Umauma Stream Bridge Rehabilitation

Hilo, Island of Hawai`i

Application for Section 401 Water Quality Certification for Discharge Associated with Construction Activities (CWB-WQC)

January 2012

Prepared For:

Department of Transportation
State of Hawai`i
869 Punchbowl Street
Honolulu, HI 96813

Prepared By:

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State of Hawaii
Department of Health
Clean Water Branch

CWB USE ONLY
WQC No.: _____ **Engineer:** _____
Date Received: _____

CWB-WQC Application

Information Required for the Section 401 Water Quality Certification (WQC)

Before completing this form, read the Guidelines for CWB-WQC Application.

☐ If mail is not received at the street address, provide the mailing address(es) in Item 14, Additional Information.

1. Owner Information (see Guidelines for CWB-WQC Application - Note 1)

   Legal Name: State of Hawai`i, Department of Transportation, Highways Division

   Street Address: 601 Kamokila Blvd., RM 688

   City, State and Zip+4 Code: Kapolei, Hawai`i 96707

   Contact Person & Title: Eddie Chiu, Department of Transportation Project Manager

   Phone No.: (808) 692-7547 Fax No.: (808) 692-7555

2. General Contractor Information (see Guidelines for CWB-WQC Application - Note 2)

   Name: To be submitted within seven (7) calendar days before the start of construction activities.

   Street Address: _____

   City, State and Zip+4 Code: _____

   Contact Person & Position Title: _____

   Phone No.: ( ) _____ Fax No.: ( ) _____

3. Emergency Contact Information (see Guidelines for CWB-WQC Application - Note 3)

   a. Company/Organization Name: Department of Transportation, Highways Division

      Contact Person & Title: Sal Panem, Hawai`i District Engineer

      Phone No.: (808) 933-8804 Phone No.: (808) 933-8875

   b. Company/Organization Name: Contractor to be submitted.

      Contact Person & Title: _____

      Phone No.: _____ Phone No.: _____

4. Project Site Information (see Guidelines for CWB-WQC Application - Note 4)

Project Name: Umauma Stream Bridge Rehabilitation

Government Project/Job No. (as applicable): Federal Aid Project No. BR-019-2(61)

Street Address: Hawaii Belt Road (Mile Post 15.8 to 16.3)

City, State and Zip+4 Code: Hilo, Hawai`i 96710

Contact Person & Title: Sal Panem, Hawai`i District Engineer

Phone No.: (808) 933-8804 Fax No.: (808) 933-8869

Island: *Hawai`i*

Tax Map Key Number(s)			
Zone	Section	Plat	Parcel(s)
3	1	001	Within R.O.W. (Adjacent to 15, 23-25, 30, 53)

5. Associated Permits or Licenses (see Guidelines for CWB-WQC Application - Note 5)

Provide the type(s), status, corresponding file number(s), and legal authorization(s) of any existing or pending permits or licenses:

a. Department of the Army (DA) Permit or License:
Provisional NWP 14 Granted (POH-2011-00098), CWA

b. Section 402 NPDES Permit: N/A

c. RCRA Permit (Hazardous Wastes): N/A

d. Facility on SARA 313 List (identify SARA 313 chemicals on site):

N/A

e. Other (Specify): CZM Approval (Ref. No. P-13383), see Appendix H attached
Draft Environmental Assessment (Published 10/23/2011), see Appendix C attached
Link:
http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2011-10-23-DEA-Umauma-Stream-Bridge.pdf

6. Receiving State Water Information (see Guidelines for CWB-WQC Application - Note 6)

a. Name: Umauma Stream
Classification: (check the appropriate space(s))

Inland:	Class 1 _____		Class 2 __X___		Estuary _____
Marine:	Class AA _____		Class A _____		Embayment _____

Describe the associated existing uses at the "discharge" location(s):

The existing use is for a State DOT Right-of-Way (ROW) with an existing steel bridge and footings. The site is in a State of Hawai`i Land Use District of Conservation. These are usually areas designated as necessary to protect watersheds, water sources, forests, or places of historic significance. The districts are administered by the State Board of Land and Natural Resources. Umauma Bridge was built in 1911, and is eligible for inclusion into the Hawai`i and National Register for Historic places. It is significant under the National Register criteria for its association with the Hilo Railroad Company, and is one of the few remaining steel girder and trestle bridges that represent the work of John Mason Young. Umauma Stream is not easily accessible to the public, nor is there sufficient flow for recreational uses such as swimming or fishing. The steep slope of this watershed and the narrow gulch characteristics of the site are dangerous to recreational users.

7. Project Description (see Guidelines for CWB-WQC Application - Note 7)

a. Project Site Coordinates

Bridge:
Latitude: 19° 54' 26.0'' N Longitude: 155° 08' 08.6" W

Upstream:
Latitude: 19° 54' 25.7'' N Longitude: 155° 08' 08.8" W

Downstream:
Latitude: 19° 54' 26.1'' N Longitude: 155° 08' 08.4" W

b. Describe the overall project scope and activities

The partially federally funded Umauma Stream Bridge project consists of rehabilitation and widening of the existing bridge located on Hawai`i Belt Road, Route 19 in the District of North Hilo. The bridge is approximately at Milepost 16.02 in the State Right of Way. The bridge's steel structure is severely oxidized and in need of replacement to avoid structural collapse. Construction will include site grading at the bridge footing for the proposed structure, grading at the bridge deck to transition from the wider bridge section to the existing pavement width, and grading of necessary slopes for the required shoulder and roadside appurtenances. A concrete footing for Pier 1 of 3 will be constructed as part of the bridge support system. The roadway pavement will be widened near the bridge connections and additional pavement will transition from the widened bridge to the existing pavement width. Proposed guardrails will replace the existing guardrails on each side of the roadway and at the bridge connections. The project serves to maintain the existing highway transportation services connecting Hilo to Hamakua, Waimea and Kailua-Kona, for which the only alternative routes are the Volcano or Saddle roads. The project will enhance bridge performance and safety, as well as improve the guardrail/crash cushions and roadway. See Draft Environmental Assessment in Appendix C (Section 2, pg. 4-17) for additional information.

c. Describe the "discharge" activity and the purpose of the proposed discharge activity

For work within the Ordinary High Water Mark (OHWM), dredged material (rock) will be removed for the proposed support footing. The rock to be removed will have very little if any water. All dredged material will be removed from behind sediment rolls or other containments and transported to South Hilo Sanitary Landfill to prevent discharge into the stream. No dredging of the stream is proposed and no future maintenance dredging is required. Fill material (concrete) for the footing will be placed within forms (to be removed after concrete has set) and behind silt containment devices. The location of the discharge/fill is at the footing location at Pier 1 of 3, which is located on the Hilo side of the stream. The work will be above the average stream flow and well above the ground water elevation.

For work outside of OHWM, potential discharge could result from the lead-based paint removal during the planned rehabilitation activities and the potential discharge of lead contaminated soil. More information about the existing lead concentrations and the contaminated locations is given in the next section (8.b.). The lead-based paint removal will be contained and limited to the areas disturbed by construction. The air will be tested daily for airborne lead concentrations, and water will be tested monthly.
Oil leaks from large scale equipment used for the bridge expansion and concrete footing could potentially discharge into the environment. Equipment will be heavily monitored and clean up equipment will be available on site.

d. List all "discharge" activities that the owner is seeking coverage for under this WQC application

The owner is seeking coverage for the dredging and subsequent cement replacement of the bridge footing within the OHWM.

e. Specify physical, chemical, biological, thermal, and any other pertinent characteristic of the "discharge" activity

The basalt rock to be dredged within the OHWM, has an approximate volume of 130 c.y. and a surface area of 440 s.f. The total volume for all excavated footings, including the work within the OHWM, is 385 c.y. of rock and 467 c.y. of soil. This will be disposed of on land at the South Hilo Sanitary Landfill and should not discharge into the stream. The concrete used for the bridge footing is a potential discharge while it is being poured and while it sets. The concrete, which will fill the dredged area, is of the same volume (130 c.y.) and surface area (440 s.f.) as the dredged material within the OHWM.

The potential lead discharge from the lead-based paint removal would be in the form of paint chips and dust. Lead is toxic and may cause health problems, even death. Mitigation efforts will be elaborated in Item 14 of this report.

The oil from large scale equipment will be petroleum based and will be cleaned immediately if a spill occurs to mitigate contaminated storm water runoff.

8. Description of the Existing Environment and Potential Environmental Effects from the Construction Activities (see Guidelines for CWB-WQC Application - Note 8)

a. Describe the Existing Physical Environment and Potential Physical Environmental Effects

The Umauma Bridge site and Umauma Stream are relatively natural and undeveloped. The substrate at this site is basalt. There is no tidal influence at this site and the stream consists of fresh water. The average water elevation adjacent to the proposed work area is 70 feet above mean sea level (MSL) and the work area is at 76 MSL. Umauma Stream is not listed as impaired in the State's 303(d) list. This area is not a groundwater recharge area and there is no history of contaminants/pollutants in the substrate. Air quality in this location is excellent, unaffected by any industrial contaminants. Other than passing vehicles on the highway and over the bridge, there are no contaminant sources, and the proposed construction will not affect air quality. There is a small removal of rock for the foundation of the footing and a small fill of reinforced concrete among a set of existing concrete footings which are being added and strengthened to support the aging bridge. Other than noise for which a Noise Variance was filed and a slight chance of concrete discharge, the proposed construction should not have any adverse impact on the physical environment. See Figures in Appendix A and the Draft Environmental Assessment in Appendix C (Section 3, pg. 18-41) for more information.

b. Describe the Existing Chemical Environment and Potential Chemical Environmental Effects

The soil and paint around the bridge site has been tested for hazardous materials. See Hazardous Materials Assessment in Appendix F for more information. The assessment concluded that there is no presence of asbestos in the area (pg. 4). However, lead-based paint with unacceptable levels of lead was detected in two samples (pg. 4). High levels of lead in the order of 4700 mg/kg were detected in the soil in one area around a concrete support on the north side of the bridge (pg. 5). This is well above 200 mg/kg, the DOH Tier 1 Environmental Action Level. Construction will include the application of new paint consisting of modified aluminum epoxy mastic coating and a polyurethane top coat. Prior to painting, loose rust and scale will be removed by hand or power tools, and steel surfaces will be coated with a solvent. See Construction Drawings in Appendix I, Sheet No. S17.1 for more information. Hazardous materials not disturbed by construction will not be removed. The lead-based paint detected on the existing concrete guardrail will be removed. The proposed construction will use standard Portland cement concrete and should not have any adverse chemical impact on the environment.

c. Describe the Existing Biological Environment and Potential Biological Environmental Effects

There are no listed, threatened or endangered species at the site. A small portion of the proposed additional footing is within the OHWM of the stream. Construction will not add any impediments to aquatic migration, but it does permanently reduce a few square feet of habitat. See Biological and Water Quality Surveys in Appendix E, pg. 6-11, for more information.

d. Describe the Existing Uses and Its Potential Effects

The site is in a State of Hawai`i Land Use District of Conservation. Therefore, it is a protected area determined by the Board of Land and Natural Resources. There are no structures at or near the site with the exception of the bridge itself, which is considered of historic significance. The design of the proposed project has been coordinated and found acceptable by the State Historic Preservation Division. See Appendix H, State of Hawaii DLNR Section 106 and Section 6E-8, HRS Review attached. There are no human uses at this site because of its ruggedness, inaccessibility, and lack of appealing features to recreational users, and the project will therefore not affect the existing uses.

9. Project Schedule (see Guidelines for CWB-WQC Application - Note 9)

a. Provide the estimated date or dates on which the activity will begin and end:

February 15, 2013 – February 12, 2015 (24 months)

b. Provide the date or dates that the discharge(s) will take place:

June 1, 2013 – June 12, 2013 (2 weeks)

10. Site-Specific Best Management Practices (BMP) Plan (see Guidelines for CWB-WQC Application - Note 10)

The BMPs Plan shall, at a minimum, include the following:

a. Maps are attached _X_ Yes (Appendix B) ___ No

b. Site Characterization

The site is located in a flood plain, and the location of one of the proposed footings is within the OHWM. The bridge support system is designed to withstand these high water levels. There is no tidal influence in the site and the freshwater stream flows down slope towards the ocean. The average water elevation adjacent to the proposed work area is 70 feet above mean sea level (MSL) and the work area is at 76 MSL. No stream gage data is available, but studies estimate the stream elevations to range from 76 MSL to 86 MSL during the 1-year and 100-year recurrence interval storm, respectively. There have been no problems with erosion near the site. This area is not a groundwater recharge area. The project does not convert wetlands or submerged areas to fast land (dry land). The proposed footing is approximately 275 feet inland of the shoreline and will be embedded in solid rock and thus there is no risk of coastal erosion.

In addition to the BMPs installed for the area within the OHWM, the general construction BMPs will include silt fences, a wash water trench, sediment rolls, rock barrier bags, temporary rockfall protection, slope stabilization, seeding and planting. A rain gage will also be installed to monitor weather conditions. For work above the stream banks, netting and filter cloth will be suspended below the work area to capture falling debris and prevent contamination of the stream. See Best Management Practices in Appendix B and the Draft Environmental Assessment in Appendix C (Section 3, pg. 19-21) for more information.

c. Construction Sequence and Duration

Task Name	Duration	Start	Finish
Site Preparation *Installation of BMPs* - *Silt Fence (for Road Construction only), Synthetic Sand/Rock Bags, Sediment Rolls*	66 days	2/15/13	5/14/13
Rock Fall Protection	66 days	2/29/13	5/28/13
Bridge Shoring	24 days	5/17/13	6/18/13
Pier Foundation Construction	143 days	6/1/13	1/17/14
Construction of Proposed Footing within OHWM - *Dredging, Installing Steel Rebar, Pouring Concrete*	45 days	6/1/13	7/30/13
Dredging for Proposed Footing within OHWM - *Dredging Basalt Rock Substrate*	10 days	6/1/13	6/12/13
Pier Column Construction	66 days	1/18/14	3/18/14
Pier Cap Construction	86 days	3/19/14	7/15/14
Mauka Side Bridge Demolition and Construction - New Abutments, New Girder, New Bridge Deck & Railing	88 days	1/1/14	3/31/14
Makai Side Bridge Demotion and Construction - New Abutments, New Girder, New Bridge Deck & Railing	77 days	3/3/14	6/17/14
Approach Slab Construction	20 days	5/24/14	6/21/14
New AC Pavement	18 days	6/22/14	7/14/14
New Approach Guardrails	38 days	5/24/14	7/14/14
Bridge Painting	61 days	5/24/14	8/17/14

Total project duration will be 2 years. Appropriate BMPs as indicated by Appendix B will be properly installed before construction. See Construction Drawings in Appendix I, Sheet No. S15.1, for further detail on the sequence of demolition and construction.

d. Construction Method

Dredging will be phased to maintain vertical support of existing footings. Support of existing footings during dredging activity may be accomplished by underpinning with braces and shoring. These braces will not extend into the stream. The proposed method of dredging utilizes relatively small equipment such as hand held jack hammers and compact excavators with limited lifting weight and height. This equipment is necessary to navigate in the limited working area that exists between steel trestles and shoring to be used during construction, and to prevent undermining of existing footing and maintain vertical support of the existing bridge. All major equipment to be used for the footing and the roadway pavement includes a crane, excavator, hydraulic hammer, pneumatic compactor, cold planer, paving skid, concrete truck, and haul truck. The crane bucket will transport excavated materials directly from the stream bed to the bed of the truck with no stock piling.

e. Characteristics of the discharge and potential pollutants associated with the proposed construction activity

Source	Composition	Quantity	Duration
Concrete	Portland Cement/Basalt aggregate/sand	130 c.y.	Permanent
Synthetic Sand Bag/Rock Bag	Burlap/Sand/Rock	200 bags	6 months
Sediment Roll	Polypropylene/Straw/ Coconut Fiber/Wood	45 c.f.	6 months
Form Boards	Wood/Metal (not chemically treated)	720 s.f.	6 months

f. Characteristics of the dredged/excavated material

Source	Composition	Quantity	Duration
Rock	Basalt	385 c.y.	1 month
Soil	Clayey Silt	467 c.y.	1 month

g. Proposed control measures and/or treatment

All dredged material will be removed from behind sediment rolls or sand/rock bags. The rock and soil will be transported to South Hilo Sanitary Landfill. The work will be above the average stream flow and well above groundwater elevation. The concrete fill material will be placed within forms (to be removed after concrete has set) and behind silt containment devices. See Best Management Practices in Appendix B for more information. For construction done on the bridge at roadway level, the contractor will be equipped with spill prevention and cleanup supplies on site. All required maintenance and fueling will be performed off site. The contractor shall not allow personnel or equipment to cross the wetted portions of the stream bed.

A silt fence will be installed in the south end of the construction site separating the south end of the bridge from the stream. Due to the basaltic rock foundation towards the north bank of the stream, a silt fence would be impractical to install. A wash water trench will also be located on the south end of construction near the construction equipment and material storage area.

11. Applicable Monitoring and Assessment Plan (see Guidelines for CWB-WQC Application - Note 11)

The Applicable Monitoring and Assessment Plan shall, at a minimum, include the following:

a. Description of the methods and means being used or proposed to monitor the quality and characteristics of the discharge

See Applicable Water Quality Monitoring and Assessment Plan in Appendix D

b. Description of the methods and means being used to monitor/maintain all pollutant control measures

See Appendix D

c. Reporting requirements

See Appendix D

d. A narrative of how the monitoring results will be used to demonstrate whether or not the project construction activity was in compliance with the applicable State water quality standards

See Appendix D

12. Mitigation/Compensation Plan (see Guidelines for CWB-WQC Application - Note 12)

Through implementation of the site-specific BMPs, there will be no adverse impacts on aquatic resources at this site. Therefore, a mitigation plan would not be required.

13. Supporting Documents (see Guidelines for CWB-WQC Application - Note 13)

List and submit applicable maps, plans, specifications, copies of associated permits or licenses, federal applications, Environmental Assessments or Environmental Impact Statements, as applicable, etc.

	Document Title	Document Date
a.	Appendix A – Figures (Maps, Photographs)	04/2011
b.	Appendix B – Best Management Practices (BMPs)	03/18/11
c.	Appendix C – Draft Environmental Assessment (EA)	10/2011
d.	Appendix D – Applicable Water Quality Monitoring and Assessment Plan	12/2011
e.	Appendix E – Biological and Water Quality Surveys (AECOS)	04/13/11
f.	Appendix F – Hazardous Materials Assessment (Bureau Veritas)	04/16/10
g.	Appendix G – Army Corps of Engineers 404 Permit Application	04/01/11
h.	Appendix H – Correspondence Letters	
i.	Appendix I – Construction Drawings	03/03/11

14. Additional Information (see Guidelines for CWB-WQC Application – Note 14)

The proposed work within the OHWM will only take place during low stream flow. The project site specific BMP's and monitoring plan will almost eliminate the possibility of pollutants discharging to the stream.

Lead Mitigation

Construction will disrupt the lead based paint on the existing bridge and the lead contaminated soil below the bridge. The lead-in-soil concentrations are above the State DOH Tier 1 Environmental Action Level and special measures will be taken to prevent lead from entering the surrounding environment. The contractor will provide all the labor and equipment for removal, handling and disposal.

All removal efforts will be conducted under the direction of an experienced Certified Industrial Hygienist (CIH) provided and paid for by the State. The CIH will review and approve the lead removal procedure. An Industrial Hygiene Technician (IHT) will also oversee operations, primarily monitoring workers and their exposure to the lead. The least toxic approved paint removal products and recycled/recyclable steel abrasives will be used.

The contractor will submit a Hazardous Waste Management report 45 calendar days after the award of contract, which will include such things as a baseline testing procedure, removal procedures, methods for transporting and disposing of the materials, and site clean-up procedures. A Lead Removal Plan will also be submitted, which will include details on a mechanical ventilation system, a collected wastewater and paint debris disposal plan, and the methods of containing airborne toxins. A laboratory will be contracted to test the airborne lead concentrations.

Much of the mitigation plan will be dependent on the contractor, who will follow EPA and State DOH guidelines. Special care will be taken to ensure the health and safety of the workers, including regular medical examinations as mandated by the Hawai`i Occupational Safety and Health Standards. Workers will be issued negative pressure respirators as well as disposable body protection suits. Refer to the "Umauma Specifications, Section 695 – Lead in Construction" for more information regarding lead removal.

15. Statement of Choice of Publication (see Guidelines for CWB-WQC Application - Note 15)

Check One:

_X_ Public Notice of Proposed Action

___ Public Notice of Public Hearing

___ Not Applicable. The applicant is seeking WQC coverage under authorization of WQC File No. _____ for a DA permit authorization under the following (provide applicable information):

DA NWP No. _____

DA GP No. _____

DA PGP No. _____

16. Authorization of Representative (see Guidelines for CWB-WQC Application - Note 16)

Check one and complete the appropriate space(s). Alteration of this item will result in the invalidation of the authorization statement(s).

a. This statement authorizes the named individual or any individual occupying the named position of the company/organization listed below to act as our representative to process the required Section 401 WQC Application to discharge to navigable waters from the subject project. The Owner hereby agrees to comply with and be responsible for all Section 401 WQC conditions.

Company/Organization Name: Department of Transportation, Highways Division

Street Address : 869 Punchbowl Street

City, State and Zip Code+4: Honolulu, Hawai`i 96813-5097

Authorized Person & Title: Alvin A. Takeshita, Interim Administrator, Highways Division

Phone No.: (808) 587-2220 Fax No.: (808) 587-2340

b. This statement authorizes the named individual or any individual occupying the named position of the company/organization listed below to act as our representative to process the required Section 401 WQC Application to discharge to navigable waters from the subject project. Our representative is further authorized to fulfill all conditions of the Section 401 WQC. The Owner hereby agrees to comply with and be responsible for all Section 401 WQC conditions.

Company/Organization Name: N/A

Street Address : _____

City, State and Zip Code+4: _____

Authorized Person & Title: _____

Phone No.: ( ) _____ Fax No.: ( ) _____

c. This statement authorizes the named individual or any individual occupying the named position of the company/organization listed below to act as our representative to fulfill all conditions of the Section 401 WQC for the subject project. The Owner hereby agrees to comply with and be responsible for all Section 401 WQC Conditions.

Company/Organization Name: Department of Transportation, Highways Division

Street Address : 50 Maka'ala Street

City, State and Zip Code+4: Hilo, Hawai`i 96720

Authorized Person & Title: Sal Panem, Hawai`i District Engineer

Phone No.: (808) 933-8804 Fax No.: (808) 933-8869

d. A separate statement is attached. Yes _____ No __X_____

17. Certification (see Guidelines for CWB-WQC Application - Note 17)

Alteration of this item will result in the invalidation of this application. **The person certifying this CWB-WQC Application must meet one of the following descriptions and be employed by the owner listed in Item 1.**

___ I certify that for a municipal agency, I am a principal executive officer or ranking elected official.

_X_ I certify that for a state agency, I am a principal executive officer or ranking elected official.

___ I certify that for a federal or other non-federal public agency, I am a principal executive officer or ranking elected official.

___ I certify that for a federal agency, I am the chief executive officer of the agency, or I am the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

___ I certify that I am a general partner for a partnership.

___ I certify that I am the proprietor for a sole proprietorship.

___ I certify that for a corporation or association, I am the President, Vice President, Secretary, or Treasurer of the corporation or association and in charge of a principal business function, or I perform similar policy or decision making functions for the corporation or association:

___ I certify that for a corporation, I am the Manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), and authority to sign documents has been assigned or delegated to me in accordance with corporate procedures.

___ I certify that for a trust, I am a trustee.

In accordance with the State of Hawaii, Department of Health, Water Quality Standards, there is reasonable assurance that the proposed activity will be conducted in such a manner which will not violate the basic water quality criteria applicable to all waters and the specific water quality criteria applicable to the class of navigable waters where the proposed "discharge" would take place.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____ Date: JAN 18 2012

Printed Name & Title: Glenn Okimoto, Ph.D., Director of Transportation

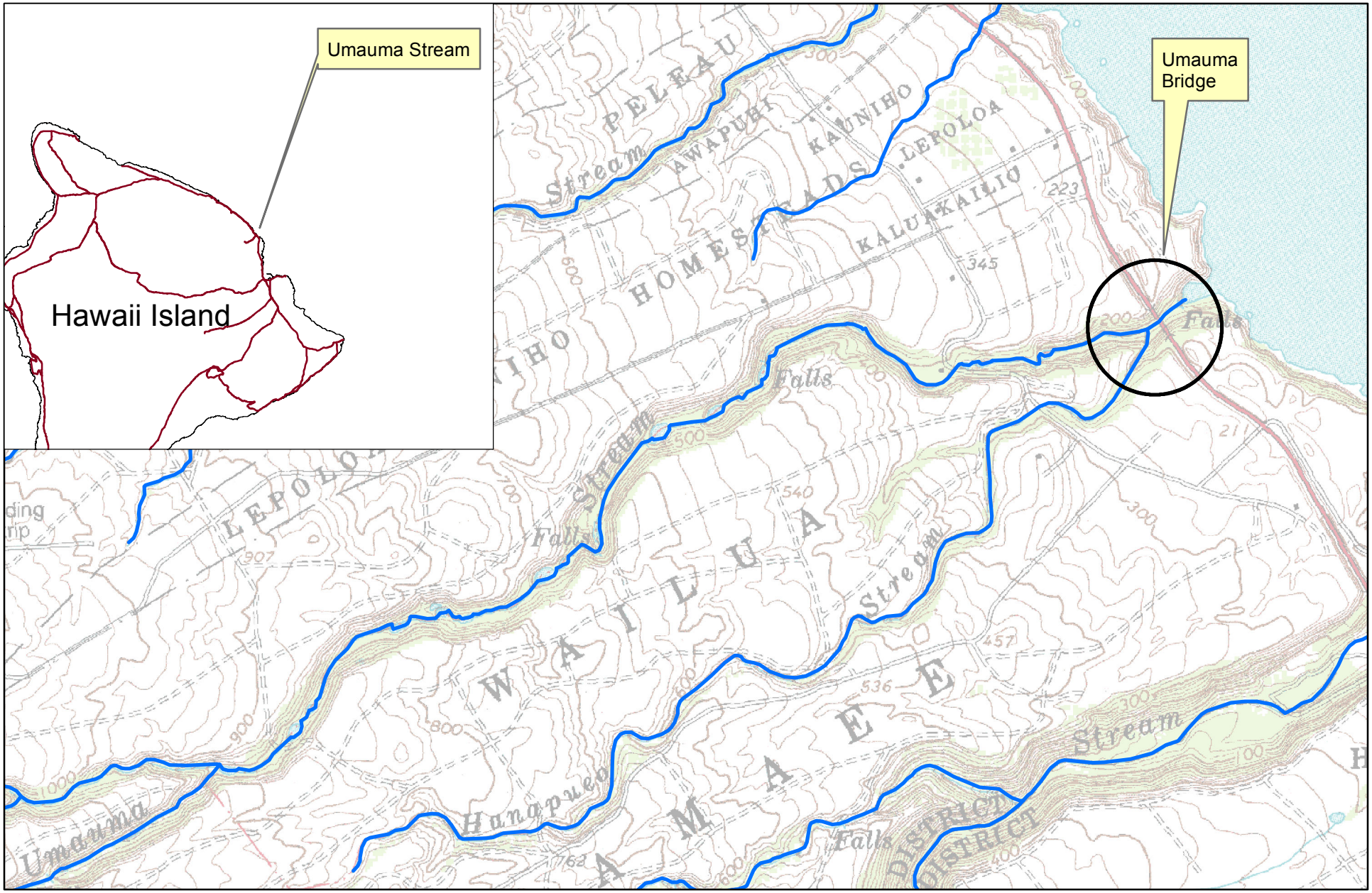
Company/Organization Name: State of Hawai`i, Department of Transportation

Phone No.: (808) 587-2150 Fax No.: (808) 587-2167

CWB-WQC Application Checklist		
If any item is listed as "no," attach a sheet with the reason for its exclusion from the Section 401 WQC Application submittal.		
Item Number	**Description**	**Is item addressed? (yes/no)**
1.	Owner Information	yes
2.	General Contractor Information	no
3.	Emergency Contact Information	yes
4.	Project Site Information	yes
5.	Associated Permits or Licenses	yes
6.	Receiving State Water Information	yes
7.	Project Description	yes
8.	Description of the Existing Environment and Potential Environmental Effects from the Construction Activities	yes
9.	Project Schedule	yes
10.	Site-Specific BMPs Plan	yes
11.	Applicable Monitoring and Assessment Plan	yes
12.	Mitigation/Compensation Plan	yes
13.	Supporting Documents	yes
14.	Additional Information	yes
15.	Statement of Choice of Publication	yes
16.	Authorization of Representative	yes
17.	Certification	yes
18.	Filing Fee ($1000.00) is attached	yes
19.	Number of copies with supporting documents submitted	
	a. One (1) copy for projects on Oahu with owner's original signature	yes
	b. Two (2) copies for projects on islands other than Oahu (one with owner's original signature)	yes

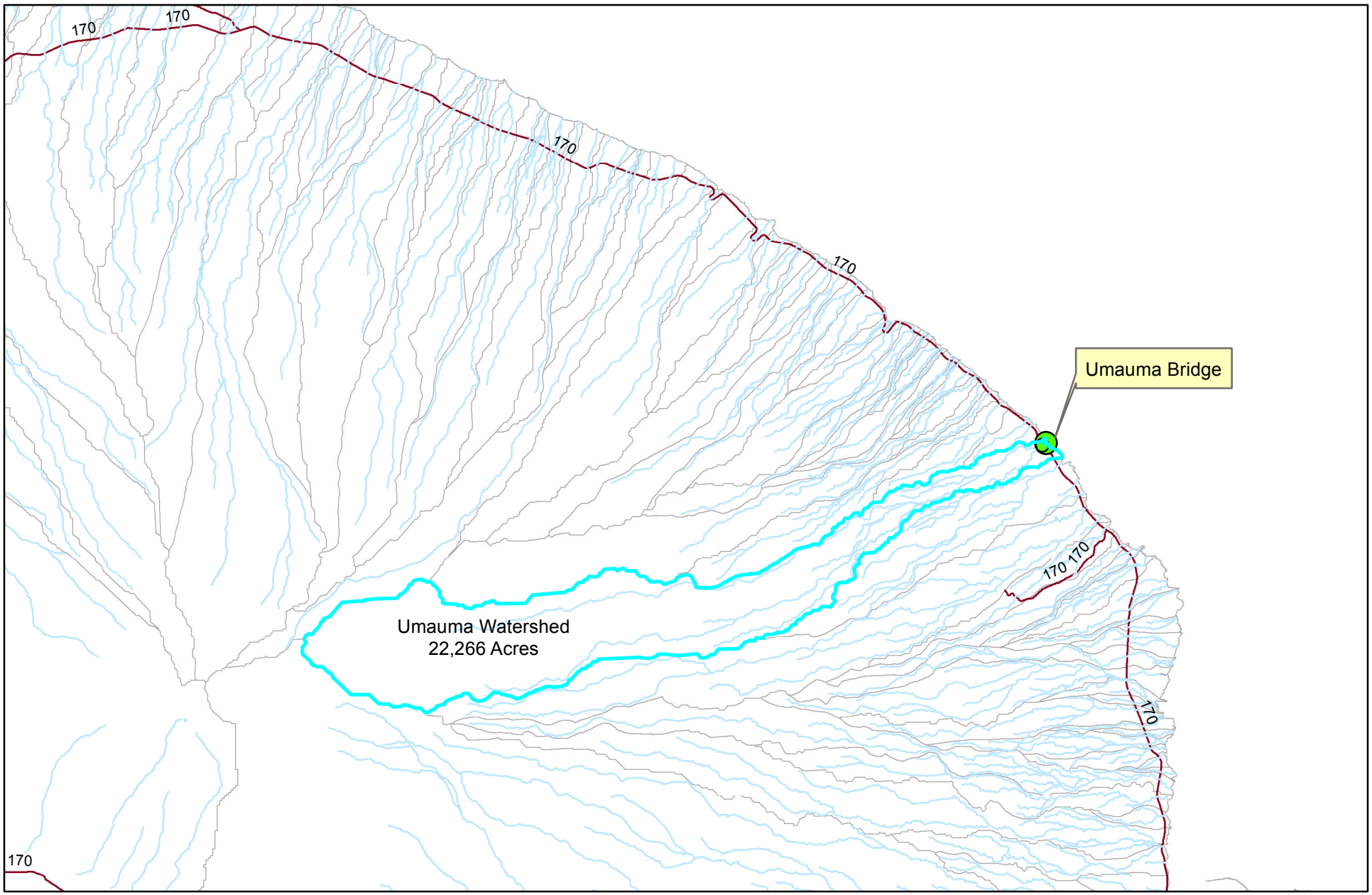
APPENDIX A

FIGURES (MAPS, PHOTOGRAPHS)



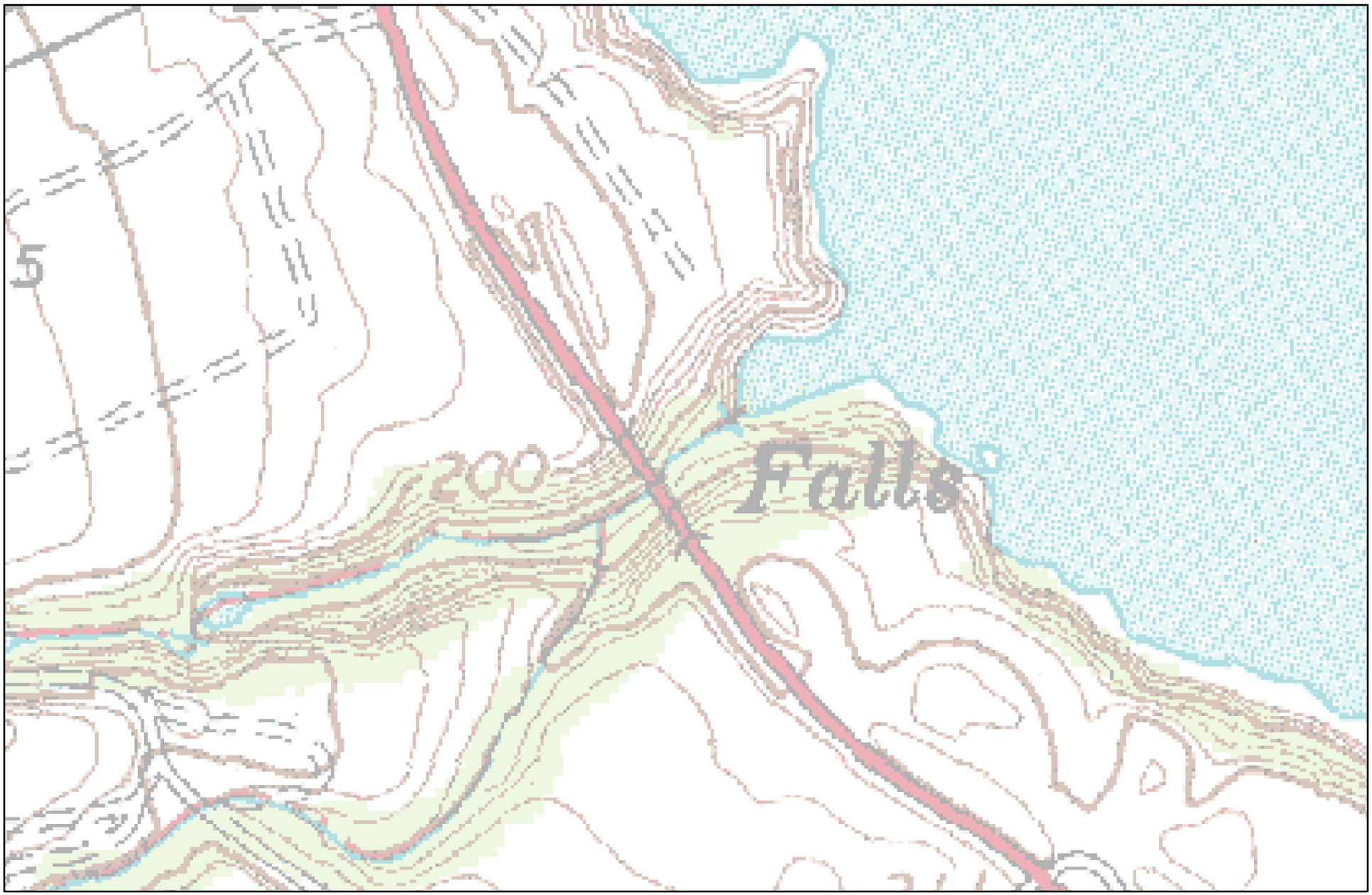
Location
Umauma Bridge

Map: E. Dashiell, AICP Honolulu, 04/01/11



Watershed
Umauma Bridge

Map: E. Dashiell, AICP Honolulu, 04/01/11



NORTH

500 250 0 500 Feet

USGS
Umauma Bridge

Map: E. Dashiell, AICP Honolulu, 04/01/11

TMK
Umauma Bridge

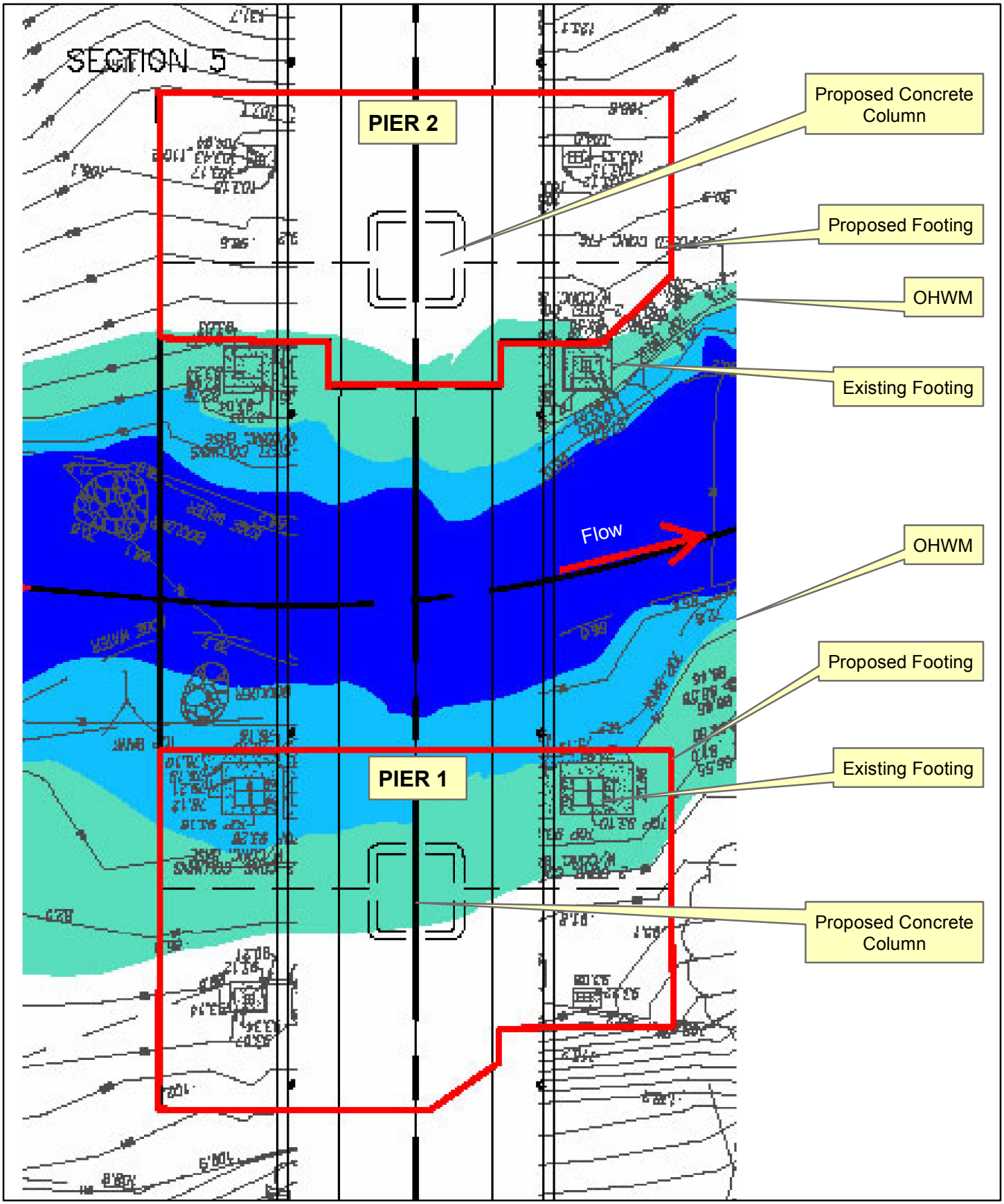
E. Dashiell, AICP, Honolulu, 04/25/11

NORTH

500 250 0 500 Feet

Aerial Image
Umauma Bridge

Map: E. Dashiell, AICP Honolulu, 04/01/11



Not to scale.

Notes: Areas outlined in red are proposed new concrete footings.
Intersection of light blue and green is considered the OHWM.

Footings & OHWM
Umauma Bridge

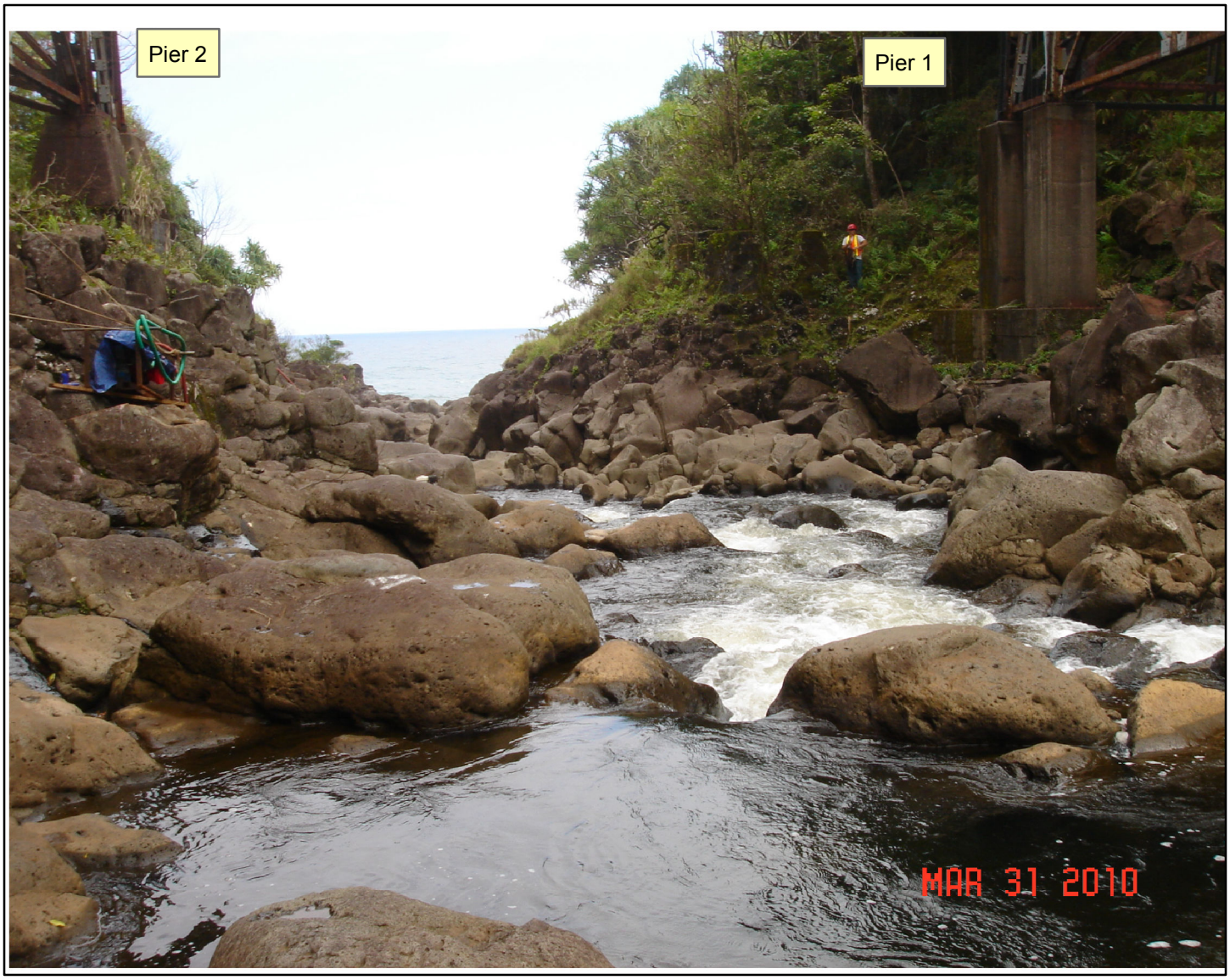
E. Dashiell, AICP Honolulu, 04/12/11

PIER 1
Footing in foreground is in OHWM
Umauma Bridge Rehabilitation

E. Dashiell, AICP, Honolulu, 04/25/11

Pier 1
View Downstream
Umauma Bridge Rehabilitation

E. Dashiell, AICP, Honolulu, 04/25/11



View Downstream

Umauma Bridge Rehabilitation

E. Dashiell, AICP, Honolulu, 04/25/11

APPENDIX B

BEST MANAGEMENT PRACTICES (BMPS)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	17	130

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.

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

Plotted: Thu, 27 Jan 2011 02:34pm By: BOMARWELL
File Name: H:\FY2008\08016 Umauma Bridge\07 Drawings\C-01 - C-03 UMAUMA - General Construction Notes.dwg

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

LICENSE EXPIRES: 4/30/10

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL NOTES

HAWAII BELT ROAD
REHABILITATION OF UMAUMA
STREAM BRIDGE

Scale: None Date: March 18, 2011

SHEET NO. C-2 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	18	130

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. NPDES Permit for Construction Activities
b. NPDES Permit for Construction Dewatering
c. NPDES Permit for Hydrotesting Waters
d. Water Quality Certification
e. Stream Channel Alteration Permit
f. Section 404 Army Corps of Engineer Permit

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL NOTES

HAWAII BELT ROAD
REHABILITATION OF UMAUMA
STREAM BRIDGE

Scale: None Date: March 18, 2011

SHEET NO. C-3 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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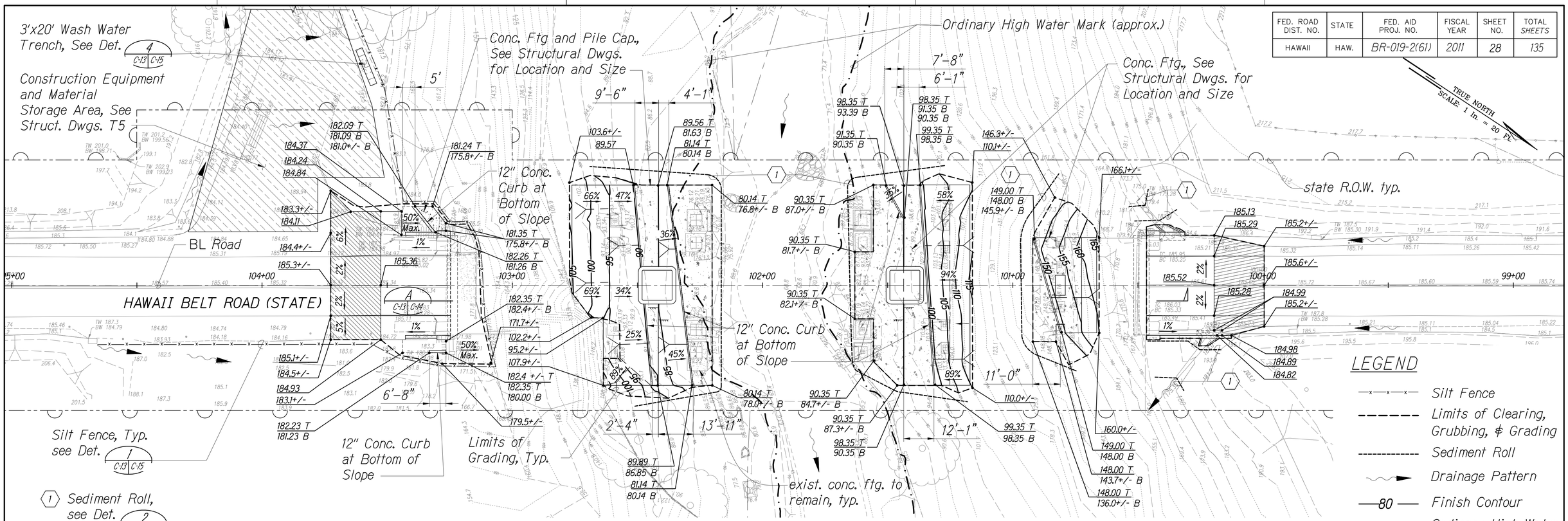

GRADING AND EROSION CONTROL PLAN
SCALE: 1" = 20'

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'

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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: Oct. 10, 2011

SHEET No. C-13 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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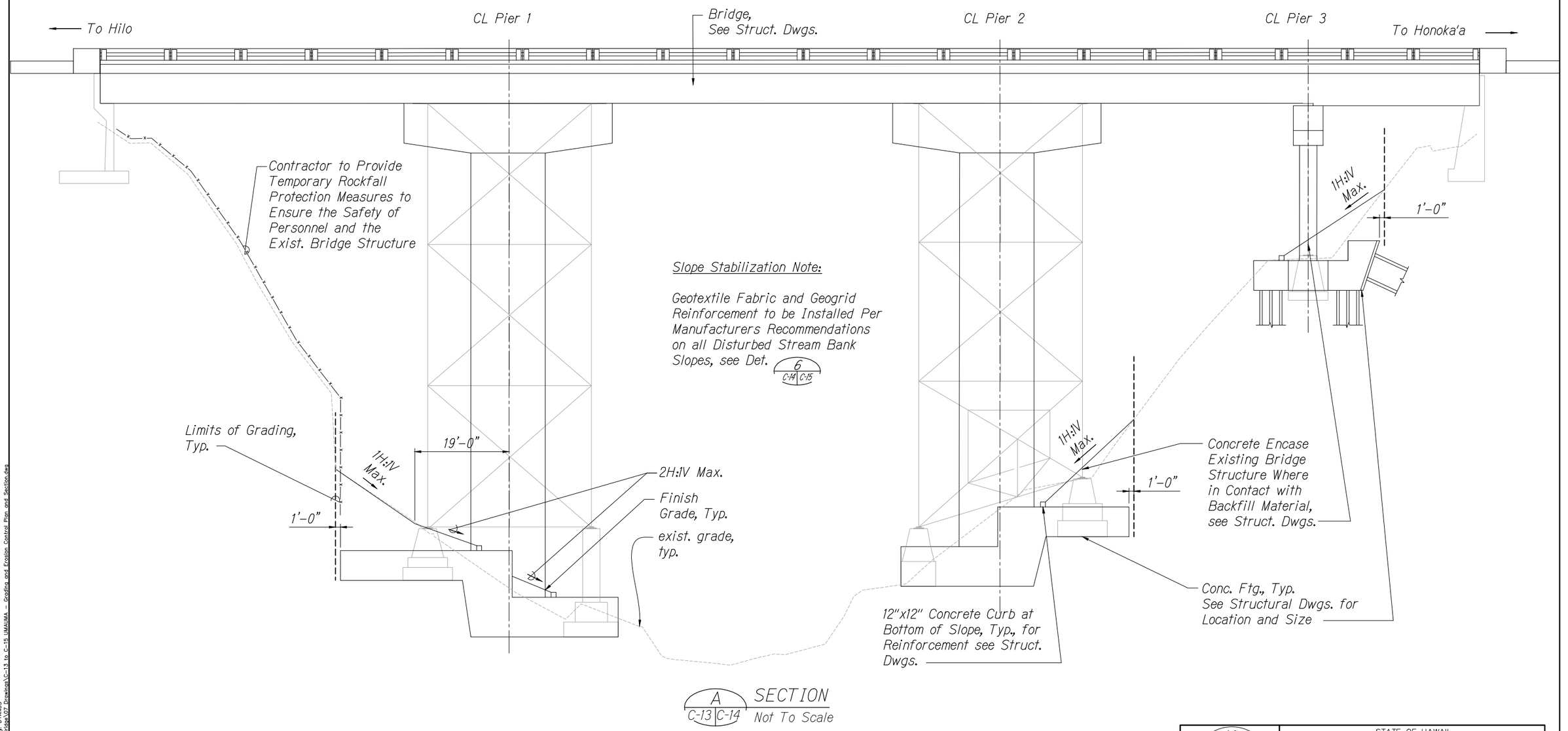

A C-13 C-14 SECTION
Not To Scale

ORIGINAL PLAN

NOTEBOOK No.

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

Plotted: May 10, 2011 4:19pm By: DYANOS
File Name: H:\FY2008\08016 Umauma Bridge\07 Drawings\C-13 to C-15 UMAUMA - Grading and Erosion Control Plan and Section.dwg

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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: Oct. 10, 2011

SHEET No. C-14 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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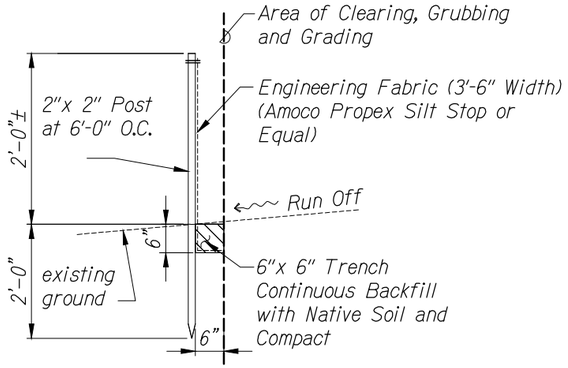

1 C-13 C-15 TYPICAL SILT FENCE DETAIL

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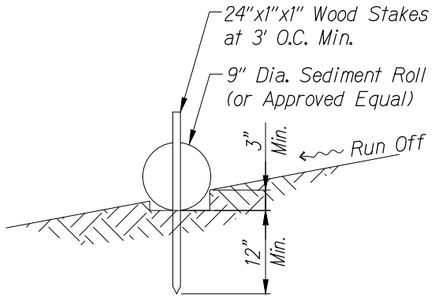
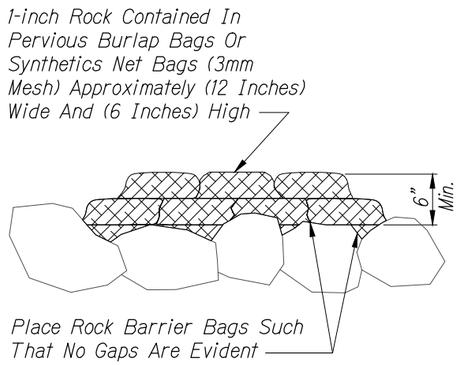


NOTE:
If the site topography does not allow for bottom of sediment roll to be continuously installed 3" below adjacent grade, contractor shall use rock barrier bags per detail 3 C-15 C-15

2 C-13 C-15 SEDIMENT ROLL DETAIL

Not To Scale



3 C-15 C-15 ROCK BARRIER BAG DETAIL

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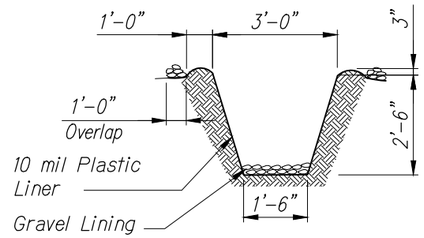

4 C-13 C-15 WASH WATER TRENCH DETAIL

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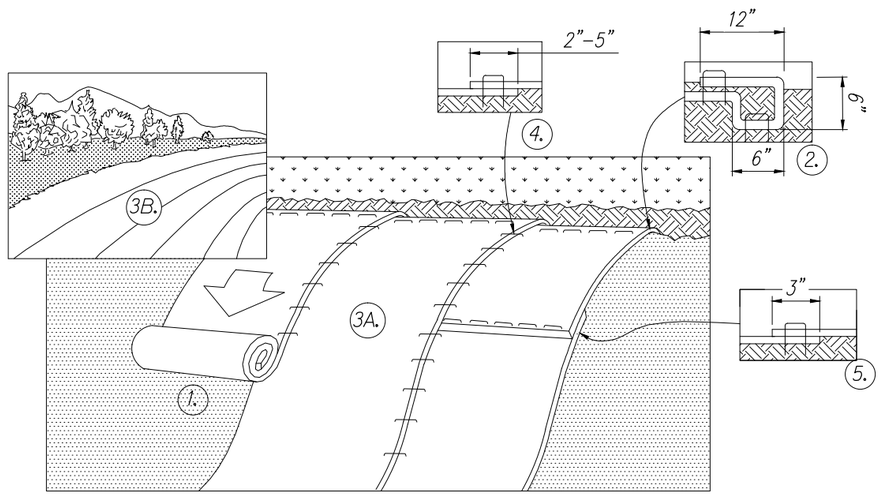
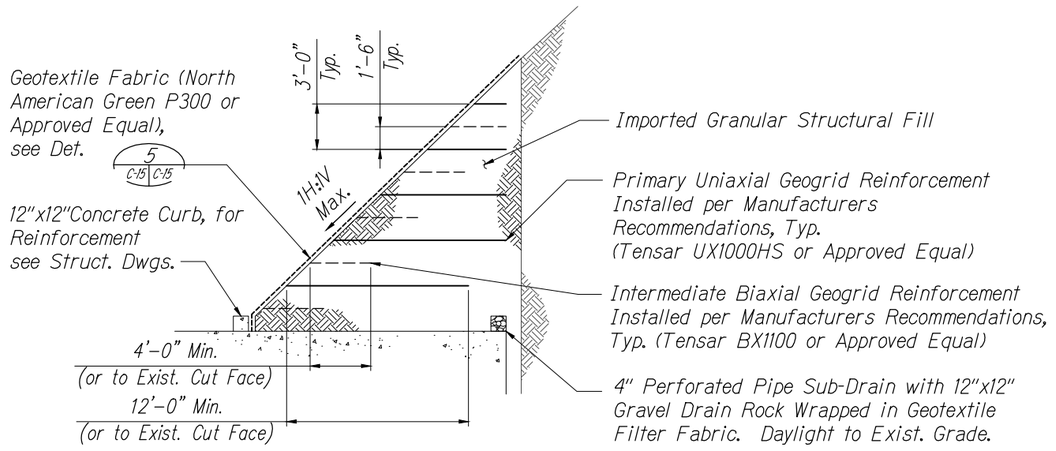


1. Prepare Soil Before Installing Rolled Erosion Control Products (Recp's), Including Any Necessary Application Of Lime, Fertilizer, And Seed.
2. Begin At The Top Of The Slope By Anchoring The Recp's In A 6" Deep X 6" Wide Trench With Approximately 12" (30cm) Of Recp's Extended Beyond The Up-slope Portion 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.

5 C-14, C-15 C-15 GEOTEXTILE FABRIC INSTALLATION DETAIL

NOT TO SCALE



6 C-14 C-15 TYPICAL SLOPE STABILIZATION DETAIL

NOT TO SCALE

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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)

Scale: None Date: Oct. 10, 2011

SHEET No. C-15 OF 19 SHEETS

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

DRAFT ENVIRONMENTAL ASSESSMENT (EA)

DRAFT ENVIRONMENTAL ASSESSMENT

REHABILITATION OF UMAUMA STREAM BRIDGE PROJECT

District of North Hilo, Island of Hawai'i
Federal Project No. BR-019-2(61)

State of Hawai'i
Department of Transportation, Highways Division

October 2011

Rehabilitation of Umauma Stream Bridge Project
Federal-Aid Project No. BR-019-2(61)
District of North Hilo, Hawai‘i Island, Hawai‘i Belt Road

Draft Environmental Assessment

This environmental document has been prepared pursuant to
Chapter 343, Hawai‘i Revised Statutes
and Hawai‘i Administrative Rules, Title 11, Chapter 200

Proposing Agency:

State of Hawai‘i
Department of Transportation, Highways Division
601 Kamokila Boulevard, Room 688
Kapolei, Hawai‘i 96707

October 2011

PROJECT SUMMARY INFORMATION

PROJECT:	Hawai‘i Belt Road, Rehabilitation of Umauma Stream Bridge, District of North Hilo, Island of Hawai‘i, Federal-Aid Project No. BR-019-2(61)
PROPOSING AGENCY:	State of Hawai‘i Department of Transportation, Highways Division 601 Kamokila Boulevard, Room 688 Kapolei, Hawai‘i 96707 Contact: Eddie Chiu, 808-692-7547
FEDERAL AUTHORITY:	Federal Highway Administration (FHWA)
LOCATION:	Hawai‘i Belt Road, District of North Hilo, Island of Hawai‘i, approximately at Milepost 16.02, State Right-of-Way. Construction Staging on TMK (3) 3-1-01:15
PROPOSED PROJECT:	The proposed project is to construct bridge widening and structural rehabilitation of the existing historic Umauma Bridge. The existing bridge would remain open and in use as the improvements are constructed.
HRS CH. 343 TRIGGER:	Use of state lands and state funds; historic site
STATE LAND USE DESIGNATION:	Conservation
EXISTING ZONING:	State Right-of-Way through areas zoned Agricultural District (AG-20)
SPECIAL MANAGEMENT AREA:	Within SMA
ANTICIPATED DETERMINATION	Finding of No Significant Impact (FONSI)

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FIGURES

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PHOTOGRAPHS

1 INTRODUCTION

1.1 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

The evaluation of projects to determine their effects on the environment is required by the Hawai'i Revised Statutes (HRS), Chapter 343. An Environmental Assessment (EA) is a "written evaluation to determine whether an action may have a significant effect" (HRS §343-2). The agency with primary responsibility over the project (the proposing agency) is required to prepare an EA and makes a final determination according to significant impacts, or lack of significance. As stated in HRS §343-1:

> An environmental review process will integrate the review of environmental concerns with existing planning processes of the State and counties, and alert decision makers to significant environmental effects which may result from the implementation of certain actions. …The process of reviewing environmental effects is desirable because environmental consciousness is enhanced, cooperation and coordination are encouraged, and public participation during the review process benefits all parties involved and society as a whole.

As described above, the basic purpose of an EA is to provide information to the public and decision makers on proposed actions. The EA must also disclose: potential significant adverse environmental impacts, the expected primary and secondary consequences, and the cumulative as well as the short and long-term effects of the action.

1.2 PROJECT OVERVIEW AND PROJECT NEED

The State of Hawai'i, Department of Transportation, Highways Division (DOT), with funding assistance from the Federal Highway Administration (FHWA), plans to construct bridge widening and structural rehabilitation of the existing historic Umauma Bridge. Improvements include construction of concrete support columns to be placed within and adjacent to the existing steel support towers, widening of the bridge deck and roadway shoulders, and construction of a new concrete railing.

The existing Umauma Bridge was constructed in 1911. In the early 1950s, the bridge, including the trestles, was widened to support a two-lane highway for vehicular traffic. The bridge was retrofitted in the early 2000s to resist updated earthquake design loads. Umauma Bridge is a historic bridge and under the jurisdiction of the State Historic Preservation Division (SHPD). The steel framed Umauma Bridge is showing signs of steel deterioration. Repair and maintenance projects have been completed and are currently in progress to minimize steel deterioration. The proposed rehabilitation project would install new concrete towers that would support bridge loads, and existing steel towers would become non-structural, as the new concrete piers would be the primary load carrying elements.

The proposed project would also improve safety and correct existing roadway deficiencies. The removal of the existing sidewalks and bridge railings, the widening of the bridge deck and constructing new bridge railings (which conform to current acceptable standards) along both

sides of the bridge would improve the safety for high-speed vehicular traffic by eliminating a vaulting hazard that a sidewalk would present. Also, wider shoulders and taller bridge railings along both sides of the bridge would improve the safety for bicyclists and pedestrians.

The State DOT has identified the following objectives of the Rehabilitation of Umauma Stream Bridge Project:

- To rehabilitate the deteriorating, steel framed Umauma Bridge while satisfying SHPD historical requirements.
- To bring the bridge roadway in compliance with FHWA regulations and current safety standards.

1.3 FEDERAL AND STATE AUTHORITY

The proposed action will utilize funding from both federal and state agencies, including the FHWA and DOT. There will be an 80 percent contribution by FHWA funds, and 20 percent contribution by the State. Because there is both federal and state funding for the project, it is subject to both federal and state environmental laws and regulations.

Environmental review procedures required by the State of Hawai‘i include compliance with HRS §343, and Hawai‘i Administrative Rules (HAR), Title 11, Department of Health. A Categorical Exclusion (CE) pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended, is anticipated for this project.

1.4 STEPS IN THE ENVIRONMENTAL REVIEW PROCESS

Following completion of the Draft EA, the environmental document is submitted the State Office of Environmental Quality Control (OEQC). OEQC will notify government agencies and the public when the Draft EA is available for review. The announcement is made in a bimonthly bulletin called the OEQC *Environmental Notice*, which is available in print and online. Publication in the *Environmental Notice* marks the beginning of a 30-day comment period during which government agencies and the public can review and comment on the environmental document and its findings. After the 30-day review period, DOT will consider all comments and determine whether a Finding of No Significant Impact (FONSI) is appropriate.

1.5 PERMITS AND APPROVALS REQUIRED OR POTENTIALLY REQUIRED

Government permits required or potentially required to implement the proposed action are listed below:

STATE OF HAWAI‘I

Department of Transportation

- Preparation and approval of an Environmental Assessment – The DOT will act as the approving agency for the proposed action and will have authority to determine if the EA is adequate and whether a FONSI is appropriate.

Office of Planning

- Coastal Zone Management (CZM) Federal Consistency Certification – Consistency Verified August 26, 2011

State Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL)

- Conservation District Use Application (CDUA) (**not required**) – The majority of the work would take place within the State right-of-way, and the staging area is on the mauka side of the road and is outside of OCCL jurisdiction. Further, rehabilitation of the bridge appears to be the continued use of a nonconforming structure, and a CDUA would not be required.

Department of Health

- Section 401, Clean Water Act (CWA) – anticipated Water Quality Certification for Nationwide Permit 14
- National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Stormwater Activities (**not required**) – since construction activities would disturb approximately 0.87 acres (less than one acre of total land area), including construction staging area, an NPDES permit would not be required.
- Noise Permit
- Noise Variance

Hawai‘i Commission on Water Resources

- Stream Channel Alteration Permit (SCAP)

COUNTY OF HAWAI‘I

- Construction Permits – Grading and Grubbing
- Special Management Area Permit (SMA) (**not required**) – the proposed bridge rehabilitation project would be considered repair of a highway within an existing right-of-way, and would be considered exempt from SMA permit requirements.

FEDERAL

U.S. Army Corps of Engineers

- Department of Army Permit, Section 404, Clean Water Act – Nationwide Permit Verification issued August 17, 2011.

2 PROJECT DESCRIPTION

2.1 ENVIRONMENTAL SETTING

PROJECT LOCATION

The project site is located on the Hawai'i Belt Road (Highway No. 19) at approximately milepost 16.02 in the North Hilo District, Hawai'i Island (see Figure 1). The Umauma Stream Bridge carries the Hawai'i Belt Road over Umauma Stream, along the Hāmākua Coast (see Photo 1). The bridge is located entirely within the State right-of-way.

EXISTING CONDITIONS

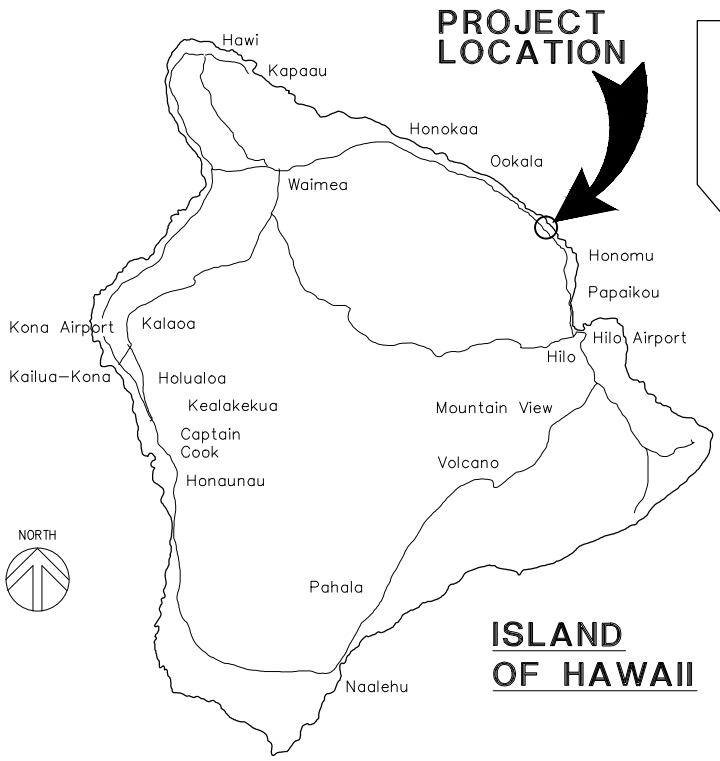
Umauma Bridge is a steel girder and trestle bridge (see Photo 2) built over Umauma Stream. The superstructure is concrete deck on steel girder and the substructure is steel girder on circa 1912 steel railroad trestle with concrete abutments. Open horizontal concrete rail and cap were added as parapets in 1955. Concrete endposts, also added in 1955, have an incised bridge name and date of construction.

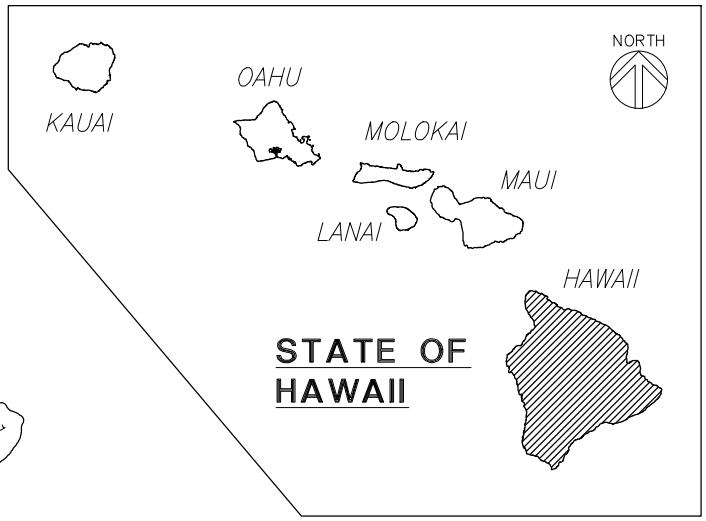
The existing bridge is approximately 110 feet tall. The bridge is 28 feet wide (curb-to-curb) and 38.5 feet wide (out-to-out) with a bridge deck half section consisting of a 12-foot wide asphaltic concrete (AC) travel lane, 2-foot wide AC shoulder, 3.5-foot wide concrete sidewalks (raised 6 inches from the roadway), and a 1-foot wide by 2.5-foot high railing (see Figure 2 for existing bridge plan and profile).

Adjacent land uses include rural residential and agricultural uses. The Umauma stream flows in a predominantly west to east direction with open ocean located to the east of the bridge.

Historical Value

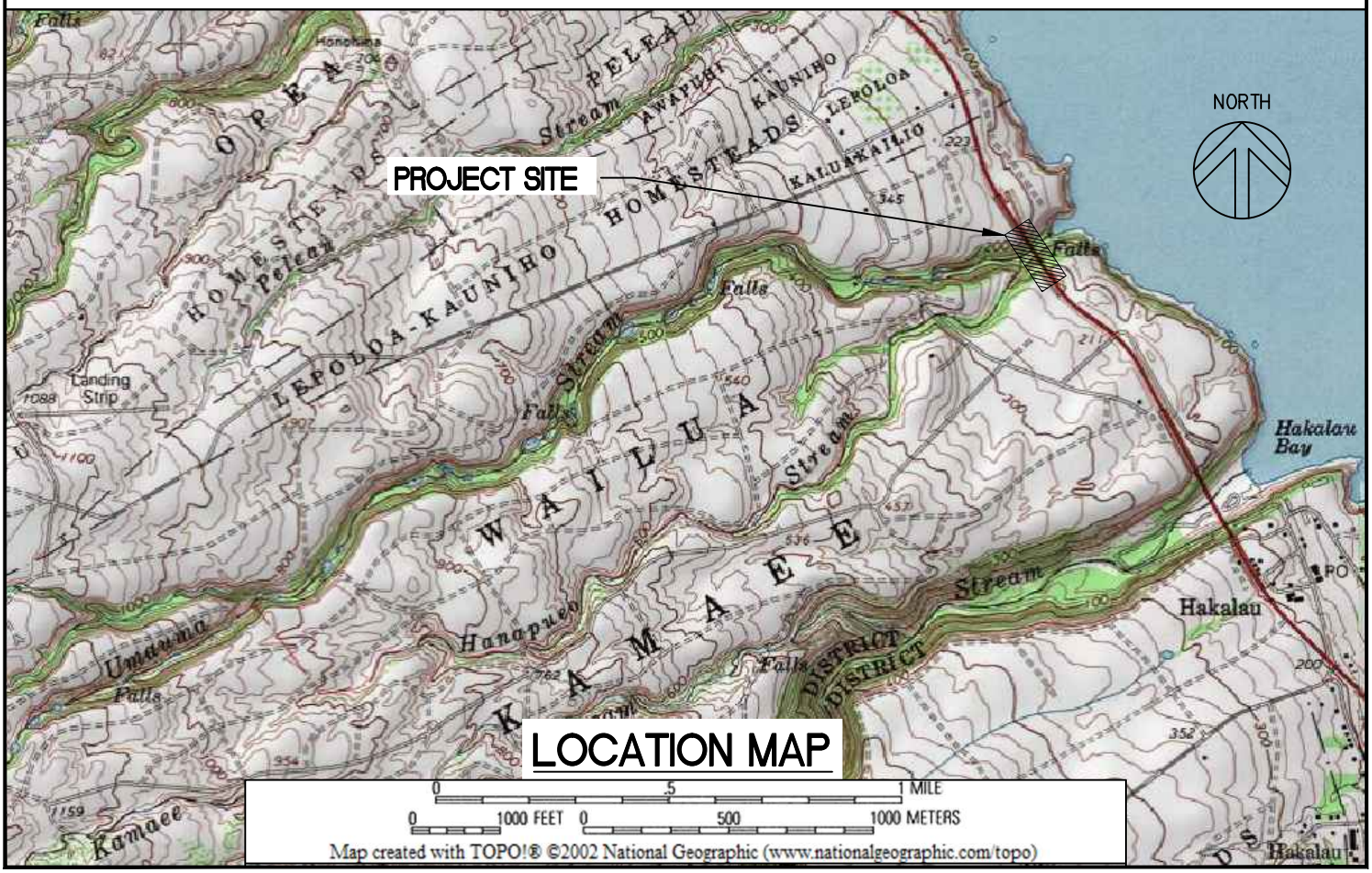
Umauma Bridge is part of a National Register eligible multiple property nomination of "Steel Trestle Bridges on the Hāmākua Coast" written by Spencer Lieneweber in cooperation with the Hawai'i DOT. The SHPD and DOT are currently working toward an agreement on the bridge inventory and finalizing documentation for the National Register. The bridge is significant under National Register criteria for its association with the Hilo Railroad Company, which played a major role in the development of the Hāmākua Coast for sugar plantations and as one of the few remaining steel girder and trestle bridges that represent the work of John Mason Young. The period of significance extends from 1911 when the rail trestle bridges were first constructed to 1953 when Territorial Highways engineer William Bartels converted the bridges to highway bridges to accommodate the change in transportation methods.





VICINITY MAP

NOT TO SCALE



LOCATION MAP

F-1

HAWAII BELT ROAD - REHABILITATION OF UMAUMA STREAM BRIDGE

VICINITY AND LOCATION MAP

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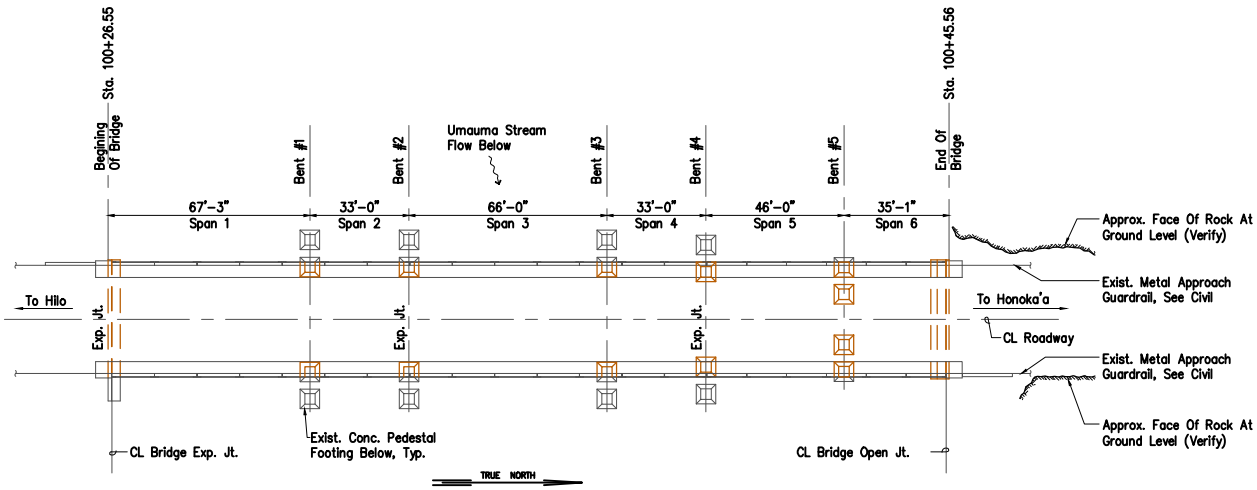
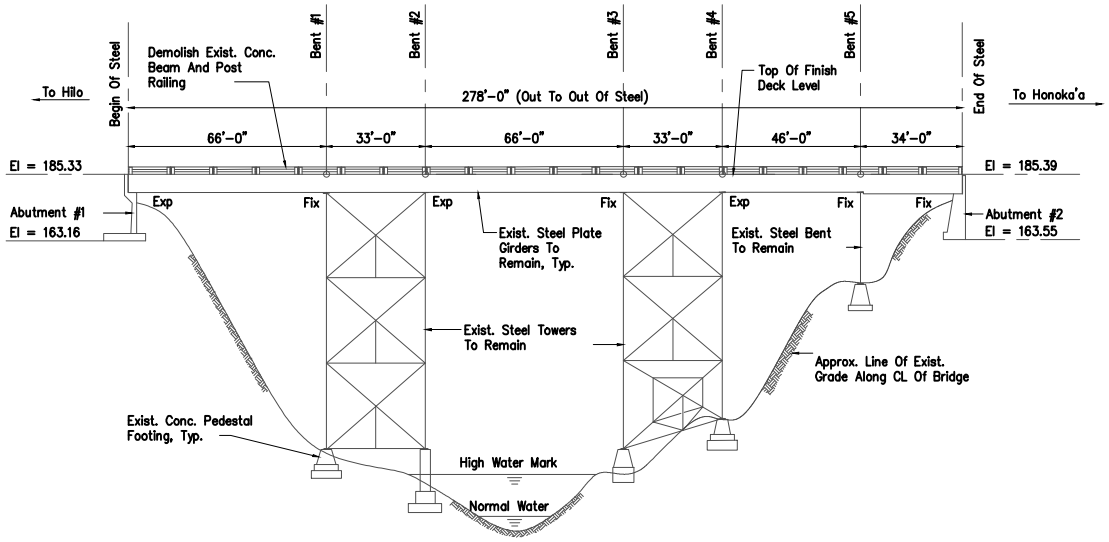


EXISTING BRIDGE PLAN

SCALE: 1" = 64'



EXISTING BRIDGE PROFILE

SCALE: 1" = 64'

GRAPHIC SCALE

20' 0 20' 40' 60'

1/64" = 1'-0"

F-2

HAWAII BELT ROAD - REHABILITATION OF UMAUMA STREAM BRIDGE

EXISTING PLAN AND PROFILE

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Photo 1: View of bridge along roadway

Photo 2: Steel girder and trestle

2.2 DESCRIPTION OF THE PROPOSED ACTION

The proposed project would include construction of concrete support columns to be placed within and adjacent to the existing steel support towers, widening of the bridge deck and roadway shoulders, and construction of a new concrete railing.

CONCRETE TOWERS

The proposed project would reinforce the deteriorating steel structure of the bridge by constructing two main concrete towers and one smaller concrete tower within the existing steel towers (see Figure 3). The towers would be constructed within the steel towers to preserve the historically significant bridge structure (see Photo 3). The new concrete pier caps would be constructed over the new towers, and the existing steel members would be encased within the new concrete pier caps. Due to constructability challenges and structural load requirements, spread footings are the foundation system that would most likely be used at Pier 1 (adjacent to stream on Hilo side) and Pier 2 (adjacent to stream on Honoka‘a side). Spread footings consist of reinforced concrete at the same ground elevation as existing pedestal footings. Micropiles would likely be used at Pier 3. A micropile is an approximate 7-inch diameter reinforced concrete pile that extends to the rock layer below existing grade, which varies from 10 to 50 feet below existing grade. Drilled shafts would be used at two abutments.

BRIDGE DECK, END POSTS, AND ROADWAY IMPROVEMENTS

To comply with Federal Highway Administration (FHWA) regulations, the bridge deck would be widened to 40 feet (curb-to-curb) and 44 feet (out-to-out). The proposed bridge deck would be entirely AC with 12-foot travel lanes and 8-foot shoulders (see Figure 4 for existing and proposed sections). The existing raised sidewalk would be removed. The new concrete railing would be raised to 4-foot-2-inches to comply with the FHWA bike safety regulations. The lower 2-foot-8-inches section of railing would be tapered to a 2-foot-6-inch base at the bottom to comply with FHWA vehicular barrier regulations. The widened bridge shoulders would taper back to the existing shoulders as soon as feasible along the roadway to avoid any major grading into the adjacent embankments. Roadway improvements on both sides of the bridge would extend approximately 20 feet beyond the bridge approach slab to provide a transition from the existing roadway to the new bridge.

The bridge end posts at the Honoka‘a end of the bridge would terminate directly into the existing cut slope to negate the need for guardrails. The bridge end post on the Hilo downstream end of the bridge would be protected via guardrail extending from the new end post and terminating into the existing cut slope (same as existing condition). Sand barrels would protect the bridge end post on the Hilo upstream end of the bridge since there is not adequate space to provide a guardrail with crashworthy end terminal while still providing access to the adjacent maintenance yard.

STORMWATER AND DRAINAGE

The proposed concrete towers would be constructed outside of the normal stream flow of Umauma Stream. The existing bridge deck drain inlets currently discharge through a section of

4-inch pipe with an outlet approximately 4-feet below the bridge deck, allowing stormwater to discharge to the atmosphere and fall to the ground/stream below (see Photos 4 and 5). The proposed project would replace the drain inlets with deck drains placed at certain locations to prevent stormwater from falling directly into the stream. By doing so, storm runoff would be filtered through natural vegetation on the stream bank before entering into the stream.

GRADING AND EARTHWORK

The proposed earthwork within the stream bank would be limited to restoration of the grades disturbed by the spread footing construction (see Figure 5 for conceptual grading plan). Because of the steepness of the existing grades, the slope would require stabilization with geotextile fabric and geogrid reinforcement (see Figure 5 section). As a result of the thickness of the spread footing, portions of the concrete would be left exposed and not buried. The proposed earthwork at the bridge deck would consist of minor grading of the approaches to accommodate the widened bridge deck shoulder.

ROCK FALL PREVENTION MEASURES

There is one rock fall potential problem area that has been identified on the *makai*[1] side of the bridge, situated at the lower 40 feet of the slope. While the rock formation is currently fairly stable, the project includes implementation of rock stabilization measures prior to construction. The area of potential rock fall and prevention measures included as part of the proposed action are described in detail in Section 3.1, *Topography and Soils*.

SITE-SPECIFIC BEST MANAGEMENT PRACTICES

The proposed bridge rehabilitation project includes site-specific Best Management Practices (BMPs) to be implemented during project construction to minimize erosion and potential impacts to water quality. These BMPs included as part of the proposed action are described in detail in Section 3.1, *Topography and Soils*.

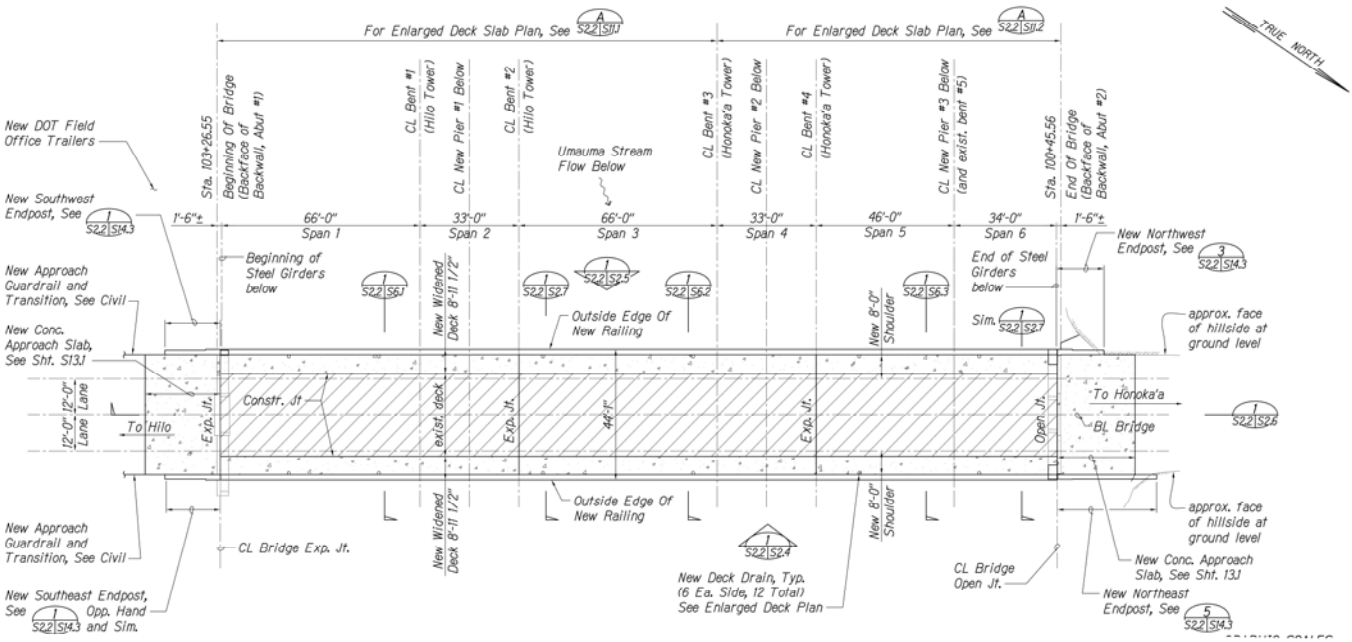
BRIDGE MAINTENANCE

Current bridge maintenance consists of temporary repairs and temporary repainting intended to slow down, but not stop, existing corrosion of steel. Bridge maintenance occurs approximately every 2 years.

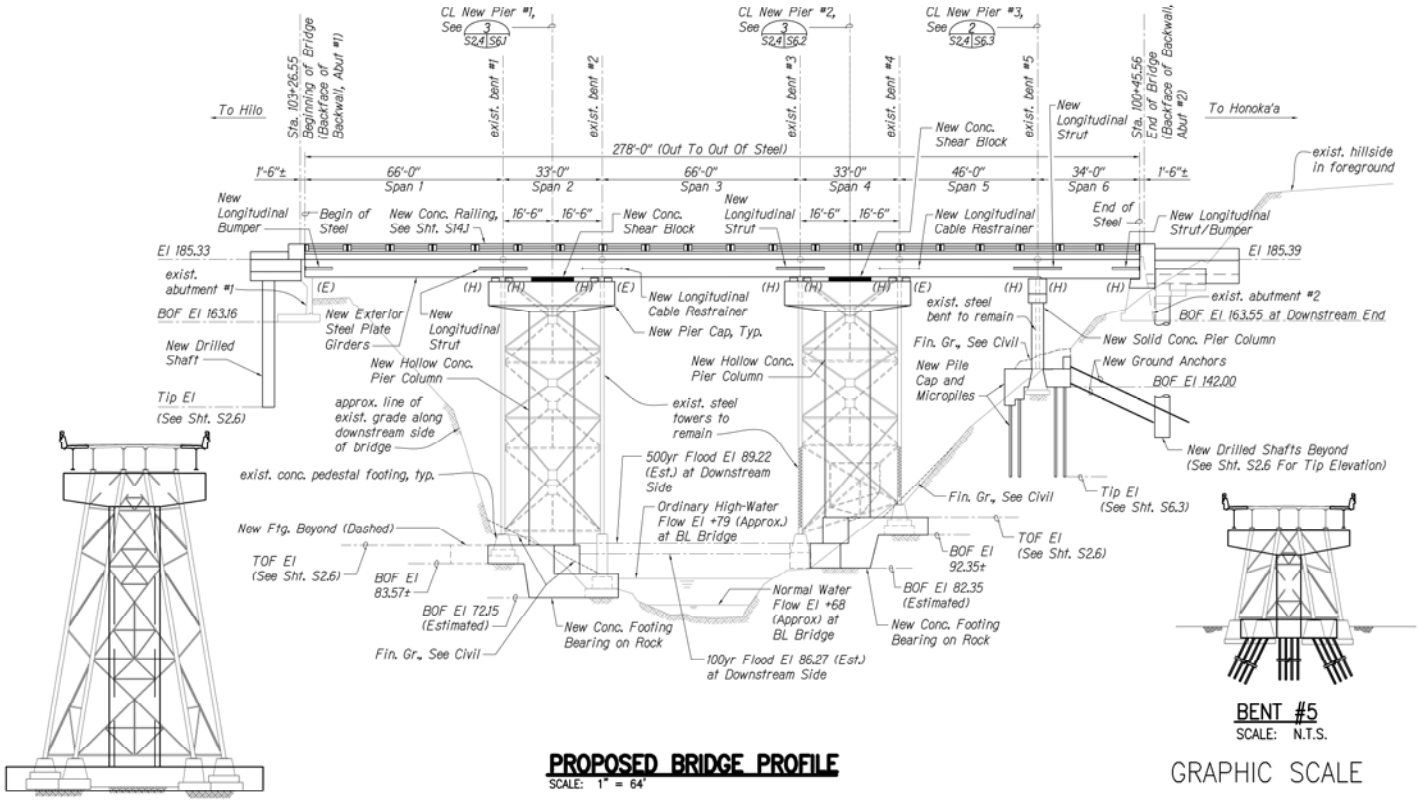
TRAFFIC CONTROL

The State DOT Hawai‘i District construction specifications require that one roadway lane be open at all times (see Photo 6). If it is necessary to close both lanes at the same time, State DOT Hawai’i District attempts to maintain a maximum of 10-minute lane closure. However, a longer closure may occur depending on the construction task.

[1] *Makai* – Hawaiian word meaning toward the ocean



PROPOSED BRIDGE PLAN
SCALE: 1" = 64'



PROPOSED BRIDGE PROFILE
SCALE: 1" = 64'

BENT #1
SCALE: N.T.S.

BENT #5
SCALE: N.T.S.

GRAPHIC SCALE

20' 0 20' 40' 60'

1/64" = 1'-0"

F-3

HAWAII BELT ROAD - REHABILITATION OF UMAUMA STREAM BRIDGE

PROPOSED PLAN AND PROFILE

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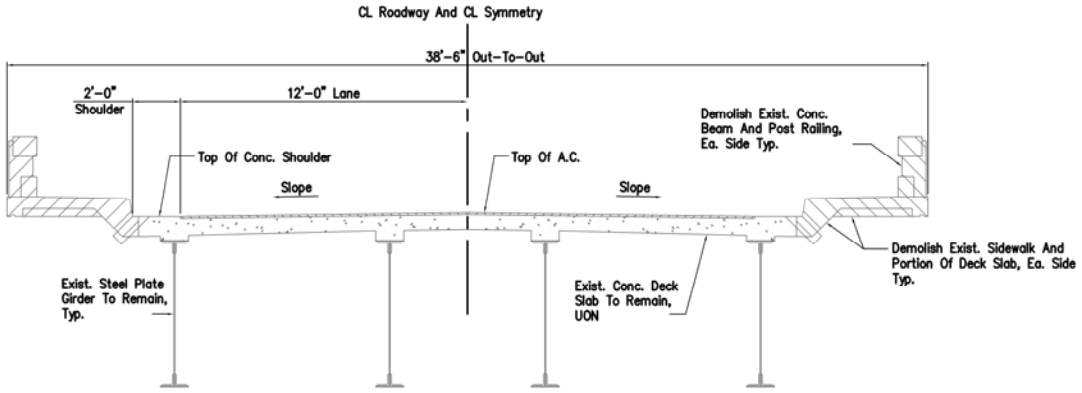
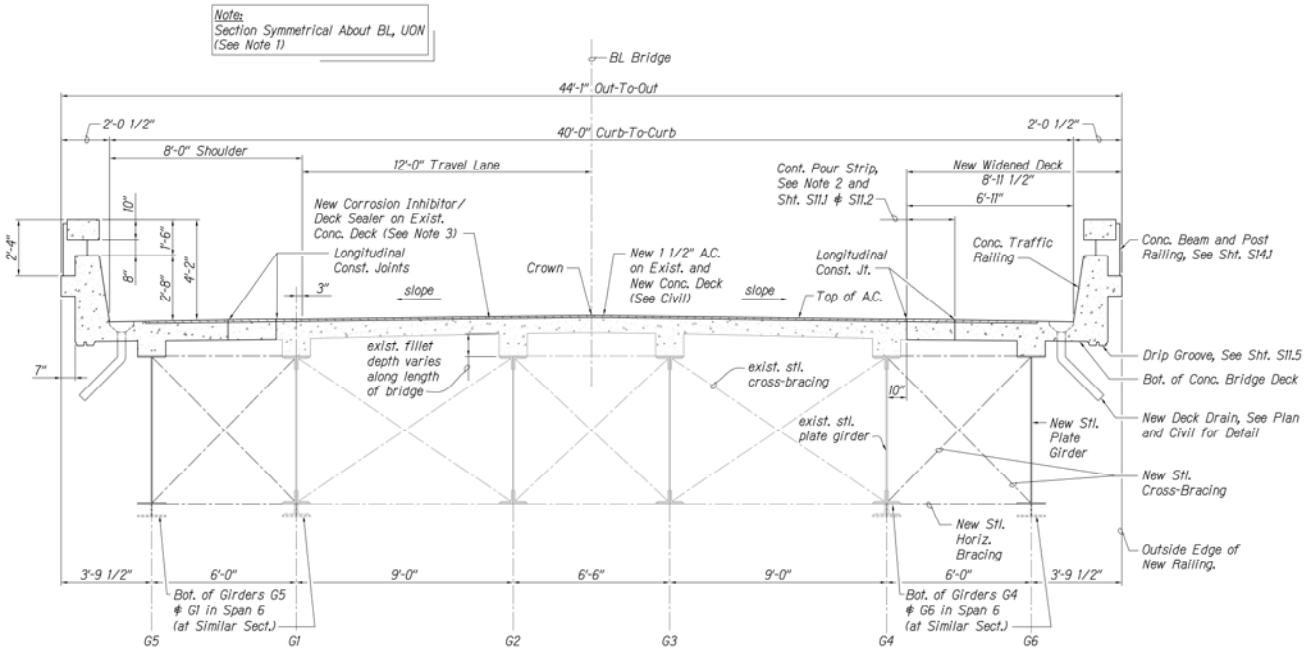


EXISTING CROSS SECTION
SCALE: N.T.S.



PROPOSED CROSS SECTION
SCALE: N.T.S.

F-4

HAWAII BELT ROAD - REHABILITATION OF UMAUMA STREAM BRIDGE

EXISTING AND PROPOSED SECTIONS

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Photo 3: Steel support tower footings

Photo 4: Drain inlet

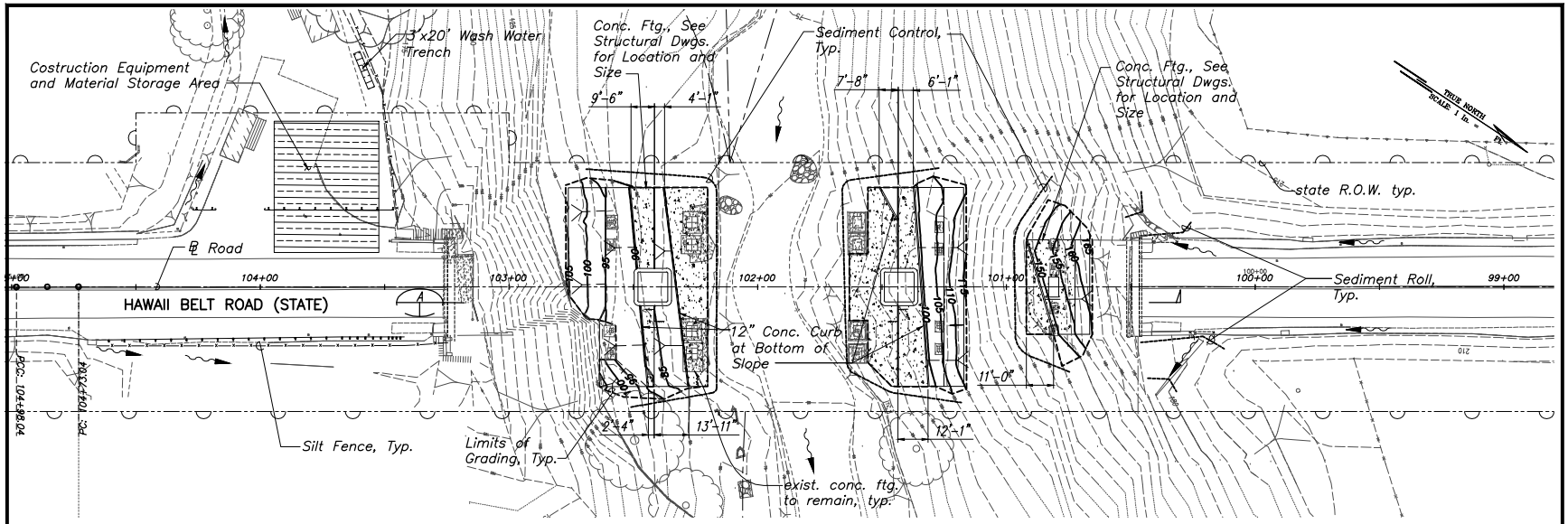
Photo 5: Drainage outfall

Photo 6: Lane closure during construction

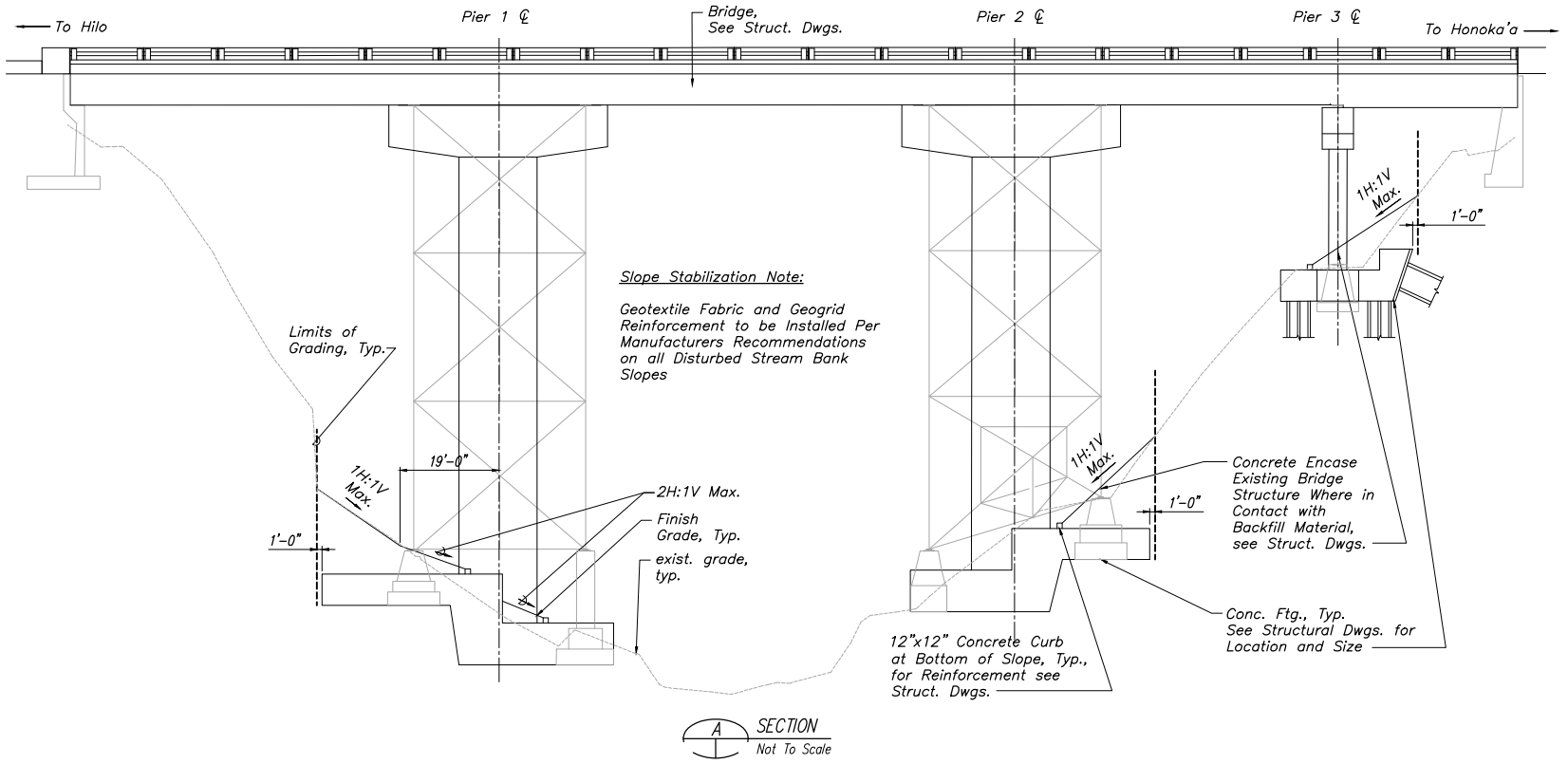
F-5

HAWAII BELT ROAD - REHABILITATION OF UMAUMA STREAM BRIDGE

GRADING AND SECTION



GRADING AND EROSION CONTROL PLAN



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CONSTRUCTION STAGING

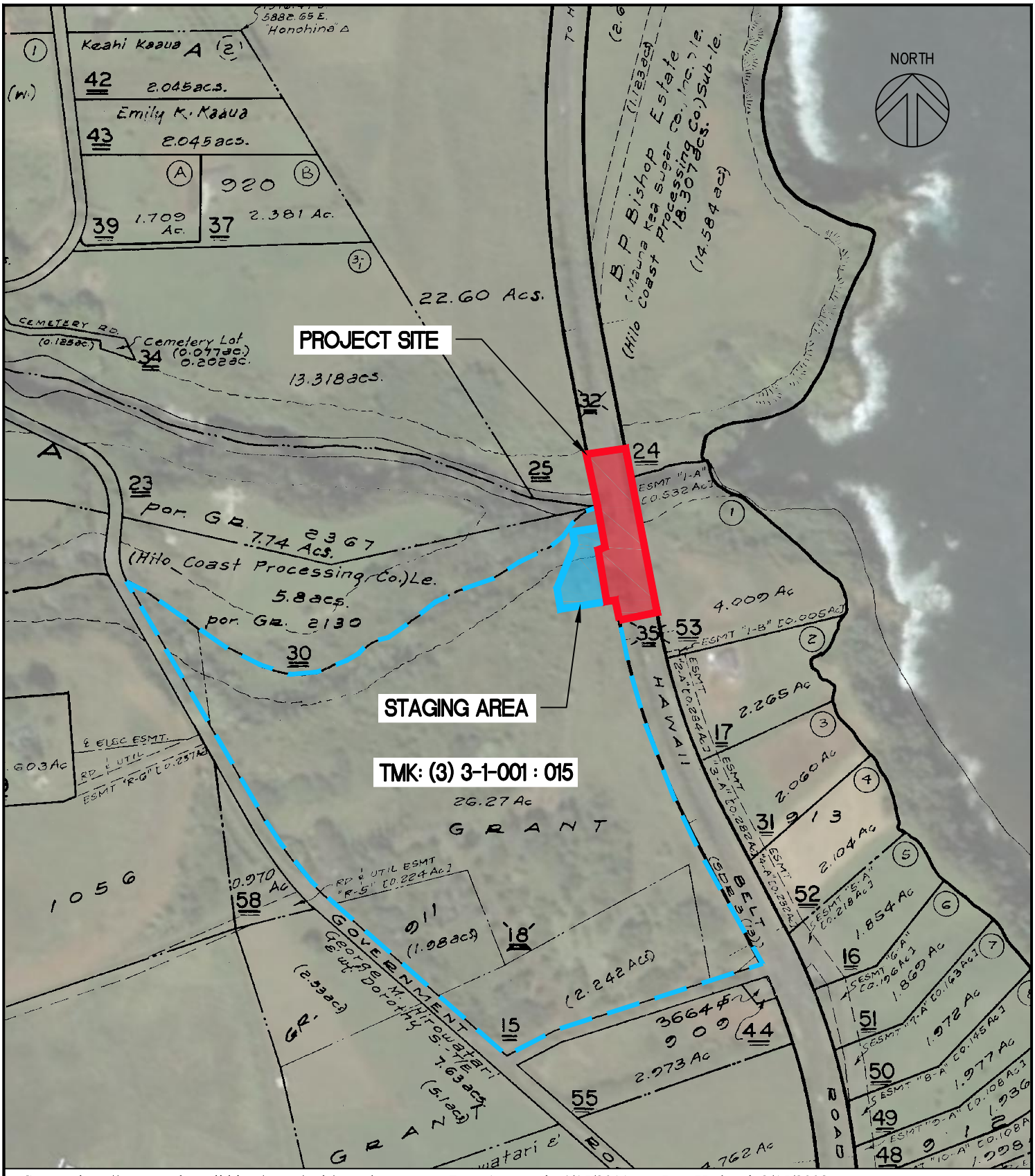
The construction staging area is proposed to be located on the Hilo side of the bridge, *mauka*[2] of the roadway, on an adjacent property to the bridge (TMK (3) 3-1-01:15) (see Figure 6). The Department of Transportation (DOT) currently has several trailers in this staging area for bridge maintenance use (see Photo 7). Construction equipment would also be staged adjacent to the bridge footings and would be within State right-of-way.

PROJECT CONSTRUCTION AND COST

Construction of the bridge rehabilitation improvements is scheduled to begin during early summer 2012. The actual start date would be dependent on obtaining the required permits and approvals. The project would be constructed for the duration of approximately two years.

Construction of the proposed bridge rehabilitation project is estimated to cost $35 million (subject to change), with Federal contribution of 80 percent and State contribution of 20 percent of the total construction cost.

[2] *Mauka* – Hawaiian word meaning toward the mountain



Source: http://www.co.hawaii.hi.us/maps/tmk/zone.htm Date Accessed : 4/15/2011 Last Updated: 2/15/2008

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HAWAII BELT ROAD - REHABILITATION OF UMAUMA STREAM BRIDGE

CONSTRUCTION STAGING AREA

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Photo 7: Construction staging area

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The intent of this chapter is to describe the existing physical and social environment that is affected by the proposed action. Potential impacts that may result from implementation of the proposed action and mitigation measures to minimize the adverse impacts are described below.

3.1 TOPOGRAPHY AND SOILS

The existing bridge spans over approximately 280 feet of the Umauma Stream gulch, with a 90 to 100-foot drop from the bridge deck to the stream and embankments below. The sides of the gully are steep, with some areas as steep as near vertical near the bottom of the slope. Most of the slope areas are covered by vegetation. Within the project area, the streambed consists of basaltic bedrock and is generally 50 to 60 feet in width (AECOS 2010). Rock outcrops, along with numerous boulders, are exposed at the bottom of the gully adjacent to the stream.

Predominant soils in the area of the project site as classified by the Natural Resources Conservation Service (NRCS) consist of rough broken land (RB) (see Figure 7). Rough broken land is used to characterize gulches, with slopes 35 to 70 percent (NRCS 2009). Based on soil suitability, the State of Hawai‘i, Department of Agriculture has established the Agricultural Lands of Importance to the State of Hawai‘i (ALISH) system to identify areas of prime farmland. The ALISH system classifies three types of land suitable for agriculture: Prime Lands, Unique Lands, and Other Lands. The project site is located within State right-of-way, and is not considered as agricultural lands of importance (see Figure 8).

Soil borings completed in April 2010 behind the existing abutments encountered fill consisting of mottled brown clayey silt with sand and gravel below the existing pavement section, with 27 feet in thickness on the Hilo side and 12 feet on the Honoka‘a side. Basalt was encountered at depths of about 36 and 47 feet. Borings drilled by the piers encountered basalt at depths ranging from the ground surface at Pier 1 to about 13 feet at Pier 2, and 11 feet at Pier 3. Borings at Pier 1 encountered groundwater at a depth of 29 feet (Hirata & Associates, Inc. 2011).

There were several areas of rock formation identified by DOT to be rock fall potential problem areas. Although there were some problem areas observed on the *mauka* side of the bridge, these problem areas were determined to be adequately set back laterally to not be a concern for the bridge or for workers repairing the bridge. An additional rock fall problem area included a set of nested rocks likely placed during the original construction of the bridge situated at the upper 20 feet of the slope, and on the *makai* side of the bridge. However, these rocks were removed in June 2010 to minimize hazards to the maintenance crew, with no impact to the existing bridge. The remaining identified area of concern is situated at the lower 40 feet of the slope, below and *makai* of the bridge, with the total height of the valley slope estimated at approximately 80 feet high. The slope in this area is generally near vertical. This rock formation appears to consist of massive basalt rock formations, and based on the jointing, the rock formation appears to consist of vertical slices or columns of rock. In general, the thickness (i.e. the distance into the slope) of the rock pieces is much less than the width and the height. Based on observations by the bridge maintenance crew, there appears to be an increased lateral width opening in the vertical joints (DOT email dated 5/12/2010). As part of the proposed bridge rehabilitation project, prior to

initiation of work on the bridge, this rock formation would be bolted in place to minimize potential rock fall hazards.

IMPACTS AND MITIGATION MEASURES

Implementation of the proposed action would result in disturbance of less than 1 acre. The proposed earthwork within the stream bank would be limited to restoration of the grades disturbed by the spread footing construction (see Figure 5 for conceptual grading plan). Because of the steepness of the existing grades, the slope would require stabilization with geotextile fabric and geogrid reinforcement (see Figure 5 section). As a result of the thickness of the spread footing, portions of the concrete would be left exposed and not buried. The proposed earthwork at the bridge deck would consist of minor grading of the approaches to accommodate the widened bridge deck shoulder. All vegetation within the grading limits shown on Figure 5 would be removed during construction and re-grassed following project completion.

There would be a short-term increase in soil erosion during construction since grading associated with construction of the proposed facilities would result in the exposure of bare soil to potential erosion. All grading operations would be conducted in compliance with dust and erosion control requirements of Hawaii County Code Chapter 10, *Erosion and Sedimentation Control*. The proposed action includes a site-specific Best Management Practices (BMP) plan developed as part of the project to minimize erosion and sedimentation during construction. The following measures have been included as part of the proposed action:

1. Implement general Water Pollution and Erosion Control Measures as required by Hawaii County Code Chapter 10, *Erosion and Sedimentation Control*.
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 during 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 streambed.
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 a DOH approved facility.
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.

The grading permit application shall specify the best management practices included as part of the project. Prior to the initiation of construction, the County would review proposed grading plan for consistency with County requirements and good engineering practice. The contractor would implement engineering measures to control soil erosion and storm runoff during construction. The project would not result in a significant impact due to soil erosion and off-site

sediment transport. For a discussion of drainage on the project site, see Section 3.2, *Hydrology and Water Quality*.

For placement of the proposed bridge footings, minor excavation of rock would be required. The excavated rock material would be removed and transported for land disposal. A Foundation Investigation report has been prepared and includes engineering characteristics of existing soils, the subsurface conditions at the site, and geotechnical recommendations for the design of new foundations, including seismic considerations, resistance to lateral pressures, and site grading (Hirata & Associates, Inc. 2011). All measures set forth in the site geotechnical report shall be adhered to during project construction. To ensure all measures are implemented, a qualified geotechnical engineer shall be retained for construction monitoring. The geotechnical engineer shall:

- Observe the construction of drilled shafts and micropiles, including all drilling and concrete placement operations, as well as load testing;
- Observe probing and grouting operations in foundation areas;
- Observe footing excavations prior to placement of reinforcing steel and concrete;
- Observe structural fill and backfill fill placement and perform compaction testing;
- Review and/or perform laboratory testing on import borrow to determine its acceptability for use in compacted fills; and,
- Provide geotechnical consultation as required.

Implementation of the recommended measures in the Foundation Investigation report would minimize impacts from soil hazards.

In addition, the proposed action includes a rock fall protection system to minimize identified potential rock fall hazards. Prior to initiation of work on the bridge, the rock formation of concern identified above would be bolted in place to minimize potential rock fall hazards. Preliminary design recommendations include bolting the formation with 10 to 15-foot deep grouted double-corrosion protected anchors spaced at 5 feet on-center. The final design of the rock fall protection system will be included prior to construction.

Map Unit Legend

Island of Hawaii Area, Hawaii (HI801)	
Map Unit Symbol	Map Unit Name
HoC	Hilo silty clay loam, 0 to 10 percent slopes
HoD	Hilo silty clay loam, 10 to 20 percent slopes
RB	Rough broken land

Source: USDA NRCS Web Soil Survey Date Accessed : 3/31/2011

F-7

HAWAII BELT ROAD - REHABILITATION OF UMAUMA STREAM BRIDGE

SOILS MAP

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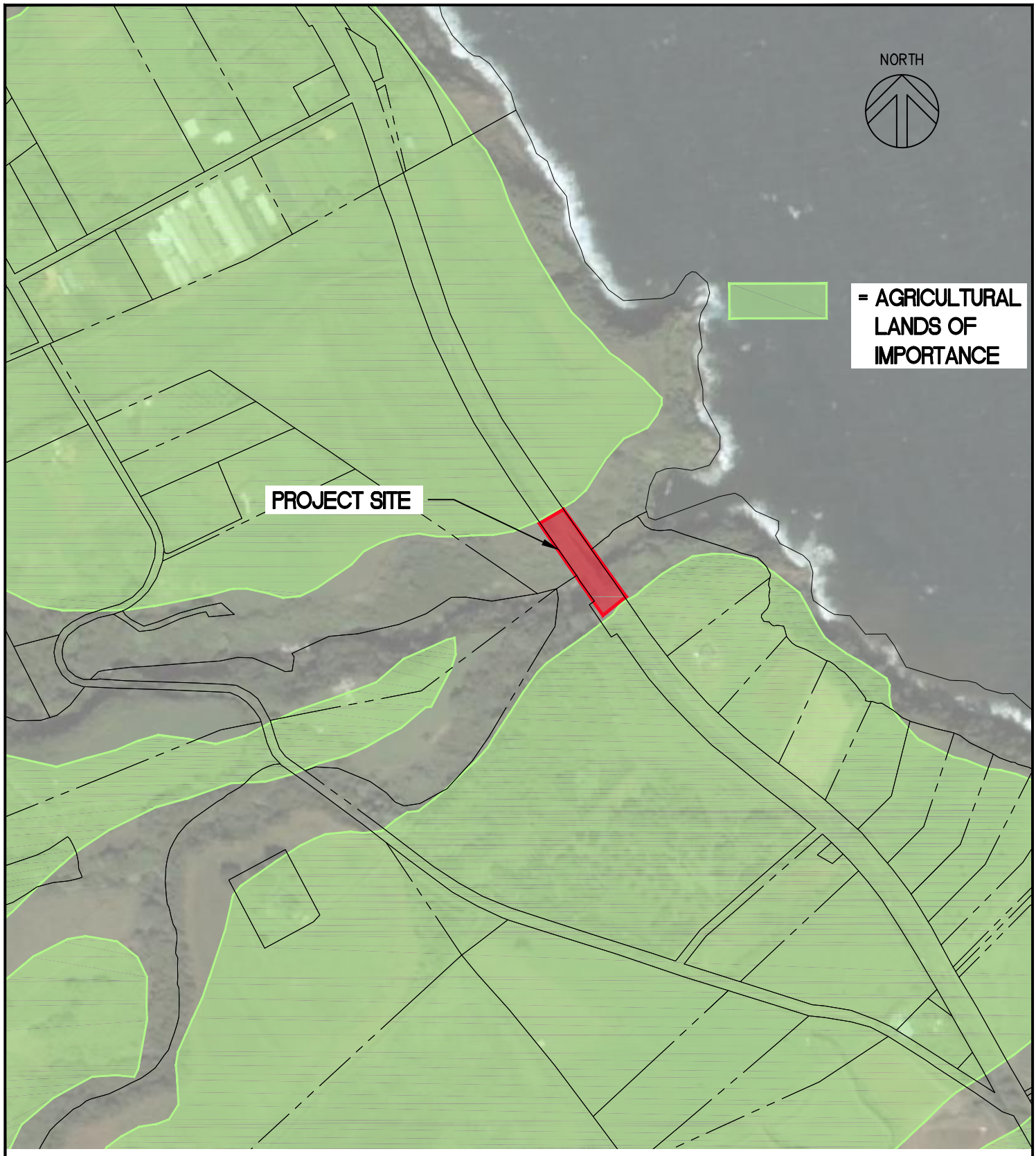

Source: http://www.state.hi.us/dbedt/gis/download.htm Date Accessed : 4/6/2011

F-8

HAWAII BELT ROAD - REHABILITATION OF UMAUMA STREAM BRIDGE

AGRICULTURAL LANDS OF IMPORTANCE

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3.2 HYDROLOGY AND WATER QUALITY

Umauma Stream originates on the eastern slopes of Mauna Kea at an elevation above 12,000 feet, passes through the Hakalau Forest National Wildlife Refuge, and reaches its coastal outlet into the Pacific Ocean as a waterfall into a small bay northwest of Hakalau Bay. The Umauma watershed is 21.5 square miles, and is large, narrow, and steep in the upper watershed. There are several tributaries in the watershed, including Hanapueo Stream, which joins Umauma Stream just above the project site at Māmalahoa Highway (State Highway 19). (AECOS Inc. 2010; DAR 2008)

Umauma Stream is a perennial stream and is classified as Class-2 inland, flowing waters by the State of Hawai'i, Division of Aquatic Resources (DAR). Protected uses of Class 2 waters include recreational use, support and propagation of fish and other aquatic life, and agricultural and industrial water supply. Umauma Stream is not included on the Hawai'i Department of Health 2006 list of impaired waters prepared under the Clean Water Act §303(d) (*AECOS*, Inc. 2010).

Water quality and biological surveys were completed for a 1,200-foot segment of Umauma Stream on July 21, 2010 to identify aquatic biota and assess water quality (see Appendix C). Water samples were collected at three locations in the project vicinity and analyzed for selected parameters. The nutrient concentrations of ammonia, nitrate-nitrite, total nitrogen, and total phosphorus were all low relative to state water quality criteria. Total nitrogen and phosphorus at the sampled levels depict clean stream waters typically found only in the least developed watersheds of Hawai'i (*AECOS*, Inc. 2010).

The existing bridge deck drain inlets currently discharge through a section of 4-inch pipe with an outlet approximately 4-feet below the bridge deck, allowing stormwater to discharge to the atmosphere and fall to the ground/stream below.

IMPACTS AND MITIGATION MEASURES

Construction activities disturbing one or more acres are regulated under the National Discharge Elimination System (NPDES) stormwater program and are required by the State to obtain a NPDES permit. Because the project would disturb approximately 0.87 acres (less than one acre), including the construction staging area, a construction NPDES permit would not be required. However, construction activities could result in adverse impacts to water quality, including erosion, sedimentation, and turbidity within Umauma Stream. The proposed action includes a site-specific Best Management Practices (BMP) plan developed as part of the project to minimize any environmental effects to water quality in the vicinity of the project site during construction. With implementation of best management practices, the construction of the project would not result in a violation of water quality standards. For a discussion of impacts due to soil erosion and off-site sediment transport, see Section 3.1, *Topography and Soils* above.

A portion of one proposed footing is within the ordinary high water mark (OHWM) of jurisdictional waters of the United States. The "footprint" of these footings would extend slightly beyond the "footprint" of the existing columns – the footprint would be larger in area and deeper into bedrock. No dredging of the stream is proposed with implementation of the proposed project. Since the Umauma Stream is a waterway subject to federal jurisdiction, construction of

the footing within the ordinary high water mark (OHWM) of the stream would require a permit from the U.S. Army Corps of Engineers (USACE). A USACE permit application was submitted for the proposed bridge rehabilitation project, and a Nationwide Permit Verification was issued for the project. Nationwide permits are general permits issued nationwide to authorize categories of minor activities. In addition to the General Conditions of the Nationwide Permit, the following special conditions would be required:

- Minimize disturbances to stream banks and place footing foundations outside of the floodplain.
- Specific erosion control measures in road construction plans shall be developed to avoid potential impacts to the environment.
- Casting of road materials shall be avoided.
- Roadway and associated stormwater collection systems shall be maintained properly.
- Any earth work shall be conducted during the dry season and construction equipment shall be staged away from stream banks on high ground when ever possible.
- Stormwater drain outlets shall be designed to avoid scouring and erosion of vegetated areas.

A Water Quality Certification (WQC), issued by the State Department of Health (DOH) pursuant to Section 401 of the Clean Water Act is required for any activity including, but not limited to, the construction or operation of facilities, which may result in any "discharge" into navigable waters. This certification is in place to regulate water quality during and after the construction phase of the project to assure discharge will meet State Water Quality Standards. It is anticipated that the project will be covered under a WQC for Nationwide Permits. Consultation with DOH to confirm WQC requirements has been initiated.

The Hawaii Commission on Water Resources requires Stream Channel Alteration permits (SCAP) for alteration of stream channels. Because there is work within the streambed, a SCAP would be required for the proposed project.

Implementation of the proposed bridge rehabilitation project would result in a slight increase in the quantity of stormwater runoff due to the increased impervious surface of the bridge deck widening. The proposed project would replace the drain inlets with deck drains placed at certain locations to prevent stormwater from falling directly into the stream. By doing so, storm runoff would be filtered through natural vegetation on the stream bank before entering into the stream and would result in a beneficial effect to stormwater quality. A scour analysis was completed for the project drainage. To prevent scouring, a concrete cut-off wall is included in the project design at the upstream / Honoka'a corner of Pier #2 spread footing foundation. Further, due to the height and size of the drain outlets, the stormwater stream would be dispersed by the air prior to hitting the ground, and scouring and erosion of vegetated areas would be avoided. The storm drains would be constructed in accordance with FHWA drainage standards Roadway runoff in Hawai'i County does not require additional permitting, such as an individual NDPES permit (HDOH 2011).

The proposed project includes continued maintenance of the historic bridge consisting of temporary repairs and repainting. Repainting and bridge maintenance would continue to occur approximately every two years. BMPs required for these maintenance activities would be implemented to minimize any potential discharge into the stream, and no additional adverse effects would occur.

3.3 NATURAL HAZARDS

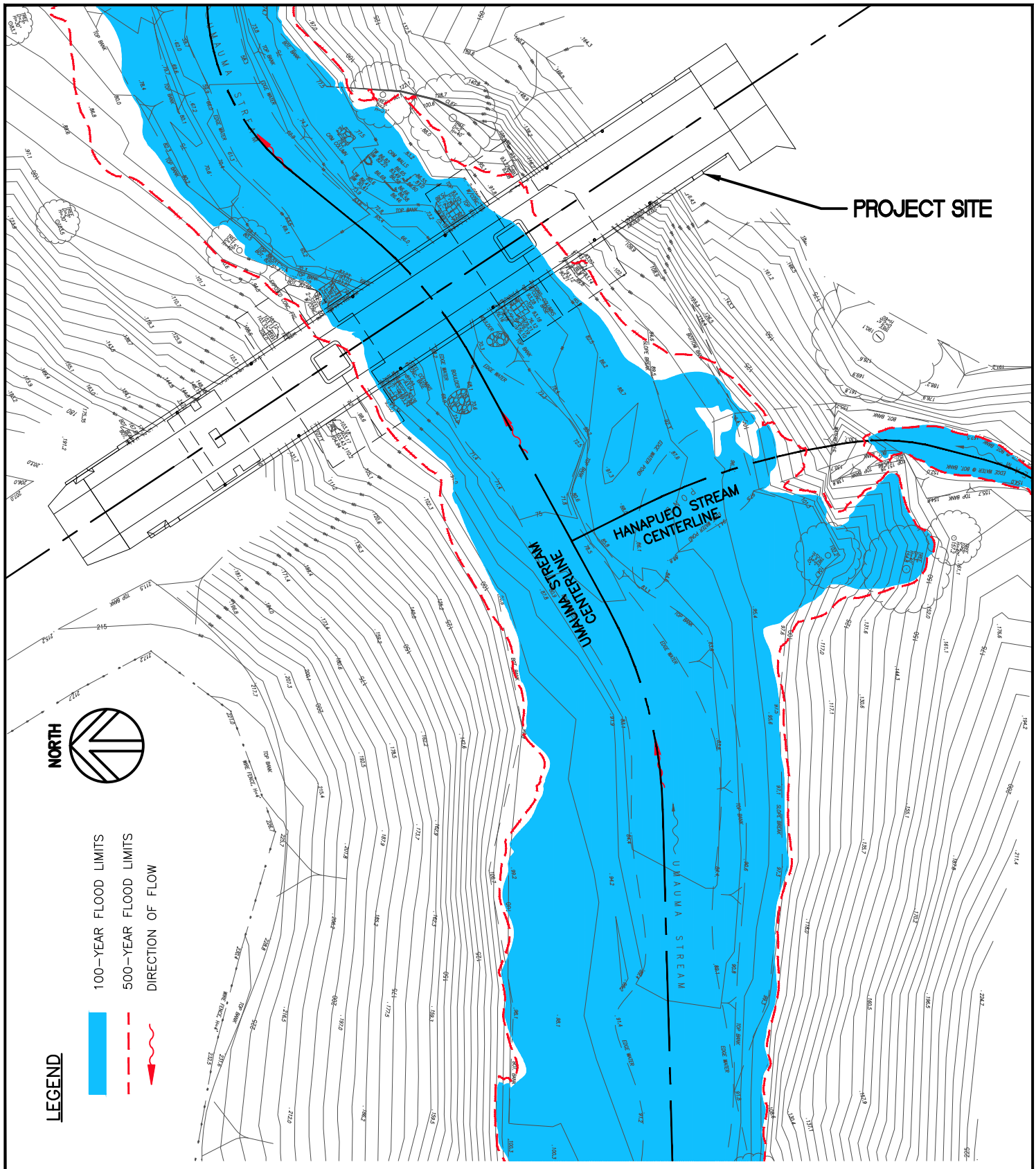
Natural hazards in Hawai‘i include floods, hurricanes, volcanoes, and earthquakes. The project site is in an area that is not mapped by the Federal Emergency Management Agency (FEMA) and is identified an area of minimal tsunami inundation. Due to the lack of available stream flow data, the stream flows will be calculated using the regression equation developed under the publication “Flood-Frequency Estimates for Streams on Kauai, Oahu, Molokai, Maui, and Hawaii, State of Hawaii” dated 2010, developed by the USGS in cooperation with DOT. The 100-year recurrence interval storm water runoff rates for Umauma Stream are shown in Figure 9. Along with the hazardous effects of strong winds, Hawai‘i is also subject to the threat of approaching tropical storms and hurricanes. The project area is not located adjacent to any active volcanoes. For a discussion of potential hazards from rock falls, see Section 3.1, *Topography and Soils*.

IMPACTS AND MITIGATION MEASURES

During construction, stream flood events, or flash flooding, could result in potential hazards to workers and construction equipment located in the flood hazards area. Site-specific BMPs included as part of the project include measures to be taken in the event of intense rainfall, weather, or increased stream flows. These measures include relocation of personnel and construction materials and equipment to higher ground (a minimum of 10 feet above the OHWM). With implementation of these BMPs, potential hazards to construction workers would be minimized, and no mitigation would be required.

Construction of the proposed bridge rehabilitation project would not result in increased flooding or hazards from flooding in surrounding areas. While the proposed bridge footings would be within a flood hazard zone, they are designed to withstand stream flood flows. During stream flood events, the average velocity of the stream is not uniform across the channel section: the higher velocity flows occur in the center of the stream, and the lower velocities will occur at the banks. Debris is typically transported through the center of the stream due to the higher velocities. Therefore, it is not anticipated that the footing forms would be subjected to heavy debris impacts during a stream flood event.

While there is no FEMA map for the project area showing tsunami inundation areas, the maximum elevation run-ups are around 17 feet MSL for tsunami inundation on FEMA maps near Hilo. Since the bridge footings are located near 70 feet MSL, it is unlikely a tsunami event would affect the bridge structure.



Source: "Storm Drainage Analysis for Hawai'i Belt Road Rehabilitation of Uma'uma Sream Bridge" by Bow Engineering Date: October 2010

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HAWAII BELT ROAD - REHABILITATION OF UMAUMA STREAM BRIDGE

FLOOD LIMITS

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The proposed concrete footing design would minimize damage during tropical storm, hurricane, or strong wind events, and earthquake events. The maximum design wind velocity applied was 105 miles per hour in accordance with HDOT Highways Division "Design Criteria for Bridges and Structures" (Oct 20, 2010 edition). Prior to the initiation of construction, the County would review proposed construction plans for consistency with County requirements and good engineering practice. No significant environmental effects would result, and no mitigation would be necessary.

3.4 BIOLOGICAL RESOURCES

Water quality and biological surveys were completed for a 1,200-foot segment of Umauma Stream on July 21, 2010 to identify aquatic biota and assess water quality (see Appendix C). This section summarizes the biological findings of the report.

Vegetation: The stream gorge margins are steep and covered in vegetation. Most of the species of flowering plants and fern observed along the stream banks are recently naturalized species and Polynesian introductions, including sourbush (*Pluchea carolinensis*), Guinea grass (*Urocloa maxima*), torpedo grass (*Panicum repens*), and Hilo grass (*Paspalum conjugatum*) (AECOS, Inc. 2010). Of the 23 species observed, only one species, *neke* (*Cyclosorus interuptus*) is indigenous[3] to the Hawaiian Islands.

Aquatic biota: Umauma Stream provides habitats for three species of 'o'opu, two of which (*L. concolor and S. stimpsoni*) are endemic to the Hawaiian Islands. Two species of endemic crustaceans (*A. bisulcata* and *M. grandimanus*) were observed during the field survey, and a native limpet and sponge have also been reported within the stream (DAR 2008). None of the aquatic species observed during the survey is listed as threatened or endangered by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973, as amended, or by the State of Hawai'i under its endangered species program (*AECOS* Inc. 2010).

Wildlife Species: Based on data compiled by the Hawaii Biodiversity and Mapping Program, and the Hawaii GAP Program, the federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) and Hawaiian hawk (*Buteo solitarius*) have been observed in the vicinity of the proposed project. There is no federally designated critical habitat on the project site (USFWS consultation letter dated June 6, 2011 – see Appendix A).

IMPACTS AND MITIGATION MEASURES

The proposed project would enlarge bridge footings and would result in the removal of all existing vegetation within the grading limits shown on Figure 5; these areas would be re-grassed following construction to prevent erosion, and would later be re-colonized by localized grasses and plants. The enlarged footings would result in long-term loss of a few square feet of natural habitat. No adverse long-term effect to natural habitat would occur with project implementation.

[3] Occurs naturally in a particular region or environment, but may occur elsewhere.

Hawaiian hoary bats roost in woody vegetation and leave their young in trees and shrubs when they forage. The Hawaiian hawks also nest in woody vegetation. To minimize potential impacts to the endangered Hawaiian hoary bat and Hawaiian hawk, the following measures would be required:

- During construction, woody plants greater than 15 feet tall shall not be removed or trimmed during the bat-birthing and pup-rearing season (May 15 through August 15).
- Brush and tree clearing for construction should be avoided during the Hawaiian hawk-breeding season (March through September). If clearing should occur during the Hawaiian hawk-breeding season, a biological survey shall be conducted to determine if Hawaiian hawk nests are in the vicinity. A qualified biologist shall conduct these surveys or ornithologist in accordance with USFWS survey methodology.

During construction, site-specific BMPs developed as part of the project would minimize erosion and sedimentation and potential adverse effects to aquatic biota down stream of the project site. No adverse long-term effects to aquatic biota would occur with project implementation, and no mitigation would be necessary.

3.5 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

HISTORICAL PERSPECTIVE

Hāmākua Area History

Early Cultural History

The cultural history of the Hāmākua area includes legend of three gods native to Hawai‘i Island: Pele, Poli‘ahu, and Kamapua‘a. Kamapua‘a lived in Kohala, Pele in the crater of Kilauea, and Poli‘ahu on the summit of Mauna Kea. The battles of Poli‘ahu and Pele resulted in eruptions and earthquakes, which gave shape to the Hāmākua landscape (County of Hawai‘i 2010).

The largest early Hawaiian settlements in the Hāmākua area were located in Waimanu and Waipi‘o Valleys. Most settlements included small villages where wet land taro was grown. There were six *moku* (districts) and many separate land divisions, or *ahupua‘a* (land division usually extending from the uplands to the sea), within the island. Connecting all *moku* was a system of trails. There are several sacred sites in the Hāmākua area, and heiau (temple) were known to exist in Waipunalei, the vicinity of Laupāhoehoe, Kukuihaele area, and at Lalakea, among others. An archaeological study of Waipi‘o Valley and Hāmākua conducted in 1977 found that there is a scarcity of visible prehistoric habitation sites along the Hāmākua coast due to agricultural practices, although some subsurface deposits may still exist (County of Hawai‘i 2010).

Historic Activities and Land Uses

From the onset of western interest, there were several trade markets on the island of Hawai‘i, including sandalwood trade until the 1820’s, whalers after 1810, and cattle ranching. In Hāmākua, dairies and other agricultural activities were important. Sugar was the most prominent agricultural crop, and plantation areas cropped up in Hāmākua. The sugar industry resulted in new infrastructure, including extensive flume systems, railways, and bridge trestles spanning

large gulches. Sugar was the dominant agricultural crop in the area until 1994, when the last sugar plantation in Hāmākua closed (County of Hawai'i 2010).

Project Site History

The existing Umauma Bridge was originally built in 1911 to support railroad tracks and consisted of two main steel trestles (or towers) supporting six spans of riveted steel plate girders. In the early 1950's, the bridge and the trestles were widened to support a two-lane highway for vehicular traffic. The widened bridge consisted of a concrete bridge deck, sidewalks, and an open beam and post type railings. In the early 2000's, the bridge was retrofitted to resist updated earthquake design loads.

AREA HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

Umauma Bridge was included in two different historic bridge inventories – one done in 1987, which was accepted by the SHPD ("The Historic Bridge Inventory and Evaluation of the Island of Hawaii" prepared for the State of Hawaii, Department of Transportation, Highway Division (SDOT), July 1987) and the other current one is a draft statewide bridge inventory ("State of Hawaii Historic Bridge Inventory and Evaluation" prepared for the State of Hawaii, Department of Transportation, Highway Division (SDOT), prepared by the Heritage Center, School of Architecture, University of Hawaii at Manoa in 2008). Both inventories show the Umauma Bridge has been identified as eligible for listing on the Hawaii and National Register of Historic Places.

Umauma Bridge is part of a National Register eligible multiple property nomination of "Steel Trestle Bridges on the Hāmākua Coast" written by Spencer Lieneweber in cooperation with the Hawai'i DOT. The SHPD and DOT are currently working toward an agreement on the bridge inventory and finalizing documentation for the National Register. The bridge is significant under National Register criteria for its association with the Hilo Railroad Company, which played a major role in the development of the Hāmākua Coast for sugar plantations and as one of the few remaining steel girder and trestle bridges that represent the work of John Mason Young.

A field inspection of the project area was conducted by Robert B. Rechtman, Ph.D. of Rechtman Consulting, LLC on March 11, 2010. Based on this inspection, it was determined that the footing areas for the new concrete columns have already been significantly impacted as a result of the original bridge construction, and that no archaeological or cultural resources are present.

Cultural practices such as fishing and gathering may occur on some areas of Umauma stream; however, Umauma stream gulch is largely inaccessible from the bridge, as the sides of the gully are steep, with some areas as steep as near vertical near the bottom of the slope. Most of the slope areas are covered by vegetation. There is no public access to the stream at the project location.

IMPACTS AND MITIGATION MEASURES

As described above, the footing areas for the new concrete columns are located on basaltic bedrock and have already been significantly impacted as a result of the original bridge

construction. No archaeological or cultural resources are present. Therefore, the placement of the new concrete columns would have no effect on archaeological resources. While cultural practices such as fishing and gathering may occur on some areas of Umauma stream, implementation of the proposed project would not result in any long-term adverse affects to these activities. For a discussion of potential short-term impacts to water quality, see Section 3.2, *Hydrology and Water Quality*.

Section 106 of the National Historic Preservation Act (NHPA) requires that the head of any Federal department having authority to license any undertaking shall, prior to the issuance of any authorization, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. Under Section 106 of the NHPA, the FHWA is required to consult with the State Historic Preservation Officer (an official appointed in each State or territory to administer the National Historic Program) in order to determine a project's potential to impact resources of historic or cultural significance.

Formal consultation with the State Historic Preservation Division (SHPD) has been conducted in accordance with Section 106 of the National Historic Preservation Act and HRS Section 6E-8. FHWA has determined the project to have "no adverse effect with conditions", and the SHPD has concurred with those findings (see letter in Appendix A). The conditions include:

1. The trestles and steel girders are retained.
2. Color the center concrete column a color such that the trestles will be more visually dominant.
3. Paint the trestles with a coating more long term to alleviate the corrosion problems necessitating the rehabilitation project.
4. Additional girders will resemble, but to the trained eye not duplicate, the originals.
5. The look and feel of the bridge is maintained as presented to SHPD.
6. DOT will provide the requested additional photographic documentation.
7. Submit the Steel Trestle Bridges of the Hāmākua Coast multiple property nomination to the Hawaii Historic Places Review Board for consideration within one year of this letter.
8. Retain the Hamilton & Chambers plaque that is affixed to the bridge's present superstructure.
9. Continue to consult with the Hawaii SHPO throughout the schematic, design development and final design stages to ensure the work conforms to the Secretary of Interior's Standards for Rehabilitation.

While there is low probability of encountering archaeological sites in this area, in the event that historic resources, including human skeletal remains, are identified during the construction activities, all work would cease in the immediate vicinity of the find, the find would be protected from additional disturbance, and the State Historic Preservation Division, Oahu Section, would be contacted immediately. With implementation of these conditions, no adverse effect to cultural, historic, or archaeological resources would occur.

3.6 AIR QUALITY AND CLIMATE

The project site is located along the Hāmākua coast on the northeastern shore of Hawai'i Island. This area lies nearly perpendicular to the prevailing flow of the trade winds, and is moderately rainy, with frequent trade wind showers. Rainfall in the project area ranges from 160 inches annually at the coastal elevations to over 240 inches in the areas upslope of the project site (County of Hawai'i 2010). Temperatures are generally uniform and mild, with daytime temperatures commonly in the 70's to 80's and nighttime temperatures are in the 60's to 70's.

The Department of Health, Clean Air Branch, monitors the ambient air in the State of Hawai'i for various gaseous and particulate air pollutants. The U. S. Environmental Protection Agency (EPA) has set national ambient air quality standards (NAAQS) for six criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, ozone, and particulate matter (PM_{10} and $PM_{2.5}$). Hawai'i has also established a state ambient air standard for hydrogen sulfide. The primary purpose of the statewide monitoring network is to measure ambient air concentrations of these pollutants and ensure that these air quality standards are met.

The closest monitoring station to the project area is located in Hilo, mainly to monitor air quality impacts from fugitive dust and hydrogen sulfide. According to the State of Hawai'i Department of Health Annual Summary 2009 Air Quality Data, criteria and pollutant levels in the State of Hawai'i remained well below all federal and state ambient air quality standards (Hawaii DOH, 2009).

IMPACTS AND MITIGATION MEASURES

Construction of the proposed bridge rehabilitation project could result in temporary air quality effects, including exhaust emissions from construction vehicles and dust generated by short-term construction related activities. Components of construction emissions include employee trips, exhaust emissions from construction equipment, and fugitive dust emissions. Grading and earthwork within the project area could generate airborne dust particulates.

Dust control measures such as watering and sprinkling shall be implemented as needed to minimize wind-blown dust. To minimize construction-related exhaust emissions, project contractors shall ensure that all internal combustion engines are maintained in proper working order. In addition, the work shall be in conformance with the air pollution control standards contained in HAR, Title 11, Chapters 59, "Ambient Air Quality Standards," and Chapter 60, "Air Pollution Control." With re-grassing of exposed areas following construction, wind-blown dust in the project area would be minimized.

Once constructed, the proposed bridge rehabilitation project and associated concrete footings would not result in any air emissions, and there would be no long-term adverse air quality impacts associated with the proposed action. Other than passing vehicles on the highway and over the bridge, there are no air contaminant sources in the project area.

3.7 NOISE

The project site is located in a rural area of northeast Hawai‘i Island. Surrounding noise levels in the vicinity of the project site are considered relatively low. Existing noise sources are from occasional vehicular traffic crossing the bridge, in addition to the sound of flowing stream water. There are four rural residential properties within a quarter mile of the nearest construction area.

IMPACTS AND MITIGATION MEASURES

Noise impacts from a project can be categorized as those resulting from construction and those from operational activities. Construction noise would have a short-term effect; operational noise would continue throughout the lifetime of the project. Implementation of the proposed bridge rehabilitation project could temporarily increase noise levels during demolition of the existing bridge deck and construction of the new bridge deck and footings above maximum allowable limits. Typical heavy construction equipment would include but may not be limited to crane, excavator, hydraulic hammer, pneumatic compactor, cold planer, paving skid, concrete truck, and haul truck. It is anticipated that there would be some type of hammering or drilling for approximately 18 months of the 24-month total construction duration.

Construction-period noise would be minimized by project compliance with HAR Chapter 11-46, “Community Noise Control” of the State Department of Health. According to these rules, a noise permit would be required if construction noise is expected to exceed allowable limits. As established in HAR §11-46-4 and 11-46-6, the maximum permissible sound level during construction in the project area is 70 dBA[4]. Construction noise typically varies between 70 and 96 dBA, which exceed permissible levels established in HAR §11-46-4.

During certain construction phases, highway travel lanes would need to be closed, resulting in one-way traffic. In order to minimize adverse traffic impacts, work requiring lane closure is proposed to be at night. Construction noise exceeding permissible sound levels outside the time period of 7 am-6 pm Monday through Friday, or 9 am-6 pm on Saturday, or any time on Sundays and holidays would require a noise variance (HRS §342F). Therefore, in addition to the noise permit, a noise variance would be requested to extend work hours into the evenings and on weekends.

A single-family residence is located approximately 400 feet from the construction work area, and could be adversely affected from nighttime construction activity. To minimize adverse noise effects, the nearby residents would be contacted via phone call or visit and informed of the schedule and proposed construction activities.

There would be no long-term increase in noise during project operations since the project includes rehabilitation of an existing bridge, which is considered a passive structure. Further, the project would not generate additional traffic and associated noise.

[4] An A-weighted decibel is a decibel corrected for the variation in frequency response of the typical human ear at commonly encountered noise levels. For this reason, environmental noise usually is measured in dBA. Generally, a three-dBA increase in ambient noise levels represents the threshold at which most people can detect a change in the noise environment.

3.8 AESTHETIC AND VISUAL RESOURCES

The project site consists of a roadway bridge spanning Umauma Stream gulch. Surrounding land uses are rural agricultural. From the highway while driving, there are limited scenic views for motorists both *mauka* and *makai* of the stream and ocean. Motorists often stop in the area to view the falls from the bridge.

The Hāmākua Heritage Corridor follows Māmalahoa Highway (State Route 19) from Hilo to the Waipi'o lookout. Umauma Falls at the World Botanical Gardens is identified as a scenic site along the corridor. While the Heritage Corridor does not have legal status at this time (July 2011), Hawai'i County Code §25-6-60 established a means to designate scenic corridors. The scenic byways program is intended to provide for the enhancement of important scenic, historic, recreational, cultural, and/or natural resources accessed from identified scenic corridors.

IMPACTS AND MITIGATION MEASURES

During construction, workers, materials, and equipment would be visible from the bridge and highway. Most of the proposed repair work would be out of site for visitors viewing the falls from the bridge since the work would be underneath the bridge. As an already existing roadway and bridge, the bridge rehabilitation project would not significantly change the scenic and visual character of the surrounding area.

3.9 SOCIAL CHARACTERISTICS

Population

The year 2010 population in Hawai'i County consisted of 185,079 persons, with a 24.5 percent increase from 2000 to 2010 (Census 2010). Population forecasts as set forth by the State Department of Business Economic Development and Tourism (DBEDT) indicate a projected population of approximately 279,700 residents by the year 2035, with an average annual growth rate of 1.3 percent (DBEDT 2009).

Economy

Agriculture is an important industry in the project area. In addition to agriculture, people in the greater project area are employed in a variety of industries not located in the project area. The annual average wage in private employment for Hawai'i County in 2008 was $33,267, compared to $38,466 in the State. Due to the rural nature of the project area, residents generally must travel to Hilo or Waimea to obtain social and health services.

Recreation

The roadway and bridge are located in a dedicated public right-of-way. Umauma stream gulch is largely inaccessible from the bridge, as the sides of the gully are steep, with some areas as steep as near vertical near the bottom of the slope. There is no public access to the stream at the project location.

IMPACTS AND MITIGATION

Implementation of the proposed action would not displace any residents or businesses since construction would occur within the existing State right-of-way. While construction employment would be created during the project construction phase, needed employees could be expected to be provided by the local labor pool, without the importation of significant amounts of new labor. The Hawai'i Belt Road is important for the movement of people and goods in a safe an efficient manner, and the proposed bridge rehabilitation project would have a beneficial effect to this end.

3.10 UTILITIES AND PUBLIC SERVICES

UTILITIES

There are no utilities that span the bridge. There are utility/electrical lines on suspended over the gulch on both *mauka* and *makai* sides of the bridge. The *mauka* utility line may need to be temporarily relocated to allow for use of a crane during construction.

POLICE, FIRE, AND EMERGENCY MEDICAL SERVICES

The County Fire Department provides fire fighting, emergency medical service, search and rescue, hazard materials response, and life guarding services. There are fire stations located at Honoka'a and Laupāhoehoe, together with the fire stations in Hilo. Police patrol the area

Hale Ho'ola Hāmākua (HHH) serves the healthcare needs of the communities of Hāmākua, North Hawai'i, and South Kohala. Other medical facilities that serve the general project area population include North Hawai'i Community Hospital (Waimea), Waiakea Health Center (Hilo), and Hilo Medical Center.

IMPACTS AND MITIGATION

During construction, there may be increased calls or complaints to the police from motorists due to traffic disruption, noise, and temporary lane closures. The proposed improvements would not result in an increase in service demands from police and fire protection or other public services. No significant adverse impacts to existing utilities and public services are expected, and no mitigation would be necessary.

3.11 TRAFFIC AND TRANSPORTATION

The Umauma Stream Bridge carries the Hawai'i Belt Road, also known as Māmalahoa Highway (Highway No. 19), over Umauma Stream. Hawai'i Belt Road is a two-lane regional arterial roadway that provides primary access to the area. As reported by DOT in April 2011, the Average Daily Traffic (two-way) is estimated at 8,100 in 2011 and estimated to increase to 11,300 in 2031. A traffic accident analysis for Umauma Bridge from the State of Hawai'i, Department of Transportation, Traffic Branch did not identify any potential areas of concern within the limits of the project (September 13, 2011).

