENTER BEAM**

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



2 S5.5 | S5.7 **LONGITUDINAL SECTION THRU EAST BEAM (WEST BEAM SIMILAR)**

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



Girder Note:
Spacing of horizontal bars and stirrup legs shall be adjusted to fit between column vertical bars, see sheet S5.6.

3 S5.5 & S5.6 | S5.7 **SECTION THRU GIRDER**

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

GRAPHIC SCALES:

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NEW PIER #2 - FOUNDATION SECTIONS

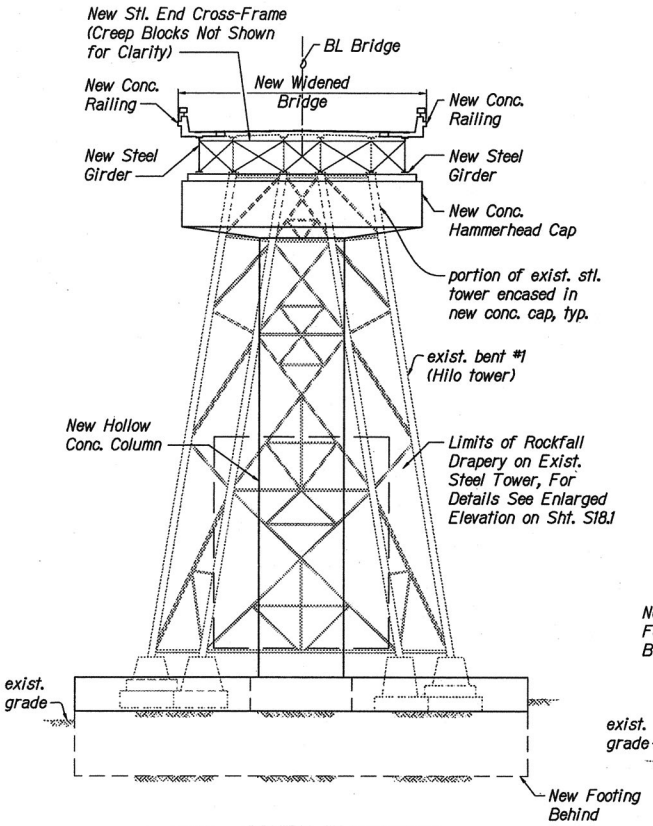
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: July 18, 2012

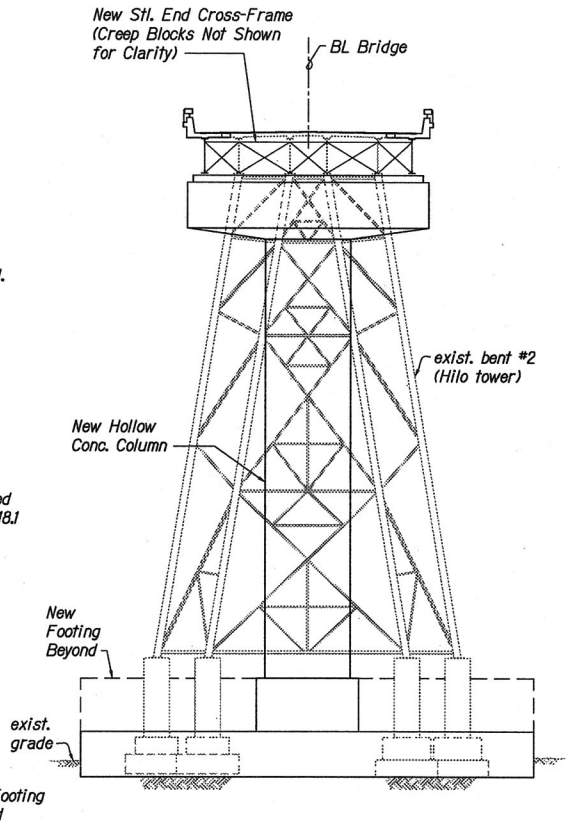
SHEET No. S5.7 OF 12 SHEETS

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

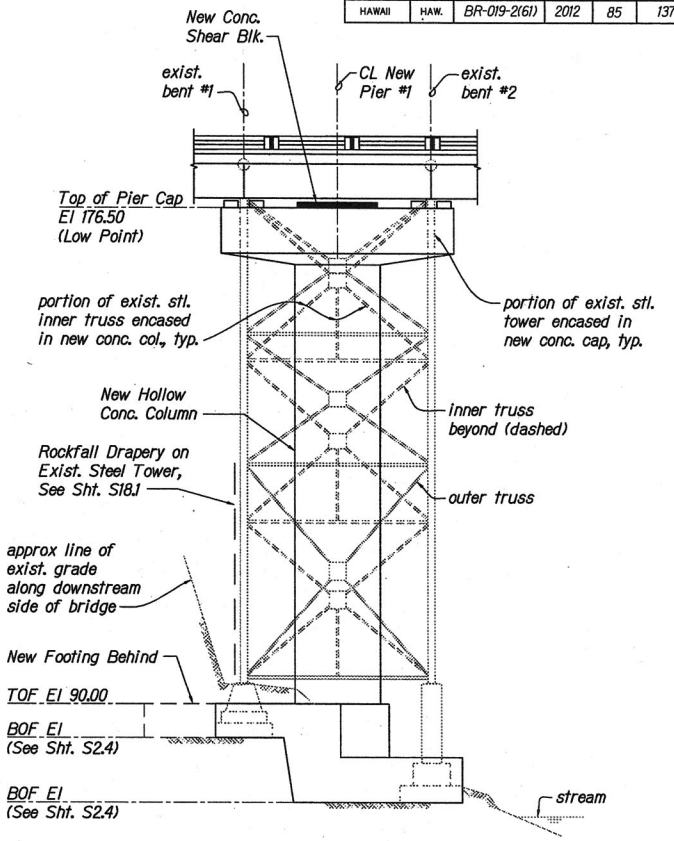
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	85	137



