State of Hawaii, Department of Health, Clean Water Branch

NPDES Form F

Application for HAR, Chapter 11-55 - NPDES Individual Permit Authorizing Discharges of Hydrotesting Waters

All sections of this form MUST be completed for National Pollutant Discharge Elimination System (NPDES) Permit compliance.

F.1 – General Information

You are required to fulfill all requirements and check the box below. If you do not check the box, your application will be considered incomplete, and the CWB may deny your request for NPDES permit coverage with prejudice.

☒ *I certify that:*

- *I will design, implement, operate, and maintain a Hydrotesting Best Management Practices (BMPs) Plan to ensure that my discharges of hydrotesting waters will not violate HAR, Chapter 11-54; HAR, Chapter 11-55; and HAR, Chapter 11-55, Appendix F.*
- *My Hydrotesting BMPs Plan shall include good housekeeping practices to prevent the introduction of pollutants to the hydrotesting effluent; mitigative measures (i.e., filtration system, dechlorination method, etc.) which will be installed to prevent pollutants that may be present in the hydrotesting effluent from entering the receiving State waters; and will contain appropriate measures to address Section 303(d) pollutants of concern for my receiving State water.*
- *Prior to any discharge of hydrotesting effluent, I will provide treatment to remove all pollutants of concern identified in Sections F.6, F.7, and F.8.*

F.2 –Maps

Attach, title, and identify all maps (pdf - minimum 300 dpi) listed below, in Attachment A. Please reference which maps account for the features listed below.

a. *Island on which the activity is located.* O‘ahu

b. *Location(s) of activity.* See **Attachment A, Exhibit 1, Items F.2.b.-e. Project Location and Hydrotesting Discharge Points.**

c. *Topographic map or maps which clearly show the legal boundaries of the activity; location of all existing and/or proposed outfalls or discharge points; and receiving State water(s) and receiving storm water drainage system(s), if applicable, identified and labeled.*. See **Attachment A, Exhibit 1, Items F.2.b.-e. Project Location and Hydrotesting Discharge Points.**

d. *Location of the tank, waterlines and/or sewer lines to be hydrotested.*. See **Attachment A, Exhibit 1, Items F.2.b.-e. Project Location and Hydrotesting Discharge Points.**

e. *Location of permit compliance sampling point(s).* See **Attachment A, Exhibit 1, Items F.2.b.-e. Project Location and Hydrotesting Discharge Points.**

Note: You are required to specify the monitoring points where samples will be taken to demonstrate permit compliance. All samples will be taken before the effluent joins or is diluted by any other wastestream, body of water, or substance. No discharge is authorized which does not totally pass through the final monitoring point. If the permit is issued, monitoring points shall not be changed without notification to and the approval of the Director of Health.

F.3 – Flow Chart or Line Drawing

Attach or insert in Attachment A, a flow chart showing the following (Check each item, as applicable): See **Attachment A, Exhibit 2, Item F.3, Hydrotesting Water Flow Chart**.

☒ a. *General route taken by hydrotesting water through the project or activity from intake to the discharge point*

☒ b. *Structures to be hydrotested*

☒ c. *Hydrotesting Best Management Practices (BMPs) utilized (e.g.,dechlorination, filtration, etc.)*

☒ d. *Estimated quantity of flow through each applicable route from upslope to the receiving State water*

☒ e. *Drainage system(s) receiving hydrotesting effluent, as applicable (e.g., City and County of Honolulu Municipal Separate Storm Sewer System (MS4), etc.)*

☒ f. *State water name(s) receiving hydrotesting effluent*

Indicate which item(s) are not identified and explain why the item(s) are not identified _____

F.4 - Existing or Pending Permits, Licenses, or Approvals

Place a check next to all applicable Federal, State, or County permits, Licenses, or approvals for the project and specify the permit number.

☒ *Other NPDES Permit or NGPC File No.:* NPDES Forms C (Construction Storm Water) and G (Dewatering Activities)

☒ *Department of the Army Permit (Section 404):* POH-2005-00342 (April 4, 2019)

If your project requires work in, above, under or adjacent to State waters, please contact the Army Corps of Engineers (COE) Regulatory Branch at (808) 438-9258 regarding their permitting requirements. Provide a copy of the COE permitting jurisdictional determination (JD) or the JD with COE Person's Name, Phone Number, and Date Contacted.

☐ *Facility on SARA 313 List (identify SARA 313 chemicals on project site):* _____

☐ *RCRA Permit (Hazardous Wastes):* _____

☐ *Section 401 Water Quality Certification:* The project is exempted from obtaining a Section 401 Water Quality Certification (WQC), as provided by Senate Bill 1016 SD1 HD1 (expires June 30, 2022).

☒ *Other (Specify)*: Special Management Permit (Resolution 278-CD1); U. S. Coast Guard Clearance (obtained); Section 106, National Historic Preservation Act, Consultation (completed); Section 7, Endangered Species Act, Consultation (completed); Section 4(f) Department of Transportation Act, Consultation (completed); Stream Channel Alteration Permit (exempt per Senate Bill 1016 SD1 HD1); HDOT Plan Review (pending); Grading Permit (pending); Coastal Zone Management Federal Consistency Review (pending)

F.5 – Activity Description

a. *Provide an overview or describe the hydrotesting activities.*

The State of Hawai‘i, Department of Transportation, Highways Division (HDOT), is proposing to repair an existing 12 inch diameter waterline that traverses beneath Kaipapa‘u Stream and replace a 16 inch diameter waterline attached to Kaipapa‘u Stream Bridge in Hau‘ula, Ko‘olauloa District, Island of O‘ahu, Hawai‘i.

Portions of an existing 12-inch diameter waterline beneath Kaipapa‘u Stream will be repaired. The portions of the 12-inch waterline to be replaced are located outside the stream (see **Attachment F, Construction Drawings, C-20, C-28**) and will be repaired via open trench (approximately 85 linear feet). The existing 12-inch waterline under the stream will be temporarily removed from service during the repairs and then reconnected and placed back into service following completion of the 12-inch waterline work. During repairs a temporary 12-inch 125-foot-long or 125 square foot waterline will be placed on the existing pedestrian bridge.

The replacement of an existing 16-inch diameter will require the removal of the existing waterline, placement of a temporary waterline, and installation of the new 16-inch diameter waterline over the stream. The temporary 16-inch diameter 250-foot-long or 333 square foot waterline will be placed on the temporary detour bridge during construction. The new permanent 16-inch diameter 155 feet long or 207 square feet waterline will be installed over the stream within the new bridge 3.2-foot-wide concrete bridge encasement. Following the installation of the 16-inch permanent waterline the temporary waterline will be removed.

The replacement of the Kaipapa‘u Stream Bridge and maintenance work will be completed through phased construction and demolition. Silt fences will be installed on down slope portions of the project site. A staging area, temporary dewatering basin, temporary concrete wash-out basin, and stabilized construction entrances will be prepared.

The sequencing of construction activity is as follows:

- Install best management practices (BMPs)/erosion control measures (see **Attachment F, Construction Drawings, Sheet C-18**).
- Install temporary 12" water line and relocate existing 12" water line (see **Attachment F, Construction Drawings, Sheets C-20, C-28,** and **C-29**).
- Relocate electrical utilities.
- Construct trial and load test drilled shafts and perform load test.
- Construct detour roadway and temporary Acrow bridge.
- Demolish existing Kaipapaʻu Stream Bridge. Expose existing 16" water line jacket and concrete support system.
- Construct Phase 1 of new Kaipapaʻu Stream Bridge (see **Attachment F, Construction Drawings, Sheets S0.7, S0.7A, S0.7B**).
- Partially remove detour roadway and temporary bridge. Construct temporary pavement transitions, signing and pavement markings.
- Construct Phase 2 of new Kaipapaʻu Stream Bridge (see **Attachment F, Construction Drawings, Sheets S0.8, S0.8A, S0.8B**).
- Remove remainder of detour roadway and temporary bridge.
- Construct sandbags and shotcrete lining along north bank above stream, upstream of Kaipapaʻu Stream Bridge (see **Attachment F, Construction Drawings, Sheet C-18**).
- Construct dumped riprap along north and south bank above stream, downstream of Kaipapaʻu Stream Bridge (see **Attachment F, Construction Drawings, Sheets C-16** and **C-18**).
- Construct AC pavement (see **Attachment F, Construction Drawings, Sheet C-16**).
- Construct final signing and pavement markings.
- Remove temporary BMPs.

Procedures for hydrotesting of the waterlines will involve the following:

1. **Hydrotesting of waterline integrity**: The waterlines will be tested for integrity against leakage followed by pre-flushing of hydrostatic test water. All hydrostatic testing, pre-flushing and chlorination will be undertaken using potable source water.

2. **Chlorination**: Chlorination will be introduced to the sections of the waterline to be disinfected. Flushing/chlorination procedures consists of the following: a) initial flush; b) inject chlorine; c) flush solution and sample; d) inject chlorine again, and e) flush solution and sample. This process is repeated if the samples fail specified laboratory tests for water quality. Data concerning concentration and length of time for disinfection are to be provided to DOH, Clean Water Branch (CWB), by the hydrotesting/chlorination contractor no fewer than 30 days prior to the start of hydrotesting activity.

3. **De-chlorination**: The section of waterline being disinfected will be de-chlorinated using sodium thiosulfate. A solution will be mixed to an average concentration of 60 lbs/100,000 gallons. The solution will be mixed with chlorinated effluent per attached, see **Attachment A, Exhibit 3, Item F.5.a., Hydrotesting Sequence**. Water quality will be monitored by the hydrotesting/chlorination contractor during flushing and de-chlorination of the effluent. Upon satisfactory flushing of all trace levels of chlorine, use of sodium thiosulfate will be terminated.

4. **Bacterial testing**: Following de-chlorination the discharge water will be tested for bacteria by the hydrotesting/chlorination contractor. As required: a) Upon successful disinfection, work will proceed to the next segment that needs dewatering; b) If bacterial tests indicate further need for chlorination, the steps indicated above will be repeated until successful results are obtained. Hydrotesting discharges for the waterlines will be directed to the filter box as represented in **Attachment A, Exhibit 4, Items F.5.a. and F.9, Filter System**.

b. Provide the estimated date when construction will begin.
The estimated scheduled start time for construction is January 2021. The overall duration of the project is expected to be approximately three years. A detailed schedule of construction activity will be completed when a contractor is selected for the project and provided to DOH-CWB 30 days prior to the start of construction.

c. Provide the estimated date when construction will end.
To be determined by the General Contractor, dates will be submitted to DOH CWB 30 days before the start of construction.

d. Provide the estimated date when hydrotesting activities will begin.
To be determined by the General Contractor, dates will be submitted to DOH CWB 30 days before the start of construction.

e. Provide the estimated date when hydrotesting activities will end.
To be determined by the General Contractor, dates will be submitted to DOH CWB 30 days before the start of construction.

f. Provide the estimated average daily flow rates.
<1.34 cfs (maximum discharge 130,559.69 gallons)

g. Provide the estimated maximum daily flow rates.
<1.34 cfs (maximum discharge 130,559.69 gallons)

h. *Provide the estimated total quantity of discharge.*
Maximum discharge 130,559.69 gallons

F.6 – Physical Hydrotesting Water Quality

a. *Provide the source(s) of hydrotesting water*
Board of Water Supply potable water from Hau‘ula and Ma‘akua Wells. See **Attachment B, Board of Water Supply Source Water Quality Mineral Analysis**.

b. *Is the source of hydrotesting water potable?*
☒ *Yes* ☐ *No*

c. *Place an “x” in either the “Believe Present” column or the “Believe Absent” column based on the test results or your best estimate.*

Parameter	*Believe Present*	*Believe Absent*
Floating Debris		X
Scum or Foam		X
Color		X
Odor		X

List the Discharge Point(s) that you identified in Section 6 of the e-Permitting CWB Individual NPDES Form that apply to this table
Discharge Point 1 (From), Kaipapa‘u Stream, Class 2, Inland: 21.61717846380141” N, -157.9142857880188 W; and Discharge Point 2 (To), Kaipapa‘u Stream, Class 2, Inland -21.617151034652878 N, -157.91334701486358 W.

Please ensure that all Discharge Points are accounted for. If you leave this item blank, we will assume that this table applies to all Discharge Points. If needed, you may copy, paste, and complete this table for each Discharge Point with different test results.

F.7 – Water Quality Parameters

You are required to fulfill all requirements in F.7.a or F.7.b below.

a. *The source of hydrotesting water is **potable**, and I have attached the water quality analysis from the source water treatment/distribution operator (i.e. Board of Water Supply, County Department of Water, etc.) in Attachment B.*
I acknowledge that no further testing of the source water is necessary, and I will not complete Table F.7 below.

Hydrotesting source water will be Board of Water Supply potable water from Hau‘ula and Ma‘akua Wells. See **Attachment B, Board of Water Supply Source Water Quality Mineral Analysis**.

b. *The source of hydrotesting water is **non-potable**. Please fulfill the requirements and check the box below. If you do not check the box, your application will be considered incomplete, and the CWB may deny your request for NPDES permit coverage with prejudice.*

☐ *I certify that:*

- *I tested all of the parameters in the Table F.7 below, and a copy of the laboratory data sheets with Quality Assurance/Quality Control and Chain of Custody documents is included in Attachment B. I am reporting the results of my test in Table F.7 below.*
- *All test results were obtained from a representative sample as defined in HAR, Chapter 11-55, Appendix A, Section 14(a). Note: The burden of proving that sampling or monitoring is representative is on the Permittee.*
- *The test methods that I utilized were promulgated in 40 CFR Part 136 and, when applicable, listed in the references of chemical methodology for seawater analyses (see HAR, Chapter 11-54, Section 10(b)). Note: If a test method has not been promulgated for a particular parameter, you may apply for approval of an alternate test procedure by following 40 CFR Section 136.4.*
- *The test methods that I utilized have detection limits below and closest to the numerical limit specified in HAR, Chapter 11-54. For situations where the numerical limitation is below the detection limit of the test methods, I used the test method which has the detection limit closest to the numerical limitation.*

c. *Complete Table F.7 below if the hydrotesting source water is **non-potable**. The test results shall be reported to the nearest decimal place or whole number as shown in the parentheses following each parameter. For example, "Temperature (0.1 °C)" - Temperature shall be reported to the nearest tenth of a centigrade and "Ammonia Nitrogen (1 µg/l)" - Ammonia Nitrogen shall be reported to the nearest whole microgram per liter. One test result may be reported for Salinity, Chloride, or Conductivity. If the test result is not detectable, indicate that the test result is "N.D." or "not detected."*

Table F.7

Parameter	*Test Result*	*Units*
Turbidity (0.1 NTU)	N/A	*NTU*
Total Suspended Solids (1 mg/l)	N/A	*mg/l*
pH (0.1 standard units)	N/A	*standard units*
Dissolved Oxygen (0.1 mg/l)	N/A	*mg/l*
Oxygen Saturation (1%)	N/A	*%*
Temperature (0.1 °C)	N/A	*°C*
Salinity (0.1 ppt)	N/A	*ppt*
*or Chloride (0.1 mg/l)**	N/A	*mg/l*

Parameter	*Test Result*	*Units*
*or Conductivity (1 µmhos/cm)**	N/A	*µmhos/cm*
Oil and Grease (1 mg/l)	N/A	*mg/l*

* *Fresh waters and effluent samples*

List the Discharge Point(s) that you identified in Section 6 of the e-Permitting CWB Individual NPDES Form that apply to Table F.7. Discharge Point 1 (From), Kaipapa‘u Stream, Class 2, Inland: 21.61717846380141” N, -157.9142857880188 W; and Discharge Point 2 (To), Kaipapa‘u Stream, Class 2, Inland - 21.617151034652878 N, -157.91334701486358 W.

Please ensure that all Discharge Points are accounted for. If you leave this item blank, we will assume Table F.7 applies to all Discharge Points. If needed, you may copy, paste, and complete Table F.7 for each Discharge Point with different test results.

F.8 – Toxic Parameters

a. *You are required to fulfill all requirements and check the box below if the hydrotesting source water is **non-potable**. If you do not check the box, your application will be considered incomplete, and the CWB may deny your request for NPDES permit coverage with prejudice.*

Hydrotesting source water will be Board of Water Supply potable water from Hau‘ula and Ma‘akua Wells. See **Attachment B, Board of Water Supply Source Water Quality Mineral Analysis**.

☒ *I certify that:*

- *I tested and I am reporting (in micrograms per liter) all of the parameters which are believed to be present in the hydrotesting water in Tables F.8.a to F.8.h below. Note: As an example, if the tank previously contained a petroleum product, you should expect that petroleum product to be present in the hydrotesting waters.*
- *For all test results that were not detectable, I indicated "N.D." or "not detected" in the “Test Result” column of Tables F.8.a to F.8.h.*
- *For all parameters not believed to be present, I indicated "N/A" for "not applicable" in the "Test Result" column of Tables F.8.a to F.8.h.*
- *If the “Test Result” columns of Tables F.8.a to F.8.h are left blank, the CWB will consider these parameters to be present. The NPDES permit will require all of these parameters to be monitored.*
- *A copy of the laboratory data sheets with Quality Assurance/Quality Control and Chain of Custody documents, are included in Attachment B.*
- *All test results were obtained from a representative sample as defined in HAR, Chapter 11-55, Appendix A, Section 14(a). Note: The burden of proving that sampling or monitoring is representative is on the Permittee.*
- *The test methods that I utilized were promulgated in 40 CFR Part 136 and, when applicable, listed in the references of chemical methodology for seawater analyses (see HAR, Chapter 11-54, Section 10(b)). Note: If a*

test method has not been promulgated for a particular parameter, you may apply for approval of an alternate test procedure by following 40 CFR Section 136.4.

- *The test methods that I utilized have detection limits below and closest to the numerical limit specified in HAR, Chapter 11-54. For situations where the numerical limitation is below the detection limit of the test methods, I used the test method which has the detection limit closest to the numerical limitation.*

b. Complete Tables F.8.a to F.8.h below if the hydrotesting source water is ***non-potable*** *. The parameters are categorized into Metals, Organonitrogen Compounds, Pesticides, Phenols, Phthalates, Polynuclear Aromatic Hydrocarbons, Volatile Organics, and Others and are listed alphabetically. A Glossary of Chemicals is listed in Attachment C.*

Hydrotesting source water will be Board of Water Supply potable water from Hau‘ula and Ma‘akua Wells. See **Attachment B, Board of Water Supply Source Water Quality Mineral Analysis**.

List the Discharge Point(s) that you identified in Section 6 of the e-Permitting CWB Individual NPDES Form that apply to Tables F.8.a to F.8.h. Discharge Point 1 (From), Kaipapa‘u Stream, Class 2, Inland: 21.61717846380141” N, -157.9142857880188 W; and Discharge Point 2 (To), Kaipapa‘u Stream, Class 2, Inland - 21.617151034652878 N, -157.91334701486358 W.

Please ensure that all Discharge Points are accounted for. If you leave this item blank, we will assume Tables F.8.a to F.8.h applies to all Discharge Points. If needed, you may copy, paste, and complete Tables F.8.a to F.8.h for each Discharge Point with different test results.

Table F.8.a - Metals

Total Recoverable Metal Parameter	*Test Result*	*Units*
Aluminum	N/A	*µg/l*
Antimony	N/A	*µg/l*
Arsenic	N/A	*µg/l*
Beryllium	N/A	*µg/l*
Cadmium	N/A	*µg/l*
Chromium (VI)	N/A	*µg/l*
Copper	N/A	*µg/l*
Lead	N/A	*µg/l*
Mercury	N/A	*µg/l*
Nickel	N/A	*µg/l*
Selenium	N/A	*µg/l*
Silver	N/A	*µg/l*
Thallium	N/A	*µg/l*

Total Recoverable Metal Parameter	*Test Result*	*Units*
Tributyltin	N/A	*µg/l*
Zinc	N/A	*µg/l*

Table F.8.b. - Organonitrogen Compounds

Organonitrogen Compound Parameter	*Test Result*	*Units*
Benzidine	N/A	*µg/l*
2,4-Dinitro-o-cresol	N/A	*µg/l*
Dinitrotoluenes	N/A	*µg/l*
1,2-Diphenylhydrazine	N/A	*µg/l*
Nitrobenzene	N/A	*µg/l*
Nitrosamines	N/A	*µg/l*
N-Nitrosodibutylamine	N/A	*µg/l*
N-Nitrosodiethylamine	N/A	*µg/l*
N-Nitrosodimethylamine	N/A	*µg/l*
N-Nitrosodiphenylamine	N/A	*µg/l*
N-Nitrosopyrrolidine	N/A	*µg/l*

Table F.8.c. - Pesticides

Pesticide Parameter	*Test Result*	*Units*
Aldrin	N/A	*µg/l*
Chlordane	N/A	*µg/l*
Chlorpyrifos	N/A	*µg/l*
DDT	N/A	*µg/l*
Demeton	N/A	*µg/l*
Dieldrin	N/A	*µg/l*
Endosulfan	N/A	*µg/l*
Endrin	N/A	*µg/l*
Guthion	N/A	*µg/l*
Heptachlor	N/A	*µg/l*
Lindane	N/A	*µg/l*
Malathion	N/A	*µg/l*
Methoxychlor	N/A	*µg/l*
Mirex	N/A	*µg/l*
Parathion	N/A	*µg/l*
TDE - metabolite of DDT	N/A	*µg/l*
Toxaphene	N/A	*µg/l*

Table F.8.d. - Phenols

Phenol Parameter	*Test Result*	*Units*
2-Chlorophenol	N/A	*µg/l*
2,4-Dichlorophenol	N/A	*µg/l*
2,4-Dimethylphenol	N/A	*µg/l*
Nitrophenols	N/A	*µg/l*
Pentachlorophenol	N/A	*µg/l*
Phenol	N/A	*µg/l*
2,3,5,6-Tetrachlorophenol	N/A	*µg/l*
2,4,6-Trichlorophenol	N/A	*µg/l*

Table F.8.e. - Phthalates

Phthalate Parameter	*Test Result*	*Units*
Bis (2-ethylhexyl) phthalate	N/A	*µg/l*
Dibutyl phthalate (esters)	N/A	*µg/l*
Diethyl phthalate (esters)	N/A	*µg/l*
Dimethyl phthalate (esters)	N/A	*µg/l*

Table F.8.f. - Polynuclear Aromatic Hydrocarbons

Polynuclear Aromatic Hydrocarbon Parameter	*Test Result*	*Units*
Acenaphthene	N/A	*µg/l*
Fluoranthene	N/A	*µg/l*
Naphthalene	N/A	*µg/l*
Polynuclear aromatic hydrocarbons	N/A	*µg/l*

Table F.8.g. - Volatile Organics

Volatile Organic Parameter	*Test Result*	*Units*
Acrolein	N/A	*µg/l*
Acrylonitrile	N/A	*µg/l*
Benzene	N/A	*µg/l*
Carbon tetrachloride	N/A	*µg/l*
Bis(2-chloroethyl)ether	N/A	*µg/l*
Bis(chloroethers-methyl)	N/A	*µg/l*
Bis(chloroisopropyl)ether	N/A	*µg/l*
Chloroform	N/A	*µg/l*
Dichlorobenzenes	N/A	*µg/l*

Volatile Organic Parameter	*Test Result*	*Units*
Dichlorobenzidine	N/A	*µg/l*
1,2-Dichloroethane	N/A	*µg/l*
1,1-Dichloroethylene	N/A	*µg/l*
Dichloropropanes	N/A	*µg/l*
1,3-Dichloropropene	N/A	*µg/l*
Ethylbenzene	N/A	*µg/l*
Hexachlorobenzene	N/A	*µg/l*
Hexachlorobutadiene	N/A	*µg/l*
Hexachlorocyclohexane, alpha	N/A	*µg/l*
Hexachlorocyclohexane, beta	N/A	*µg/l*
Hexachlorocyclohexane, technical	N/A	*µg/l*
Hexachlorocyclopentadiene	N/A	*µg/l*
Hexachloroethane	N/A	*µg/l*
Isophorone	N/A	*µg/l*
Pentachlorobenzene	N/A	*µg/l*
Pentachloroethanes	N/A	*µg/l*
1,2,4,5-Tetrachlorobenzene	N/A	*µg/l*
1,1,2,2-Tetrachloroethane	N/A	*µg/l*
Tetrachloroethanes	N/A	*µg/l*
Tetrachloroethylene	N/A	*µg/l*
Toluene	N/A	*µg/l*
1,1,1-Trichloroethane	N/A	*µg/l*
1,1,2-Trichloroethane	N/A	*µg/l*
Trichloroethylene	N/A	*µg/l*
Vinyl chloride	N/A	*µg/l*

Table F.8.h. - Others

Other Parameter	*Test Result*	*Units*
Chlorine	N/A	*µg/l*
Cyanide	N/A	*µg/l*
Dioxin	N/A	*µg/l*
Polychlorinated biphenyls	N/A	*µg/l*

F.9 – Hydrotesting Best Management Practices (BMPs) Plan

You are responsible for the design, implementation, operation, and maintenance of the Hydrotesing BMPs Plan to ensure that discharges of hydrotesting waters will not cause or contribute to a violation of HAR, Chapter 11-54, Chapter 11-55, and Chapter 11-55 Appendix F.