IMPACTS AND MITIGATION

Construction of the proposed bridge rehabilitation project would result in short-term impacts on traffic. During certain construction phases, one highway travel lane would need to be closed, resulting in one-way traffic and temporary delays. Temporary lane closure is proposed to occur during nighttime hours to minimize impacts to traffic. Providing notification of any temporary closures would minimize impacts to the public. Emergency services (police, fire, and ambulance services) and area residents would be given adequate notice of potential delays prior to construction. A temporary construction staging area is proposed be located on an adjacent property to the bridge to minimize illegal parking and ensure safety.

There would be no direct increase in operational traffic due to implementation of the proposed bridge rehabilitation project. While there were no areas of concern identified in the traffic accident analysis for Umauma Bridge, the proposed improvements would bring the bridge roadway in compliance with FHWA regulations and current safety standards. The removal of the existing sidewalks and bridge railings, the widening of the bridge deck and constructing new bridge railings (which conform to current acceptable standards) along both sides of the bridge would improve the safety for high-speed vehicular traffic by eliminating a potential vaulting hazard that a sidewalk could present. No additional vehicular lanes are proposed that could increase roadway capacity.

The bridge is regularly used as a viewing point by pedestrians for the waterfalls on Umauma Stream, creating a potential hazard to both motorists crossing the bridge and pedestrians stopping to view the falls. The proposed project includes wider shoulders and taller bridge railings along both sides of the bridge, which would improve the safety for bicyclists and pedestrians.

3.12 LAND USE CONTROLS

Sate and County policy, and land use and community plans and controls are established to address the long-term physical, social, economic, and environmental needs in Hawai‘i. State and County land use controls for the Rehabilitation of Umauma Stream Bridge project are described below.

STATE OF HAWAI‘I

The Hawai‘i State Plan, as codified in HRS Chapter 226, established a set of goals, objectives, and policies that serve as long-range guidelines for the growth and development of the State. The following discussion evaluates the general consistency of the proposed bridge rehabilitation project with the Hawai‘i State Plan goals and policies.

Table 1	**Consistency of the Proposed Rehabilitation of Umauma Stream Bridge Project with Adopted Hawai‘i State Plan Objectives and Policies**
§226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources.	
Objective:	(a) Planning for the State’s physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi- cultural/historical resources.
Policy:	(1) Promote the preservation and restoration of significant natural and historic resources.
Policy:	(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.
	The proposed bridge rehabilitation project is designed to minimize potential impacts to historic impacts. There would be no adverse impacts to the aesthetic environment with implementation of the proposed project.
§226-13 Objectives and policies for the physical environment--land, air, and water quality.	
Objective:	(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.
Policy:	(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.
Policy:	(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.
	The proposed project includes site-specific BMPs to minimize potential sedimentation and erosion in the project area. The proposed improvements would bring the bridge roadway in compliance with FHWA regulations and current safety standards. The removal of the existing sidewalks and bridge railings, the widening of the bridge deck and constructing new bridge railings (which conform to current acceptable standards) along both sides of the bridge would improve the safety for high-speed vehicular traffic by eliminating a vaulting hazard that a sidewalk would present.
§226-17 Objectives and policies for facility systems--transportation.	
Policy:	(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment;
	The proposed project is designed with sensitivity to the natural environment. The project would provide short-term construction employment and would ensure the continued movement of people and goods in a safe and efficient manner.

Hawai‘i State Environmental Policy

The identified purpose of the State Environmental Policy (HRS Chapter 344) is to “encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawaii” (HRS §344-1). The following policies and guidelines from the State Environmental Policy apply to the proposed bridge rehabilitation project:

Table 2	**Consistency of the Proposed Rehabilitation of Umauma Stream Bridge Project with State Environmental Policy Policies**
§344-3 Environmental policy. It shall be the policy of the State, through its programs, authorities, and resources to:	
(1)	Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaii.
	The proposed project includes site-specific BMPs to minimize potential sedimentation and erosion in the project area. The proposed improvements would bring the bridge roadway in compliance with and current safety standards and is designed to minimize potential impacts to historic resources. There would be no long-term adverse impacts to natural resources and the environment with implementation of the proposed project.
§344-4 Guidelines. In pursuance of the state policy to conserve the natural resources and enhance the quality of life, all agencies, in the development of programs, shall, insofar as practicable, consider the following guidelines:	
(2)	Land, water, mineral, visual, air, and other natural resources.
(A)	Encourage management practices which conserve and fully utilize all natural resources.
	The proposed project includes site-specific BMPs to minimize potential sedimentation and erosion in the project area and is designed with sensitivity to the natural environment.
(4)	Parks, recreation, and open space.
(A)	Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses;
	The proposed project is designed to minimize potential impacts to historic resources (see section 3.5 of this document).

State of Hawai'i, Land Use Commission – State Land Use Districts

The HRS Chapter 205 establishes four major land use district in which all lands in the State are placed. These districts include: urban, rural, agricultural, and conservation. The land *makai* of the bridge appears to be located within the "Conservation" District Resource Subzone classification. According to consultation with the Office of Conservation (OCCL), it is unclear if the bridge actually lies within the Conservation District or Agricultural District, as the roadway marks the boundary between these designations. The bridge appears to be a nonconforming structure, constructed after 1912 and improved upon in 1955, prior to Conservation District rules (1964). HRS §183C-5 allows for the continued use of nonconforming structures. Further, since the majority of the work would take place within the right-of-way, which is outside of OCCL jurisdiction, a Conservation District Use Permit would not be required.

Coastal Zone Management Program

In October 1972, the Congress passed the Coastal Zone Management Act for the purpose of establishing a national program for the management, beneficial use, protection, and development of land and water resources of the coastal areas of the United States. The Hawaii Coastal Zone Management (CZM) Program (HRS Chapter 205A) was promulgated in 1977 in response to the Federal Coastal Zone Management Act of 1972. The objectives and policies of the CZM are to

provide recreational resources; protect historic, scenic, and coastal ecosystem resources; provide economic uses; reduce coastal hazards; and manage development in the coastal zone. An application for a Federal Consistency Review for the CZM Program was submitted for the proposed project, and concurrence of CZM consistency was issued on August 26, 2011. A brief discussion of the project's conformance with the CZM objectives is included below.

Table 3 Consistency of the Proposed Rehabilitation of Umauma Stream Bridge Project with Hawaii Coastal Zone Management (CZM) Program Objectives

RECREATIONAL RESOURCES	
Objective:	Provide coastal recreational opportunities accessible to the public. The roadway and bridge are located in a dedicated public right-of-way. Umauma stream gulch is largely inaccessible from the bridge, as the sides of the gully are steep, with some areas as steep as near vertical near the bottom of the slope. There is no public access to the stream at the project location.
HISTORIC RESOURCES	
Objective:	Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture. The bridge has been determined eligible for listing in both the Hawaii state and National Register of Historic Places. The proposed rehabilitation project would conform to the Secretary of Interior's Standards for Rehabilitation, and the State Historic Preservation Division has concurred with the determination of "no adverse effect with conditions".
SCENIC AND OPEN SPACE RESOURCES	
Objective:	Protect, preserve and where desirable, restore or improve the quality of coastal scenic and open space resources. The bridge project is not directly adjacent or abutting a scenic landmark, how Umauma Falls can be seen from the bridge and highway near the bridge and visitors stop in this area to view the falls. As an already existing roadway and bridge, the bridge rehabilitation project would not significantly change the scenic and visual character of the surrounding area.
COASTAL ECOSYSTEMS	
Objective:	Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems. A portion of one proposed footing is within the jurisdictional waters (OHWM) of the U.S. and a USACE permit application has been submitted. Clearing and grubbing would occur adjacent to the highway for construction staging and near the stream beneath the bridge above the OHWM for construction staging. Site-specific BMPs have been prepared to minimize adverse effects to project waterways.
ECONOMIC USES	
Objective:	Provide public or private facilities and improvements important to the State's economy in suitable locations. Rehabilitation of the Umauma Stream Bridge is vital to maintaining the viability of the Hawai'i Belt Road, which connects Hilo to Hāmākua, Waimea, and Kailua-Kona. The Hawai'i Belt Road is important for the movement of people and goods in a safe an efficient manner, and the proposed bridge rehabilitation project would have a beneficial effect to this end.

Table 3	**Consistency of the Proposed Rehabilitation of Umauma Stream Bridge Project with Hawaii Coastal Zone Management (CZM) Program Objectives**
COASTAL HAZARDS	
Objective:	Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.
	Construction of the proposed bridge rehabilitation project would not result in increased flooding or hazards from flooding in surrounding areas. While the proposed bridge footings would be within a flood hazard zone, they are designed to withstand stream flood flows.
MANAGING DEVELOPMENT	
Objective:	Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
	Details of the proposed project were provided to elected leaders and federal, state, and county agencies for early consultation. The opportunity for public review will occur with issuance of the DEA and the USACE permit public notice. Site-specific BMPs would be required of the contractor to prevent adverse effects to state coastal waters.
PUBLIC PARTICIPATION	
Objective:	Stimulate public awareness, education, and participation in coastal management.
	See above.
BEACH PROTECTION	
Objective:	Protect beaches for public use and recreation.
	The proposed bridge footing is approximately 275 feet inland of the shoreline and approximately 75 feet above mean sea level. The footing would be embedded in solid rock. Because of the nature of the work and the distance from the shoreline, there is no risk of coastal erosion.
MARINE RESOURCES	
Objective:	Implement the State's ocean resources management plan.
	A conservation ethic and stewardship would be applied in the proposed project through the application of the site-specific BMPs. No marine or coastal resources are affected because of the BMPs and the distance of the project from the shoreline.

Special Management Area Designation

The CZM outlines controls and policies within an area along the shoreline called the Special Management Area (SMA). The objectives of the SMA were "the maintenance, restoration, and enhancement of the overall quality of the coastal zone environment, including, but not limited to, its amenities and aesthetic values, and to provide adequate public access to publicly owned or used beaches, recreation areas and national reserves." The purpose of the SMA Permit is to regulate any use, activity or operation that qualifies as a "development" and is administered at the County level. The project area is located within the SMA boundary. However, because "[r]epair or maintenance of roads and highways within existing rights-of-way" are not considered "development" according to HRS Chapter 205A-22 and Planning Commission Rule 9-4(e)(2)(B), the proposed bridge rehabilitation project would be considered exempt, and further review of the project according to SMA rules and regulations would not be required.

COUNTY LAND USE PLANS AND POLICIES

County of Hawaii General Plan

The *County of Hawaii General Plan* (2005) is a long range, generalized planning policy document to guide development of the County. It serves as a basis for an implementation program to effectuate desired changes and improvements in the social, economic, and environmental atmosphere of the County. Topics addressed in the General Plan include goals and policies regarding population, land use, the environment, cultural resources, economic activity, housing and urban design, transportation, social infrastructure, and government. The General Plan identifies viewpoints of Umauma gulch both mauka and makai from the bridge as examples of natural beauty in the North Hilo District. A goal of the General Plan is to "[p]rotect scenic vistas and view planes from becoming obstructed." The proposed project is rehabilitation of an existing bridge and highway, and would not conflict with this goal.

County of Hawai'i Zoning Designation

The proposed bridge rehabilitation project is located within the State right-of-way. Since the proposed alignment falls within existing right-of-way, there are no specific zoning standards or requirements that would require discretionary review. Property adjacent to the project are zoned Agricultural District.

Hāmākua Community Development Plan (CDP)

The project site is located in the planning area of the Hāmākua Community Development Plan (CDP). The Hāmākua CDP is currently (July 2011) in the planning process and has not yet been adopted. In the Hāmākua CDP Draft Community Profile (December 2010), the viewpoint of falls in Umauma gulch both *mauka* and *makai* is identified as a natural beauty site and a scenic resource of the area. The proposed bridge rehabilitation project is also identified as one of the proposed and funded capital road improvements in the Planning Area under the State Transportation Improvements Plan (STIP) (FY2011-2014) and State Capital Improvements Program (CIP).

4 ALTERNATIVES TO THE PROPOSED ACTION

This chapter considers alternatives to the proposed action, including the No Action Alternative. The alternatives were rejected for their inability to meet the project objectives or because attainment of the objectives were achieved at a higher cost, either financially or environmentally.

4.1 PROPOSED ALTERNATIVES

NO ACTION ALTERNATIVE

Under the No Action Alternative, the Umauma Stream Bridge would continue under current operations and maintenance schedule. Current maintenance consists of temporary repairs and temporary repainting intended to slow down, but not stop, existing corrosion of steel. Maintenance painting and repairs occur approximately every 2 years. Even with temporary repairs and repainting, the condition of the existing bridge would continue to deteriorate, and eventually the bridge would become unsafe. Further, this alternative would not meet any of the project objectives, including:

- To rehabilitate the deteriorating, steel framed Umauma Bridge while satisfying SHPD historical requirements.
- To bring the bridge roadway in compliance with FHWA regulations and current safety standards.

ALTERNATIVE 1: REPAIR AND REPAINT THE EXISTING STEEL TOWERS EVERY 8 YEARS FOR NEXT 75 YEARS

Alternative 1 is a more long-term repair and repainting plan than the No Action Alternative, and is estimated to last up to about 8 years. While it would extend the life of the bridge over the No Action Alternative, the cost and effort of doing a long-term repair/repainting cycle is substantially greater than cost/effort to do a temporary repair/repainting cycle. In addition, the following objectives would not be met:

- To rehabilitate the deteriorating, steel framed Umauma Bridge while satisfying SHPD historical requirements.
- To bring the bridge roadway in compliance with FHWA regulations and current safety standards.

ALTERNATIVE 2: BUILD NEW CONCRETE TOWERS WITHIN EXISTING STEEL TOWERS AND KEEP EXISTING BRIDGE SUPERSTRUCTURE (NO WIDENING).

This alternative would include building new concrete towers within the existing steel towers similar to the proposed action. Therefore, the project would meet the identified objective of rehabilitating the bridge while satisfying SHPD historical requirements. However, it would not

include improvements to the bridge roadway, including widening of the roadway. The following objective would not be met:

- To bring the bridge roadway in compliance with FHWA regulations and current safety standards.

ALTERNATIVE CONSIDERED BUT ULTIMATELY REJECTED: REPLACE EXISTING BRIDGE

One alternative considered but ultimately rejected included replacing the existing bridge in its entirety. This alternative was rejected due to significant and unavoidable adverse effects to historic resource, since it would result in the demolition of a significant historic resource.

4.2 LIFE CYCLE COST ANALYSIS OF ALTERNATIVES

To assist in the selection of the most cost-effective alternative, a life cycle cost analysis was performed for several of the alternatives (see table below). The cost analysis assumes a 75-year life cycle and 2007 dollars.

Alternative 1: Repair and repaint	$112,000,000
Alternative 2: Build new concrete towers – no widening	$51,000,000

The initial construction cost for Alternative 2 was estimated at $33 million, which is less than the proposed project cost of $35 million. However, as stated above, Alternative 2 would not meet the project-identified objective to bring the bridge roadway in compliance with FHWA regulations and current safety standards.

A cost analysis of a new parallel bridge next to the existing bridge was not considered due to its effect on realigning the existing roadway through the existing hillside at each end of the bridge. By inspection, the cost for this option would exceed the cost of all the other options already presented.

5 FINDINGS AND DETERMINATION

As set forth in HAR, Title 11, Department of Health, Chapter 200, §11-200-12, in considering the significance of potential environmental effects, an agency must "consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action." The proposed action is not expected to have a significant effect on the environment. The recommended preliminary determination for the Rehabilitation of Umauma Stream Bridge Project is a Finding of No Significant Impact (FONSI). The findings supporting this determination are discussed below.

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.

The proposed project would rehabilitate an existing bridge to preserve the historic integrity and improve roadway safety. The proposed project has been designed to avoid potential impacts to natural or cultural resources. Environmental impacts would be minimized by constructing the proposed improvements within the existing right-of-way and with implementation of mitigation measures and BMPs contained in this document.

(2) Curtails the range of beneficial uses of the environment.

The proposed improvements would not curtail the range of beneficial uses at the project site; implementation of the proposed rehabilitation project would be consistent with its current use as a bridge and roadway.

(3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.

The proposed project is consistent with the environmental goals, policies, and guidelines established in HRS Chapter 344 as discussed in Section 3.12 of this document. The project objective is to rehabilitate Umauma Bridge while maintaining its historical aspects and bring the bridge roadway in compliance with current safety standards.

(4) Substantially affects the economic or social welfare of the community or state.

The proposed action would have a positive effect on the economic and social welfare of the community and the state. Proposed improvements would support the safe movement of people and goods for the local community, as well as inter-island residents and visitors.

(5) Substantially affects public health.

Construction activities may temporarily increase fugitive dust and noise levels in the project vicinity. However, these impacts would cease upon completion of construction. No long-term negative impact on public health is anticipated with implementation of the proposed action. All bridge and roadway improvements would be constructed in accordance with all health and safety regulations.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities.

The proposed action is intended to serve the existing population and travelling public. The proposed action is not expected to generate population change since it would not increase the capacity of the roadway, and the bridge rehabilitation project would not create secondary demands and impacts on public facilities and services.

(7) Involves a substantial degradation of environmental quality.

There would be no long-term impacts associated with the proposed action. Construction activities may temporarily increase dust, noise, and traffic inconvenience in the project vicinity. However, these impacts would cease upon completion of construction. The project includes a small increase in impervious surfaces, which would increase stormwater runoff; however, project design includes the construction of storm drainage improvements that would redirect drainage from emptying directly into the stream. Storm runoff would be filtered through natural vegetation on the stream bank before entering into the stream. The proposed project also includes site-specific BMPs to minimize erosion and sedimentation effects to water quality. Additional mitigation measures included in Chapter 3 would minimize potential construction-related impacts.

(8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.

The proposed action is limited to rehabilitation of Umauma Stream Bridge to preserve the historic quality of the bridge and bring the roadway into compliance with current safety regulations. The proposed action does not involve a commitment for larger action.

(9) Substantially affects a rare, threatened, or endangered species, or its habitat.

The proposed improvements would occur at the existing bridge and roadway alignment. With implementation of mitigation and BMPs described in Section 3.4 of this document, no substantial adverse effects would occur to rare, threatened, or endangered species, or its habitat.

(10) Detrimentally affects air or water quality or ambient noise levels.

Construction activities would have a short-term effect on air quality, water quality, and ambient noise levels. Mitigation included in Chapter 3 would minimize these potential impacts. No additional long-term impacts would occur.

(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

There is no flood insurance map or flood hazard classification for the project area from the U.S. Federal Emergency Management Agency (FEMA). The project site is subject to minimal tsunami inundation. During construction, stream flood events, or flash flooding, could result in

potential hazards to workers and construction equipment located in the flood hazards area. Site-specific BMPs included as part of the project include measures to be taken in the event of intense rainfall, weather, or increased stream flows. With implementation of these BMPs, potential hazards to construction workers would be minimized, and no mitigation would be required. Construction of the proposed bridge rehabilitation project would not result in increased flooding or hazards from flooding in surrounding areas. Prior to the initiation of construction, the County would review proposed construction plans for consistency with County requirements and good engineering practice.

(12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies.

As an already existing roadway and bridge, the bridge rehabilitation project would not significantly change the scenic and visual character of the surrounding area.

(13) Requires substantial energy consumption.

There would be energy consumption associated with construction of the proposed bridge rehabilitation project. The amount of energy that would be consumed with project implementation is not considered substantial.

6 INDIVIDUALS, COMMUNITY GROUPS, AND AGENCIES CONSULTED

6.1 CONSULTATION

Preliminary consultation with agencies, organizations, and individuals were conducted during preparation of the Draft EA for the Rehabilitation of Umauma Stream Bridge project. Agencies, organizations, and individuals followed by an asterisk (*) provided written comments for the project Draft EA, as included in Appendix A of this document.

Federal Agencies

US Army Corps of Engineers
US EPA, Region 9
* U.S. Fish and Wildlife Services
* National Marine Fisheries Services

State Agencies

* Department of Health (DOH)
Department of Agriculture
* Department of Defense
* Department of Education
Department of Human Services
Department of Labor and Industrial Relations
Housing Finance & Development Corporation
* Department of Accounting and General Services (DAGS)
Department of Business, Economic Development and Tourism (DBEDT), Office of Planning
DBEDT, Energy Office
University of Hawai‘i Environmental Center
* Office of Hawaiian Affairs (OHA)
* Department of Hawaiian Home Lands (DHHL)
Department of Land and Natural Resources (DLNR)
* DLNR, State Historic Preservation Division
DLNR, Division of Aquatic Resources
DLNR, Division of Conservation and Resource Enforcement
DLNR, Division of Forestry and Wildlife
DLNR, Land Division
* DLNR, Office of Conservation and Coastal Lands

County Agencies

* Department of Planning
* Department of Public Works
Department of Water Supply, Water Quality Assurance Branch
Department of Parks and Recreation
* Fire Department
* Police Department
* Department of Environmental Management
Department of Research and Development
Office of Housing and Community Development

Elected Officials

Senator Akaka
Senator Inouye
Congresswoman Hanabusa, 1st District
Congresswoman Hirono, 2nd District
William P. Kenoi, Mayor, County of Hawai'i
Malama Solomon, 1st Senatorial District
Mark M. Nakashima, 1st Representative District
Dominic Yagong, Hawaii County Councilmember, District 1

Community

North Hilo Community Council

Utility Companies

Hawaii Electric Light Company
Hawaiian Telcom

Libraries

Laupahoehoe Public Library
Hilo Public Library

News Media

Hawaii Tribune Herald
West Hawaii Today

6.2 ENVIRONMENTAL ASSESSMENT PREPARATION

This Draft Environmental Assessment (EA) was prepared for DOT by RMBJ Consulting and Bow Engineering & Development, Inc. The following consultants were involved in the preparation of this document:

Raadha M. B. Jacobstein	Project Planner, RMBJ Consulting
William H. Q. Bow, P.E.	President, Bow Engineering & Development, Inc.
Brian Campbell	Project Engineer, Bow Engineering & Development, Inc.

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U.S. Department of Agriculture, Natural Resources Conservation Service. See NRCS.

APPENDIX D

APPLICABLE WATER QUALITY MONITORING AND ASSESSMENT PLAN

Applicable Water Quality Monitoring and Assessment Plan

for

Rehabilitation of Umauma Stream Bridge Project

January 2012

Prepared For:

Department of Transportation
Highways Division, State of Hawai`i
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INTRODUCTION

This water quality monitoring and assessment plan accompanies the "Application for Section 401 Water Quality Certification for Discharge Associated with Construction Activities" for the Umauma Stream Bridge Rehabilitation. This assessment plan has been prepared in accordance with the State of Hawai`i water quality criteria for streams HAR §11-54-05.2(b) and the Department of Health, Amendment and Compilation of Chapter 11-54 Hawaii Administrative Rules May 27 2009.

The Umauma Stream Bridge Project is located on Hawai`i Belt Road, Route 19 in the District of North Hilo. The steel frame of the bridge is showing deterioration and this project aims to rehabilitate the existing structure.

The project has the following objectives:

- Rehabilitate the deteriorating, steel framed Umauma Bridge while satisfying State Historic Preservation Division (SHPD) requirements

- Bring the bridge roadway in compliance with Federal Highway Administration (FHWA) regulations and current safety standards.

Improvements will include installing new concrete support columns within and adjacent to the existing steel support towers, widening the bridge deck and roadway shoulders, and constructing new concrete railing. Construction plans are included in the WQC Application.

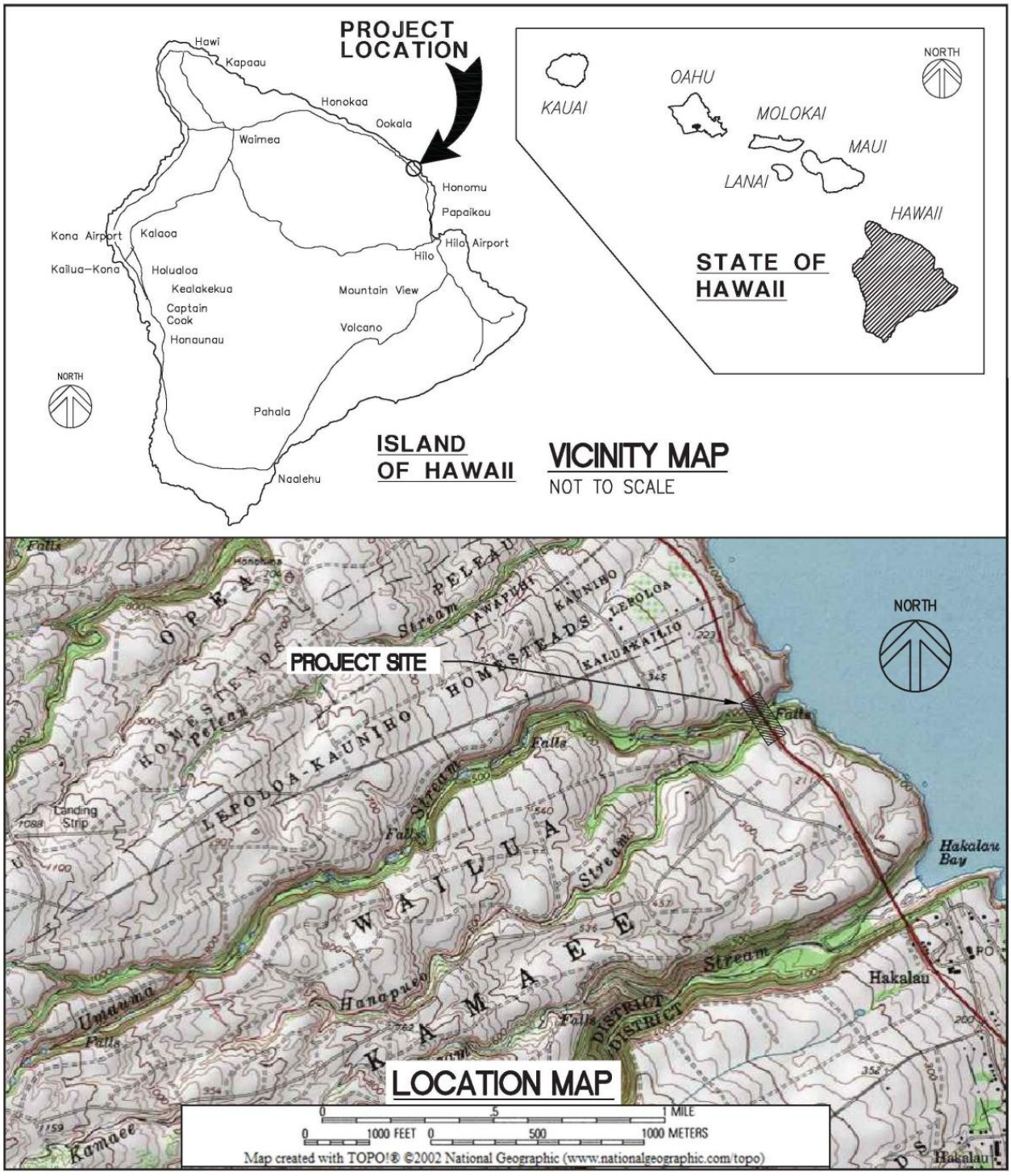
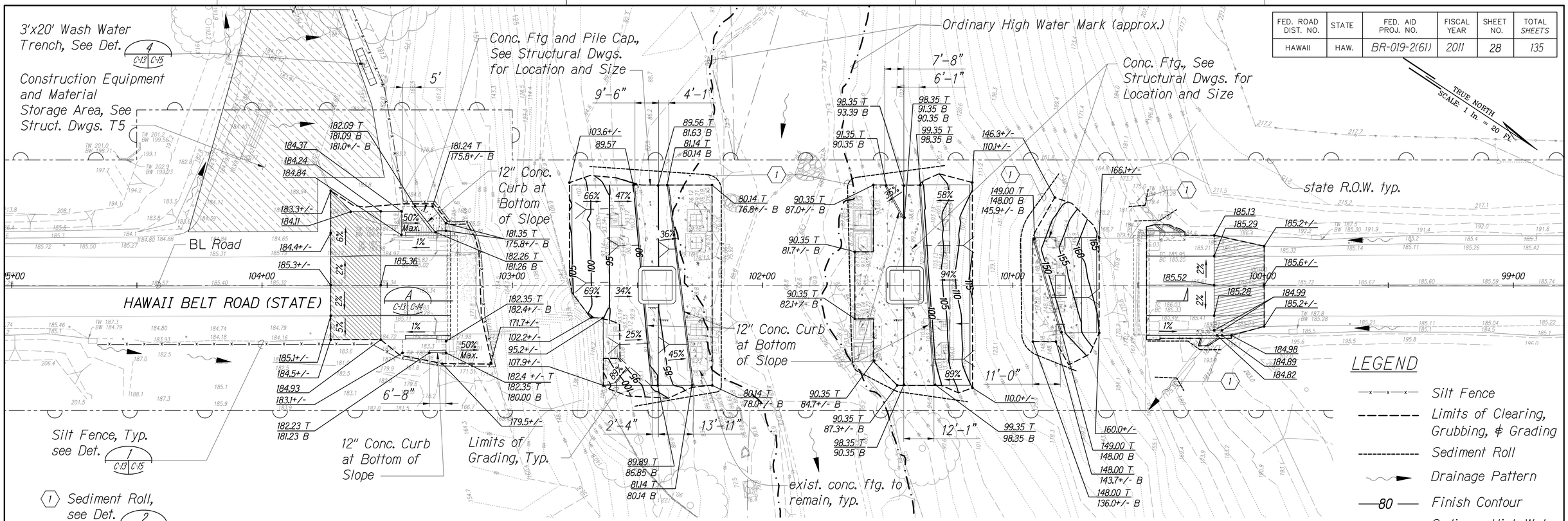


FIGURE 1 – Project Location Map

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	28	135



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'

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTEBOOK | No.
Plotted: Tue, 20 Dec 2011 @ 1:52pm By: MOHANG
File Name: H:\Y2008\Y08016 Umauma Bridge\07 Drawings\C-13 to C-15 UMAUMA - Grading and Erosion Control Plan and Section.dwg

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

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: Oct. 10, 2011

SHEET No. C-13 OF 19 SHEETS

PARAMETERS TO BE MEASURED

Data for the stream quality needs to be collected before, during and after construction. The following parameters will be tested in accordance with the General Monitoring Guideline for Section 401 Water Quality Certification Projects (HDOH 2000): pH, turbidity, total suspended solids (TSS), dissolved oxygen (DO), salinity, and temperature. Lead concentration will also be tested, as it was identified as a potential contaminant by preliminary hazardous materials testing. These measurements will be used to make a decision about "acceptable risk-based thresholds" to determine if the BMPs are adequate or if modifications must be made.

SAMPLING LOCATIONS

The future testing of the stream water will correspond with the locations used by AECOS Inc. in their preliminary report study, "Stream biological and water quality surveys for the Umauma Stream Bridge Rehabilitation Project near Hakalau, Hawai`i," hereinafter referred to as "*AECOS Report*".

FIGURE 3 – Locations of pre-construction, during construction, and post-construction water sampling stations, "AECOS Report"

The "Upstream" station is located 175 feet upstream of Umauma Bridge. The "Bridge" station is located several feet downstream of the bridge. The "Downstream" station is located 200 feet downstream of the bridge, just above the waterfall that empties into the Pacific Ocean.

TABLE 1 – Global Coordinates for water sampling stations		
Water Sampling Station	Latitude	Longitude
Upstream	19° 54' 25.02" N	155° 08' 10.16" W
Bridge	19° 54' 26.07" N	155° 08' 08.38" W
Downstream	19° 54' 27.04" N	155° 08' 06.83" W

SAMPLING FREQUENCY

Pre-Construction Sampling

Pre-construction samples will be taken daily for two weeks prior to construction. This meets the "General Monitoring Guideline for Section 401 Water Quality Certification Projects" requirement of ten samples over two weeks. These tests will establish a baseline for the stream's existing water quality conditions. Grab samples will be taken from the three stations indicated in Figure 3. These locations are approximate and may be slightly modified by the survey company as long as the exact locations remain consistent for all testing. Methods used for testing are indicated in Table 2.

During-Construction Sampling

During-construction samples will be taken monthly. Samples will be taken from the same three stations indicated for pre-construction sampling. The same parameters will also be tested.

Post-Construction Sampling

After construction has concluded and BMPs are removed, samples will be taken from the same three stations once a week for 3 weeks. This will determine if construction has had an adverse impact on the stream's water quality.

TABLE 2 – Analytical methods and instruments for sampling of Umauma Stream, "AECOS Report"

Analysis	Method	Reference	Instrument
Conductivity (Salinity)	SM 2510-B	Standard Methods, 20th Edition (1998)	Hydach pH/conductivity meter
Dissolved Oxygen	SM 4500-O G	Standard Methods, 20th Edition (1998)	YSI Model 550A Dissolved Oxygen Meter
pH	SM 4500 H+	Standard Methods, 20th Edition (1998)	Hannah pocket pH meter
Temperature	thermister calibrated to NBS. Cert. thermometer SM 2550 B	Standard Methods, 20th Edition (1998)	YSI Model 550A Dissolved Oxygen Meter
Total Suspended Solids	Method 2540 D	Standard Methods, 20th Edition (1998)	Mettler H31 balance
Turbidity	EPA 180.1 Rev 2.0	EPA (1993)	Hach 2100N Turbidimeter
Lead	EPA 3050 or approved equivalent	EPA (1989)	Atomic Absorption Spectrometer

SAMPLING AND ANALYTICAL METHODS

In addition to the samples taken during construction by the trained technicians, the contractor will have an assigned representative conduct a visual inspection of the construction area twice a month for the duration of construction. This inspection will include, but is not limited to, photographs of the construction site accompanied by descriptions of what the photos depict, a description of that day's construction activities, the date and time the inspection was done, the weather conditions and other activities unrelated to the bridge construction that might have an impact on the water quality. If there is an adverse impact due to the construction, Hawai`i Department of Health Clean Water Branch (HDOH-CWB) will be notified by an authority of the project within 24 hours or the next business day. Any modifications to the BMPs to remediate the impact will be employed in a timely manner and HDOH-CWB will be notified immediately. The photographs will include the three sample stations as well as other relevant locations of the construction site as determined by the contractor.

The samples will be grab samples taken by trained technicians. Samples will be taken in 250 milliliter plastic bottles right below the surface of the water. The bottles will be rinsed out with the water to be sampled first, then faced upstream to fill. Turbidity and lead concentration are analyzed in the laboratory, while all other parameters are measured *in situ*. The date, time and location of each sample will be recorded. Results will be faxed (586-4235) or emailed

(cleanwaterbranch@doh.hawaii.gov) within 24 hours or the next business day. Methods for sampling are indicated in Table 2.

QUALITY ASSURANCE PLAN

A Quality Assurance plan will be submitted by the laboratory chosen by the contractor. The contractor for this project is to be submitted within seven calendar days before the start of construction activities.

DATA QUALITY OBJECTIVES

"The DQO Process is used to establish performance or acceptance criteria, which serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of a study" (EPA QA/G-4). It consists of seven iterative steps that outline an efficient data collection system.

STEP 1 – State the Problem

Describing the Problem. Construction of Umauma Bridge could adversely impact Umauma Stream which lies directly below and partially within the proposed construction area. A water quality monitoring plan needs to be put into effect to ensure the stream quality continues to meet State standards.

Establishing the planning team

The planning team includes:

- State of Hawai`i Department of Transportation Highways Division Project Manager Eddie Chiu
- Consultant, Bow Engineering & Development, Inc. Project Manager Brian Campbell
- Contractor, to be submitted within seven (7) calendar days before start of construction activities
- Water quality surveyor/Trained technician, to be determined by contractor

Describing the conceptual model of the potential hazard. The most probable contaminants are debris, construction material, and chemicals that could potentially enter the stream during construction. Lead based paint and lead contaminated soil was identified to be present at the project site and the construction is likely to disturb the paint, leading to chipping and potential discharge into the environment. Since there is no recreational use of the stream due to inaccessibility, there is no threat to the public. Proper Best Management Practices (BMPs) will be installed to mitigate the pollution.

Identifying available resources, constraints, and deadlines. The cost of taking samples from Umauma Stream and testing them for the aforementioned parameters is the decision of the contractor who is awarded the contract. The contractor will contract a company qualified to perform the field data analysis. Testing will commence two weeks prior to the start of construction. The technician(s) to perform the survey and tests shall be properly trained for this task.

STEP 2 – Identify the Goal of the Study

Specifying the primary question. Is the contaminant concentration significantly above pre-construction levels and exceeding State standards, thereby requiring a different approach in mitigating the discharge of pollutants?

Determining alternative actions. Possible alternative actions are as follows:

- Modify BMPs dependent on which contaminant exceeds State regulations
- Take no action

Specifying the decision statement. Determine whether the stream water quality is adversely affected by the Umauma Bridge Rehabilitation.

STEP 3 – Identify Information Inputs

Identifying the source of information. Data from the preliminary "AECOS Report" will serve as a guideline on sampling methods and sampling locations along Umauma Stream for further studies. New data will be obtained from water quality surveys performed directly before, during, and after construction. Additional information will be obtained from state agencies including the Department of Health Clean Water Branch, and members of the planning team.

Identifying how the Action Level will be determined. The State of Hawai`i water quality criteria for streams HAR §11-54-05.2(b) will govern the Action Level which will lead to resolution of the decision statement. If levels exceed the maximum allowable in the criteria, then alternative actions will be considered. Also if adverse impacts on the stream can be visually identified from contactor supervised inspections, this will also dictate the Action Level.

Identifying appropriate sampling and analysis methods. The stream water samples will be measured according to the methods indicated in Table 2. Salinity is equivalent to Conductivity.

Tests will be conducted before, during, and after construction and results will be faxed or emailed to HDOH-CWB within 24 hours or the next business day. A typed report will be sent by the contractor within two weeks of the completed analyses to HDOH-CWB via facsimile or email. A final monitoring assessment will be submitted to HDOH-CWB by the contractor within 60 days of the post-construction testing.

STEP 4 – Define the Boundaries of the Study

Specifying the target population. The target population consists of all possible stream water samples in the proximity of the Umauma Bridge construction. The samples directly below the bridge and downstream towards the ocean are of particular interest. A sampling unit from the target population would consist of one 250 milliliter bottle, which would be tested for turbidity, TSS, and lead concentration. The other parameters will be measured in situ.

Specifying spatial and temporal boundaries and other practical constraints. The stream is generally 50-60 feet in width. Technicians should attempt to take samples from the middle of the stream flow as this will provide the best representative sample of the stream. Due to the continuous flow of water down the stream, there are temporal constraints. All parameters are dependent on other factors, such as rainfall, runoff and the stage of construction. For example, heavy rainfall could stir the water and increase the Total Suspended Solids (TSS) or the water temperature could differ depending on the time of day the test was performed. Therefore, the samples should be taken as routinely as possible, and weather conditions and the day's construction activities should be duly noted. This will ensure timely sampling and decision-making. Results will be reported within 24 hours of testing or the next business day.

Specify the scale of inference for decision making. A decision unit corresponds to one of the sample bottles that may contain elevated levels of one or more of the aforementioned parameters.

STEP 5 – Develop the Analytic Approach

Specifying the Action Level. The Action Level is dependent on the State of Hawai`i water quality criteria for streams HAR §11-54-05.2(b), Department of Health Amendment and Compilation of Chapter 11-54, or an adverse consequence due to construction identified through visual inspection. Salinity during and after construction should be compared to the baseline levels established in pre-construction testing. See Table 3.

TABLE 3 – Water Quality Criteria*	
Parameter	**State of Hawai`i Criteria**
pH	shall not deviate more than 0.5 units from ambient and not be lower than 5.5 nor higher than 8.0
Dissolved Oxygen	not less than 80% saturation
Temperature	shall not vary more than 1 C from ambient
Conductivity (Salinity)	not more than 300 micromhos/cm
Turbidity (NTU)	Dry Season: Not to exceed 2 NTU Wet Season: Not to exceed 5 NTU
Total Suspended Solids (mg/l)	Dry Season: Not to exceed 10 mg/l Wet Season: Not to exceed 20 mg/l
Lead**	In freshwater: Acute: Not to exceed 29 µg/l Chronic: Not to exceed 29 µg/l

*****State of Hawai`i water quality criteria for streams (geometric mean values) for wet (Nov. 1 – Apr. 30) and dry (May 1 – Oct. 31) seasons, HAR §11-54-05.2(b);
**Department of Health, Amendment and Compilation of Chapter 11-54 Hawaii Administrative Rules May 27 2009, §11-54-4

Specifying the theoretical decision rule. If any stream water sample contains parameter levels (lead concentration, pH, turbidity, total suspended solids (TSS), dissolved oxygen (DO), salinity, or temperature) exceeding the State allowable levels, then the construction of Umauma Bridge will be halted, and the Best Management Practices will be reevaluated and modified to accommodate the exceeded parameter. For example, if the turbidity of the water exceeds acceptable levels, then it could be decided that more sediment rolls be installed. If a consequence of construction is identified through visual inspection, then the same procedure of reevaluation of BMPs will be undertaken. If the parameter levels are not exceeded and no visual adverse impact of construction is identified, then the construction will continue.

STEP 6 – Specify Performance or Acceptance Criteria

Setting the baseline and alternative conditions. The health of the stream and the cleanliness of the stream water in meeting State regulations are of utmost importance. The samples taken from the stream before, during, and after construction must demonstrate appropriate levels of the aforementioned parameters. The baseline is established as "the water meets State regulations" (i.e., the parameters are below the levels mentioned in Tables 3 and 4).
The statistical hypotheses are:

H_o (Null Hypothesis/Baseline): the lead concentration, pH, turbidity, total suspended solids (TSS), dissolved oxygen (DO), salinity, and temperature of any given sample meet State regulations

H_a (alternative condition): the lead concentration, pH, turbidity, total suspended solids (TSS), dissolved oxygen (DO), salinity, and/or temperature of any given sample does not meet State regulations

Unless there is conclusive information from the field data to reject the null hypothesis or baseline condition H_o for the alternative condition H_a, the baseline condition is assumed true.

Determining the impact of decision errors. A "false acceptance decision error" corresponds to deciding that a stream water sample meets State regulations, when in reality it does not. A "false rejection decision error" corresponds to deciding that a stream water sample does not meet State regulations, when in reality it does.

Consequences for each decision error.

- Making a false acceptance decision error would result in adversely impacting the health of Umauma stream, and its aquatic inhabitants. The owners of the project would be held accountable and this could result in costly environmental clean-up procedures.
- Making a false rejection decision error would unnecessarily require the reevaluation of the construction site's BMPs and increase the cost to the owner of the project for modifications of those BMPs deemed inadequate.

As lead is a confirmed contaminant of the soil adjacent to the stream, the health of the stream outweighs the consequence of increased cost for BMP modification. Making a false acceptance decision error would result in a higher consequence than making a false rejection decision error.

Specifying the "gray region" for the problem's Decision Performance Curve / Completing the Decision Performance Curve by setting tolerable decision error limits. This gray area is determined to address decision errors resulting from sampling or measurement errors. This uncertainty is present in all field sampling. The gray area would need to be specified for all given parameters. Elevated levels of lead, for example, would be the greatest risk to human health. The gray area would therefore be much larger in relation to the other parameters.

The false acceptance decision error limit would also be larger. The turbidity and total suspended solids (TSS) have allowable limits indicated in Table 5. If any test results fall within the gray area, it should be considered that the Action Level may have been triggered, but due to sampling or measurement error the test result did not quite reach the Action Level. Further tests should be performed to confirm that the results were in fact below the Action Level. Refer to Table 6.

TABLE 5 – Turbidity and TSS Stream Criteria, HAR §11-54-05.2(b)

	Turbidity (NTU)	**Total Suspended Solid (mg/l)**
Not to exceed given value		
(dry season)	2	10
(wet season)	5	20
Not to exceed more than 10% of the time		
(dry season)	5.5	30
(wet season)	15	50
Not to exceed more than 2% of the time		
(dry season)	10	55
(wet season)	25	80

TABLE 6 – Decision Error Limits			
Parameter	**Gray Region Width**	**False Rejection Decision Error Limit**	**False Acceptance Decision Error Limit**
Lead Concentration	20 - 29 micrograms/liter	0.02 (2%)	0.20 (20%)
pH	5.5-5.7, 7.8-8	0.05 (5%)	0.10 (10%)
Turbidity	1.8-2.0 NTU in dry season 4.6 - 5.0 NTU in wet season	0.10 (10%)	0.10 (10%)
Total Suspended Solids (TSS)	9 mg/l - 10 mg/l in dry season 18 mg/l - 20 mg/l in wet season	0.10 (10%)	0.10 (10%)
Dissolved Oxygen (DO)	75%-80% saturation	0.05 (5%)	0.10 (10%)
Salinity	To be determined based on baseline established during pre-construction testing	0.10 (10%)	0.10 (10%)
Temperature	To be compared with temperatures from previous years; would vary seasonally	0.10 (10%)	0.10 (10%)

STEP 7 – Develop the Plan for Obtaining Data

Selecting a sampling design. This project will follow the "General Monitoring Guideline for Section 401 Water Quality Certification Projects" as issued by the Clean Water Branch. The contractor for this project shall designate the company to perform the water quality surveys for pre-construction, post-construction and during construction. Because the contractor for this project has yet to be determined (and will be submitted within seven calendar days before the start of construction activities), the water quality survey company also has yet to be determined. The sampling frequency and methods have been discussed in previous sections.

The contractor will do a routine check of the BMPs twice a day, before commencing daily construction and after concluding daily construction. If there are malfunctions with the BMPs or their effectiveness in maintaining water quality is below DOH-CWB standards, necessary measures will be made to modify the BMPs. DOH-CWB will be notified immediately

CHAIN OF CUSTODY PROCEDURES

The written record of the chain of custody of the samples will be kept for the laboratory's use. A chain-of-custody (COC) form will accompany the samples to the laboratory, and will include their identification numbers for the laboratory's record keeping. The date and time of transfers and the associated samplers will be recorded on the COC form. Each person in possession of the samples will record their name on the form.

FIELD ANALYSIS QUALITY CONTROL

All instrument calibration will be performed by trained personnel in accordance with manufacturer instructions before field samples are taken. This calibration will be recorded in the field notebook. pH analysis should be performed within 15 minutes of the sample collection, unless conditions allow for sampling *in situ*. All equipment used for the sampling analyses will be determined functional, otherwise taken out of service until properly repaired.

REPORTS/ASSESSMENT

All sampling results will be recorded in a field notebook kept at the contractor's office and made available for HDOH-CWB personnel inspection during normal business hours. *In situ* sampling results will be sent through facsimile or email within 24 hours or the next business day to HDOH-CWB. A full typed report of each day's results will be prepared by the contractor within 2 weeks of analysis completion and sent via facsimile or email to HDOH-CWB. A pre-construction monitoring report will be prepared by the contractor within 45 days of the pre-construction analysis. A final report of all the results from pre-construction, during construction, and post-construction will be prepared by the contractor within 60 days of the last post-construction sampling. Additional information to be included in the report is as follows:

- Instrument calibration procedures
- A record of which technicians and analysts handled the samples from the field to the laboratory and on what dates
- An analysis of the impact of the construction on water quality

The results in the final report will compare all parameters in pre-construction, during construction, and post-construction phases. This will determine if there have been any adverse impacts on the Umauma Stream water quality at any phases of construction, and if there are any permanent adverse effects. These results will then be compared to the State water quality standards. Compliance with these standards will be determined upon complete of the final report.

REFERENCES

Amendment and Compilation of Chapter 11-54 Hawai`i Administrative Rules
Department of Health, State of Hawai`i
May 27, 2009

Guidance on Systematic Planning Using the Data Quality Objectives Process
EPA QA/G-4
February 2006

Stream biological and water quality surveys for Umauma Stream Bridge Rehabilitation Project near Hakalua, Hawai`i
AECOS, Inc.
April 13, 2011

Water quality criteria for streams HAR §11-54-05.2(b)
Department of Health, State of Hawai`i

APPENDIX E

BIOLOGICAL AND WATER QUALITY SURVEYS (AECOS, INC.)

AECOS No. 1237

Stream biological and water quality surveys for the Umauma Stream Bridge Rehabilitation Project near Hakalau, Hawai‘i.

Prepared by:

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September 21, 2010
Revised April 13, 2011

Stream biological and water quality surveys for the Umauma Stream Bridge Rehabilitation Project near Hakalau, Hawai‘i.

April 13, 2011 *AECOS* No.1237

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Introduction

In July 2010, *AECOS*, Inc. biologists conducted biological and water quality surveys in Umauma Stream, located 14 mi (23 km) north of Hilo, along the Hāmākua Coast, on the island of Hawai‘i (Fig. 1). The existing Māmalahoa Highway (State Hwy. 19; also known as Hawai‘i Belt Road) bridge crossing Umauma Stream is scheduled for rehabilitation. *AECOS*, Inc. was contracted by Pacific Environmental Planners, Inc.[1] to ascertain aquatic resources and assess water quality for the proposed project. This report details findings of those surveys.

Stream Description

Umauma Stream originates on the eastern slopes of Mauna Kea, between the Pu‘u Kanakaleonui cinder cone and Pu‘u ‘Ula‘ula at an elevation above 12,000 ft (3,660 m). Nauhi Stream originating around 8,050 ft (2,450 m) and Honohina Stream originating at 7,500 ft (2,290 m) represent two major tributaries to Umauma in the upper reaches of the watershed. Several smaller unnamed tributaries join both flows before the confluence of Nauhi and Honohina at 1,700 ft (520 m) within the confines of the Hakalau Forest National Wildlife Refuge. Hanapueo Stream joins the system just above the project site at Māmalahoa Highway. Approximately 250 ft (75 m) downstream from the highway, Umauma Stream reaches its coastal outlet into the Pacific Ocean as a

[1] This document will be incorporated into the Environmental Assessment (EA) for the Umauma Stream Bridge Rehabilitation Project and will become part of the public record.

waterfall into a small bay, northwest of Hakalau Bay on the Hāmākua Coast of the Island of Hawai'i (Fig. 1). The watershed for Umauma Stream is large (21.5 mi^2 or 55.7 km^2) and steep with areas upslope of the project site receiving in excess of 250 in (650 cm) of rainfall annually (Climate Source, 2010; HSCO, 2010). The result is a stream course characterized by highly eroded, steep stream banks with numerous cascades and waterfalls.

Figure 1. General location of the project site, northwest of Hakalau, Hawai'i.

Survey Methods

AECOS, Inc. biologists surveyed a 1200-ft (365-m) segment of Umauma Stream on July 21, 2010. The purpose of the survey was to identify aquatic biota present and assess water quality within the survey area surrounding the Umauma Stream bridge crossing. Stream flow was brisk with clear stream

water flowing through the survey area. Water quality field measurements and samples were collected from three stations near the project site. Table 1 lists analytical methods and instrumentation used in the analyses. Macro-algae samples were collected for microscopic examination and identification from three locations near the project site.

Table 1. Analytical methods and instruments used for water quality analyses of Umauma Stream water sampled on July 21, 2010.

Analysis	**Method**	**Reference**	**Instrument**
Ammonia	EPA 350.1 M	EPA (1993)	Technicon AutoAnalyzer II
Conductivity	SM 2510-B	Standard Methods, 20th Edition (1998)	Hydach pH/conductivity meter
Dissolved Oxygen	SM 4500-O G	Standard Methods 20th Edition (1998)	YSI Model 550A Dissolved Oxygen Meter
Nitrate + Nitrite	EPA 353.2 Rev 2.0	EPA (1993)	Technicon AutoAnalyzer II
pH	SM 4500 H+	Standard Methods 20th Edition (1998)	Hannah pocket pH meter
Temperature	thermister calibrated to NBS. Cert. thermometer SM 2550 B	Standard Methods 20th Edition (1998)	YSI Model 550A Dissolved Oxygen Meter
Total Nitrogen	persulfate digestion/EPA 353.2	Grasshoff et al (1986)/ EPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	EPA 365.1 Rev 2.0	EPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids	Method 2540 D	Standard Methods 20th Edition (1998)	Mettler H31 balance
Turbidity	EPA 180.1 Rev 2.0	EPA (1993)	Hach 2100N Turbidimeter

Station "Upstream" was located in a large pool approximately 175 ft (53 m) upstream of the Māmalahoa Highway bridge, upstream from the Umauma-Hanapueo confluence. Station "Bridge" was located a few meters downstream from the bridge. Station "Downstream" was located in a pool just above the waterfall near the ocean shore, about 200 ft (60 m) downstream from the bridge. All water samples were collected on July 21, 2010 and delivered to *AECOS*, Inc. in Kaneʻohe, Oʻahu for laboratory analyses (*AECOS* Log No 26469).

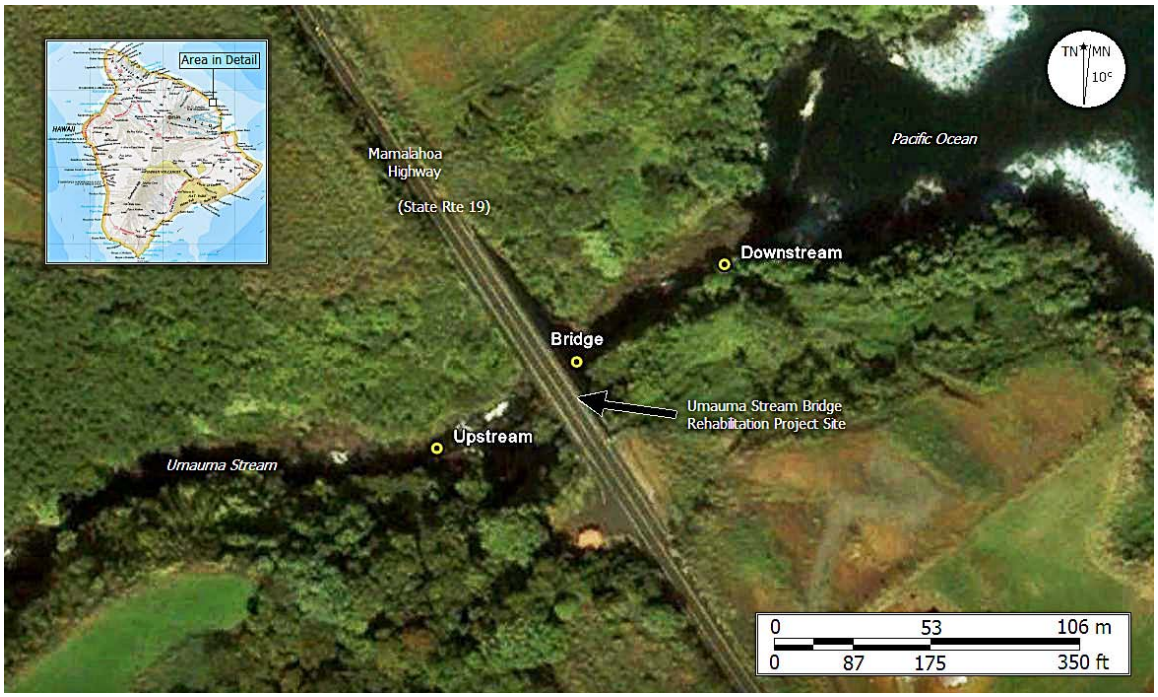

Figure 2. Location of water quality stations (yellow circles) sampled on July 21, 2010.

Survey Results

Within the survey area, the stream bed consists of basaltic bedrock and is generally 50 to 60 ft (10 to 30 m) in width, except at the confluence with Hanepueo where total width exceeds 100 ft (33 m). Sediment is present only in deeper pools which are uncommon near the bridge. The stream gorge margins are steep, in excess of 100 ft (33m) high, and covered with vegetation. Of the 23 species of flowering plants and fern observed along stream banks in the survey area, only one species, *neke* (*Cyclosorus interruptus*) is indigenous to the main Hawaiian Islands. The bulk of the species present are recently naturalized species in addition to a few Polynesian introductions. The most commonly observed plants at the project site include: sourbush (*Pluchea carolinensis*), *neke*, Guinea grass (*Urochloa maxima*), torpedo grass (*Panicum repens*), and Hilo grass (*Paspalum conjugatum*).

Water Quality

Table 2 lists water quality results for all analyzed parameters from Umauma Stream samples collected July 21, 2010. Field measurements for temperature, pH, and dissolved oxygen reflect only minor variability between stations near the project site. Total suspended solid concentrations and turbidity levels are low, reflecting the clear stream waters observed during sampling. Likewise, the nutrient concentrations of ammonia, nitrate-nitrite, total nitrogen and total phosphorus are all low. Low ammonia concentrations, like those found in Umauma Stream during the survey, are indicative of constant water flow preventing accumulation of biotic waste from aquatic life. The presence of high, oxidized nitrogen (nitrate-nitrite) in stream waters generally occur only when significant amounts of groundwater are contributing to the stream's flow. Levels of nitrate-nitrite found at all three stations on July 21, 2010 may indicate some input from ground water sources, like seeps and springs. Total nitrogen and total phosphorus at their respective levels depict clean stream waters typically found only in the least developed watersheds of the Hawaiian Islands.

Table 2. Water quality characteristics of Umauma Stream on July 21, 2010.

Station	Time	Temp. (°C)	Dissolved Oxygen (mg/l)	Dissolved Oxygen (% sat.)	pH --	Conductivity (µmhos/cm)
Downstream	1225	25.4	8.28	101	7.11	59
Bridge	1235	25.2	8.41	102	7.65	59
Upstream	1250	25.3	8.55	104	7.78	52

	TSS (mg/l)	Turbidity (ntu)	Ammonia (µg N/l)	Nitrate+ Nitrite (µg N/l)	Total N (µg N/l)	Total P (µg P/l)
Downstream	1.2	0.81	1	29	95	11
Bridge	2.0	0.70	<1	28	99	10
Upstream	1.2	0.58	1	42	104	10

Aquatic Biota

Upstream from the project site native gobies are quite common in large pools. *ʻOʻopu nākea* (*Awaous guamensis*) and *ʻoʻopu ʻalamoʻo* (*Lentipes concolor*) comprise most of the gobies sighted but a few *ʻoʻopu nōpili* (*Sicyopterus stimpsoni*) are present as well (Fig. 3). Native goby densities as high as 14/m^2 were noted in a large pool 800 ft (m) upstream of the bridge slated for rehabilitation. Native crustaceans are also present upstream of the project. Mountain *ʻōpae* or *ʻōpae kalaʻole* (*Atyoida bisulcata*; Fig. 3), are occasional while Hawaiian prawn or *ʻōpae ʻoehaʻa* (*Macrobrachium grandimanus*) are rare in large pools.

Near the project site, the Hanapueo Stream enters from the south side (left bank) of the stream as a waterfall into a small pool (Fig. 3). Swordtails (*Xiphophorus helleri*) are occasional in the brief segment of Hanapueo between the waterfall and the confluence with Umauma. A few small, shallow pools in the segment are overgrown with chlorophytes, from the genera *Rhizoclonium* and *Spyrogyra*, and diatoms, including *Synedra ulna*.

Umauma Stream bed near the project site is narrower than upstream. Water flow is brisk through a series of small pools and falls. *ʻOʻopu nākea* and *ʻoʻopu ʻalamoʻo* are sighted rarely. Feathery tufts of bright green algae (*Stigeolconium* sp.) are conspicuous on boulders and bedrock with fast water flow. Two species of dragonflies, the scarlet skimmer (*Crocothemis servilla*) and roseate skimmer (*Orthemis ferruginea*) are sighted occasionally resting on riparian vegetation along stream margins or flying above stream waters.

Similar fish and crustaceans are present in the stream downstream of the highway bridge crossing. Several isolated pools are located along stream margins just upslope from the terminal waterfall. Dragonfly and damselfly naiads (Order Odonata) are occasional in the shallow pools and red-rimmed melania (*Melanoides tuberculata*) are also present. Close inspection reveals tiny pouch snails (Family Physidae) abundant in these pools, feeding on algae and other organic matter on the pool bottom. *ʻAʻama* or thin shelled rock crabs (*Graspsus tenuicrustatus*), which are abundant along rocky marine shorelines throughout the islands are common near the stream's coastal outlet into the Pacific Ocean. Remarkably however, the crabs were present, albeit in lesser numbers, throughout the survey area including the upstream edge of the survey area approximately 1,200 ft (365 m) from the shoreline at 300-ft (90-m) elevation. All aquatic biota identified from Umauma Stream during the July 2010 survey are listed in Table 3 alongside historical data on species reported from previous surveys (DAR, 2009).

Figure 3. (Clockwise from top left) Hanapueo confluence with Umauma Stream just upslope from highway bridge; Stream flow and chlorophyte growth downstream from project site; Endemic *ʻōpae kālāʻole* from Umauma stream; Numerous *ʻoʻopu nakea* and *ʻoʻopu ʻalamoʻo* in a large pool upstream from the project site.

Assessment

Umauma Stream is listed as a perennial stream by the State of Hawaiʻi, Division of Aquatic Resources (DAR, 2009) and assigned stream code 8-2-030. The stream is classified as Class-2 inland, flowing waters. The protected uses of Class 2 waters include recreational use, support and propagation of fish and

Table 3. Checklist of aquatic biota observed during the July 21, 2010 survey or reported previously as present in Umauma Stream.

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name	Abundance	Status	ID Code
	ALGAE			
BACILLARIOPHYTA				
FRAGILARIACEAE				
Synedra ulna (Nitzsch) Ehrenb.	diatom	O	**Ind.**	3
CHLOROPHYTA				
CHAETOPHORACEAE				
Stigeoclonium sp. Kuetzing		C	**Ind.**	3
CLADOPHORACEAE				
Rhizoclonium sp. Kuetzing		R	**Ind.**	3
ZYGNEMATACEAE				
Spirogyra sp. Link in C.G. Nees		O	**Ind.**	3
	INVERTEBRATES			
PORIFER, DEMOSPONGIAE				
HAPLOSCLERIDA				
SPONGILLIDAE				
Heteromeyenia baileyi Bowerbank	freshwater sponge	--	**Ind.**	1
MOLLUSCA,GASTROPODA				
BASOMMATOPHORA				
LYMNAEIDAE				
unid.	pond snail	--	Nat.	1
PHYSIDAE				
unid.	pouch snail	C	Nat.	1,2
MOLLUSCA,GASTROPODA				
NEOTAENIOGLOSSA				
THIARIDAE				
Melanoides tuberculata Muller	red rimmed melania	R	Nat.	1,2
MOLLUSCA,GASTROPODA				
NERITOPSINA				
NERITIDAE				
Neritina granosa Sowerby	*hīhīwai*	--	**End.**	1
ARTHROPODA,INSECTA				
ODONATA, ANISOPTERA				
unid.	dragonfly naiad	O	--	2
LIBELLULIDAE				
Crocothemis servilla Drury	scarlet skimmer	O	Nat.	1,2
Orthemis ferruginea Fabricius	roseate skimmer	O	Nat.	1,2

Table 3 (continued).

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name	Abundance	Status	ID Code
ARTHROPODA, INSECTA				
ODONATA, ZYGOPTERA				
unid.	damselfly naiad	O	--	2
ARTHROPODA, MALACOSTRACA, DECOPODA				
ATYIDAE				
Atyoida bisulcata JW Randall	Hawaiian shrimp *ʻōpae kālā ʻole*	O	**End.**	2
PALAEMONIDAE				
Macrobrachium grandimanus JW Randall	Hawaiian prawn; *ʻōpaeʻoheaʻa*	R	**End.**	2
Macrobrachium lar J.C. Fabricius	Tahitian river prawn	--	Nat.	1
GRAPSIDAE				
Grapsus tenuicrustatus	thin shelled rock crab *ʻaʻama*	C	**Ind.**	2
	FISHES			
CHORDATA, ACTINOPTERYGII				
GOBIIDAE				
Awaous guamensis Valenciennes	*ʻoʻopu nākea*	A	**Ind.**	1,2
Lentipes concolor Gill	*ʻoʻopu ʻalamoʻo*	C	**End.**	1,2
Sicyopterus stimpsoni Gill	*ʻoʻopu nōpili*	O	**End.**	1,2
POECIILIDAE				
Poecilia reticulata Peters	guppy	C	Nat.	1,2
Xiphophorus hellerii Heckel	swordtail	O	Nat.	2
unid.	poeciliid fish	--	Nat.	1
	AMPHIBIANS			
CHORDATA, AMPHIBIA, ANURA				
BUFONIDAE				
Bufo marinus L.	giant toad	R	Nat.	1,2
RANIDAE				
Rana catesbeiana Shaw	American bullfrog	R	Nat.	1,2

KEY TO SYMBOLS USED:

Abundance categories:

R – Rare – only one or two individuals observed.
U – Uncommon – several to a dozen individuals observed.
O – Occasional – seen irregularly in small numbers
C – Common -observed everywhere, although generally not in large numbers.

A – Abundant – observed in large numbers and widely distributed.

Table 3 (continued).

Status categories:
End – Endemic – species found only in Hawaii
Ind. – Indigenous – species found in Hawaii and elsewhere
Nat. – Naturalized – species were introduced to Hawaii intentionally, or accidentally.
Identification codes:
1 –reported present within the Umauma watershed (DAR, 2009).
2 – field identification during July, 21, 2010
3 - identified by laboratory microscopic examination from collection made on July 21, 2010.

other aquatic life, and agricultural and industrial water supply. Umauma Stream does not appear on the Hawai'i Department of Health (HDOH) 2006 list of impaired waters in Hawai'i, prepared under Clean Water Act §303(d) (HDOH, 2008).

The flowing water of Umauma Stream—sampled at three locations in the project vicinity on July 21, 2010—has excellent water quality: low suspended particulates (turbidity and suspended solids) and only slightly elevated nitrate-nitrite nitrogen concentrations relative to State of Hawai'i water quality criteria for streams (Table 4). Upstream from the project, the nutrient concentrations are low, and fall below state water quality criteria. A single sampling event does not imply impairment or compliance with these parameters; a geometric mean of at least three sampling events would be required to determine compliance.

Umauma Stream provides habitats for an impressive assemblage of native aquatic species. Three species of *'o'opu*, two of which (*L. concolor* and *S. stimpsoni*) are endemic to the Hawaiian Islands and two species of endemic crustaceans (*A. bisulcata* and *M. grandimanus*) were observed during the July 2010 field survey. A native limpet (*Neritina granosa*) and sponge (*Heteromeyenia baileyi*) have also reported (DAR, 2009) from the stream reach. All of these native fishes and invertebrates, except the sponge require passage up and down the stream to complete their diadromous life cycle.

None of the aquatic species observed during these surveys is listed as threatened or endangered by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973, as amended, or by the State of Hawai'i under its endangered species program (DLNR 1998; USFWS, 2009).

The proposed project plans to enlarge bridge footings slightly. The footings are planned to be placed within the existing footprint in the stream resulting in long term loss of a few square feet of natural habitat. The project is not anticipated to have adverse long term effect to stream biota or water quality. A Best Management Practices (BMP) plan should be designed and implemented to

minimize any environmental impacts to water quality and aquatic biota in the vicinity of the project site during construction. Footings placed within the ordinary high water mark (OHWM) of the stream will require a permit from the U. S. Army Corps of Engineers as this is a waterway subject to federal jurisdiction.

Table 4. State of Hawai'i water quality criteria for streams (geometric mean values) for wet (Nov. 1-Apr. 30) and dry (May 1-Oct. 31) seasons from HAR §11-54-05.2(b).

	Total Nitrogen (µg N/l)	Nitrate + Nitrite (µg N/l)	Total Phosphorus (µg P/l)	Turbidity (NTU)	Total Suspended Solids (mg/l)
Not to exceed given value					
(dry season)	180.0	30.0	30.0	2.0	10.0
(wet season)	250.0	70.0	50.0	5.0	20.0
Not to exceed more than 10% of the time					
(dry season)	380.0	90.0	60.0	5.5	30.0
(wet season)	520.0	180.0	100.0	15.0	50.0
Not to exceed more than 2% of the time					
(dry season)	600.0	170.0	80.0	10.0	55.0
(wet season)	800.0	300.0	150.0	25.0	80.0

- pH – shall not deviate more than 0.5 units from ambient and not be lower than 5.5 nor higher than 8.0.
- Dissolved oxygen – not less than 80% saturation.
- Temperature – shall not vary more than 1 °C from ambient.
- Conductivity – not more than 300 micromhos/cm.

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APPENDIX F

HAZARDOUS MATERIALS ASSESSMENT (BUREAU VERITAS)

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

April 16, 2010
Project No. 17010-010018.00

Prepared for:

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For the benefit of business and people

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CONTENTS

List of Acronyms

AAS	Atomic Absorption Spectrophotometry
ACM	Asbestos-Containing Materials
AIHA	American Industrial Hygiene Association
DOH	State of Hawaii Department of Health
DRO	Diesel Residual Organics
ELLAP	Environmental Lead Laboratory Accreditation Program
EPA	United States Environmental Protection Agency
GRO	Gasoline Residual Organics
HAR	Hawaii Administrative Rule
DOH Tier 1 EAL	State of Hawaii Department of Health Tier 1 Environmental Action Level
GC-MS	Gas Chromatography-Mass Spectrometry
HIOSH	Hawaii Occupational Safety and Health
HUD	Housing and Urban Development
ICP-MS	Inductively Coupled Plasma-Mass Spectroscopy
ID	Identification
LBP	Lead-Based Paint
LCP	Lead-Containing Paint
mg/kg	Milligrams Per Kilogram
NAVFAC	Naval Facilities Engineering Command
NVLAP	National Voluntary Laboratory Accreditation Program
PLM	Polarized Light Microscopy
RCRA	Resource Conservation and Reclamation Act
RRO	Residual Range Organics
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
UIC	Underground Injection Control Line
%	Percent

Executive Summary

Nagamine Okawa Engineers, Inc. retained Bureau Veritas North America, Inc. (Bureau Veritas) to conduct a hazardous materials assessment with soil and sediment sampling and analysis for the "Rehabilitation of Umauman Stream Bridge" project. The Umauma Streat Bridge is located on Hawaii Belt Road, Route 19, in the District of North Hilo, on the Island of Hawaii (the "project structure"). Bureau Veritas' assessment of the project structure included all accessible bridge structural members, the roadway atop the bridge, the soil immediately surrounding the concrete structural support bases, and the riverbed sediment upstream and downstream of the project structure.

The purpose of this project was to conduct an asbestos and lead-based paint (LBP) survey of the project structure prior to the planned rehabilitation activities. In addition, Bureau Veritas collected bulk samples of soil and sediment to assess the presence or absence total petroleum hydrocarbons (TPH) and the Resource Conservation and Reclamation Act (RCRA)-eight metals including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. This survey included the collection and analyses of bulk samples of suspect asbestos-containing materials (ACM), paints, and soil/sediment.

Based on our assessment and laboratory analyses, Bureau Veritas' findings and recommendations are summarized as follows:

Asbestos-Containing Materials

Bureau Veritas collected a total of 12 samples of suspect ACM from areas of the project structure that may be impacted during the planned rehabilitation activities. The suspect ACM samples were shipped to NVL Laboratories, Inc., a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited laboratory, located in Seattle, Washington, for polarized light microscopy (PLM) analysis. Based on the laboratory results, no asbestos was detected in the 12 samples collected. Therefore, no special handling of the building materials is required during the planned renovation activities

This asbestos assessment was limited to accessible portions of the project structure under the conditions present during Bureau Veritas' site inspection. While Bureau Veritas made every attempt to conduct a complete and thorough assessment of the project structure, additional suspect ACM may exist underground or underneath permanent structures such as the concrete structural support bases. If additional suspect ACM are discovered during the planned rehabilitation activities, additional sampling and analysis of the suspect ACM should be conducted.

Lead-Based Paints

Bureau Veritas collected a total of 14 paint samples from areas of the project structure that may be impacted during the planned rehabilitation activities. The paint samples were shipped to NVL Laboratories, Inc., an Environmental Lead Laboratory Accreditation Program (ELLAP) and American Industrial Hygiene Association (AIHA)-certified laboratory, for atomic absorption spectrophotometry (AAS) analysis. Based on laboratory analysis, two (2) of the paint samples contained a lead concentration above the United States Environmental Protection Agency (EPA) regulatory level of 0.5 percent (%) lead by weight, and therefore, are considered LBP.

The following paints were confirmed as LBP:

- Red/black/gray paint splatter coating the rocks located below the project structure
- White paint on the ends of the concrete roadway guardrails located on each side of the project structure

In addition, small concentrations of lead were detected above the laboratory's reporting limit in 10 of the remaining paint samples. These paints are considered lead-containing paints (LCP) and included:

- Gray paint on metal structural beams, located on the north side of the project structure
- Black paint on selected metal structural beams, located on the south side of the project structure
- Red paint (over gray paint) on selected metal structural beams, located on the south side of the project structure
- Black paint (over gray paint) on metal vertical piping, located throughout the project structure
- Black paint (over red paint, over gray paint) on metal main structural beam/girder, located on south end of the project structure
- Gray paint on metal retrofit hardware penetrating the main structural beam/girder, located on south end of the project structure
- Gray paint on metal handrail of the service access area, located on the south side of the project structure
- Gray paint on wooden stairs and handrails of the service access stairway, located on the south side of the project structure
- Silver paint on metal roadway guardrails, located on each side of the project structure
- Yellow reflective striping paint on asphalt roadway of the project structure

These paints were observed ranging from fair to poor condition with some widespread areas of delamination. Although these paints do not meet the EPA definition of LBP, the general contractor and their subcontractors must follow the Hawaii Occupational Safety and Health Division (HIOSH) Lead in Construction Standard (Health Standards, Title 12, Subtitle 8, Part 3, Chapter 148.1) when workers have a potential to be exposed to lead during work activities (i.e., cutting, drilling, sanding, grinding, etc.).

TPH and RCRA-Eight Metals-In-Soil/Sediment

Bureau Veritas collected four (4) soil/sediment samples from the ground surface to approximately two inches below the exposed surface at selected locations at the project structure for laboratory analysis for TPH and RCRA-eight metal analytes. Bureau Veritas collected two (2) soil samples at the concrete structural support bases (one from each side of the project structure), and two (2) riverbed sediment samples (one sample upstream and one sample downstream of the project structure). The soil/sediment samples were hand-delivered to Test America Laboratories, Inc., a State of Hawaii Department of Health (DOH), State Laboratories Division-certified laboratory located in Aiea, Oahu, Hawaii.

Based on laboratory analyses, one sample (Sample No.: UMAUMA-02) reported a lead concentration of 4700 milligrams per kilogram (mg/kg). This reported concentration is above 200 mg/kg, which is the DOH Tier 1 Environmental Action Level (EAL) for lead, which is 200 mg/kg. This sample was collected immediately surrounding the front, left, concrete structural support base on the north side of the project structure. If this area will be impacted during the planned rehabilitation activities, the impacted soil must be handled and disposed in accordance with applicable regulatory requirements. Additional testing may be performed to assess the horizontal and vertical delineation of the contamination. The impacted soil

should be excavated and properly containerized, and a representative sample from the containerized soil should be submitted for toxicity characteristic leaching procedure (TCLP) analysis to assess final disposal options.

The remaining three (3) samples did not report TPH or RCRA-eight metal analytes above the DOH Tier 1 EAL, therefore, no special handling of this soil/sediment is required if these areas will be impacted during the planned rehabilitation activities.

1.0 INTRODUCTION

Nagamine Okawa Engineers, Inc. (NOEI) retained Bureau Veritas North America, Inc. (Bureau Veritas) to conduct a hazardous materials assessment with soil sampling and analysis for the "Rehabilitation of Umauma Stream Bridge" project, located on Hawaii Belt Road, Route 19, in the District of North Hilo, on the island of Hawaii (the "project structure"). Bureau Veritas' assessment of the project structure included all accessible bridge structural members, the roadway of the bridge, the soil immediately surrounding the concrete structural support bases, and the riverbed sediment upstream and downstream of the project structure.

The purpose of this project was to conduct an asbestos and lead-based paint (LBP) survey of the project structure prior to the planned rehabilitation activities. In addition, Bureau Veritas collected bulk samples of soil and sediment to assess the presence or absence total petroleum hydrocarbons (TPH) and the Resource Conservation and Reclamation Act (RCRA)-eight metals including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. This survey included the collection and analyses of bulk samples of suspect asbestos-containing materials (ACM), paints, and soil/sediment.

On March 16, 2010, Mr. Justin Marshall and Mr. Peter Austin, Industrial Hygienists from Bureau Veritas' Honolulu regional office, conducted the site inspection and sampling of the project structure. Mr. Marshall and Mr. Austin are certified by the State of Hawaii Department of Health (DOH) and the U.S. Environmental Protection Agency (EPA) as Asbestos Inspectors (Certification Nos: HIASB-2996 and HIASB-3163). Site access was coordinated by Mr. George Gutierrez, Jr., Vice President of NOEI.

During the assessment, Bureau Veritas performed a visual inspection of the project structure and noted areas where friable and non-friable materials suspected of containing asbestos were located. A friable material is one which, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Bureau Veritas also collected paint samples for lead analysis and soil/sediment samples from the hillside and riverbed surrounding the project structure that may be impacted during the planned rehabilitation activities.

2.0 SCOPE OF WORK

Bureau Veritas performed the following scope of work:

- Collected bulk samples of suspect ACM. Because of the non-uniformity of many ACM, three samples of each type of material were collected to comply with Hawaii Administrative Rule (HAR) Title 11, Chapter 501 Standard for Demolition and Renovation. A total of 12 suspect ACM samples were collected from areas of the project structure that may be impacted during planned rehabilitation activities.

- The suspect ACM samples were shipped to NVL Laboratories, Inc., a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited laboratory, located in Seattle, Washington. The samples were analyzed for asbestos using the EPA Method EPA/600R-93/116, polarized light microscopy (PLM) for asbestos content.

- Collected bulk samples of paint from representative building surfaces throughout the interior and exterior of the project structure utilizing methods outlined in the Department of Housing and Urban Development (HUD) guidelines for lead analysis. A total of 14 paint samples were collected from areas of the project structure that may be impacted during planned rehabilitation activities.

- The paint samples were shipped to NVL Laboratories, Inc., an Environmental Lead Laboratory Accreditation Program (ELLAP) and American Industrial Hygiene Association (AIHA)-certified laboratory. The samples were analyzed for lead content using EPA Method 7000B, atomic absorption spectrophotometry (AAS).

- Collected soil/sediment samples from ground level to approximately two inches below the ground surface at locations immediately surrounding the concrete structural support bases and from the riverbed upstream and downstream of the project structure to assess the presence or absence of TPH and RCRA-eight metal analytes in the soil. A total of four (4) soil/sediment samples were collected from areas of the project structure that may be impacted during planned rehabilitation activities.

- The soil/sediment samples were hand-delivered to Test America Laboratories, Inc., a DOH, State Laboratories Division-certified laboratory located in Aiea, Oahu, Hawaii. The soil/sediment samples was analyzed for TPH including diesel range organics (DRO), gas range organics (GRO), and residual range organics (RRO) using EPA Method 8015-Modified/8260B, gas chromatography-mass spectrometry (GC-MS). The samples were also analyzed for RCRA-eight metal analytes using EPA Method 6020, inductively coupled plasma-mass spectroscopy (ICP-MS).

- Provided detailed descriptions of the bulk materials and paints sampled and analyzed during our assessment. A drawing of the project structure is provided and identifies the sample collection locations.

- Prepared this report, including the results of our assessment, laboratory analytical results and recommendations.

3.0 SAMPLING AND ANALYSIS ASSESSMENTS

On March 16, 2010, Bureau Veritas conducted the site inspection and sampling of the project structure. Bureau Veritas' assessment resulted in the identification, bulk sample collection, and laboratory analyses of suspect hazardous materials and soil/sediment from the project structure.

During Bureau Veritas' site assessment, Bureau Veritas could not gain access into the locked, gated service areas on each end of the project structure. Bureau Veritas conducted a visual inspection of the inaccessible areas from the perimeter of the fencing and did not observe any additional suspect ACM or paints, however, without complete access, Bureau Veritas could not verify the homogeneity of the building materials in the inaccessible area. Therefore, the inaccessible service areas are not covered by this hazardous materials assessment.

Bulk samples collected for asbestos analysis and paint samples collected for lead analysis were shipped to NVL Laboratories Inc., an AIHA, NVLAP, and ELLAP-accredited laboratory located in Seattle, Washington. The soil/sediment samples collected for TPH and RCRA-eight metals analysis were hand-delivered to Test America Laboratories, Inc., a DOH, State Laboratories Division-certified laboratory located in Aiea, Oahu, Hawaii. The following sections describe the sampling and analytical procedures for the collection of suspect ACM, LBP, and soil/sediment samples.

3.1 DESCRIPTION OF ASBESTOS ASSESSMENT

During Bureau Veritas' inspection, four (4) types of suspect ACM were identified and sampled (three samples per material) from the project structure. These materials included:

- Black tar adhesive over asphalt pavement with aggregate
- White filler at expansion joints of bridge decking system
- White adhesive/sealant
- Textured non-skid coating

Suspect ACM samples were collected from the project structure using hand tools including chisels, hammers, and razor knives. Extracted samples were approximately 1- by 1-inch in size and were collected down to the underlying substrate, placed in sealed plastic bags, and labeled with unique sample numbers.

The EPA and State of Hawaii define ACM as a material that contains one percent (1%) or greater asbestos fibers. In accordance with HAR, three samples of every homogenous material were collected for laboratory analysis. Suspect ACM sampled and analyzed are described in Table 1, located in behind the *Tables* tab.

The suspect ACM samples were analyzed for asbestos content using PLM for determining asbestos fibers in bulk materials, EPA Method 600R-93/116. The analytical laboratory report is included in Appendix A.

3.2 DESCRIPTION OF LEAD-BASED PAINT ASSESSMENT

Paint chips were collected from representative painted surfaces throughout the project structure. Paint samples were collected from the project structure using hand tools including chisels and razor scrapers. To collect the paint samples, the painted material was scraped down to the underlying substrate, and the removed paint chips/shavings were placed in sealed plastic bags and labeled with unique sample numbers. Paint samples collected from the project structure were approximately two square inches in size.

The EPA defines paint as lead-based when it contains 0.5% or more lead by weight. It should be noted that the Hawaii Occupational Safety and Health (HIOSH) Lead in Construction Standards must be followed when any detectable level of lead is reported in paint. Paint sample descriptions and locations are presented in Table 2, located behind the *Tables* tab.

The paint samples were analyzed for total lead content using AAS, EPA Method 7000B. The analytical laboratory report is included in Appendix B.

3.3 DESCRIPTION OF TPH AND RCRA-EIGHT METAL ANALYTES-IN-SOIL/SEDIMENT ASSESSMENT

Bureau Veritas collected soil/sediment samples from ground level to approximately two inches below ground surface at locations immediately surrounding the concrete structural support bases and from the riverbed upstream and downstream of the project structure to assess the presence or absence of TPH and RCRA-eight metal analytes in the soil.

The soil and sediment samples were collected using a clean stainless steel rectangular scoop utilizing hand sampling techniques. After each sample was extracted, the soil/sediment was placed directly into a dedicated sterile glass container, and labeled with a unique sample number. The soil/sediment samples

were placed in a portable ice chest with frozen gel-ice, following standard chain-of-custody protocols. The sample was hand-delivered to Test America Laboratories, Inc., a DOH, State Laboratories Division-certified laboratory located in Aiea, Oahu, Hawaii.

The State of Hawaii Department of Health Tier 1 Environmental Action Level (DOH Tier 1 EAL) for TPH and RCRA-eight metal analytes are based on the project structure's geographical location and its proximity to the DOH underground injection control (UIC) line. In this case, the project structure is not situated above a current or potential drinking water resource and a surface water body is located less than or equal to 150 meters from the site.

The soil/sediment samples were analyzed for TPH including DRO, GRO, and RRO using GC-MS, EPA Method 8015-Modified/8260B. The samples were also analyzed for RCRA-eight metal analytes using ICP-MS, EPA Method 6020. The analytical laboratory report is included in Appendix C.

4.0 SURVEY RESULTS

4.1 RESULTS OF ASBESTOS ASSESSMENT

Bureau Veritas' assessment resulted in the collection of 12 bulk samples of suspect ACM from areas of the project structure that may be impacted during the planned rehabilitation activities. The suspect ACM samples were shipped to NVL Laboratories, Inc., a NVLAP-accredited laboratory, for PLM analysis. Based on the laboratory results, no asbestos was detected in the 12 samples collected. Therefore, no special handling of the building materials is required during the planned renovation activities

This asbestos assessment was limited to accessible portions of the project structure under the conditions present during Bureau Veritas' site inspection. While Bureau Veritas made every attempt to conduct a complete and thorough assessment of the project structure, additional suspect ACM may exist underground or underneath permanent structures such as the concrete structural support bases. If additional suspect ACM are discovered during the planned rehabilitation activities, additional sampling and analysis of the suspect ACM should be conducted.

Table 1, located behind the *Tables* tab, show suspect ACM descriptions, locations, analytical results, and sample identification (ID) numbers.

4.2 RESULTS OF LEAD-BASED PAINT ASSESSMENT

Bureau Veritas collected a total of 14 paint samples from areas of the project structure that may be impacted during the planned rehabilitation activities. The paint samples were shipped to NVL Laboratories, Inc., an ELLAP and AIHA-certified laboratory, for AAS analysis. Based on laboratory analysis, two (2) of the paint samples contained a lead concentration above the United States Environmental Protection Agency (EPA) regulatory level of 0.5 percent (%) lead by weight, and therefore, are considered LBP.

The following paints were confirmed as LBP:

- Red/black/gray paint splatter coating the rocks located below the project structure
- White paint on the ends of the concrete roadway guardrails located on each side of the project structure

Furthermore, small concentrations of lead were detected above the laboratory's reporting limit in 10 of the remaining paint samples. These paints are considered lead-containing paints (LCP) and included:

- Gray paint on metal structural beams, located on the north side of the project structure
- Black paint on selected metal structural beams, located on the south side of the project structure
- Red paint (over gray paint) on selected metal structural beams, located on the south side of the project structure
- Black paint (over gray paint) on metal vertical piping, located throughout the project structure
- Black paint (over red paint, over gray paint) on metal main structural beam/girder, located on south end of the project structure
- Gray paint on metal retrofit hardware penetrating the main structural beam/girder, located on south end of the project structure
- Gray paint on metal handrail of the service access area, located on the south side of the project structure
- Gray paint on wooden stairs and handrails of the service access stairway, located on the south side of the project structure
- Silver paint on metal roadway guardrails, located on each side of the project structure
- Yellow reflective striping paint on asphalt roadway of the project structure

These paints were observed ranging from fair to poor condition with some widespread areas of delamination. Although these paints do not meet the EPA definition of LBP, the general contractor and their subcontractors must follow the Hawaii Occupational Safety and Health Division (HIOSH) Lead in Construction Standard (Health Standards, Title 12, Subtitle 8, Part 3, Chapter 148.1) when workers have a potential to be exposed to lead during work activities (i.e., cutting, drilling, sanding, grinding, etc.).

Table 2, located behind the *Tables* tab, show suspect paint descriptions, locations, analytical results, and sample ID numbers.

4.3 RESULTS OF TPH AND RCRA-EIGHT METAL ANALYTES-IN-SOIL/SEDIMENT ASSESSMENT

Bureau Veritas collected four (4) soil/sediment samples from the ground surface to approximately two inches below the exposed surface at selected locations at the project structure for laboratory analysis for TPH and RCRA-eight metal analytes. Bureau Veritas collected two (2) soil samples at the concrete structural support bases (one from each side of the project structure), and two (2) riverbed sediment samples (one sample upstream and one sample downstream of the project structure). The soil/sediment samples were hand-delivered to Test America Laboratories, Inc., a DOH, State Laboratories Division-certified laboratory located in Aiea, Oahu, Hawaii.

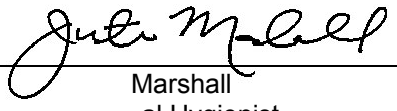
Based on laboratory analyses, one sample (Sample No.: UMAUMA-02) reported a lead concentration of 4700 milligrams per kilogram (mg/kg). This reported concentration is above 200 mg/kg, which is the DOH Tier 1 EAL for lead, which is 200 mg/kg. This sample was collected immediately surrounding the front, left, concrete structural support base on the north side of the project structure. If this area will be

impacted during the planned rehabilitation activities, the impacted soil must be handled and disposed in accordance with applicable regulatory requirements. Additional testing may be performed to assess the horizontal and vertical delineation of the contamination. The impacted soil should be excavated and properly containerized, and a representative sample from the containerized soil should be submitted for toxicity characteristic leaching procedure (TCLP) analysis to assess final disposal options.

The remaining three (3) samples did not report TPH or RCRA-eight metal analytes above the DOH Tier 1 EAL, therefore, no special handling of this soil/sediment is required if these areas will be impacted during the planned rehabilitation activities.

5.0 LIMITATIONS

The information and opinions rendered in this report are exclusively for use by Nagamine Okawa Engineers, Inc. Bureau Veritas will not distribute this report without your written consent except as may be required by law or court order. The information and opinions expressed in this report are given in response to our limited assignment and should be evaluated and implemented only in light of that assignment. We accept the responsibility for the competent performance of our duties in executing the assignment and preparing this report in accordance with the normal standards of our profession, but disclaim any responsibility for consequential damages.

This report prepared by: 

Justin Marshall
Industrial Hygienist
Health, Safety, and Environmental Services

This report reviewed by: 

Raymond Benzing, M.P.H.
Manager
Health, Safety, and Environmental Services

April 16, 2010
Project No. 17010-010018.00

TABLES

Table 1
Analytical Results of Asbestos Sampling
at
Umauma Stream Bridge
Hawaii Belt Road, Route 19
District of North Hilo, Island of Hawaii

Project No.: 17010-010018.00
Sample Collection Date: March 16, 2010

Material Description / Location	Sampling Location	Asbestos Type & %	Sample ID
Black tar adhesive over asphalt pavement with aggregate / Asphalt roadway atop bridge	South end of bridge, left	None Detected	UMAU-01
	Center of bridge, left		UMAU-02
	North end of bridge, left		UMAU-03
White filler at expansion joints of bridge decking system / Perpendicular expansion joints in concrete walkways along bridge	South end of bridge, left	None Detected	UMAU-04
	Center of bridge, right		UMAU-05
	North end of bridge, left		UMAU-06
White adhesive/sealant / Between light reflectors and the top of the concrete guardrails of bridge	Reflector on south end, left	None Detected	UMAU-07
	Reflector on center of bridge, left		UMAU-08
	Reflector on north end, left		UMAU-09
Textured non-skid coating / On wooden stairs leading to the service access area on the south side of the bridge	Stairway on south end, center	None Detected	UMAU-10
	Stairway on south end, center		UMAU-11
	Stairway on south end, center		UMAU-12

Current Federal and State regulatory level of greater than 1% asbestos fibers defines asbestos-containing materials (ACM).

Table 2
Analytical Results of Lead Paint Sampling
at
Umauma Stream Bridge
Hawaii Belt Road, Route 19
District of North Hilo, Island of Hawaii

Project No.: 17010-010018.00
Sample Collection Date: March 16, 2010

Paint Description / Location	Sampling Location	Lead Content (% by WT)	Sample ID
Gray paint on metal structural beams located on the north side of the bridge	North side of bridge, front structural support on right	0.0720*	UMAU-P1
Black paint on selected metal structural beams located on the south side of the bridge	South side of bridge, front structural support on right	0.0220*	UMAU-P2
Red paint (over gray paint) on selected metal structural beams located on the south side of the bridge	South side of bridge, rear structural support on right	0.0590*	UMAU-P3
Gray paint on metal retrofit structural supports throughout the bridge	North side of bridge, front structural support on right	<0.0042	UMAU-P4
Black paint (over gray paint) on metal vertical piping located throughout the bridge	North side of bridge, front structural support on left	0.0920*	UMAU-P5
Red/black/gray paint splatter coating the rocks located below the bridge	North side of bridge, rock in center of front structural supports	**28.0000**	**UMAU-P6**
Black paint (over red paint, over gray paint) on metal main structural beam/girder located on south end of the bridge	South side of bridge, near service access gate	0.1300*	UMAU-P7
Gray paint on metal retrofit hardware penetrating the main structural beam/girder located on south end of the bridge	South side of bridge, near service access gate, hardware on right	0.0074*	UMAU-P8
Gray paint on metal handrail of the service access area located on the south side of the bridge	South side of bridge, handrail of south service access	0.0780*	UMAU-P9
Gray paint on wooden stairs and handrails of the service access stairway located on the south side of the bridge	South side of bridge, lower wooden handrail of south service access	0.0066*	UMAU-P10

Table 2 (continued)

Paint Description / Location	Sampling Location	Lead Content (% by WT)	Sample ID
White paint on the ends of the concrete roadway guardrails located on each side of the bridge	South side of bridge, left end, above service access area	**5.3000**	**UMAU-P11**
Silver paint on metal roadway guardrails located on each side of the bridge	South side of bridge, left end, near small parking area	0.0620*	UMAU-P12
White reflective striping paint on asphalt roadway of the bridge	South side of roadway atop bridge, left side	<0.0043	UMAU-P13
Yellow reflective striping paint on asphalt roadway of the bridge	Center of roadway atop bridge, stripe on left	0.0064*	UMAU-P14

Occupational Safety and Health Administration (OSHA) regulations for worker protection apply to any paint with a detectable concentration of lead.

Bold Entries are confirmed lead-based paint (LBP) based on the EPA regulatory level of 0.5 percent (%) lead by weight.

* Entries reported detectable levels of lead below the EPA regulatory level and are considered lead-containing paint (LCP).

< - Below laboratory reporting limit

Table 3
Analytical Results of Soil/Sediment Sampling
at
Umauma Stream Bridge
Hawaii Belt Road, Route 19
District of North Hilo, Island of Hawaii

Project No. 17010-010018.00
Sample Colelction Date: March 16, 2010

Sample ID: / Analyte	UMAUMA-01 (mg/kg)	UMAUMA-02 (mg/kg)	UMAUMA-03 (mg/kg)	UMAUMA-04 (mg/kg)	DOH Tier 1 EAL (mg/kg)
Total Petroleum Hydrocarbon / EPA Method 8015-Modified					
TPH-DRO	7.48	21	16.4	4.7	500
TPH-RRO	61.6	67	98.4	ND<18.5	500
Total Petroleum Hydrocarbon / EPA Method 8015 Modified / 8260B					
TPH-GRO	ND<0.478	ND<0.433	ND<0.468	ND<0.472	100
RCRA Eight Metals/EPA Methods 6010/747x					
Arsenic	16	5.9	7.8	4.5	20
Barium	32	34	34	34	750
Cadmium	ND<2.5	ND<2.5	ND<0.50	ND<0.50	12
Chromium	150	90	95	56	500
Lead	44	**4700**	7.2	2.2	200
Mercury	0.115	0.273	0.127	0.105	4.7
Selenium	ND<5.0	ND<4.9	1	ND<0.99	10
Silver	ND<2.5	ND<2.5	ND<0.50	ND<0.50	20

NOTES:

DOH Tier 1 EAL	Hawaii State Department of Health (HDOH) Tier 1 Environmental Action Levels (EALs) at sites where groundwater IS NOT a current or potential drinking water resource and a surface water body IS located less than or equal to 150 meters of the site (March 2009).
DRO	Diesel range organics
GRO	Gasoline range organics
RRO	Residual range organics
mg/kg	milligrams per kilogram
ND<	Analyte not detected. The value after the '<' is the laboratory Method Reporting Limit (MRL)
bold	Analyte detected greater than the DOH Tier 1 EAL
RCRA	Resource Conservation and Reclaimation Act

PHOTOGRAPHS

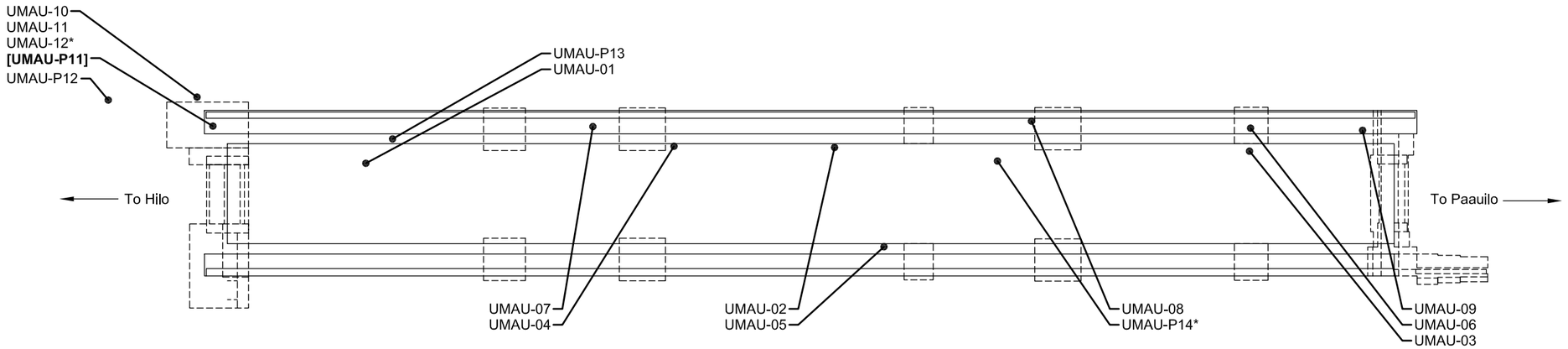
Project No.	Description	View of Umauma Stream Bridge	Photo 1
	Site Name	Umauma Stream Bridge, Belt Road, Route 19 District of North Hilo, Island of Hawaii	
17010-010018.00	Client	Nagamine Okawa Engineers, Inc.	Date March 16, 2010

Project No.	Description	View of red/black/gray lead-based paint splatter coating the rocks located below the Umauma Stream Bridge	Photo 2
	Site Name	Umauma Stream Bridge, Belt Road, Route 19 District of North Hilo, Island of Hawaii	
17010-010018.00	Client	Nagamine Okawa Engineers, Inc.	Date March 16, 2010

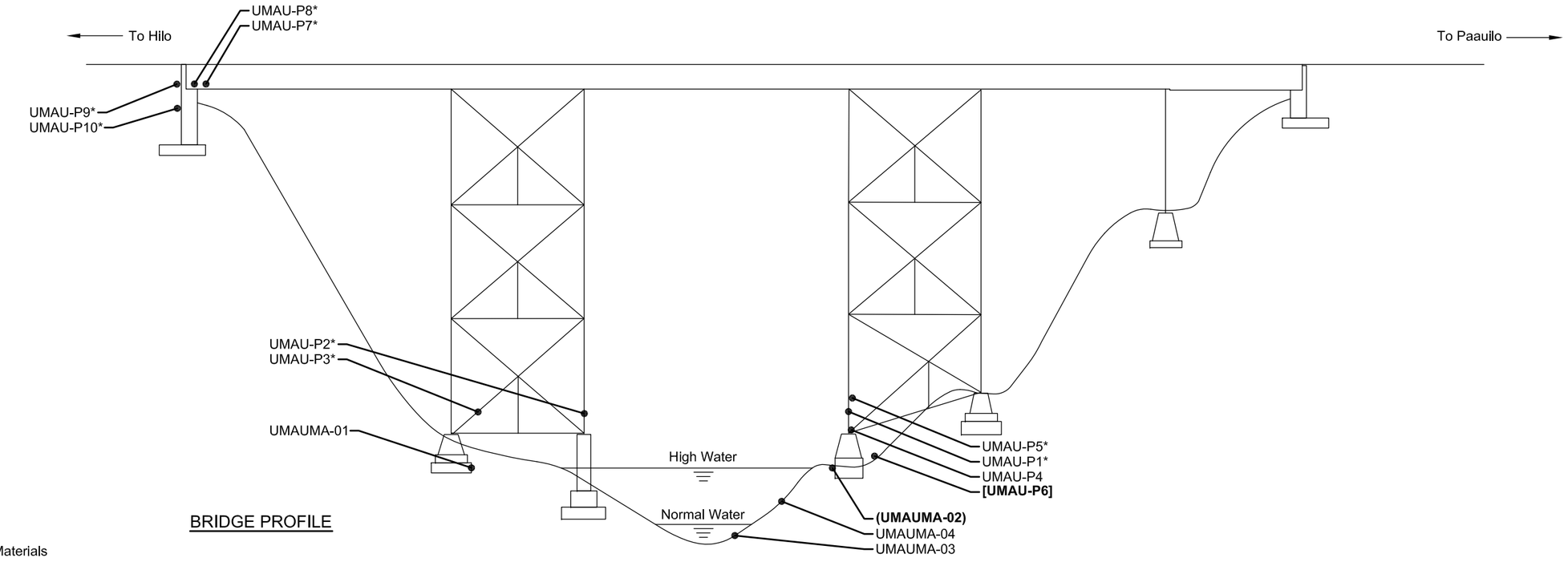
Project No.	Description	View of white lead-based paint on the ends of the concrete roadway guardrails, located on each side of Umauma Stream Bridge	Photo 3
	Site Name	Umauma Stream Bridge, Belt Road, Route 19 District of North Hilo, Island of Hawaii	
17010-010018.00	Client	Nagamine Okawa Engineers, Inc.	Date March 16, 2010

Project No.	Description	View of inaccessible, locked service access area	Photo 4
	Site Name	Umauma Stream Bridge, Belt Road, Route 19 District of North Hilo, Island of Hawaii	
17010-010018.00	Client	Nagamine Okawa Engineers, Inc.	Date March 16, 2010

FIGURE



ROADWAY VIEW



BRIDGE PROFILE

Note:
No Confirmed Asbestos-Containing Materials

BUREAU VERITAS

Legend:

[UMAU-PXX]	Confirmed Lead-Based Paint (LBP)
UMAU-PXX*	Confirmed Lead-Containing Paint (LCP)
(UMAUMA-XX)	At least one analyte exceeded applicable State of Hawaii Department of Health (DOH)Tier 1 Environmental Action Levels (EALs).

N

0 7.5' 15' 30' 60'

Approximate Scale

Project No.: 17010-010018.00	Sample Location Plan
Date: 04/14/10	Umauma Stream Bridge Belt Road, Route 19 District of North Hilo, Island of Hawaii
Revised By: DG	
Checked By: JM	Nagamine Okawa Engineers, Inc.

FIGURE

APPENDIX A

LABORATORY ANALYTICAL REPORT FOR ASBESTOS SAMPLING

NVL Laboratories, Inc.

4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100, Fax: 206.634.1936
www.nvllabs.com

NVLAP

For the scope of accreditation under NVLAP Lab Code 102063-0

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Bureau Veritas North America, Inc.-Hawaii
Address: 970 North Kalaheo Avenue
Suite C-316
Kailua, HI 96734
Attention: Mr. Justin Marshall
Project Location: NOEI-Umauma Bridge, North Hilo

Batch #: 3003249.00
Client Project #: 17010-010018.00
Date Received: 03/18/2010
Samples Received: 12
Samples Analyzed: 12
Method: EPA/600R-93/116

Lab ID: 30017850 **Client Sample #: UMAU-01**
Location: NOEI-Umauma Bridge, North Hilo
Layer 1 of 1 **Description:** Black asphaltic material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Asphalt/Binder, Gravel, Sand	None Detected ND	**None Detected ND**

Lab ID: 30017851 **Client Sample #: UMAU-02**
Location: NOEI-Umauma Bridge, North Hilo
Layer 1 of 1 **Description:** Black asphaltic material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Asphalt/Binder, Gravel	None Detected ND	**None Detected ND**

Lab ID: 30017852 **Client Sample #: UMAU-03**
Location: NOEI-Umauma Bridge, North Hilo
Layer 1 of 1 **Description:** Black asphaltic material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Asphalt/Binder, Gravel	None Detected ND	**None Detected ND**

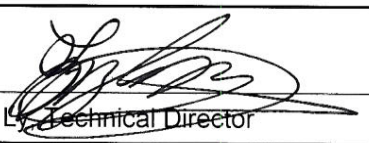
Lab ID: 30017853 **Client Sample #: UMAU-04**
Location: NOEI-Umauma Bridge, North Hilo
Layer 1 of 1 **Description:** Light gray soft material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Fine particles, Binder/Filler	None Detected ND	**None Detected ND**

Lab ID: 30017854 **Client Sample #: UMAU-05**
Location: NOEI-Umauma Bridge, North Hilo
Layer 1 of 1 **Description:** Light gray soft material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Fine particles, Binder/Filler	None Detected ND	**None Detected ND**

Sampled by: Client
Analyzed by: Alla Prysyazhnyuk **Date:** 03/22/2010
Reviewed by: Nick Ly **Date:** 03/22/2010



Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R -93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40 -60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.

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Tel: 206.547.0100, Fax: 206.634.1936
www.nvllabs.com

NVLAP

For the scope of accreditation under NVLAP Lab Code 102063-0

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Bureau Veritas North America, Inc.-Hawaii
Address: 970 North Kalaheo Avenue
Suite C-316
Kailua, HI 96734
Attention: Mr. Justin Marshall
Project Location: NOEI-Umauma Bridge, North Hilo

Batch #: 3003249.00
Client Project #: 17010-010018.00
Date Received: 03/18/2010
Samples Received: 12
Samples Analyzed: 12
Method: EPA/600R-93/116

Lab ID: 30017855 **Client Sample #: UMAU-06**
Location: NOEI-Umauma Bridge, North Hilo

Layer 1 of 1	**Description:** Light gray soft material			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Fine particles, Binder/Filler	None Detected	ND	**None Detected ND**

Lab ID: 30017856 **Client Sample #: UMAU-07**
Location: NOEI-Umauma Bridge, North Hilo

Layer 1 of 2	**Description:** Gray soft material			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Fine particles, Binder/Filler	Polyethylene fibers	3%	**None Detected ND**
Layer 2 of 2	**Description:** Gray brittle material			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Fine particles, Binder/Filler, Mineral grains	None Detected	ND	**None Detected ND**

Lab ID: 30017857 **Client Sample #: UMAU-08**
Location: NOEI-Umauma Bridge, North Hilo

Layer 1 of 2	**Description:** Gray soft material			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Fine particles, Binder/Filler	Polyethylene fibers	2%	**None Detected ND**
Layer 2 of 2	**Description:** Gray brittle material			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Fine particles, Binder/Filler, Mineral grains	None Detected	ND	**None Detected ND**

Lab ID: 30017858 **Client Sample #: UMAU-09**
Location: NOEI-Umauma Bridge, North Hilo

Layer 1 of 2	**Description:** Gray soft material			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Fine particles, Binder/Filler	Polyethylene fibers	2%	**None Detected ND**

Sampled by: Client
Analyzed by: Alla Prysyazhnyuk **Date:** 03/22/2010
Reviewed by: Nick Ly **Date:** 03/22/2010

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
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NVLAP

For the scope of accreditation under NVLAP Lab Code 102063-0

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Bureau Veritas North America, Inc.-Hawaii
Address: 970 North Kalaheo Avenue
Suite C-316
Kailua, HI 96734
Attention: Mr. Justin Marshall
Project Location: NOEI-Umauma Bridge, North Hilo

Batch #: 3003249.00
Client Project #: 17010-010018.00
Date Received: 03/18/2010
Samples Received: 12
Samples Analyzed: 12
Method: EPA/600R-93/116

Layer 2 of 2	**Description:** Gray brittle material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Fine particles, Binder/Filler, Mineral grains	None Detected	ND	**None Detected ND**

Lab ID: 30017859 **Client Sample #: UMAU-10**
Location: NOEI-Umauma Bridge, North Hilo

Layer 1 of 1	**Description:** Gray textured paint (on wood)			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Paint, Mineral grains	None Detected	ND	**None Detected ND**

Lab ID: 30017860 **Client Sample #: UMAU-11**
Location: NOEI-Umauma Bridge, North Hilo

Layer 1 of 1	**Description:** Gray textured paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Paint, Mineral grains	None Detected	ND	**None Detected ND**

Lab ID: 30017861 **Client Sample #: UMAU-12**
Location: NOEI-Umauma Bridge, North Hilo

Layer 1 of 1	**Description:** Gray textured paint (on wood)			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Paint, Mineral grains	None Detected	ND	**None Detected ND**

Sampled by: Client
Analyzed by: Alla Prysyazhnyuk **Date:** 03/22/2010
Reviewed by: Nick Ly **Date:** 03/22/2010 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.

BATCH ID
3003249.00

LABS

NVL Laboratories, Inc.

4708 Aurora Ave N, Seattle, WA 98103
Tel: 206.547.0100 Emerg.Pager: 206.344.1878
Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

CHAIN of CUSTODY SAMPLE LOG

Client Bureau Veritas North America, Inc.
Street 970 North Kalaheo Ave Suite C-316
Kailua, HI 96734

Project Manager Justin Marshall
Project Location NOEI - Umauma Bridge, North Hilo

NVL Batch Number
Client Job Number 17010-010018.00
Total Samples 12

Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days ☐ 2-Hrs ☐ 2 Days ☒ 5 Days ☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days
Please call for TAT less than 24 Hrs

Email address justin.marshall@us.bureauveritas.com

Phone: (808) 531-6708 **Fax:** (808) 537-4084 Cell (808) 479-4636

☐ **Asbestos Air**	☐ PCM (NIOSH 7400)	☐ TEM (NIOSH 7402)	☐ TEM (AHERA)	☐ TEM (EPA Level II)	☐ Other _____	
☒ **Asbestos Bulk**	☒ PLM (EPA/600/R-93/116)	☐ PLM (EPA Point Count)	☐ PLM (EPA Gravimetry)	☐ TEM Bulk		

METALS	**Det. Limit**	**Matrix**		**RCRA Metals**		**Other Metals**
☐ Total Metals	☐ ppm (AAS)	☐ Air Filter	☐ Paint Chips	☐ Arsenic (As)	☐ All 8	☐ **All 3**
☐ TCLP	☐ ppb (GFAA)	☐ Drinking water	☐ Paint Chips (Area)	☐ Barium (Ba)	☐ Lead (Pb)	☐ Copper (Cu)
		☐ Dust/wipe	☐ Waste Water	☐ Cadmium (Cd)	☐ Mercury (Hg)	☐ Nickel (Ni)
		☐ Soil		☐ Chromium (Cr)	☐ Selenium (Se)	☐ Zinc (Zn)
					☐ Silver (Ag)	

☐ **Other Types of Analysis**	☐ Fiberglass ☐ Silica	☐ Nuisance Dust ☐ Respirable Dust	☐ Other (Specify) _____	

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments	A/R
1		UMAU-01	*See Attached	
2		↓		
3				
4		UMAU-12		
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

	Print Below	Sign Below	Company	Date	Time
Sampled by	Justin Marshall	Justin Marshall	Bureau Veritas	3/16/10	10:00 am
Relinquished by	Justin Marshall	Justin Marshall	Bureau Veritas	3/17/10	10:00 am
Received by	Brittany Vogel	Brittany Vogel	NVL	3/18/10	9:00 FedEx
Analyzed by	Multiple Analysts	Multiple Analysts	NVL	3/22/10	4:00 p.m.
Results Called by					
Results Faxed by					

Special Instructions: Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

BUREAU VERITAS – Asbestos Sampling Sheet

Project No. 17010-010018.00
Project Name: NOEI - Umauma Bridge
Inspectors' Name: J.Marshall (HHASB-29906)
Bldg. Name / No. Umauma Bridge
Page: 1 of 1
Date: 03/16/10

Sample Number	Sample Location	Material Description	Quantity/Material Location	Category	Friability
UMAU-01	North end of bridge, L	Black reflector adhesive over asphalt	Asphalt roadway, throughout Approx. ≈ 4200 ft	☐ Surfacing ☐ TSI ☒ Misc.	☐ Friable ☑ Non-Friable
UMAU-02	Center of bridge, L				
UMAU-03	South end of bridge, L				
UMAU-04	North end of bridge, L	White filler at expansion joints of bridge system	@ Perpendicular expansion joints Approx. = 50 lf	☐ Surfacing ☐ TSI ☒ Misc.	☐ Friable ☒ Non-Friable
UMAU-05	Center of bridge, R				
UMAU-06	South end of bridge, L				
UMAU-07	Reflector on N end of bridge	White reflector adhesive on cement bridge rails	@ white reflectors on concrete bridge rails Approx. ≈ 10 ft	☐ Surfacing ☐ TSI ☒ Misc.	☐ Friable ☒ Non-Friable
UMAU-08	Reflector on Cntr of bridge, L				
UMAU-09	Reflector on S end of bridge, L				
UMAU-10	Stairway, center	Textured non-skid coating on wooden access stairs on south	On stairs on south, L of bridge. Approx. ≈ 100 ft	☒ Surfacing ☐ TSI ☐ Misc.	☐ Friable ☒ Non-Friable
UMAU-11	Stairway, center				
UMAU-12	Stairway, center				
				☐ Surfacing ☐ TSI ☐ Misc.	☐ Friable ☐ Non-Friable
				☐ Surfacing ☐ TSI ☐ Misc.	☐ Friable ☐ Non-Friable
				☐ Surfacing ☐ TSI ☐ Misc.	☐ Friable ☐ Non-Friable
				☐ Surfacing ☐ TSI ☐ Misc.	☐ Friable ☐ Non-Friable
				☐ Surfacing ☐ TSI ☐ Misc.	☐ Friable ☐ Non-Friable
				☐ Surfacing ☐ TSI ☐ Misc.	☐ Friable ☐ Non-Friable

BATCH ID 3003249.00

Notes: Access to each service entrance to bridge decking restricted. Visual inspection through chain link area revealed no suspect ACM. Only complete access will confirm. Additional

APPENDIX B

LABORATORY ANALYTICAL REPORT FOR LEAD PAINT SAMPLING

NVL Laboratories, Inc.

4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100, Fax: 206.634.1936
www.nvllabs.com

Analysis Report

AIHA - IH # 101861
WA - DOE # C1765

AIHA Environmental Lead and Industrial Hygiene ACCREDITED LABORATORY

Total Lead (Pb)

Client: Bureau Veritas North America, Inc.-Hawaii
Address: 970 North Kalaheo Avenue
Suite C-316
Kailua, HI 96734
Attention: Mr. Justin Marshall
Project Location: NOEI-Umauma Bridge, North Hilo

Batch #: 3003248.00
Matrix: Paint Chips
Method: EPA 7000B
Client Project #: 17010-010018.00
Date Received: 03/18/2010
Samples Received: 14
Samples Analyzed: 14

Lab ID	Client Sample #	Sample Weight	RL in mg/Kg	Results in mg/Kg	Results in percent
30017836	UMAU-P1	0.2194	37.0	720.0	0.0720
30017837	UMAU-P2	0.1997	40.0	220.0	0.0220
30017838	UMAU-P3	0.2165	37.0	590.0	0.0590
30017839	UMAU-P4	0.1943	42.0	< 42.0	< 0.0042
30017840	UMAU-P5	0.2136	38.0	920.0	0.0920
30017841	UMAU-P6	0.2016	40.0	280000.0	28.0000
30017842	UMAU-P7	0.2142	38.0	1300.0	0.1300
30017843	UMAU-P8	0.1659	49.0	74.0	0.0074
30017844	UMAU-P9	0.1900	43.0	780.0	0.0780
30017845	UMAU-P10	0.2199	37.0	66.0	0.0066
30017846	UMAU-P11	0.2313	35.0	53000.0	5.3000
30017847	UMAU-P12	0.1920	42.0	620.0	0.0620
30017848	UMAU-P13	0.1892	43.0	< 43.0	< 0.0043
30017849	UMAU-P14	0.1917	42.0	64.0	0.0064

Sampled by: Client
Analyzed by: Alla Prysyazhnyuk Date Analyzed: 03/22/2010
Reviewed by: Nick Ly Date Issued: 03/22/2010

Nick Ly, Technical Director

mg/ Kg =Milligrams per kilogram
Percent = Milligrams per kilogram / 10000
Note : Method QC results are acceptable unless stated otherwise.
Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.

RL = Reporting Limit
'<' = Below the reporting Limit

Bench Run No: 30-0322-02

BATCH ID
3003248.00

L A B S

NVL Laboratories, Inc.

4708 Aurora Ave N, Seattle, WA 98103
Tel: 206.547.0100 Emerg.Pager: 206.344.1878
Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

CHAIN of CUSTODY SAMPLE LOG

Client Bureau Veritas North America, Inc.
Street 970 North Kalaheo Ave Suite C-316
Kailua, HI 96734

Project Manager Justin Marshall
Project Location NOEI - Umauma Bridge, North Hilo

NVL Batch Number
Client Job Number 17010-010018.00
Total Samples 14

Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days ☐ 2-Hrs ☐ 2 Days ☒ 5 Days ☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days
Please call for TAT less than 24 Hrs

Email address justin.marshall@us.bureauveritas.com

Phone: (808) 531-6708 **Fax:** (808) 537-4084 Cell (808) 479-4636

☐ **Asbestos Air** ☐ PCM (NIOSH 7400) ☐ TEM (NIOSH 7402) ☐ TEM (AHERA) ☐ TEM (EPA Level II) ☐ Other _____

☐ **Asbestos Bulk** ☐ PLM (EPA/600/R-93/116) ☐ PLM (EPA Point Count) ☐ PLM (EPA Gravimetry) ☐ TEM Bulk

METALS	**Det. Limit**	**Matrix**	**RCRA Metals**	**Other Metals**
☒ Total Metals	☒ ppm (AAS)	☐ Air Filter ☒ Paint Chips	☐ Arsenic (As) ☐ All 8	☐ **All 3**
☐ TCLP	☐ ppb (GFAA)	☐ Drinking water ☐ Paint Chips (Area)	☒ Lead (Pb)	☐ Copper (Cu)
		☐ Dust/wipe ☐ Waste Water	☐ Barium (Ba) ☐ Mercury (Hg)	☐ Nickel (Ni)
		☐ Soil	☐ Cadmium (Cd) ☐ Selenium (Se)	☐ Zinc (Zn)
			☐ Chromium (Cr) ☐ Silver (Ag)	

☐ **Other Types of Analysis** ☐ Fiberglass ☐ Nuisance Dust ☐ Other (Specify) _____
☐ Silica ☐ Respirable Dust

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments	A/R
1		UMAU-P1	*See Attached	
2		↓		
3				
4		UMAU-P14		
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

	Print Below	Sign Below	Company	Date	Time
Sampled by	Justin Marshall	Justin Marshall	Bureau Veritas	3/16/10	10:00 am
Relinquished by	Justin Marshall	Justin Marshall	Bureau Veritas	3/17/10	10:00 am
Received by	Brittany Vogel		NVL	3/18/10	9:00 FedEx
Analyzed by	Alla Prysyazhnyuk		NVL	3/22/10	11:00 AM
Results Called by					
Results Faxed by					

Special Instructions: Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

BUREAU VERITAS – Paint Sampling Sheet

Project No. 17010-010018.00
Project Name: NOEI - Umauma Bridge
Inspector(s) Name: J. Marshall / P. Austin
Bldg. Name / No. Umauma Bridge
Page: 1 of 2
Date: 03/16/10

Sample Number	Sample Location	Paint Description	Substrate	Notes/Paint Location	Condition
UMAU-P1	North side of bridge, front struc. support on right	Gray paint	Metal	Structural beams on North side of bridge & on south side	☐ Good ☐ Damaged % ☐ Sig. Dam. %
UMAU-P2	South side of bridge, ~~front~~ struc. support on right	Black paint	Metal	Selected structural beams on South side of bridge	☐ Good ☐ Damaged % ☐ Sig. Dam. %
UMAU-P3	South side of bridge, rear struc. support on right	Red paint over Gray paint	Metal	Selected structural beams on south side of bridge	☐ Good ☐ Damaged % ☐ Sig. Dam. %
UMAU-P4	North side of bridge, front struc. support on right	Gray paint	Metal	Retrofit braces throughout entire structural system (North & South)	☐ Good ☐ Damaged % ☐ Sig. Dam. %
UMAU-P5	North side of bridge, front struct support on left	Black paint over Gray paint	Metal	Vertical pipes / round supports throughout bridge system	☐ Good ☐ Damaged % ☐ Sig. Dam. %
UMAU-P6	North side of bridge, rock in center of front struc.	Red, black, & gray paint	Rocks	Paint splatter coating rocks below bridge	☐ Good ☐ Damaged % ☐ Sig. Dam. %
UMAU-P7	South side of bridge, near service access gate	Black paint over Red paint over Gray paint	Metal	Main structural beam/ girder on south end	☐ Good ☐ Damaged % ☐ Sig. Dam. %
UMAU-P8	South side of bridge, near service access gate, hardware on R	Gray paint	Metal	Over hardware (retrofit) penetrating main structural beam / girder	☐ Good ☐ Damaged % ☐ Sig. Dam. %
UMAU-P9	South side of bridge, handrail of South L service acces,	Gray paint bottom	Metal	On metal handrail of South service access	☐ Good ☐ Damaged % ☐ Sig. Dam. %
UMAU-P10	South side of bridge, lower wooden handrail of ~~rear~~ South L service access	Gray paint	wood	Wooden stairs & hand rails of service access on south, L of bridge	☐ Good ☐ Damaged % ☐ Sig. Dam. %

Notes:

BATCH ID
3003248.00

BUREAU VERITAS – Paint Sampling Sheet

Project No. 17010-010018.00 Inspector(s) Name: J. Marshall / P. Austin Page: 2 of 2

Project Name: NOEI - Umauma Bridge Bldg. Name / No. Umauma Bridge Date: 03/16/10

Sample Number	Sample Location	Paint Description	Substrate	Notes/Paint Location	Condition
UMAU-P11	South side of bridge, left end	white paint	Conc.	Ends (NJS) of conc. bridge rails & on curbs of bridge	☐ Good ☐ Damaged % ☐ Sig. Dam. % _
UMAU-P12	South side of bridge, left end	Silver paint	Metal	Steel guardrails on each side/each end (NJS)	☐ Good ☐ Damaged % _ ☐ Sig. Dam. % _
UMAU-P13	South side of bridge, left side	white reflective paint	Asphalt	white painted lines on R & L of roadway	☐ Good ☐ Damaged % _ ☐ Sig. Dam. % _
UMAU-P14	Center of bridge, stripe on left	Yellow reflective paint	Asphalt	Yellow painted center stripe (double) on roadway	☐ Good ☐ Damaged % _ ☐ Sig. Dam. % _
					☐ Good ☐ Damaged % _ ☐ Sig. Dam. % _
					☐ Good ☐ Damaged % _ ☐ Sig. Dam. % _
					☐ Good ☐ Damaged % _ ☐ Sig. Dam. % _
					☐ Good ☐ Damaged % _ ☐ Sig. Dam. % _
					☐ Good ☐ Damaged % _ ☐ Sig. Dam. % _
					☐ Good ☐ Damaged % _ ☐ Sig. Dam. % _

BATCH ID 30032248.00

Notes:

APPENDIX C

LABORATORY ANALYTICAL REPORT FOR TPH AND RCRA-EIGHT METAL ANALYTES-IN-SOIL SAMPLING

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Bureau Veritas
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316
Kailua, HI 96734
Justin Marshall

Work Order: HTC0102
Project: Umauma Bridge
Project Number: NOEI - Umauma Bridge Rest., 17010-010018.00

Received: 03/16/10
Reported: 04/15/10 09:30

Sample Summary

Sample Identification	Lab Number	Client Matrix	Date/Time Sampled	Date/Time Received	Sample Qualifiers
UMAUMA-01	HTC0102-01	Solid/Soil	03/16/10 09:50	03/16/10 16:50	
UMAUMA-02	HTC0102-02	Solid/Soil	03/16/10 10:35	03/16/10 16:50	
UMAUMA-03	HTC0102-03	Solid/Soil	03/16/10 10:20	03/16/10 16:50	
UMAUMA-04	HTC0102-04	Solid/Soil	03/16/10 10:50	03/16/10 16:50	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Bureau Veritas
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316
Kailua, HI 96734
Justin Marshall

Work Order: HTC0102
Project: Umauma Bridge
Project Number: NOEI - Umauma Bridge Rest., 17010-010018.00

Received: 03/16/10
Reported: 04/15/10 09:30

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dil	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HTC0102-01 (UMAUMA-01 - Solid/Soil)					**Sampled: 03/16/10 09:50**		**Recvd: 03/16/10 16:50**		
Extractable Petroleum Hydrocarbons by 8015M									
DRO	**7.48**		mg/kg	3.92	1	03/22/10 20:50	03/18/10	10C0138	SW8015M
RRO	**61.6**		"	19.6	"	"	"	"	"
Surr: o-Terphenyl (35-120%)	*77 %*					"	"	"	"
Gasoline Range Organics/BTEX/MTBE by HO-ORG-018/8260/GC-MS									
GRO	ND		mg/kg	0.478	1	03/25/10 15:24	03/25/10	10C0215	SW8260B
Surr: Toluene-d8 (80-120%)	*110 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Mercury	**0.115**		mg/kg	0.0194	1	03/23/10 14:45	03/23/10	10C0168	SW7471
METALS									
Arsenic	**16**		mg/kg	2.5	5	03/24/10 15:16	03/23/10	10C2887	EPA 6020
Barium	**32**		"	2.5	"	"	"	"	"
Cadmium	ND	RL1	"	2.5	"	"	"	"	"
Chromium	**150**		"	5.0	"	"	"	"	"
Lead	**44**		"	2.5	"	"	"	"	"
Selenium	ND	RL1	"	5.0	"	"	"	"	"
Silver	ND	RL1	"	2.5	"	"	"	"	"

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Bureau Veritas
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316
Kailua, HI 96734
Justin Marshall

Work Order: HTC0102
Project: Umauma Bridge
Project Number: NOEI - Umauma Bridge Rest., 17010-010018.00

Received: 03/16/10
Reported: 04/15/10 09:30

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dil	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HTC0102-02 (UMAUMA-02 - Solid/Soil)					**Sampled: 03/16/10 10:35**		**Recvd: 03/16/10 16:50**		
Extractable Petroleum Hydrocarbons by 8015M									
DRO	**21.0**		mg/kg	3.96	1	03/22/10 21:06	03/18/10	10C0138	SW8015M
RRO	**67.0**		"	19.8	"	"	"	"	"
Surr: o-Terphenyl (35-120%)	*78 %*					"	"	"	"
Gasoline Range Organics/BTEX/MTBE by HO-ORG-018/8260/GC-MS									
GRO	ND		mg/kg	0.433	1	03/25/10 15:50	03/25/10	10C0215	SW8260B
Surr: Toluene-d8 (80-120%)	*117 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Mercury	**0.273**		mg/kg	0.0182	1	03/23/10 14:47	03/23/10	10C0168	SW7471
METALS									
Arsenic	**5.9**		mg/kg	2.5	5	03/24/10 15:20	03/23/10	10C2887	EPA 6020
Barium	**34**		"	2.5	"	"	"	"	"
Cadmium	ND	RL1	"	2.5	"	"	"	"	"
Chromium	**90**		"	4.9	"	"	"	"	"
Lead	**4700**		"	25	50	03/25/10 20:04	"	"	"
Selenium	ND	RL1	"	4.9	5	03/24/10 15:20	"	"	"
Silver	ND	RL1	"	2.5	"	"	"	"	"

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Bureau Veritas
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316
Kailua, HI 96734
Justin Marshall

Work Order: HTC0102
Project: Umauma Bridge
Project Number: NOEI - Umauma Bridge Rest., 17010-010018.00

Received: 03/16/10
Reported: 04/15/10 09:30

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dil	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HTC0102-03 (UMAUMA-03 - Solid/Soil)					**Sampled: 03/16/10 10:20**		**Recvd: 03/16/10 16:50**		
Extractable Petroleum Hydrocarbons by 8015M									
DRO	**16.4**		mg/kg	3.83	1	03/22/10 21:22	03/18/10	10C0138	SW8015M
RRO	**98.4**		"	19.2	"	"	"	"	"
Surr: o-Terphenyl (35-120%)	*73 %*					"	"	"	"
Gasoline Range Organics/BTEX/MTBE by HO-ORG-018/8260/GC-MS									
GRO	ND		mg/kg	0.468	1	03/25/10 16:15	03/25/10	10C0215	SW8260B
Surr: Toluene-d8 (80-120%)	*104 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Mercury	**0.127**		mg/kg	0.0179	1	03/23/10 14:48	03/23/10	10C0168	SW7471
METALS									
Arsenic	**7.8**		mg/kg	0.50	1	03/24/10 15:24	03/23/10	10C2887	EPA 6020
Barium	**34**		"	0.50	"	"	"	"	"
Cadmium	ND		"	0.50	"	"	"	"	"
Chromium	**95**		"	1.0	"	"	"	"	"
Lead	**7.2**		"	0.50	"	"	"	"	"
Selenium	**1.0**		"	1.0	"	"	"	"	"
Silver	ND		"	0.50	"	"	"	"	"

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Bureau Veritas
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316
Kailua, HI 96734
Justin Marshall

Work Order: HTC0102
Project: Umauma Bridge
Project Number: NOEI - Umauma Bridge Rest., 17010-010018.00

Received: 03/16/10
Reported: 04/15/10 09:30

ANALYTICAL REPORT

Analyte	Sample Result	Data Qualifiers	Units	Rpt Limit	Dil	Date Analyzed	Prep Date	Seq/ Batch	Method
Sample ID: HTC0102-04 (UMAUMA-04 - Solid/Soil)					**Sampled: 03/16/10 10:50**		**Recvd: 03/16/10 16:50**		
Extractable Petroleum Hydrocarbons by 8015M									
DRO	**4.70**		mg/kg	3.70	1	03/22/10 21:38	03/18/10	10C0138	SW8015M
RRO	ND		"	18.5	"	"	"	"	"
Surr: o-Terphenyl (35-120%)	*78 %*					"	"	"	"
Gasoline Range Organics/BTEX/MTBE by HO-ORG-018/8260/GC-MS									
GRO	ND		mg/kg	0.472	1	03/25/10 16:41	03/25/10	10C0215	SW8260B
Surr: Toluene-d8 (80-120%)	*99 %*					"	"	"	"
Total Metals by SW 846 Series Methods									
Mercury	**0.105**		mg/kg	0.0185	1	03/23/10 14:49	03/23/10	10C0168	SW7471
METALS									
Arsenic	**4.5**		mg/kg	0.50	1	03/24/10 15:28	03/23/10	10C2887	EPA 6020
Barium	**34**		"	0.50	"	"	"	"	"
Cadmium	ND		"	0.50	"	"	"	"	"
Chromium	**56**		"	0.99	"	"	"	"	"
Lead	**2.2**		"	0.50	"	"	"	"	"
Selenium	ND		"	0.99	"	"	"	"	"
Silver	ND		"	0.50	"	"	"	"	"

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Bureau Veritas
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316
Kailua, HI 96734
Justin Marshall

Work Order: HTC0102
Project: Umauma Bridge
Project Number: NOEI - Umauma Bridge Rest., 17010-010018.00

Received: 03/16/10
Reported: 04/15/10 09:30

SAMPLE EXTRACTION DATA

Parameter	Batch	Lab Number	Wt/Vol Extracted	Default Wt/Vol	Extracted Vol	Default Vol	Date	Analyst	Extraction Method
Extractable Petroleum Hydrocarbons by 8015M									
SW8015M	10C0138	HTC0102-01	31	30	1	1	03/18/10 09:50	BKL	SW 3550B GC
SW8015M	10C0138	HTC0102-02	30	30	1	1	03/18/10 09:50	BKL	SW 3550B GC
SW8015M	10C0138	HTC0102-03	31	30	1	1	03/18/10 09:50	BKL	SW 3550B GC
SW8015M	10C0138	HTC0102-04	32	30	1	1	03/18/10 09:50	BKL	SW 3550B GC

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

99-193 Aiea Heights Drive, Suite 121 Aiea, HI 96701 * 808-486-5227 * Fax 808-486-2456

Bureau Veritas
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316
Kailua, HI 96734
Justin Marshall

Work Order: HTC0102
Project: Umauma Bridge
Project Number: NOEI - Umauma Bridge Rest., 17010-010018.00

Received: 03/16/10
Reported: 04/15/10 09:30

LABORATORY BLANK QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Extractable Petroleum Hydrocarbons by 8015M													
Batch\Seq: 10C0138 Extracted: 03/18/10													
Blank Analyzed: 03/22/2010 (10C0138-BLK1)													
DRO			mg/kg	N/A	4.00	ND							
RRO			mg/kg	N/A	20.0	ND							
Surrogate: o-Terphenyl			mg/kg					*80*		*35-120*			
Total Metals by SW 846 Series Methods													
Batch\Seq: 10C0168 Extracted: 03/23/10													
Blank Analyzed: 03/23/2010 (10C0168-BLK1)													
Mercury			mg/kg	N/A	0.0200	ND							
METALS													
Batch\Seq: 10C2887 Extracted: 03/23/10													
Blank Analyzed: 03/24/2010 (10C2887-BLK1)													
Antimony			mg/kg	N/A	0.99	ND							
Arsenic			mg/kg	N/A	0.49	ND							
Barium			mg/kg	N/A	0.49	ND							
Beryllium			mg/kg	N/A	0.25	ND							
Cadmium			mg/kg	N/A	0.25	ND							
Chromium			mg/kg	N/A	0.99	ND							
Cobalt			mg/kg	N/A	0.25	ND							
Copper			mg/kg	N/A	0.99	ND							
Lead			mg/kg	N/A	0.49	ND							
Molybdenum			mg/kg	N/A	0.99	ND							
Nickel			mg/kg	N/A	0.99	ND							
Selenium			mg/kg	N/A	0.99	ND							
Silver			mg/kg	N/A	0.49	ND							
Thallium			mg/kg	N/A	0.49	ND							
Vanadium			mg/kg	N/A	0.99	ND							
Zinc			mg/kg	N/A	9.9	ND							

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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Bureau Veritas
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316
Kailua, HI 96734
Justin Marshall

Work Order: HTC0102
Project: Umauma Bridge
Project Number: NOEI - Umauma Bridge Rest., 17010-010018.00

Received: 03/16/10
Reported: 04/15/10 09:30

LCS/LCS DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Extractable Petroleum Hydrocarbons by 8015M													
Batch\Seq: 10C0138 Extracted: 03/18/10													
LCS Analyzed: 03/22/2010 (10C0138-BS1)													
DRO		167	mg/kg	N/A	4.00	141		85		50-115			
Surrogate: o-Terphenyl			mg/kg					*94*		*35-120*			
Gasoline Range Organics/BTEX/MTBE by HO-ORG-018/8260/GC-MS													
Batch\Seq: 10C0215 Extracted: 03/25/10													
LCS Analyzed: 03/25/2010 (10C0215-BS1)													
GRO		5.00	mg/kg	N/A	0.500	4.89		98		75-125			
Surrogate: Toluene-d8			mg/kg					*100*		*80-120*			
Total Metals by SW 846 Series Methods													
Batch\Seq: 10C0168 Extracted: 03/23/10													
LCS Analyzed: 03/23/2010 (10C0168-BS1)													
Mercury		0.333	mg/kg	N/A	0.0200	0.353		106		80-120			
METALS													
Batch\Seq: 10C2887 Extracted: 03/23/10													
LCS Analyzed: 03/24/2010 (10C2887-BS1)													
Antimony		50.0	mg/kg	N/A	1.0	45.5		91		80-120			
Arsenic		50.0	mg/kg	N/A	0.50	44.1		88		80-120			
Barium		50.0	mg/kg	N/A	0.50	44.5		89		80-120			
Beryllium		50.0	mg/kg	N/A	0.30	47.6		95		80-120			
Cadmium		50.0	mg/kg	N/A	0.50	44.8		90		80-120			
Chromium		50.0	mg/kg	N/A	1.0	45.1		90		80-120			
Cobalt		50.0	mg/kg	N/A	0.50	45.8		92		80-120			
Copper		50.0	mg/kg	N/A	1.0	45.1		90		80-120			
Lead		50.0	mg/kg	N/A	0.50	45.0		90		80-120			
Molybdenum		50.0	mg/kg	N/A	1.0	45.0		90		80-120			
Nickel		50.0	mg/kg	N/A	1.0	45.5		91		80-120			
Selenium		50.0	mg/kg	N/A	1.0	42.6		85		80-120			
Silver		25.0	mg/kg	N/A	0.50	22.7		91		80-120			
Thallium		50.0	mg/kg	N/A	0.50	44.4		89		80-120			
Vanadium		50.0	mg/kg	N/A	1.0	43.7		87		80-120			
Zinc		50.0	mg/kg	N/A	10	58.4		117		80-120			

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Bureau Veritas
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316
Kailua, HI 96734
Justin Marshall

Work Order: HTC0102
Project: Umauma Bridge
Project Number: NOEI - Umauma Bridge Rest., 17010-010018.00

Received: 03/16/10
Reported: 04/15/10 09:30

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA

Analyte	Source Result	Spike Level	Units	MDL	MRL	Result	Dup Result	% REC	Dup %REC	% REC Limits	RPD	RPD Limit	Q
Extractable Petroleum Hydrocarbons by 8015M													
Batch\Seq: 10C0138 Extracted: 03/18/10													
Matrix Spike Analyzed: 03/22/2010 (10C0138-MS1)				**QC Source Sample: HTC0094-01**									
DRO	4.13	166	mg/kg	N/A	3.97	135	134	79	79	50-115	1	30	
Surrogate: o-Terphenyl			mg/kg					*88*	*89*	*35-120*			
Gasoline Range Organics/BTEX/MTBE by HO-ORG-018/8260/GC-MS													
Batch\Seq: 10C0215 Extracted: 03/25/10													
Matrix Spike Analyzed: 03/25/2010 (10C0215-MS1)				**QC Source Sample: HTC0102-03**									
GRO	ND	4.67	mg/kg	N/A	0.467	4.58	4.30	98	99	75-125	6	25	
Surrogate: Toluene-d8			mg/kg					*107*	*102*	*80-120*			
Total Metals by SW 846 Series Methods													
Batch\Seq: 10C0168 Extracted: 03/23/10													
Matrix Spike Analyzed: 03/23/2010 (10C0168-MS1)				**QC Source Sample: HTC0128-01**									
Mercury	0.953	0.308	mg/kg	N/A	0.0923	1.38	1.36	140	135	85-115	2	20	MHA
METALS													
Batch\Seq: 10C2887 Extracted: 03/23/10													
Matrix Spike Analyzed: 03/24/2010 (10C2887-MS1)				**QC Source Sample: ITC2033-01**									
Antimony	0.241	49.8	mg/kg	N/A	1.0	44.5	44.2	89	89	75-125	1	20	
Arsenic	1.41	49.8	mg/kg	N/A	0.50	44.7	44.3	87	87	75-125	1	20	
Barium	27.4	49.8	mg/kg	N/A	0.50	74.3	71.6	94	90	75-125	4	20	
Beryllium	0.130	49.8	mg/kg	N/A	0.30	49.1	48.1	99	97	75-125	2	20	
Cadmium	ND	49.8	mg/kg	N/A	0.50	44.3	44.4	89	90	75-125	0	20	
Chromium	6.07	49.8	mg/kg	N/A	1.0	51.4	50.9	91	91	75-125	1	20	
Cobalt	1.84	49.8	mg/kg	N/A	0.50	46.9	45.8	91	89	75-125	2	20	
Copper	3.91	49.8	mg/kg	N/A	1.0	47.5	47.0	88	87	75-125	1	20	
Lead	2.68	49.8	mg/kg	N/A	0.50	49.2	46.6	94	89	75-125	5	20	
Molybdenum	0.154	49.8	mg/kg	N/A	1.0	45.7	45.6	92	92	75-125	0	20	
Nickel	3.37	49.8	mg/kg	N/A	1.0	48.9	47.1	91	89	75-125	4	20	
Selenium	ND	49.8	mg/kg	N/A	1.0	43.0	43.6	86	89	75-125	1	20	
Silver	ND	24.9	mg/kg	N/A	0.50	22.5	22.5	90	91	75-125	0	20	
Thallium	0.113	49.8	mg/kg	N/A	0.50	44.9	43.2	90	87	75-125	4	20	
Vanadium	14.4	49.8	mg/kg	N/A	1.0	60.4	59.0	92	91	75-125	2	20	
Zinc	16.6	49.8	mg/kg	N/A	10	56.6	54.5	80	77	75-125	4	20	

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Bureau Veritas	Work Order:	HTC0102	Received: 03/16/10
Pali Palms Plaza - 970 North Kalaheo Avenue, Suite C-316			Reported: 04/15/10 09:30
Kailua, HI 96734	Project:	Umauma Bridge	
Justin Marshall	Project Number:	NOEI - Umauma Bridge Rest., 17010-010018.00	

CERTIFICATION SUMMARY

TestAmerica Honolulu

Method	Matrix	Nelac	Hawaii
SW7471	Solid/Soil	X	
SW8015M	Solid/Soil	X	
SW8260B	Solid/Soil	X	

Subcontracted Laboratories

TestAmerica - Irvine, CA

17461 Derian Avenue Suite 100 - Irvine, CA 92614

Method Performed: EPA 6020

Samples: HTC0102-01, HTC0102-02, HTC0102-03, HTC0102-04

For information concerning certifications of this facility or another TestAmerica facility, please visit our website at www.TestAmericaInc.com

DATA QUALIFIERS AND DEFINITIONS

MHA	Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information. See Blank Spike (LCS).
RL1	Reporting limit raised due to sample matrix effects.
ND	Not detected at the reporting limit (or method detection limit if shown)

ADDITIONAL COMMENTS

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LABORATORY USE ONLY
LAB JOB NO. HTC0102 3/17.0
LOCATION HTL0102
CONTAINERS

Chain of Custody / Analysis Request Form

Report to: Justin Marshall
Company name: Bureau Veritas North America
Address: 970 N. Kalaheo Ave., Suite C-316
City: Kailua State: HI ZIP: 96734
Phone: 479-4636 Fax:
Sampler: J. Marshall
samples in shipment: 4 samples (4 containers each = 16 cont.)

Project identification
Job name: NOEL - Umauma Bridge Rest.
Job number: 17010-010018.00
P.O. number:
Contact email address: Justin.marshall@us.bureauveritas.com
Date results needed: ~~5 day - TAT~~ Standard

Indicate analyses requested: EPA 6020 (RCRA Metals); EPA 8015 (TPH) GDO

Item no.	Client sample ID	COMP	GRAB	Matrix: Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Preservation method	Sampling: Date	Time	No. of containers	EPA 6020	EPA 8015	Laboratory ID no.
1	UMAUMA-01		X		X								N/A	03/16/10	0950	4	X	X	HTL0102-01
2	UMAUMA-02		X		X								N/A	03/16/10	1035	4	X	X	-02
3	UMAUMA-03		X		X								N/A	03/16/10	1020	4	X	X	-03
4	UMAUMA-04		X		X								N/A	03/16/10	1050	4	X	X	-04
5																			
6																			
7																			
8																			
9																			
10																			

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
Justin Marshall	03/16/10 1650	Hand		TA Hon	3/16/10 1650	Rush 4°C
	/				/	Cool
	/				/	

Comments: Please contact Justin Marshall @ 479-4636 with any questions regarding analyses of these samples.

Please check one:
- ☐ Dispose by lab
- ☐ Return to client
- ☐ Archive

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sample Receipt Checklist

Client Name: Bureau Veritas **Date/ Time Received:** 3/16/15 1650

Checklist Completed By: JL **Received By:** JL

Matrices: Soil **Carrier:** Client **Airbill# :**

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑ #:
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑ #:
Chain of Custody present?	Yes ☑	No ☐	
Chain of Custody Signed when relinquished and received?	Yes ☑	No ☐	
Chain of Custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sample containers on ice?	Yes ☑	No ☐	Type: Gel
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Water - VOA Vials have Zero Headspace?	Yes ☐	No ☐	No VOA vials present: ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Checked: ☑
pH Adjusted?	Yes ☐	No ☑	Final pH:
Encores / 5035 Vials Present?	Yes ☐	No ☑	
Sample Filtration Needed?	Yes ☐	No ☑	Filtered in Field: ☐
Dry Weight Corrected Results?	Yes ☐	No ☐	Take Action: ☑
DODQSM / QAPP Project?	Yes ☐	No ☑	Type:

Temperature Blank Present? Yes ☐ No ☑

Sample Container/Blank Temperature Range (Minimum 3 sample containers if available): 4 °C

Comments/ Sampling Handling Notes:

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LABORATORY USE ONLY
LAB JOB NO. HTC0120 3/17/10
LOCATION HTL0102
CONTAINERS

Chain of Custody / Analysis Request Form

Report to: Justin Marshall
Company name: Bureau Veritas North America
Address: 970 N. Kalaheo Ave., Suite C-316
City: Kailua State: HI ZIP: 96734
Phone: 479-4636 Fax:
Sampler: J. Marshall
samples in shipment: 4 samples (4 containers each = 16 cont.)

Project identification
Job name: NOEL - Umauma Bridge Rest.
Job number: 17010-010018.00
P.O. number:
Contact email address: Justin.marshall@us.bureauveritas.com
Date results needed: ~~5 day~~ - TAT Standard

Indicate analyses requested
EPA 6020 (RCRA Metals)
EPA 8015 (TPH) GDO

Item no.	Client sample ID	COMP	GRAB	Matrix: Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Preservation method	Sampling: Date	Time	No. of containers	EPA 6020	EPA 8015	Laboratory ID no.
1	UMAUMA-01		X		X								N/A	03/16/10	0950	4	X	X	HTL0102-01
2	UMAUMA-02		X		X								N/A	03/16/10	1035	4	X	X	-02
3	UMAUMA-03		X		X								N/A	03/16/10	1020	4	X	X	-03
4	UMAUMA-04		X		X								N/A	03/16/10	1050	4	X	X	-04
5																			
6																			
7																			
8																			
9																			
10																			

Released by (print / sign)	Date / time released	Delivery method	Received by (print / sign)	Company / Agency affiliation	Date / time received	Condition noted
Justin Marshall	03/16/10 1650	Hand		TA Hon	3/16/10 1650	4°C
	/				/	Gel
	/				/	

Comments: Please contact Justin Marshall @ 479-4636 with any questions regarding analyses of these samples.