1 SOUTH ELEVATION
S2.1, S2.2, S5.2 ⊄ S6.1|S6.1 SCALE: 3/32" = 1'-0"

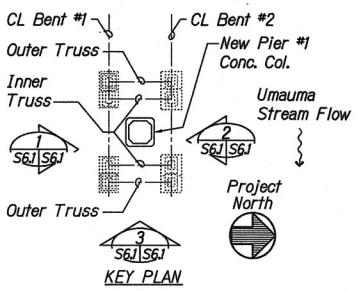


2 NORTH ELEVATION
S5.2 ⊄ S6.1|S6.1 SCALE: 3/32" = 1'-0"



3 EAST/DOWNSTREAM ELEVATION (UPSTREAM SIMILAR)
S2.4, S2.5, S5.2 ⊄ S6.1|S6.1 SCALE: 3/32" = 1'-0"

NEW PIER #1 ELEVATIONS



KEY PLAN

Note:
Portions of existing steel bent not embedded in new concrete structures shall be repaired and repainted. See sheet S17.1.

GRAPHIC SCALES:

0' 2' 4' 8' 16' 32'
3/32"=1'-0"

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/14
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIER #1 ELEVATIONS
(AT EXISTING BENT #1 & #2)

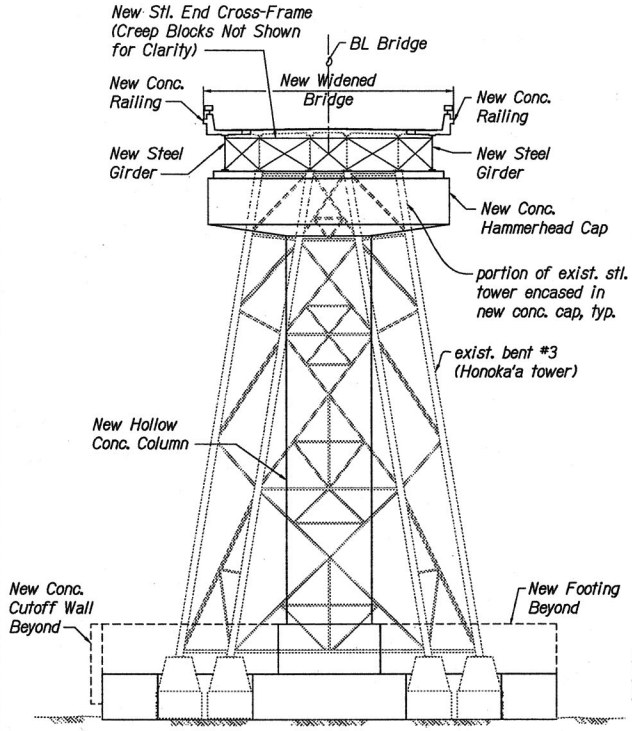
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 3/32" = 1'-0" Date: July 18, 2012

SHEET No. S6.1 OF 3 SHEETS

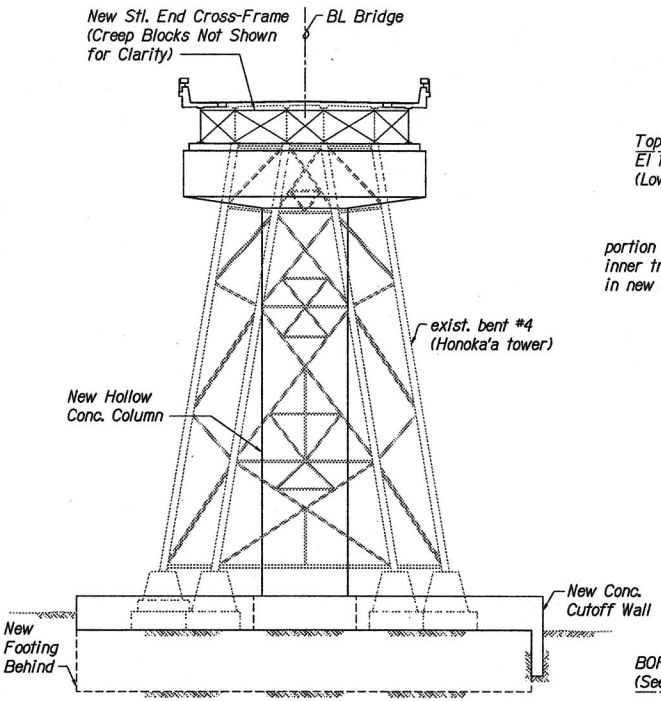
ORIGINAL PLAN | NOTEBOOK No. | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	86	137



