

**STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION**

ADDENDUM NO. 2

FOR

**KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
VICINITY OF LANIAKEA BEACH (MP 3.06 TO MP 3.54)**

PROJECT NO. 83B-01-09

DISTRICT OF WAIALUA

ISLAND OF OAHU

September 1, 2023

The Addendum shall make the following amendments to the bid documents:

A. SPECIAL PROVISIONS

1. Delete the Table of Contents in its entirety dated 4/18/23 and replace with the attached Table of Contents in its entirety dated r9/1/23.
2. Delete the Section 607 in its entirety dated 11/02/22 and replace with the attached Section 607 in its entirety dated r9/1/23.
3. Delete the Section 621 in its entirety dated 10/21/22 and replace with the attached Section 621 in its entirety dated r9/1/23.
4. Add and make part of the specifications the attached Section 638 dated r9/1/23.
5. Delete the Section 671 in its entirety dated 12/28/22 and replace with the attached Section 671 in its entirety dated r9/1/23.

B. PROPOSAL

1. Replace Proposal Schedule in its entirety dated 7/13/23 with the attached Proposal Schedule in its entirety dated r9/1/23.

C. PLANS

1. Replace Plan Sheet No. 2 with the attached Plan Sheet No. Addendum 2.
2. Replace Plan Sheet No. 4 with the attached Plan Sheet No. Addendum 4.
3. Replace Plan Sheet No. 10 with the attached Plan Sheet No. Addendum 10.
4. Replace Plan Sheet No. 11 with the attached Plan Sheet No. Addendum 11.
5. Replace Plan Sheet No. 24 with the attached Plan Sheet No. Addendum 24.
6. Replace Plan Sheet No. 37 with the attached Plan Sheet No. Addendum 37.
7. Replace Plan Sheet No. 38 with the attached Plan Sheet No. Addendum 38.
8. Replace Plan Sheet No. 39 with the attached Plan Sheet No. Addendum 39
9. Replace Plan Sheet No. 40 with the attached Plan Sheet No. Addendum 40.
10. Add and make part of the Plans the attached Plan Sheet No. Addendum 40S-1.
11. Replace Plan Sheet No. 42 with the attached Plan Sheet No. Addendum 42.
12. Replace Plan Sheet No. 43 with the attached Plan Sheet No. Addendum 43.
13. Replace Plan Sheet No. 50 with the attached Plan Sheet No. Addendum 50.
14. Replace Plan Sheet No. 53 with the attached Plan Sheet No. Addendum 53.
15. Replace Plan Sheet No. 54 with the attached Plan Sheet No. Addendum 54.
16. Replace Plan Sheet No. 55 with the attached Plan Sheet No. Addendum 55.
17. Replace Plan Sheet No. 56 with the attached Plan Sheet No. Addendum 56.
18. Replace Plan Sheet No. 57 with the attached Plan Sheet No. Addendum 57.
19. Replace Plan Sheet No. 58 with the attached Plan Sheet No. Addendum 58.
20. Replace Plan Sheet No. 67 with the attached Plan Sheet No. Addendum 67.
21. Replace Plan Sheet No. 68 with the attached Plan Sheet No. Addendum 68.
22. Replace Plan Sheet No. 69 with the attached Plan Sheet No. Addendum 69.

23. Replace Plan Sheet No. 128 with the attached Plan Sheet No. Addendum 128.
24. Replace Plan Sheet No. 129 with the attached Plan Sheet No. Addendum 129.
25. Replace Plan Sheet No. 130 with the attached Plan Sheet No. Addendum 130.

D. PERMITS

The following permits are provided for information.

1. Blanket Section 401 Water Quality Certification memo dated April 28, 2023, File No. WQC1092
2. Department of the Army Permit Compliance Certification POH-2016-00040
3. Pre-Construction Notification Attachments
4. Nationwide Permit 14 Verification Letter POH-2016-00040
5. Notice of General Permit Coverage File No. HIR10H138
6. Draft Archaeological Monitoring Plan


E. RESPONSES TO REQUESTS FOR INFORMATION/QUESTIONS (RFIs/QUESTIONS)

1. The attached Responses to Request for Information (RFI/Questions) is provided for information.

F. PRE-BID MEETING NOTES

1. The attached Pre-Bid Meeting Minutes and Attendance Sheet are provided for information.

Please acknowledge receipt of this Addendum No. 2 by recording the date of its receipt in the space provided on Page P-4 of the Proposal.



ROBIN K. SHISHIDO
Deputy Director of Transportation for Highways

ADDENDUM NO. 2

83B-01-09

9/1/23

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Performance Bond

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Labor and Material Payment Bond

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Certification of Compliance for Employment of State Residents

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1 **SECTION 607 – CHAIN LINK FENCES AND GATES**

2
3 Make the following amendment to said Section:

4
5 **(I)** Amend **607.04 - Measurement** by replacing lines 105 to 106 to read:

6
7 **“607.04 Measurement.** The Engineer will measure fence by the linear foot.
8 Measurement will be along the top of the fence from outside to outside of end
9 post for each continuous run of fence.

10
11 The Engineer will measure bollards per each as complete units of the size
12 and type specified in the proposal, complete in place.”

13
14 **(II)** Amend **607.05 – Payment** by revising lines 108 to 115 to read as follows:

15
16 **“607.05 Payment.** The Engineer will pay for the accepted quantities of
17 fence at the contract unit price per linear foot of the types and sizes specified in
18 the proposal, complete in place.

19
20 The Engineer will pay for the accepted quantities of bollard at the contract
21 unit price per each types and sizes specified in the proposal, complete in place

22
23 The Engineer will pay for following pay items when included in proposal
24 schedule:

25

Pay Item	Pay Unit
_____ - Feet, Chain Link Fence	Linear Foot
_____ - Feet, _____ Fence	Linear Foot
_____ - Feet, Bollard	Each
_____ - Cattle Gate	Each

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36 **END OF SECTION 607**

1 Make the following section a part of the Standard Specifications:
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3 **SECTION 621 – INVASIVE SPECIES MANAGEMENT**
4
5

6 **621.01 Description.** This section describes the best management practices for
7 the prevention, identification, control, eradication, and reporting of invasive plant
8 and animal species (collectively, invasive species). Invasive species impacts can
9 include damage to infrastructure, public health and safety issues, reduction of
10 biodiversity, and reduced cover of desirable native and/or nonnative species. The
11 material found in Section 621 – Invasive Species Management shall be applied to
12 the following sections, as appropriate: Section 201 – Clearing and Grubbing,
13 Sections 202 – Removal of Structures and Obstructions, 203 – Excavation and
14 Embankment, 204 –Excavation and Backfill for Miscellaneous Facilities, 205 –
15 Excavation and Backfill for Bridge and Retaining Structures, and 206 –Excavation
16 and Backfill for Drainage Facilities, which cover various excavations; Section 209
17 – Temporary Water Pollution, Dust, and Erosion Control; Section 619 – Planting;
18 Section 641 – Hydro-Mulch Seeding; Section 642 – Landscape Maintenance; and
19 Section 643 – Maintenance of Existing Landscape Areas.
20

21 **(A) Definitions.** Whenever the following words, terms, or pronouns are
22 used in contract documents, unless otherwise prescribed therein and
23 without regard to the use or omission of uppercase letters, the intent and
24 meaning shall be interpreted as follows:
25

26 **(1) Alien Species.** Any species, including its seeds, eggs,
27 spores, or other biological material capable of propagating that
28 species, that is not native to that ecosystem.
29

30 **(2) Botanist/Arborist.** A person with a minimum of 5 years of
31 experience in the botanical field, including the identification,
32 eradication, control, and reporting of invasive plant species. The
33 CONTRACTOR’s selected botanist/arborist shall be approved by the
34 Engineer.
35

36 **(3) Hawaii Invasive Species Council (HISC).** Inter-
37 departmental collaboration comprised of the Departments of Land &
38 Natural Resources (DLNR), Agriculture (DOA), Health (DOH),
39 Transportation (DOT), Business, Economic Development & Tourism
40 (DBEDT), and the University of Hawaii (UH). The HISC was
41 established in 2003 for the special purpose of providing policy level
42 direction, coordination, and planning among state departments,
43 federal agencies, and international and local initiatives for the control
44 and eradication of harmful invasive species infestations throughout
45 the State and for preventing the introduction of other invasive species
46 that may be potentially harmful.

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(4) Invasive Species. An alien species whose introduction does, or is likely to, cause economic or environmental harm or harm to human health.

(5) Invasive Species Committee (ISC). Committees located in Hawai'i that are island-based partnerships of government agencies, nongovernmental organizations, and private businesses protecting each island from the most threatening invasive weeds and pests.

(6) Noxious Weed. Any plant species that is, or that may be likely to become, injurious, harmful, or deleterious to the agricultural, horticultural, aquacultural, or livestock industry of the state and to forest and recreational areas and conservation districts of the state, as regulated by the Secretary of Agriculture and the federal land management agencies and the State of Hawai'i Department of Agriculture (HDOA) Hawai'i Revised Statutes (HRS) Chapter 152. The HDOA Noxious Weed List can be found in HRS 4:6:68 (Noxious Weed Rules).

(7) Pest. Any insect, rodent, nematode, fungus, weed, or any other form of terrestrial or aquatic plant or animal life or virus, bacteria, or other microorganism (except viruses, bacteria, or other microorganisms on or in living humans or other living animals) that the Engineer declares to be a pest (Federal Insecticide, Fungicide, and Rodenticide Act, Section 2(t)).

(8) Physical Construction. Activities associated with clearing, grubbing, grading, excavating, filling of land, or other similar site work activities and that cause ground disturbance and/or site disturbance.

(9) Propagule. A vegetative structure that can become detached from a plant and give rise to a new plant, e.g., a bud, sucker, or spore.

(10) Priority Invasive Plants for the State of Hawai'i Department of Transportation Construction Projects.

(a) Plants and weeds identified in State of Hawai'i Department of Transportation (HDOT) contract specifications.

(b) Plants on the U.S. Department of Agriculture Federal Noxious Weed List and in HRS 4:6:68 (Noxious Weed Rules) *provided that* the HDOA and/or the ISC also recommend that weed as a target.

91 (c) Species identified as targets for the early detection,
92 eradication, or containment and control by the local island ISC
93 in each county, found at the following websites:
94

- 95 1. Hawai'i Island: <https://www.biisc.org/>
- 96
- 97 2. Kaua'i: <https://www.kauaiisc.org/>
- 98
- 99 3. Maui: <https://mauiinvasive.org/>
- 100
- 101 4. O'ahu: <https://www.oahuisc.org/>
- 102

103 (d) Species determined by HDOT to impact roadside
104 maintenance operations, infrastructure, or health and safety
105 of the public (as determined by the Engineer). These species
106 can be found in Chapter 2 of the HDOT Invasive Species
107 Project Prioritization Plan.
108

109 (e) Species that are actively controlled by neighboring
110 landowners and agreed upon by the Engineer, as identified
111 during pre-construction consultation with landowners (as
112 applicable).
113

114 **(11) Priority Pests for the State of Hawai'i Department of**
115 **Transportation.**
116

117 (a) Animals and pathogens designated as high-priority
118 invasive species for early detection, eradication, or
119 containment by the ISCs or HDOA in each county.
120

121 (b) Animals and pathogens known to impact roadside
122 maintenance operations, infrastructure, or public safety, as
123 determined by HDOT.
124

125 (c) Animals and pathogens that are of concern to
126 neighboring landowners and the Engineer agrees should be
127 targets for HDOT.
128

129 **(12) Weed.** Any plant growing where it is not wanted, as
130 determined by the Engineer.
131

132 **(13) Wildlife Biologist.** A person with a minimum of 5 years of
133 experience in the wildlife field, including identification, eradication,
134 control, and reporting of invasive animal species. The
135 CONTRACTOR's selected Wildlife Biologist shall be approved by the
136 Engineer.

137 **621.02 Materials.**

138
139 **(A) Free from Invasive Plants or Pests.** All material, including plant
140 material, gravel, sand, and soil, provided for the project shall be free of
141 invasive plants or pests. Such action is to prevent the introduction of
142 invasive species onto the project site.

143
144 **(B) Plant Material Sources.**

145
146 **(1)** The CONTRACTOR shall buy plants propagated on the island
147 where the plants will be planted. The CONTRACTOR shall provide
148 the Engineer with the names of the nursery or nurseries they will use
149 to provide landscaping plants in accordance with Section 619 –
150 Planting. A Botanist/Arborist and a Wildlife Biologist (collectively,
151 Biologists) shall inspect the nursery for the presence of invasive
152 species on the property and in planting materials destined for the
153 project site within 90 days of planting. Inspection results shall be
154 provided to the Engineer in a report.

155
156 **(2)** Should plants not be available on-island, imported plants from
157 off-island may be used but shall not be brought directly to the project
158 site. State of Hawai'i Plant Quarantine Branch–certified nurseries
159 should be given priority when selecting off-island plant imports (State
160 of Hawai'i Plant Industry Division 2020, available at:
161 <https://hdoa.hawaii.gov/1pi/pq/certified-nurseries/>). These plants
162 shall not be mixed with locally grown plants and shall be first
163 quarantined in a location away from the project site for a period not
164 less than 30 days in an area approved by the Engineer. Biologists
165 shall inspect all plants imported from off-island to ensure that they
166 are free from invasive species, such as coqui frogs
167 (*Eleutherodactylus coqui*), fire ants (*Wasmannia auropunctata* and
168 *Solenopsis geminata*), and weed seedlings, that could arrive
169 inadvertently. The Biologists shall screen out any priority invasive
170 plants or other potentially invasive plants or organisms, including
171 imported plants that appear to be sick or carrying disease. Any plant
172 that appears to be diseased shall be submitted to the University of
173 Hawai'i College of Tropical Agriculture and Humane Resources
174 extension agents for positive identification of the disease. The
175 Biologists may also seek assistance from other organizations,
176 including the State of Hawai'i Department of Land and Natural
177 Resources (DLNR), HDOA, and the local island ISC in the
178 identification or detection of non-plant invasive species. Imported
179 plants shall be planted out only after they have been determined to
180 be free of unwanted weeds or animal pests at the quarantine location
181 determined by the Engineer. All pests or invasive species shall be

182 reported by calling the Hawai'i Invasive Species Council at 808-643-
183 PEST (7378) to determine appropriate treatment.

184
185 (3) In conjunction with Section 641 – Hydro-Mulch Seeding, a
186 botanist/arborist shall inspect seeded areas a minimum of 45 days
187 after hydroseed is applied.

188
189 **(C) Construction Material.**

190
191 (1) The Contractor shall make sure all material stockpile sites are
192 free of invasive plants (including seeds and propagules) and
193 animals. Stockpile site surveys shall be included in the Biologists'
194 inventory report.

195
196 (2) All imported materials, including gravel, soil, rock, and sand
197 shall be free of invasive species.

198
199 (3) All materials shall be stockpiled at a designated staging area
200 to prevent contamination. If possible, permanent containment areas
201 shall be constructed for long-term projects.

202
203 (4) Stockpiles of materials such as gravel, soil, rock, and sand
204 shall be inspected every 6 months by the Biologists to ensure that
205 they are not encroached upon by invasive plants or animals (a buffer
206 of 30 feet shall be maintained).

207
208 (5) If invasive species are present, the CONTRACTOR shall
209 either chemically or mechanically remove them, as determined by
210 the Engineer.

211
212 (6) Stockpiled materials and spoil materials shall be segregated
213 to the maximum extent practicable. The Contractor shall implement
214 sediment and erosion control measures to ensure that all stockpiled
215 materials and spoil materials will not result in the spread of invasive
216 species from one area to another via storm water run-off.

217
218 **621.03 Construction.**

219
220 **(A) Responsibility.**

221
222 (1) Any priority invasive plants and priority pests that establish
223 after notice to proceed and prior to final acceptance by the Engineer
224 that were not present before construction shall be the sole
225 responsibility of the CONTRACTOR to remove or control.
226 Acceptable removal is dependent on the type of species and shall be
227 approved by the Engineer.

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(2) The CONTRACTOR shall be responsible for the control or eradication of priority invasive plants and/or priority pests that are already established at a project site before construction begins. CONTRACTOR responsibility is determined by the Engineer. Removal of already established species shall be paid from the force account; see Payment section below.

(3) The CONTRACTOR shall ensure that weed and/or pest removal is carried out in a legal manner, including obtaining all necessary training, licenses, and permits from applicable regulatory agencies for the specific methods proposed for removal and disposal of invasive species.

(B) Inventory of Invasive Species before Physical Construction.

(1) A full list of plant and animal species present at the site (botanical inventory and faunal inventory, respectively) is required for projects that have more than 1 acre or 43,560 square feet of roadside soil or vegetation and which will remain as soil or vegetation at the end of the construction project. The botanical and faunal inventory can either be combined into one report or the floral and faunal inventories can be reported on separately. Biologists shall provide one electronic copy of each inventory report to the Engineer. Botanical and faunal inventories shall be undertaken within 30 days before physical construction activities (e.g., site work, clearing, grubbing, ground disturbance, and/or any other site disturbance) are initiated. The postconstruction botanical and faunal inventories shall be undertaken during the Plant Establishment Period, which extends 9 months from the accepted completion date of the Planting Period. See Section 619 – Planting for definitions on the Planting Period and the Plant Establishment Period. The botanical and faunal inventory of the right-of-way shall be done by Biologists hired by the CONTRACTOR. The botanical inventory report shall include scientific names of plant species and their abundance (area covered and/or number of plants, as appropriate, depending on growth form). For priority invasive plants, the inventory shall provide details on GPS location (NAD 83) and reproductive status: mature (reproductive parts present) or immature. For priority invasive animals, the inventory shall include scientific names of faunal species and shall provide details on GPS location (NAD 83) and individual(s) detected.

(2) The Biologists shall inventory and report any priority invasive plants and/or priority invasive pests within 30 feet of any proposed

273 on-site stockpiles for gravel, sand, and soil that may be sourced for
274 the construction project.

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(C) Invasive Species Removal Plan.

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(D) Removal of Priority Invasive Species Found before Physical Construction.

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(1) If invasive species are found before physical construction, including within 30 feet of material stockpile locations, the CONTRACTOR shall submit an invasive species removal plan for approval by the Engineer. This plan shall include specific removal methods for all priority invasive species identified by the Engineer, such as physical removal and/or chemical treatments, and a detailed post-removal monitoring plan. The plan should address how to prevent the spread of the invasive species if not removed. A cost to remove and a cost to prevent the spread shall be submitted by the CONTRACTOR. Preparation of the removal plan will be paid for from the force account.

(2) If the invasive species is/are not removed prior to physical construction, the CONTRACTOR shall surround areas of all invasive plants with a protective 4-foot-high, orange plastic mesh or equivalent fence accepted by the Engineer, supported on a minimum 6-foot-long steel T-post. The CONTRACTOR shall provide signage on the fence that states “not to disturb or work within the fenced area.” Fences shall be erected before removal work begins and shall not be removed until removal work is completed. For trees or shrubs, flagging tape can be used to mark plants. The CONTRACTOR shall contact the local island ISC to determine the best method to contain invasive animals.

(1) The CONTRACTOR shall be required to remove invasive plants and/or priority pests present at the site after approval of the removal plan or implement mitigation measures to prevent their spread. Removal of invasive species present prior to construction will be paid from the force account. Removal shall be completed prior to any physical construction at the project site.

(2) The CONTRACTOR shall be responsible for ensuring the plant and animal removal is carried out in a legal manner, including obtaining all necessary training, licenses, and permits from applicable regulatory agencies for the specific methods proposed for clearing and removing invasive species.

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(3) If pesticides are proposed for use in the removal plan, the CONTRACTOR shall ensure that their application is supervised by a licensed commercial applicator. The labels for pesticides being used must be in the applicator’s possession; the applicator shall have proper safety equipment and be prepared to handle chemical spills before they occur. The CONTRACTOR shall use the least toxic chemical that shall achieve the desired results. If a chemical spill occurs, the Engineer must be notified, and the proper authorities shall be notified in accordance with the pesticide label requirements. A record of chemical applications shall be kept by the commercial applicator and submitted to the Engineer.

(4) Green waste resulting from invasive species removal shall be disposed in a manner that will prevent spread by seeds or regrowth from plant fragments. Material contaminated with invasive species shall be covered and secured during transport to prevent other areas from becoming contaminated. In addition, seeds and fruit shall be placed and secured in bags by the CONTRACTOR. As determined by the Engineer, plant material shall be incinerated or buried in a landfill.

(E) Post-removal Monitoring and Inspection. A Biologist shall carry out post-removal monitoring at least every 6 months to confirm that the removal plan was successfully implemented. The post-removal monitoring is intended to ensure that the treated areas remain free of invasive species during the construction. Before handing the site over to the Engineer, the CONTRACTOR shall perform an inspection of the entire construction site. The Engineer shall determine whether the CONTRACTOR has met the responsibilities for invasive species removal based on the post-removal inspection report.

(F) Decontaminating Equipment, Machinery, and Vehicles.

(1) Clean Equipment.

(a) All CONTRACTOR equipment and vehicles shall arrive at the work site clean and visibly free of any soil, plants, or plant parts (e.g., seeds); insects and insect eggs; reptiles and amphibians and their eggs; or any other invasive species. Routine clean-down procedures shall be implemented to prevent contaminants from building up using visible inspection and power washing equipment. All equipment cleaning and sanitation shall be incidental to the lump-sum pay items.

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(b) The CONTRACTOR shall certify that equipment is arriving free of soil and debris capable of transporting viable invasive plant parts, seeds, or propagules, or invasive animals. The CONTRACTOR shall provide the Engineer with sequentially numbered decals and an accompanying spreadsheet with the decal numbers indicated in one column and subsequent column headings for the date of inspection and license plate number. Decals shall include the contract number and be consistent with the format supplied by the Engineer. The CONTRACTOR shall place the decal on construction project machinery and vehicles, and the Engineer will initial and date the decal after an inspection determines that the vehicles are acceptably clean. After initialing the decal on the vehicle/ machinery, the Engineer will use the submitted spreadsheet to record the date of inspection and license plate number. The CONTRACTOR shall remove the decal after project completion.

(c) Vehicles or equipment that are off-site for 1 or more working days shall be cleaned and inspected at least once prior to their arrival at site. For other vehicles left on-site, the CONTRACTOR shall attempt to maintain reasonable standards of vehicle hygiene, and frequency of inspection will be determined by the Engineer.

(d) All vehicles and equipment brought in for construction work from off-island are required to be thoroughly washed at the port of export before they arrive at the project site. If invasive species are found at the project site, all vehicles that are deemed to be contaminated by the Engineer must be washed before leaving the project site and being returned to its island of origin, or if not feasible or appropriate at the project site, then at an approved alternative site.

(e) Cleaning Stations.

1. The Engineer will designate a cleaning station for the project site. The location of cleaning stations shall be recorded using a GPS unit and provided to the Engineer. The Engineer will consider the following when selecting and approving a cleaning station at the project site:

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a. The cleaning stations shall not contribute to further contamination of machinery. To prevent this, gravel or other appropriate material shall be used to minimize contact with mud or dirt, which may contain invasive plant seeds.

b. Cleaning stations shall be located in low-value areas (e.g., away from native vegetation) or off-site.

c. The designated cleaning area must provide an environment for operators to safely undertake clean-down procedures (i.e., is safe for road traffic and personnel).

d. Cleaning station locations must be clearly posted with signs that say: "Cleaning Station."

2. The CONTRACTOR shall only use designated cleaning stations at the project site to decontaminate equipment, machinery, and vehicles. All earthwork equipment shall be cleaned and be completely free of soil, seeds, vegetative matter, or other debris that could contain plant seeds or propagules prior to arrival and/or before leaving the project site. Manual clean-down procedures consist of using hand tools such as brushes, brooms, air compressors, vacuums, and/or high-pressure water guns. If using high-pressure water, apply only as much water as needed to avoid unnecessary run-off. As part of the cleaning, the CONTRACTOR must pay particular attention to key areas such as the chassis and wheels. A clean-down checklist for vehicles shall include the following:

a. Underside: wheels, rollers, tracks, wheel arches, wheel trim, bumpers, mud flaps, tire rims, axle, differentials, and spare tire

b. Digging apparatus, blades, and buckets

c. Interior: foot wells, carpets, and under mats

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d. Engine bay: radiator, air filters, grille, recess under windscreen wipers, and transmission gearbox

e. Tray and trunk (for soil, seed, and plant material)

3. The CONTRACTOR shall clean and inspect equipment before it arrives at the project site. Equipment shall be considered free of soil, seeds, and other such debris after a visual inspection confirms it. Visual inspection shall include the complete exterior, including undercarriages, tires, wheel wells, and grille. Disassembly of equipment components or specialized inspection tools are not required. The Engineer will maintain a log of vehicle inspections. Earthwork equipment shall not be allowed to operate within the state right-of-way until approved by the Engineer.

4. Priority pests found hitchhiking on equipment shall be reported to HDOA by calling 808-643-PEST (7378).

5. Equipment shall not be sprayed with pesticides as a preventative measure. Spraying equipment with pesticides is not consistent with label specifications. Additionally, many pesticides target a wide range of vegetation and invertebrates and using pesticides in this way may harm nontarget vegetation and invertebrates.

6. The CONTRACTOR shall thoroughly inspect seeding equipment prior to conducting seeding activities to ensure they are free of invasive plant propagules.

(G) Ensuring No Invasive Species Become Established during Construction.

(1) The CONTRACTOR is responsible for keeping the construction site free of invasive species. Monitoring shall be carried out by the CONTRACTOR after removal of invasive species found prior to construction, every 6 months during construction, after physical construction, and after the Plant Establishment Period, before handing the site over to the State. This monitoring shall be undertaken by a Botanist/Arborist for invasive plants and a Wildlife

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Biologist for invasive animals who shall provide an inventory report which will include scientific names of plant and animal species and their abundance (e.g., area covered and/or number of plants, as appropriate, depending on growth form; and number of individual animals detected). The invasive species inventory report can either report on invasive plants and animals separately or joined as a single document. The report for priority invasive plants shall provide GPS (NAD 83) locations and reproductive status, and the report for priority invasive pests shall provide GPS (NAD 83) locations and the number of individuals detected. Each Biologist shall provide one electronic copy of each inventory report to the Engineer.

(2) Invasive Species Information Signage at the Project Site. Invasive species and noxious weed signage shall be prominently posted at the CONTRACTOR’s workplace and at the project site. Signage shall include one laminated 8.5 × 11–inch color page for each HDOT priority invasive species relevant to the project site. The CONTRACTOR may obtain free digital files with invasive species photographs that shall be printed and laminated for use on the project site; these are available at: <http://www.hawaiiinvasivespecies.org>. All signage shall include “Call 808-643-PEST (7378).”

(3) Training. HDOT and the CONTRACTOR’s field staff shall attend a mandatory training by biologists knowledgeable about invasive plants and animals about on-site decontamination protocols, identification of priority invasive species and pests, and reporting procedures, once annually (or prior to any physical construction). The local island ISC should be contacted for training information. Trainers shall record the name and date of training for those individuals that complete the training, which shall be provided to the Engineer upon request.

(4) Unannounced Inspections. The CONTRACTOR shall provide unfettered access to the state right-of-way to any ISC staff, HDOA staff, or anyone else acting for the Engineer for the purpose of detecting or monitoring invasive species.

533 (H) **Post-Physical Construction Prior to Returning the Site to the**
534 **State—Post-Construction Inventory.** The CONTRACTOR shall conduct
535 a post-construction invasive species inventory to verify and confirm that the
536 CONTRACTOR maintained the site in the original condition after the initial
537 removal of invasive species was conducted. If additional invasive species
538 are found, the CONTRACTOR would be responsible to develop a removal
539 plan, remove the invasive species found, and conduct post-removal
540 monitoring at their own expense. The removal plan shall be subject to
541 Engineer approval.

542
543 **621.04 Measurement.**

544
545 (A) Invasive species control measures during construction, including
546 signage and decontamination training, will be paid on a lump sum basis.
547 Measurement for payment will not apply.

548
549 (B) The development of the invasive species removal plan, removal of
550 invasive species established before physical construction and not part of
551 the project's physical construction work, as well as the post-removal
552 monitoring, shall be paid with force account funds. The Engineer will
553 measure invasive species removal planning, removal, and monitoring
554 required and requested by Engineer on a force account basis in accordance
555 with Subsection 109.06 – Force Account Provisions and Compensation.

556
557 **621.05 Payment.** The Engineer will pay for the accepted invasive species
558 management on a contract lump-sum basis after the final acceptance of the
559 project. Payment will be full compensation for the work prescribed in this section
560 and the contract documents.

561
562 The Engineer will pay for the following pay items when included in the
563 proposal schedule:

564

565 Pay Item	566 Pay Unit
567 Inventory of Invasive Species before Construction	568 Lump sum
569 Invasive Species Removal Plan	570 Force account
571 Removal of Plants and Animals Established before 572 Physical Construction or Site Work, Post-removal Monitoring	573 Force account
574 Monitoring of Invasive Species during and after Construction	575 Lump sum
576 Post-Construction Inventory Prior to Returning the Site 577 to the State	578 Lump sum

579 An estimated amount for the force account is allocated in the proposal
580 schedule under Existing Invasive Species Removal, which includes the Invasive
581 Species Removal Plan and the Removal of Plants and Animals Established before
582 Physical Construction or Site Work, Post-removal Monitoring. The actual amount
583 to be paid will be the sum shown on accepted force account records, whether this
584 sum is more or less than the estimated amount allocated in the proposal schedule.