Please check one:
☐ Dispose by lab
☐ Return to client
☐ Archive

COC REV 06/2006 Distribution: White - TestAmerica Yellow - TestAmerica - Pink - Client

Page ____ of ____

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Sample Receipt Checklist

Client Name: Bureau Veritas **Date/ Time Received:** 3/16/15 1650

Checklist Completed By: JL **Received By:** JL

Matrices: Soil **Carrier:** Client **Airbill# :**

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑ #:
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑ #:
Chain of Custody present?	Yes ☑	No ☐	
Chain of Custody Signed when relinquished and received?	Yes ☑	No ☐	
Chain of Custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sample containers on ice?	Yes ☑	No ☐	Type: Gel
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Water - VOA Vials have Zero Headspace?	Yes ☐	No ☐	No VOA vials present: ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Checked: ☑
pH Adjusted?	Yes ☐	No ☑	Final pH:
Encores / 5035 Vials Present?	Yes ☐	No ☑	
Sample Filtration Needed?	Yes ☐	No ☑	Filtered in Field: ☐
Dry Weight Corrected Results?	Yes ☐	No ☐	Take Action: ☑
DODQSM / QAPP Project?	Yes ☐	No ☑	Type:

Temperature Blank Present? Yes ☐ No ☑

Sample Container/Blank Temperature Range (Minimum 3 sample containers if available): 4 °C

Comments/ Sampling Handling Notes:

BUREAU VERITAS – Soil Sampling Sheet

Project No. 17010-010018.00 Inspector(s) Name: J. Marshall / P. Austin Page: 1 of 1

Project Name: NOEI - Umauma Bridge Rest. Bldg. Name / No. Umauma Bridge Date: 03/16/10

Sample Number	Sample Location	Soil Description	Notes	Analysis Requested
UMAUMA-01	South side of river, on hillside, near front, right Structural support (conc.)	Soil surrounding concrete bases of struc. supports.	Conc. supports surrounded by rocks, limited soil present.	EPA 6020 (RCRA) EPA 8015 (TPH) GDO
UMAUMA-02	North side of river, on hillside, near front, left Structural support (conc.)	Soil surrounding concrete bases of struc. supports. Muddy.	Muddy soil, near plant growth at base of conc.	↓ ↓
UMAUMA-03	North side of river, in shallow water, approx. 25' downstream of bridge	Sediment from river bed. Comprised of small rocks/pebbles	Downstream of river, shallow	
UMAUMA-04	North side of river, in shallow water, approx. 25' upstream of bridge	Sediment from river bed. Comprised of small rocks/pebbles	Upstream of river, shallow	

Notes:

APPENDIX G

ARMY CORPS OF ENGINEERS 404 PERMIT APPLICATION

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT *(33 CFR 325)*	OMB APPROVAL NO. 0710-0003 **EXPIRES: 31 August 2012**

Public reporting burden for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers, Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
First - Glenn Middle - M Last – Okimoto	First - George Middle - Last – Gutierrez, Jr.
Company – Dept. Transportation, State of Hawaii	Company – Nagamine Okawa Engineers Inc.
E-mail Address – Glenn.Okimoto@Hawaii.gov	E-mail Address – georgeg@nagamineokawa.com
6. APPLICANT'S ADDRESS	**9. AGENT'S ADDRESS**
Address - 869 Punchbowl Street	Address - 1003 Bishop St, STE 2025
City – Honolulu State – HI Zip – 96813 Country – USA	City – Honolulu State – Hawaii Zip – 96713 Country – USA
7. APPLICANT'S PHONE NOs. W/AREA CODE	**10. AGENT'S PHONE NOs. W/AREA CODE**
a. Residence b. Business 587-2150 c. Fax 587-2167	a. Residence b. Business 808-535-3004 c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Nagamine Okawa Engineers Inc. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE — DATE: JUN 13 2011

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

Umauma Stream Bridge Rehabilitation

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Umauma Stream	Address No street address.
15. LOCATION OF PROJECT	
Latitude: °N 155 8.147 Longitude: °W 19 54.431	City - State – Zip -

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID 331001999 Municipality County of Hawaii

Section – Township – Range –

17. DIRECTIONS TO THE SITE

From Hilo drive north on Rt. 19 approx. 16 miles (Hwy. mile marker 16, approx.).

18. Nature of Activity (Description of project, include all features)

Structural and foundation repairs to the existing bridge over Umauma Stream.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The bridge's steel structure is severely oxidized and in need of replacement.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Pier foundations are to be strengthened, one pier is partially within the OHWM.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
Concrete (130 cubic yards)		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres

Or

Liner Feet 440 square feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

There is minimal effect in the stream channel. BMPs will prevent release of contaminants to the stream.

24. Is Any Portion of the Work Already Complete? Yes ☐ No ☑ IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list)

Address – See supplemental list.

City – State – Zip –

26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
State of Hawaii	Envr. Assessment		In preparation		
DLNR	CDUA		Not reqd in Hwy ROW		
Co of Hawaii	SMA		Not reqd in Hwy ROW		
DLNR	SCAP				

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

JUN 13 2011

SIGNATURE OF APPLICANT DATE

SIGNATURE OF AGENT 6·20·11 DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

QUESTIONNAIRE
(Umauma Stream Bridge Repair, Island of Hawaii)

A complete Department of the Army Permit Application consists of the application form (ENG Form 4345), drawings and environmental information necessary to determine a project's probable impact on the public interest (33 CFR Part 325.1 (d)(1) and Part 325.3(a)). Based on our experience, the environmental information necessary to make the public interest determination is often inadequate when only the ENG Form 4345 form is submitted by applicants. Project managers must then request additional information from applicants, resulting in delays in project evaluation. In order to provide more efficient processing of your application, this questionnaire has been developed to supplement the information required in ENG Form 4345 and to simplify your submittal of environmental assessment information.

A. LOCATION (supplement to Blocks 15-16 of ENG Form 4345):

1. Please provide the Tax Map Key number(s) for the project site: *331001999*
2. Please provide the Latitude *155 8.147*____ and Longitude_*19 54.431*_____.
3. Please provide the watershed in which work is proposed:_*Umauma*_____

B. DISCHARGE OF DREDGED AND/OR FILL MATERIAL (Blocks 20-22 of ENG Form 4345 also pertain to discharges of dredged and/or fill material).

1. State the source of the dredged or fill material. *The dredge material will be rock removed for the footing and none of this material will be discharged. The fill material will be concrete which comprises the discharge.*
2. State the method of discharge*. Dredge material will be removed and deposited on land so that there is no discharge. Fill material (concrete) will be placed within forms (to be removed after concrete has set) and behind silt containment devices. See BMPs (attached).*
3. Indicate the location of the discharge within the project site. This is best accomplished through a plan view drawing of the site that shows the footprint of filling (discharge). A cross-sectional view with existing and proposed contours (elevations) also provides necessary information on the scope of proposed work. *The location of the discharge/fill is at Pier 1 of 3, which is located on the Hilo side of stream. See drawings (attached).*
4. What types of structures or facilities would be constructed on the fill area? (Show on drawings their dimensions, layout, etc.) *The structure to be constructed is a reinforced concrete footing for one of the proposed new bridge support columns.*

*Note that Blocks 21 and 22 of ENG Form 4345 require both the volume (usually given in cubic yards) *and* surface area (square feet, acres, etc.) of fill.
**Please submit any drawings on 8 ½ x 11" paper whenever possible.

C. DREDGING PROJECTS

1. Please provide plans showing the dredging footprint within the project site. Include cross-sectional views depicting the existing and proposed contours. Also include a location/vicinity map and plan view (if appropriate) of the area(s) where dredge spoil will be stockpiled, processed, and disposed.
See attached plans.

2. What is the type and composition of the material to be dredged?
Rock.

3. How much time will be required to complete the dredging (construction window)?
Approximately 1 month

Will the dredging project be accomplished in phases? If so, please describe.
Dredging will be phased to maintain vertical support of existing footings. Support of existing footing during dredging activity may be accomplished by underpinning with braces and shoring. These braces will not extend into stream.

Is maintenance dredging proposed, and, if so, what is the timeframe of the dredging cycle?
Maintenance dredging is not proposed.

4. How much material will be dredged?
    a. *Volume: 130 c.y.*
    b. *Surface area: 440 s.f.*

5. State what dredging method(s) will be used, and indicate why that method(s) is proposed.
Proposed method of dredging is with relatively small equipment such as hand held jack hammers and compact excavators with limited lifting weight and height. This equipment is necessary to navigate in limited working area that exists between steel trestles and shoring to be used during construction, prevent undermining existing footing and maintain vertical support of existing bridge.

6. Where will the dredged material be de-watered?
The rock to be removed will have very little if any water. All dredge material will be removed from behind sediment rolls or other containments. The rock will be transported to land disposal. De-watering is not proposed because work will be above the normal stream flow and well above the ground water elevation.

7. Do you plan to transport dredged material for the purpose of disposing it in the ocean?

No transport of dredged material for purposes of disposing it in the ocean is proposed..

a. Where do you plan to dispose of the dredged material?
b. How much material (volume) will be disposed?
c. What is the type and composition of the material?
d. How long do you plan to dispose of the material?
e. How will you transport the material to the ocean dump site?

D. STRUCTURES IN NAVIGABLE WATERS

1. What specific structures will be constructed (type and size)?

The structure will be a concrete footing for Pier 1 of 3. It comprises an area of 440 s.f. *and a volume of* 130 c.y.

2. What will the structures be used for*?*
3. *The structure will be part of the bridge support system.*

E. EXISTING ENVIRONMENT

Please submit photos when possible! *Photographs are attached.*

1. PHYSICAL ENVIRONMENT

a. How would you generally describe the project area and surrounding area?

(1) Level of development:

The Umauma Bridge site and Umauma Stream are relatively natural and undeveloped.

(2) Existing land and water use:

At this location there are no existing land or water uses. The stream is not easily accessible to the public, nor is there sufficient flow for recreational uses such as swimming or fishing. The steep slope of this watershed and the narrow gulch characteristics at the site are dangerous to recreational users.

(3) Other general features:

b. What kind of substrate (soil) is found at the project site?

The substrate at this site is basalt.

c. What is the range of water levels which occur (during normal tides and during storm of flood periods)?

There is no tidal influence at this site. The average water elevation adjacent to the proposed work area is 70 feet above mean sea level (MSL) and the work area is at 76 MSL. No stream gage data is available, but studies estimate the stream elevations to range from 79 MSL to 86 MSL during the 1-year and 100-year recurrence interval storm, respectively.

d. Describe the water currents and water circulation patterns at the project site.
There is no tidal influence at this site, stream flow is flashy and always down slope towards the ocean.

e. What is the salinity (salt, brackish, or fresh) of the water at the project site?
Fresh.

f. What is the quality of the water at the project site? For instance, in Hawaii a stream may be listed as a 303(d) Impaired Water by the State of Hawaii's Department of Health (DOH). See DOH's web site below:
http://www.hawaii.gov/health/environmental/env-planning/wqm/wqm.html#303pcd
Umauma Stream is not listed as impaired in the State's 303(d) list. See AECOS biological and water quality report (attached).

g. Is this area a groundwater recharge area?
No.

h. What is the history or possibility of contaminants/pollutants in the substrate (soil) at the source of fill material?

None, see hazmat report (attached).

i. Have there been problems with erosion at or near the project site?
No.

j. Is the project site located in or near a drainage way or flood plain? If yes, describe.
Yes, the location of the footing is subject to high water levels and the bridge support system is designed to withstand them.

k. What is the quality of the air at the project site? Will the proposed project have an adverse, or insignificant, effect on air quality at the site? Will the impacts to air quality be temporary or permanent?
Air quality at this location is excellent, unaffected by any industrial or other contaminants. Other than passing vehicles on the highway and over the bridge, there are no contaminant sources. The proposed concrete footing will not affect air quality.

l. What are the existing noise levels at the project site? Will the proposed project have an adverse, or insignificant, effect on noise levels at the site? Will the impacts to noise levels be temporary or permanent?
Ambient noise levels at the location of the footing reflect the sounds of the flowing stream water and the occasional passing vehicle over the bridge. The proposed project will not add to the permanent noise climate as it is a passive structure.

Construction equipment and processes will create a temporary adverse noise impact.

2. BIOLOGICAL ENVIRONMENT (attach biological survey reports if available)
a. Biological survey reports from a qualified environmental professional can provide much of the necessary information for evaluating a project's potential to impact aquatic resources. If not available, a general characterization of the plants and animals at the site should be provided.
A *biological report prepared by AECOS is attached.*

b. Please list any plants and animals found within or near the project area that are listed as threatened or endangered under the Endangered Species Act of 1973).
http://endangered.fws.gov/esa.html
There are no listed, threatened or endangered species at the site.

3. SPECIAL AQUATIC SITES Is the project site located at or adjacent to any of the following areas? (Show on vicinity drawings the extent of the special sites, if they are present, clearly labeling each type.)

	Dredge Site	Discharge Site	Construction Site
Sanctuaries and Refuges (protected wildlife areas)			
Wetlands (swamps, marshes, bogs)			
Mudflats			
Vegetated Shallows (seagrass bed)			
Coral Reefs			
Riffle and Pool Complexes			

The project site is not located at or adjacent to any of the above areas, please refer to photographs, maps and figures (attached).

4. HUMAN USE CHARACTERISTICS
a. What is the existing land use zoning for the site and its vicinity*?*
The site is in a State of Hawaii Land Use District of Conservation.

b. What is on the land (including dwellings, facilities, etc.) at or near the site? *There are no structures at or near the site with the exception of the bridge itself.*

c. Do any of the following occur at or near the site?
The bridge itself is considered an historic site and the design of the proposed project has been coordinated and found acceptable by the State Historic Preservation Division (attachment). There are no human uses at this site because of its ruggedness, inaccessibility, and lack of appealing features to recreational users.

	Dredge Site	Discharge (fill) Site	Construction Site
Local fresh water supply			
Fishing (recreational, commercial)			
Scenic areas			
Agriculture (type)			
Aquaculture (type)			
Historic sites (type)			*Bridge*
Other cultural resources (type)			
Parks, monuments, preserves, etc.			
Other (type)			

F. ENVIRONMENTAL EFFECTS OF PROPOSED PROJECT

Briefly describe the environmental effects which may be expected as a result of your proposal, referring to the items listed in Section E above. Please don't answer "none"..all projects have some effects.

1. Physical environment (effects on land, water, air, soil, etc.)
There is a small removal of rock for the foundation of the footing and a small fill of reinforced concrete among a set of existing concrete footings which are being added to and strengthened to support this aging bridge.

2. Biological environment (effects on plants, animals, and habitats)
A small portion of the proposed additional footing is within the OHWM of the stream and it does not add to any impediments to aquatic migration nor does it reduce habitat which at this project site consists of hard rock substrate.

3. Special aquatic sites (effects on wetlands, coral reefs, etc.)
None are present at this site.

4. Human use (how existing human activities would be affected).
The only human use of this location is the historic feature of the bridge itself which is visible from the highway. There is no human use of the stream or bridge support area due to its ruggedness and inaccessibility.

5. Historical/Cultural resources. The Corps must evaluate permit applications pursuant to Section 106 of the National Historic Preservation Act. In many cases, the Corps must

coordinate its determination of a project's potential to adversely affect historic sites with the local Historic Preservation Officer. The Corps encourages applicants to contact their local Historic Preservation Officer as soon as possible in the project planning process to address any issues relevant to Section 106. The State of Hawaii's Historic Preservation Office can be found at http://www.hawaii.gov/dlnr/hpd/hpgreeting.htm . *Coordination has been done with the Hawaii State Preservation Division and the proposed project is acceptable to that agency, see attached letter, Supplemental Information Section.*

6. Indirect impacts (will the project eventually encourage or discourage residential, agricultural, urban, industrial or resort activities?)
The proposed project has no indirect impacts because the project serves to maintain the existing highway transportation services for which there are no alternative routes.

7. Cumulative impacts (Is this project similar in purpose, characteristics, and location compared to previous projects? Will this project lead to or be followed by similar projects? Are there other activities in the area similar to your proposed activity?)
There are no cumulative impacts. This project is only for rehabilitation and widening of existing bridge to comply with current AASHTO standards.

8. Other impacts.
No other impacts are anticipated. The proposed project for repair of the bridge do not provide for increased capacity of the bridge, only for it's longevity.

ALTERNATIVES

1. List other sites which may be suitable for this proposal and indicate whether these are or could become available to you. If none, explain why.
To build a new bridge over Umauma would be cost-prohibitive because it would require realignment of the existing highway. Umauma Stream gulch is a long, narrow and deep gulch which traverses from the ocean to near the top of Mauna Kea, crossing it any point would be very costly and would have similar effects on the stream at any location. The only road alternative on East Hawaii is Government Road which has a one lane bridge over Umauma Stream and is not capable of supporting heavy vehicles. Absent the Umauma Bridge, heavy vehicles would need to use either the Saddle Road, or travel via West Hawaii.

2. If your project involves the discharge of fill material to convert wetlands or submerged areas to fastland (dry land), list any existing fastland sites which are or could become available to you. If none, clearly explain why.
The project does not convert wetlands or submerged areas to fast land.

3. List other methods or project designs which would fulfill the basic purpose of your proposal. Which ones are reasonable for you? If none, explain why.
Alternatively, the existing bridge and its "trestle-like" support system could be replaced with some sort of suspension bridge at a greater cost and replacement of this historic

structure with a modern structure would not be acceptable or compliant with the national and state historic preservation acts.

4. If your permit application were denied, what other alternatives would you have?
There is a risk of bridge collapse if the proposed new foundation and support system is not constructed. This is an aging bridge whose structural steel has severely deteriorated over the 100 or so year-life span in a harsh coastal climate subject to severe oxidation forces. The proposed project would install a reinforced concrete column support system while maintaining for historic preservation purposes the existing structural steel skeleton.

MITIGATION

What can you do to avoid or minimize adverse effects of your proposal on the environment? For instance, a project might be relocated to a non-aquatic site, the footprint of fill or dredging can be minimized to only that which is necessary to achieve project purpose, a project footprint might be moved within a site to avoid aquatic resources, and/or different construction methods could be used.
Because there are no adverse impacts on aquatic resources at this site with implementation of the site-specific BMPs, mitigation would not be required.

Please see the Honolulu District's Compensatory Mitigation and Monitoring Guidelines on-line on our web site (http://www.poh.usace.army.mil/regulatory.asp), or contact the Corps office listed below to request a hard copy. Thank you for your cooperation in this manner. If you have any questions, please contact the Corps of Engineers, Regulatory Branch at (808) 438-9258 in Honolulu or at (671) 339-2108 in Guam.

APPENDIX H

CORRESPONDENCE LETTERS

APPENDIX H

The following correspondences include responses to consultation requests from the following agencies. The content of this consultation has been incorporated into the analysis contained in this Water Quality Certification application.

Federal Agencies

- Department of the Army
- U.S. Fish and Wildlife Services
- National Marine Fisheries Services

State Agencies

- Department of Business, Economic Development & Tourism
- Department of Health (DOH)
- Department of Defense
- Department of Education
- Department of Accounting and General Services (DAGS)
- Office of Hawaiian Affairs (OHA)
- Department of Hawaiian Home Lands (DHHL)
- DLNR, State Historic Preservation Division
- DLNR, Office of Conservation and Coastal Lands

County Agencies

- Department of Planning
- Department of Public Works
- Fire Department
- Police Department
- Department of Environmental Management

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF:

April 13, 2011

Regulatory Branch

POH-2011-00098

Eugene P. Dashiell
Environmental Planning
728 Nunu Street
Kailua, Hawaii 96734

Dear Mr. Dashiell:

This is in response to your letter dated April 1, 2011 requesting a Department of the Army (DA) Jurisdictional Determination (JD) for the proposed rehabilitation of the Hawaii Belt Road Bridge over the Umauma Stream located near Hakalau, Island of Hawaii, Hawaii. We have determined that the enclosed drawings dated September 21, 2010, accurately identify waters under the regulatory jurisdiction of the Corps of Engineers.

The Corps has jurisdiction over certain waterbodies pursuant to Section 10 of the Rivers and Harbors Act of 1899 (Section 10) and Section 404 of the Clean Water Act (Section 404). Section 10 requires that a DA permit be obtained for certain structures or work in or affecting navigable waters of the United States (U.S.), prior to conducting the work (33 U.S.C. 403). Section 404 requires that a DA permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including wetlands, prior to conducting the work (33 U.S.C. 1344).

We have determined that the Umauma Stream at this location is not considered a navigable water of the U.S., but it is considered a water of the U.S. Our assertion of jurisdiction is based on our documentation that the waterbody in question is a water of the U.S. and recognition that the use, degradation, or destruction of this waterbody could affect interstate commerce.

If you anticipate discharging any dredged or fill material in the Umauma Stream, you will need to apply for and receive authorization from the Corps prior to starting such work. Please visit our website at http://www.poh.usace.army.mil/EC-R/EC-R.htm to download copies of the DA permit application. Please ensure project drawings follow the Drawing Recommendations also found on our website. You may also request hardcopies of these documents.

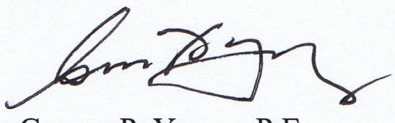
This letter contains an approved JD for the property in question and is valid for a period of five (5) years unless new information warrants revision of the determination before the expiration date. If you object to this determination, you may request an Administrative Appeal under Corps regulations at 33 Code of Federal Regulations (CFR) Part 331. We have enclosed a Notification of Appeal Process and Request For Appeal (NAP/RFA) form. If you request to appeal this determination you must submit a completed RFA form, according to instructions in the RFA, to the Corps' Pacific Ocean Division office at the following address:

Thom Lichte, Appeals Review Officer
U.S. Army Corps of Engineers
Pacific Ocean Division, ATTN: CEPOD-PDC
Building 525
Fort Shafter, HI 96858-5440

Thank you for giving us the opportunity to review this proposal and for your cooperation with our regulatory program. Please be advised you can provide comments on your experience with the Honolulu District Regulatory Branch by accessing our web-based customer survey form at http://per2.nwp.usace.army.mil/survey.html.

Should you have any questions, please contact Mr. Robert Deroche of this office at the above address or telephone (808) 438-2039 (FAX: (808) 438-4060) or by E-Mail at robert.d.deroche2@usace.army.mil. Please refer to File Number POH-2011-00098 in all future communications with this office regarding this or other projects at this location.

Sincerely,



George P. Young, P.E.
Chief, Regulatory Branch

Enclosures

Final JD Form
Flowchart
RFA Document

Copy Furnished

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2011-TA-0279

Mr. Brian Campbell
Bow Engineering and Development, Inc.
1953 South Beretania Street, PH-A
Honolulu, Hawaii 96826

JUN 0 6 2011

Subject: Technical Assistance for the Preparation of a Draft Environmental Assessment for the Rehabilitation of Umauna Stream Bridge, Hawaii

Dear Mr. Campbell:

On May 6, 2011, we received a letter from Dr. Glenn Okimoto requesting our comments for the preparation of a Draft Environmental Assessment (EA) for the proposed Rehabilitation of Umauna Stream Bridge Project [Federal Aid Project Number BR-019-2(61)]. This project will include installing new concrete piers and replacing existing steel towers which will remain in a non-structural capacity and potentially rockfall mitigation. This response is in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.).

Based on information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program, and the Hawaii GAP Program, the federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) and Hawaiian hawk (*Buteo solitarius*) have been observed in the vicinity of the proposed project. There is no federally designated critical habitat in the project footprint. To assist you in avoiding impacts to listed species we offer the following recommendations.

Hawaiian hoary bats roost in both exotic and native woody vegetation and leave their young unattended in "nursery" trees and shrubs when they forage. If trees or shrubs suitable for bat roosting are cleared during the bat breeding season (May to August), there is a risk that young bats could inadvertently be harmed or killed. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet (4.6 meters) tall should not be removed or trimmed during the bat-birthing and pup-rearing season (May 15 through August 15).

Hawaiian hawks also nest in both exotic and native woody vegetation. To avoid impacts to Hawaiian hawks we recommend avoiding brush and tree clearing during their breeding season (March through September). If you must clear the property during the Hawaiian hawk breeding season, we recommend conducting biological surveys to determine if Hawaiian hawk nests are in the vicinity. Please contact our office regarding survey methodology.

Implementation of these recommendations does not alleviate your responsibilities pursuant to the ESA if a listed species may be affected by the proposed action. If you have any questions regarding this letter, please contact Dr. Jeff Zimpfer, Fish and Wildlife Biologist, Consultation and Habitat Conservation Planning Program (phone: 808-792-9431; email: jeff_zimpfer@fws.gov).

Sincerely,

for Loyal Mehrhoff
Field Supervisor

Brian Campbell

From: Aydee Zielke <Aydee.Zielke@noaa.gov>
Sent: Tuesday, November 15, 2011 2:38 PM
To: Brian Campbell; eddie.chiu@hawaii.gov
Cc: nmfs.pir.hcd.efh.consult@noaa.gov
Subject: [Fwd: Hawaii Belt Road Rehabilitation of Umauma Stream Bridge Scoping and Pre-Assessment Consultation (Fed Aid Project No. BR-019-(61)]

Aloha,

The NOAA Fisheries, Pacific Islands Regional Office, Habitat Conservation Division (HCD) has reviewed the Hawaii Belt Road Rehabilitation of Umauma Stream Bridge Draft Environmental Assessment (Fed Aid Project No. BR-019-(61)) as pursuant to the Magnuson-Steven Fishery Conservation and Management Act; Essential Fish Habitat (EFH).
The HCD had given initial comments for the project during the scoping stage of the project (provided below and in DEA Appendix A). The HCD was mostly concerned with potential impacts to coral reef habitat from erosion due to construction erosion.

The Aquatic Biota section of the Water Quality and Biological Survey conducted for the project focused on the Umauma Stream habitat. From what we gathered there were no surveys conducted for the project beyond the rocky marine shorelines to confirm the presence of coral reef, therefore to error on the side of caution, the HCD is assuming, from what information we were able to obtain for the project site, that coral reef may be present near where the Umauma Stream meets with the Pacific Ocean.

The DEA provided a detailed BMP plan to minimize erosion and sedimentation during construction (section 3.1). The plan involves avoidance and minimization measures for erosion impacts resulting from project construction. In addition to the mentioned BMP's the HCD strongly suggests that in order to stabilize all exposed soils, seed and mulch (using native and non-invasive materials) exposed soils and/or cover exposed soil with compost or plastic sheeting with anchors. On slopes greater that 2:1, use erosion blankets or matting such as excelsior, jute, textile and plastic matting and netting, applied in accordance with manufacturer’s recommendations.

Thank you for the opportunity to comment on the scoping and DEA stages of this project. Please do not hesitate to contact HCD should you have further questions.

Mahalo,

Aydee Zielke
Natural Resource Specialist
Ocean Associates Inc. Contractor
National Oceanic and Atmospheric Administration National Marine Fisheries Service
Pacific Islands Regional Office Habitat Conservation Division
808-944-2146
aydee.zielke@noaa.gov
http://www.fpir.noaa.gov/HCD/hcd_efh.html

-------- Original Message --------
Subject: Hawaii Belt Road Rehabilitation of Umauma Stream Bridge Scoping and Pre-Assessment Consultation (Fed Aid Project No. BR-019-(61)
Date: Fri, 03 Jun 2011 16:55:04 -1000
From: Aydee Camunas-Zielke <Aydee.Camunas-Zielke@noaa.gov>
To: eddie.chiu@hawaii.gov
CC: nmfs.pir.hcd.efh.consult@noaa.gov

Aloha,

The NOAA Fisheries, Pacific Islands Regional Office, Habitat Conservation Division (HCD) has reviewed the Hawaii Belt Road Rehabilitation of Umauma Stream Bridge Scoping and Pre-Assessment Consultation (Fed Aid Project No. BR-019-(61)) as pursuant to the Magnuson-Steven Fishery Conservation and Management Act; Essential Fish Habitat (EFH). The project is located 16 miles north of Hilo District (Hawaii Island) along the Hamakua Coast. The project sites adjacent land use is mainly rural, residential, and agricultural.

The Umauma stream flows below the bridge, west to east, flowing directly into the Pacific Ocean. The project consist of widening and structural rehabilitation of the historic 110 ft. tall bridge. The existing bridge is approximately 28 ft. wide (curb-to-curb) and 39 ft.
(out-to-out) with the bridge deck half section consisting of 12-ft wide asphaltic concrete (AC) travel lane, 2-foot wide AC shoulder, 3.5 ft . wide concrete sidewalks (rasied 6 in. from roadway), and a 1 foot wide by 2.5 ft high railing. The existing bridge deck drain inlets currently discharge through a section of 4-inch pipes with a outlet approximately 4-feet below the bridge desk, allowing storm water to discharge to the atmosphere and fall to the ground/stream below.

The proposed project would include construction of support columns to be placed within and adjacent to the existing steel support towers, widening of the bridge deck and roadway shoulders, and construction of a new concrete railing. The deteriorating steel structure would be reinforced by constructing two main concrete and one smaller concrete tower within the existing steel towers to preserve the historically significant of the bridge structure. Constructibility challenges and structural load requirements make spread footing foundation systems the most likely foundation to be implemented for pier 1 and 2 which is adjacent to stream. The proposed concrete towers would be constructed outside of the normal stream flow. The bridge drain outlets will also be replaced with deck drains placed at certain locations to prevent stormwater from falling directly into the stream. The storm water would be filtered through natural vegetation on the stream bank before entering into the stream.

The type and extent of depend on the footing selected by the structural geotechnical engineer. Earth work information will be included in Draft Environmental Assessment (DEA). Other than earthwork from footing, there would be minor earthwork for drainage at the roadway approaches to the bridge. In addition the project includes implementation of rock fall mitigation measures. The area of potential rockfall and prevention measures will be describes in detail in the DEA. The construction staging is propsed to be located on the Hilo side of the bridge, mauka of the roadway. Construction equipment would also be staged adjacent to the bridge footings.

Although the project site is not technically located in EFH, the Umauma Stream connects to the Pacific Ocean within considerable proximity to the bridge. The HCD assumes that coral reef may be present (from surveys that documented coral reef habitat exist near the project site) near the mouth of the stream. When conducting field studies for the Draft EA, the DOT should consider surveying the area to confirm the presence of coral reef habitat. Our main concern with the temporary project construction and permanent structural changes is the potential of erosion smothering coral reef. We encourage that the designs proposed in the DEA include minimizing disturbances to stream banks and placing footing foundations outside of the floodplain. Also, specific erosion control measures in road construction plans should be developed to avoid potential impacts to the environment. Casting of road materials into streams should also be avoided. Roadway and associated stormwater collection systems should be maintained properly. Any earth work should be conducted during the dry season and construction equipment should be staged away from stream banks on high ground when ever possible. In addition, the stormwater drain outlets should be designed to avoid scouring and erosion of vegetated areas. Thank you for the opportunity to comment. Please do not hesitate to contact HCD should you have further questions.

Mahalo,

Aydee Zielke
Natural Resource Specialist
NOAA-Fisheries
Pacific Islands Regional Office
Habitat Conservation Division
808-944-2146
aydee.camunas-zielke@noaa.gov
http://www.fpir.noaa.gov/HCD/hcd_efh.html

NEIL ABERCROMBIE
GOVERNOR
RICHARD C. LIM
DIRECTOR
MARY ALICE EVANS
DEPUTY DIRECTOR
JESSE K. SOUKI
DIRECTOR
OFFICE OF PLANNING

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-13383

August 26, 2011

To: Glenn M. Okimoto, Ph.D., Director
Department of Transportation

From: Jesse K. Souki, Director

Subject: Hawaii Coastal Zone Management (CZM) Program Federal Consistency Review for Umauma Stream Bridge Rehabilitation, North Hilo, Hawaii;
Federal Aid Project No. BR-019-2(61)

The proposed use of funds from the Federal Highway Administration to rehabilitate the Umauma Stream Bridge, North Hilo, Hawaii, has been reviewed for consistency with the Hawaii CZM Program. We concur with your certification that the activity is consistent with the enforceable policies of the Hawaii CZM Program. In a separate review, CZM consistency verification was provided to the U.S. Army Corps of Engineers on July 22, 2011, for authorization under Nationwide Permit No. 14 - Linear Transportation Projects, for which general consistency concurrence was issued on May 11, 2007.

CZM consistency concurrence is not an endorsement of the project nor does it convey approval with any other regulations administered by any State or County agency. Thank you for your cooperation in complying with the Hawaii CZM Program. If you have any questions, please call John Nakagawa of our CZM Program at 587-2878.

c: ✓Mr. Eugene Dashiell, Environmental Planning Services
Planning Department, County of Hawaii

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
EMD/CWB

09010CEC.11

September 12, 2011

The Honorable Glenn M. Okimoto
Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Okimoto:

Subject: Section 401 Water Quality Certification (WQC) Requirement for Department of the Army (DA), Nationwide Permit (NWP) No. 14 Rehabilitate Structural and Foundation Repairs to the Existing Bridge over Umauma Stream, Island of Hawaii, Hawaii
DA File No. POH-2011-00098
TMK: (3) 3-1-001:999

Reference is made to a "**Provisional Nationwide Permit Verification**" dated September 7, 2011, from Mr. George Young, Chief of the Regulatory Branch, Honolulu Engineer District (HED) of the U.S. Army Corps of Engineers (COE) to you for the subject proposed project. Mr. Young stated in his September 7, 2011 letter that:

> "Reference our Nationwide Permit (NWP) verification letter dated August 17, 2011 issued from this office for proposed bridge repairs over Umauma Stream at TMK 331001999 near Hilo, Island of Hawaii. The letter should have stated that it was a "Provisional" verification based on the fact that Section 401 Water Quality Certification (WQC) has not yet been issued by the State of Hawaii Department of Health Clean Water Branch (CWB). Federal regulations require issuance of the Section 401 WQC prior to issuance of a Department of the Army permit under Section 404 of the Clean Water Act.
>
> You are advised, therefore, that you **are** not authorized to commence the work at this time. Before you may proceed with the work authorized by this NWP, you must receive Section 401 WQC from the CWB and submit a copy to the U.S. Army Corps of Engineers, Honolulu District. You must implement and abide by the terms and conditions of the WQC…"

Based on Mr. Young's September 7, 2011 clarification regarding the August 17, 2011 DA Provisional NWP #14 (Linear Transportation Projects) work authorization verification, a Section 401 WQC is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters …"

The Section 401 WQC Application Form and guidelines may be downloaded from our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/forms/forms/wqc-index.html.

Data Quality Objectives (DQO) planning process is recommended for preparing the "Applicable Monitoring and Assessment Plan (AMAP)" as required in Item No. 11 of the Application. "*Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)*," (EPA/240/B-06/001) is available at EPA's Quality System support Web site (http://www.epa.gov/quality).

Please make sure that the person to be duly authorized by you under Item No. 16 of the Application meets 40 CFR §122.22 (b) requirements.

Please complete and submit the Section 401 WQC Application, a CD or DVD that contains the Application and all attachments in pdf format (minimum 300 dpi), and the required filing fee to the Clean Water Branch (CWB) for processing.

Please be informed that Hawaii Revised Statutes, Section 342D-50, requires that:

> **[§342D-50] Prohibition**. (a) No person, including any public body, shall discharge any water pollutant into state waters, or cause or allow any water pollutant to enter state waters except in compliance with this chapter, rules adopted pursuant to this chapter, or a permit or variance issued by the director.

Please include the following certification statement in all future correspondence with the Department of Health for the subject project:

> "**I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations**."

Should you have any questions, please have your staff contact Mr. Edward Chen of the Engineering Section, CWB, at 586-4309.

Sincerely,

LORETTA J. FUDDY, A.C.S.W., M.P.H.
Director of Health

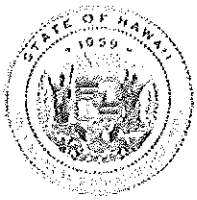
EC:np

c: Dr. Wendy Wiltse, PICO, EPA, Region 9 [via fax 541-2712 only]
Regulatory Branch, HED, COE [via fax 438-4060 only]
CZM Program, Office of Planning, DBEDT [via fax 587-2899 only]
CWRM, DLNR [via fax 587-0219 only]

NEIL ABERCROMBIE
GOVERNOR

MAJOR GENERAL DARRYLL D. M. WONG
DIRECTOR OF CIVIL DEFENSE

VICTOR G. GUSTAFSON
INTERIM VICE DIRECTOR OF CIVIL DEFENSE



PHONE (808) 733-4300
FAX (808) 733-4287

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

November 17, 2011

Mr. Brian Campbell
Bow Engineering & Development, Inc.
1953 South Beretania Street, PH-A
Honolulu, Hawaii 96826

Dear Mr. Campbell:

Hawaii Belt Road Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61), Draft Environmental Assessment

Thank you for this opportunity to comment on the Draft Environmental Assessment for the proposed project to widen and structurally rehabilitate the existing and historic Umauma Bridge.

We recommend that the retrofit design for bridge rehabilitation include measures as appropriate to mitigate flooding risks to the structure as well as upstream and downstream areas. Although proposed construction work is planned to occur outside normal stream flow of Umauma Stream, we strongly recommend that the rehabilitation design and construction activities account for risk of a 100-year flood event.

Rockfall risk is identified within the scope of the Draft Environmental Assessment, and we recommend ongoing assessment of rockfall risks in order to reduce future risk. Further, the project area is located in the high-risk designation of Seismic Zone 4. It remains our recommendation that enhanced design standards be utilized to ensure structural integrity sufficient to withstand a significant seismic event.

Lastly, the Umauma Bridge is located in a designated conservation area and is listed on the National Historic Register. The proposed work will include upgrades to deck drains and earthwork for the bridge footings, and we defer to the Department of Health, Department of Land and Natural Resources, and the US Army Corps of Engineers in regard to permit requirements and notification(s) of work to be performed and completed.

We look forward to a copy of the Environmental Assessment once it is completed. If you have any questions, please have your staff contact Ms. Dawn Johnson at (808) 733-4300.

Sincerely,

VICTOR G. GUSTAFSON
Interim Vice Director of Civil Defense

c: Eddie Chiu, Department of Transportation, Highways Division

NEIL ABERCROMBIE
GOVERNOR

KATHRYN S. MATAYOSHI
SUPERINTENDENT

STATE OF HAWAI`I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI`I 96804

OFFICE OF THE SUPERINTENDENT

October 27, 2011

TO: Mr. Eddie Chiu
Highways Division
Department of Transportation

FROM: Kathryn S. Matayoshi, Superintendent
Department of Education

SUBJECT: Draft Environmental Assessment for the Rehabilitation of Umauma Stream Bridge
District of North Hilo, Island of Hawaii, Federal Project No. BR-019-2(61)

The Department of Education (DOE) has reviewed the Draft Environmental Assessment for the rehabilitation of Umauma Stream Bridge.

The DOE has no comment regarding this project.

Thank you for the opportunity to provide comments. If you have any questions, please call Roy Ikeda of the Facilities Development Branch at 377-8301.

KSM:jmb

c: √Brian Campbell, Bow Engineering & Development, Inc.
Randolph G. Moore, Assistant Superintendent, OSFSS
Valerie Takata, CAS, Hilo/Laupahoehoe/Waiakea Complex Areas

NOV 17 2011

NEIL ABERCROMBIE
GOVERNOR

JAN S. GOUVEIA
ACTING COMPTROLLER (P)1317.1

KERRY K. YONESHIGE
ACTING DEPUTY COMPTROLLER

STATE OF HAWAI'I
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAI'I 96810-0119

NOV 16 2011

MEMORANDUM

TO: Mr. Eddie Chiu
Highways Division
Department of Transportation

FROM: Jan S. Gouveia
Acting State Comptroller

SUBJECT: Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)
Hawai'i, North Hilo
State Right-of-Way; Construction Staging on
TMK: (3) 3-1-01:15

This is in response to your letter, dated October 17, 2011 regarding the subject project. This project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions please call me at 586-0400, or have your staff call Mr. David DePonte of the Public Works Division at 586-0492.

c: Mr. Brian Campbell, Bow Engineering and Development
Mr. Jerry Watanabe, DAGS Hawaii

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD11/5725

May 24, 2011

Brian Campbell
Bow Engineering & Development, Inc.
1953 South Beretania Street, PH-A
Honolulu, Hawai'i 96826

Re: Umauma Steam Bridge Rehabilitation Project
Island of Hawai'i

Aloha e Brian Campbell,

The Office of Hawaiian Affairs (OHA) is in receipt of a May 5, 2011 letter from the State of Hawai'i-Department of Transportation (HDOT) seeking comments ahead of the proposed Umauma Stream Bridge Rehabilitation Project (project) on the Island of Hawai'i. Project activities include the widening and structural rehabilitation of the existing Umauma Steam Bridge (bridge) and possibly rock fall mitigation. A variety of State and County of Hawai'i permits and approvals will be required to facilitate this project. Because funding from the Federal Highways Administration will be utilized, provisions of the National Historic Preservation Act (NHPA) and National Environmental Policy Act (NEPA) are applicable.

This bridge is eligible for listing on the National Register of Historic Places under multiple criteria. OHA advocates that NHPA consultation be initiated with interested parties to develop appropriate mitigation for any adverse effects this project will have on the bridge. OHA does not assign religious or cultural significance to this bridge and thus, will defer NHPA consultation to other consulting parties with expertise and interest in this matter. We do seek assurances that an appropriate level effort to identify historic properties within the area of potential effect (APE) for this project be conducted pursuant to the requirements of the NHPA. After a review of our records, we are unaware of any historic properties of religious or cultural significance to the Native Hawaiian people which may be impacted by this project at this time.

OHA advocates that best management practices be implemented and employed for the duration or project activities to protect stream and near-shore water quality and species. If re-vegetation efforts are a component of this project, we respectfully suggest you consider using native plant species which are common and adapted to the project area.

Thank you for the opportunity to provide comments at this early stage of the project. We look forward to seeing this project completed as it will contribute to the safety of the Hawai'i Island community traveling along the Hāmākua and Hilo coastline. We appreciate the detailed

information which is included in the HDOT letter regarding the permits and approvals which will be required for the project and the scope of work which is proposed. OHA acknowledges that a NEPA Categorical Exclusion is anticipated for this project. Should you have any questions or concerns, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Chief Executive Officer

C: OHA- East Hawai'i COC
Pat Phung, FHWA
Eddie Chiu, HDOT-Technical Design Services Office

NOV 4 - 2011

NEIL ABERCROMBIE
GOVERNOR
STATE OF HAWAI'I

ALBERT "ALAPAKI" NAHALE-A
CHAIRMAN
HAWAIIAN HOMES COMMISSION

MICHELLE K. KAUHANE
DEPUTY TO THE CHAIRMAN

M. WAIALEALE SARSONA
EXECUTIVE ASSISTANT

STATE OF HAWAI'I
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAI'I 96805

November 3, 2011

Mr. Brian Campbell
Bow Engineering & Development, Inc.
1953 S. retania Street, PH-A
Honolulu, Hawaii 96826

Aloha Mr. Campbell:

Subject: DRAFT ENVIRONMENTAL ASSESSMENT
REHABILITATION OF UMAUMA STREAM BRIDGE PROJECT
FEDERAL AID PROJECT NO. BR-019-2(61)
HAWAII BELT ROAD, NORTH HILO, HAWAII

Mahalo for the opportunity to review the subject document.

The department understands the importance of this rehabilitation project along the Hawaii Belt Road system to support the movement of people and goods, including between our homestead communities, in a safe and efficient manner. The proposed highway bridge improvement will promote this objective.

If you have any questions, please contact our Planning Office at 620-9481.

Me ke aloha,

Albert "Alapaki" Nahale-a
Chairman
Department of Hawaiian Home Lands

cc: Eddie Chin, DOT Highways Division

NEIL ABERCROMBIE
GOVERNOR

DWIGHT TAKAMINE
DIRECTOR

AUDREY HIDANO
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
830 PUNCHBOWL STREET, ROOM 321
HONOLULU, HAWAII 96813
www.hawaii.gov/labor
Phone: (808) 586-8844/Fax: (808) 586-9099

November 8, 2011

Mr. Eddie Chiu
Department of Transportation
Highways Division
601 Kamokila Blvd., Room 688
Kapolei, HI 96707

Mr. Brian Campbell
Bow Engineering & Development, Inc.
1953 S. Beretania Street, PH-A
Honolulu, HI 96826

Dear Mr. Chiu and Mr. Campbell:

This is in response to your request for comments dated October 17, 2011 on the Draft Environmental Assessment for the Rehabilitation of Umauma Stream Bridge Project located in North Hilo, island of Hawaii. The Department of Labor and Industrial Relations has no comments, and we foresee no impact on our existing or proposed programs.

Should you have any questions, please call me at 586-8844.

Sincerely,

DWIGHT TAKAMINE
Director

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

May 17, 2010

Mr. Domingo Galicinao
Federal Highway Administration
Hawaii Division
P.O. Box 50206
Honolulu, Hawaii 96850

LOG NO:2010.1889
DOC NO:1005MA10

Architecture

Dear Mr. Galicinao:

SUBJECT: Section 106 and Section 6E-8, HRS Review
Rehabilitation of Umauma Stream Bridge
State of Hawaii, Department of Transportation
TMK: 3-1-001: no plat number as a bridge

On April 29, 2010, we received the State Department of Transportation's (DOT) memorandum of April 27, 2010, concerning the rehabilitation of Umauma Bridge on the island of Hawaii's Hamakua Coast, and we thank you for the opportunity to comment on this partially federally funded undertaking. The bridge appears to meet the criteria for listing in the Hawaii and National Registers of Historic Places, and has been so identified in a 1987 Hawaii Island bridge inventory undertaken by the DOT in 1987 and in the DOT's more recent draft statewide inventory of historic bridges. The Area of Potential Effect is the bridge structure and the lands upon which the steel trestles sit.

We have reviewed the potential effects, by consulting the attached preliminary drawings, draft multiple property National Register nomination form, and information contained in DOT's cover memorandum. Based on our examination, we concur with FHWA's determination that, Pursuant to 800.5 (b), the project will result in **"no adverse effect" provided the FHWA ensures the following conditions are fulfilled:**

1. The trestles and steel girders are retained.
2. Color the center concrete column a color such that the trestles will be more visually dominant.
3. Paint the trestles with a coating more long term to alleviate the corrosion problems necessitating the rehabilitation project.
4. Additional girders will resemble, but to the trained eye not duplicate, the originals.
5. The look and feel of the bridge is maintained as presented in Option 1.
6. DOT provide the requested additional photographic documentation.
7. Submit the Steel Trestle Bridges of the Hamakua Coast multiple property nomination to the Hawaii Historic Places Review Board for consideration within one year of this letter.
8. Retain the Hamilton & Chalmers plaque that is affixed to the bridge's present superstructure.

9. Continue to consult with the Hawaii SHPO throughout the schematic, design development and final design stages to ensure the work conforms to the Secretary of Interior's Standards for Rehabilitation.

While there is low probability of encountering archaeological sites in this area, in the event that historic resources, including human skeletal remains, are identified during the construction activities, all work needs to cease in the immediate vicinity of the find, the find needs to be protected from additional disturbance, and the State Historic Preservation Division, Oahu Section, needs to be contacted immediately.

With the above conditions in mind, the office concurs with this proposed project in accordance with Section 6E-8, HRS.

Should you have any questions regarding architectural concerns, please contact Nancy A. McMahon at (808) 692-8015.

Aloha,

Nancy A. McMahon

Nancy A. McMahon (Deputy SHPO)
State Historic Preservation Officer

cc. National Park Service
Attention: Mr. Frank Hays
Box 50165
Honolulu, HI 96850

Henry Kennedy
Hawaii Department of Transportation
555 Kamokila Boulevard
Kapolei, Hawaii 96707

Tonia Moy
Fung Associates
1833 Kalakaua Avenue, Suite 1008
Honolulu, Hawaii 96815

George Gutierrez Jr.
Nagamine Okawa Engineers, Inc.
1003 Bishop Street
Pauahi Tower, suite 2025
Honolulu, Hawaii 96813

From: Kimberly.Mills@hawaii.gov
Subject: **Re: Rehabilitation of Umauma Bridge**
Date: July 7, 2011 6:35:22 PM EDT
To: Raadha Jacobstein <raadhabj@gmail.com>
Cc: Sam.J.Lemmo@hawaii.gov
2 Attachments, 5.1 MB

Kimberly.Mills@ha...
Not In Address Book

Hi,

It is unclear if the bridge actually lies in the Conservation District as it appears the roadway is the boundary between CD and another State land use district. The land makai of the bridge appears to lie within the Conservation District, resource subzone.

The bridge appears to be a nonconforming structure, created after 1912 and improved upon in 1955, prior to Conservation District rules (1964). 183C-5, HRS allows for the continued use of nonconforming structures.

As the majority of work shall take place within the Right of Way and the staging area is on the mauka side of the road, both these areas are outside of our jurisdiction, therefore we have no comments.

~Tiger
Kimberly K. Tiger Mills, Staff Planner
State of Hawaii
Department of Land & Natural Resources
Office of Conservation and Coastal Lands
P.O. Box 621
Honolulu, Hawaii 96809
www.hawaii.gov/dlnr/occl

Raadha Jacobstein <raadhabj@gmail.com>

07/07/2011 10:45 AM

To kimberly.mills@hawaii.gov
cc
Subject Rehabilitation of Umauma Bridge

Tiger,
enclosed is a draft of the letter that would have gone to your office, in addition to a project description to assist you in your review. Please let me know if you have any questions.

OCCL copy o...pdf (63.9 KB) PD Umauma ....pdf (5.0 MB)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 30, 2011

Department of Transportation
Highways Division
601 Kamokila Boulevard, Room 688
Kapolei, Hawaii 96707

Bow Engineering & Development, Inc.
Attention: Mr. Brian Campbell
1953 S. Beretania Street, PH-A
Honolulu, Hawaii 96826

via email: bcampbell@bowengineering.com

Gentlemen:

SUBJECT: Draft Environmental Assessment of the Rehabilitation of Umauma Stream Bridge Project located at Hawaii Belt Road, Hamakua Coast, North Hilo, Hawaii - Construction Staging Area on TMK: (3) 3-1-001:015

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from the Engineering Division on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at 587-0417. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 18, 2011

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment of the Rehabilitation of Umauma Stream Bridge Project
LOCATION: Hawaii Belt Road, Hamakua Coast, North Hilo, Hawaii; Construction Staging Area on TMK: (3) 3-1-001:015
APPLICANT: Bow Engineering & Development, Inc.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 25, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed:
Date: 11/22/11

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
REF: DEA for the Rehabilitation of Umauma Stream Bridge Project, Hawaii Belt Rd., Hamakua Coast, N. Hilo Hawaii.008

COMMENTS

(X) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in an area that is not mapped (panel not printed), and identified as an area of minimal tsunami inundation.

( ) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

( ) Please note that the project site must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

( ) Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.

( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.

( ) Ms. Wynne Ushigome at (808) 241-4890 of the County of Kauai, Department of Public Works.

( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

( ) The applicant should provide to the Engineering Division upon its availability the water demands and calculations for the selected site, so it can be included in the State Water Projects Plan Update.

( ) Additional Comments: _____

_____

( ) Other: _____

_____

Should you have any questions, please call Mr. Dennis Imada of the Planning Branch at 587-0257.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 11/22/11

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 14, 2011

Department of Transportation
Highways Division
601 Kamokila Boulevard, Room 688
Kapolei, Hawaii 96707

Bow Engineering & Development, Inc.
Attention: Mr. Brian Campbell
1953 S. Beretania Street, PH-A
Honolulu, Hawaii 96826

via email: bcampbell@bowengineering.com

Gentlemen:

SUBJECT: Draft Environmental Assessment of the Rehabilitation of Umauma Stream Bridge Project located at Hawaii Belt Road, Hamakua Coast, North Hilo, Hawaii - Construction Staging Area on TMK: (3) 3-1-001:015

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments previously sent you on November 30, 2011, enclosed are comments from our Land Division – Hawaii District on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at 587-0417. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 18, 2011

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment of the Rehabilitation of Umauma Stream Bridge Project
LOCATION: Hawaii Belt Road, Hamakua Coast, North Hilo, Hawaii; Construction Staging Area on TMK: (3) 3-1-001:015
APPLICANT: Bow Engineering & Development, Inc.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 25, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed: _____
Date: 12.5.11

cc: Central Files

William P. Kenoi
Mayor

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

November 22, 2011

Mr. Glenn M. Okimoto, Director
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

Dear Mr. Okimoto:

SUBJECT: Review of Draft Environmental Assessment
Project: Rehabilitation of Umauma Stream Bridge
TMK: (3) 3-1-001:015; Kamae'e, North Hilo, Hawai'i

Thank you for your letter received October 19, 2011, requesting comments from this office regarding the Draft Environmental Assessment (DEA) for the rehabilitation of Umauma Stream Bridge project.

The Umauma Bridge carries the Hawai'i Belt Road over Umauma Stream, along the Hāmākua Coast. The proposed project is to construct bridge widening and structural rehabilitation of the existing historic Umauma Bridge. The existing bridge would remain open and in use as the improvements are constructed. The bridge is located entirely within the State right-of-way. The construction staging area is proposed to be located on the subject property. Construction equipment would also be staged adjacent to the bridge footings and would be within State right-of-way.

The subject parcel and surrounding properties are zoned A-20a (Agricultural-20 acre minimum lot size). The properties are situated within the State Land Use Agricultural and Conservation districts. The project area is within the Special Management Area (SMA).

According to Hawaii Revised Statutes (HRS) Chapter 205A-22 and Planning Commission Rule 9-4(e) (2) (B) relating to Special Management Area, "development" does not include "*Repair or maintenance of roads and highways within existing rights-of-way.*" Therefore, we have determined that the proposed bridge rehabilitation is

considered exempt from the definition of "development". Further review of the project against the Special Management Area rules and regulations will not be required.

The project site is located in the Hāmākua Community Development Plan (CDP) planning area. The Hāmākua CDP has not yet been adopted and is currently in the planning process. However, The DEA references the Hāmākua CDP Draft Community Profile (December 2010), which includes the viewpoints of the Umauma Falls as natural beauty site. We concur that the viewpoints will not be negatively affected by the bridge rehabilitation project.

The subject bridge is regularly frequented by pedestrians viewing the waterfalls on Umauma Stream. We understand the project will bring the bridge roadway in compliance with FHWA regulations and current safety standards and improve the safety for high speed vehicular traffic by eliminating the sidewalks that present a possible vaulting hazard. We continue to recommend that you consider the pedestrian safety when finalizing the design.

We have no further comments to offer, at this time. If you have any questions or if you need further assistance, please feel free to contact Bethany Morrison of this office at 961-8138.

Sincerely,

BJ LEITHEAD TODD
Planning Director

BJM:bjm
P:\wpwin60\Bethany\EA-EIS Review\consultdraftea Umauma Bridge Rehabilitation.doc

xc: Bow Engineering & Development, Inc.
1953 S. Beretania Street, PH-A
Honolulu, HI 96826

DIR 0694

William P. Kenoi
Mayor

William T. Takaba
Managing Director

Warren H. W. Lee
Director

Brandon A. K. Gonzalez
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 • Hilo, Hawaii 96720-4224
(808) 961-8321 • Fax (808) 961-8630

June 2, 2011

Glenn M. Okimoto, Ph.D.
Director of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96813-5097

SUBJECT: REHABILITATION OF UMAUMA STREAM BRIDGE
Hawaii Belt Road - Federal Aid Project No. BR-019-2(61)
Scoping and Pre-Assessment Consultation
Construction Staging - Tax Map Key: (3) 3-1-01: 015

We have reviewed the subject project as described in your letter dated May 5, 2011 and offer the following comments for your consideration.

The subject project is in an area that is not mapped by the Federal Emergency Management Agency (FEMA) and is identified as an area of "Minimal Tsunami Inundation." The National Flood Insurance Program does not have any regulations for developments within the Minimal Tsunami Inundation areas and Zone X.

All earthwork activity, including grading and grubbing, shall conform to Chapter 10, Erosion and Sedimentation Control, of the Hawaii County Code.

We note that there are no planned projects by this department within the subject project's vicinity.

Questions may be referred to Mr. Kelly Gomes, P.E. of the Engineering Division at (808) 961-8327.

Kelly Gomes
for BEN E. ISHII, Division Chief
Engineering Division

William P. Kenoi
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Room 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

October 21, 2011

Mr. William Bow
Bow Engineering & Development, Inc.
1953 S. Beretania Street, PH-A
Honolulu, Hawai'i 96826

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
REHABILITATION OF UMAUMA STREAM BRIDGE PROJECT
NO. BR-019-2(61)
TMK: (3) 3-1-01:15, NORTH HILO DISTRICT

We have no comments to offer at this time in reference to the above-mentioned draft Environmental Assessment.

DARREN J. ROSARIO
Fire Chief

KT:lpc

CC: Eddie Chiu - State of Hawai'i, Department of Transportation Highways Division

William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai'i
POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-8865

October 27, 2011

Mr. Eddie Chiu
State of Hawaii
Department of Transportation
Highways Division
601 Kamokila Boulevard, Room 688
Kapolei, HI 96707

Dear Mr. Chiu:

SUBJECT: REHABILITATION OF UMAUMA STREAM BRIDGE; NO. BR-019-2(61)
STATE RIGHT-OF-WAY; CONSTRUCTION STAGING ON TMK (3) 3-1-01:15, N. HILO, HAWAII

Staff has reviewed the above- referenced document, in particular Chapters 3.10 and 3.11, which pertains to public services and traffic, and does not anticipate any significant public safety concerns.

If you have any questions, please contact Captain Mitchell Kanehailua of the North Hilo and Hamakua Districts at (808) 775-7533.

Sincerely,

HENRY J. TAVARES, JR.
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

MK:lli
110322

William P. Kenoi
Mayor

William T. Takaba
Managing Director

Dora Beck, P.E.
Acting Director

Hunter Bishop
Deputy Director

County of Hawai'i
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
25 Aupuni Street • Hilo, Hawai`i 96720
(808) 961-8083 · Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

October 25, 2011

Mr. Eddie Chiu
State of Hawai`i Department of Transportation
Highways Division
610 Kamokila Blvd., Room 688
Kapolei, HI 96707

Mr. Brian Campbell
Bow Engineering & Development, Inc.
1953 S. Beretania Street, PH-A
Honolulu, HI 96707

RE: DEA
Rehabilitation of Umauma Stream Bridge Project
No. BR-019-2(61)
Hawai`i, North Hilo
State Right-of-Way; Construction Staging on TMK (3) 3-1-01:15

We have no comments to offer on the subject project.

Thank you for allowing us to review and comment on this project.

Sincerely,

Dora Beck

Dora Beck, P.E.
ACTING DIRECTOR

APPENDIX I

CONSTRUCTION DRAWINGS

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
35-135	STRUCTURAL DRAWINGS

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION
HONOLULU, HAWAII

PLANS FOR

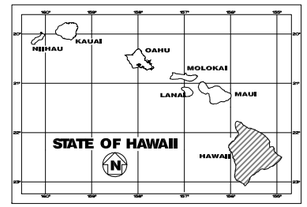
HAWAII BELT ROAD

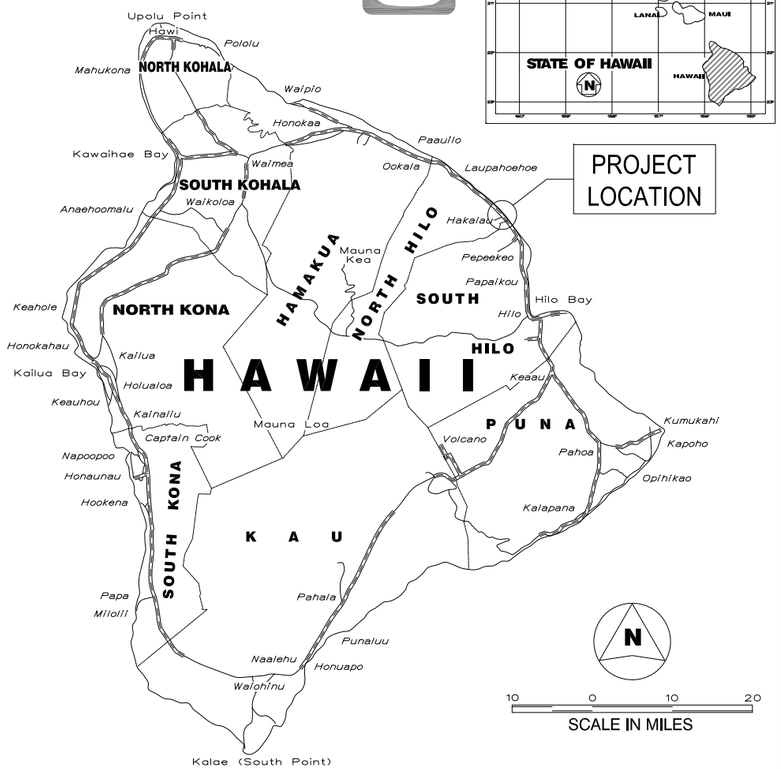
REHABILITATION OF UMAUMA STREAM BRIDGE
FEDERAL AID PROJECT NO. BR-019-2(61)

DISTRICT OF NORTH HILO
ISLAND OF HAWAII

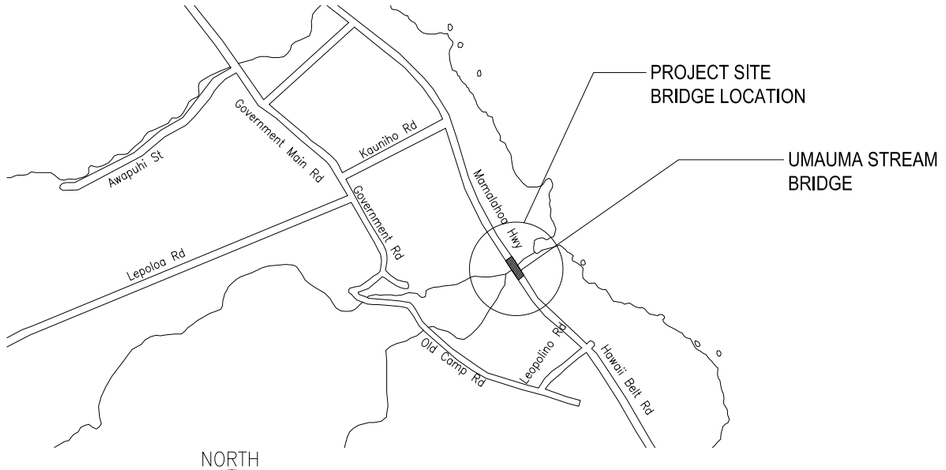
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	1	135

19





PROJECT LOCATION



VICINITY MAP
NOT TO SCALE

FEDERAL AID PROJECTS PREVIOUSLY CONSTRUCTED OR UNDER CONSTRUCTION

UMAUMA STREAM BRIDGE MILE POST 15.80 TO MILE POST 16.30

DESIGN DESIGNATION

ADT (2011)	8,100
ADT (2031)	11,300
DHV	960
D	55/45
T	6.5%
V	55 mph

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

NAGAMINE OKAWA ENGINEERS INC.
DESIGNED BY

HWY-DS
P. S. & E. BY

692-7547
PHONE

Oct. 2011
DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	2	135

DETAILED INDEX TO DRAWINGS

Sheet No.	Sheet	Title
1	T1	Title Sheet
2	T2	Detailed Index to Drawings
3	T3	Detailed Index to Drawings
4	T4	Standard Plan Summary
5	T5	Location Plan
6	T6	Topographic Map of Area on Bridge
7	T7	Topographic Map of Area Below Bridge
8	T8	Boring Location Plan
9	T9	Boring Location Plan
10	T10	Boring Log #1
11	T11	Boring Log #2
12	T12	Boring Log #3
13	T13	Boring Log #4
14	T14	Boring Log #5
15	T15	Soil Classifications
16	C-1	General Notes
17	C-2	General Notes
18	C-3	General Notes
19	C-4	Typical Road Section
20	C-5	Guardrail Details
21	C-6	Strong Post W-Beam Guardrail Details
22	C-7	Typical Type 3 Thrie Beam Metal Guardrail
23	C-8	Guardrail Terminal Connector and End Section Details
24	C-9	Guardrail Type 3 Thrie Beam and Appurtenance Details
25	C-10	Miscellaneous Details
26	C-11	Demolition Plan
27	C-12	Site Plan
28	C-13	Grading and Erosion Control Plan
29	C-14	Section
30	C-15	Erosion Control Details
31	C-16	Striping and Signage Plan
32	C-17	Traffic Control Plan
33	C-18	Traffic Control Plan
34	C-19	Traffic Control Plan
35	S0.1	General Structural Notes
36	S0.2	General Structural Notes (Continuation)
37	S0.3	General Structural Notes (Cont.) Legend & Abbreviations
38	S0.4	Estimated Quantities (Structural)
39	S1.1	Existing & Demolition General Notes
40	S1.2	Existing & Demolition Plan - Foundation Level
41	S1.3	Existing & Demolition Plan - Bridge Deck Level
42	S1.4	Existing & Demolition - East (or Downstream) Elevation
43	S1.5	Existing & Demolition - Bridge Transverse Section
44	S1.6	Existing & Demolition Abutment #1 - Plan & Elevation
45	S1.7	Existing & Demolition Abutment #1 Details
46	S1.8	Existing & Demolition Abutment #2 - Plan & Elevation
47	S1.9	Existing & Demolition Abutment #2 Details
48	S1.10	Existing Elevtion At Hilo Tower - Bent #1 & Bent #2
49	S1.11	Existing Elevation At Hilo Tower - Trusses Between Bents
50	S1.12	Existing Elevation At Honoka'a Tower - Bent #3 & Bent #4
51	S1.13	Existing Elevation At Honoka'a Tower - Trusses Between Bents
52	S1.14	Existing Elevations - Bent #5
53	S2.1	New Widened Bridge Foundation Level
54	S2.2	New Widened Bridge - Bridge Deck Plan (Overall)
55	S2.3	New Widened Bridge - Girder Framing Plan (Overall)
56	S2.4	New Widened Bridge Elevation - East/Downstream
57	S2.5	New Widened Bridge Elevation - West/Upstream
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59	S2.7	New Widened Bridge - Transverse Section
60	S3.1	Micropiles - General Notes & Typical Details
61	S3.2	Micropiles - Typical Details
62	S3.3	Drilled Shafts - General Notes & Typical Details
63	S3.4	Drilled Shafts - Typical Details
64	S4.1	Abutment - Typical Pay Limits For Excavation
65	S4.2	New Widened Bridge, Abutment #1 - Plans
66	S4.3	New Widened Bridge, Abutment #1 - Elevations
67	S4.4	New Widened Bridge, Abutment #1 - Sections & Details
68	S4.5	New Widened Bridge, Abutment #1 - Sections & Details
69	S4.6	New Widened Bridge, Abutment #2 - Plans
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71	S4.8	New Widened Bridge, Abutment #2 - Sections & Details
72	S4.9	New Widened Bridge, Abutment #2 - Sections & Details
73	S5.1	New Pier Foundation - Special Notes & Typical Pay Limits
74	S5.2	New Pier #1 - Foundation Plan
75	S5.3	New Pier #1 - Foundation Sections
76	S5.4	New Pier #1 - Foundation Sections
77	S5.5	New Pier #2 - Foundation Plan
78	S5.6	New Pier #2 - Foundation Sections
79	S5.7	New Pier #2 - Foundation Sections
80	S5.8	New Pier #3 Foundation - Key Plan and Elevations
81	S5.9	New Pier #3 Foundation - Enlarged Plan and Notes
82	S5.10	New Pier #3 Foundation - Grade Beam Reinforcing
83	S5.11	New Pier #3 Foundation - Grade Beam Reinforcing
84	S5.12	New Pier #3 Foundation - Ground Anchor Details

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

LICENSE EXPIRES: 4/30/12
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: Oct. 20, 2011

SHEET No. T2 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	3	135

DETAILED INDEX TO DRAWINGS

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

LICENSE EXPIRES: 4/30/12
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: Oct. 20, 2011

SHEET No. T3 OF 15 SHEETS

STANDARD PLANS SUMMARY

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	4	135

STANDARD PLAN NO.	TITLE	DATE
B-01	NOTES & MISCELLANEOUS DETAILS	05/31/07
B-03	BACKFILL DETAILS AT EARTH RETAINING STRUCTURES	05/31/07
B-12	PRESTRESSED CONCRETE PILES & COMPRESSION SPLICE	05/31/07
	CAN DETAILS	
B-12A	PRESTRESSED CONCRETE PILES, PILE & COMPRESSION	05/31/07
	SPLICE CAN DETAILS & NOTES	
B-12B	PILE INTERACTION DIAGRAM	05/31/07
B-13	PRESTRESSED CONCRETE PILE BUILD-UP DETAILS	05/31/07

D-01	CATTLE GATE	05/31/07
D-02 ●	CHAIN LINK FENCE WITH TOPRAIL	05/31/07
D-03	CHAIN LINK FENCE WITHOUT TOPRAIL	05/31/07
D-04	WIRE FENCE WITH METAL POSTS	05/31/07
D-05	TYPICAL DETAILS OF CURBS AND/OR GUTTERS	05/31/07
D-06	TYPICAL DETAIL OF REINFORCED CONCRETE DROP DRIVEWAY	05/31/07
D-07	CENTERLINE AND REFERENCE SURVEY MONUMENTS	05/31/07
D-08	STREET SURVEY MONUMENT	05/31/07
D-15	CONCRETE SIDEWALK	05/31/07
D-16	P.C.C. BUS PAD	05/31/07
D-17	P.C.C. BUS PAD	05/31/07
D-18	P.C.C. PAVEMENT LAYOUT	05/31/07
D-19	P.C.C. PAVEMENT W/ PERMEABLE BASE JOINT DETAILS	05/31/07
D-20	P.C.C. PAVEMENT W/ PERMEABLE BASE JOINT DETAILS	05/31/07
D-21	P.C.C. LONGITUDINAL JOINT DETAILS	05/31/07
D-22	P.C.C. CONNECTION TO CURBS AND GUTTERS	05/31/07
D-23	JOINTS	05/31/07

L-01	TREE PLANTING	08/16/06
L-02	TREE PLANTING	08/16/06
L-03	TREE TRANSPLANTING	08/16/06
L-04	PALM PLANTING	08/16/06
L-05	SHRUB PLANTING	08/16/06
L-06	LANDSCAPE DETAILS	08/16/06
L-07	LANDSCAPE DETAILS	08/16/06
L-08	LANDSCAPE DETAILS	08/16/06
L-09	LANDSCAPE DETAILS	08/16/06
L-10	LANDSCAPE DETAILS	08/16/06
L-11	PLANTING NOTES	08/16/06
L-12	IRRIGATION DETAILS	08/16/06
L-13	IRRIGATION DETAILS	08/16/06
L-14	IRRIGATION DETAILS	08/16/06
L-15	IRRIGATION DETAILS	08/16/06
L-16	IRRIGATION DETAILS	08/16/06
L-17	IRRIGATION DETAILS	08/16/06
L-18	IRRIGATION DETAILS	08/16/06
L-19	IRRIGATION DETAILS	08/16/06
L-20	IRRIGATION DETAILS	08/16/06
L-21	IRRIGATION DETAILS	08/16/06
L-22	IRRIGATION DETAILS	08/16/06
L-23	IRRIGATION DETAILS	08/16/06
L-24	IRRIGATION NOTES	08/16/06

STANDARD PLAN NO.	TITLE	DATE
H-01A	TYPE A CATCH BASIN	05/31/07
H-01B	TYPE B CATCH BASIN	05/31/07
H-01C	TYPE C CATCH BASIN	05/31/07
H-01D	TYPE D CATCH BASIN	05/31/07
H-01E	CATCH BASIN SECTIONS	05/31/07
H-02A	TYPE A1 CATCH BASIN	05/31/07
H-02B	TYPE B2 CATCH BASIN	05/31/07
H-02C	TYPE C1 CATCH BASIN	05/31/07
H-02D	TYPE D1 CATCH BASIN	05/31/07
H-02E	CATCH BASIN SECTION	05/31/07
H-03	TYPE A,B, AND C STORM DRAIN MANHOLE	05/31/07
H-04	TYPE D STORM DRAIN MANHOLE	05/31/07
H-05	TYPICAL REINFORCING DETAILS FOR DRAINAGE STRUCTURES	05/31/07
H-06	TYPICAL REINFORCING DETAILS FOR DRAINAGE STRUCTURES	05/31/07
H-07 ●	CATCH BASIN AND MANHOLE CASTINGS	05/31/07
H-08	TYPE 1A-9 AND 1A-9P GRATED DROP INLET	05/31/07
H-09	TYPE 2A-9 AND 2A-9P GRATED DROP INLET	05/31/07
H-10	TYPE A-9 OR A-9P STEEL FRAMES	05/31/07
H-11	TYPE A-9 AND A-9P STEEL GRATES	05/31/07
H-12	TYPE 61614P AND 1211214P GRATED DROP INLET	05/31/07
H-13	TYPE 61616P AND 1211216P GRATED DROP INLET	05/31/07
H-14	TYPE 61214P GRATED DROP INLET	05/31/07
H-15	TYPE 1211214, 1211214P, 1211216, 1211216P STEEL	05/31/07
	FRAME AND GRATES	
H-16	TYPE 61614, 61614P, 61616, 61616P STEEL FRAME	05/31/07
	AND GRATES	
H-17	TYPE 61214 STEEL FRAMES AND GRATES	05/31/07
H-18	TYPE 61214P STEEL GRATES	05/31/07
H-19	TYPE 61614B STEEL FRAME AND GRATES	05/31/07
H-20	CEMENT RUBBLE MASONRY STRUCTURES	05/31/07
H-21	CONCRETE AND CEMENT RUBBLE MASONRY STRUCTURES	05/31/07
H-22	INLET/OUTLET STRUCTURE	05/31/07
H-23	INLET/OUTLET STRUCTURE	05/31/07
H-24	FLARED END SECTION FOR CULVERTS	05/31/07
H-25	FLARED END SECTION FOR CULVERTS	05/31/07
H-26	CONCRETE SPILLWAY INLET	05/31/07
H-27	CAP COUPLING DETAILS STANDARD JOINT	05/31/07
H-28	REINFORCED CONCRETE COLLAR & JACKET	05/31/07
H-29	UNDERDRAIN CLEANOUT STEEL FRAME AND COVER	05/31/07
H-30	UNDERDRAIN CONNECTION TO DRAINAGE STRUCTURE	05/31/07

TE-01	SIGN HEIGHT AND LOCATION	07/11/08
TE-1A	SIGN INSTALLATION	07/11/08
TE-02A	GALVANIZED FLANGED CHANNEL SIGN POST MOUNTING	05/31/07
TE-02B	GALVANIZED FLANGED CHANNEL SIGN POST MOUNTING	05/31/07
TE-02C	GALVANIZED FLANGED CHANNEL SIGN POST MOUNTING	05/31/07
TE-03A	GALVANIZED SQUARE TUBE SIGN POST MOUNTING	05/31/07
TE-03B	GALVANIZED SQUARE TUBE SIGN POST MOUNTING	05/31/07
TE-04 ●	REGULATORY SIGNS	07/11/08
TE-05 ●	WARNING SIGNS	07/11/08
TE-06	MISCELLANEOUS SIGNS	07/11/08
TE-07 ●	CONSTRUCTION SIGNS	07/11/08
TE-08	MISCELLANEOUS INTERSECTION SIGNS	07/11/08

STANDARD PLAN NO.	TITLE	DATE
TE-09	BIKE ROUTE SIGN & SUPPLEMENTARY PLATES	07/11/08
TE-10	INTERSTATE ROUTE MARKER	07/11/08
TE-11	STATE ROUTE MARKER AND AUXILIARY MARKERS	07/11/08
TE-12	STATE ROUTE MARKER AND BORDER DETAIL FOR	07/11/08
	GUIDE SIGNS	
TE-12A	ROUTE SIGN ASSEMBLIES	07/11/08
TE-13	STREET NAME SIGN ON MAST ARM	07/11/08
TE-14 ●	MISCELLANEOUS REFLECTOR MARKERS	07/11/08
TE-15 ●	OBJECT MARKERS	07/11/08
TE-16	MILE POSTS	07/11/08
TE-17A	CANTILEVER OVERHEAD SIGN ELEVATION & DETAILS	05/31/07
TE-17B	CANTILEVER SIGN FRAME DETAIL AND SECTION	05/31/07
TE-17C	CANTILEVER SIGN FRAME DETAIL	05/31/07
TE-17D	CANTILEVER SIGN FRAME SECTION	05/31/07
TE-17E	CANTILEVER SIGN FRAME DETAILS	05/31/07
TE-18A	TWO POST OVERHEAD SIGN FRAME ELEVATIONS	05/31/07
TE-18B	TWO POST SIGN FRAMING PLAN SECTION	05/31/07
TE-18C	TWO POST SIGN FRAMING SECTIONS AND DETAILS	05/31/07
TE-18D	TWO POST SIGN FRAME DETAILS	05/31/07
TE-18E	TWO POST SIGN FRAME DETAILS	05/31/07
TE-19A	OVERHEAD SIGN FRAMING SCHEDULE	05/31/07
TE-19B	SIGN POST DRILLED SHAFT FOUNDATION	05/31/07
TE-19C	SPREAD FOOTING	05/31/07
TE-19D	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.1	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.2	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.3	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.4	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.5	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19E	ANCHORAGE DETAILS	05/31/07
TE-19F	ANCHORAGE DETAILS	05/31/07
TE-19G	MISCELLANEOUS SIGN FRAME DETAILS	05/31/07
TE-19H	LUMINAIRE WALKWAY SUPPORT	05/31/07
TE-19J	FIXED MESSAGE LUMINAIRE SUPPORT	05/31/07
TE-19K	MISCELLANEOUS SIGN DETAILS	05/31/07
TE-19L	MISCELLANEOUS SIGN DETAILS	05/31/07
TE-19M	MISCELLANEOUS SIGN FRAME DETAILS	05/31/07
TE-20	SUPPORTS FOR GROUND MOUNTED GUIDE SIGN	05/31/07
TE-20A	SUPPORTS FOR GROUND MOUNTED GUIDE SIGN	05/31/07
TE-20B	SUPPORTS FOR GROUND MOUNTED GUIDE SIGN	05/31/07
TE-20C	SUPPORTS FOR GROUND MOUNTED GUIDE SIGN	05/31/07
TE-21A	SIGN BREAKAWAY MOUNTS	05/31/07
TE-21B	SIGN BREAKAWAY MOUNTS	05/31/07
TE-22	LAMINATED ALUMINUM SIGN PANELS (OVERHEAD)	05/31/07
TE-23	LAMINATED ALUMINUM SIGN PANELS (GROUND MOUNTED)	07/11/08
TE-24	SOLID ALUMINUM EXTRUDED SIGN PANEL AND	05/31/07
	ACCESSORY DETAILS	
TE-25	GUIDE SIGNS LUMINAIRE MOUNTINGS	05/31/07
TE-26 ●	RAISED PAVEMENT MARKERS AND STRIPING	07/11/08
TE-27	RAISED PAVEMENT MARKERS AND STRIPING	07/11/08
TE-28	ENTRANCE AND EXIT PAVEMENT MARKINGS	07/11/08
TE-28A	MISCELLANEOUS PAVEMENT MARKINGS	07/11/08
TE-29	PAVEMENT ARROWS AND SYMBOLS	07/11/08
TE-30	PAVEMENT ALPHABETS, NUMBERS & SYMBOLS	07/11/08
TE-31	PAVEMENT ALPHABETS, NUMBERS & SYMBOLS	07/11/08

STANDARD PLAN NO.	TITLE	DATE
TE-32	TYPE I & II TRAFFIC SIGNAL SYSTEM MISC. DETAILS	05/31/07
TE-33	TYPE II TRAFFIC SIGNAL SYSTEM	08/16/06
TE-33A.1	TYPE II TRAFFIC SIGNAL STANDARD	05/31/07
TE-33A.2	TYPE II TRAFFIC SIGNAL STANDARD	05/31/07
TE-34	LOOP DETECTOR DETAILS	07/11/08
TE-35	LOOP DETECTORS & DUCT DETAILS	07/11/08
TE-36	TRAFFIC SIGNAL DETAILS	07/11/08
TE-37	PULLBOX & COVER DETAILS	07/11/08
TE-37A	TYPE "A" TRAFFIC PULLBOX	05/31/07
TE-37B	TYPE "A" TRAFFIC PULLBOX REINFORCING	05/31/07
TE-37C	TYPE "B" TRAFFIC PULLBOX	05/31/07
TE-37D	TYPE "B" TRAFFIC PULLBOX REINFORCING	05/31/07
TE-37E	TYPE "B" TRAFFIC PULLBOX FOUNDATION	05/31/07
TE-37F	TYPE "C" TRAFFIC PULLBOX	05/31/07
TE-37G	TYPE "C" TRAFFIC PULLBOX REINFORCING	05/31/07
TE-37H	TYPE "C" TRAFFIC PULLBOX FOUNDATION	05/31/07
TE-37J	TRAFFIC PULLBOX COVER AND DETAILS	05/31/07
TE-38	TYPE III TRAFFIC SIGNAL STANDARD	05/31/07
TE-38A.1	TYPE III TRAFFIC SIGNAL STANDARD	05/31/07
TE-38A.2	TYPE III TRAFFIC SIGNAL STANDARD	05/31/07
TE-39	METAL GUARDRAIL CONNECTION TO CONCRETE BARRIER	07/11/08
TE-40	CONCRETE BARRIER TRANSITION	05/31/07
TE-40A	CONCRETE BARRIER TRANSITION SECTIONS	05/31/07
TE-41	GUARDRAIL TYPE 4 (RIGID BARRIER)	05/31/07
TE-42 ●	PORTABLE CONCRETE BARRIER	05/31/07
TE-43 ●	PORTABLE CONCRETE BARRIER	05/31/07
TE-44	GUARDRAIL TYPE 4 MISCELLANEOUS DETAILS	07/11/08
TE-45 ●	BARRICADES	07/11/08
TE-46	DELINEATION & PAVEMENT MARKINGS AT NARROW BRIDGES	07/11/08
TE-47	HIGHWAY LIGHT STANDARD	05/31/07

NOTE:

STANDARD PLANS APPLICABLE TO THIS PROJECT ARE INDICATED BY A " ● " NEXT TO THE STANDARD PLAN NO.
(FOR EXAMPLE: D-07 ●)

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.

LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

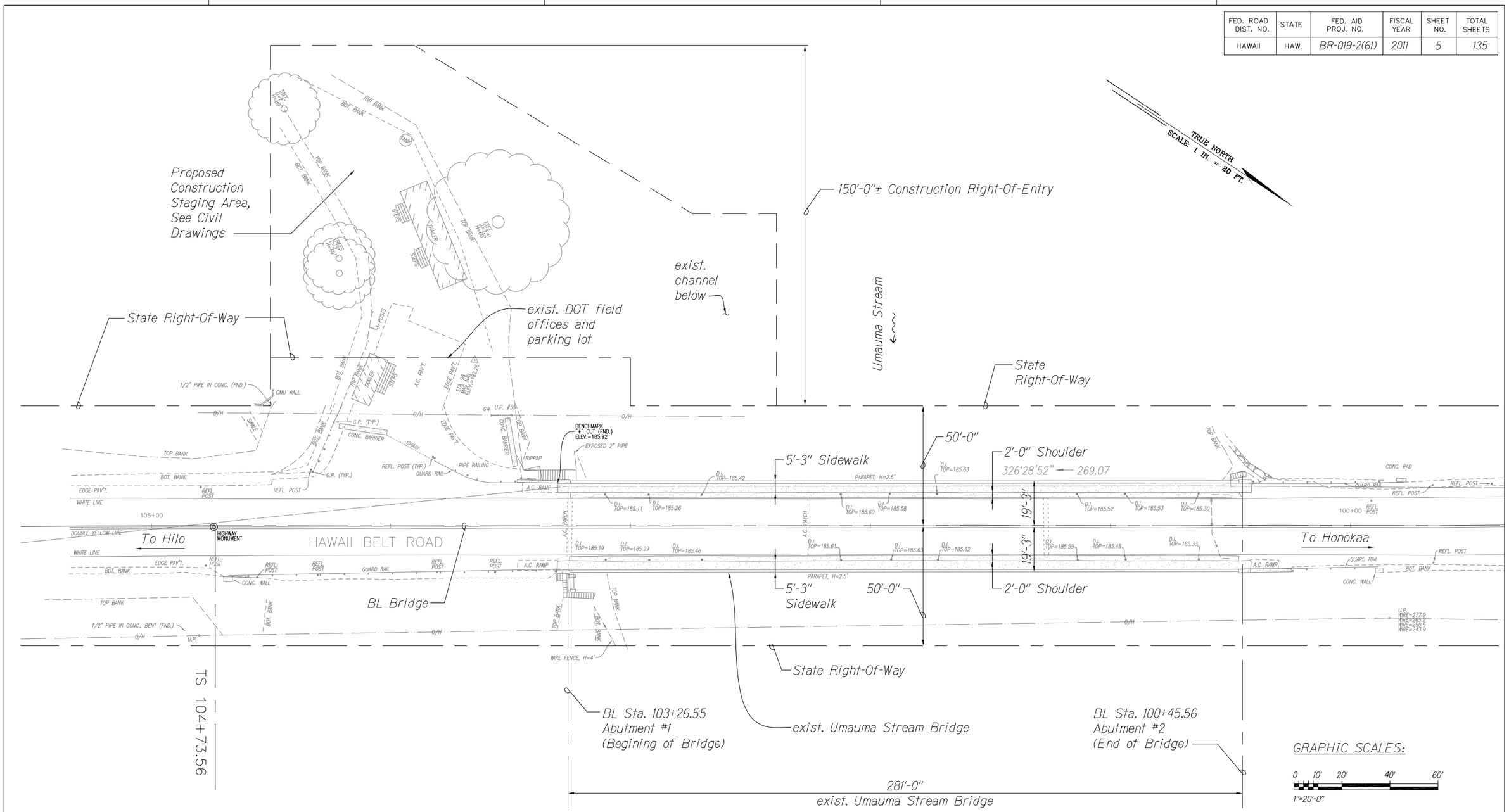
STANDARD PLAN SUMMARY

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

Scale: None Date: Oct. 20, 2011

SHEET No. T4 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	5	135



A T5 | T5 LOCATION PLAN
SCALE: 1" = 20'-0"

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

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

LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

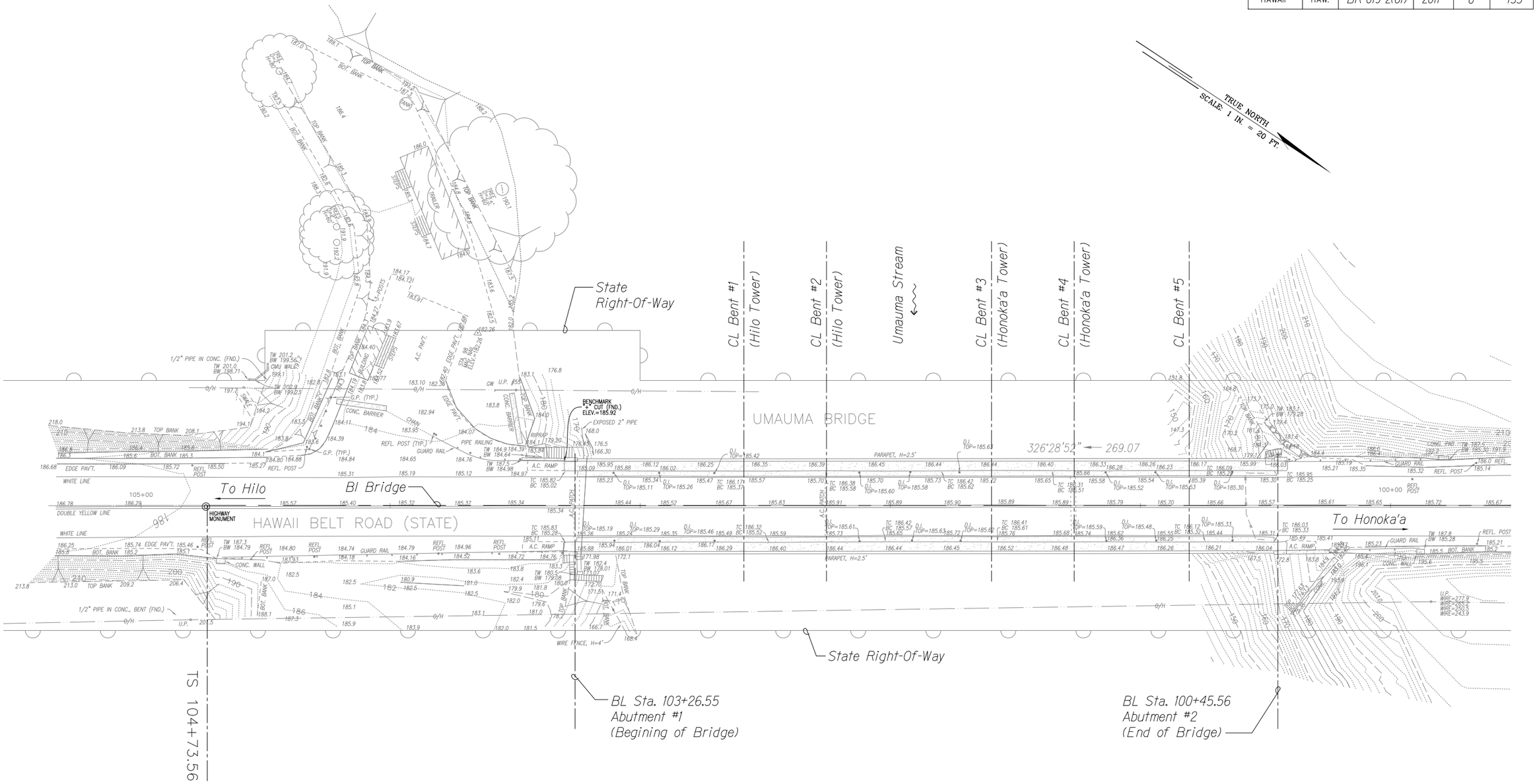
LOCATION PLAN

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

Scale: 1" = 20'-0" Date: Oct. 20, 2011

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)	2011	6	135



Reference elevation - Mean sea Level

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

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

GRAPHIC SCALES:

0 10' 20' 40' 60'
1"=20'-0"

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.

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

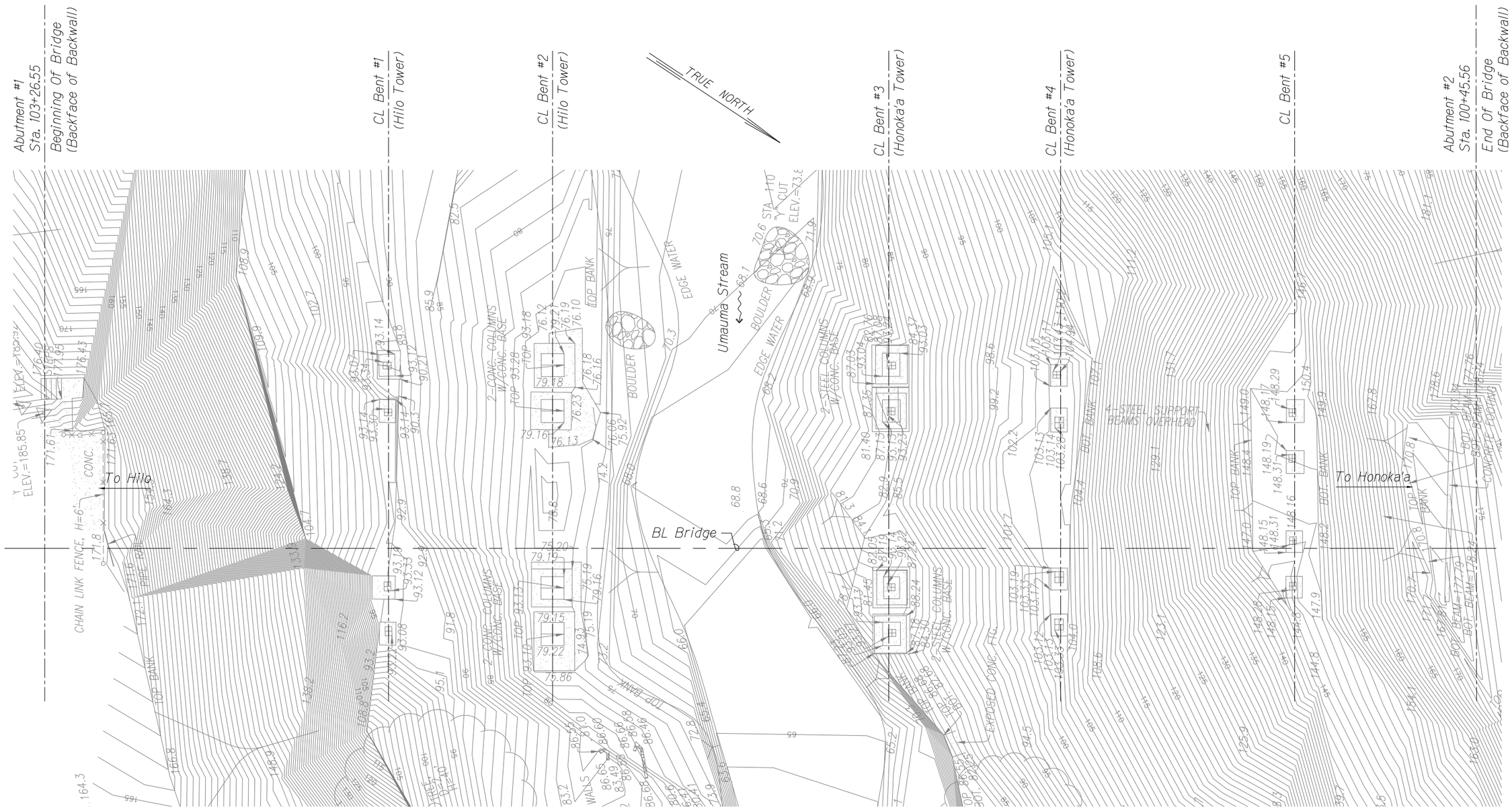
TOPOGRAPHIC MAP OF AREA ON BRIDGE

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

Scale: 1" = 20'-0" Date: Oct. 20, 2011

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)	2011	7	135



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 1' 5' 10' 20' 30'
1"=10'-0"

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.

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

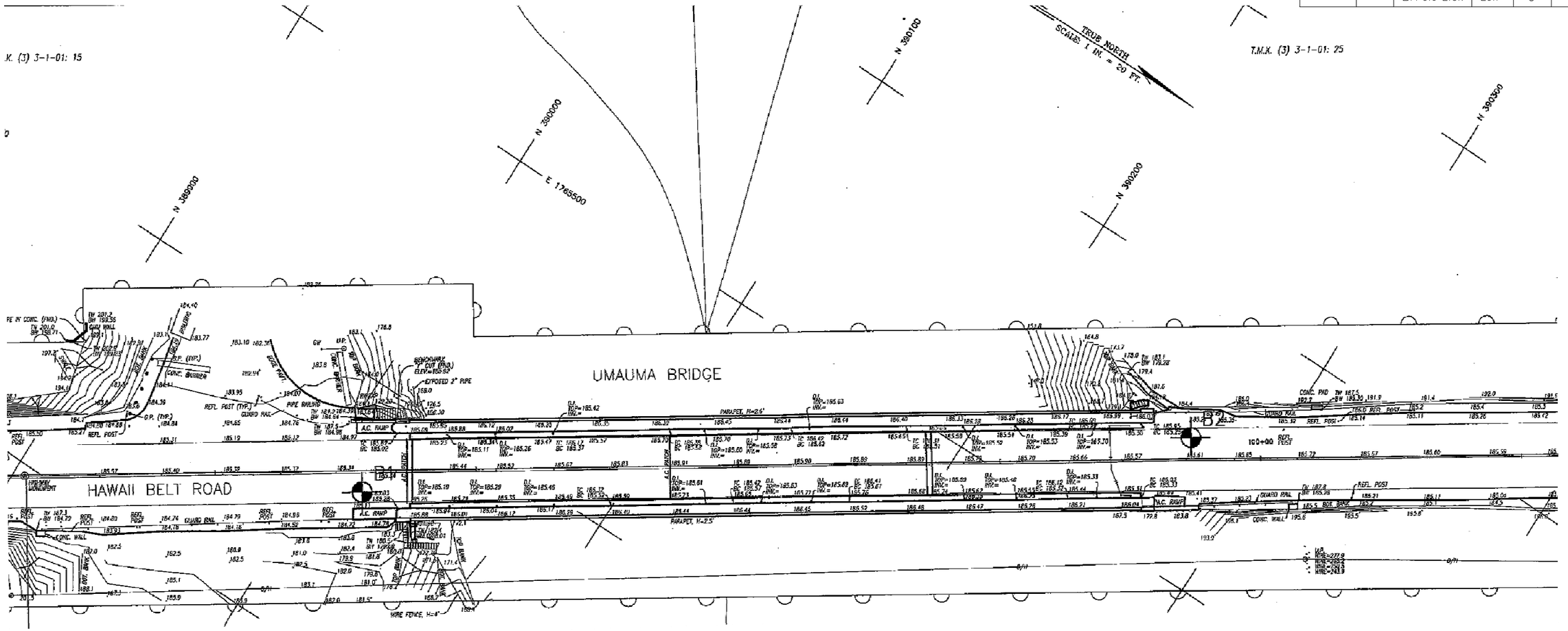
TOPOGRAPHIC MAP OF AREA BELOW BRIDGE

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

Scale: 1" = 10'-0" Date: Oct. 20, 2011

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)	2011	8	135



BORING NOTES

1. The boring logs shown on the drawings indicate the approximate subsurface conditions encountered at that specified location and at the times of the field exploration only, and may not represent conditions at other locations or on other dates. Soil conditions and ground water levels may change with the weather, passage of time, and/or improvements or changes at the site.
2. The penetration resistance shown on the boring logs indicate the number of blows required for a 3-inch O.D. split tube sampler.
3. The data provided in the boring logs is for general information only. Bidders shall examine the site and make their own interpretations and conclusions regarding the materials to be encountered. Neither the State of Hawaii nor Hirata & Associates, Inc. will assume responsibility for interpretations made by others.

LEGEND:

Approximate location of borings

TOPOGRAPHIC SURVEY MAP
UMAUMA BRIDGE
WAILUA, ISLAND OF HAWAII, HAWAII
JOB NO. : 10003-01 FIELD BOOK : M-173
FEBRUARY 23, 2010

BENCHMARK
REFERRED TO "+" CUT ON SOUTH END OF BRIDGE AS SHOWN ON HAWAII BELT ROAD AS-BUILTS PLANS, F.A.P. NO. SDR-3(13) SHEET 7
ELEV. = 185.92

LEGEND

A.C.	ASPHALT CONCRETE	GW	GUY WIRE
BC	BOTTOM CURB	H	HEIGHT
BOT.	BOTTOM	HV	HAND VALVE
BW	BOTTOM WALL	O/H	OVERHEAD
C.L.	CHAIN LINK	PAV'T.	PAVEMENT
CRM	CONCRETE RUBBLE MASONRY	REFL.	REFLECTOR
CONC.	CONCRETE	S.L.	STREET LIGHT
D	DIAMETER OR DRAIN	STA.	STATION
DI.	DRAIN INLET	TC	TOP CURB
DWY.	DRIVEWAY	TW	TOP WALL
ELEV.	ELEVATION	TYP.	TYPICAL
FND.	FOUND	U.P.	UTILITY POLE
G.P.	GUARD POST/CAFE POST		

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

T.M.K. (

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

CON C. TRUONG
LICENSED PROFESSIONAL ENGINEER
No. 9019-C
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/12
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

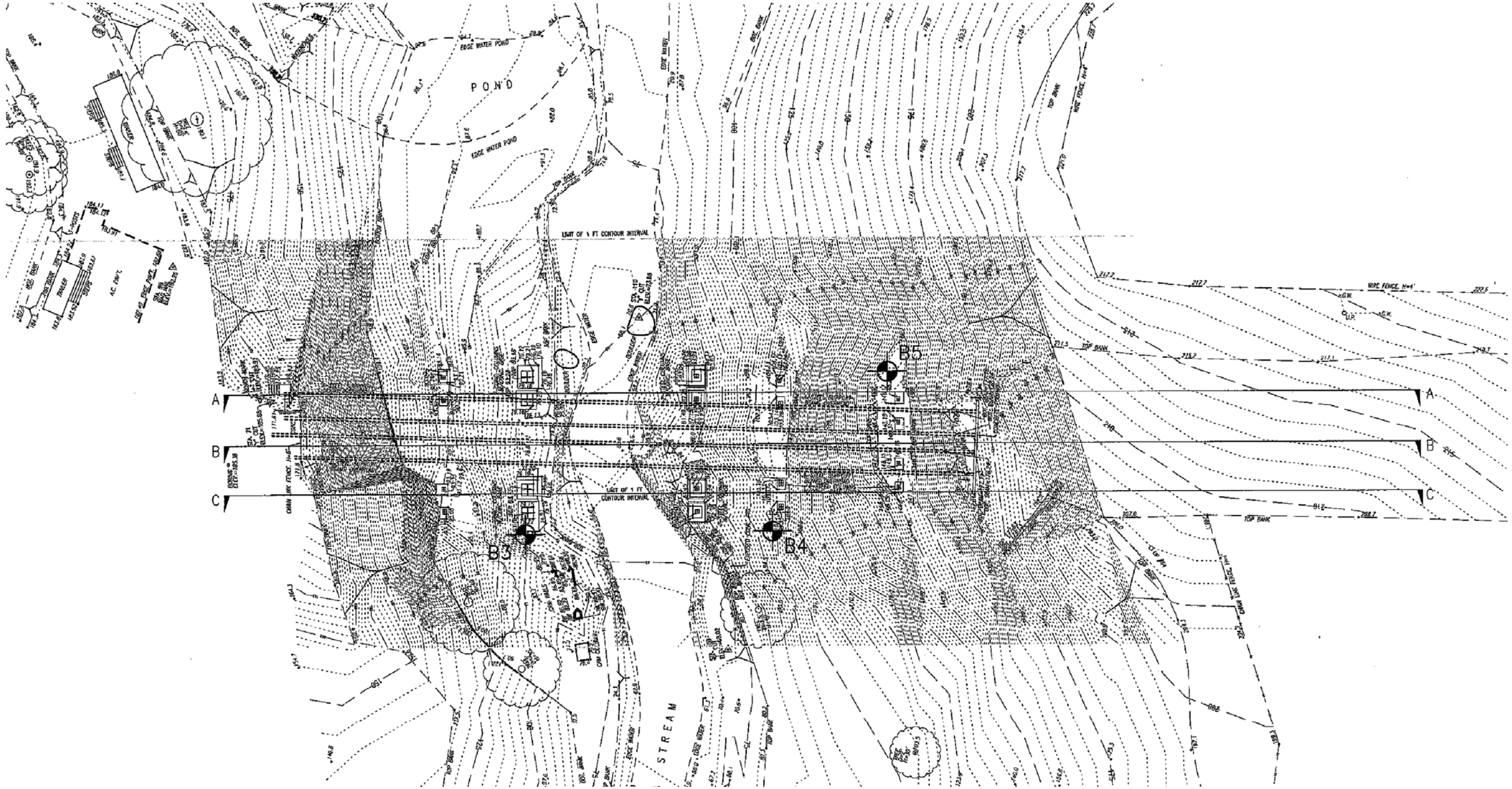
BORING LOCATION PLAN

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

Scale: 1" = 20'-0" Date: Oct. 20, 2011

SHEET No. T8 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	9	135



LEGEND:

Approximate location of borings

GRAPHIC SCALE:

0 10' 20' 40' 60'

1"=20'-0"

CON C. TRUONG
LICENSED PROFESSIONAL ENGINEER
No. 9019-C
HAWAII, U.S.A.

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

BORING LOCATION PLAN

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

Scale: 1" = 20'-0" Date: Oct. 20, 2011

SHEET No. T9 OF 15 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)	2011	10	135

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 10-4890

BORING NO. B1 DRIVING WT. 140 lb. START DATE 3/2/10
SURFACE ELEV. 185±* DROP 30 in. END DATE 3/4/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) – Mottled brown, moist, medium stiff, with sand and gravel. (Fill) Covered by 8 inches of asphaltic concrete over 8 inches of base material.
			11	76	34	
5			7	77	32	
			8	76	40	
10						
			12	103	23	
15						
			19	85	23	
20						
			9	105	27	
25						
			9	64	53	Clayey SILT (MH) – Mottled brown, moist, medium stiff. (Completely Weathered Rock)
30						Plate A4.1

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 10-4890

BORING NO. B1 (continued) DRIVING WT. 140 lb. START DATE 3/2/10
SURFACE ELEV. 185± DROP 30 in. END DATE 3/4/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						
			14	62	59	
35						BASALT (WS) – Gray, dense to hard, fractured.
						Begin NX coring at 39 feet. 97% Recovery from 39 to 42 feet. RQD = 56%
40						80% Recovery from 42 to 47 feet. RQD = 48%
45						Highly weathered from 45.5 feet to 53 feet, dense to medium hard.
						25% Recovery from 47 to 52 feet. RQD = 0%
50			35/6" 50/2"			
55						60% Recovery from 53.5 to 58.5 feet. RQD = 45%
						Moderate to highly fractured from 57 feet.
60						57% Recovery from 58.5 to 63.5 feet. RQD = 20%
						Plate A4.2

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 10-4890

BORING NO. B1 (continued) DRIVING WT. 140 lb. START DATE 3/2/10
SURFACE ELEV. 185± DROP 30 in. END DATE 3/4/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						
						Highly fractured, with clinkers from 62 to 72 feet.
65						47% Recovery from 64.5 to 69.5 feet. RQD = 0%
70			35			
						70% Recovery from 71.5 to 76.5 feet. RQD = 28% moderately weathered, hard from 72 feet.
75						
						End boring at 76.5 feet.
						Neither groundwater nor seepage water encountered.
80						* Elevations based on topographic survey maps prepared by ControlPoint Surveying, Inc., dated February 23, 2010.
85						
90						Plate A4.3

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

CON C. TRUONG
LICENSED PROFESSIONAL ENGINEER
No. 9019-C
HAWAII, U.S.A.

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

BORING LOG #1

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

Scale: None Date: Oct. 20, 2011

SHEET No. T10 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	11	135

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 10-4890

BORING NO. B2 DRIVING WT. 140 lb. START DATE 3/15/10
SURFACE ELEV. 185± DROP 30 in. END DATE 3/17/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) – Mottled brown, moist, stiff, with sand and gravel. (Fill) Covered by 7 inches of asphaltic concrete over 10 inches of base material.
			42	96	30	
5			22	96	18	
						Very moist at 6 feet.
			17/6" 50/6"	84	37	
10						COMPLETELY WEATHERED ROCK – Mottled brown, moist, medium dense.
			14	57	62	
15						
			50/2"	Tip Recovery		Moderately weathered, dense to medium hard from 18 to 25 feet.
20						
			32/6" 58/6"	105	16	
25						
			17	76	46	
30						

Plate A4.4

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 10-4890

BORING NO. B2 (continued) DRIVING WT. 140 lb. START DATE 3/15/10
SURFACE ELEV. 185± DROP 30 in. END DATE 3/17/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						
			25	74	33	
35						
			22	58	82	
40						
			50/3"	60	60	Dense to medium hard at 43 feet.
45						
						BASALT (WS) – Gray, hard, slightly weathered.
50						Begin NX coring at 48 feet. 97% Recovery from 48 to 53 feet. RQD = 82%
						60% Recovery from 53 to 58 feet. RQD = 40%
55						Clinker at 55 to 57 feet.
						95% Recovery from 58 to 63 feet. RQD = 72%
60						

Plate A4.5

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 10-4890

BORING NO. B2 (continued) DRIVING WT. 140 lb. START DATE 3/15/10
SURFACE ELEV. 185± DROP 30 in. END DATE 3/17/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						
						88% Recovery from 63 to 68 feet. RQD = 50%
65						
						100% Recovery from 68 to 70 feet. RQD = 88%
70						End boring at 70 feet.
						Neither groundwater nor seepage water encountered in the boring.
75						
80						
85						
90						

Plate A4.6

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

CON C. TRUONG
LICENSED PROFESSIONAL ENGINEER
No. 9019-C
HAWAII, U.S.A.

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

BORING LOG #2

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

Scale: None Date: Oct. 20, 2011

SHEET No. T11 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	12	135

HIRATA & ASSOCIATES, INC.

BORING LOG W.O. 10-4890

BORING NO. B3 DRIVING WT. 140 lb. START DATE 4/5/10
SURFACE ELEV. 76± DROP 30 in. END DATE 4/7/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						BASALT (WS) – Gray, hard, slight to moderately fractured, slightly weathered. Begin NX coring from surface. 97% Percent recovery from 0 to 5 feet. RQD = 68%
5						100% Recovery from 5 to 10 feet. RQD = 72%
10						100% Recovery from 10 to 15 feet. RQD = 72% Moderate to highly fractured from 12 to 20 feet.
15						100% Recovery from 15 to 20 feet. RQD = 17%
20						100% Recovery from 20 to 25 feet. RQD = 97%
25						100% Recovery from 25 to 30 feet. RQD = 77%
30	▽					Brown, highly fractured, moderately weathered at 29 feet.

Plate A4.7

HIRATA & ASSOCIATES, INC.

BORING LOG W.O. 10-4890

BORING NO. B3 (continued) DRIVING WT. 140 lb. START DATE 4/5/10
SURFACE ELEV. 76± DROP 30 in. END DATE 4/7/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						100% Recovery from 30 to 35 feet. RQD = 75%
35						100% Recovery from 35 to 40 feet. RQD = 82%
40						100% Recovery from 40 to 45 feet. RQD = 43% Moderately fractured, with clinkers from 41 to 50 feet.
45						100% Recovery from 45 to 50 feet. RQD = 42%
50						97% Recovery from 50 to 55 feet. RQD = 52% Reddish brown, highly weathered from 52 to 54 feet.
55						88% Recovery from 55 to 60 feet. RQD = 80%
60						

Plate A4.8

HIRATA & ASSOCIATES, INC.

BORING LOG W.O. 10-4890

BORING NO. B3 (continued) DRIVING WT. 140 lb. START DATE 4/5/10
SURFACE ELEV. 76± DROP 30 in. END DATE 4/7/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						100% Recovery from 60 to 65 feet. RQD = 32% Moderately fractured, with weathered seams from 62 to 64 feet.
65						97% Recovery from 65 to 70 feet. RQD = 72%
70						End boring at 70 feet. Groundwater encountered at 29 feet at 10:15 am on 4/8/10.
75						
80						
85						
90						

Plate A4.9

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

ORIGINAL PLAN
NOTEBOOK
No.

CON C. TRUONG
LICENSED PROFESSIONAL ENGINEER
No. 9019-C
HAWAII, U.S.A.

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

BORING LOG #3

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

Scale: None Date: Oct. 20, 2011

SHEET No. T12 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	13	135

HIRATA & ASSOCIATES, INC.

BORING LOG W.O. 10-4890

BORING NO. B4 DRIVING WT. 140 lb. START DATE 3/29/10
SURFACE ELEV. 100± DROP 30 in. END DATE 3/31/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) – Brown, moist, medium stiff, with gravel. (Volcanic Ash)
			10	53	47	
5			10	66	41	
			12	85	21	
10						Boulder at 11 feet.
						BASALT (WS) – Gray, hard, slightly weathered. Begin NX coring at 12.5 feet. 76% Recovery from 12.5 to 17.5 feet. RQD = 47% Moderately fractured from 12.5 to 17.5 feet.
15						93% Recovery from 17.5 to 22.5 feet. RQD = 52%
20						98% Recovery from 22.5 to 27.5 feet. RQD = 83%
25						100% Recovery from 27.5 to 32.5 feet. RQD = 95%
30						

Plate A4.10

HIRATA & ASSOCIATES, INC.

BORING LOG W.O. 10-4890

BORING NO. B4 (continued) DRIVING WT. 140 lb. START DATE 3/29/10
SURFACE ELEV. 100± DROP 30 in. END DATE 3/31/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						
						100% Recovery from 32.5 to 36.5 feet. RQD = 100%
35						
						100% Recovery from 37.5 to 42.5 feet. RQD = 100%
40						
						100% Recovery from 42.5 to 47.5 feet. RQD = 95%
45						
						100% Recovery from 47.5 to 52.5 feet. RQD = 95%
50						
						100% Recovery from 52.5 to 57.5 feet. RQD = 92%
55						
						Reddish brown, moderate to highly weathered from 56 to 63 feet. 100% Recovery from 57.5 to 62.5 feet. RQD = 28%
60						

Plate A4.11

HIRATA & ASSOCIATES, INC.

BORING LOG W.O. 10-4890

BORING NO. B4 (continued) DRIVING WT. 140 lb. START DATE 4/5/10
SURFACE ELEV. 100± DROP 30 in. END DATE 4/7/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						
						100% Recovery from 62.5 to 67.5 feet, RQD = 82%
65						
						End boring at 67.5 feet.
70						Neither groundwater nor seepage water encountered.
75						
80						
85						
90						

Plate A4.12

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CHECKED BY
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ORIGINAL PLAN
NOTEBOOK
No.

CON C. TRUONG
LICENSED PROFESSIONAL ENGINEER
No. 9019-C
HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG #4

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

Scale: None Date: Oct. 20, 2011

SHEET No. T13 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	14	135

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 10-4890

BORING NO. B5 DRIVING WT. 140 lb. START DATE 3/23/10
SURFACE ELEV. 147± DROP 30 in. END DATE 3/25/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) – Mottled brown, moist, medium stiff, with gravel. (Volcanic Ash)
			9	64	55	
5			5	53	72	
			17/6"	49	88	
			35/6"			WEATHERED ROCK (WC) – Mottled brown, moist, medium dense to dense, completely weathered.
10						BASALT (WS) – Gray, hard, slightly weathered. Highly to moderately weathered from 10.5 to 12 feet.
						Begin NX coring at 13 feet. 88% Recovery from 13 to 18 feet. RQD = 83%
15						
						100% Recovery from 18 to 23 feet. RQD = 33% Brown, highly weathered at 19 feet.
20						
						100% Recovery from 23 to 28 feet. RQD = 90%
25						
						92% Recovery from 28 to 33 feet. RQD = 47% Moderately fractured at 29 feet.
30						

Plate A4.13

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 10-4890

BORING NO. B5 (continued) DRIVING WT. 140 lb. START DATE 3/23/10
SURFACE ELEV. 147± DROP 30 in. END DATE 3/25/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						
						98% Recovery from 33 to 38 feet. RQD = 75%
35						
						100% Recovery from 38 to 43 feet. RQD = 37% Moderate to highly fractured, moderately weathered from 38 to 45 feet.
40						
						100% Recovery from 43 to 48 feet. RQD = 78%
45						
						End boring at 48 feet.
50						Neither groundwater nor seepage water encountered.
55						
60						

Plate A4.14

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG #5

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

Scale: None Date: Oct. 20, 2011

SHEET No. T14 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	15	135

MAJOR DIVISIONS			GROUP SYMBOLS		TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of the material is LARGER than No. 200 sieve size.)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines.)		GW	Well graded gravels, gravel-sand mixtures, little or no fines.
				GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines.)		GM	Silty gravels, gravel-sand-silt mixtures.
				GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size.)	CLEAN SANDS (Little or no fines.)		SW	Well graded sands, gravelly sands, little or no fines.
				SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines.)		SM	Silty sands, sand-silt mixtures.
				SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of the material is SMALLER than No. 200 sieve size.)	SILTS AND CLAYS (Liquid limit LESS than 50.)			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
				OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50.)			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH	Inorganic clays of high plasticity, fat clays.
				OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS				PT	Peat and other highly organic soils.
					FRESH TO MODERATELY WEATHERED BASALT
					VOLCANIC TUFF / HIGHLY TO COMPLETELY WEATHERED BASALT
					CORAL

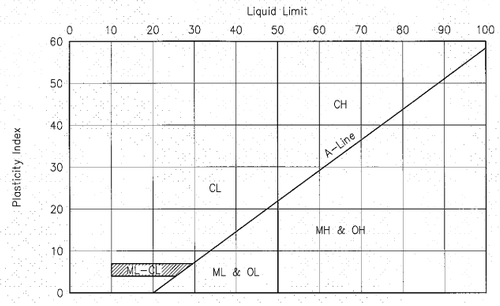
SAMPLE DEFINITION

2" O.D. Standard Split Spoon Sampler	Shelby Tube	RQD Rock Quality Designation
3" O.D. Split Tube Sampler	NX / PQ/ 4" Coring	Water Level

W.O. 10-4890	Umauma Stream Bridge Rehabilitation, North Hilo
Hirata & Associates, Inc.	BORING LOG LEGEND

Plate A3.1

PLASTICITY CHART



GRADATION CHART

COMPONENT DEFINITIONS BY GRADATION

COMPONENT	SIZE RANGE
Boulders	Above 12 in.
Cobbles	3 in. to 12 in.
Gravel Coarse gravel Fine gravel	3 in. to No. 4 (4.76 mm) 3 in. to 3/4 in. 3/4 in. to No. 4 (4.76 mm)
Sand Coarse sand Medium sand Fine sand	No. 4 (4.76 mm) to No. 200 (0.074 mm) No. 4 (4.76 mm) to No. 10 (2.0 mm) No. 10 (2.0 mm) to No. 40 (0.42 mm) No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and clay	Smaller than No. 200 (0.074 mm)

W.O. 10-4890	Umauma Stream Bridge Rehabilitation, North Hilo
Hirata & Associates, Inc.	UNIFIED SOIL CLASSIFICATION SYSTEM

Plate A3.2

Grade	Symbol	Description
Fresh	F	No visible signs of decomposition or discoloration. Rings under hammer impact.
Slightly Weathered	WS	Slight discolorction inwards from open fractures, otherwise similar to F.
Moderately Weathered	WM	Discoloration throughout. Weaker minerals such as feldspar decomposed. Strength somewhat less than fresh rock but cores cannot be broken by hand or scraped by knife. Texture preserved.
Highly Weathered	WH	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with knife. Core stones present in rock mass. Texture becoming indistinct but fabric preserved.
Completely Weathered	WC	Minerals decomposed to soil but fabric and structure preserved (Saprolite). Specimens easily crumbled or penetrated.
Residual Soil	RS	Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed. Large volume change.

Reference: Soils Mechanics, NAVFAC DM-7.1, Department of the Navy, Naval Facilities Engineering Command, September, 1986.

W.O. 10-4890	Umauma Stream Bridge Rehabilitation, North Hilo
Hirata & Associates, Inc.	ROCK WEATHERING CLASSIFICATION SYSTEM

Plate A3.3

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SOIL CLASSIFICATIONS

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

Scale: None Date: Oct. 20, 2011

SHEET No. T15 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	16	135

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 the 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.

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

PLOTTED: Mon, 10 Oct 2011 - 4:18pm By: DYKINOS
File Name: H:\FY2008\08016 Umauma Bridge\07 Drawings\C-01 - C-03 UMAUMA - General Construction Notes.dwg

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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: Oct. 10, 2011

SHEET No. C-1 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	17	135

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.

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STATE OF HAWAII
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GENERAL NOTES

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

Scale: None Date: Oct. 10, 2011

SHEET No. C-2 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	18	135

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.

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HIGHWAYS DIVISION

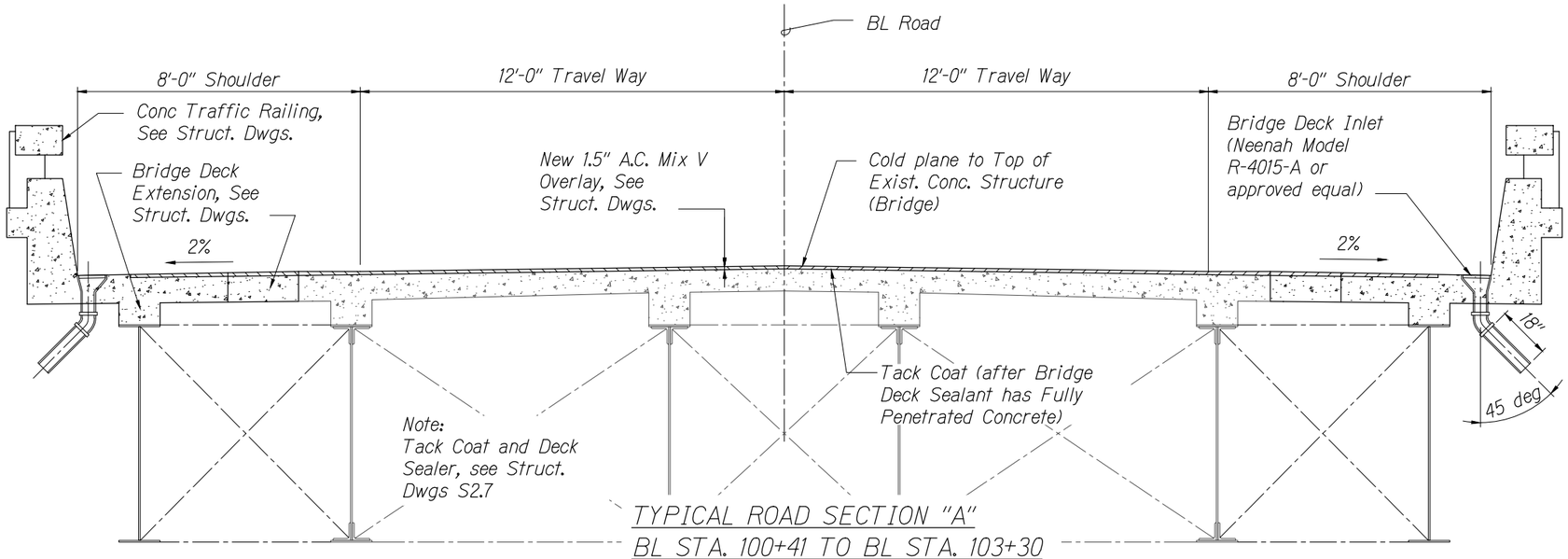
GENERAL NOTES

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

Scale: None Date: Oct. 10, 2011

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)	2011	19	135



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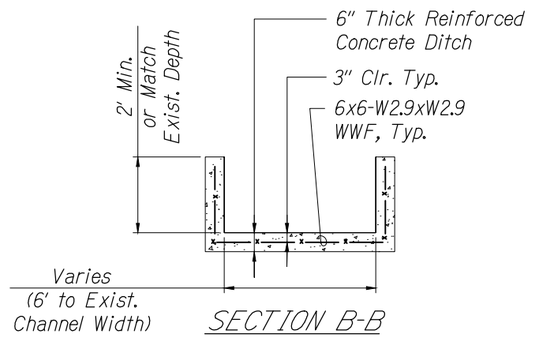
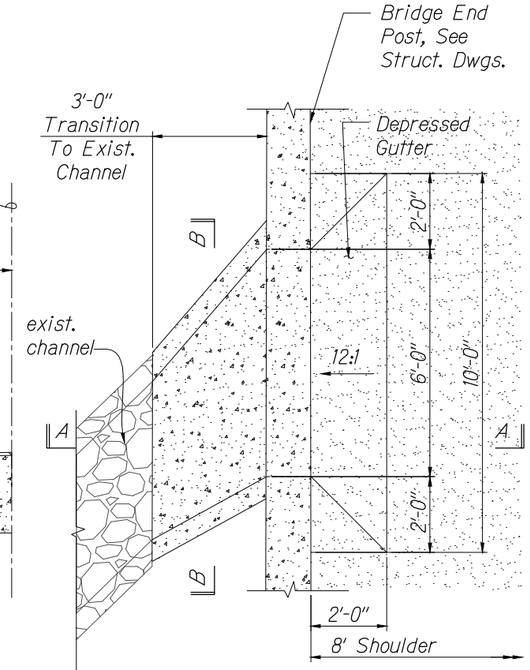
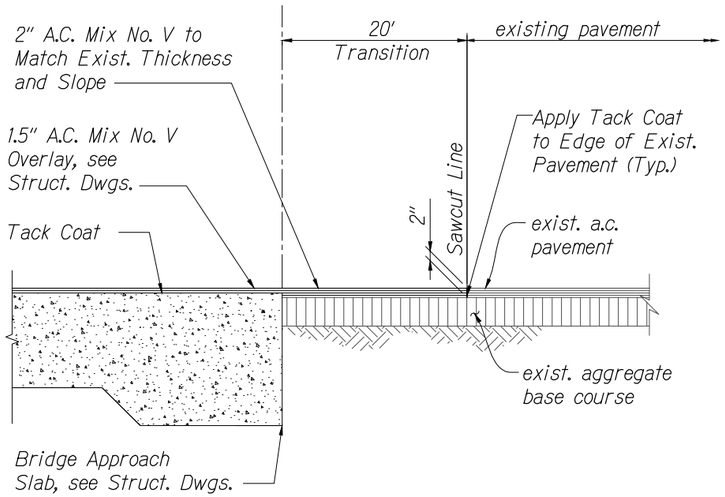


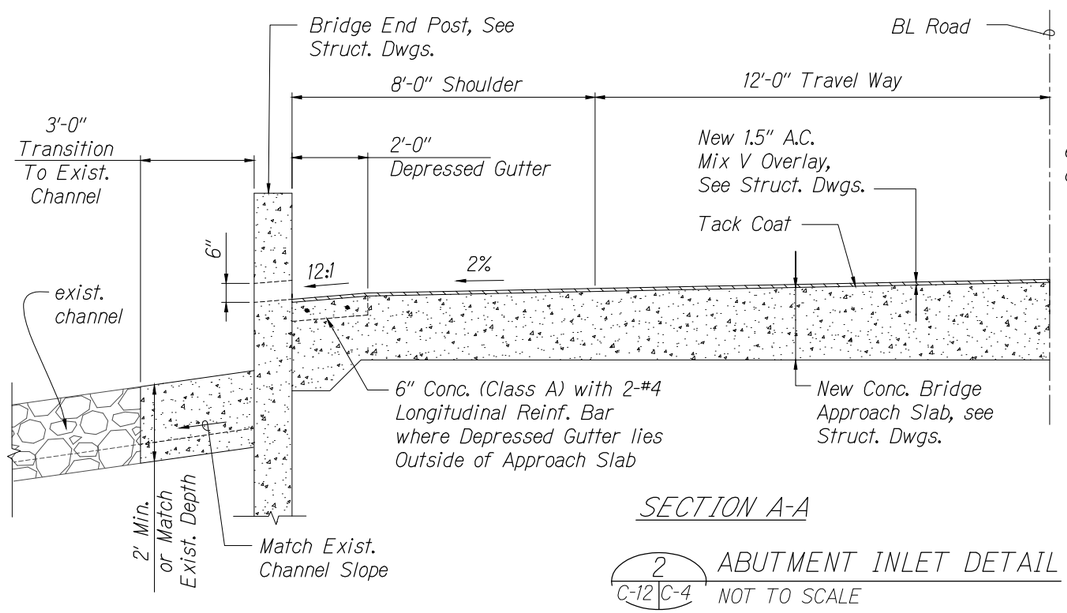
SECTION B-B



PLAN



1 SMOOTH RIDING CONNECTION DETAIL
C-12 | C-4
NOT TO SCALE



SECTION A-A

2 ABUTMENT INLET DETAIL
C-12 | C-4
NOT TO SCALE

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL ROAD SECTION

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

Scale: None Date: Oct. 10, 2011

SHEET No. C-4 OF 19 SHEETS

ORIGINAL PLAN | NOTEBOOK | No. | DATE
SURVEY PLOTTED BY
DRAWN BY
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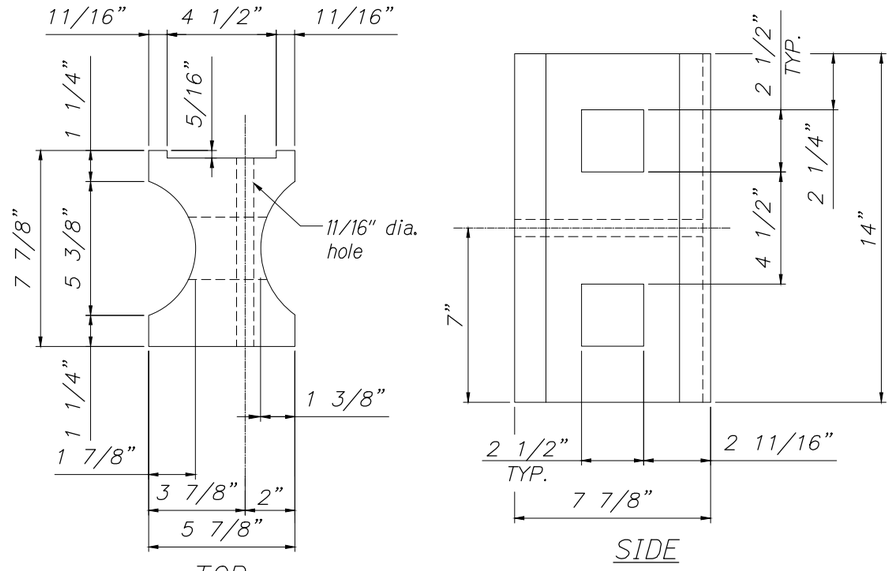
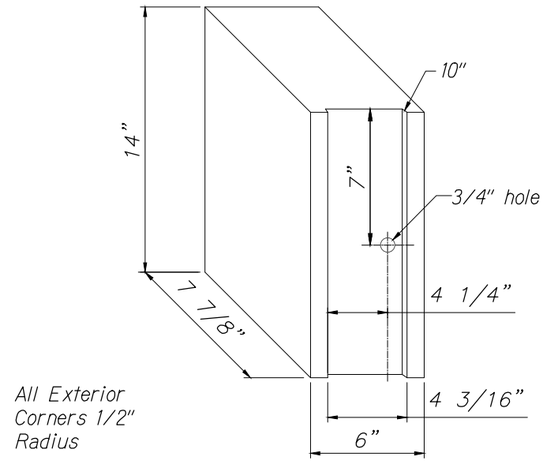
DESIGNED BY
QUANTITIES BY
CHECKED BY
Plotted: Mon, 10 Oct 2011 - 4:18pm By: DYANOS
File Name: H:\FY2008\08616 Umauma Bridge\07 Drawings\C-04 UMAUMA - Typical Road Section.dwg

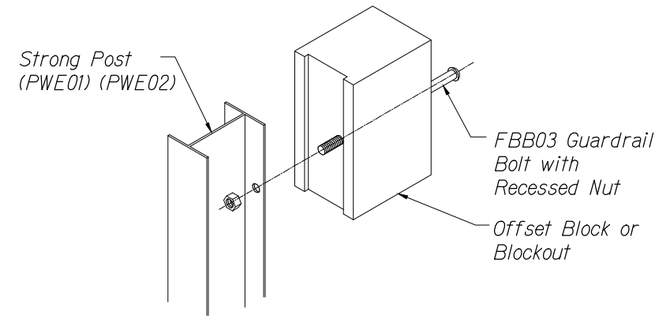
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	20	135



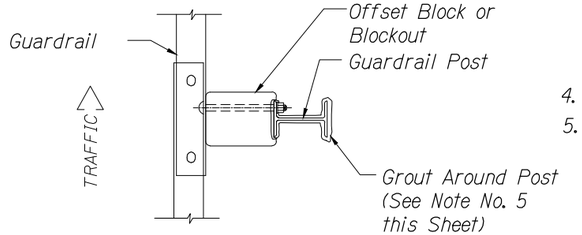
1 C-5 C-5 RECYCLED PLASTIC BLACKOUT (TYPE I)
NOT TO SCALE

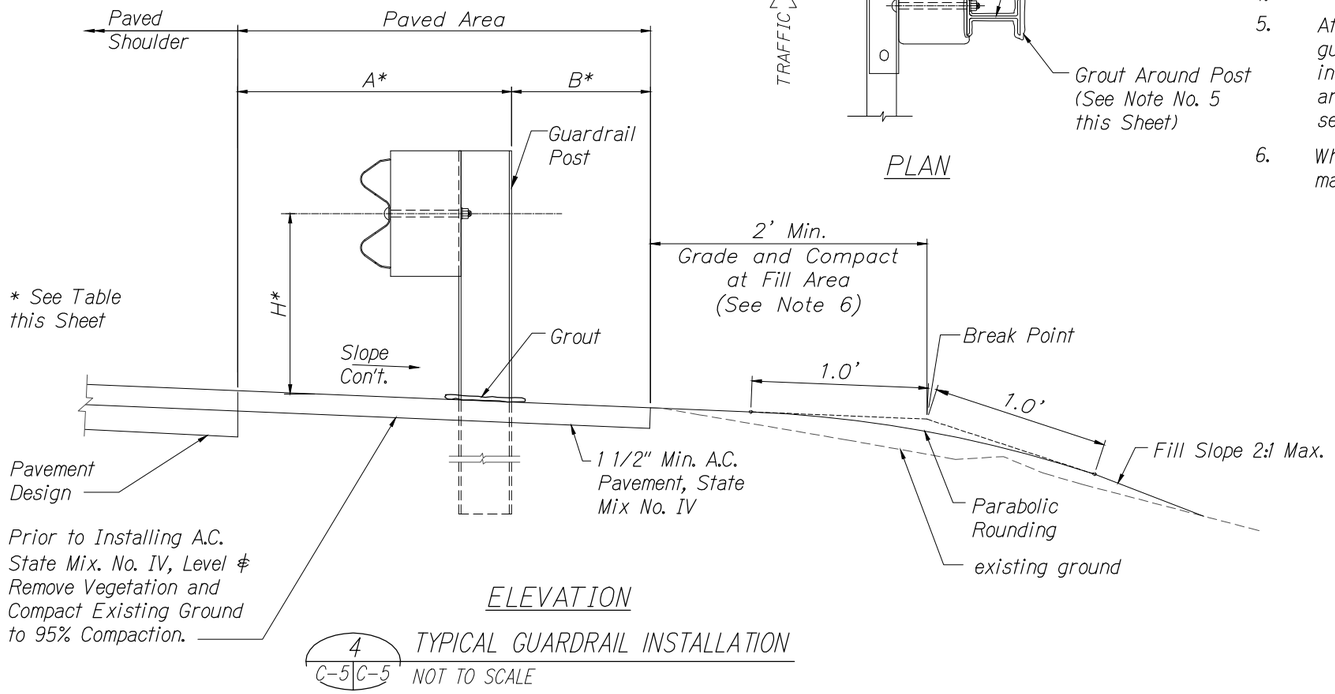


2 C-5 C-5 RECYCLED POLYETHYLENE OFFSET BLOCK (TYPE II)
NOT TO SCALE



3 C-5 C-5 STEEL POST AND BLOCK DETAIL
NOT TO SCALE





4 C-5 C-5 TYPICAL GUARDRAIL INSTALLATION
NOT TO SCALE

GENERAL NOTES

1. All hardware, posts and fasteners shall be hot-dip zinc coated galvanized after fabrication. no punching, drilling or cutting will be permitted after galvanizing.
2. Where conditions require, special post lengths in increments of 6 inches may be specified.
3. All fasteners, posts, and rail elements (i.e. FBB03, PWE01, RWM02B, etc.) shall conform to the latest edition and amendments of "A Guide to Standardized Highway Barrier Rail Hardware," a report prepared and approved by the AASHTO-AGC-ARTBA joint cooperative Committee, Subcommittee on new highway materials, task force 13 report. Dimensions of fasteners, posts and rail elements have been converted from metric units into their present form.
4. The recycled plastic block or offset block shall be approved by the State.
5. After the guardrail posts are installed in the paved area, the contractor shall grout around the guardrail post and seal all cracks in the paved area that was caused during the guardrail post installation. If required by the Inspector/Engineer, the Contractor shall tamper the paved area around the guardrail post prior to grouting. The cost for this work shall not be paid for separately, but shall be considered incidental to the various guardrail items.
6. When standards for the fill slope area cannot be met, a site specific, Engineer approved design may be used.

GUARDRAIL TYPE	DIMENSION		
	H	A	B
Strong Post with W Beam	1'-9 5/8"	1'-6"	1'-0"
Rubrail	2'-0"	1'-6"	2'-0"
Modified Thrie Beam	2'-0"	2'-0"	1'-0"

ORIGINAL PLAN | NOTEBOOK No. | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
Plotted: Mon, 10 Oct 2011 - 4:14pm By: JOYANOS
File Name: H:\FY2008\080816 Umauma Bridge\07 Drawings\C-05 UMAUMA — Guard Rail Details 1.dwg

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

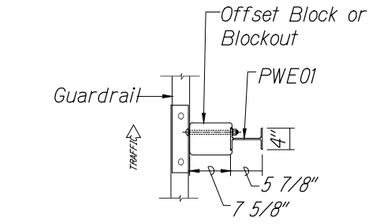
GUARDRAIL DETAILS

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

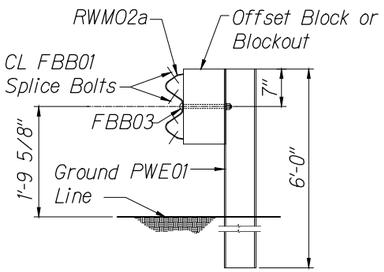
Scale: None Date: Oct. 10, 2011

SHEET No. C-5 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	21	135



PLAN

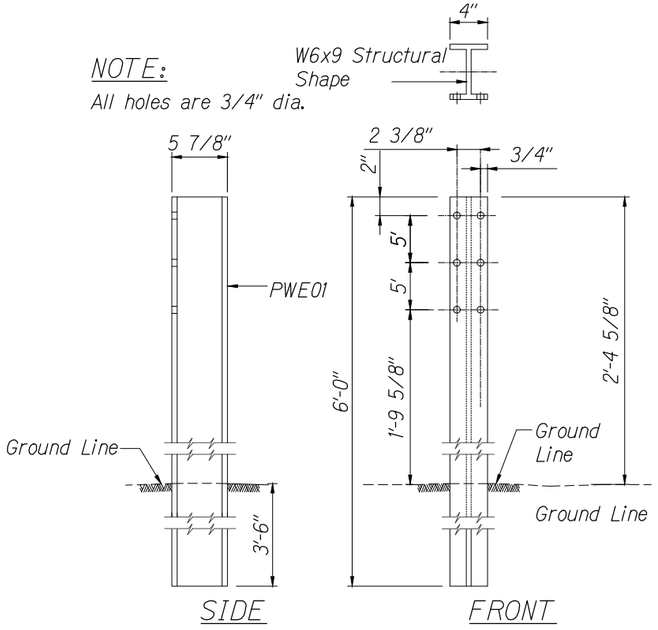


ELEVATION

STRONG POST W-BEAM GUARDRAIL (SGR04a)

1 C-6 | C-6 NOT TO SCALE

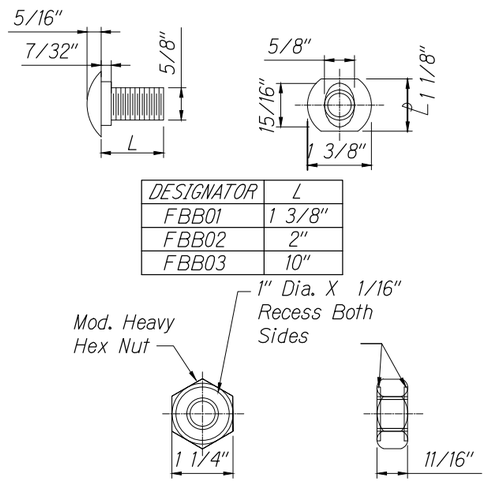
NOTE:
All holes are 3/4" dia.



SIDE FRONT

W-BEAM STRONG POST (PWE01)

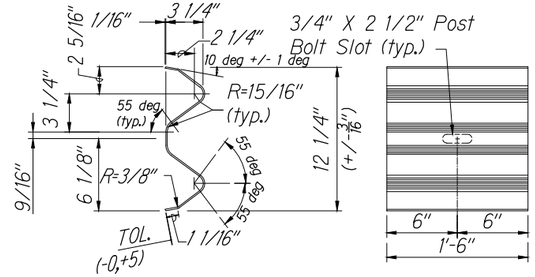
2 C-6 | C-6 NOT TO SCALE



DESIGNATOR	L
FBB01	1 3/8"
FBB02	2"
FBB03	10"

GUARDRAIL BOLTS AND RECESSED

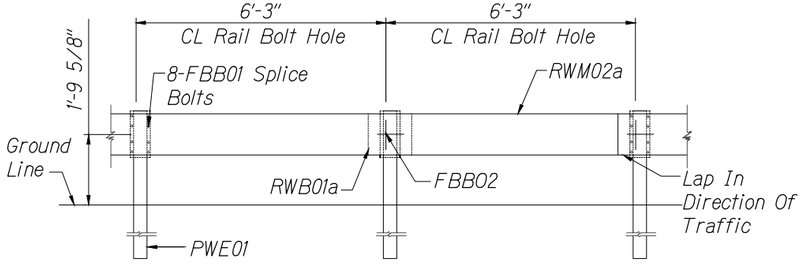
3 C-6 | C-6 NOT TO SCALE



Designator	Base Metal Thickness
RWM01a	12 Gauge

W-BEAM BACK UP PLATE (RWB01a)

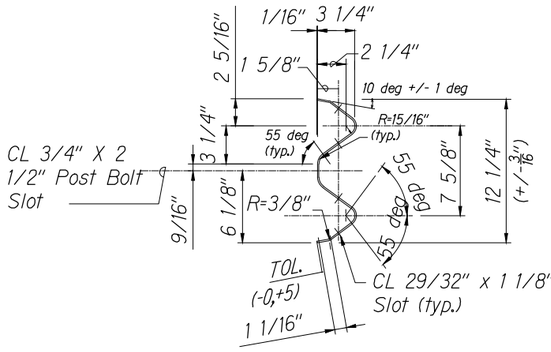
4 C-6 | C-6 NOT TO SCALE



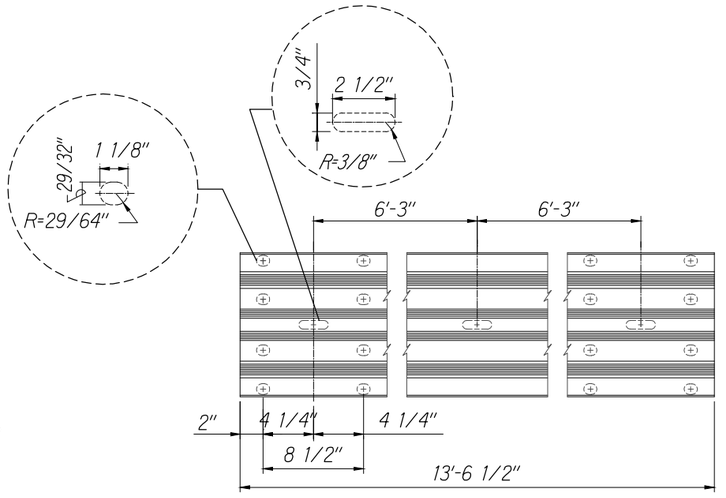
ELEVATION

STRONG POST W-BEAM WITH RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT

5 C-6 | C-6 NOT TO SCALE



Designator	Base Metal Thickness
RWM02a	12 Gauge



2 SPACE W-BEAM GUARDRAIL (RWM02a)

6 C-6 | C-6 NOT TO SCALE

ORIGINAL PLAN | NOTEBOOK No. ____

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

Plotted: Mon, 10 Oct 2011 - 4:18pm By: DYANOS
File Name: H:\FY2008\08316 Umauma Bridge\07 Drawings\C-06 UMAUMA - Strong Post W-Beam Guardrail Details.dwg

WILLIAM H. Q. SOH
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

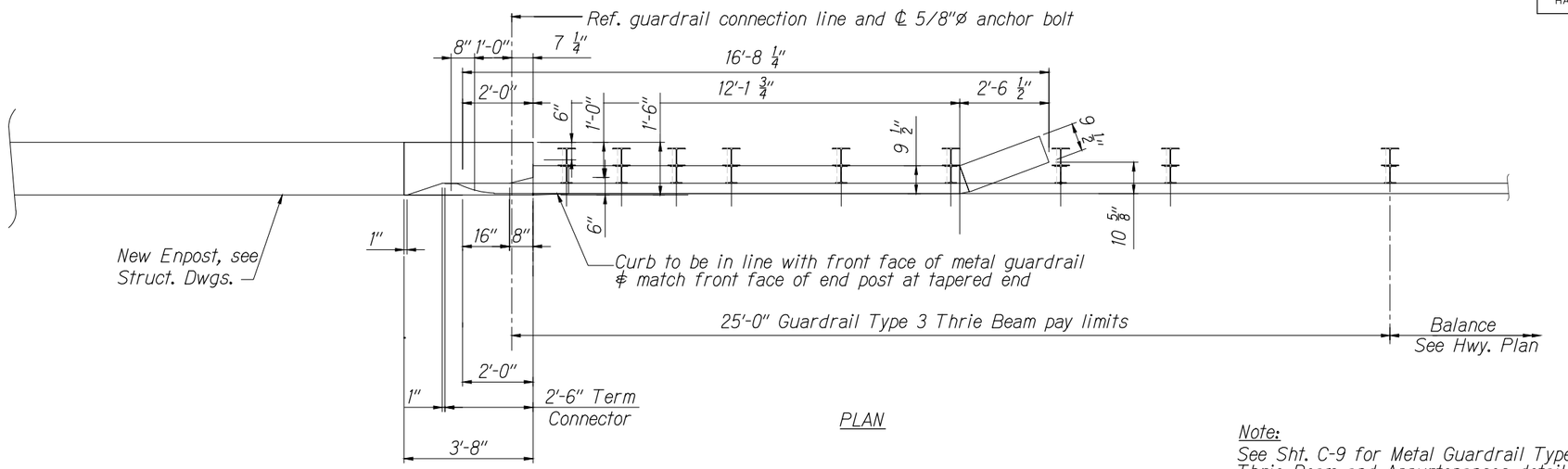
STRONG POST W-BEAM GUARDRAIL DETAILS

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

Scale: None Date: Oct. 10, 2011

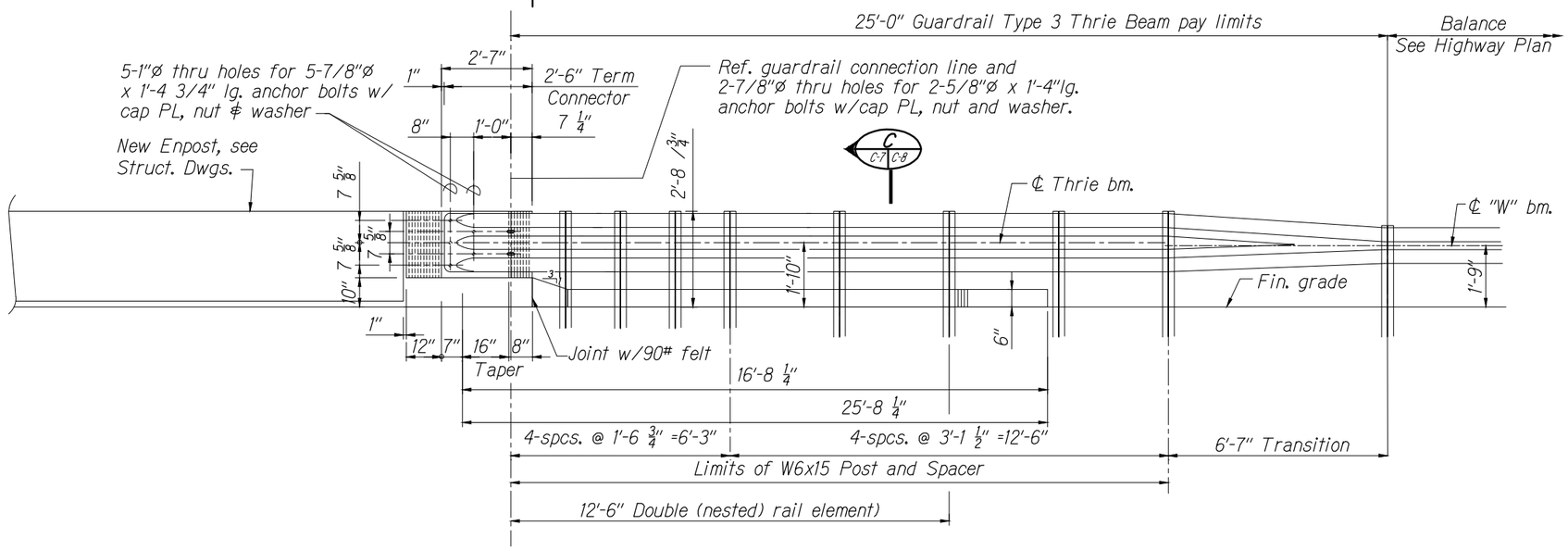
SHEET No. C-6 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	22	135



PLAN

Note:
See Sht. C-9 for Metal Guardrail Type 3 Thrie Beam and Appurtenances details.