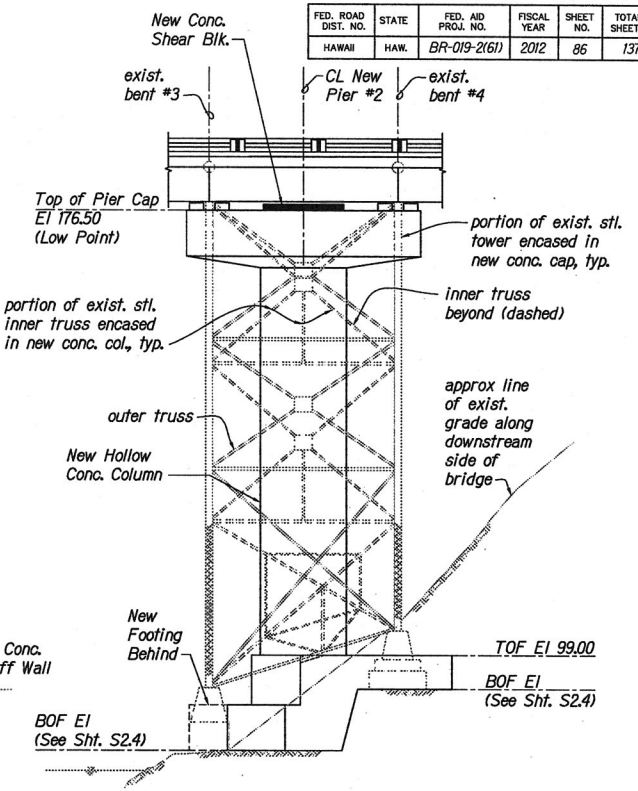
1 SOUTH ELEVATION

S2.1, S2.2, S5.5 ℄ S6.2|S6.2 SCALE: 3/32" = 1'-0"



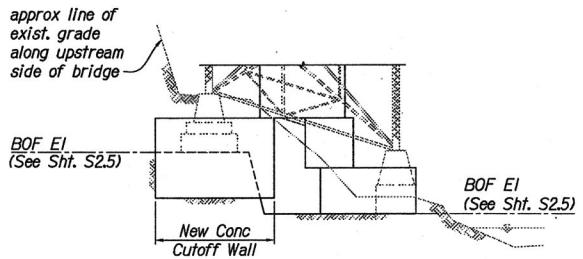
2 NORTH ELEVATION

S5.5 ℄ S6.2|S6.2 SCALE: 3/32" = 1'-0"



3 EAST/DOWNSTREAM ELEVATION

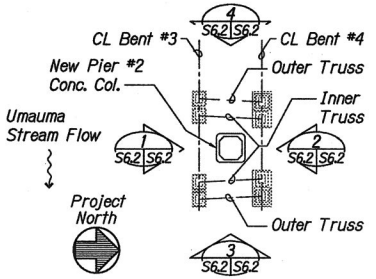
S2.4, S2.5, S5.5 ℄ S6.2|S6.2 SCALE: 3/32" = 1'-0"



4 PARTIAL WEST/UPSTREAM ELEVATION

S5.5 ℄ S6.2|S6.2 SCALE: 3/32" = 1'-0"

NEW PIER #2 ELEVATIONS



KEY PLAN

Note:
Portions of existing steel bent not embedded in new concrete structures shall be repaired and repainted. See sheet S17.1.

GRAPHIC SCALES:

0 1'2'4' 8' 16' 32'

3/32"=1'-0"

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LICENSE EXPIRES: 4/30/14
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIER #2 ELEVATIONS (AT EXISTING BENT #3 ℄ #4)

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 3/32" = 1'-0" Date: July 18, 2012

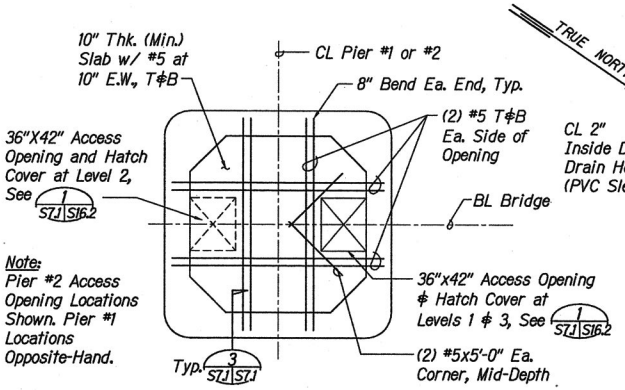
SHEET No. S6.2 OF 3 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	88	137

New Pier Column Notes (Typical):