Are you submitting the Hydrotesting BMPs Plan with your NPDES application?

☒ *Yes. My Hydrotesting BMPs Plan complies with Section F.1. It is included in Attachment D.* See **Attachment D – Hydrotesting BMPs Plan**

☐ *No. My Hydrotesting BMPs Plan will comply with Section F.1.* ***If you do not submit the Hydrotesting BMPs Plan with your NPDES application, you acknowledge that:***

- *The CWB may not provide comments on information in Section F.9.*
- *You are required to submit Section F.9 to the DOH-CWB for comment at least 30 calendar days prior to starting hydrotesting activities. All questions/concerns that the DOH may have must be answered to the satisfaction of the CWB.*
- *The CWB will review Section F.9 in the order received and will not expedite the review to accommodate your schedule.*
- *The CWB has no required time limits to review any hydrotesting BMPs Plan after issuance of an NPDES Permit.*
- *You are potentially exposing yourself to significant delays.*

F.10 – Additional Information

Include any other site-specific information pertaining to the project or activity in Attachment E. If nothing is included in Attachment E, the CWB will assume you do not want to include additional information. See **Attachment E, Hydrotesting Discharge Calculations**.

Attachment A – Maps, Flow Chart, Hydrotesting Sequence & Filtration System (Sections F.2, F.3, F.5 & F.9)

ATTACHMENT A - TABLE OF CONTENTS		
Exhibit	**Item(s)**	**Exhibit Title**
1	F.2 b.-e.	Project Location and Hydrotesting Discharge Points
2	F.3	Hydrotesting Water Flow Chart
3	F.5.a.	Hydrotesting Sequence
4	F.5.a. and F.9	Filter System

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2020	19	149

Discharge Point No. 1 (From)
Kaipapa'u Stream
Class 2 Inland Waters
Latitude 21.61717846380141
Longitude -157.9142857880188

Benchmark
Sta. "BRIDGE"
1/2" PIPE
℄ Sta.1247+19.86
O/S 17.85' Rt.
191.89 S
2885.48 E
Elev=10.24 MSL

Concrete Washout Basin (5'x5'x5') See det., sht. C-35

Construction parcel

Temporary sand bags See det., sht. C-35

New Easement

Kaipapau Stream

Limit of Grading

True North 1"=20'

Stabilized entry/exit 12" min. thickness, #2 crushed rock, typ. See det., sht. C-35

Temp. stream diversion Grade as req'd. to drain and provide 0.5% min. slope

Limit of Grading

New R/W

8' High Dust Fence

Compost filter sock See det,. sht. C-35

Match exist. pav't. and provide smooth riding conn. See det., sht. C-37

To Kaneohe

To Kahuku

℄ KAMEHAMEHA HWY.

1246+00 1247+00 1248+00 1249+00 1250+00

Abut. No. 1

Abut. No. 2

Match exist. pav't. and provide smooth riding conn. See det., sht. C-37

Compost filter sock See det,. sht. C-35

New R/W

New Easement

Limit of Grading

Approx. location of human burial (SIHP-4796). See Section 106 of the National Historic Preservation ACT Notes

Match exist. conc. pav't. and provide smooth conn.

New Utility Easement

Piipiani Pl. (Private)

Match exist. ac pav't. and provide smooth conn. See det., sht. C-37

Construction parcel

Compost filter sock See det,. sht. C-35

8' High Dust Fence

12' High Dust Fence

New R/W

New Easement

Temp. Dewatering Basin (20'x15'x8')

Discharge Point No. 2 (To)
Kaipapa'u Stream
Class 2 Inland Waters
Latitude 21.617151034652878
Longitude -157.91334701486358

Legend
- Discharge Point
- Project Boundary

Legend:
- Project Limits
- 10 — Exist. Ground Contour
- 10 — Finished Grade Contour
- Limit of Grading
- Dust Fence
- Compost Filter Sock
- Top of Bank
- Bottom of Bank
- Fill Condition / Cut Condition
- Drainage Flow Direction
- Stabilized Entry/Exit

ROADWAY GRADING, EROSION & SEDIMENT CONTROL PLAN
Scale: 1"=20'

Notes:
1. For additional finished grade elevations, see sht. C-20.
2. For bridge deck elevations, see structural drawings.
3. For grading work under bridge, see sht. C-19.
4. The contractor shall be responsible for obtaining grading permit from the City and County of Honolulu, Department of Planning and Permitting.

Graphic Scale:
1" = 20' 20' 10' 0 20' 40'
Scale in Feet

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. "OBSERVATION OF CONSTRUCTION" IS DEFINED IN CHAPTER 16-115, HAWAII ADMINISTRATIVE RULES, ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."

4/30/20
SIGNATURE LIC. EXPIRATION
R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY GRADING, EROSION & SEDIMENT CONTROL PLAN
Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted Date: April 2019

SHEET No. C-18 OF SHEETS

SURVEY PLOTTED BY DATE
DRAFT BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
ORIGINAL PLAN
WORK DONE BY
No.

RMTC JOB NO. : 1-19548-0E

Attachment A, Exhibit 2, Item F.3 – Hydrotesting Water Flow Chart

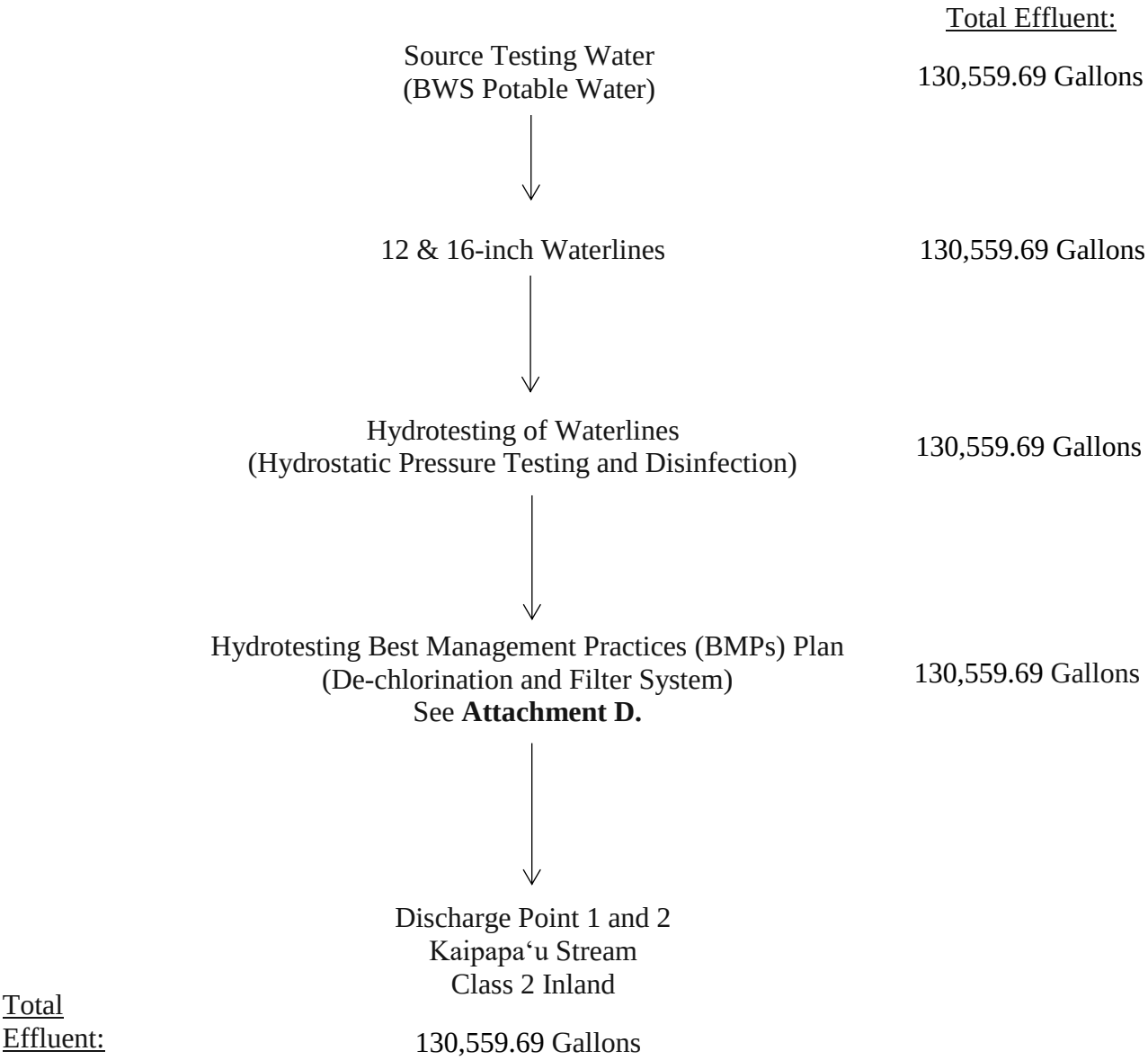


Exhibit 2, Item F.3
Hydrotesting Water Flow Chart
Kaipapa‘u Stream Bridge Replacement
Hau‘ula, Ko‘olauloa District, O‘ahu, Hawai‘i

R. M. TOWILL CORPORATION

Attachment A, Exhibit 3, Item F.5.a. – Hydrotesting Sequence

SOURCE: Basic schematic and process derived from NPDES NOI File No. HI93F002, Modification of Dewatering and BMPs, McCully-Waikiki 30-Inch and 12-Inch Water Main, by Board of Water Supply, City and County of Honolulu, and E.E. Black, Ltd., October 15, 1993.

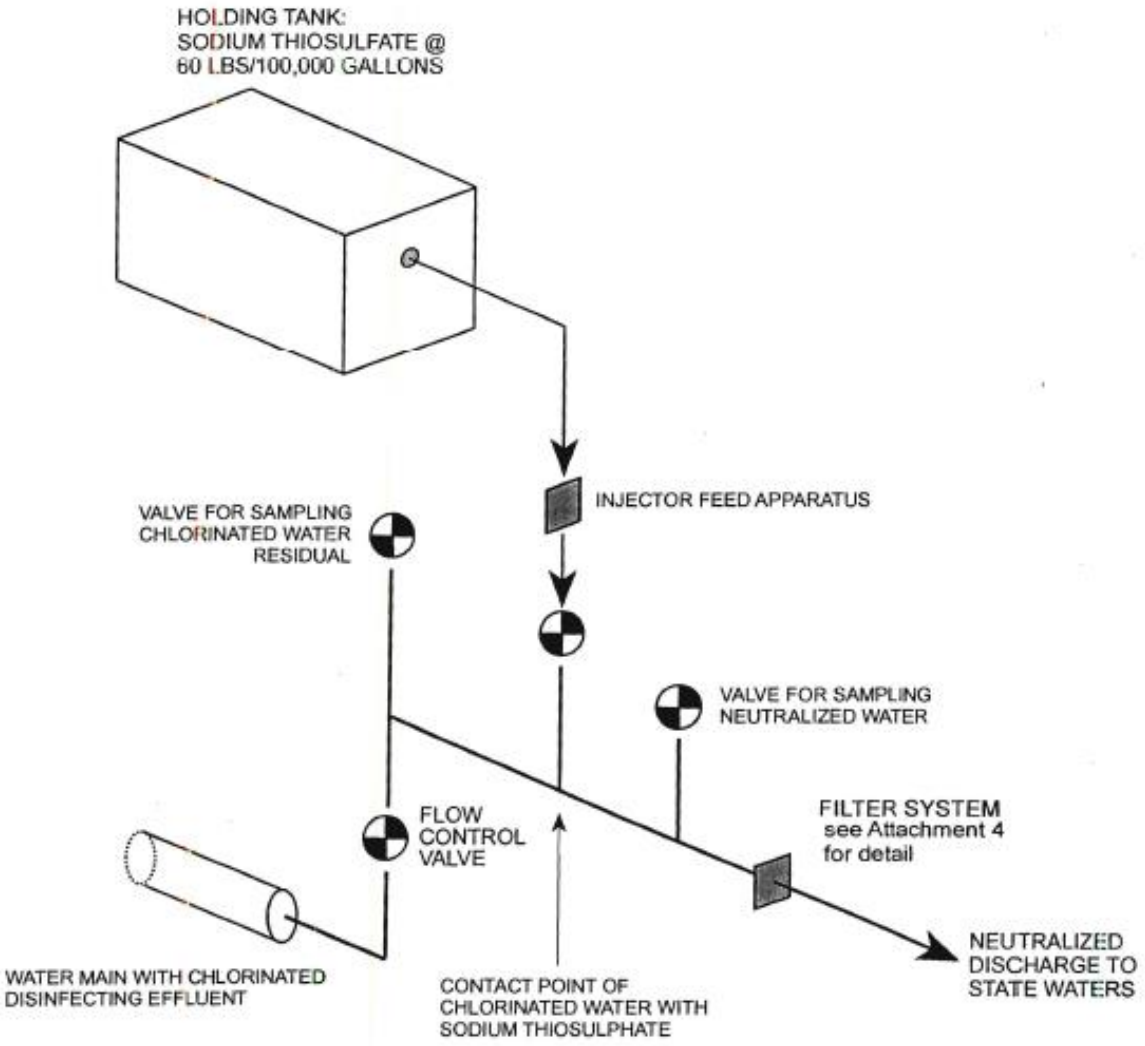
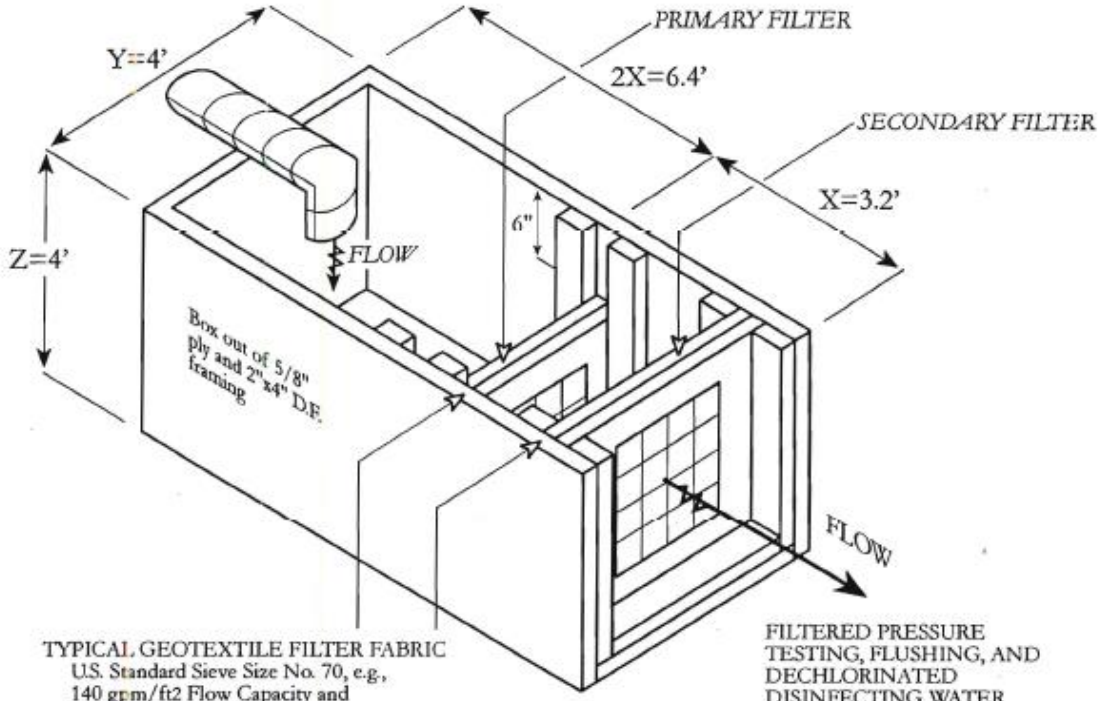


Exhibit 3, Item F.5.a.
Hydrotesting Sequence
Kaipapa‘u Stream Bridge Replacement
Hau‘ula, Ko‘olauloa District, O‘ahu, Hawai‘i

R. M. TOWILL CORPORATION *No Scale*

Attachment A, Exhibit 4, Item F.5.a. and F.9 – Filter Box



NOTES:

1) Minimum filter area shall equal two times the discharge flow rate divided by allowable geotextile fabric flow rate, or (2 x 600 gpm)/140 gpm/ft2=8.57 ft2.
2) Proposed design assumes overall filter efficiency rate of approximately 50% due to clogging and degradation of performance, where the area of filter fabric required to achieve 100%=8.57 ft2 x 2=17.14 ft2.
3) Proposed design provides storage of +2-minutes of retention or 1,197gallons, where:
   Z(4') x Y(4') x 2X(6.4') = 160 ft3; and
   160 ft3 x 7.48 gallons/ft3 = 1,197 gallons.
4) X, Y, and Z dimensions, materials specifications, and product brand names, as applicable, may be subject to change based on requirements of the Board of Water Supply, City and County of Honolulu; and, State Department of Health, Clean Water Branch.
5) As required, two or more filter boxes shall be employed to accomplish hydrotesting.

Exhibit 4, Items F.5.a. and F.9
Filter System
Kaipapa‘u Stream Bridge Replacement
Hau‘ula, Ko‘olauloa District, O‘ahu, Hawai‘i

R. M. TOWILL CORPORATION *No Scale*

Attachment B – Board of Water Supply Source Water Quality Mineral Analysis (Sections F.7 and F.8)

The water serving Your Location **has been tested and meets all Federal and State standards.**

21762

The water quality monitoring results are presented below.

The water sources serving this address are:

Source Name	Origin of Water	Treatment	Region
a) Hauula Well	Groundwater	Chlorination	2
b) Maakua Well	Groundwater	Chlorination	2

Source Water Monitoring

The substances detected in these sources are shown below. If a substance is not shown then it was not detected.

Regulated Contaminants (2)

Contaminant	Sample Year	Unit	Highest Average	Range Minimum	Range Maximum	MCL (Allowed)	MCLG (Goal)	Found in Sources
Barium	2017	ppm	0.004	0.004	0.004	2.000	2.000	b
Chromium	2017	ppb	2.000	1.500	2.000	100.000	100.000	All Sources
Nitrate	2017	ppm	0.180	0.160	0.180	10.000	10.000	All Sources

Definitions:

MCL	Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
GAC	Granular Activated Carbon Filtration
Health Advisory	An estimate of acceptable drinking water levels for a chemical substance based on health effects information. Health advisory is not a legally enforceable standard.
CFU/100ml	Colony forming units per 100 milliliter
mrem/yr	Millirems Per Year (A Measure of Radiation)
pCi/L	Picocuries Per Liter (A Measure of Radioactivity)
ppb	Parts Per Billion or Micrograms Per Liter"
ppm	Parts Per Million or Milligrams Per Liter
ppt	Parts Per Trillion or Nanograms Per Liter
NQ	Not Quantifiable (<means \"less than\")
NYA	Not Yet Available
N/A	Not Applicable
ND	Not Detected
*	EPA considers 50 pCi/L to be the level of concern for beta particles
(1)	Analysis by the State of Hawaii Department of Health.
(2)	Analysis by the Honolulu Board Of Water Supply. Questions, call 808-748-5370.
LRAA	Locational running annual average is the average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.
MRDL	Maximum residual disinfectant level: The highest level of a disinfectant allowed in drinking water.
MRDLG	Maximum residual disinfectant level goal: The level of a drinking water disinfectant below which there is no known or expected risk to health.

Unregulated Contaminants (Do not have designated maximum limits but require monitoring)

Contaminant	Tested By	Sample Year	Unit	Highest Average	Range Minimum	Range Maximum	Health Advisory	Found in Sources
Chlorate	(2)	2017	ppb	40.000	18.000	40.000	210.000	All Sources
Chloride	(2)	2017	ppm	34.000	29.000	34.000	250 **	All Sources
Chromium, Hexavalent	(2)	2017	ppb	2.300	1.500	2.300	13.000	All Sources
Sodium	(2)	2017	ppm	22.000	22.000	22.000	60.000	b
Strontium	(2)	2017	ppb	66.000	54.000	66.000	4000.000	All Sources
Sulfate	(2)	2017	ppm	4.600	4.100	4.600	250 **	All Sources
Vanadium	(2)	2017	ppb	11.000	9.400	11.000	21.000	All Sources

** Secondary Maximum Contaminant Levels (SMCLs) are standards established as guidelines to assist public water systems in managing the aesthetic quality (taste, odor and color) of drinking water. EPA does not enforce SMCLs.