ELEVATION

TYPICAL TYPE 3 THRIE BEAM METAL GUARDRAIL

NOT TO SCALE

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

Plotted: Mon, 10 Oct 2011 - 4:18pm By: DYANOS
File Name: H:\FY2008\UB016 Umauma Bridge\107 Drawings\C-07 UMAUMA - Type 3 Thrie Beam Guardrail Detail.dwg

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

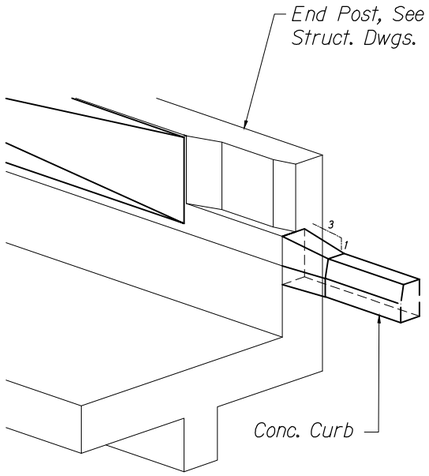
TYPICAL TYPE 3 THRIE BEAM METAL GUARDRAIL

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

Scale: None Date: Oct. 10, 2011

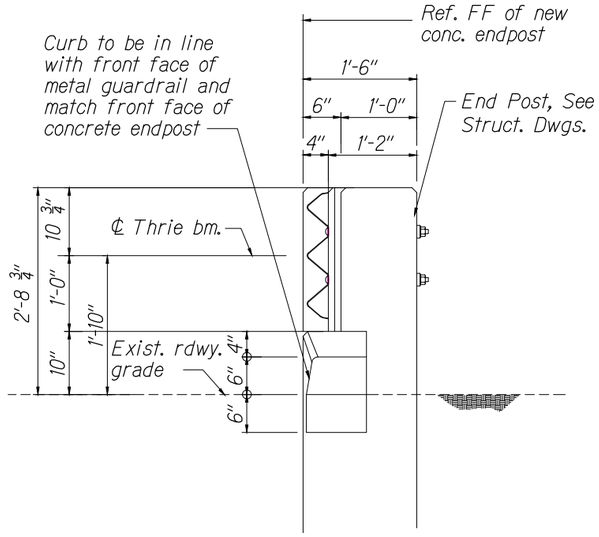
SHEET No. C-7 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	23	135



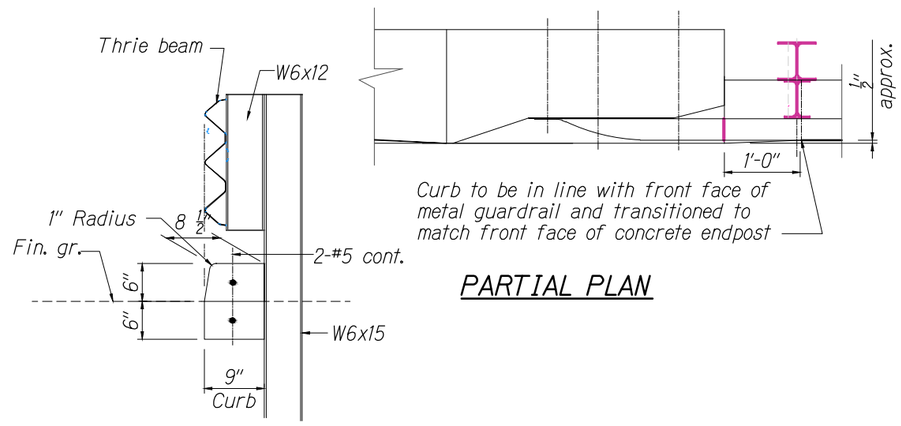
PARTIAL ISOMETRIC VIEW TYPE "D2" ENDPOST

A C-7 | C-7 NOT TO SCALE



SECTION

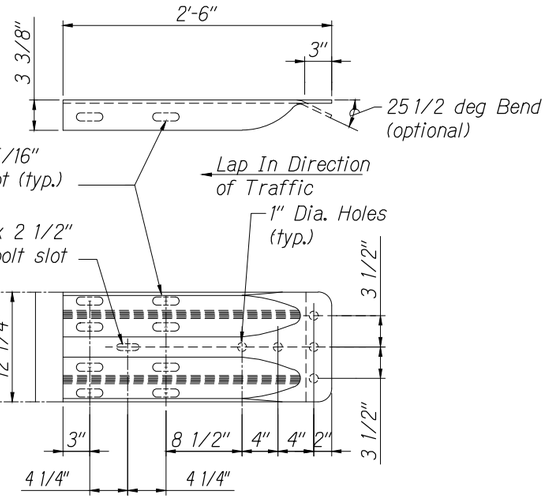
B C-7 | C-8 NOT TO SCALE



PARTIAL PLAN

SECTION

C C-7 | C-8 NOT TO SCALE

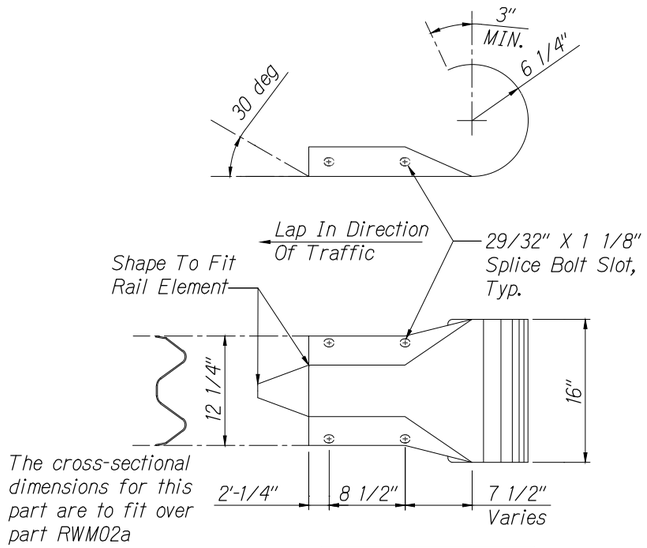


The cross-sectional dimensions for this part are to fit over part RWM02b on the approach end and under part RWM02b on the trailing end.

Designator	Base Metal Thickness
RWM02b	10 Gauge

1 C-7 | C-7 W-BEAM TERMINAL CONNECTOR (RWE02b)

NOT TO SCALE



The cross-sectional dimensions for this part are to fit over part RWM02a

Designator	Base Metal Thickness
RWM02a	12 Gauge

2 C-7 | C-7 W-BEAM END SECTION (ROUNDED RWE03a)

NOT TO SCALE

ORIGINAL PLAN | NOTEBOOK No. ____

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

Plotted: Mon, 10 Oct 2011 - 4:18pm By: DYANOS
File Name: H:\FY2008\08616 Umauma Bridge\07 Drawings\C-08 UMAUMA - Terminal Connector and End Section.dwg

WILLIAM H. Q. SOH 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

GUARDRAIL TERMINAL CONN & END SECTION DETAIL

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

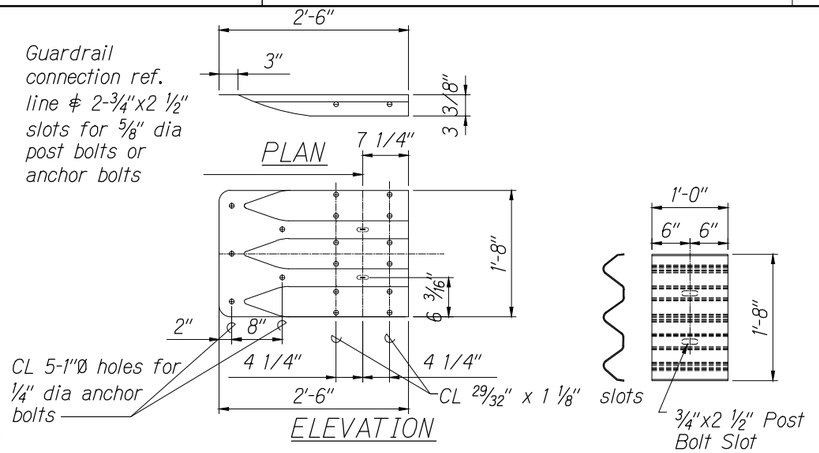
Scale: None Date: Oct. 10, 2011

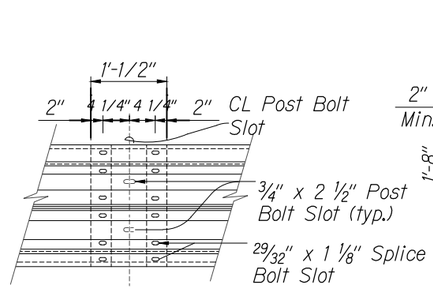
SHEET No. C-8 OF 19 SHEETS

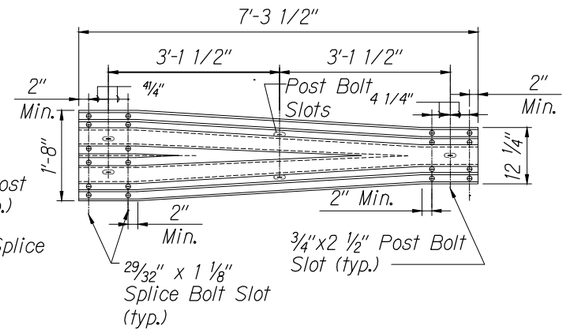
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	24	135

NOTES:

1. The work necessary to connect guardrail to concrete end post shall include all labor, materials, tools, equipment and incidentals necessary to complete the work and will not be paid for separately.
2. Lap terminal connector and rail element in direction of traffic to prevent snagging.
3. All anchor bolts shall be high strength bolts conforming to the requirements of ASTM 325 and Standard Specification, Section 713.04.
4. Anchor bolt length shall be such that a snug fit of the elements and full thread engagement plus 1/4" (max) is attained.
5. "Terminal Connector", "Transition Section" and thrie beam shall be fabricated from 10gauge steel conforming to the requirements of AASHTO M 180, Type II, Class B.
6. "Terminal Connector" and standard spacer, including all anchor bolts, cap PL, nuts and washers, shall be hot-dip galvanized after fabrication.
7. Cap PL shall be fabricated from ASTM A 36.
8. First 25'-0" of guardrail adjoining "Terminal Connector" shall be galvanized steel and supports spaced as shown on the detail drawings. This section of rail shall be placed on tangent to end post or parallel to roadway, unless conditions at site renders it impossible to do so. Flare point to be determined in field.
9. Double (nest 1st panel) thrie beam elements at all end post connections, except on highways with one-way traffic pattern, use single thrie beam elements at end post on trailing end only.
10. Where double (nested) beam occur, 12" "Back-up Plate" not required.
11. Heads of through anchor bolts shall be placed on the traffic side of the rail.
12. All steel shapes, rails and plates shall conform to ASTM A 36 specifications.





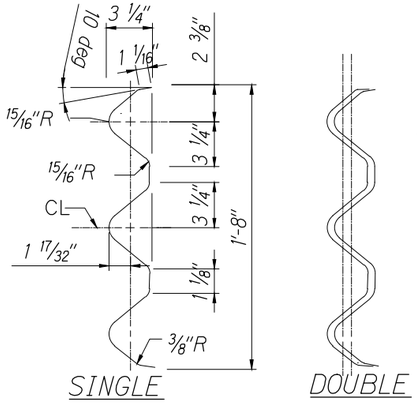


1 C-9 C-9 TERMINAL CONNECTOR (Use at Posts where Splices do not occur)
NOT TO SCALE

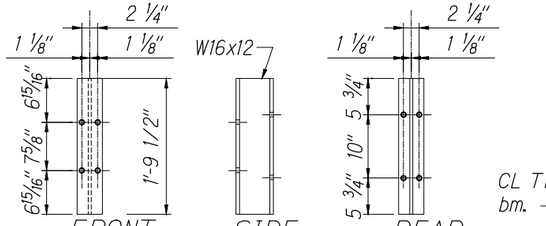
2 C-9 C-9 BACKUP PLATE
NOT TO SCALE

3 C-9 C-9 RAIL SPLICE
NOT TO SCALE

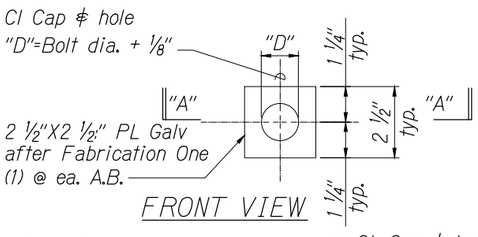
4 C-9 C-9 TRANSITION SECTION
NOT TO SCALE

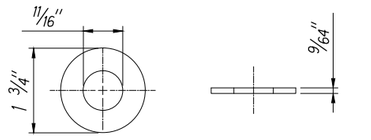


5 C-9 C-9 NOT TO SCALE

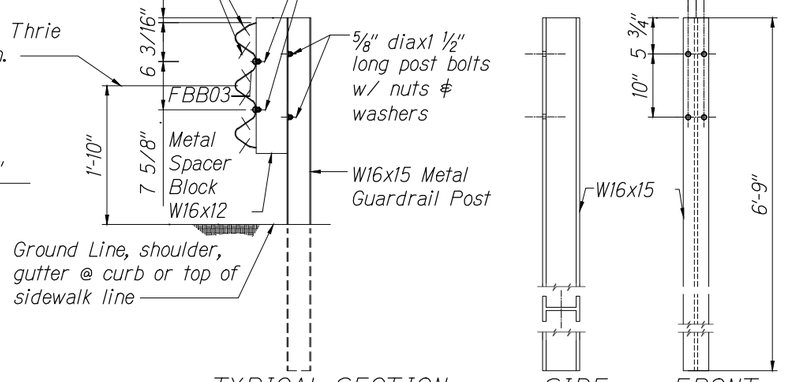


6 C-9 C-9 NOT TO SCALE



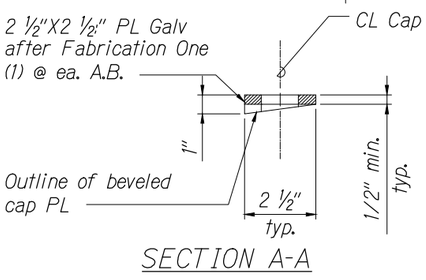


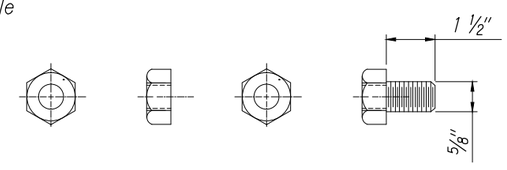
L	Thread Length
1 ¼"	Full thread
2"	1 ½" min. thread length

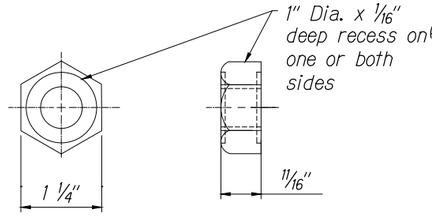


7 C-9 C-9 NOT TO SCALE

8 C-9 C-9 POST DET
NOT TO SCALE







9 C-9 C-9 METAL GUARDRAIL TYPE 3 THRIE BEAM AND APPURTENANCE DETAILS
NOT TO SCALE

ORIGINAL PLAN | NOTEBOOK No. ____
SURVEY PLOTTED BY ____ DATE ____
DRAWN BY ____
TRACED BY ____
DESIGNED BY ____
QUANTITIES BY ____
CHECKED BY ____
Plotted: Mon, 10 Oct 2011 - 4:18pm By: DYANOS
File Name: H:\FY2008\08616 Umauma Bridge\07 Drawings\C-09 UMAUMA - Guard Rail Details 4.dwg

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

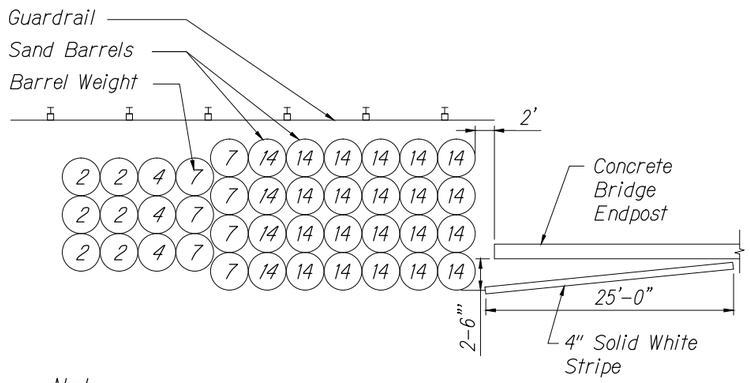
GUARDRAIL TYPE 3 THRIE BEAM & APPURTENANCE DET

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

Scale: None Date: Oct. 10, 2011

SHEET No. C-9 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	25	135



Notes:

1. Numbers indicate weight of sand in 100 lb. units
2. Installation shall conform to Manufacturer's recommendations and Roadside Design Guide.

1 C-12 C-10 INERTIAL BARRIER SYSTEM DETAIL

NOT TO SCALE

ORIGINAL PLAN | NOTEBOOK | No.

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

Plotted: Mon, 10 Oct 2011 - 4:19pm By: DYARIS
File Name: H:\FY2008\08016 Umauma Bridge\07 Drawings\C-10 UMAUMA — Miscellaneous Details.dwg

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

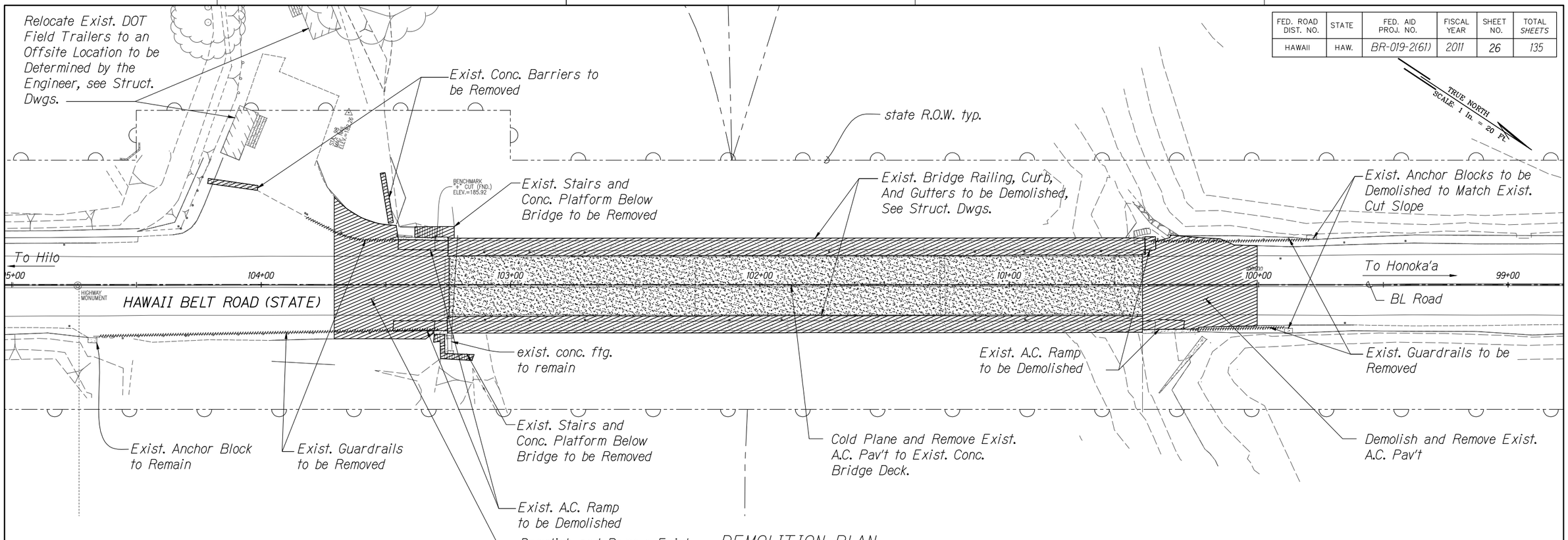
MISCELLANEOUS DETAILS

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

Scale: None Date: Oct. 10, 2011

SHEET No. C-10 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	26	135



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'

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

Plotted: May. 10, 2011 - 4:10pm By: DYAMOS
File Name: H:\FY2008\080516 Umauma Bridge\07 Drawings\C-11 UMAUMA - Demolition Plan.dwg

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

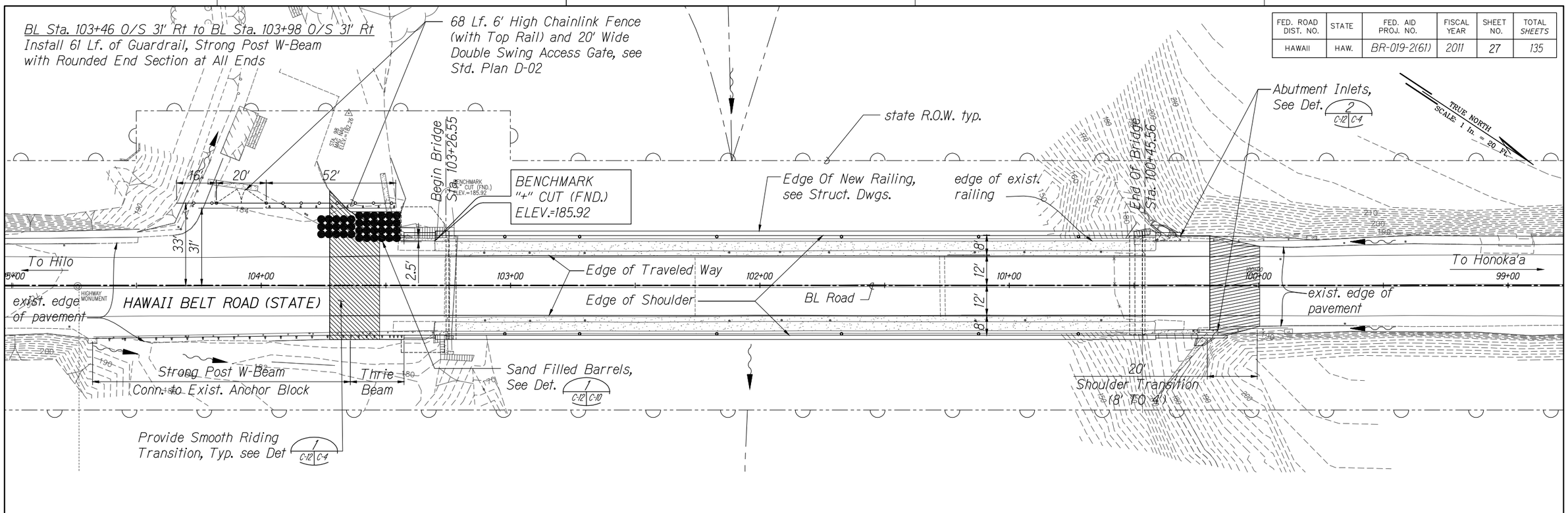
DEMOLITION PLAN

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

Scale: 1" = 20' Date: Oct. 10, 2011

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)	2011	27	135



SITE PLAN
SCALE: 1" = 20'

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SITE PLAN

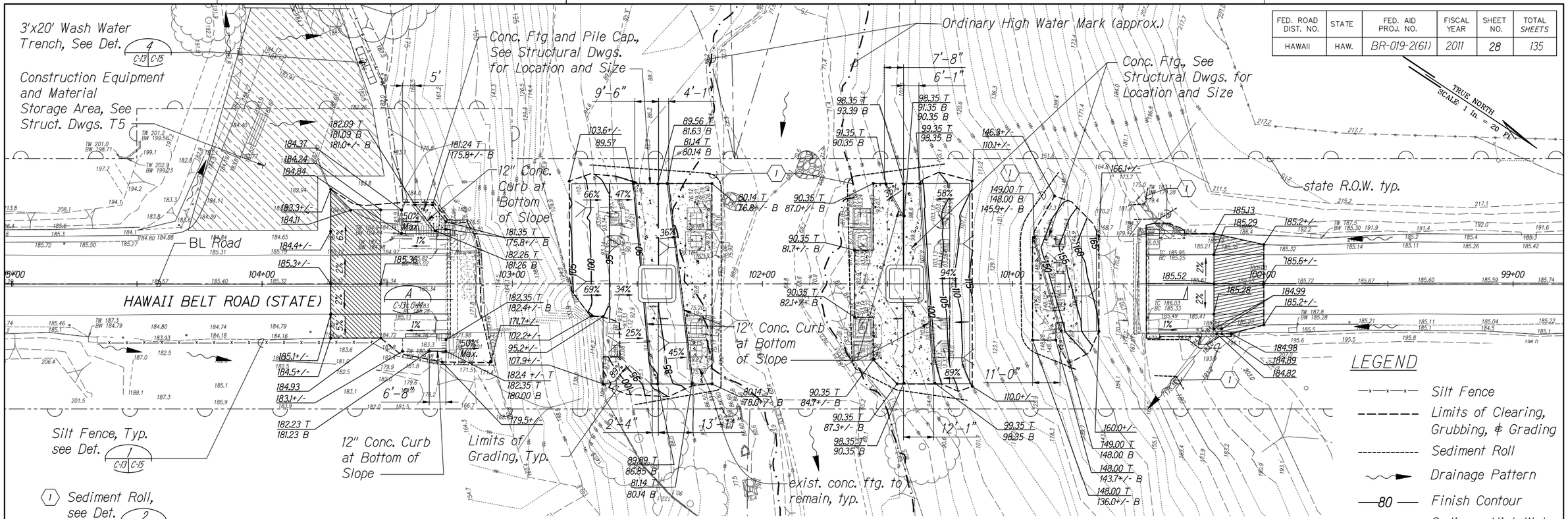
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1" = 20' Date: Oct. 10, 2011

SHEET No. C-12 OF 19 SHEETS

ORIGINAL PLAN
NOTEBOOK No.
SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
Plotted: Mon, 10 Oct 2011 - 4:19pm By: DYANOS
File Name: H:\FY2008\08616 Umauma Bridge\07 Drawings\C-12 UMAUMA - Site Plan.dwg

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	28	135



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 a DOH approved facility.
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

GRADING AND EROSION CONTROL PLAN
SCALE: 1" = 20'

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

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

PLOTTED: Mon, 10 Oct 2011 4:19pm By: DYANOS
File Name: N:\FY2008\0816 Umauma Bridge\07 Drawings\C-13 to C-15 UMAUMA - Grading and Erosion Control Plan and Section.dwg

WILLIAM H. Q. SOW 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

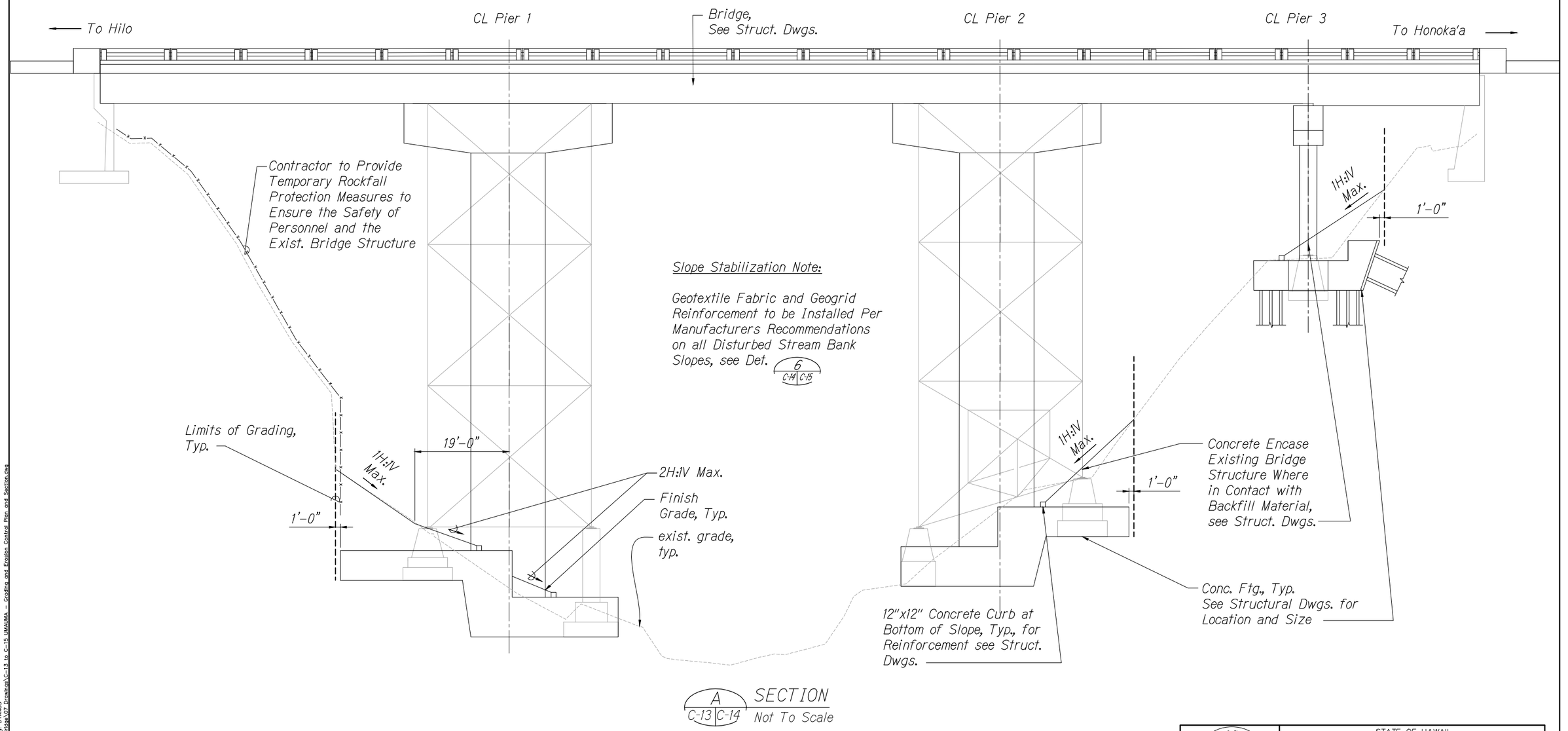
GRADING AND EROSION CONTROL PLAN

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

Scale: 1" = 20' Date: Oct. 10, 2011

SHEET No. C-13 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	29	135



A C-13 C-14 SECTION
Not To Scale

ORIGINAL PLAN

NOTEBOOK No.

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

Plotted: May 10, 2011 4:19pm By: DYANOS
File Name: H:\FY2008\08016 Umauma Bridge\07 Drawings\C-13 to C-15 UMAUMA - Grading and Erosion Control Plan and Section.dwg

WILLIAM H. Q. BOW
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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

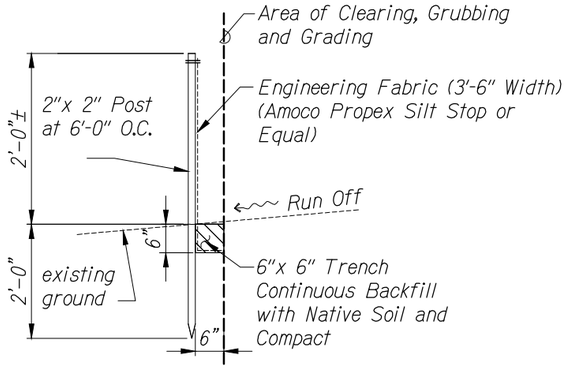
SECTION

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

Scale: None Date: Oct. 10, 2011

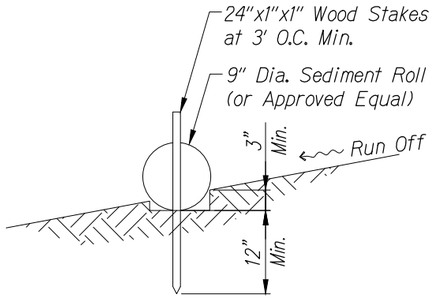
SHEET No. C-14 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	30	135



1 C-13 C-15 TYPICAL SILT FENCE DETAIL

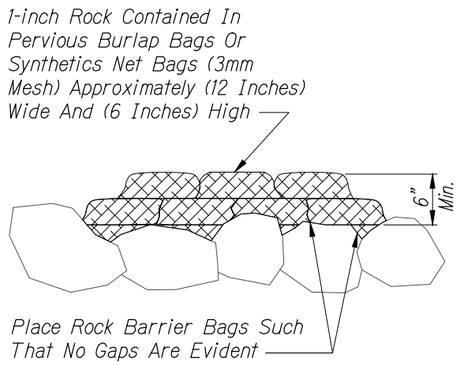
Not To Scale



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 3 C-15 C-15

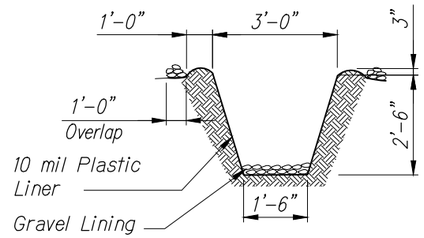
2 C-13 C-15 SEDIMENT ROLL DETAIL

Not To Scale



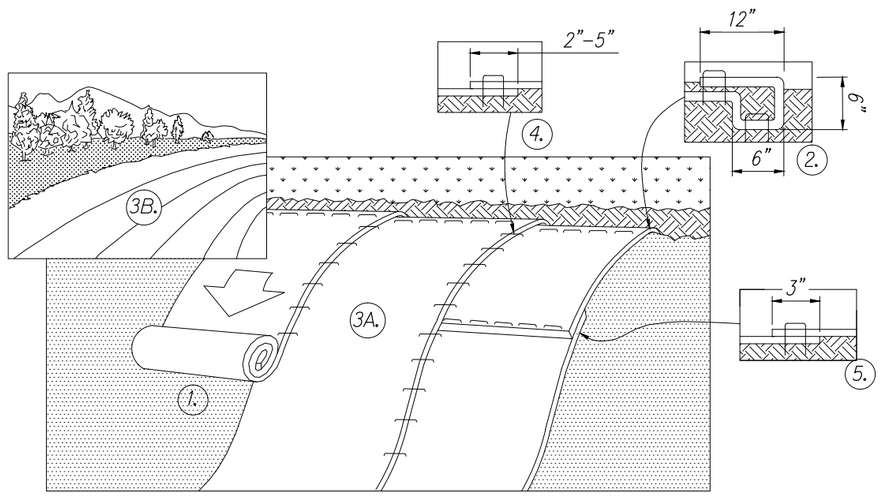
3 C-15 C-15 ROCK BARRIER BAG DETAIL

Not To Scale



4 C-13 C-15 WASH WATER TRENCH DETAIL

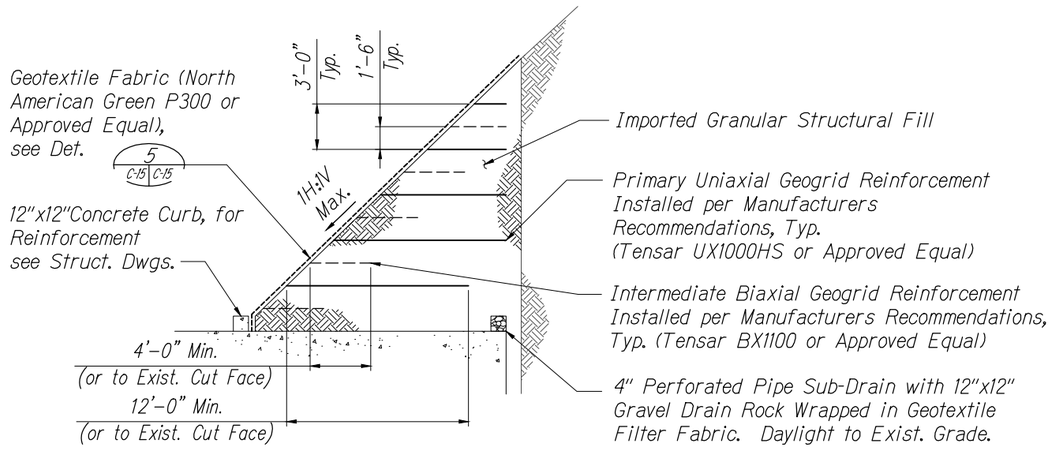
Not To Scale



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.

5 C-14, C-15 C-15 GEOTEXTILE FABRIC INSTALLATION DETAIL

NOT TO SCALE



6 C-14 C-15 TYPICAL SLOPE STABILIZATION DETAIL

NOT TO SCALE

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

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

EROSION CONTROL DETAILS

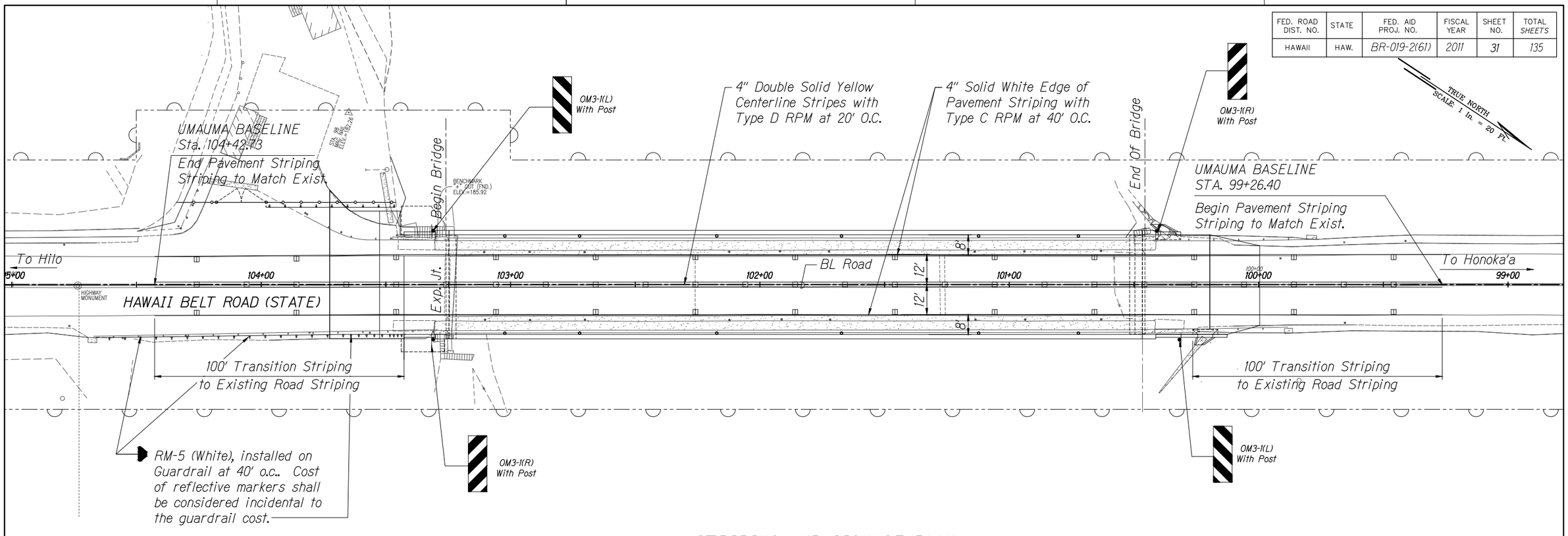
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: Oct. 10, 2011

SHEET No. C-15 OF 19 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTEBOOK | No. | Plotted: May 10, 2012 @ 4:19pm By: DYANOS
File Name: H:\FY2008\080616 Umauma Bridge\07 Drawings\C-13 to C-15 UMAUMA - Grading and Erosion Control Plan and Section.dwg

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	31	135



STRIPING AND SIGNAGE PLAN
SCALE: 1" = 20'

GENERAL NOTES

1. Layout of pavement markings and striping shall be done by the Contractor and approved by the Engineer prior to any installation work.
2. Existing pavement markings not incorporated in the final traffic pattern shall be removed as directed by the Engineer. Cost shall be incidental to the various pavement marking items.
3. Final locations of all signs shall be approved by the Engineer prior to any installation work.
4. Existing signs not shown on these plans shall remain as posted unless otherwise directed by the Engineer. Removal and disposal of existing signs and/or posts as designated on these plans or directed by the Engineer shall be considered incidental to the various signing items.
5. All pavement striping shall be as noted on the Legend or plans.
6. Removal of existing delineators and posts as directed by the Engineer shall be considered incidental to the various signing items.
7. Existing signs that are to be replaced shall not be removed until new signs are installed as replacements, or the messages are no longer valid or necessary.
8. All new and relocated signs and markers installed on pipe or light standard are to be mounted with band brackets and steel braces.

STRIPING LEGEND

4" Double Solid Yellow Centerline Stripes with Type D Raised Pavement Markers @ 20'-0" O.C. (Thermoplastic Extrusion)

4" White Edge Stripe with Type C Raised Pavement Markers @ 40'-0" O.C. (Thermoplastic Extrusion)

GRAPHIC SCALE:

20 10 0 20 40

1" = 20'

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

Plotted: Mon, 10 Oct 2011 - 7:19pm By: DYANOS
File Name: h:\FY2008\08016_Umauma_Bridge\07 Drawings\C-16_UMAUMA - Striping Plan.dwg

WILLIAM H. Q. BOW
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LICENSE EXPIRES: 4/30/12
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

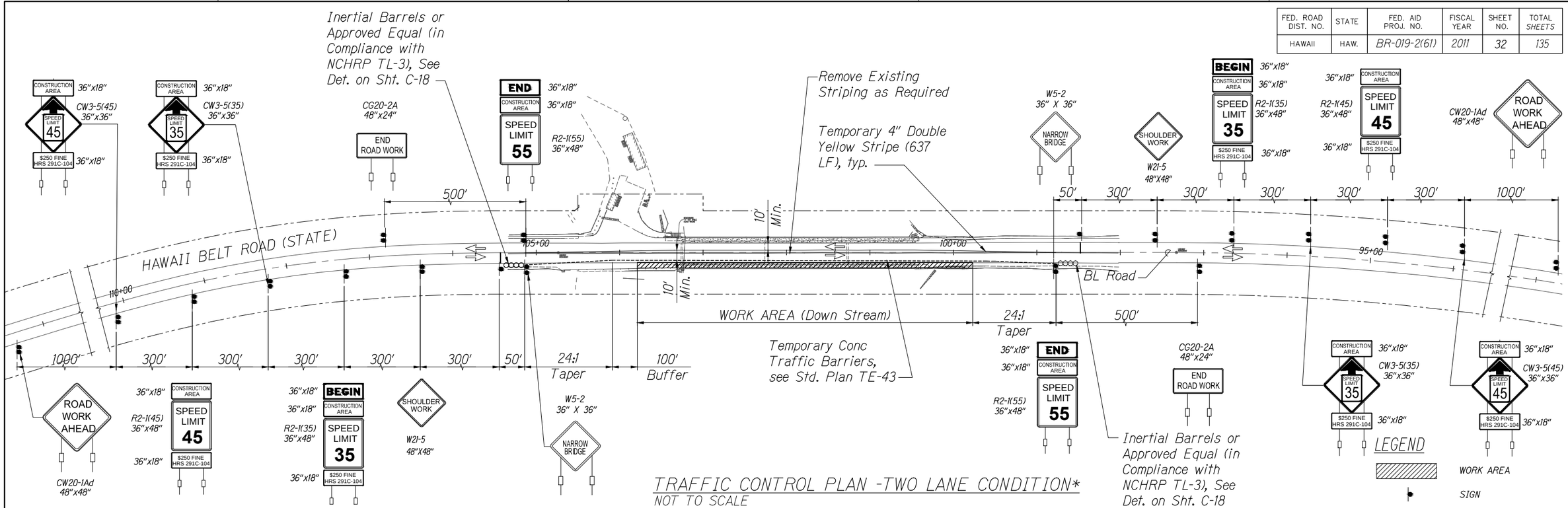
STRIPING AND SIGNAGE PLAN

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

Scale: 1" = 20' Date: Oct. 10, 2011

SHEET No. C-16 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	32	135



TRAFFIC CONTROL PLAN -TWO LANE CONDITION*

NOT TO SCALE

* Upstream Work Traffic Control Plan Opposite

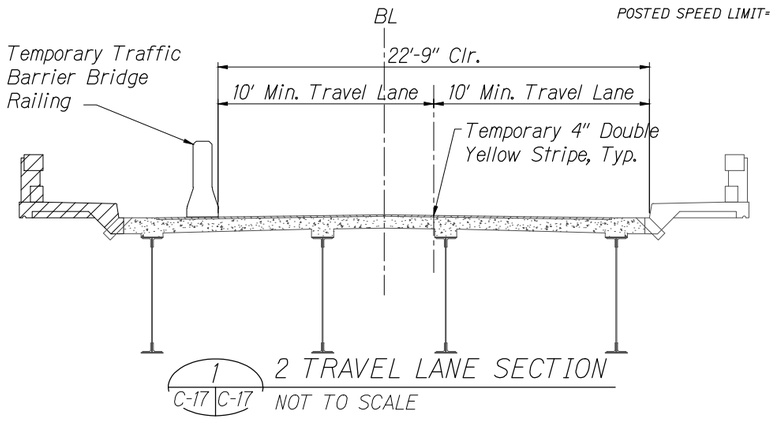
TRAFFIC CONTROL NOTES

1. The permittee shall make minor adjustments at intersection, driveways, bridges, structures, etc., to fit field conditions.
2. Cones or delineators shall be extended to a point where they are visible to approaching traffic.
3. Traffic control devices shall be installed such that the sign or device farthest from the work area shall be placed first. The others shall then be placed progressively toward the work area.
4. Regulatory and warnings signs within the construction zone that are in conflict with the traffic control plans shall be removed or covered. All signs shall be restored upon completion of the work.
5. Flaggers and/or police officers shall be in sight of each other or in direct communication at all times.
6. When required by the issuing office, the permittee shall install a flashing arrow signal as shown on the traffic control plans.
7. Sign spacings, (d) taper lengths (t) and spacing or cones or delineators shall be as shown in table 1, unless otherwise noted on the traffic control plans.
8. All traffic lanes shall be a minimum of 10 feet wide.
9. All construction warning signs shall be promptly removed or covered whenever the message is not applicable or not in use.

TABLE 1 FOR TRAFFIC CONTROL PLAN

POSTED SPEED LIMIT (M.P.H.)	SIGN SPACING (FEET) (L)	TAPER LENGTH (T) (FEET)		LONGITUDINAL BUFFER SPACE (B) (FEET)	SPACING OF CONES OR DELINEATORS (FEET)		
		W=12' OR LESS ②	W=GREATER THAN 12' ②		TAPER	TANGENT	WORK AREA
20	250	200	W x 17	35	20	20	10
25	250	200	W x 17	55	25	25	10
30	250	250	W x 20	85	30	30	10
35	250	250	W x 20	120	35	35	10
40	500	350	W x 30	170	40	40	10
45	500	550	W x 45	220	45	45	10
50	1000	600	W x 50	280	50	50	10
55	1000	700	W x 55	335	55	55	10

NOTE: ② W = WIDTH OF SHOULDER OR OFFSET



1 C-17 C-17 2 TRAVEL LANE SECTION

NOT TO SCALE

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

Plotted: Mon, 10 Oct 2011 - 7:16am By: DYAMOS
File Name: H:\FY2008\08016 Umauma Bridge\07 Drawings\C-17 thru C-19 UMAUMA — Traffic Control Plan.dwg

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

TRAFFIC CONTROL PLAN

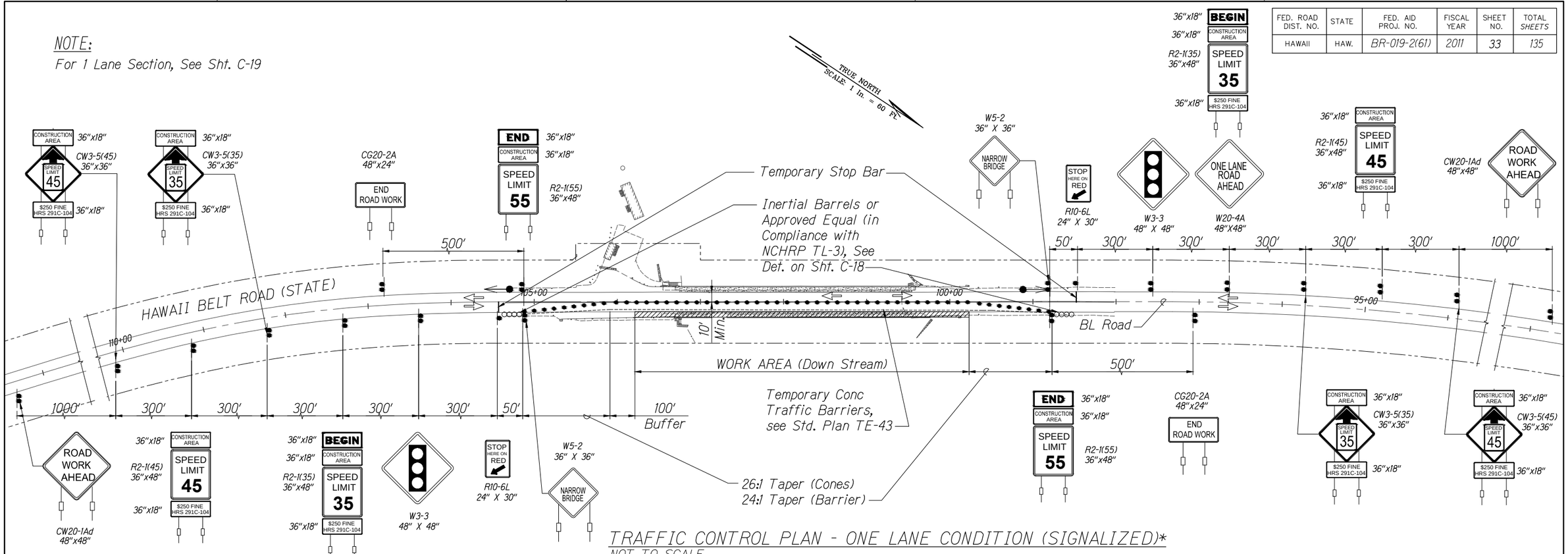
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: None Date: Oct. 10, 2011

SHEET No. C-17 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	33	135

NOTE:
For 1 Lane Section, See Sht. C-19

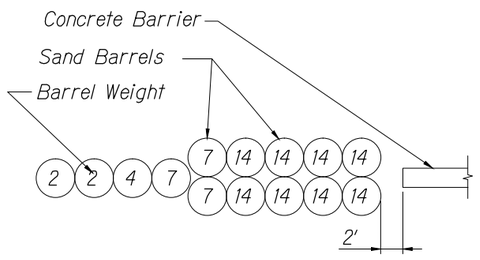


TRAFFIC CONTROL PLAN - ONE LANE CONDITION (SIGNALIZED)*
NOT TO SCALE

* Upstream Work Traffic Control Plan Opposite

TRAFFIC CONTROL NOTES (Cont.)

10. The backs of all signs for traffic control shall be appropriately covered to preclude the display of inapplicable sign messages (i.e., when signs have messages on both sides).
11. At the end of each day's work or as soon as the work is completed, the permittee shall remove all traffic control devices no longer needed to permit free and safe passage of public traffic. Removal shall be in reverse order of installation.
12. Replace permanent pavement markings and traffic signs upon completion of each phase of work.
13. All work zone traffic control devices shall comply with the "Statewide Guideline for Work Zone Traffic Control Devices" dated September 13, 2000.
14. High level warning device (flag tree) shall be installed on approach to all work areas.
15. Install steady burn amber lamps on portable concrete barrier @ 20.0' o.c. Installing, maintaining, and changing batteries of the Portable Mounted Steady Burn Amber Lamps shall be considered incidental to the various items of work.
16. All signs shall be installed on 2 osts per std. plan TE-02A.
17. Each construction warning sign and work zone speed limit assembly shall have a minimum of two (2) Type II OM. Installation of each Type II OM shall be considered incidental to the various items of work.
18. Placement of construction signs shall not obstruct the path of pedestrians and bicyclists.



TEMPORARY INERTIAL BARREL SYSTEM
NOT TO SCALE

Notes:

1. Numbers indicate weight of sand in 100 lb. units
2. Typical layout will vary based on speed and manufacturer of system used. Installation shall conform to Manufacturer's recommendations and Roadside Design Guide.
3. Ends of portable barriers shall be protected with Sand Filled Barrels as shown on Construction Phasing Plans.
4. Providing, transporting, placing, relocation of barrels shall be considered incidental to the various items of work.

LEGEND

- WORK AREA
- SIGN
- CONE OR DELINEATOR
- DIRECTION OF TRAFFIC
- TRAFFIC SIGNAL
- CONCRETE BARRIERS
- SAND FILLED BARRELS

POSTED SPEED LIMIT= 55 MPH

ORIGINAL PLAN | NOTEBOOK No. ____ | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
Plotted: May 10, 2012 - 4:19pm By: DYANOS
File Name: H:\FY2008\08016 Umauma Bridge\07 Drawings\C-17 thru C-19 UMAUMA - Traffic Control Plan.dwg

WILLIAM H. Q. BOW
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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

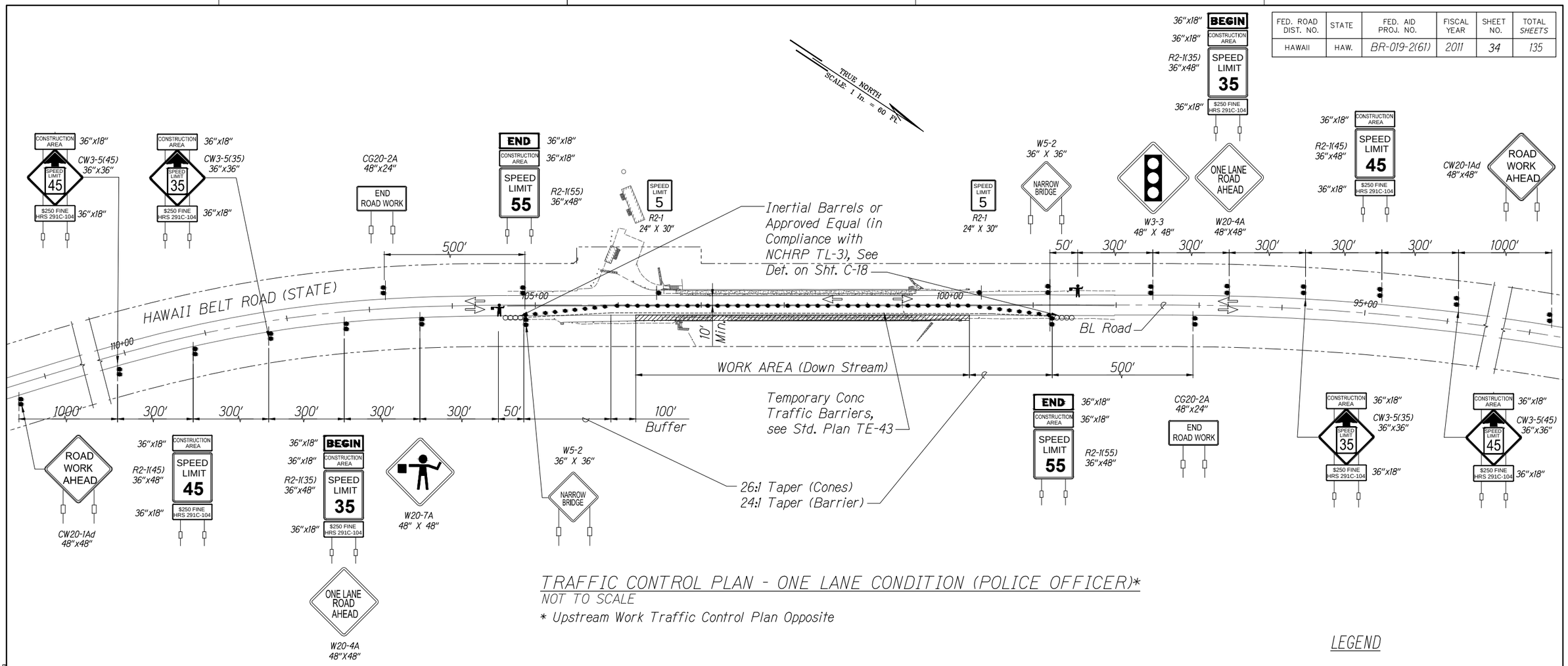
TRAFFIC CONTROL PLAN

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

Scale: None Date: Oct. 10, 2011

SHEET No. C-18 OF 19 SHEETS

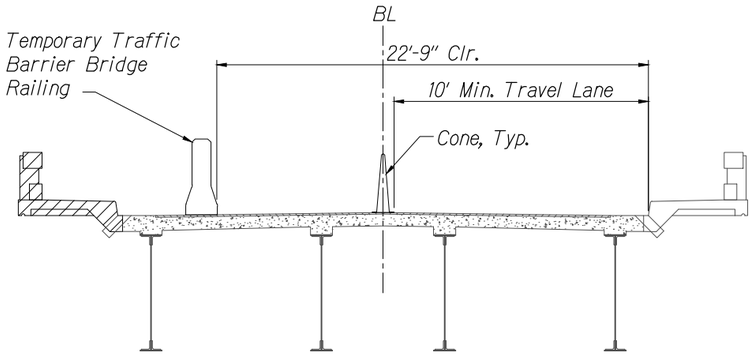
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	34	135



TRAFFIC CONTROL PLAN - ONE LANE CONDITION (POLICE OFFICER)*

NOT TO SCALE

* Upstream Work Traffic Control Plan Opposite



1 TRAVEL LANE SECTION

C-18 C-19 C-19 NOT TO SCALE

Note:

Contractor Shall Provide a County Police Officer on Each Side of the Bridge During Phase 4 and 8 (as Shown on the Structural Sheet S15.1). The Police Officers Shall Direct Traffic And Enforce A 5 Mph Speed Limit For All Vehicles Traversing The Bridge. All Associated Costs Shall Be Paid Under Item 645.1000.

LEGEND

- WORK AREA
- SIGN
- CONE OR DELINEATOR
- DIRECTION OF TRAFFIC
- POLICE OFFICER
- CONCRETE BARRIERS
- SAND FILLED BARRELS

POSTED SPEED LIMIT= 55 MPH

ORIGINAL PLAN | NOTEBOOK | No. | DATE
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DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
Plotted: May. 10, 2011 07:20pm By: DYAROS
File Name: H:\FY2008\08016 Umauma Bridge\07 Drawings\C-17 thru C-19 UMAUMA - Traffic Control Plan.dwg

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TRAFFIC CONTROL PLAN

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

Scale: None Date: Oct. 10, 2011

SHEET No. C-19 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	35	135

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 | 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.

LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

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: Oct. 20, 2011

SHEET No. S0.1 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	36	135

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

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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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 (CONTINUATION)

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

Scale: None Date: Oct. 20, 2011

SHEET No. S0.2 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	37	135

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:

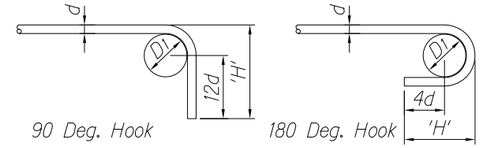
℄	And
A.B.	Anchor Bolt
Abut.	Abutment
A.C.	Asphalt Concrete
Approx.	Approximate
Ave.	Average
BL	Baseline
Blk.	Block
Bm	Beam
BOF	Bottom of Footing
Bot., (B)	Bottom
Brg.	Bearing
Bw	Bottom of Wall
c.c.	Center to Center
CL	Centerline
Clr.	Clear
Col.	Column
Conc.	Concrete
Conn.	Connection
Const. Jt.	Construction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

ABBREVIATIONS (CONTINUE):

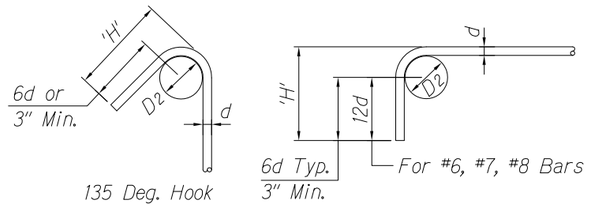
Ea.	Each
E.F.	Each Face
El, Elev.	Elevation
Eq.	Equal
Est.	Estimated
E.W.	Each Way
Exist.	Existing
Exp.	Expansion
Ext.	Exterior
Fin.	Finish
Fin. Gr.	Finish Grade
Ft.	Feet, Foot
Ftg.	Footing
Galv	Galvanized
Hk.	Hook
Horiz., (H)	Horizontal
H.S.	High Strength
ID	Inside Diameter
in.	Inch
Int.	Interior
Jt.	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	D_2	D_1
#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

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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: Oct. 20, 2011

SHEET No. S0.3 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	38	135

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.
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.

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
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

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

LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

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: Oct. 20, 2011

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)	2011	39	135

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 from the State of Hawaii Department of Transportation, Highways Division, Design Branch, Kakuhihewa Building Room 688, Kamokila Boulevard, Kapolei, Hawaii 96707, Phone no. 808-692-7546.

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".

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

LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

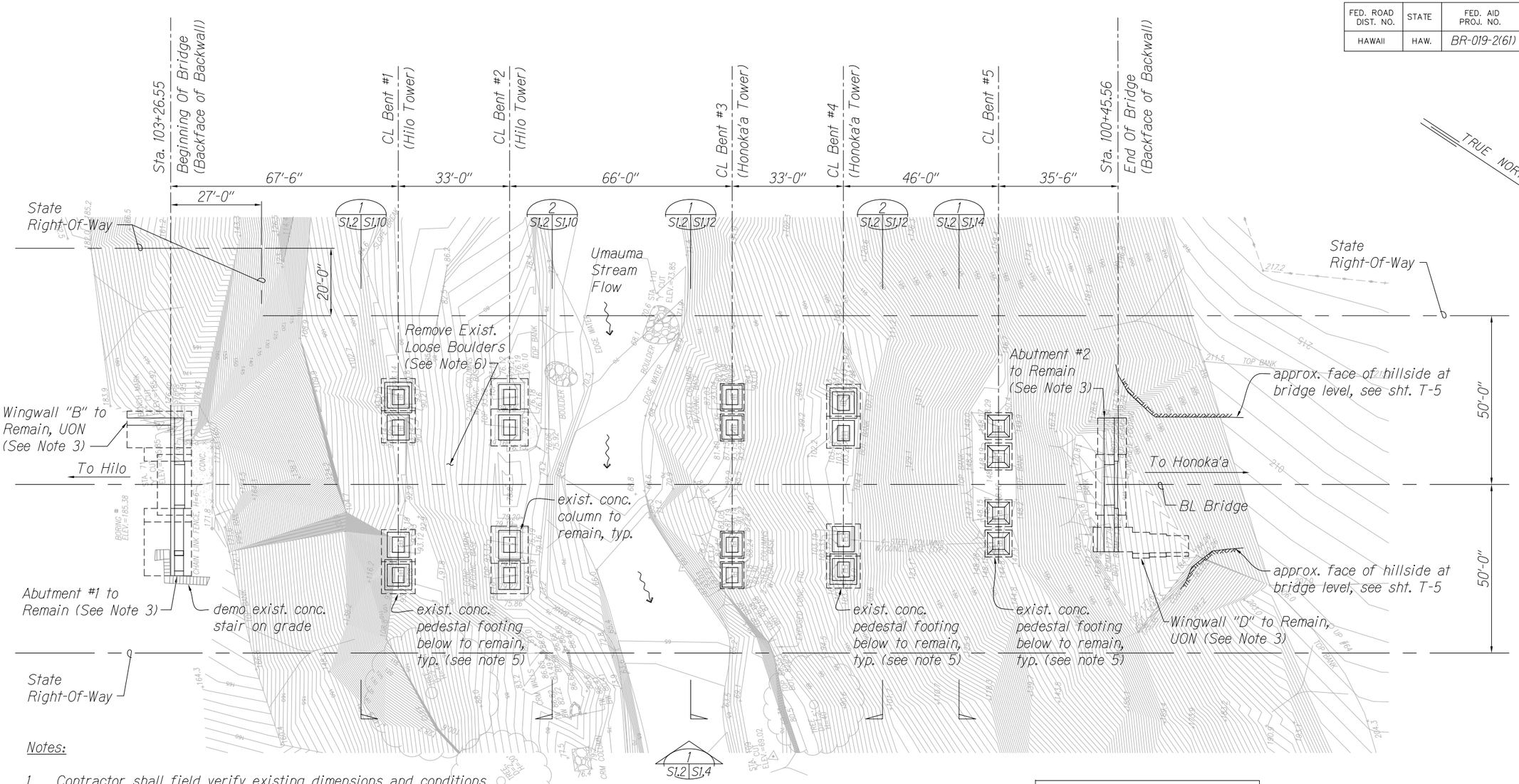
EXISTING & DEMOLITION GENERAL NOTES

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

Scale: None Date: Oct. 20, 2011

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)	2011	40	135



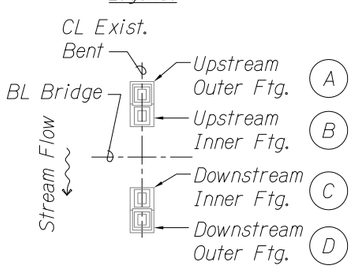
A S1.2 S1.2 EXISTING FOUNDATION PLAN
SCALE: 1/16" = 1'-0"

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.

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

Legend:



GRAPHIC SCALES:

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

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

EXISTING & DEMOLITION PLAN - FOUNDATION LEVEL

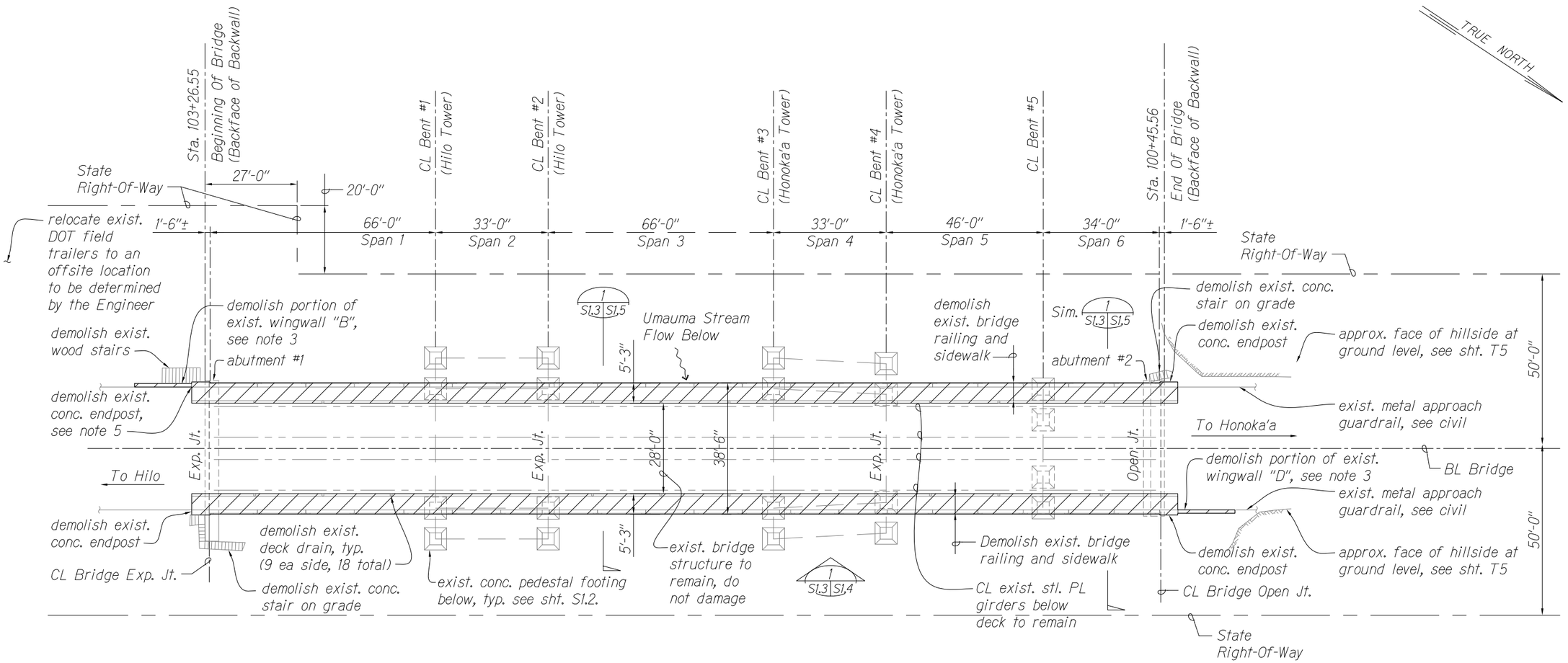
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

SHEET No. S1.2 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)	2011	41	135



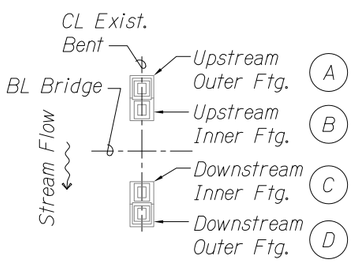
A / S1.3 | S1.3 EXISTING & DEMOLITION PLAN - BRIDGE DECK LEVEL

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-based paint on existing concrete endpost prior to demolition. See Hazardous Materials notes on sheet S1.1.
6. For construction phasing, see sheet S15.1.

Legend:



GRAPHIC SCALES:

0 1 2 4 8 16 32'

1/16"=1'-0"

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

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

EXISTING & DEMOLITION PLAN - BRIDGE DECK LEVEL

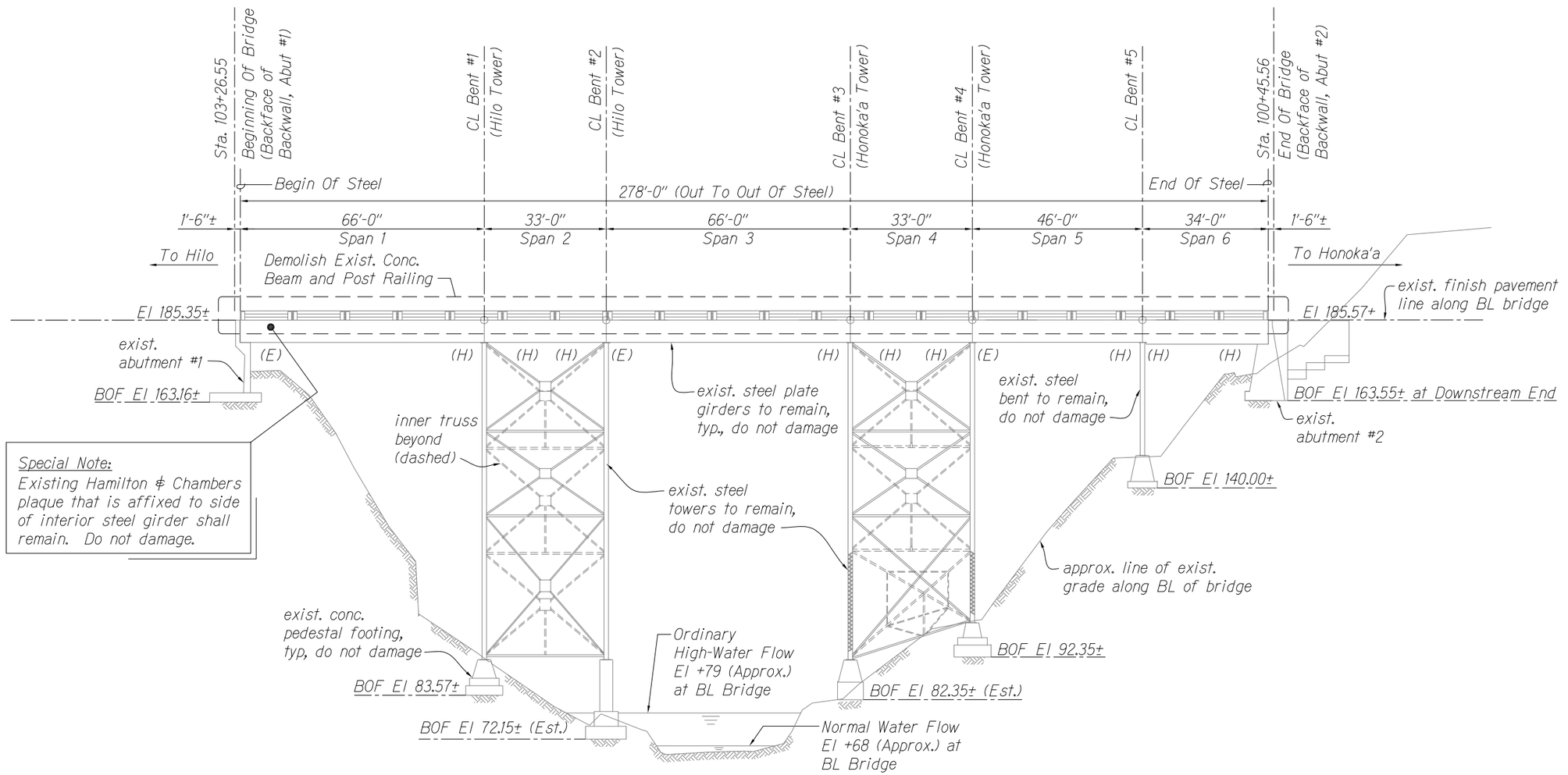
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

SHEET No. S1.3 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)	2011	42	135



1 S1.2, S1.3, S1.4 EXISTING & DEMOLITION - EAST/DOWNSTREAM ELEVATION (WEST/UPSTREAM SIMILAR)

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 | 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

LICENSE EXPIRES: 4/30/12

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

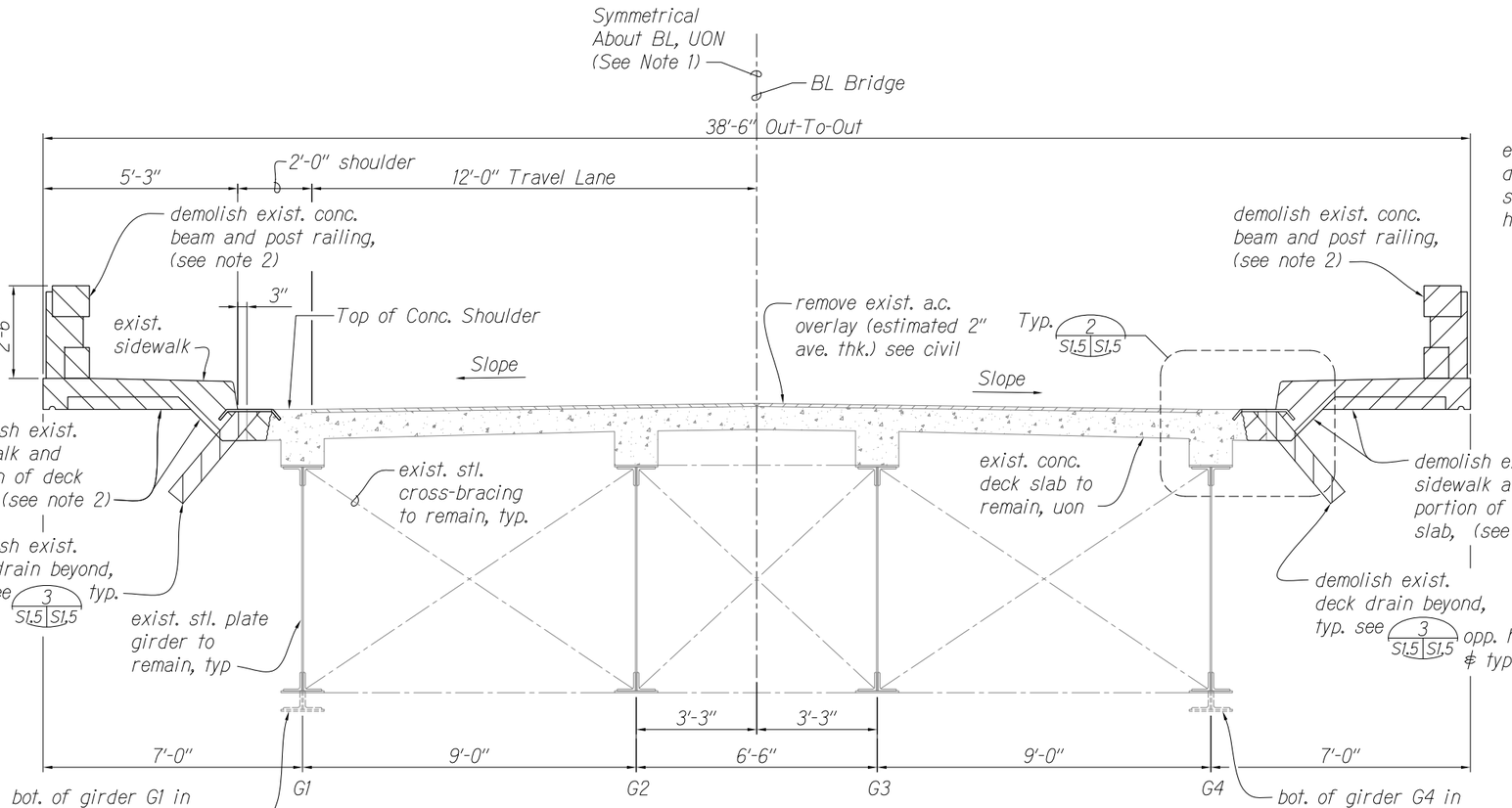
EXISTING & DEMOLITION - EAST (OR DOWNSTREAM) ELEVATION

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

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

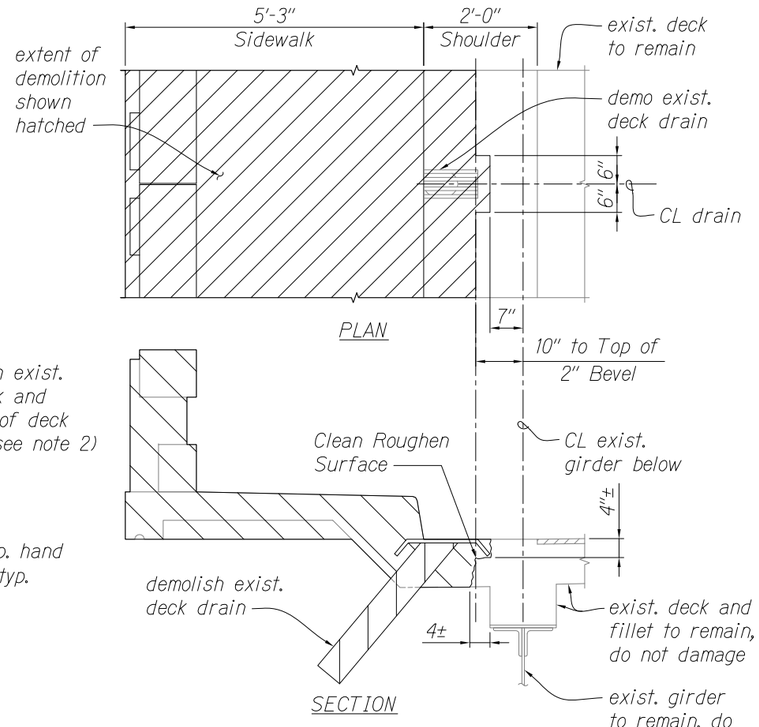
SHEET No. S1.4 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	43	135



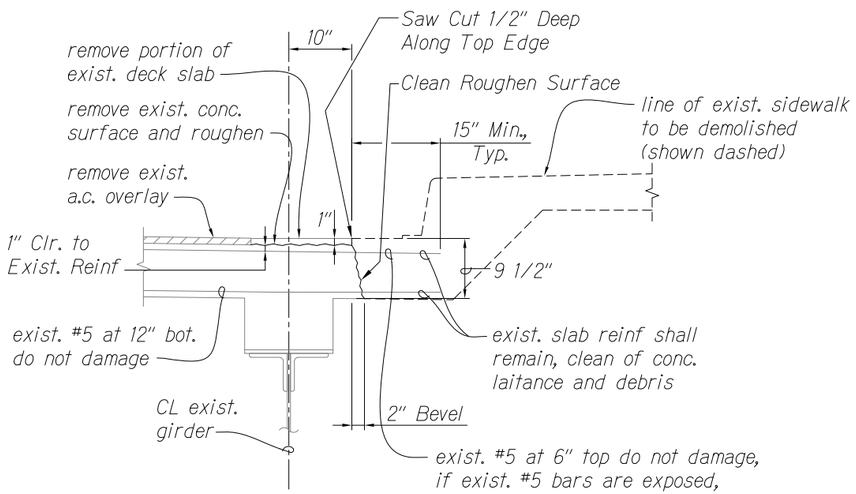
1 S1.3 S1.5 EXISTING & DEMOLITION - BRIDGE TRANSVERSE SECTION (LOOKING NORTH)

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



3 S1.5 S1.5 DETAIL AT DECK DRAIN

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



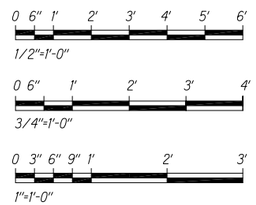
2 S1.5 S1.5 DETAIL - SECTION

SCALE: 1" = 1'-0"

Notes:

1. Contractor shall field verify existing dimensions and conditions prior to construction. Existing as-built conditions may not be symmetrical.
2. Only one side of existing bridge shall be demolished and then widened prior to demolishing the other side. See construction phasing on sheet S15.1.
3. For temporary traffic barrier/bridge railing, see civil sheets. Temporary barrier/railing shall be rated for AASHTO LRFD test level TL-3 and shall be properly secured to existing concrete deck. Contractor shall retain a Hawaii Licensed Structural Engineer to design the connection to the concrete deck. Drawings and calculations shall be stamped and signed by Contractor's Structural Engineer, and shall be submitted to the Engineer for information prior to construction.

GRAPHIC SCALES:



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

LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

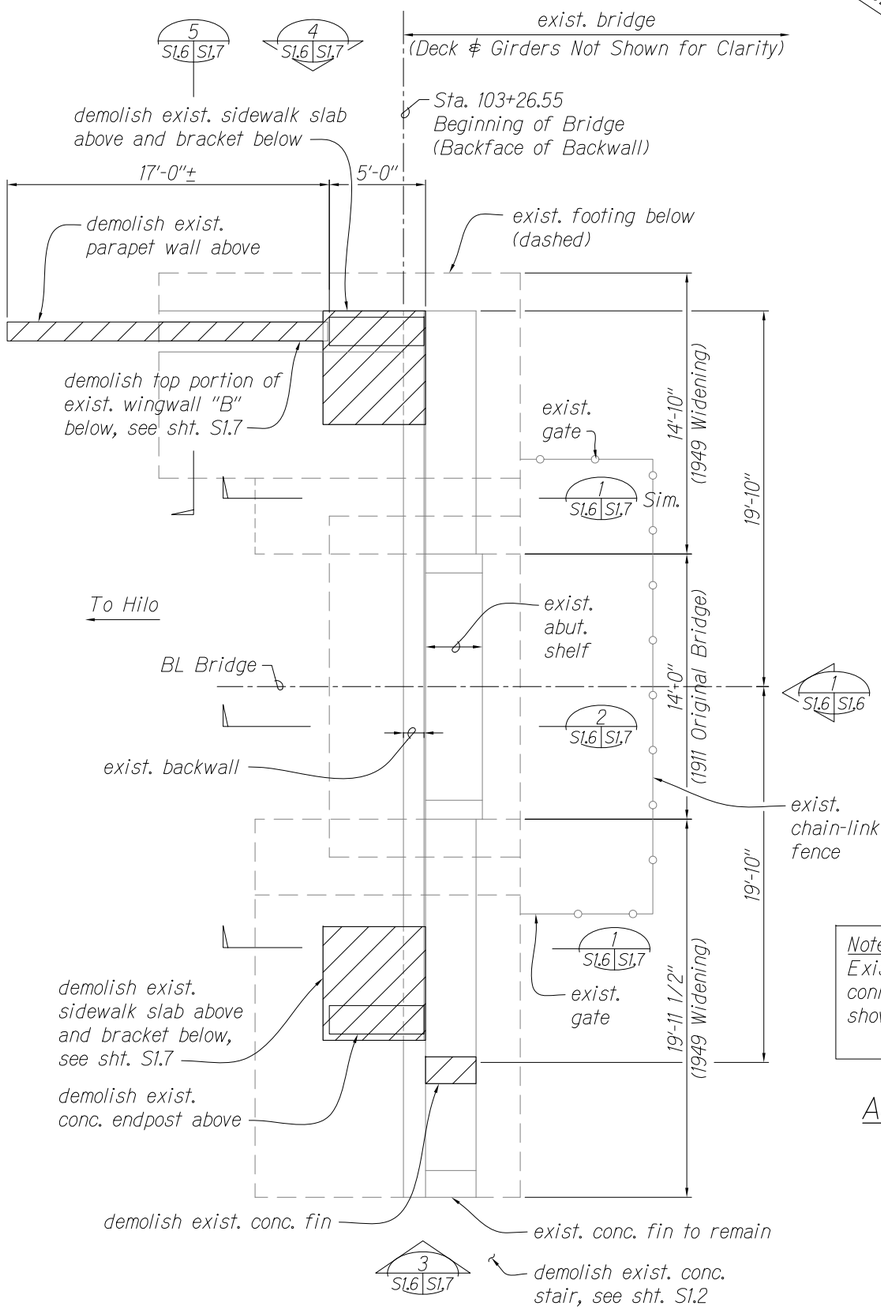
EXISTING AND DEMOLITION - BRIDGE TRANSVERSE SECTION

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

Scale: As Shown Date: Oct. 20, 2011

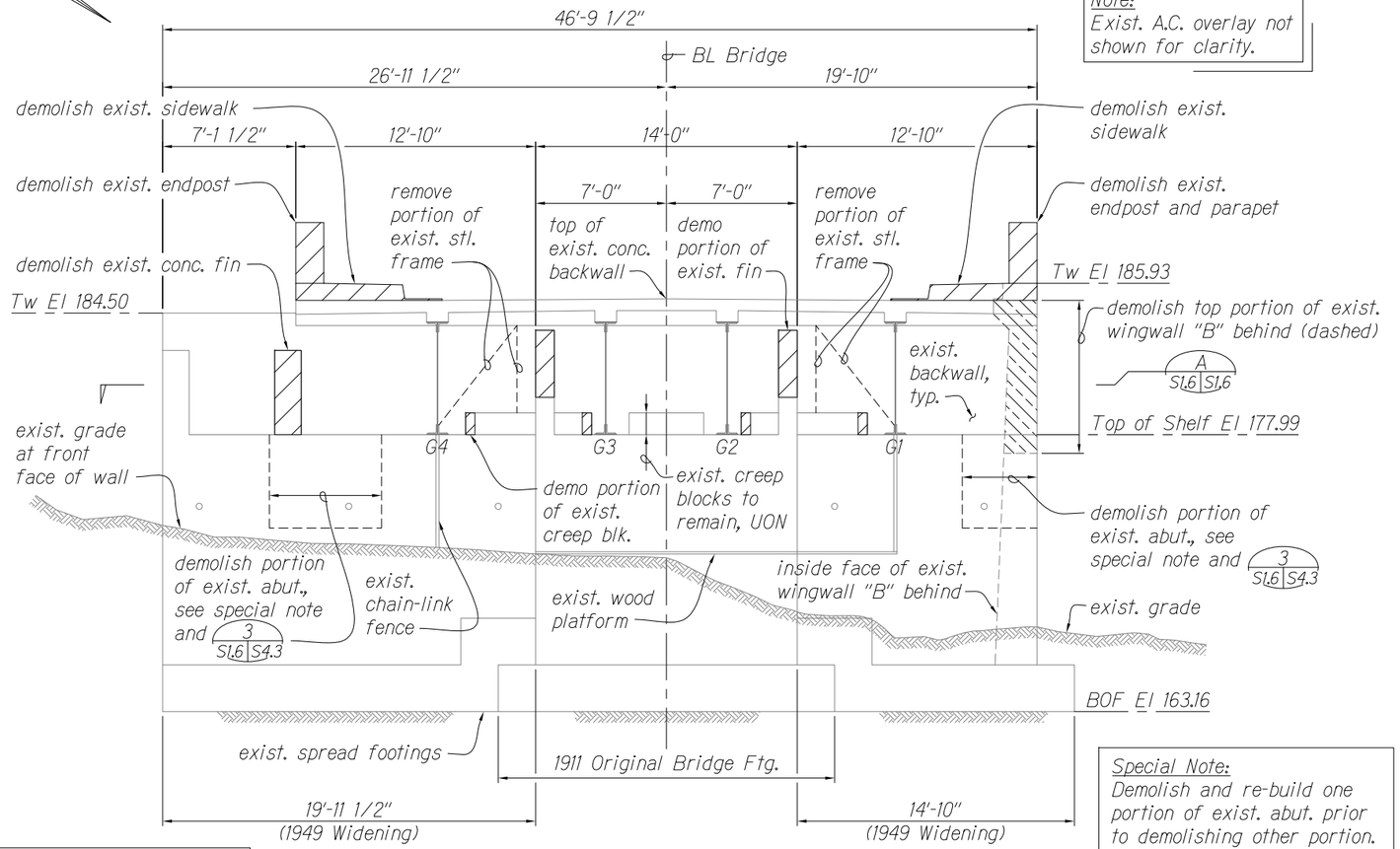
SHEET No. S1.5 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	44	135



A S1.2 & S1.6 ABUTMENT #1 - BRIDGE LEVEL & FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

TRUE NORTH



Note:
Exist. A.C. overlay not shown for clarity.

Note:
Existing steel end frame and connection to remain not shown, UON. See 1 S1.6 S9.5

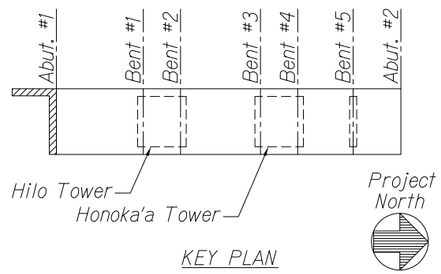
1 S1.6 S1.6 ABUTMENT #1 - FRONT ELEVATION
SCALE: 1/4" = 1'-0"

Special Note:
Demolish and re-build one portion of exist. abut. prior to demolishing other portion. Coordinate work sequence with constructuion phasing on sht. S15.1

ABUTMENT #1 - EXISTING AND DEMOLITION

GRAPHIC SCALES:

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



KEY PLAN

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A
LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING & DEMOLITION
ABUTMENT #1 - PLAN & ELEVATION

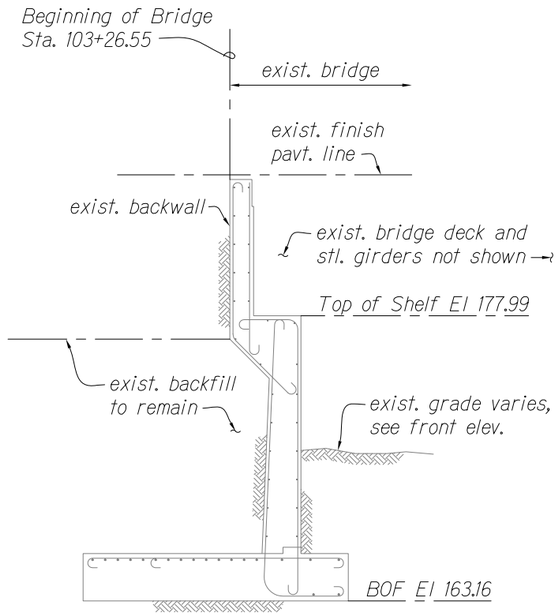
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

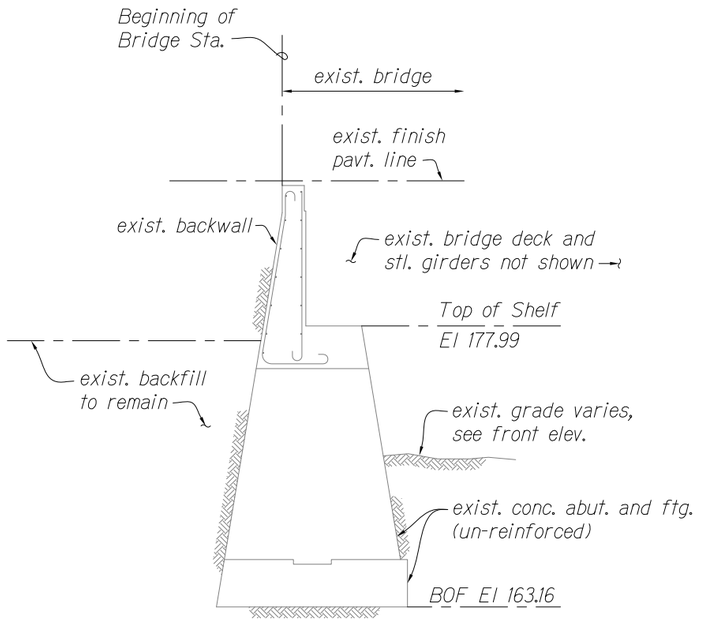
SHEET No. S1.6 OF 14 SHEETS

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

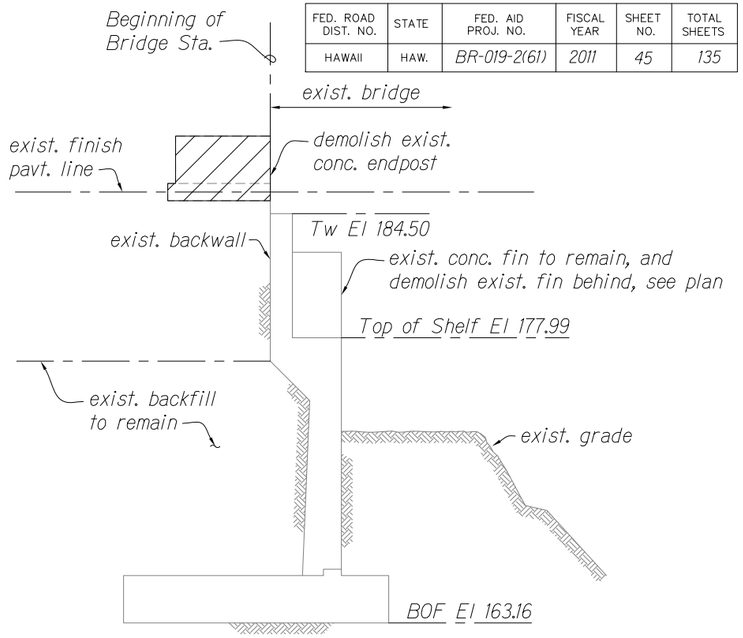
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	45	135



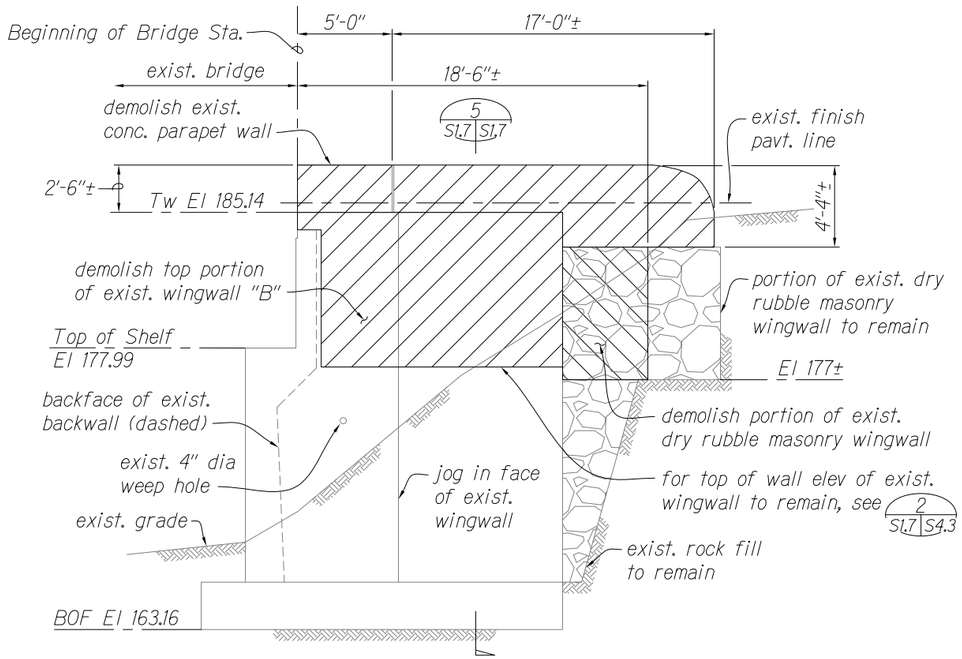
1 S1.6 S1.7 SECTION THRU 1949 WIDENING
SCALE: 1/4" = 1'-0"



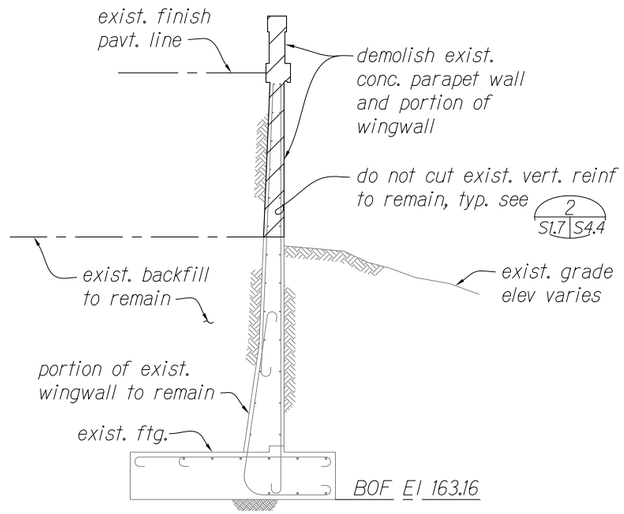
2 S1.6 S1.7 SECTION THRU 1911 ORIGINAL ABUTMENT
SCALE: 1/4" = 1'-0"



3 S1.6 S1.7 EXISTING ELEVATION "A"
SCALE: 1/4" = 1'-0"



4 S1.6, S4.3 S1.7 EXIST WINGWALL "B" - ELEVATION
SCALE: 1/4" = 1'-0"



5 S1.6 & S1.7 S1.7 SECTION AT EXIST WINGWALL "B"
SCALE: 1/4" = 1'-0"

GRAPHIC SCALES:

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

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

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

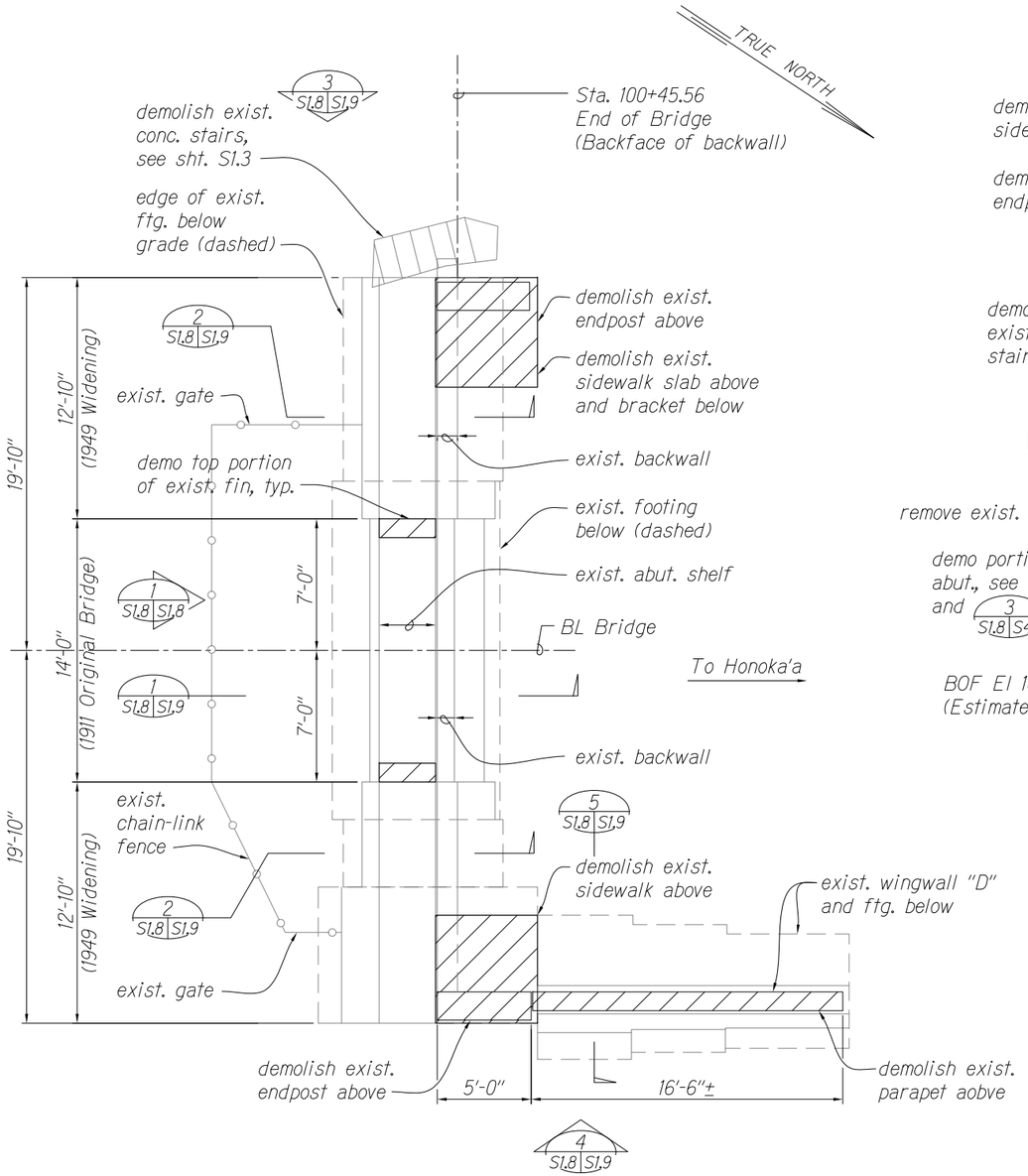
EXISTING & DEMOLITION ABUTMENT #1 DETAILS

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

Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

SHEET No. S1.7 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	46	135

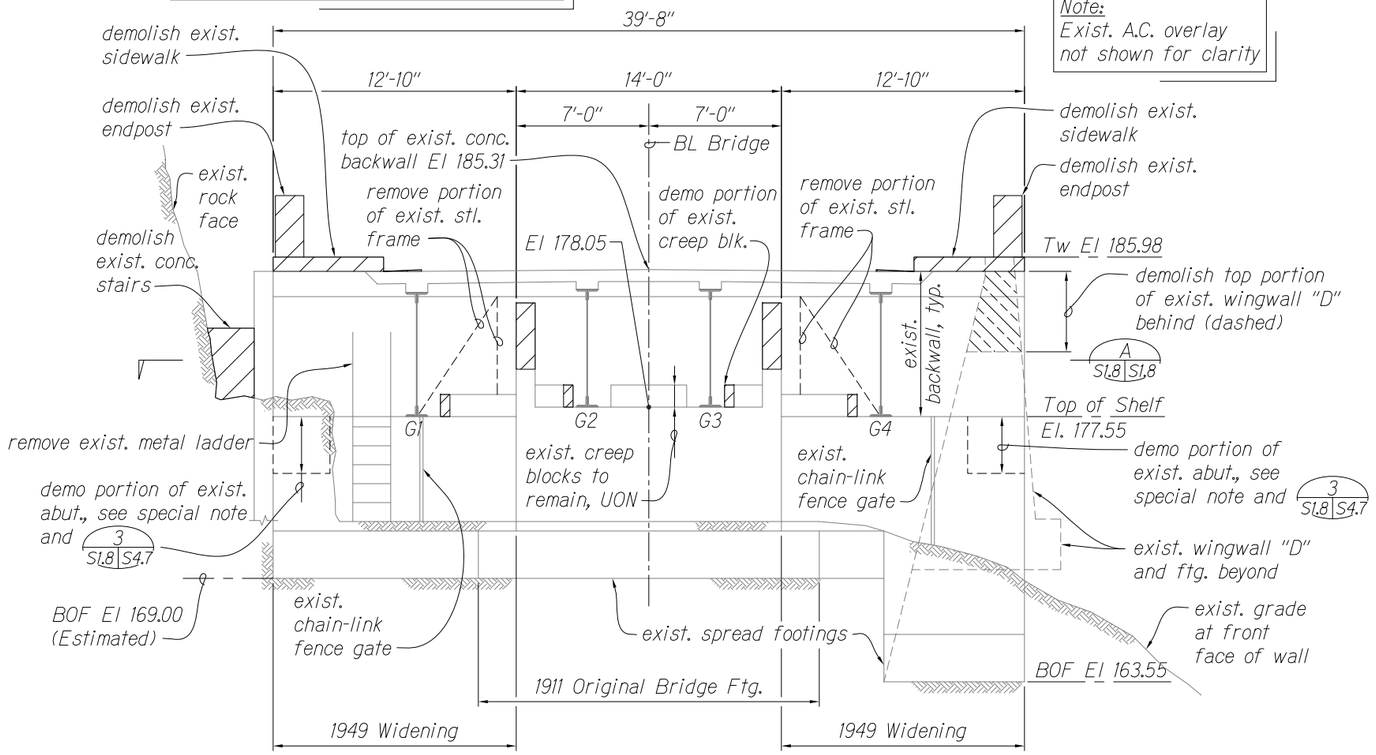


A S1.2 & S1.8 S1.8 ABUTMENT #2 - BRIDGE LEVEL & FOUNDATION PLAN

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

Special Note:
Demolish and re-build one portion of exist. abut. prior to demolishing other portion. Coordinate work sequence with constructuion phasing on sht. S15.1

Note:
Exist. A.C. overlay not shown for clarity



1 S1.8 S1.8 ABUTMENT #2 - FRONT ELEVATION

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

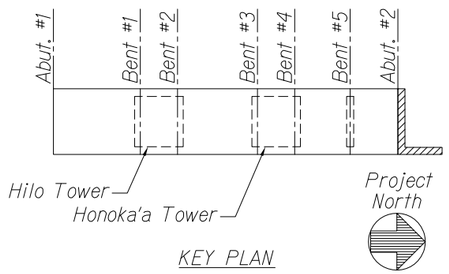
Note:
Existing steel end frames and connection to remain not shown, UON. See 2 S1.8 S9.5

ABUTMENT #2 - EXISTING AND DEMOLITION

GRAPHIC SCALES:

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

1/4"=1'-0"



KEY PLAN

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

LICENSE EXPIRES: 4/30/12

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING & DEMOLITION ABUTMENT #2 - PLAN & ELEVATION

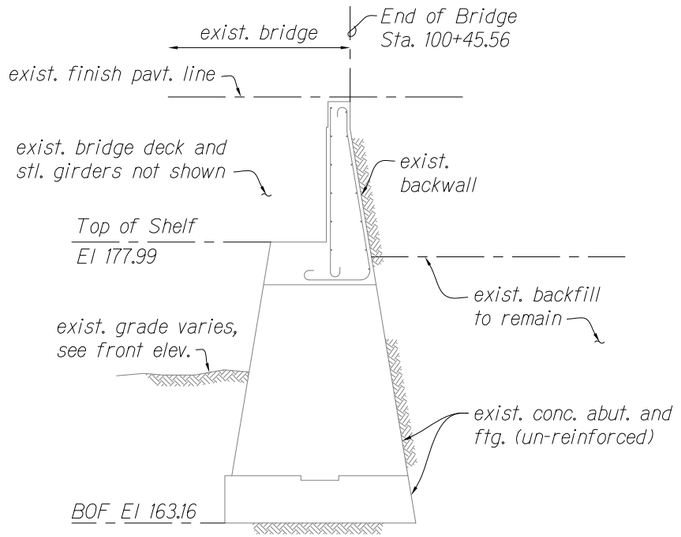
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

SHEET No. S1.8 OF 14 SHEETS

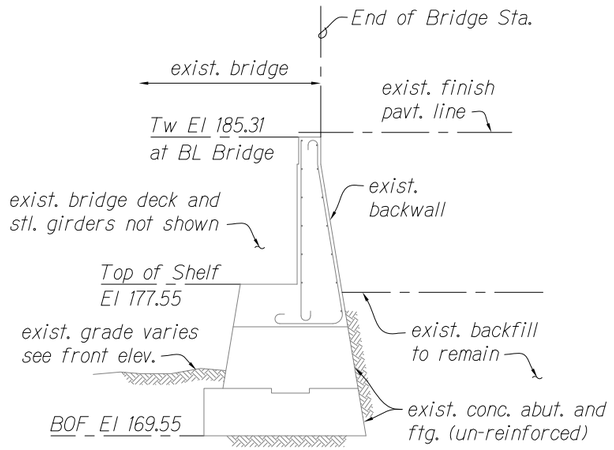
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTEBOOK No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	47	135



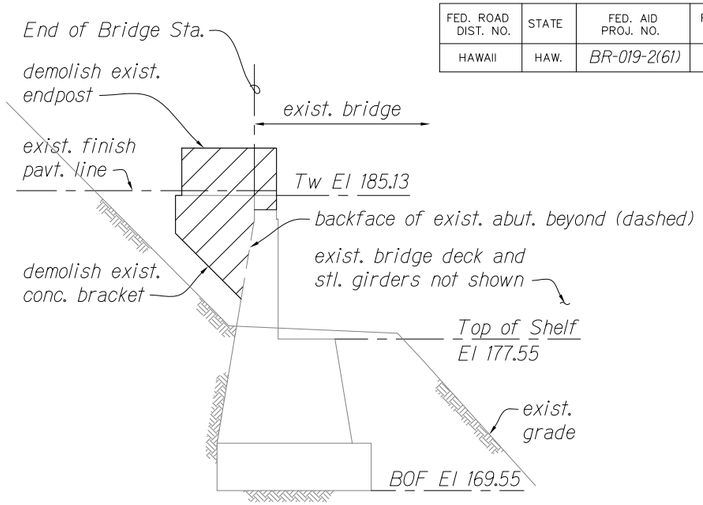
1 S1.8 | S1.9 SECTION THRU 1911 ORIGINAL ABUTMENT

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



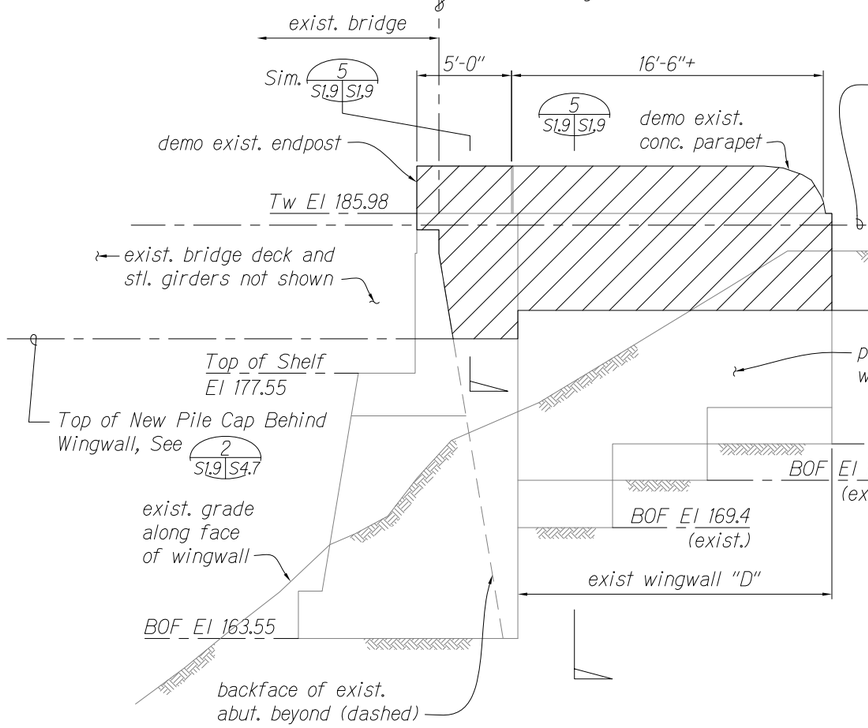
2 S1.8 | S1.9 SECTION THRU 1949 WIDENING

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



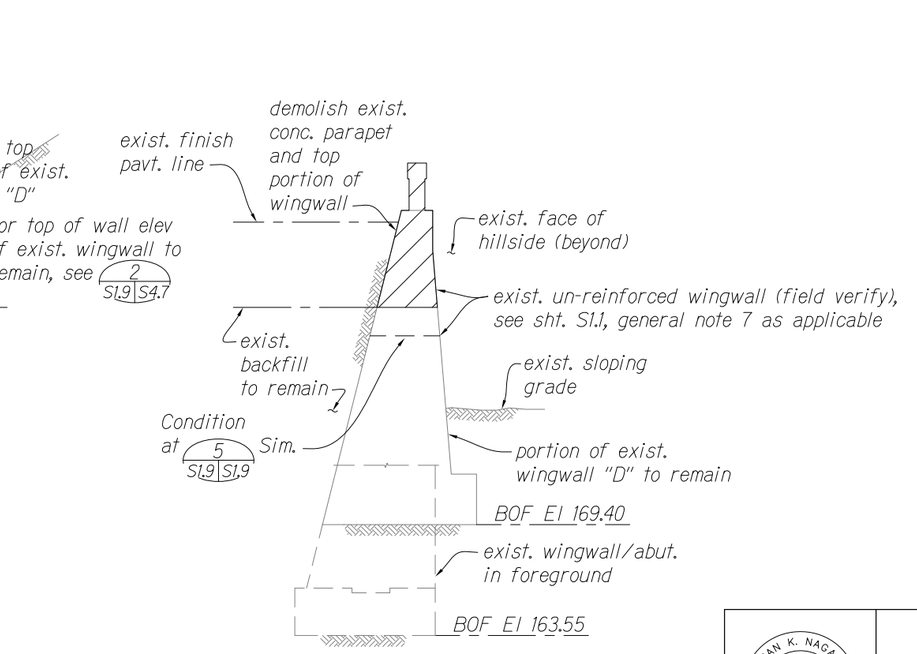
3 S1.8 | S1.9 EXISTING ELEVATION "C"

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



4 S1.8 | S1.9 EXIST WINGWALL "D" - ELEVATION

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



5 S1.8 & S1.9 | S1.9 SECTION AT EXISTING WINGWALL "D"

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

GRAPHIC SCALES:

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

1/4"=1'-0"

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

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LICENSE EXPIRES: 4/30/12

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

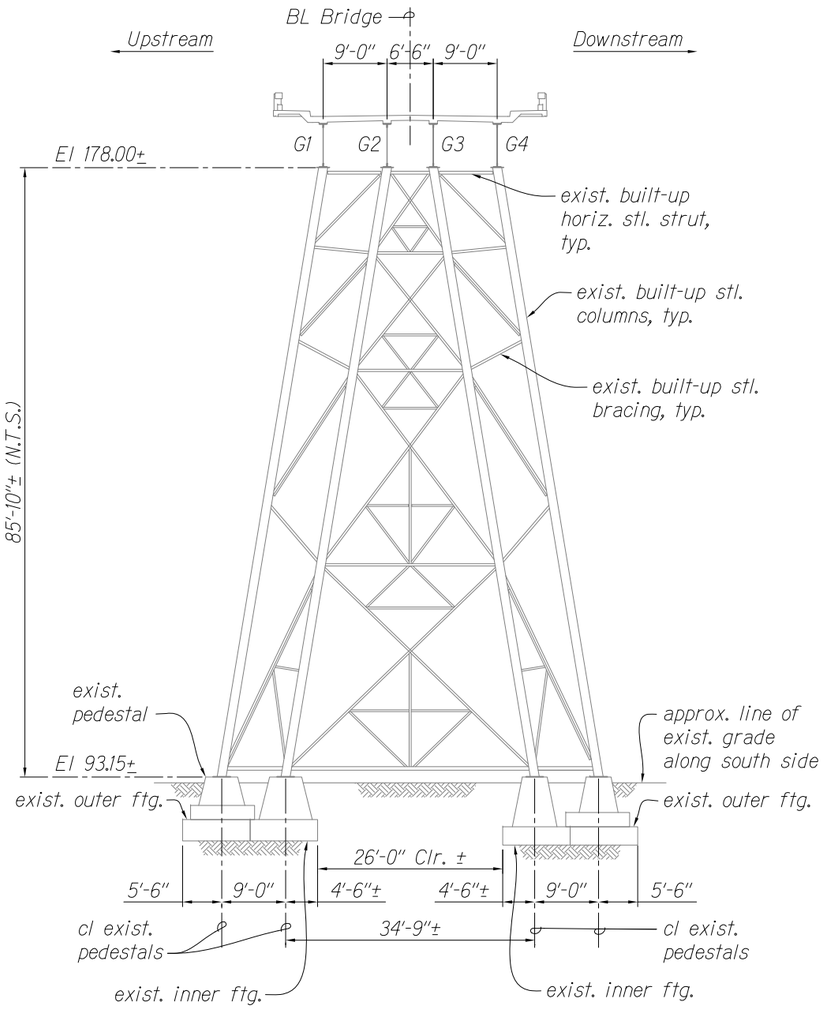
EXISTING & DEMOLITION ABUTMENT #2 DETAILS

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

Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

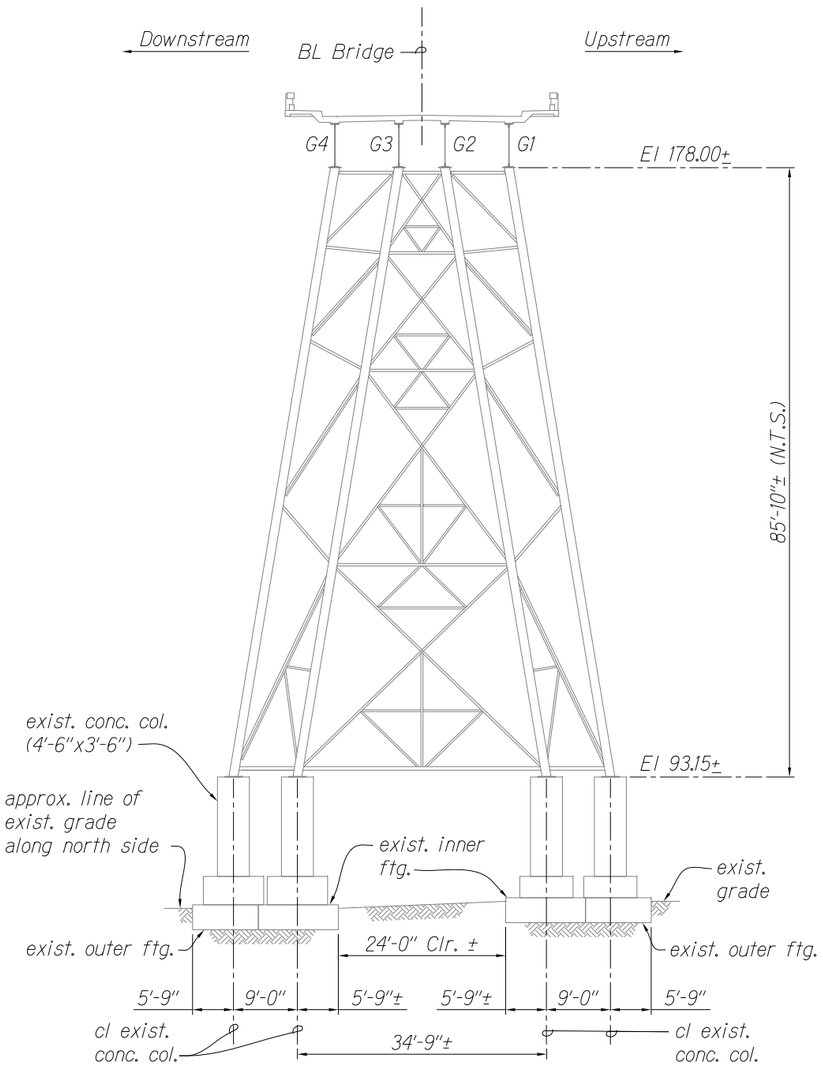
SHEET No. S1.9 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	48	135



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"

Notes:

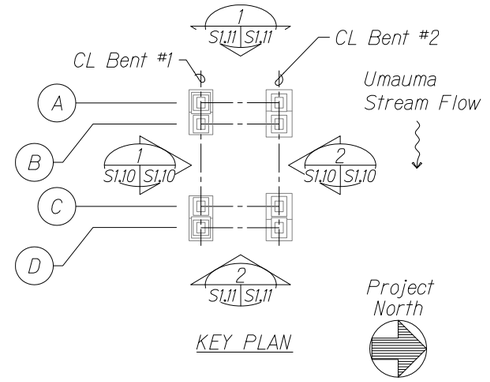
1. See existing and demolition general notes on sheet S1.1.
2. Existing tower and foundation structures shall remain. Contractor shall protect existing structure from damage at all times during construction period.
3.

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

EXISTING HILO TOWER BENT ELEVATIONS

GRAPHIC SCALES:

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

3/32"=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: 4/30/12
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

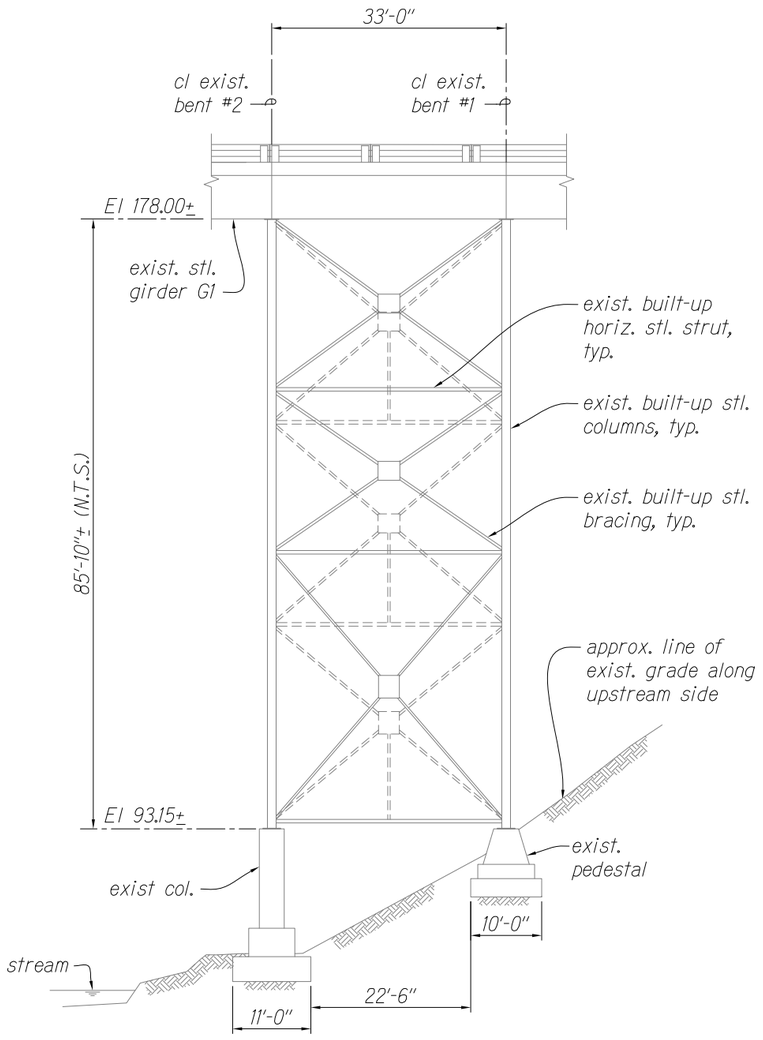
EXISTING ELEVATION AT HILO TOWER - BENT #1 & BENT #2

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

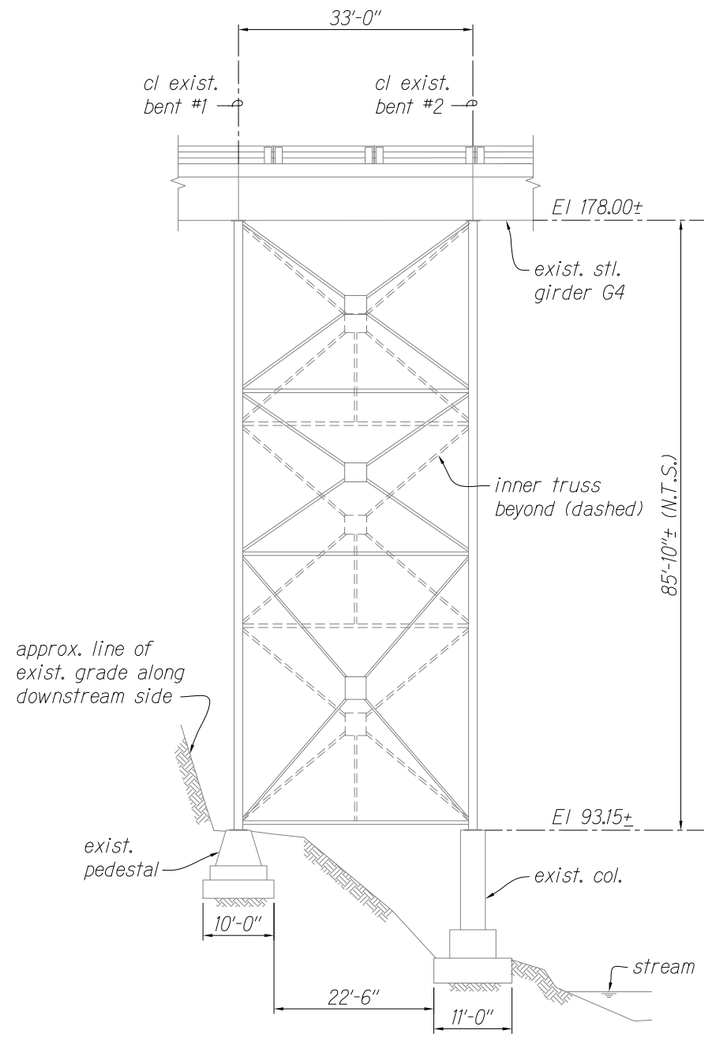
Scale: 3/32" = 1'-0" Date: Oct. 20, 2011

SHEET No. S1.10 OF 14 SHEETS

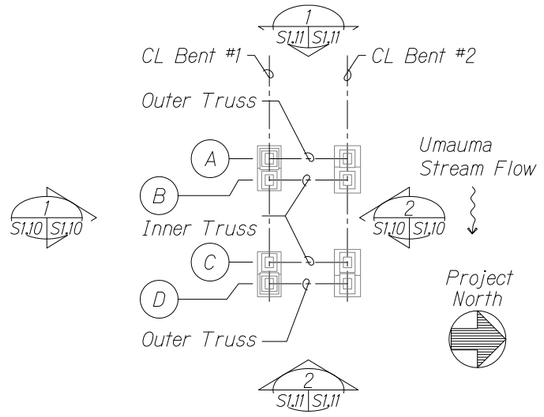
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	49	135



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"

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

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

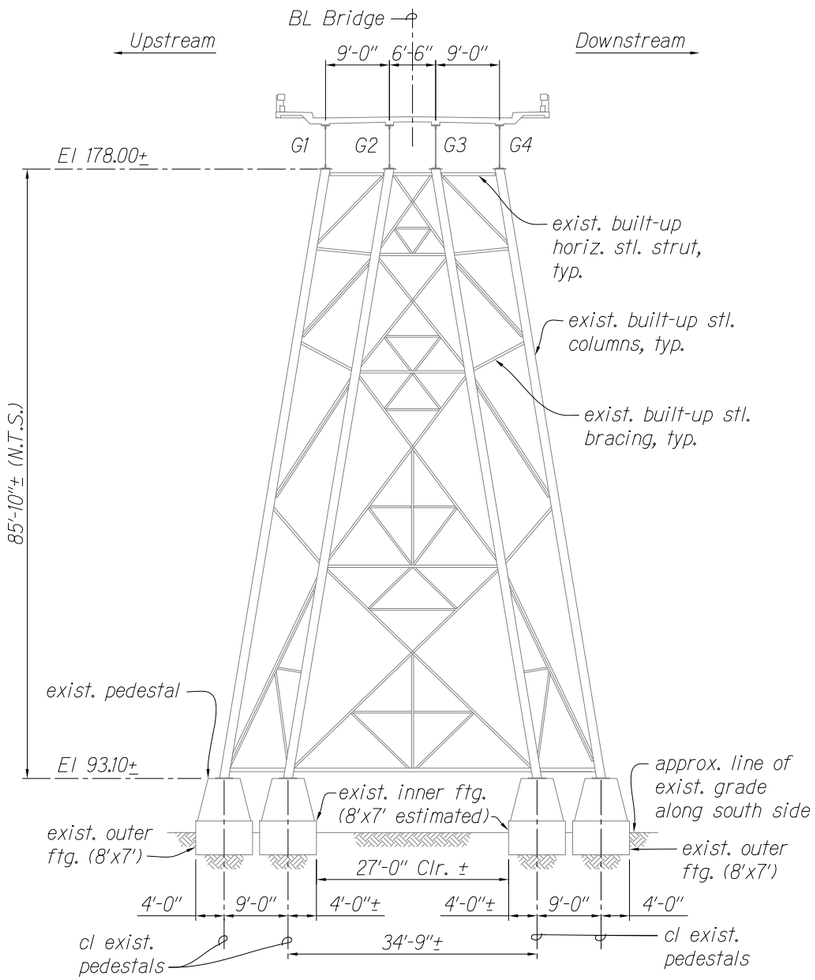
EXISTING ELEVATION AT HILO TOWER - TRUSSES BETWEEN BENTS

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

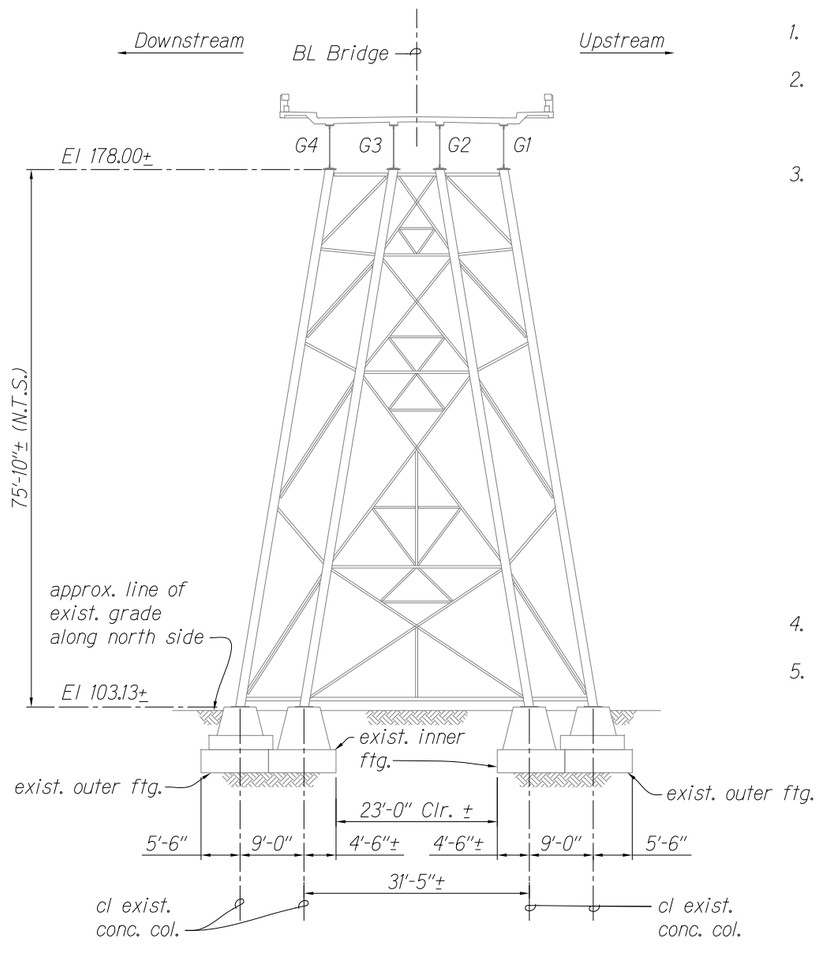
Scale: 3/32" = 1'-0" Date: Oct. 20, 2011

SHEET No. S1.11 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	50	135



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"

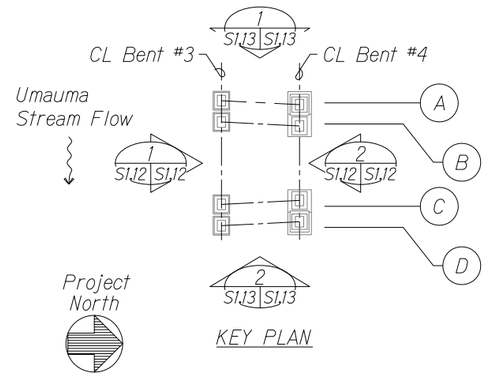
Notes:

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.



EXISTING HONOKA'A TOWER BENT ELEVATIONS

GRAPHIC SCALES:

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

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

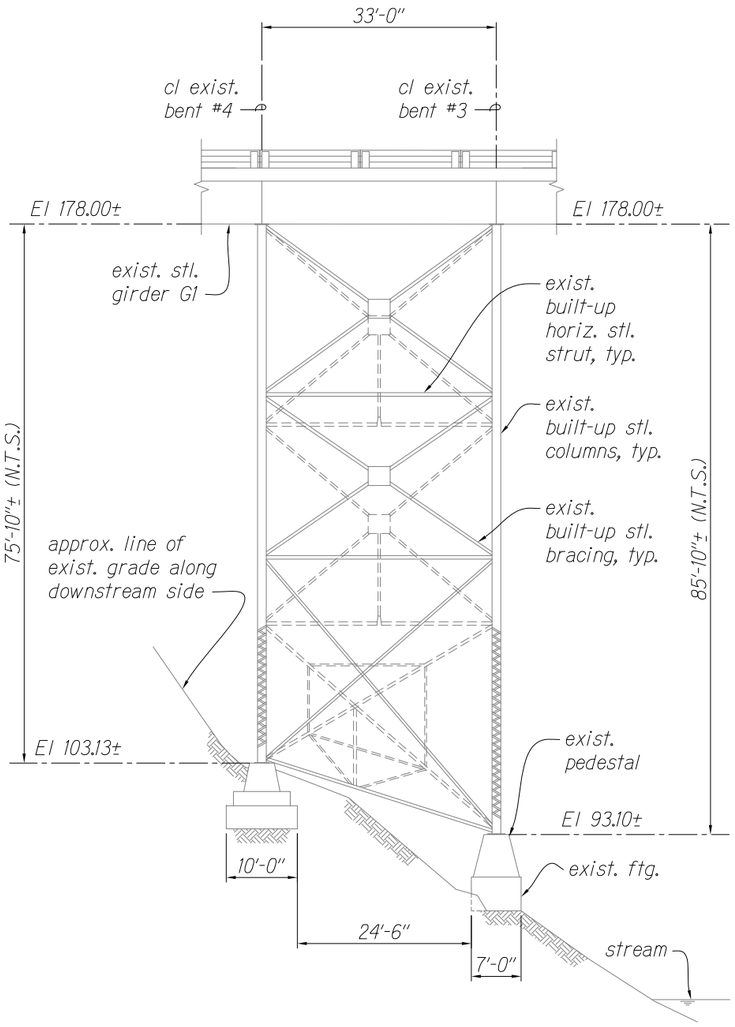
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 3/32" = 1'-0" Date: Oct. 20, 2011

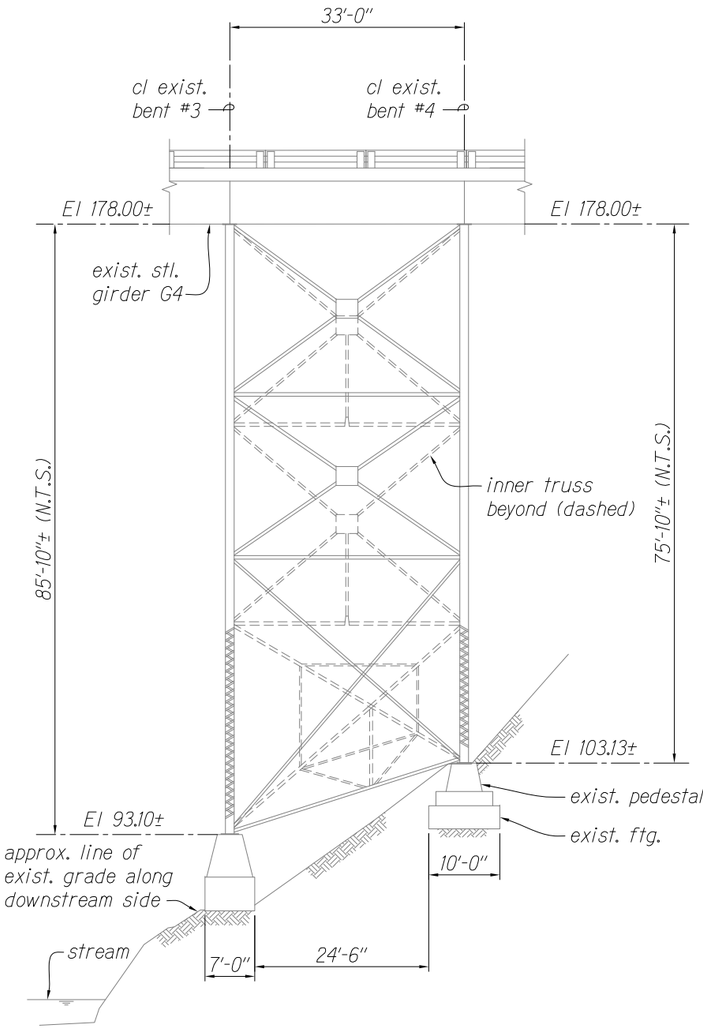
SHEET No. S1.12 OF 14 SHEETS

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)	2011	51	135



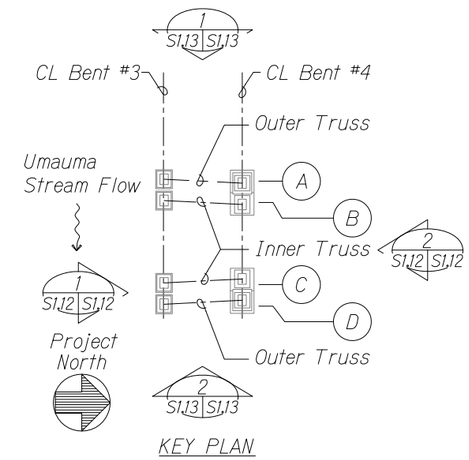
1 S1.13 | S1.13 WEST/UPSTREAM ELEVATION
SCALE: 3/32" = 1'-0"



2 S1.13 | S1.13 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 S1.12.
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

EXISTING HONOKA'A TOWER TRUSS ELEVATIONS

GRAPHIC SCALES:

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

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

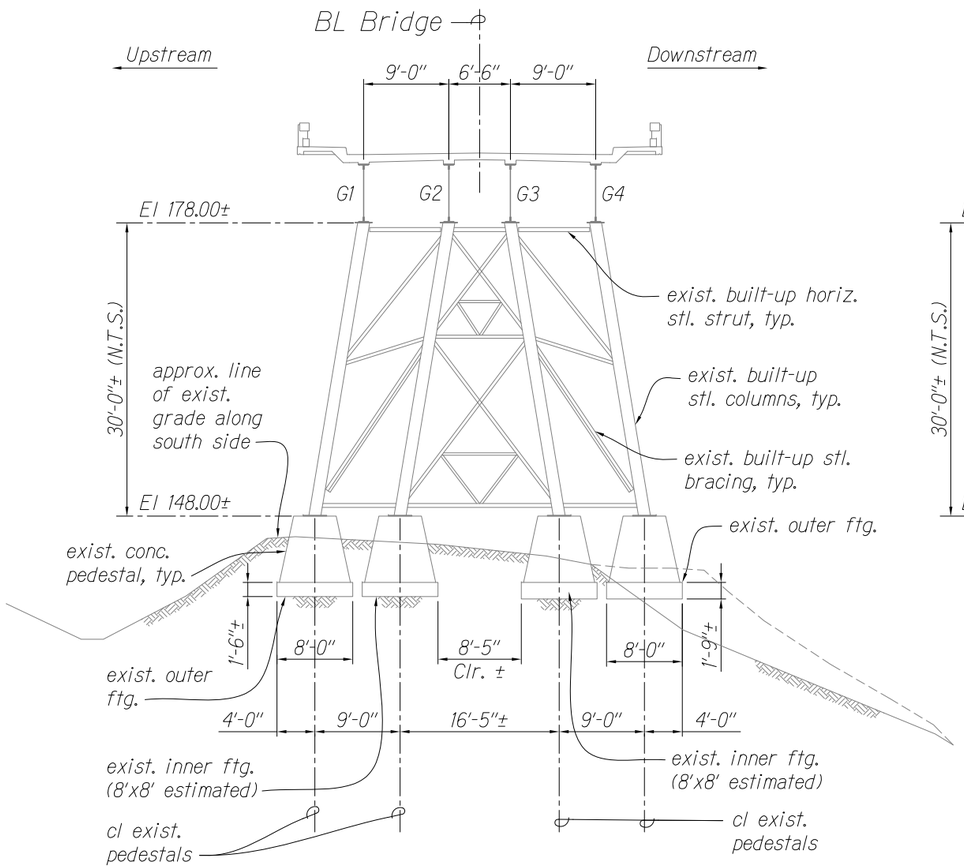
EXISTING ELEVATION AT HONOKA'A TOWER - TRUSSES BETWEEN BENTS

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

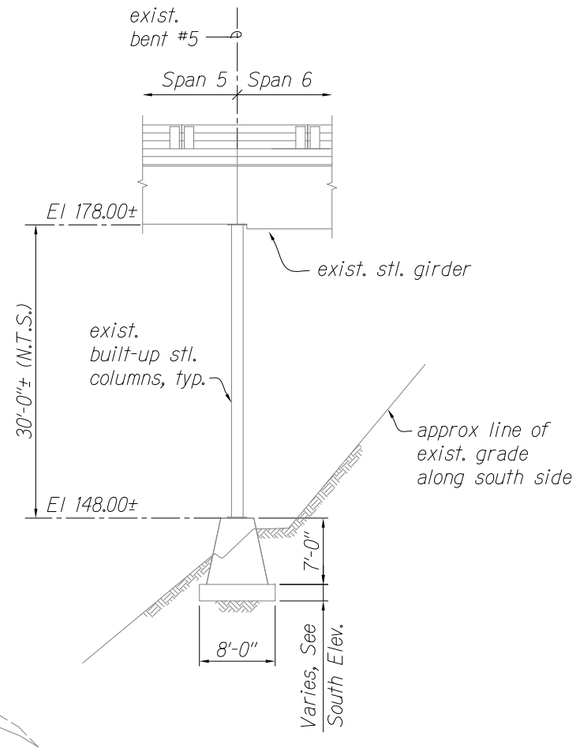
Scale: 3/32" = 1'-0" Date: Oct. 20, 2011

SHEET No. S1.13 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	52	135



1 S1.14 S1.14 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



2 S1.14 S1.14 EAST/DOWNSTREAM ELEVATION (WEST/UPSTREAM ELEVATION SIMILAR)
SCALE: 1/8" = 1'-0"

EXISTING ELEVATIONS - BENT #5

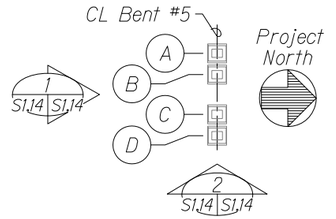
Notes:

1. See existing and demolition general notes on sheet S1.1.
2. Existing bent 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 #5	
	DEAD	LIVE
OUTER FOOTINGS:	140	70
INNER FOOTINGS:	120	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.



KEY PLAN

GRAPHIC SCALES:

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

ORIGINAL PLAN
NOTEBOOK No.
SURVEY PLOTTED BY
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

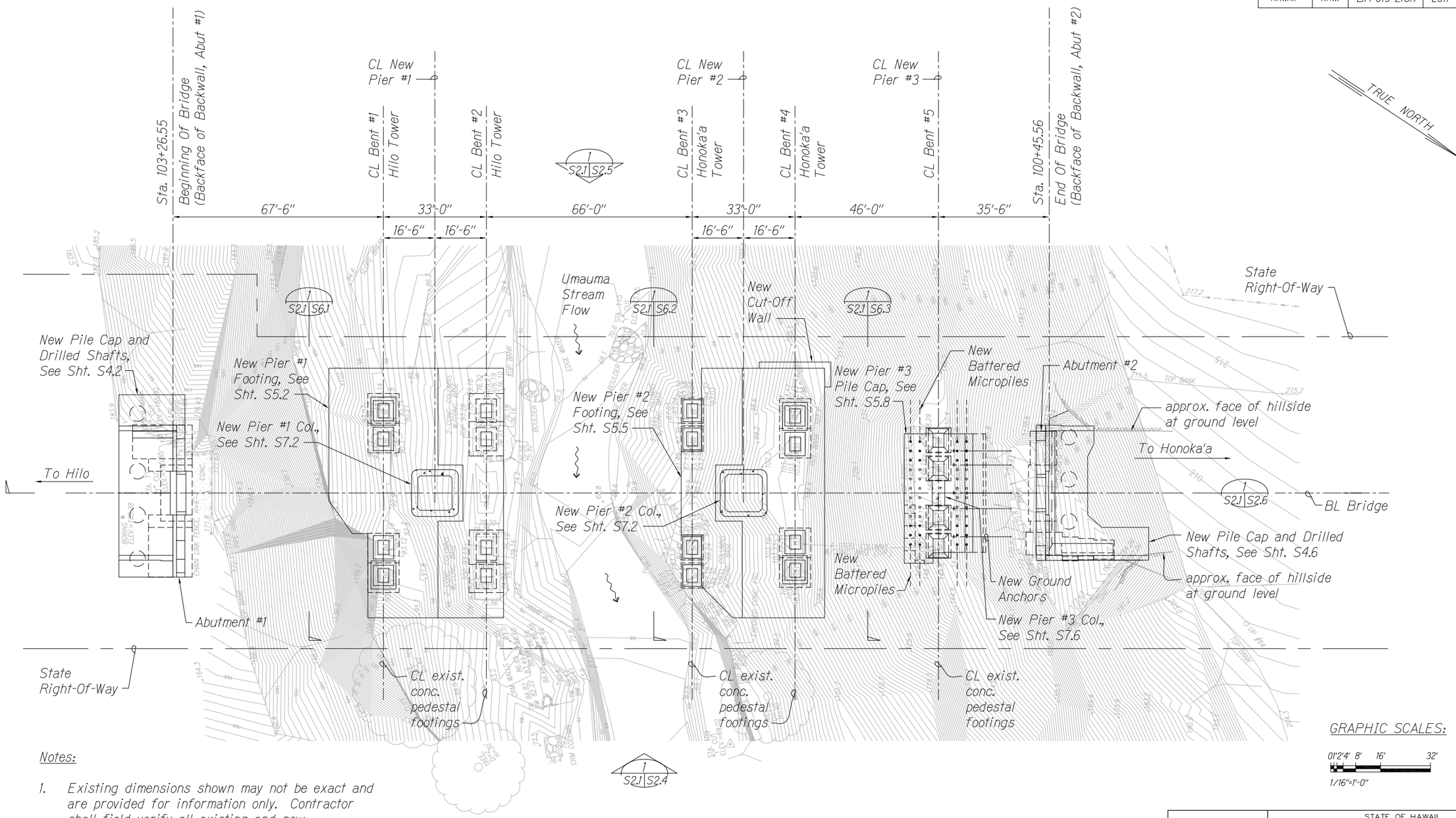
EXISTING ELEVATIONS - BENT #5

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

Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

SHEET No. S1.14 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	53	135



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.