1. *All vertical reinforcing (#8, #9 , #10 ⊄ #11 bars) shall be ASTM A706, Grade 60.*
2. *Lap splices shall not be permitted in vertical reinforcing. Provide welded butt splice or mechanical butt splice connections only where shown. Mechanical butt splice (coupler) shall develop minimum 125% of specified yield strength of unspliced bars.*
3. *Welded or mechanical butt splice connection shall be staggered 24" minimum (alternate splice location of every other vertical bar).*
4. *Lap splices shall not be permitted in horizontal reinforcing.*
5. *Intermittent pour "holes" shall be provided in formwork to facilitate placement of concrete and to avoid segregation of concrete or displacement of rebars. See Special Provisions Section 503 - "Concrete Structures".*
6. *Existing structural steel to be embedded in new concrete shall be blast cleaned and coated with 2 coats epoxy. See Sheet S0.3.*
7. *Unless otherwise noted or shown, for reinforcing bar bends and hook lengths, see Sheet S0.3.*



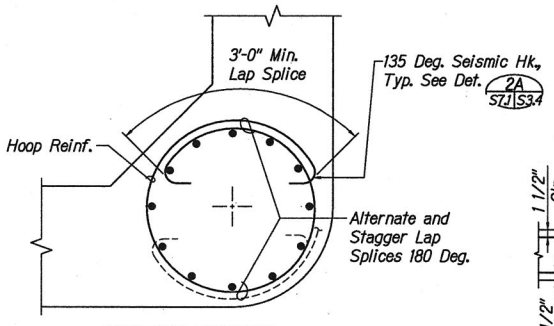
DIAPHRAGM SLAB REINFORCING

DIAPHRAGM SLAB SLOPES

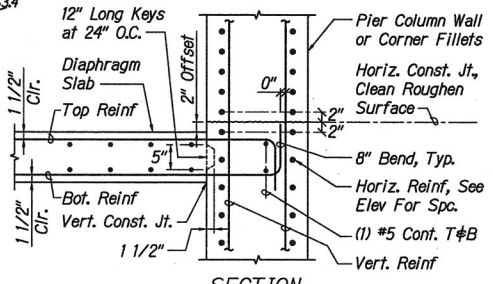
1 DIAPHRAGM SLAB PLANS (TYPICAL)
S7.2, S7.4 ⊄ S16.2 S7.1 SCALE: 1/4"=1'-0"

Notes:

1. *Concrete Diaphragm Slabs Shall be 6,000 PSI.*
2. *Concrete Diaphragm Slabs Shall be Incidental to Concrete Pier Columns and will not be Paid for Separately.*

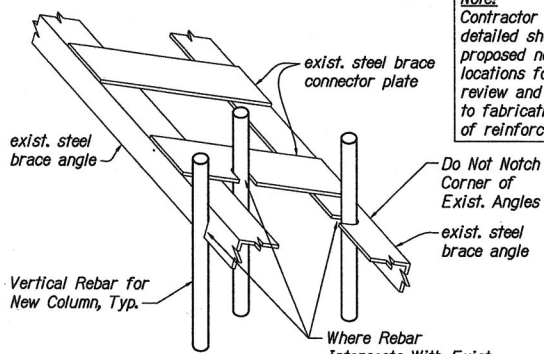


2 CORNER COLUMN HOOP REINFORCING DETAIL (TYPICAL)
S7.3 ⊄ S7.5 S7.1 SCALE: 1" = 1'-0"



SECTION

3 DETAIL - CONSTRUCTION JOINT (TYPICAL)
S7.2 ⊄ S7.4 S7.1 SCALE: 1" = 1'-0"



Note:
Contractor shall submit detailed shop drawings of proposed notch sizes and locations for Engineer's review and approval prior to fabrication or ordering of reinforcing steel.

ISOMETRIC VIEW

GRAPHIC SCALES:

0 3" 6" 9" 1' 2' 3'
1"=1'-0"

0 6" 1' 2' 3' 5' 7' 9' 11'
1/4"=1'-0"