Distribution System Monitoring

Disinfection By-Products (2)

System Name	Contaminant	Unit	Range Min	Range Max	Highest LRAA	MCL (Allowed)	MCLG (Goal)
Honolulu-Windward-Pearl Harbor	Total Trihalomethanes	ppb	0.00	14.00	4.90	80	None
	Haloacetic Acids	ppb	0.00	0.00	0.00	60	None

Microbial Contaminants (2)

System Name	Contaminant	Number of positive E. Coli samples found	Violation (Yes/No)	Number of assessments required to perform	Source of contaminant
Honolulu-Windward-Pearl Harbor	E. Coli	0	No	0	Naturally present in the environment

Residual Chlorine

System Name	Sample Year	Unit	Lowest Monthly Average	Highest Monthly Average	Running Annual Average	MRDL	MRDLG
Honolulu-Windward-Pearl Harbor	2017	ppm	0.28	0.32	0.30	4	4

Lead/Copper Testing (2)

Contaminant	Sample Year	Unit	90th Percentile Reading	Action Level	# Samples Above Action Level
Copper	2015	ppm	0.058	1.300	0
Lead	2015	ppb	<1.000	15.000	0

No violations found for calendar year 2017

Date Report Printed: 6/4/2018

Attachment C – Glossary of Chemicals (Section F.8)

This glossary is for general use and is not intended to be a complete or definitive reference. The parameters are categorized into Metals, Organonitrogen Compounds, Pesticides, Phenols, Phthalates, Polynuclear Aromatic Hydrocarbons, Volatile Organics, and Others and are listed alphabetically.

The information was obtained primarily from Environmental Protection Agency (EPA) Ambient Water Quality Criteria documents which are referenced in EPA's Quality Criteria for Water (EPA 440/5-86-001), updated May 1, 1987. Additional information was obtained from the EPA pamphlet "Suspended, Cancelled and Restricted Pesticides," January 1985; The Condensed Chemical Dictionary, 10th Ed. (Van Nostrand Reinhold Co., Inc., New York, 1981); and The Farm Chemicals Handbook (Meister Publishing Company, Willoughby, OH, 1988).

Information on organotins was obtained from the International Organotin Symposium held at Halifax, Nova Scotia in September 1987 and published in Volume 4 of the Oceans '87 Proceedings, by the Marine Technology Society, Washington D.C., and IEEE Ocean Engineering Society, Piscataway, NJ.

a. Metals

Antimony - A metal used as a hardening alloy for lead, particularly in lead-acid batteries. Also used as a semiconductor and in pyrotechnics.

Arsenic - A metal used as an alloy with lead and copper in shot, batteries, and cables. Arsenic trioxide is used as a pigment and as an insecticide, rodenticide, herbicide, sheep and cattle dip, hide preservative, and wood preservative. It was used as a pesticide in the production of canec panels in Hilo. Use in houses is restricted to concentrations below 1.5 percent. Carcinogen.

Beryllium - A metal for various high-technology uses including nuclear reactor moderator and structural material. Carcinogen.

Cadmium - A metal used in electroplating and coating, alloys, nickel-cadmium batteries, pigments, and in a variety of other industrial areas.

Chromium - A metal used in plating, alloys and in pigments. Hexavalent forms are most toxic and are used in cooling tower additives.

Copper - A metal used in wiring, plumbing, electroplating, alloys, insecticides, and in anti- fouling paints.

Lead - A metal used in batteries, gasoline additives, solder, and ammunition.

Mercury - A metal used in dentistry, electronics, instruments, lamps, metallurgy and formerly in anti-fouling paints.

Nickel - A metal used in alloys, electroplating, and batteries.

Selenium - A metalloid element used in electronics, rubber production, dandruff shampoo, and a trace element in animal feed.

Silver - A metal with various electronic, chemical, plating, photographic, and dental uses.

Thallium - A metal. Pesticide registration of thallium sulfate cancelled.

Tributyltin - Tributyltin is of environmental concern primarily because of its use in marine anti- fouling paints. This use has recently been restricted by Congress. Organotins have also been used in agriculture and residential areas to control fungi and insects including moths, houseflies, cockroaches, and mosquito larvae. The largest use is in stabilizing polyvinyl chloride polymers used in construction materials and food packaging.

Zinc - A metal used in alloys, electroplating, galvanizing, batteries, and cathodic protection.

b. Organonitrogen Compounds

Benzidine - Aromatic amine used in dye production. Carcinogen.

Dinitro-o-cresol - Pesticide, fungicide, insecticide and miticide. Also used as a blossom- thinning agent on fruit trees.

Dinitrotoluene - Commercial and military explosive.

Diphenylhydrazine - Used as a reagent for the sugars arabinose and lactose and for the production of phenylbutanone and benzidine.

Nitrobenzene - Used in the production of aniline dyes, rubber, medicinals, metal polish, shoe black, perfume, and as a combustion propellant and chemical reaction, and crystallizing solvent.

Nitrosamines - Only small quantities are synthesized for research and rubber and pesticide production. Primary environmental exposure is probably due to the nitrosation of amine

and amide precursors in reactions in air, soil, water, food, and animal systems. Carcinogen.

c. Pesticides

Aldrin - Insecticide used in ground injection for termite control and non-food plant dip. Registration for other uses cancelled. Metabolizes to dieldrin. Carcinogen.

Chlordane - Insecticide used for termite control and non-food plant dip. Registration for other uses cancelled. Carcinogen.

Chlorpyrifos - Organophosphorus insecticide (a.k.a. Dursban, Lorsban). Used locally for termite control.

DDT - Persistent lipid-soluble chlorinated pesticide. Formerly most widely used. All pesticide uses cancelled except by government agencies and physicians. Metabolizes to DDE and TDE. Carcinogen.

Demeton - Systemic insecticide and acaricide applied as a foliage spray and soil drench.

Dieldrin - Persistent insecticide used in ground injection for termite control and as non-food plant dip. Registration for other uses cancelled. Carcinogen.

Endosulfan -Insecticide and acaricide (a.k.a. Thiodan). Used on pineapples in Hawaii.

Endrin - Pesticide, rodenticide, and avicide. Used on sugarcane to control the sugarcane beetle. Registration cancelled for control of the sugarcane borer. Teratogen.

Guthion - Organophosphorus pesticide used for many pests on various fruits, melons, nuts, vegetables, field crops, ornamental, and shade trees.

Heptachlor - Insecticide registered for termite control and non-food plant dip. Registration for other uses cancelled. Carcinogen.

Lindane - Broad spectrum insecticide used in livestock sprays, forestry, christmas trees, structural treatments, hardwood logs and lumber, dog sprays, dusts and dips, flea collars, moth sprays, seed treatments, shelf paper, and household sprays. Carcinogen.

Malathion - Organophosphorus insecticide used for many insects including: aphids, spider mites, scale insects, house flies, mosquitos, and for insects attacking fruits, vegetables, ornamental and stored products. Used in public health programs to control mosquitos.

Methoxychlor - Organochlorine pesticide.

Mirex - Organophosphorus insecticide. Registration cancelled 12/01/77. Mirex was used to control fire ants on pineapples in Hawaii.

Parathion - Organophosphorus pesticide used on fruit, nut, vegetable, and field crops. TDE - Metabolite of DDT. Carcinogen.

Toxaphene - 175 compounds of chlorinated camphene. Formerly the most heavily used pesticide. Registration cancelled in 1982 with exceptions for cattle, pineapples, and bananas. No U.S. production. Persistent in the environment. Carcinogen.

d. Phenols

Chlorinated Phenols - (Includes cholorinated cresols). Synthesis of dyes, pigments, resins, pesticides, herbicides and used directly as flea repellents, fungicides, wood preservatives, mold inhibitors, antiseptics, disinfectants, and anti-gumming agents in gasoline. Chlorinated phenol pesticide products include 2,4-D, 2,4-DCP, 2,4,5-T, 2,3,4,6-TCP, and PCP. Some forms carcinogenic.

2-Chlorophenol - Intermediate in chemical production of fungicides, slimicides, bactericides, antiseptics, disinfectants, and wood and glue preservatives. Can be produced in the chlorination of drinking water and sewage. May be biodegraded.

2,4-Dichlorophenol - Used in the production of herbicides (2,4-D) and in mothproofing, antiseptics, and seed disinfectants. Metabolic and photodegradation product of the above.

Nitrophenols - 2,4,6 trinitrophenol (picric acid) has been used as an explosive, dye intermediate, reagent, germicide, fungicide, staining agent and tissue fixative, and in photochemicals, pharmaceuticals, and metal etching. Mono and dinitrophenols

would occur in the environment primarily from discharges from manufacturing plants or possibly from the degradation of pesticides. They are used in the production of dyes, photochemicals, pesticides, wood preservatives, explosives, and leather treatments. See also 2,4 dinitro-o-cresol.

Pentachlorophenol - Very common pesticide, fungicide, and bactericide (a.k.a. PCP).

Phenol - Used in production of epoxy and phenolic resins, pharmaceuticals, germicides, fungicides, slimicides, herbicides, dyes and acids, and as a disinfectant and antiseptic.

e. Phthalates

Phthalate Esters - Plasticizers used especially in Polyvinyl chloride (PVC) production. Easily extractable and up to 60 percent of the total weight of plastic. Also used in the production of pesticide carriers, cosmetics, fragrances, munitions, industrial oils, and insect repellents.

f. Polynuclear Aromatic Hydrocarbons

Acenaphthene - Coal tar product used in the manufacturing of dyes and plastics and as an insecticide and fungicide. Also detected in cigarette smoke and gasoline exhaust.

Fluoranthene - A polynuclear aromatic hydrocarbon. Primarily a pyrolysis product formed in frying, smoking, incineration, etc. Natural as well as man-made sources. Carcinogen.

Naphthalene - Primary parameter of coal tar. Used in dye production, formulation of solvents, and chemical synthesis. Also used in lubricants and motor fuels, and as a moth repellant, insecticide, anthelminthic, vermicide, and intestinal antiseptic.

Polynuclear Aromatic Hydrocarbons - Diverse class of compounds formed by incomplete combustion of organics with insufficient oxygen. Examples include benzo[a]pyrene and benz[a]anthracene. Carcinogen.

g. Volatile Organics

Acrolein - Biocide for weed, algae, mollusk and slime control, and to protect liquid fuels from microorganisms. Also used in leather tanning, tissue fixation, paper, textiles, crease- proofing cotton, and as a chemical intermediate, plasticizer, copolymer in photography, builder in laundry and dishwashing detergents, and coating for aluminum and steel.

Acrylonitrile - Copolymer used in the production of fibers and plastics (e.g., ABS Acrylonitrile- Butadiene-Styrene plastic), and latexes and chemicals. Banned as a resin for soft drink containers and as a fumigant. Similar toxic effects as cyanide. Carcinogen.

Benzene - Coal tar and petroleum product used in pharmaceutical and chemical synthesis, including the production of styrene, detergents, pesticides, thinners, and inks. Also used as a cleaner and degreaser, solvent, and gasoline anti-knock additive. Carcinogen.

BHC - Benzene hexachloride. See hexachlorocyclohexane and lindane. C arcinogen.

Carbon Tetrachloride - Solvent and grain fumigant also used in fire extinguishers. Carcinogen.

Chlorinated Benzenes - Solvents for fats, oils and greases, also used as fumigants, degreasers, lubricants, dielectrics, dye carriers, wood preservatives; in chemical, pesticide, and herbicide production; heat transfer; military pyrotechnics; and termite control. Carcinogen.

Chlorinated Ethanes - Used in the production of tetraethyl lead and vinyl chloride and as solvents and chemical intermediates. Some forms carcinogenic.

Chloroalkyl ethers - Used in organic synthesis, textiles, ion exchange resins, pesticides, and reaction solvents.

Chloroform - Chemical solvent. Formed in the chlorination of sewage and water supplies. Carcinogen.

Dichlorobenzenes - Used in air deodorants, insecticides, chemical production, dyes, herbicides, and degreasers.

Dichlorobenzidine - Used in the production of dyes and pigments and a curing agent for polyurethanes. Carcinogen.

Dichloroethylenes - Intermediate in chemical production, and polyvinylidene chloride copolymers in food packaging materials (e.g., plastic wrap) and tank coatings. Degradation products of larger chlorinated hydrocarbons. Carcinogen.

Dichloropropane - Soil fumigant for nematodes, oil and fat solvent, and degreaser. Dichloropropene - Soil fumigant for nematodes, used in Hawaii on pineapples. Also oil and fat solvent and degreaser.

Ethylbenzene - Up to 20 percent of gasoline. Widespread commercial use including production of styrene, diluents in paints, and used as insecticides.

Hexachlorobutadiene - Organic solvent used in chlorine production recovery, in rubber and lubricant production, and as a gyroscope fluid. Carcinogen.

Hexachlorocyclohexane - Broad spectrum insecticide (a.k.a. BHC). Only the gamma isomer, lindane, is currently registered and produced. Carcinogen.

Hexachlorocyclopentadiene - Base of several chlorinated pesticides including: aldrin, dieldrin, chlordane, heptachlor, endrin, isodrin, kepone, mirex, endosulfan, and pentac. Also used in the production of flame retardants.

Isophorone - Solvent for fats, oils, gums, natural and synthetic resins, cellulose derivatives, lacquers, pesticides and herbicides. Used in chemical and plant growth retardant production.

Tetrachloroethylene - Solvent in textile and dry cleaning, metal cleaning, and chemical production (a.k.a. perchloroethylene or PCE). Carcinogen.

Toluene - Aviation fuel and high-octane blending stock, chemical intermediate, thinner, solvent for paints, gums, resins, oils, rubber, and vinyl, and used in plastic cement, chemicals, explosives, and detergents.

Trichlorinated ethanes - Metal degreaser, chemical intermediate, adhesive and resin solvent, pesticide, dry cleaning solvent, formerly used as a fumigant 1,1,2 isomer carcinogenic.

Trichloroethylene - Degreasing solvent in metal industries. Formerly dry cleaning solvent and extractive solvent in foods (a.k.a. TCE). Carcinogen.

Vinyl chloride - Polymerized in the production of PVC, the most widely used material in the manufacture of plastics. All pesticide uses cancelled (whether an active or inert ingredient) for uses in the home, food handling establishments, hospitals, and enclosed areas. Degradation product of larger chlorinated hydrocarbons. Carcinogen.

h. Others

Chlorine - Chlorine is commonly used to disinfect wastewater and water supplies and to control fouling organisms in cooling water systems.

Cyanide - Used and formed in many industrial processes including steel, petroleum, plastics, synthetic fibers, metal plating, mining, and chemical industries.

Dioxin - Trace contaminant of chlorinated phenols, chlorinated phenoxy acids (especially the herbicide 2,4,5-T and Silvex), and hexachlorophene. Carcinogen.

Polychlorinated biphenyls (PCBs) - Used as a transformer and capacitor fluid. Also used as a heat transfer, hydraulic, compressor, and vacuum pump fluid, plasticizer, and in lubricants and wax extenders. No longer manufactured in the United States. All pesticide uses eliminated. Carcinogen.

Attachment D – Hydrotesting BMPs Plan (Section F.9)

HYDROTESTING BMPS PLAN

1. **Operating and Maintenance Procedures for Hydrotesting Treatment Systems:**
   Disinfected discharges shall cease or the rate of discharge will be reduced if de-chlorination cannot be achieved. The dechlorination system shall be constantly monitored to ensure the proper proportion of sodium thiosulfate to chlorination is achieved. As required, the system used to provide water shall also be monitored to ensure against malfunction.

2. **Operating and Maintenance Procedures for Hydrotesting Filtration Systems**:
   Geotextile filter fabric that allows water to flow through while preventing soil particles up to # 70 sieve size will be used for filtration. All discharges from the waterlines will be passed through the filter system (see **Attachment A, Exhibit 4, Items F.5.a. and F.9, Filter System**) to remove suspended solids or foreign particles. Discharge from the filter system that is not used on-site for dust control or irrigation will be directed into flexible or rigid piping to allow for discharge into State waters (i.e., Kaipapa‘u Stream).

   Flushing discharges shall cease or the rate of discharge reduced if adequate filtration cannot be achieved. The hydrotesting/chlorination contractor shall monitor the filtration system for clogging of the filter medium. Filters shall be replaced immediately upon failure of the primary filter.

   Discharges into Streams
   When discharges are required into a stream, a diffuser shall be placed at the open end of the discharge hose or pipe to reduce flow velocities and diffuse the flow of water into the stream. If there are soft sediments in the stream the open end of hose or pipe with diffuser shall be placed in a box, bucket, or other suitable enclosure that is sealed at the bottom and sides, but open at the top to allow the indirect discharge of water.

3. **Hydrotesting Effluent Monitoring Procedures**:
   a. The hydrotesting/chlorination contractor shall conduct frequent visual inspections during effluent discharges to ensure against changes in turbidity, color and odor. If physical changes are observed, discharges shall be terminated until appropriate modifications/corrections to the treatment system are in place.
   b. Representative samples for chlorine shall be collected and tested prior to entering receiving waters. Chlorine residual shall be measured by standard DPD kits and Color Comparators.
   c. Effluent type and quality: Hydrotesting source is potable water from BWS Hau‘ula and Ma‘akua Wells. Chlorination will be up to 50 mg/l depending on the level of need for disinfection. The disinfected effluent shall be dechlorinated to acceptable levels in accordance with Hawai‘i Administrative Rules (HAR), Chapter 11-54, Water Quality Standards.
   d. Should unforeseen conditions result in release of chlorine levels exceeding allowable standards of HAR 11-54, the following measures will be employed:
      i. All chlorination and discharges of hydrotesting effluent will be terminated. The hydrotesting/chlorination contractor will be responsible for notifying the DOH, Clean Water Branch, at (808) 586-4309;

ii. The hydrotesting and chlorination/de-chlorination procedures will be reviewed to correct the situation resulting in the release; and,

iii. Upon satisfactory review and repair of equipment and procedures, DOH Clean Water Branch will be notified and work activities will resume.

Additional methods, measures, or controls shall be documented on-site by the hydrotesting/ chlorination contractor.

4. **Good Housekeeping Practices**:
   a. All interior surfaces of the waterlines are to be kept free of dirt and debris during installation. The end of the pipe is to be capped at the end of each workday with a cap sufficient to prevent groundwater, dirt, debris, or other foreign substances from entering the pipe. As required, dewatering of trenches will be undertaken to ensure dry working conditions. Initial flushing is to be filtered prior to discharge to ensure removal of sediments accumulated during construction.
   b. The hydrotesting contractor is to set up chlorination equipment and exercise operating procedures in accordance with safe engineering practices.
   c. The hydrotesting contractor is to have the de-chlorination equipment set up prior to start up. This will ensure that the de-chlorination equipment will be mobilized and available should the waterlines require immediate evacuation of effluent.
   d. Vehicles and equipment will be cleaned before moving to another location and the street will be swept clean. The sweeping of sediment or debris into drainage ways is strictly prohibited.
   e. Fueling and maintenance of equipment and vehicles in the vicinity of any open drains, excavations and trenches is prohibited. All servicing will be performed in areas away from the construction site where fuel and oil spills can be contained.
   f. Existing roads that have been tracked with mud or dirt shall be cleaned immediately by sweeping. Flushing of roads may be performed only if runoff is avoided.

Attachment E – Additional Information (Section F.10)

HYDROTESTING DISCHARGE CALCULATIONS
Kaipapa'u Stream Bridge Replacement (Project No. BR-083-1(48))
Department of Transportation, State of Hawai'i
Hau'ula, O'ahu, Hawai'i

PURPOSE:

The purpose of these calculations is to estimate the magnitude of discharges that will occur during hydrotesting of the proposed water lines.

OVERVIEW OF HYDROTESTING PROCESS FOR WATER LINES

The typical hydrotesting process will consist of 6 steps: (1) hydrostatic pressure testing; (2) preliminary flushing; (3) initial chlorination; (4) secondary flushing; (5) secondary chlorination; and (6) final flushing and zeroing down. Discharge will occur during flushing. A total turnover of approximately 10 volumes will take place during the water line testing operation.

VOLUME CALCULATIONS

Pipe Volume = πr^2 x Length(in.) / (231 cubic in./gal.)

Diameter (inch)	Length (linear feet)	Length (linear inch)	Volume (cubic inch)	Volume (Gallons)
12	400.00	4,800.00	542,867.21	2,350.07
16	400.00	4,800.00	965,097.26	4,177.91
Total	800.00		Total	6,527.98

Total x 10 (TOs)	**65,279.85**	***Per Installation***
	x 2	
Project will require two installations (temporary & permanent alignments)	**130,559.69**	

RATE AND TIME OF DISCHARGE

Discharge rate is based on rate of flow through a standard 4-inch stubout at 600 gpm or 1.34 cfs.

Time of Discharge Calculation

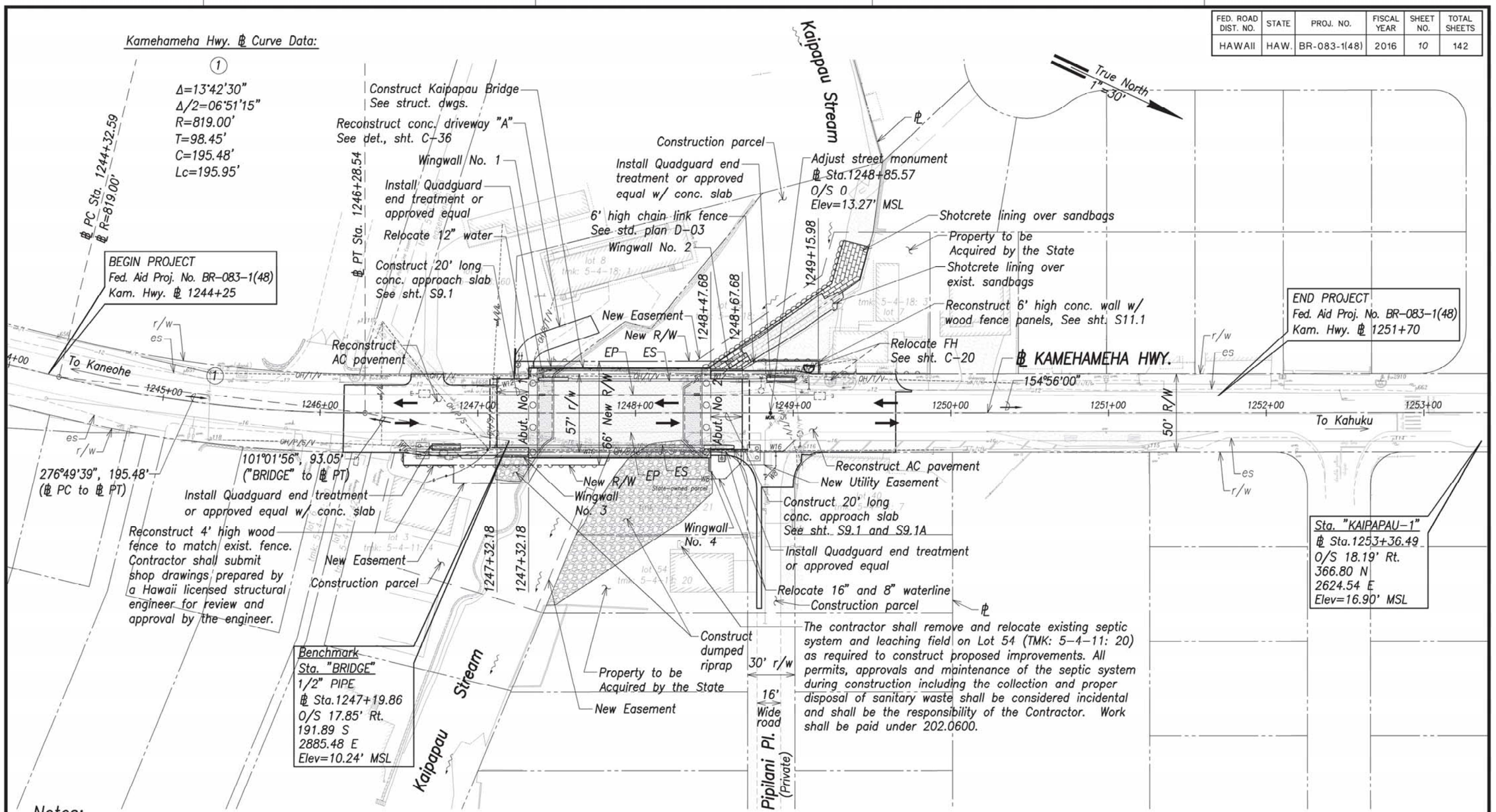
Total Discharge Volume =	130,559.69	Gallons
Divided by 600 Gallons per Minute =	217.60	Minutes to Discharge
Divided by 60 Minutes per Hour =	3.63	Approximate Hours to Discharge
Divided by 6 Hours per Day =	0.60	Days to Complete Hydrotesting
Gallons per Day Flow Rate =	216,000.00	Gallons per Day

***Note: The hydrotesting calculations are conservative*

KAIPAPA'U STREAM BRIDGE REPLACEMENT

CONSTRUCTION DRAWINGS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	10	142



Notes:

1. See sheet C-10 for construction phasing and sheet C-29 for 16" waterline phasing.
2. The Contractor shall comply with Environmental Permit Conditions.
3. Kaipapau Stream is able to convey a 2-year storm, 1-hour storm. The stream frequently overtops. It is critical that the Contractor shall ensure that the flow capacity of the Kaipapau Stream is not reduced during a storm event. Equipment and materials within the stream during a storm event shall be removed immediately. Final damages that occur due to the contractor equipment and materials blocking flow during a rain storm will be the contractor's responsibility.
4. The Contractor shall construct a temporary detour road, temporary detour waterline, and other temporary improvements. See sht. C-10.