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

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

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

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LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/12
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

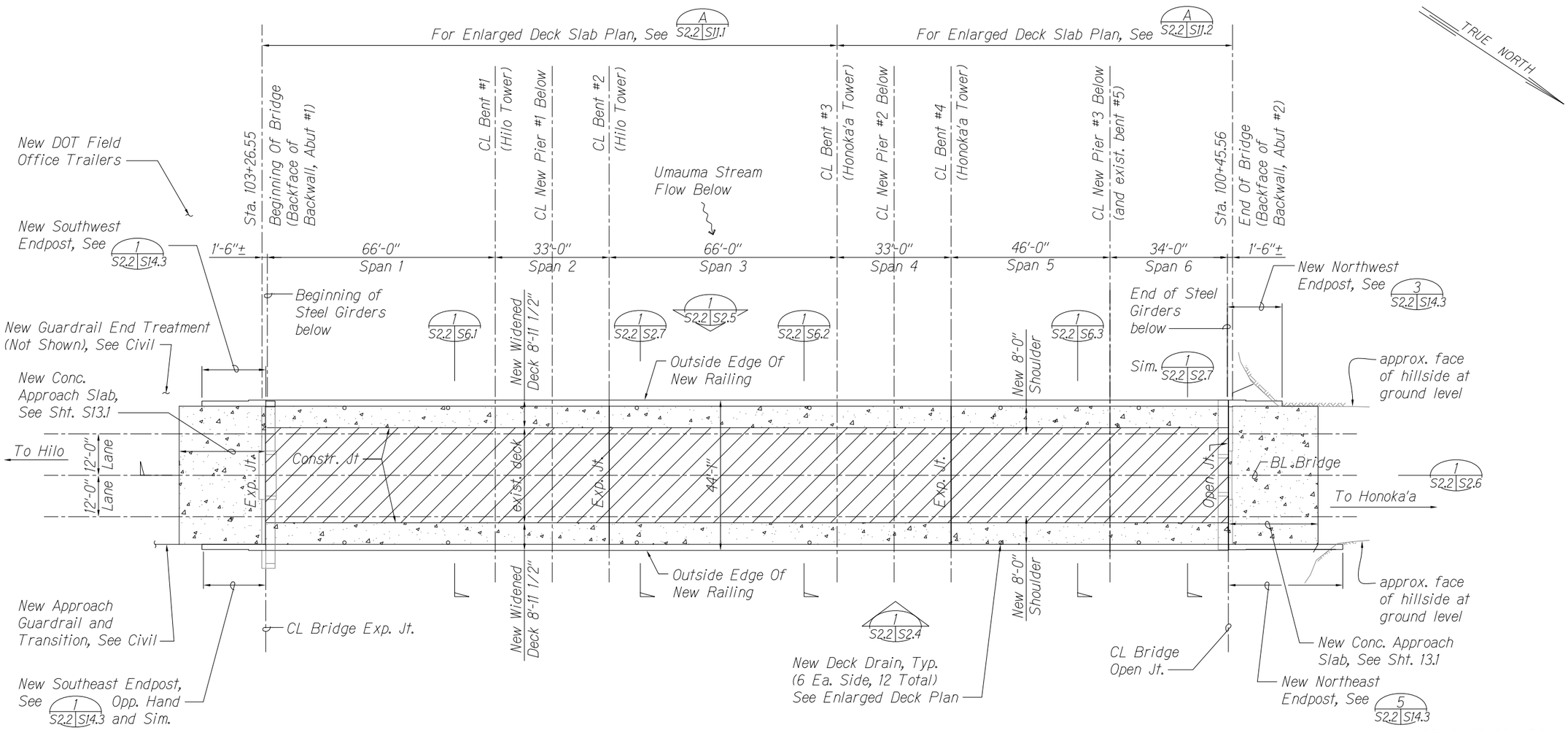
NEW WIDENED BRIDGE FOUNDATION LEVEL

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

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

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)	2011	54	135



A S2.2 & S2.3 S2.2 NEW WIDENED BRIDGE - BRIDGE DECK PLAN (OVERALL)

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

GRAPHIC SCALES:

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

1/16"=1'-0"

Notes:

1. New piers and foundations below existing bridge not shown, see sheet S2.1
2. For new widened bridge girder framing plan, see sheet S2.3.
3. For construction phasing, see sheet S15.1.

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

LICENSE EXPIRES: 4/30/12

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

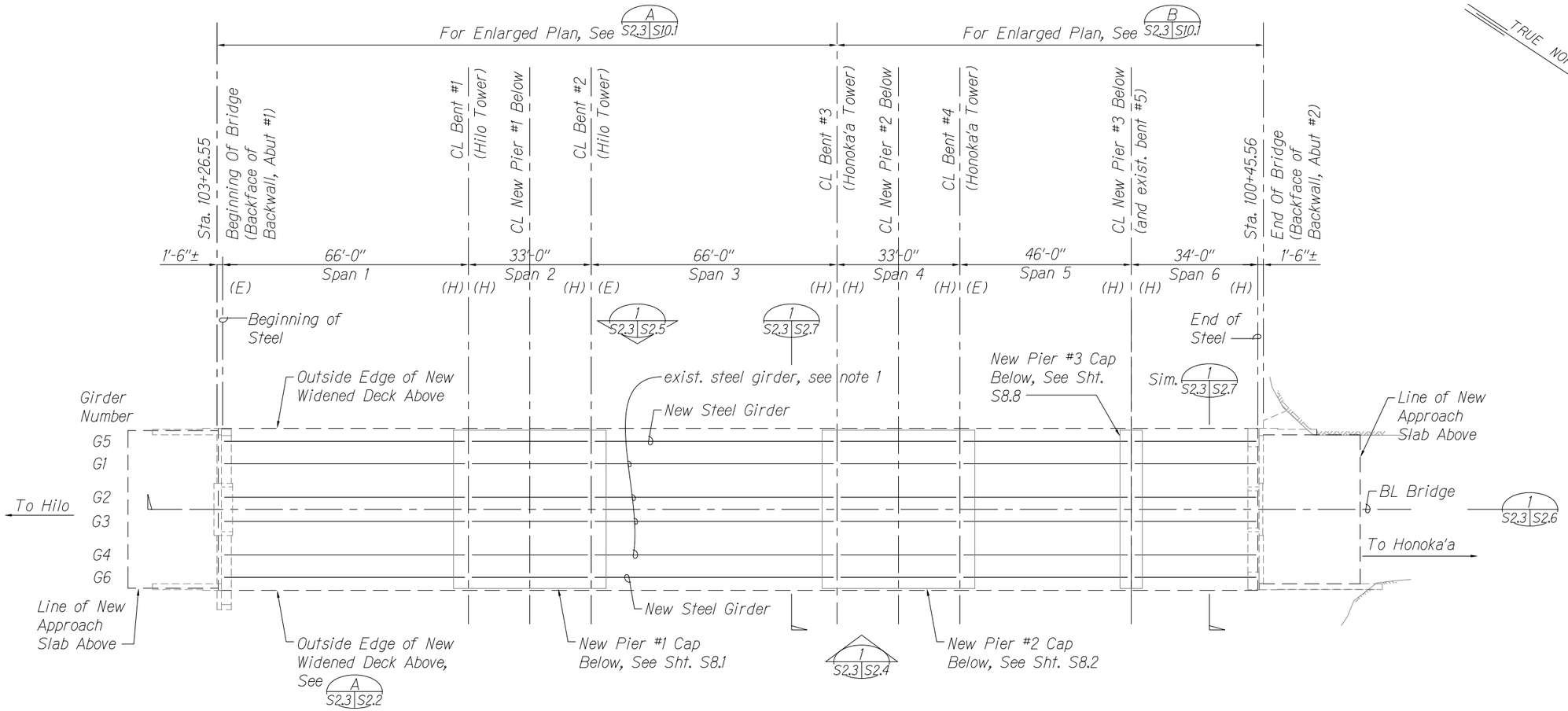
NEW WIDENED BRIDGE - BRIDGE DECK PLAN (OVERALL)

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

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

SHEET No. S2.2 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	55	135



A S2.3 S2.3 NEW WIDENED BRIDGE - GIRDER FRAMING PLAN (OVERALL)

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

GRAPHIC SCALES:

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

1/16"=1'-0"

Notes:

1. Clean and repaint existing steel superstructure (girders, bracings and connections), see Special Provisions Section 501 "Steel Structures" and Section 694 "Clean and Paint Structural Bridge Steel", for General Notes, see sheet S17.1. For surface preparation and application, see Special Provisions.

2. New steel girders shall be shop primed and painted. See Structural Steel notes on sheet S0.1 and Special Provision Section 501.

Legend:

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

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: 4/30/12
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

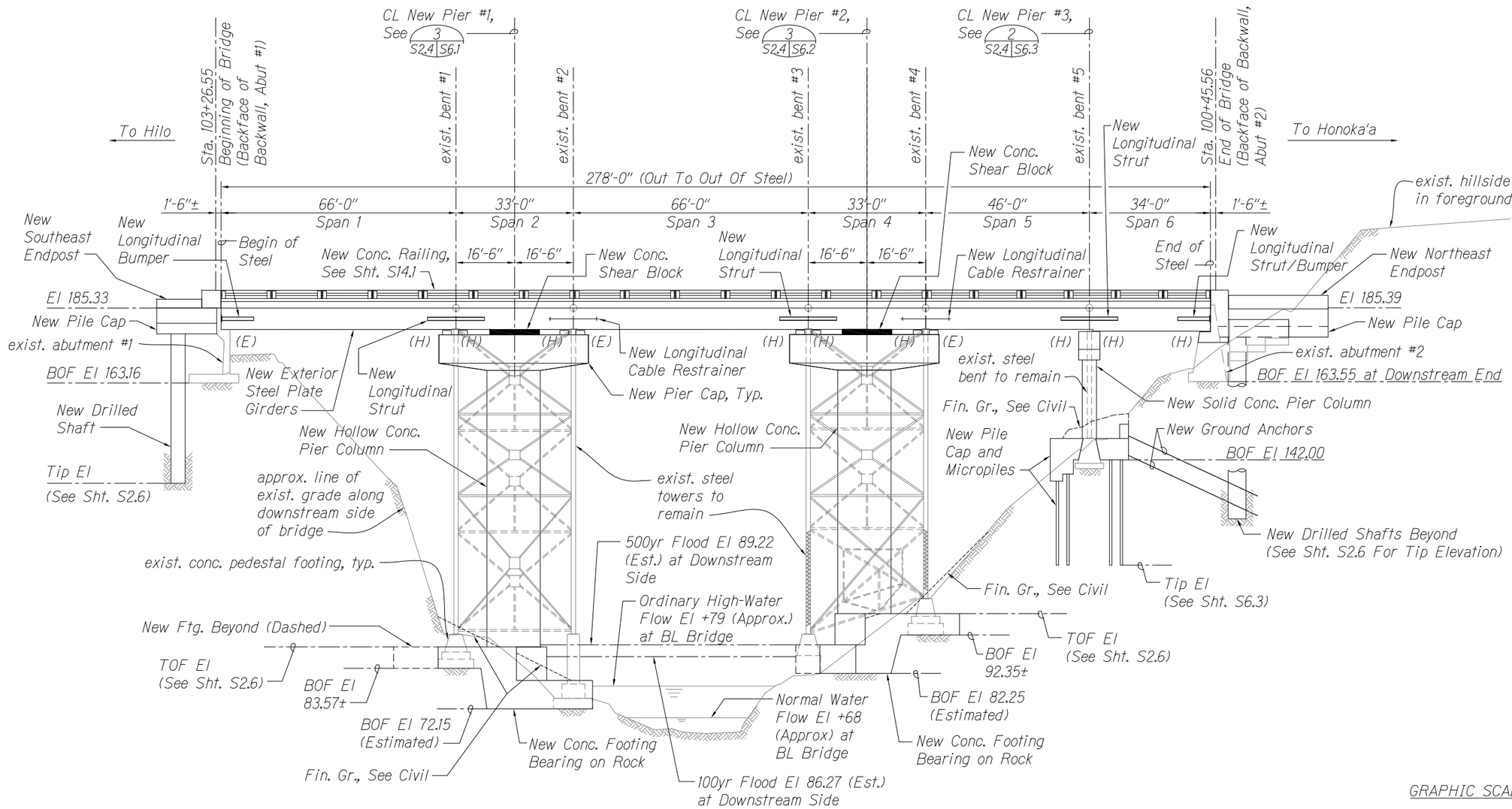
NEW WIDENED BRIDGE - GIRDER FRAMING PLAN (OVERALL)

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

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

SHEET No. S2.3 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	56	135



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

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

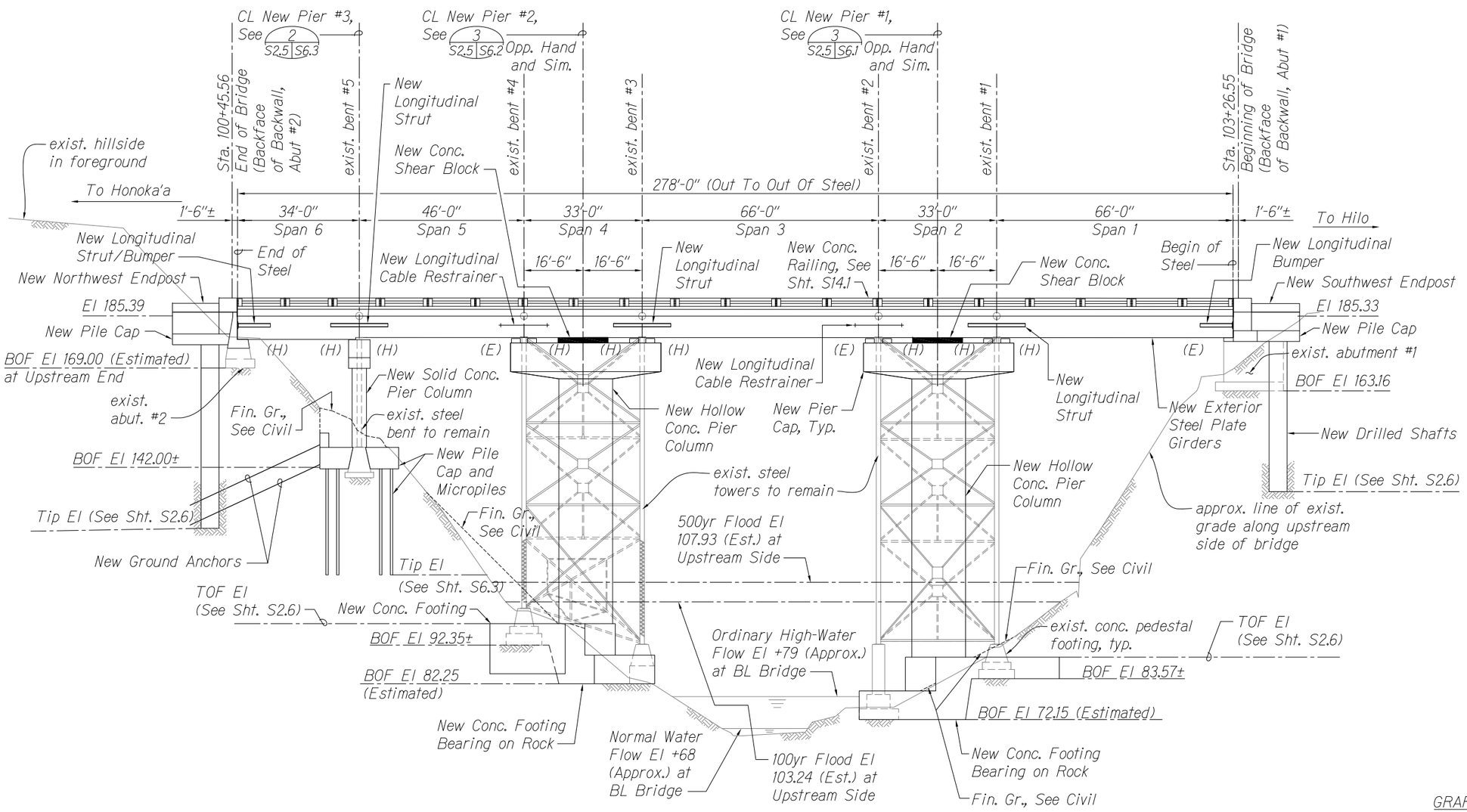
NEW WIDENED BRIDGE ELEVATION - EAST/DOWNSTREAM

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

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

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)	2011	57	135



1 NEW WIDENED BRIDGE ELEVATION - WEST/UPSTREAM

S2.1, S2.2 & S2.3 S2.5 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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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

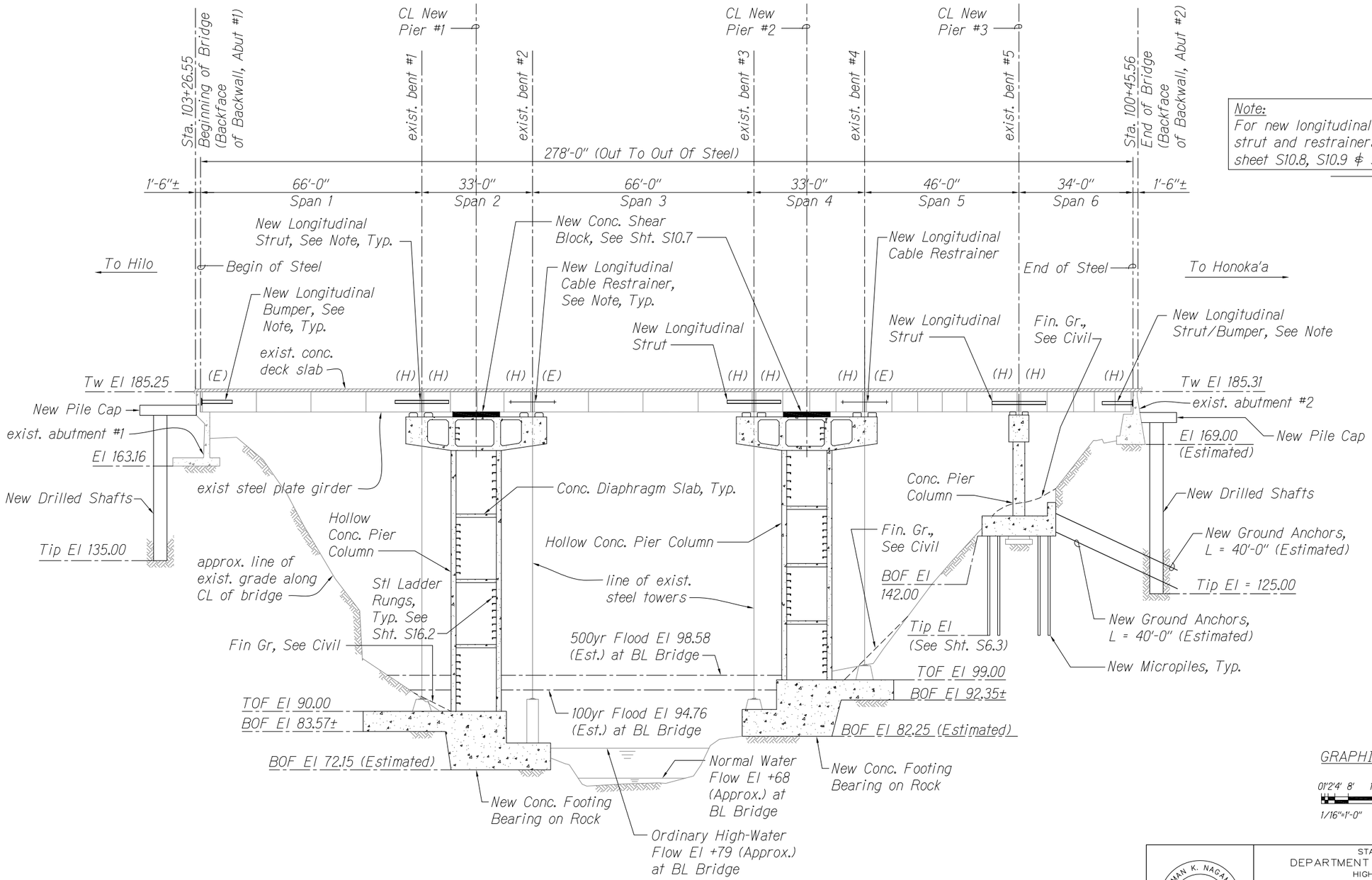
NEW WIDENED BRIDGE ELEVATION - WEST/UPSTREAM

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

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

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)	2011	58	135



1 LONGITUDINAL SECTION THRU BRIDGE
S2.1, S2.2 & S2.3 | S2.6 (ALONG BASELINE) 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

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

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LONGITUDINAL SECTION THRU BRIDGE

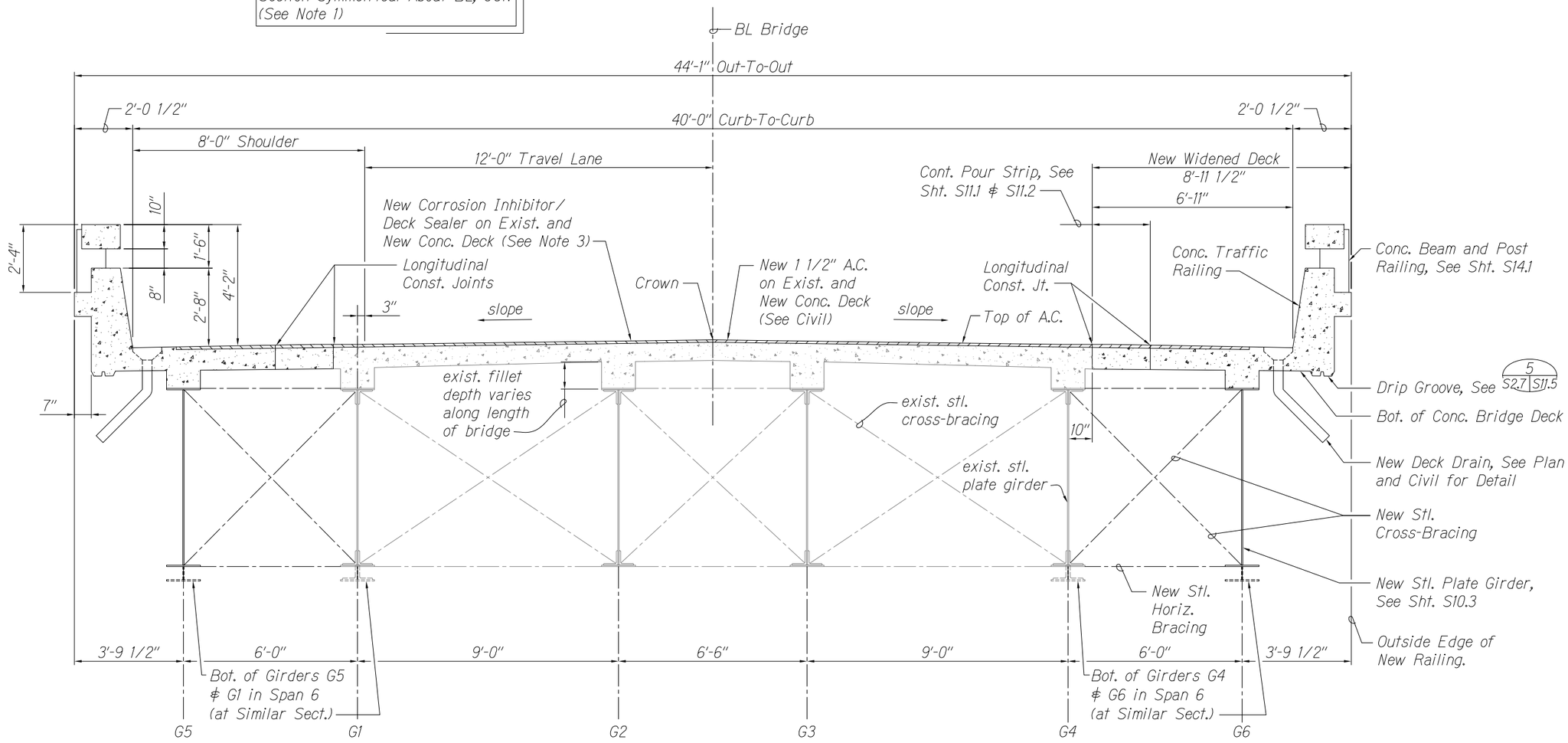
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

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)	2011	59	135

Note:
Section Symmetrical About BL, UON
(See Note 1)



1
S2.2 & S2.3 S2.7 NEW WIDENED BRIDGE - TRANSVERSE SECTION (LOOKING NORTH)
SCALE: 1/2" = 1'-0"

GRAPHIC SCALES:

0 6" 1' 2' 3' 4' 5' 6'
1/2"=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. Existing as-builts conditions may not be symmetrical.

2. For construction phasing, see sheet S15.1..

3. New corrosion inhibitor/deck sealer shall be installed on new and existing concrete deck surfaces between curb-to-curb prior to installing new A.C. overlay. See Special Provisions Section 503 - Concrete Structures. This item shall be incidental to and paid for under Section 401 Hot Mix Asphalt Pavement. Contractor shall coordinate this work with A.C. pavement sub-contractor.

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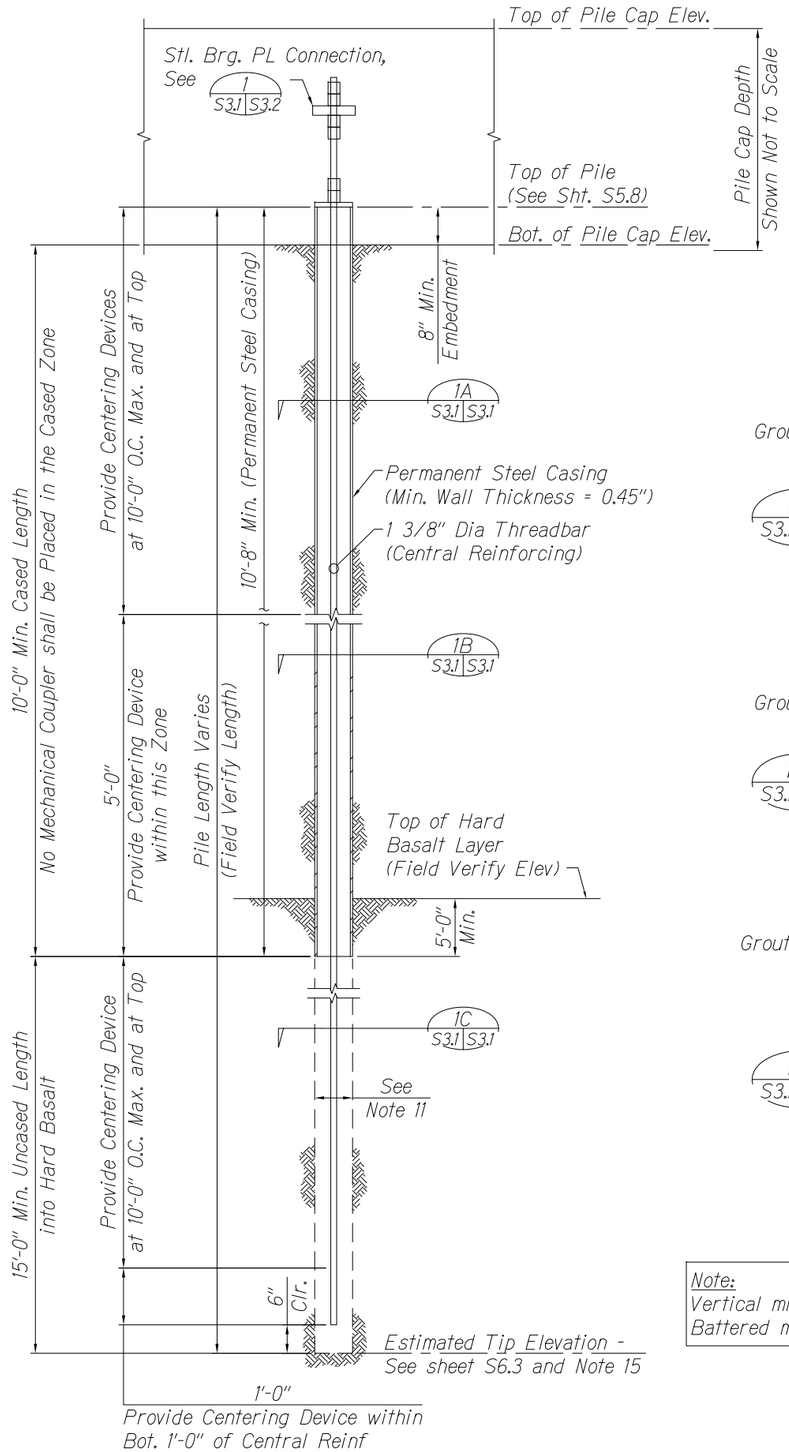
NEW WIDENED BRIDGE - TRANSVERSE SECTION

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

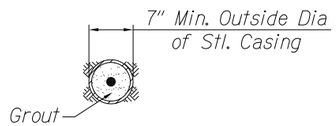
Scale: 1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S2.7 OF 7 SHEETS

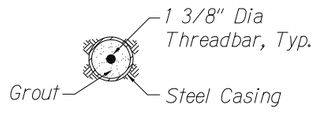
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	60	135



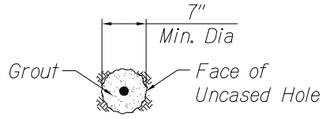
1 S3.1, S3.2 S3.1 DETAIL - TYPICAL MICROPILE ELEVATION
SCALE: 3/4" = 1'-0"



1A S3.1 S3.1 SECTION
SCALE: 1" = 1'-0"



1B S3.1 S3.1 SECTION
SCALE: 1" = 1'-0"



1C S3.1 S3.1 SECTION
SCALE: 1" = 1'-0"

Note:
Vertical micropile elevation shown.
Battered micropile elevation similar.

Micropile General Notes:

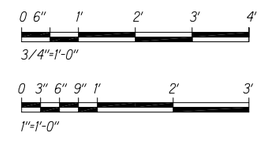
1. Micropile and foundation design is based on Geotechnical recommendations report by Hirata and Associates, dated April 28, 2011.
2. 7" diameter micropile shall be embedded into hard basalt as shown on drawings.

   Design Loads Per Micropile (Vertical and Battered):

Strength Limit State:	150 kips Compression 75 kips Uplift
Extreme Event Limit State:	220 kips Compression 150 kips Uplift

3. Contractor shall refer to Special Provisions Section 512 "Micropiles".
4. Excavations shall be clean of all dirt and debris prior to placement of reinforcing steel and cement grout.
5. Permanent steel casing shall have outside diameter and wall thickness as shown on drawings, machined flush jointed threads, and conform to ASTM A 252, Grade 3.
6. Permanent steel casing shall be hot dip zinc coated conforming to ASTM A 123.
7. Central reinforcing steel shall be 1-3/8 inch diameter high-strength threadbar conforming to ASTM A 722 (AASHTO M 275), Type II, grade 150, and shall be fusion bonded epoxy coated conforming to ASTM A 934.
8. Provide centering devices (centralizers) fabricated from plastic or material not harmful to reinforcing steel. Provide centralizers at top and bottom and 10'-0" O.C. within micropile length. Centralizer shall allow grout to flow freely.
9. Cement grout shall be f'c = 5,500 psi at 28 days with water-cement ratio of 0.40 or less.
10. Where necessary, central reinforcing steel shall be spliced only below end of permanent steel casing with coupler capable of developing 125% of bar ultimate strength in tension or compression. Submit coupler product data for Engineer's review.
11. Micropiles shall have at least 15'-0" uncased length into hard basalt. See elevation.
12. For Pier #3 foundation, at least two pre-production vertical micropiles shall be load tested, one in compression and one in tension. See Special Provisions and sheet S5.8.
13. Production micropiles shall be proof tested. 10 percent of all vertical micropiles shall be tested as directed by the Engineer. Half shall be tested in compression and half shall be tested in tension, see Special Provisions.
14. Contractor shall notify the Engineer prior to commencing with any load test.
15. Estimated tip elevation of micropile shall be field verified and shall be adjusted as necessary to provide minimum cased and uncased lengths, and minimum embedment into hard basalt layer. See typical elevation on this sheet.

GRAPHIC SCALES:



ORIGINAL PLAN
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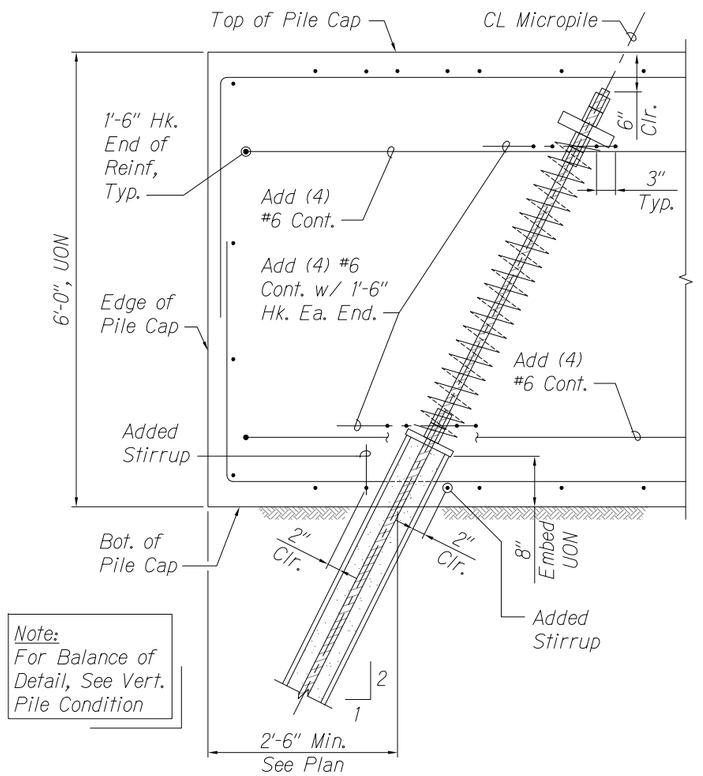
MICROPILES - GENERAL NOTES & TYPICAL DETAILS

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

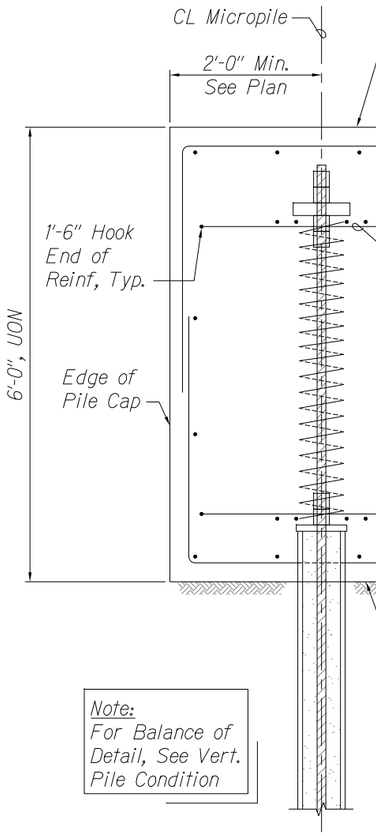
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S3.1 OF 4 SHEETS

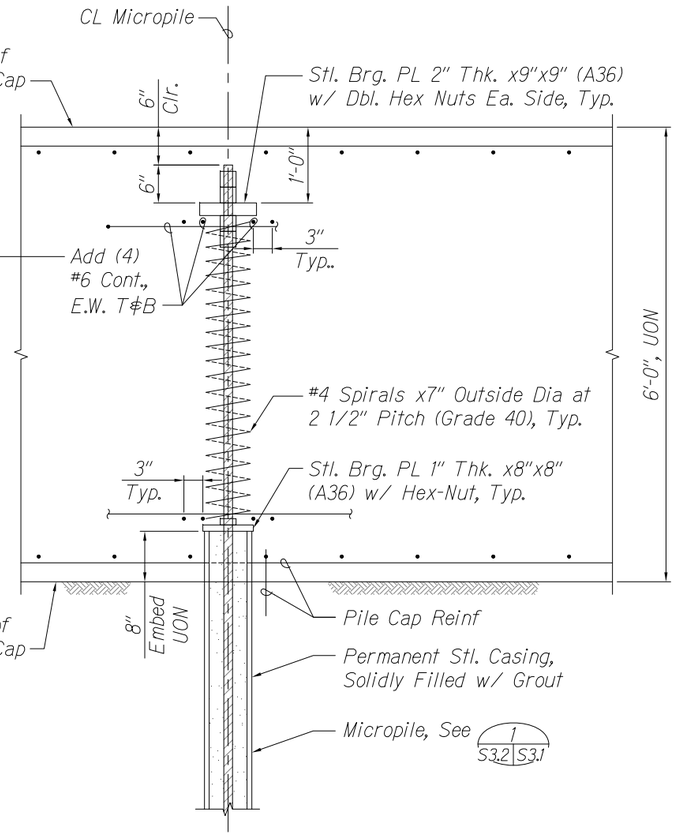
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	61	135



BATTERED PILE CONDITION



EDGE CONDITION



VERTICAL PILE CONDITION

1 / S3.1 & S3.2 | S3.2 SECTION - MICROPILE PILE CAP CONNECTION

SCALE: 1" = 1'-0"

Notes:

1. Micropile extension into pile cap, steel bearing plate and hex nut connection, and added reinforcing steel in pile cap shall be incidental to respective items of work.
2. Hex nuts shall develop the full ultimate load of the threadbar in tension or compression.
3. Hex nuts shall be compatible with epoxy coated threadbar and shall be furnished by the threadbar manufacturer.

GRAPHIC SCALES:

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

1"=1'-0"

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

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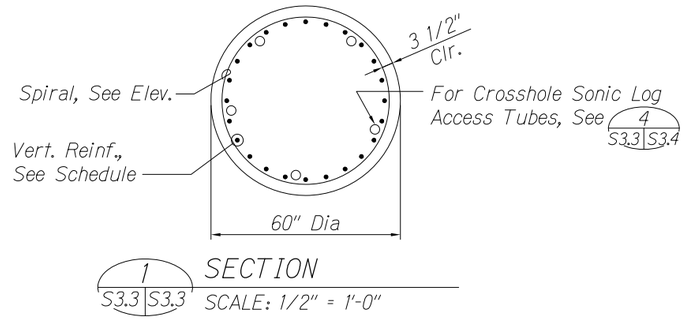
MICROPILES - TYPICAL DETAILS

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

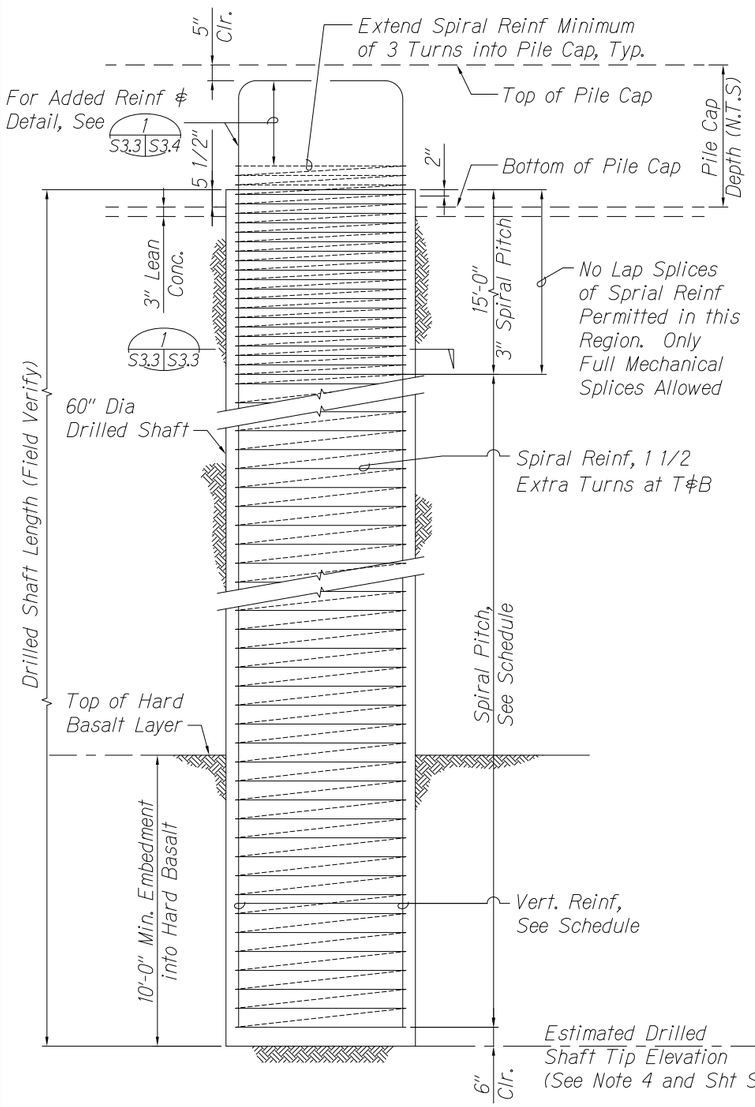
Scale: 1" = 1'-0" Date: Oct. 20, 2011

SHEET No. S3.2 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	62	135



1 S3.3 S3.3 SECTION
SCALE: 1/2" = 1'-0"



2 S3.3 S3.3 DRILLED SHAFT ELEVATION
SCALE: 1/2" = 1'-0"

Drilled Shaft Notes:

1. Foundation design based on Geotechnical Report by Hirata & Associates, dated April 28, 2011. Lateral load resistance of drilled shafts are as shown in table this sheet.
2. The contractor shall refer to the Special Provisions Section 511 "DRILLED SHAFTS" and Standard Specs Section 511.
3. All excavation and drilling operations for foundations shall be monitored by the Engineer.
4. Drilled shafts shall extend at least 10 feet into hard basalt. Drilled shaft tip elevations shown in the drawings are estimated elevations. The actual drilled shaft tip elevations shall be determined by the Engineer during construction.
5. Shafts within three diameters of an adjacent shaft shall not be drilled within 24 hours of completion of concreting of the adjacent shaft.
6. Contractor shall provide for de-watering of excavations from either surface water, ground water or seepage. Otherwise, concrete shall be placed by tremie as necessary.
7. Provide temporary non-corrugated steel casing as necessary to reduce caving of the side walls. Permanent casing shall not be permitted.
8. Drilled shafts shall be embedded to tip elevations and a minimum of 10 feet into hard basalt, whichever is deeper. Temporary casing shall be removed.
9. Excavations for drilled shafts shall be approved by the Engineer prior to placing the concrete and reinforcing. Contractor shall notify the Engineer when excavation is ready for inspection.
10. Excavations shall be cleaned of all dirt and debris prior to placement of reinforcing steel and concrete.
11. Longitudinal (or vertical) reinforcing bars shall conform to ASTM A706, Grade 60. Spiral and hoop reinforcing shall be uncoated deformed bars conforming to ASTM A615, Grade 60.
12. Longitudinal (or vertical) bars shall not be lap spliced. Splices, if required, shall be mechanical butt splices capable of developing in tension and compression at least 125 percent of the specified yield strength of the smaller bar connected. Welded splices shall not be permitted.
13. Minimum lap length for spiral and hoop lateral reinforcement shall be as shown on typical detail (see sheet S3.4). Welded lap splices shall not be permitted.
14. Spacer blocks shall be used to maintain proper position and clearance of the reinforcement cage within the shaft.
15. Drilled shafts concrete shall be f'c = 6,000 PSI at 28 days with water-cement ratio of 0.40 or less. Maximum size of coarse aggregate shall be 3/8 inch.
16. Concrete shall not be placed without approval of the Engineer.
17. All excavations shall be properly backfilled. Do not place backfill behind retaining walls before concrete has attained full design strength and a minimum of 7 days curing time.
18. For Crosshole Sonic Log access tubes and testing, see Standard Specs Section 511 and Special Provisions. CSL testing and analysis will be performed by the Engineer or the Engineer's authorized representative.
19. Special Note For Abutment #2:
Contractor shall refer to sheet S5.9 for new ground anchors below abutment, and shall field verify and coordinate actual drilled shaft locations to avoid conflicts.
20. Contractor shall provide survey ties to all drilled shaft as-built locations. See Special Provisions.

LATERAL LOAD RESISTANCE OF DRILLED SHAFT (60" DIA)

Location	Limit State	Loading Direction	Maximum Shear (kips)	Lateral Deflection (inches)
Abut. #1	Extreme Event	Longitudinal (Into Slope)	135	1.5
		Longitudinal (Away From Slope)	115	1.5
		Transverse	485	1.5
Abut. #2	Extreme Event	Longitudinal (Into Slope)	135	1.5
		Longitudinal (Away From Slope)	85	1.5
		Transverse	295	1.5

REINFORCING SCHEDULE

Location	Vert. Reinf	Spiral Reinf
Abut. #1	(24) #14	#6 at 3" Pitch
Abut. #2	(24) #11	#5 at 3" Pitch

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

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HIGHWAYS DIVISION

DRILLED SHAFTS - GENERAL NOTES & TYPICAL DETAILS

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

Scale: 1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S3.3 OF 4 SHEETS

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

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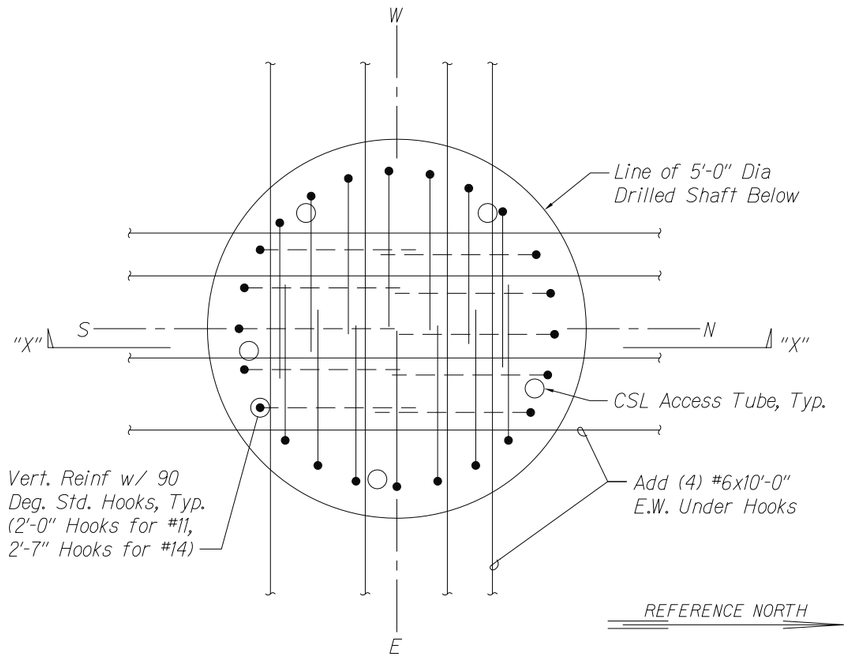
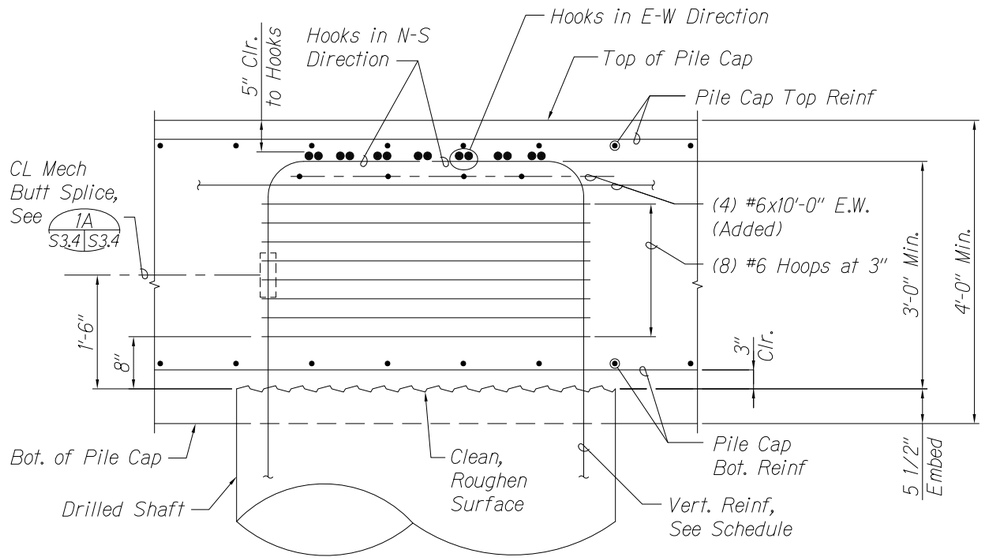
HAWAII	HAW.	BR-019-2(61)	2011	63	135



PLAN



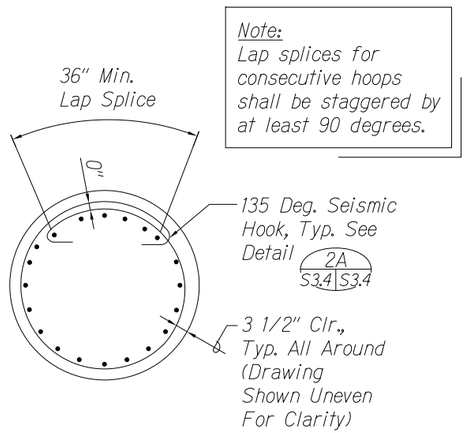
SECTION "X-X"

1. *Top hooked section of vertical reinforcing (no more than every other bar) shall be installed after pouring and curing (7 days minimum) of drilled shaft concrete.*
2. *Top section of vertical reinforcing (no more than every other bar) shall be mechanical butt spliced as shown. Mechanical butt splice shall be "sleeve-filler metal" type only. See Standard Specs Section 602 Reinforcing Steel, subsection 602.03 (E) (3) (b) 2.*
3. *Contractor shall submit locations of proposed bar to be spliced, for Engineer's approval.*

1A S3.4 S3.4 MECHANICAL BUTT SPLICE NOTES

1 S3.3 S3.4 DETAIL AT TOP OF PILE CAP (24 BAR PATTERN SHOWN)

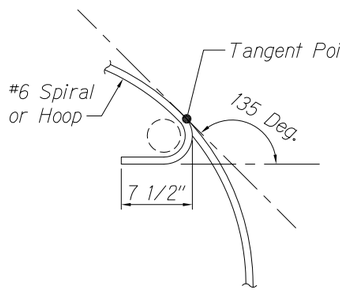
SCALE: 1" = 1'-0"



Note:
Lap splices for consecutive hoops shall be staggered by at least 90 degrees.

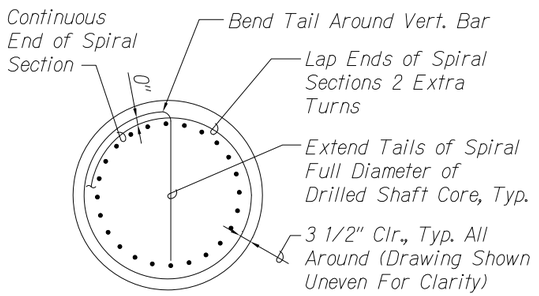
2 S3.4 S3.4 HOOP REINFORCING LAP SPLICE DETAIL (TYPICAL)

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



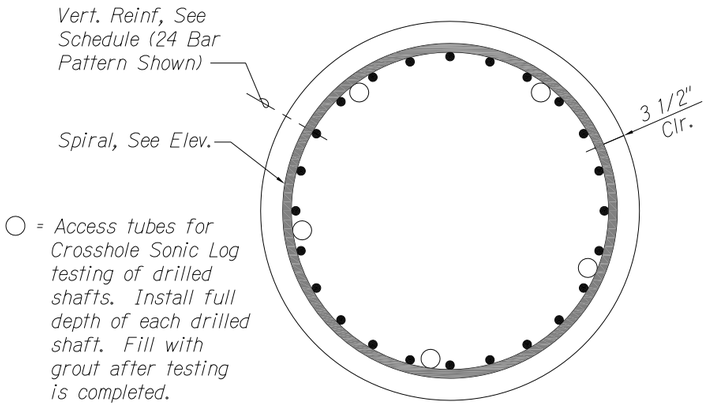
2A S3.4 & S7.1 S3.4 SEISMIC HOOK DETAIL

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



3 S3.4 S3.4 SPIRAL REINFORCING LAP SPLICE DETAIL (TYPICAL)

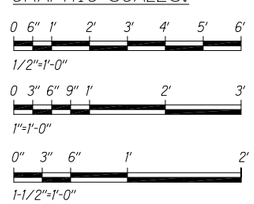
SCALE: 1/2" = 1'-0"



4 S3.3 S3.4 CSL ACCESS TUBES

SCALE: 1" = 1'-0"

GRAPHIC SCALES:



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DRILLED SHAFTS - TYPICAL DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S3.4 OF 4 SHEETS

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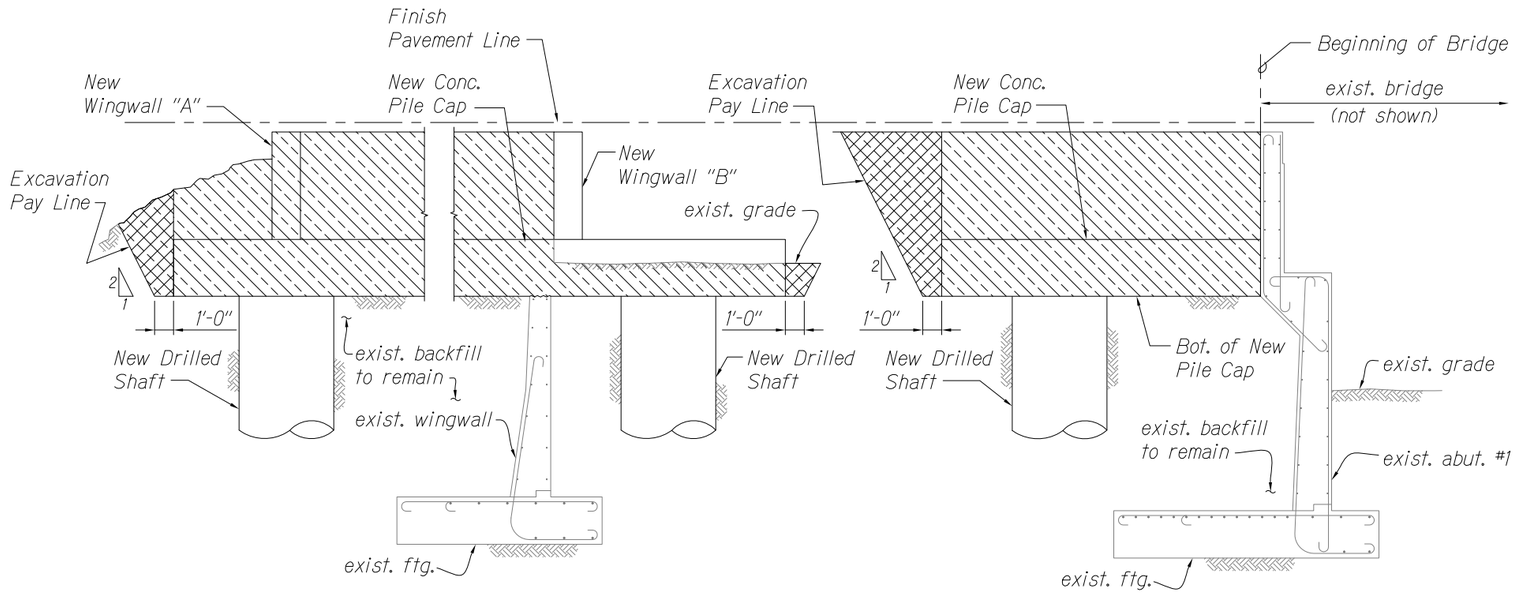
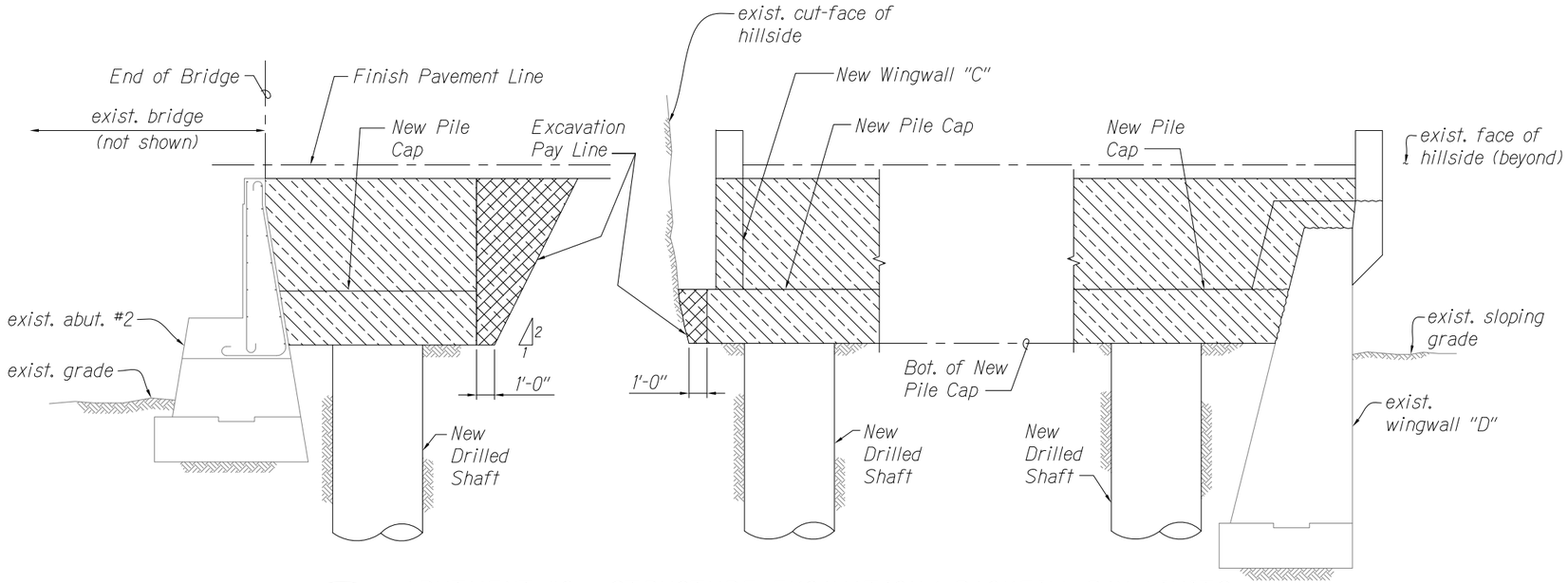
HAWAII	HAW.	BR-019-2(61)	2011	64	135



1 / S4.1 | S4.1 ABUTMENT #1 - STRUCTURE EXCAVATION/ BACKFILL PAY LIMITS

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



2 / S4.1 | S4.1 ABUTMENT #2 - STRUCTURE EXCAVATION/ BACKFILL PAY LIMITS

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

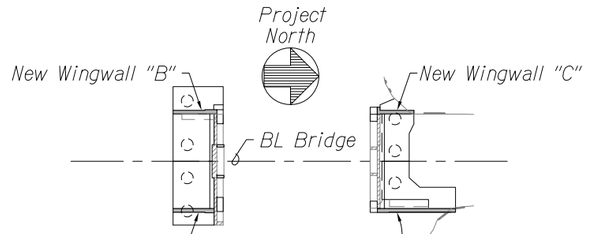
Legend:

= Structure Excavation

= Structure Backfill

Notes:

1. Refer to General Structural Notes on sheets S0.1 and S0.2.
2. Existing abutment and wingwall footings, and existing pavements shall be protected at all times from undermining.
3. Excavation for drilled shafts will be paid for under Section 511-Drilled Shafts.



KEY PLAN

GRAPHIC SCALES:

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

1/4"=1'-0"

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

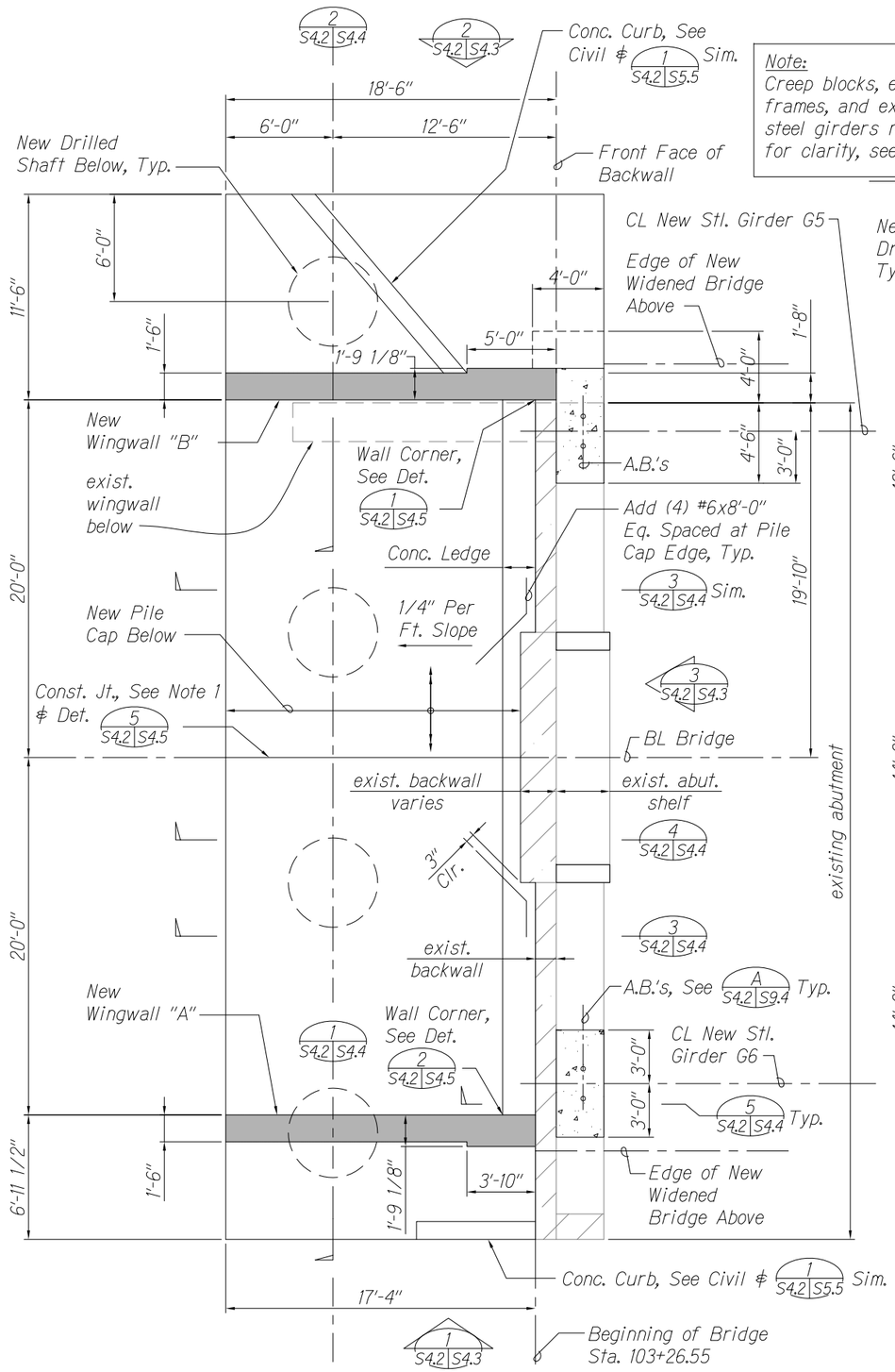
ABUTMENT - TYPICAL PAY LIMITS FOR EXCAVATION

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

Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

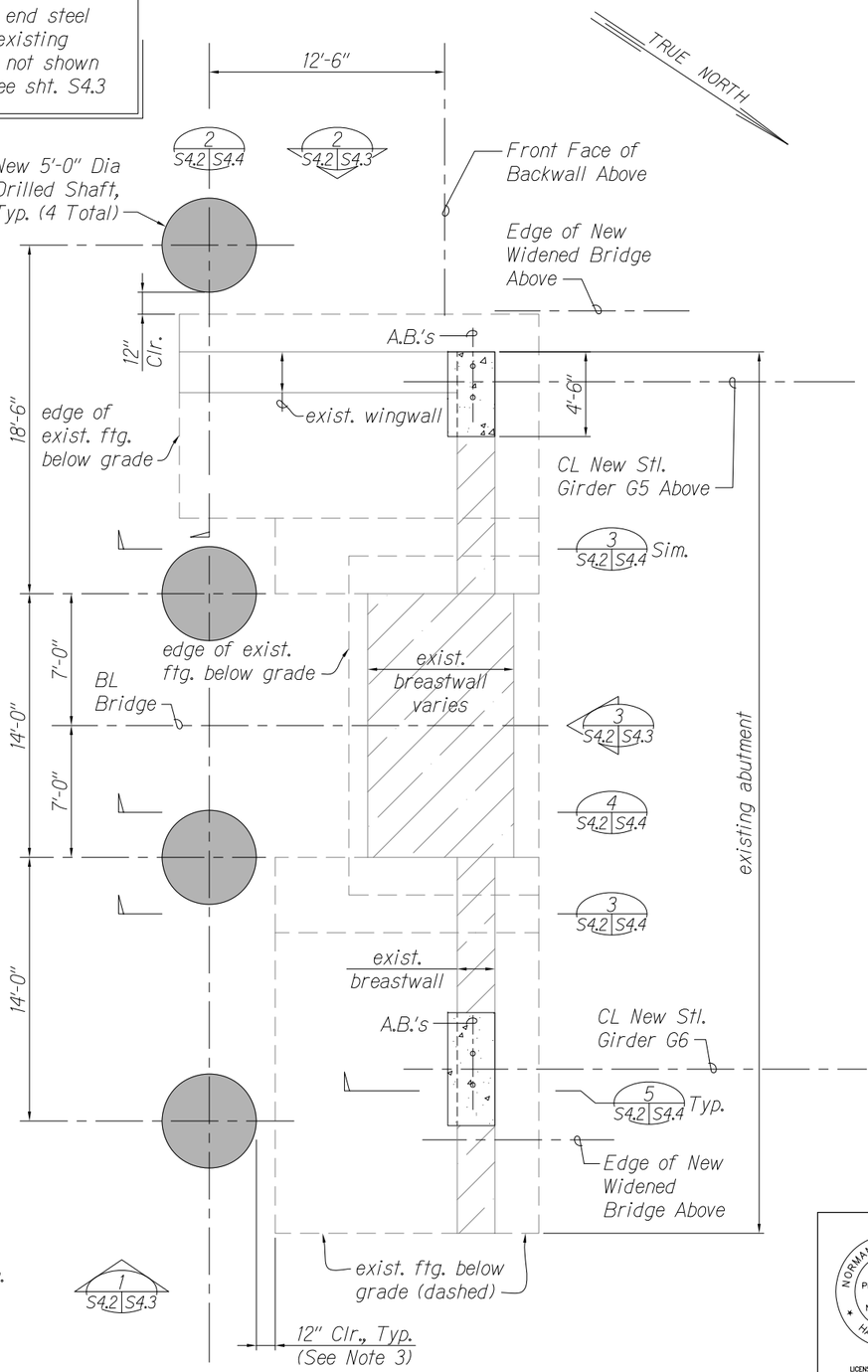
SHEET No. S4.1 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	65	135



A ABUTMENT #1 - BRIDGE LEVEL PLAN
S2.1 & S4.3 S4.2 SCALE: 1/4" = 1'-0"

Note:
Creep blocks, end steel frames, and existing steel girders not shown for clarity, see sht. S4.3



B ABUTMENT #1 - FOUNDATION PLAN
S2.1 & S4.3 S4.2 SCALE: 1/4" = 1'-0"

Notes:

1. Construction phasing, see sheet S15.1.
2. Drilled shaft typical details and reinforcing, and added reinforcing steel in pile cap, see sheets S3.3 and S3.4.
3. Locate edge of existing footings prior to drilling shaft excavation. If existing footing encroaches into drilled shaft, immediately notify Engineer for direction.
4. Excavations for new drilled shafts and new pile cap shall be kept dry during construction. See Standard Specs Section 205.
5. Where new concrete is poured against existing concrete, existing interface surface shall be cleaned and intentionally roughened to 1/4" amplitude, typical.
6. Portion of existing Abutment #1 breastwall to be re-poured shall have f'c = 6,000 psi.
7. New concrete creep blocks shall have f'c = 6,000 psi and shall be incidental to abutment concrete.

GRAPHIC SCALES:

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

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

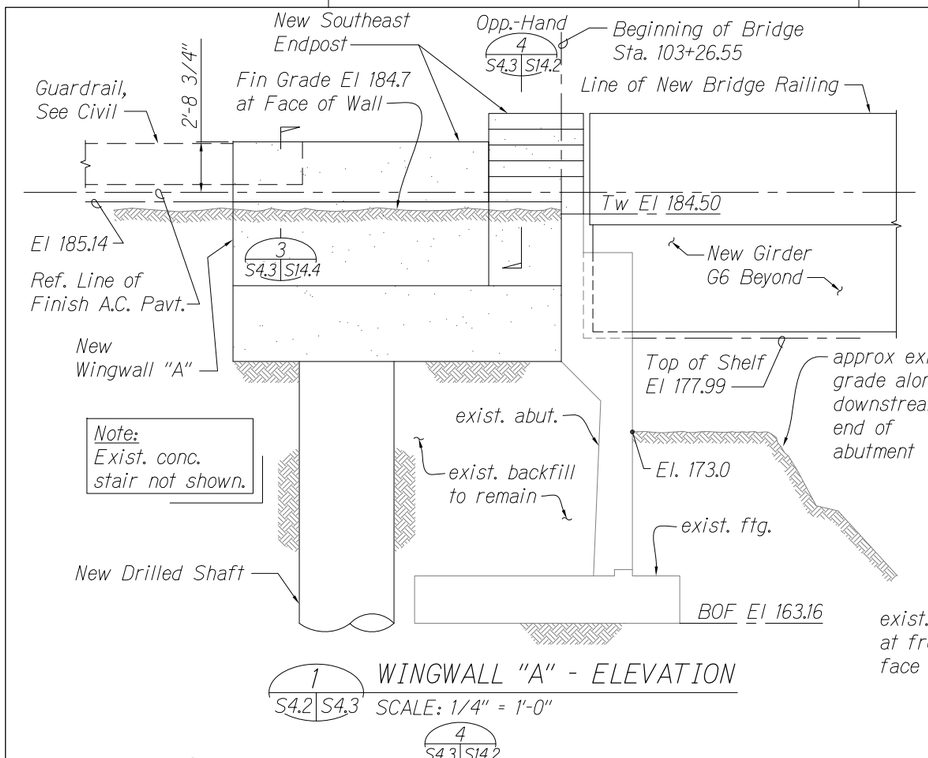
NEW WIDENED BRIDGE, ABUTMENT #1 - PLANS

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

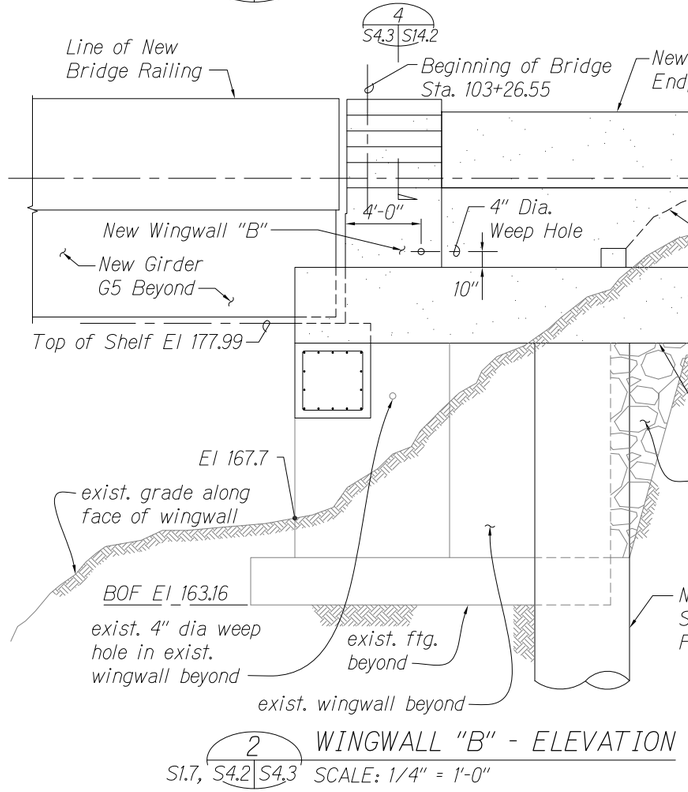
Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

SHEET No. S4.2 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	66	135

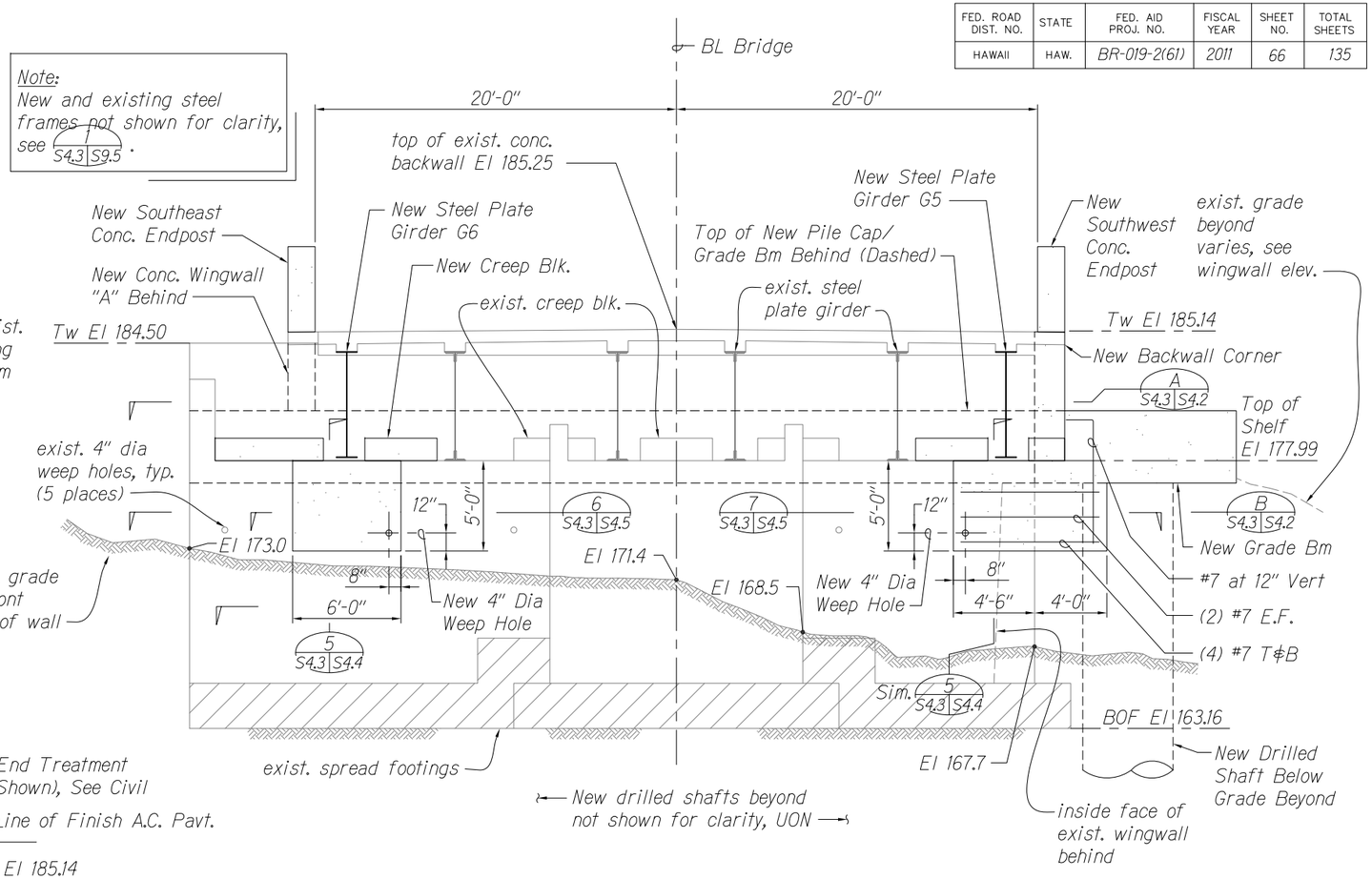


1 S4.2 S4.3 WINGWALL "A" - ELEVATION SCALE: 1/4" = 1'-0"



2 S1.7, S4.2 S4.3 WINGWALL "B" - ELEVATION SCALE: 1/4" = 1'-0"

Note: New and existing steel frames not shown for clarity, see 7 S4.3 S9.5.



3 S1.6, S4.2, S9.5 S4.3 ABUTMENT #1 - FRONT ELEVATION SCALE: 1/4" = 1'-0"

GRAPHIC SCALES:

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

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

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

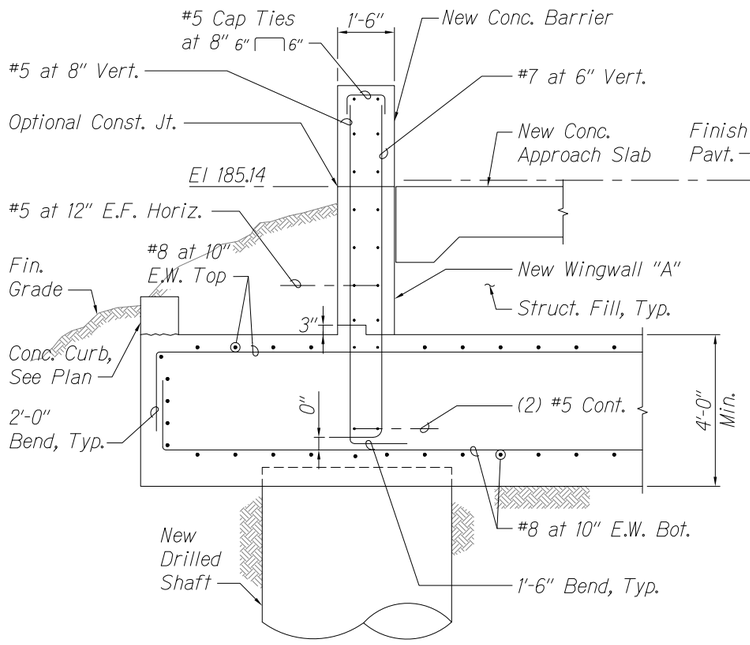
NEW WIDENED BRIDGE, ABUTMENT #1 - ELEVATIONS

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

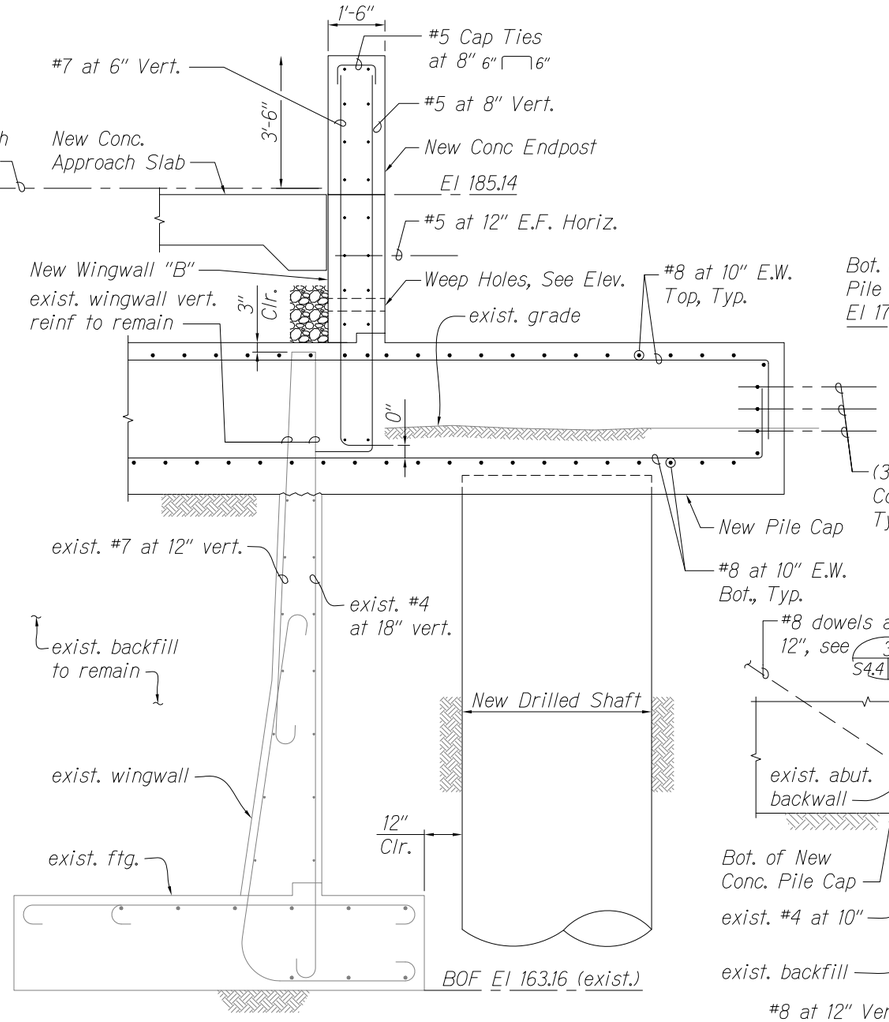
Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

SHEET No. S4.3 OF 9 SHEETS

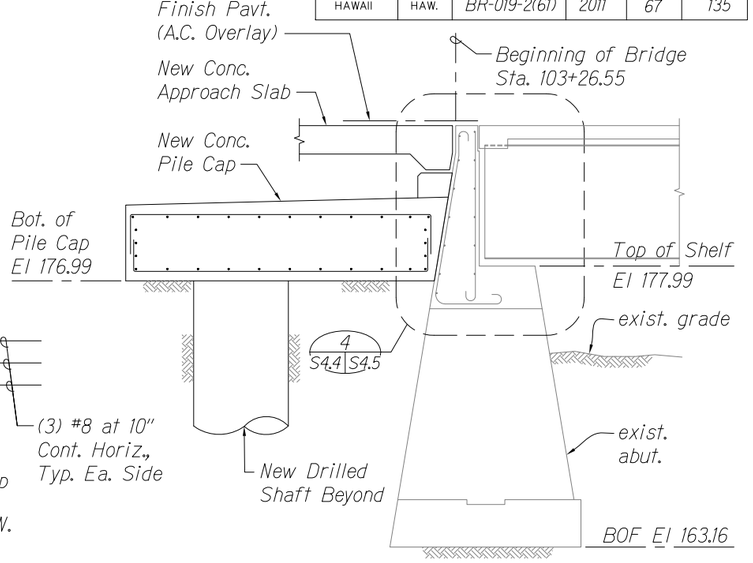
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	67	135



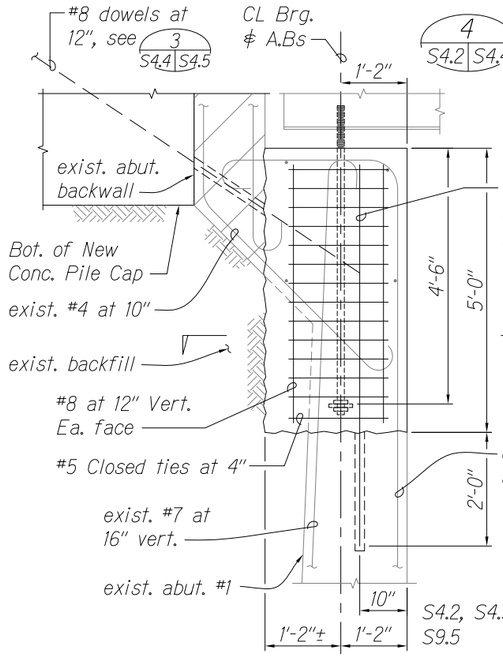
1 S4.2, S14.4 | S4.4 SECTION AT NEW WINGWALL "A"
SCALE: 1/2" = 1'-0"



2 S1.7, S4.2 | S4.4 SECTION AT NEW WINGWALL "B"
SCALE: 1/2" = 1'-0"

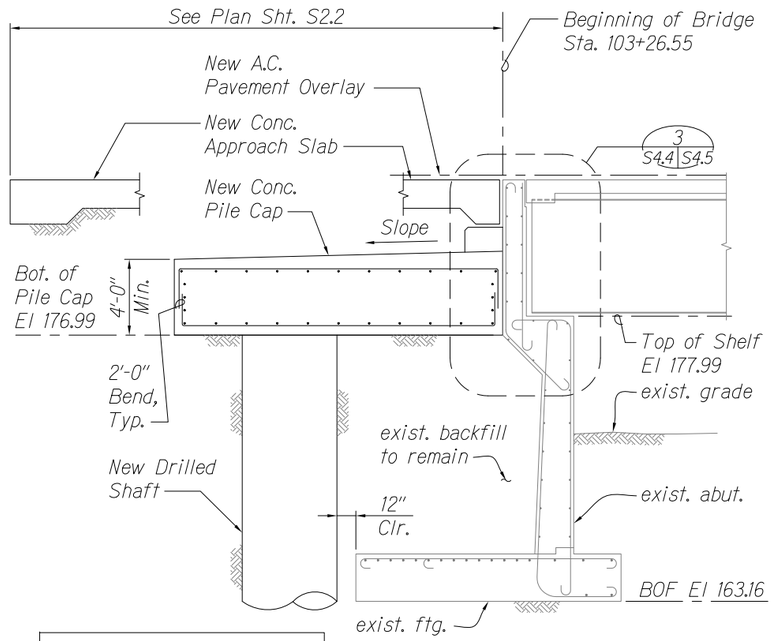


4 S4.2 | S4.4 SECTION
SCALE: 1/4" = 1'-0"



5 S4.2, S4.3 & S9.5 | S4.5 | S4.4 SECTION
SCALE: 3/4" = 1'-0"

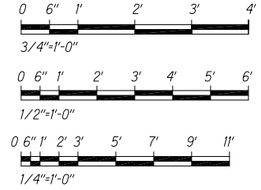
Note:
All exist. abut. reinf shall remain and be cast-in new concrete.



Note:
Drilled shaft reinf not shown, see sht. S3.3 & S3.4.

3 S4.2 | S4.4 SECTION
SCALE: 1/4" = 1'-0"

GRAPHIC SCALES:



NORMAN K. NAGAMINE
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW WIDENED BRIDGE, ABUTMENT #1 - SECTION & DETAILS

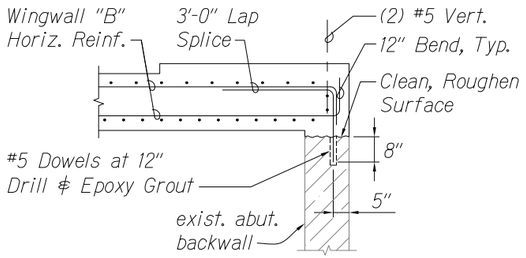
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S4.4 OF 9 SHEETS

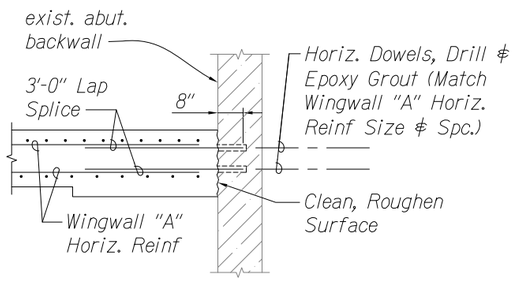
ORIGINAL PLAN | NOTEBOOK No. | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	68	135



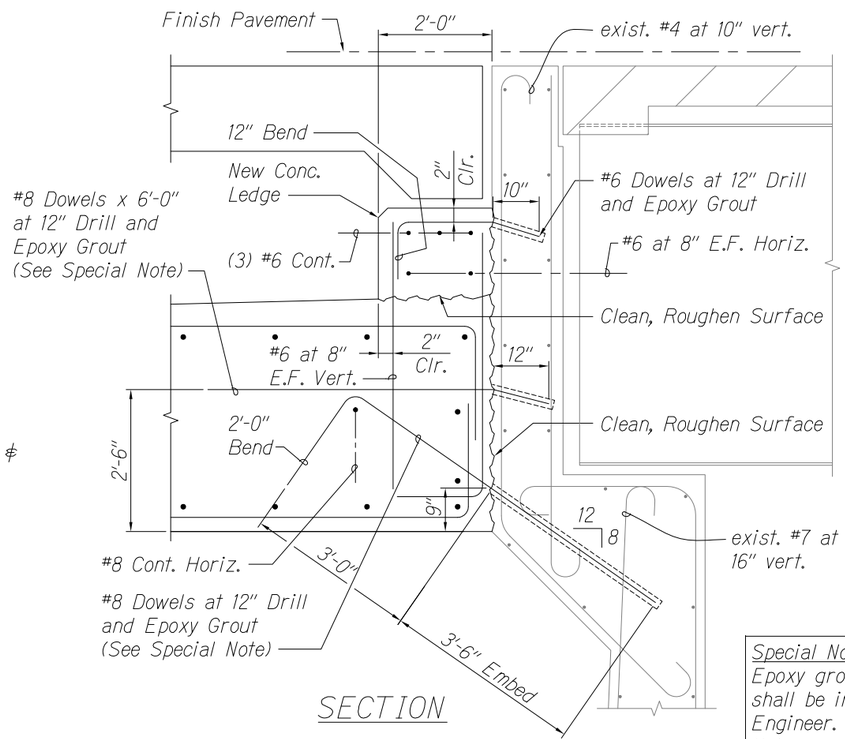
PLAN/SECTION

1 S4.2 | S4.5 DETAIL SCALE: 1/2" = 1'-0"



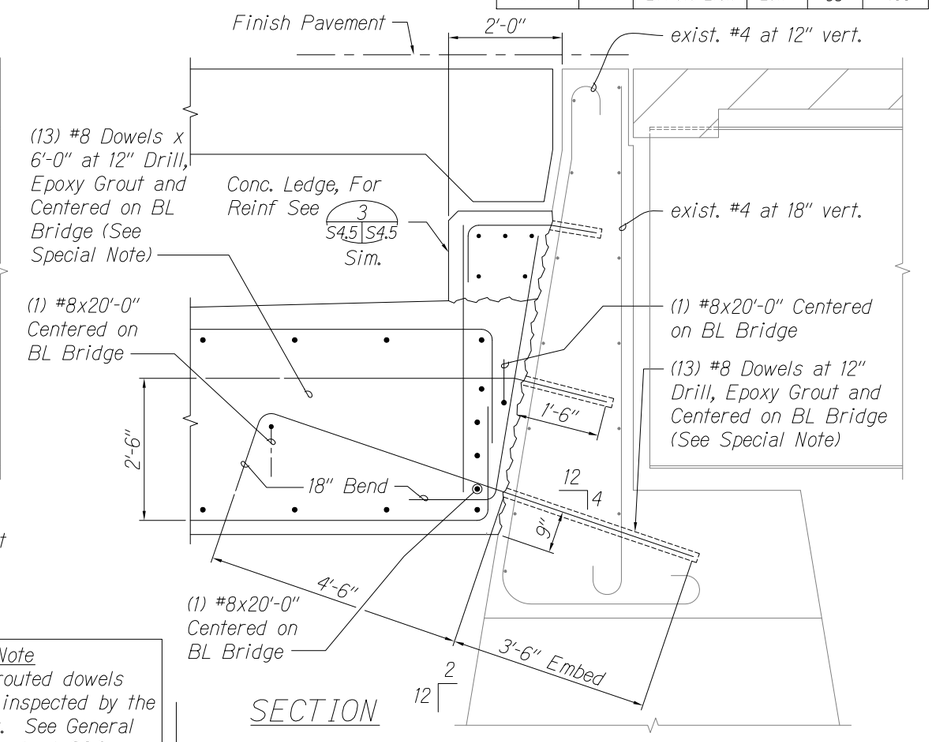
PLAN/SECTION

2 S4.2 | S4.5 DETAIL SCALE: 1/2" = 1'-0"



SECTION

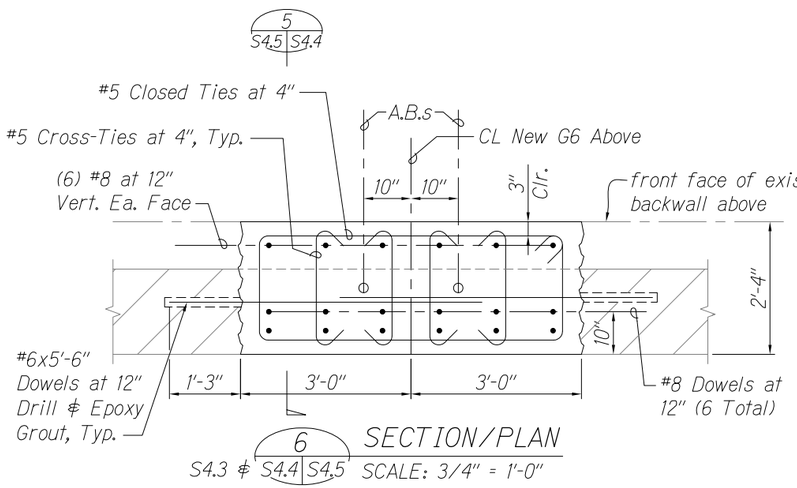
3 S4.4 & S4.5 | S4.5 DETAIL SCALE: 3/4" = 1'-0"



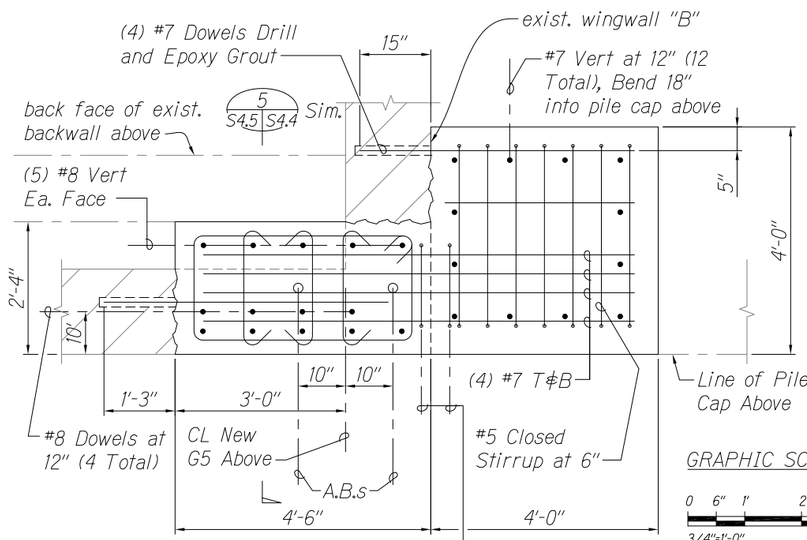
SECTION

4 S4.4 & S4.9 | S4.5 DETAIL SCALE: 3/4" = 1'-0"

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

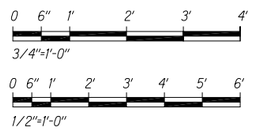


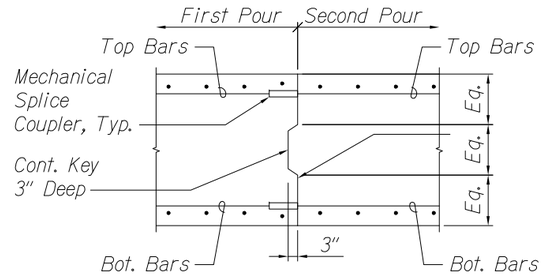
6 S4.3 & S4.4 | S4.5 SECTION/PLAN SCALE: 3/4" = 1'-0"



7 S4.3 & S4.4 | S4.5 SECTION/PLAN SCALE: 3/4" = 1'-0"

GRAPHIC SCALES:





5 S4.2 | S4.5 CONSTRUCTION JOINT DETAIL SCALE: 1/2" = 1'-0"

SURVEY PLOTTED BY
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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: 4/30/12
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

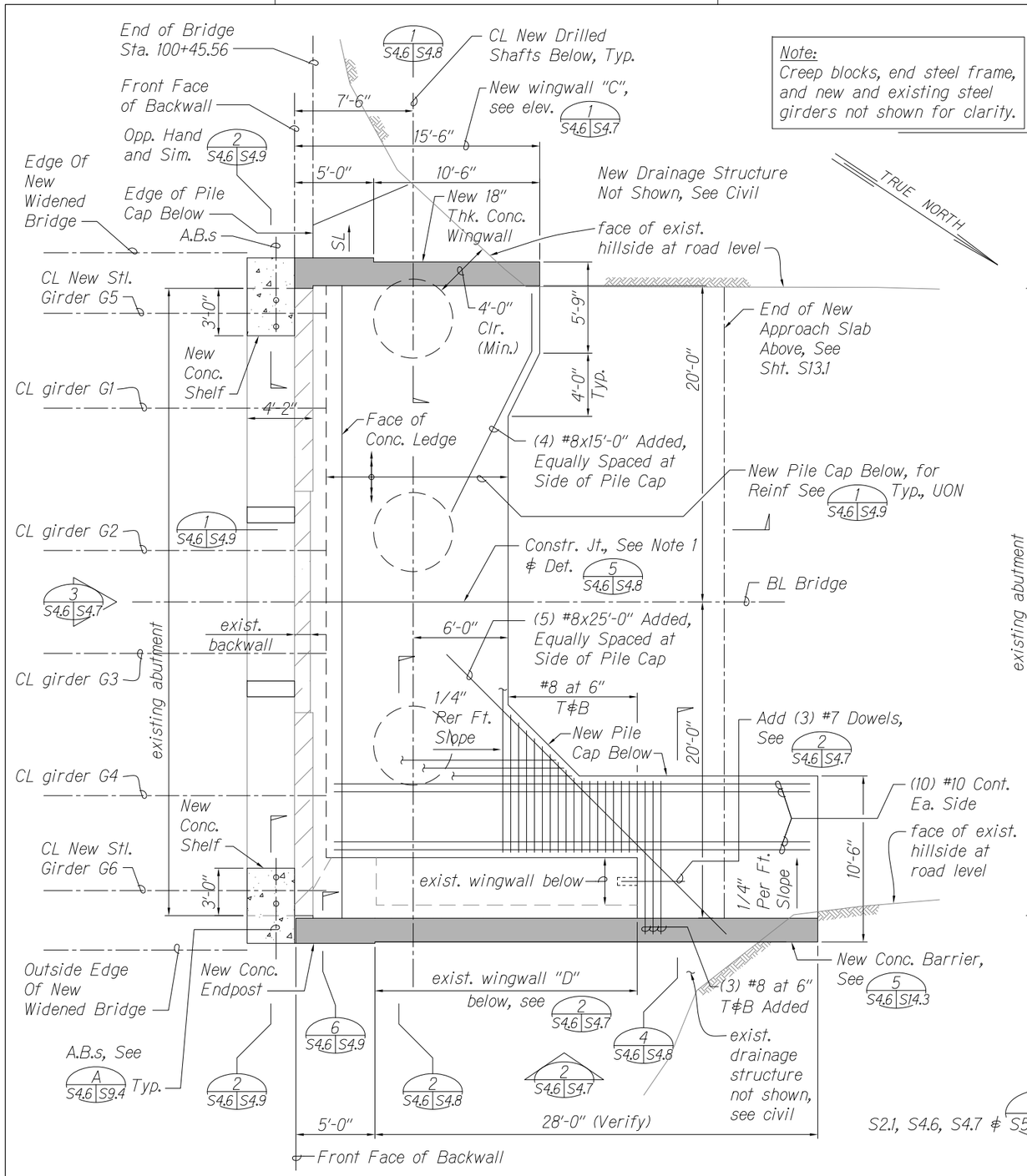
NEW WIDENED BRIDGE, ABUTMENT #1 - SECTION & DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S4.5 OF 9 SHEETS

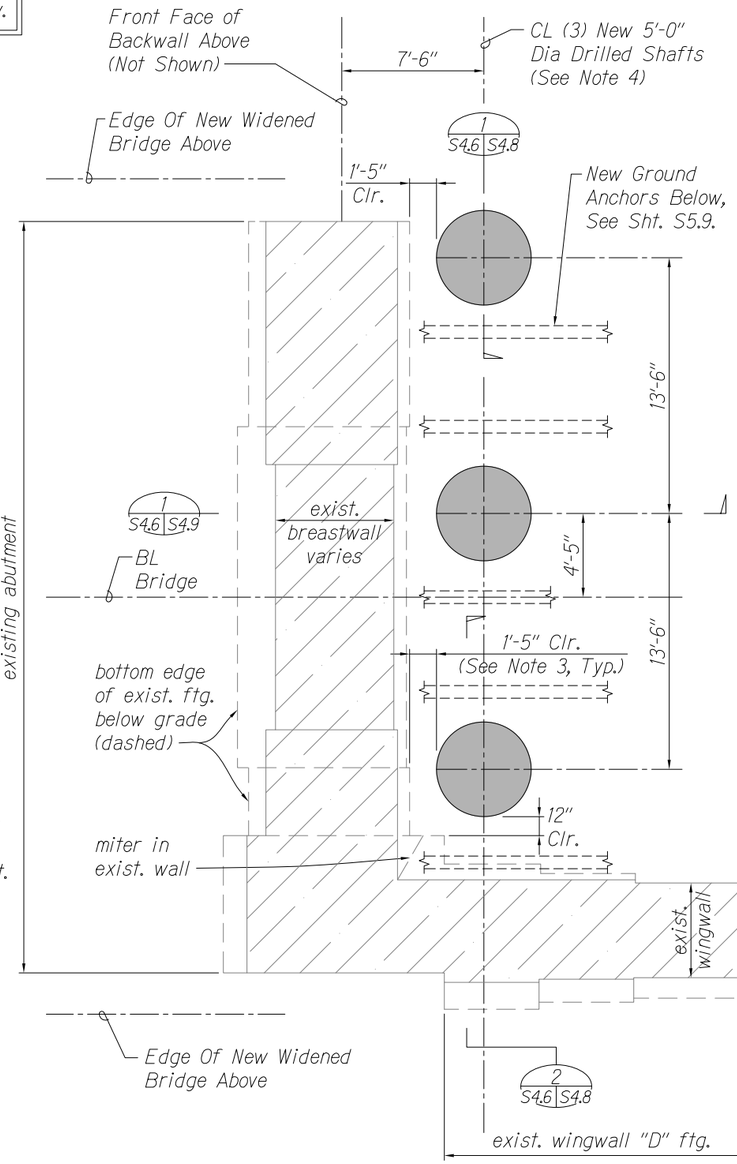
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	69	135



Note:
Creep blocks, end steel frame, and new and existing steel girders not shown for clarity.

A ABUTMENT #2 - BRIDGE LEVEL PLAN

S2.1, S4.7 & S14.3 S4.6 SCALE: 1/4" = 1'-0"



B ABUTMENT #2 - FOUNDATION PLAN

S2.1, S4.6, S4.7 & S5.9 S4.6 SCALE: 1/4" = 1'-0"

Notes:

1. Construction phasing, see sheet S15.1.
2. Drilled shaft typical details and reinforcing, and added reinforcing steel in pile caps, see sheets S3.3 and S3.4.
3. Locate edge of existing footings prior to drilling shaft excavation. If existing footing encroaches into drilled shaft, immediately notify Engineer for direction.
4. Coordinate plan location of drilled shafts with new Pier #3 foundation ground anchors below to avoid conflicts. See sheet S5.9.
5. Excavations for new drilled shafts and new pile cap shall be kept dry during construction. See Standard Specs Section 205.
6. Where new concrete is poured against existing concrete, existing interface surface shall be cleaned and intentionally roughened to 1/4" amplitude, typical.
7. Portion of existing Abutment #1 breastwall to be re-poured shall have f'c = 6,000 psi.
8. New concrete creep blocks shall have f'c = 6,000 psi and shall be incidental to abutment concrete.

GRAPHIC SCALES:

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

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.

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

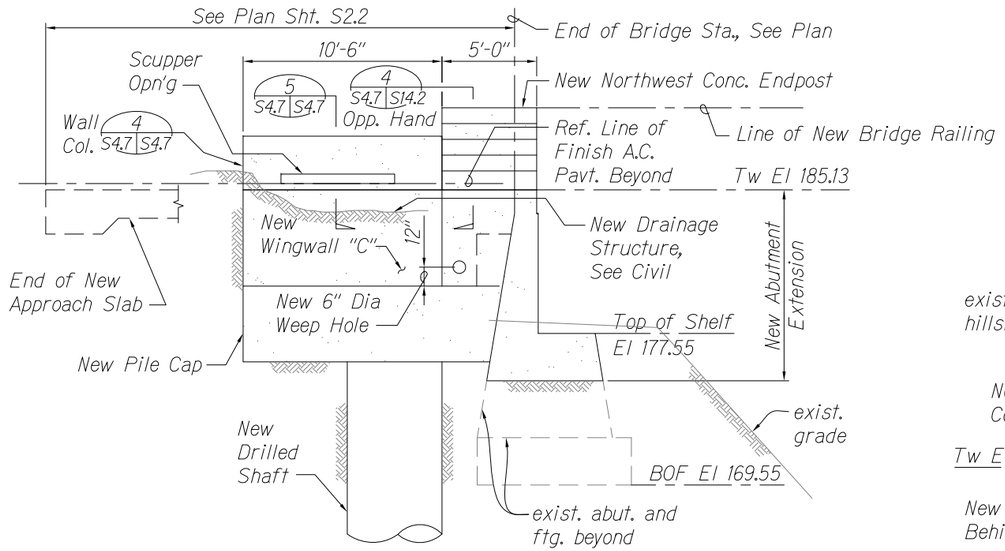
NEW WIDENED BRIDGE, ABUTMENT #2 - PLANS

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

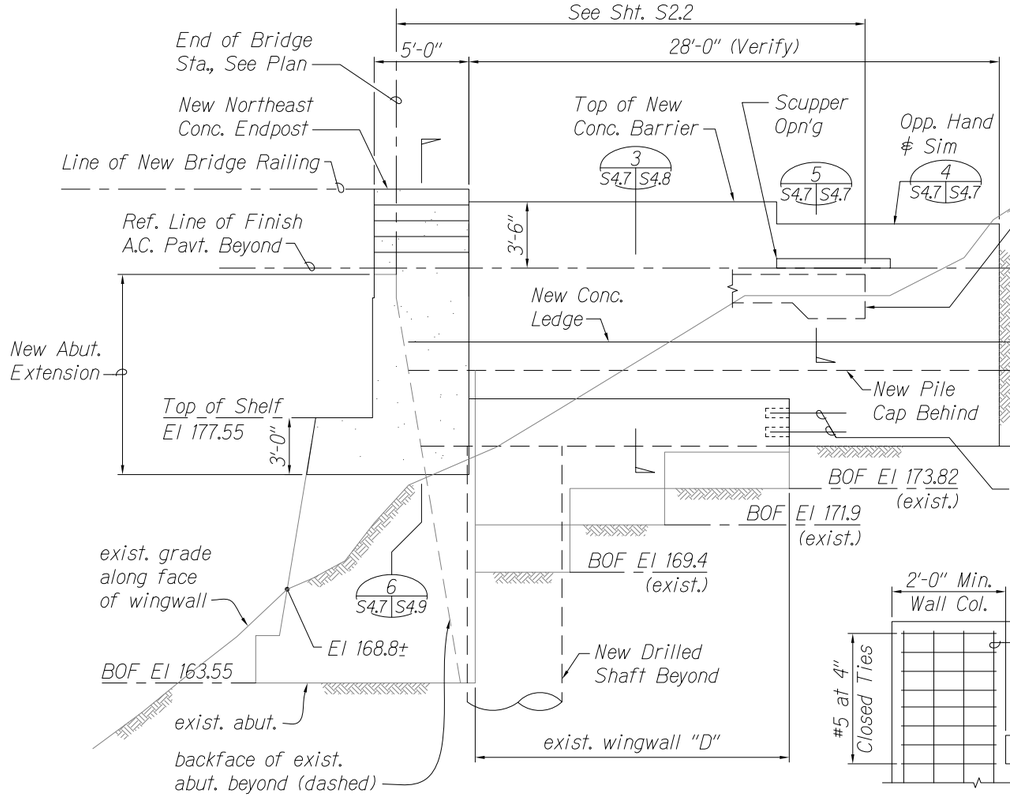
Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

SHEET No. S4.6 OF 9 SHEETS

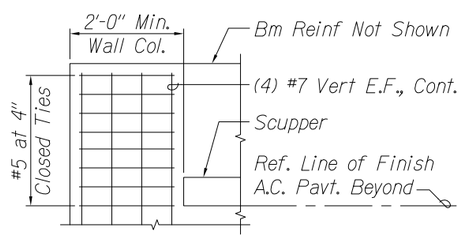
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	70	135



1 S4.6 | S4.7 WINGWALL "C" - ELEVATION
SCALE: 1/4" = 1'-0"

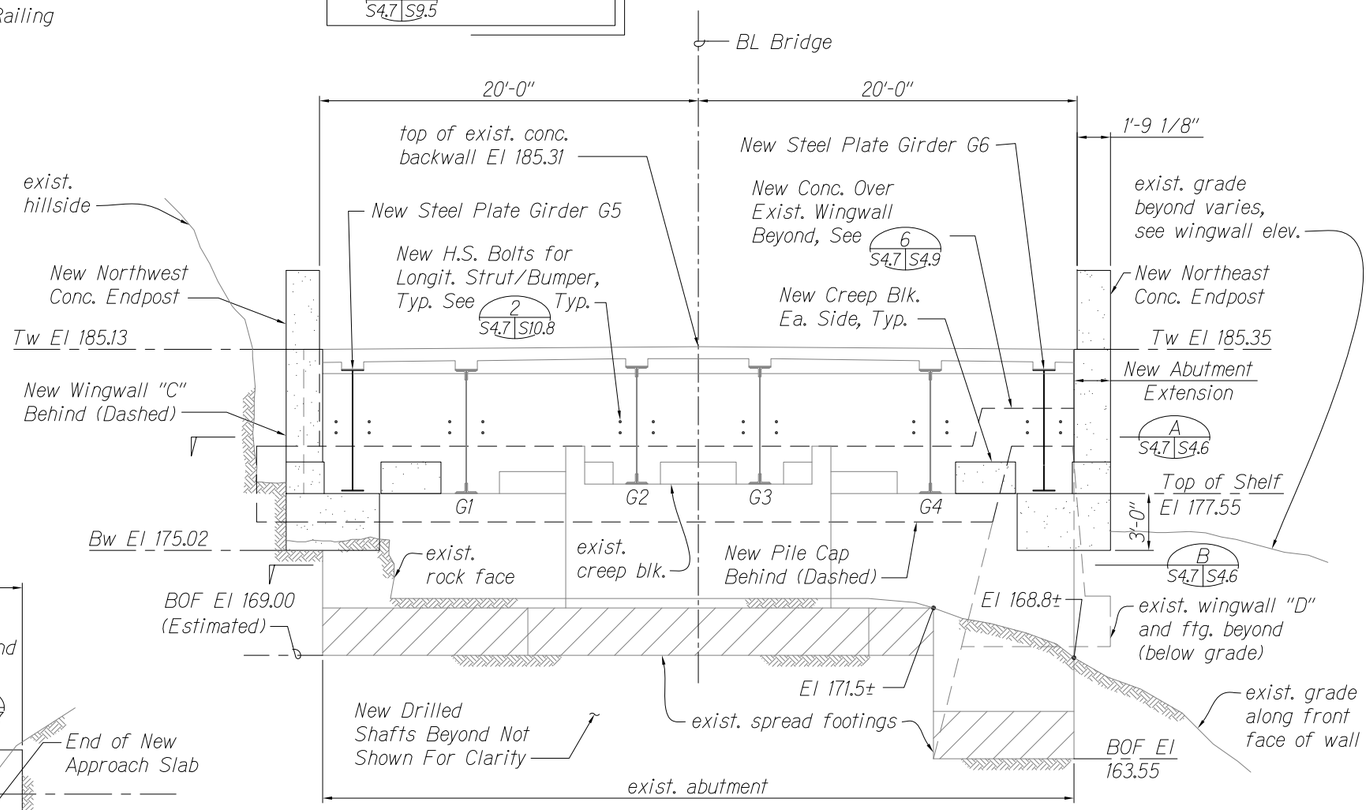


2 S1.9, S4.6 & S4.8 | S4.7 WINGWALL "D" - ELEVATION
SCALE: 1/4" = 1'-0"

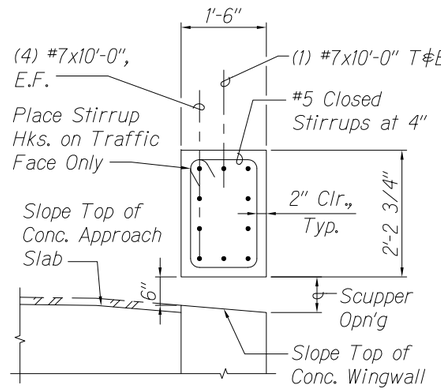


4 S4.7 | S4.7 DETAIL/ELEVATION
SCALE: 3/4" = 1'-0"

Note:
New and existing steel frames not shown for clarity, see 2 S4.7 | S9.5.

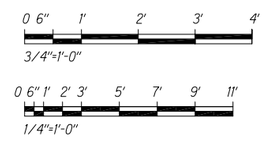


3 S1.8 & S4.6 | S4.7 ABUTMENT #2 - FRONT ELEVATION
SCALE: 1/4" = 1'-0"



5 S4.7 & S13.1 | S4.7 SECTION
SCALE: 3/4" = 1'-0"

GRAPHIC SCALES:



NORMAN K. NAGAMINE
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LICENSE EXPIRES: 4/30/12
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW WIDENED BRIDGE, ABUTMENT #2 - ELEVATIONS

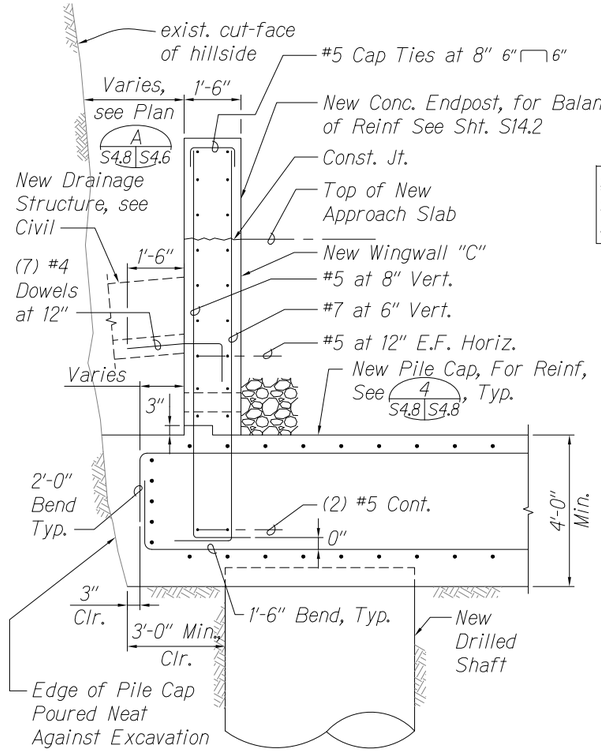
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: Oct. 20, 2011

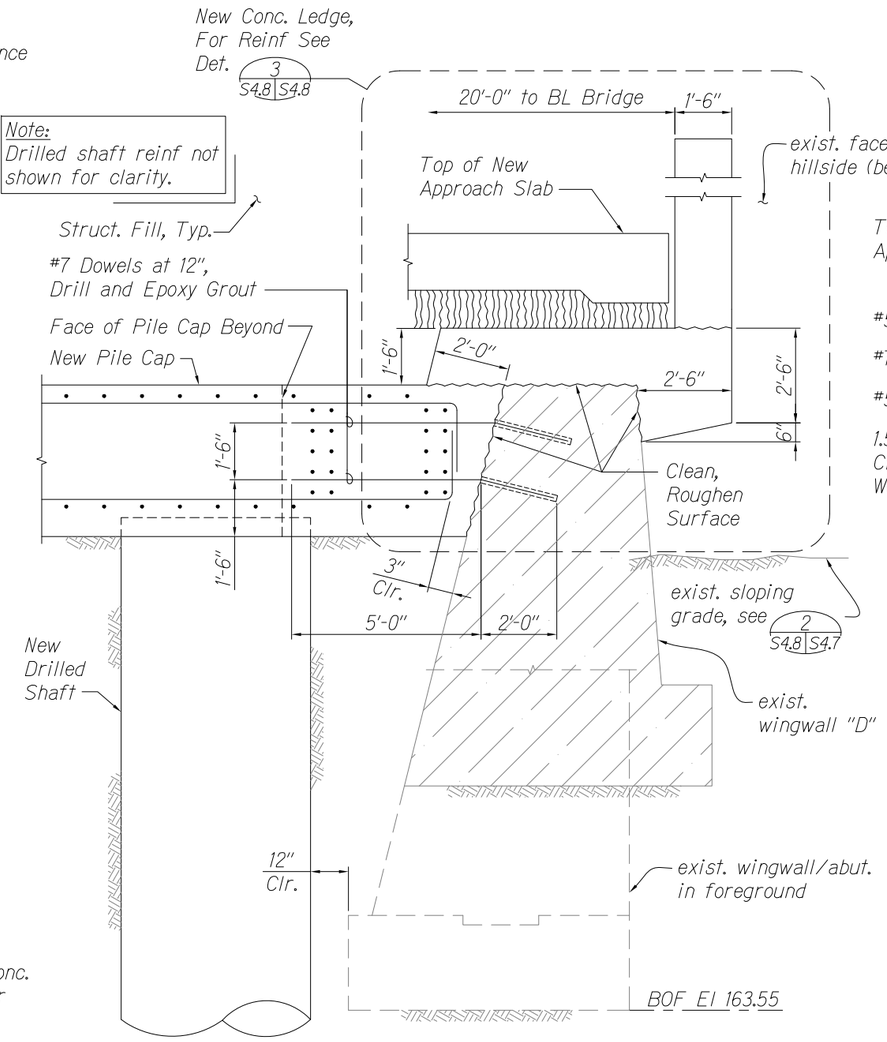
SHEET No. S4.7 OF 9 SHEETS

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

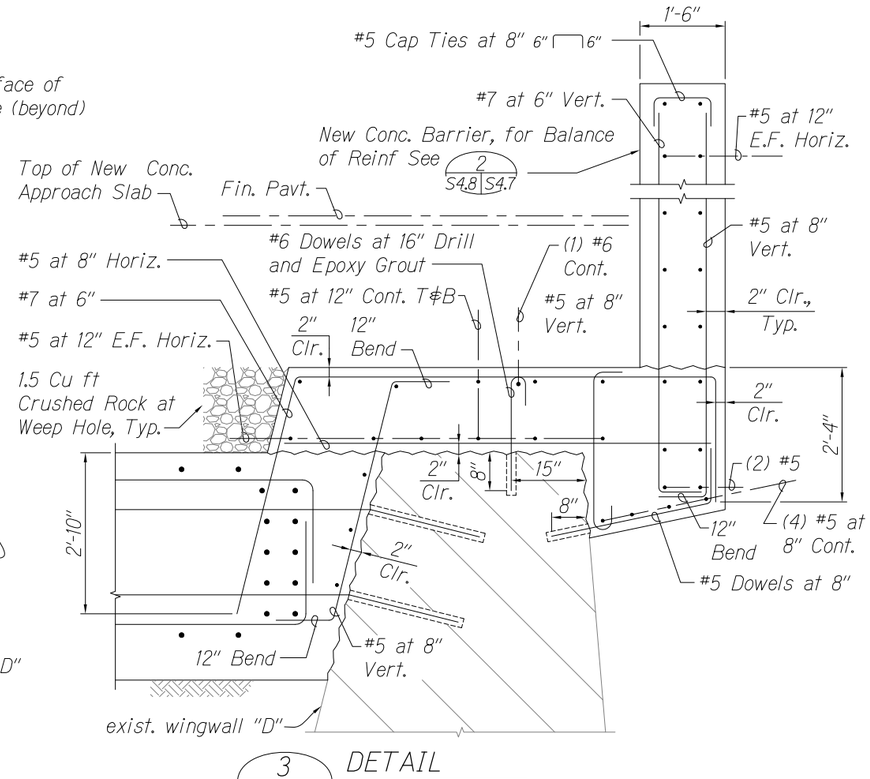
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	71	135



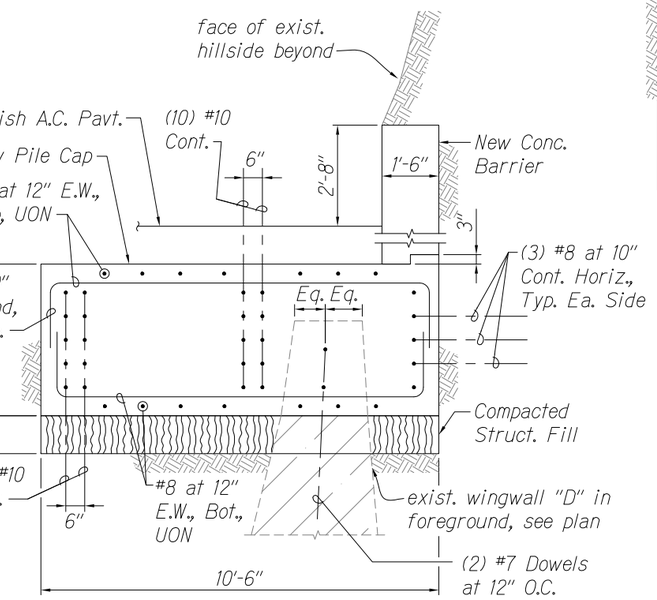
1 S4.6 | S4.8 SECTION AT NEW WINGWALL "C"
SCALE: 1/2" = 1'-0"



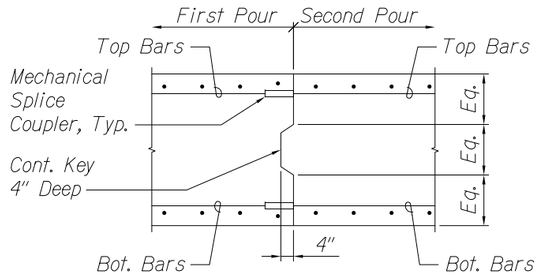
2 S4.6 | S4.8 SECTION AT EXISTING WINGWALL "D"
SCALE: 1/2" = 1'-0"



3 S4.7, S4.8, S4.9 & S14.3 | S4.8 DETAIL
SCALE: 3/4" = 1'-0"

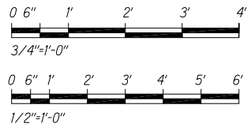


4 S4.6, S4.8 & S4.9 | S4.8 SECTION
SCALE: 1/2" = 1'-0"



5 S4.6 | S4.8 CONSTRUCTION JOINT DETAIL
SCALE: 1/2" = 1'-0"

GRAPHIC SCALES:



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HIGHWAYS DIVISION

NEW WIDENED BRIDGE, ABUTMENT #2 - SECTIONS & DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S4.8 OF 9 SHEETS

ORIGINAL PLAN | NOTEBOOK | No. | DATE
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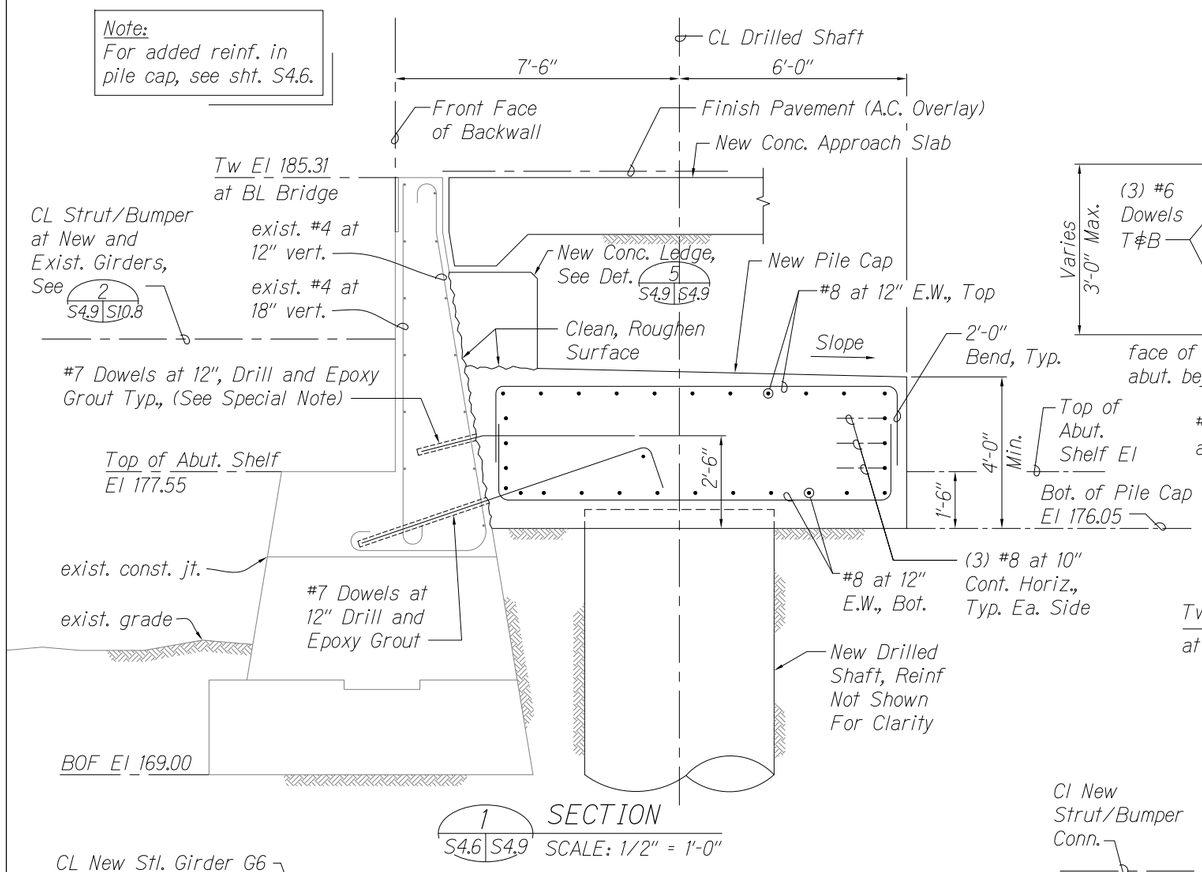
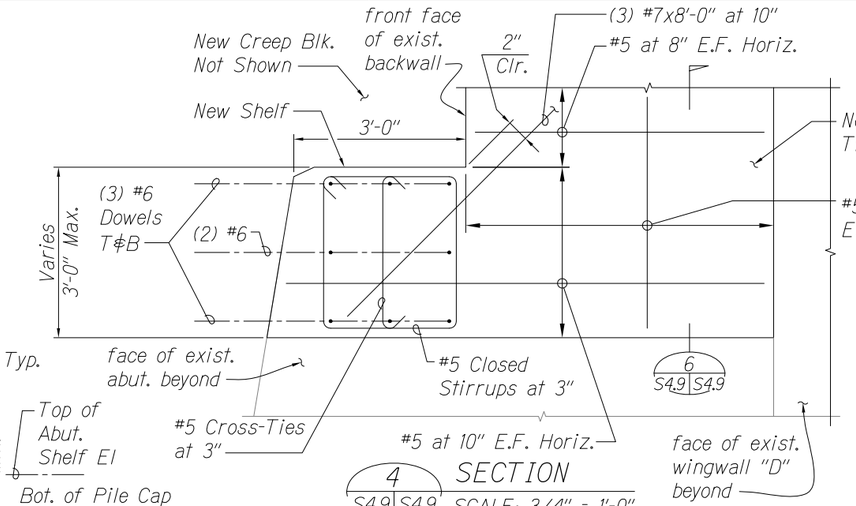
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	72	135

Note:
For added reinf. in pile cap, see sht. S4.6.

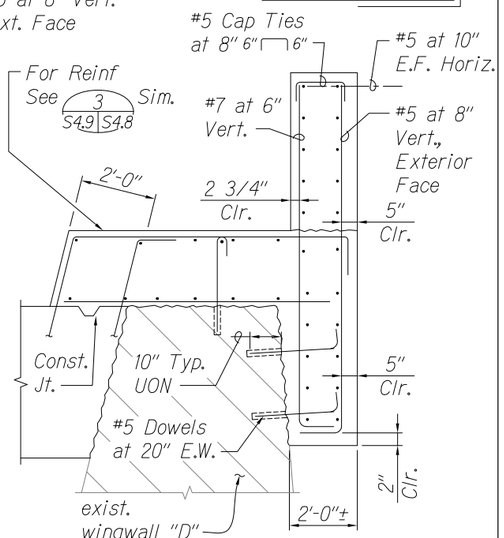


1 SECTION
S4.6 | S4.9 SCALE: 1/2" = 1'-0"

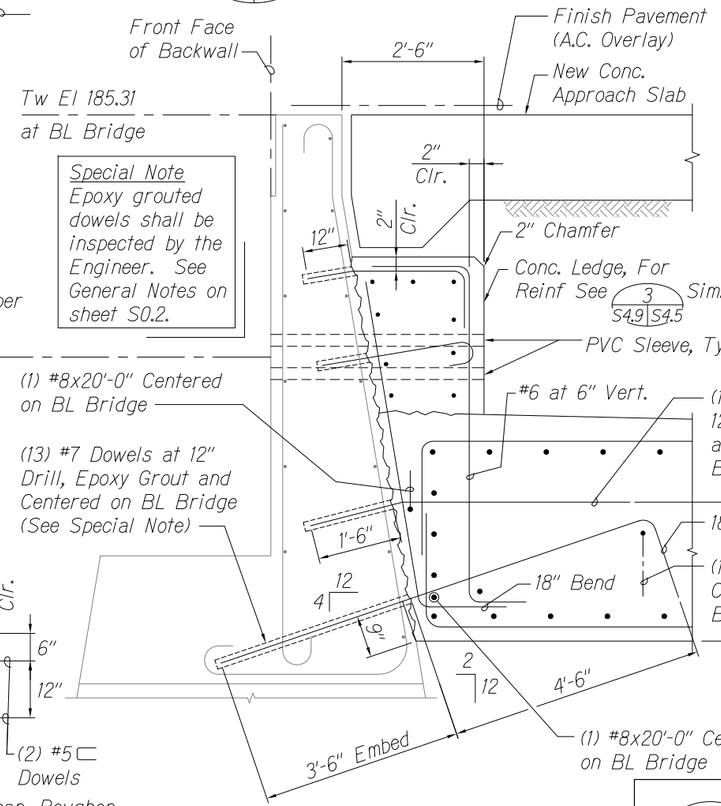


4 SECTION
S4.9 | S4.9 SCALE: 3/4" = 1'-0"

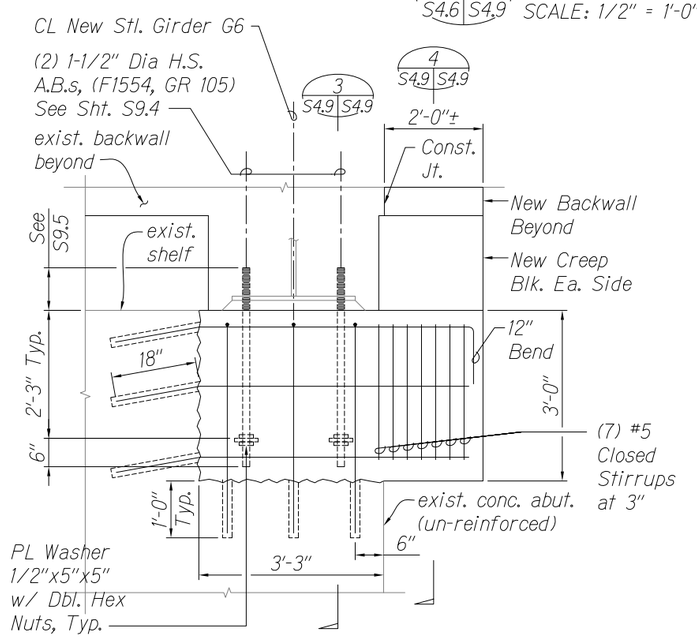
Note:
Horiz. grooves not shown, see 4 S4.9 | S14.2



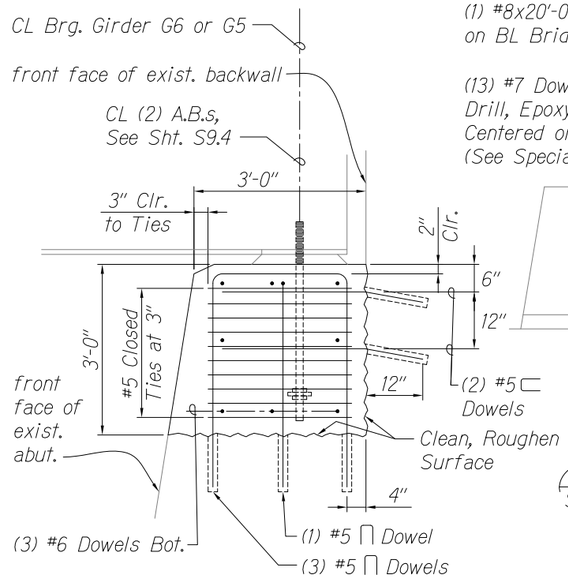
6 SECTION
S4.6, S4.7 & S4.9 | S4.9 SCALE: 1/2" = 1'-0"



5 CONCRETE LEDGE DETAIL
S4.9 | S4.9 SCALE: 3/4" = 1'-0"

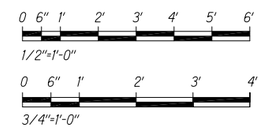


2 SECTION
S4.6 & S9.5 | S4.9 SCALE: 3/4" = 1'-0"



3 SECTION
S4.9 | S4.9 SCALE: 3/4" = 1'-0"

GRAPHIC SCALES:



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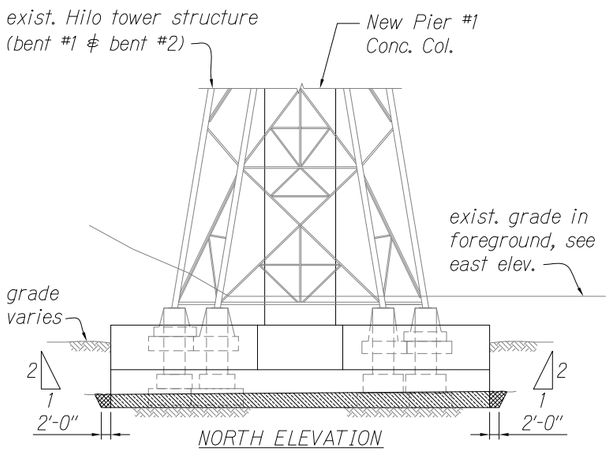
NEW WIDENED BRIDGE, ABUTMENT #2 - SECTIONS & DETAILS

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

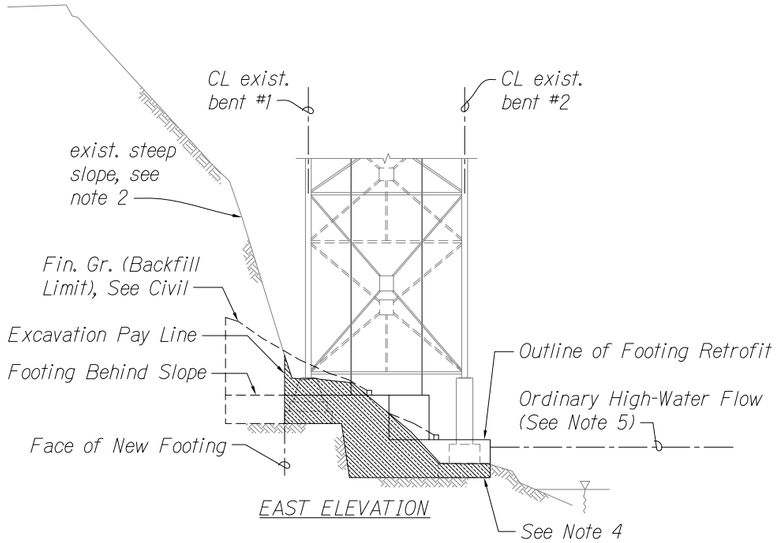
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S4.9 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	73	135



NORTH ELEVATION



EAST ELEVATION

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

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

NORTH ELEVATION

EAST ELEVATION

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

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

SOUTH ELEVATION

EAST ELEVATION

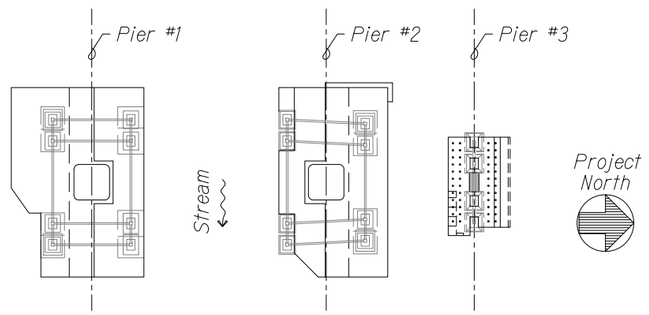
3 S5.1 | S5.1 NEW PIER #3 - STRUCTURE EXCAVATION/BACKFILL PAY LIMITS

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.*

   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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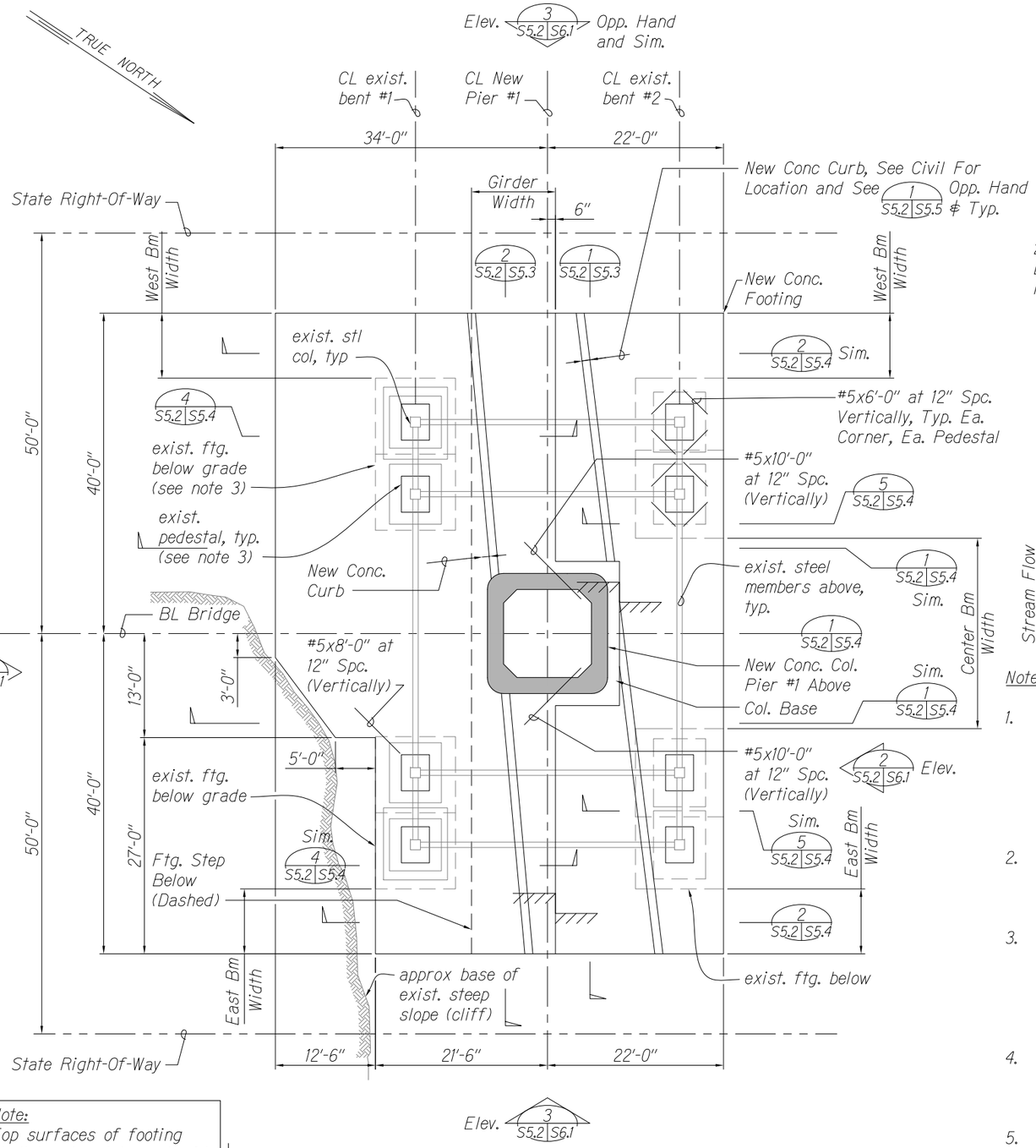
NEW PIER FOUNDATION - SPECIAL NOTES & TYPICAL PAY LIMITS

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

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

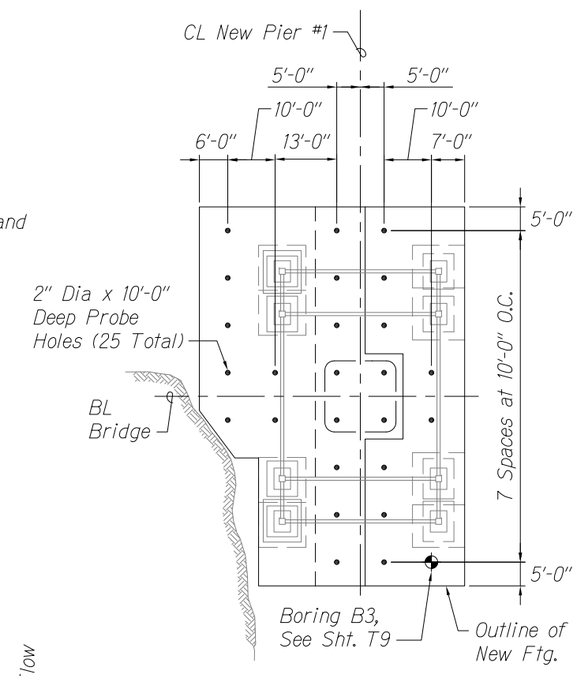
SHEET No. S5.1 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	74	135



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: 1/16" = 1'-0"



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

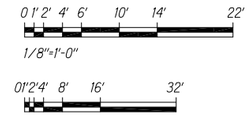
Notes:

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:



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

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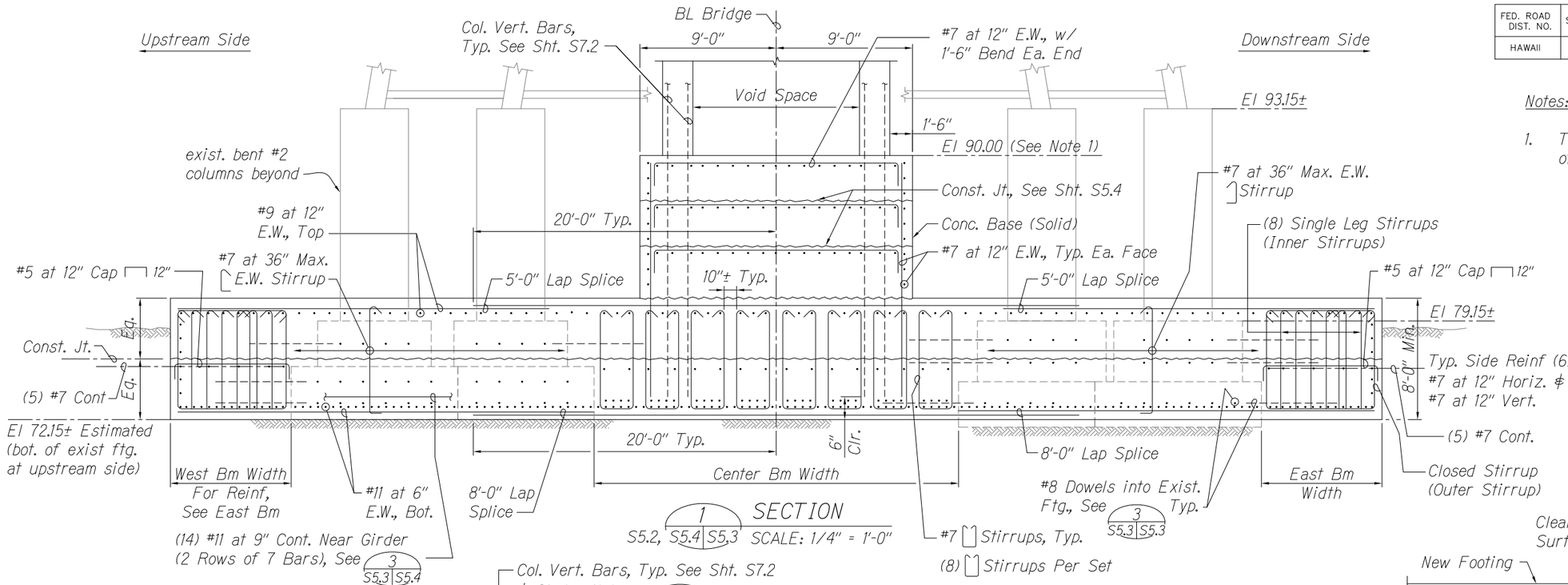
NEW PIER #1 - FOUNDATION PLAN

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S5.2 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	75	135



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

Notes:

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

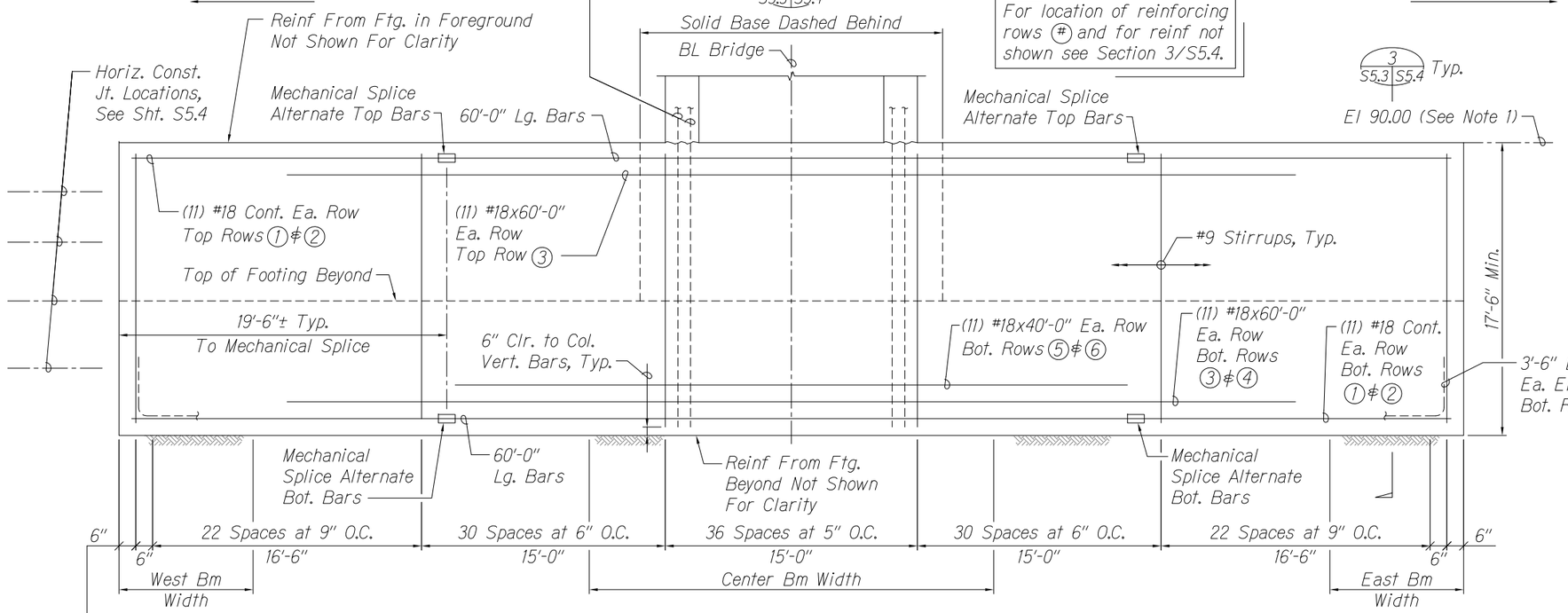
GRAPHIC SCALES:

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

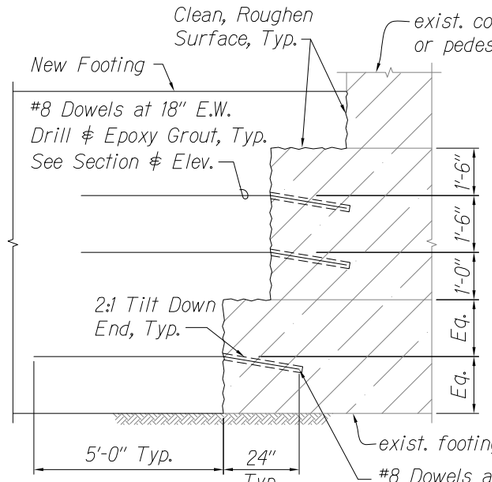
0 6" 1' 2' 3' 4' 5' 6'
1/2"=1'-0"

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



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

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NOTEBOOK No.
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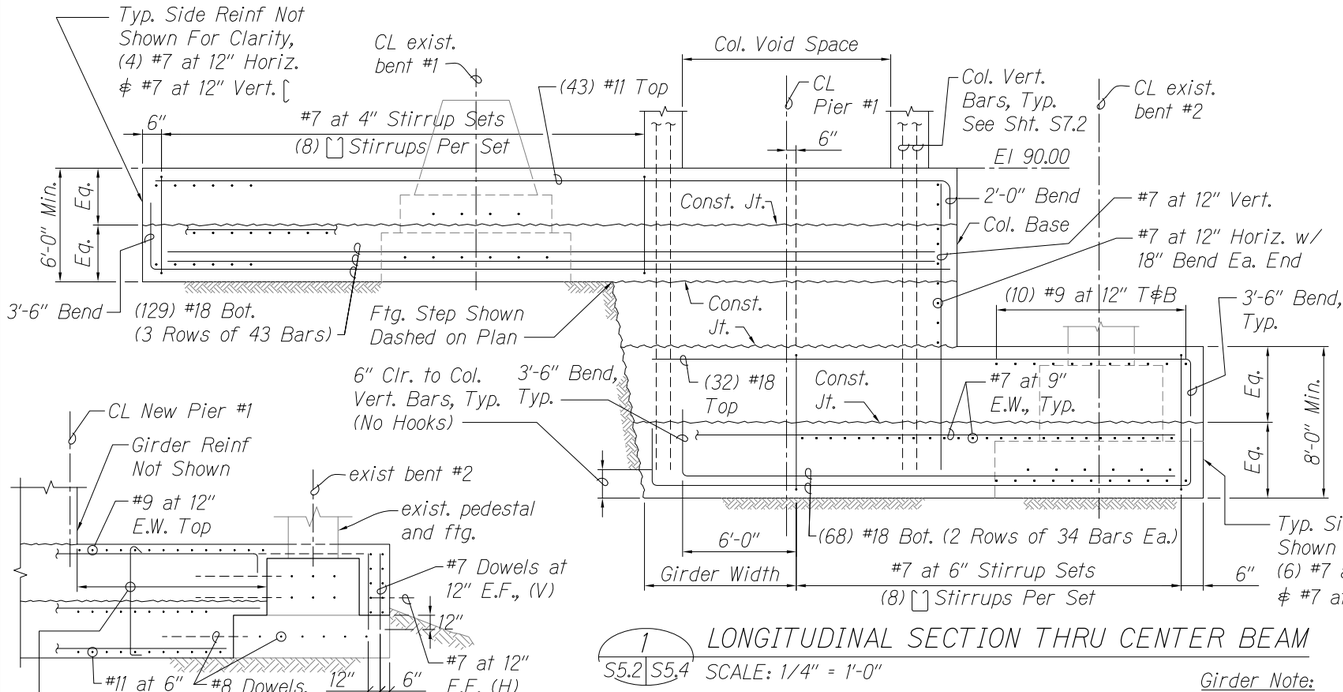
NEW PIER #1 - FOUNDATION SECTIONS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S5.3 OF 12 SHEETS

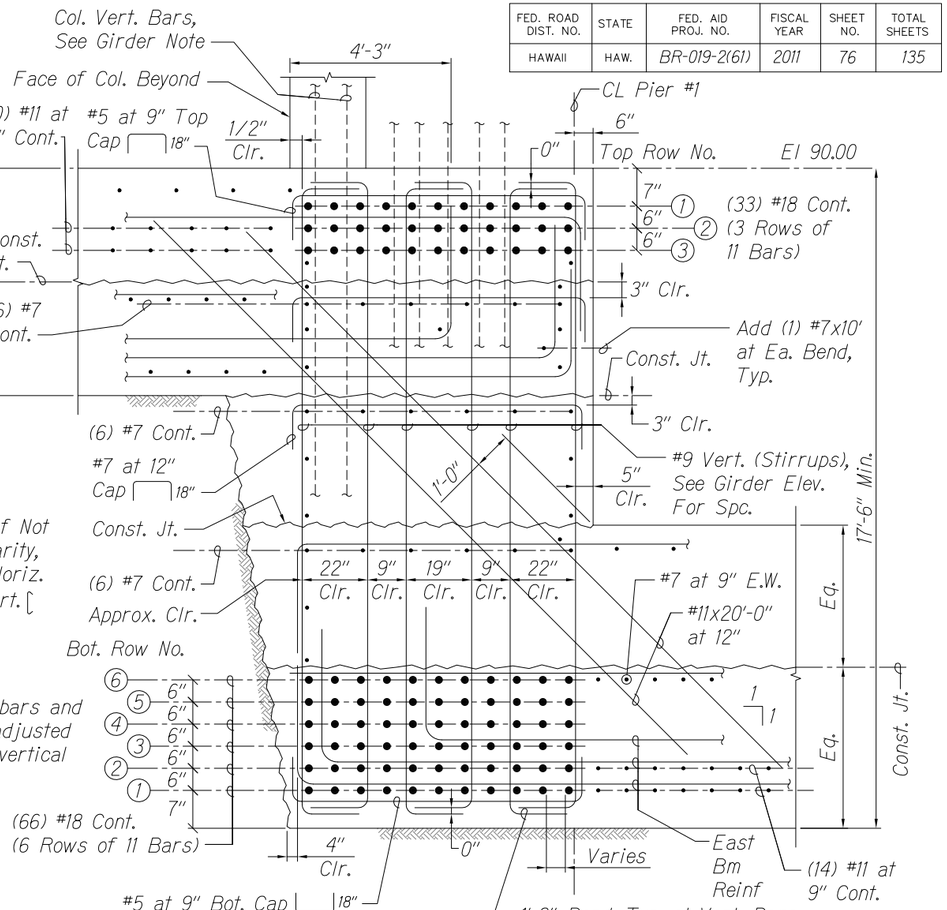
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	76	135



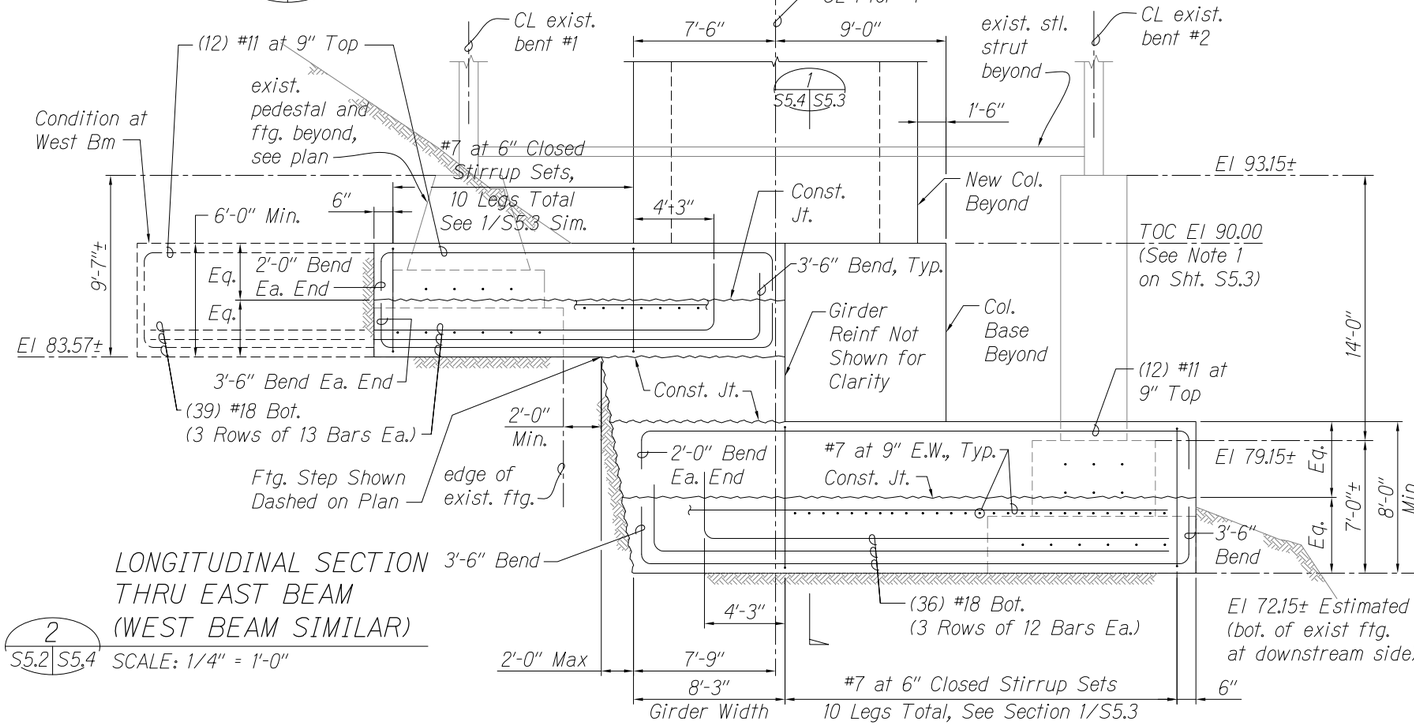
1 S5.2 | S5.4 LONGITUDINAL SECTION THRU CENTER BEAM
SCALE: 1/4" = 1'-0"

5 S5.2 ℄ S5.3 | S5.4 SECTION
SCALE: 3/16" = 1'-0"

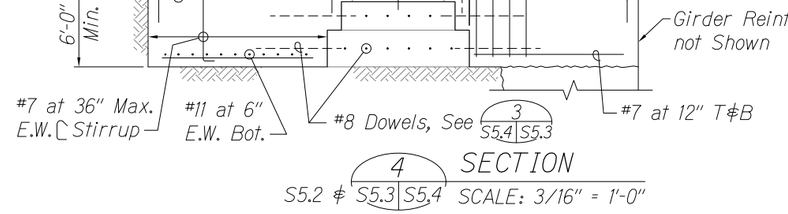
Girder Note:
Spacing of horizontal bars and stirrup legs shall be adjusted to fit between column vertical bars, see sheet S5.3.