4 DETAIL (TYPICAL)
S7.2 ⊄ S7.4 S7.1 NOT TO SCALE

ORIGINAL PLAN | NOTEBOOK | No. | SURVEY PLOTTED BY | DRAWN BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

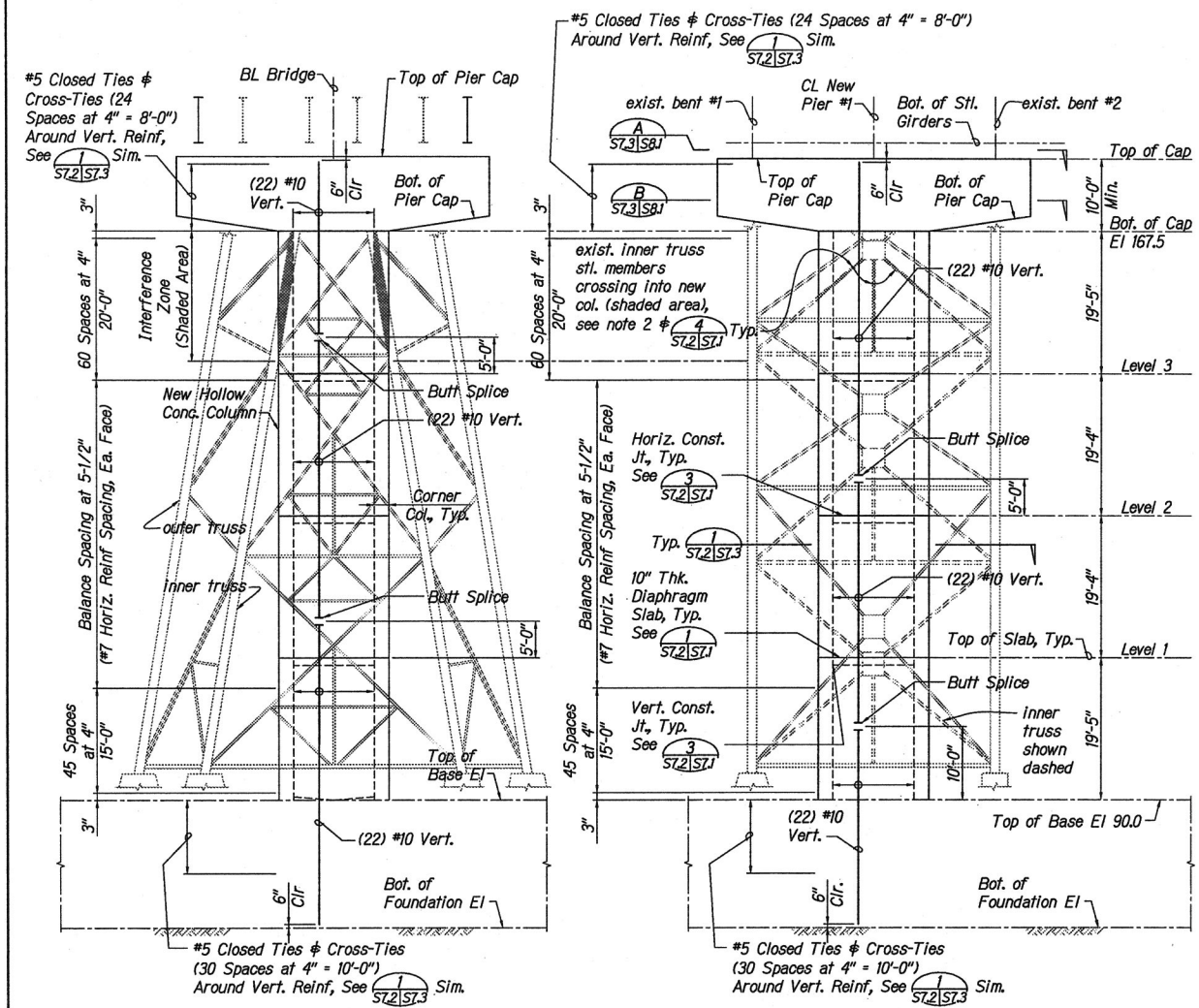
NEW PIER COLUMN - TYPICAL DETAILS ⊄ NOTES

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: July 18, 2012

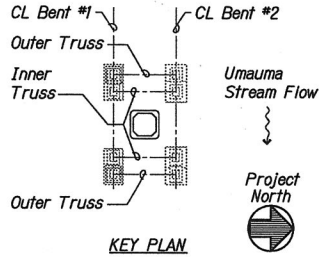
SHEET No. S7.1 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	89	137



Notes:

1. Typical pier column notes, see sheet S7.1.
2. Portions of existing steel members crossing into new columns shall be blast cleaned and coated with 2 coats epoxy. See sheet S0.3.



KEY PLAN

GRAPHIC SCALES:

0 1'2' 4' 6' 10' 14' 22'
1/8"=1'-0"

1 S7.2|S7.2 ELEVATION NEW PIER #1 COLUMN REINFORCING
SCALE: 1/8" = 1'-0"

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIER #1 - COLUMN ELEVATIONS & REINFORCING