GENERAL SITE PLAN

SCALE 1"=30'

Graphic Scale:

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

Scale in Feet

APPROVED:

Manager and Chief Engineer, BWS (for work affecting BWS facilities State R/W & BWS easements only) DATE

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4/30/16

SIGNATURE LIC. EXPIRATION

R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL SITE PLAN

Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

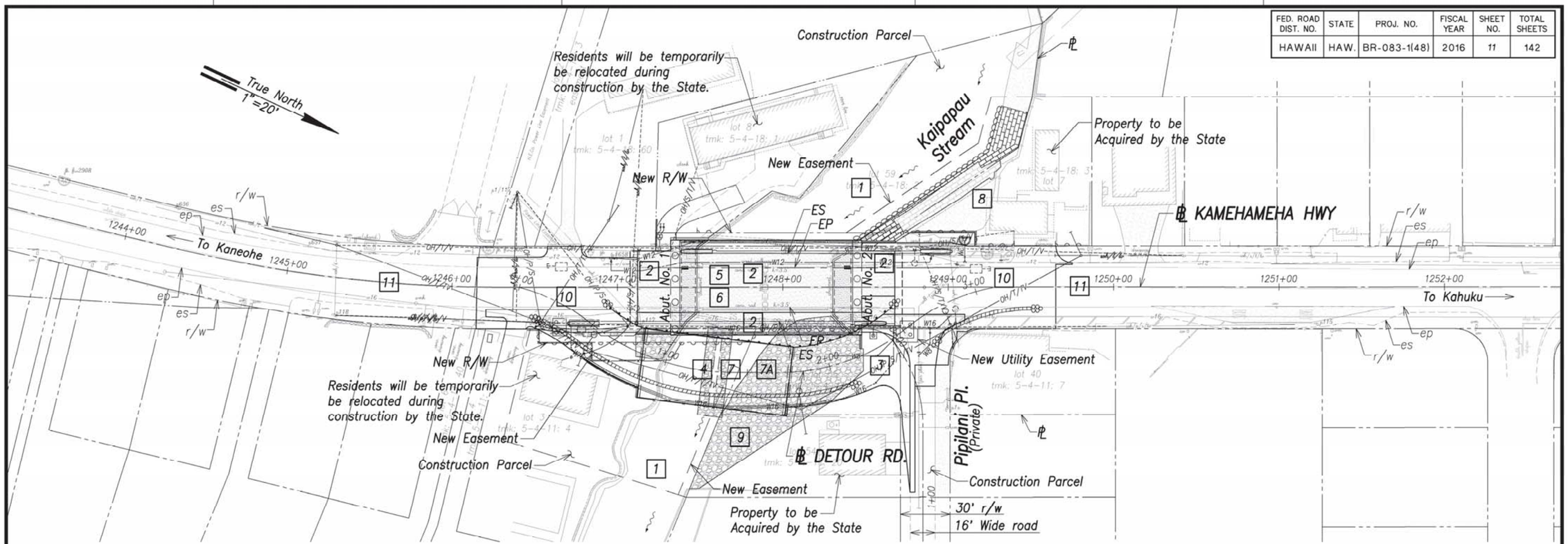
Scale: As Noted Date: April 2015

SHEET No. C-9 OF SHEETS

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

RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	11	142



OVERALL CONSTRUCTION PHASING PLAN

Scale: 1"=20'

Phasing Notes:

1. For electrical phasing see electrical drawings.
2. For structural phasing see structural drawings.
3. The Contractor shall perform work to ensure continuous traffic and pedestrian flow.
4. Phasing indicated shall not be modified unless approved in writing by the Engineer.
5. The Contractor shall ensure that water and other utility line construction are fully coordinated with Board of Water Supply and Private Utility Companies.
6. All temporary measures required shall be considered incidental to the various items of work.
7. For water line phasing see sht. C-28 and C-29.

Suggested Construction Sequence of Major Constuction Items:

1. Install best management practices/erosion control measures. See Notes sheets and sht. C-17.
2. Install temporary 12" waterline and relocate existing 12" water line. See 12" Waterline Plan and Profile, sht. C-20. Relocate electrical utilities. See electrical drawings for temporary and permanent electrical relocation phasing.
3. Construct trial and load test drilled shafts and perform load test. See structural drawings.
4. Construct detour roadway and temporary bridge. See sht. C-22 to C-27 and stuctural drawings.
5. Demolish existing Kaipapau Stream bridge. See sht. C-15 and structural drawings. Expose existing 16" water line jacket and concrete support system.
6. Construct Phase 1 new Kaipapau Stream bridge. See Construction Sequence, Phase 1 of structural drawings, shts. S0.7, S0.7A, and S0.7B.
7. Partially remove Detour roadway and temporary bridge. Construct temporary pavement transitions, signing and pavement markings. Temporary work shall be considered incidental to the various items of work. Construct Phase 2 of new Kaipapau Stream bridge. See Construction Sequence, Phase 2 of structural drawings, shts. S0.8, S0.8A, and S0.8B..

7A. Remove remainder of Detour roadway and temporary bridge.

8. Construct sand bags and shotcrete lining along north bank, upstream of Kaipapau Stream bridge. See sht. C-18.
9. Construct dumped riprap along north and south bank, downstream of Kaipapau Stream bridge. See sht. C-16 and C-18.
10. Construct AC pavement. See sht. C-16. The contractor shall submit a pavement phasing plan and schedule for Engineer's review and approval.
11. Construct final signing and pavement markings. See sht. C-21.

Graphic Scale:
1" = 20' 20' 10' 0 20' 40'
Scale in Feet

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

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R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

OVERALL CONSTRUCTION PHASING PLAN

Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted Date: April 2015

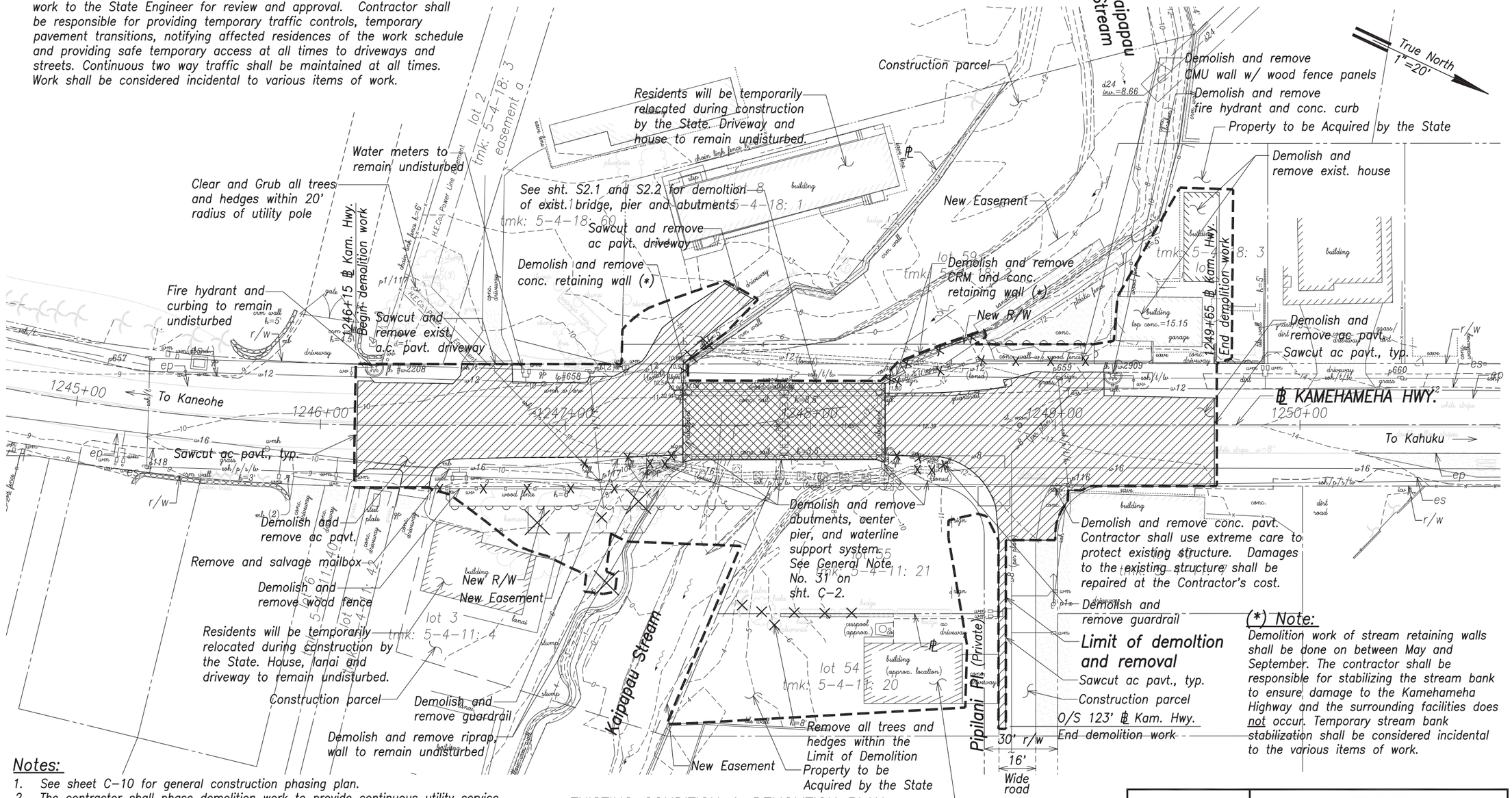
SHEET No. C-10 OF SHEETS

RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	16	142

Phasing Note:

Contractor shall submit a phasing plan and schedule for demolition work to the State Engineer for review and approval. Contractor shall be responsible for providing temporary traffic controls, temporary pavement transitions, notifying affected residences of the work schedule and providing safe temporary access at all times to driveways and streets. Continuous two way traffic shall be maintained at all times. Work shall be considered incidental to various items of work.



Notes:

1. See sheet C-10 for general construction phasing plan.
2. The contractor shall phase demolition work to provide continuous utility service.
3. See C-20 and C-32 for waterline demolition work.
4. See C-21 for signing and striping demolition work.
5. See electrical drawings for electrical demolition and temporary relocation work.
6. See structural drawings for structural demolition work.
7. Traffic controls, detour, and best management practices shall be in place prior to the start of demolition work.
8. The contractor shall demolish and remove everything within the Limit of Demolition and Removal unless otherwise indicated to remain.
9. See General Note No. 30 on sht. C-2.

EXISTING CONDITION & DEMOLITION PLAN

Scale: 1"=20'

Bridge Note:

The contractor shall perform photographic documentation of the existing Kaipapau Stream bridge acceptable to the State Historic Preservation Division (SHPD) prior to the start of bridge demolition. Work shall be considered incidental to the various items of work.

Graphic Scale:

1" = 20' 20' 10' 0 20' 40'

Scale in Feet

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING CONDITION & DEMOLITION PLAN

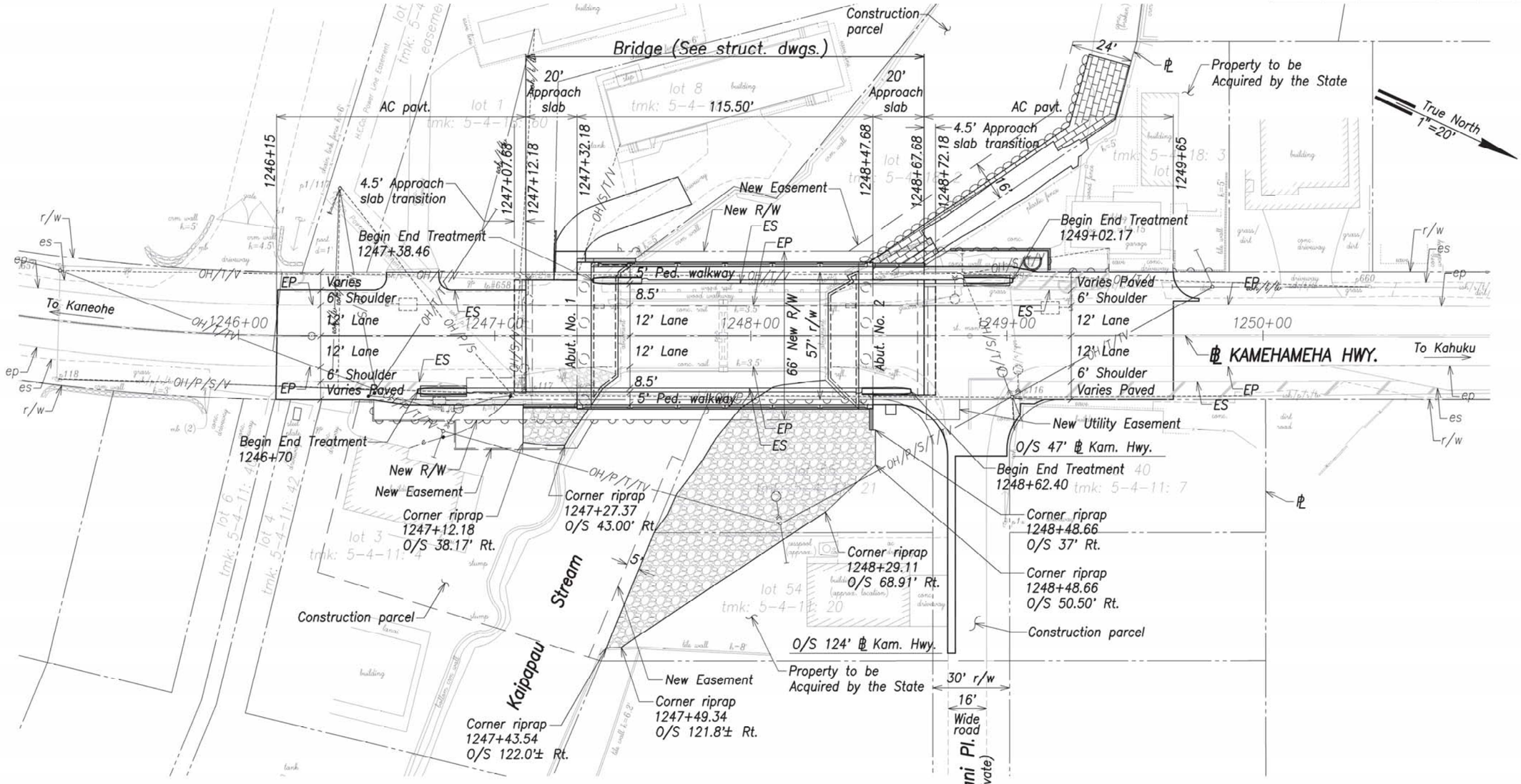
Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted Date: April 2015

SHEET No. C-15 OF SHEETS

RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	17	142



SITE LAYOUT PLAN
SCALE 1"=20'

Pavement Note:

Contractor shall submit a pavement phasing plan and schedule for the AC pavement work to the State Engineer for review and approval. Contractor shall be responsible for providing temporary traffic controls, temporary pavement transitions, notifying affected residences of the work schedule and providing safe temporary access at all times to driveways and streets. Continuous two way traffic shall be maintained at all times. Work shall be considered incidental to various items of work.

Legend:

Dumped Riprap

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAFT BY RST	
	TRACED BY	
NOTE BOOK	DESIGNED BY MC	
	QUANTITIES BY	
No.	CHECKED BY	

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SITE LAYOUT PLAN

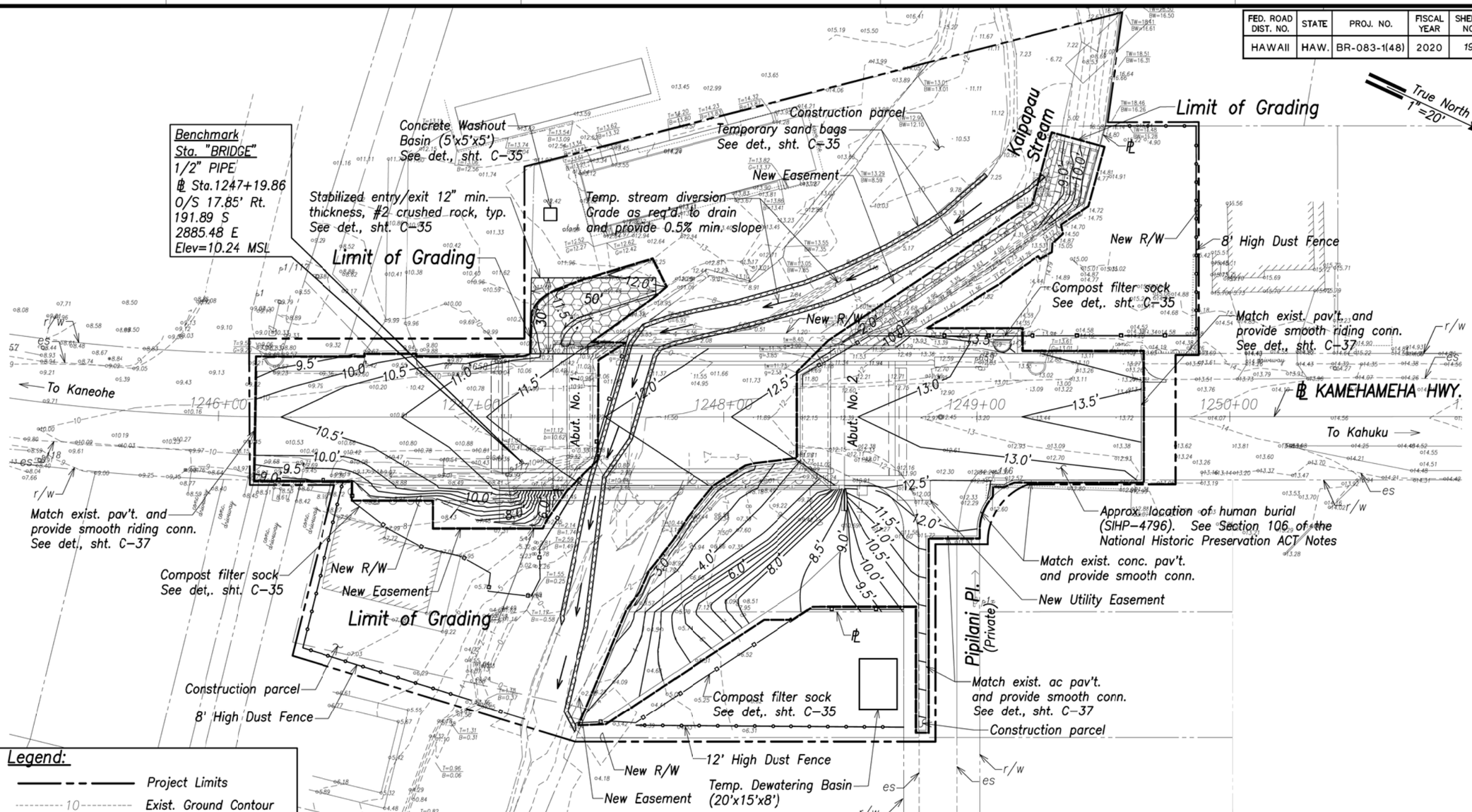
Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted Date: April 2015

SHEET No. C-16 OF SHEETS

RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2020	19	149



Legend:

- Project Limits
- 10 Exist. Ground Contour
- 10 Finished Grade Contour
- Limit of Grading
- Dust Fence
- Compost Filter Sock
- Top of Bank
- Bottom of Bank

Fill Condition Cut Condition

- Drainage Flow Direction
- Stabilized Entry/Exit

ROADWAY GRADING, EROSION & SEDIMENT CONTROL PLAN

Scale: 1"=20'

Notes:

1. For additional finished grade elevations, see sht. C-20.
2. For bridge deck elevations, see structural drawings.
3. For grading work under bridge, see sht. C-19.
4. The contractor shall be responsible for obtaining grading permit from the City and County of Honolulu, Department of Planning and Permitting.