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END OF SECTION 621

1 **SECTION 638 – PORTLAND CEMENT CONCRETE CURB AND GUTTER**

2
3 Make the following amendments to said Section:

4
5 **(I)** Amend **638.04 – Measurement** by revising lines 130 to 131 to read as
6 follows:

7
8 **“638.04 Measurement.** The Engineer will measure curb and/or gutter, both
9 new and reset, by the linear foot. The Engineer will measure along the front face
10 of the curb at the finished grade elevation. If the Engineer measures gutter
11 separately, the Engineer will measure gutter along the front face of the gutter.
12 The Engineer will not make deduction in gutter length for drainage
13 appurtenances installed such as catch basins and drop inlets.

14
15 The Engineer will not measure curb and/or gutter both new and reset
16 when contracted on a lump sum basis.

17
18 The Engineer will measure curb and/or gutter transition for payment as
19 follows:

20

From	To	Measurement for Payment
Cast-in-place Curb or Precast Curb	Cast-in-place Curb and Gutter	Cast-in-place Curb and Gutter
Cast-in-place Curb and Gutter	Precast Curb and Cast-in-place Gutter	Cast-in-place Curb and Gutter
Cast-in-place Curb and Gutter Type _____	Cast-in-place Curb and Gutter Type _____	Cast-in-place Curb and Gutter 1/2 of Transition to each type
Cast-in-place Curb Type _____	Cast-in-place Curb Type _____	Cast-in-place Curb 1/2 of Transition to each type

21
22 The Engineer will measure precast concrete drop curb and driveway curb
23 or cast-in-place integral driveway curb and gutter under the adjacent normal curb
24 and/or gutter.”z

25
26 **(II)** Amend **638.05 – Payment** by revising lines 133 to 148 to read as follows:
27

28 **“638.05 Payment.** The Engineer will pay for the accepted quantities of curb
29 and/or gutter at the contract lump sum price or at the contract unit price per linear
30 foot for each type of curb and/or gutter specified.

31
32 Payment will be full compensation for work prescribed in this section and
33 contract documents.

34
35 The Engineer will pay for each of the following pay items when included in
36 proposal schedule:

37
38 **Pay Item** **Pay Unit**
39
40 Curb, Type _____ Linear Foot,

41
42
43

END OF SECTION 638

1 Make the following section a part of the Standard Specifications:
2

3 **“SECTION 671 – PROTECTION OF ENDANGERED SPECIES**
4

5 **671.01 Description.** The Endangered Species Act (ESA) listed species
6 Hawaiian Hoary Bat (*Lasiurus cinereus semotus*), Hawaiian goose (*Branta*
7 *sandvicensis*), Hawaiian petrel (*Pterodroma sandwichensis*), band-rumped storm-
8 petrel (*Oceanodroma castro*), the threatened Newell’s shearwater (*Puffinus newelli*),
9 and the Hawaiian Stilt Bird (*Himantopus mexicanus knudseni*) are in the general
10 vicinity of the proposed project that may transit or visit the proposed project. The
11 State listed species, and the State listed species, Hawaiian Hawk (*Buteo solitaries*),
12 is also in the general vicinity of the proposed project that may transit or visits the
13 proposed project. The contractor shall protect these endangered species
14 throughout the construction duration. The Contractor shall also minimize the spread
15 of Rapid Ohia Death (ROD).
16

17 **671.02 Materials.** None
18

19 **671.03 Construction.**
20

21 **(A) Pre-Construction and Construction Requirements.** Comply with
22 the following conditions:
23

24 **(1)** Hawaiian Hoary Bats nest in both exotic and native woody
25 vegetation. To minimize impacts to the Hawaiian Hoary Bat,
26 there will be no disturbance, removal, or trimming of woody
27 plants greater than 15 feet (4.6 meters) tall during the birthing
28 and pup rearing season (June 1 through September 14
29

30 Additionally, barbed wire will not be used for fencing and for
31 any construction.
32

33 **(2)** If any Hawaiian Goose are present during construction
34 activities, then all activities within 100 feet (30 meters) should
35 cease, and the bird should not be approached, fed or disturbed
36 in any way. Work may continue after the bird leaves the area of
37 its own accord.
38

39 If Hawaiian Goose are observed loafing or foraging within the
40 project area during the breeding season (September 1 through
41 April 30), all work will cease and a nest survey will be
42 conducted in and around the project area by a biologist familiar
43 with the nesting behavior of Hawaiian Goose prior to the
44 resumption of any work. Surveys will be repeated after any
45 delay of work of three or more days. If a nest is identified

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within 150 feet of the work area, all work will cease and the United States Department of Interior Fish and Wildlife Service (USFWS) and the State of Hawai'i Department of Land and Natural Resources, Division of Forestry and Wildlife will be contacted immediately for further guidance.

In areas where Hawaiian Goose are known to be present, reduced speed limits will be posted and implemented and project personnel and contractors will be informed of the presence of endangered species on-site.

- (3)** Hawaiian seabirds, Newell's shearwater, and band-rumped storm-petrel may traverse the project area at night. If nighttime work will be required in conjunction with the development of the project, all lights will be fully shielded so the bulb can only be seen from below bulb height to reduce the potential for interactions of nocturnally flying seabirds with external lights and man-made structures. All outdoor lights will be turned off when human activity is not occurring in the lighted area.

On all islands except Oahu, no nighttime construction will occur during the peak seabird fledging period (September 15 through December 15).

Any streetlights that are installed, as part of this action, will be shielded. This minimization measure would serve the dual purpose of minimizing the threat of disorientation or downing of seabirds, while at the same time complying with the Hawaii County Code Section 14-50 et seq. which requires the shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting.

- (4)** Hawaiian Stilt Birds – A biological monitor familiar with the species' biology and approved by the FHWA will conduct Hawaiian Stilt Bird nest surveys where appropriate habitat occurs within the proposed maintenance site prior to cleaning culverts and drainage structures. Survey will take place within three days of project initiation and after any subsequent delay of work of three or more days (during which the birds may attempt to nest). If a nest or active brood is found, cease work and contact the USFWS.

- (5)** Hawaiian Hawks nest in both exotic and native woody vegetation. To minimize potential impact to Hawaiian Hawks during the breeding season (March 1 through September 30), a

91 nest search will be conducted of the project footprint and
92 surrounding areas immediately prior to the start of construction
93 activities by a biologist familiar with the species. No trees
94 containing a nest will be trimmed or cut regardless of the time
95 of year as nests may be reused during consecutive breeding
96 seasons.
97

98 **(6)** For ROD, ensure that all work will be completed within the
99 existing, pre-disturbed right of way and implement the following
100 minimization measures should tree clearing occur to minimize
101 the potential spread of ROD:
102

103 **(a)** A survey of any locations where tree cutting may occur
104 will be conducted within two weeks prior to tree cutting
105 to determine if there are infected ohia trees.
106

107 **(b)** If infected trees are identified, the following measures
108 will be implemented:
109

110 i. The USFWS, the University of Hawaii
111 Cooperative Extension Service, the U.S.
112 Department of Agriculture (USDA) Forest
113 Service, and the USDA Agricultural Research
114 Service will be contacted for further guidance.
115

116 **(c)** Both prior to cutting and after the project is complete,
117 the following measures will be implemented:
118

119 i. Tools used for cutting infected ohia trees will be
120 cleaned with a 70% rubbing alcohol solution or a
121 freshly prepared 10% solution of chlorine bleach
122 and water as long as the tools are oiled
123 afterwards. Chainsaw blades will be brushed
124 clean.
125

126 ii. Vehicles used off-road in infected areas will be
127 thoroughly cleaned and tires and the
128 undercarriage will be pressure washed with
129 detergent.
130

131 iii. Shoes and clothing worn in infected area will be
132 cleaned by dipping shoe soles in 70% alcohol
133 and washing clothing in hot water with detergent.
134

135 iv. All cut wood will be left on-site to avoid spreading

136 ROD.

137
138 **(B) Compliance Requirements.** The Contractor shall protect, Hawaiian
139 Hoary Bats, Hawaii Goose and Hawaiian seabirds, Newell's
140 shearwater, band-rumped storm-petrel, Hawaiian Stilt Bird, Hawaiian
141 Hawks for the duration of construction.

142
143 The Contractor shall submit to the Engineer the qualifications of a
144 trained / certified biologist for HDOT approval. The trained / certified
145 biologist shall have a minimum of five (5) years of experience in the
146 field, including the identification, control, and reporting of animal
147 species. The qualified biologist shall train on-site construction staff
148 about seabird fallout that may occur when birds flying at night are
149 attracted to artificially lighted areas resulting in disorientation and
150 exhaustion.

151
152 This biologist shall conduct pre-construction staff trainings for all on-
153 site personnel to identify potential threatened and / or endangered
154 species that may be present in the project area and ensure
155 implementation of the identified mitigation and minimization measures
156 on the project work area.

157
158 Failure to comply with the construction requirements, harm or a taking
159 of an individual during the construction duration shall be enforceable
160 by the USFWS as set forth by the ESA and DOWAW. Resultant
161 penalties and/or fines shall be at the Contractors expense without cost
162 or liability to the State.

163
164 **671.04 Measurement.** The Engineer will measure the work required for the
165 protection of endangered species on a force account basis in accordance with
166 Subsection 109.06 – Force Account Provisions and Compensation and as ordered
167 by the Engineer.

168
169 The Engineer will not measure the work required for minimizing spread of Rapid
170 Ohia Death for payment.

171
172 **671.05 Payment.** The Engineer will pay for the accepted protection of
173 endangered species on a force account basis in accordance with Subsection 109.06
174 – Force Account Provisions and Compensation. Payment will be full compensation
175 for the work prescribed in this section, by the Engineer, and in the contract
176 documents.

177
178 The Engineer shall consider the cost for minimizing the spread of ROD as
179 included in the contract price of the various contract items.

180

181 The Engineer will pay for the following pay item when included in the
182 proposal schedule:

183	Pay Item	Pay Unit
184		
185		
186	Protection of Endangered Species	Force Account

187
188 An estimated amount may be allocated in the proposal schedule under
189 “Protection of Endangered Species”, but the actual amount to be paid will be the
190 sum shown on the accepted force account records, whether this sum be more or
191 less than the estimated amount allocated in the proposal schedule.”

192
193 **END OF SECTION 671**

PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
201.1000	Clearing and Grubbing	17,910	SY	\$ _____	\$ _____
202.0100	Removal of Existing Traffic Sign and Post	35	Each	\$ _____	\$ _____
202.0200	Removal of Existing Signs	56	Each	\$ _____	\$ _____
202.0300	Removal of Existing Headwall	1	Each	\$ _____	\$ _____
202.0500	Removal of Existing Pavement and Driveways	5,985	SY	\$ _____	\$ _____
202.0600	Removal of Existing Pavement Striping, Markers and Crosswalks	LS	LS	LS	\$ _____
202.0700	Removal of Existing Fence	745	LF	\$ _____	\$ _____
202.0900	Removal of Existing Barriers, Barrels and Sand	LS	LS	LS	\$ _____
202.2000	Removal of Existing CRM Walls	LS	LS	LS	\$ _____
203.1000	Roadway Excavation	980	CY	\$ _____	\$ _____
203.2000	Imported Borrow	11,420	CY	\$ _____	\$ _____
204.1000	Trench Excavation for Water Systems	LS	LS	LS	\$ _____
204.2000	Trench Backfill for Water Systems	LS	LS	LS	\$ _____
205.1000	Structure Excavation for Abutments, Pier and Wingwalls	825	CY	\$ _____	\$ _____

Addendum No. 2

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PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
205.2000	Structure Backfill for Abutments and Wingwalls	140	CY	\$ _____	\$ _____
205.3000	Structure Excavation for Cutoff Wall	90	CY	\$ _____	\$ _____
205.4000	Structure Excavation Dumped Riprap and Cushion Layer	60	CY	\$ _____	\$ _____
205.5000	CLSM Backfill for Abutments and Wingwalls	1,220	CY	\$ _____	\$ _____
206.1000	Excavation for 24-inch Drainline	80	CY	\$ _____	\$ _____
207.1000	Ditch and Channel Excavation	170	CY	\$ _____	\$ _____
209.1000	Installation, Maintenance, Monitoring and Removal of BMP for Construction Activities including in-water inspections	LS	LS	LS	\$ _____
209.2000	Installation, Maintenance, Monitoring and Removal of BMP for Hydrotesting Activities	LS	LS	LS	\$ _____
209.3000	Installation, Maintenance, Monitoring and Removal of BMP for Dewatering Activities	LS	LS	LS	\$ _____
209.4000	Additional Water Pollution, Dust and Erosion Control	FA	FA	FA	\$25,000.00
212.1000	Archaeological Monitoring	FA	FA	FA	\$100,000.00
219.1000	Determination and Characterization of Fill Material	LS	LS	LS	\$ _____
219.2000	Testing for Lead Based Paint	FA	FA	FA	\$250,000

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PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
301.1000	Hot Mix Asphalt Base Course	2,735	Ton	\$ _____	\$ _____
304.1000	Aggregate Base	1,920	CY	\$ _____	\$ _____
313.1000	Permeable Separator	12,995	SY	\$ _____	\$ _____
401.1000	PMA Pavement, Mix No. IV	1,420	Ton	\$ _____	\$ _____
415.1000	Cold Planing	LS	LS	LS	\$ _____
417.1000	Geogrid	10,850	SY	\$ _____	\$ _____
417.1010	Additional Geogrid	FA	FA	FA	\$10,000.00
503.1000	Concrete for Abutment Walls	LS	LS	LS	\$ _____
503.1010	Concrete for Drill Shaft Cap Beams, Pier Wall and Pier Cap Beam	LS	LS	LS	\$ _____
503.1020	Concrete for Concrete Topping, Edge Beams, Pier Diaphragm, and End Beams	LS	LS	LS	\$ _____
503.1030	Concrete Approach Slabs and Sleeper Slabs	LS	LS	LS	\$ _____
503.1040	Concrete for Wingwalls and Drilled Shaft Caps	LS	LS	LS	\$ _____
503.1050	Concrete for Keywalls	LS	LS	LS	\$ _____
503.1060	Concrete for Mud Slabs	LS	LS	LS	\$ _____

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PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
503.2000	Concrete for Cutoff Wall	LS	LS	LS	\$ _____
503.3000	Concrete for Water System	LS	LS	LS	\$ _____
503.4000	Blanket Grinding and Mechanical Grooving	LS	LS	LS	\$ _____
504.1000	Prestressed Concrete Planks	16	Each	\$ _____	\$ _____
507.1000	Bridge Concrete Railing	220	LF	\$ _____	\$ _____
507.1010	Concrete End Post Railing	4	Each	\$ _____	\$ _____
511.0100	Furnishing Drilled Shaft Drilling Equipment	LS	LS	LS	\$ _____
511.0200	Obstructions	40	Hours	\$ _____	\$ _____
511.0300	Load Test (36-inch Diameter)	1	Each	\$ _____	\$ _____
511.0400	Drilled Shaft for Abutments and Pier (36-inch Diameter)	600	LF	\$ _____	\$ _____
511.0410	Drilled Shaft for Wingwalls (36-inch Diameter)	200	LF	\$ _____	\$ _____
511.0500	Unclassified Shaft Excavation (36-inch Diameter)	800	LF	\$ _____	\$ _____
511.0600	Trial Shaft (36-inch Diameter)	70	LF	\$ _____	\$ _____
511.0700	Coring for Integrity Testing for Acceptable Drilled Shafts	220	LF	\$ _____	\$ _____

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PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
602.1000	Reinforcing Steel for Abutment Walls	LS	LS	LS	\$ _____
602.1010	Reinforcing Steel for Drilled Shaft Cap Beam, Pier Wall, and Pier Cap Beam	LS	LS	LS	\$ _____
602.1020	Reinforcing Steel for Concrete Topping, Edge Beams, Pier Diaphragm and End Beams	LS	LS	LS	\$ _____
602.1030	Reinforcing Steel for Approach Slabs and Sleeper Slabs	LS	LS	LS	\$ _____
602.1040	Reinforcing Steel for Wingwalls and Drilled Shaft Caps	LS	LS	LS	\$ _____
602.1050	Reinforcing Steel for Keywalls	LS	LS	LS	\$ _____
602.2000	Reinforcing Steel for Cutoff Wall	LS	LS	LS	\$ _____
603.1000	Bed Course Material for Culvert	15	CY	\$ _____	\$ _____
603.2000	24-inch Reinforced Concrete Pipe, Class III	75	LF	\$ _____	\$ _____
603.3000	Clean Existing Culverts	FA	FA	FA	\$5,000.00
604.1000	Type 61614P Grated Drop Inlet, 4 feet to 5 feet	1	Each	\$ _____	\$ _____
604.1010	Type A Storm Drain Manhole, 6 feet to 7 feet	1	Each	\$ _____	\$ _____
606.1000	Guardrail Type 3 Thrie Beam	100	LF	\$ _____	\$ _____
606.2000	Guardrail Type 3 (31" W-Beam with Standard 8" Offset Block)	1,660	LF	\$ _____	\$ _____

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PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
606.3000	Terminal Section (MSKT-SP-MGS or Approved Equal)	6	Each	\$ _____	\$ _____
607.1000	4-Feet Chain Link Fence	1058	LF	\$ _____	\$ _____
607.1010	4-Feet Wooden Fence	577	LF	\$ _____	\$ _____
607.1020	4-Feet High Tensile Hinge Joint Fence	401	LF	\$ _____	\$ _____
607.1030	4-Feet Chain Link fence w/ Geotextile Fabric	931	LF	\$ _____	\$ _____
607.1040	4-Feet Bollard	14	Each	\$ _____	\$ _____
607.1050	4-feet High Tensile Hinge Joint Fence w/ Geotextile Fabric	996	LF	\$ _____	\$ _____
607.1060	Cattle Gate, 20' Span	2	Each	\$ _____	\$ _____
610.1000	4-inch Reinforced Concrete Driveway	LS	LS	LS	\$ _____
612.1000	Grouted Rubble Paving	25	CY	\$ _____	\$ _____
613.1000	Centerline and Reference Survey Monuments	3	Each	\$ _____	\$ _____
615.1000	12-Inch Bicycle Friendly Milled Edgeline Rumble Strip, Shoulder	600	LF	\$ _____	\$ _____
615.2000	12-Inch Continuous Milled Strip	1,200	LF	\$ _____	\$ _____
617.0100	Imported Planting Soil, 4" Layer	1,545	CY	\$ _____	\$ _____

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83B-01-09

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P-12

PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
617.0200	Imported Compost, 2" Layer	124,900	SF	\$_____	\$_____
619.0100	True Kou Tree (Cordia subcordata, 25 Gal.)	LS	LS	LS	\$_____
619.0200	Beach Heliotrope Tree (Heliotropium foertherianum, 25 Gal.)	LS	LS	LS	\$_____
619.0300	Milo Tree (Thespesia populnea, 25 Gal.)	LS	LS	LS	\$_____
619.0400	Beach Naupaka Shrub (Scaevola taccada, 1 Gal. 30" O.C. Tri. Spacing)	LS	LS	LS	\$_____
619.0500	Akia (Wikstroemia uva-ursi, 1 Gal., 24" O.C. Tri. Spacing)	LS	LS	LS	\$_____
619.0600	Nanea (Vigna marina, 6" Pot 12" O.C. Tri. Spacing)	LS	LS	LS	\$_____
619.0700	Pohinahina (Vitex rotundifolia, 4" Pots, 24" O.C. Tri. Spacing)	LS	LS	LS	\$_____
619.0800	Wood Mulch, 2" Layer	LS	LS	LS	\$_____
619.0900	Plastic Root Control Barrier, 36" Depth	LS	LS	LS	\$_____
621.0100	Inventory of Invasive Species before Construction	LS	LS	LS	\$_____
621.0200	Invasive Species Removal Plan	FA	FA	FA	\$5,000.00
621.0300	Removal of Plants and Animals Established before Physical Construction or Site Work, Post-removal Monitoring	FA	FA	FA	\$30,000.00

Addendum No. 2

83B-01-09

r9/1/23

P-13

PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
621.0400	Monitoring of Invasive Species Before and After Construction	LS	LS	LS	\$ _____
621.0500	Post-Construction Inventory Prior to Returning the Site to the State	LS	LS	LS	\$ _____
622.1000	Roadway Lighting System	LS	LS	LS	\$ _____
624.1000	Fire Hydrant Water System A	LS	LS	LS	\$ _____
624.2000	Fire Hydrant Water System B	LS	LS	LS	\$ _____
624.3000	Fire Hydrant Water System C	LS	LS	LS	\$ _____
624.4000	Temporary 12-inch Water System	LS	LS	LS	\$ _____
624.5000	Adjusting Water Meter Frame and Cover	6	Each	\$ _____	\$ _____
626.1000	Adjusting Water Manhole Frame and Cover	6	Each	\$ _____	\$ _____
626.2000	Adjusting Water Standard Valve Box	9	Each	\$ _____	\$ _____
627.1000	Cathodic Protection System	LS	LS	LS	\$ _____
629.1000	White, 6-inch Pavement Striping (Tape, Type I, or Thermoplastic)	4,395	LF	\$ _____	\$ _____
629.1010	Yellow, Double 4-Inch Pavement Striping (Tape, Type I, or Thermoplastic)	6,010	LF	\$ _____	\$ _____
629.1020	White, 12-Inch Pavement Striping (Tape, Type III, or Thermoplastic)	25	LF	\$ _____	\$ _____

Addendum No. 2

83B-01-09

r9/1/23

P-14

PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
629.1030	Yellow, 12-inch Pavement Striping (Tape, Type III, or Thermoplastic)	495	LF	\$ _____	\$ _____
629.2000	Type C Pavement Marker	107	Each	\$ _____	\$ _____
629.2010	Type D Pavement Marker	60	Each	\$ _____	\$ _____
629.2020	Type H Pavement Marker	90	Each	\$ _____	\$ _____
629.2030	Type F Pavement Marker	3	Each	\$ _____	\$ _____
631.1000	Regulatory Sign and Post (10 Square Feet or Less)	5	Each	\$ _____	\$ _____
631.1010	Relocation of Existing Sign Installed on New Post	3	Each	\$ _____	\$ _____
631.1020	Relocation of Existing Sign	6	Each	\$ _____	\$ _____
632.1000	Type II Object Marker	10	Each	\$ _____	\$ _____
632.1010	Type III Object Marker	4	Each	\$ _____	\$ _____
632.1020	Flexible Delineator Post and Reflectors	17	Each	\$ _____	\$ _____
636.1000	Additional E-Construction Programs, Additional License or Additional Equipment	FA	FA	FA	\$10,000.00
638.1000	Curb, Type 2D	123	LF	\$ _____	\$ _____
640.1000	Concrete Spillway No. 1	1	Each	\$ _____	\$ _____

Addendum No. 2

83B-01-09

r9/1/23

P-15

PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
640.1010	Concrete Spillway No. 2	1	Each	\$ _____	\$ _____
641.0100	Hydro-Mulch Seeding	LS	LS	LS	\$ _____
641.0200	Additional Hydro-Mulch Seeding Applications	FA	FA	FA	\$15,000.00
642.1000	Maintenance of Existing Landscape	FA	FA	FA	\$30,000.00
645.1000	Traffic Control	LS	LS	LS	\$ _____
645.2000	Additional Police Officers, Additional Traffic Control Devices, and Advertisement	FA	FA	FA	\$50,000.00
648.1000	Field Posted Drawings	LS	LS	LS	\$ _____
652.1000	Grass Pavers	19,235	SF	\$ _____	\$ _____
655.0100	Dumped Riprap	600	CY	\$ _____	\$ _____
655.0200	Dumped Riprap Cushion Layer	55	CY	\$ _____	\$ _____
671.1000	Protection of Endangered Species	FA	FA	FA	\$25,000.00
694.1000	Public Education Materials or Services	FA	FA	FA	\$20,000.00
695.1000	Just-In-Time Training	LS	LS	LS	\$ _____
696.1000	Maintenance of Trailer	FA	FA	FA	\$60,000.00

Addendum No. 2

83B-01-09

r9/1/23

P-16

PROPOSAL SCHEDULE

ITEM NO.	ITEM	APPROX. QUANTITY	UNIT	UNIT PRICE	AMOUNT
696.2000	Field Office Trailer (Not to Exceed \$32,000.00)	LS	LS	LS	\$ _____
699.1000	Mobilization (Not to Exceed 6 Percent of the Sum of All Items Excluding Bid Price of This Item)	LS	LS	LS	\$ _____
Total Amount for Comparison of Bids					\$ _____
<p>NOTE: Bidders must complete all unit prices and amounts. Failure to do so may be grounds for rejection of bid.</p>					

Addendum No. 2

83B-01-09

r9/1/23

P-17

STANDARD PLANS SUMMARY

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	2	231

STANDARD PLAN NO.	TITLE	DATE
B-01 ●	NOTES & MISCELLANEOUS DETAILS	05/31/07
B-03	BACKFILL DETAILS AT EARTH RETAINING STRUCTURES	05/31/07
B-12	PRESTRESSED CONCRETE PILES & COMPRESSION SPLICE	05/31/07
	CAN DETAILS	
B-12A	PRESTRESSED CONCRETE PILES, PILE & COMPRESSION	05/31/07
	SPLICE CAN DETAILS & NOTES	
B-12B	PILE INTERACTION DIAGRAM	05/31/07
B-13	PRESTRESSED CONCRETE PILE BUILD-UP DETAILS	05/31/07

D-01 ●	CATTLE GATE	05/31/07
D-02 ●	CHAIN LINK FENCE WITH TOPRAIL	05/31/07
D-03 ●	CHAIN LINK FENCE WITHOUT TOPRAIL	05/31/07
D-04	WIRE FENCE WITH METAL POSTS	05/31/07
D-05 ●	TYPICAL DETAILS OF CURBS AND/OR GUTTERS ▲	05/31/07
D-06	TYPICAL DETAIL OF REINFORCED CONCRETE DROP DRIVEWAY	05/31/07
D-07 ●	CENTERLINE AND REFERENCE SURVEY MONUMENTS	05/31/07
D-08	STREET SURVEY MONUMENT	05/31/07
D-15	CONCRETE SIDEWALK	05/31/07
D-16	P.C.C. BUS PAD	05/31/07
D-17	P.C.C. BUS PAD	05/31/07
D-18	P.C.C. PAVEMENT LAYOUT	05/31/07
D-19	P.C.C. PAVEMENT W/ PERMEABLE BASE JOINT DETAILS	05/31/07
D-20	P.C.C. PAVEMENT W/ PERMEABLE BASE JOINT DETAILS	05/31/07
D-21	P.C.C. LONGITUDINAL JOINT DETAILS	05/31/07
D-22	P.C.C. CONNECTION TO CURBS AND GUTTERS	05/31/07
D-23	JOINTS	05/31/07

L-01 ●	TREE PLANTING	08/16/06
L-02 ●	TREE PLANTING	08/16/06
L-03 ●	TREE TRANSPLANTING	08/16/06
L-04 ●	PALM PLANTING	08/16/06
L-05 ●	SHRUB PLANTING	08/16/06
L-06 ●	LANDSCAPE DETAILS	08/16/06
L-07 ●	LANDSCAPE DETAILS	08/16/06
L-08 ●	LANDSCAPE DETAILS	08/16/06
L-09 ●	LANDSCAPE DETAILS	08/16/06
L-10 ●	LANDSCAPE DETAILS	08/16/06
L-11 ●	PLANTING NOTES	08/16/06
L-12	IRRIGATION DETAILS	08/16/06
L-13	IRRIGATION DETAILS	08/16/06
L-14	IRRIGATION DETAILS	08/16/06
L-15	IRRIGATION DETAILS	08/16/06
L-16	IRRIGATION DETAILS	08/16/06
L-17	IRRIGATION DETAILS	08/16/06
L-18	IRRIGATION DETAILS	08/16/06
L-19	IRRIGATION DETAILS	08/16/06
L-20	IRRIGATION DETAILS	08/16/06
L-21	IRRIGATION DETAILS	08/16/06
L-22	IRRIGATION DETAILS	08/16/06
L-23	IRRIGATION DETAILS	08/16/06
L-24	IRRIGATION NOTES	08/16/06