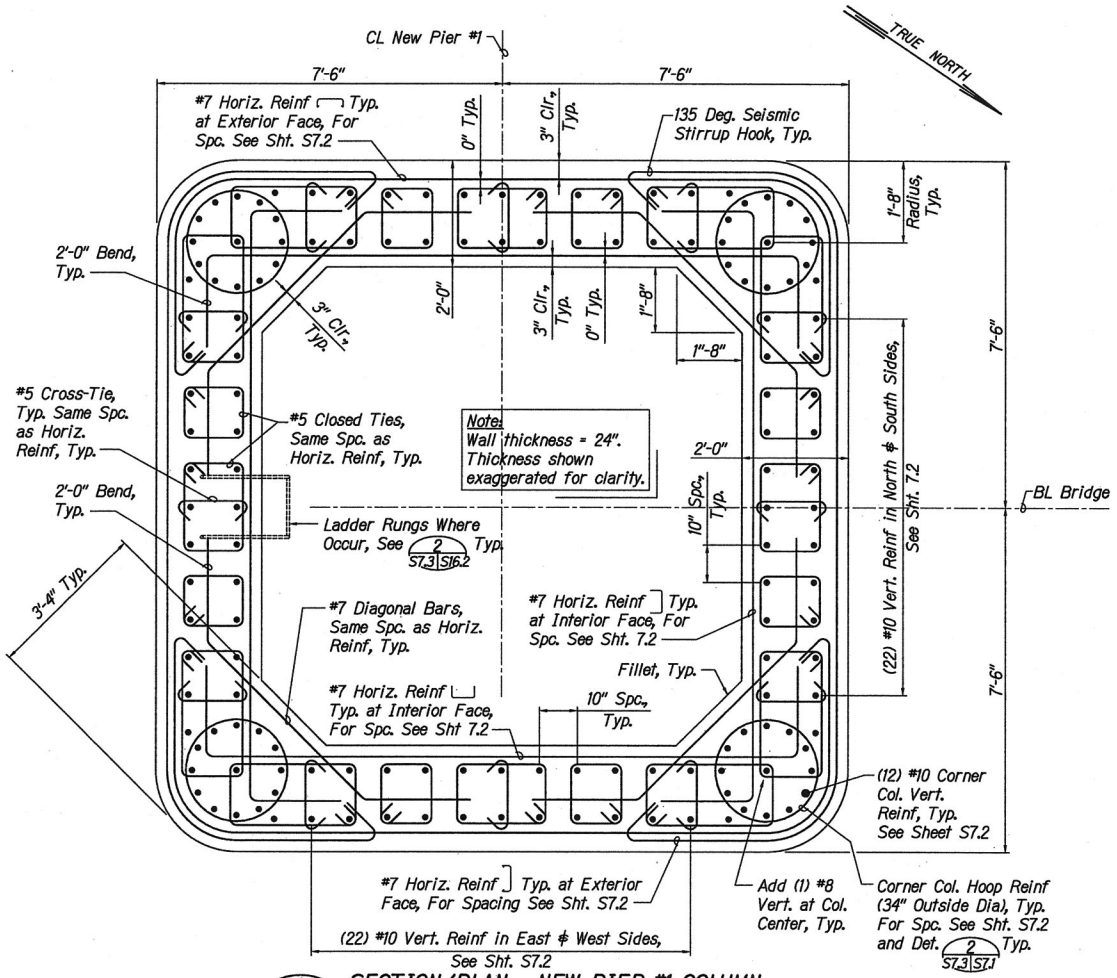
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/8" = 1'-0" Date: July 18, 2012

SHEET No. S7.2 OF 6 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	90	137



1 S7.2 S7.3 SECTION/PLAN - NEW PIER #1 COLUMN
NOT TO SCALE

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
ORIGINAL PLANS
NOTEBOOK
No.

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5478-S HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/14
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