Graphic Scale:

1" = 20' 20' 10' 0 20' 40'

Scale in Feet

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

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HIGHWAYS DIVISION

ROADWAY GRADING, EROSION & SEDIMENT CONTROL PLAN

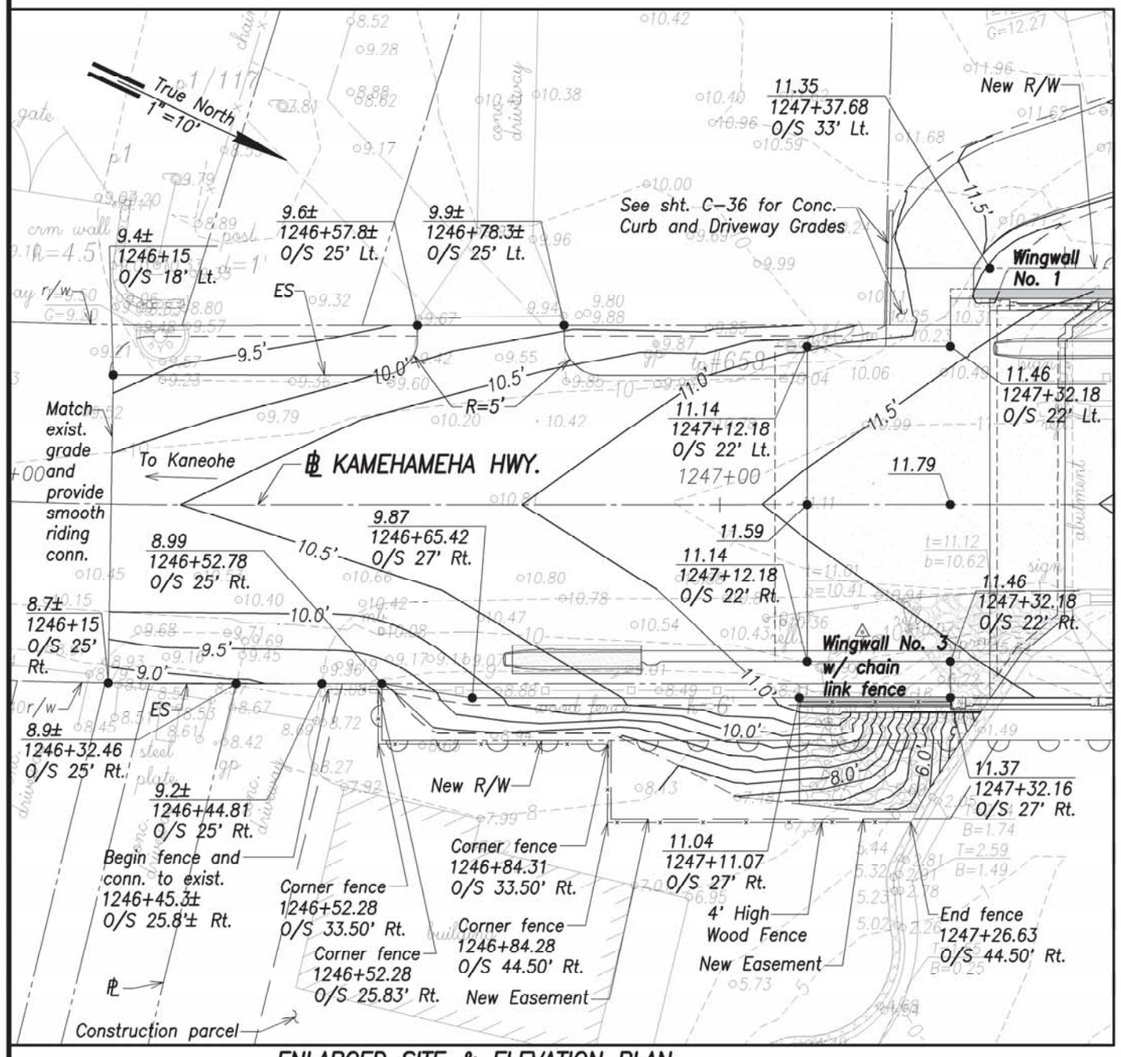
Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted Date: April 2019

SHEET No. C-18 OF SHEETS

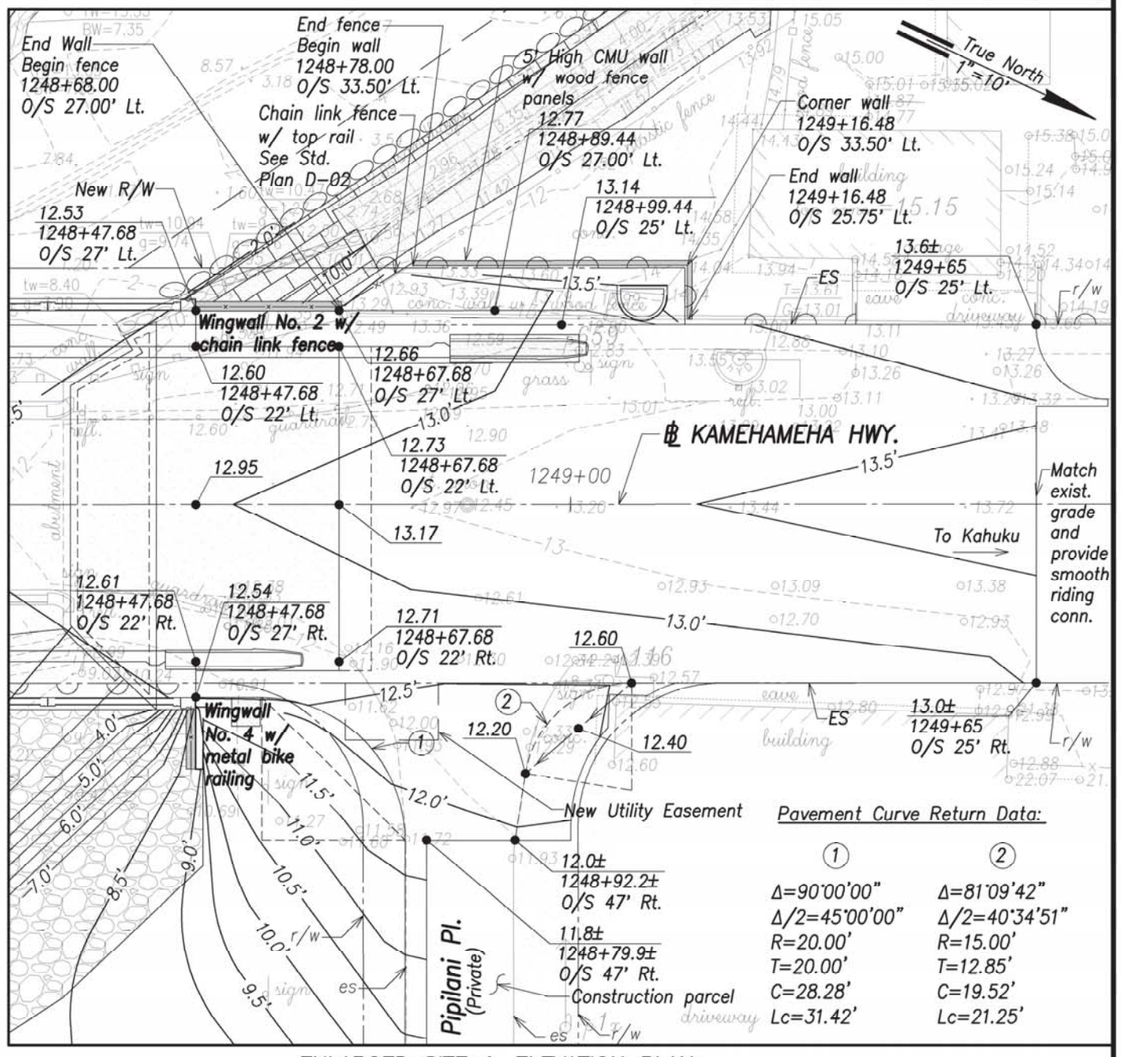
RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	20	142



ENLARGED SITE & ELEVATION PLAN (KANEOHE SIDE)

Scale: 1"=10'



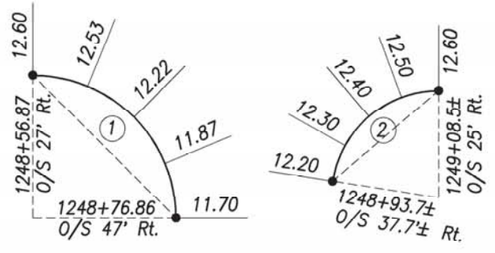
Pavement Curve Return Data:

①	②
Δ=90°00'00"	Δ=81°09'42"
Δ/2=45°00'00"	Δ/2=40°34'51"
R=20.00'	R=15.00'
T=20.00'	T=12.85'
C=28.28'	C=19.52'
Lc=31.42'	Lc=21.25'

ENLARGED SITE & ELEVATION PLAN (KAHUKU SIDE)

Scale: 1"=10'

Pipilani Place
Pavement Curve Return Grades:



Legend:

- Exist. Ground Contour
- Finished Grade Contour
- 10.00 / 2+37.40 / O/S 31.3' Rt. — Finished Grade Elevation
- ℄ Station / ℄ Offset

Graphic Scale:

1" = 10'

10' 5' 0 10' 20'

Scale in Feet

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAFT BY	RBY
	TRACED BY	
NOTE BOOK	DESIGNED BY	WC
	QUANTITIES BY	
No.	CHECKED BY	

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R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ENLARGED SITE & ELEVATION PLAN

Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted Date: April 2015

SHEET No. C-19 OF SHEETS

RMTC JOB NO. : 1-19548-0E

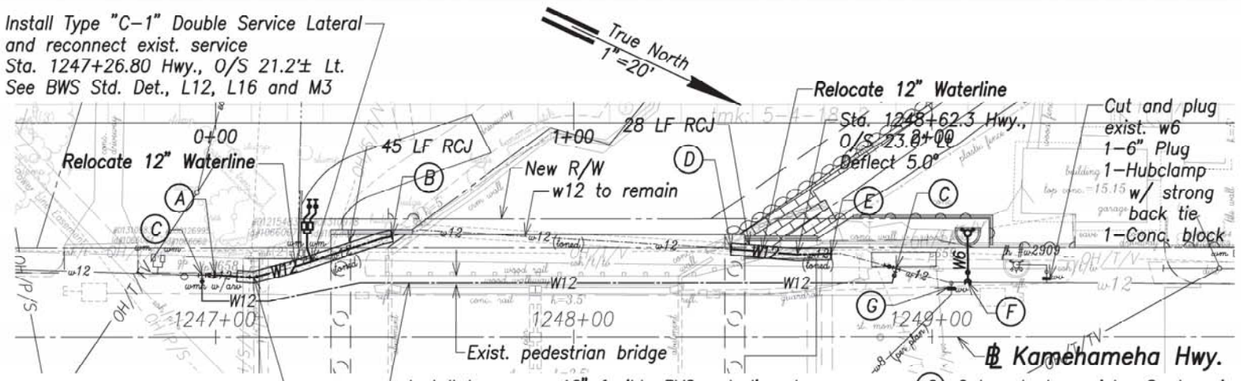
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	21	142

(A) Sta. 1246+99.7± Hwy.,
O/S 17.5'± Lt.
=Sta. 0+00.0± 12" W.L.
Deflect 4.0°

(B) Connect to exist. w12
Sta. 1247+49.3± Hwy.,
O/S 28.2'± Lt.
=Sta. 0+51.0± 12" W.L.
Materials for conn.
1–12" Sleeve, 12" long
8± LF 12" D.I.P., Cl. 52
Temp. for testing
1–12" Cap w/4" C.O.
1–Conc. block
Contractor to verify
invert and location

(C) Connect to exist. w12
Sta. 1246+96± Hwy.,
O/S 17.4'± Lt. and
Sta. 1248+90± Hwy.,
O/S 19.2'± Lt.
Materials for conn.
1–12" x 12" Tee
2–12" GV, 150#
2–Valve box w/ cover
1–Conc. block w/
struct. struts
Temp. for testing
1–12" Cap w/4" C.O.
1–Conc. block
Contractor to verify
invert and location

Install Type "C–1" Double Service Lateral and reconnect exist. service
Sta. 1247+26.80 Hwy., O/S 21.2'± Lt.
See BWS Std. Det., L12, L16 and M3



Sta. 1247+10.50 Hwy.,
O/S 16.70' Lt.
=Sta. 0+10.55 12" W.L.
1–12" 1/8 Bend (H & TV)
1–Conc. block

Install temporary 12" fusible PVC waterline. Lay temporary 12" waterline on existing pedestrian walkway. In areas outside of the existing pedestrian walkway and provide temporary ADA accessible route, place temporary waterline in shallow open trench and cover with steel plates. See Temporary Waterline Notes on this sheet.

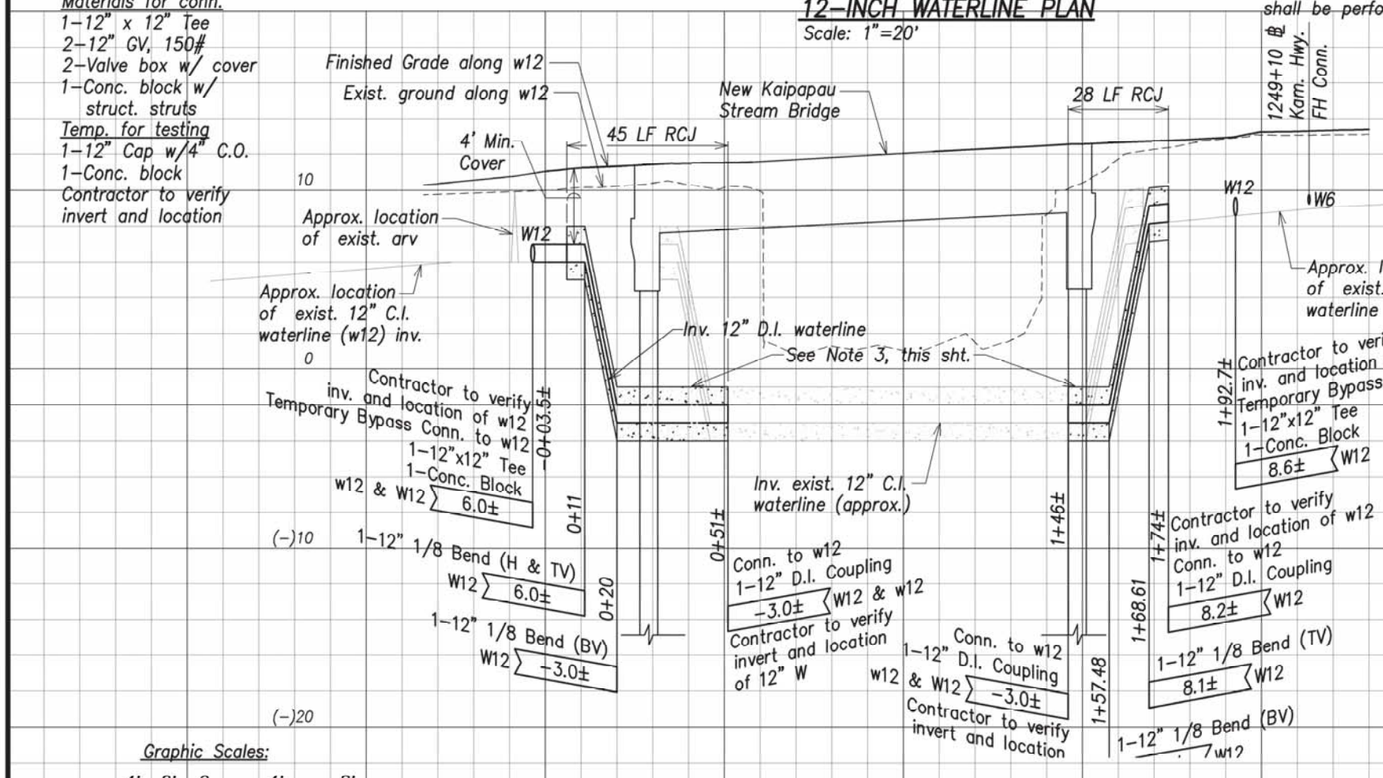
(D) Connect to exist. w12
Sta. 1248+43.9± Hwy.,
O/S 24.6'± Lt.
=Sta. 1+46.0± 12" W.L.
Materials for conn.
1–12" Sleeve, 12" long
8± LF 12" D.I.P., Cl. 52
Temp. for testing
1–12" Cap w/4" C.O.
1–Conc. block
Contractor to verify
invert and location

(E) Connect to exist. w12
Sta. 1248+71.9± Hwy.,
O/S 23.3'± Lt.
=Sta. 1+74± 12" W.L.
Materials for conn.
1–12" Sleeve, 12" long
8± LF 12" D.I.P., Cl. 52
1–12" 1/8 Bend (TV)
Temp. for testing
1–12" Cap w/4" C.O.
1–Conc. block
Contractor to verify
invert and location

(F) FH Connection
Sta. 1249+10 Hwy.
O/S 15.1'± Lt.
1–12" x 6" Tapping Tee (MJ x FE)
1–6" 1/4 Bend (BV)
1–6" GV (MJ x FE), Cl. 150
1–Valve box
1–FH (Ht.=6'–4")
1–FH Extension piece
1–FH Marker
1–FH Curb guard
14 LF 6" D.I.P. Cl. 52
1–Conc. block
1–Conc. block w/ struct. struts
See BWS Std. Det. FH4 and FH11
For Profile, see sht. C–37
Temp. for Testing
1–6" cap w/ 2–1/2" C.O.
1–Conc. block

(G) Cut and plug exist. w8 at main.
Remove valve and box. Salvage frame and cover.
1–8" Plug
1–Hubclamp w/ strong back tie
1–Conc. block
See sht. C–29 for Phase when work shall be performed.

12–INCH WATERLINE PLAN
Scale: 1"=20'



Graphic Scales:
1" = 4' 4' 2' 0 4' 8' Scale in Feet
1" = 20' 20' 10' 0 20' 40' Scale in Feet

12–INCH WATERLINE PROFILE
Scales: 1"=20' Horiz.
1"=4' Vert.

Notes:
1. The existing waterlines shown on these plans were located using record drawings and toning information from the Board of Water Supply. The contractor shall make an independent check by probing the waterlines and coordinating with the Board of Water Supply to ascertain the exact locations of the waterlines. Any discrepancies shall be immediately brought to the attention of the Engineer prior to any work on the water system.
2. Demolish and remove existing waterline as required to construct waterline.
3. Dewatering for removal of water system shall be considered inciental to Item No. 202.0520.
4. Dewatering for installation of the temporary and pernanent water system shall be considered incidental to Item No. 624.1003 Water Systems. No additional compensation will be provided for dewatering.

Temporary Waterline Notes:
1. The temporary waterline shall be constructed, tested and in–service prior to starting construction of permanent water system. The contractor shall coordinate with the Board of Water Supply (BWS) for shut–down of the 12–inch waterline. The maximum down time shall be six (6) hours unless otherwise approved by the BWS. The contractor shall be responsible for providing advanced notification to all users affected by the waterline shut–down.
2. The temporary waterline shall not be in–service for more than two (2) months unless otherwise approved by the BWS.
3. Contractor to provide all fittings, bends as required and install temporary 3/4" ARV in cage at high point of temporary waterline
4. The contractor shall be responsible for providing safe temporary pedestrian access at all times that meets ADA requirements.
5. The contractor shall be responsible for providing traffic controls during temporary waterline installation.

APPROVED:

Manager and Chief Engineer, BWS DATE
(for work affecting BWS facilities
State R/W & BWS easements only)

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4/30/16
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R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

12–INCH WATERLINE PLAN & PROFILE

Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR–083–1(48)

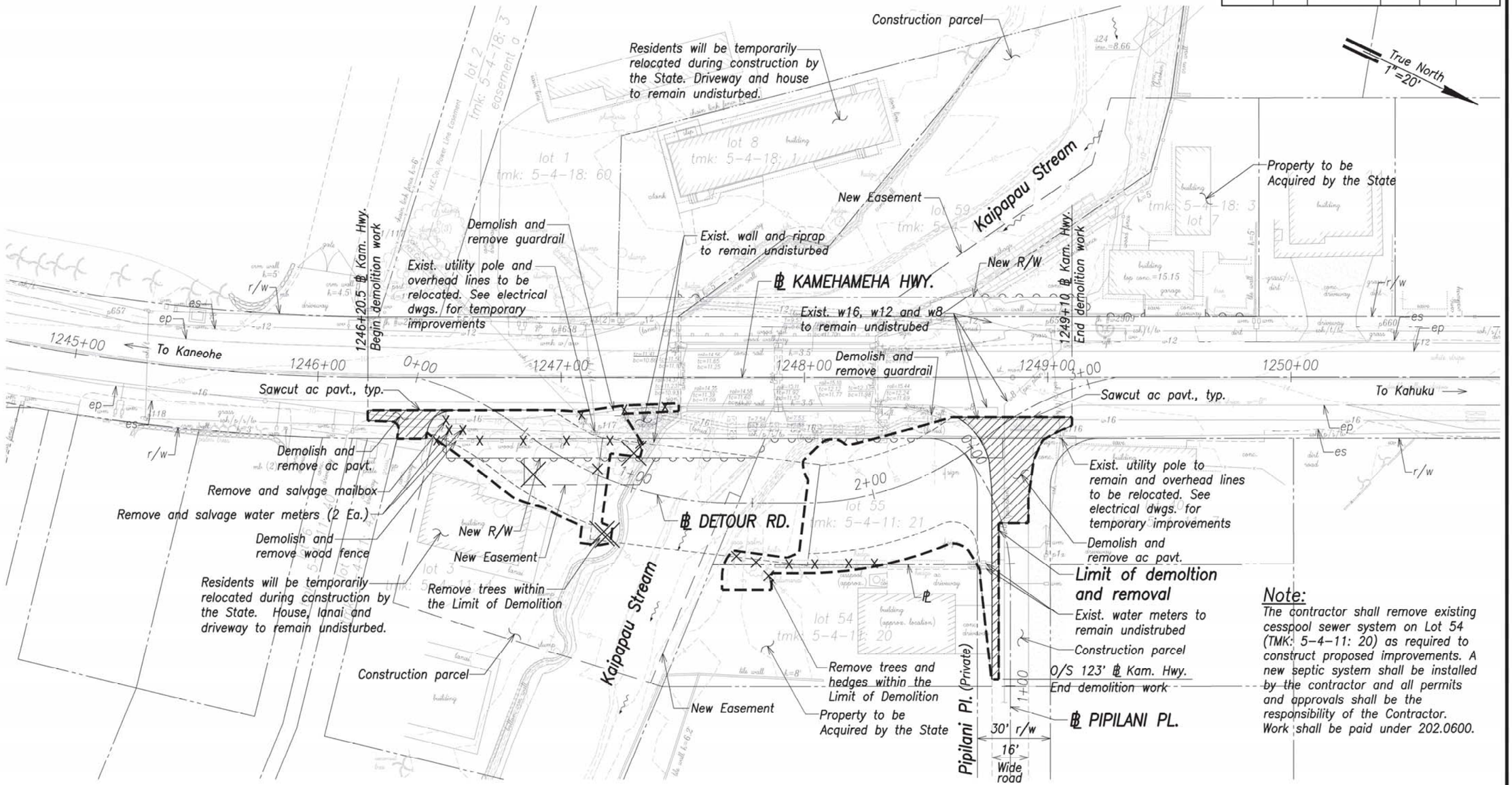
Scale: As Noted Date: April 2015

SHEET No. C–20 OF SHEETS

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

RMTC JOB NO. : 1–19548–0E

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	25	142



Note:
The contractor shall remove existing cesspool sewer system on Lot 54 (TMK: 5-4-11: 20) as required to construct proposed improvements. A new septic system shall be installed by the contractor and all permits and approvals shall be the responsibility of the Contractor. Work shall be paid under 202.0600.