3 S5.3 | S5.4 SECTION THRU GIRDER
SCALE: 1/2" = 1'-0"



2 S5.2 | S5.4 LONGITUDINAL SECTION THRU EAST BEAM (WEST BEAM SIMILAR)
SCALE: 1/4" = 1'-0"



4 S5.2 ℄ S5.3 | S5.4 SECTION
SCALE: 3/16" = 1'-0"

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"

0 1' 2' 4' 8' 16'
3/16"=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: Oct. 20, 2011

SHEET No. S5.4 OF 12 SHEETS

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

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HAWAII	HAW.	BR-019-2(61)	2011	77	135

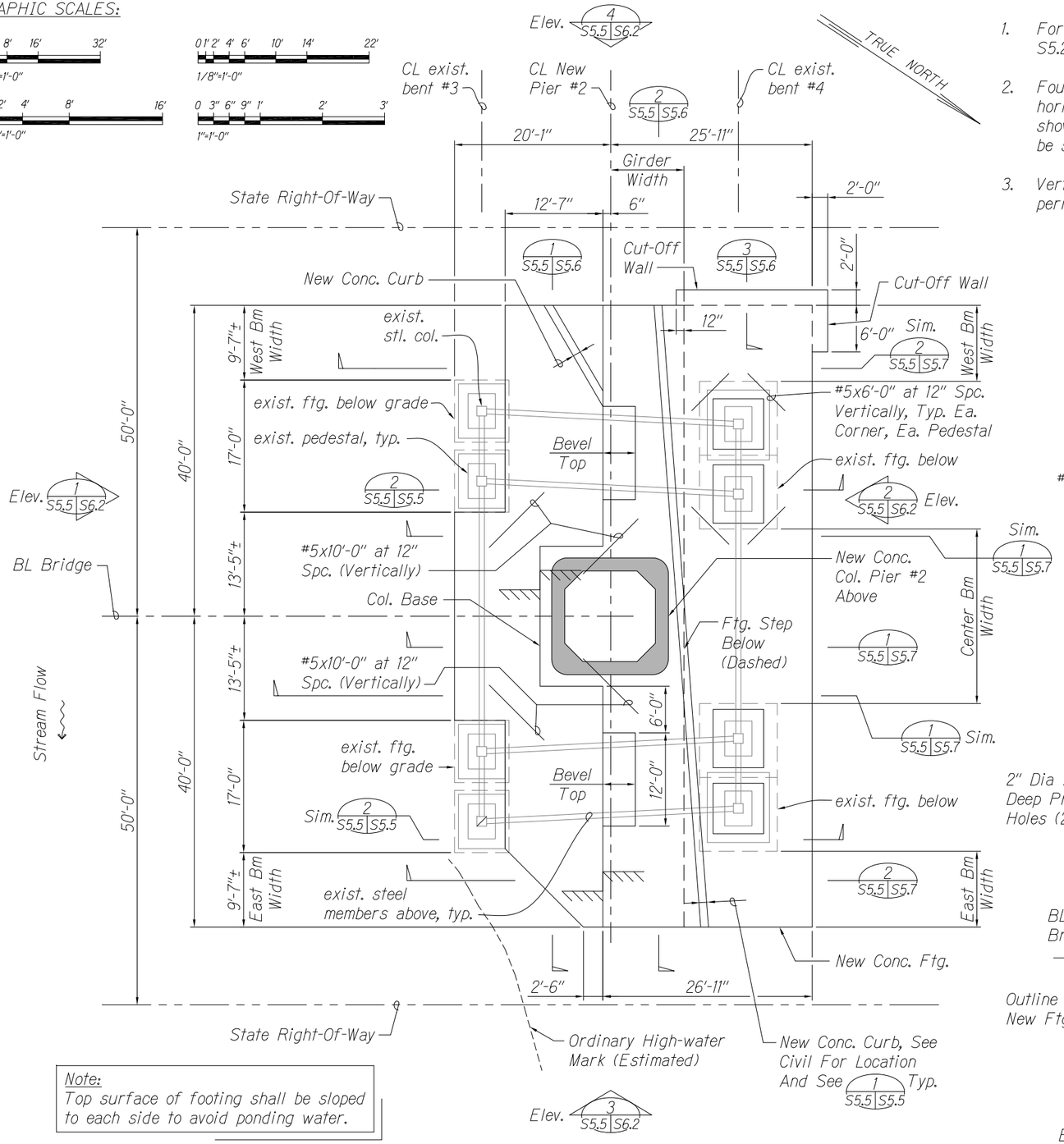
GRAPHIC SCALES:

1/16"=1'-0"

1/8"=1'-0"

3/16"=1'-0"

1"=1'-0"

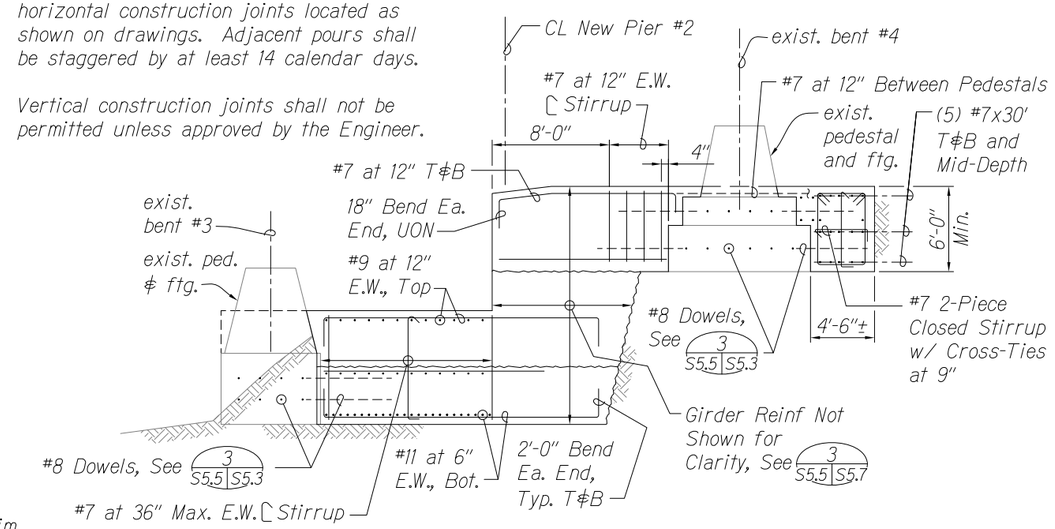


Note:
Top surface of footing shall be sloped to each side to avoid ponding water.

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

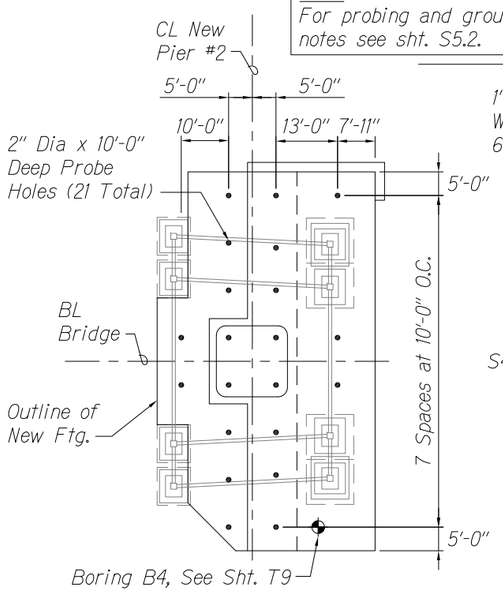
Notes:

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.

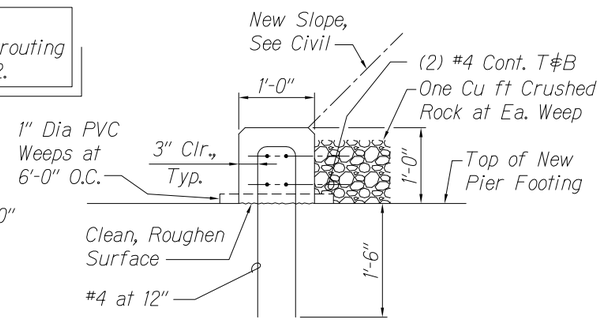


2 S5.5 S5.5 SECTION
SCALE: 3/16" = 1'-0"

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"

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HIGHWAYS DIVISION

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: Oct. 20, 2011

SHEET No. S5.5 OF 12 SHEETS

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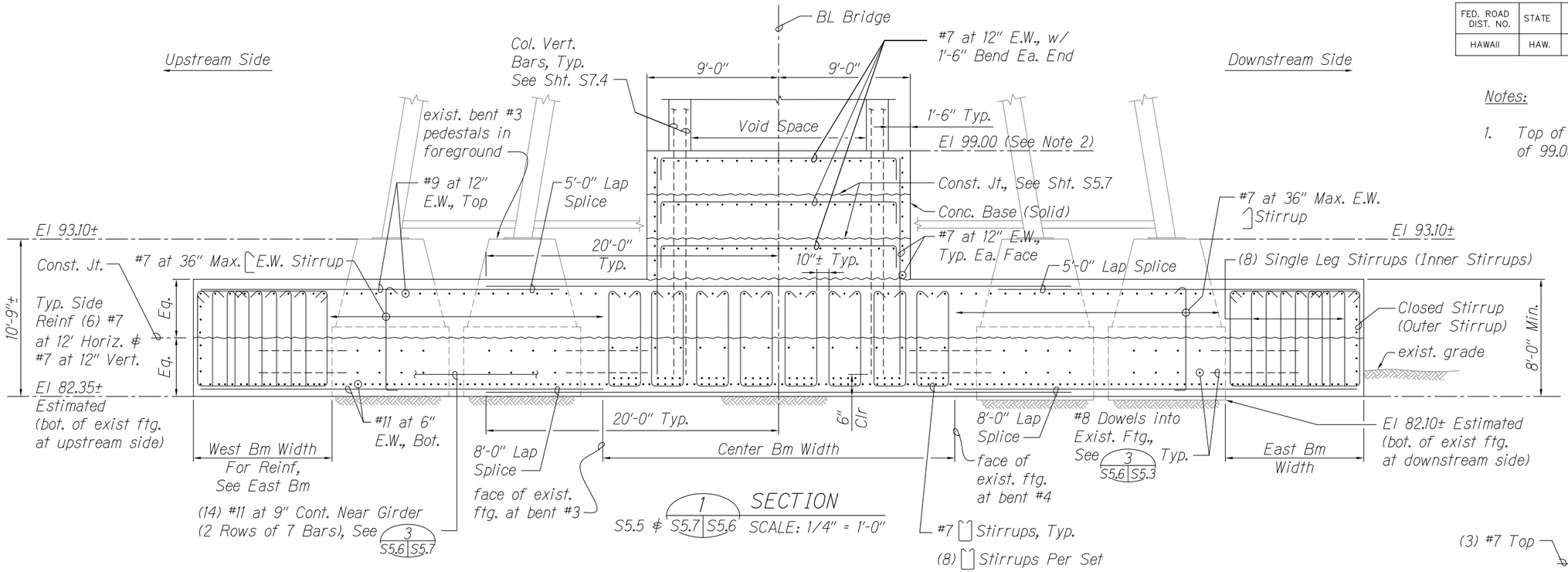
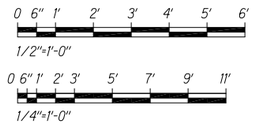
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	78	135

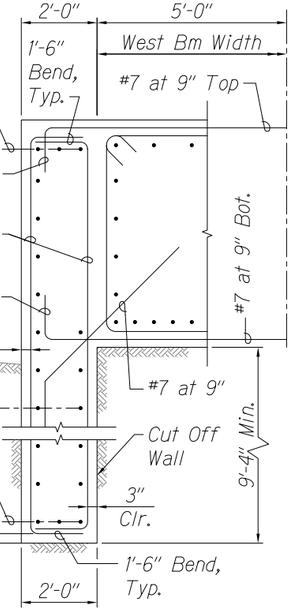
Notes:

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



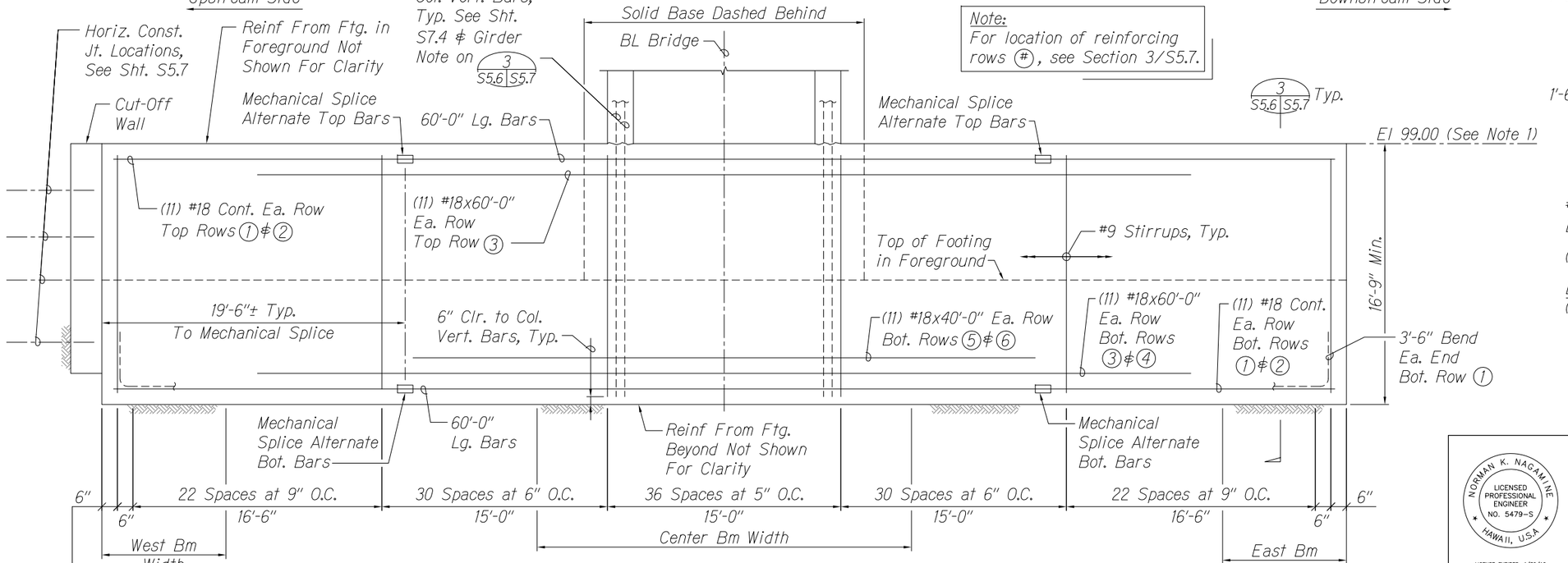
GRAPHIC SCALES:





3 S5.6 S5.7 SECTION
SCALE: 1/2" = 1'-0"

Note:
For location of reinforcing rows (#), see Section 3/S5.7.



2 S5.5 S5.6 NEW PIER #2 FOUNDATION - GIRDER ELEVATION
SCALE: 1/4" = 1'-0"

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DESIGNED BY
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NO. 5479-S
HAWAII, U.S.A.

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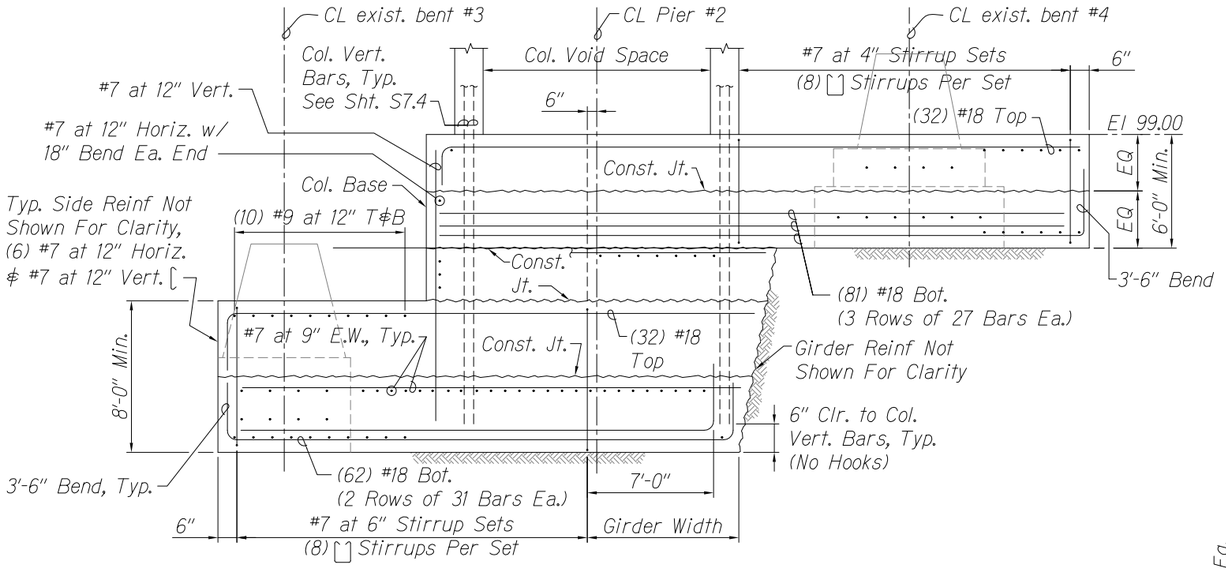
NEW PIER #2 - FOUNDATION SECTIONS

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

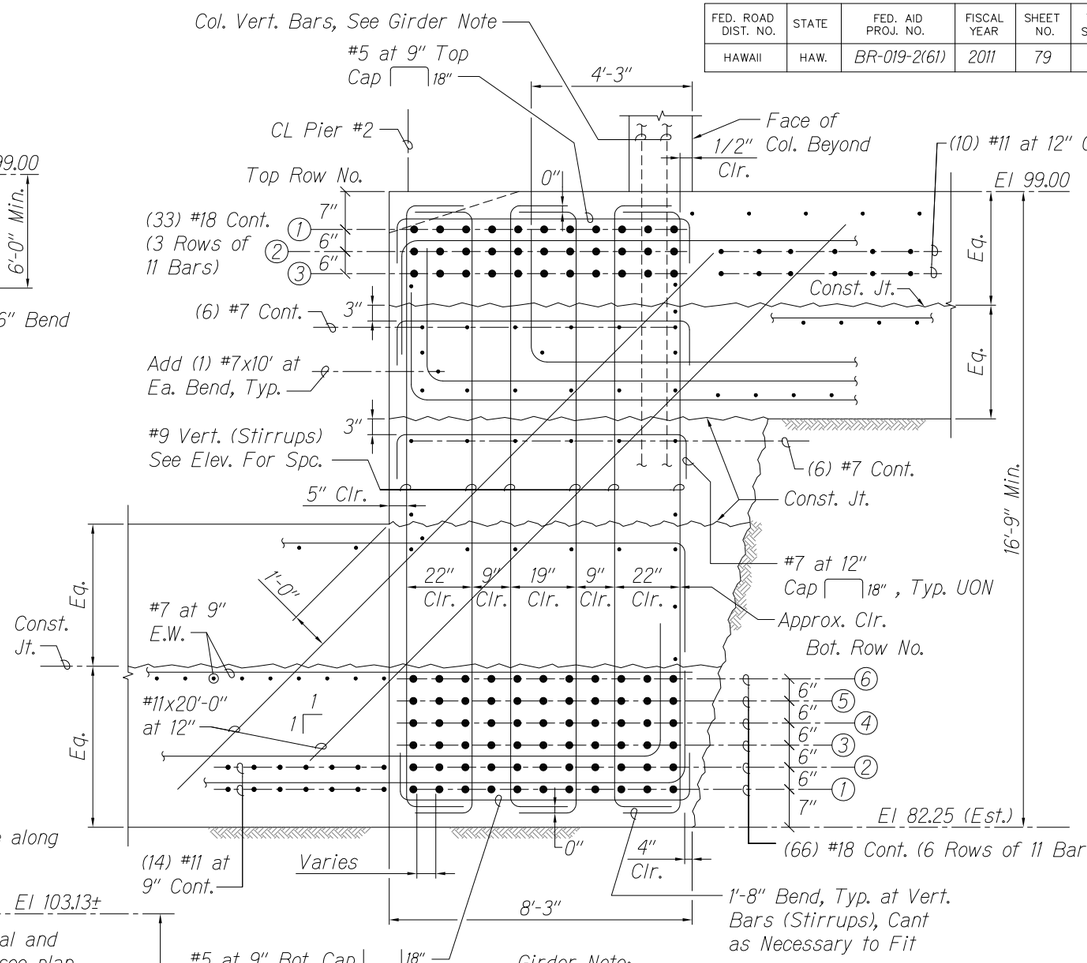
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S5.6 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	79	135

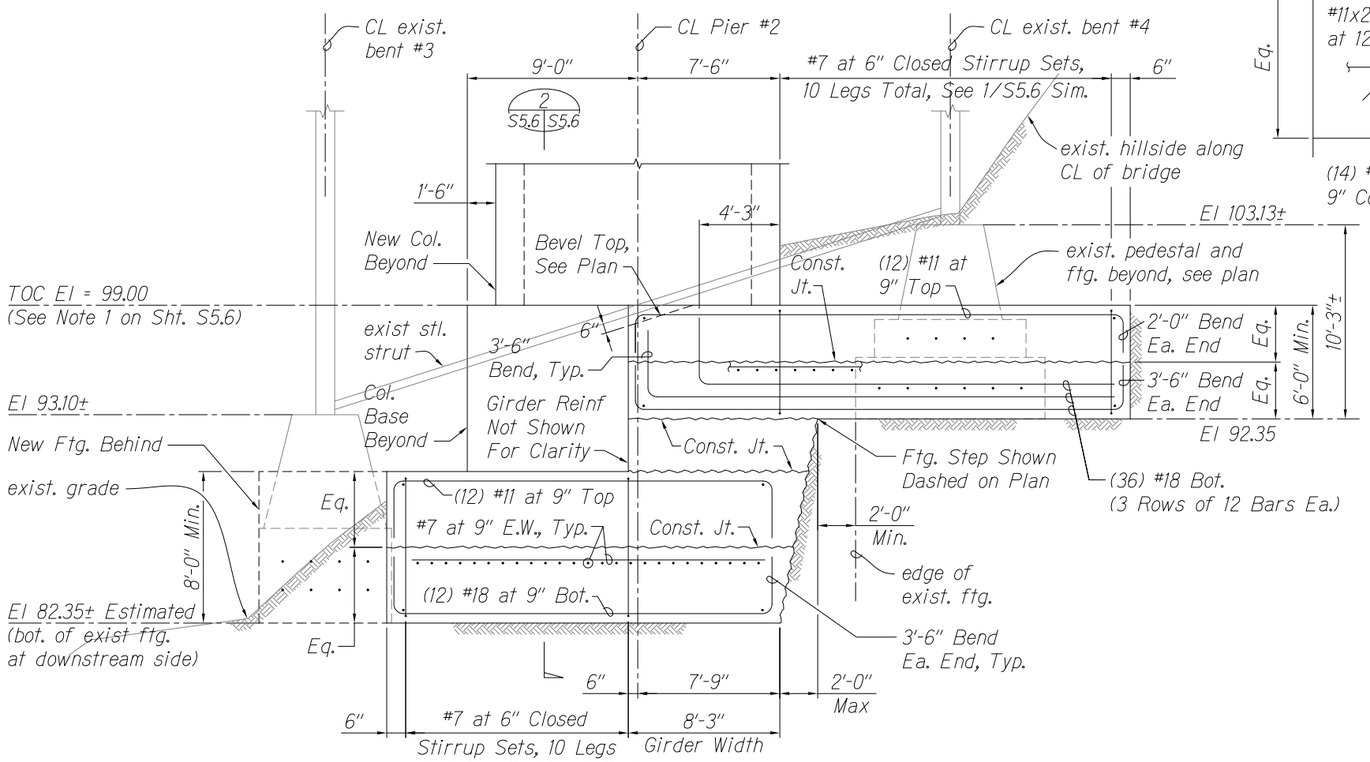


1 S5.5 | S5.7 LONGITUDINAL SECTION THRU CENTER BEAM
SCALE: 1/4" = 1'-0"



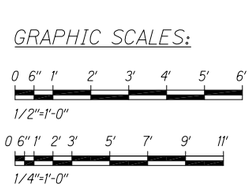
Girder Note:
Spacing of horizontal bars and stirrup legs shall be adjusted to fit between column vertical bars, see sheet S5.6.

3 S5.5 ∉ S5.6 | S5.7 SECTION THRU GIRDER
SCALE: 1/2" = 1'-0"



2 S5.5 | S5.7 LONGITUDINAL SECTION THRU EAST BEAM (WEST BEAM SIMILAR)
SCALE: 1/4" = 1'-0"

GRAPHIC SCALES:



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HIGHWAYS DIVISION

NEW PIER #2 - FOUNDATION SECTIONS

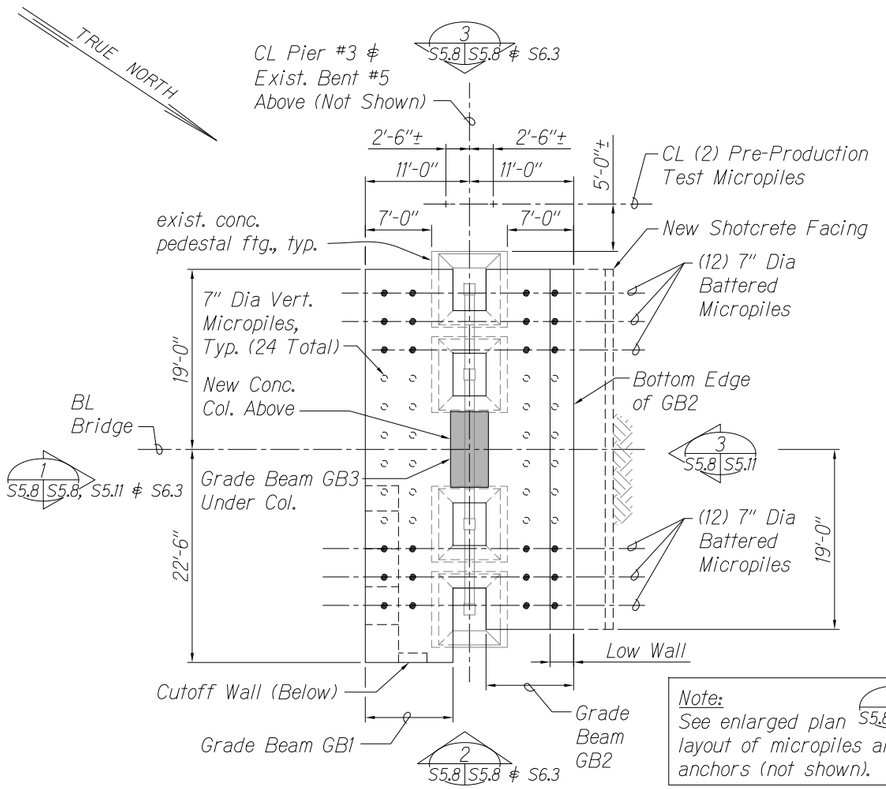
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S5.7 OF 12 SHEETS

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

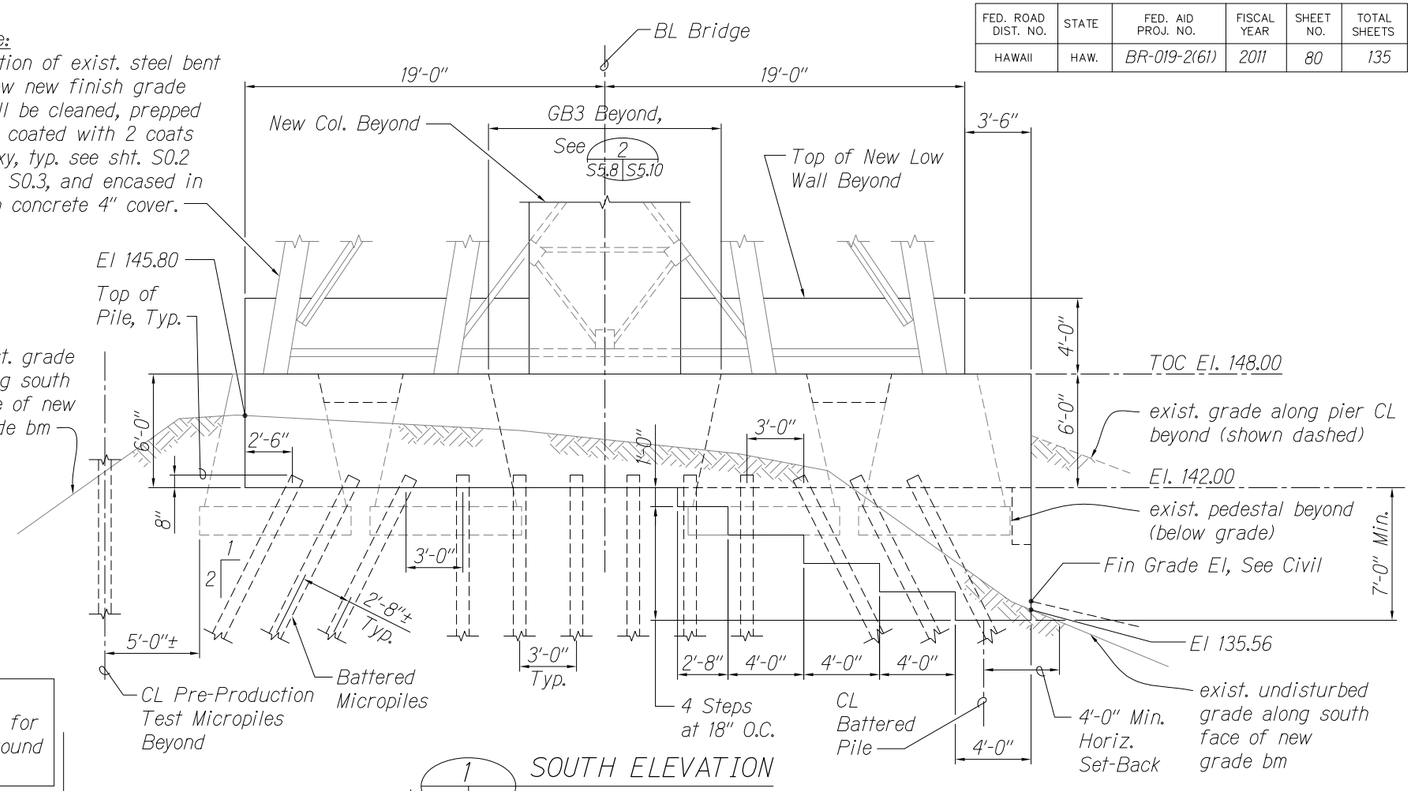
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	80	135



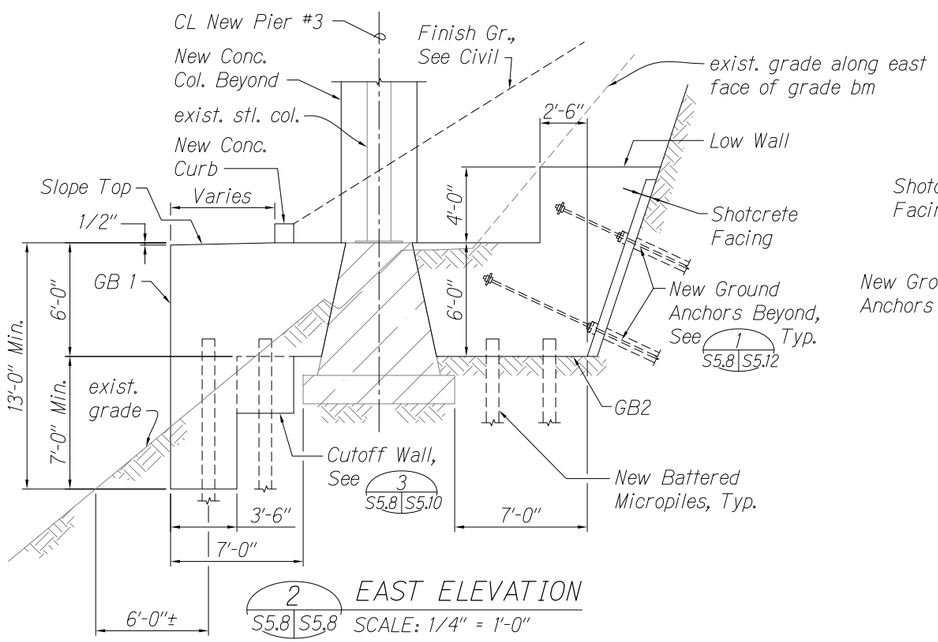
Note:
See enlarged plan A S5.8 | S5.9 for layout of micropiles and ground anchors (not shown).

A S2.1 | S5.8 NEW PIER #3 - FOUNDATION KEY PLAN
SCALE: 1/8" = 1'-0"

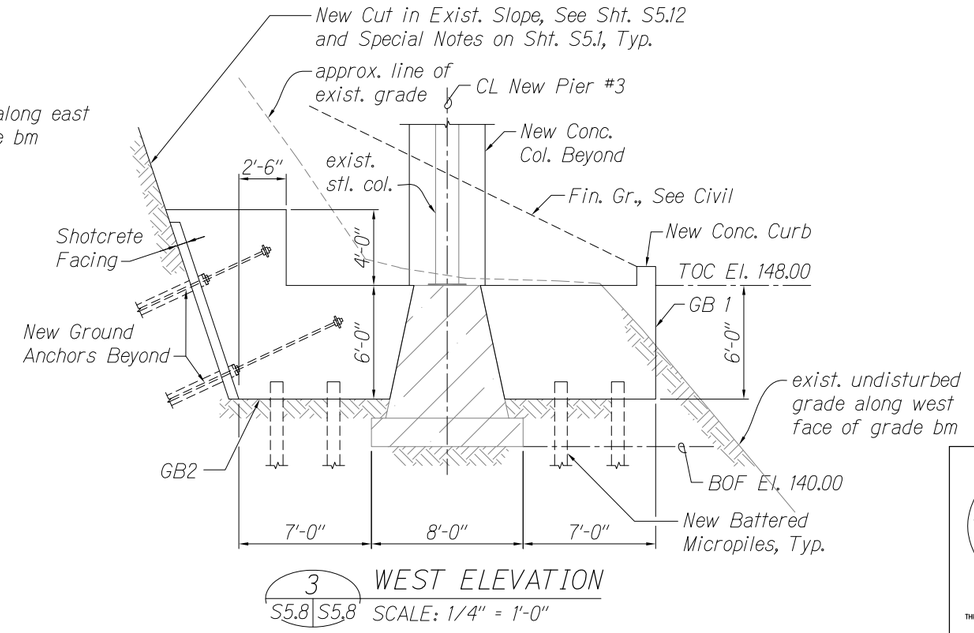
Note:
Portion of exist. steel bent below new finish grade shall be cleaned, prepped and coated with 2 coats epoxy, typ. see sht. S0.2 and S0.3, and encased in lean concrete 4" cover.



1 S5.8, S5.10 ℄ S5.11 | S5.8 SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



2 S5.8 | S5.8 EAST ELEVATION
SCALE: 1/4" = 1'-0"



3 S5.8 | S5.8 WEST ELEVATION
SCALE: 1/4" = 1'-0"

GRAPHIC SCALES:

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

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

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

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NEW PIER #3 FOUNDATION - KEY PLAN & ELEVATIONS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S5.8 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	81	135

Suggested Micropile Installation Sequence

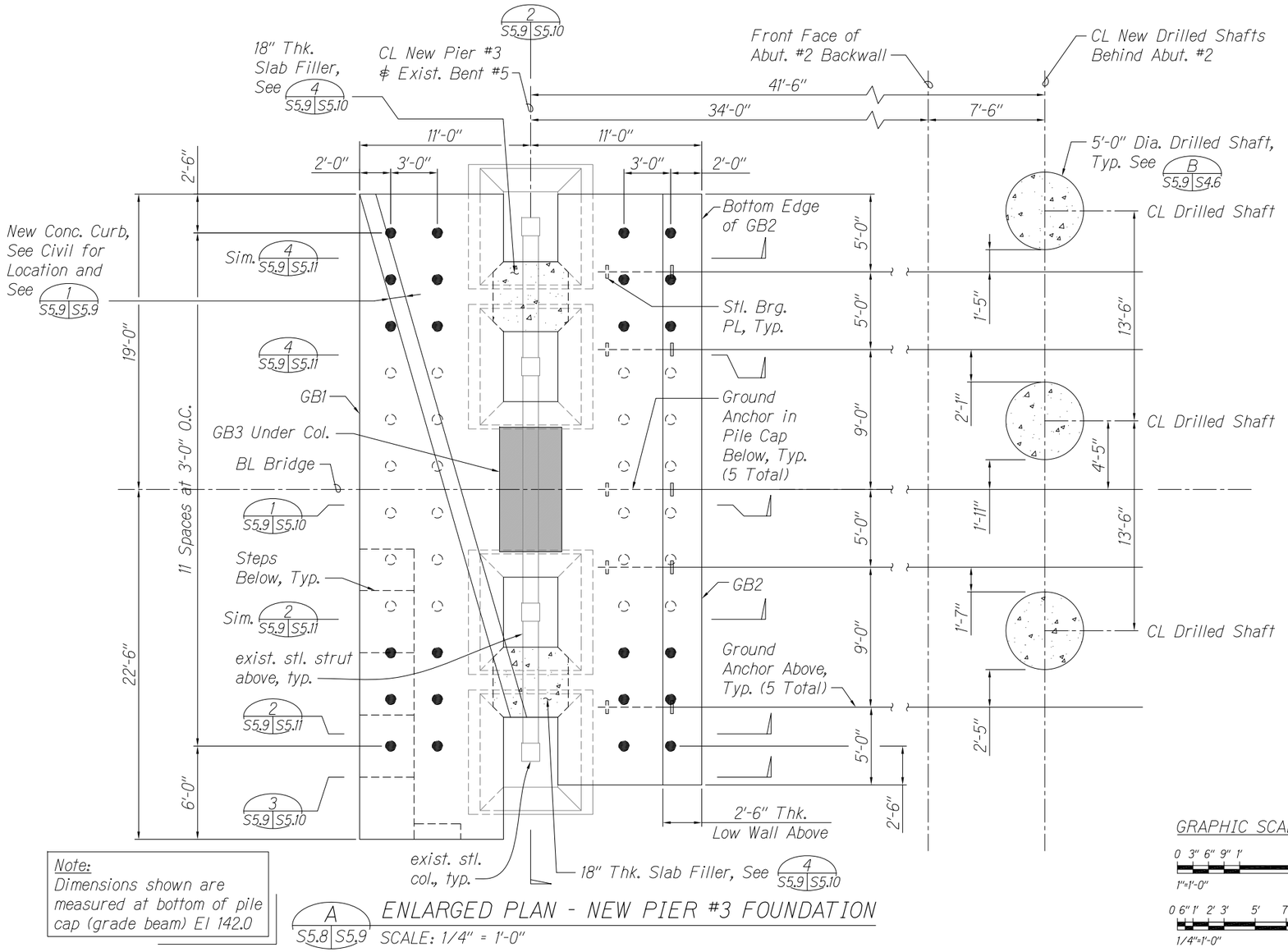
1. Excavate along north side of existing bent #5 and install new micropiles (2 rows).
2. Construct new grade beam GB2.
3. Excavate along south side of existing bent #5 and install new micropiles (2 rows).
4. Construct new grade beams GB1 and GB3.

Legend:

○ = 7" Dia Vertical Micropile

● = 7" Dia Battered Micropile

TRUE NORTH

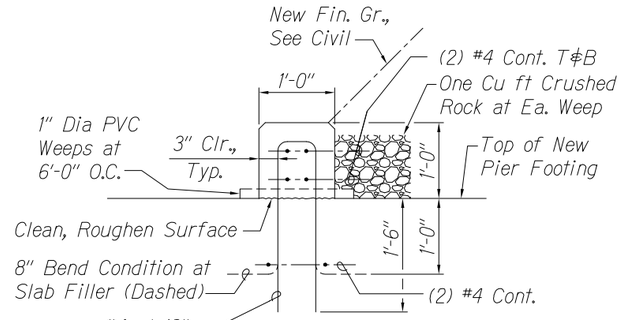


Note:
Dimensions shown are measured at bottom of pile cap (grade beam) El 142.0

A S5.8 | S5.9 ENLARGED PLAN - NEW PIER #3 FOUNDATION
SCALE: 1/4" = 1'-0"

Notes:

1. Existing pedestal footings shall be strengthened, shored and/or under-pinned prior to excavating existing grade for new pier footing. See sheet S5.1
2. For special notes and excavation pay limits, see sheet S5.1.
3. For new micropile suggested installation sequence, see notes on this sheet. For other requirements, see Special Provisions Section 512.
4. For micropile General Notes and Typical Details, and added reinforcing in grade beams, see sheets S3.1 and S3.2.
5. For ground anchor General Notes and Typical Details, see sheet S5.12.
6. Contractor shall field verify and coordinate actual plan locations of ground anchors and drilled shafts to avoid conflicts.
7. Epoxy grouted dowels shall be inspected by the Engineer. See General Notes on sheet S0.2.
8. For pre-production load test micropiles, see key plan on sheet S5.8, and General Notes on sheet S3.1.
9. For grade beam concrete, maximum size of coarse aggregate shall be 3/4 inch.



1 S5.9 & S5.11 | S5.9 CURB SECTION
SCALE: 1" = 1'-0"

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"

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NEW PIER #3 FOUNDATION - ENLARGED PLAN & NOTES

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S5.9 OF 12 SHEETS

ORIGINAL PLAN
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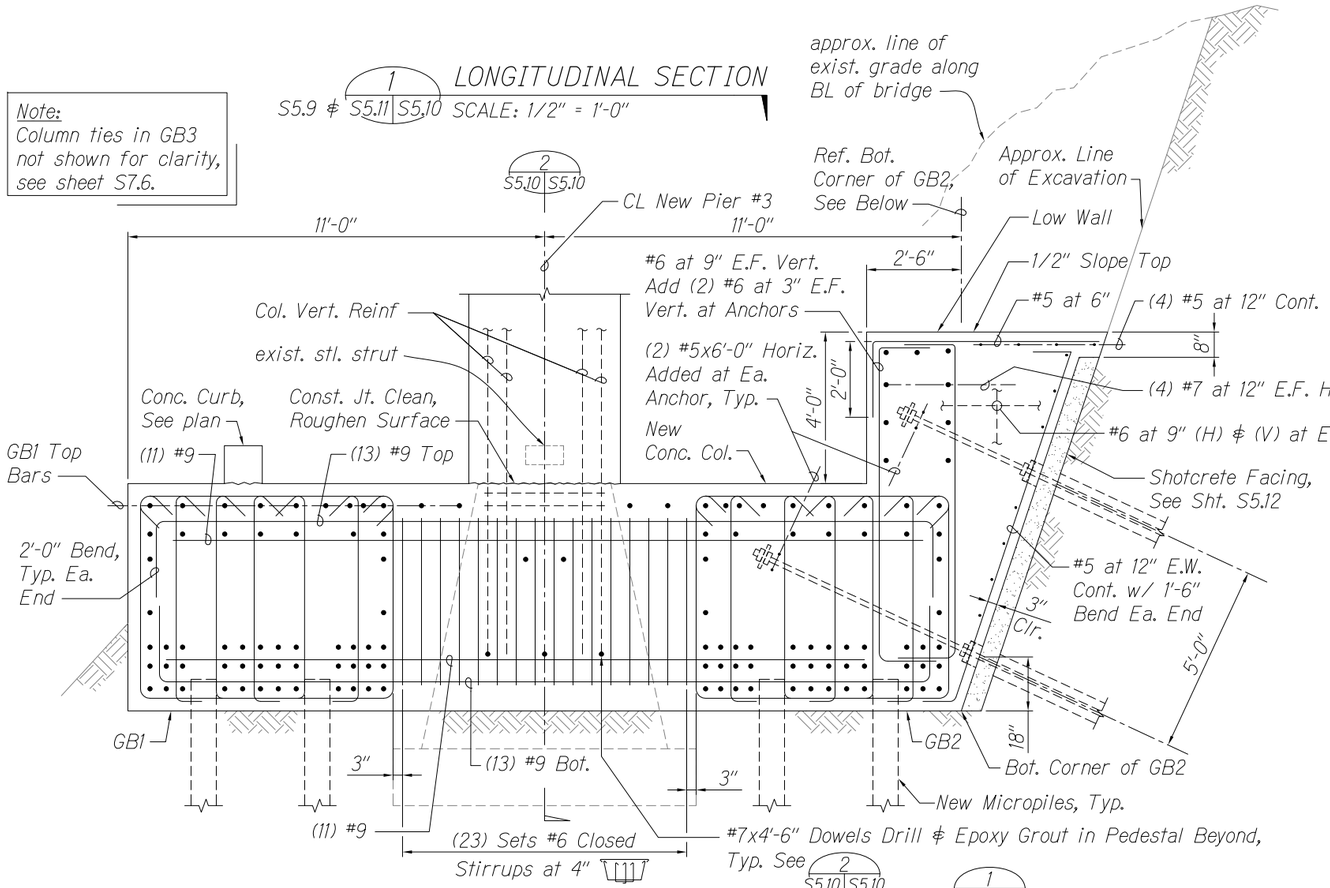
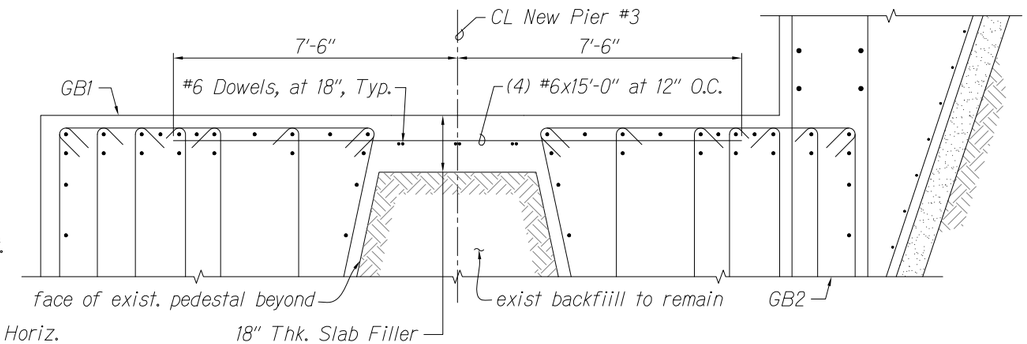
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	82	135

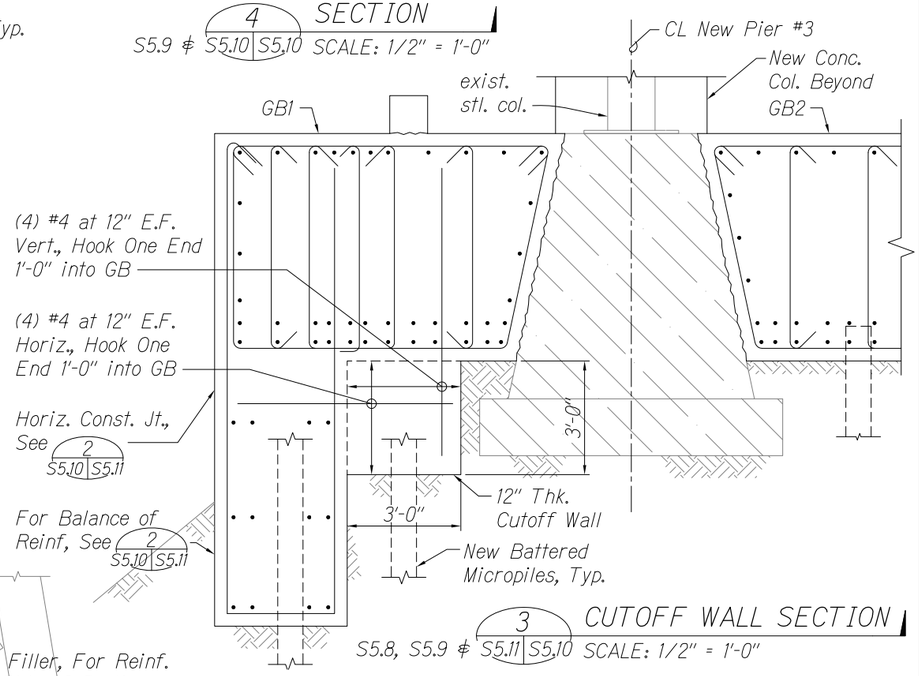
Note:
Column ties in GB3 not shown for clarity, see sheet S7.6.

1 LONGITUDINAL SECTION
S5.9 ⊄ S5.11 | S5.10 SCALE: 1/2" = 1'-0"

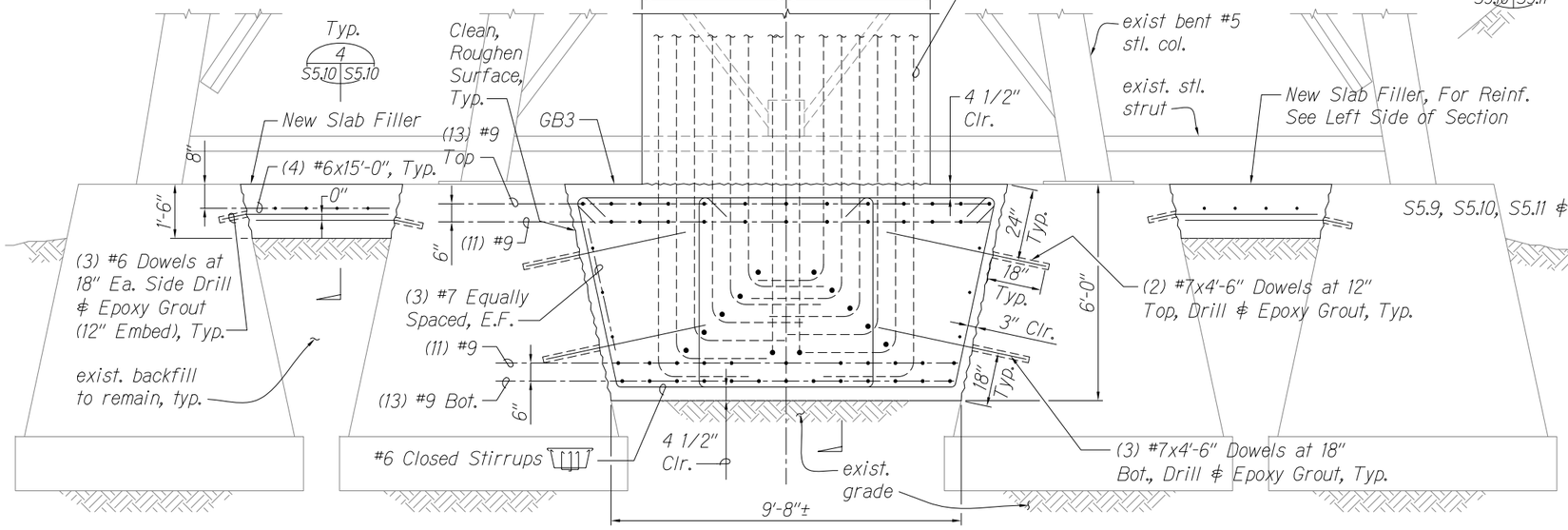




4 SECTION
S5.9 ⊄ S5.10 | S5.10 SCALE: 1/2" = 1'-0"



3 CUTOFF WALL SECTION
S5.8, S5.9 ⊄ S5.11 | S5.10 SCALE: 1/2" = 1'-0"



2 TRANSVERSE SECTION
S5.9, S5.10, S5.11 ⊄ S7.6 | S5.10 SCALE: 1/2" = 1'-0"

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

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

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NEW PIER #3 FOUNDATION - GRADE BEAM REINFORCING

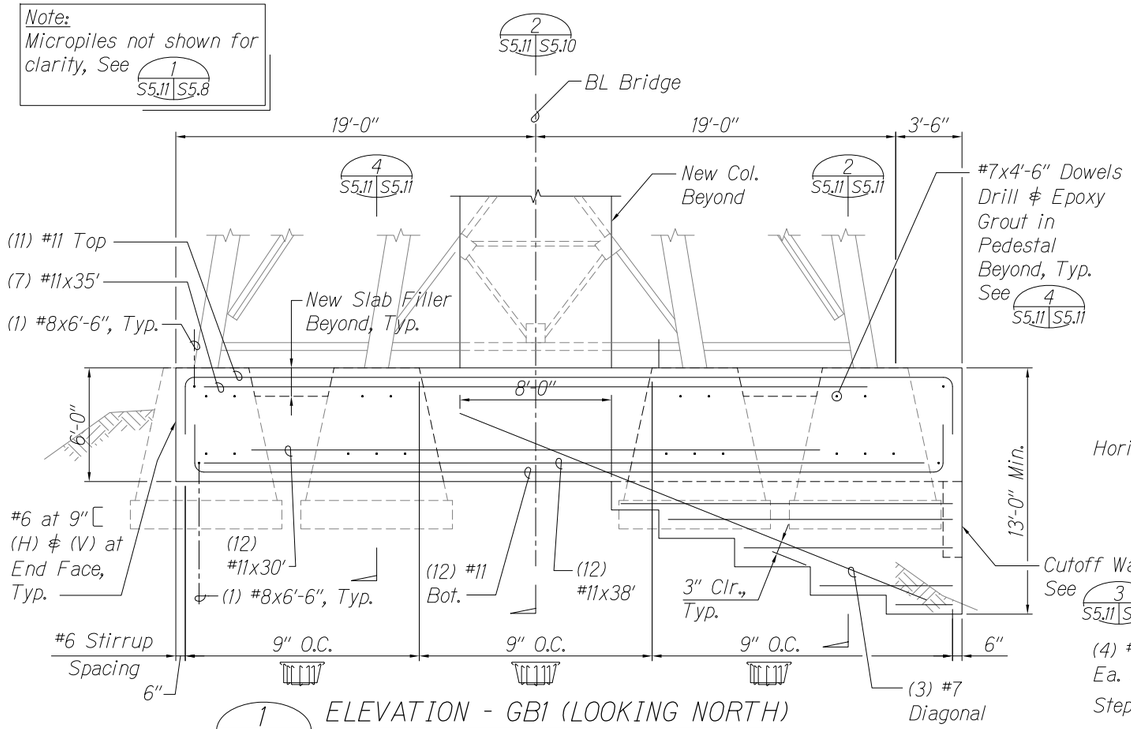
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/2" = 1'-0" Date: Oct. 20, 2011

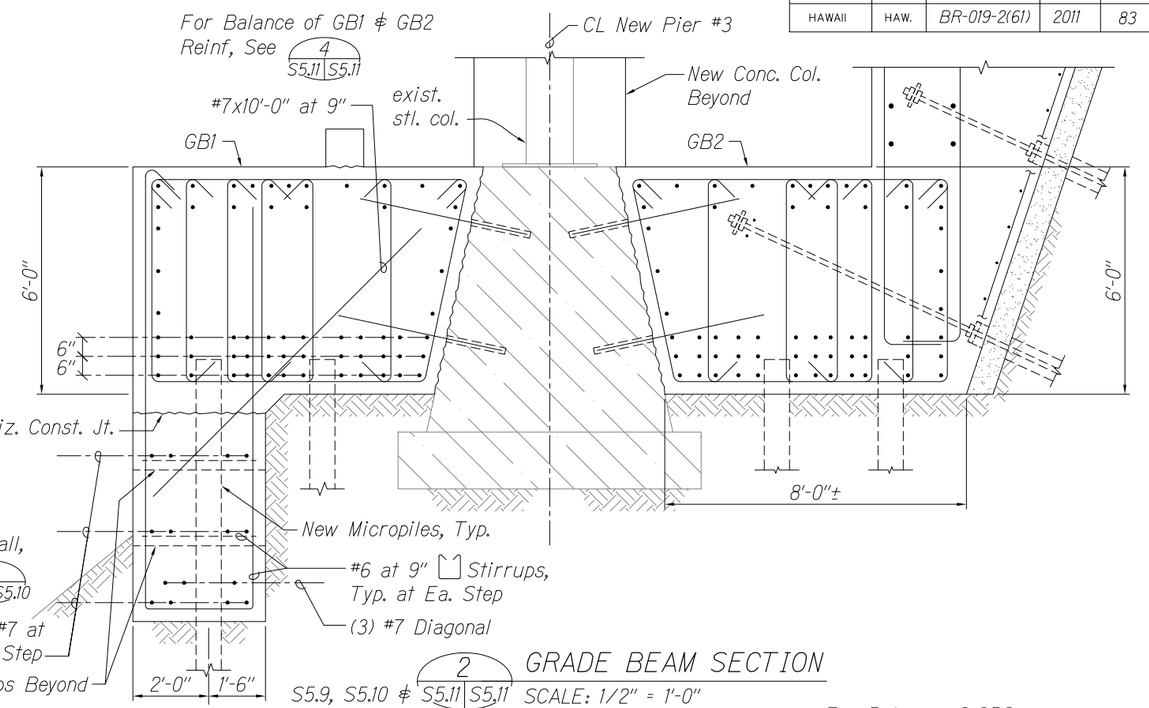
SHEET No. S5.10 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	83	135

Note:
Micropiles not shown for clarity, See 1 S5.11 | S5.8

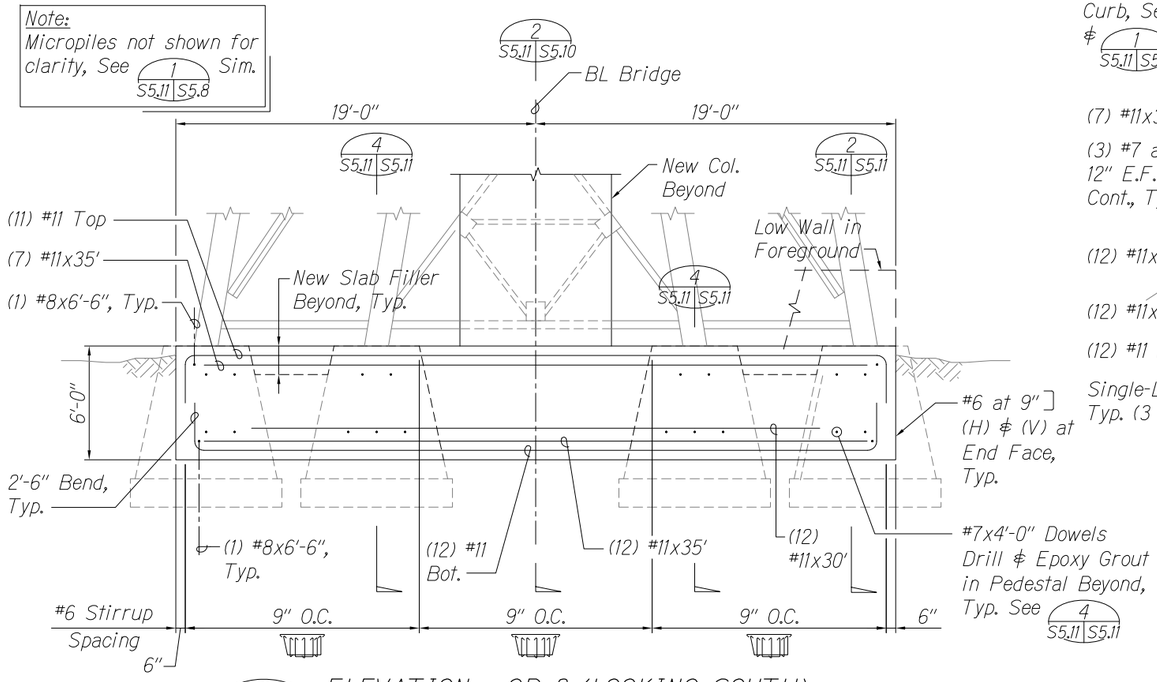


1 S5.8 | S5.11 ELEVATION - GB1 (LOOKING NORTH)
SCALE: 1/4" = 1'-0"

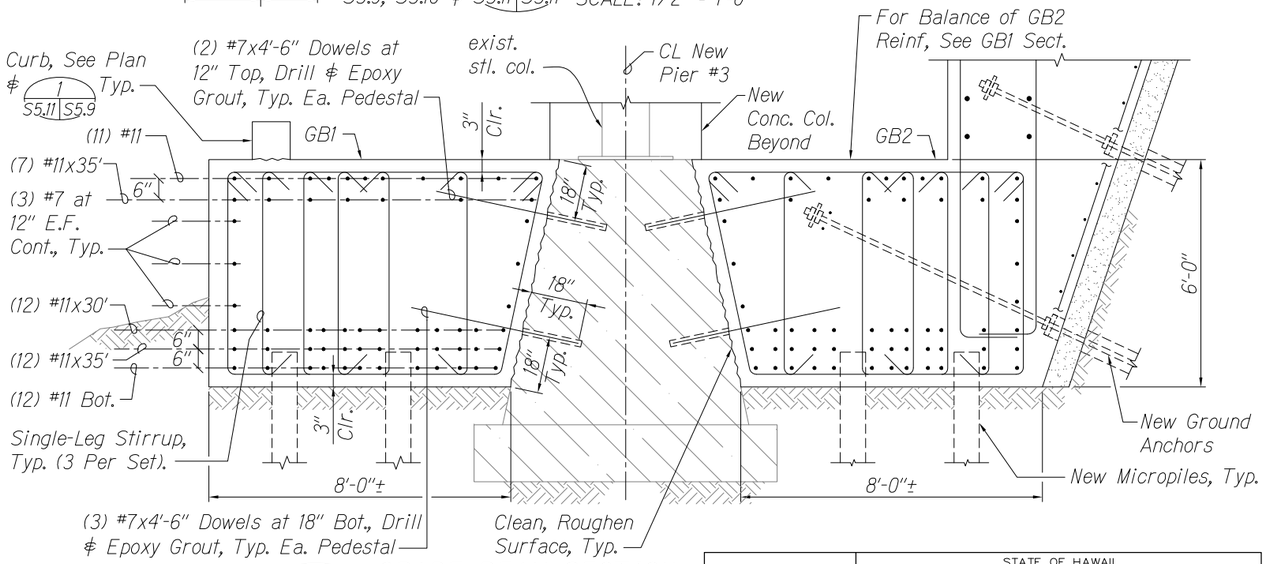


2 S5.11 | S5.11 GRADE BEAM SECTION
S5.9, S5.10 & S5.11 | S5.11 SCALE: 1/2" = 1'-0"

Note:
Micropiles not shown for clarity, See 1 S5.11 | S5.8 Sim.



3 S5.8 | S5.11 ELEVATION - GB 2 (LOOKING SOUTH)
SCALE: 1/4" = 1'-0"



4 S5.9 & S5.11 | S5.11 GRADE BEAM SECTION
SCALE: 1/2" = 1'-0"

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"

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NEW PIER #3 FOUNDATION - GRADE BEAM REINFORCING

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S5.11 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	84	135

Pier #3 Foundation - Ground Anchor Notes

General 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. Soil Design Data
   a. Average soil-grout bond strength = 1,500 psf
   b. Resistance Factor for Extreme Event Limit State = 0.7
   c. Minimum soil-grout bonded length = 25 feet
   d. Declination angle from horizontal = 25 degrees
3. Ground anchors shall be uncoated high-strength steel deformed bars conforming to ASTM A-722 (AASHTO M 275), Type II, Grade 150, with minimum bar diameter as shown on drawings.
4. Where possible, ground anchors shall be installed in one section (no splicing). Where not possible, ground anchors shall be mechanically spliced with couplers and lock nut capable of developing 125% of bar yeild strength in tension. Submit coupler and lock nut product data for Engineer's review and approval.
5. Structural steel plates shall be ASTM A36, and hot-dip zinc coated.
6. Cement grout shall have f'c = 3,000 psi at 28 days with water-cement ratio of 0.40 or less.
7. Shotcrete facing shall have f'c = 4,000 psi minimum at 28 days. Provide broom finish. For other requirements, refer to Standard Specs section 628 "Shotcrete".

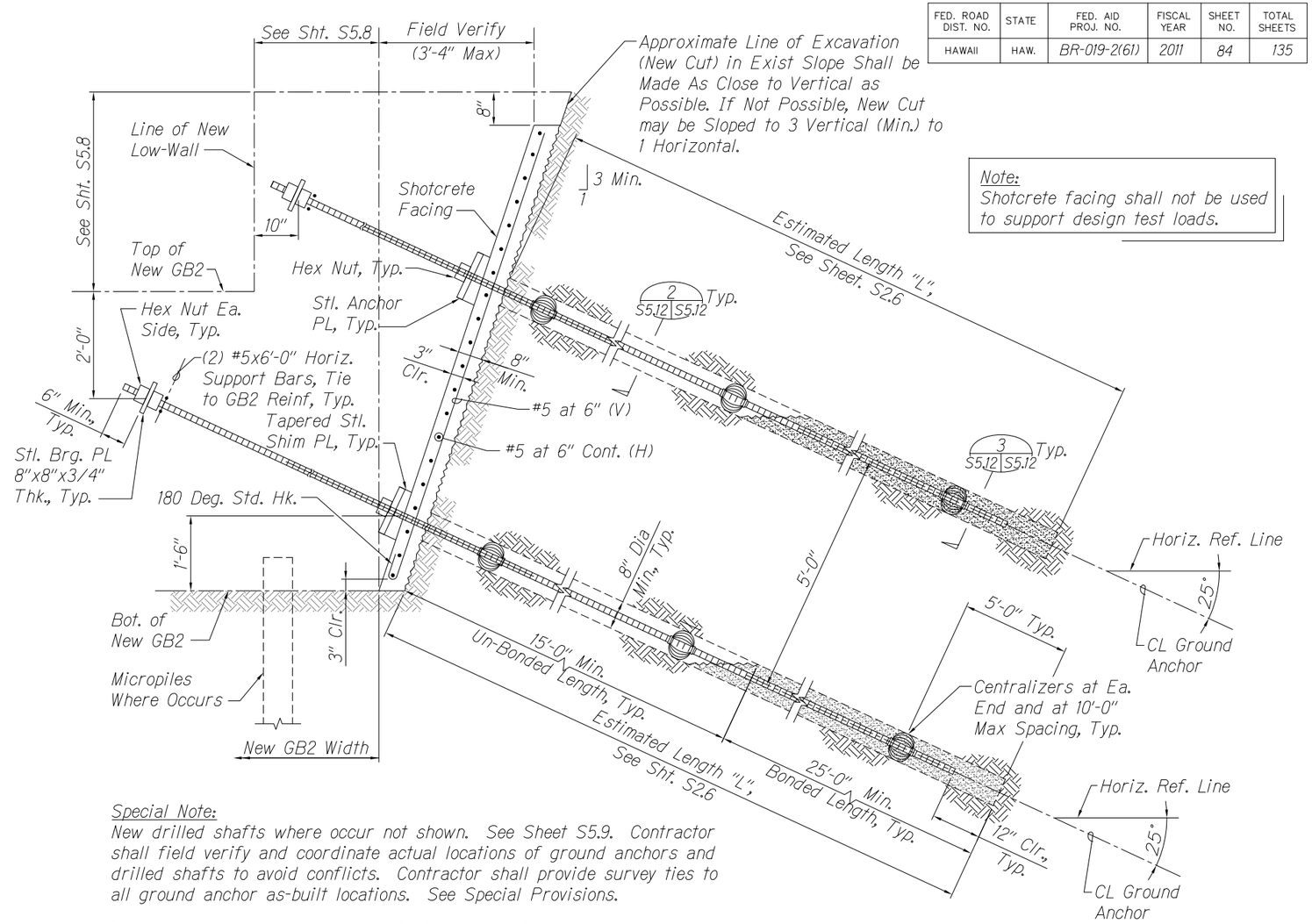
Construction Notes

1. Contractor shall refer to Special Provisions Section 681 "Ground Anchors".
2. One production ground anchor shall be performance tested. See Special Provisions.
3. All other production ground anchors shall be proof tested. See Special Provisions.
4. All testing shall be performed by a Hawaii Licensed Professional Engineer retained by Contractor. Contractor shall notify the State's Engineer at least 7 calendar days prior to commencing with any testing. Cost for all testing shall be incidental to cost of ground anchors.
5. Design Test Load: For Bonded Length = 25 feet and 8" Diameter Hole

   Performance test, P = 55.0 kips Per Anchor

   Proof test, P = 55.0 kips Per Anchor

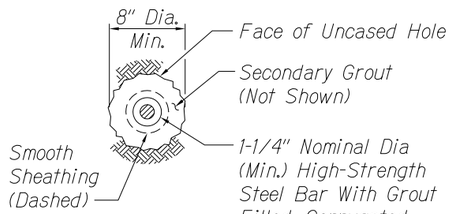
   Lockoff Load = 3.0 kips Per Anchor



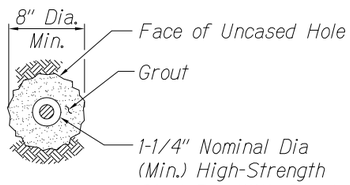
Note:
Shotcrete facing shall not be used to support design test loads.

Special Note:
New drilled shafts where occur not shown. See Sheet S5.9. Contractor shall field verify and coordinate actual locations of ground anchors and drilled shafts to avoid conflicts. Contractor shall provide survey ties to all ground anchor as-built locations. See Special Provisions.

1 S5.8 & S5.12 | S5.12 DETAIL - TYPICAL GROUND ANCHOR ELEVATION
SCALE: 3/4" = 1'-0"

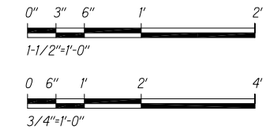


2 S5.12 | S5.12 SECTION
SCALE: 1 1/2" = 1'-0"



3 S5.12 | S5.12 SECTION
SCALE: 1 1/2" = 1'-0"

GRAPHIC SCALES:



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DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
ORIGINAL PLAN
NOTEBOOK
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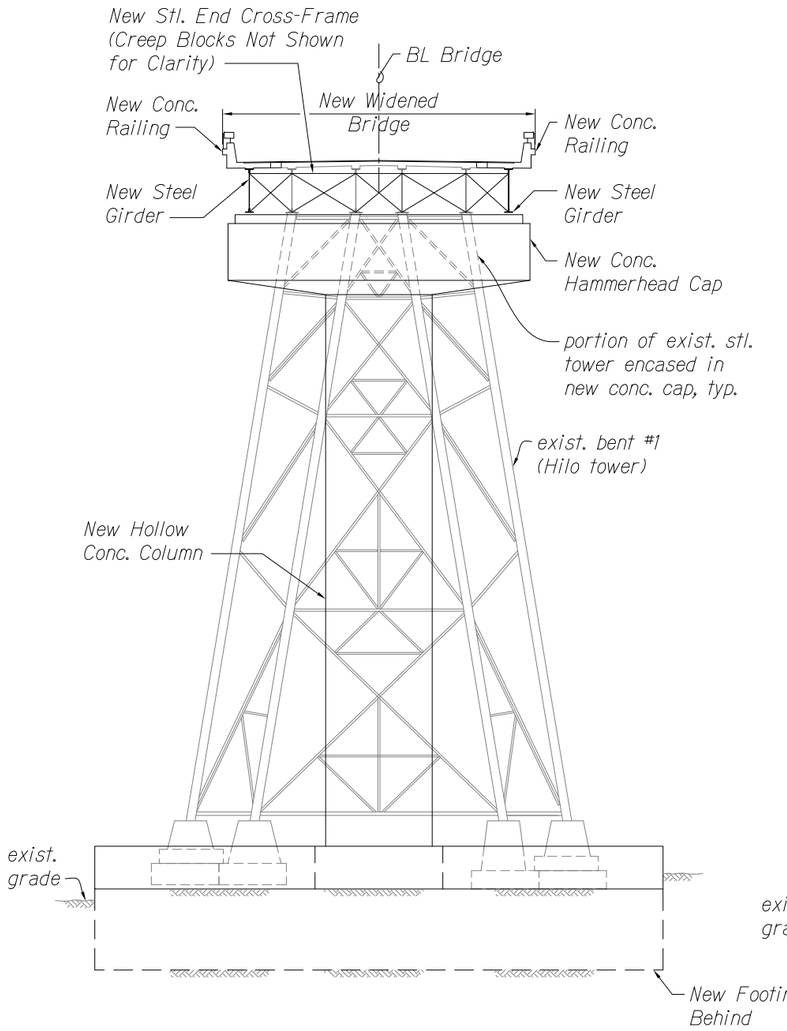
NEW PIER #3 FOUNDATION - GROUND ANCHOR DETAILS

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

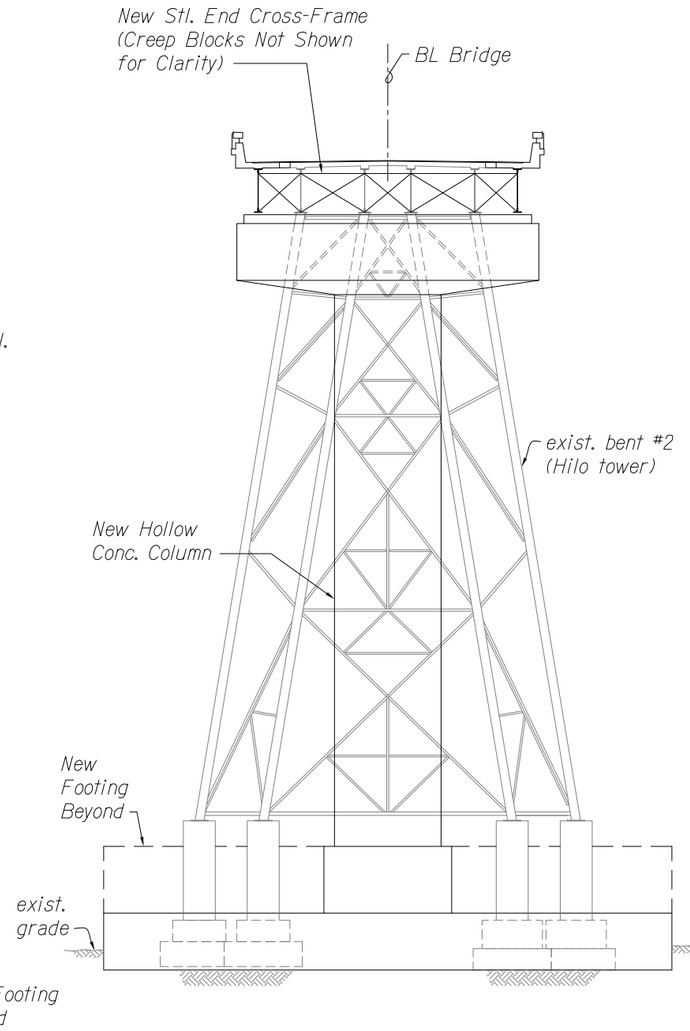
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S5.12 OF 12 SHEETS

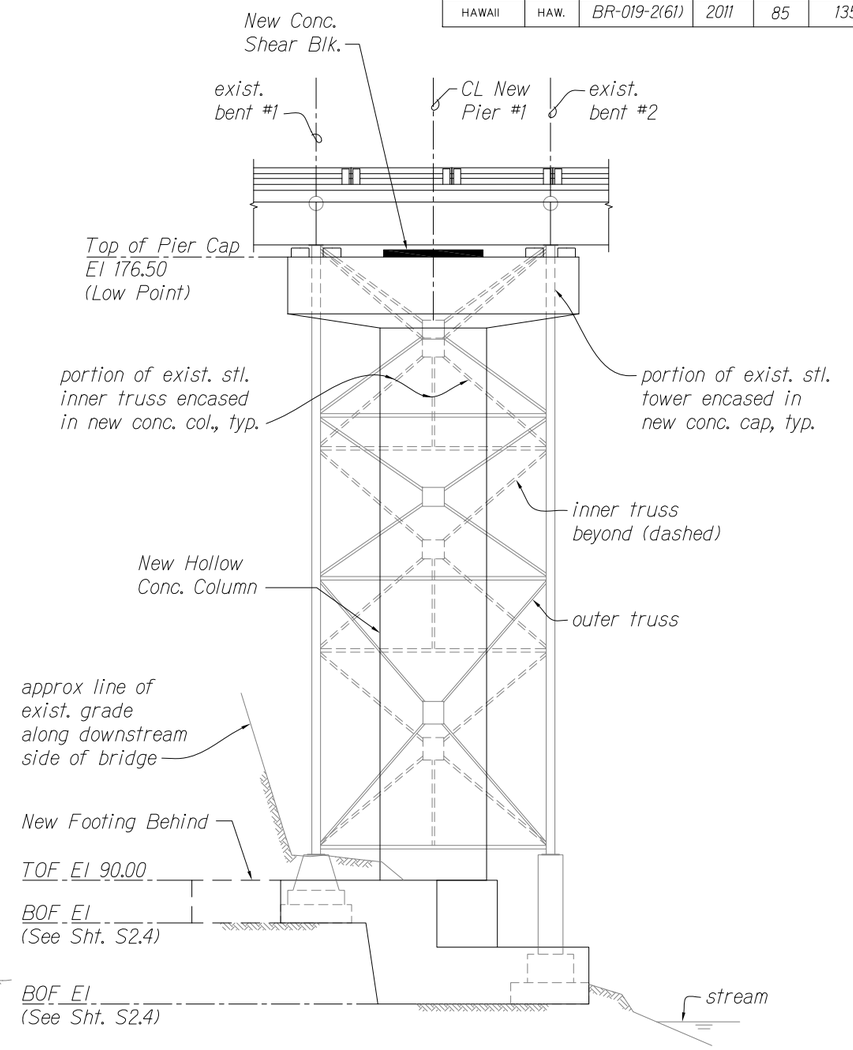
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	85	135



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



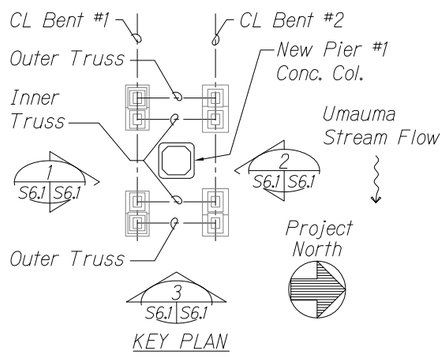
2 NORTH ELEVATION
S5.2 & S6.1 | S6.1 SCALE: 3/32" = 1'-0"



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

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



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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

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

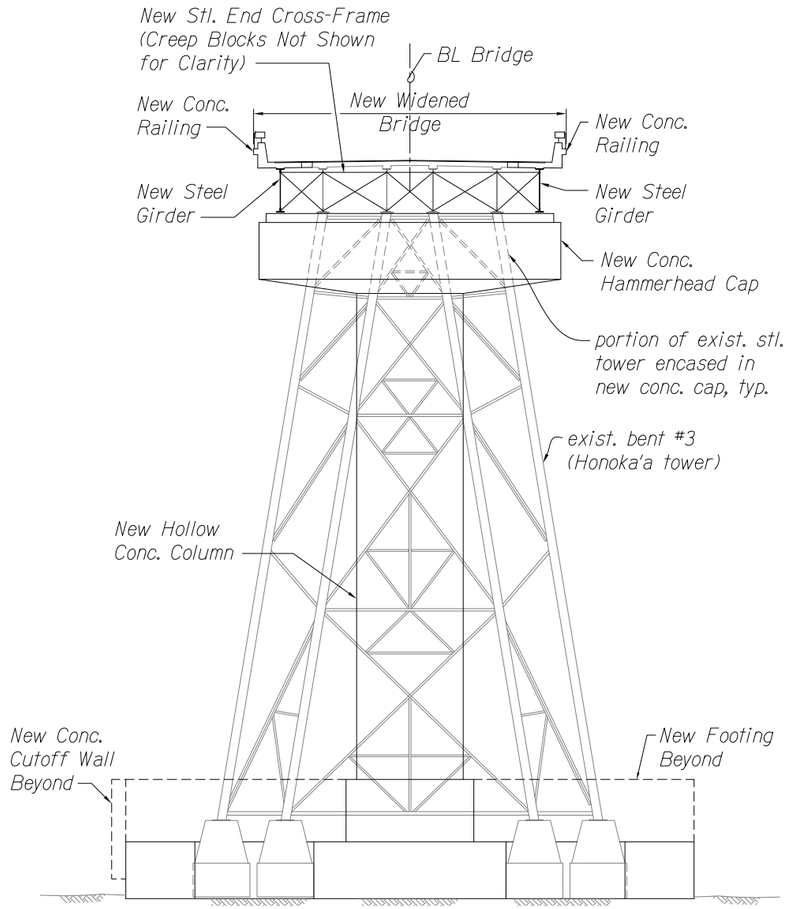
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 3/32" = 1'-0" Date: Oct. 20, 2011

SHEET No. S6.1 OF 3 SHEETS

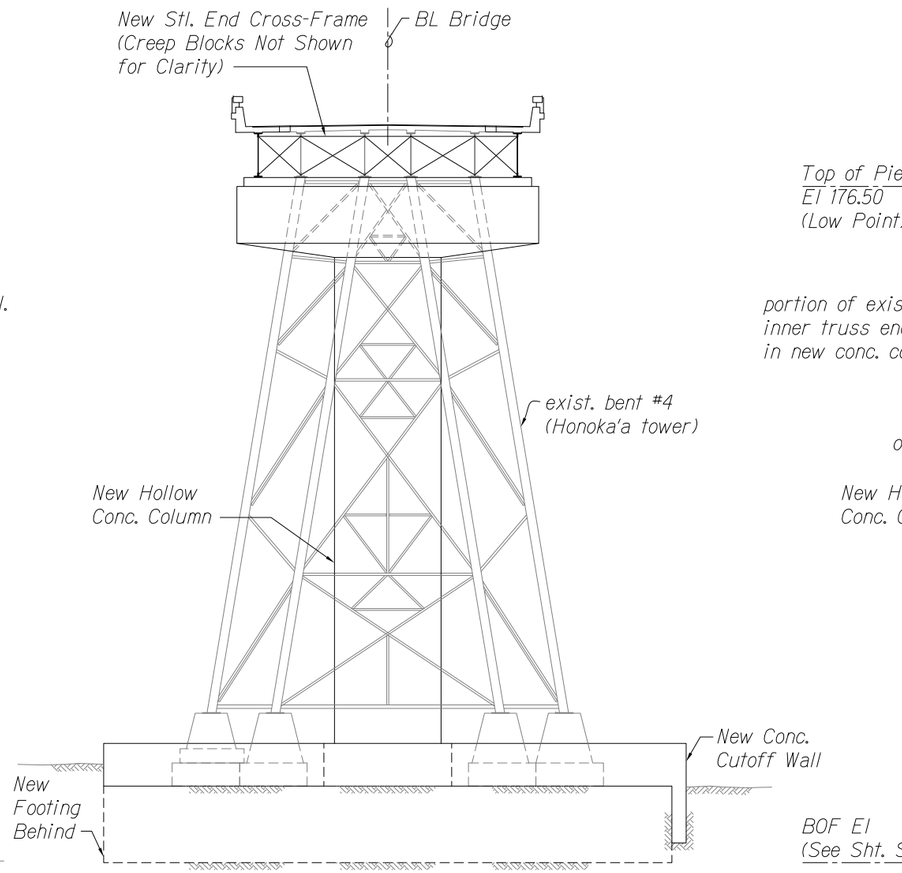
ORIGINAL PLAN | NOTEBOOK No. | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	86	135



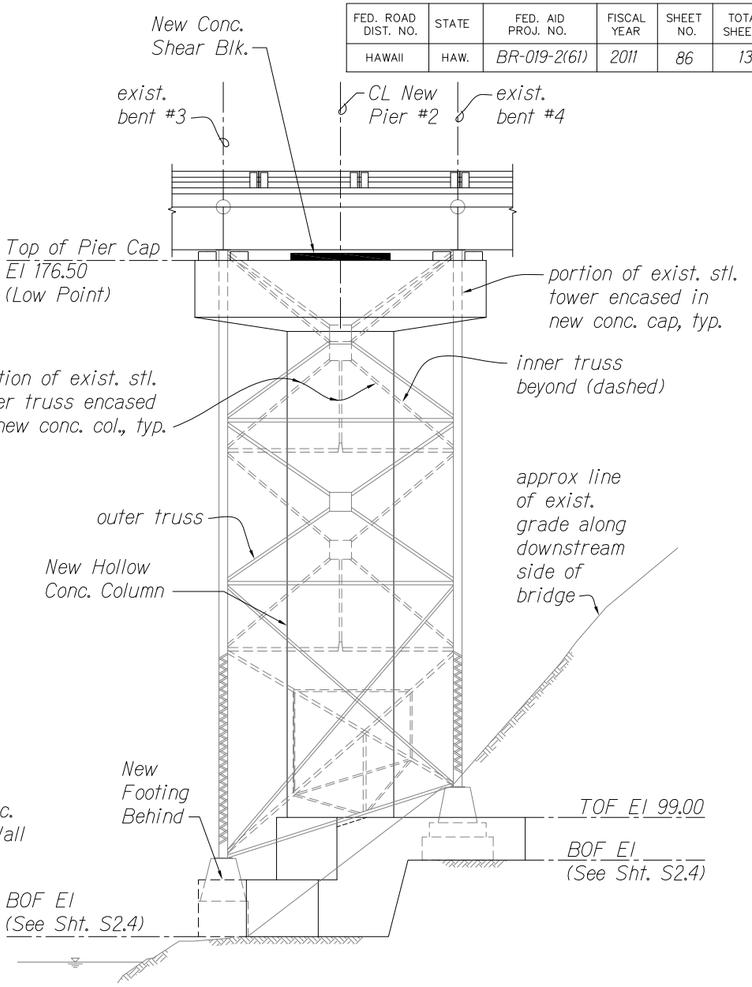
1 SOUTH ELEVATION

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



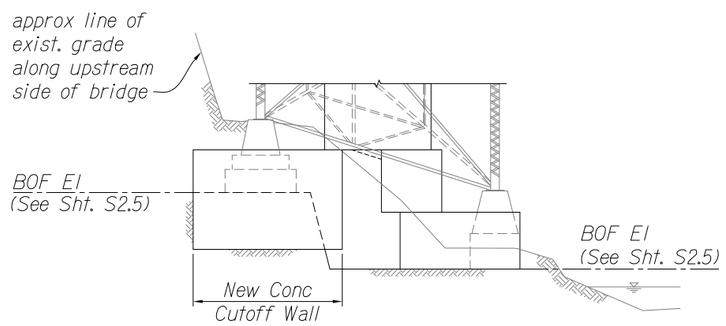
2 NORTH ELEVATION

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



3 EAST/DOWNSTREAM ELEVATION

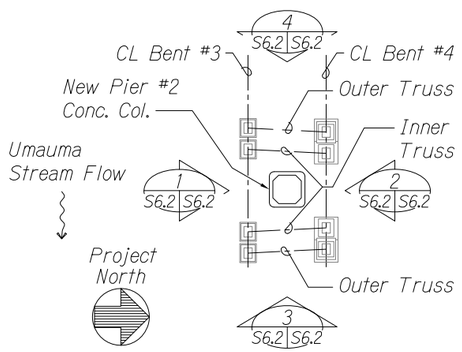
S2.4, S2.5, S5.5 & S6.2|S6.2 SCALE: 3/32" = 1'-0"



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

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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: Oct. 20, 2011

SHEET No. S6.2 OF 3 SHEETS

ORIGINAL PLAN | NOTEBOOK | No. | DATE
SURVEY PLOTTED BY
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DESIGNED BY
QUANTITIES BY
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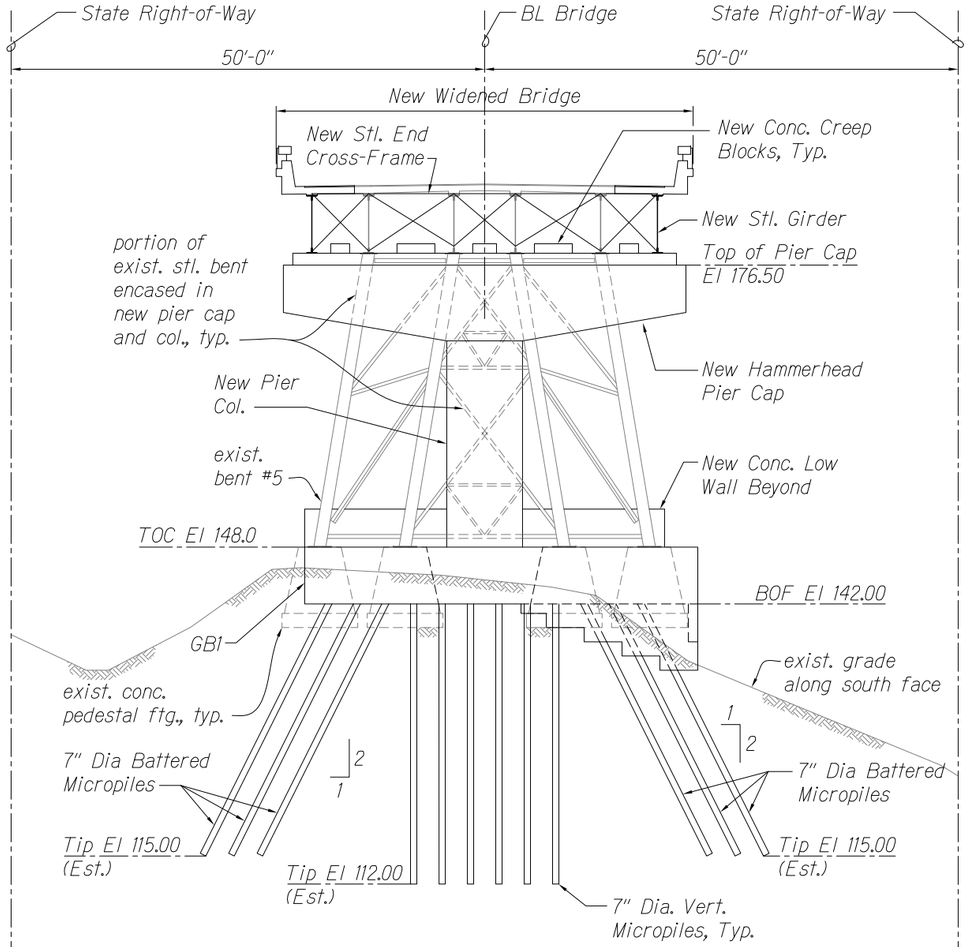
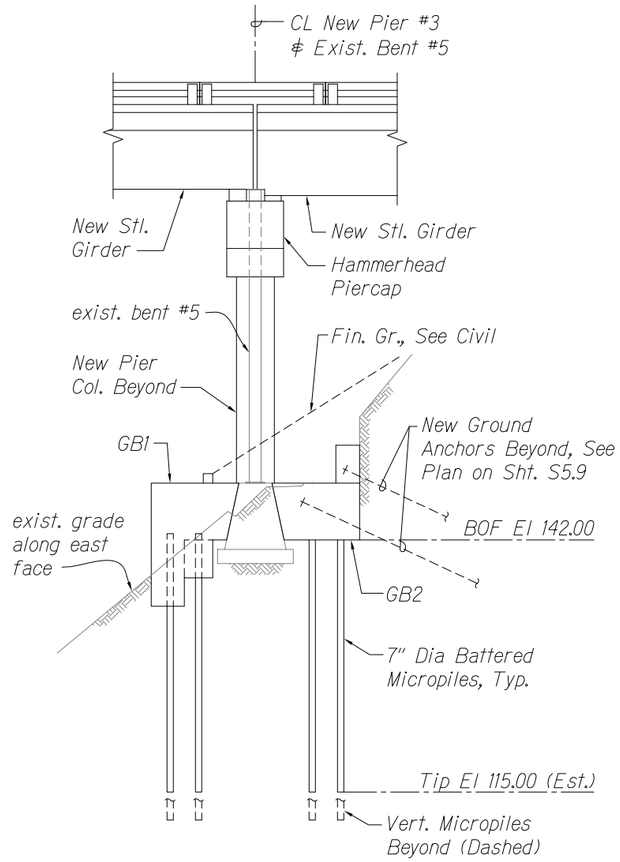
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	87	135



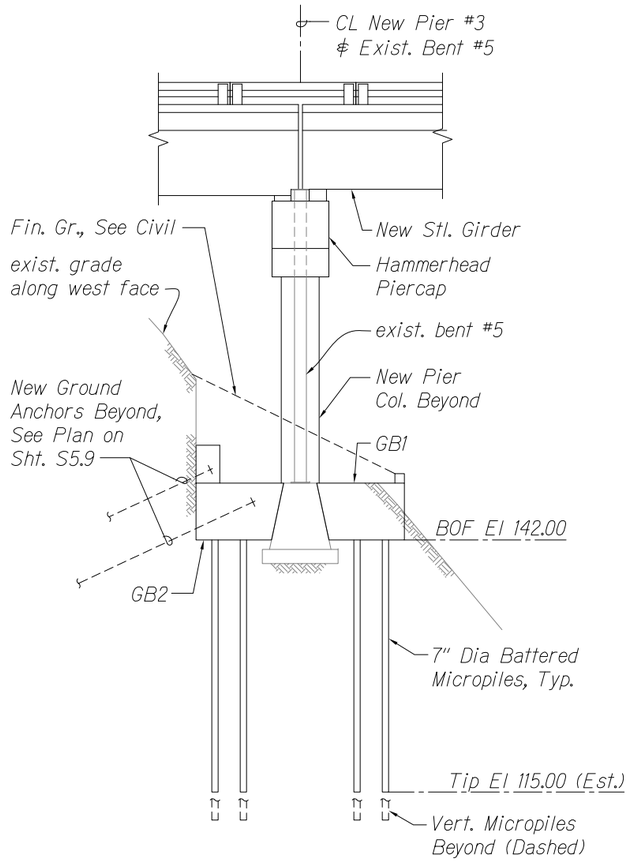
1 SOUTH ELEVATION

S2.1, S2.2, S5.7 ⊄ S6.3 | S6.3 SCALE: 1/8" = 1'-0"



2 EAST ELEVATION

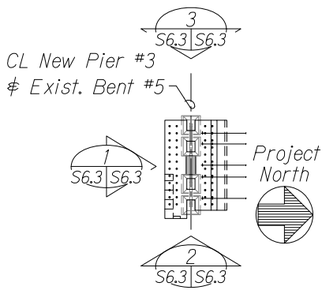
S2.4, S5.7 ⊄ S6.3 | S6.3 SCALE: 1/8" = 1'-0"



3 WEST ELEVATION

S2.5, S5.7 ⊄ S6.3 | S6.3 SCALE: 1/8" = 1'-0"

NEW PIER #3 ELEVATIONS



KEY PLAN

GRAPHIC SCALES:

0 1' 2' 4' 6' 10' 14' 22'

1/8"=1'-0"

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

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

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

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HIGHWAYS DIVISION

NEW PIER #3 ELEVATIONS (AT EXISTING BENT #5)

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

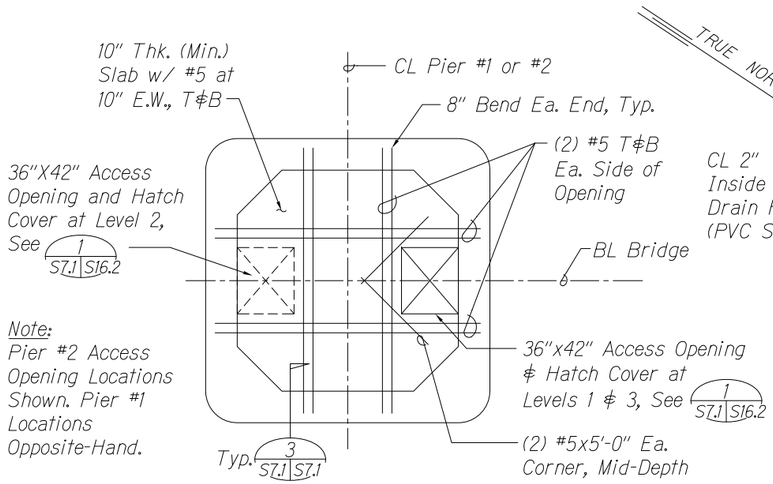
Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

SHEET No. S6.3 OF 3 SHEETS

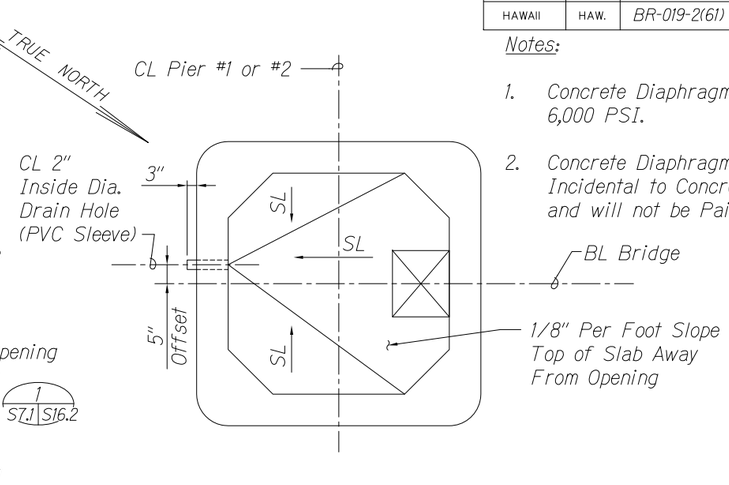
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	88	135

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



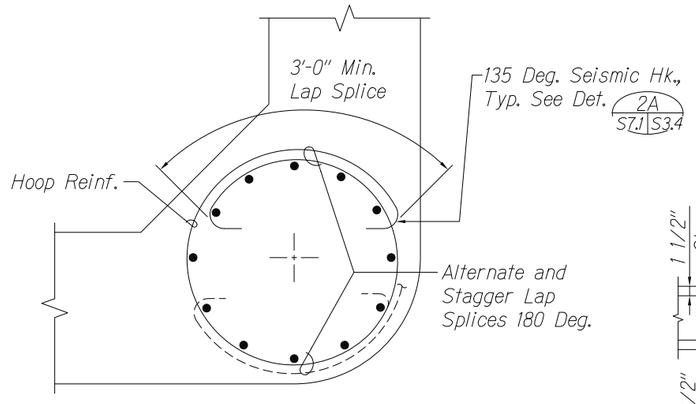
DIAPHRAGM SLAB SLOPES

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.*

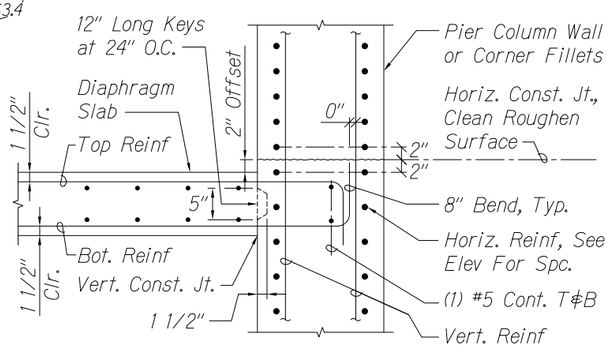
1 DIAPHRAGM SLAB PLANS (TYPICAL)

S7.2, S7.4 & S16.2 | S7.1 SCALE: 1/4"=1'-0"



2 CORNER COLUMN HOOP REINFORCING DETAIL (TYPICAL)

S7.3 & S7.5 | S7.1 SCALE: 1" = 1'-0"

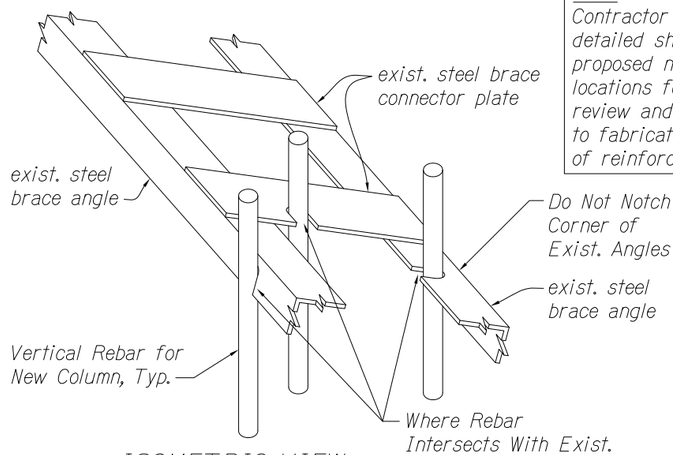


SECTION

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

4 DETAIL (TYPICAL)

S7.2 & S7.4 | S7.1 NOT TO SCALE

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"

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

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

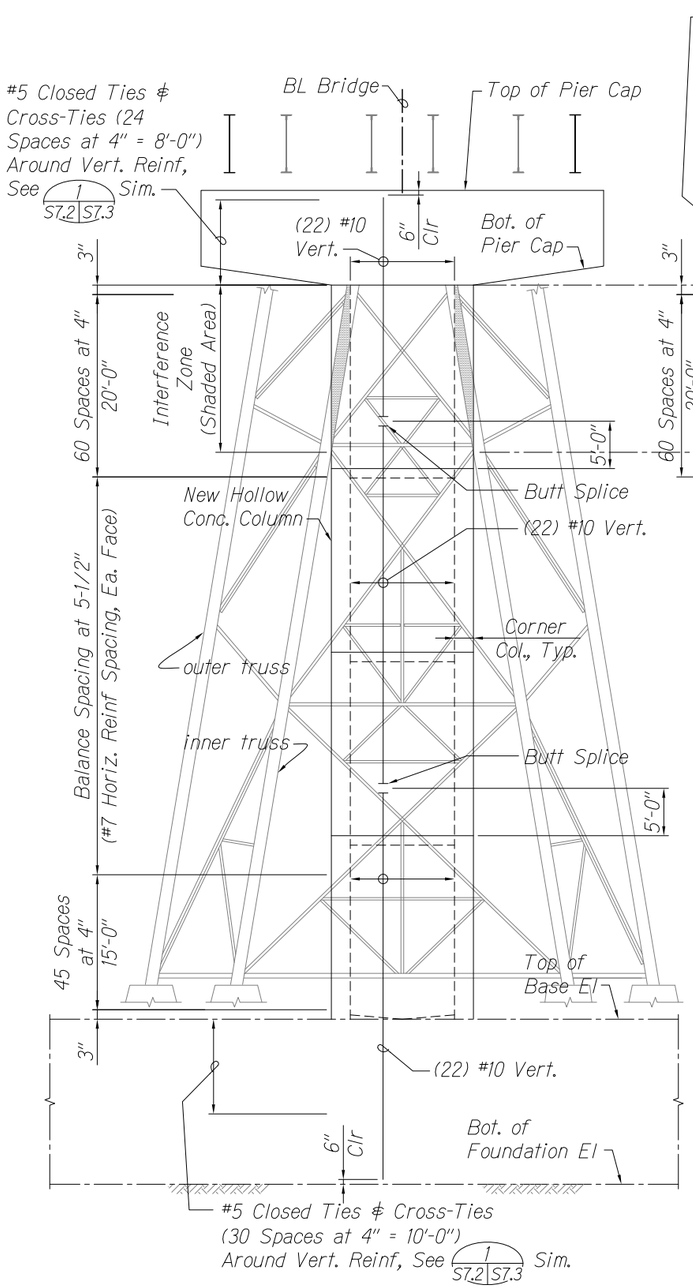
NEW PIER COLUMN - TYPICAL DETAILS & NOTES

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

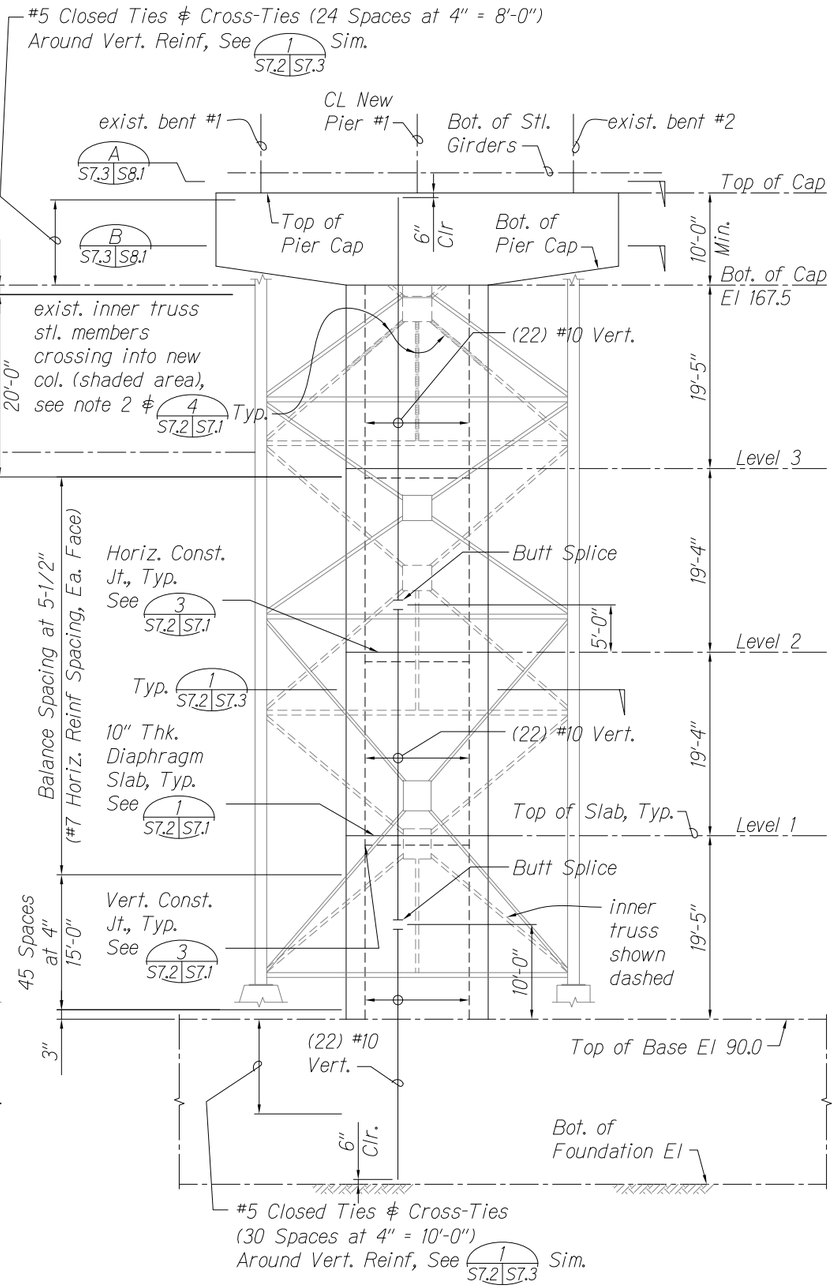
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S7.1 OF 6 SHEETS

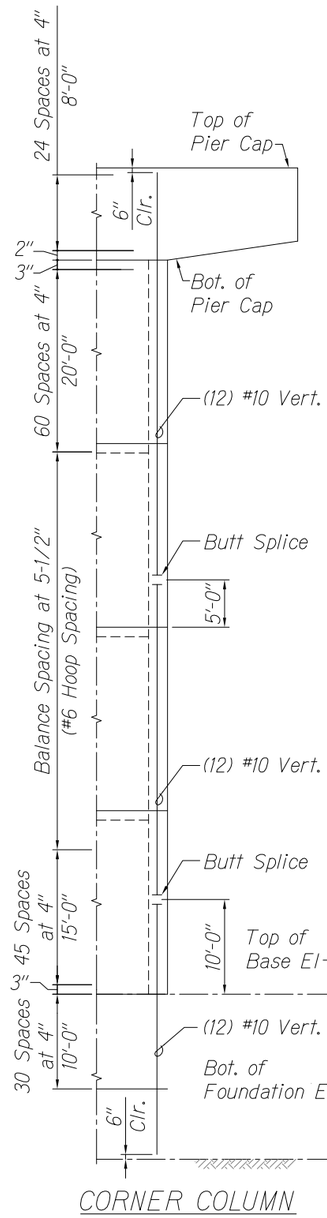
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	89	135



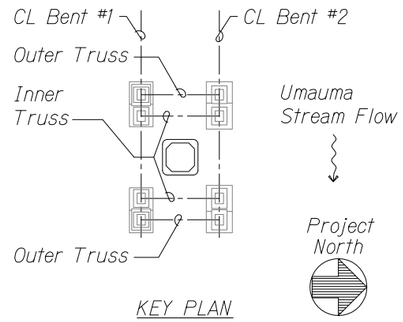
NORTH AND SOUTH ELEVATION



EAST AND WEST ELEVATION



CORNER COLUMN



KEY PLAN

GRAPHIC SCALES:

0 1' 2' 4' 6' 10' 14' 22'

1/8"=1'-0"

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 S7.2 S7.2 ELEVATION NEW PIER #1 COLUMN REINFORCING

SCALE: 1/8" = 1'-0"

ORIGINAL PLAN | NOTEBOOK | No.

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

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NO. 5479-S
HAWAII, U.S.A

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

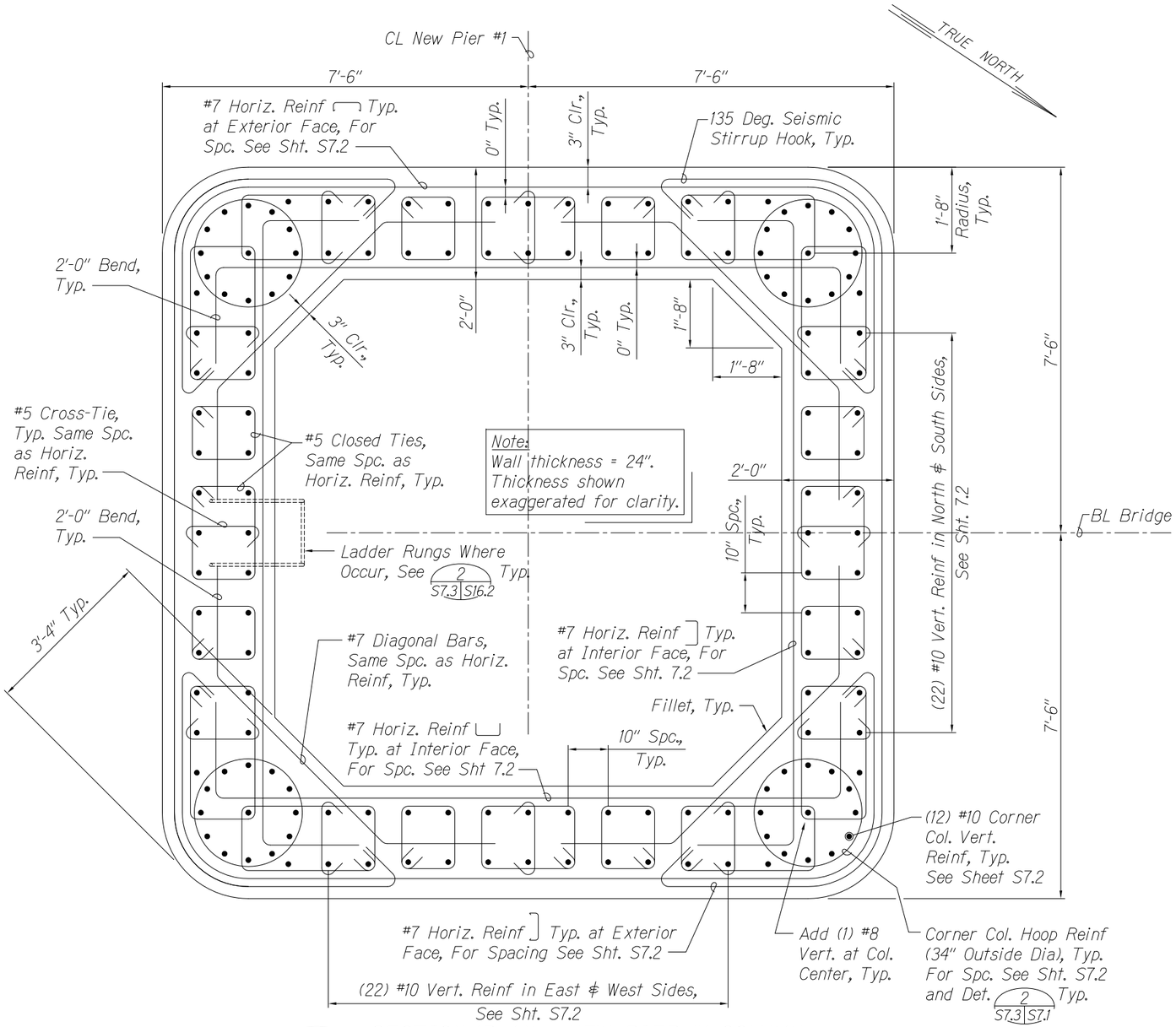
NEW PIER #1 - COLUMN ELEVATIONS & REINFORCING

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

Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

SHEET No. S7.2 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	90	135



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

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

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LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A
LICENSE EXPIRES: 4/30/12
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

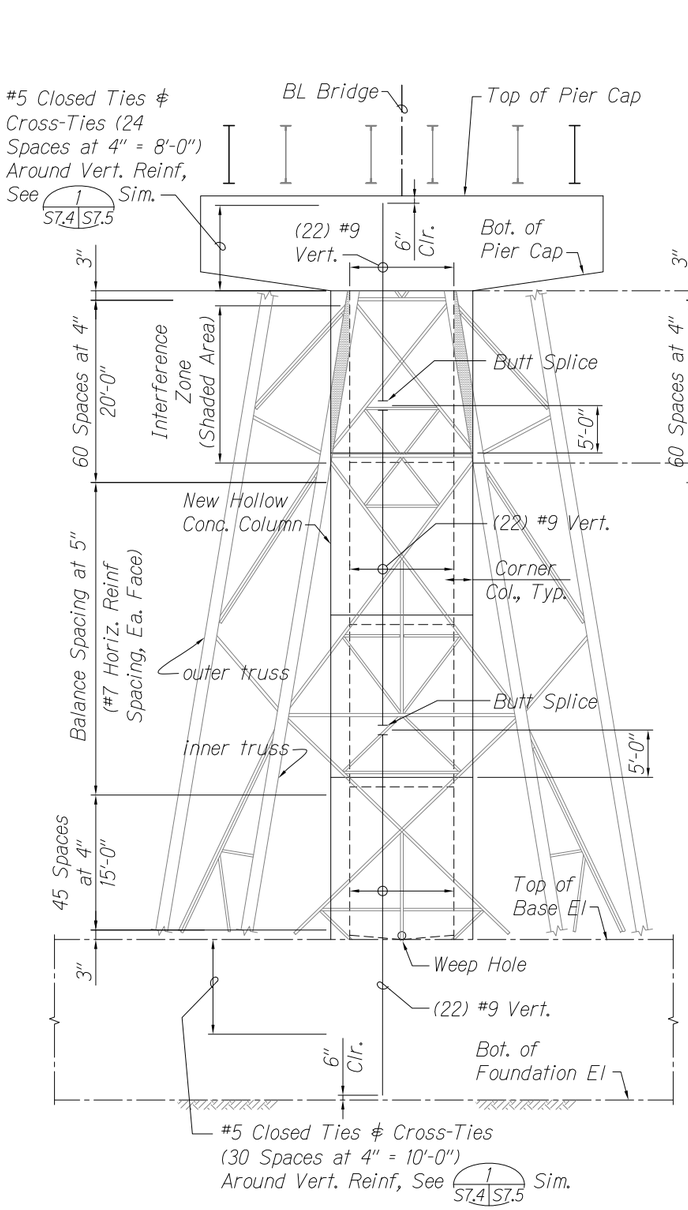
NEW PIER #1 COLUMN - SECTION

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

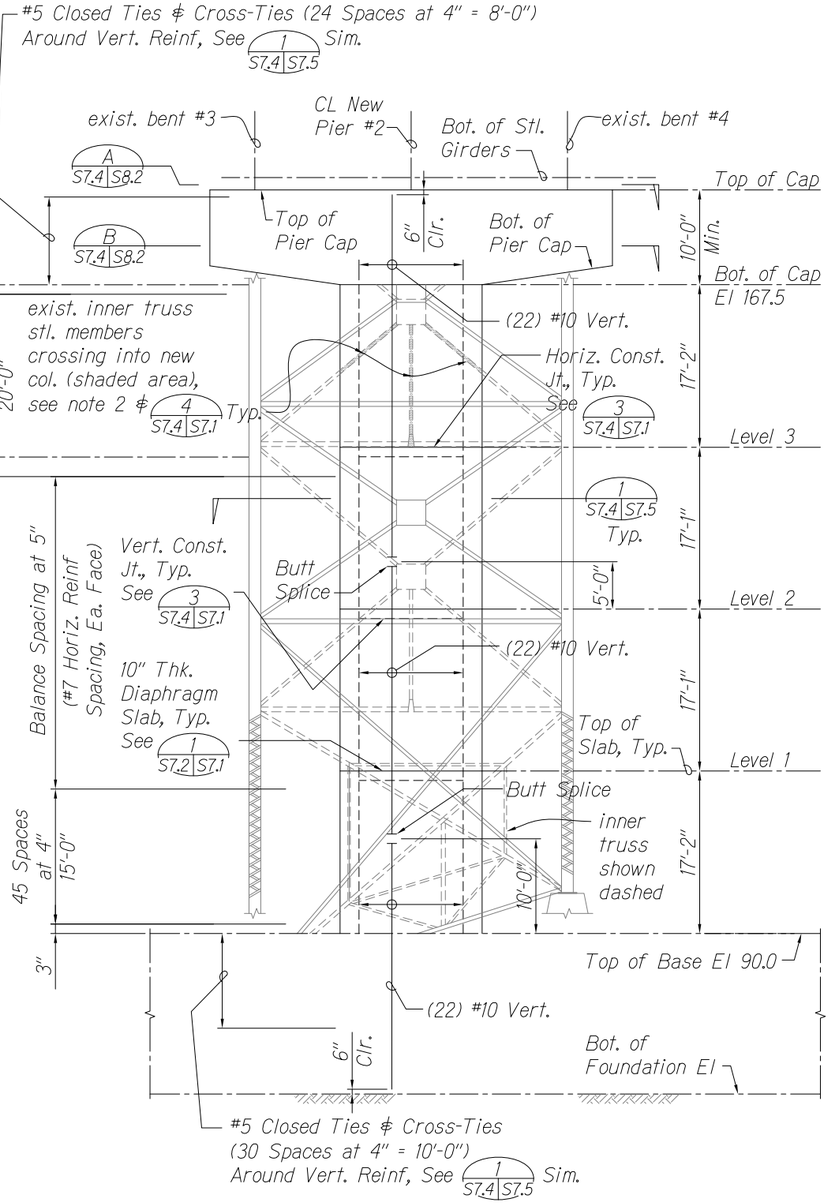
Scale: None Date: Oct. 20, 2011

SHEET No. S7.3 OF 6 SHEETS

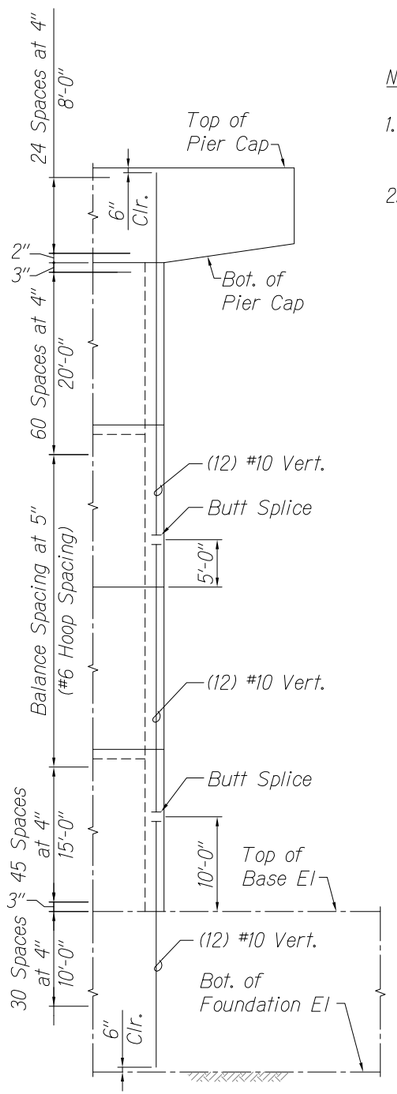
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	91	135



NORTH AND SOUTH ELEVATION



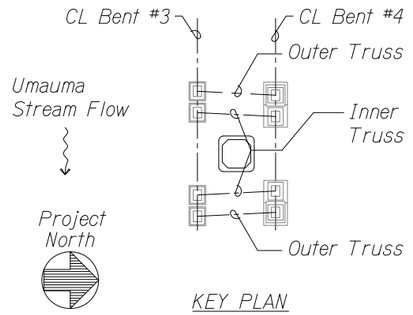
EAST AND WEST ELEVATION



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.



KEY PLAN

GRAPHIC SCALES:

0 1' 2' 4' 6' 10' 14' 22'

1/8"=1'-0"

1 S7.4 S7.4 ELEVATION NEW PIER #2 COLUMN REINFORCING

SCALE: 1/8" = 1'-0"

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

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LICENSE EXPIRES: 4/30/12

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

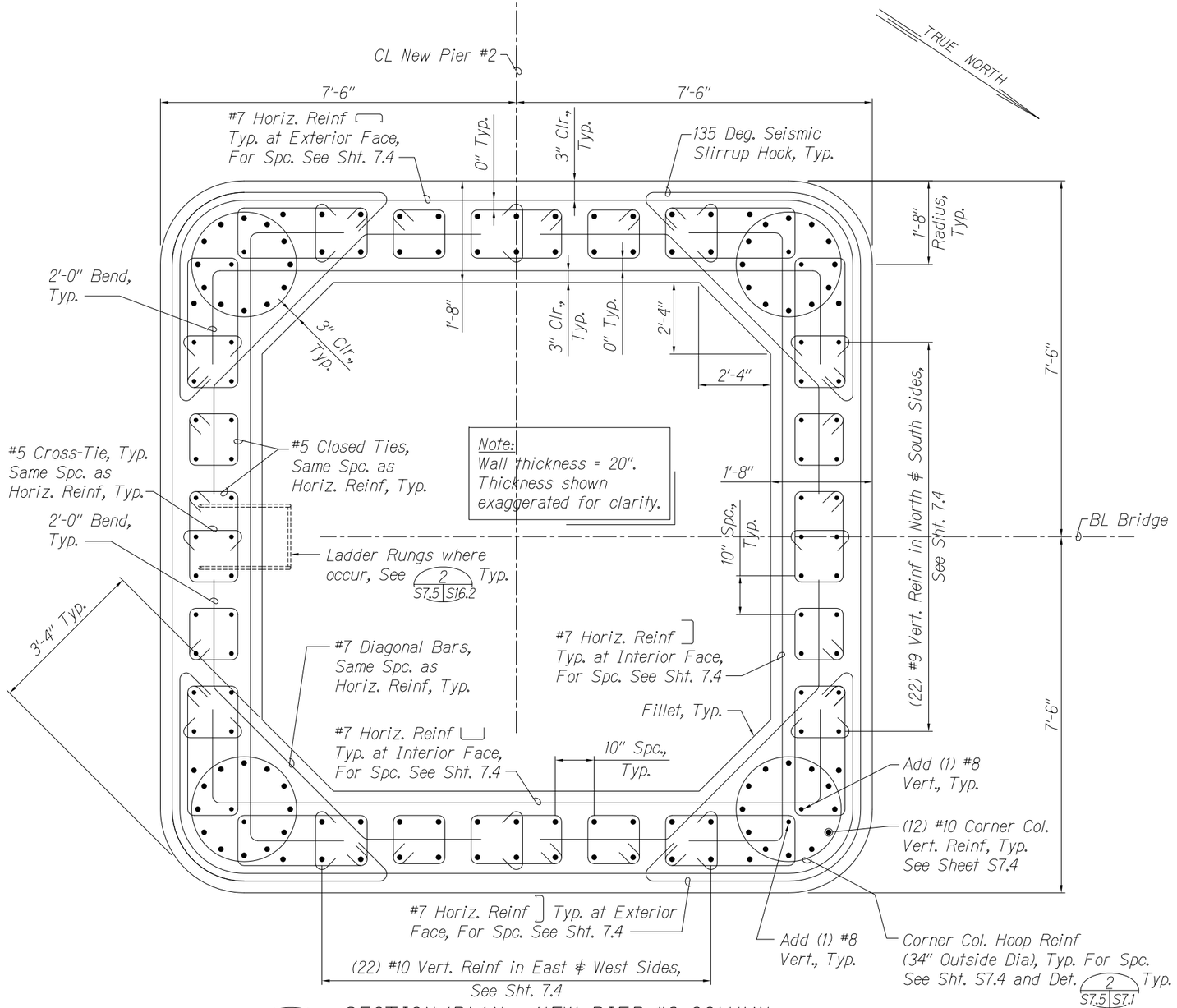
NEW PIER #2 - COLUMN ELEVATIONS & REINFORCING

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

Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

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)	2011	92	135



1 S7.4 S7.5 SECTION/PLAN - NEW PIER #2 COLUMN

NOT TO SCALE

ORIGINAL PLAN | NOTEBOOK | No.

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

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

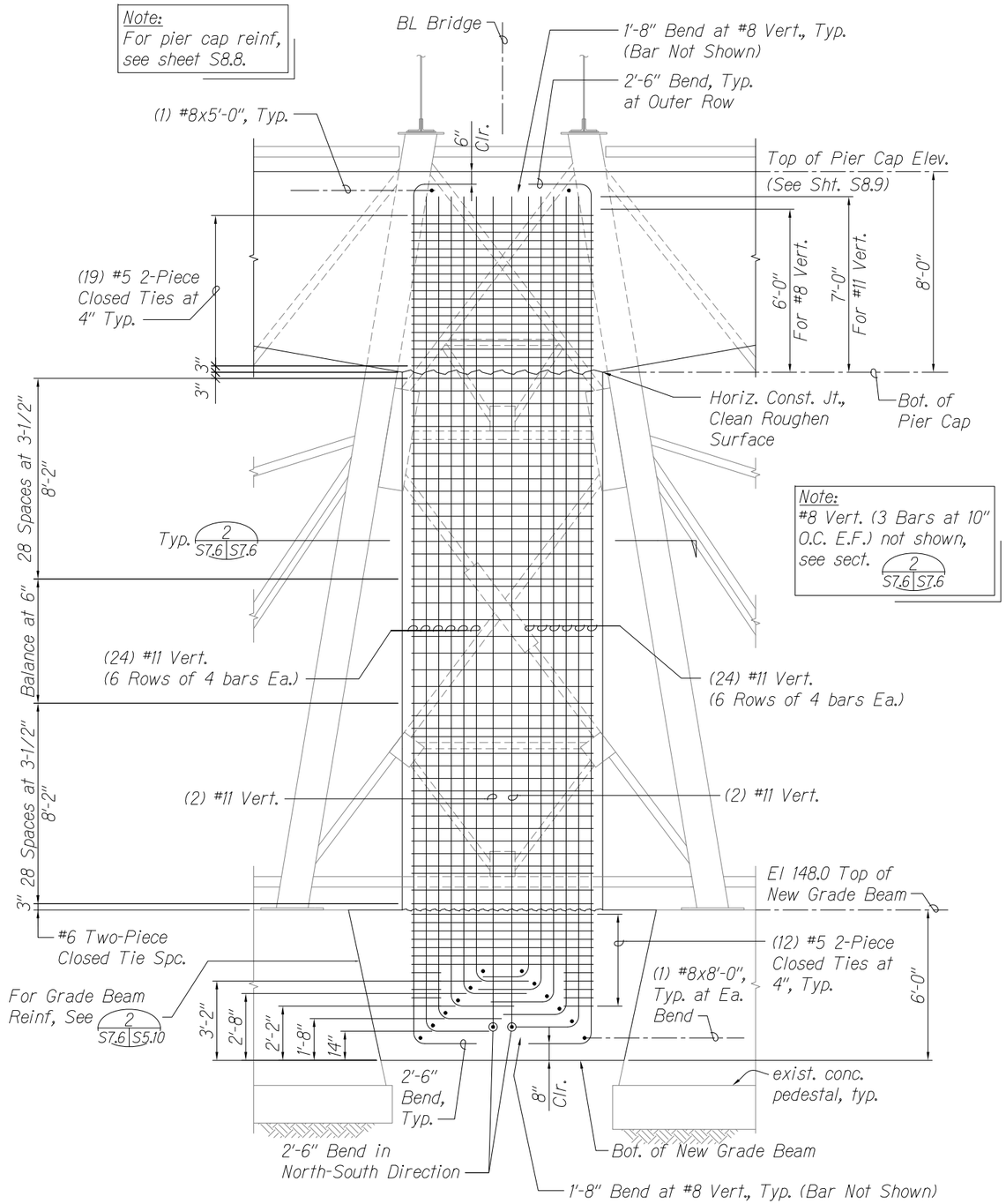
NEW PIER #2 COLUMN - SECTION

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

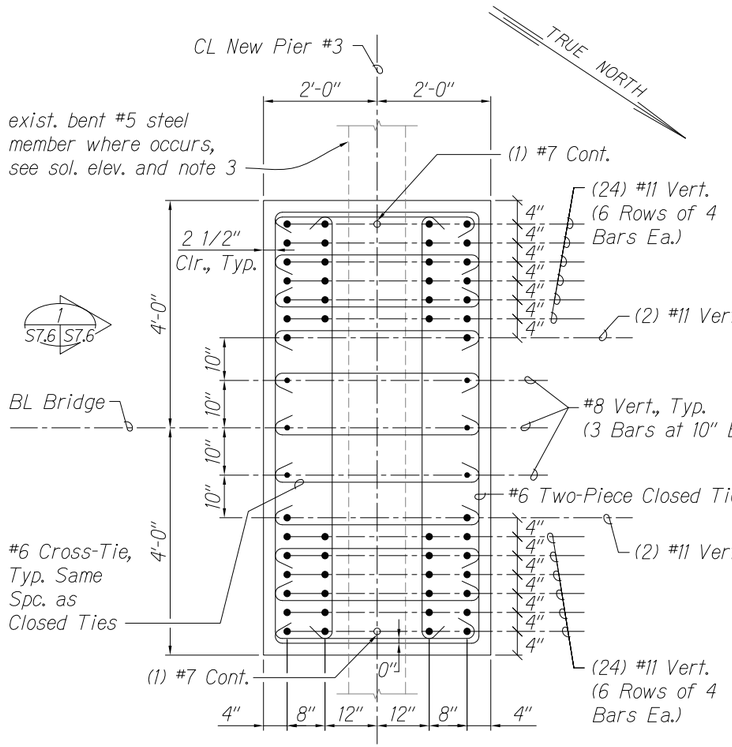
Scale: None Date: Oct. 20, 2011

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)	2011	93	135



1 S5.10, S6.3 & S7.6 S7.6 NEW PIER #3 - COLUMN ELEVATION (LOOKING NORTH)
SCALE: 3/4" = 1'-0"



2 S7.6 S7.6 NEW PIER #3 - COLUMN SECTION
SCALE: 3/4" = 1'-0"

Notes:

1. For typical pier column notes, see sheet S7.1.
2. All vertical reinforcing (#8 & #11 Bars) shall be ASTM A706, Grade 60.
3. Portions of existing steel members crossing into new column shall be blast cleaned and coated with 2 coats epoxy. See sheet S0.3.
4. Concrete coarse aggregate size shall be 3/4" maximum.

GRAPHIC SCALES:

0 6" 1' 3' 5' 7'
3/8"=1'-0"

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

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

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIER #3 - COLUMN ELEVATION & SECTION

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

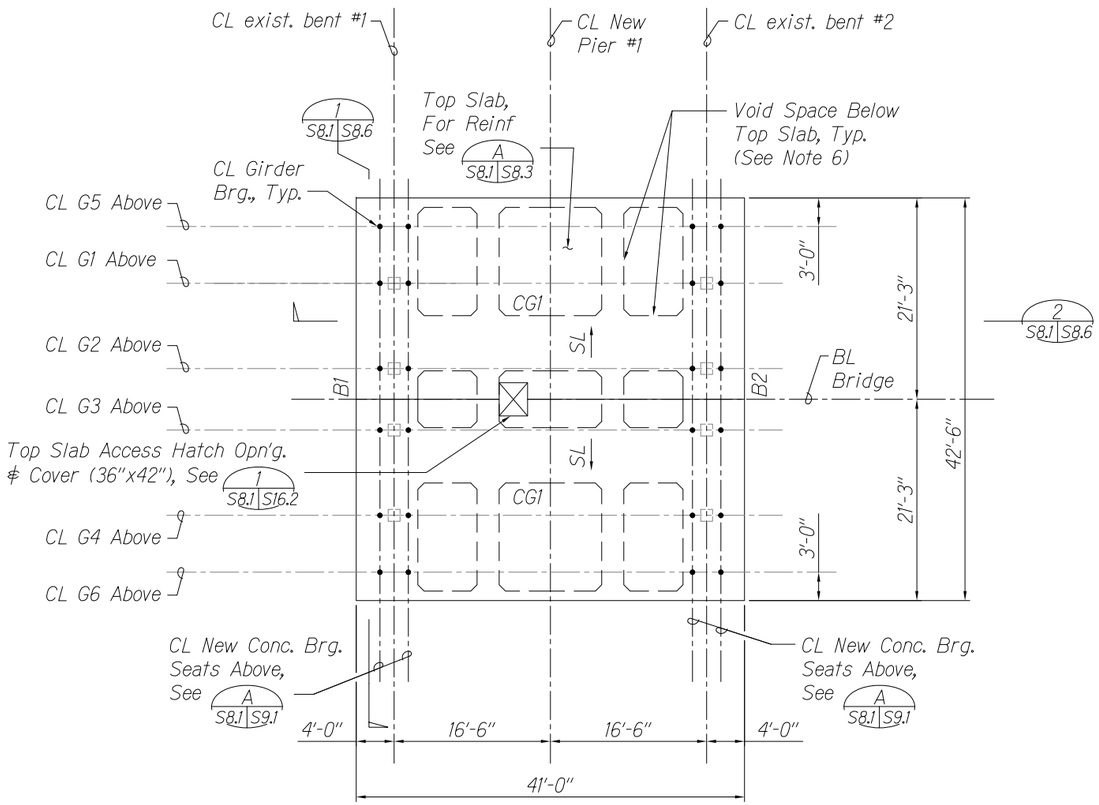
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S7.6 OF 6 SHEETS

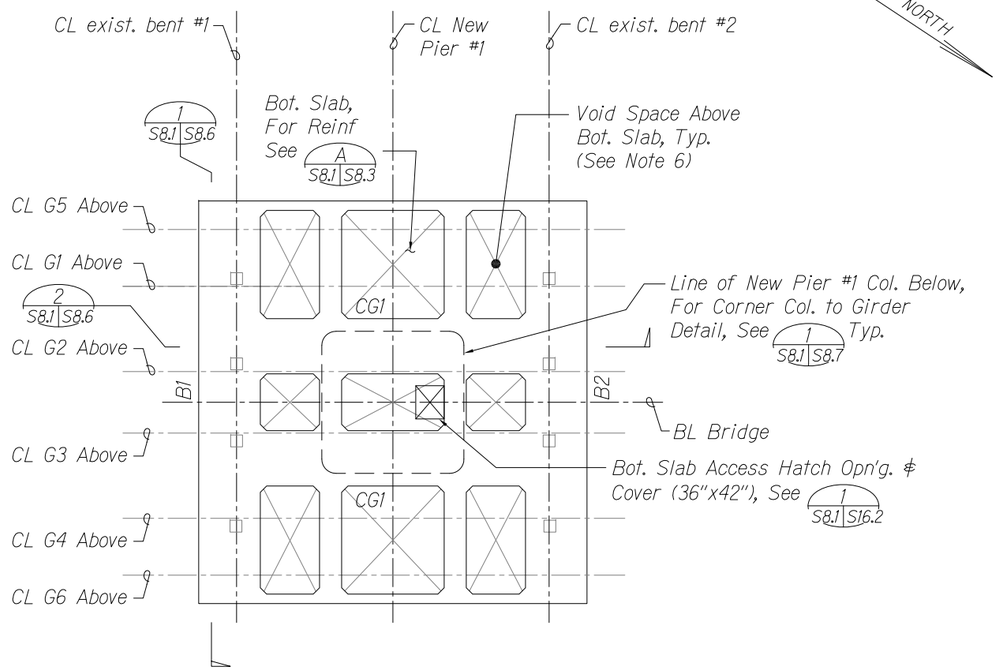
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	94	135

Notes:

1. For top of cap elevation, see sheet S6.1.
2. New Pier #1 column below not shown for clarity, see B (S8.1 | S8.1).



A NEW PIER #1 - PLAN AT TOP OF CAP
S2.3, S7.3 & S8.1 | S8.1 SCALE: 1/8" = 1'-0"



PLAN

B NEW PIER #1 - SECTION AT BOTTOM OF CAP
S7.3 & S8.1 | S8.1 SCALE: 1/8" = 1'-0"

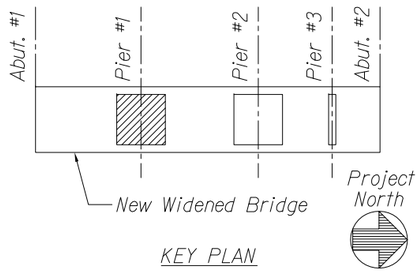
Notes:

1. Portions of existing steel members crossing into new cap beam shall be blast cleaned and coated with 2 coats epoxy prior to concrete pour. See notes on sheet S0.3.
2. Construction loads shall not be supported by existing steel tower.
3. Vent holes and drain holes not shown. See enlarged plan on sheet S8.3.
4. Slope top surface of pier cap, see enlarged plan on sheet S8.3.
5. Concrete bearing seats shall be incidental to concrete caps.
6. Formwork within void spaces shall be removed. Provide temporary access holes (3'-0"x3'-0" max.) in top slab subject to the Engineer's approval.