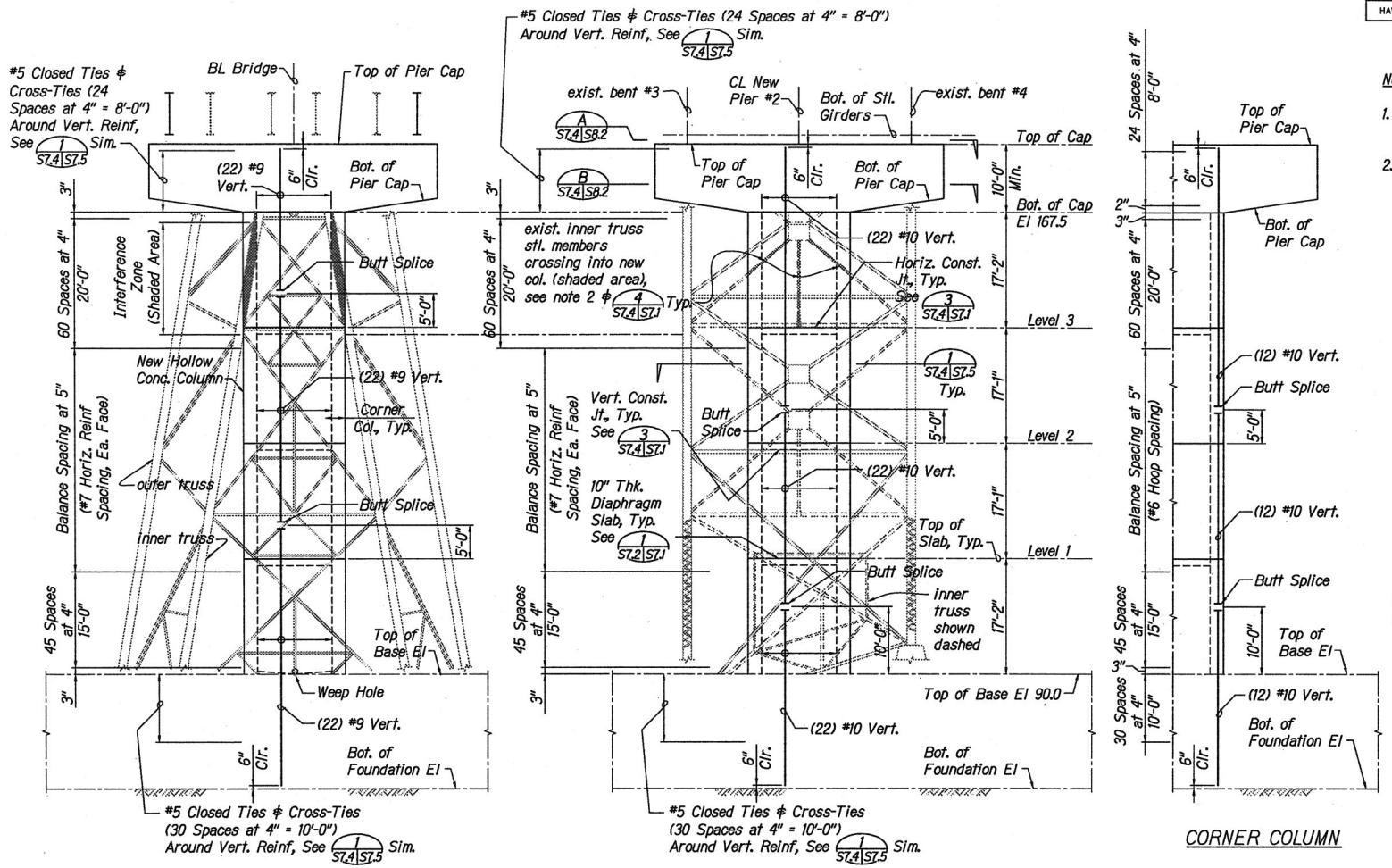
NEW PIER #1 COLUMN - SECTION

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. S7.3 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	91	137



NORTH AND SOUTH ELEVATION

EAST AND WEST ELEVATION

CORNER COLUMN

Notes:

1. Typical pier column notes, see sheet S7.1.
2. Portions of existing steel members crossing into new columns shall be blast cleaned and coated with 2 coats epoxy. See sheet S0.3.

1 S7.4 S7.4 ELEVATION NEW PIER #2 COLUMN REINFORCING
SCALE: 1/8" = 1'-0"

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

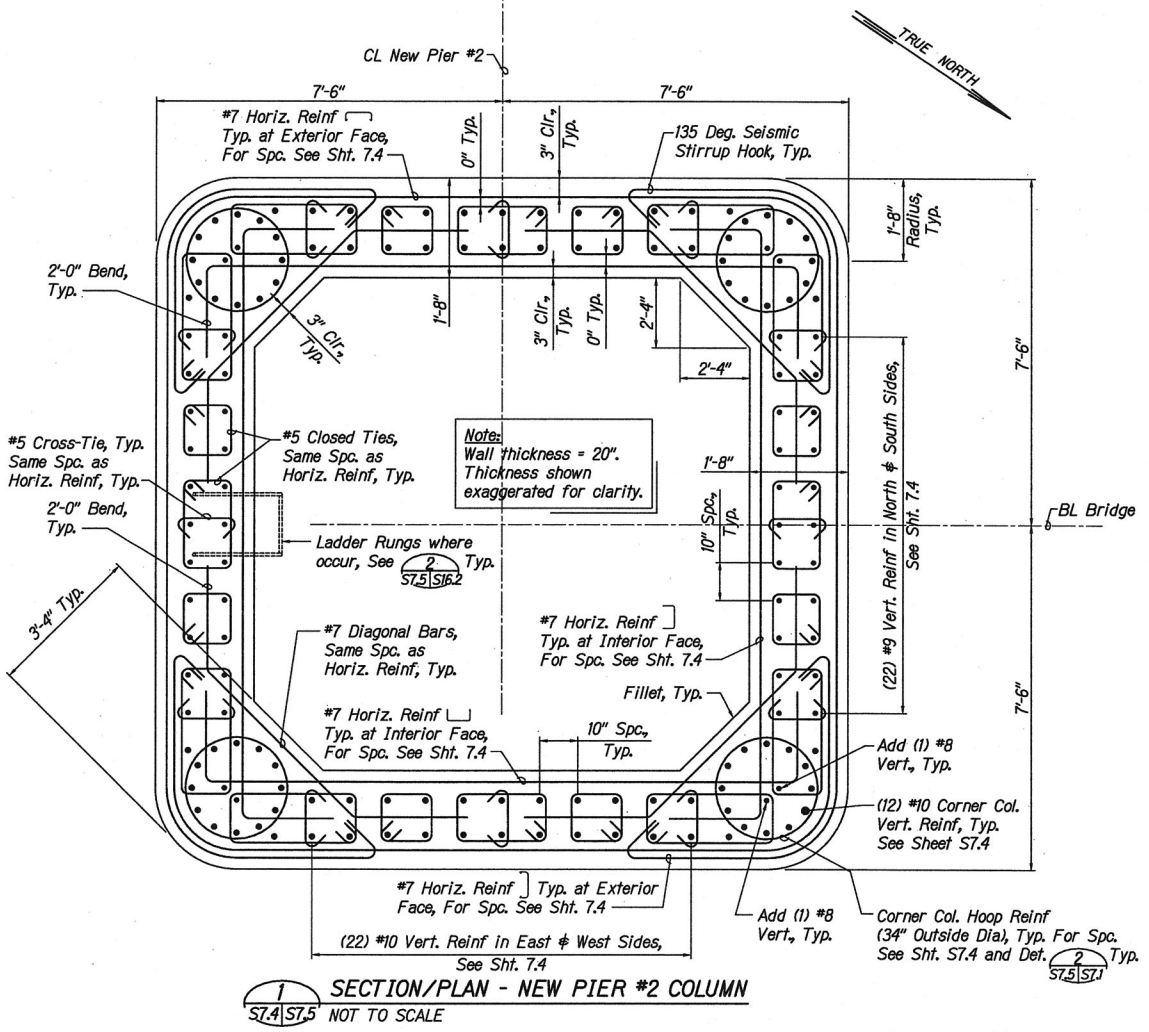
NEW PIER #2 - COLUMN ELEVATIONS & REINFORCING

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/8" = 1'-0" Date: July 18, 2012