STANDARD PLAN NO.	TITLE	DATE
H-01A	TYPE A CATCH BASIN	05/31/07
H-01B	TYPE B CATCH BASIN	05/31/07
H-01C	TYPE C CATCH BASIN	05/31/07
H-01D	TYPE D CATCH BASIN	05/31/07
H-01E	CATCH BASIN SECTIONS	05/31/07
H-02A	TYPE A1 CATCH BASIN	05/31/07
H-02B	TYPE B2 CATCH BASIN	05/31/07
H-02C	TYPE C1 CATCH BASIN	05/31/07
H-02D	TYPE D1 CATCH BASIN	05/31/07
H-02E	CATCH BASIN SECTION	05/31/07
H-03 ●	TYPE A,B, AND C STORM DRAIN MANHOLE	05/31/07
H-04	TYPE D STORM DRAIN MANHOLE	05/31/07
H-05	TYPICAL REINFORCING DETAILS FOR DRAINAGE STRUCTURES	05/31/07
H-06	TYPICAL REINFORCING DETAILS FOR DRAINAGE STRUCTURES	05/31/07
H-07 ●	CATCH BASIN AND MANHOLE CASTINGS	05/31/07
H-08	TYPE 1A-9 AND 1A-9P GRATED DROP INLET	05/31/07
H-09	TYPE 2A-9 AND 2A-9P GRATED DROP INLET	05/31/07
H-10	TYPE A-9 OR A-9P STEEL FRAMES	05/31/07
H-11	TYPE A-9 AND A-9P STEEL GRATES	05/31/07
H-12	TYPE 61614P AND 1211214P GRATED DROP INLET	05/31/07
H-13 ●	TYPE 61616P AND 1211216P GRATED DROP INLET	05/31/07
H-14	TYPE 61214P GRATED DROP INLET	05/31/07
H-15	TYPE 1211214, 1211214P, 1211216, 1211216P STEEL FRAME AND GRATES	05/31/07
H-16 ●	TYPE 61614, 61614P, 61616, 61616P STEEL FRAME AND GRATES	05/31/07
H-17	TYPE 61214 STEEL FRAMES AND GRATES	05/31/07
H-18	TYPE 61214P STEEL GRATES	05/31/07
H-19	TYPE 61614B STEEL FRAME AND GRATES	05/31/07
H-20	CEMENT RUBBLE MASONRY STRUCTURES	05/31/07
H-21	CONCRETE AND CEMENT RUBBLE MASONRY STRUCTURES	05/31/07
H-22	INLET/OUTLET STRUCTURE	05/31/07
H-23	INLET/OUTLET STRUCTURE	05/31/07
H-24	FLARED END SECTION FOR CULVERTS	05/31/07
H-25	FLARED END SECTION FOR CULVERTS	05/31/07
H-26	CONCRETE SPILLWAY INLET	05/31/07
H-27	CAP COUPLING DETAILS STANDARD JOINT	05/31/07
H-28	REINFORCED CONCRETE COLLAR & JACKET	05/31/07
H-29	UNDERDRAIN CLEANOUT STEEL FRAME AND COVER	05/31/07
H-30	UNDERDRAIN CONNECTION TO DRAINAGE STRUCTURE	05/31/07

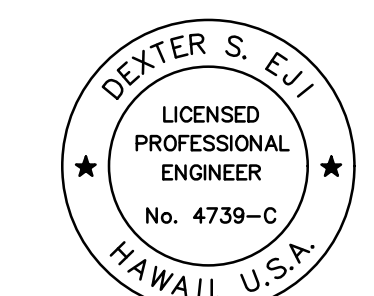
TE-01 ●	SIGN HEIGHT AND LOCATION	07/11/08
TE-1A ●	SIGN INSTALLATION	07/11/08
TE-02A ●	GALVANIZED FLANGED CHANNEL SIGN POST MOUNTING	05/31/07
TE-02B ●	GALVANIZED FLANGED CHANNEL SIGN POST MOUNTING	05/31/07
TE-02C ●	GALVANIZED FLANGED CHANNEL SIGN POST MOUNTING	05/31/07
TE-03A	GALVANIZED SQUARE TUBE SIGN POST MOUNTING	05/31/07
TE-03B	GALVANIZED SQUARE TUBE SIGN POST MOUNTING	05/31/07
TE-04 ●	REGULATORY SIGNS	07/11/08
TE-05 ●	WARNING SIGNS	07/11/08
TE-06 ●	MISCELLANEOUS SIGNS	07/11/08
TE-07	CONSTRUCTION SIGNS	07/11/08
TE-08	MISCELLANEOUS INTERSECTION SIGNS	07/11/08

STANDARD PLAN NO.	TITLE	DATE
TE-09	BIKE ROUTE SIGN & SUPPLEMENTARY PLATES	07/11/08
TE-10	INTERSTATE ROUTE MARKER	07/11/08
TE-11	STATE ROUTE MARKER AND AUXILIARY MARKERS	07/11/08
TE-12	STATE ROUTE MARKER AND BORDER DETAIL FOR GUIDE SIGNS	07/11/08
TE-12A	ROUTE SIGN ASSEMBLIES	07/11/08
TE-13	STREET NAME SIGN ON MAST ARM	07/11/08
TE-14 ●	MISCELLANEOUS REFLECTOR MARKERS	07/11/08
TE-15 ●	OBJECT MARKERS	07/11/08
TE-16	MILE POSTS	07/11/08
TE-17A	CANTILEVER OVERHEAD SIGN ELEVATION & DETAILS	05/31/07
TE-17B	CANTILEVER SIGN FRAME DETAIL AND SECTION	05/31/07
TE-17C	CANTILEVER SIGN FRAME DETAIL	05/31/07
TE-17D	CANTILEVER SIGN FRAME SECTION	05/31/07
TE-17E	CANTILEVER SIGN FRAME DETAILS	05/31/07
TE-18A	TWO POST OVERHEAD SIGN FRAME ELEVATIONS	05/31/07
TE-18B	TWO POST SIGN FRAMING PLAN SECTION	05/31/07
TE-18C	TWO POST SIGN FRAMING SECTIONS AND DETAILS	05/31/07
TE-18D	TWO POST SIGN FRAME DETAILS	05/31/07
TE-18E	TWO POST SIGN FRAME DETAILS	05/31/07
TE-19A	OVERHEAD SIGN FRAMING SCHEDULE	05/31/07
TE-19B	SIGN POST DRILLED SHAFT FOUNDATION	05/31/07
TE-19C	SPREAD FOOTING	05/31/07
TE-19D	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.1	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.2	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.3	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.4	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19D.5	SIGN FRAME FOUNDATION SCHEDULE	05/31/07
TE-19E	ANCHORAGE DETAILS	05/31/07
TE-19F	ANCHORAGE DETAILS	05/31/07
TE-19G	MISCELLANEOUS SIGN FRAME DETAILS	05/31/07
TE-19H	LUMINAIRE WALKWAY SUPPORT	05/31/07
TE-19J	FIXED MESSAGE LUMINAIRE SUPPORT	05/31/07
TE-19K	MISCELLANEOUS SIGN DETAILS	05/31/07
TE-19L	MISCELLANEOUS SIGN DETAILS	05/31/07
TE-19M	MISCELLANEOUS SIGN FRAME DETAILS	05/31/07
TE-20	SUPPORTS FOR GROUND MOUNTED GUIDE SIGN	05/31/07
TE-20A	SUPPORTS FOR GROUND MOUNTED GUIDE SIGN	05/31/07
TE-20B	SUPPORTS FOR GROUND MOUNTED GUIDE SIGN	05/31/07
TE-20C	SUPPORTS FOR GROUND MOUNTED GUIDE SIGN	05/31/07
TE-21A ●	SIGN BREAKAWAY MOUNTS	05/31/07
TE-21B ●	SIGN BREAKAWAY MOUNTS	05/31/07
TE-22	LAMINATED ALUMINUM SIGN PANELS (OVERHEAD)	05/31/07
TE-23	LAMINATED ALUMINUM SIGN PANELS (GROUND MOUNTED)	07/11/08
TE-24	SOLID ALUMINUM EXTRUDED SIGN PANEL AND ACCESSORY DETAILS	05/31/07
TE-25	GUIDE SIGNS LUMINAIRE MOUNTINGS	05/31/07
TE-26 ●	RAISED PAVEMENT MARKERS AND STRIPING	07/11/08
TE-27 ●	RAISED PAVEMENT MARKERS AND STRIPING	07/11/08
TE-28	ENTRANCE AND EXIT PAVEMENT MARKINGS	07/11/08
TE-28A ●	MISCELLANEOUS PAVEMENT MARKINGS	07/11/08
TE-29 ●	PAVEMENT ARROWS AND SYMBOLS	07/11/08
TE-30 ●	PAVEMENT ALPHABETS, NUMBERS & SYMBOLS	07/11/08
TE-31 ●	PAVEMENT ALPHABETS, NUMBERS & SYMBOLS	07/11/08

STANDARD PLAN NO.	TITLE	DATE
TE-32	TYPE I & II TRAFFIC SIGNAL SYSTEM MISC. DETAILS	05/31/07
TE-33	TYPE II TRAFFIC SIGNAL SYSTEM	08/16/06
TE-33A.1	TYPE II TRAFFIC SIGNAL STANDARD	05/31/07
TE-33A.2	TYPE II TRAFFIC SIGNAL STANDARD	05/31/07
TE-34	LOOP DETECTOR DETAILS	07/11/08
TE-35	LOOP DETECTORS & DUCT DETAILS	07/11/08
TE-36	TRAFFIC SIGNAL DETAILS	07/11/08
TE-37	PULLBOX & COVER DETAILS	07/11/08
TE-37A	TYPE "A" TRAFFIC PULLBOX	05/31/07
TE-37B	TYPE "A" TRAFFIC PULLBOX REINFORCING	05/31/07
TE-37C	TYPE "B" TRAFFIC PULLBOX	05/31/07
TE-37D	TYPE "B" TRAFFIC PULLBOX REINFORCING	05/31/07
TE-37E	TYPE "B" TRAFFIC PULLBOX FOUNDATION	05/31/07
TE-37F	TYPE "C" TRAFFIC PULLBOX	05/31/07
TE-37G	TYPE "C" TRAFFIC PULLBOX REINFORCING	05/31/07
TE-37H	TYPE "C" TRAFFIC PULLBOX FOUNDATION	05/31/07
TE-37J	TRAFFIC PULLBOX COVER AND DETAILS	05/31/07
TE-38	TYPE III TRAFFIC SIGNAL STANDARD	05/31/07
TE-38A.1	TYPE III TRAFFIC SIGNAL STANDARD	05/31/07
TE-38A.2	TYPE III TRAFFIC SIGNAL STANDARD	05/31/07
TE-39 ●	METAL GUARDRAIL CONNECTION TO CONCRETE BARRIER	07/11/08
TE-40	CONCRETE BARRIER TRANSITION	05/31/07
TE-40A	CONCRETE BARRIER TRANSITION SECTIONS	05/31/07
TE-41	GUARDRAIL TYPE 4 (RIGID BARRIER)	05/31/07
TE-42 ●	PORTABLE CONCRETE BARRIER	05/31/07
TE-43 ●	PORTABLE CONCRETE BARRIER	05/31/07
TE-44	GUARDRAIL TYPE 4 MISCELLANEOUS DETAILS	07/11/08
TE-45	BARRICADES	07/11/08
TE-46 ●	DELINEATION & PAVEMENT MARKINGS AT NARROW BRIDGES	07/11/08
TE-47 ●	HIGHWAY LIGHT STANDARD	05/31/07

NOTE:
STANDARD PLANS APPLICABLE TO THIS PROJECT ARE INDICATED BY A " ● " NEXT TO THE STANDARD PLAN NO. (FOR EXAMPLE: D-07 ●)

DATE	_____
DESIGNED BY	_____
TRACED BY	_____
NOTED BY	_____
CHECKED BY	_____
QUANTITIES BY	_____
NO.	_____



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
SIGNATURE: *Dexter S. Eji* 04/30/24
EXPIRATION DATE OF THE LICENSE

9/1/23	▲ Addendum 2 Added D-05
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
STANDARD PLAN SUMMARY	
KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54) Project No. 83B-01-09	
Scale: None	Date: December 2022
SHEET No. SPS-1 OF 1 SHEETS	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	4	231

NOTES FOR PROTECTION OF ENDANGERED SPECIES:

- HAWAIIAN SEABIRDS**
No night time construction will be permitted during the seabird fledging period (September 15th through December 15th). The Contractor's attention is directed to Special Provision Section 107.18 - Avoidance and Minimization Measures for Endangered Species.

All outdoor lights shall be fully shielded and only visible from below the bulb height. Outdoor lights shall only be used when necessary and shall be turned off when activity is not occurring in the lighted area.
- HAWAIIAN HOARY BAT ('Ope'ape'a)**
No disturbing, clearing, grubbing, or trimming of woody plants greater than 15' tall shall be allowed during the Hawaiian Hoary Bat birthing and pup-rearing season (June 1st through September 15th).

The Contractor shall not use barbed wire fencing.
- HAWAIIAN WATERBIRDS**
In areas where waterbirds are known to be present, post and implement reduced speed limits and inform project personnel about the presence of endangered species on-site.

In areas where vegetated streambanks would be disturbed, waterbird nest searches shall be conducted by a qualified biologist before any work is conducted, within 3 days of project initiation and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest).

If a nest or active brood is found:
- Contact the Service (808) 861-8525 within 48 hours for further guidance.
- Establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer.
- SEA TURTLES**
When possible, night work near the beach, night work near the beach will be avoided between May 1 and November 1, the sea turtle nesting and hatching season
- Shielded lighting to reduce direct and ambient lighting of beach habitats within and adjacent to the project site will be used.**

When possible, night work near the beach will be avoided between May 1 and November 1, the sea turtle nesting and hatching season.
- HAWAIIAN SHORT-EARED OWL OR PUEO**
Before clearing any vegetation, daily pre-construction surveys shall be conducted by a qualified biologists

If pueo nests are present, DOFAW staff should be notified and a 100 foot buffer zone should be established in which no clearing occurs until nesting is completed.

- A biological monitor that is familiar with the species' biology shall be present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.

NOTES FOR PROTECTION OF ENDANGERED SPECIES (CONT):

- Turbidity and siltation from project-related work should be minimized and contained within the project area by silt containment devices and curtailing work during flooding or adverse tidal and weather conditions. BMPs should be maintained for the life of the construction period until turbidity and siltation within the project area is stabilized. All project construction-related debris and sediment containment devices should be removed and disposed of at an approved site.
- No project construction-related materials or equipment (dredges, vessels, backhoes, silt curtains, etc.) shall be placed in an aquatic environment. Project related activities should not result in any debris disposal, non-native species introductions, or attraction of non-native pests to the affected or adjacent aquatic or terrestrial habitats.
- Project construction-related materials (fill, revetment rock, pipe, etc.) should not be stockpiled in, or in close proximity to, aquatic habitats and should be protected from erosion (e.g., with filter fabric, etc.), to prevent materials from being carried into waters by wind, rain, or high surf.
- Fueling of project-related vehicles and equipment should take place away from the aquatic environment and a contingency plan to control petroleum products accidentally spilled during the project should be developed. The plan should be retained on site with the person responsible for compliance with the plan. Absorbent pads and containment booms should be stored on-site to facilitate the clean-up of accidental petroleum releases.
- All deliberately exposed soil or under-layer materials used in the project near water should be protected from erosion and stabilized as soon as possible with geotextile, filter fabric or native or non-invasive vegetation matting, hydro-seeding, etc.
- Artificial light from exterior fixtures on the zoning lot, including but not limited to floodlights, uplights, or spot lights used for decorative or aesthetic purposes, is prohibited if the light directly illuminates or is directed to project across property boundaries toward the shoreline and ocean waters, except as otherwise permitted pursuant to HRS Section 205A-71(b). All outdoor lighting shall be fully shielded during and after construction to avoid artificial light impacts on seabirds, hoary bats, and sea turtles, particularly during the seabird fledging season from September 15 through December 15.
- All project activities must cease if a Hawaiian monk seal or green sea turtle is present within 150 ft of the work area, or as recommended by State of Federal regulations. Project activities may only recommence after the animal voluntarily leaves the area. If a monk seal and/or pup pair is present, a 300 ft buffer must be observed. Any Project-related debris that may impose an entanglement threat to monk seals and turtles must be removed from the work area at the end of each day and at the conclusion of the Project-related activities.

PUBLIC HEALTH, SAFETY, AND CONVENIENCE NOTES:

- The Contractor shall observe and comply with all Federal, State, and Local laws required for the protection of public health and safety and environmental quality.
- The Contractor, at his own expense, shall keep the project and its surrounding areas free from dust nuisance. The work shall be in conformance with the air pollution standards and regulations of the State Department of Health. The City may require supplementary measures as necessary.

PUBLIC HEALTH, SAFETY, AND CONVENIENCE NOTES (CONT):

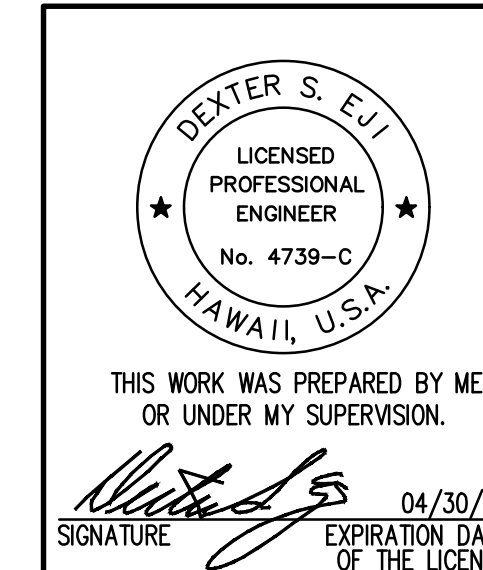
- The Contractor's attention is directed to Chapter 448, Public Health Regulations, Department of Health, State of Hawaii, "Community Noise Control for Oahu" in which maximum allowable noise levels have been set. If the construction activities for this project will exceed the allowable noise levels, the Contractor will be required to obtain a permit from the Director of the Department of Health. The Contractor shall obtain a copy of Chapter 448 and become familiar with the noise level restrictions and the procedures for obtaining a Permit for construction activities.
- The Contractor is to comply with the directions of the State of Hawaii Occupation Safety and Health Law (DOSH).

MONUMENT GENERAL NOTES

- All existing right-of-way, centerline, as-built, construction, and NGS (horizontal and vertical in the NGS database) monuments located within the State of Hawaii right of way, must be preserved and displayed on the plans. All monuments shall be preserved during all design and construction phases. If monuments are disturbed or destroyed, the Cadastral Engineering Section (HWY-DC) shall be notified prior to groundbreaking. Reconciliation to the Right-of-Way Baseline and/or a boundary study and determination may be required prior to re-installation of the disturbed or destroyed monuments. HWY-DC shall be contacted for guidelines and procedures. As to construction, a State of Hawaii Licensed Surveyor shall perform the location and staking of the reset monument. The DOT Standard Plans \neq Specifications, with the exception of NGS monuments which shall have a NGS approved "brass disk" marker, shall be referenced for the monument type and materials.
- Any NGS vertical monuments that are deemed necessary for relocation due to construction shall follow the NGS benchmark reset procedures written by Curtis Smith dated September 2010 or newer. All work must be done by an electronic digital level that is acceptable by NGS for second-order class one or higher work. The surveyor must use two one-piece invar barcode rods with current certifications with struts with 15 lbs turning plate or turtles; and/or turning pin with driving cap and temperature readings. Contact NGS prior to any work to ensure all equipment meets reset specifications. A State of Hawaii Licensed Surveyor shall perform the relocation. All work must be submitted both in electronic and hard copy formats to NGS and HWY-DC.
- All monument work shall be considered incidental to this project.

DATE	_____
DESIGNED BY	_____
CHECKED BY	_____
NO.	_____

9/1/23	ADDENDUM 2 Added Notes
DATE	REVISION



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL NOTES

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
Project No. 83B-01-09

Scale: _____ Date: December 2022

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	10	231

WATER NOTES:

- Unless otherwise specified, all materials and construction of water system facilities and appurtenances shall be in accordance with the City and County of Honolulu Board of Water Supply's "WATER SYSTEM STANDARDS", DATED 2002, THE "WATER SYSTEM EXTERNAL CORROSION CONTROL STANDARDS", VOLUME 3, DATED 2021, and all subsequent amendments and additions.
- All plans approved by the Board of Water Supply are based solely on the adequacy of the water supply.
- The Contractor shall notify Board of Water Supply Capital Projects Division, Construction Section in writing or call (808) 748-5730, and submit six (6) sets of 24"x36" approved construction drawings, one week prior to commencing construction activities.
- The existence and location of underground utilities and structures as shown on the plans are from the latest available data but is not guaranteed as to the accuracy or the encountering of other obstacles during the course of the work. The Contractor shall be responsible and pay for all damages to existing utilities. The Contractor shall not assume that where no utilities are shown, that none exist.
- Re-approval shall be required if this project is not under construction within a period of two years.
- The Contractor shall be responsible for the protection of all water lines during construction. The Contractor shall be especially careful when excavating behind water lines, tees, and bends wherever there is a possibility of water line movement due to the removal of the supporting earth beyond the existing reaction blocks. The Contractor shall take whatever measure necessary to protect the water lines, such as constructing special reaction blocks (with BWS approval) and/or modifying his construction methods.
- Prior to any excavating, the Contractor shall verify in the field the location of existing water mains and appurtenances.
- The Contractor shall verify all existing service lateral locations whether shown or not shown on plans prior to commencing with any of the work and shall not assume that where no services are shown, none exist.
- The Contractor shall adjust all manhole frames/valve boxes/meter boxes within the resurfaced area. The Contractor shall be responsible for "referencing" these manholes/valve boxes/meter boxes to facilitate the adjustments.
- All waterline construction requiring shutdown connection shall be scheduled for normal working hours at six (6) hours maximum downtime.
- At the electrical/cable/signal ductline water crossings, adjust all electrical/cable/signal ductline elevations to maintain 12" vertical clear separation from all waterlines at no cost to the Board of Water Supply.
- Maintain 3'-0" minimum horizontal clear separation between all waterlines and nearest electrical/cable/signal ductlines paralleling the water system at no cost to the Board of Water Supply.
- All fire hydrants to be adjusted and/or relocated shall be replaced with new fire hydrants, unless otherwise directed by the Board of Water Supply.

WATER NOTES, CONT':

- Maintain 3'-0" minimum horizontal clear separation between electrical/cable/signal appurtenances, (including any modular units) and the nearest waterline or water appurtenance. Contractor shall field verify for any conflicts at each electrical/cable/signal appurtenance location. Where conflicts occur, the contractor shall coordinate with the project engineer to revise the electrical/cable/signal appurtenance to provide the required clearances at no cost to the BWS.
- Pipe cushion shall be of high resistivity material. The Contractor shall submit a soil certification that high resistant cushion material has a resistivity greater than 5,000 OHM-CM. Remainder of the backfill material shall be as specified in the Water Systems Standards. Pipe cushion and backfill material shall contain no hazardous substances above regulatory action levels including but not limited to lead, asbestos, mercury, chromium, cadmium, zinc, strontium, and polychlorinated biphenyls (PCB).
- All ductile iron pipe including sections requiring reinforced concrete jacketing, shall be Ductile Iron Class 53, and bonded dielectric coated as per the Board of Water Supply 2002 Water System Standards as amended.
- The Contractor shall install electronic markers to all mains and test the electronic markers prior to installations to verify proper operation. BWS personnel shall verify the number and locations of placed electronic markers before final paving of the project.
- No deviation to the Board of Water Supply 2002 Water System Standards shall be allowed without the Manager and Chief Engineer's approval.
- Any adjustments to the existing water system required during construction, to meet the requirements of the BWS Standards, whether shown on the plans or not, shall be done by the Contractor at no cost to the Board of Water Supply.
- When a utility (gas, sewer, electrical duct line, fiber optic, drainage, etc.) crosses below a Board of Water Supply water main, the designer of record and their construction engineer shall be responsible for determining the adequate water main structural support and submit the construction method and shop drawing, stamped by a licensed engineer and reviewed by the designer of record, to the Board of Water Supply for approval. All work shall be at no cost to the Board of Water Supply.
- All ductile iron fittings and metallic valves shall have factory applied coating and wrapped with petroleum wax tape.
- Soil resistivity for the site has a corrosion rating of Corrosion Category A (Moderately to Severely Corrosive) and Corrosion Category B (Negligibly to Mildly Corrosive) as reported by Geolabs. All required electrical isolation procedures and corrosion control requirements shall apply.

WATER NOTES, CONT':

- Water Pipeline Chlorination and Testing Procedures
 - The following chlorination and water sample collection procedure shall apply to all water pipeline projects (all work to be coordinated through Board of Water Supply Inspector):
 - Chlorination of Water Systems
 - The Contractor shall provide a 4-week advance notice, in writing, to the Officer-In-Charge for proposed flushing, filling and bacterial testing of the new pipeline.
 - The Contractor shall hire a State of Hawaii - Department of Health certified laboratory to provide water sampling services and to deliver water samples to the Micro Lab for analysis. Water samples for bacterial testing shall be delivered no later than 2:30 p.m. on the day the samples are taken to the Board of Water Supply Micro Lab located at 630 S. Beretania St., Honolulu, HI 96843. The Micro Lab shall perform analysis and provide their results to the Officer-In-Charge by 4:30 p.m. on the following day (in some cases, final results notification may take up to 48 hours).
 - Water mains shall be disinfected in accordance with the Board of Water Supply System Standards (2002), as amended, Section 302.29.

Step 1 - Preliminary Flushing (Prior to Chlorination): The mains shall be flushed with maximum available pressure and velocity. Adequacy of turnovers shall be determined by the absence of particles. Turbidity shall be less than 1.0 NTU before chlorination. During all flushing operations, the Manager's authorized representative shall determine the rate of water use.

Step 2 - Chlorination: The Contractor shall submit to the Manager, for approval, a sketch showing locations of sampling points and a plan or schedule delineating the method or steps the Contractor proposes to use to accomplish the work. The following methods for chlorination shall be used:

 - The following chlorination and water sample collection procedure shall apply to all water pipeline projects:

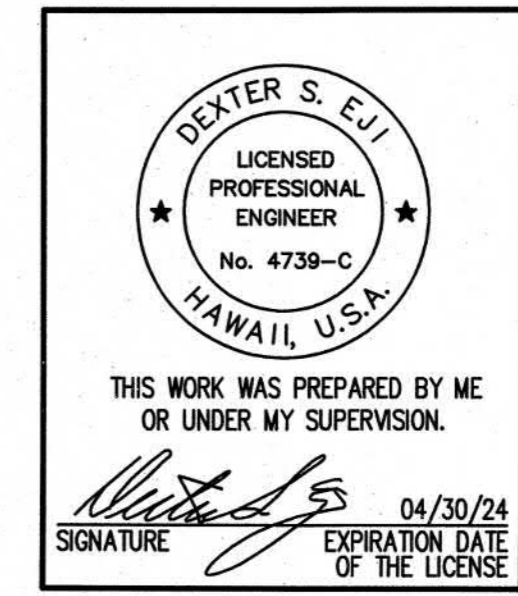
Step 1: Chlorinate main by filling with water and introducing chlorine in sufficient quantity to obtain a minimum chlorine concentration of 50 parts per million. Leave chlorinated water in main overnight.

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

APPROVED:

[Signature]
 FOR: MANAGER & CHIEF ENGINEER, BWS *
 (For Work Affecting BWS Facilities in
 City/State Right-of-Way and BWS Easement only)
 DATE: 8/1/2023

9/1/23	▲	Addendum 2 BWS Signature
DATE		REVISION



STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

UTILITY NOTES

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

Scale: None Date: December 2022

SHEET No. N-08 OF 13 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	11	231

WATER NOTES, CONT':

Step 2: Flush main with fresh water until all chlorine has been flushed out as evidenced by the N, N-diethyl-p-phenylenediamine (DPD) test, then collect a water sample while continuing to flush the main.

Step 3: Repeat Steps 1 and 2. After collecting the second water sample, stop flushing and allow the water to stand in the main overnight.

Step 4: Thoroughly flush the main with fresh water until all water that had been standing in the main overnight has been flushed out. Stop flushing and let the water stand in the main for one hour. Collect a water sample.

b. The main is deemed acceptable and certified when:

- (i) the three consecutive water samples, collected 24 hours apart under Steps 1 and 2, show no TC (Total Coliform bacteria), no E. coli, less than CFU/ml (Colony Forming Units per ml) of HPC (Heterotrophic Plate Count bacteria) or less than 202 HPC using the MPN (Most Probable Number) method and Turbidity <1.0 NTU, and
- (ii) the sample of water held in the main for one hour, collected under Step 4, also shows no TC, no E. coli, less than 200 CFU of HPC using the MPN method and Turbidity <1.0 NTU.

c. Chlorination, flushing, sampling and testing will be extended should unsatisfactory results be encountered. Any sample that shows positive TC, E. coli, HPC > 200 CFU/ml, HPC >202 MPN or Turbidity >1.0 NTU is unsatisfactory.

d. Steps 1 and 2 may be repeated before collecting the one-hour hold sample specified in Step 4. Repeating Steps 1 and 2 is recommended in the event samples show the presence of TC and/or E. coli and/or increasing total bacterial results from one sample to the next.

e. Water samples that show the presence of atypical results, debris, high turbidity or results inconsistent with existing water are subject to reconfirmation. The Manager reserves the right to request and test additional water samples in the interest of safeguarding public health and safety at no additional cost to the Department.

f. Liquid chlorine, chlorine based liquid disinfectants or calcium hypochlorite that has been tested and certified as meeting the specifications of ANSI/NSF Standard 60, Drinking Water Treatment Chemicals - Health Effects, shall be used for chlorination of the water mains.

d. Prior to chlorination, the water mains shall be thoroughly flushed.

e. The interior surfaces of the water mains shall be exposed to the chlorinating solution by completely filling the mains to remove air pockets, for a minimum of 24-hours and the free chlorine residual shall not be less than 10ppm after such time.