NEW PIER #1 CAP

Legend:

B1 & B2 - Denotes New Conc. Beam
CG1 - Denotes New Conc. Girder



KEY PLAN

GRAPHIC SCALES:

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIER #1 CAP - PLAN & SECTIONS

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

Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

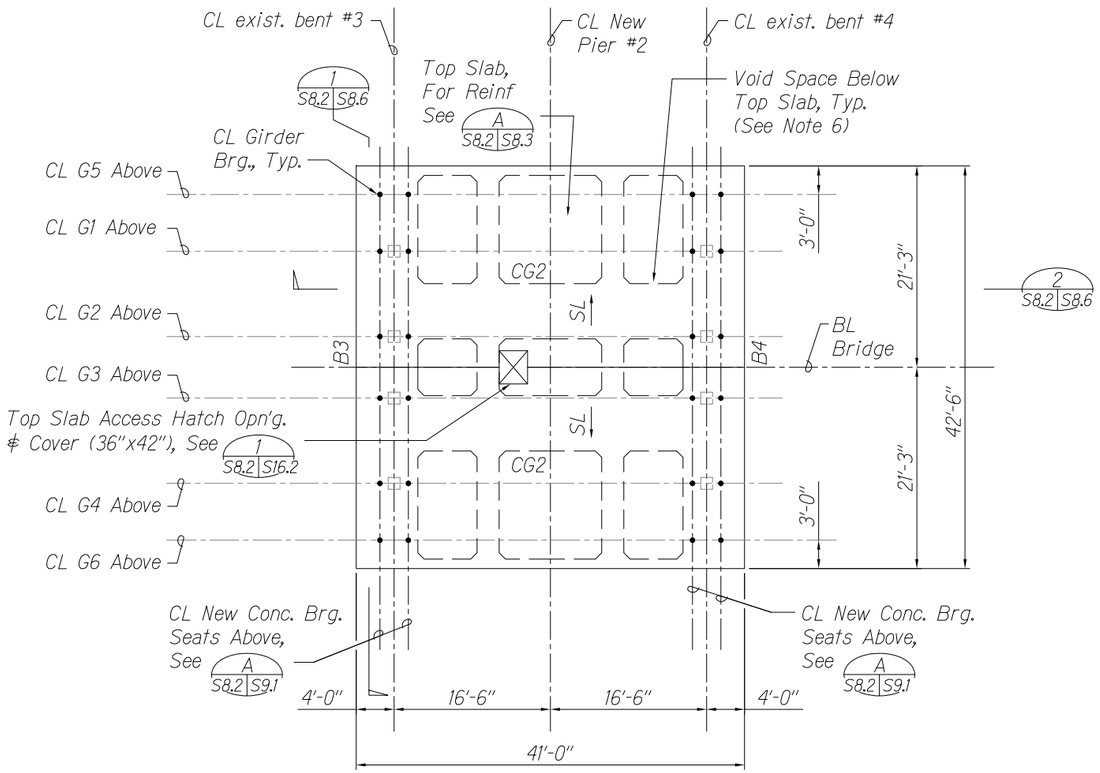
SHEET No. S8.1 OF 9 SHEETS

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

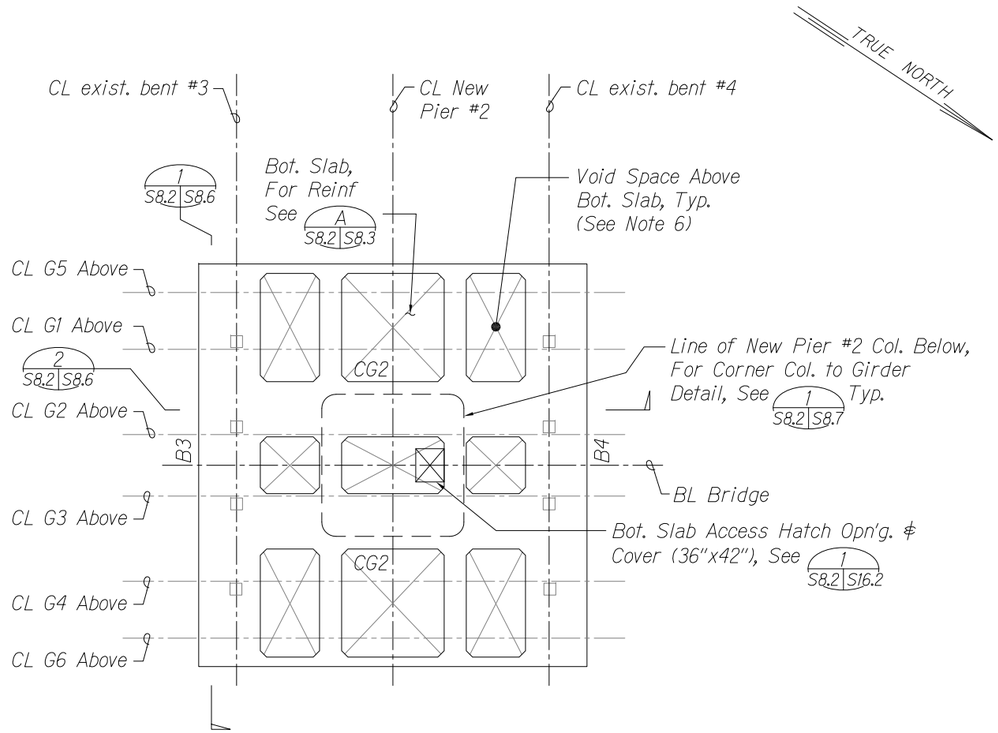
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	95	135

Notes:

1. For top of cap elevation, see sheet S6.2.
2. New Pier #2 column below not shown for clarity, see B S8.2 | S8.2.



A NEW PIER #2 - PLAN AT TOP OF CAP
S2.3, S7.4 & S8.2 | S8.2 SCALE: 1/8" = 1'-0"



PLAN

B NEW PIER #2 - SECTION AT BOTTOM OF CAP
S7.4 & S8.2 | S8.2 SCALE: 1/8" = 1'-0"

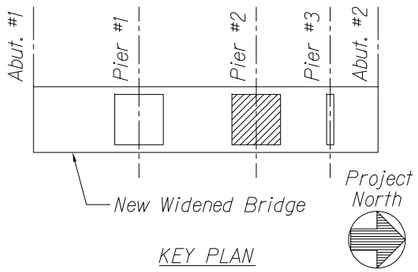
Notes:

1. Portions of existing steel members crossing into new cap beam shall be blast cleaned and coated with 2 coats epoxy prior to concrete pour. See notes on sheet S0.3.
2. Construction loads shall not be supported by existing steel tower.
3. Vent holes and drain holes not shown. See enlarged plan on sheet S8.3.
4. Slope top surface of pier cap, see enlarged plan on sheet S8.3.
5. Concrete bearing seats shall be incidental to concrete caps.
6. Formwork within void spaces shall be removed. Provide temporary access holes (3'-0"x3'-0" max.) in top slab subject to the Engineer's approval.

NEW PIER #2 CAP

Legend:

B3 & B4 - Denotes New Conc. Beam
CG2 - Denotes New Conc. Girder



KEY PLAN

GRAPHIC SCALES:

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIER #2 CAP - PLAN & SECTIONS

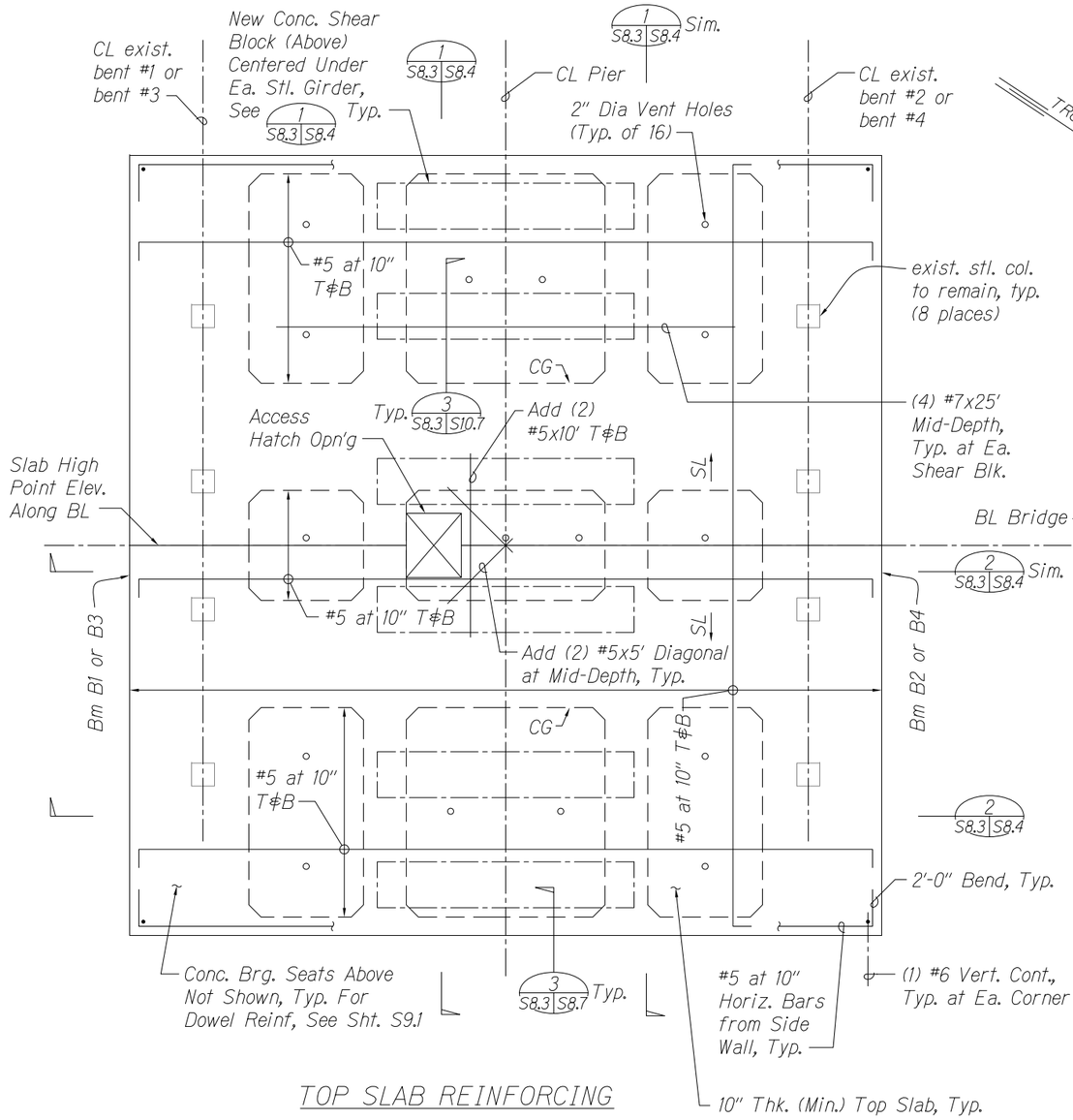
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

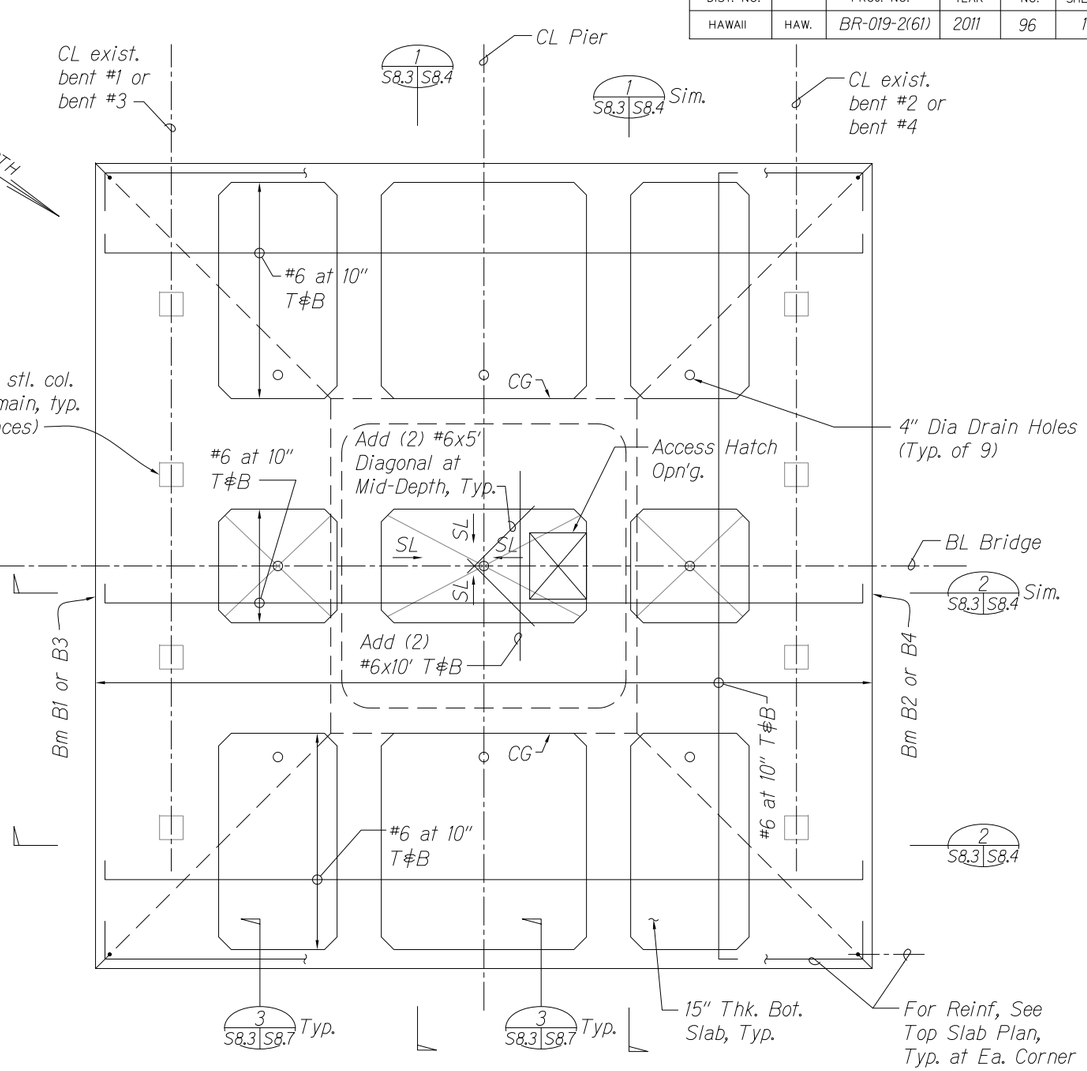
SHEET No. S8.2 OF 9 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	96	135



TOP SLAB REINFORCING



BOTTOM SLAB REINFORCING

GRAPHIC SCALES:

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

1/4"=1'-0"

A S8.1 & S8.2 S8.3 ENLARGED PLAN - NEW PIER #1 & PIER #2 CAP SLAB REINFORCING

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

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

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LICENSE EXPIRES: 4/30/12

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

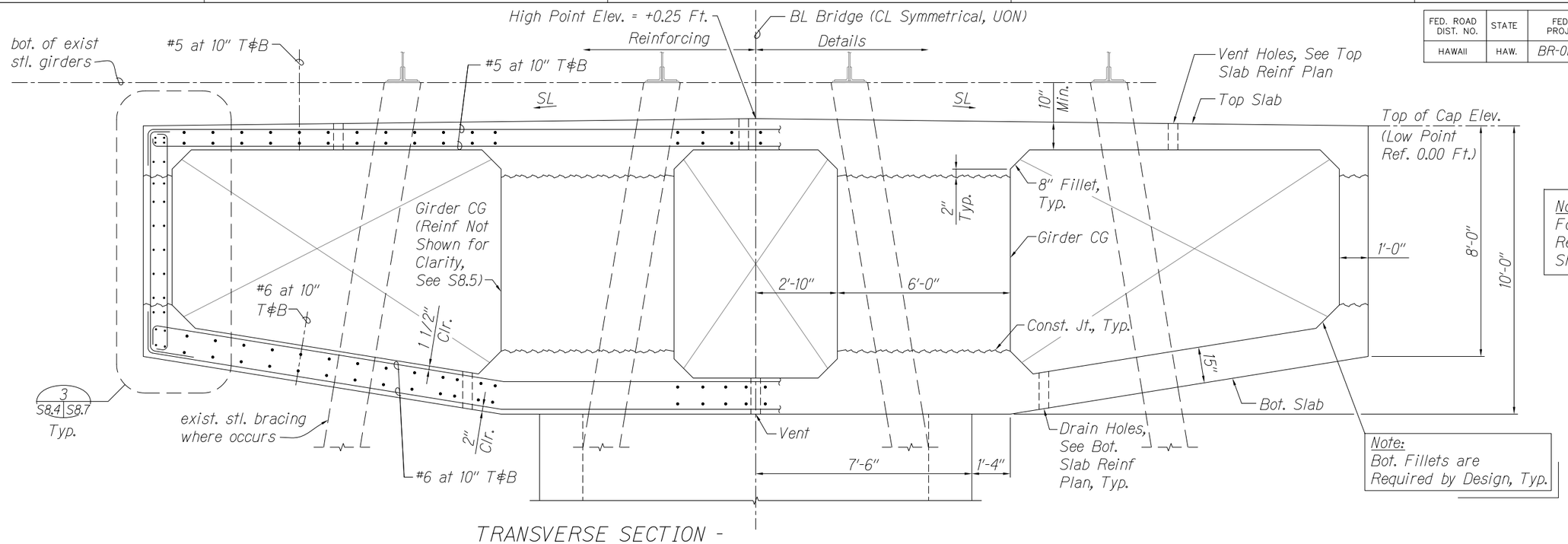
NEW PIER #1 & #2 CAP SLAB REINFORCING PLAN

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

Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

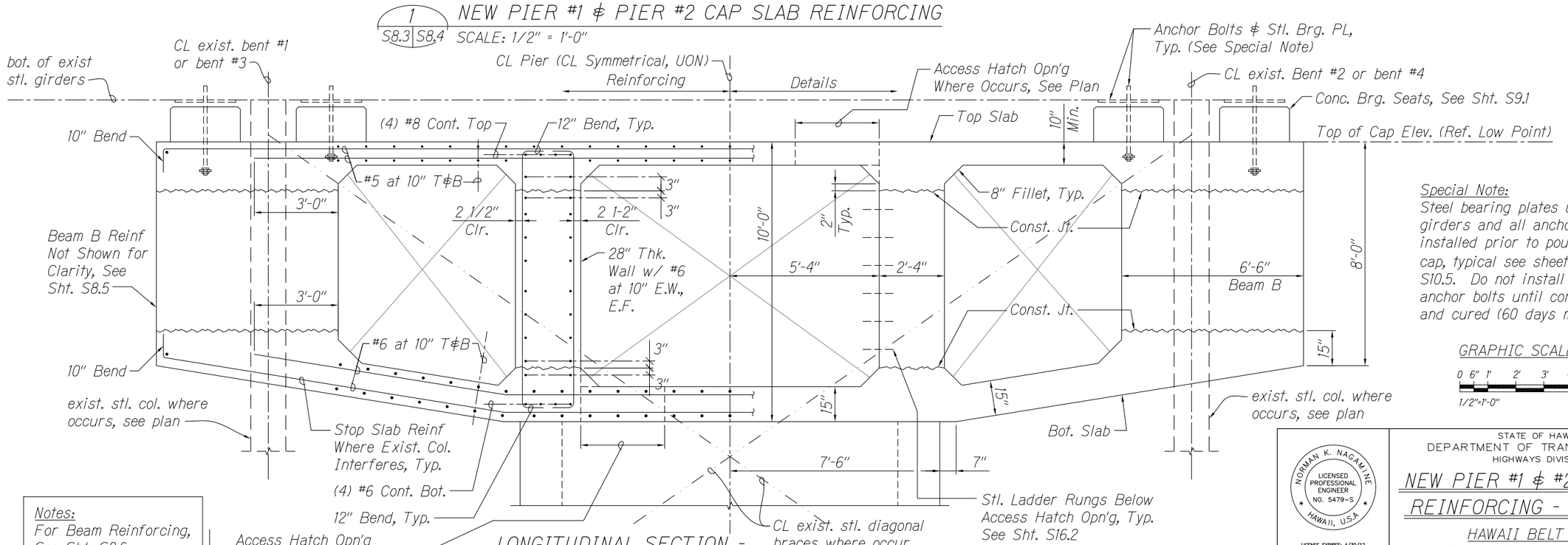
SHEET No. S8.3 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	97	135



TRANSVERSE SECTION - NEW PIER #1 & PIER #2 CAP SLAB REINFORCING

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



Special Note:
Steel bearing plates under existing girders and all anchor bolts shall be installed prior to pouring top slab of cap, typical see sheets S9.1, S10.4 & S10.5. Do not install double nuts on anchor bolts until concrete is cast and cured (60 days minimum).

GRAPHIC SCALES:

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

Notes:
For Beam Reinforcing, See Sht. S8.6

LONGITUDINAL SECTION - NEW PIER #1 & PIER #2 CAP SLAB REINFORCING

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

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

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

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

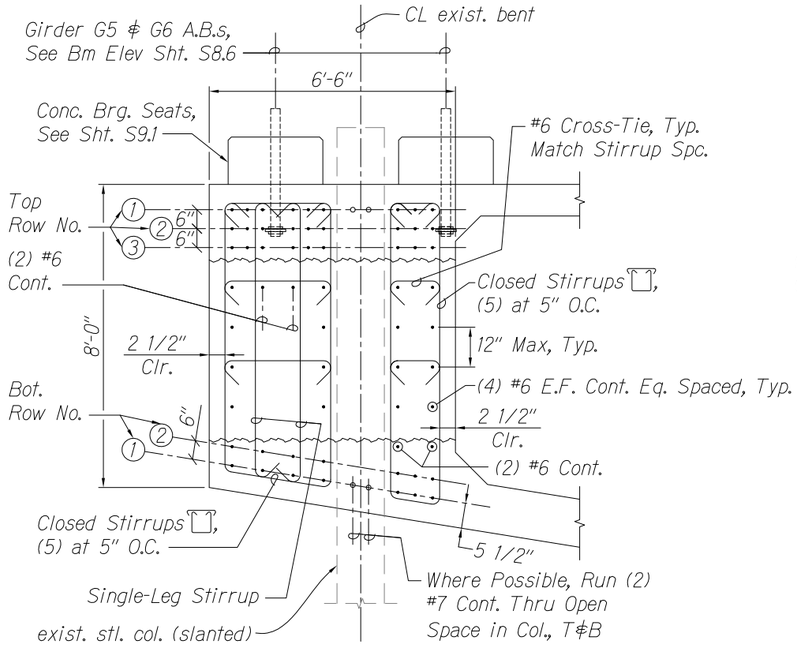
NEW PIER #1 & #2 CAP SLAB REINFORCING - SECTIONS

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

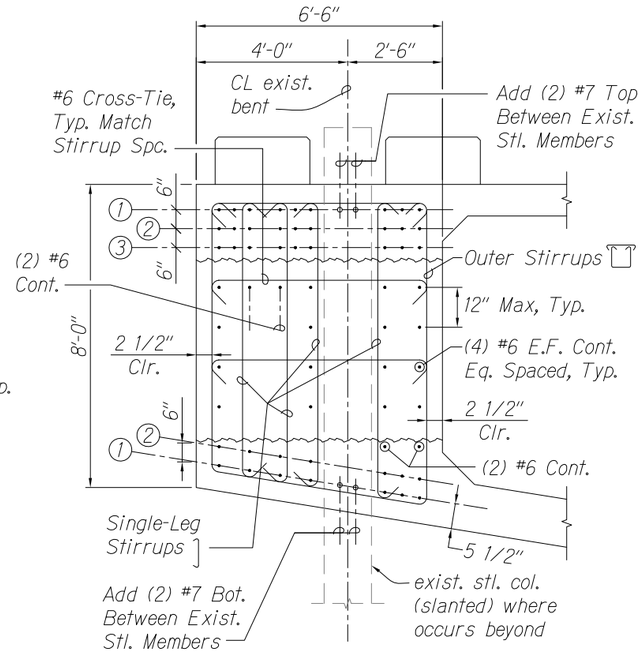
Scale: 1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S8.4 OF 9 SHEETS

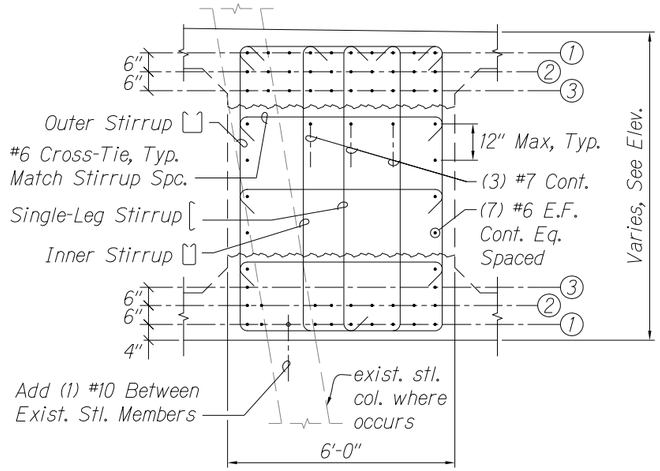
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	98	135



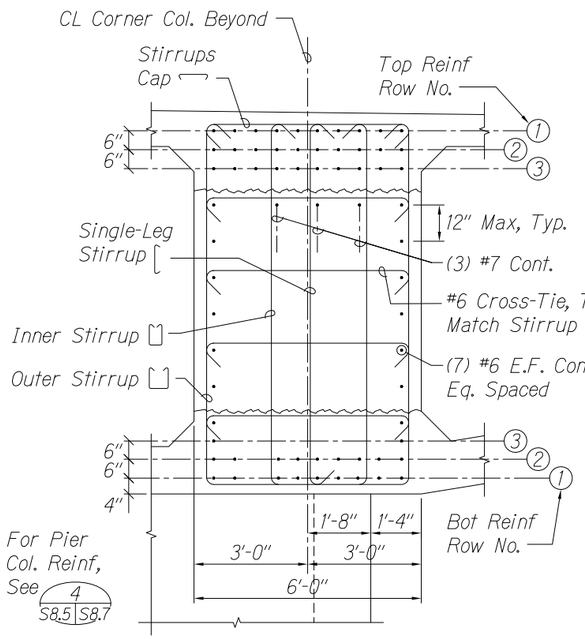
1 S8.6 S8.5 TYPICAL SECTION - CAP BEAM "B"
SCALE: 1/2" = 1'-0"



2 S8.6 S8.5 SECTION - CAP BEAM "B"
SCALE: 1/2" = 1'-0"



3 S8.6 S8.5 TYPICAL SECTION - CAP GIRDER "CG"
SCALE: 1/2" = 1'-0"



4 S8.6 S8.5 SECTION - CAP GIRDER "CG"
SCALE: 1/2" = 1'-0"

Cap Beam and Cap Girder Reinforcing Schedule

Mark	Width	Depth	Top Reinforcing			Bottom Reinforcing			Stirrup Reinforcing			
									Cantilevered Ends		Center Section	
			①	②	③	①	②	③	Detail No.	Size ⊄ Spc.	Detail No.	Size ⊄ Spc.
B1	6'-6"	8'-0" Min., See Section	(9) #10	(9) #10	(9) #10	(7) #10	(7) #10	-	1/S8.5	#6 at 5"	2/S8.5	#6 at 5"
B2	6'-6"	DO	DO	DO	DO	DO	DO	-	DO	DO	DO	DO
B3	6'-6"	DO	DO	DO	DO	DO	DO	-	DO	DO	DO	DO
B4	6'-6"	DO	DO	DO	DO	DO	DO	-	DO	DO	DO	DO
CG1	6'-0"	Varies, See Elev.	(10) #10	(10) #10	(10) #10	(9) #10	(9) #10	(2) #10	3/S8.5	#6 at 5"	4/S8.5	#6 at 8"
CG2	6'-0"	Varies, See Elev.	(10) #10	(10) #10	(10) #10	(9) #10	(9) #10	(2) #10	3/S8.5	#6 at 5"	4/S8.5	#6 at 8"

Notes:

1. For cap beam and cap girder elevations, see sheet S8.6.
2. ① denotes row number, see sections and elevations.
3. For longitudinal side bars each face, see sections this sheet.
4. For added stirrup reinforcing, see sheet S8.6.
5. For added reinforcing at corner column, see detail 1 S8.5 S8.7 .

GRAPHIC SCALES:

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

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

NEW PIER #1 ⊄ #2 CAP - BEAM, GIRDER SECTION ⊄ SCHEDULE

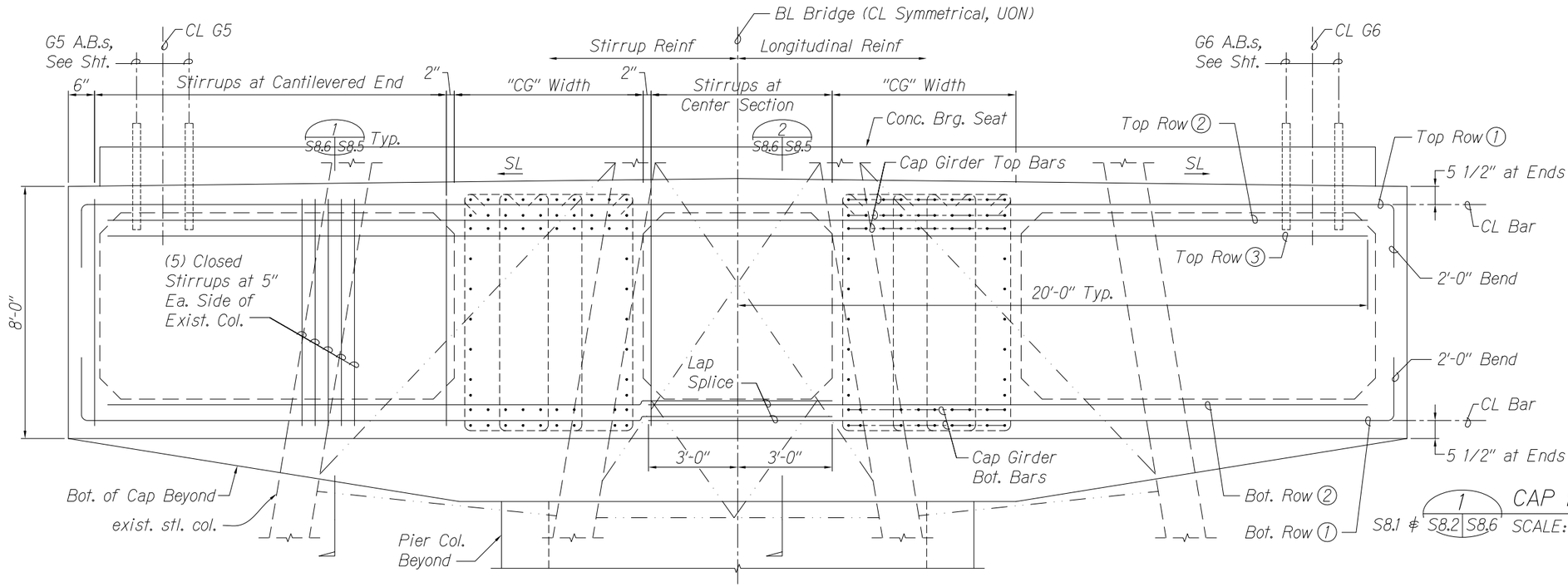
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S8.5 OF 9 SHEETS

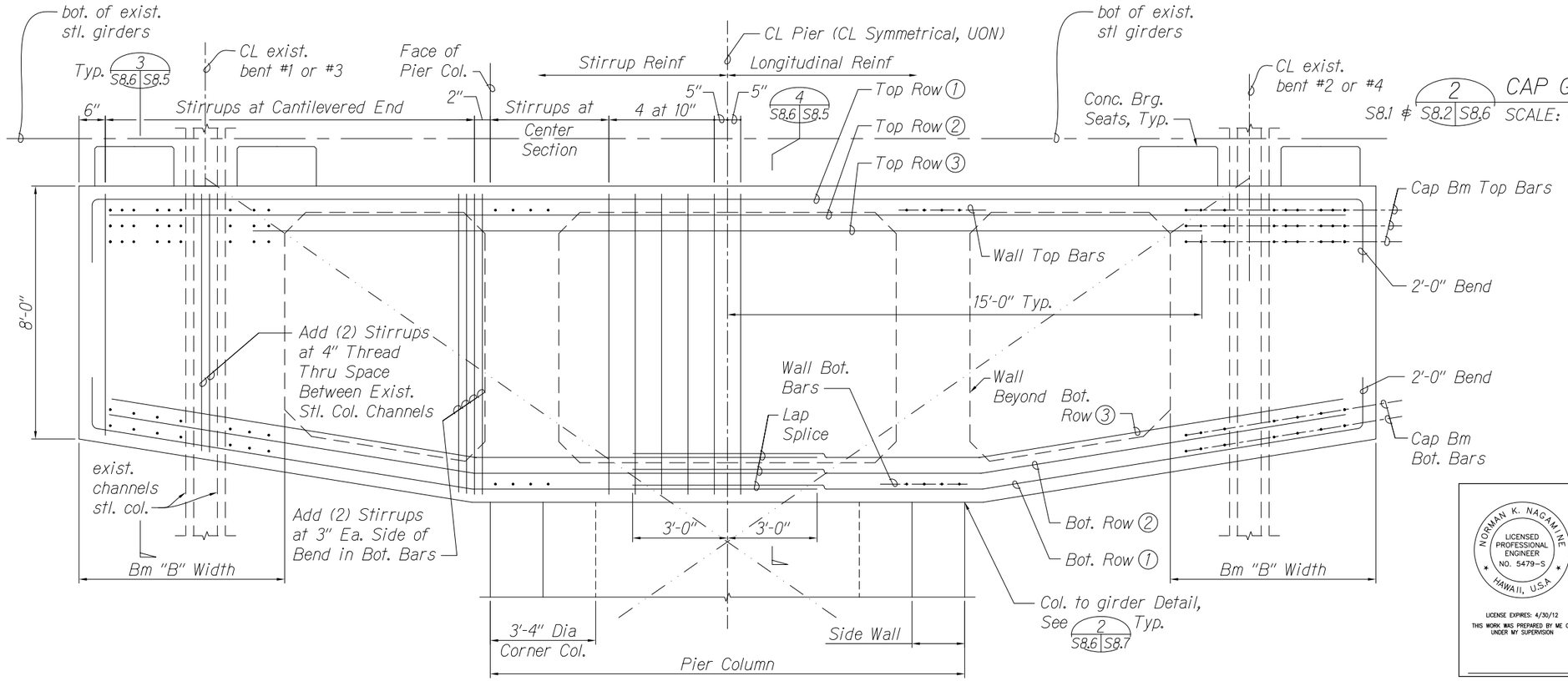
ORIGINAL PLAN | NOTEBOOK No. | DESIGNED BY | QUANTITIES BY | TRACED BY | DRAWN BY | SURVEY PLOTTED BY | CHECKED BY | DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	99	135



1 S8.1 ∉ S8.2 | S8.6 CAP BEAM - SECTION/ELEVATION SCALE: 1/2" = 1'-0"

Note:
For stirrups and longitudinal reinforcing, see schedule on sheet S8.5.



2 S8.1 ∉ S8.2 | S8.6 CAP GIRDER - SECTION/ELEVATION SCALE: 1/2" = 1'-0"

Note:
For stirrups and longitudinal reinforcing, see schedule on sheet S8.5.

GRAPHIC SCALES:

0 6" 1' 2' 3' 4' 5' 6'
1/2"=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: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

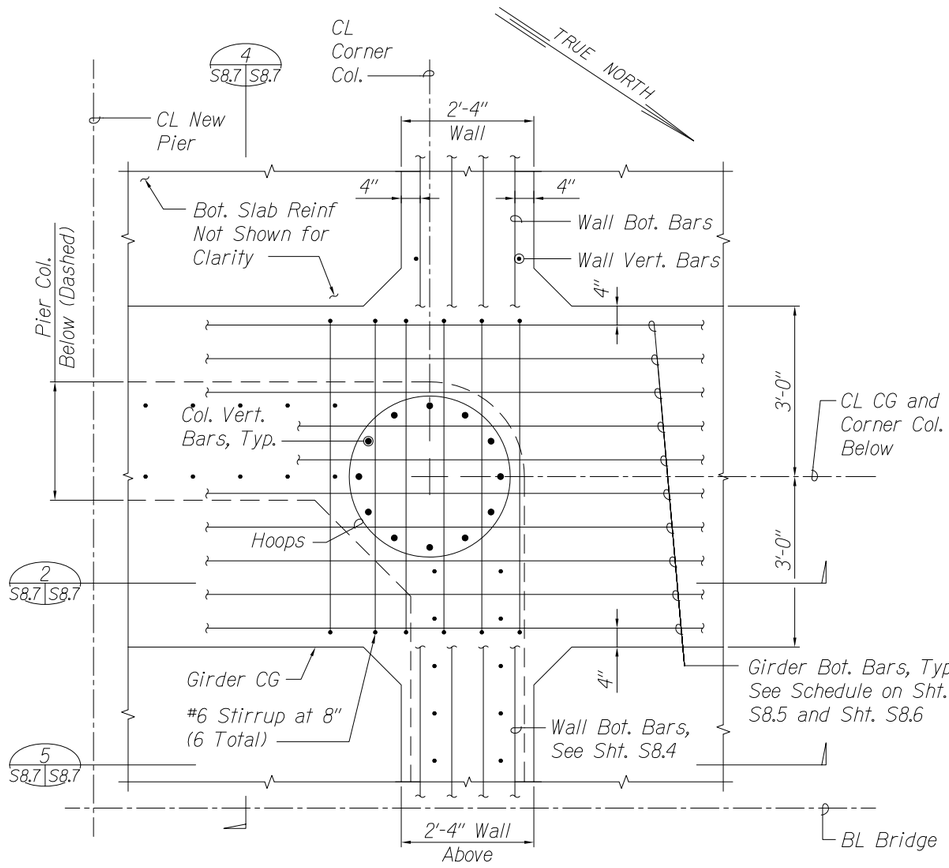
NEW PIER #1 & #2 CAP
BEAM & GIRDER - SECTIONS

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

Scale: 1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S8.6 OF 9 SHEETS

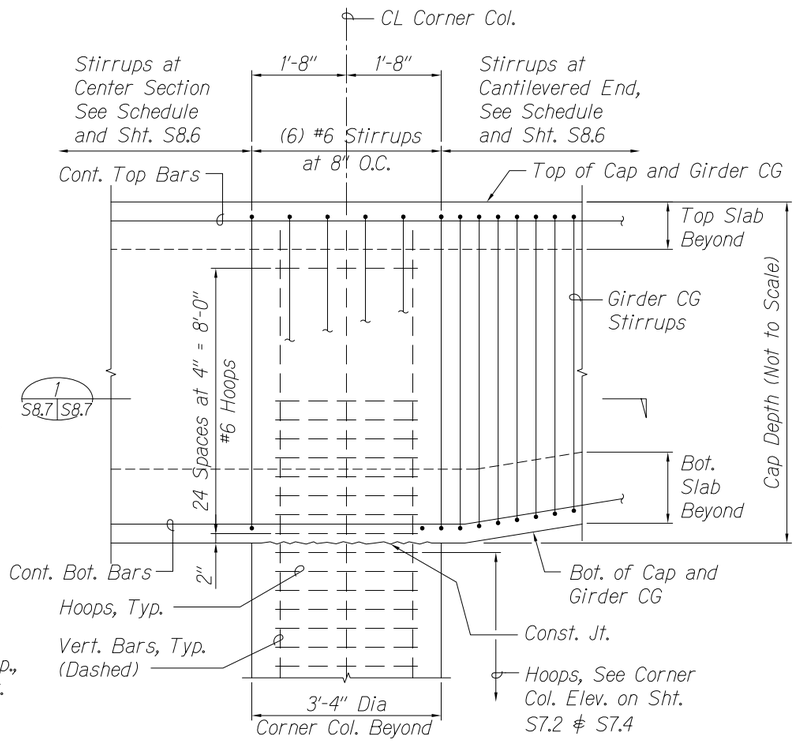
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	100	135



PLAN

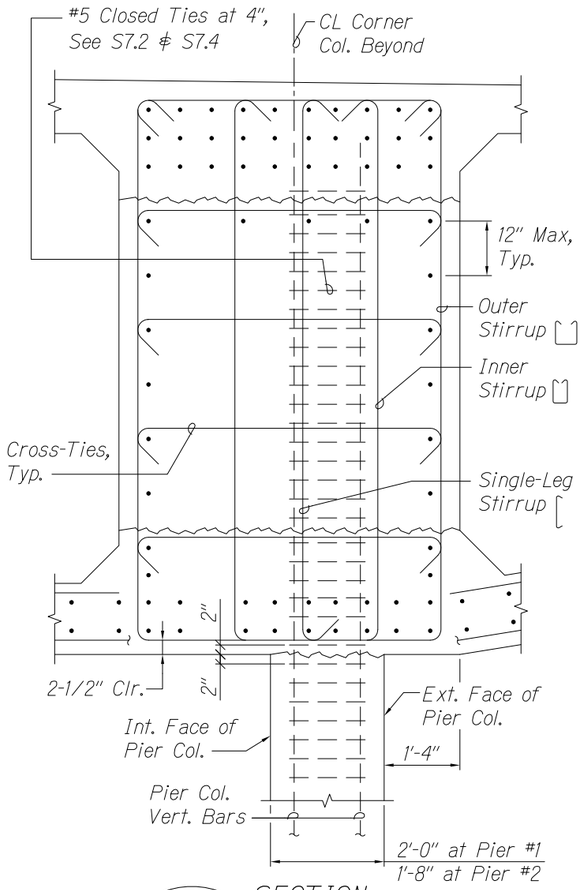
1 S8.1, S8.2, S8.5 & S8.7 S8.7 CORNER COLUMN TO GIRDER DETAIL

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



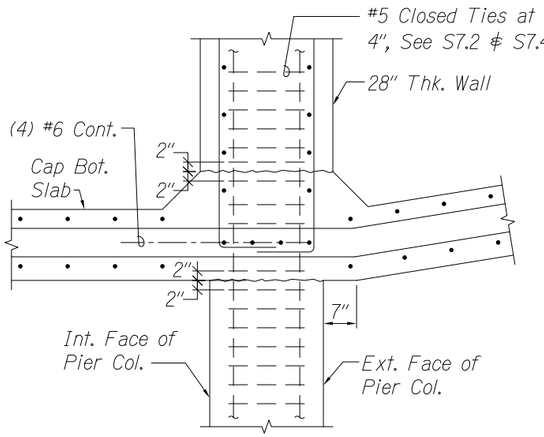
2 S8.6 & S8.7 S8.7 SECTION (TYP.)

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



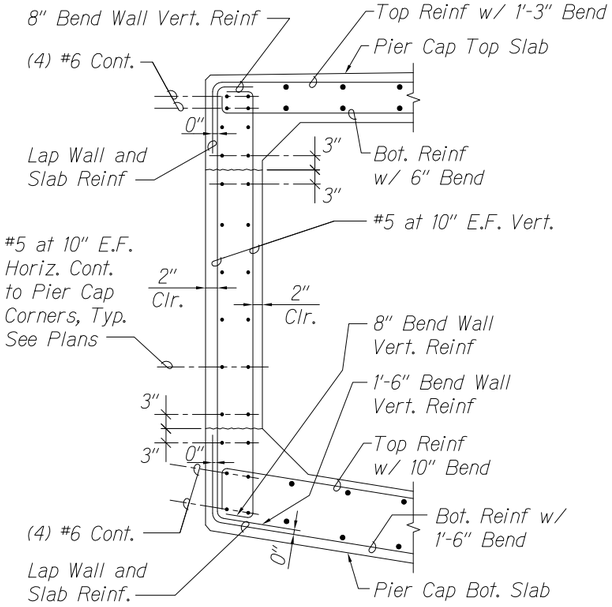
4 S8.5 & S8.7 S8.7 SECTION

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



5 S8.7 S8.7 SECTION

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



3 S8.3 & S8.4 S8.7 SIDE WALL SECTION

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

GRAPHIC SCALES:

0 6" 1' 2' 3' 4'

3/4"=1'-0"

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

NORMAN K. NAGAMINE
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HAWAII, U.S.A

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

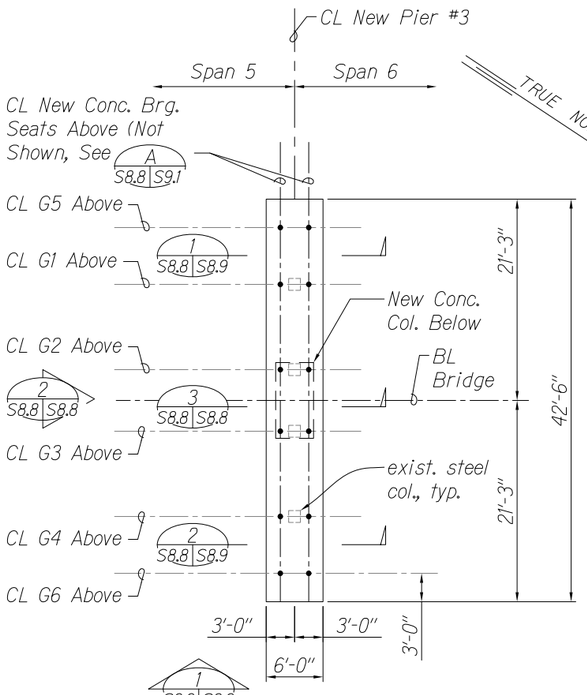
NEW PIER #1 & #2 CAP BEAM & GIRDER - DETAILS

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

Scale: 3/4" = 1'-0" Date: Oct. 20, 2011

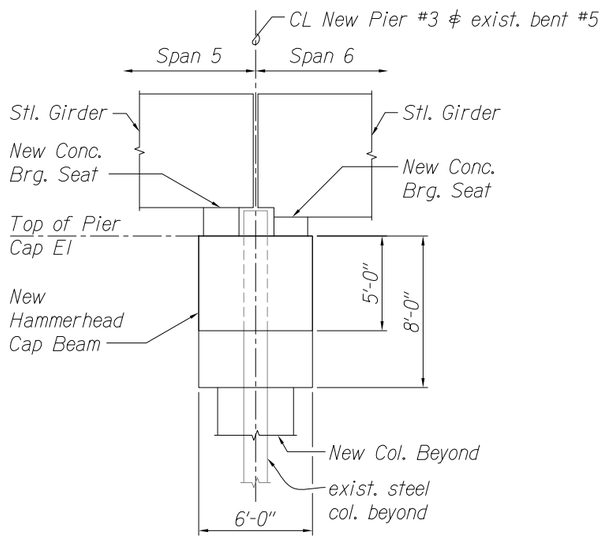
SHEET No. S8.7 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	101	135



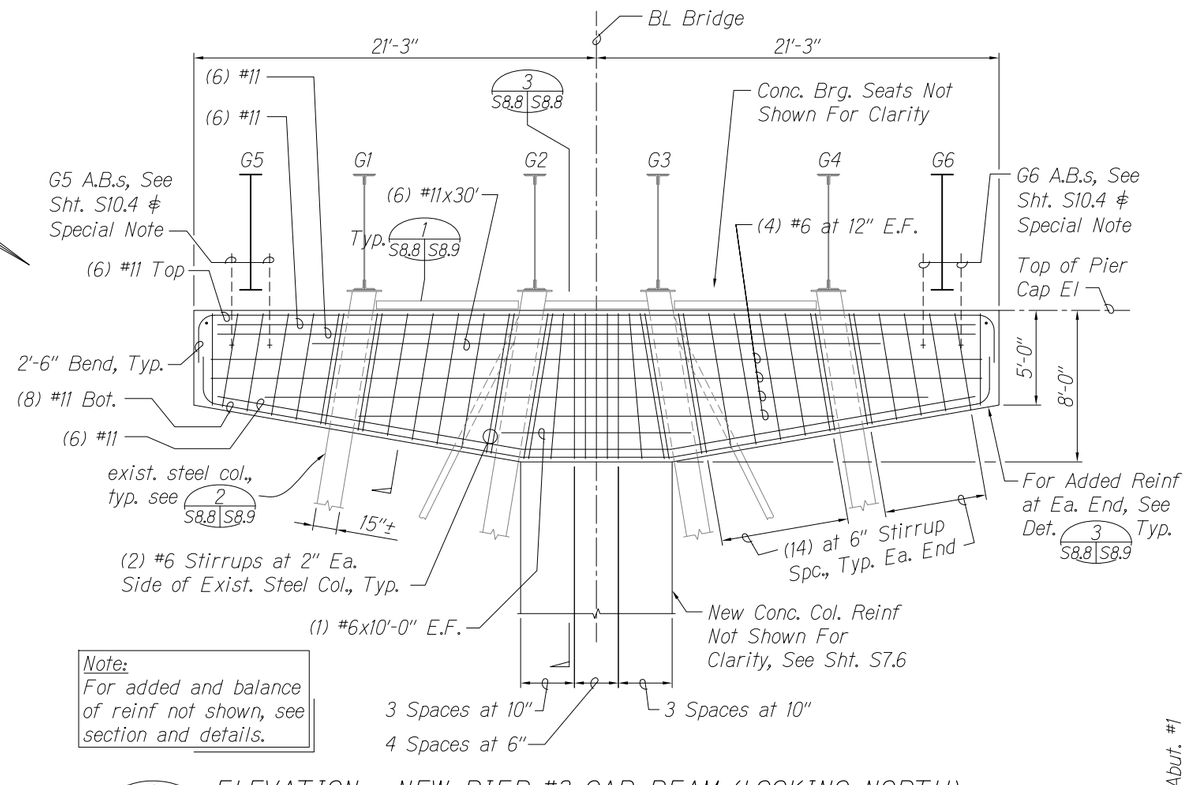
A S2.3 | S8.8 NEW PIER #3 CAP BEAM - PLAN

SCALE: 1/8" = 1'-0"



1 S8.8 | S8.8 EAST END ELEVATION

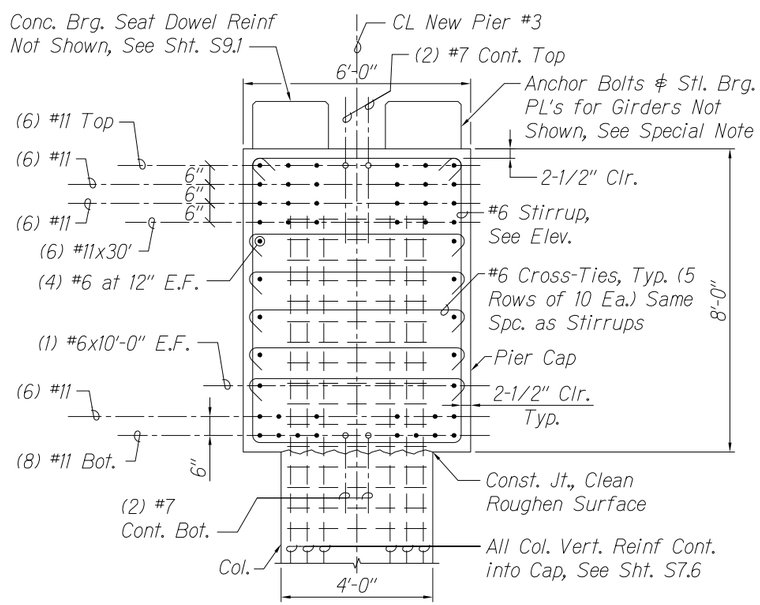
SCALE: 1/4" = 1'-0"



Note:
For added and balance of reinf not shown, see section and details.

2 S8.8 | S8.8 ELEVATION - NEW PIER #3 CAP BEAM (LOOKING NORTH)

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



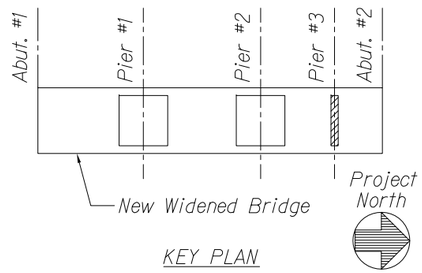
3 S8.8 | S8.8 SECTION

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

Notes:

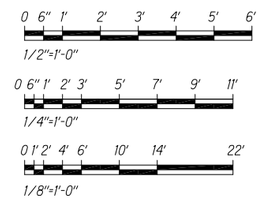
1. Portions of existing steel members crossing into new cap beam shall be blast cleaned and coated with 2 coats epoxy. See sheet S0.3.
2. Concrete coarse aggregate size shall be 3/4" maximum.
3. Concrete bearing seats shall be incidental to concrete cap beam.

Special Note:
Steel bearing plates under existing girders and all anchor bolts shall be installed prior to pouring pier cap, typical see sheets S9.1 & S10.5. Do not install double nuts on anchor bolts until concrete pier cap is cast and cured (60 days minimum).



KEY PLAN

GRAPHIC SCALES:



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.

LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

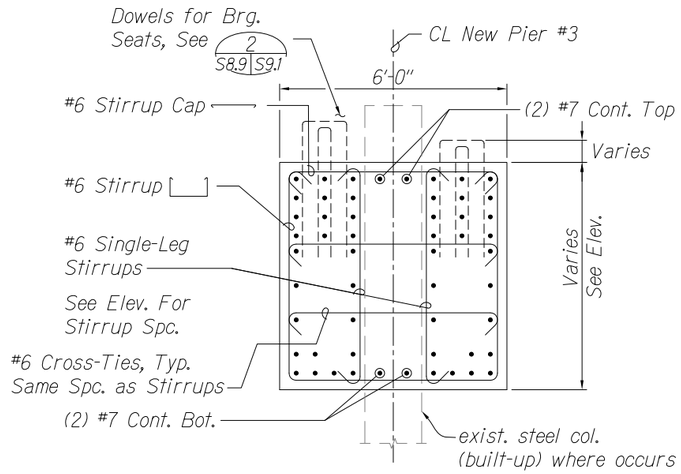
NEW PIER #3 CAP BEAM - PLAN & SECTIONS

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

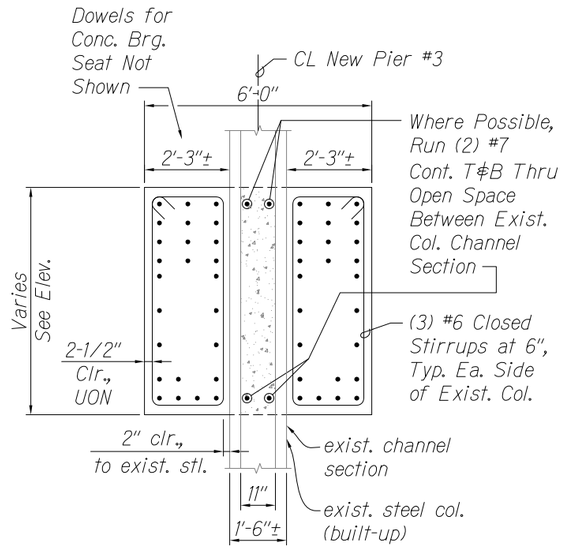
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S8.8 OF 9 SHEETS

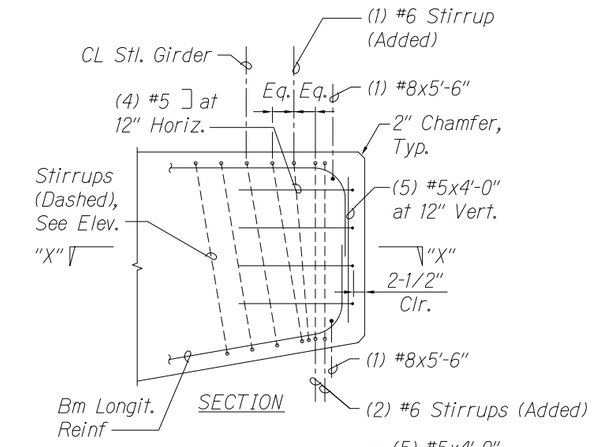
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	102	135

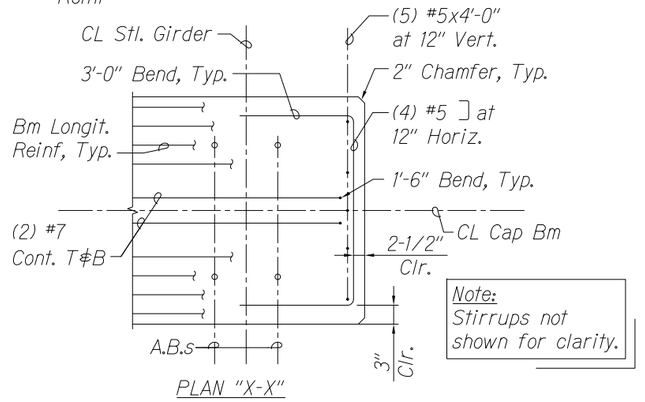


1 S8.8 S8.9 SECTION
SCALE: 1/2" = 1'-0"



2 S8.8 S8.9 SECTION AT EXISTING COLUMN
SCALE: 1/2" = 1'-0"





Note:
Stirrups not shown for clarity.

3 S8.8 S8.9 END DETAIL
SCALE: 1/2" = 1'-0"

GRAPHIC SCALES:

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

DATE
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DESIGNED BY
QUANTITIES BY
CHECKED BY
ORIGINAL PLAN
NOTEBOOK
No.

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

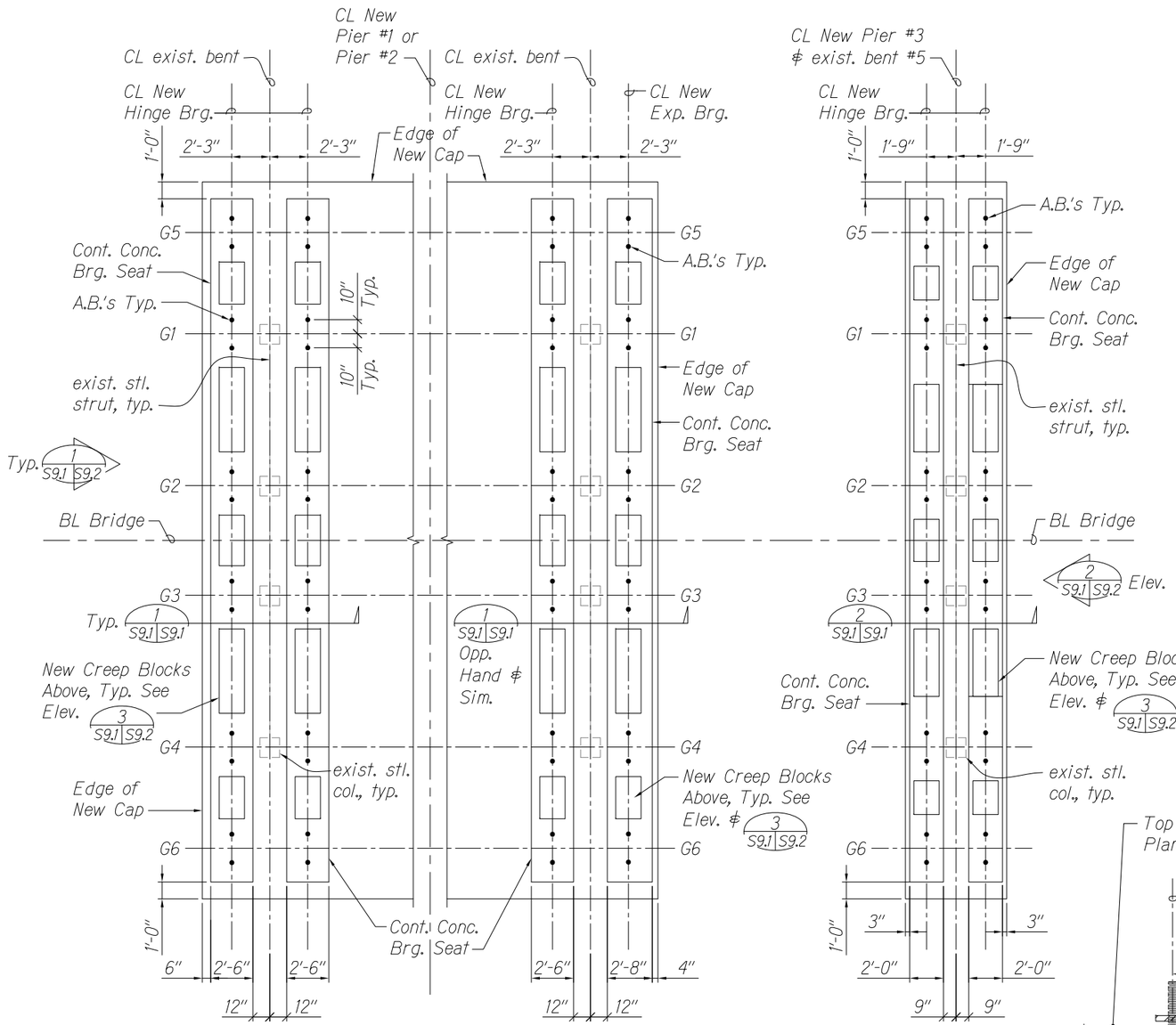
NEW PIER #3 CAP REINFORCING - SECTIONS & DETAILS

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

Scale: 1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S8.9 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	103	135



EXIST BENT #1 OR BENT #3

EXIST BENT #2 OR BENT #4

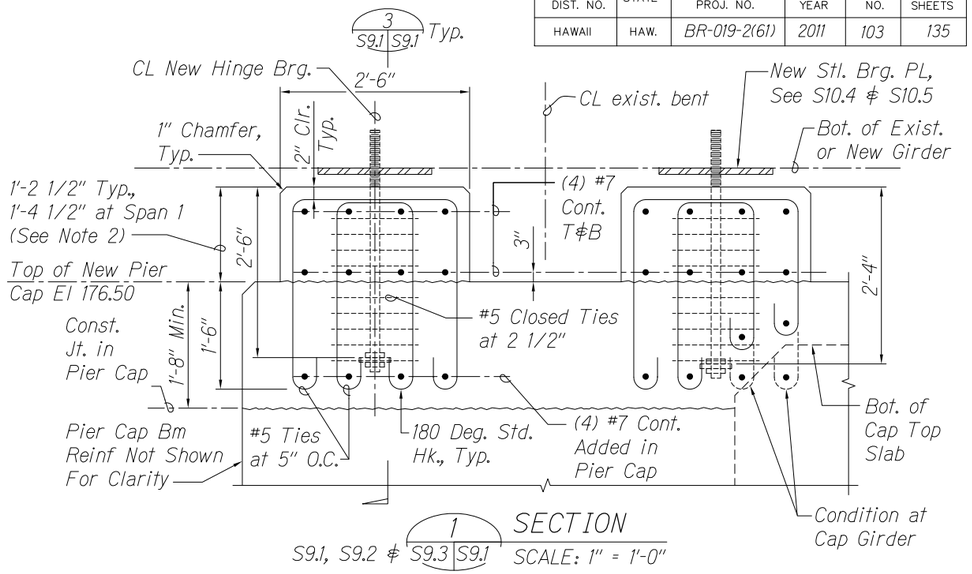
EXIST BENT #5 (NEW PIER #3)

Notes:

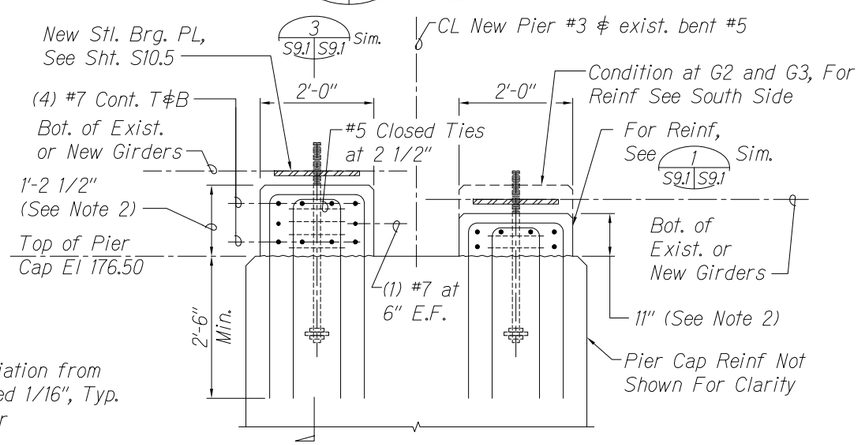
1. New steel end cross-frames above not shown for clarity. See elevation on sheet S9.2 and plan on sheet S10.2.
2. Heights of new concrete bearing seats shall be field verified with new and existing conditions prior to construction.

TRUE NORTH

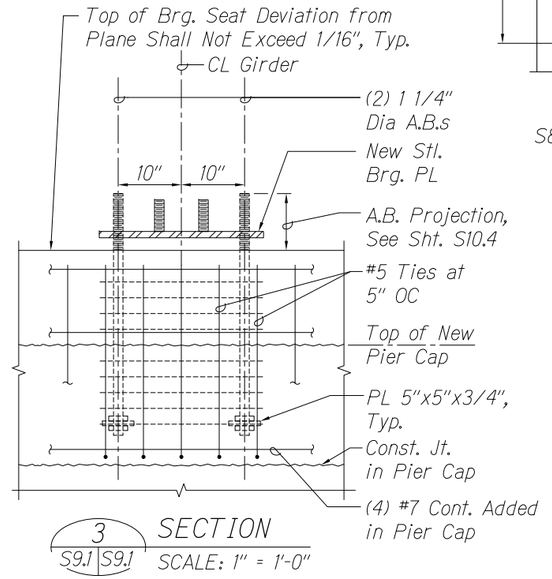
A PLAN - BEARING SEAT AT NEW PIER CAPS
S8.1, S8.2 ∉ S8.8 S9.1 SCALE: 1/4" = 1'-0"



1 S9.1, S9.2 ∉ S9.3 S9.1 SECTION
SCALE: 1" = 1'-0"

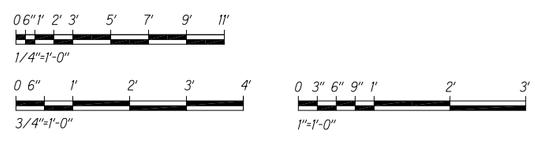


2 S8.9, S9.1 ∉ S9.2 S9.1 SECTION
SCALE: 3/4" = 1'-0"



3 S9.1 S9.1 SECTION
SCALE: 1" = 1'-0"

GRAPHIC SCALES:



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIERS - CONCRETE BEARING SEAT PLANS ∉ SECTIONS

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

Scale: As Shown Date: Oct. 20, 2011

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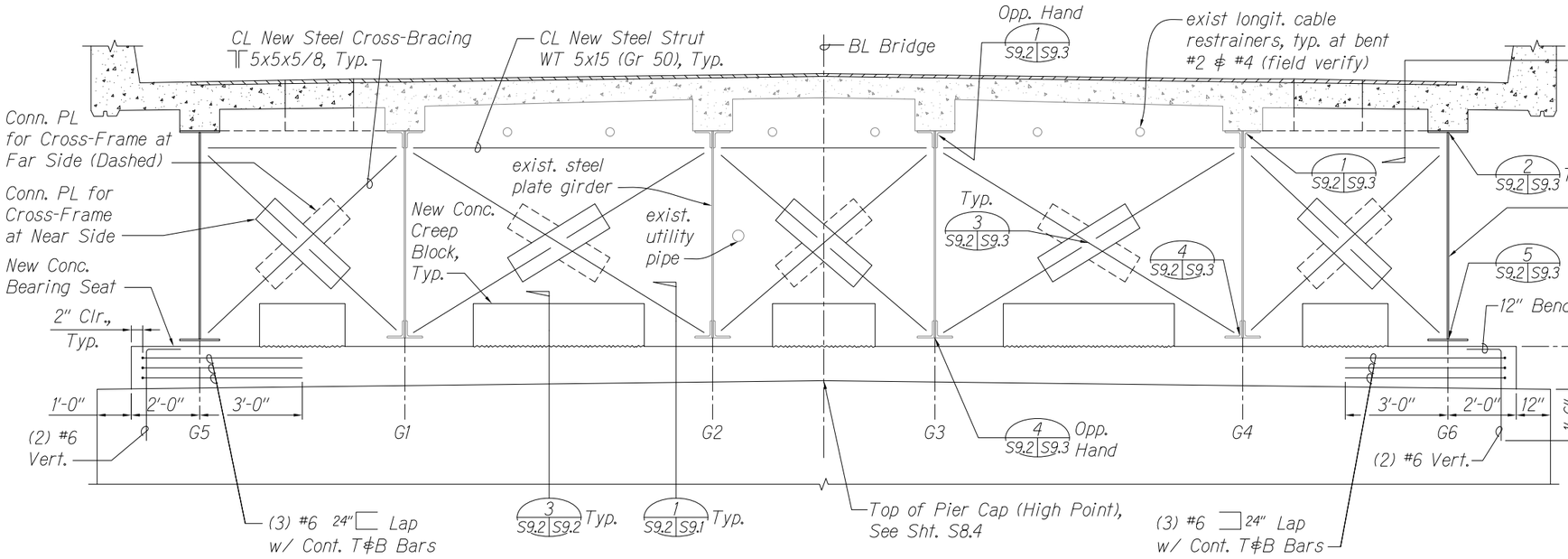
SHEET No. S9.1 OF 6 SHEETS

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

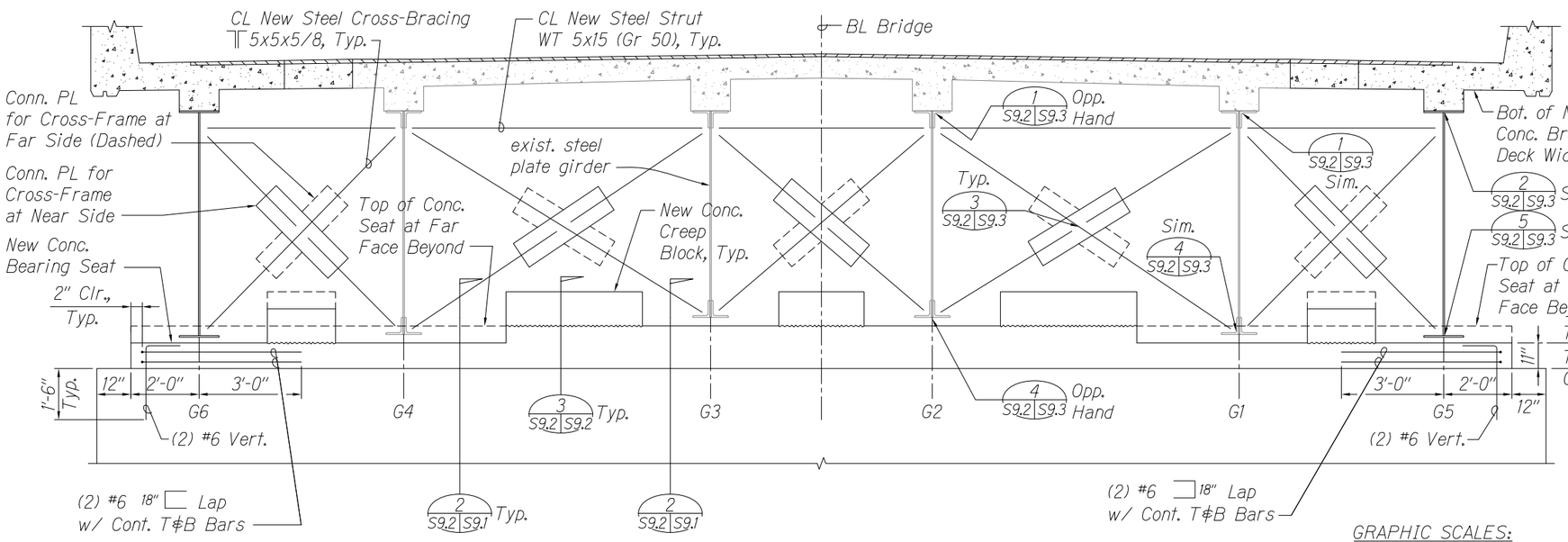
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	104	135



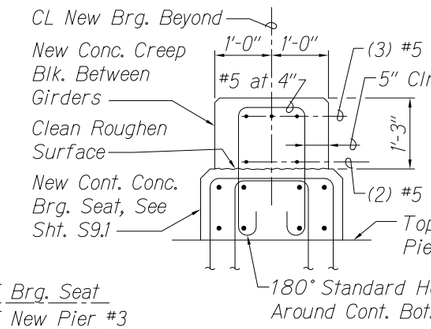
1 S9.1, S10.1 & S10.2 S9.2 ELEVATION - NEW PIER #1 & PIER #2 BEARING SEAT, CREEP BLOCK & END CROSS-FRAME (LOOKING NORTH)
SCALE: 1/2" = 1'-0"

Notes For Piers:

1. Field welding to existing steel shall not be permitted unless specifically shown or noted, see Structural Steel general notes on sheet S0.1.
2. New anchor bolts embedded in concrete pier caps shall be ASTM F1554, grade 105, hot-dip galvanized. This item shall be incidental to new steel bearing and expansion plates.
3. Cast-in anchor bolts shall be inspected by the Engineer, see sheet S0.2.
4. Concrete bearing seats and creep blocks shall be incidental to concrete in pier cap.



2 S9.1 & S10.2 S9.2 ELEVATION - NEW PIER #3 BEARING SEAT, CREEP BLOCK & END CROSS -FRAME (LOOKING SOUTH)
SCALE: 1/2" = 1'-0"



3 S9.1 & S9.2 S9.2 CREEP BLOCK SECTION
SCALE: 3/4" = 1'-0"

GRAPHIC SCALES:

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

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

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LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/12
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW PIERS - BEARING SEAT, CREEP BLOCK & END FRAME

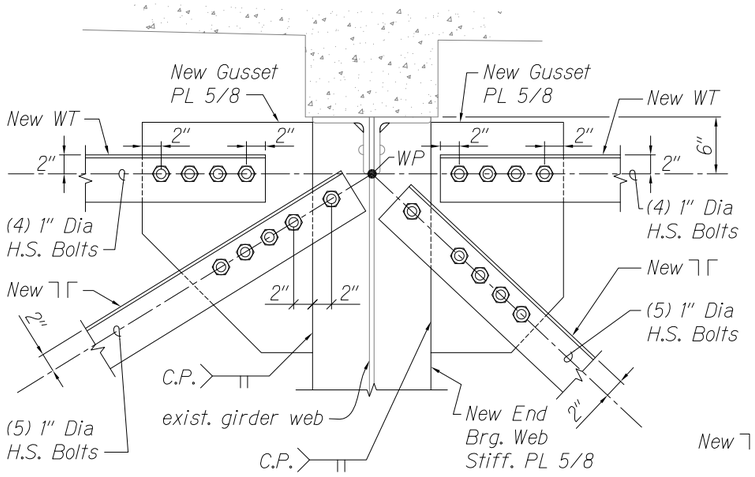
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S9.2 OF 6 SHEETS

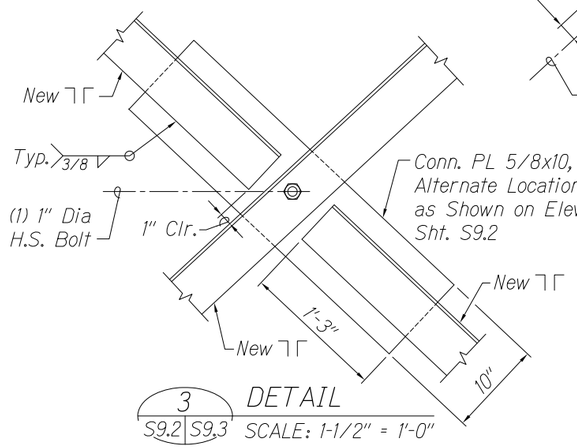
ORIGINAL PLAN | NOTEBOOK | No. | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	105	135

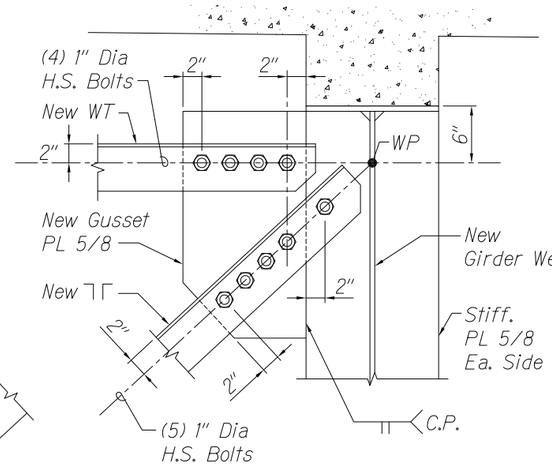


1 DETAIL
S9.2 | S9.3 SCALE: 1-1/2" = 1'-0"

Note:
All bolts shall be spaced at 3" c.c., UON



3 DETAIL
S9.2 | S9.3 SCALE: 1-1/2" = 1'-0"

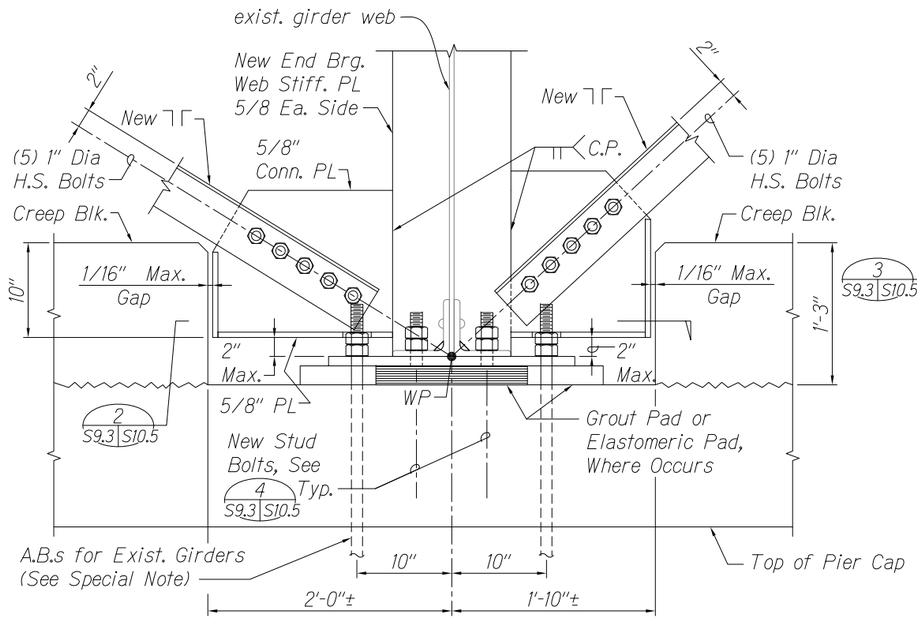


2 DETAIL
S9.2 | S9.3 SCALE: 1-1/2" = 1'-0"

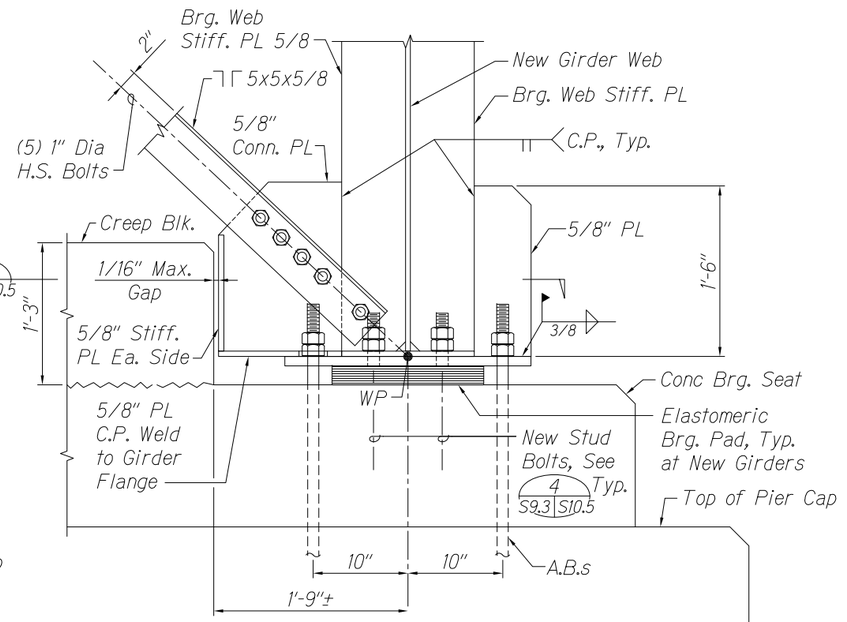
Notes:

1. For steel girder bearing plates, see notes on sheet S10.4.

Special Note:
At existing girders, do not install double nuts on anchor bolts until concrete pier cap is cast and cured (60 days minimum).



4 DETAIL
S9.2 & S10.5 | S9.3 SCALE: 1-1/2" = 1'-0"



5 DETAIL
S9.2 & S10.5 | S9.3 SCALE: 1-1/2" = 1'-0"

GRAPHIC SCALES:

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

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

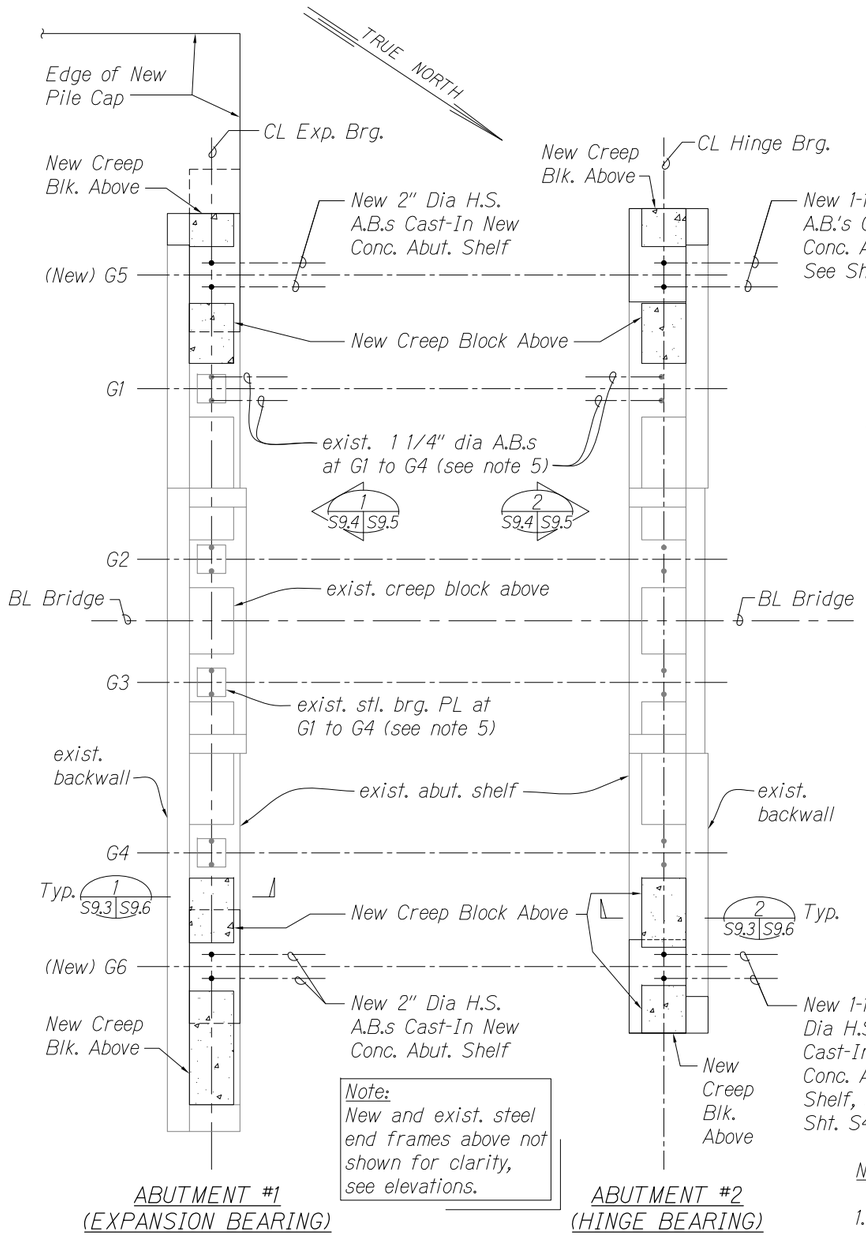
NEW PIERS - END CROSS-FRAME DETAILS

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

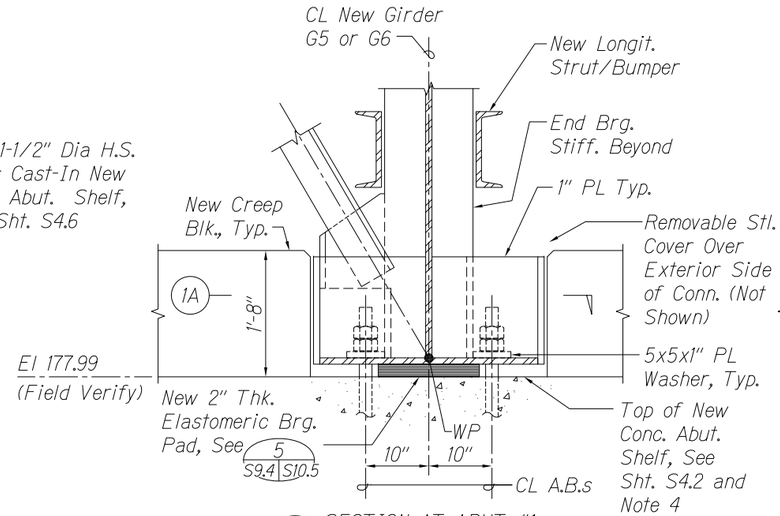
Scale: 1-1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S9.3 OF 6 SHEETS

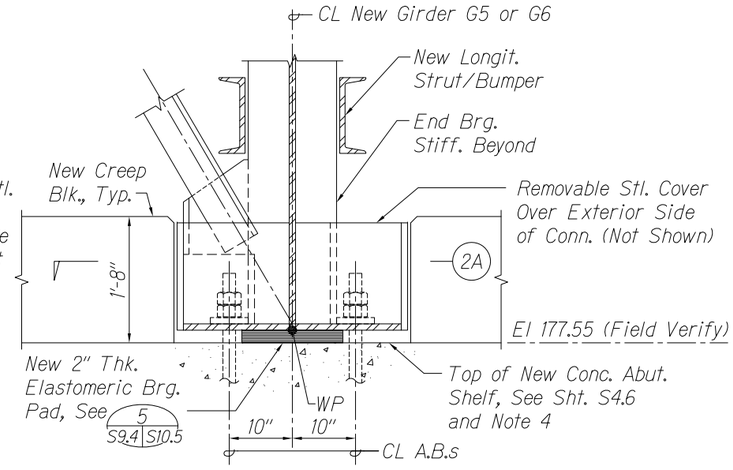
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	106	135



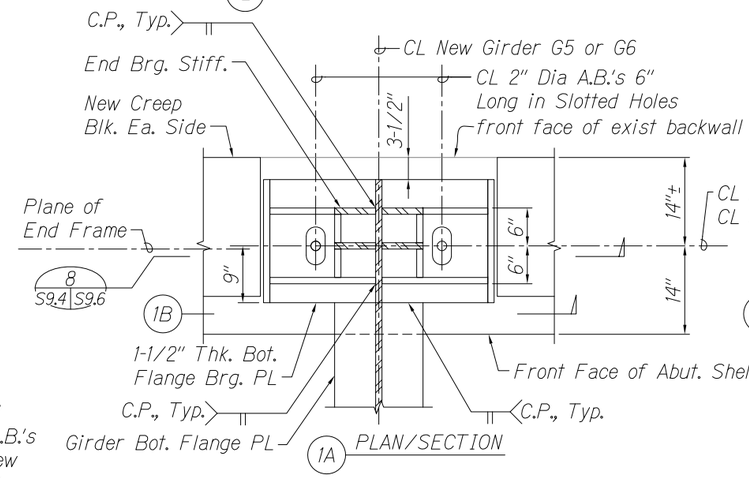
A PLAN - BEARING SEAT AT ABUTMENTS
S4.2 ℄ S4.6 S9.4 SCALE: 1/4" = 1'-0"



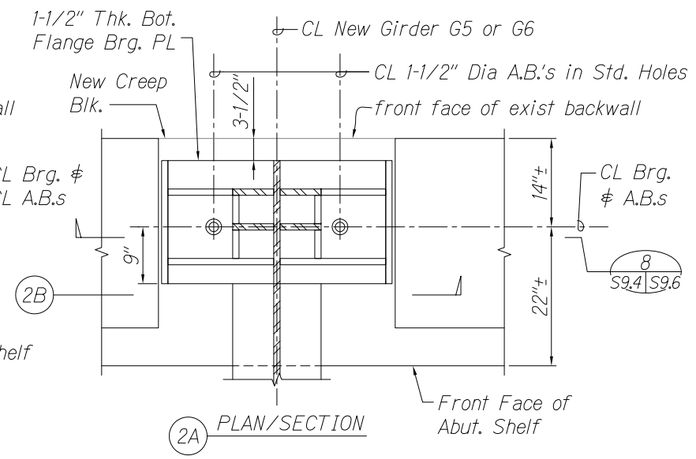
1B SECTION AT ABUT. #1



2B SECTION AT ABUT. #2



1 DETAIL - EXPANSION BEARING
S9.4 ℄ S9.6 S9.4 SCALE: 1" = 1'-0" (ABUTMENT #1)



2 DETAIL - HINGE BEARING
S9.4 ℄ S9.6 S9.4 SCALE: 1" = 1'-0" (ABUTMENT #2)

Notes For Abutments:

1. Field welding to existing steel shall not be permitted unless specifically shown or noted, see Structural Steel general notes on sheet S0.1.
2. New high strength anchor bolts cast in concrete abutments shall be ASTM F 1554 (grade 105), hot-dip galvanized. This item shall be incidental to new steel girders. Anchor bolts shall be snug-tight, do not torque.
3. Cast-in anchor bolts shall be inspected by the Engineer, see sheet S0.2.
4. Concrete abutment shelf bearing area deviation from plane shall not exceed 1/16-inch.
5. Existing steel bearing plates and existing anchor bolts shall be cleaned and painted. See Special Provisions Section 501 and Section 694.

GRAPHIC SCALES:

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

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

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

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HAWAII, U.S.A.
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

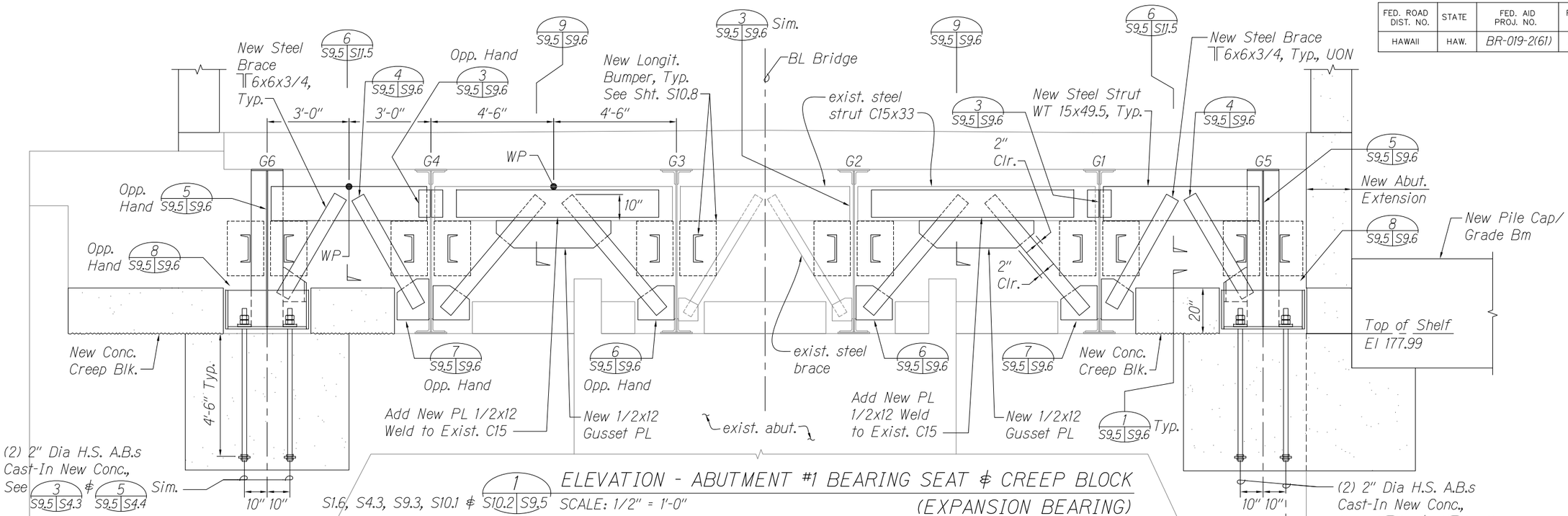
ABUTMENT - NEW CONCRETE BEARING SEAT PLANS & SECTIONS

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

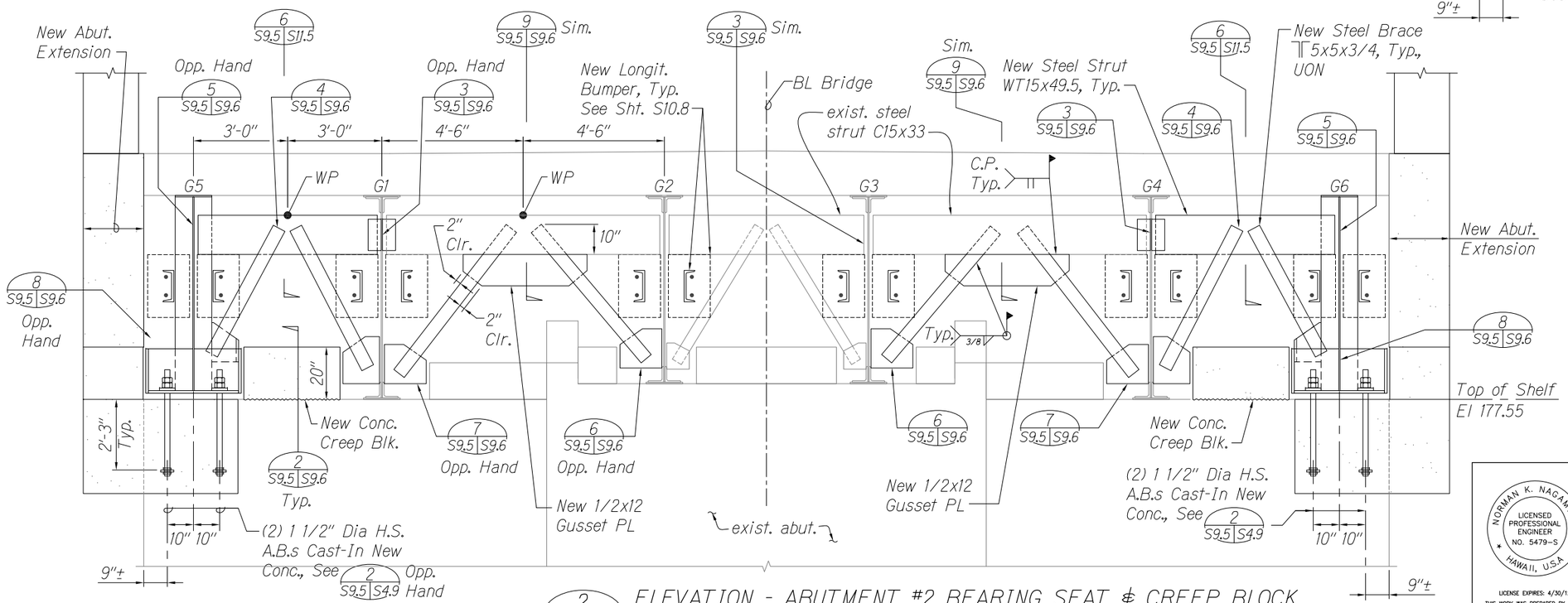
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S9.4 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	107	135



1 S1.6, S4.3, S9.3, S10.1 & S10.2 S9.5 **ELEVATION - ABUTMENT #1 BEARING SEAT & CREEP BLOCK (EXPANSION BEARING)** SCALE: 1/2" = 1'-0"



2 S1.8, S4.7, S9.3, S10.1 & S10.2 S9.5 **ELEVATION - ABUTMENT #2 BEARING SEAT & CREEP BLOCK (HINGE BEARING)** SCALE: 1/2" = 1'-0"

GRAPHIC SCALES:

0 6" 1' 2' 3' 4' 5' 6'

1/2"=1'-0"

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

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

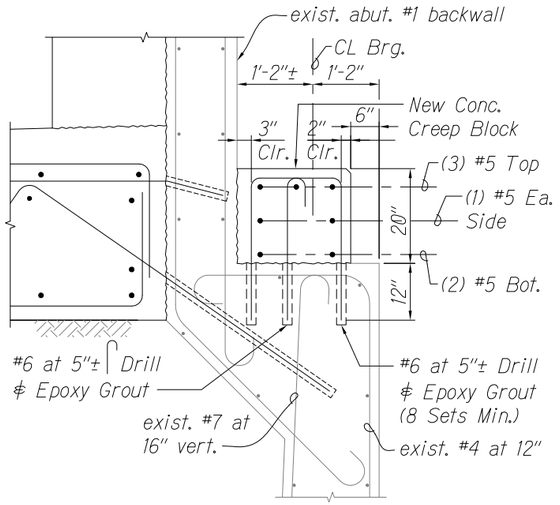
ABUTMENT - BEARING SEAT & CREEP BLOCK DETAILS

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

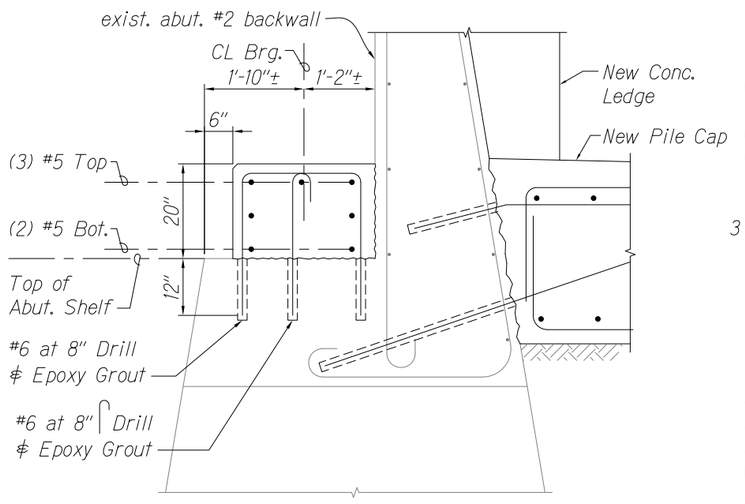
Scale: 1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S9.5 OF 6 SHEETS

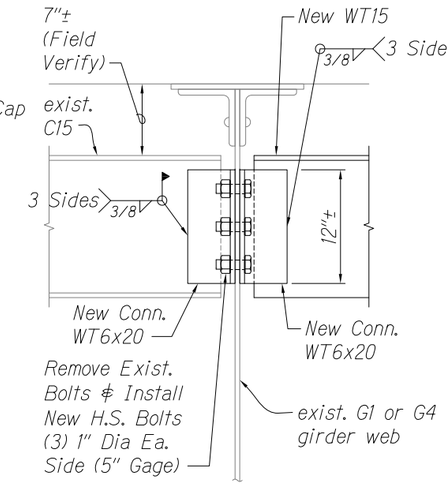
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	108	135



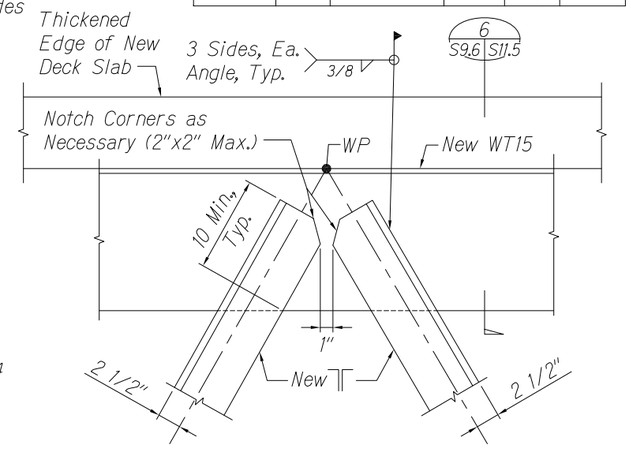
1 SECTION
S9.3, S9.5 & S9.6 SCALE: 3/4" = 1'-0"



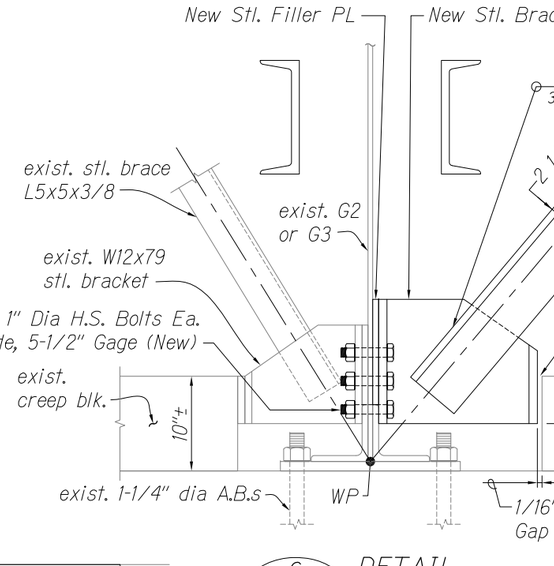
2 SECTION
S9.3 & S9.5 S9.6 SCALE: 3/4" = 1'-0"



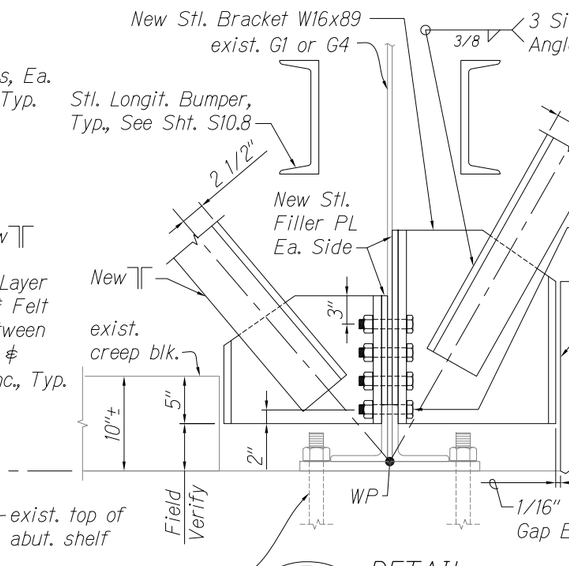
3 DETAIL
S9.5 S9.6 SCALE: 1 1/2" = 1'-0"



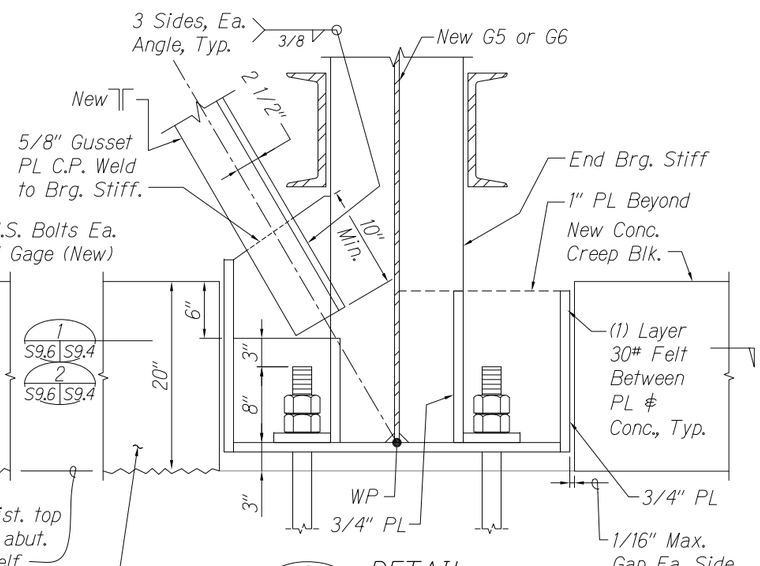
4 DETAIL
S9.5 S9.6 SCALE: 1 1/2" = 1'-0"



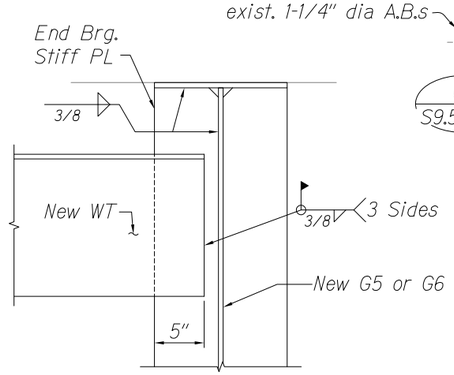
6 DETAIL
S9.5 S9.6 SCALE: 1 1/2" = 1'-0"



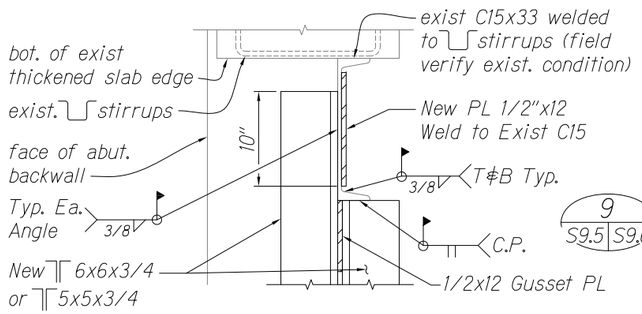
7 DETAIL
S9.5 S9.6 SCALE: 1 1/2" = 1'-0"



8 DETAIL
S9.4, S9.5 & S10.3 S9.6 SCALE: 1 1/2" = 1'-0"



5 DETAIL
S9.5 S9.6 SCALE: 1 1/2" = 1'-0"



9 SECTION
S9.5 S9.6 SCALE: 1 1/2" = 1'-0"

GRAPHIC SCALES:

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

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

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
LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

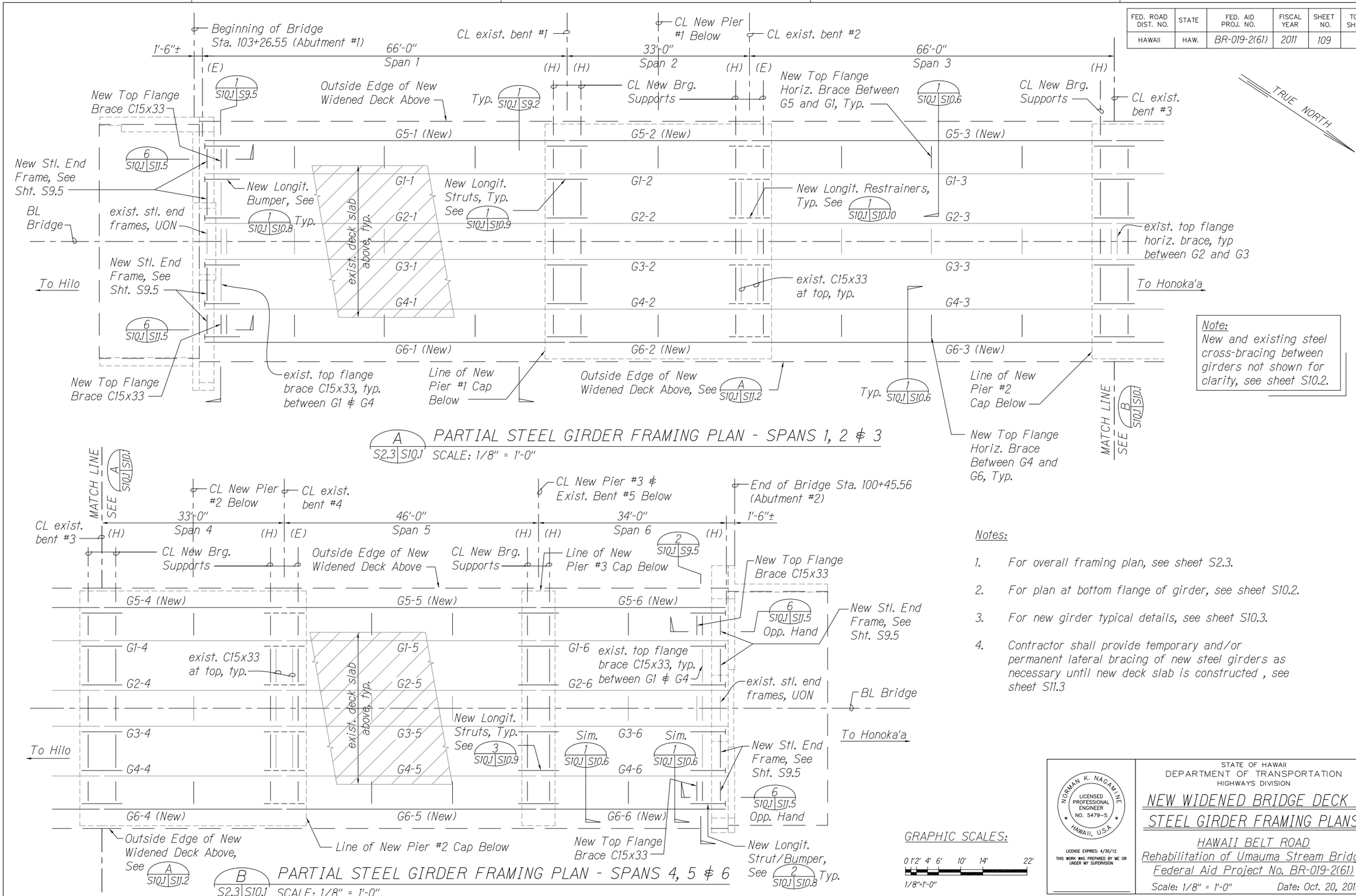
ABUTMENT - BEARING SEAT, CREEP BLOCK & END FRAME DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S9.6 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	109	135



A S2.3 | S10.1 PARTIAL STEEL GIRDER FRAMING PLAN - SPANS 1, 2 & 3
SCALE: 1/8" = 1'-0"

B S2.3 | S10.1 PARTIAL STEEL GIRDER FRAMING PLAN - SPANS 4, 5 & 6
SCALE: 1/8" = 1'-0"

Note:
New and existing steel cross-bracing between girders not shown for clarity, see sheet S10.2.

Notes:

1. For overall framing plan, see sheet S2.3.
2. For plan at bottom flange of girder, see sheet S10.2.
3. For new girder typical details, see sheet S10.3.
4. Contractor shall provide temporary and/or permanent lateral bracing of new steel girders as necessary until new deck slab is constructed , see sheet S11.3

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

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HAWAII, U.S.A.
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NEW WIDENED BRIDGE DECK - STEEL GIRDER FRAMING PLANS

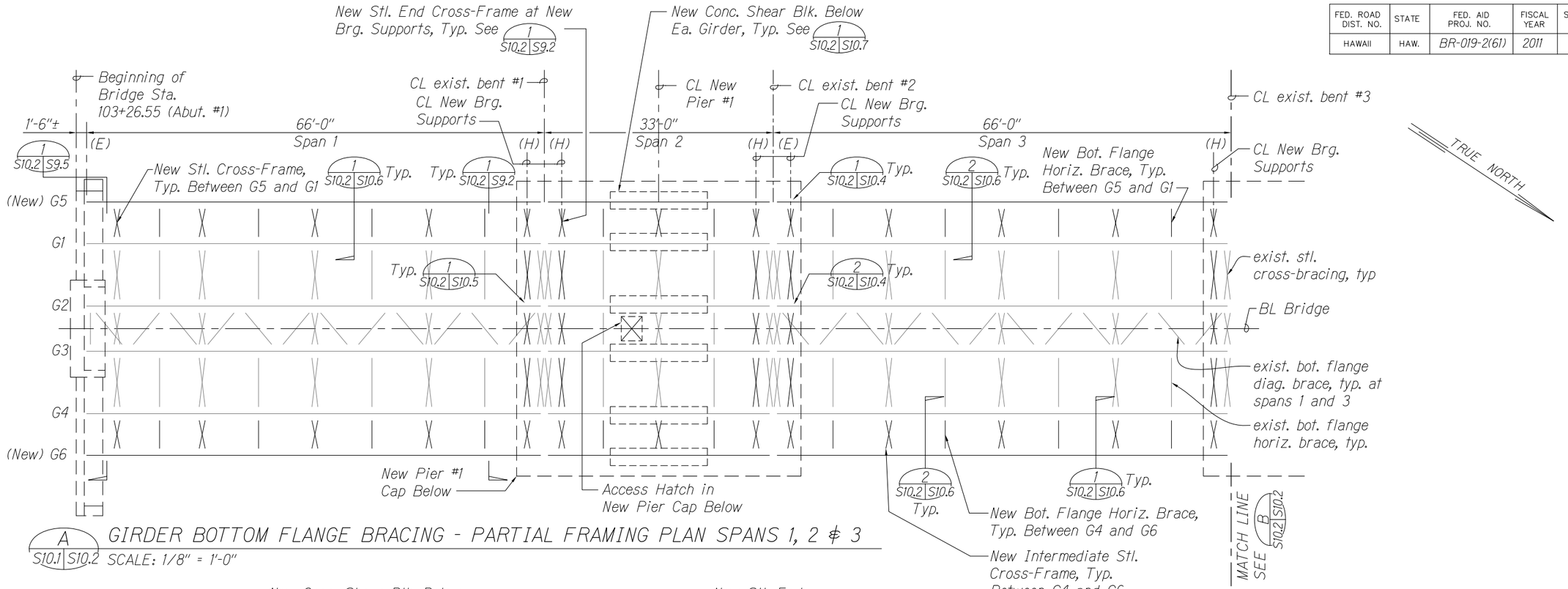
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

SHEET No. S10.1 OF 10 SHEETS

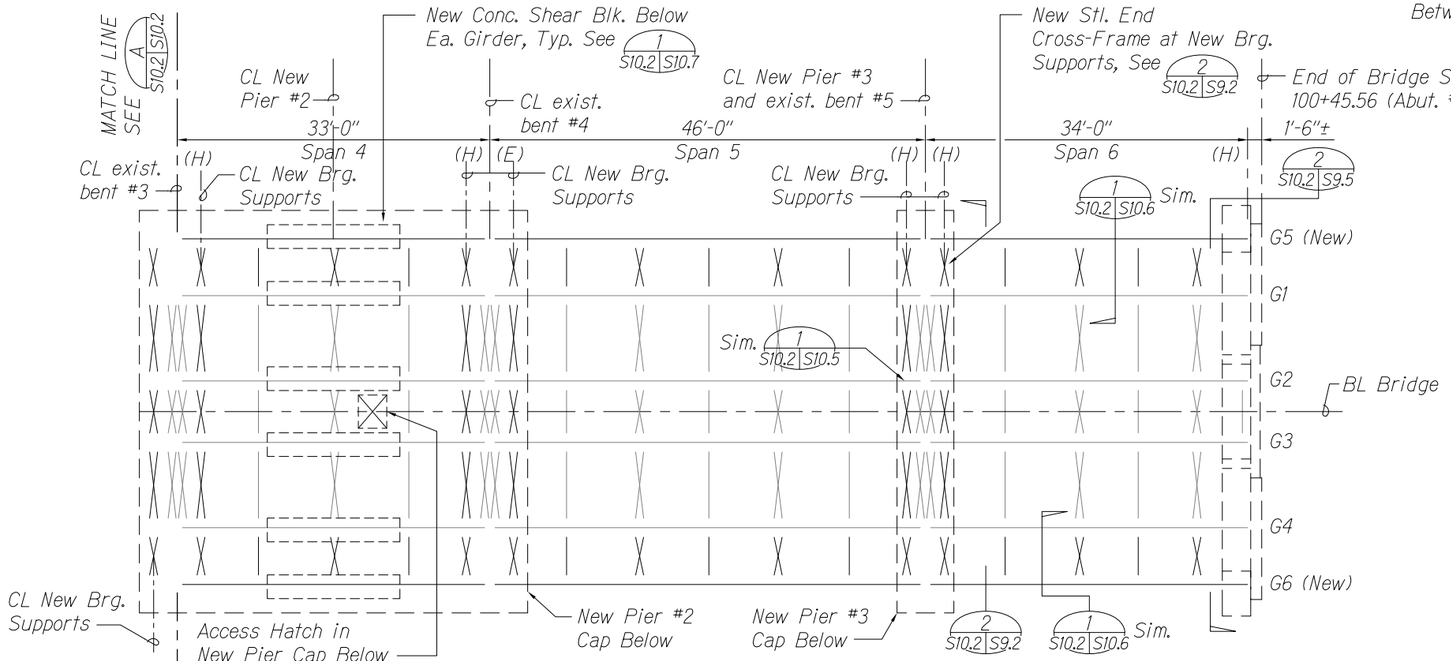
ORIGINAL PLAN | NOTEBOOK | No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	110	135



A S10.1 S10.2 GIRDER BOTTOM FLANGE BRACING - PARTIAL FRAMING PLAN SPANS 1, 2 & 3

SCALE: 1/8" = 1'-0"



B S10.1 S10.2 GIRDER BOTTOM FLANGE BRACING - PARTIAL FRAMING PLAN SPANS 4, 5 & 6

SCALE: 1/8" = 1'-0"

Notes:

1. For plan at top flange of girder, see sheet S10.1.
2. For girder bearing details, see sheet S10.4 and S10.5.
3. For intermediate cross-frame details, see sheet S10.6.
4. For end cross-frame details, see sheet S9.2 and S9.3.
5. Contractor shall provide temporary and/or permanent lateral bracing of new steel girders as necessary until new deck slab is constructed, see sheet S11.3.

GRAPHIC SCALES:

0 1'2' 4' 6' 10' 14' 22'

1/8"=1'-0"

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

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

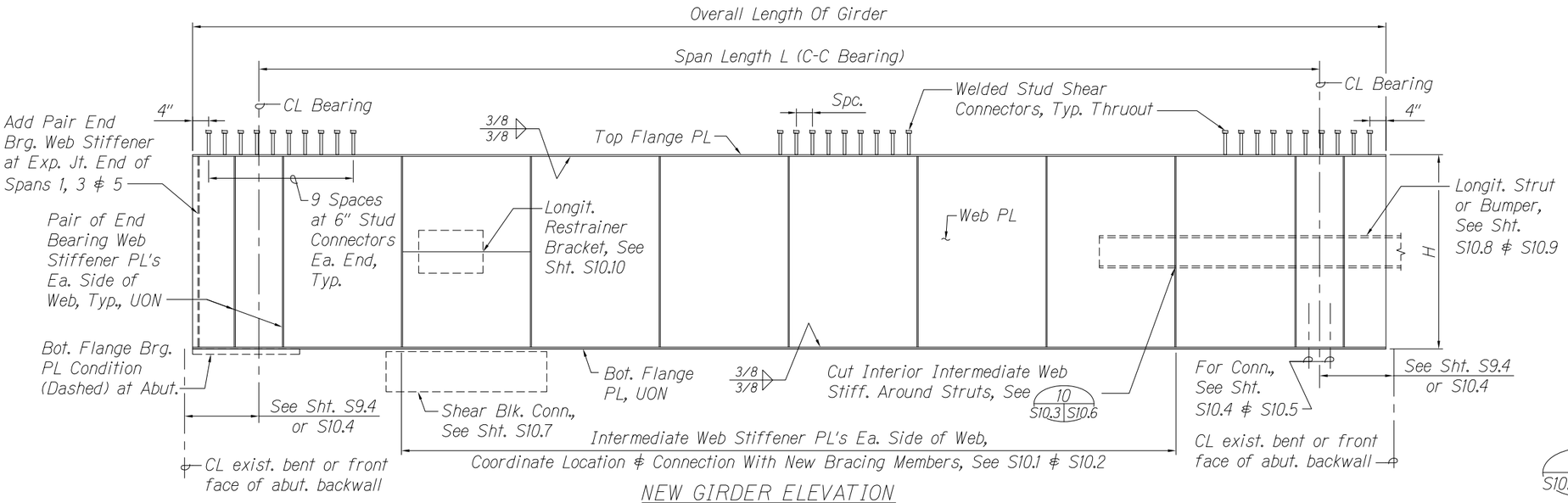
NEW WIDENED BRIDGE DECK - BOTTOM FLANGE BRACING FRAMING PLANS

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

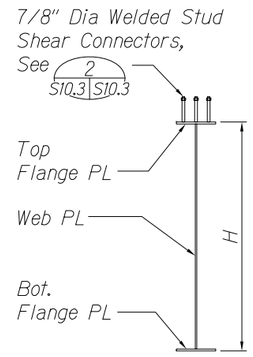
Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

SHEET No. S10.2 OF 10 SHEETS

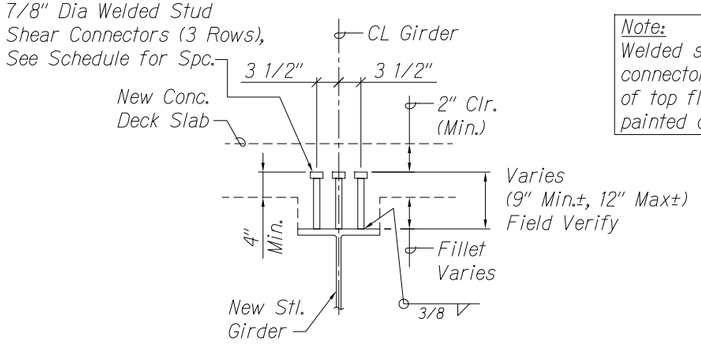
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	111	135



NEW GIRDER ELEVATION

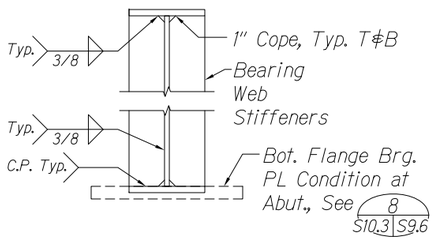


1 S10.3 S10.3 NEW STEEL GIRDER SECTION
SCALE: 1/2"=1'-0"

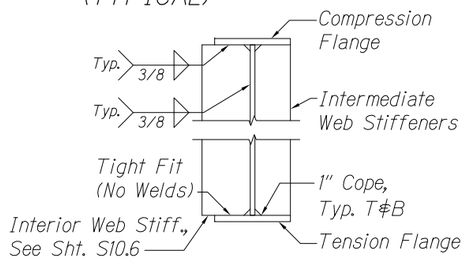


Note:
Welded stud shear connectors and top surface of top flange shall not be painted or zinc coated.

2 S10.3 S10.3 DETAIL - WELDED STUD SHEAR CONNECTORS (TYPICAL)
SCALE: 1" = 1'-0"



3 S10.3 S10.3 DETAIL - END BEARING WEB STIFFENER
SCALE: 1" = 1'-0" (TYPICAL, UON)



4 S10.3 S10.3 DETAIL - INTERMEDIATE WEB STIFFENER
SCALE: 1" = 1'-0" (TYPICAL)

New Steel Girder Schedule

Girder No.	Span No.	Span Length L	Overall Depth H (Inches)	Flange PL's Top & Bot.	Web Plate Thk. (Inches)	Intermediate Web Stiff Plates Each Side		End Brg Web Stiff PL Ea. Side Thk.	Welded Stud Shear Spacing, UON	Midspan Camber	Remarks
						Thk. (Inches)	Max Spacing				
G5-1 & G6-1	1	62'-9"	70"	13"x9/16"	1/2"	3/8"	4'-0"	5/8"	12"	1/2"	
G5-2 & G6-2	2	28'-6"	72"	13"x9/16"	1/2"	3/8"	4'-0"	5/8"	6"	0"	
G5-3 & G6-3	3	61'-6"	73"	13"x9/16"	1/2"	3/8"	4'-0"	5/8"	12"	1/2"	
G5-4 & G6-4	4	28'-6"	72"	13"x9/16"	1/2"	3/8"	4'-0"	5/8"	6"	0"	
G5-5 & G6-5	5	42'-0"	72"	13"x9/16"	1/2"	3/8"	4'-0"	5/8"	6"	1/4"	
G5-6 & G6-6	6	31'-3"	76"	13"x5/8"	9/16"	3/8"	4'-0"	5/8"	6"	0"	

Notes:

1. Contractor shall field verify all dimensions, existing conditions, span lengths, overall depths, connection details, etc, prior to fabrication or ordering of materials.
2. Camber values indicated do not include effect of girder self-weight.
3. All web stiffeners shall be full depth.
4. Unless otherwise indicated, all plate girder steel shall be shop primed and painted. See steel notes on sheet S0.1. This item shall be incidental to Section 501 "Steel Structures" and will not be paid for separately.
5. All plate girder steel, including web stiffeners, shall be ASTM A709, grade 50.

GRAPHIC SCALES:

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

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

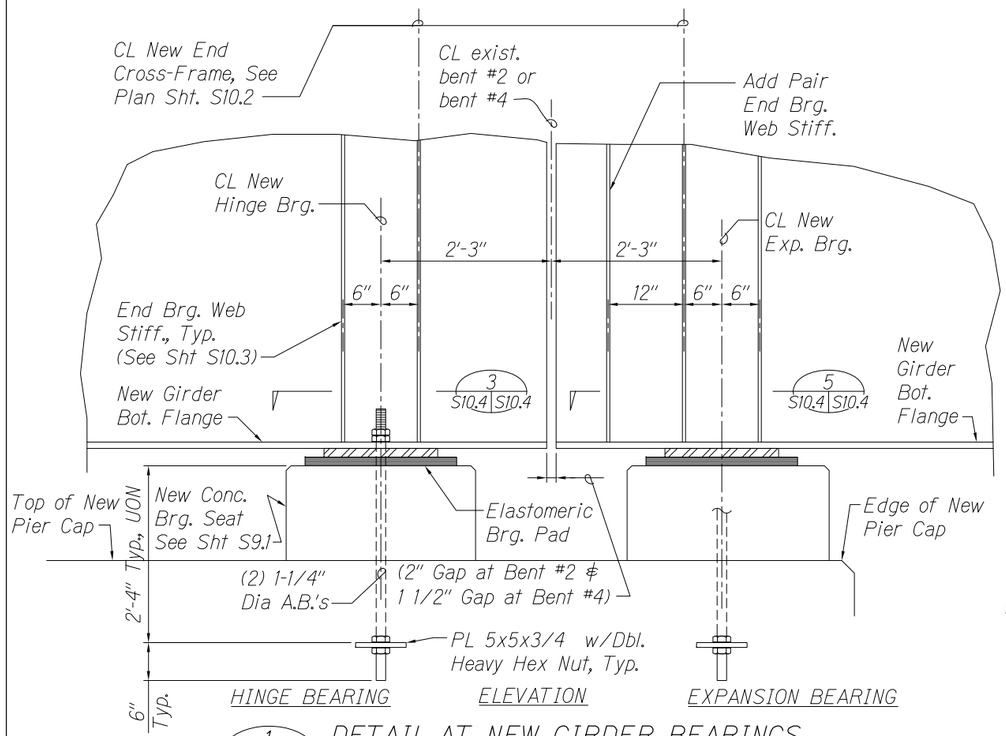
NEW STEEL GIRDER TYPICAL DETAILS & SCHEDULE

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

Scale: As Shown Date: Oct. 20, 2011

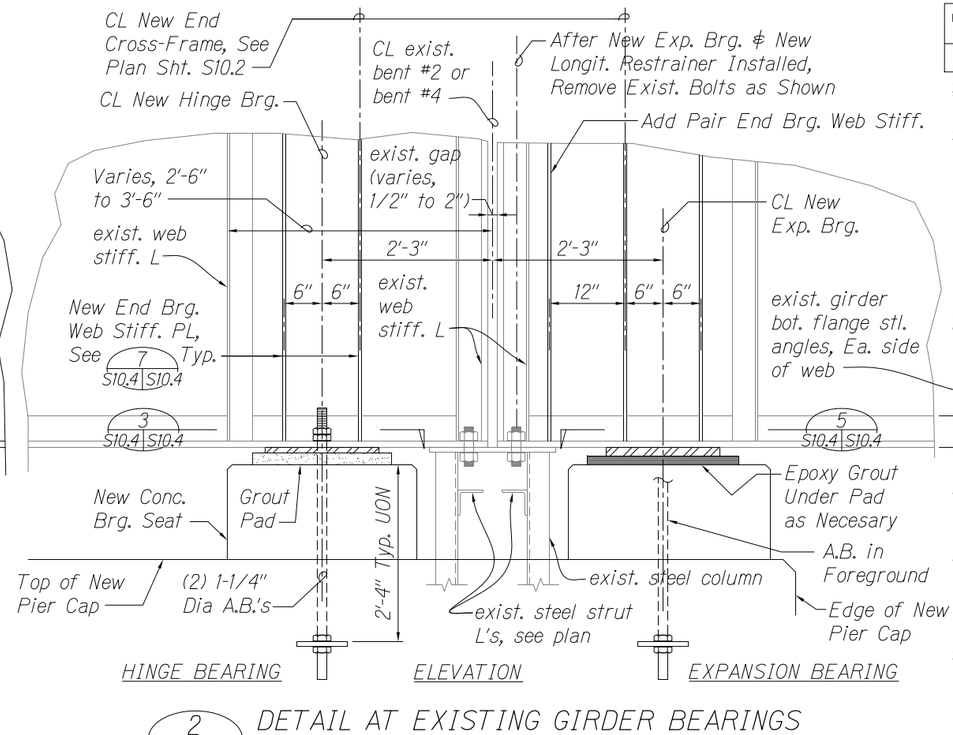
SHEET No. S10.3 OF 10 SHEETS

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



1 S10.2 | S10.4 DETAIL AT NEW GIRDER BEARINGS

SCALE: 1"=1'-0"



2 S10.2 & S10.4 | S10.4 DETAIL AT EXISTING GIRDER BEARINGS

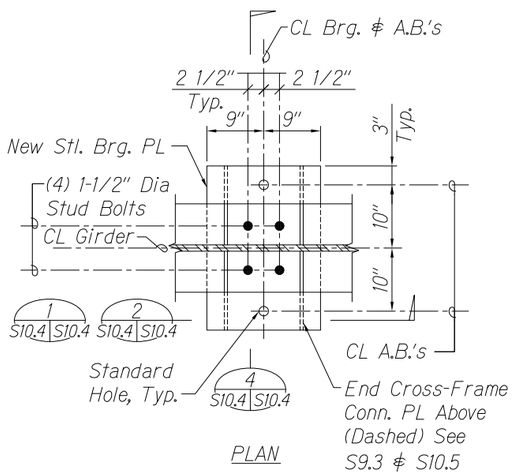
SCALE: 1"=1'-0"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	112	135

Notes:

1. At existing girders, new bearing plates, sole plates and anchor bolts shall be installed prior to pouring concrete bearing seats and top slab of pier caps. Do not install nuts until concrete is cast and cured (60 days minimum).
2. All field welds shall be performed slowly to avoid excessive heat build-up. See Standard Specs and Special Provisions for other requirements. Grind all welds smooth and touchup paint.
3. New steel on exist. girder shall be incidental to Item 501.2000.
4. New elastomeric bearing pads under new and existing girders shall be incidental to Item 501.1000.
5. Grout pad under existing steel girder bearing plates shall conform to Standard Spec Section 712.04(A) "Non-Shrink Grout". Grout pad shall be incidental to bearing and expansion plates.

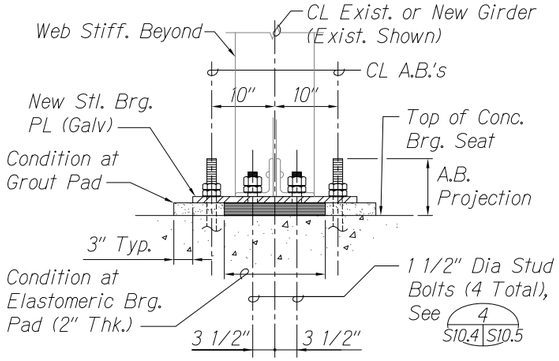
Note:
End cross-frame not shown for clarity



PLAN

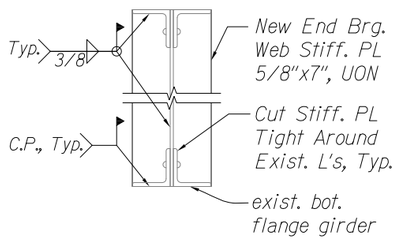
3 S10.4 | S10.4 DETAIL - HINGE BEARING

SCALE: 1"=1'-0"



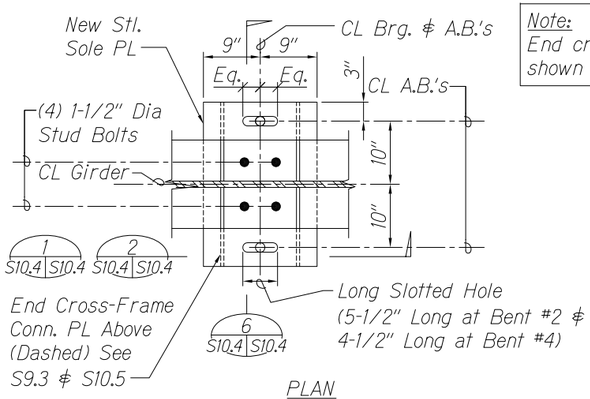
4 S10.4 | S10.4 SECTION - HINGE BEARING

SCALE: 1"=1'-0"



7 S10.4 | S10.4 SECTION

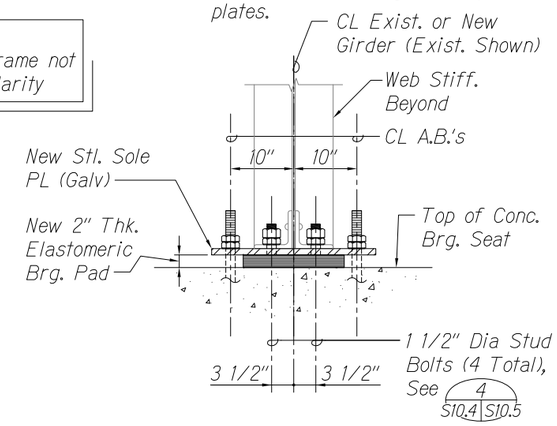
SCALE: 1"=1'-0"



PLAN

5 S10.4 | S10.4 DETAIL - EXPANSION BEARING

SCALE: 1"=1'-0"



6 S10.4 | S10.4 SECTION - EXPANSION BEARING

SCALE: 1"=1'-0"

GRAPHIC SCALES:

0 1' 2' 3'

1"=1'-0"

ORIGINAL PLAN | NOTEBOOK | No. | DATE

SURVEY PLOTTED BY
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TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

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LICENSED PROFESSIONAL ENGINEER
No. 5479-S
HAWAII, U.S.A.

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

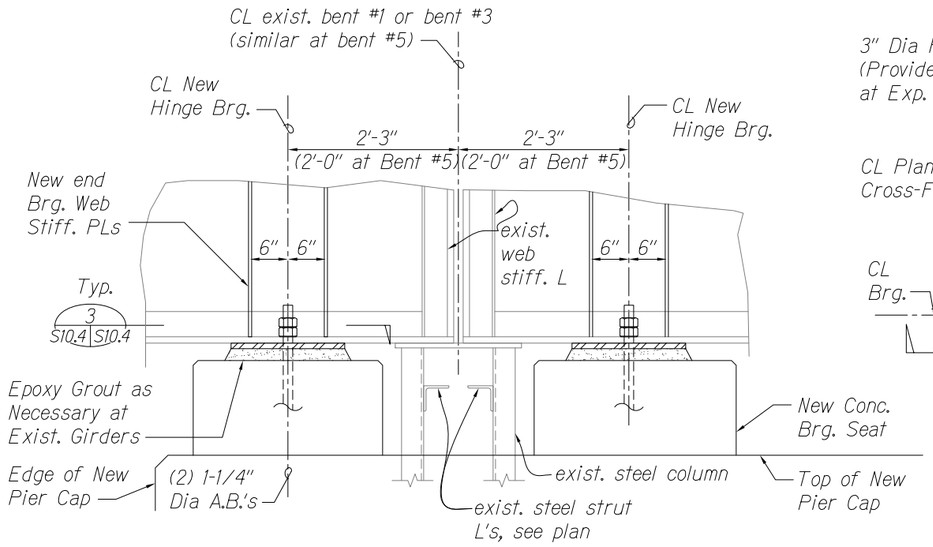
STEEL GIRDER BEARING DETAILS AT BENT #2 & #4

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

Scale: 1" = 1'-0" Date: Oct. 20, 2011

SHEET No. S10.4 OF 10 SHEETS

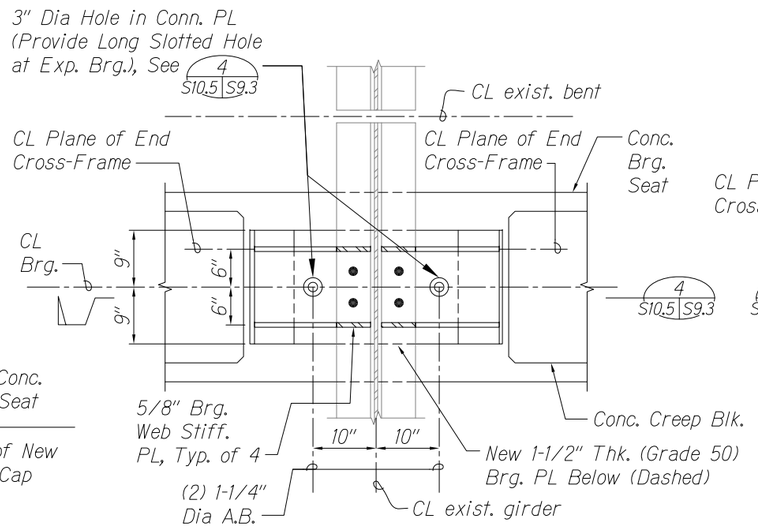
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	113	135



ELEVATION

1 S10.2 S10.5 DETAIL - GIRDER BEARING AT BENT #1 & #3 (SIMILAR AT BENT #5)

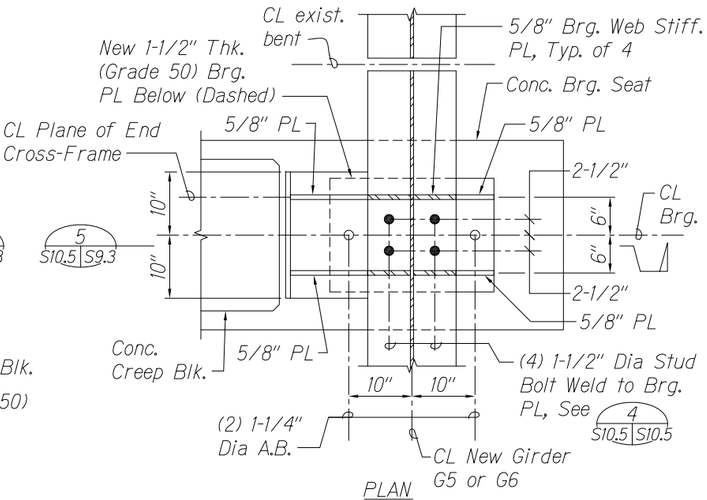
SCALE: 1"=1'-0"



PLAN

2 S9.3 S10.5 DETAIL

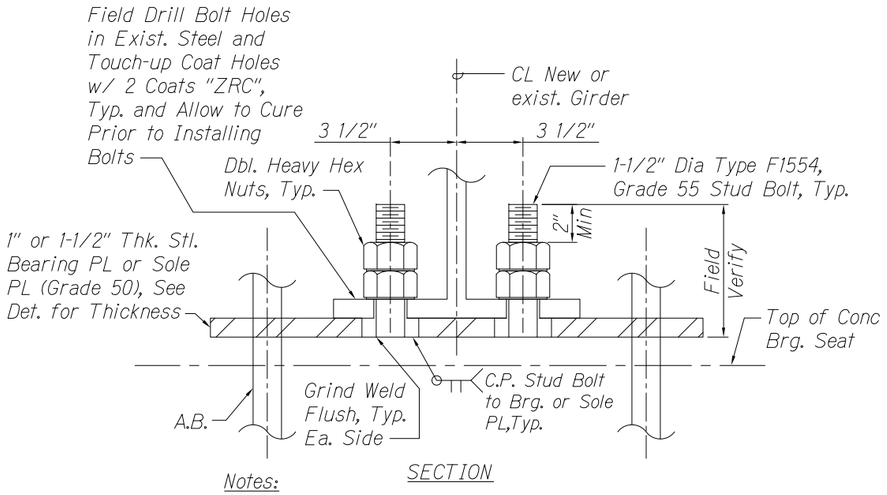
SCALE: 1"=1'-0"



PLAN

3 S9.3 S10.5 DETAIL

SCALE: 1"=1'-0"



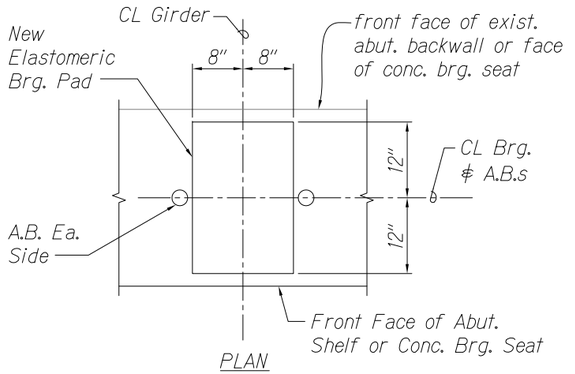
SECTION

Notes:

1. Hot-dip galvanize steel bearing plates, sole plates and stud bolts after fabrication.
2. Stud bolts, nuts and plate washers, and welding shall be incidental to steel bearing plates and will not be paid for separately.

4 S9.3, S10.4, S10.5 S10.5 STUD BOLT DETAIL

SCALE: 3" = 1'-0"



PLAN

Notes:

1. Elastomeric bearing pads shall conform to Standard Specs Section 712.09(C) "Elastomeric Bearing Pad".
2. For thickness of bearing pad, see sheet S9.4 and S10.4.
3. Bottom of bearing pads shall be secured with adhesive to concrete abutment shelf and concrete bearing seat, see Standard Specs.
4. Elastomeric bearing pads under new and existing steel girders shall be incidental to "Bearing and Expansion Plates".

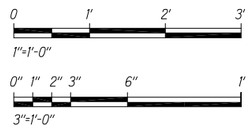
5 S9.4 & S10.4 S10.5 DETAIL - ELASTOMERIC BEARING PAD

SCALE: 1"=1'-0"

Note:

Refer to notes on sheet. S10.4.

GRAPHIC SCALES:



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

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HAWAII, U.S.A

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STEEL GIRDER BEARING DETAILS AT BENT #1, #3 & #5

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

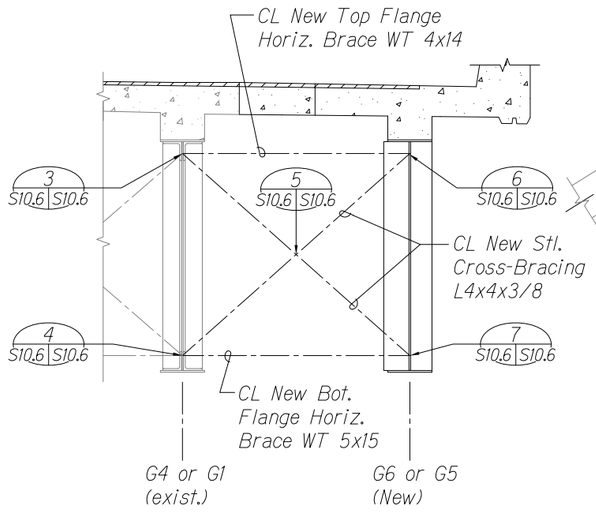
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S10.5 OF 10 SHEETS

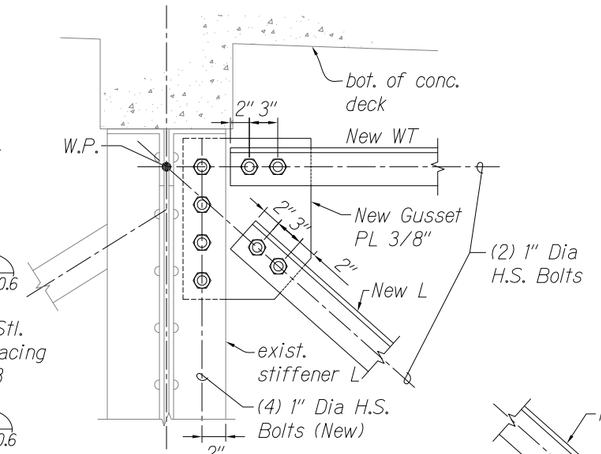
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	114	135

Note:

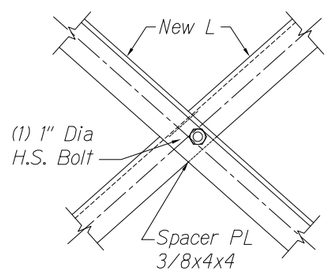
1. Field drill bolt holes in existing steel and touch-up coat holes with 2 coats "ZRC", and allow to cure prior to installing new bolts.