SHEET No. S7.4 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	92	137



1 S7.4 S7.5 SECTION/PLAN - NEW PIER #2 COLUMN
NOT TO SCALE

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

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5478-S
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/14
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

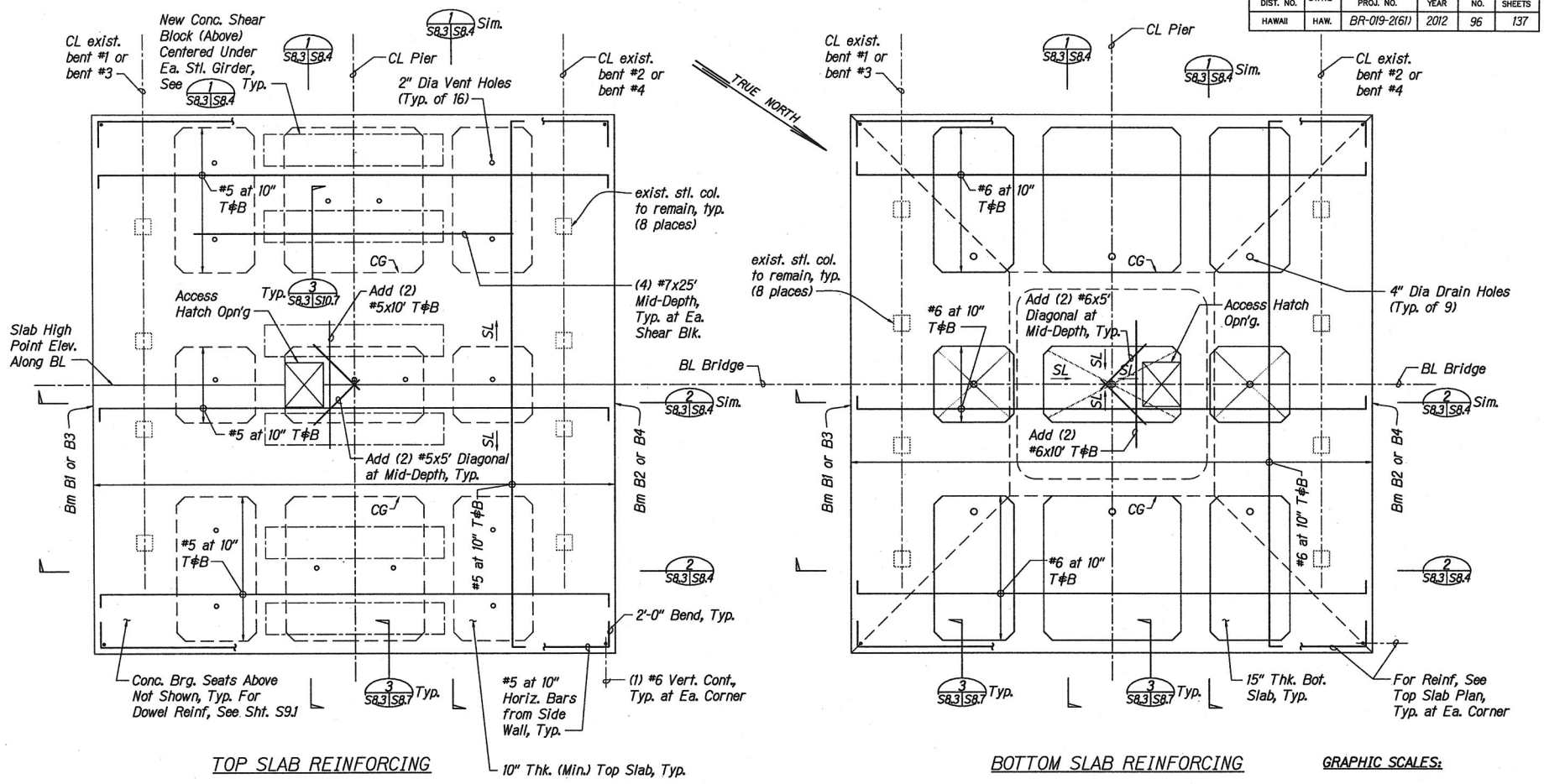
NEW PIER #2 COLUMN - SECTION

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 18, 2012

SHEET No. S7.5 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	96	137



TOP SLAB REINFORCING

BOTTOM SLAB REINFORCING

GRAPHIC SCALES:

0 6" 1' 2' 3' 5' 7' 9' 11'

1/4"=1'-0"

A ENLARGED PLAN - NEW PIER #1 & PIER #2 CAP SLAB REINFORCING

S8.1 & S8.2 S8.3 SCALE: 1/4" = 1'-0"

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

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/14
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIER #1 & #2 CAP SLAB REINFORCING PLAN

HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/4" = 1'-0" Date: July 18, 2012

SHEET No. S8.3 OF 9 SHEETS