WATER NOTES, CONT':

f. Should the calcium hypochlorite be used, no solid and/or undissolved portion of the compound shall be introduced into any section of the water mains to be chlorinated.

g. At the end of the 24-hour disinfection period, representative samples shall be taken and analyzed to ensure a free chlorine residual of at least 10 ppm.

h. Should the free chlorine residual results indicate adequate chlorination, the water mains shall be thoroughly flushed and filled with water from the existing system and again tested for free chlorine residual. The flushing shall be considered adequate if the free chlorine residual test results indicate that the water in the water mains has a comparable chlorine residual as the water in the existing system.

i. The Contractor shall be responsible for the proper disposal of chlorinated water to safeguard public health and the environment in accordance with applicable State of Hawaii Department of Health requirements. A neutralizing chemical shall be applied to the water to be disposed to thoroughly neutralize the chlorine residual remaining in the water in accordance with Board of Water Supply Water System Standards (2002), as amended.

j. The Contractor shall be responsible for obtaining a National Pollutant Discharge Elimination System (NPDES) Permit from the Department of Health, Clean Water Branch prior to the start of construction, for the disposal of water used for hydro testing and chlorination, as required by the contract documents.

k. Following the acceptable flushing of the water mains, three (3) consecutive days of acceptable samples, taken at least 24-hours apart, from representative points shall be taken and subjected to microbiological tests. For water lines, at least one set of samples shall be collected from every 1,200 feet of new water main. Positive or invalid test results will not be acceptable, and the process will be repeated.

l. All measures for chlorine residual shall be analyzed using E.P.A. approved methods for drinking water.

m. All microbiological tests shall be performed by a laboratory approved by the Department of Health, State of Hawaii and the Water Quality Division of the Board of Water Supply.

n. The Contractor shall be responsible for all costs associated with all of the foregoing.

o. Cleaning and Swabbing procedures shall be in accordance with Board of Water Supply Water System Standards (2002), as amended.

p. All materials in direct contact with the potable water shall have National Sanitation Foundations (NSF) approvals. The Contractor shall submit these approvals to the Board of Water Supply for information only prior to its application.

WATER NOTES, CONT':

25. All water mains and appurtenances shall be subject to hydrostatic test pressure of 150 psi and by the contractor in accordance with Division 300 - Construction, Section 302.28, PIPE PRESSURE TEST of the "WATER SYSTEM STANDARDS", DATED 2002. During the 30-minute pressure test, the pressure shall not drop more than 10 psi.

26. The Contractor shall chlorinate the entire inside surface of each pipe and fitting with disinfection solution of 5 ounces of sodium hypochlorite mixed with 10 gallons of water. (For connection only)

27. Prior to installation, the Contractor shall submit for approval by Board of Water Supply, the manufacturer's certification that all cast iron (gray or ductile) fittings for the project conform in all respects to the Water Systems Standards, dated 2002.

28. Polygon shape for mechanical joint glands as described in AWWA Standard C111 shall be "straight-sided" or an approved equal on a job-to-job basis.

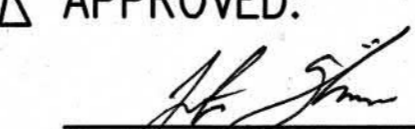
29. Contractor shall cut and plug all existing unused laterals at the main whether or not shown on the plans. The damaged area shall be repaired to an equal or better condition than the immediate area. All work shall be done at the expense of the Contractor.

30. The Contractor/Developer shall obtain a NPDES permit prior to chlorination and/or dewatering. A copy of the permit shall be submitted to the Board of Water Supply, Capital Projects Division, Construction Section.

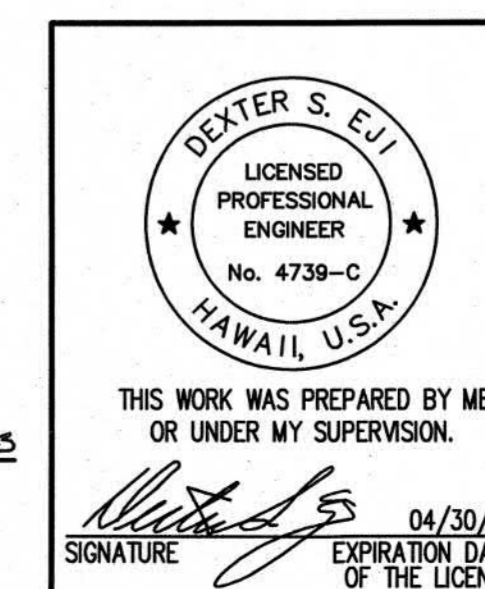
31. Install 4 mil thick, non-metallic, blue colored, 6 inches wide warning tape over centerline of the pipe and below the base course along the entire length of trench. Tape should be marked with "CAUTION WATER LINE BURIED BELOW".

32. Cleaning shall be by the use of pigs introduced into the pipeline and run completely through all installed pipelines and all branches line for fire hydrants. "Pigging" of service laterals is not required. Bare Foam "pigs" shall be used to swab piping clean as each length of pipeline is installed. The type, density, size, diameter and length of the pig shall be submitted for review and approval by the Manager prior to pigging work. "Pig" shall be used per manufacturer's specifications. Prior to use, the "pig" shall be submerged in a chlorine solution of 1 oz. of 5% chlorine bleach in 5 gallons of water. "Pigging" of the pipeline shall be considered incidental to the installation of the new pipeline. Manual sweeping, hand cleaning or swabbing may be allowed in lieu of "pigging" as approved by the Board of Water Manager.

DATE	*****
DESIGNED BY	
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NO.	

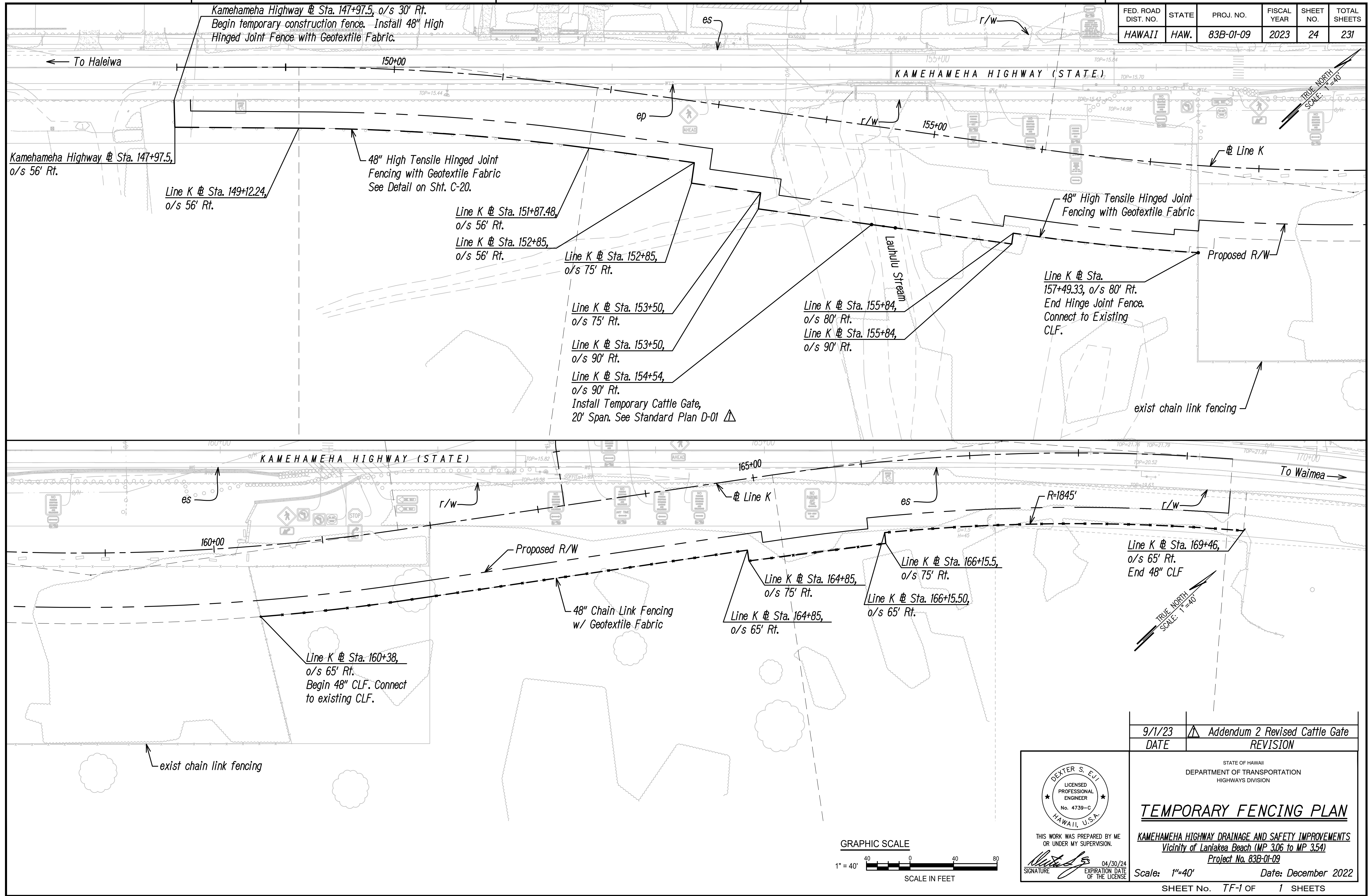
APPROVED: 
 MANAGER & CHIEF ENGINEER, BWS *
 (For Work Affecting BWS Facilities in
 City/State Right-of-Way and BWS Easement only)

8/1/2023
DATE



9/1/23	▲	Addendum 2 BWS Signature
DATE		REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION		
UTILITY NOTES		
KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS Vicinity of Laniaka Beach (MP 3.06 to MP 3.54) Project No. 83B-01-09		
Scale: None		Date: December 2022
SHEET No. N-09 OF 13 SHEETS		

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	24	231



DATE	_____
STAFFS PROVIDED BY	_____
DRAWN BY	_____
DESIGNED BY	_____
QUANTITIES BY	_____
CHECKED BY	_____
ORIGINAL PLAN	_____
NOTE BOOK	_____
No.	_____

9/1/23	▲ Addendum 2 Revised Cattle Gate
DATE	REVISION

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

 SIGNATURE: *Dexter S. Eji*

 EXPIRATION DATE OF THE LICENSE: 04/30/24

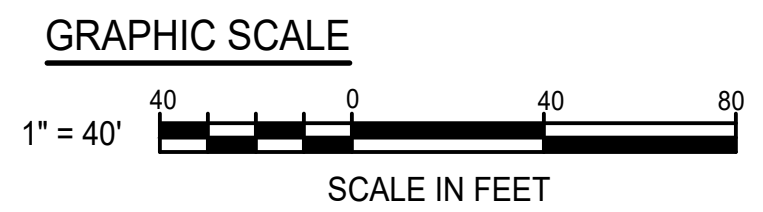
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

TEMPORARY FENCING PLAN

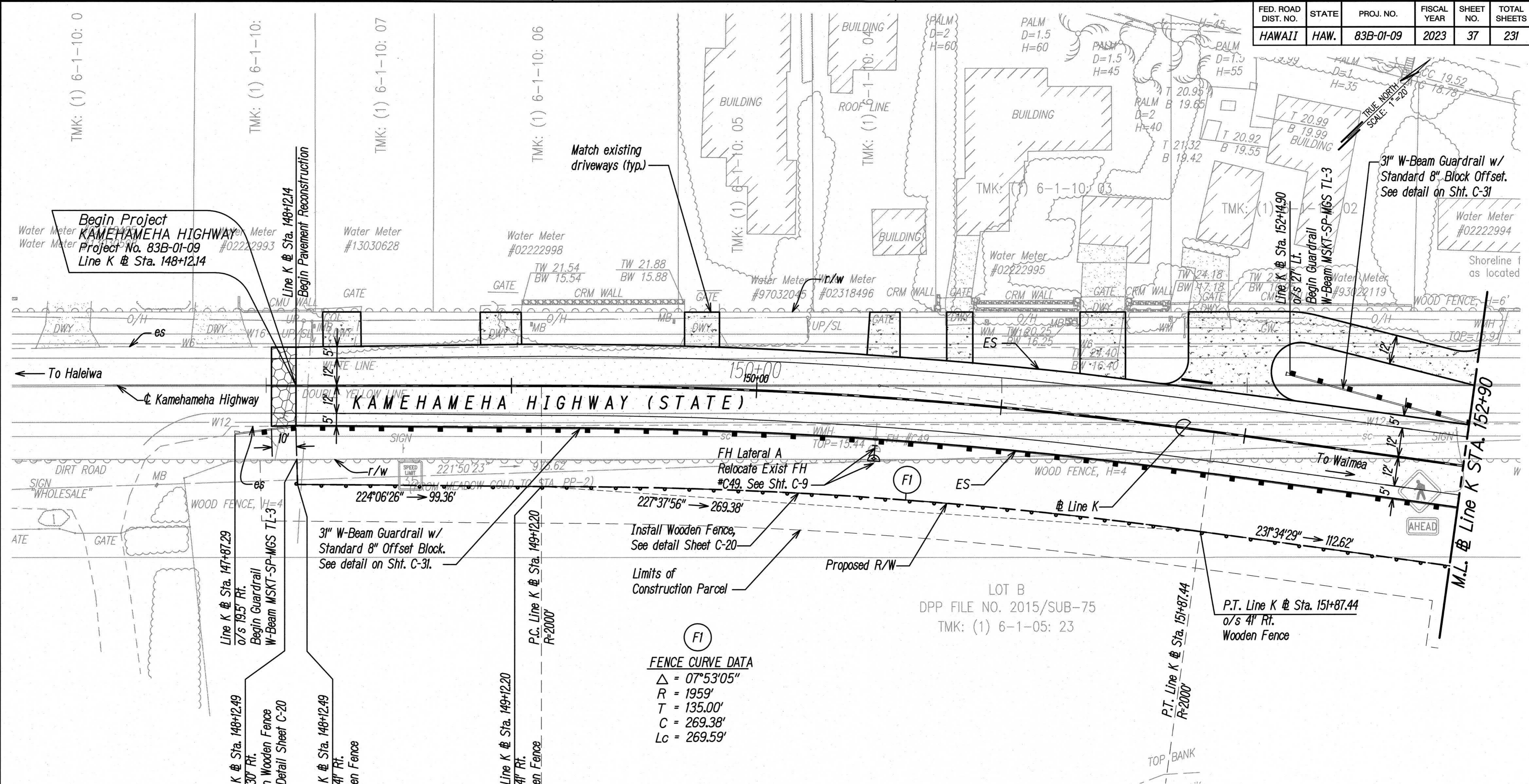
KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

Scale: 1"=40' Date: December 2022

SHEET No. TF-1 OF 1 SHEETS

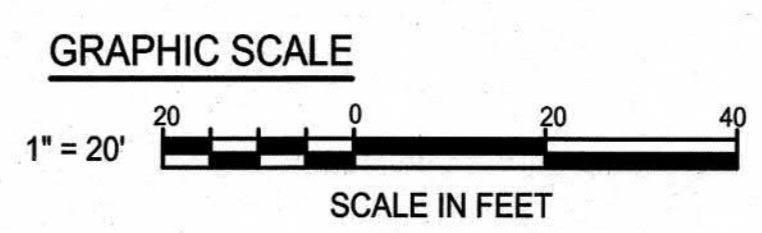


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	37	231



FENCE CURVE DATA
 $\Delta = 07^{\circ}53'05''$
 $R = 1959'$
 $T = 135.00'$
 $C = 269.38'$
 $Lc = 269.59'$

- Legend:**
- Concrete Driveway (Std. Plan D-06.)
 - Asphalt Pavement
 - Pavement Transition See detail on Sht. C-20.
 - 31" W-Beam Guardrail w/ Standard 8" Offset Block. See Detail on Sht. C-31



DEXTER S. EJI
 LICENSED PROFESSIONAL ENGINEER
 No. 4739-C
 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 SIGNATURE: *[Signature]* 04/30/24
 EXPIRATION DATE OF THE LICENSE

9/1/23	ADDENDUM 2 BWS SIGNATURE
DATE	REVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

ROADWAY CONSTRUCTION PLAN

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

Scale: 1"=20' Date: December 2022
 SHEET No. C-4 OF 32 SHEETS

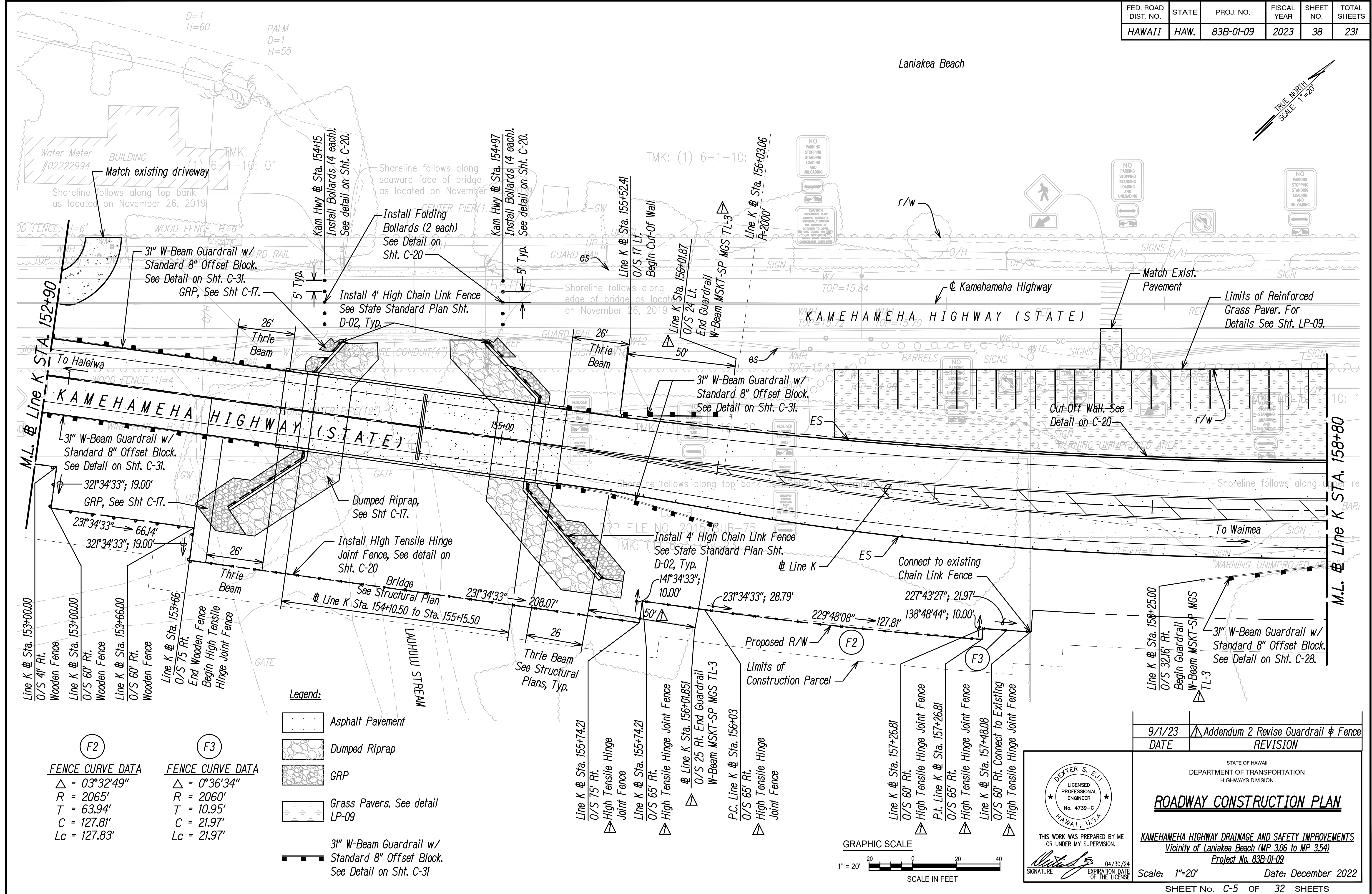
Approved:

[Signature]
 Manager and Chief Engineer, BWS *
 (For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)

8/7/2023
 Date

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

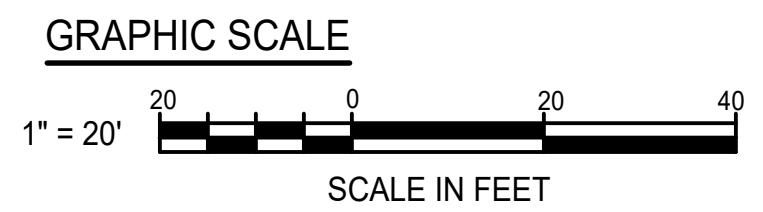
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	38	231



DATE	
STAFFS PROVIDED BY	
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
NOTE BOOK	
No.	

F2	F3
FENCE CURVE DATA	FENCE CURVE DATA
$\Delta = 03^{\circ}32'49''$	$\Delta = 0^{\circ}36'34''$
$R = 2065'$	$R = 2060'$
$T = 63.94'$	$T = 10.95'$
$C = 127.81'$	$C = 21.97'$
$Lc = 127.83'$	$Lc = 21.97'$

- Legend:**
- Asphalt Pavement
 - Dumped Riprap
 - GRP
 - Grass Pavers. See detail LP-09
 - 31" W-Beam Guardrail w/ Standard 8" Offset Block. See Detail on Sht. C-31



DEXTER S. EJI
 LICENSED PROFESSIONAL ENGINEER
 No. 4739-C
 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 SIGNATURE: [Signature] EXPIRATION DATE OF THE LICENSE: 04/30/24

9/1/23	ADDENDUM 2 REVISE GUARDRAIL & FENCE
DATE	REVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

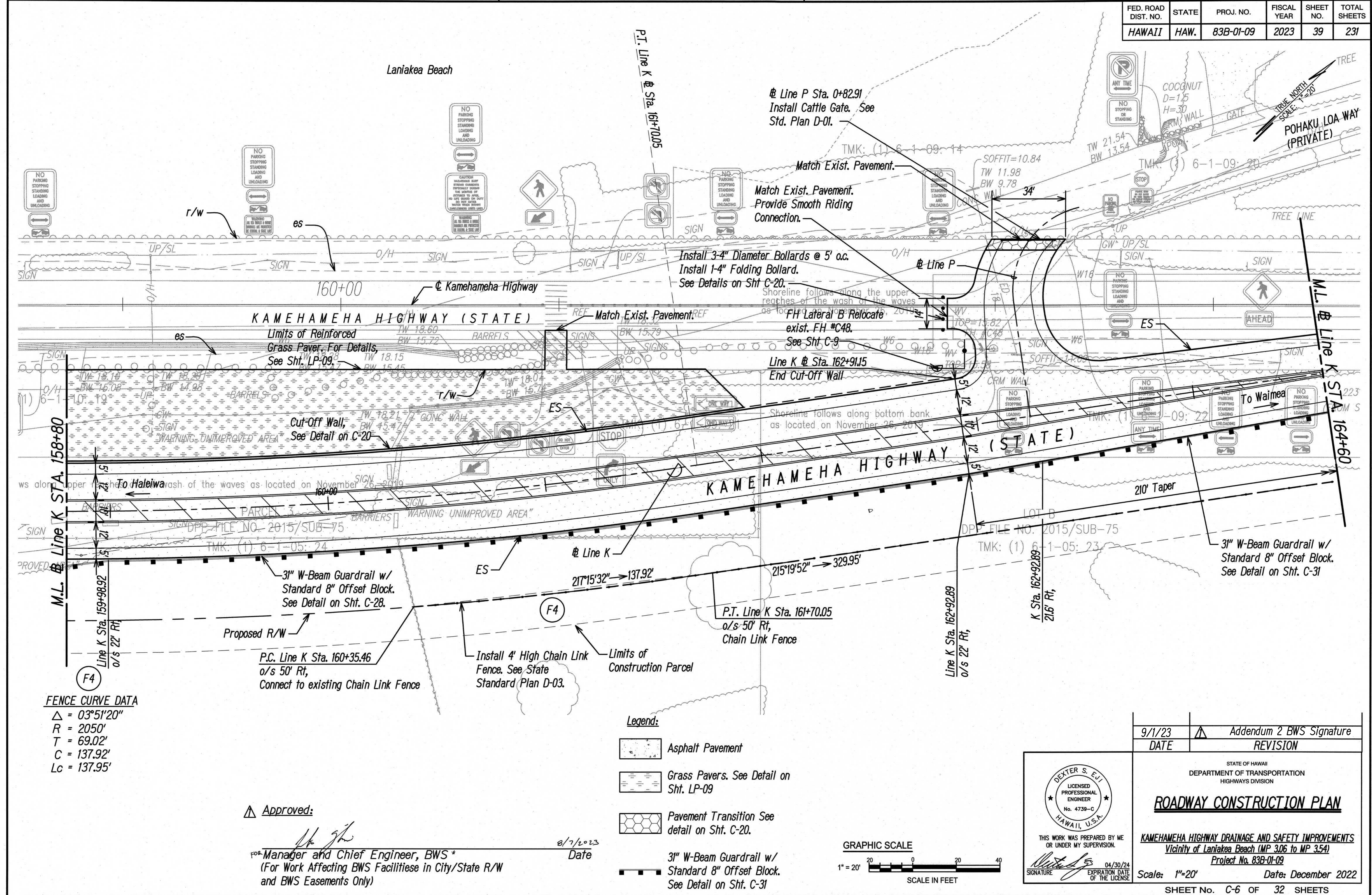
ROADWAY CONSTRUCTION PLAN

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

Scale: 1"=20' Date: December 2022

SHEET No. C-5 OF 32 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	39	231

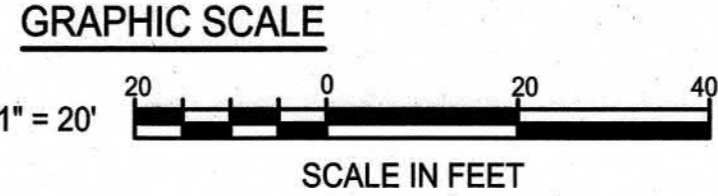


FENCE CURVE DATA

Δ	= 03°51'20"
R	= 2050'
T	= 69.02'
C	= 137.92'
Lc	= 137.95'

Approved: *[Signature]*
 Manager and Chief Engineer, BWS*
 (For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)
 Date: 8/7/2023

- Legend:**
- Asphalt Pavement
 - Grass Pavers. See Detail on Sht. LP-09
 - Pavement Transition See detail on Sht. C-20.
 - 31" W-Beam Guardrail w/ Standard 8" Offset Block. See Detail on Sht. C-31

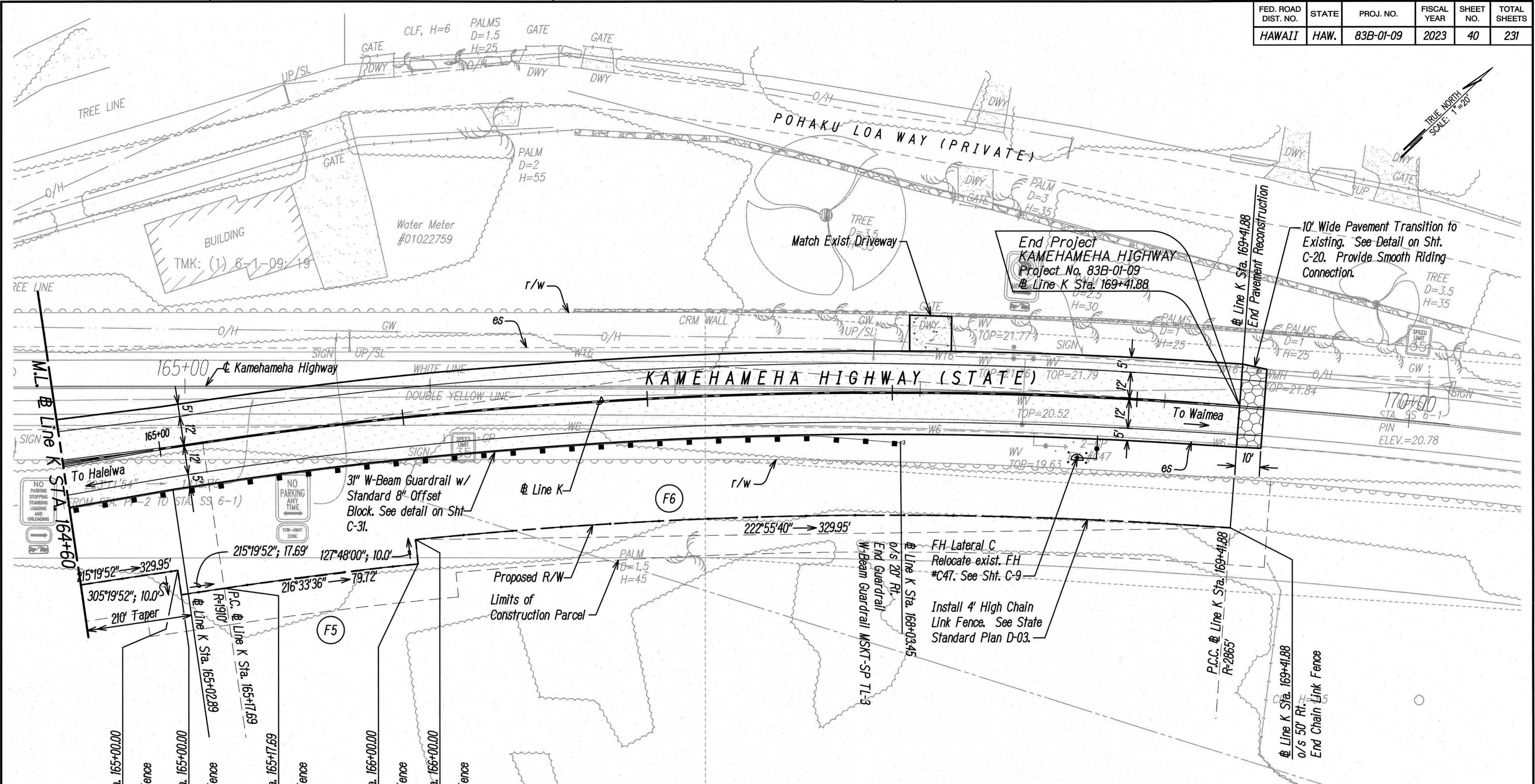


DEXTER S. EJI
 LICENSED PROFESSIONAL ENGINEER
 No. 4738-C
 HAWAII, U.S.A.
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 SIGNATURE: *[Signature]* EXPIRATION DATE OF THE LICENSE: 04/30/24

9/1/23	▲	Addendum 2 BWS Signature
DATE		REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION ROADWAY CONSTRUCTION PLAN KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS Vicinity of Laniakea Beach (MP 3.06 to MP 3.54) Project No. 83B-01-09 Scale: 1"=20' Date: December 2022		
SHEET No. C-6 OF 32 SHEETS		

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

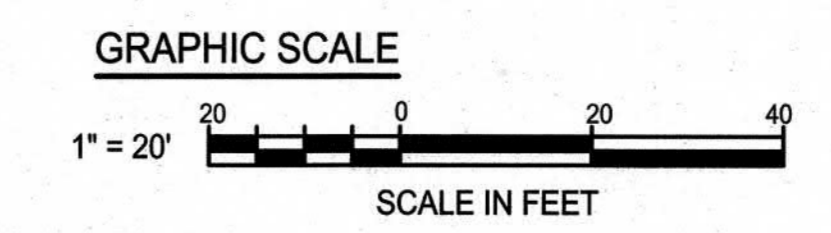
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	40	231



F5	F6
FENCE CURVE DATA	FENCE CURVE DATA
Δ = 02°28'09"	Δ = 10°15'20"
R = 1850'	R = 1860'
T = 39.86'	T = 166.91'
C = 79.72'	C = 332.48'
Lc = 79.72'	Lc = 332.93'

Approved: *[Signature]*
 Manager and Chief Engineer, BWS*
 (For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)
 Date: 8/7/2023

- Legend:**
- Concrete Driveway (Std. Plan D-06.)
 - Asphalt Pavement
 - Pavement Transition See detail on Sht. C-20.
 - 31" W-Beam Guardrail w/ Standard 8" Offset Block. See Detail on Sht. C-31



SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NOTE BOOK No.	