DETOUR ROAD – EXISTING CONDITION & DEMOLITION PLAN

Scale: 1"=20'

Graphic Scale:
1" = 20' 20' 10' 0 20' 40'
Scale in Feet

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

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4/30/16
SIGNATURE — LIC. EXPIRATION
R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DETOUR RD. – EXISTING CONDITION & DEMOLITION PLAN

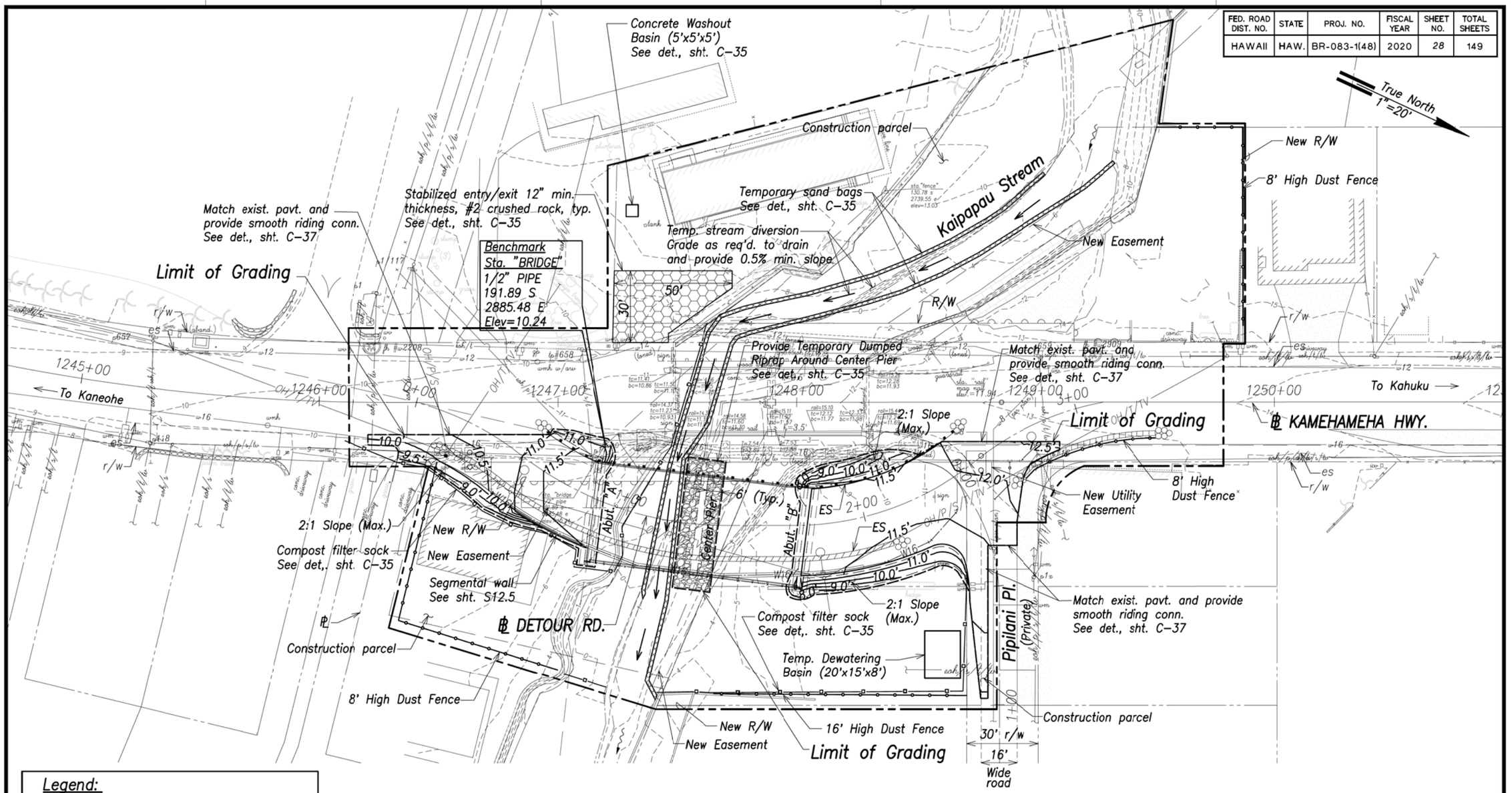
Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted Date: April 2015

SHEET No. C-24 OF SHEETS

RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2020	28	149



Legend:

- Project Limits
- 10 — Exist. Ground Contour
- 10.0' — Finished Grade Contour
- Limit of Grading
- Dust Fence
- Compost Filter Sock
- Drainage Flow Direction
- Stabilized Entry/Exit

DETOUR ROAD – GRADING, EROSION AND SEDIMENT CONTROL PLAN

Scale: 1"=20'

Graphic Scale:

1" = 20' 20' 10' 0 20' 40'

Scale in Feet

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

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R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DETOUR ROAD-GRADING, EROSION AND SEDIMENT CONTROL PLAN

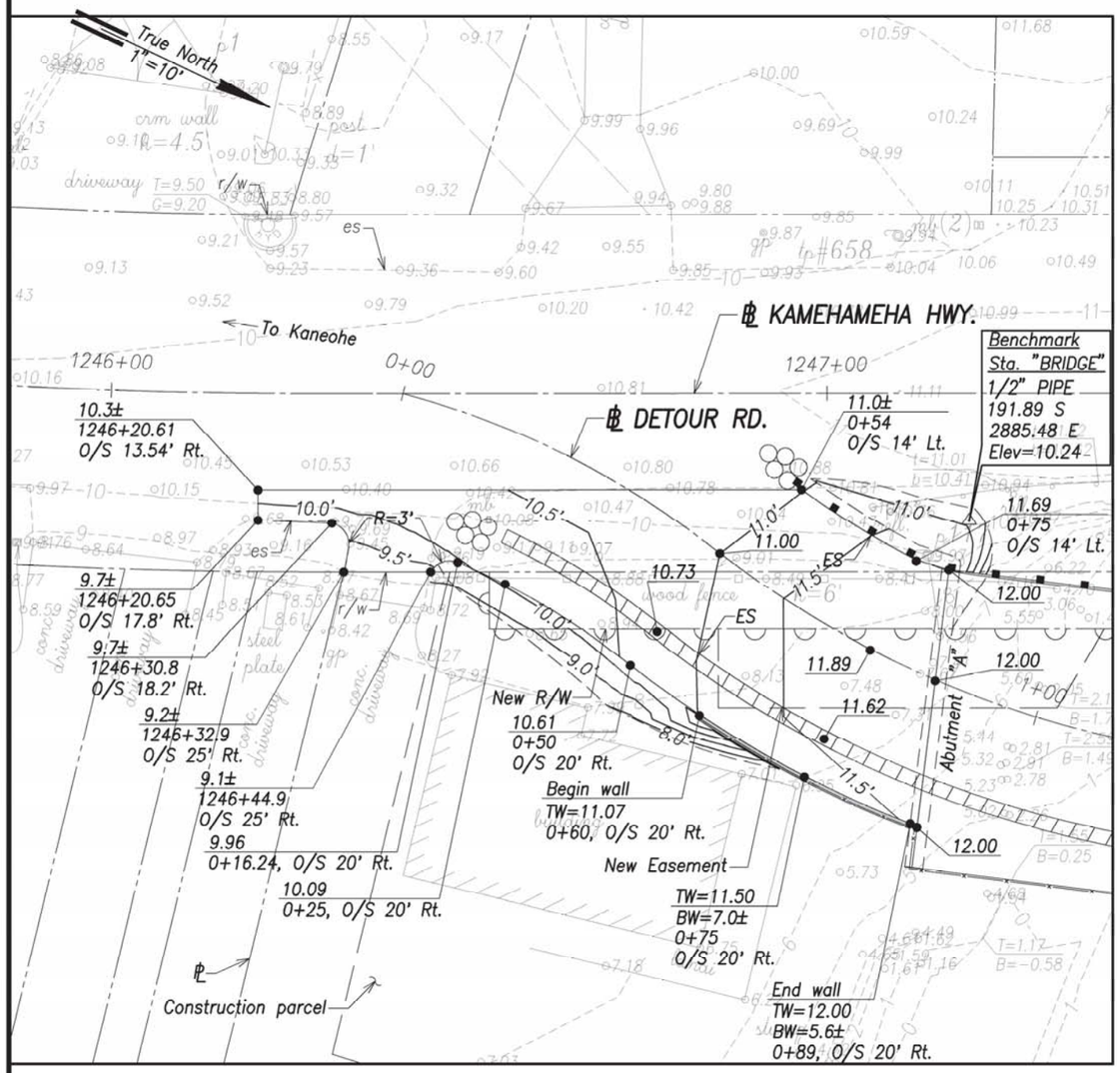
Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted Date: April 2019

SHEET No. C-27 OF SHEETS

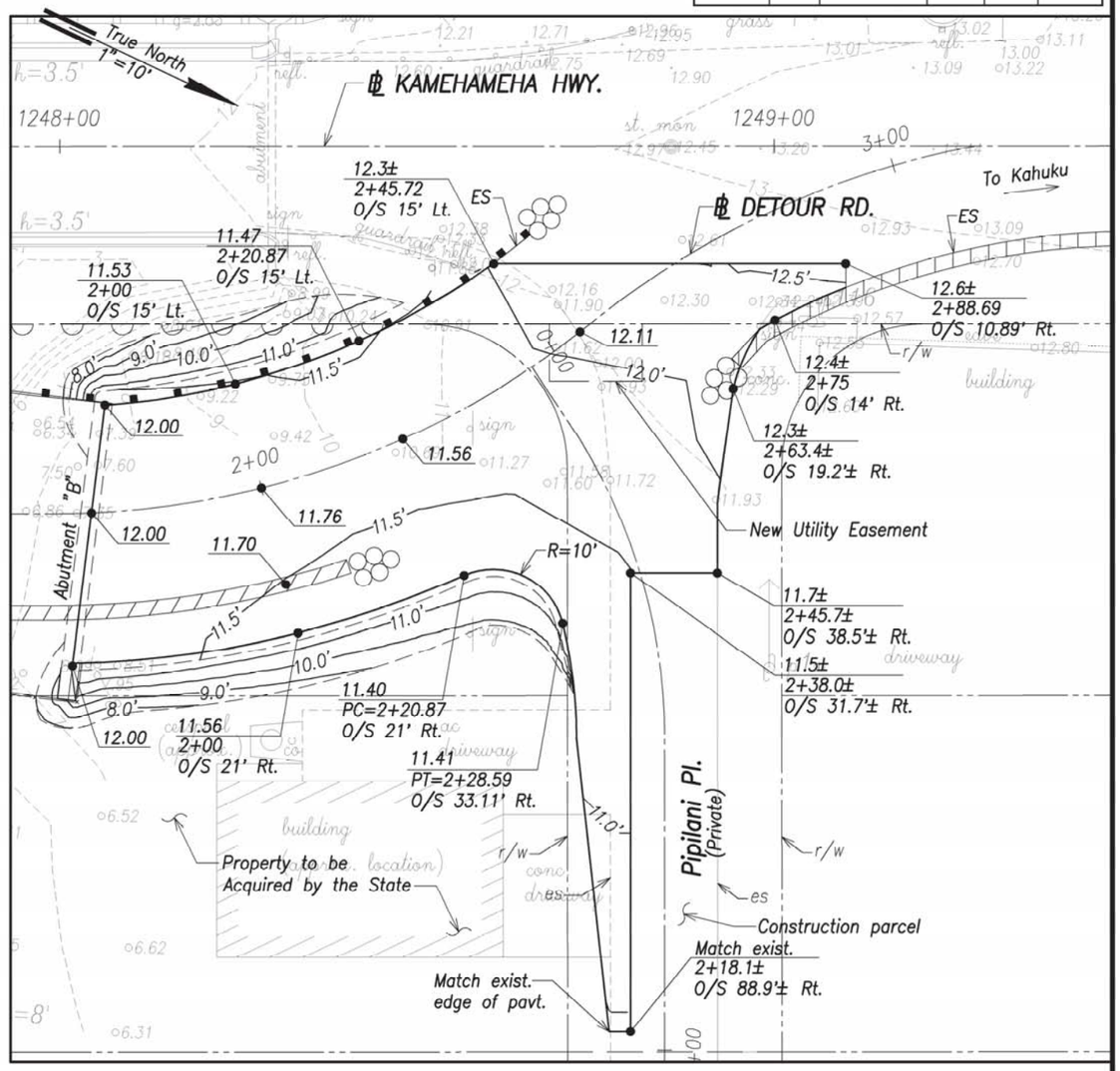
RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	28	142



DETOUR ROAD ENLARGED SITE & ELEVATION PLAN (KANEOHE SIDE)

Scale: 1"=10'



DETOUR ROAD ENLARGED SITE & ELEVATION PLAN (KAHUKU SIDE)

Scale: 1"=10'

Legend:

10	Exist. Ground Contour
10.0'	Finished Grade Contour
10.00 2+37.40 O/S 31.3' Rt.	Finished Grade Elevation ℄ Station ℄ Offset

Graphic Scale:

1" = 10' 10' 5' 0 10' 20'

Scale in Feet

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4/30/16
SIGNATURE L.C. EXPIRATION
R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DETOUR ROAD ENLARGED SITE & ELEVATION PLAN

Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

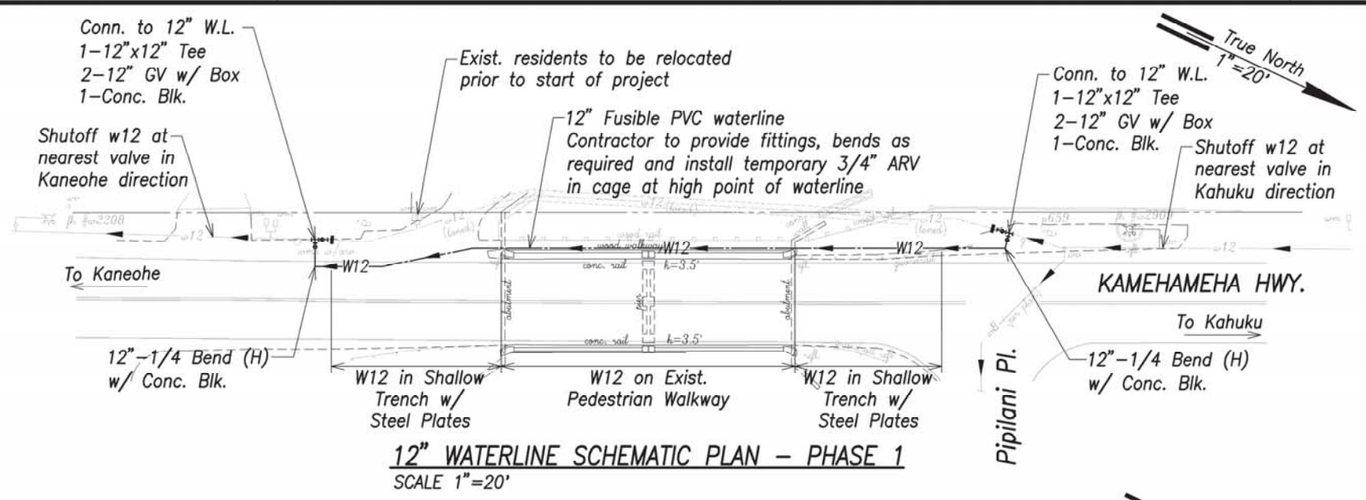
Scale: As Noted Date: April 2015

SHEET No. C-27 OF SHEETS

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

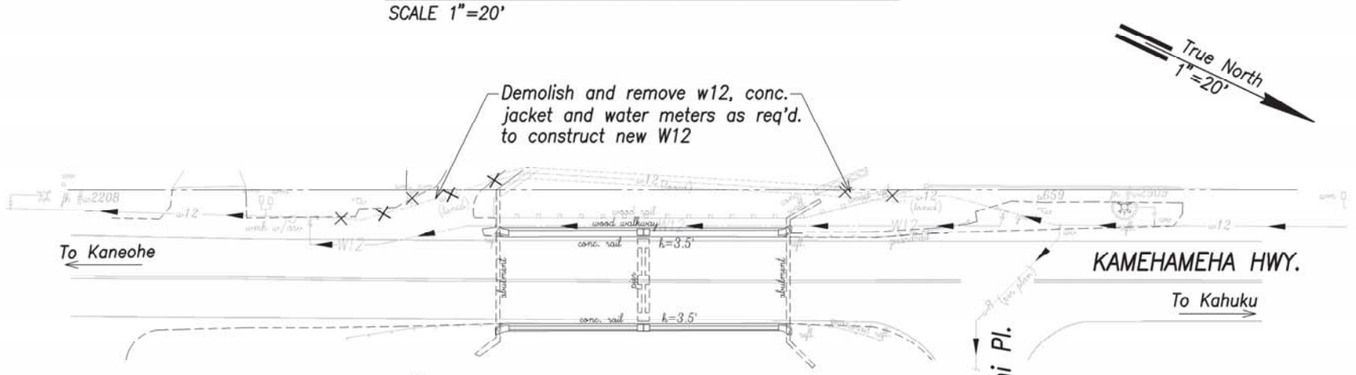
RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	29	142



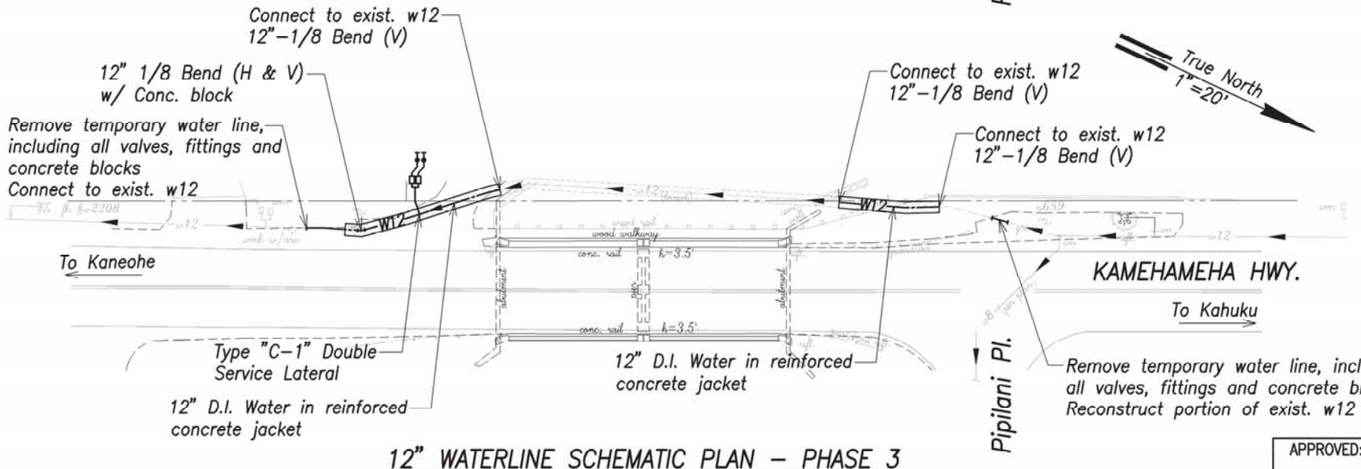
12" WATERLINE SCHEMATIC PLAN – PHASE 1

SCALE 1"=20'



12" WATERLINE SCHEMATIC PLAN – PHASE 2

SCALE 1"=20'



12" WATERLINE SCHEMATIC PLAN – PHASE 3

SCALE 1"=20'

Suggested Phasing for Work on 12" Waterline:

PHASE 1:

Construct temporary bypass waterline improvements shown on this sheet and perform pressure test and chlorination. Shutoff existing w12 by closing the nearest existing valves in the Kaneohe and Kahuku direction and make connections to the existing w12. (Note: Maximum allowable time for w12 shutdown is 6 hours.)

PHASE 2:

Excavate trench and construct shoring for new W12 improvements. Remove portions of existing w12 in concrete jacket required to construct new improvements.

PHASE 3:

Construct permanent waterline improvements shown on this sheet and perform pressure test and chlorination. Shutoff existing w12 by closing the nearest existing valves in the Kaneohe and Kahuku direction and make connections to the existing w12. Remove W12 bypass waterline, including all gate valves, fittings and concrete blocks on both sides of existing bridge. (Note: Maximum allowable time for w12 shutdown is 6 hours.)

Note:

The contractor shall check the invert and location of the existing 12–inch waterline prior to the start of waterline construction and adjust the invert of the new 12–inch waterline to match the existing invert for future connection.

Graphic Scale:

1" = 20' 20' 10' 0 20' 40'

Scale in Feet

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

APPROVED:

Manager and Chief Engineer, BWS (for work affecting BWS facilities State R/W & BWS easements only) — DATE

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R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

12" WATERLINE PHASING PLAN

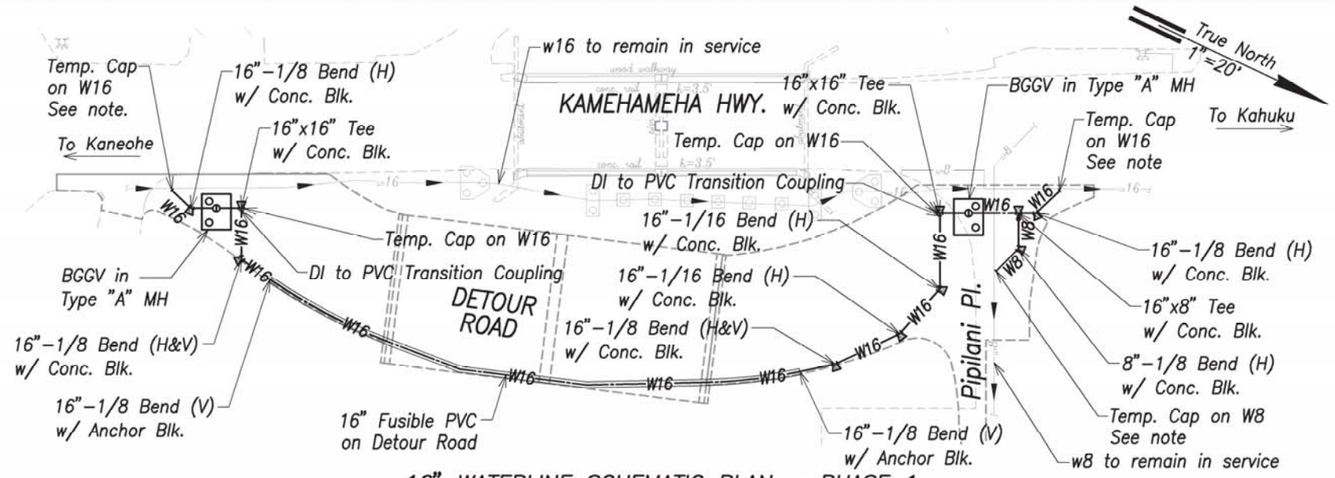
Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR–083–1(48)

Scale: As Noted Date: April 2015

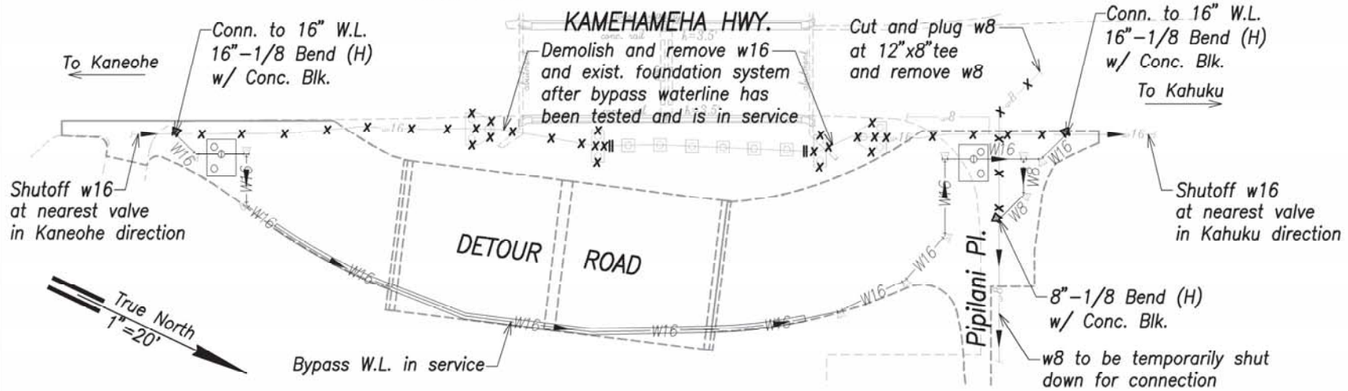
SHEET No. C-28 OF SHEETS

RMTC JOB NO. : 1–19548–0E

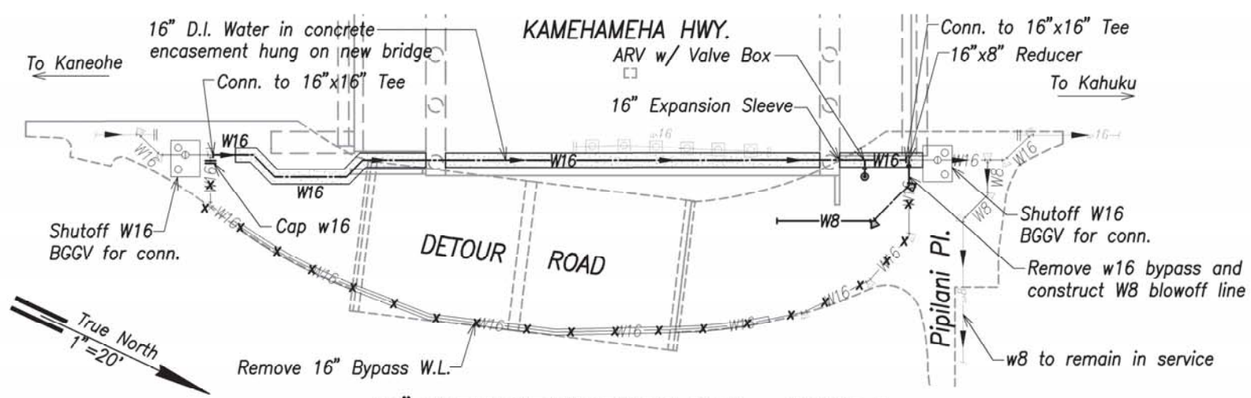
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	30	142



16" WATERLINE SCHEMATIC PLAN – PHASE 1
SCALE 1"=20'



16" WATERLINE SCHEMATIC PLAN – PHASE 2
SCALE 1"=20'



16" WATERLINE SCHEMATIC PLAN – PHASE 3
SCALE 1"=20'

Suggested Phasing for Work on 16" Waterline:

PHASE 1:
Existing w16 and w8 serving Pipilani Road shall remain in service at all times. Construct detour road and temporary bridge. Construct Phase 1 waterline improvements shown on this sheet and perform pressure test and chlorination.