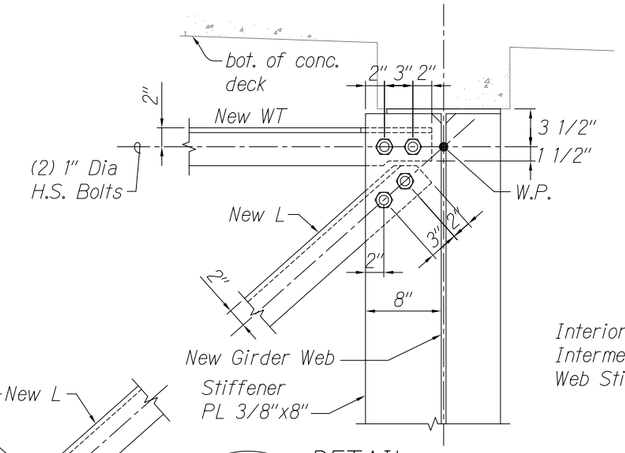
1 SECTION - NEW INTERMEDIATE CROSS-FRAME
S10.1 & S10.2 | S10.6 SCALE: 1/2" = 1'-0"



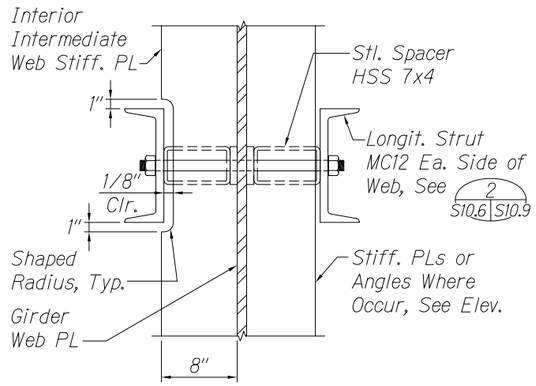
3 DETAIL
S10.6 | S10.6 SCALE: 1-1/2" = 1'-0"



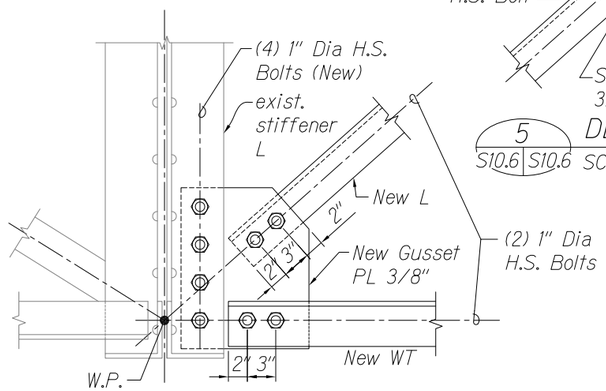
5 DETAIL
S10.6 | S10.6 SCALE: 1-1/2" = 1'-0"



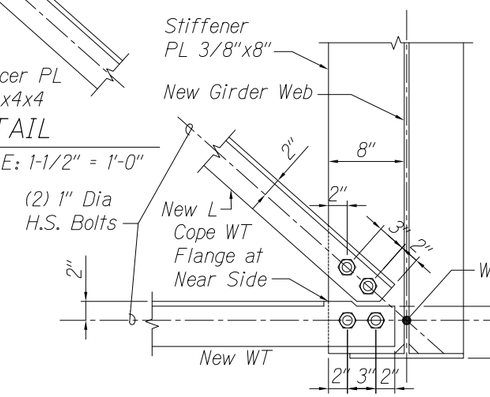
6 DETAIL
S10.6 | S10.6 SCALE: 1-1/2" = 1'-0"



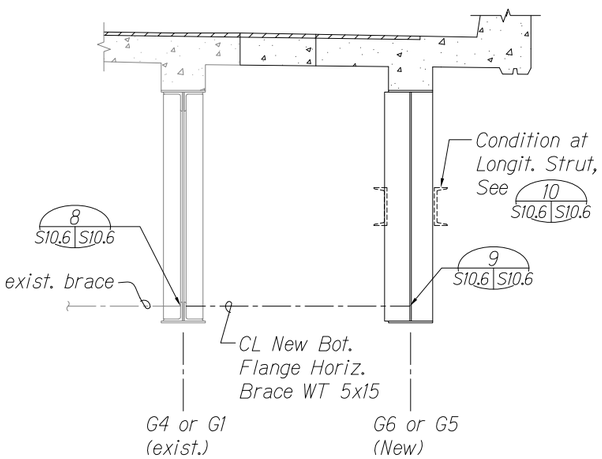
10 SECTION
S10.3 & S10.6 | S10.6 SCALE: 1 1/2" = 1'-0"



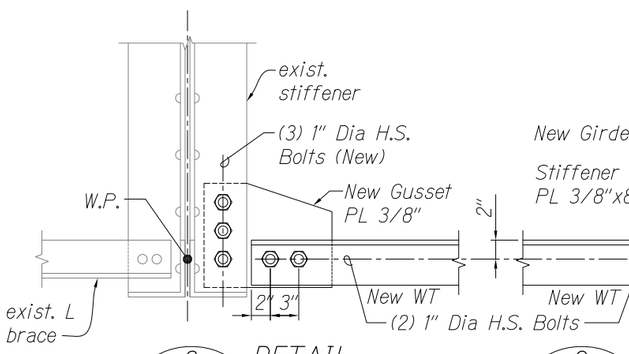
4 DETAIL
S10.6 | S10.6 SCALE: 1-1/2" = 1'-0"



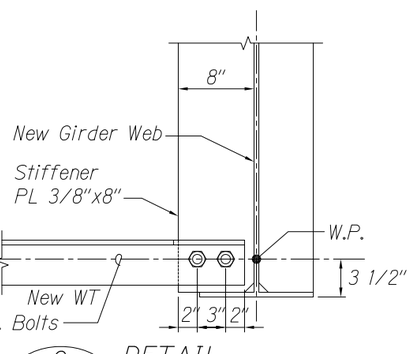
7 DETAIL
S10.6 | S10.6 SCALE: 1-1/2" = 1'-0"



2 SECTION
S10.2 | S10.6 SCALE: 1/2" = 1'-0"

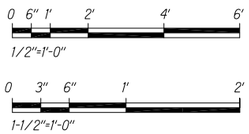


8 DETAIL
S10.6 | S10.6 SCALE: 1-1/2" = 1'-0"



9 DETAIL
S10.6 | S10.6 SCALE: 1-1/2" = 1'-0"

GRAPHIC SCALES:



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

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A
LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

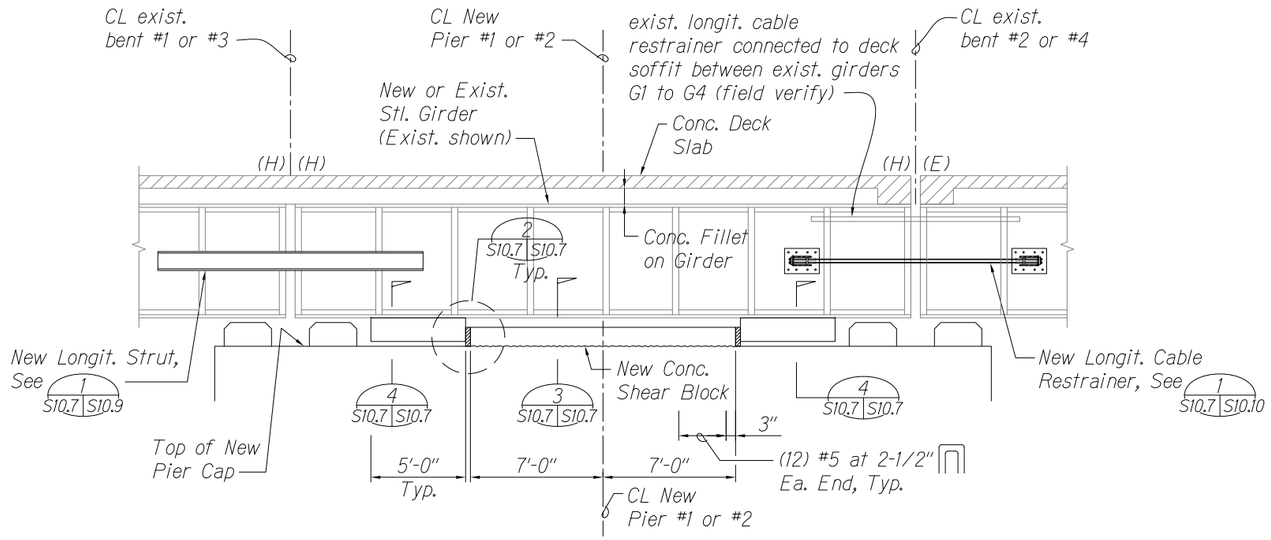
NEW INTERMEDIATE CROSS-FRAME DETAILS

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

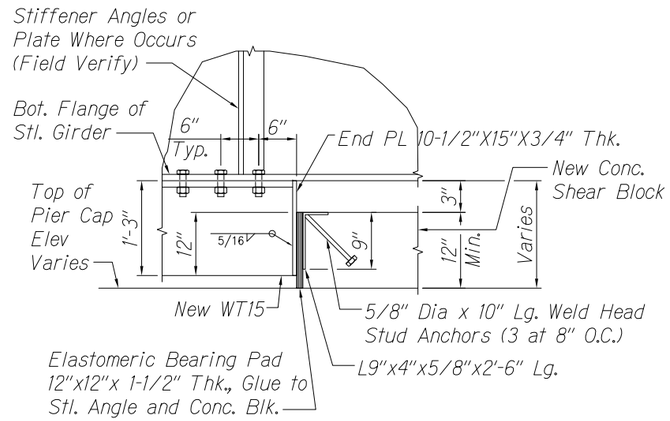
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S10.6 OF 10 SHEETS

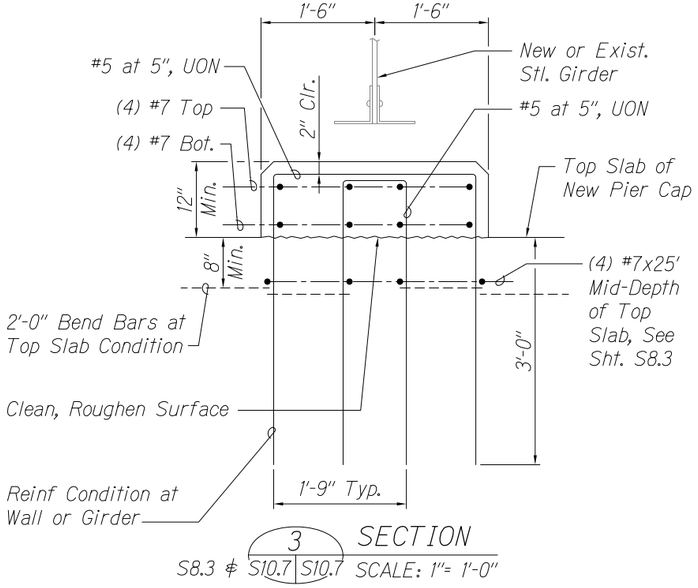
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	115	135



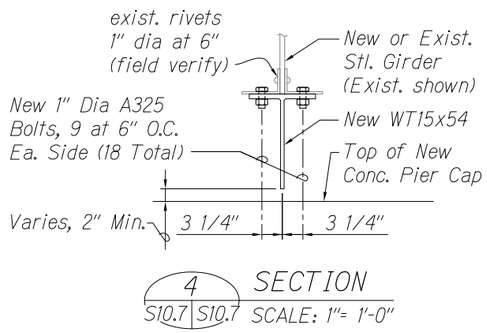
1 S10.2 S10.7 ELEVATION - NEW CONCRETE SHEAR BLOCK
SCALE: 1/4" = 1'-0"



2 S10.7 S10.7 SECTION
SCALE: 1"= 1'-0"



3 S8.3 & S10.7 S10.7 SECTION
SCALE: 1"= 1'-0"



4 S10.7 S10.7 SECTION
SCALE: 1"= 1'-0"

Notes:

1. Concrete shear blocks shall be incidental to concrete caps.
2. Concrete strength shall be 6,000 psi at 28 days.
3. Elastomeric bearing pad shall conform to Standard Specs Section 712.09(C), and shall be incidental to concrete caps.
4. Field drill bolt holes in existing steel and touch-up coat holes with 2 coats "ZRC", and allow coating to cure prior to installing new bolts.

GRAPHIC SCALES:

0 1' 2' 4' 8' 12'
1/4"=1'-0"

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

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.
LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

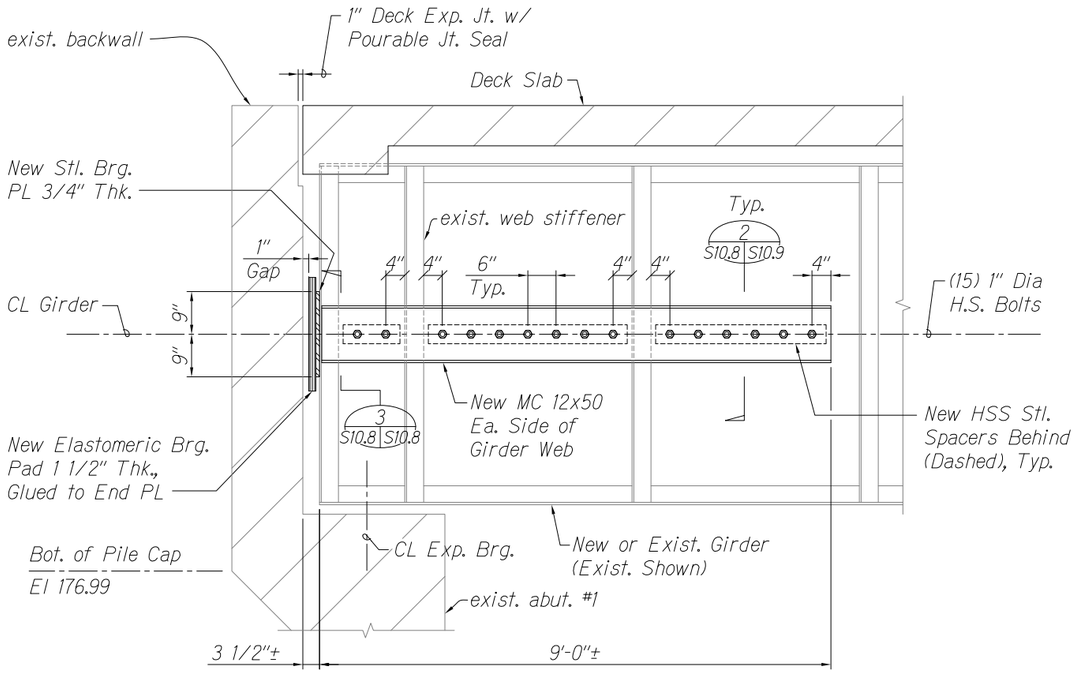
CONCRETE SHEAR BLOCK DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S10.7 OF 10 SHEETS

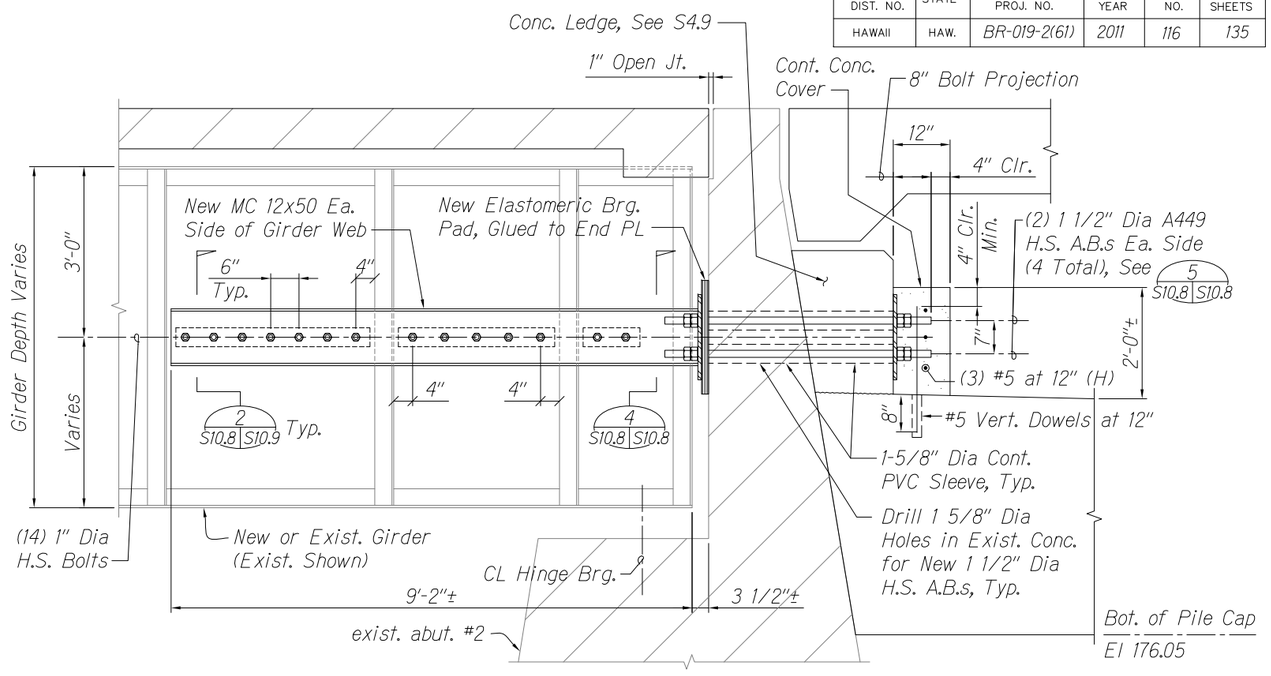
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	116	135



ELEVATION

1 LONGITUDINAL BUMPER AT ABUTMENT #1

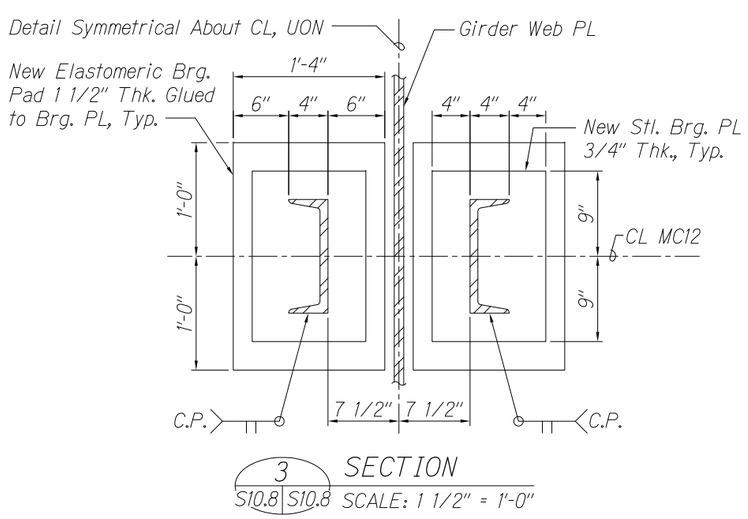
S10.1 | S10.8 SCALE: 3/4" = 1'-0"



ELEVATION

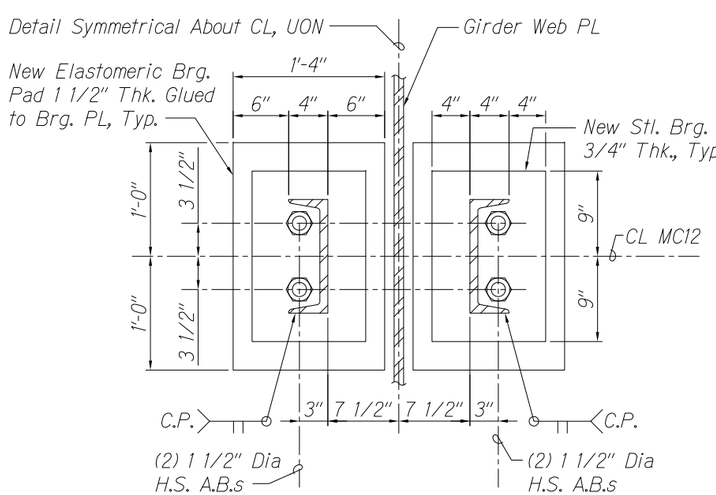
2 LONGITUDINAL STRUT/BUMPER AT ABUTMENT #2

S4.7, S4.9 & S10.1 | S10.8 SCALE: 3/4" = 1'-0"



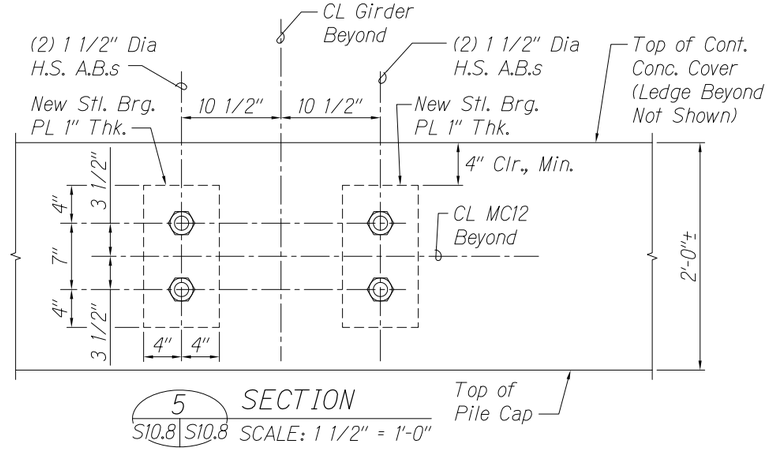
3 SECTION

S10.8 | S10.8 SCALE: 1 1/2" = 1'-0"



4 SECTION

S10.8 | S10.8 SCALE: 1 1/2" = 1'-0"



5 SECTION

S10.8 | S10.8 SCALE: 1 1/2" = 1'-0"

GRAPHIC SCALES:

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

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

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

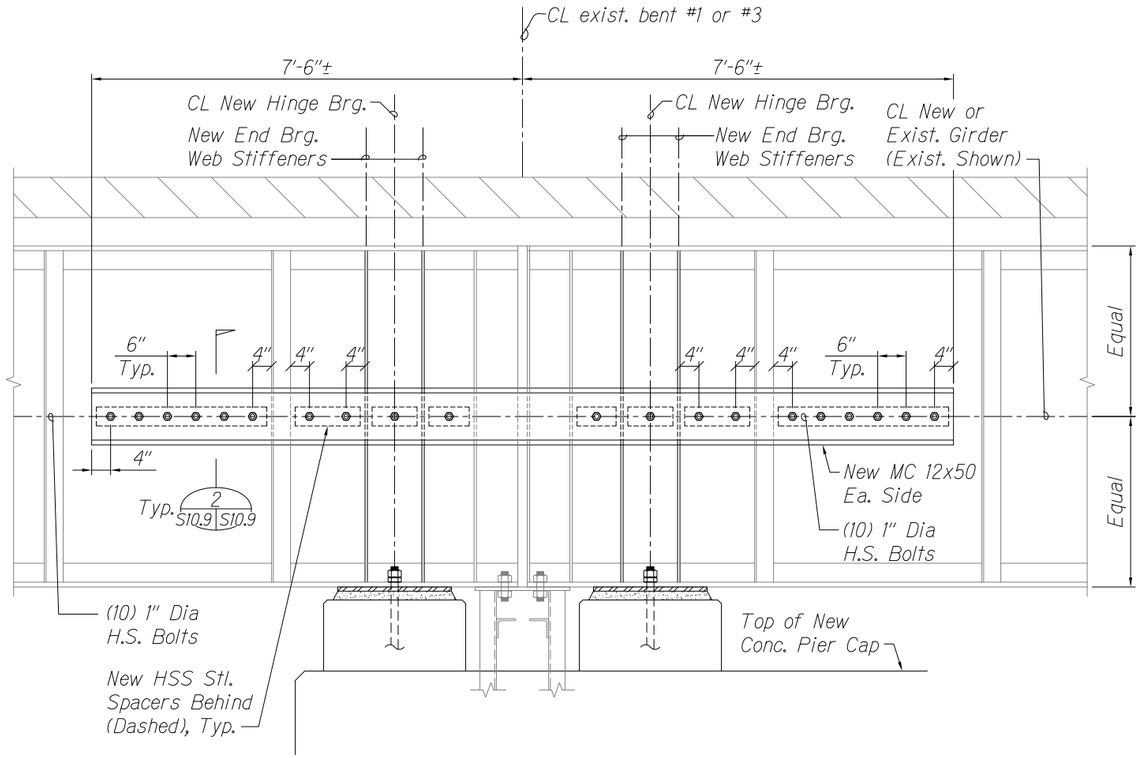
LONGITUDINAL BUMPER & STRUT/BUMPER DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S10.8 OF 10 SHEETS

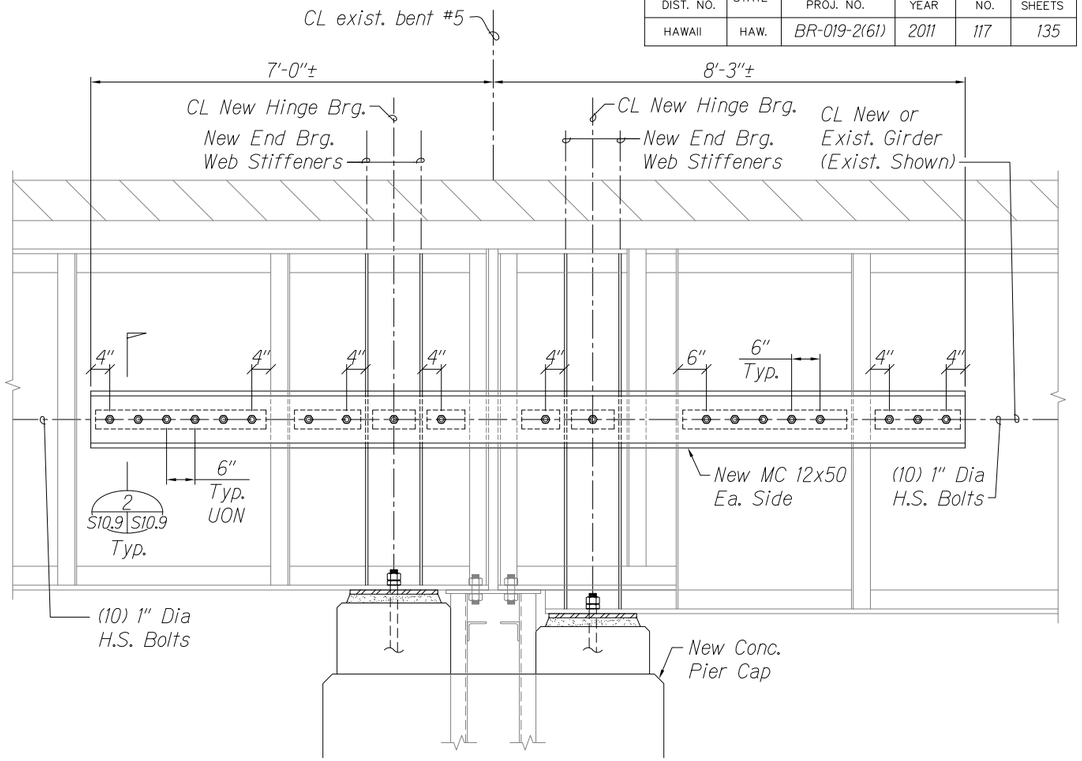
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	117	135



ELEVATION

1 DETAIL NEW LONGITUDINAL STRUT AT BENT #1 & #3

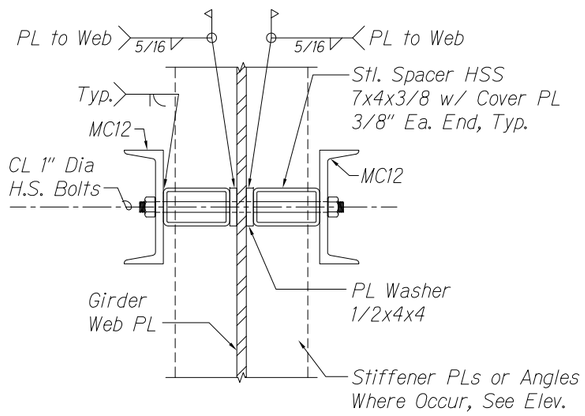
S10.1 & S10.7 | S10.9 SCALE: 3/4" = 1'-0"



ELEVATION

3 DETAIL NEW LONGITUDINAL STRUT AT BENT #5

S10.1 | S10.9 SCALE: 3/4" = 1'-0"



2 SECTION (TYPICAL)

S10.6, S10.8 & S10.9 | S10.9 SCALE: 1 1/2" = 1'-0"

Notes for Longitudinal Strut, Bumper, and Strut/Bumper:

1. Anchor bolts shall be high-strength conforming to ASTM A449, Grade 105.
2. Elastomeric bearing pads shall conform to Standard Specs Section 712.09(C), and shall be incidental to structural steel Pay Item No. 501.3000.
3. Anchor bolts, nuts and plate washers, and elastomeric bearing pads shall be incidental to Pay Item No. 501.3000 and will not be paid for separately.
4. Steel shall be hot-dip zinc coated after fabrication, and painted.

GRAPHIC SCALES:

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

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

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

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

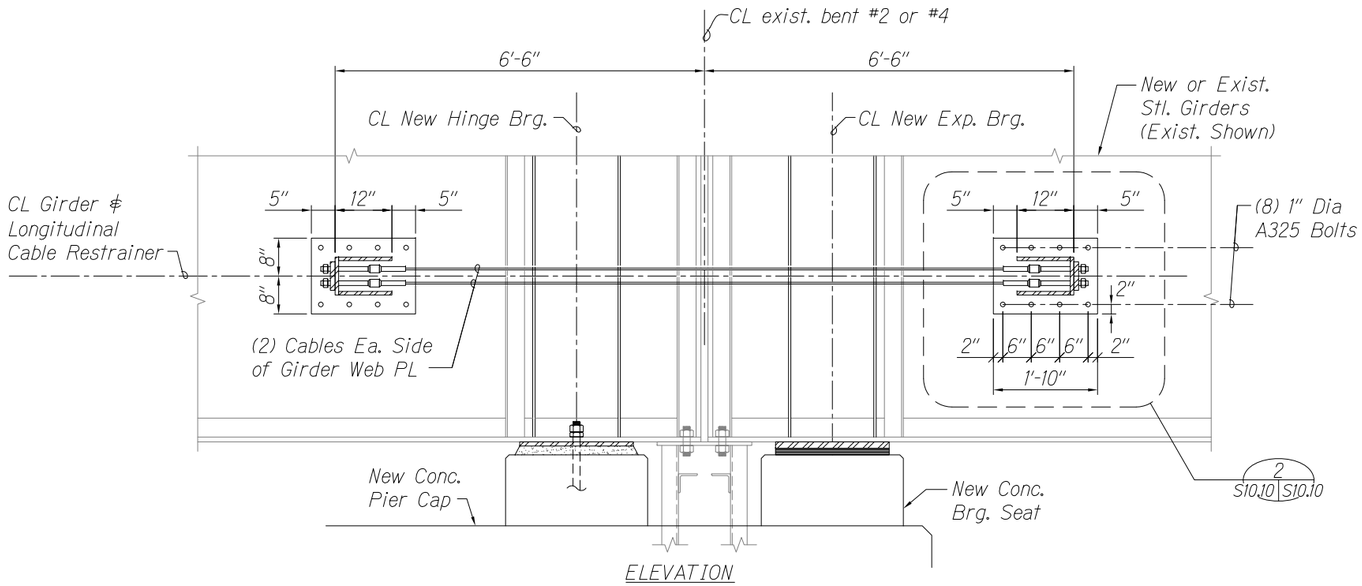
LONGITUDINAL STRUT DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

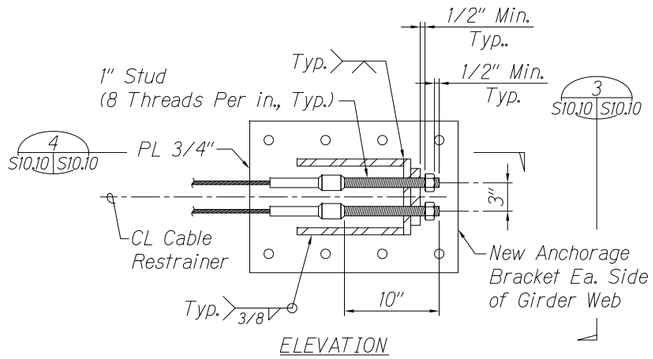
SHEET No. S10.9 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	118	135



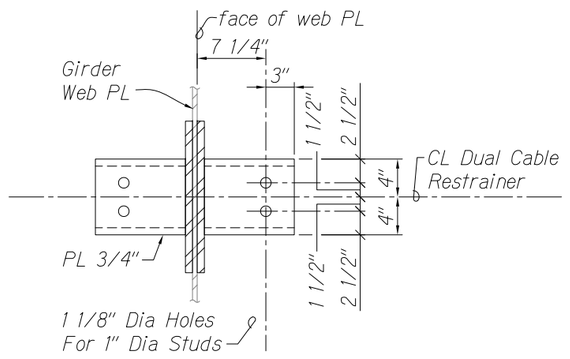
1 LONGITUDINAL CABLE RESTRAINER DETAIL

S10.1 ℄ S10.7 | S10.10 SCALE: 3/4" = 1'-0"



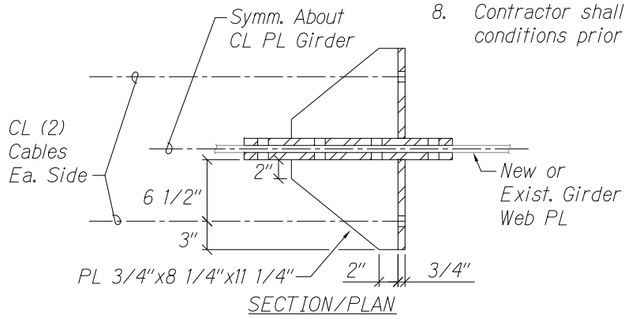
2 DUAL CABLE RESTRAINER ASSEMBLIES

S10.10 | S10.10 SCALE: 1 1/2" = 1'-0"



3 SECTION

S10.10 | S10.10 SCALE: 1 1/2" = 1'-0"



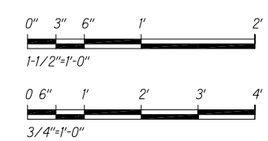
4 ANCHORAGE BRACKET DETAIL

S10.10 | S10.10 SCALE: 1 1/2" = 1'-0"

Cable Restrainer Notes:

1. Contractor shall refer to Standard Specs Section 654 "Restrainers".
2. Wire rope shall be 6x9 Independent Wire Rope Core (IRWC) galvanized in accordance with Fed spec. RR-W-410d, right regular lay with a minimum breaking strength at 46 kips. See Standard Specs Section 709.02.
3. Swage fitting shall be machined from 1-5/8" diameter C1035 hot rolled annealed bar stock suitable for cold swaging and galvanized per ASTM A153.
4. Threaded stud of the restrainer system shall be 1" diameter (8 Threads per inch) x 10" long A449 threaded stud, Class 2A thread before galvanizing per ASTM 153.
5. Nuts and washers shall conform to ASTM A325, galvanized.
6. Sheathing covering the wire rope shall be High Density Polyethylene (HDPE) with ultraviolet protection. See Standard Specs Section 712.12 "Sheathing".
7. Corrosion inhibiting grease for wire rope shall conform to Standard Specs Section 713.13 "Corrosion-Inhibiting Grease".
8. Contractor shall field verify all dimensions and existing conditions prior to fabrication or ordering of materials.

GRAPHIC SCALES:



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.

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

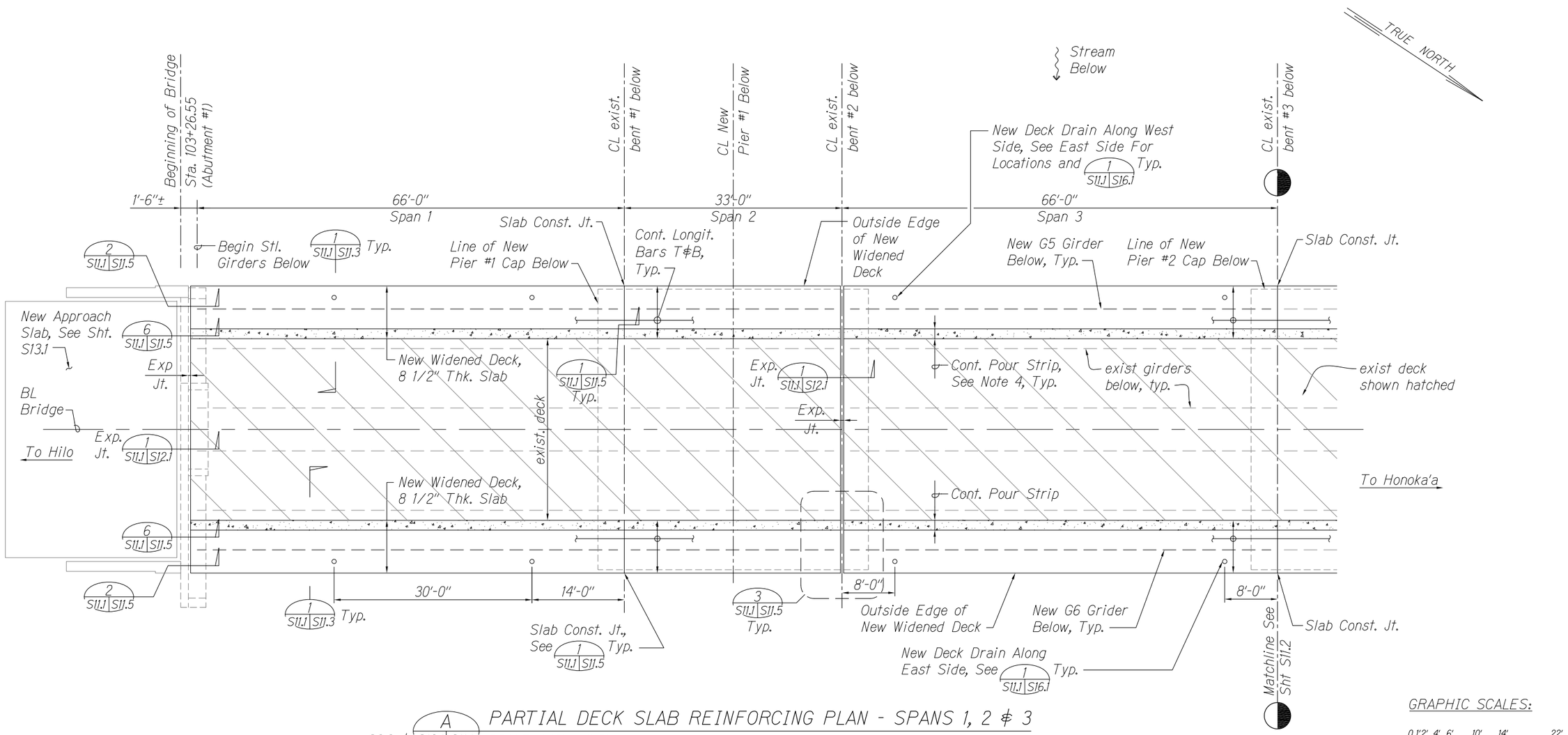
LONGITUDINAL CABLE RESTRAINER DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S10.10 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	119	135



A PARTIAL DECK SLAB REINFORCING PLAN - SPANS 1, 2 & 3
S2.2 & S10.1 S11.1 SCALE: 1/8" = 1'-0"

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

Notes:

1. For reinforcing not shown, see sheet S11.3.
2. For deck finish elevations and slopes, see sheet S11.4.
3. For construction phasing, see sheet S15.1.
4. For pour strip special notes, see sheet S11.3.

ORIGINAL PLAN
NOTEBOOK No.
SURVEY PLOTTED BY
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DATE

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

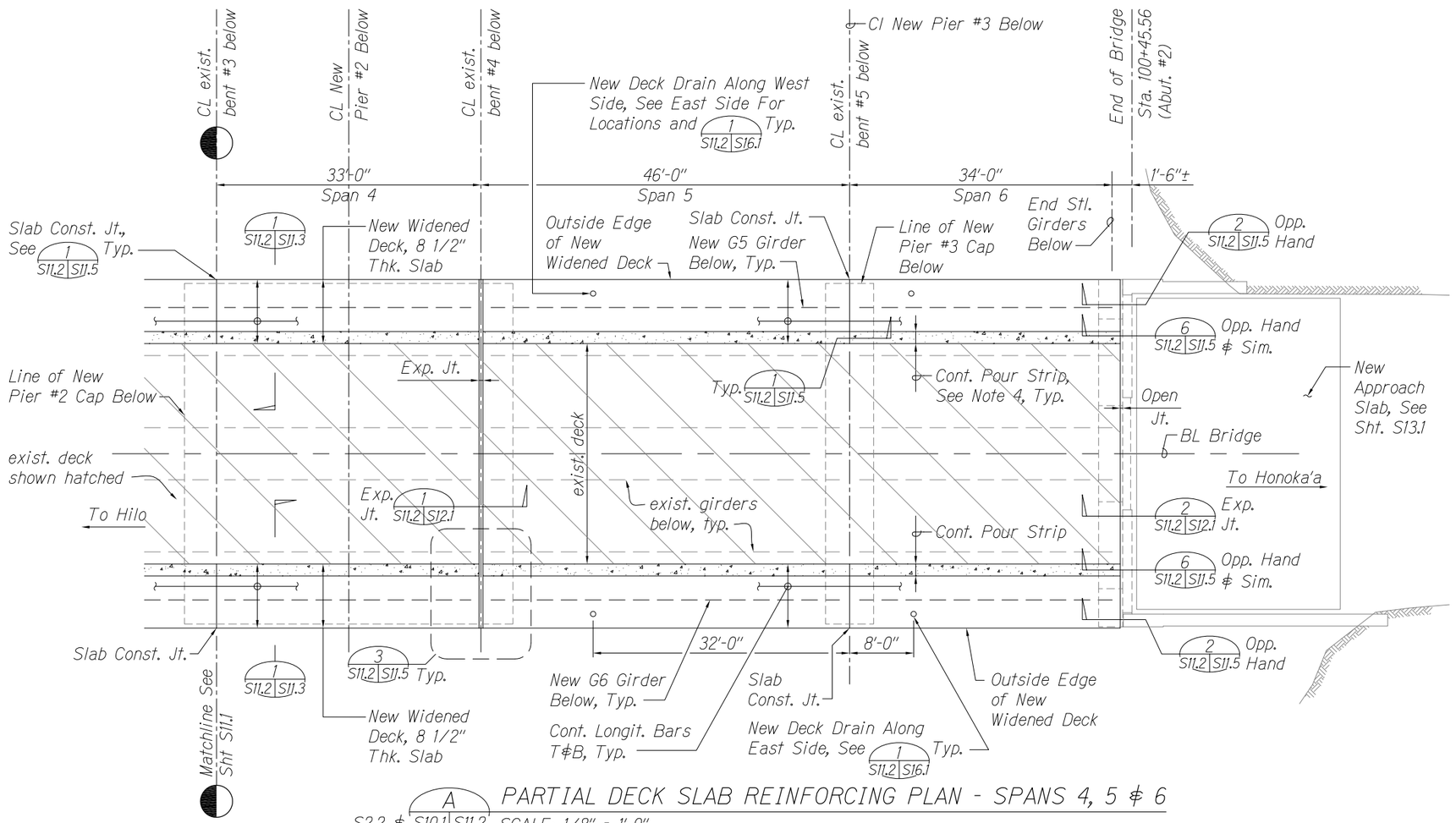
PARTIAL DECK REINFORCING PLAN - SPANS 1, 2 & 3

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

Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

SHEET No. S11.1 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	120	135



A S2.2 ℄ S10.1 S11.2 PARTIAL DECK SLAB REINFORCING PLAN - SPANS 4, 5 ℄ 6 SCALE: 1/8" = 1'-0"

GRAPHIC SCALES:

0 1'2' 4' 6' 10' 14' 22'

1/8"=1'-0"

Notes:

1. For reinforcing not shown, see sheet S11.3.
2. For deck finish elevations and slopes, see sheet S11.4.
3. For construction phasing, see sheet S15.1.
4. For pour strip special notes, see sheet S11.3.

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

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

LICENSE EXPIRES: 4/30/12

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

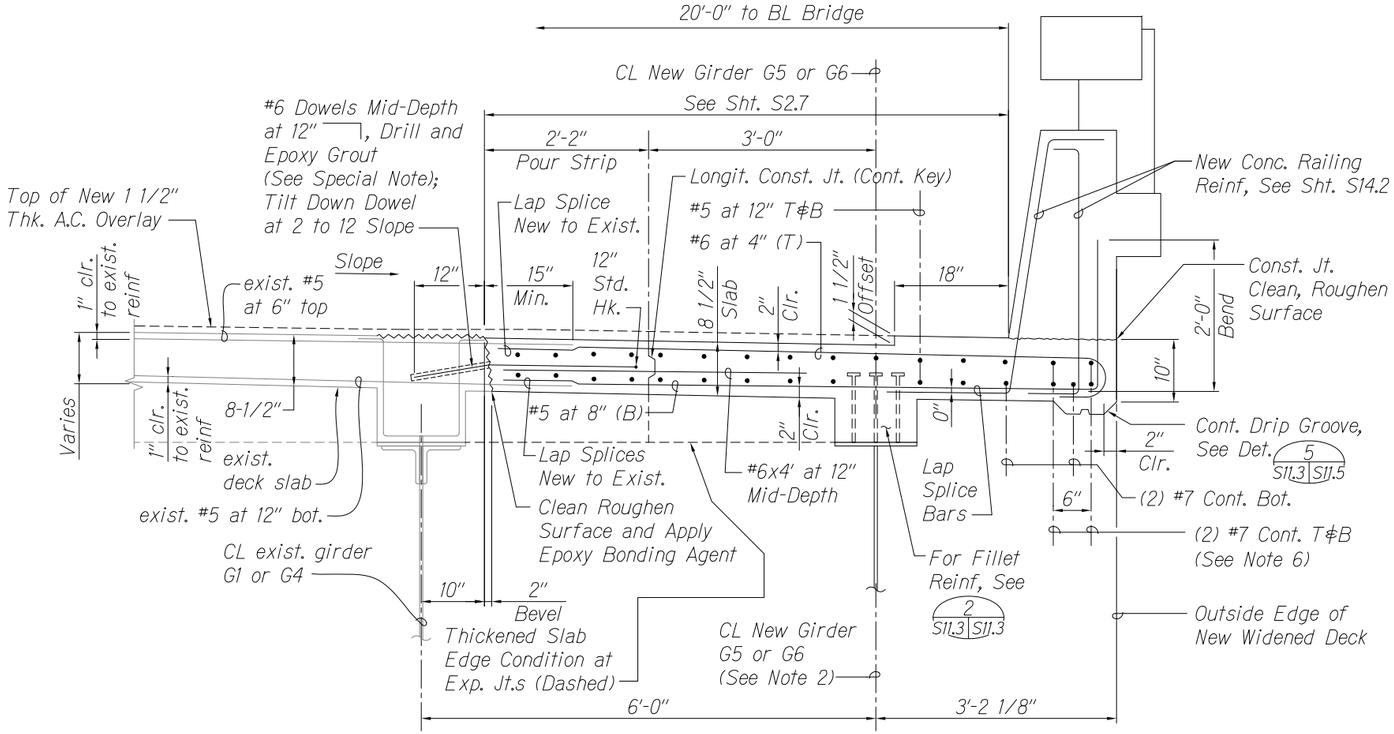
PARTIAL DECK REINFORCING PLAN - SPANS 4, 5 ℄ 6

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

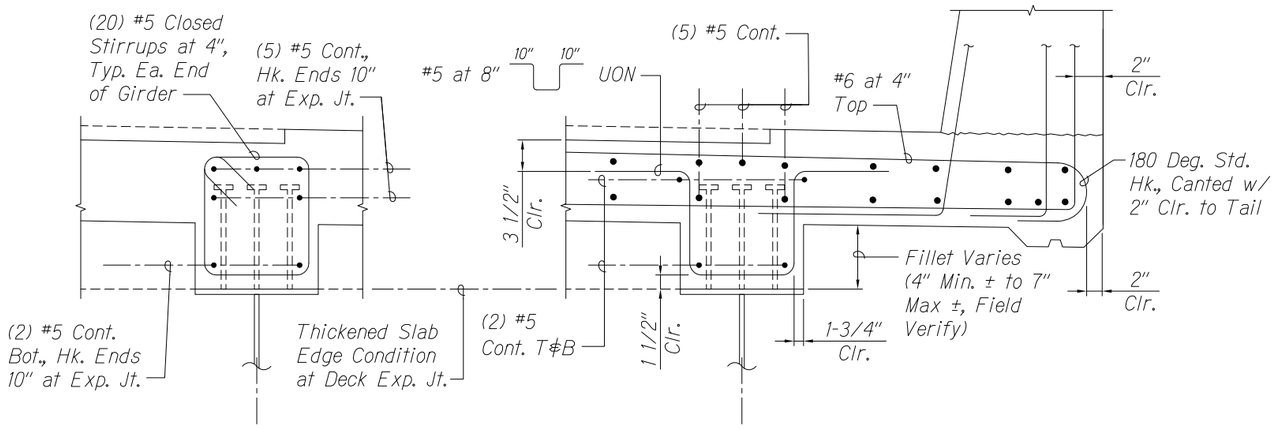
Scale: 1/8" = 1'-0" Date: Oct. 20, 2011

SHEET No. S11.2 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	121	135



1 SECTION (TYPICAL)
S11.1 & 1 S11.2 S11.3 SCALE: 1" = 1'-0"



GIRDER END CONDITION

2 DETAIL
S11.3 & 2 S11.5 S11.3 SCALE: 1-1/2" = 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. Contractor shall provide temporary and/or permanent lateral bracing of new steel girder to keep girder stable until new concrete deck slab and pour strip are cast and cured.
3. Weights of wet concrete deck slab and pour strip shall be supported by un-shored steel girders only.
4. Top surface of slab and pour strip shall be sloped in transverse and longitudinal directions. For finish deck (A.C. overlay) elevations, see sheet S11.4.
5. Deflections due to weights of wet concrete deck slab, pour strip and bridge railing shall be accounted for by the Contractor as necessary to obtain final finish deck elevations.
6. New concrete railing shall not be poured until new slab and pour strip are cast, cured 14 days minimum, attains 28-day design strength, and all shoring is removed.
7. Lap splice length for #7 continuous longitudinal bars shall be 4'-6" minimum. Stagger adjacent bar splices 10'-0" minimum.

Special Note:

Epoxy grouted dowels shall be inspected by the Engineer. See sheet S0.2.

Special Notes for Pour Strip:

1. Pour strip shall not be poured until new slab is cast and cured for 7 days minimum. Concrete for pour strip shall be high early strength with f'c = 6,000 psi minimum.
2. During concrete pour strip placement and initial curing time, traffic on bridge shall be restricted to one-lane located adjacent to curb or railing furthest away from pour strip, and a reduced speed limit of 5 mph. Full bridge closure during concrete pour may be permitted, subject to Engineer's approval.
3. Initial curing time of pour strip shall be 8 hours minimum after placement of last truck load.
4. Traffic, lane, and speed limit restrictions shall not be lifted until directed by the Engineer.

GRAPHIC SCALES:

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

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

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.
LICENSE EXPIRES: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

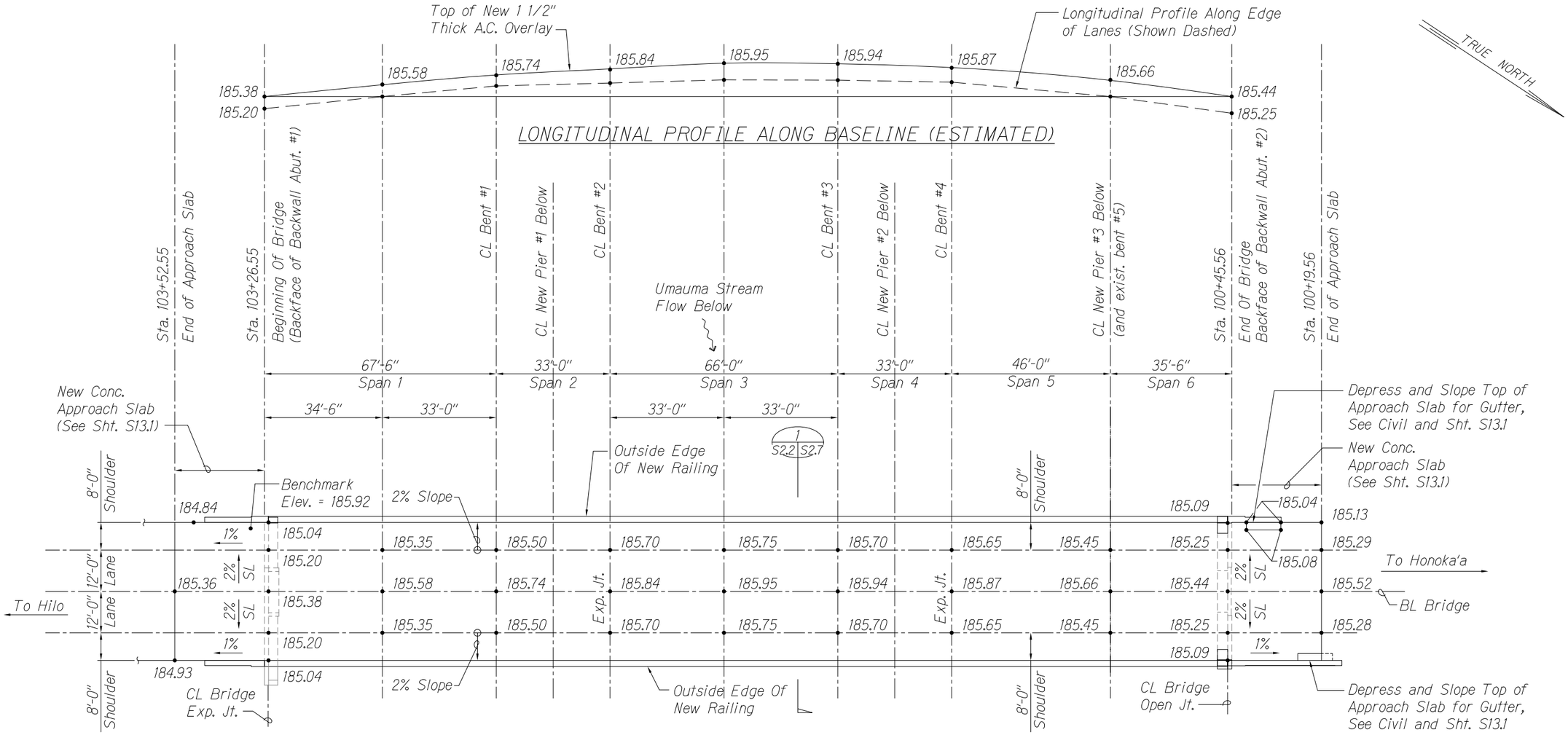
NEW WIDENED DECK - REINFORCING SECTIONS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S11.3 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	122	135



A S11.4 S11.4 PLAN - NEW WIDENED BRIDGE DECK FINISH ELEVATIONS (ESTIMATED)

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

GRAPHIC SCALES:

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

1/16"=1'-0"

Notes:

1. For existing spot elevations on bridge deck, contractor shall refer to topo map on sheet T6.
2. Contractor shall field verify all existing and new finish deck elevations.
3. New A.C. overlay on bridge deck and on approach slabs shall be 1 1/2" thick.

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

LICENSE EXPIRES: 4/30/12

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

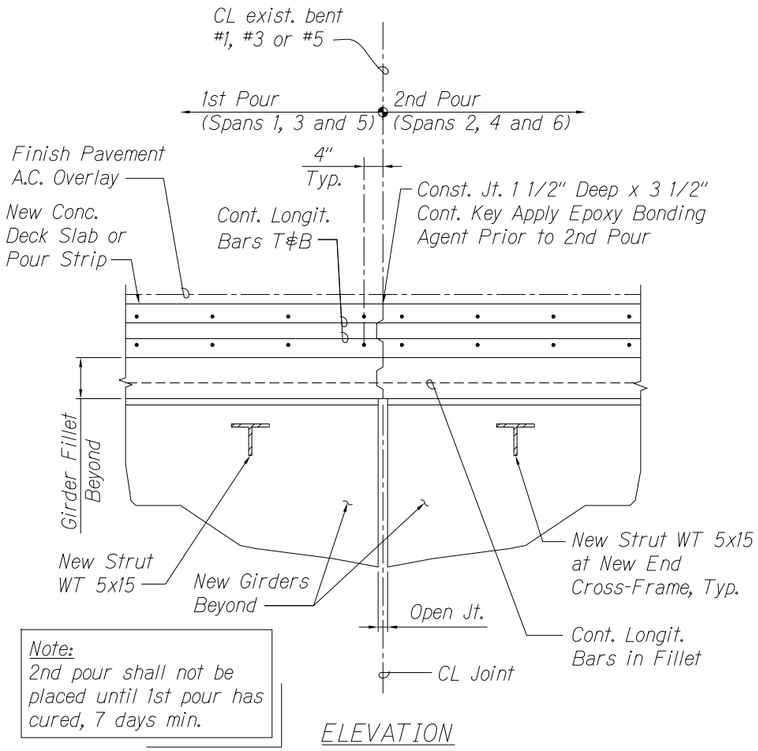
DECK FINISH ELEVATIONS - PLAN

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

Scale: 1/16" = 1'-0" Date: Oct. 20, 2011

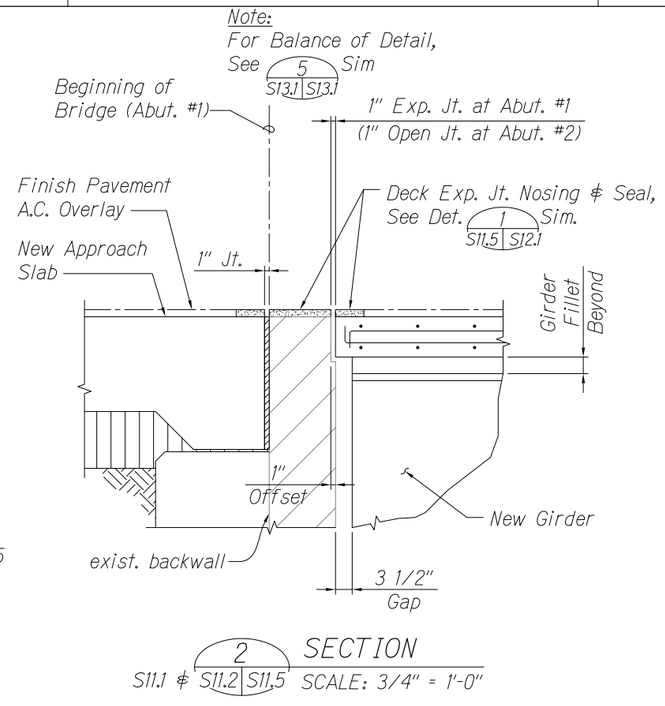
SHEET No. S11.4 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	123	135

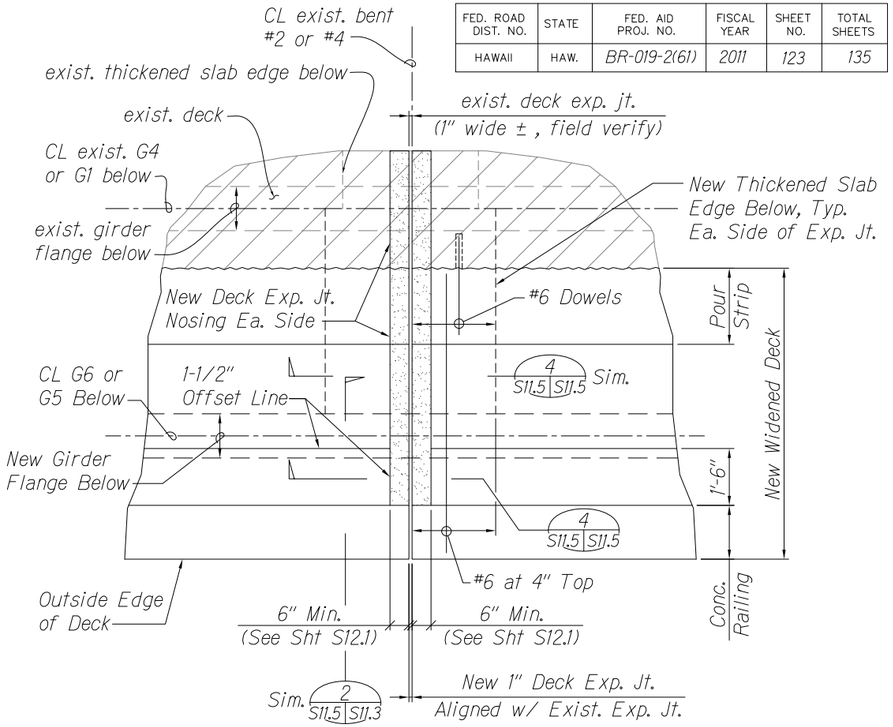


Note:
2nd pour shall not be placed until 1st pour has cured, 7 days min.

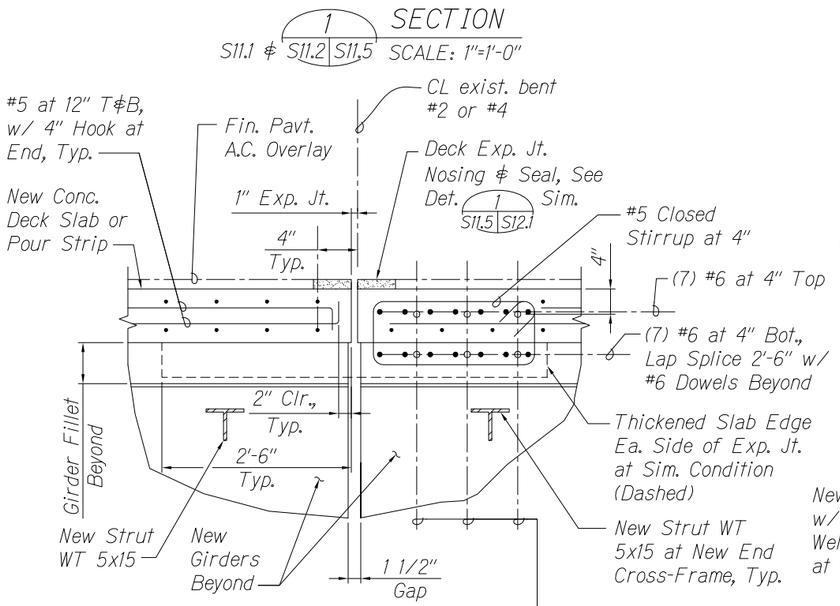
ELEVATION



2 SECTION
S11.1 & S11.2 | S11.5 SCALE: 3/4" = 1'-0"

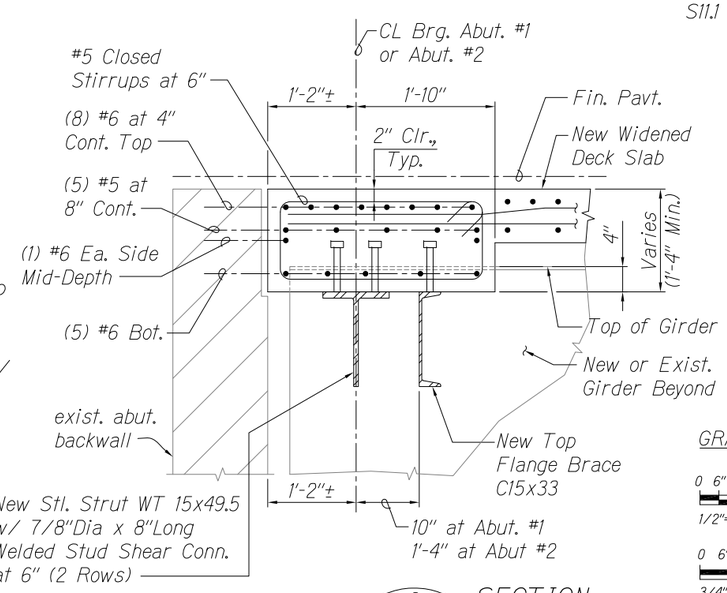


3 ENLARGED PLAN - NEW WIDENED DECK EXPANSION JOINT
S11.1 & S11.2 | S11.5 SCALE: 1/2"=1'-0"

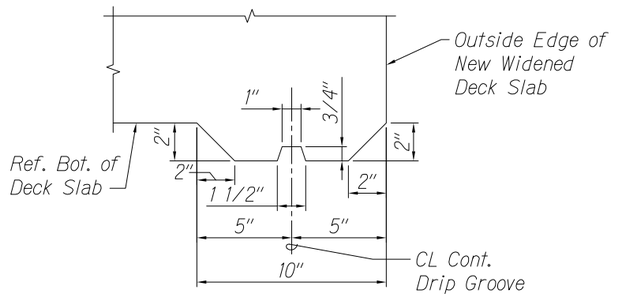


ELEVATION

1 SECTION
S11.1 & S11.2 | S11.5 SCALE: 1"=1'-0"

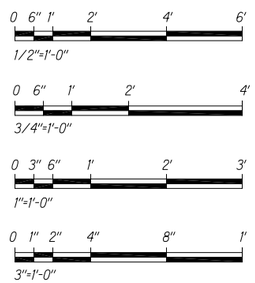


6 SECTION
S9.5, S9.6, S10.1, S11.1 & S11.2 | S11.5 SCALE: 1"=1'-0"



5 DRIP GROOVE DETAIL
S2.7 & S11.3 | S11.5 SCALE: 3"=1'-0"

GRAPHIC SCALES:



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NO. 5479-S
HAWAII, U.S.A
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DECK JOINT SECTIONS & DRIP GROOVE DETAIL

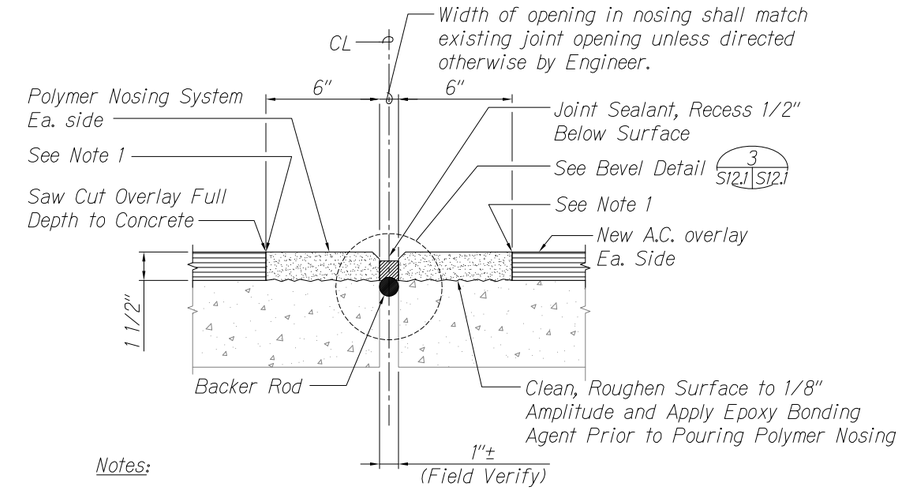
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S11.5 OF 5 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)	2011	124	135

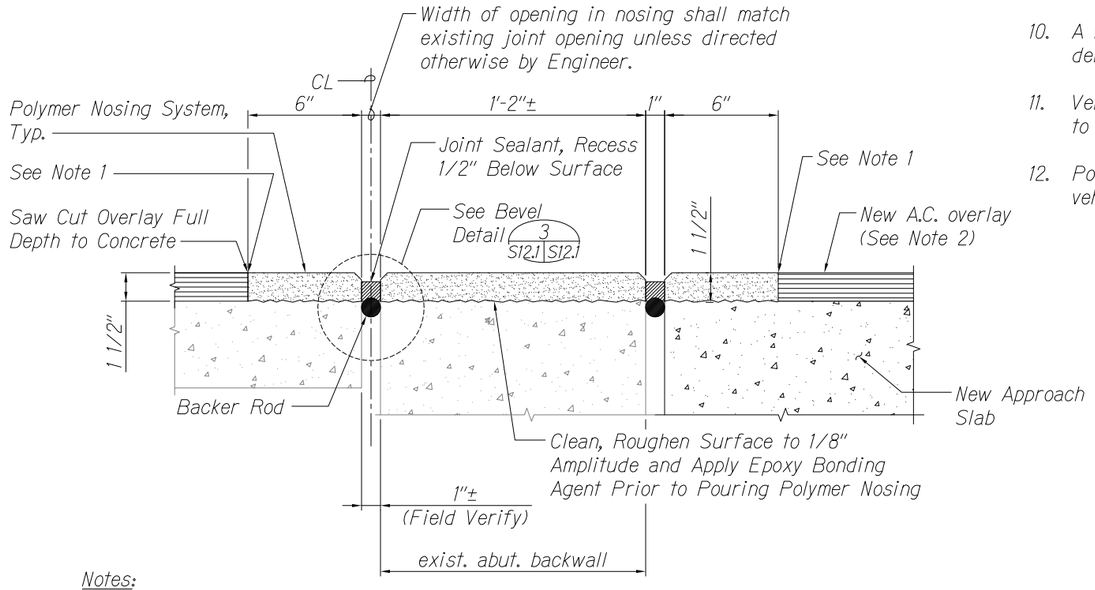


Notes:

1. Finish surface elevation of nosing shall match adjacent A.C. overlay elevation.
2. Finish riding surfaces on bridge deck shall have a smooth transition with no kinks, humps or dips.

1 S11.1, S11.2, S11.5 S12.1 EXPANSION JOINT DETAIL AT BRIDGE DECK

SCALE: 3" = 1'-0"



Notes:

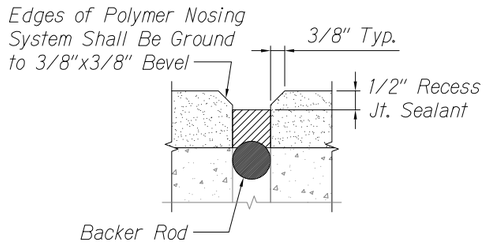
1. Finish surface elevation of nosing shall match adjacent A.C. overlay elevation.
2. Finish riding surfaces on bridge deck, abutment backwall and approach slab shall have a smooth transition with no kinks, humps or dips.

2 S11.2, S11.5 S12.1 JOINT DETAIL AT ABUT #2

SCALE: 3" = 1'-0" (SIMILAR AT ABUT #1)

Notes for Deck Joint Details

1. Contractor shall refer to Special Provisions Section 503 "Concrete Structures" for joint sealant. Joint sealant shall be a rapid curing two-component 100% silicone sealant conforming to ASTM C-719 and ASTM C-793.
2. For construction phasing, see sheet S15.1.
3. Information shown on the plans are based on "as-built" plans. Contractor shall field measure actual joint widths prior to ordering of materials.
4. At existing bridge deck, remove existing nosing system down to top of concrete deck.
5. Remove any cracked or weakened concrete deck sections exposed after the existing nosing system has been removed.
6. Existing deck reinforcing steel shall not be damaged or cut. Any damage shall be repaired to the satisfaction of the Engineer and at Contractor's expense.
7. Repair all chipped, spalled, or damaged concrete in existing joint areas.
8. Clean up and remove debris accumulated on bridge members located directly below the joints to the satisfaction of the Engineer.
9. Install new Polymer Nosing System and joint sealant per manufacturer's recommendations.
10. A representative of the manufacturer shall be present at start of work to demonstrate proper cleaning and installation techniques.
11. Vehicular traffic on lane adjacent to deck joint work area shall be restricted to 10 mph until Polymer Nosing System has cured for 4 hours minimum.
12. Polymer Nosing System shall be cured for 8 hours minimum prior to allowing vehicular traffic over new joints.



3 S12.1 S12.1 BEVEL DETAIL

SCALE: 6" = 1'-0"

Polymer Nosing System

1. Polymer Nosing System shall consist of a two component, rapid curing liquid polymer, and blended aggregates to form a dense, semiflexible polymer based mortar.
2. Liquid polymer shall have a shore "D" hardness at 77 deg F of 45 to 75.
3. Cured polymer-based mortar shall have a compressive strength (Method B) of 2,500 PSI at 24 hours.
4. Concrete substrate temperature shall be minimum 50 degrees F and rising during installation of mortar.
5. Polymer nosing system and joint sealant shall be compatible with each other, and shall be furnished by the same manufacturer.
6. Polymer nosing system shall be incidental to deck joint sealant.

GRAPHIC SCALES:

0" 1" 2" 3" 6" 1'

3"=1'-0"

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

LICENSE EXPIRES: 4/30/12

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

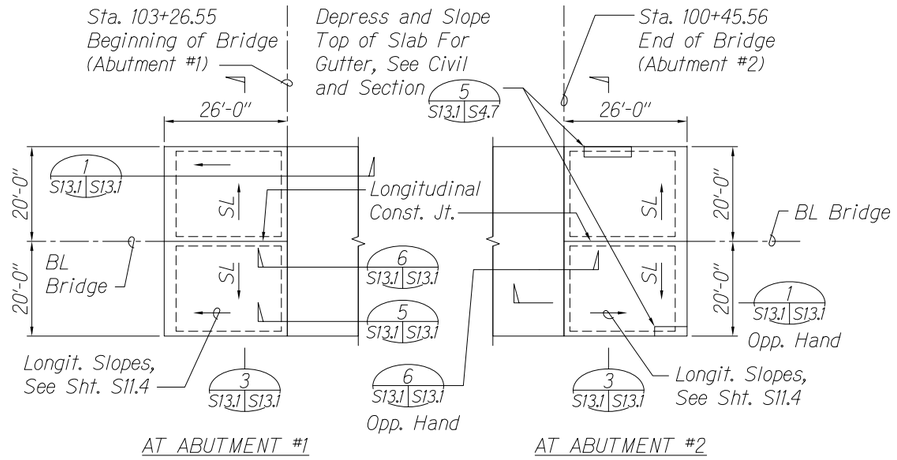
BRIDGE DECK EXPANSION JOINT DETAILS

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

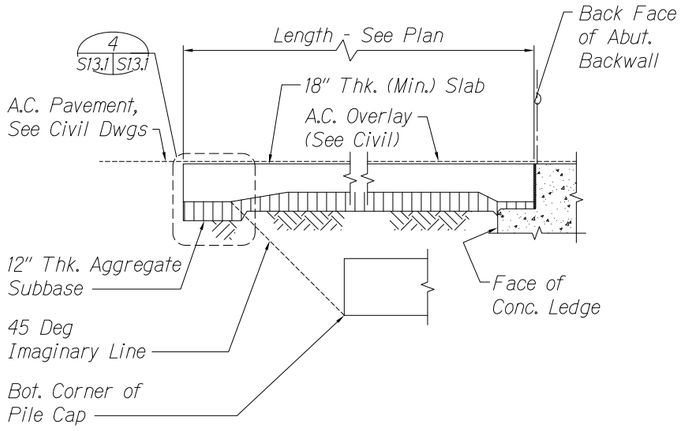
Scale: As AShown Date: Oct. 20, 2011

SHEET No. S12.1 OF 1 SHEETS

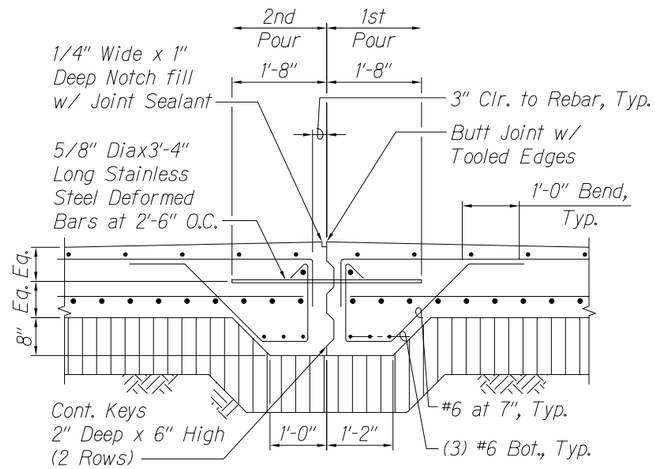
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	125	135



A S2.2 S13.1 PLAN - APPROACH SLABS SCALE: 1/16" = 1'-0"

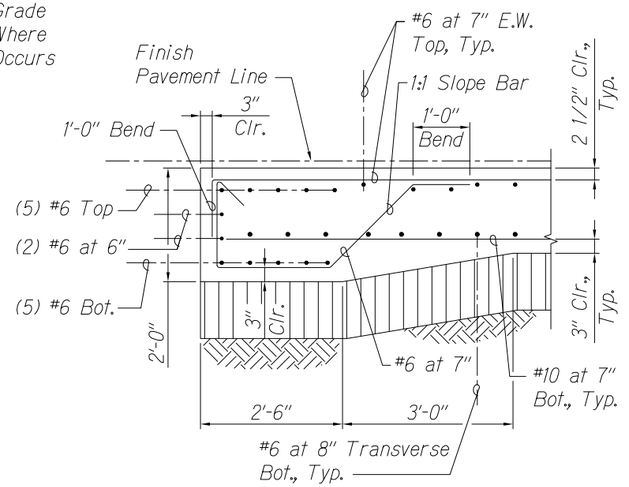


1 S13.1 S13.1 LONGITUDINAL SECTION SCALE: 1/4" = 1'-0"

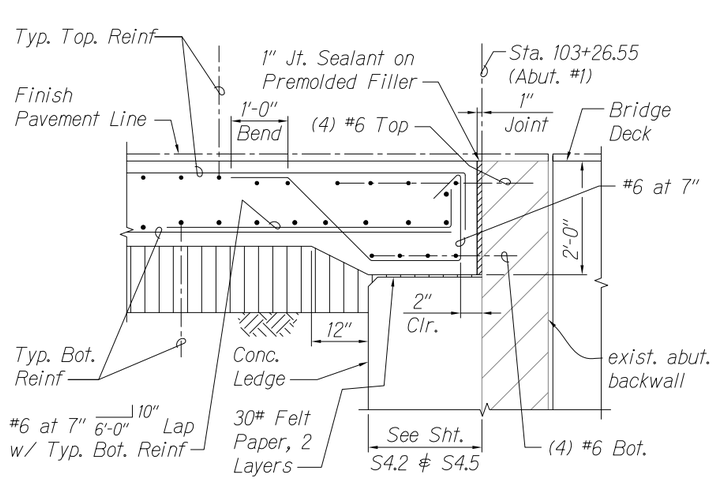


2 S13.1 S13.1 LONGITUDINAL CONSTRUCTION JOINT DETAIL SCALE: 3/4" = 1'-0"

3 S13.1 S13.1 TRANSVERSE SECTION SCALE: 1/4" = 1'-0"



4 S13.1 S13.1 SECTION SCALE: 3/4" = 1'-0"



5 S13.1 S13.1 SECTION SCALE: 3/4" = 1'-0"

6 S13.1 S13.1 SECTION SCALE: 3/4" = 1'-0"

Notes:

1. For construction phasing, see sheet S15.1.
2. Excavation and backfill for approach slabs shall be incidental to structure excavation and backfill for abutments and wingwalls.
3. For finish pavement (A.C. overlay) elevations, see sheet S11.4.

GRAPHIC SCALES:

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

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

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

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

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NO. 5479-S
HAWAII, U.S.A

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

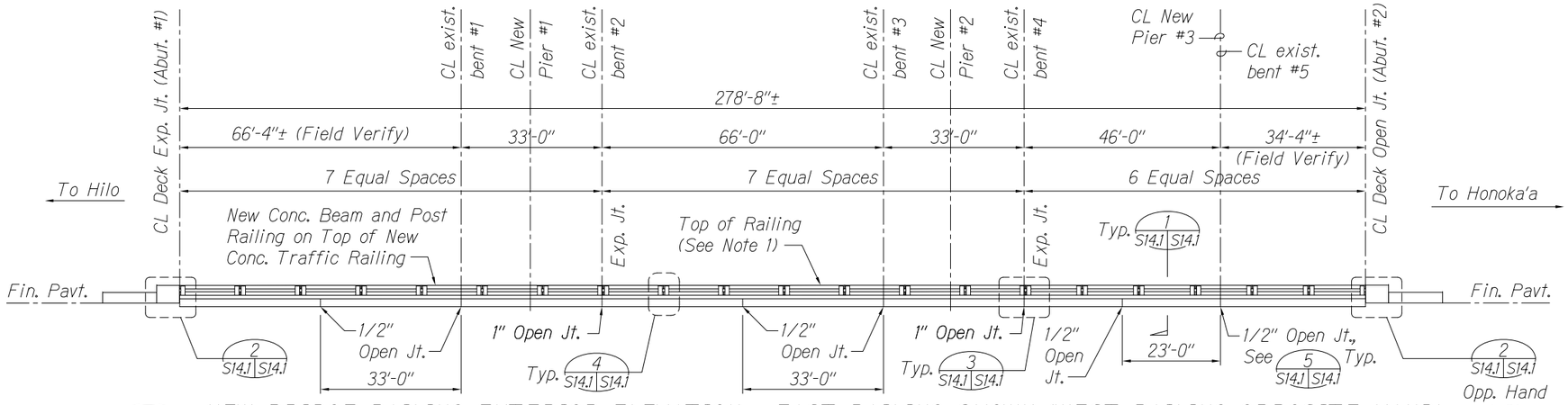
APPROACH SLAB AT ABUTMENT #1 & #2 - PLAN, SECTION & DETAIL

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

Scale: As Shown Date: Oct. 20, 2011

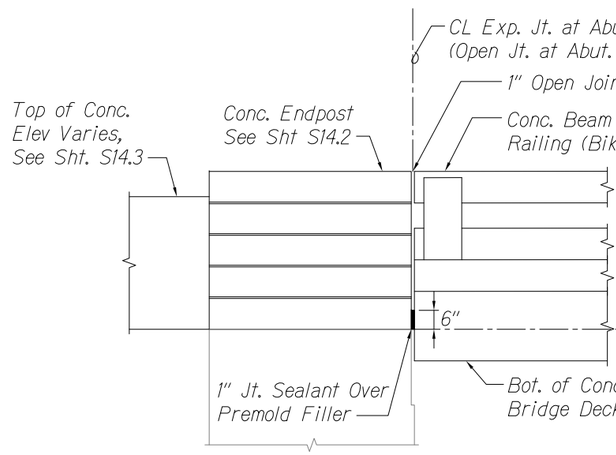
SHEET No. S13.1 OF 1 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	126	135



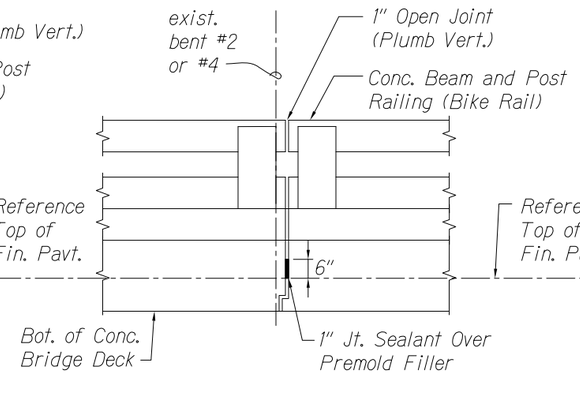
A S2.5 & S2.4 S14.1 NEW BRIDGE RAILING EXTERIOR ELEVATION - EAST RAILING SHOWN (WEST RAILING OPPOSITE HAND)

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



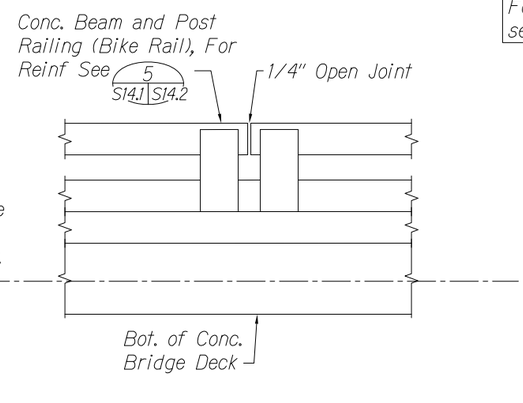
2 S14.1 S14.1 TYPICAL DETAIL AT ENDPOST (EXTERIOR ELEVATION)

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



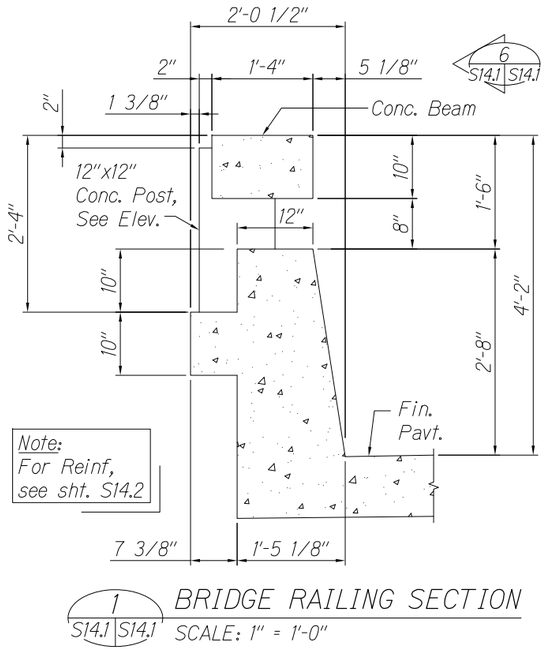
3 S14.1 S14.1 DETAIL AT EXPANSION JOINTS (EXTERIOR ELEVATION)

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



4 S14.1 S14.1 TYPICAL BRIDGE RAILING DETAIL (EXTERIOR ELEVATION)

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



Note: For Reinf, see sht. S14.2

1 S14.1 S14.1 BRIDGE RAILING SECTION

SCALE: 1" = 1'-0"

Notes:

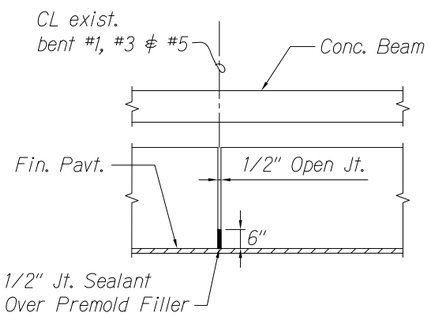
1. Railing elevations shown horizontally (level) for clarity. Top of railing shall follow profile of finish pavement elevation along base of railing. See sheet S11.4.
2. For Railing Reinforcing, see sheet S14.2.
3. Concrete endposts shall be incidental to Section 507 "Railings" and will not be paid for separately.

GRAPHIC SCALES:

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

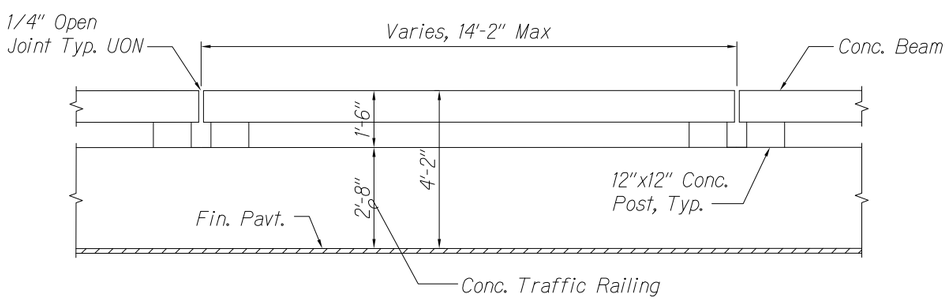
0 6" 1' 2' 3' 4' 5' 6'
1/2"=1'-0"

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



5 S14.1 S14.1 DETAIL (INTERIOR ELEVATION)

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



6 S14.1 S14.1 PARTIAL INTERIOR ELEVATION OF NEW BRIDGE RAILING

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

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.

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

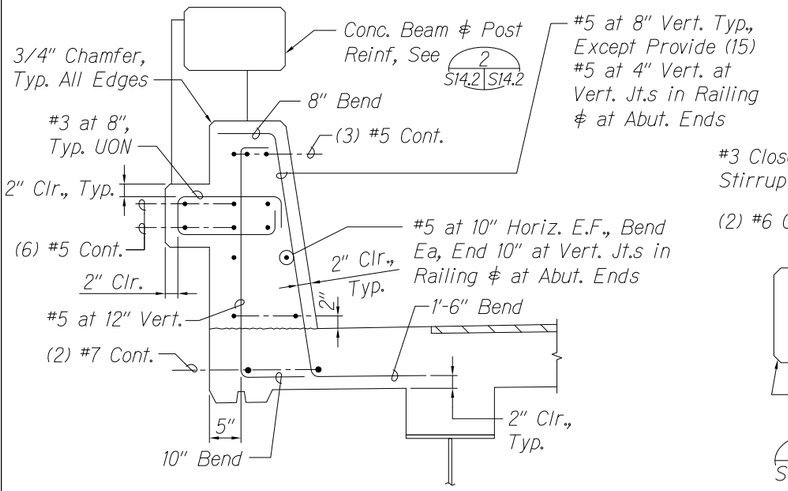
NEW BRIDGE RAILING - ELEVATIONS & DETAILS

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

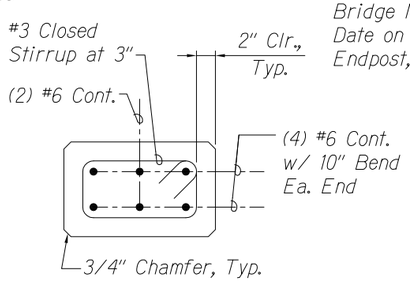
Scale: As Shown Date: Oct. 20, 2011

SHEET No. S14.1 OF 4 SHEETS

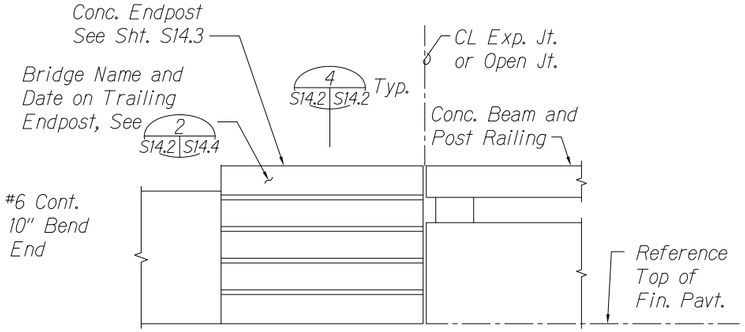
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	127	135



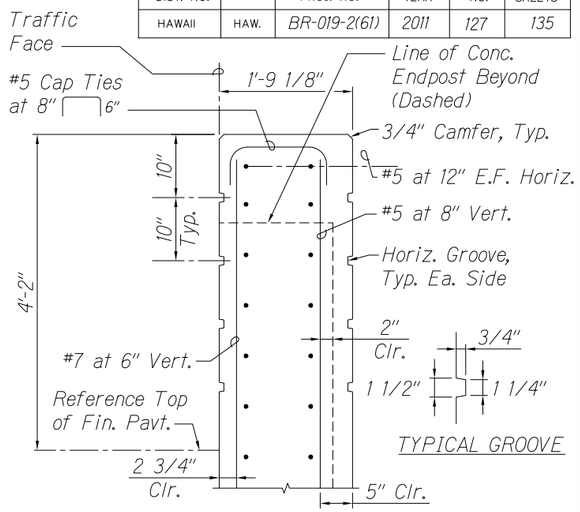
1 SECTION - TRAFFIC RAILING REINFORCING
S14.1 & S14.2 | S14.2 SCALE: 1"= 1'-0"



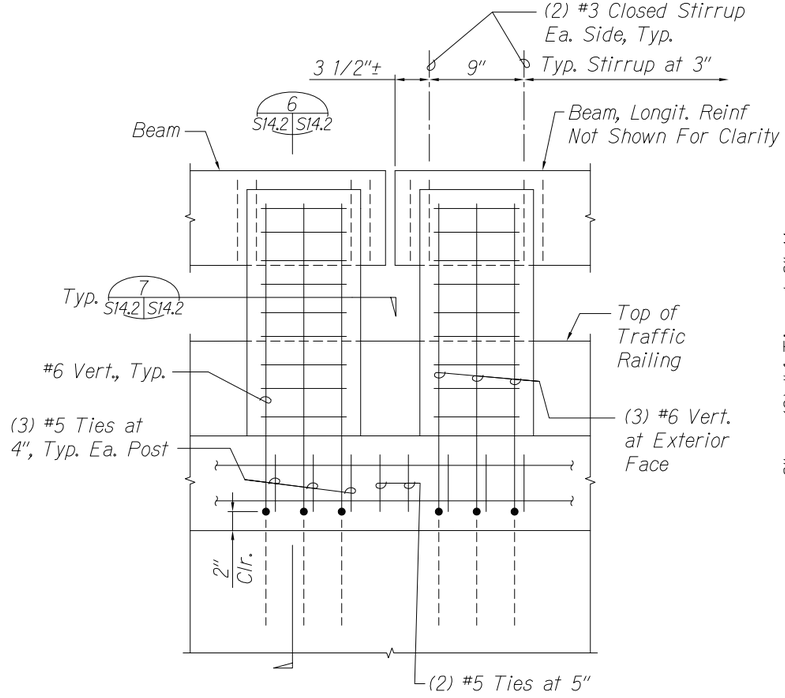
2 BEAM SECTION
S14.2 | S14.2 SCALE: 1-1/2" = 1'-0"



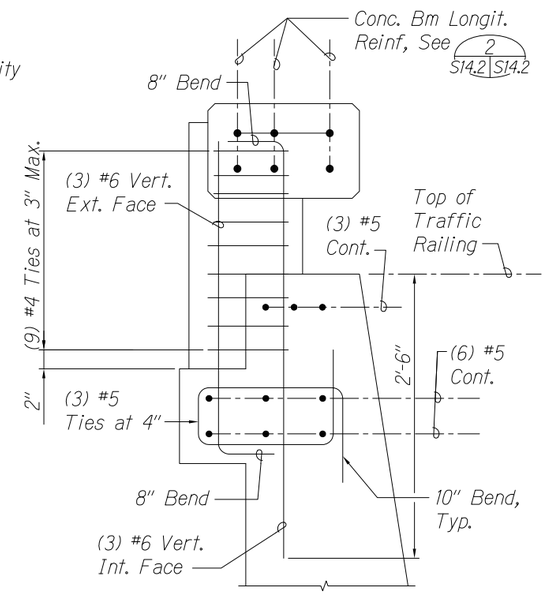
TYPICAL DETAIL AT ENDPOST (INTERIOR ELEVATION)
3 S14.2 | S14.2 SCALE: 1/2" = 1'-0"



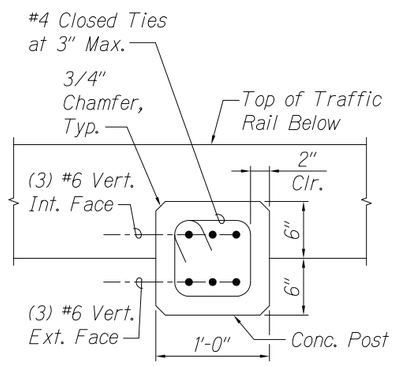
4 SECTION
S4.3, S4.7, S4.9 & S14.2 | S14.2 SCALE: 1" = 1'-0"



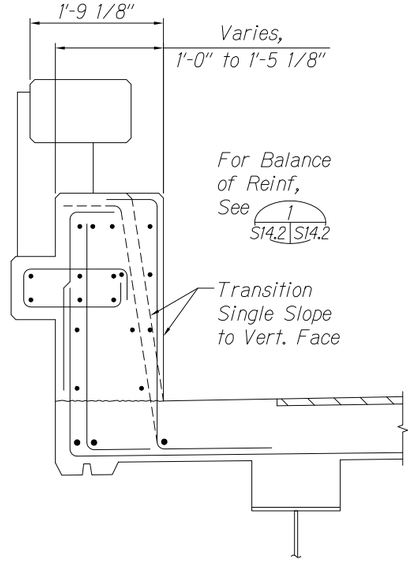
5 DETAIL - EXTERIOR ELEVATION
S14.1 & S14.2 | S14.2 SCALE: 1-1/2" = 1'-0"



6 SECTION AT POST
S14.2 | S14.2 SCALE: 1-1/2" = 1'-0"



7 SECTION/PLAN
S14.2 | S14.2 SCALE: 1-1/2" = 1'-0"



8 SECTION AT TRANSITION - TRAFFIC RAILING REINFORCING
S14.3 | S14.2 SCALE: 1"= 1'-0"

GRAPHIC SCALES:

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

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

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

ORIGINAL PLAN | NOTEBOOK | No. | DATE
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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

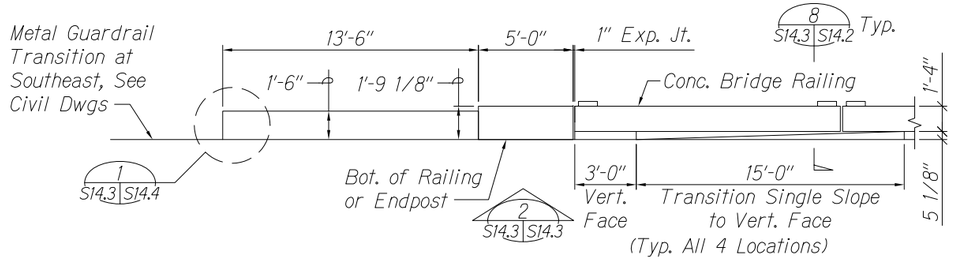
NEW BRIDGE RAILING - REINFORCING SECTIONS & DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

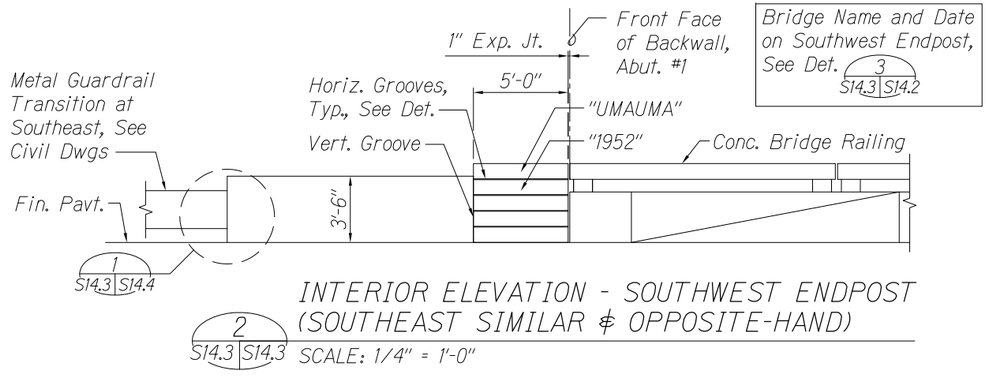
SHEET No. S14.2 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	128	135



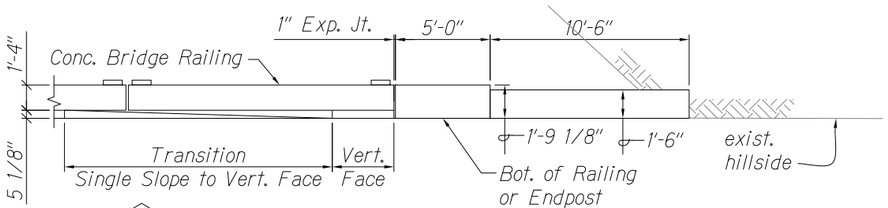
1 S2.2 S14.3 PLAN - SOUTHWEST ENDPOST (SOUTHEAST SIMILAR & OPPOSITE-HAND)

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



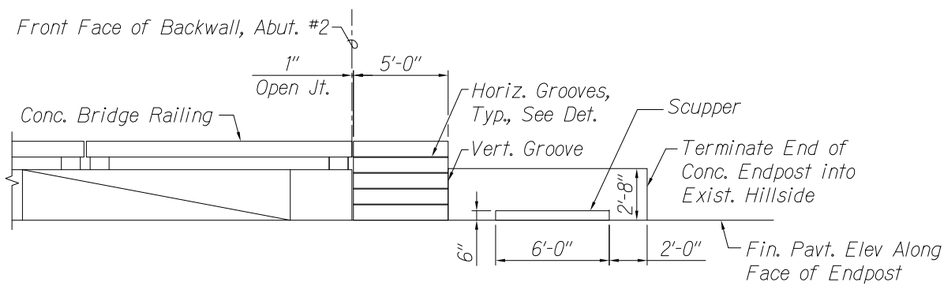
2 S14.3 S14.3 INTERIOR ELEVATION - SOUTHWEST ENDPOST (SOUTHEAST SIMILAR & OPPOSITE-HAND)

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



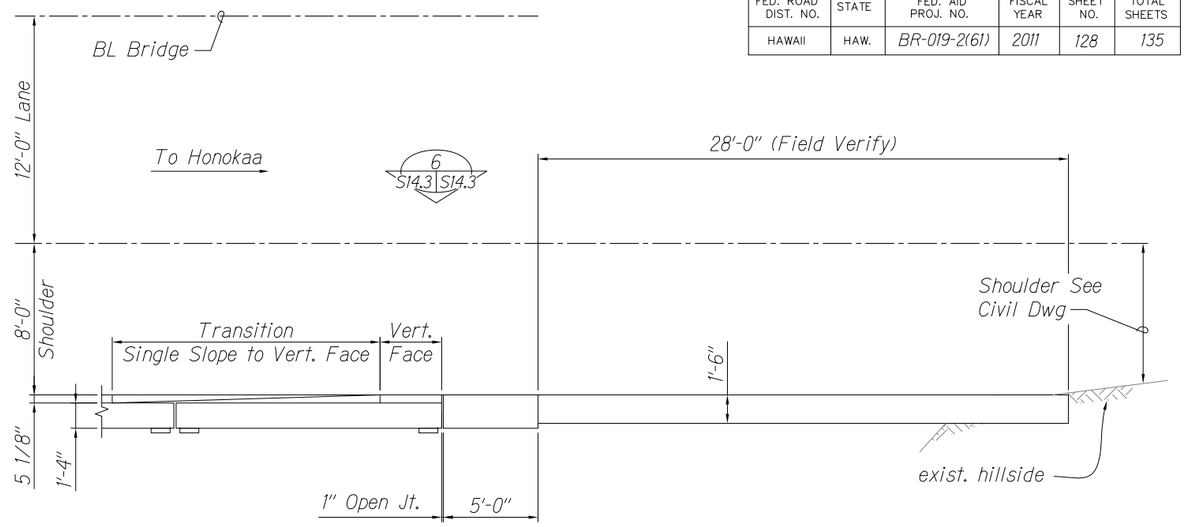
3 S2.2 S14.4 PLAN -NORTHWEST ENDPOST

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



4 S14.3 S14.3 INTERIOR ELEVATION - NORTHWEST ENDPOST

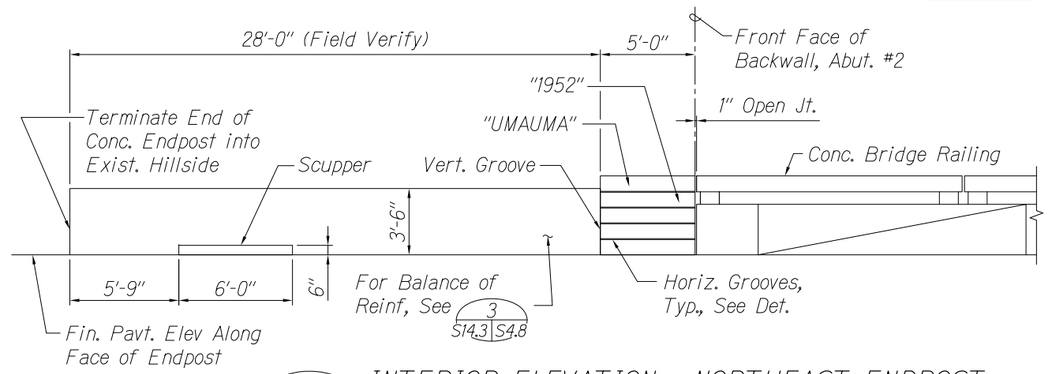
SCALE: 1/4" = 1'-0"



5 S2.2 & S4.6 S14.3 PLAN - NORTHEAST ENDPOST

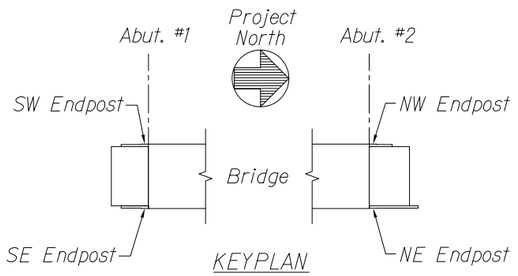
SCALE: 1/4" = 1'-0"

Note: For Endpost and Barrier Foundation Plan, See A S14.3 S4.6



6 S14.3 S14.3 INTERIOR ELEVATION - NORTHEAST ENDPOST

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



KEYPLAN

GRAPHIC SCALES:

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

1/4"=1'-0"

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BRIDGE ENDPOST DETAILS - HILO & HONOKA'A APPROACH

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

Scale: 1/4" = 1'-0" Date: Oct. 20, 2011

SHEET No. S14.3 OF 4 SHEETS

ORIGINAL PLAN | NOTEBOOK | No. | DATE
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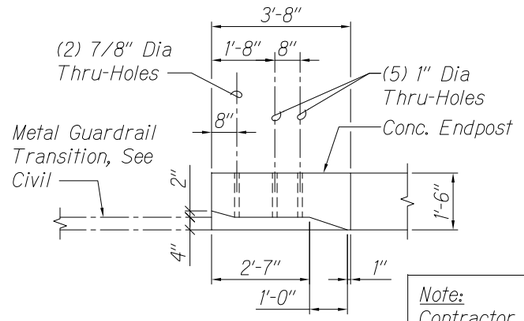
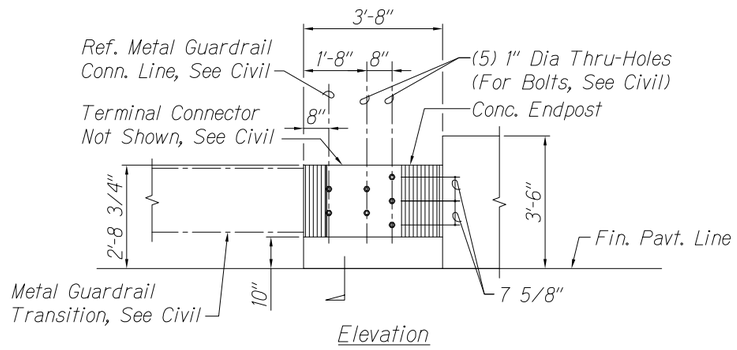
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	129	135



Plan

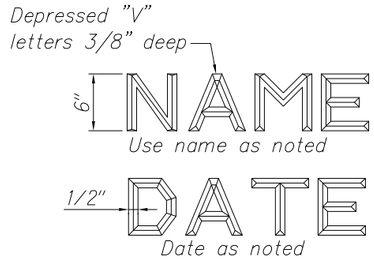
Note:
Contractor shall verify and coordinate all dimensions with specified metal guardrail details prior to construction.

3 S14.4 | S14.4



Elevation

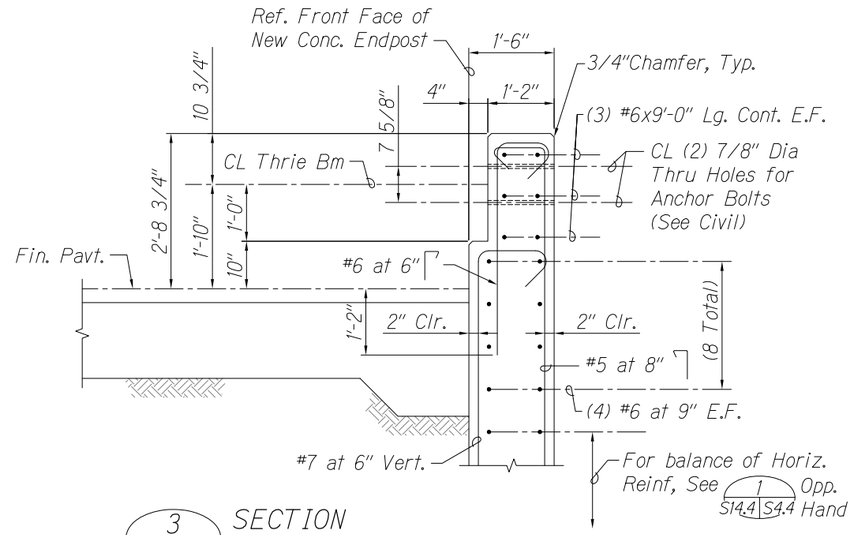
1 S14.3 | S14.4 CONCRETE ENDPOST TO METAL GUARDRAIL DETAIL
SCALE: 1/2" = 1'-0"



Note: Refer to corresponding detail drawings for placement of such names & dates at end post.

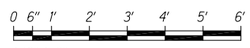
Exact details & spacing of letters & figures shall be as directed by the Engineer. Gothic letters and figures approximating dimensions shown will be acceptable if approved by the Engineer. Match existing lettering style.

2 S14.2 | S14.4 TYPICAL DETAIL OF LETTERS & FIGURES AT CONCRETE END POST
NOT TO SCALE



3 S4.3 & S14.4 | S14.4 SECTION
SCALE: 3/4" = 1'-0"

GRAPHIC SCALES:



ORIGINAL PLAN | NOTEBOOK | No.
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HAWAII, U.S.A.

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BRIDGE ENDPOST DETAILS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S14.4 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	130	135

Construction Phasing - Sequence of Demolition and Construction

Phase 1: Construct new concrete pier foundations, columns and caps below existing bridge.

Phase 2: Construct new foundations (drilled shafts and pile cap) and wingwalls on upstream side of existing abutments.

Phase 3: Demolish existing upstream concrete bridge railing, sidewalk and portion of existing deck slab.

Phase 4: Construct new steel girders and concrete deck slab along upstream side of bridge. Provide a pour strip to keep new deck slab separate from existing deck slab during curing. Cast pour strip after new upstream deck slab has cured. See note 3 below.

Phase 5: Construct new concrete bridge railing along upstream side of bridge.

Phase 6: Construct new foundations (drilled shafts and pile cap) and wingwalls on downstream side of existing abutments.

Phase 7: Demolish existing downstream concrete bridge railing, sidewalk and portion of existing deck slab.

Phase 8: Construct new steel girders and concrete deck slab along downstream side of bridge. Provide a pour strip to keep new deck slab separate from existing deck slab during curing. Cast pour strip after new downstream deck slab has cured. See note 3 below.

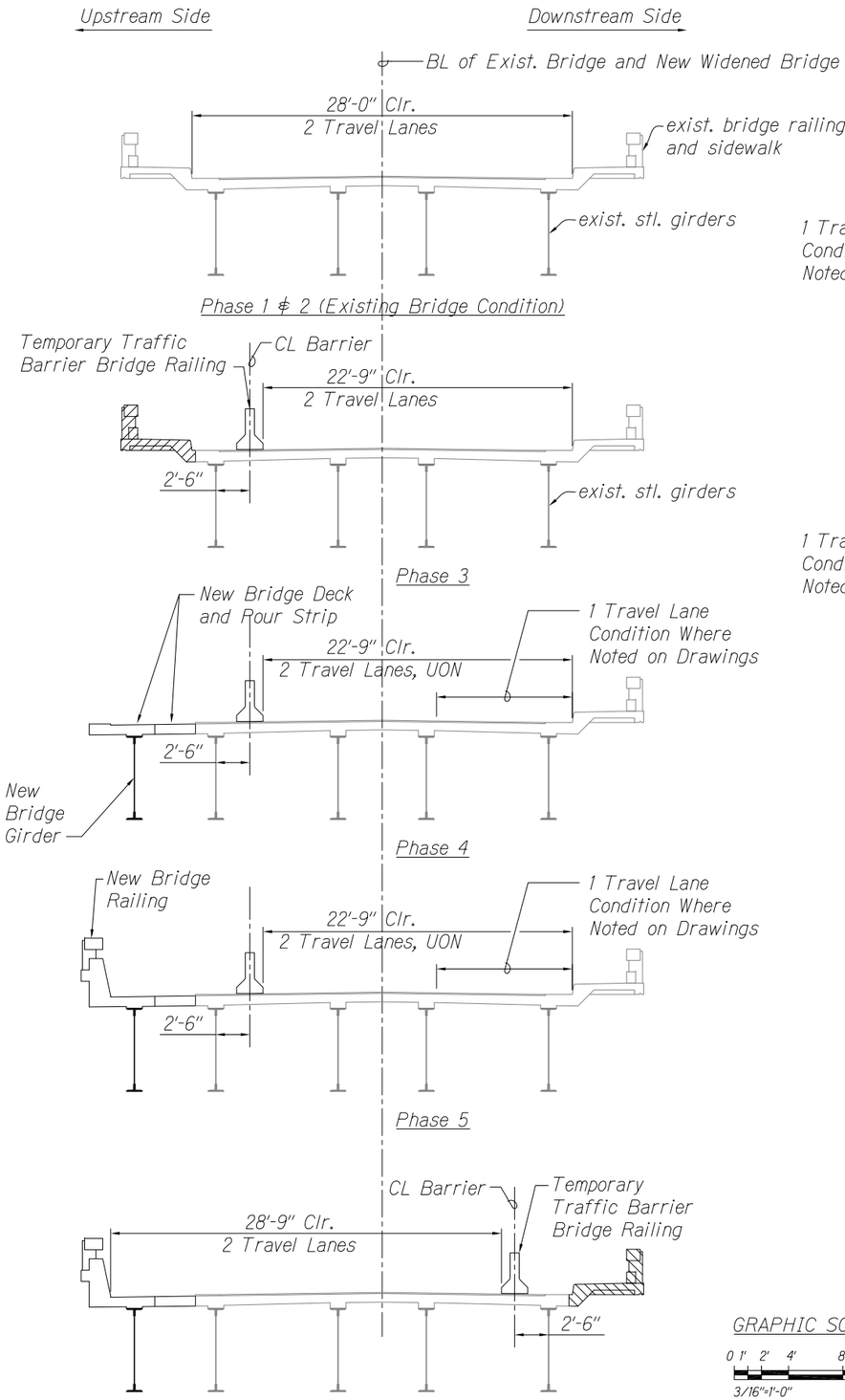
Phase 9: Construct new concrete bridge railing along downstream side of bridge.

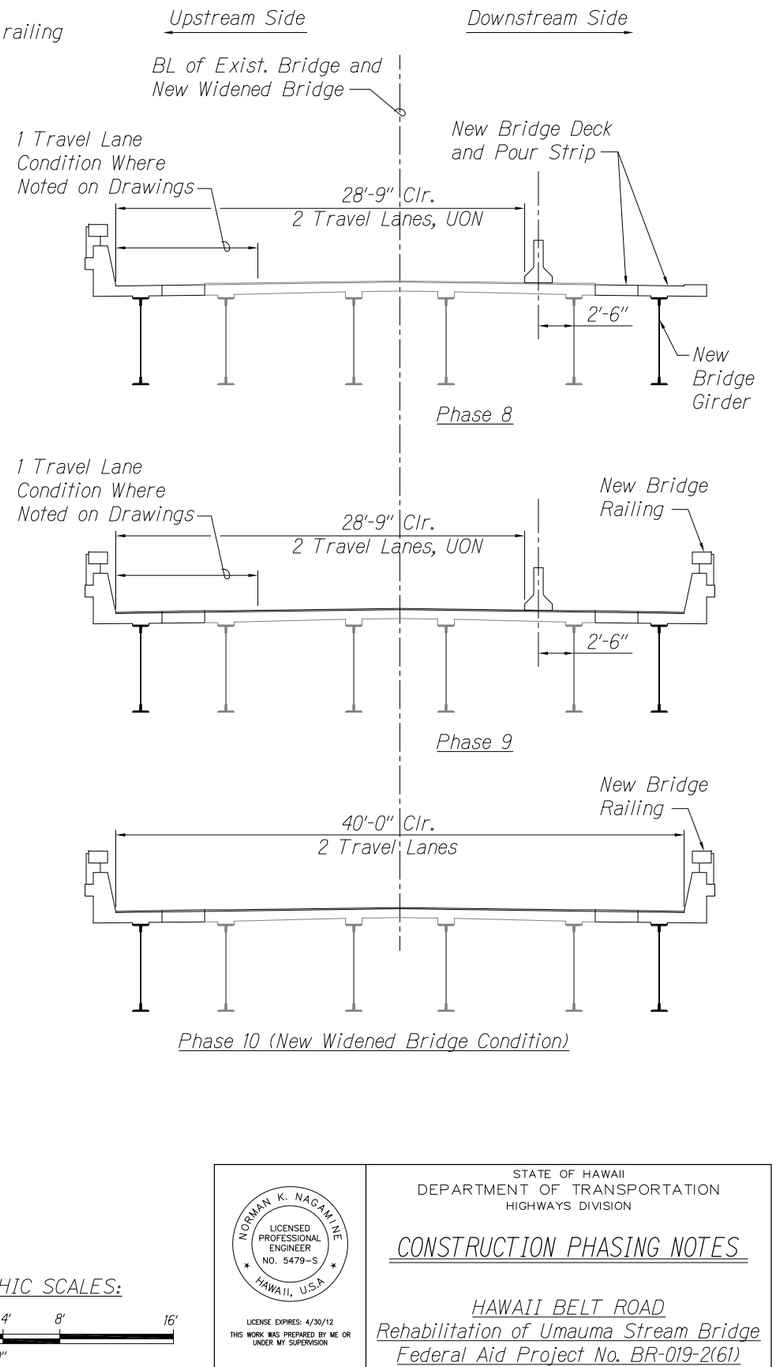
Phase 10: Construct new concrete approach slabs in sections to match phasing and lane closures on bridge.

Contractor's Option: Approach slabs may be constructed in earlier phases, subject to Engineer's approval.

Construction Phasing - General Notes

1. Two lanes on bridges shall remain open to traffic as much as possible during construction. One of the lanes on the bridge shall remain open to traffic at all times during construction. Full bridge closure for only very short periods of time may be permitted, subject to Engineer's approval.
2. For Traffic Control, see Civil sheets.
3. During pouring and initial curing of concrete pour strip, vehicular traffic shall be restricted to 5 mph max speed limit and one travel lane. See Special Notes on sheet S11.3.
4. New bridge deck and pour strip shall be poured in alternating spans. See sheet S11.3.





GRAPHIC SCALES:

0 1' 2' 4' 8' 16'

3/16"=1'-0"

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DESIGNED BY
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DATE
ORIGINAL PLAN
NOTEBOOK
No.

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

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

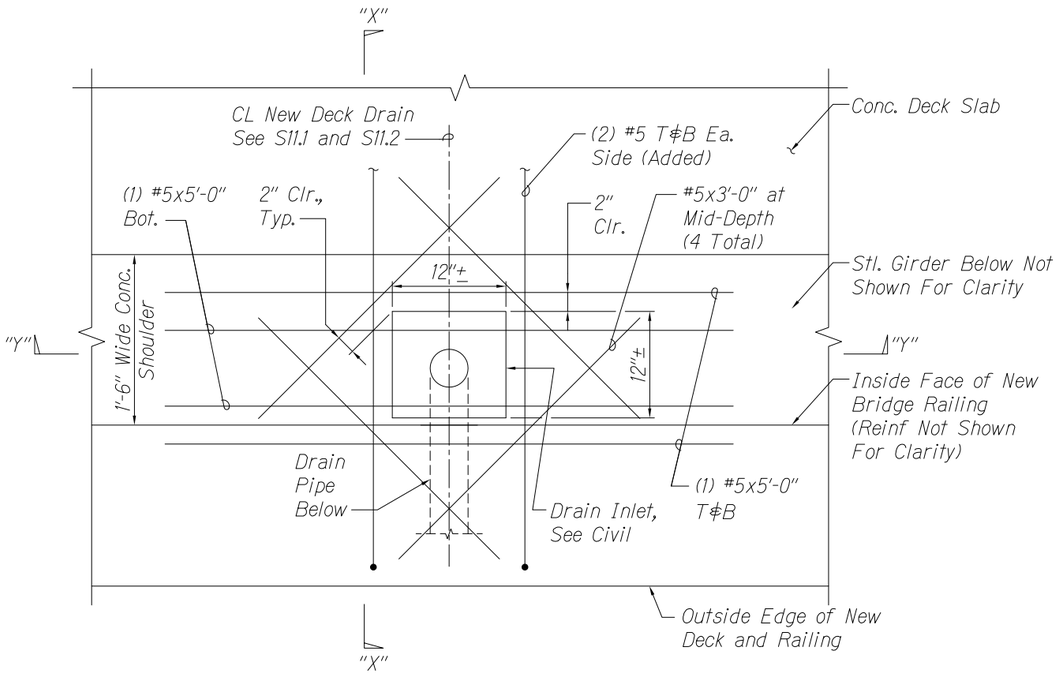
CONSTRUCTION PHASING NOTES

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

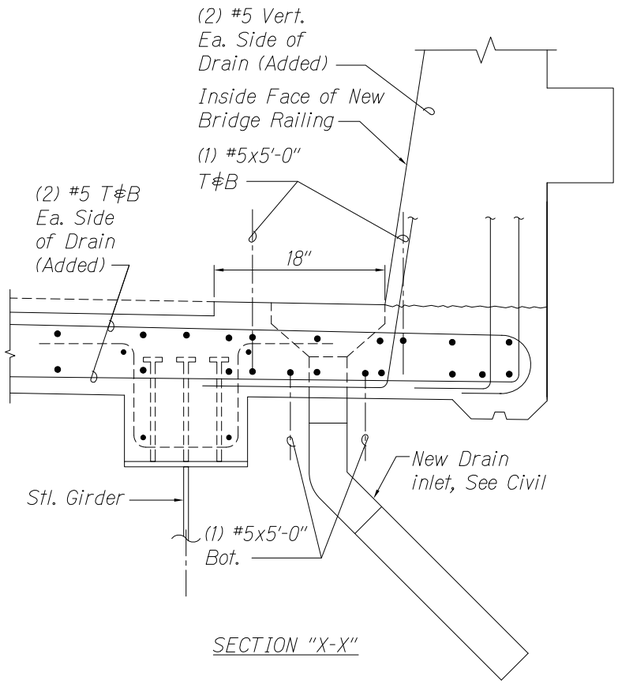
Scale: 3/16" = 1'-0" Date: Oct. 20, 2011

SHEET No. S15.1 OF 1 SHEETS

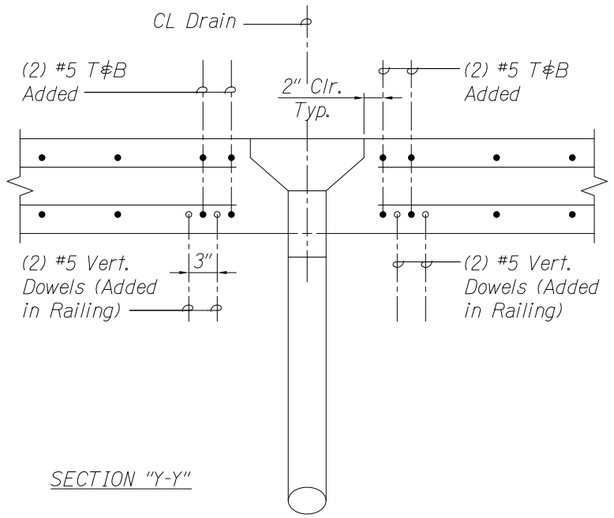
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	131	135



PLAN



SECTION "X-X"



SECTION "Y-Y"

1
S11.1 & S11.2 | S16.1 NEW DECK DRAIN DETAIL
SCALE: 1-1/2" = 1'-0"

GRAPHIC SCALES:

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

ORIGINAL PLAN
NOTEBOOK
No.
SURVEY PLOTTED BY
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LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A

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STATE OF HAWAII
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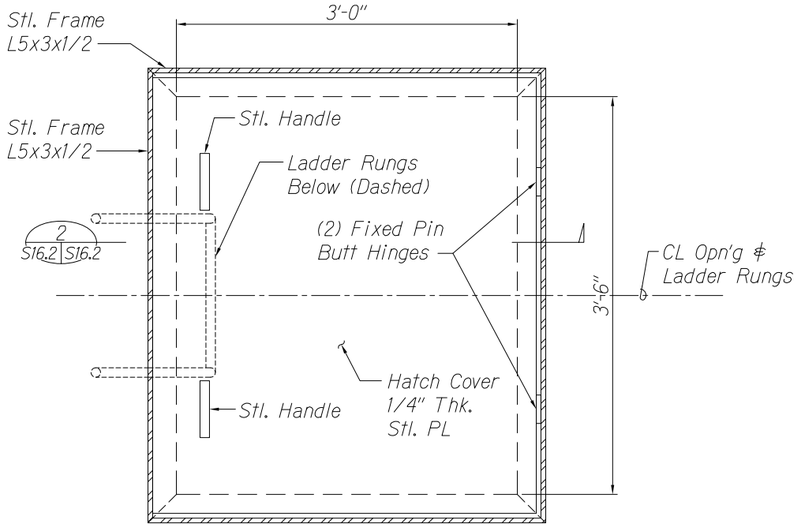
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS - DECK DRAINS

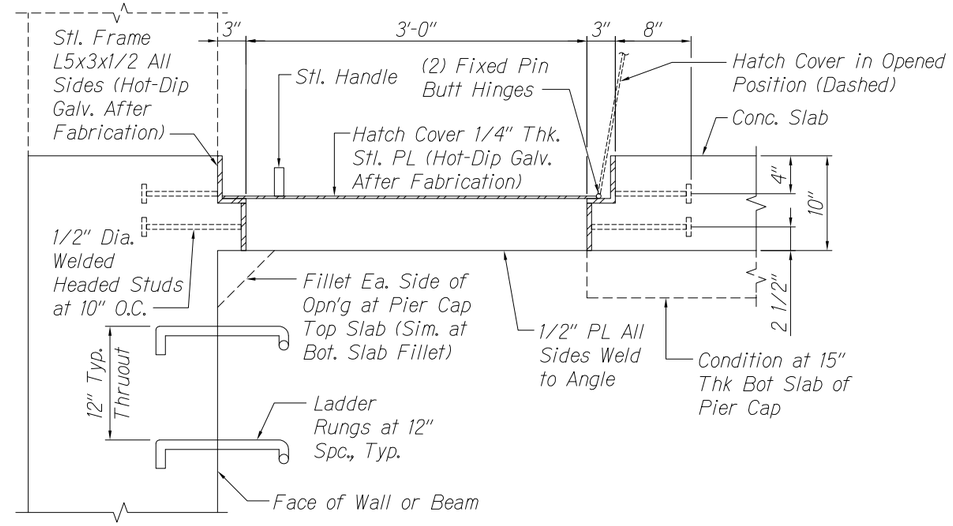
HAWAII BELT ROAD
Rehabilitation of Umauma Stream Bridge
Federal Aid Project No. BR-019-2(61)

Scale: 1-1/2" = 1'-0" Date: Oct. 20, 2011

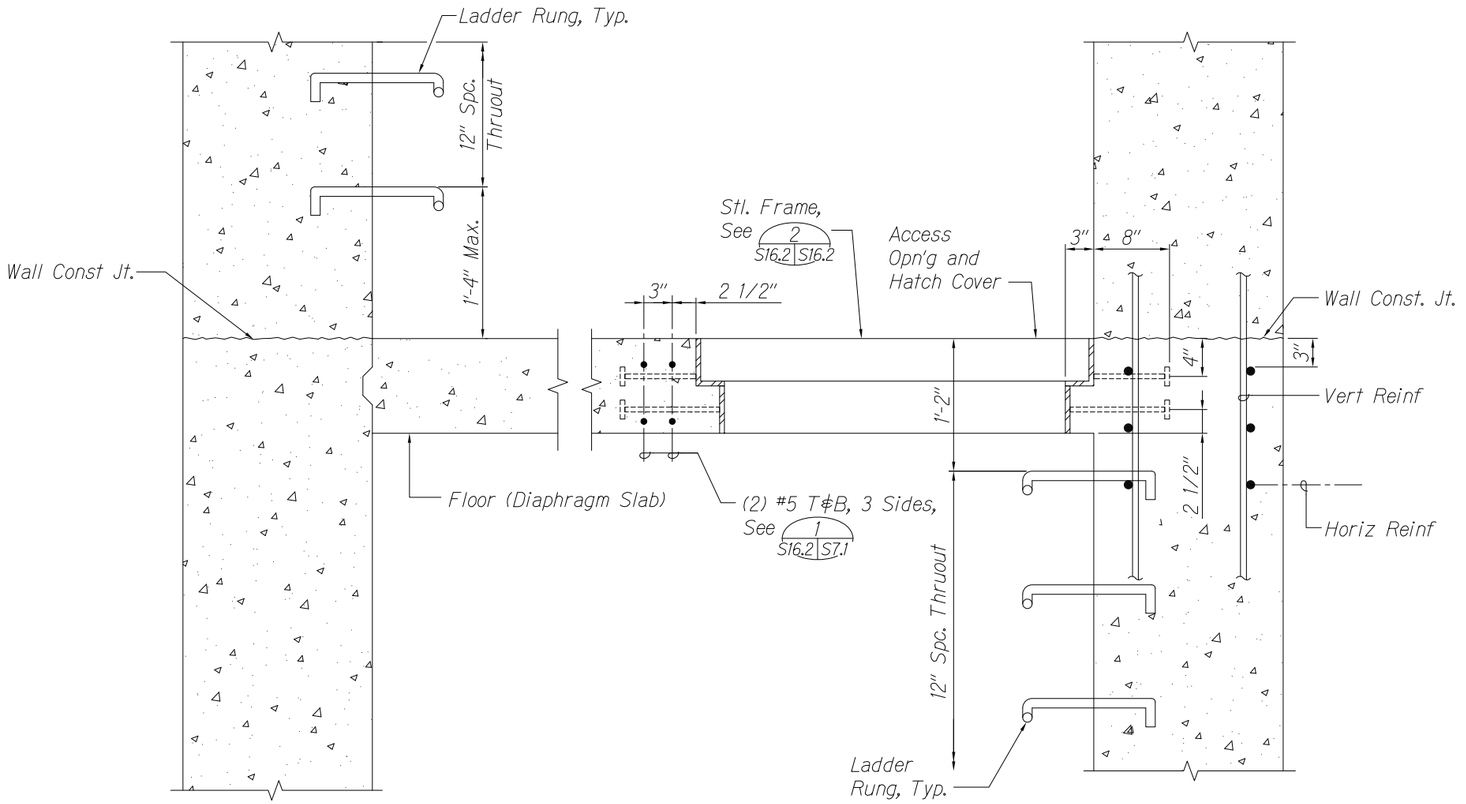
SHEET No. S16.1 OF 2 SHEETS



1 PLAN - NEW HATCH COVER
S7.1, S8.1, S8.2 S16.2 SCALE: 1-1/2" = 1'-0"



2 SECTION
S7.3, S7.5, S16.2 S16.2 SCALE: 1-1/2" = 1'-0"



3 SECTION AT FLOOR (DIAPHRAGM SLAB)
S16.2 S16.2 SCALE: 1-1/2" = 1'-0"

4 SECTION AT ACCESS OPENING
S16.2 S16.2 SCALE: 1-1/2" = 1'-0"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	132	135

Notes:

1. Refer to Standard Specs Section 712.07 "Frames, Grates, Covers, and Ladder Rungs", and Special Provisions.
2. Ladder Rungs Shall be 1" diameter wrought iron ASTM A36, hot dip zinc coated. For detail, see Standard Plan H-07, "Manhole Rung".
3. Ladder rungs shall be incidental to steel frame and hatch cover, and will not be paid for separately.
4. For ladder rung locations in pier, see sheet S2.6.

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

GRAPHIC SCALES:

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

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISC. DETAILS - NEW PIER ACCESS HATCH, STEEL RUNGS

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

Scale: 1-1/2" = 1'-0" Date: Oct. 20, 2011

SHEET No. S16.2 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	133	135

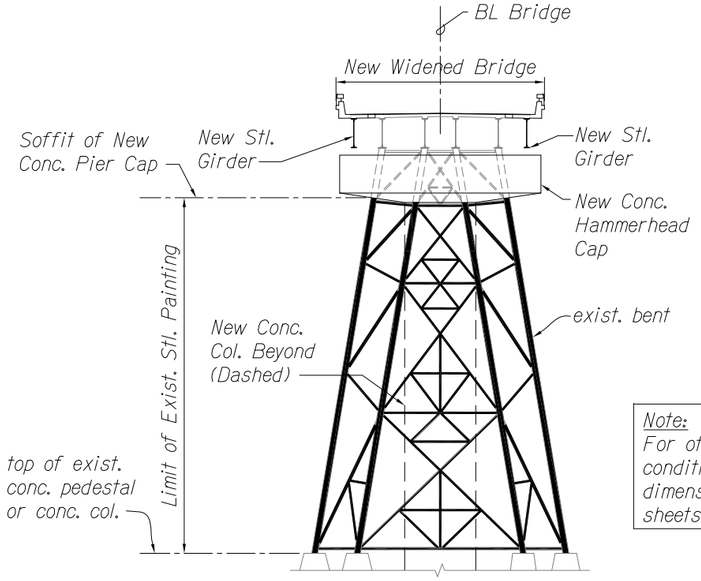
Clean and Paint Existing Steel Towers and Bents - Notes

General

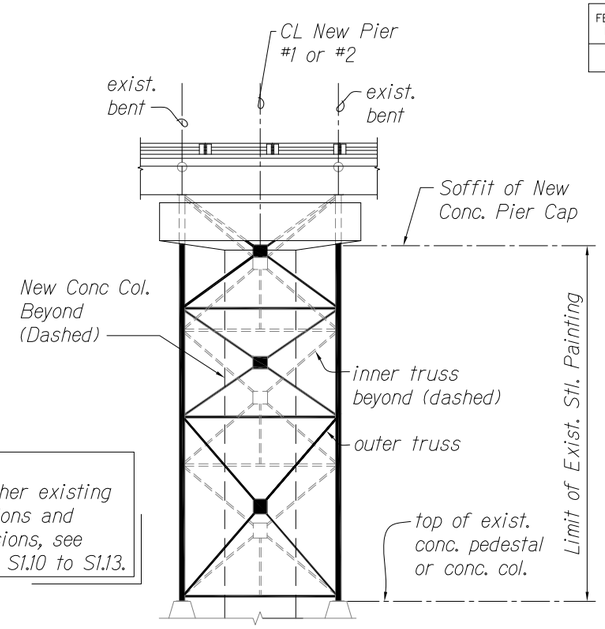
1. Contractor shall refer to Special Provisions Section 694 "Clean and Paint Structural Bridge Steel".
2. For general structural notes, see sheets S0.1, S0.2 and S0.3.
3. For existing and demolition general notes, see sheet S1.1.
4. Existing conditions are shown on the drawings as of December 2010. Where shown on drawings, dimensions and steel member sizes are based on available as-built bridge plans and may not be exact. This is provided for information only. Contractor shall field verify all existing and new dimensions and conditions. All discrepancies shall be promptly reported to the Engineer and shall be resolved prior to commencing work.
5. Contractor shall take adequate measures to protect the environment from all construction materials. See Standard Specs Section 107.13 - "Pollution Control and Protection of Archeological, Historical, and Burial Sites", and Section 209 - "Temporary Water Pollution, Dust and Erosion Control", and "Water Pollution and Erosion Control Notes" on civil sheets C-2 and C-3, and "Site Specific BMP Notes" on sheet C-13.
6. Contractor shall provide temporary containment structures around the work area to protect the environment. See Special Provisions.
7. New paint shall be a three-coat system consisting of a modified aluminum epoxy mastic coating (base coat and intermediate coat) and a polyurethane top coat. Color of top coat shall be black. See Special Provisions.

Surface Preparation and Application

1. Where existing steel members or connections are damaged, steel shall be repaired prior to cleaning and painting work. Contractor shall immediately notify the Engineer. See sheet S17.2 and S17.3 for typical repair details and estimated repair quantities (allowance). For variations in estimated quantities, see Standard Specs Section 104.07.
2. All loose rust and scale shall be removed by hand or power tool clean (SSPC SP2 or SP3).
3. Steel surfaces to be coated shall be solvent wiped (SSPC SP1).
4. Apply specified modified aluminum epoxy mastic coating (base coat and intermediate coat) in strict conformance with manufacturer's recommendations and allow each coat to properly dry.
5. Apply specified polyurethane top coat in strict conformance with manufacturer's recommendations. See Special Provisions.

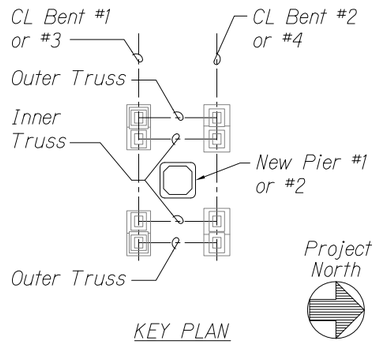


SOUTH OR NORTH ELEV



EAST OR WEST ELEV

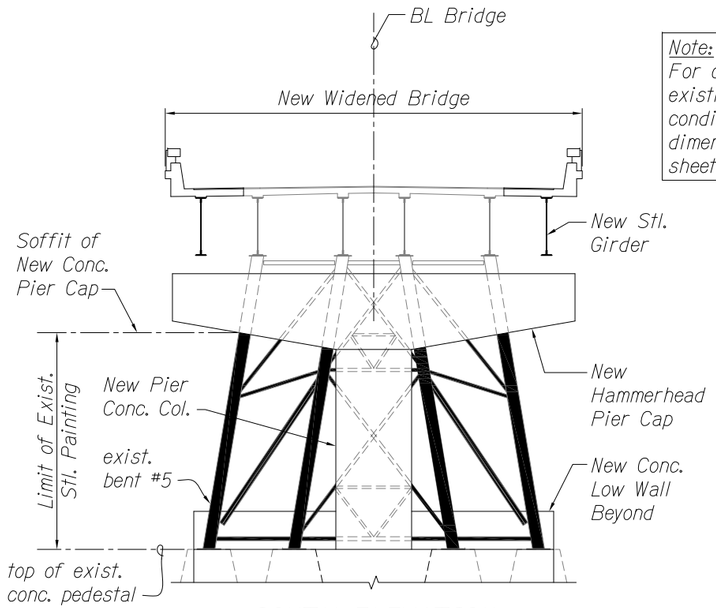
Note: For other existing conditions and dimensions, see sheets S1.10 to S1.13.



KEY PLAN

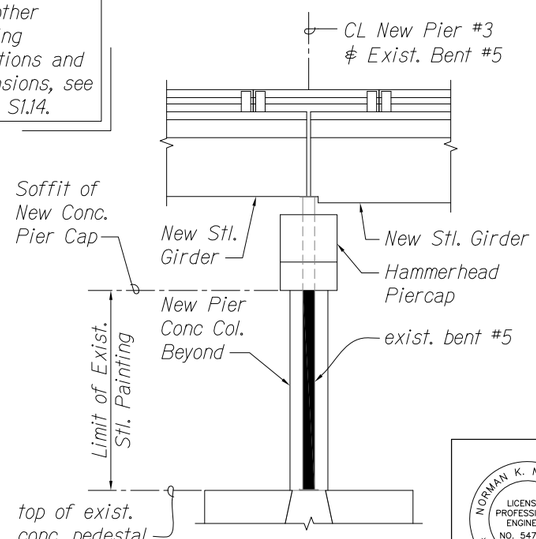
1 / S17.1 | S17.1 ELEVATION - NEW PIER #1 OR PIER #2

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



SOUTH ELEVATION

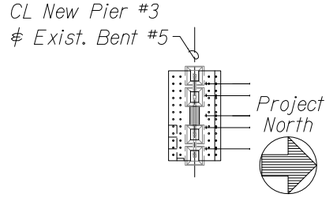
Note: For other existing conditions and dimensions, see sheet S1.14.



EAST ELEVATION

2 / S17.1 | S17.1 ELEVATION - NEW PIER #3

SCALE: 1/8" = 1'-0"



KEY PLAN

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"

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

LICENSE EXPIRES: 4/30/12

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

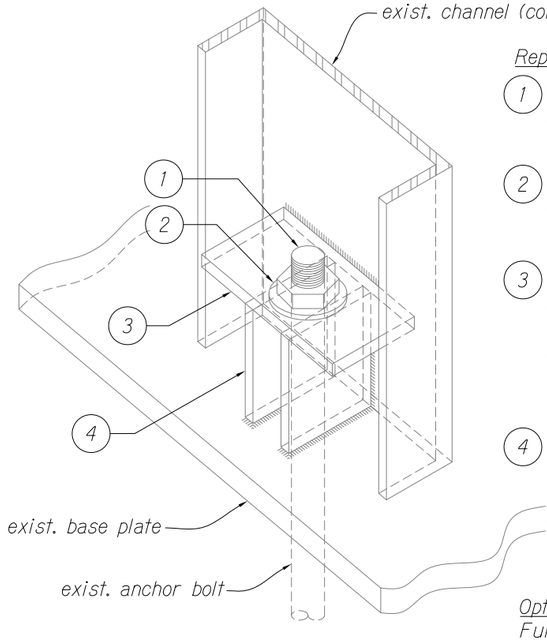
CLEAN & PAINT EXISTING STEEL TOWERS & BENTS

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

Scale: As Shown Date: Oct. 20, 2011

SHEET No. S17.1 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	134	135



Repair Notes:

(1) Weld existing anchor bolt to horizontal plate (3)

(2) Remove corroded nut and washer

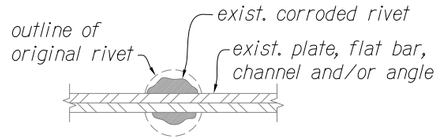
(3) Replace existing corroded horizontal plate (3), if thickness loss is greater than 30%

(4) Replace existing corroded vertical plates (4), if thickness loss is greater than 30%

Option:
Fully weld bolt to nut, nut to washer and washer to plate (3).

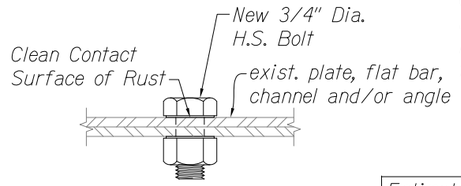
Estimated Qty. = 20 Each

REPAIR DETAIL - TYPE 1
Not To Scale



EXISTING CORRODED RIVET

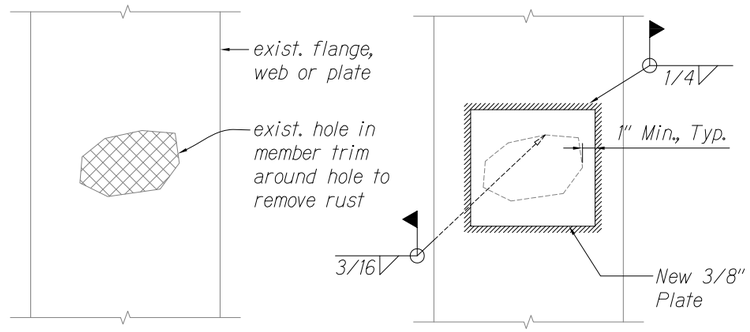
Repair Note:
Remove and replace corroded rivets one at a time. Alternate sequence of replacement about centerline of member, starting from center-most rivet and proceeding toward outer-most rivets.



Estimated Qty. = 500 Each

REPLACEMENT BOLT

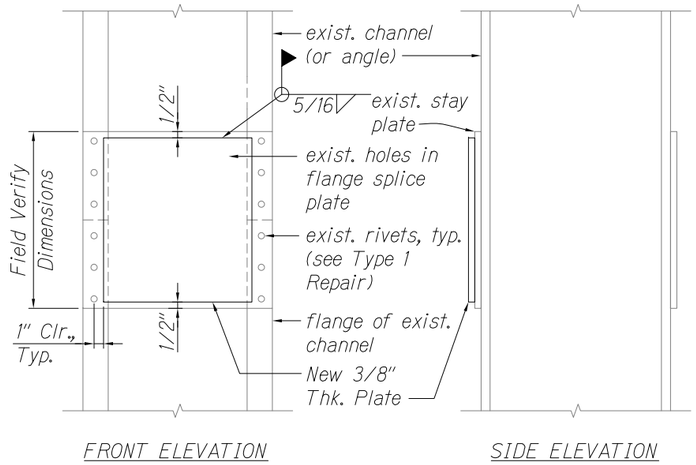
REPAIR DETAIL - TYPE 2
Not To Scale



EXISTING DETAIL
REPAIR DETAIL

Estimated Qty. = 100 Each

REPAIR DETAIL - TYPE 3
Not To Scale



FRONT ELEVATION
SIDE ELEVATION

Option:
Remove existing corroded stay plate and replace with new 3/8" plate welded or bolted to existing channels or angles.

Estimated Qty. = 100 Each

REPAIR DETAIL - TYPE 4
Not To Scale

1 / S17.2 | S17.2 REPAIR DETAILS
Not To Scale

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: 4/30/12
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

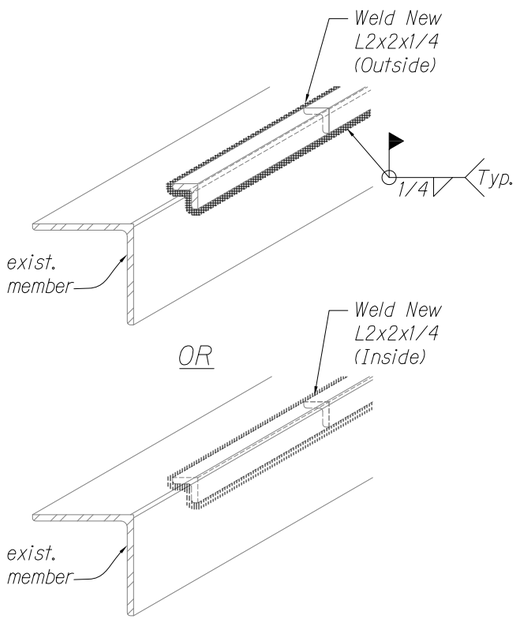
EXISTING STEEL TOWERS & BENTS - REPAIR DETAILS

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

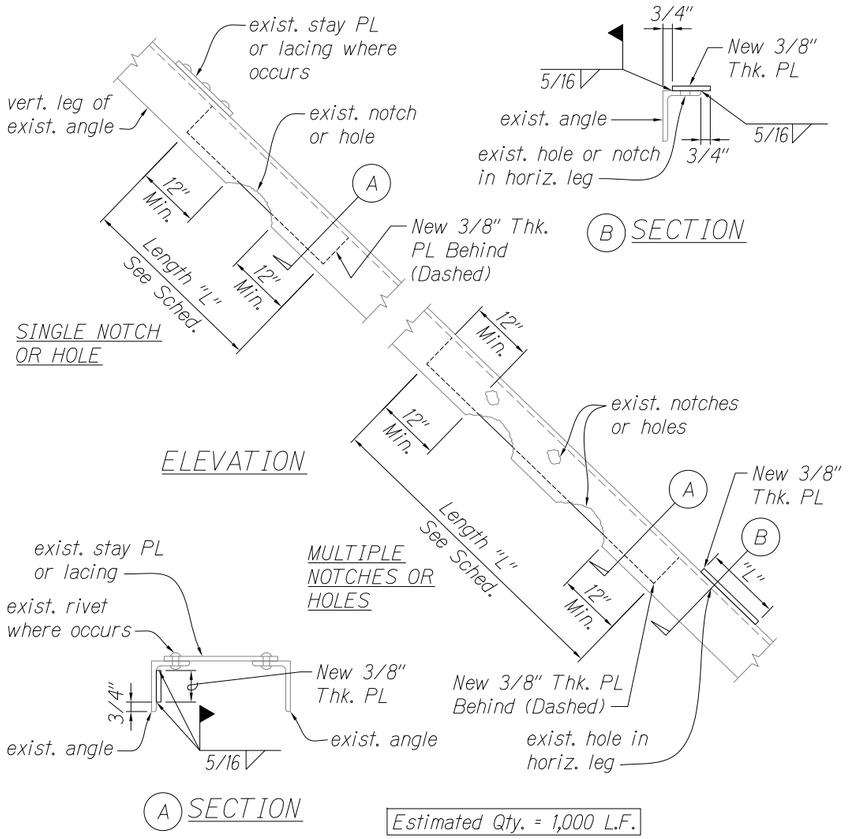
Scale: None Date: Oct. 20, 2011

SHEET No. S17.2 OF 3 SHEETS

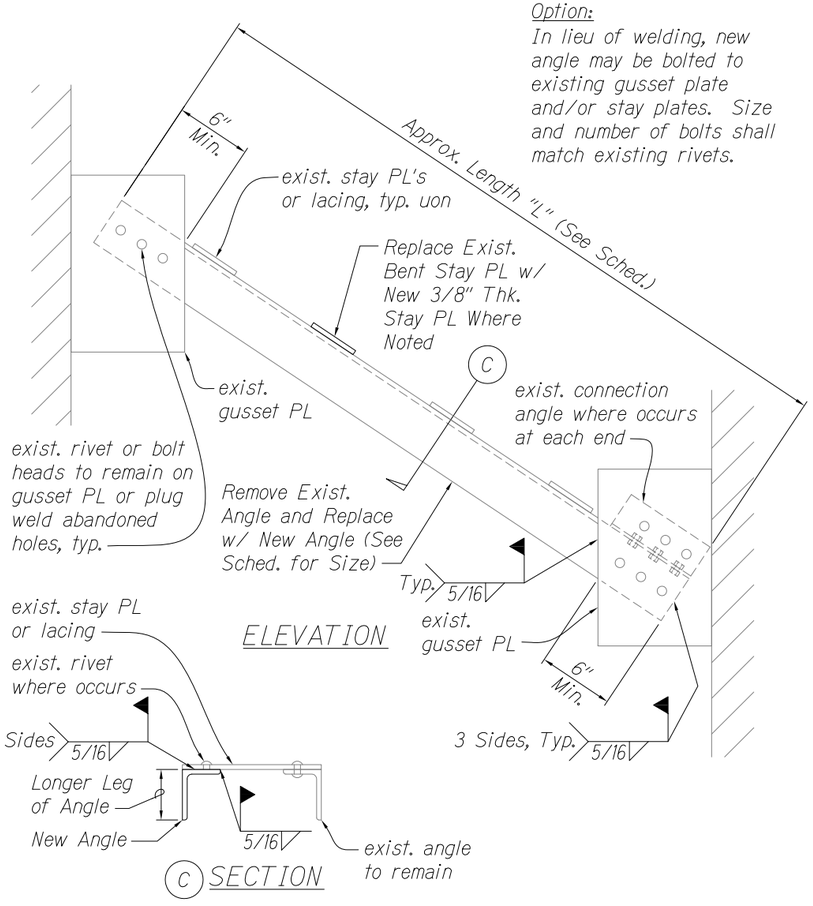
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2011	135	135



Estimated Qty. = 1,000 L.F.



Estimated Qty. = 1,000 L.F.



REPAIR DETAIL - TYPE 5

Not To Scale

REPAIR DETAIL - TYPE 6

Not To Scale

1 S17.3 | S17.3 REPAIR DETAILS

Not To Scale

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

ORIGINAL PLAN
NOTEBOOK
No.

NORMAN K. NAGAMINE
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING STEEL TOWERS & BENTS - REPAIR DETAILS

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

Scale: None Date: Oct. 20, 2011

SHEET No. S17.3 OF 3 SHEETS