9/1/23	▲ Addendum 2 BWS Signature
DATE	REVISION

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 Signature: *[Signature]* 04/30/24
 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

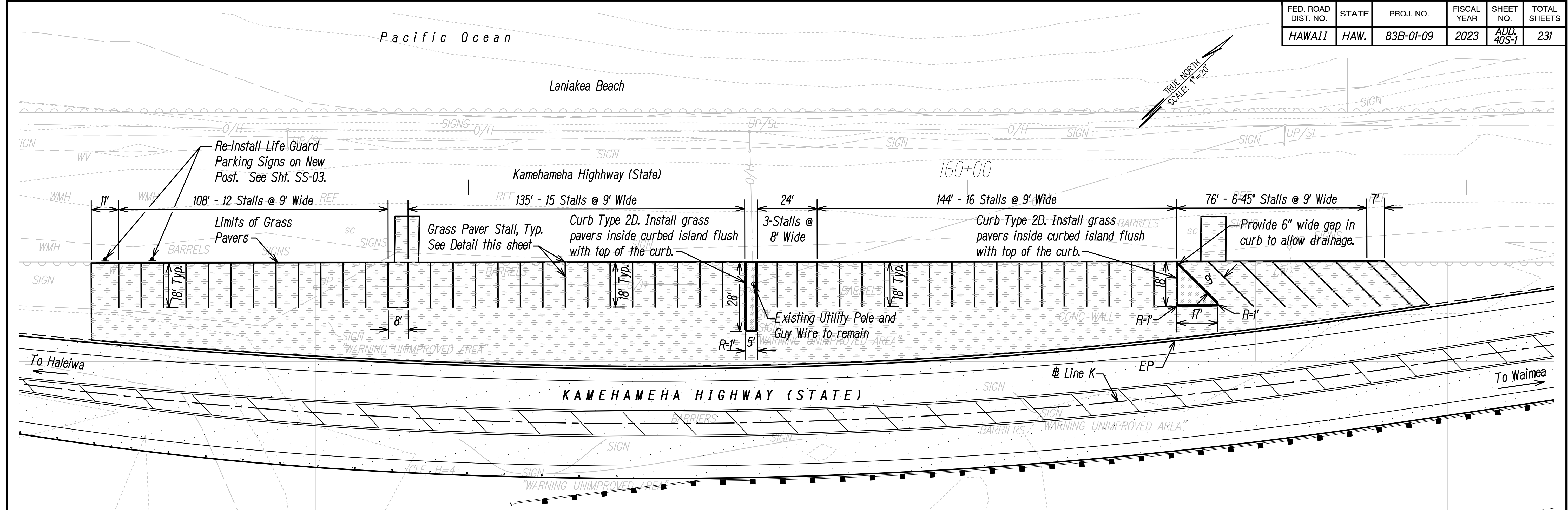
ROADWAY CONSTRUCTION PLAN

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

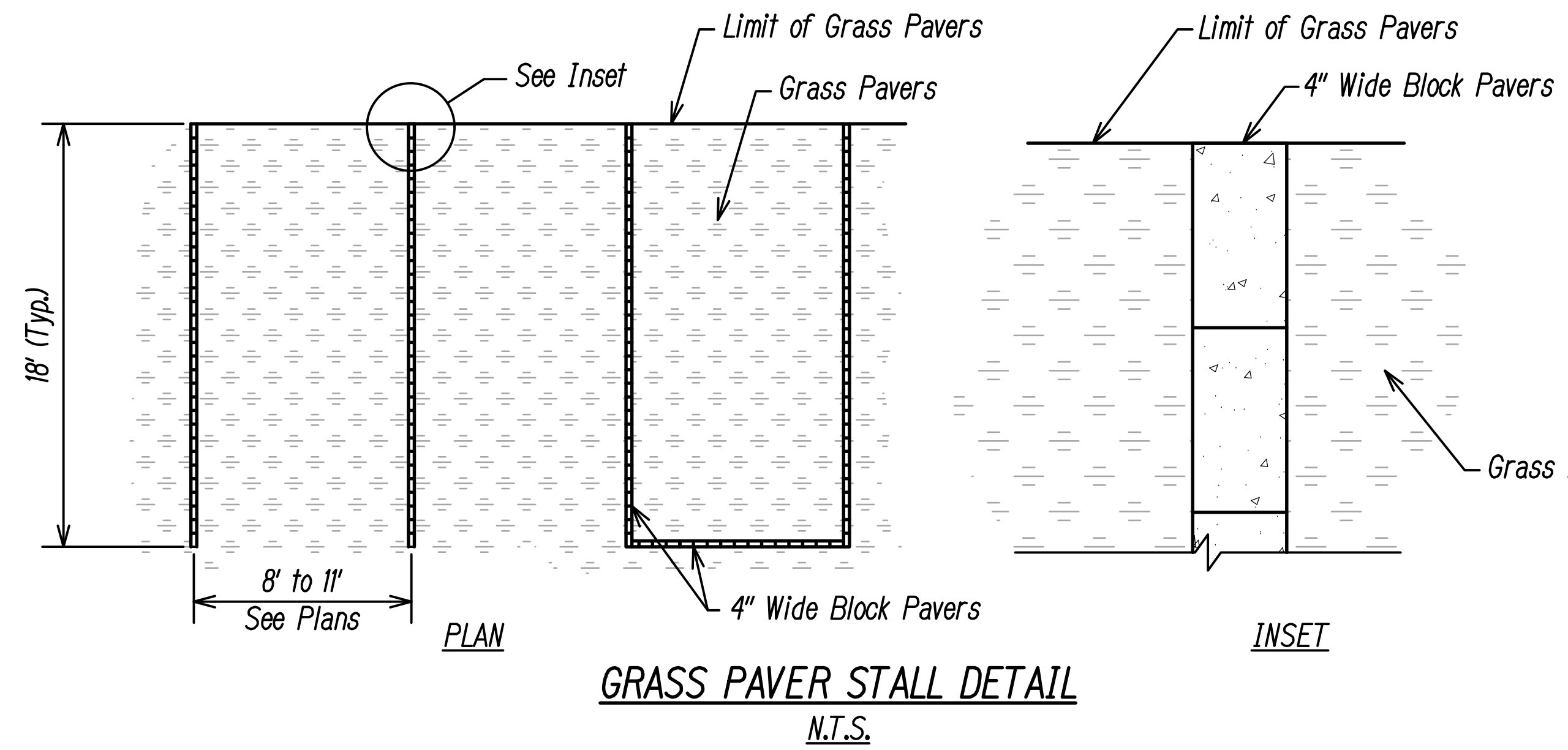
Scale: 1"=20' Date: December 2022

SHEET No. C-7 OF 32 SHEETS

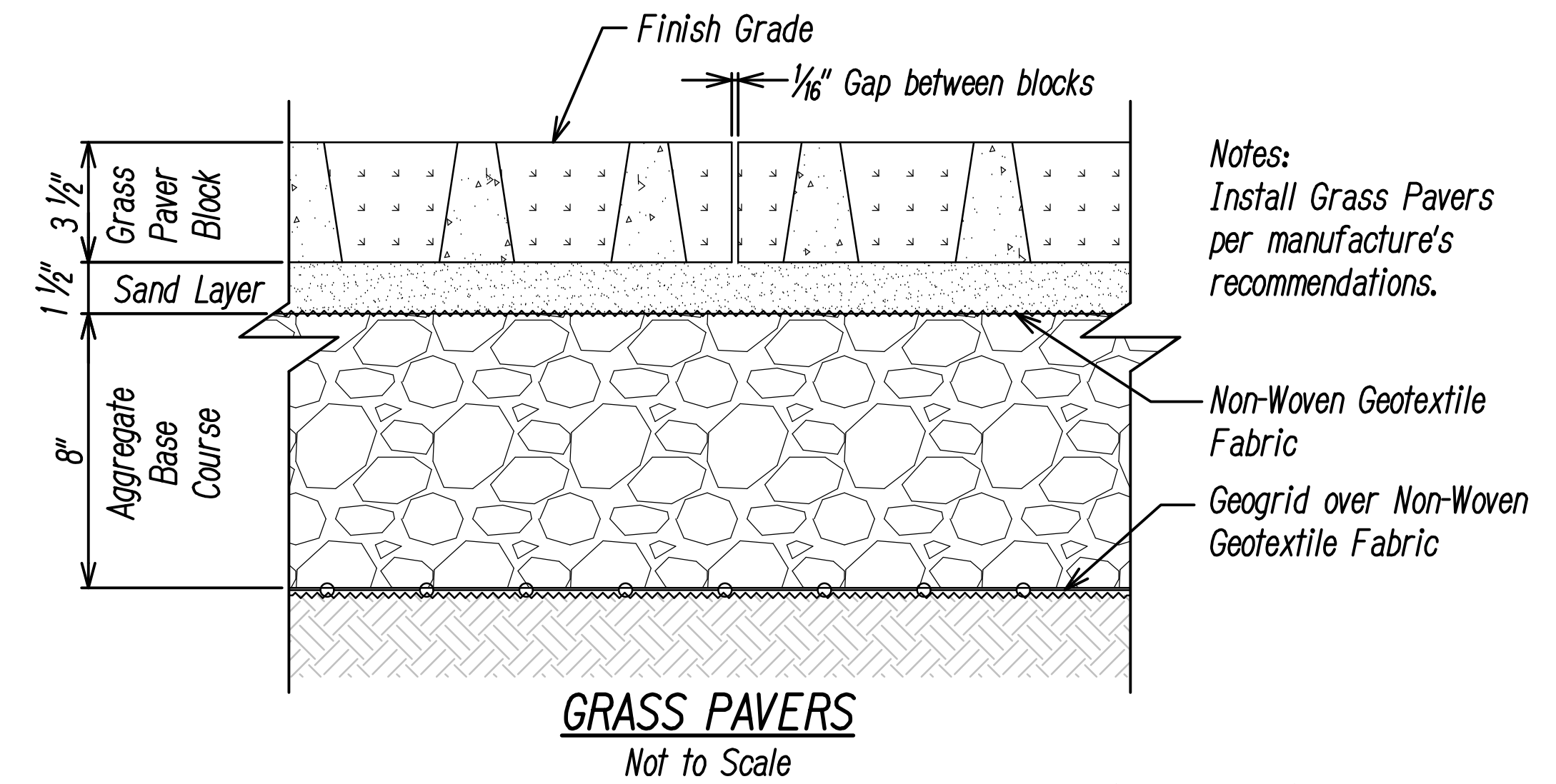
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	ADD. 40S-1	231



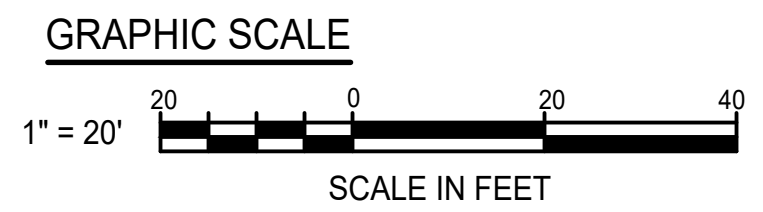
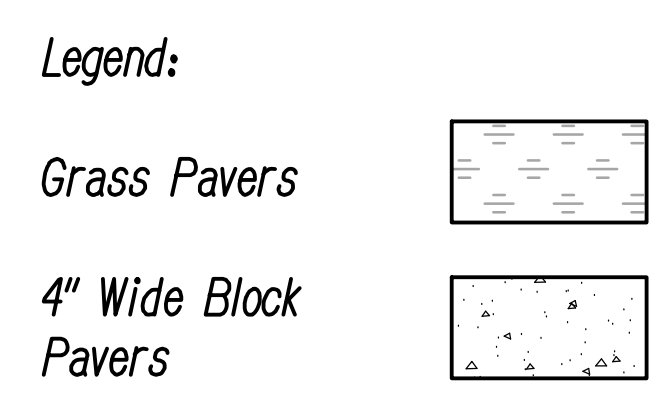
PLAN
Scale: 1"=20'



GRASS PAVER STALL DETAIL
N.T.S.



GRASS PAVERS
Not to Scale



Dexter S. Eji
LICENSED PROFESSIONAL ENGINEER
No. 4739-C
HAWAII, U.S.A.

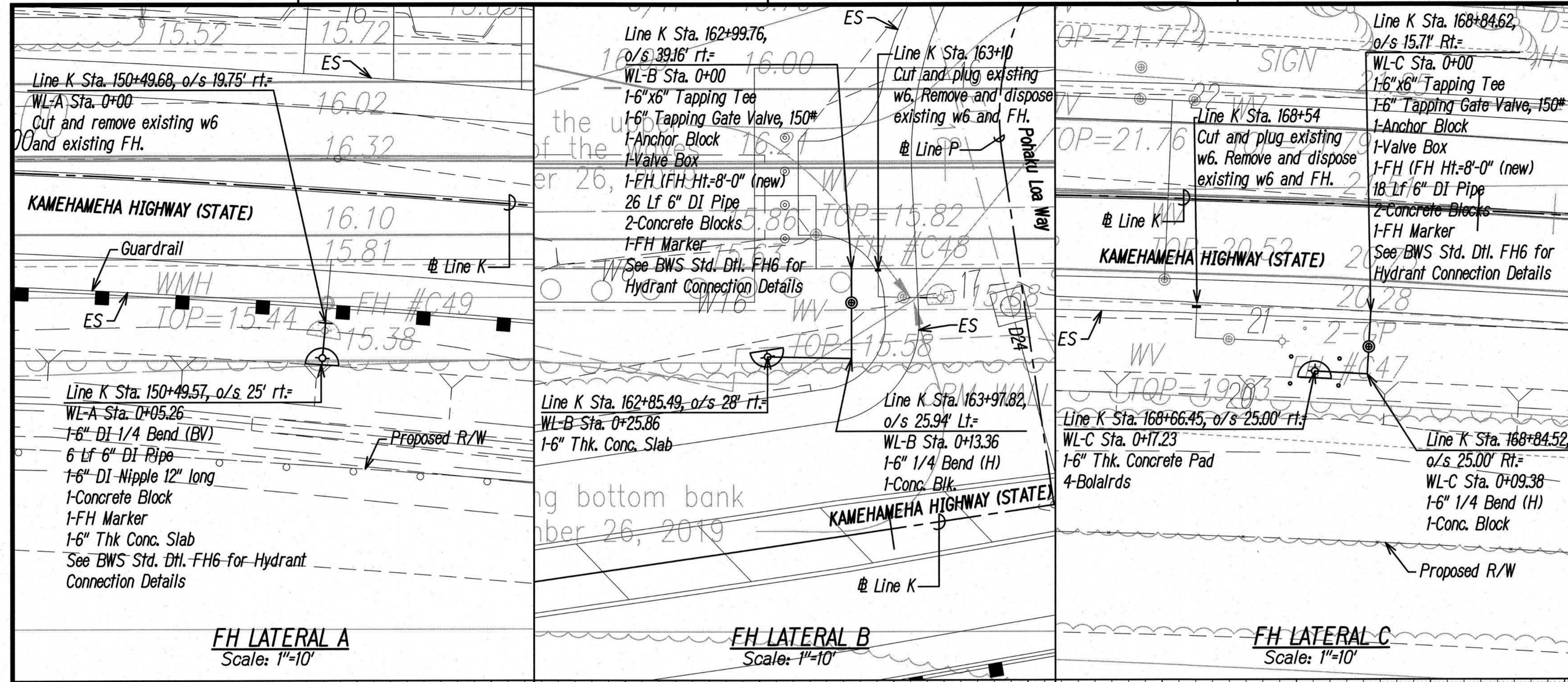
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Signature: *Dexter S. Eji*
EXPIRATION DATE OF THE LICENSE: 04/30/24

9/1/23	▲	Addendum 2 New Sheet
DATE		REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION		
GRASS PAVER PLAN		
KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS Vicinity of Laniakea Beach (MP 3.06 to MP 3.54) Project No. 83B-01-09		
Scale: 1"=20'	Date: December 2022	
SHEET No. C-7A OF 32 SHEETS		

DATE	
DESIGNED BY	
DRAWN BY	
CHECKED BY	
NOTED BY	
NO.	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	42	231



6" Transition Coupling

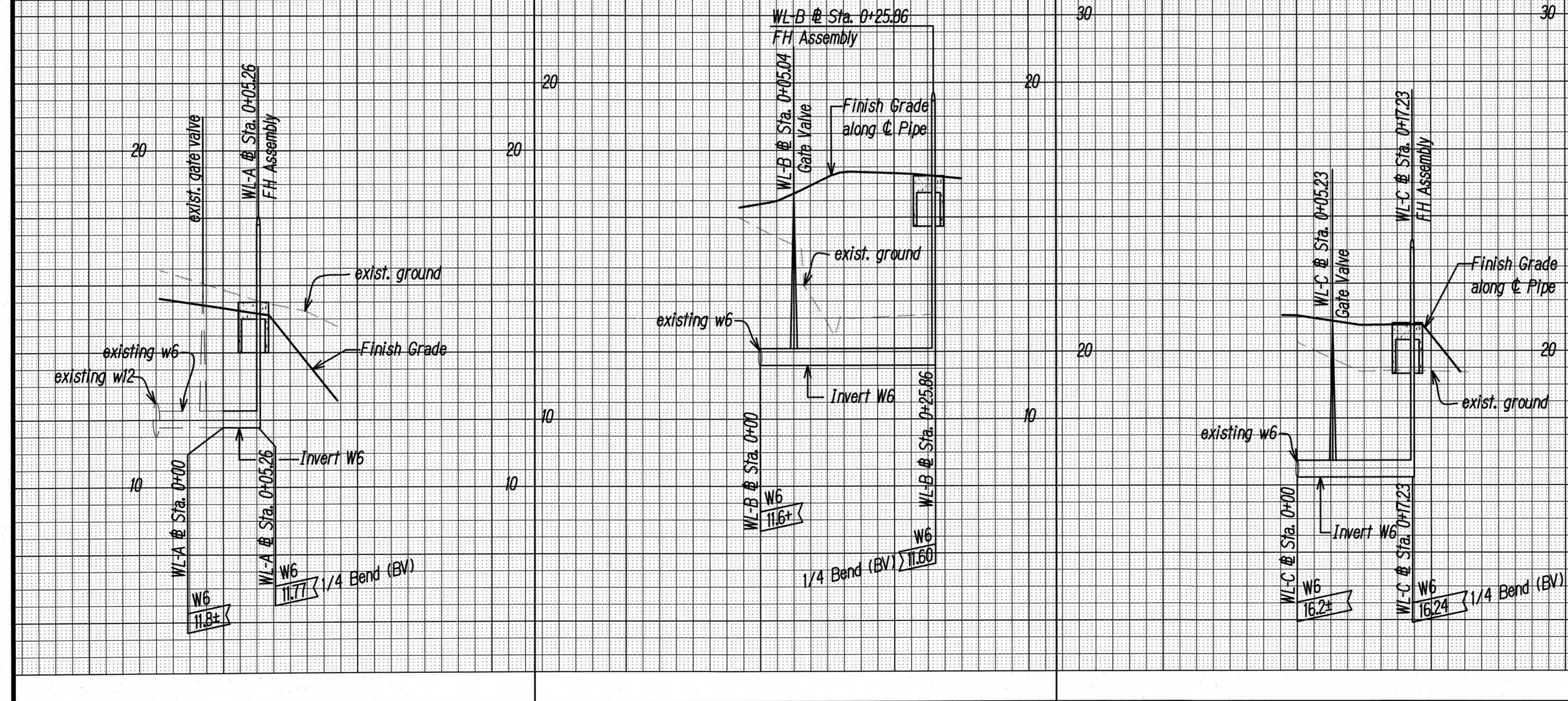
Exist. W6" Cast Iron

6" Pipe

WL-A Sta. 0+00

Temporary for Testing:
 2-6" Cap Tapped for 2 1/2" IPT
 2-2 1/2" Cleanout
 2-Concrete Blocks

Approved: *[Signature]* 2/1/2023
 Date
 FOR Manager and Chief Engineer, BWS*
 (For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)



GRAPHIC SCALE

HORIZ. 1" = 10'

SCALE IN FEET

VERT. 1" = 2'

SCALE IN FEET

9/1/23	REVISION
DATE	ADDENDUM 2 BWS SIGNATURE

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

**PLAN AND PROFILE
 FH LATERAL A, B, & C**

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

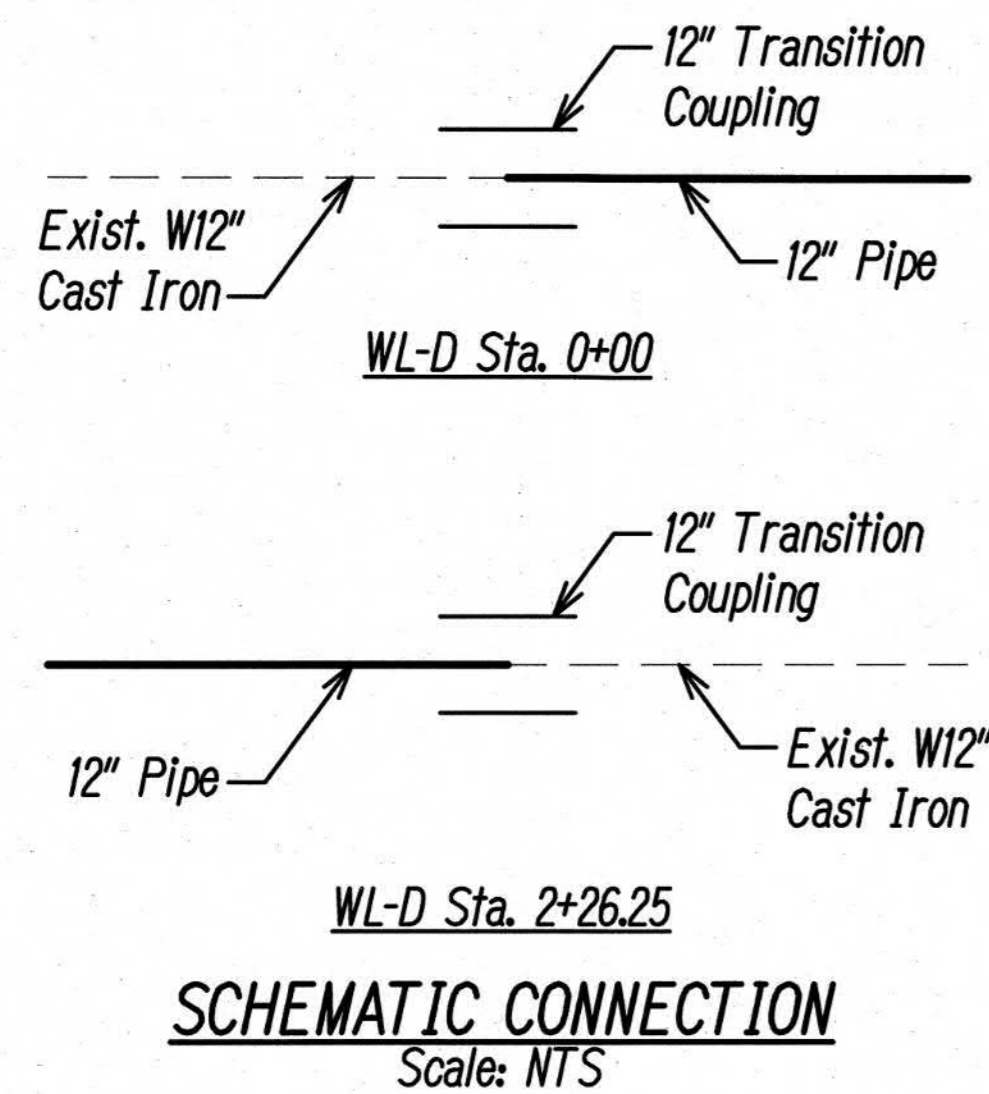
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SHEET No. C-9 OF 32 SHEETS