PHASE 2:
Shutoff existing w16 by closing the nearest existing valves in the Kaneohe and Kahuku direction. Drain w16 using existing w8 blowoff line. Construct Phase 2 waterline improvements shown on this sheet. Open existing valves to restore water service. (Note: Maximum allowable time for w16 and w8 shutdown is 8 hours)

After temporary W16 waterline is in service, demolish and remove the existing w16 and existing foundation system shown in Phase 2 on this sheet. Abandon-in-place the existing w16 and existing foundation system under Kaipapau Stream. The contractor shall plug both ends of abandoned waterline.

PHASE 3:
Construct new bridge and Phase 3 waterline improvements, including W8 blowoff line and W16 encased in concrete between new bridge girders, as shown on this sheet. See structural drawings for details. Perform pressure test and chlorination. Shutoff W16 bypass waterline using bevel gear gate valves on both sides of new bridge. (Note: Maximum allowable time for W16 is 8 hours) Connect W16 on both sides of new bridge. Open bevel gear gate valves to restore water service.

After W16 waterline is in service, demolish and remove the bypass waterline.

Note:
The contractor shall check the invert and location of the existing 16-inch waterline prior to the start of waterline construction and adjust the invert of the new 16-inch waterline to match the existing invert for future connection.

Graphic Scale:
1" = 20' 20' 10' 0 20' 40'
Scale in Feet

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	RST
	TRACED BY	
NOTE BOOK	DESIGNED BY	WC
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R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

16" WATERLINE PHASING PLAN

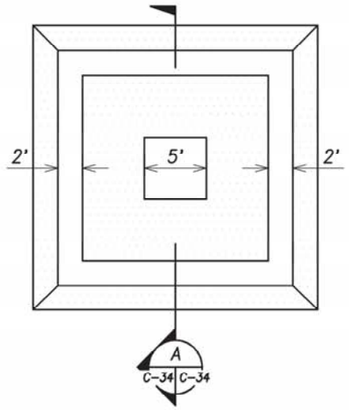
Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted — Date: April 2015

SHEET No. C-29 OF SHEETS

RMTC JOB NO. : 1-19548-0E

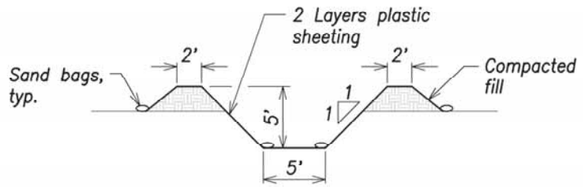
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	35	142



PLAN VIEW

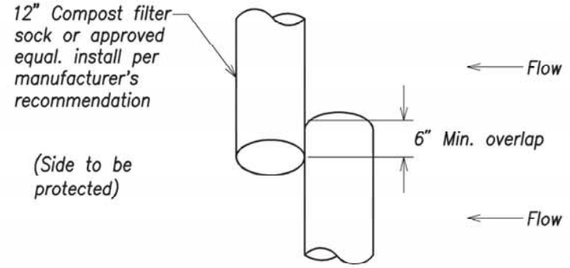
Notes:

1. Line basin with 2 layers of 4 mil. polyethylene plastic.
2. Place sand bags on top sheeting.
3. Clean out hardened concrete to maintain basin capacity.

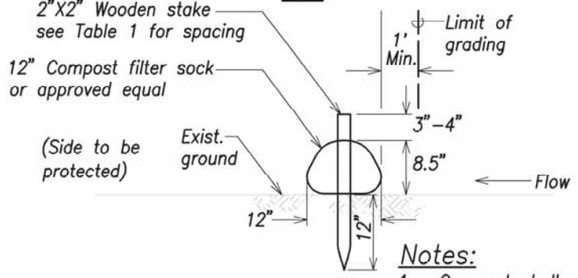


SECTION

CONCRETE WASH-OUT BASIN DETAIL
NOT TO SCALE



PLAN



SECTION

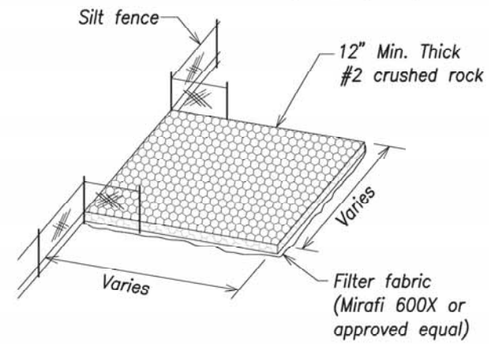
Notes:

1. Compost shall not contain biosolids and should be consistent with EPA guidelines as well as meet all local, state and federal quality requirements.
2. Contractor shall inspect compost filter socks when as required by the project SWPPP.

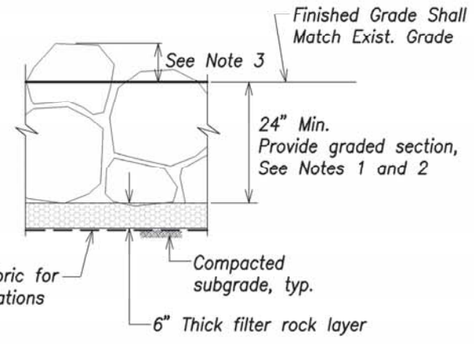
Table 1: Wooden stake anchor spacing

Slope	Anchor spacing
< 4:1	Not required
4:1 to 3:1	10' O.C.
> 3:1 to 2:1	5' to 10' O.C.
> 2:1	5' O.C.

COMPOST FILTER SOCK DETAIL
NOT TO SCALE



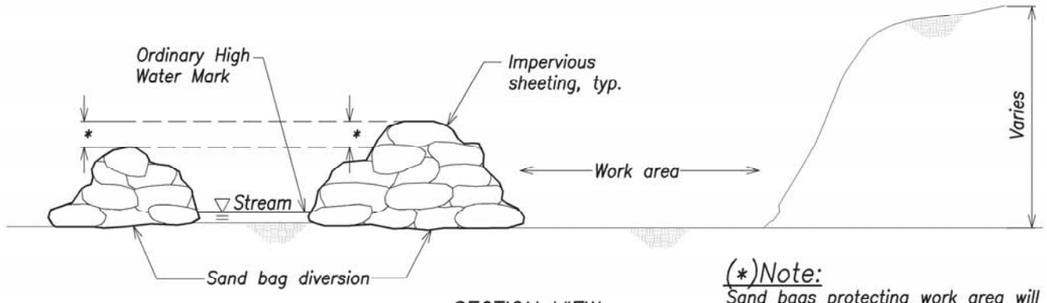
STABILIZED CONSTRUCTION ENTRANCE
Not To Scale



Notes:

1. Riprap shall be basalt rock and consist of 6"ø average stone size, 12"ø maximum stone size.
2. Riprap gradation:
   D_{85} = 9"
   D_{50} = 6"
   D_{15} = 4"
3. 6" Max. from highest adjacent rock finish top.

TEMPORARY DUMPED RIPRAP
Not to Scale



SECTION VIEW

SAND BAG DETAIL
Not To Scale

(*)Note:
Sand bags protecting work area will be constructed 1.5' higher than the opposite side to allow overflow of stream away from work area during high rainfall events.

ORIGINAL PLAN
SURVEY PLOTTED BY — DATE
DRAWN BY — RST
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DESIGNED BY — WC
NOTE BOOK
QUANTITIES BY
No. — CHECKED BY

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R. M. TOWILL CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EROSION & SEDIMENT CONTROL DETAILS
Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: As Noted — Date: April 2015

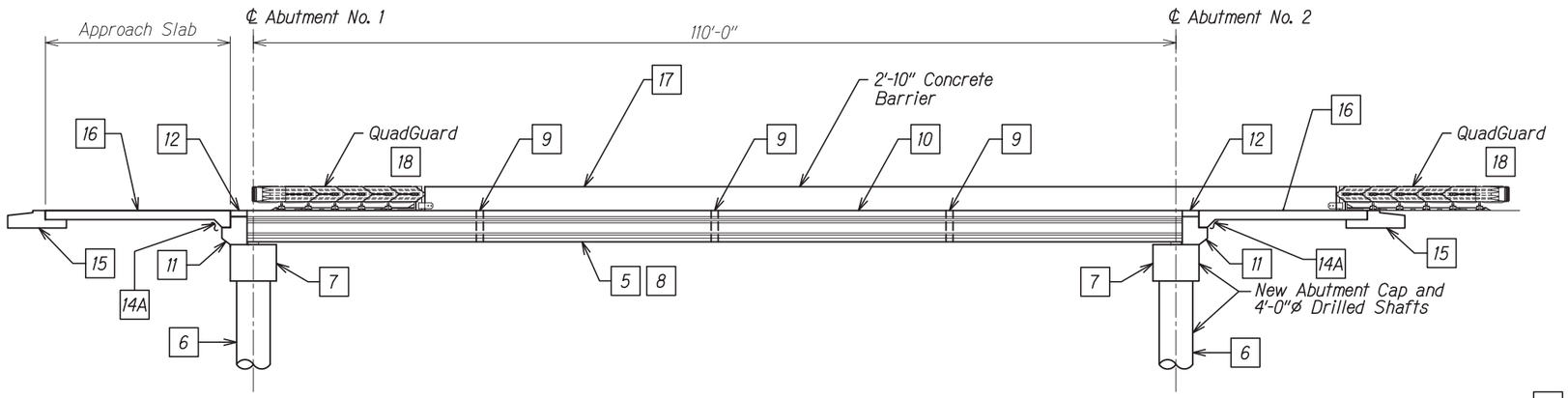
SHEET No. C-34 OF SHEETS

RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	62	148

To Kaneohe ←

→ To Kahuku



CONSTRUCTION SEQUENCE

Scale: 1/8" = 1'-0"

CONSTRUCTION SEQUENCE NOTES:

1. Order of construction sequence shall not be changed.
2. Each sequence stage shall be completely finished before proceeding to the next stage unless otherwise noted. The Engineer will be the sole judge of whether the sequence stage is complete, and may direct the Contractor to stop work on a sequence stage to complete work on the preceeding sequence stage.
3. Contractor shall submit overweight vehicular details for approval prior to their use.

LEGEND:

[#] Phase 1 Stages

CONSTRUCTION SEQUENCE ELEVATION

[1] Relocate existing utility lines.

[2] Construct trial and load test shafts. Perform load test.

[3] Install detour road and temporary bridge.

[4] Demolish existing bridge.

[5] Construct precast girders. (May be done concurrently with Stages 1 through 4.)

[6] Construct 4 ft diameter drilled shafts. Shaft numbers 1, 2, 3, 5, 6, 7.

[7] Cast Phase 1 drilled shaft cap beams, girder seats, and corbels for concrete encased ducts at least 7 days after the final drilled shaft concrete pour in Stage 6 or until the concrete in Stage 6 has attained a compressive strength of 4,500 psi, whichever occurs later.

[8] Erect Phase 1 precast girders at least 15 days after the concrete pour in Stage 7 or until the concrete in Stage 7 has attained a compressive strength of 5,000 psi, whichever occurs later. Place slush grout immediately prior to placement of precast girders.

[9] Construct Phase 1 intermediate diaphragms.

[10] Pour Phase 1 cast-in-place deck except areas over end beams and electrical duct encasement.

[11] Pour Phase 1 corbel and end beams to top of precast girder at least 30 days after the concrete pour in Stage 10. The concrete pour shall occur between midnight and 3:00 AM (3 hour window).

[12] Pour remainder of Phase 1 deck concrete a minimum of 24 hours after the concrete pour in Stage 11.

[13] Construct Phase 1 wing walls at least 8 days after the concrete pour in Stage 12 or after the concrete in Stage 12 has attained a compressive strength of 5,000 psi, whichever occurs later.

[14A] Backfill to Phase 1 limits and to bottom of approach slab at least 14 days after the concrete pour in Stage 13 or until the concrete in Stage 13 has attained a compressive strength of 5,000 psi, whichever occurs later. Maximum height difference of backfill between abutments shall not exceed 2 feet. Install concrete encased ducts behind abutments when backfill height is at the elevation of the bottom of the concrete encased electrical ducts. Continue backfilling after concrete for encased electrical ducts has attained its 28 day compressive strength.

[14B] Construct barrier wall.

[15] Construct Phase 1 sleeper slabs.

[16] Construct Phase 1 approach slabs.

[17] Construct mauka aesthetic railing, concrete barrier and fence wall.

[18] Install mauka quadguards.

[19] Install temporary barriers.

STEWART N. WILLIAMS
LICENSED PROFESSIONAL ENGINEER
No. 3908-S
HAWAII, U.S.A.

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MITSUNAGA & ASSOCIATES, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONSTRUCTION SEQUENCE
PHASE 1

KAMEHAMEHA HIGHWAY
Kaipapau Stream Bridge Replacement
Federal Aid Proj. No. BR-083-1(48)

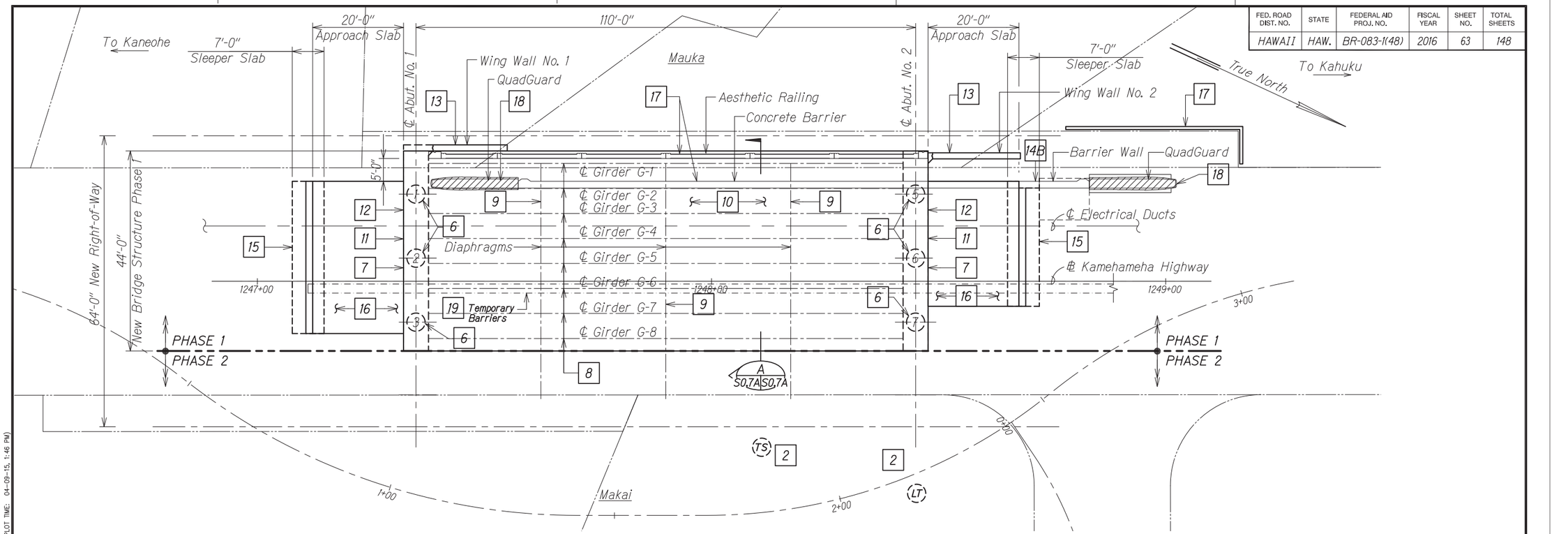
Scale: As Noted Date: April 2015

SHEET No. S0.7 OF 12 SHEETS

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

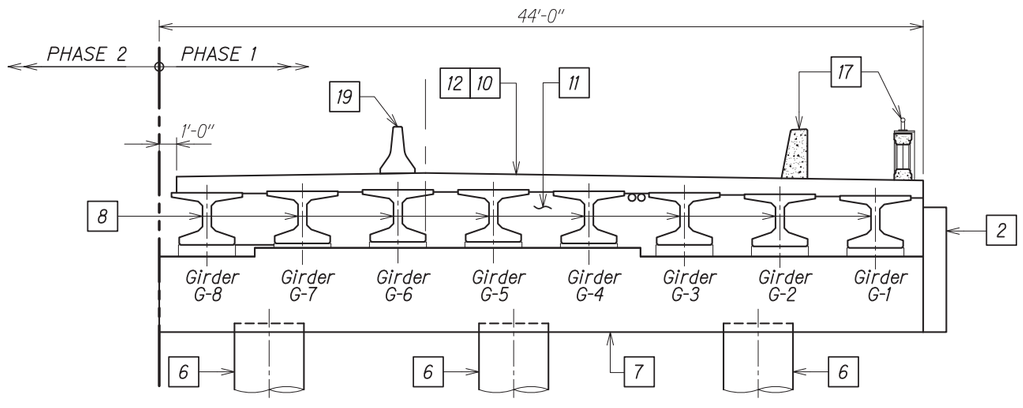
DRAWING NAME: K:\VERBATIM 12-10-14\B R I D G E\K A I 15-4-8\15-4-9 SW CADD PLOT\---1BI SW CADD 2015-04-10\KSB-S007.DWG PLOT TIME: 04-09-15, 10:52 AM)

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	63	148



PROPOSED CONSTRUCTION SEQUENCE PLAN (PHASE 1)

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



CONSTRUCTION SEQUENCE (PHASE 1)

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

A S0.7A S0.7A

LEGEND:

- # — Construction Sequence Stage
- (#) — Drilled Shaft ID
- (TS) — Trial Shaft
- (LT) — Load Test Shaft

STEWART N. WILLIAMS — LICENSED PROFESSIONAL ENGINEER — No. 3908-S — HAWAII, U.S.A.