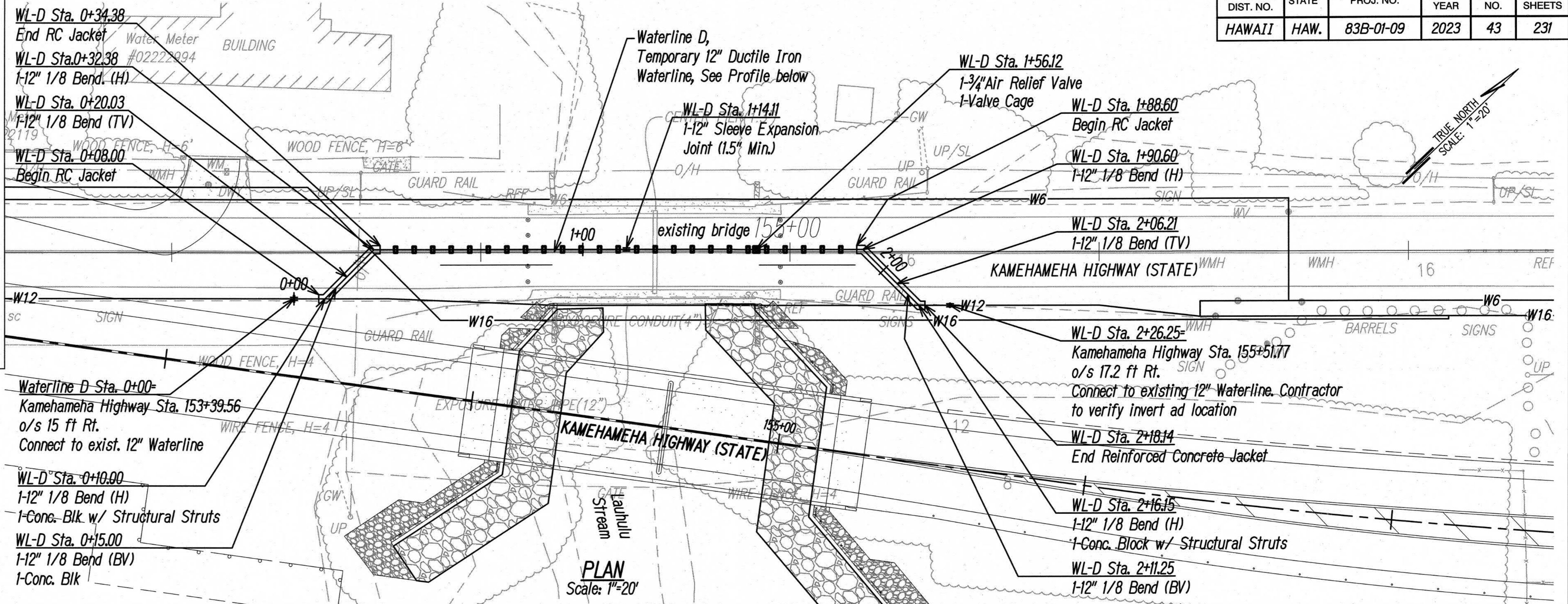
ADD. 42

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	43	231

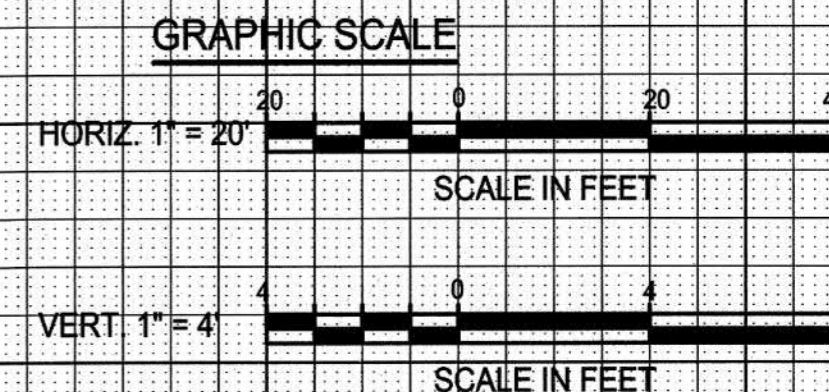
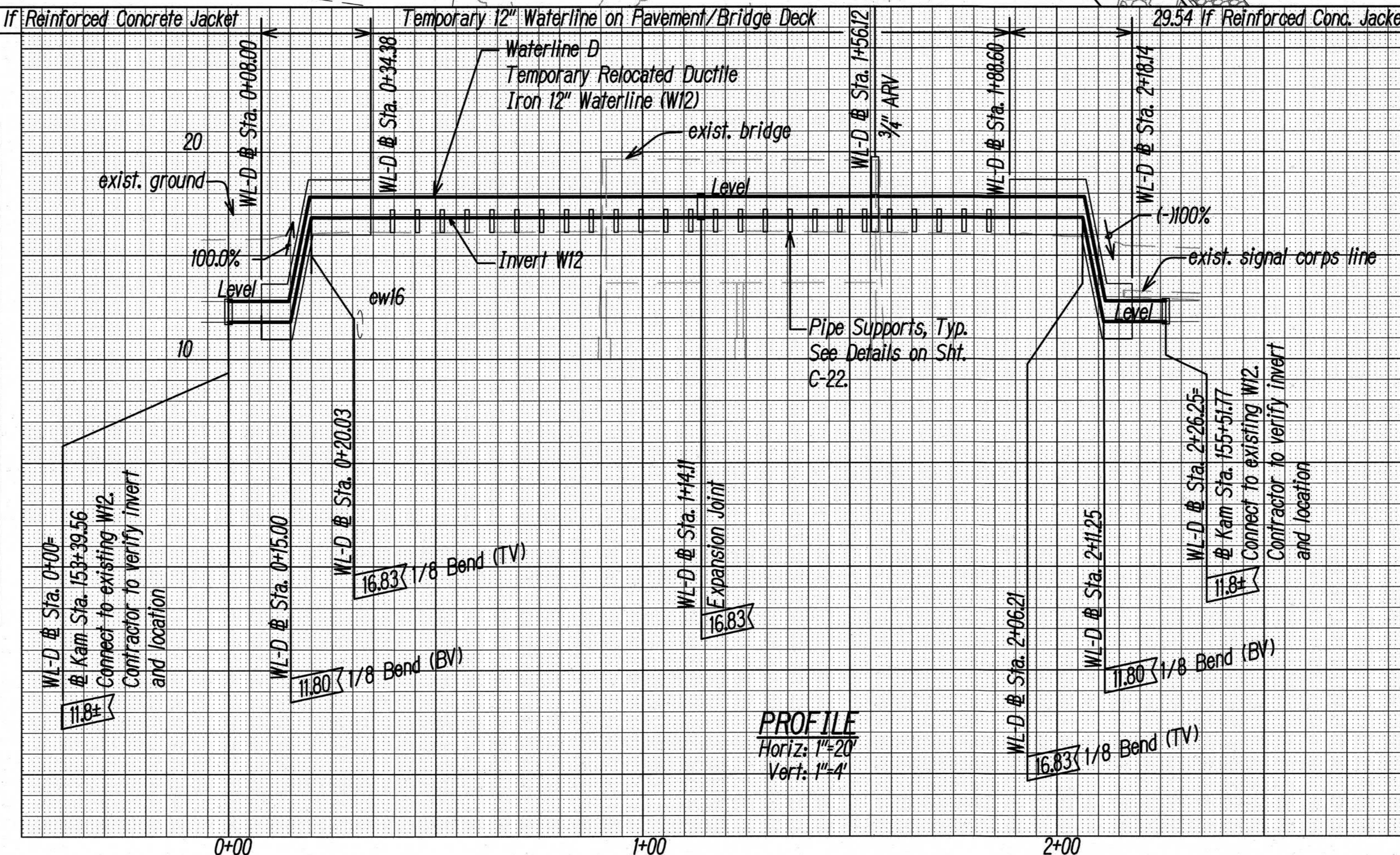


- Materials for Connection:**
 1-12" Sleeves, 2' Long
 2-10' LF of 12" Pipe
 2-12" Transition Couplings, 2' Long
- Temporary for Testing:**
 2-12" Cap Tapped for 4" IPT
 2-4" Cleanout
 2-Concrete Block

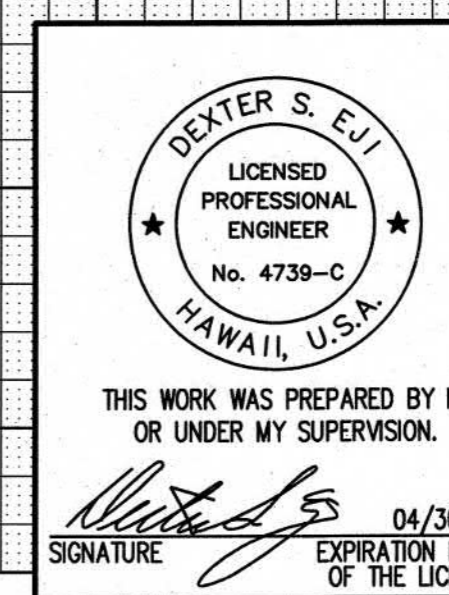


Temporary 12" Waterline D	TC Plan
1. Construct temporary 12-inch Waterline D except for tie ins to exist. 12W	Phase 2C
2. Turn Off Exist. W12 at valves for construction.	
3. Connect temporary 12-inch Waterline D to exist. W12	
4. Turn on exist. valves	
5. Remove existing wingwall.	
6. Construct new Wingwalls	
7. Replace fill behind new wingwalls	
8. Turn off temp. 12-inch Waterline D at Valves for connection	
9. Connect exist. W12 to exist W12 on bridge	
10. Turn on exist valves	
11. Remove temporary 12-inch Waterline D, Reinforced Concrete Jacket, Pipe Support, Air Relief Valve and enclosure.	

Note:
 Should the existing 16" WL be found to not have a concrete encasement as shown on the structural drawings, Contractor shall concrete encase existing 16" WL between points exposed for wingwall construction on either side of the stream with jacket ending at the nearest bell joint outside of the exposed section.



Approved: *[Signature]*
 Manager and Chief Engineer, BWS*
 (For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)
 Date: 8/7/2025



9/1/23	ADDENDUM 2 BWS SIGNATURE
DATE	REVISION

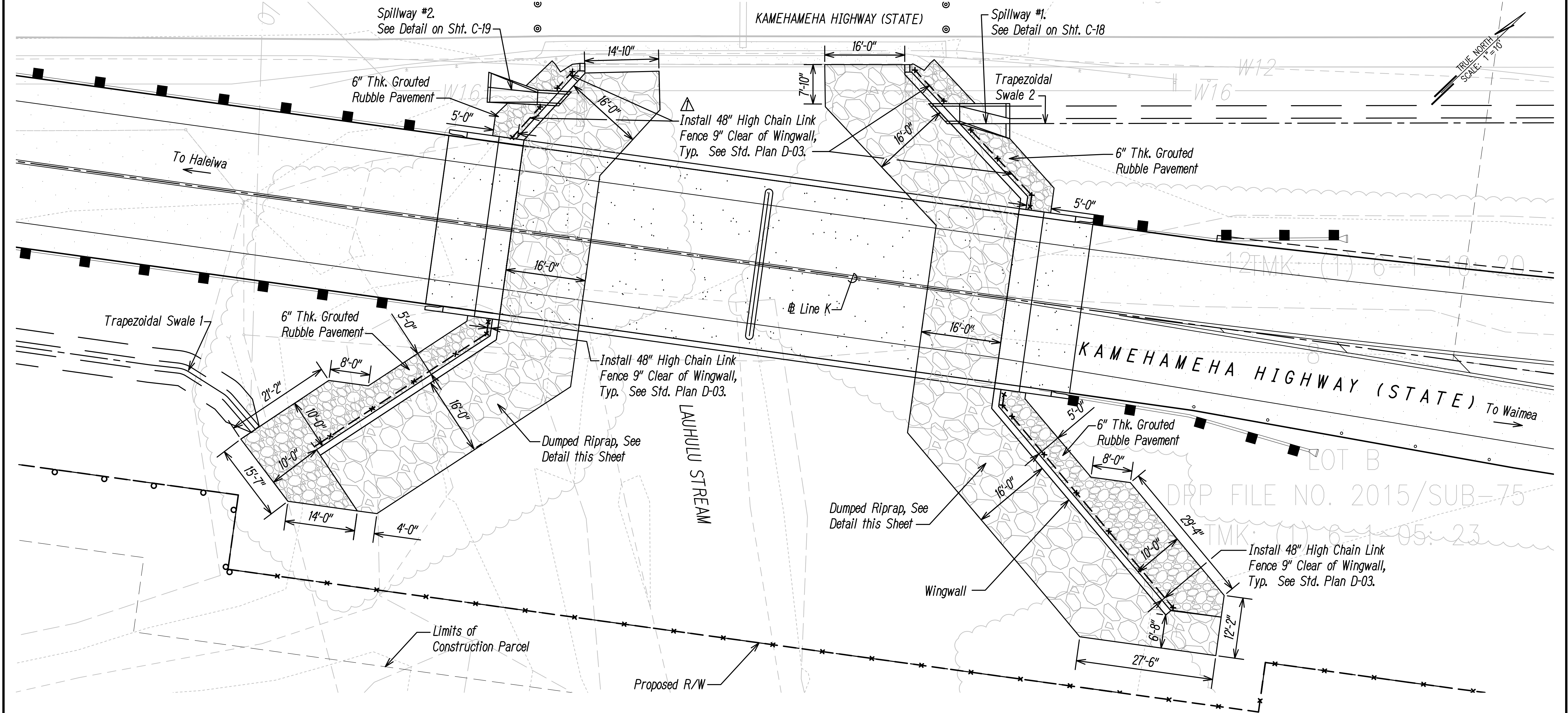
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

PLAN AND PROFILE
TEMPORARY 12" WATERLINE
 KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

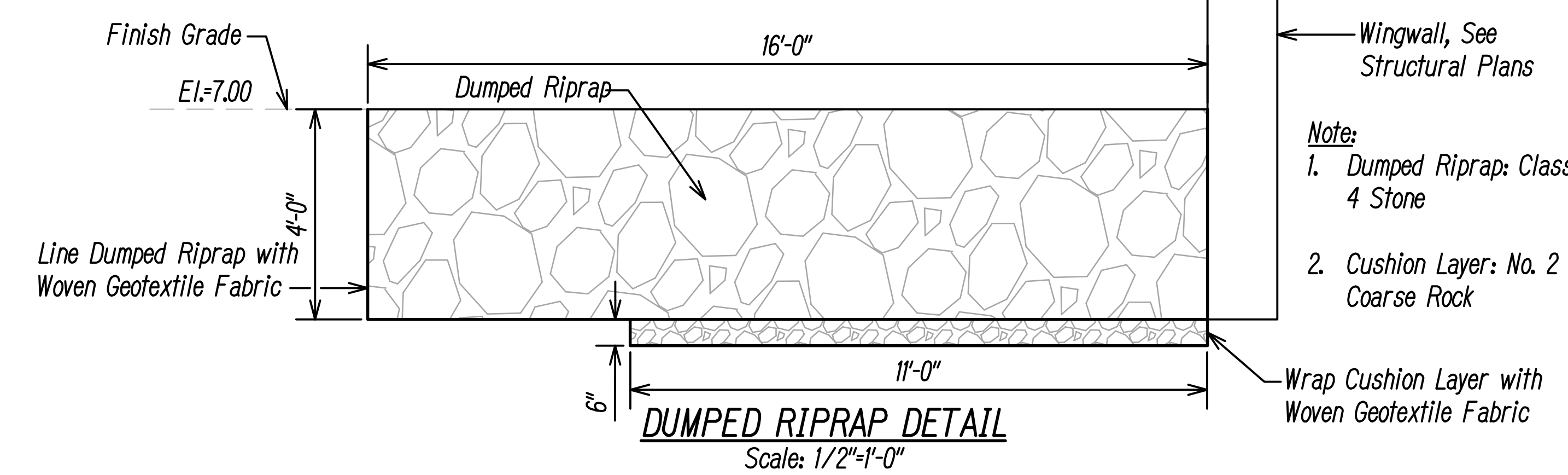
Scale: As Shown Date: December 2022
 SHEET No. C-10 OF 32 SHEETS

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	50	231

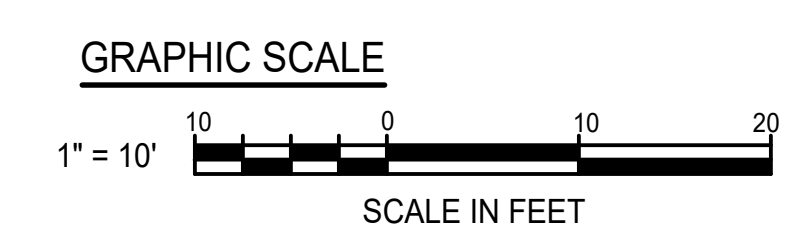


PLAN - DUMPED RIPRAP
Scale: 1"=10'

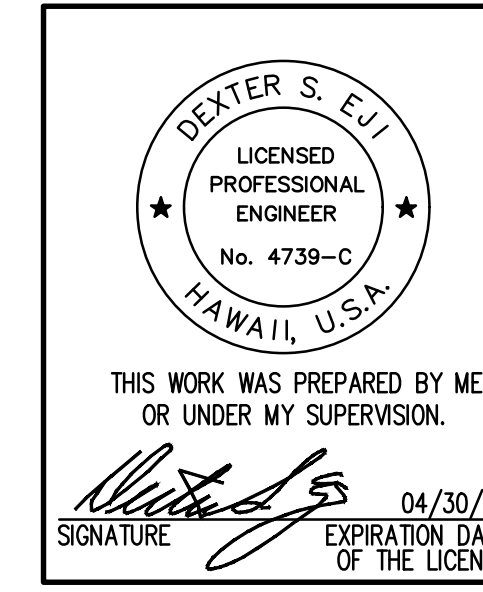


DUMPED RIPRAP DETAIL
Scale: 1/2"=1'-0"

- Note:
1. Dumped Riprap: Class 4 Stone
 2. Cushion Layer: No. 2 Coarse Rock



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



9/1/23	▲ Addendum 2 Revise CLF Callout
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

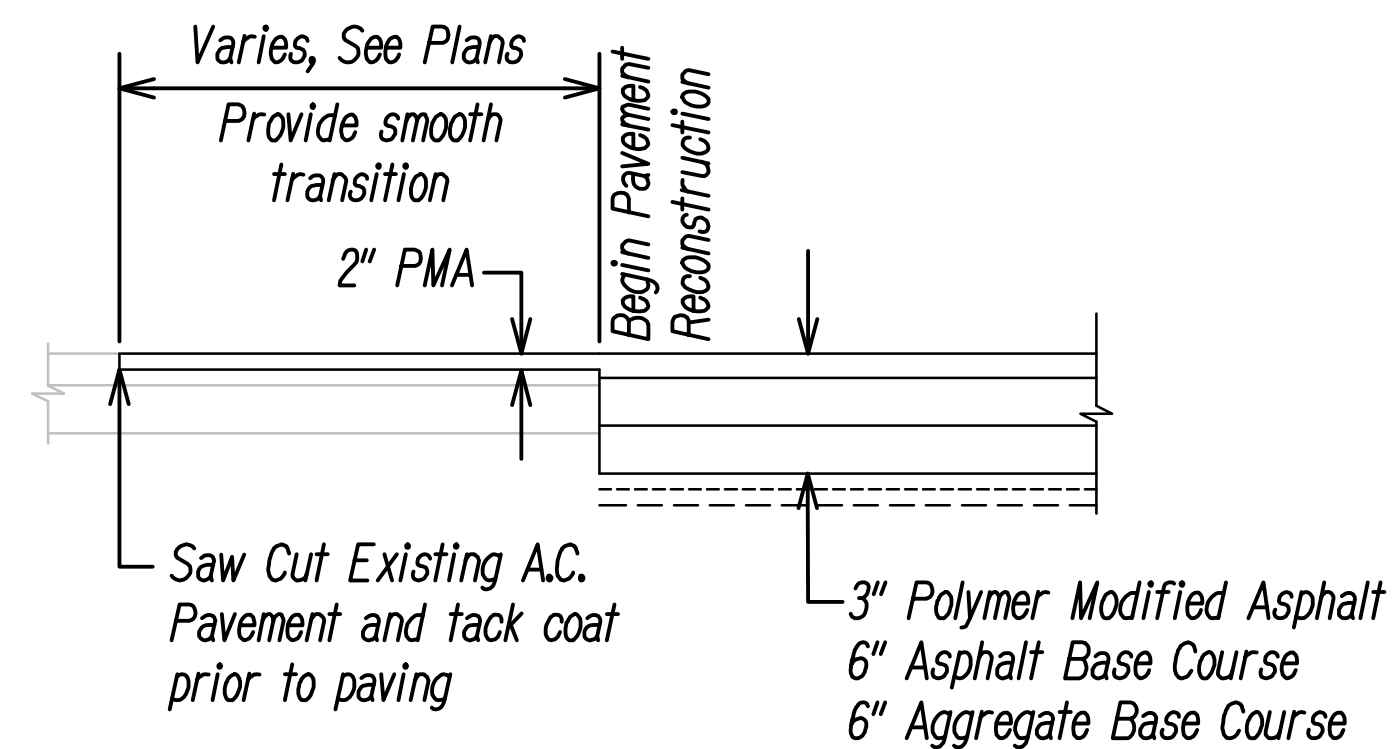
PLAN - DUMPED RIPRAP

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)
Project No. 83B-01-09

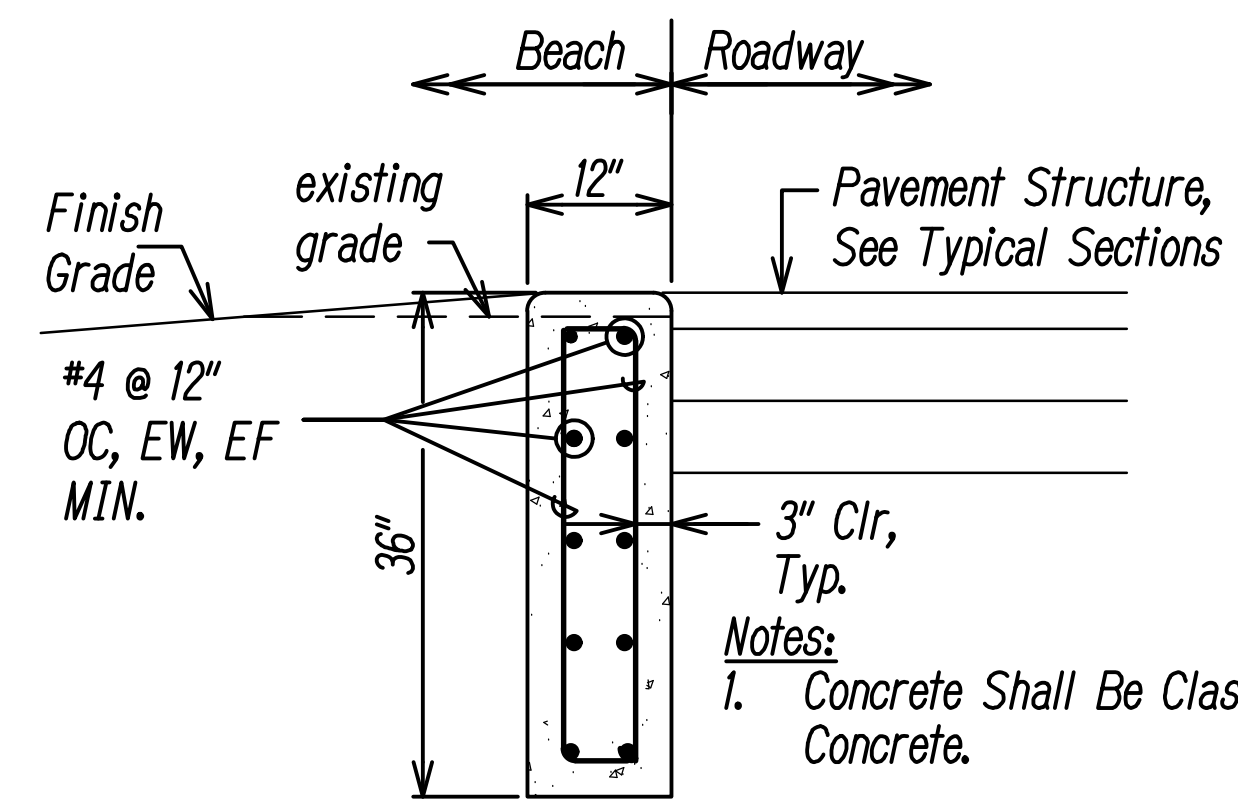
Scale: 1"=10' Date: December 2022

SHEET No. C-17 OF 32 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	53	231

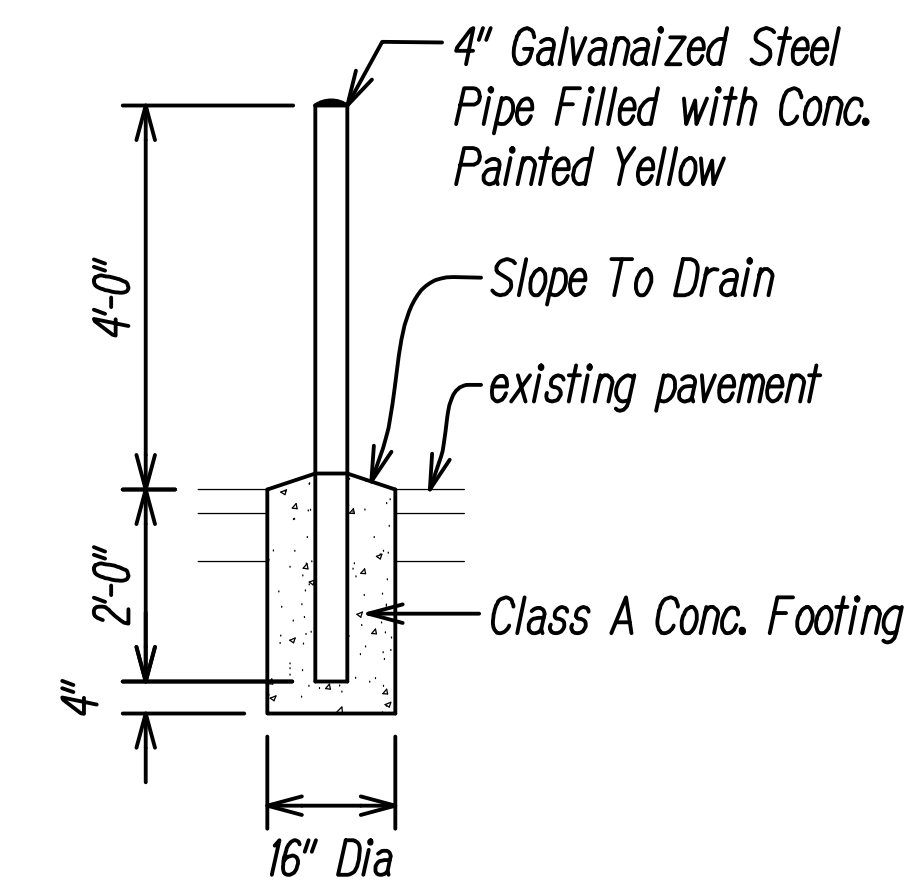


PAVEMENT TRANSITION DETAIL
Not to Scale

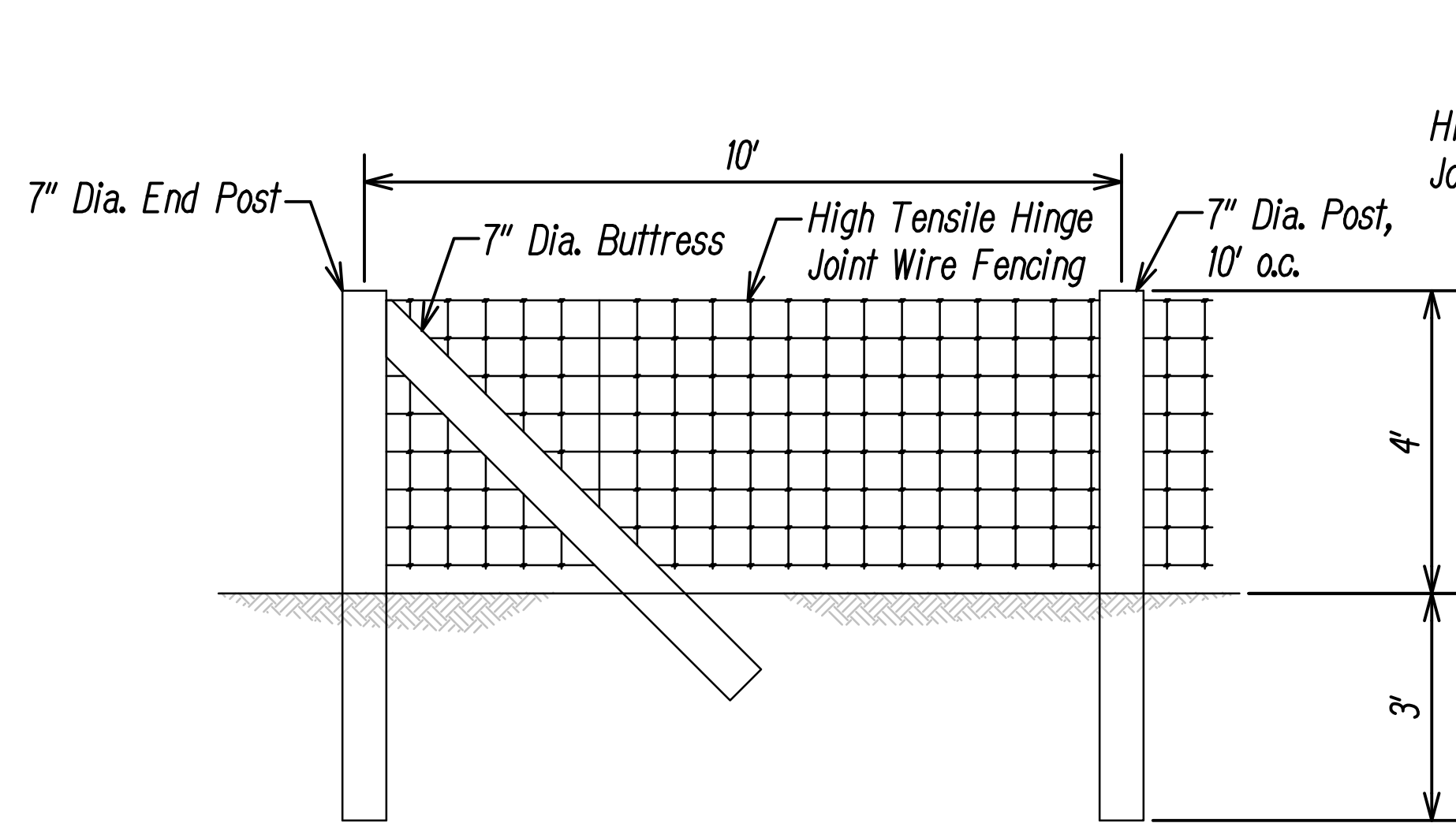


- Notes:**
1. Concrete Shall Be Class A Concrete.
2. All Exposed Corners shall Be Chamfered 3/4" x 3/4".

CUT-OFF WALL DETAIL
Scale 3/16"=1'-0"

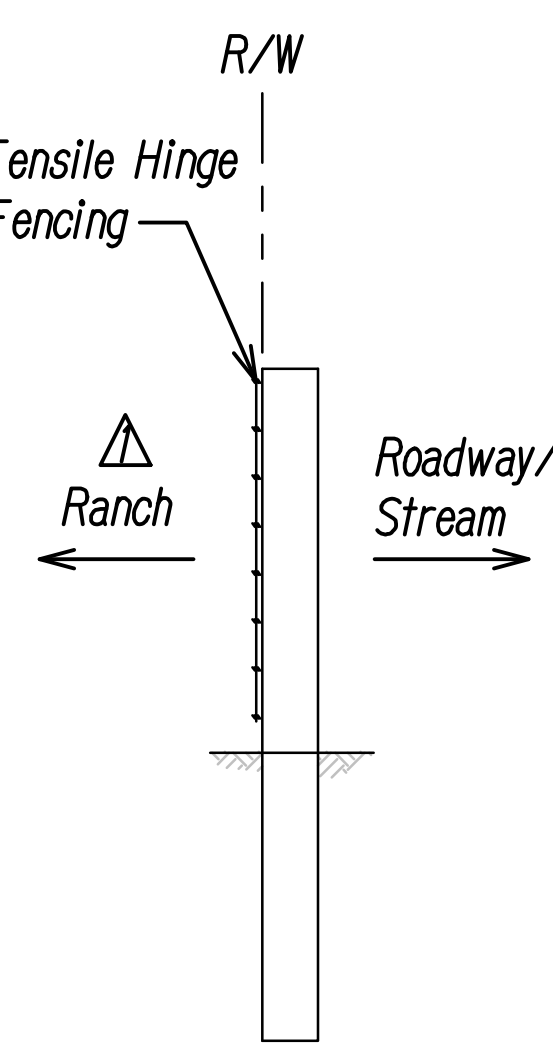


BOLLARD DETAIL
SCALE: 1/2"=1'-0"

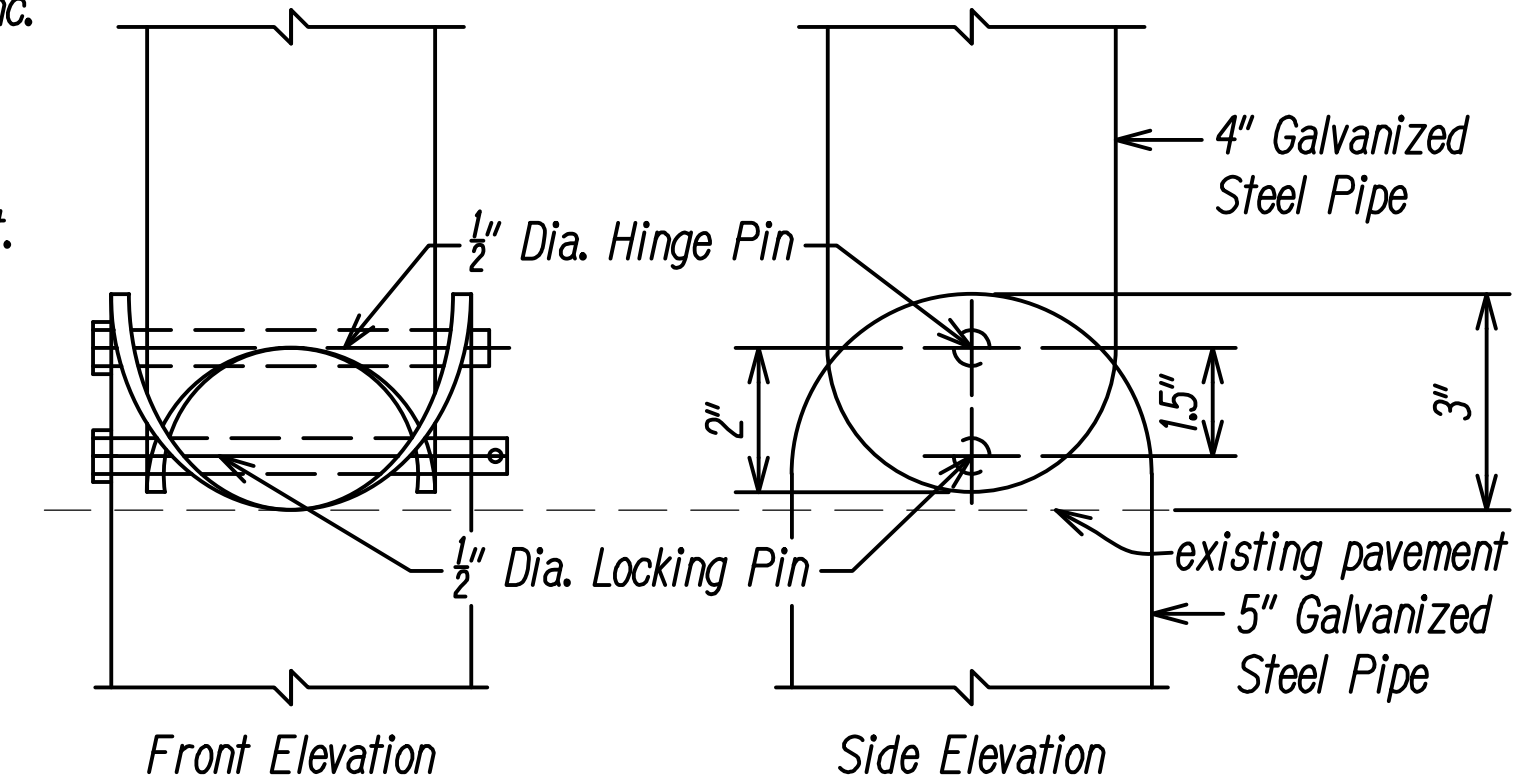
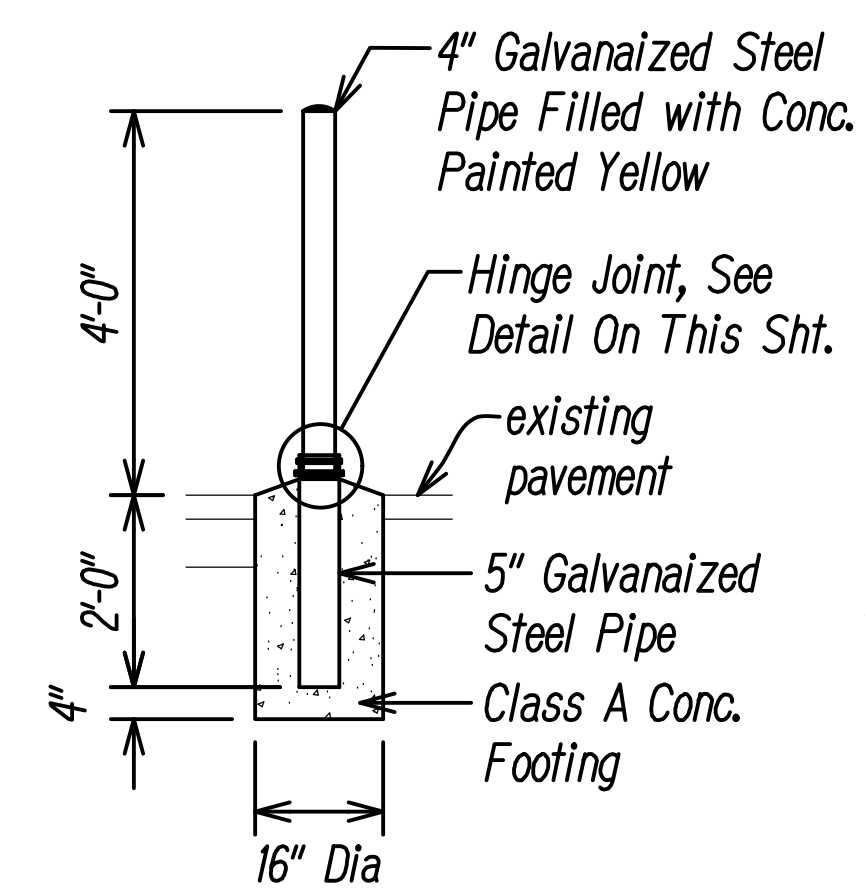


ELEVATION

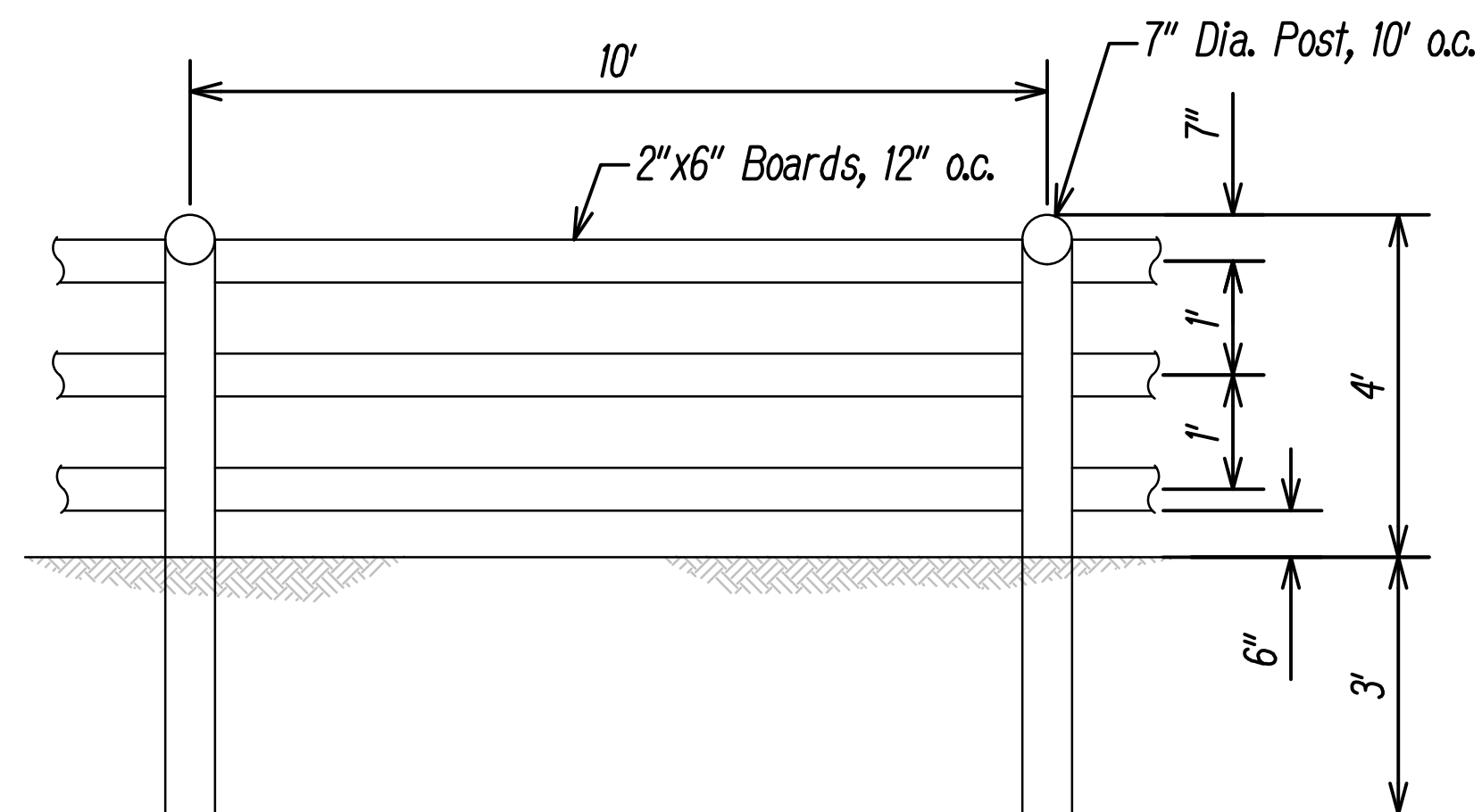
HIGH TENSILE HINGE JOINT FENCE DETAIL
Scale: 1"=2'



SECTION

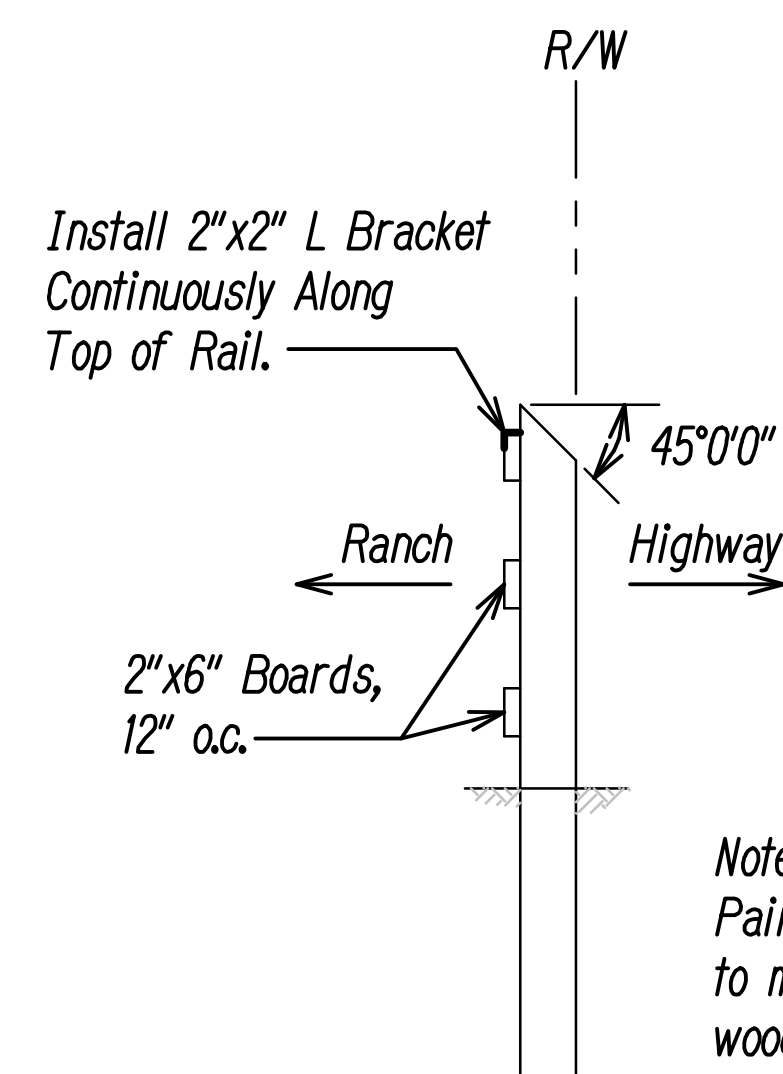


HINGE JOINT DETAIL
FOLDING BOLLARD DETAIL
SCALE: 1/2"=1'-0"



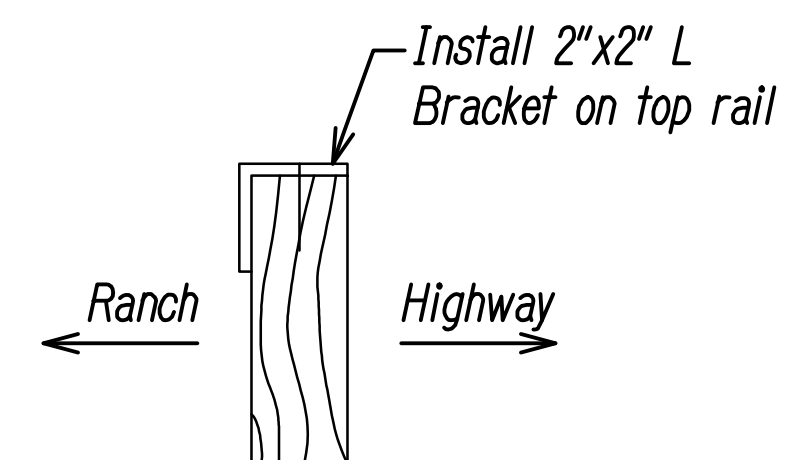
ELEVATION

WOODEN FENCE DETAIL
Scale: 1"=2'



SECTION

Note:
Paint fence white to match existing wood fence.



PLANK DETAIL

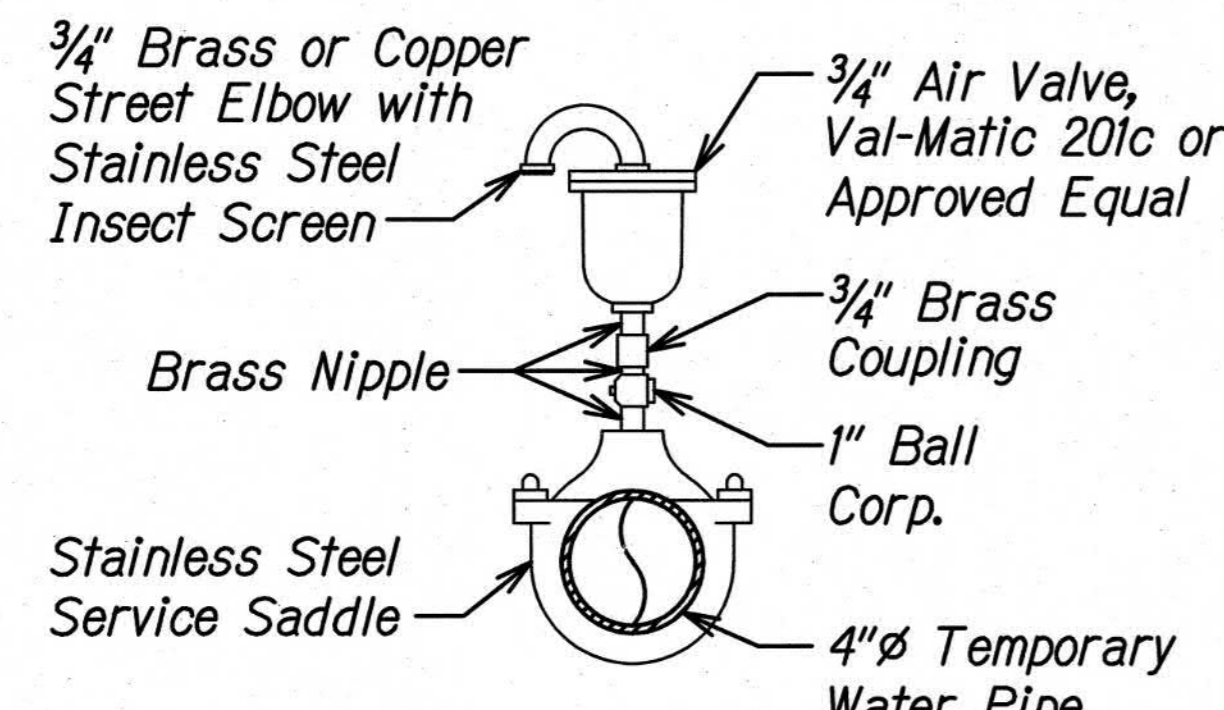
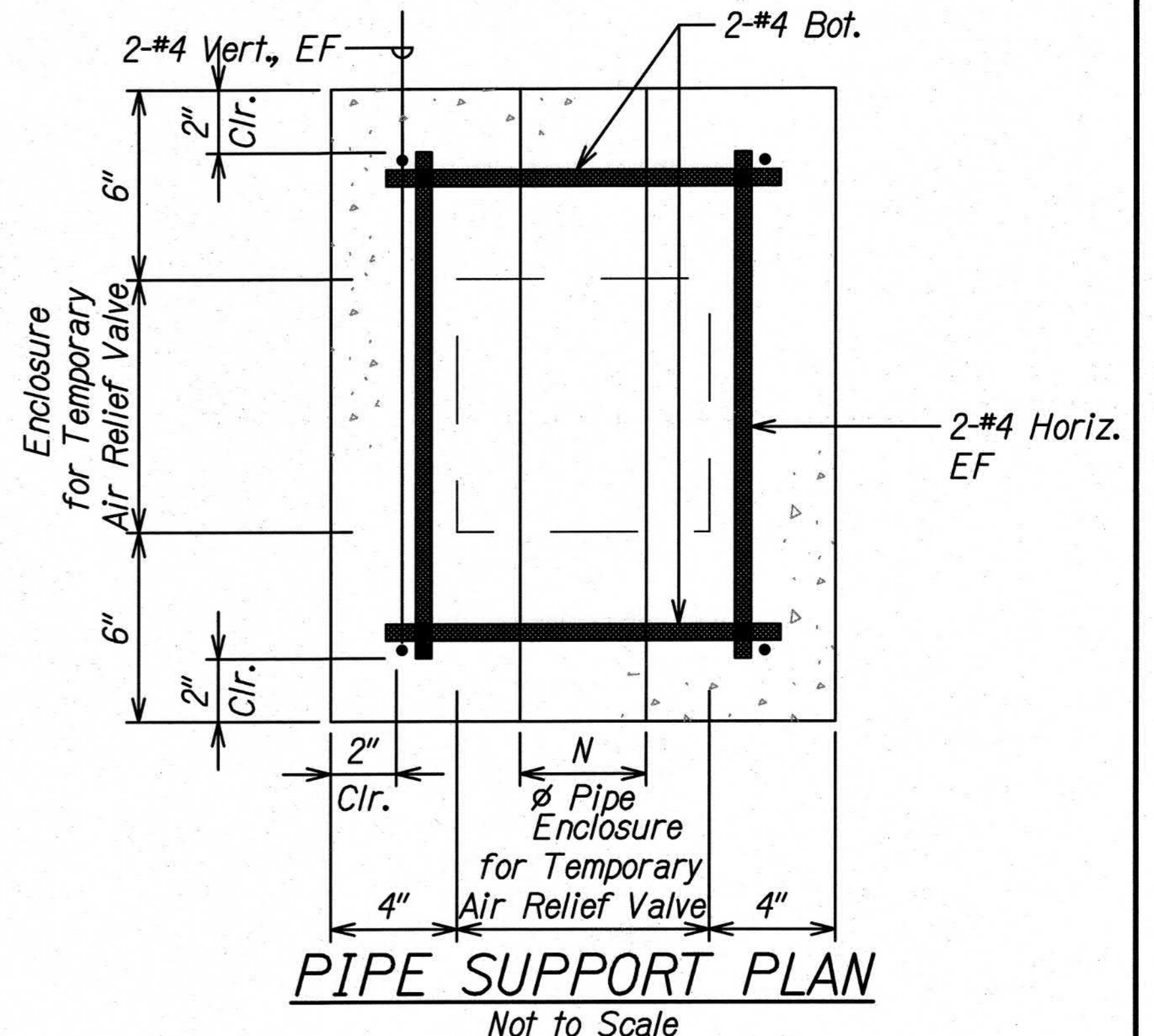
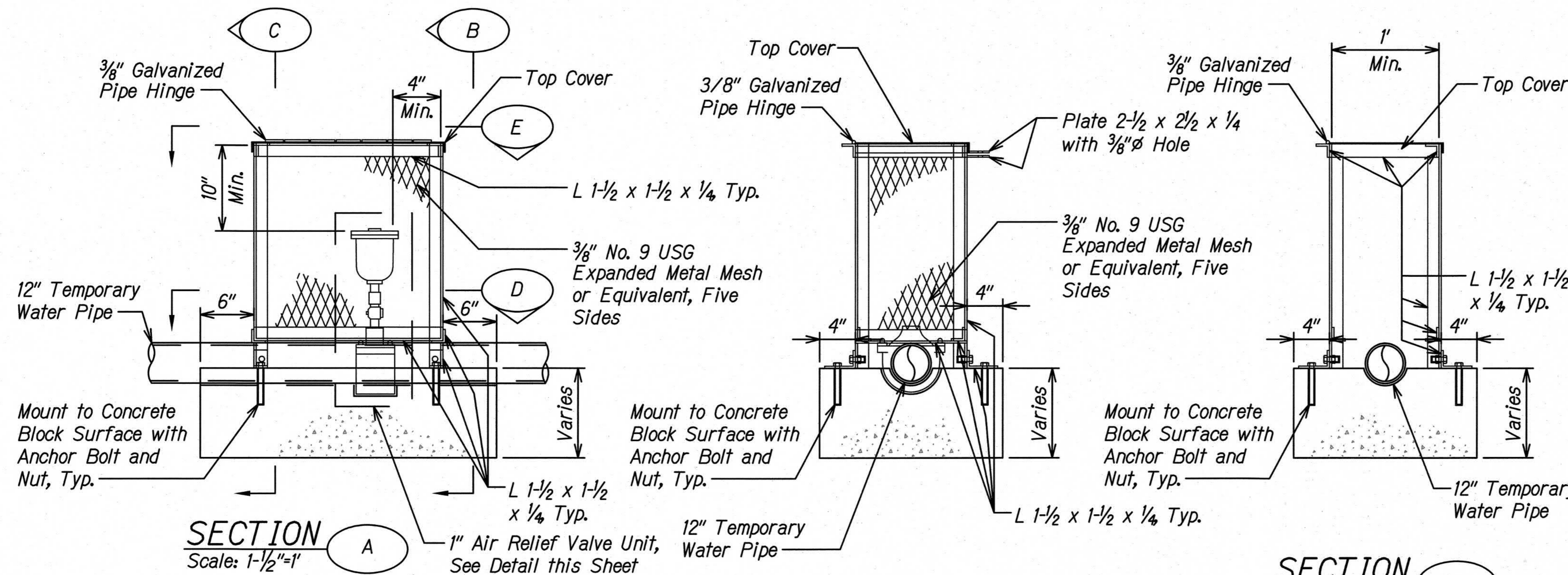
DATE	_____
STAFFS PROVIDED BY	_____
PLANS BY	_____
TRACED BY	_____
DESIGNED BY	_____
QUANTITIES BY	_____
CHECKED BY	_____
ORIGINAL PLAN NO.	_____
NOTE BOOK	_____
No.	_____

9/1/23	ADDENDUM 2 Revised Fence Detail
DATE	REVISION

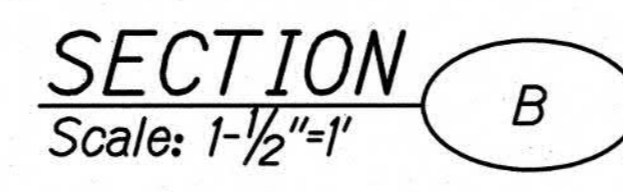
DEXTER S. EJI
LICENSED PROFESSIONAL ENGINEER
No. 4739-C
HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
SIGNATURE: *Dexter S. Eji*
EXPIRATION DATE OF THE LICENSE: 04/30/24

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MISCELLANEOUS DETAILS
KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)
Project No. 83B-01-09
Scale: As Shown
Date: December 2022

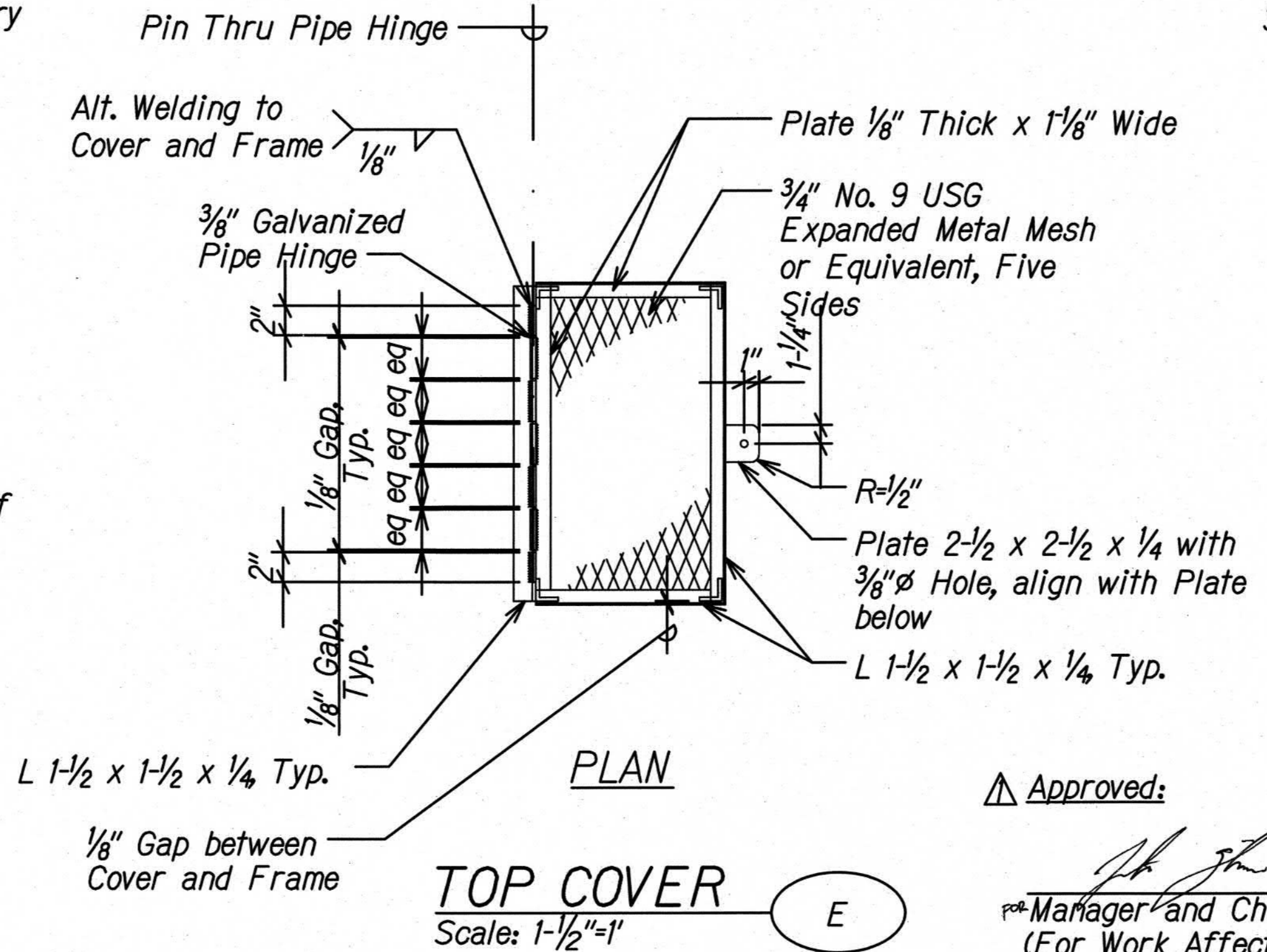
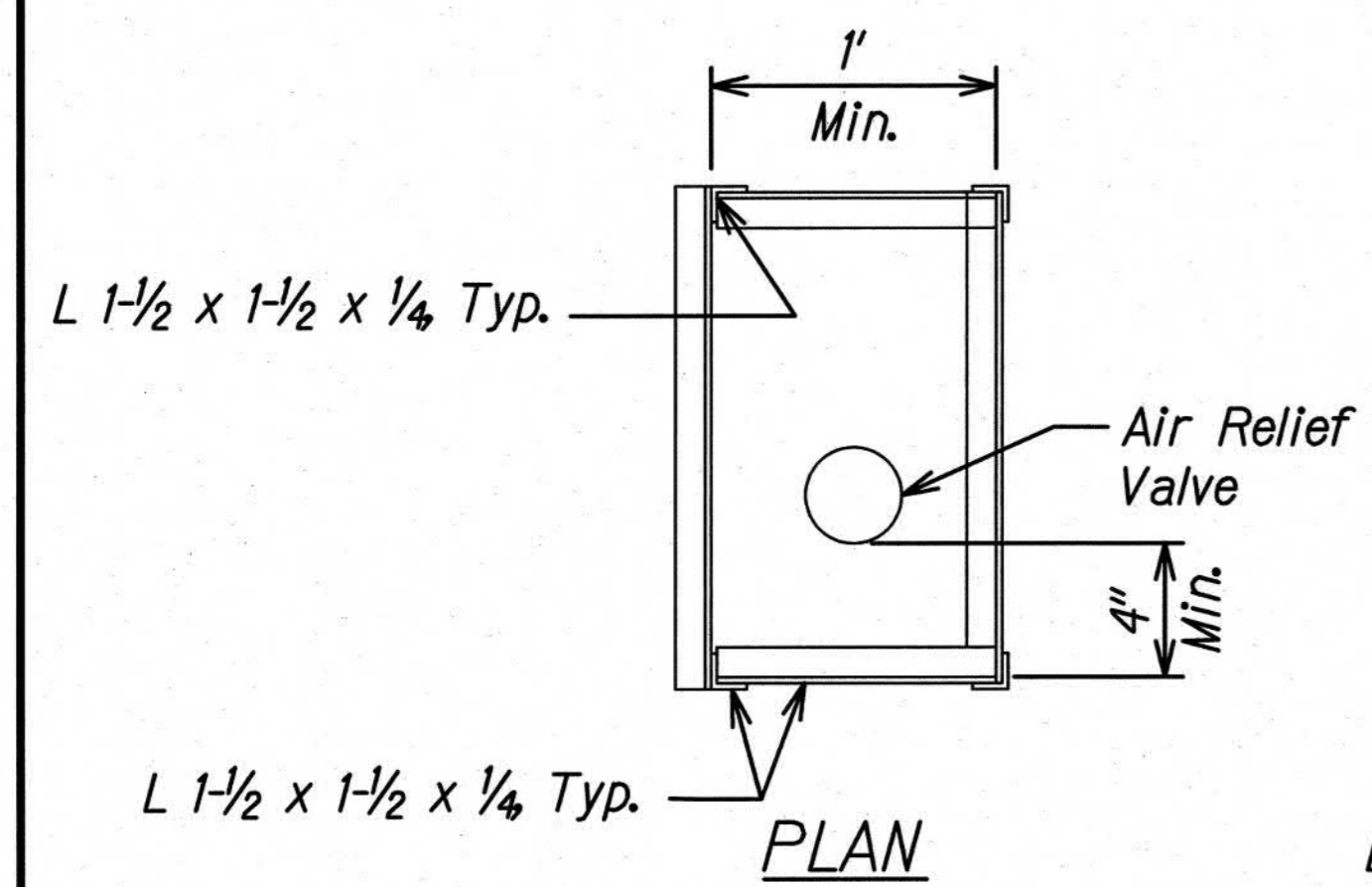
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	54	231



3/4" AIR RELIEF VALVE UNIT DETAIL
Not to Scale



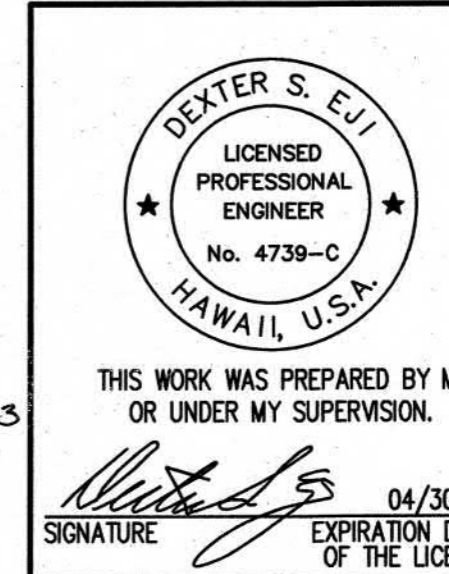
- NOTES:**
- All angle connections shall be 3/16" fillet welds unless noted otherwise.
 - Expanded metal mesh shall be welded to inside edges of angles then hot-dip galvanize entire enclosure.
 - Pin thru pipe hinge shall be inserted and welded to exterior 2" pipes after hot-dip galvanizing enclosure and cover. Apply zinc-rich paint to welded area.