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4/30/16
SIGNATURE — LIC. EXPIRATION
MITSUNAGA & ASSOCIATES, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONSTRUCTION SEQUENCE PHASE 1

KAMEHAMEHA HIGHWAY
Kaipapau Stream Bridge Replacement
Federal Aid Proj. No. BR-083-1(48)

Scale: As Noted Date: April 2015

SHEET No. S0.7A OF 12 SHEETS

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

DRAWING NAME: K:\VERBATIM 12-10-14\B R I D G E\K A I 15-4-8\15-4-9 SW CADD PLOT\---1BI SW CADD 2015-04-10\KSB-S007A.DWG PLOT TIME: 04-09-15, 1:46 PM)

KAIPAPAU STREAM BRIDGE REPLACEMENT – OVERALL CONSTRUCTION SEQUENCE

	Structural Construction Stage	Description	References: Civil	Electrical	Geotech.	Structural	Waterline Work	Exist Bridge Open	Detour Open	Detour Off Peak Lane Closures Anticipated	Remarks
	Prior to Site Mobilization for Demolition	1. Prior to Site Mobilization, the Contractor shall submit required BMP's and other Municipal and National permit applications as indicated in the project Plans, Special Provisions and Specifications. 2. The Contractor shall submit Prefabricated Steel Beam Bridge Structural Computations and Erection drawings to the Owner for Review and Approval Prior to Fabrication.	Civil Sequence See C-10. See Civil 1			Structural Sequence S0.7,S0.7A, S0.8,S0.8A		Exist Bridge Open to Traffic			
	1	1. Install approved BMP measures. 2. Relocate Existing overhead utility lines. 3. Install temporary 12" fusible PVC waterline on existing (upstream) pedestrian walkway.	C-15,16,17, C-20, C-28, see Civil 2	E-8, E-9, E-10, E-11			Temporary 12" fusible PVC waterline				
	2	1. Construct Trial and Load Test shafts * 2. Perform Load Test. Demobilize drilled shaft equipment off site.	See Civil 3		Special drilling equipment*	S1.1, S8.3					*Special Provisions Section 511
	3	1. Install Detour Pier, Abutments and Temporary Bridge. Construct Civil Phase 1 waterline Improvements C-29; C-30. 2. Construct Detour Approach Retaining Wall, Fills and Roadway – chainlink fence see C-23. 3. Construct Civil Phase 2 waterline improvements–see C-29; C-31.	See Civil 4 C-23, C-29, C-30, C-31, C-32	E-10, E-11, E-15	Excavation Bracing–Spec. Prov. 205*	S12.1, S12.2 S12.3, S12.4 S12.5	Civil Phase 1 & 2 (W16) waterline work–see C-29, C-30.		Detour Open to Traffic		*Excavation Bracing anticipated upstream of detour.
	4	1. Relocate existing water line W12 (prior to existing bridge demolition) – see C-20, C-28. 2. Demolish existing bridge.	See Civil 5 C-20, C-28		Excavation Bracing–Spec. Prov. 205*	S2.1, S2.2	Relocate Exist W12 waterline C-20, C-28.	Exist Bridge Demolition			*Exc. Bracing upstream of existing.
	5	Construct precast girders. (May be done concurrently with stages 1 through 4.)	See Civil 6			S4.x series					
	6	Construct 4 ft. diameter drilled shafts. 1, 2, 3, 5, 6, 7. *			Special drilling equipment*	S1.1,S1.2,S6.1, S6.2,S8.1,S8.2					*Special Provisions Section 511
STRUCTURAL PHASE 1	7	Cast phase 1 drilled shaft cap beams, girder seats, and corbels for concrete encased ducts at least 7 days after the final drilled shaft concrete pour in stage 6 or until the concrete in stage 6 has attained a compressive strength of 4,500 psi, whichever occurs later.			Structure – Excavation Bracing per Spec Prov 205	S0.7, S0.7A, S6.x series					Marks 7 through 18 are PHASE 1. Structural see 20 for PHASE 2
	8	Erect phase 1 precast girders at least 15 days after the concrete pour in stage 7 or until the concrete in stage 7 has attained a compressive strength of 5,000 psi, whichever occurs later. Place slush grout immediately prior to placement of precast girders.			Required at Makai Limit	S0.7, S0.7A, S1.2, S1.3, S6.x series					
	9	Construct phase 1 intermediate diaphragms.				S0.7,S0.7A, S5.x series					
	10	Pour phase 1 cast-in-place deck except areas over end beams and duct encasement.				S0.7,S0.7A S1.6,S3.1,S3.2					
	11	Pour phase 1 end beams to top of precast girder and corbel at least 30 days after the concrete pour in Stage 10. The concrete pour shall occur between midnight and 3:00 AM (3 hours).				S0.7,S0.7A, S6.x series					Concrete Placement At Night
	12	Pour remainder of phase 1 deck concrete a minimum of 24 hours after the concrete pour in stage 11.									
	13	Construct phase 1 wing walls at least 8 days after the concrete pour in stage 12 or after the concrete in stage 12 has attained a compressive strength of 5,000 psi, whichever occurs later.				S0.7,S0.7A, S7.x series				Lane Closure Duration Approx 3 weeks each abutment with Further Lane Closure Duration Approx 2 weeks each approach	
	14	Backfill to phase 1 limits and to bottom of approach slab and at least 14 days after the concrete pour in Stage 13 or until the concrete in Stage 13 has attained a compressive strength of 5,000 psi, whichever occurs later. Maximum height difference of backfill between abutments shall not exceed 2 feet. Install concrete encased ducts when backfill height is at the elevation of bottom of concrete encased ducts. Continue backfilling after concrete for encased ducts has attained its 28 day compressive strength.		Signal Corps Work E-1, E-5 E-12, E-13, E-16		S0.7,S0.7A,S6.x S9.x					
	15	Construct phase 1 sleeper slabs.									
	16	Construct phase 1 approach slabs.		Signal Corps Work E-1, E-5 E-12,E-13,E-16							
	17	Construct mauka aesthetic railings and concrete barrier.									
	18	Install mauka quadguards.									
	19	Install Temporary Barriers and Temporary Striping on PHASE 1 of New Bridge.	See Civil for Barriers								

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	64	148

CONSTRUCTION SEQUENCE NOTES:

1. Order of construction sequence shall not be changed unless authorized in writing by the Engineer.
2. Each sequence stage shall be completely finished before proceeding to the next stage unless otherwise noted. The Engineer will be the sole judge of whether the sequence stage is complete, and may direct the Contractor to stop work on a sequence stage to complete work on the preceeding sequence stage.
3. Contractor shall submit overweight vehicular details for approval prior to their use.
4. Construction shall be conducted such that no construction debris, wash water or other contaminants shall enter the Stream Waters.
5. Closing of the Prefabricated Steel Beam Bridge Structure:
   (a) If for any reason or at any time, the Prefabricated Beam Bridge Structure's ability to safely carry traffic is in question, the Contractor shall be responsible for immediately taking the actions necessary to protect the public by closing, repairing and reopening the Prefabricated Steel Truss Bridge.
   (b) When the Contractor closes the Prefabricated Steel Beam Bridge Structure, the Contractor shall immediately notify the Engineer and the appropriate Law Enforcement Agency.
   (c) Closing of the Prefabricated Steel Beam Bridge shall be included as incidental to Maintenance of Traffic Control.
6. The Contractor shall phase 16 inch waterline (W16) to allow no more than 8 hours of down time. Liquidated Damages of $100,000 per day will be imposed if the Contractor exceeds the 8 hour restriction.

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

STEWART N. WILLIAMS
LICENSED PROFESSIONAL ENGINEER
No. 3908-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

4/30/16
SIGNATURE LIC. EXPIRATION
MITSUNAGA & ASSOCIATES, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

OVERALL CONSTRUCTION SEQUENCE
STRUCTURAL PHASE 1

Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: AS NOTED Date: April 2015

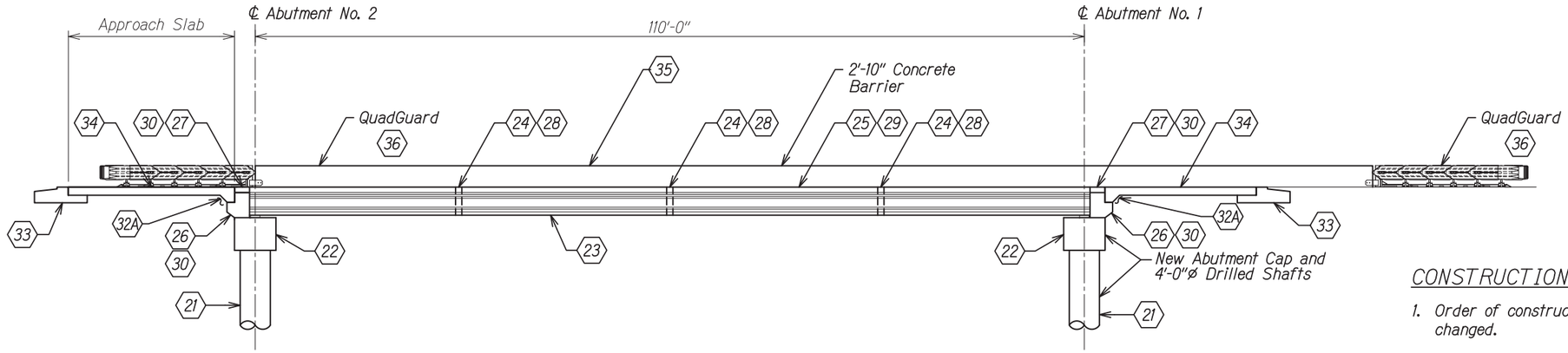
SHEET No. S0.7B OF 12 SHEETS

RMTC JOB NO. : 1-19548-0E

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	65	148

To Kaneohe ←

→ To Kahuku



CONSTRUCTION SEQUENCE

Scale: 1/8" = 1'-0"

CONSTRUCTION SEQUENCE NOTES:

1. Order of construction sequence shall not be changed.
2. Each sequence stage shall be completely finished before proceeding to the next stage unless otherwise noted. The Engineer will be the sole judge of whether the sequence stage is complete, and may direct the Contractor to stop work on a sequence stage to complete work on the preceeding sequence stage.
3. Contractor shall submit overweight vehicular details for approval prior to their use.

LEGEND:

(#) Phase 2 Stages

CONSTRUCTION SEQUENCE ELEVATION

(20) Partially remove temporary bridge as required to construct Phase 2 of Kaipapau Stream Bridge

(21) Construct 4 ft diameter shafts – Shaft nos. 4 and 8.

(22) Cast Phase 2 drilled shaft cap beams, girder seats, and corbels for concrete jacketed waterline at least 7 days after the final drilled shaft concrete pour in Stage 21 or until the concrete in Stage 21 has attained a compressive strength of 4,500 psi, whichever occurs later.

(23) Erect Phase 2 precast girders at least 15 days after the concrete pour in Stage 22 or until the concrete in Stage 22 has attained a compressive strength of 5,000 psi, whichever occurs later. Place slush grout immediately prior to placement of precast girders.

(24) Construct Phase 2 intermediate diaphragms between girders G-9 and G-10, install dowels connecting G-10 and G-11, and install W16 with light-weight concrete jacket between girders G-10 and G-11.

(25) Pour Phase 2 cast-in-place deck except areas over end beams and closure pour.

(26) Pour Phase 2 corbel and end beams (except at closure pour) to top of precast girder at least 30 days after the concrete pour in Stage 25. The concrete pour shall occur between midnight and 3:00 AM (3 hour window).

(27) Pour remainder of Phase 2 deck concrete (except at closure pour) a minimum of 24 hours after the concrete pour in Stage 26.

(28) Pour Phase 2 intermediate diaphragms between girders G-8 and G-9 at least 4 days after the concrete pour in Stage 27.

(29) Pour Phase 2 cast-in-place deck closure except over end beams. Material for cast-in-place deck closure pour shall be VESLMC. (See Special Provisions).

(30) Pour Phase 2 corbel and end beam closure from top of drilled shaft cap beam to top of deck. Material for end beam closure pour shall be VESLMC. (See Special Provisions).

(31) Construct Phase 2 wing walls at least 8 days after the concrete pour in Stage 30 or after the concrete in Stage 30 has attained a compressive strength of 5,000 psi, whichever occurs later.

(32A) Backfill to bottom of approach slab at least 14 days after the concrete pour in Stage 31 or until the concrete in stage 31 has attained a compressive strength of 5,000 psi, whichever occurs later. Maximum height difference of backfill between abutments shall not exceed 2 feet. Install jacketed waterline behind abutments when backfill height is at the elevation of the bottom of the jacketed waterline. Continue backfilling after concrete for jacketed waterline has attained its 28 day compressive strength.

(32B) Construct Barrier Wall.

(33) Construct Phase 2 sleeper slabs.

(34) Construct Phase 2 approach slabs.

(35) Constuct Makai aesthetic railing and concrete barrier.

(36) Install Makai quadguards.

(37) Remove remainder of temporary bridge.

STEWART N. WILLIAMS
LICENSED PROFESSIONAL ENGINEER
No. 3908-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

4/30/16
SIGNATURE LIC. EXPIRATION
MITSUNAGA & ASSOCIATES, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONSTRUCTION SEQUENCE
PHASE 2
KAMEHAMEHA HIGHWAY
Kaipapau Stream Bridge Replacement
Federal Aid Proj. No. BR-083-1(48)

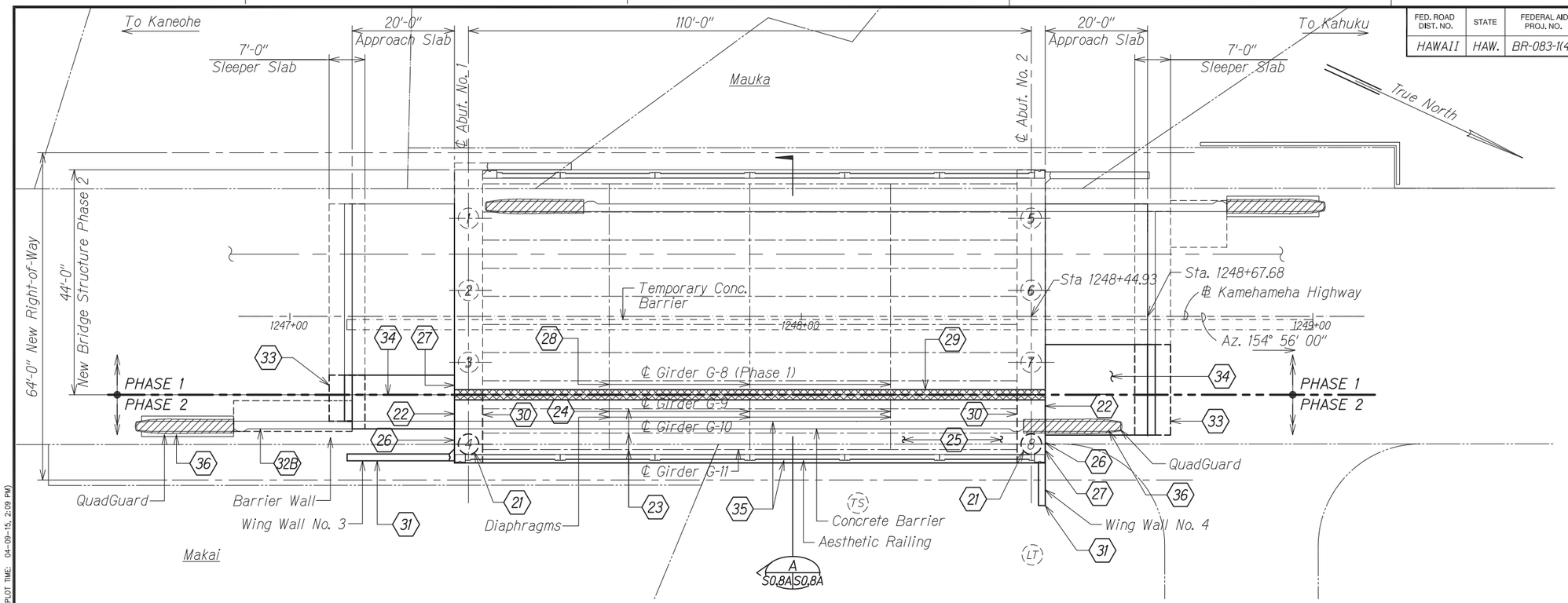
Scale: As Noted Date: April 2015

SHEET No. S0.8 OF 12 SHEETS

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

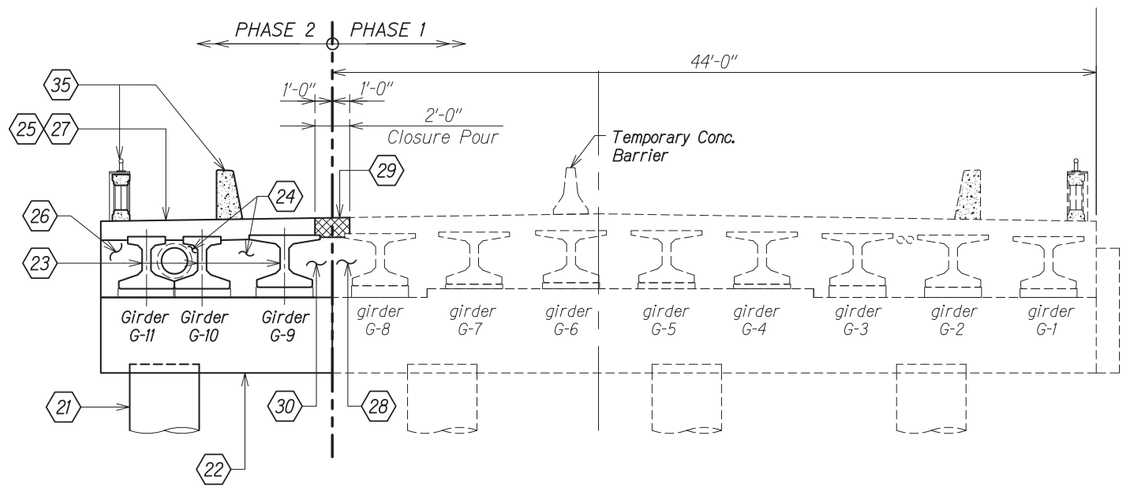
DRAWING NAME: K:\VERBATIM 12-10-14\B R I D G E\K A I 15-4-8\15-4-9 SW CADD PLOT\---1BI SW CADD 2015-04-10\KSB-S008.DWG PLOT TIME: 04-09-15, 11:03 AM)

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	66	148



PROPOSED CONSTRUCTION SEQUENCE PLAN (PHASE 2)

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



CONSTRUCTION SEQUENCE (PHASE 2)

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

A S6.3 S6.3

LEGEND:

- (#) Construction Sequence Stage
- (#) Drilled Shaft ID
- (TS) Trial Shaft
- (LT) Load Test Shaft
- Closure Pour

STEWART N. WILLIAMS LICENSED PROFESSIONAL ENGINEER No. 3908-S HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

4/30/16
SIGNATURE LIC. EXPIRATION
MITSUNAGA & ASSOCIATES, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONSTRUCTION SEQUENCE
PHASE 2

KAMEHAMEHA HIGHWAY
Kaipapau Stream Bridge Replacement
Federal Aid Proj. No. BR-083-1(48)

Scale: As Noted Date: April 2015

SHEET No. S0.8A OF 12 SHEETS

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

DRAWING NAME: K:\VERBATIM 12-10-14\BRIDGE\K A I 15-4-8\15-4-9 SW CADD PLOT\---1BI SW CADD 2015-04-10\KSB-S008A.DWG PLOT TIME: 04-09-15, 2:09 PM)

KAIPAPAU STREAM BRIDGE REPLACEMENT – OVERALL CONSTRUCTION SEQUENCE

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-083-1(48)	2016	67	148

Structural Construction Stage		Description	References: Civil	Electrical	Geotech.	Structural	Waterline Work	Exist Bridge Open	Detour Open	Detour Off Peak Lane Closures Anticipated	Remarks
	20	1. Open PHASE I of New Bridge to traffic. Close Temporary Bridge and Detour Roadway to traffic. 2. Remove Mauka portion of Temporary Bridge Only (Remainder to remain in place to support construction equipment for construction of PHASE 2 portion of New Bridge and to support temporary W16 until Final W16 is constructed).				S0.8, S0.8A		PHASE I of New Bridge Open to Traffic to allow Detour Closure	Close Detour and Remove Limited Portion of Temporary Bridge	Not Applicable	Close Detour; Open PHASE 1 of New Bridge: Start Construction of PHASE 2 of New Bridge
STRUCTURAL PHASE 2	21	Construct 4 ft. diameter drilled shafts – Shaft nos. 4 and 8.	See Civil 6		Special drilling equipment*	S1.1, S1.2, S6.1, S6.2, S8.1, S8.2			Detour Closed		*Special Provisions Section 511
	22	Cast Phase 2 drilled shaft cap beams, girder seats, and corbels for concrete jacketed waterline at least 7 days after the final drilled shaft concrete pour in stage 21 or until the concrete in stage 21 has attained a compressive strength of 4,500 psi, whichever occurs later.			Structure Excavation Bracing per Spec for 205 Required at Approaches.	S0.8, S0.8A, S6.x series					Special Provisions Section 205
	23	Erect Phase 2 precast girders at least 15 days after the concrete pour in stage 22 or until the concrete in stage 22 has attained a compressive strength of 5,000 psi, whichever occurs later. Place slush grout immediately prior to placement of precast girders.				S0.8, S0.8A, S1.2, S1.3, S6.x series	Civil Phase 3 (W16) waterline improvements seeC-29,C32				
	24	Construct Phase 2 intermediate diaphragms between girders G-9 and G-10 and light-weight W16 concrete jacket between girders G-10 and G-11.	C-29, C-30			S0.8,S0.8A, S5.x series					
	25	Pour Phase 2 cast-in-place deck except areas over end beams and closure pour.				S0.8,S0.8A S1.6,S3.1,S3.2					
	26	Pour Phase 2 end beams (except at closure pour) to top of precast girder and corbel at least 30 days after the concrete pour in Stage 25. The concrete pour shall occur between midnight and 3:00 AM (3 hours).				S0.8,S0.8A, S6.x series					Concrete Placement At Night
	27	Pour remainder of Phase 2 deck concrete (except at closure pour) a minimum of 24 hours after the concrete pour in stage 25.									
	28	Pour Phase 2 intermediate diaphragms between girders G-8 and G-9 at least 4 days after the concrete pour in stage 27.									
	29	Pour Phase 2 cast-in-place deck closure except over end beams. Material for cast-in-place deck closure pour shall be VESLMC.									
	30	Pour Phase 2 end beams closure from top of drilled shaft cap beam to top of deck. Material for end beam closure pour shall be VESLMC.									
	31	Construct Phase 2 wing walls at least 8 days after the concrete pour in stage 30 or after the concrete in stage 30 has attained a compressive strength of 5,000 psi, whichever occurs later.				S0.8,S0.8A, S7.x series					
	32	Backfill to bottom of approach slab at least 14 days after the concrete pour in Stage 31 or until the concrete in Stage 31 has attained a compressive strength of 5,000 psi, whichever occurs later. Maximum height difference of backfill between abutments shall not exceed 2 feet. Install jacketed waterline when backfill height is at the elevation of bottom of the jacketed waterline. Continue backfilling after concrete for jacketed waterline has attained its 28 day compressive strength.				S0.8,S0.8A,S6.x S9.x					
	33	Construct Phase 2 sleeper slabs.									
	34	Construct Phase 2 approach slabs.									
	35	Construct Makai aesthetic railings and concrete barrier.									
	36	Install Makai guadguards. Remove Detour; construct stream hardening. Remove Temporary Barriers at New Bridge. Open Phase 1 and Phase 2 of New Bridge to traffic.	See Civil 7 thru 12	Permanent Electrical Plan See E-12,E-13, E-14			Remove temp W16 at Closed Detour	PHASE I and PHASE 2 of New Bridge Open	Remove Remainder of Detour		

CONSTRUCTION SEQUENCE NOTES:

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3. Contractor shall submit overweight vehicular details for approval prior to their use.
4. Construction shall be conducted such that no construction debris, wash water or other contaminants shall enter the Stream Waters.
5. Closing of the Prefabricated Steel Beam Bridge Structure:
   (a) If for any reason or at any time, the Prefabricated Beam Bridge Structure's ability to safely carry traffic is in question, the Contractor shall be responsible for immediately taking the actions necessary to protect the public by closing, repairing and reopening the Prefabricated Steel Truss Bridge.
   (b) When the Contractor closes the Prefabricated Steel Beam Bridge Structure, the Contractor shall immediately notify the Engineer and the appropriate Law Enforcement Agency.
   (c) Closing of the Prefabricated Steel Beam Bridge shall be included as incidental to Maintenance of Traffic Control.
6. The Contractor shall phase 16 inch waterline (W16) to allow no more than 8 hours of down time. Liquidated Damages of $100,000 per day will be imposed if the Contractor exceeds the 8 hour restriction.

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

STEWART N. WILLIAMS
LICENSED PROFESSIONAL ENGINEER
No. 3908-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

4/30/16
SIGNATURE | LIC. EXPIRATION
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

OVERALL CONSTRUCTION SEQUENCE
STRUCTURAL PHASE 2

Kamehameha Highway
Kaipapau Stream Bridge Replacement
Federal Aid Project No. BR-083-1(48)

Scale: AS NOTED | Date: April 2015

SHEET No. S0.8B OF 12 SHEETS

RMTC JOB NO. : 1-19548-0E