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

Approved: _____
 Date: 8/7/2023
 Manager and Chief Engineer, BWS
 (For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)

9/1/23	ADDENDUM 2 BWS SIGNATURE
DATE	REVISION



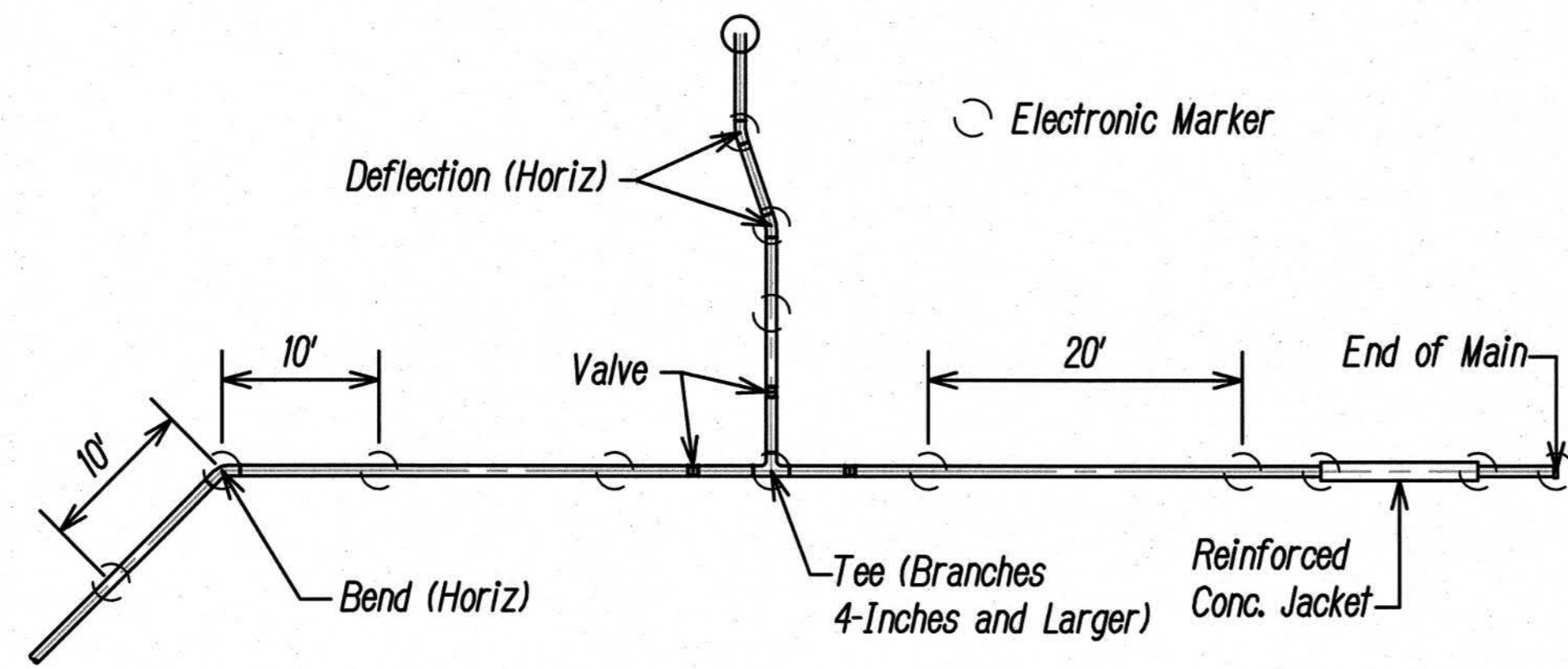
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

TEMPORARY AIR RELIEF VALVE ENCLOSURE DETAILS

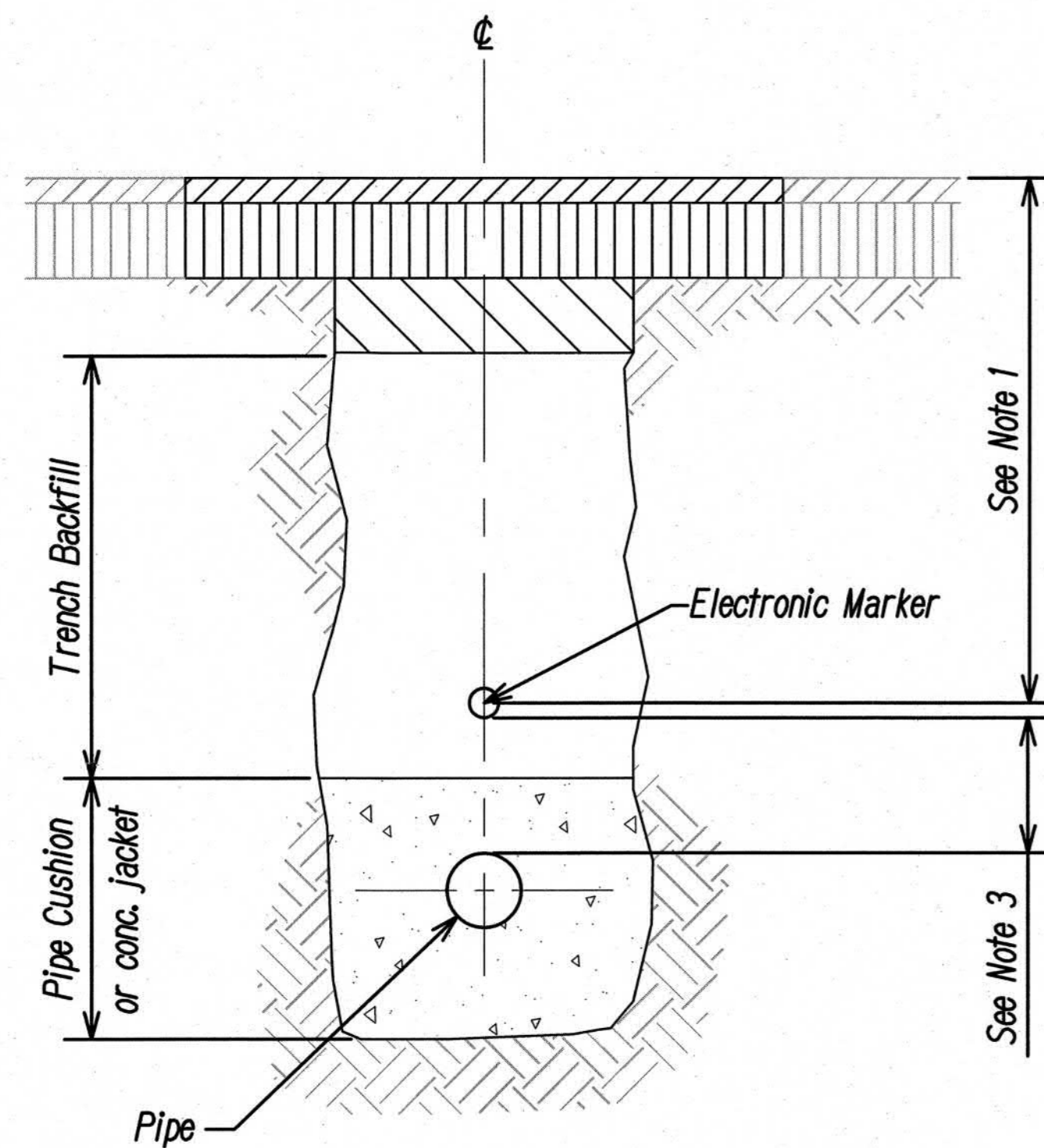
KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

Scale: As Shown Date: December 2022

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	55	231



PLAN VIEW

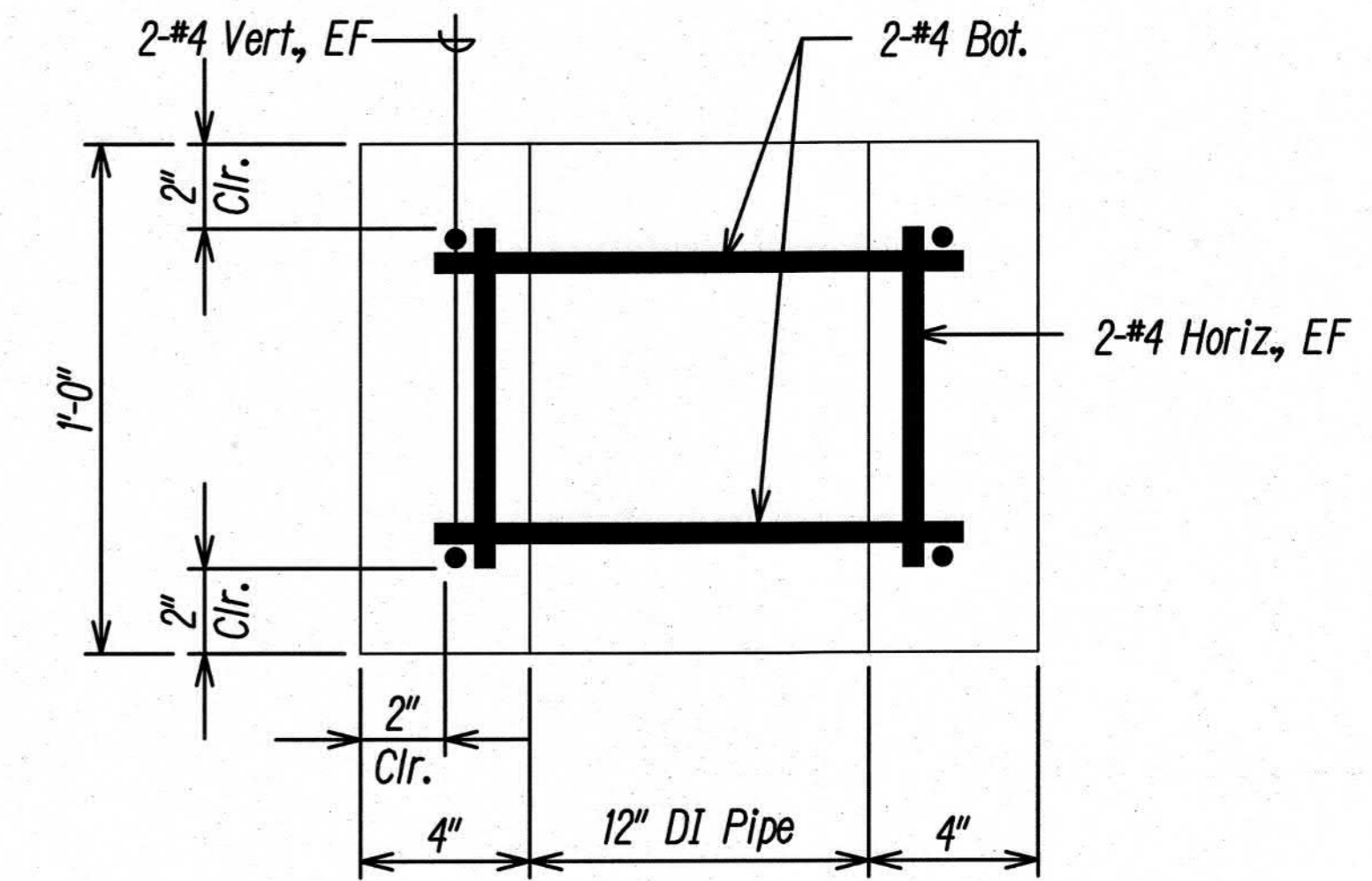


SECTION VIEW

TYPICAL ELECTRONIC MARKER INSTALLATION

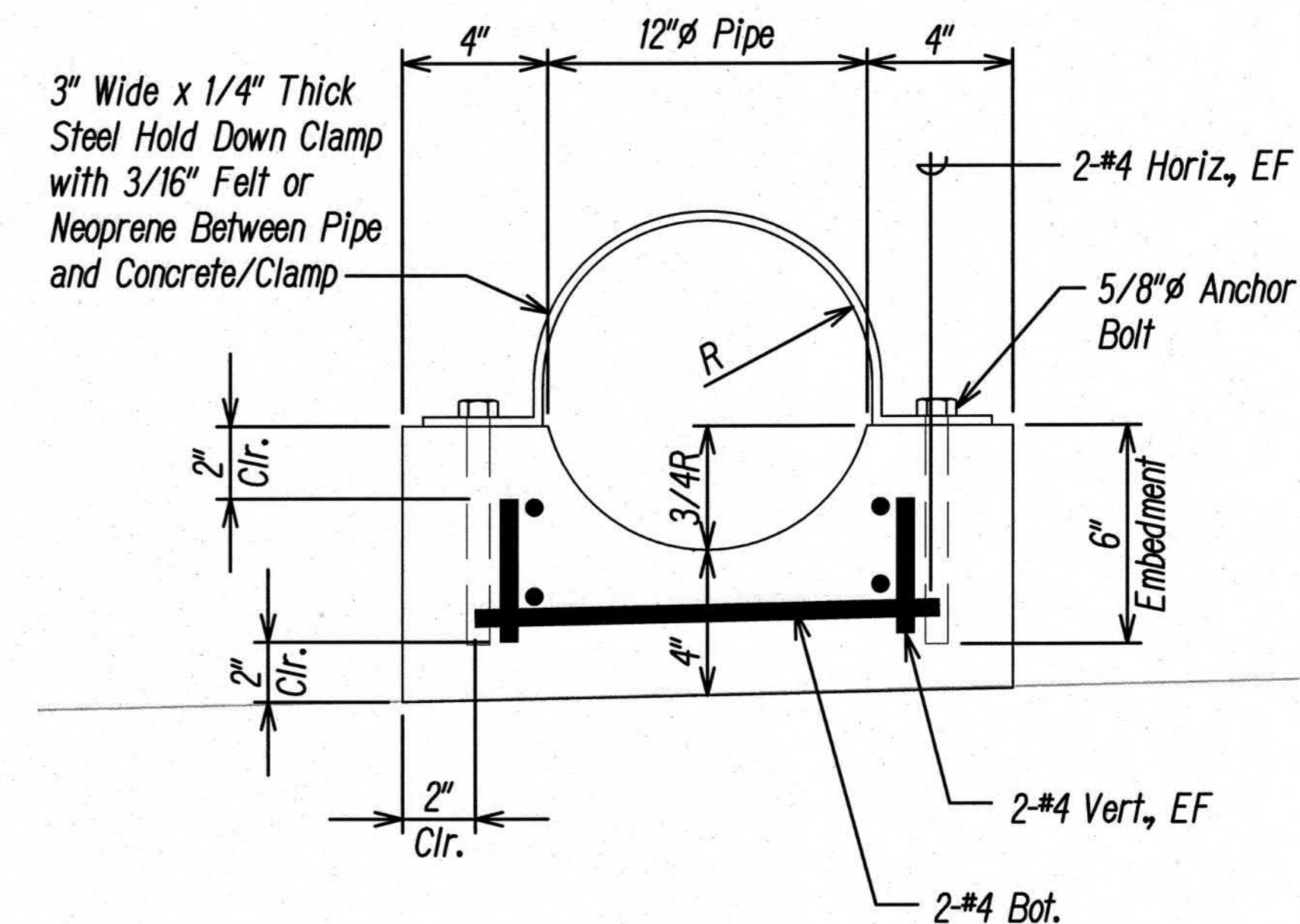
Not to Scale

- Note:
1. Install electronic marker over centerline of pipe at a minimum depth of 2 feet and a maximum depth of 3 feet from finish grade.
 2. Install trench backfill and pipe cushion material in accordance to the plans and specifications.
 3. Install electronic marker at a minimum clearance of 6-inches above the pipe or concrete jacket.



PIPE SUPPORT PLAN

Scale: 3" = 1'-0"



PIPE SUPPORT SECTION

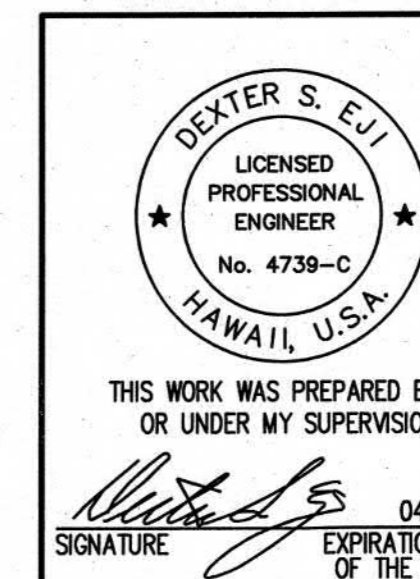
Scale: 3" = 1'-0"

DATE	
SURVEY PLOTTED BY	
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NOTE BOOK	
No.	

Approved:

[Signature]
 Manager and Chief Engineer, BWS*
 (For Work Affecting BWS Facilities in
 City/State R/W and BWS Easements Only)

8/7/2023
 Date



THIS WORK WAS PREPARED BY ME
 OR UNDER MY SUPERVISION.
 SIGNATURE: *[Signature]* EXPIRATION DATE OF THE LICENSE: 04/30/24

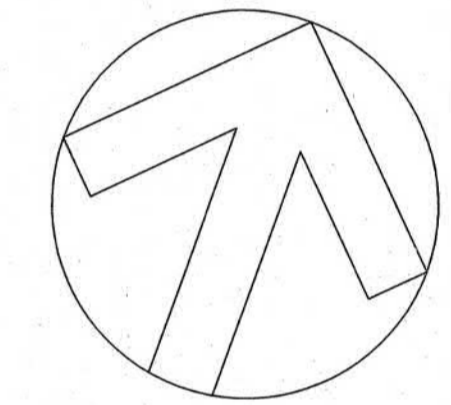
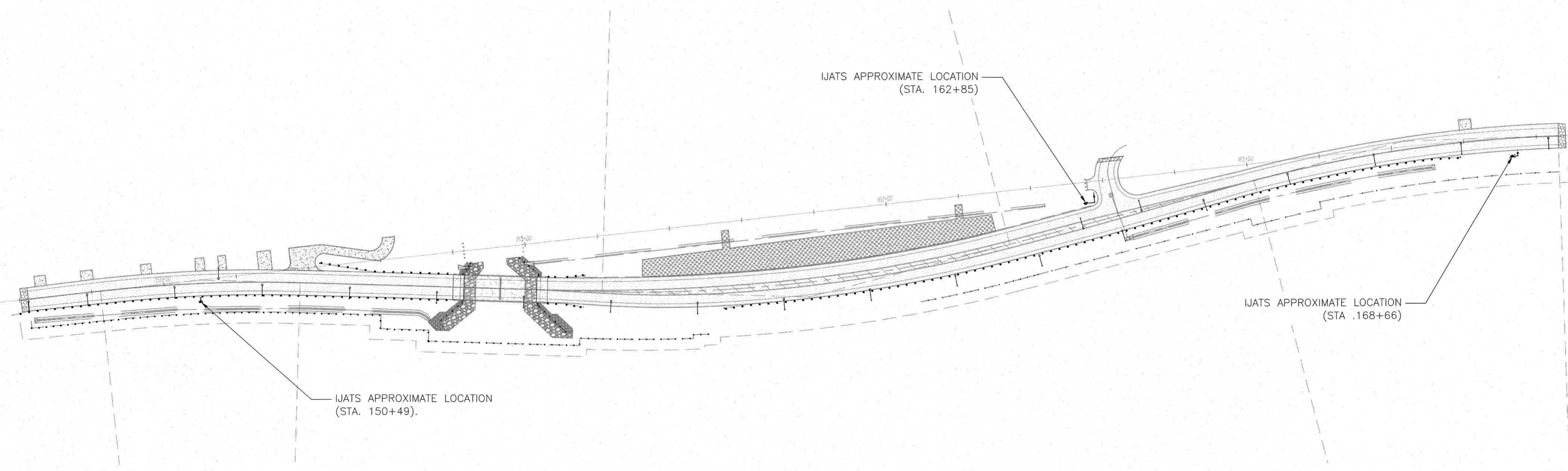
9/1/23	▲ Addendum 2 BWS Signature
DATE	REVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
PIPE SUPPORT DETAIL
 KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09
 Scale: As Shown Date: December 2022

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	56	231

NOTES:

1. ALL TEST STATIONS TO BE LOCATED BEHIND NEAREST CURB AND WITHIN 5 FT OF FIRE HYDRANT WHEN AVAILABLE.
2. ALL TEST STATIONS TO BE LOCATED IN AREAS NOT SUBJECT TO VEHICULAR TRAFFIC, SUCH AS SIDEWALKS.
3. IJTS STATIONING TAKEN FROM INSULATING JOINT.
4. ELECTRICALLY ISOLATE ALL METALLIC LATERAL PIPING (INCLUDING ARVs) FROM PROJECT PIPELINES. IF METALLIC LATERAL PIPING IS NOT PROPERLY ISOLATED FROM THE PROJECT PIPELINES, THEN THE CATHODIC PROTECTION SYSTEM COULD BE PREMATURELY DEPLETED.
5. THE CATHODIC PROTECTION SYSTEM DESIGN IS DEPENDENT ON THE DIP HAVING A BONDED DIELECTRIC COATING PER THE BWS WATER SYSTEM EXTERNAL CORROSION CONTROL STANDARDS VOLUME 3, DATED 2021. IF THE DIP DOES NOT HAVE A BONDED DIELECTRIC COATING, THEN THE CATHODIC PROTECTION SYSTEM COULD BE PREMATURELY DEPLETED.



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

APPROVED:

[Signature]
 MANAGER AND CHIEF ENGINEERING, BWS*
 (FOR WORK AFFECTING BWS FACILITIES IN CITY/STATE RIGHT OF WAY AND BWS EASMENT ONLY)
 DATE: 8/1/2023

TEST STATION LOCATION PLAN VIEW

SCALE: 5/32" = 1'-0"

V&A
 1000 Broadway, Suite 320
 Oakland, CA 94607
 Tel. (510) 903-6600, Fax (510) 903-6601
 Project No. 23-0049

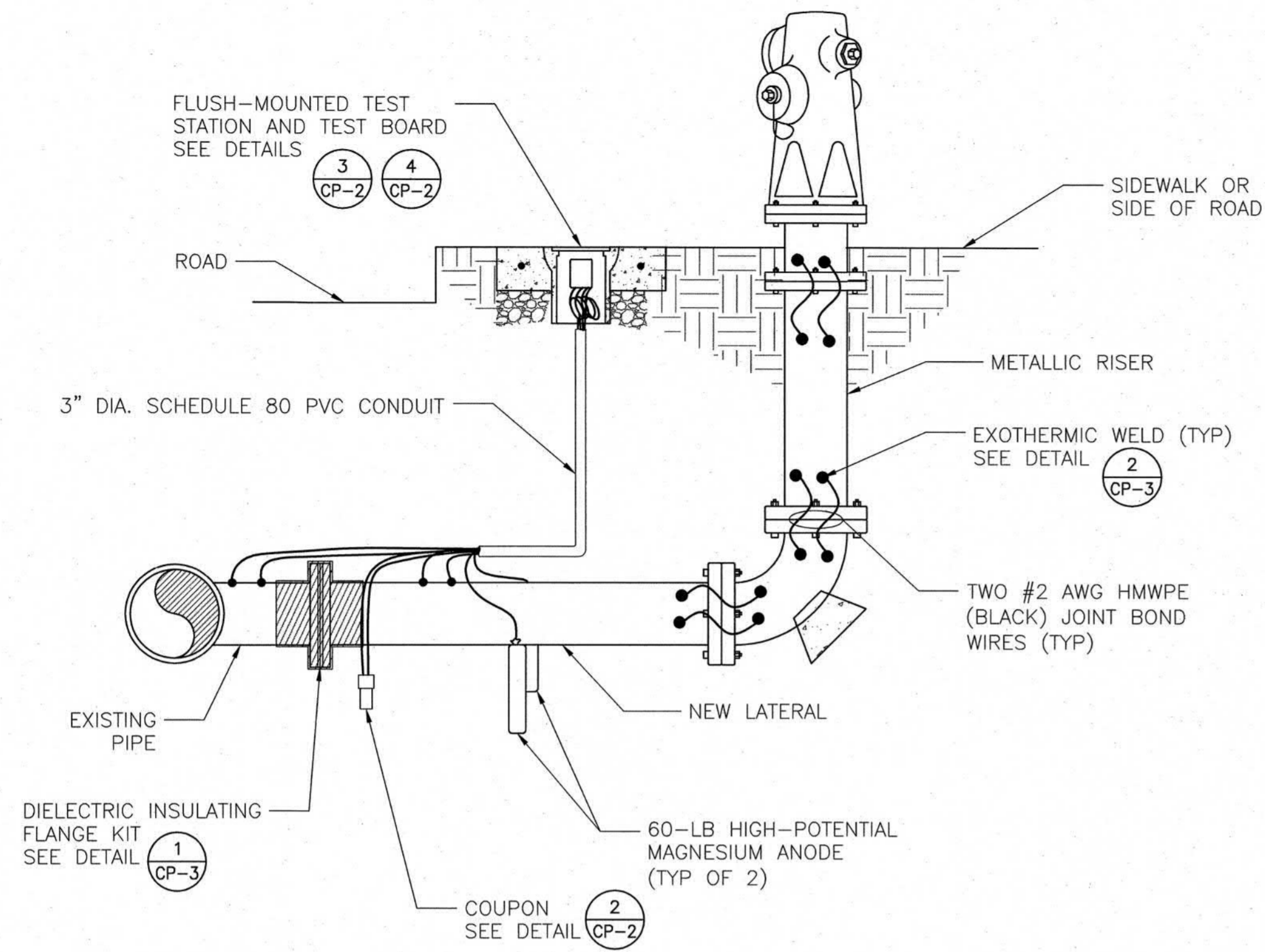
Exp: 4/30/24

Glenn H. Willson

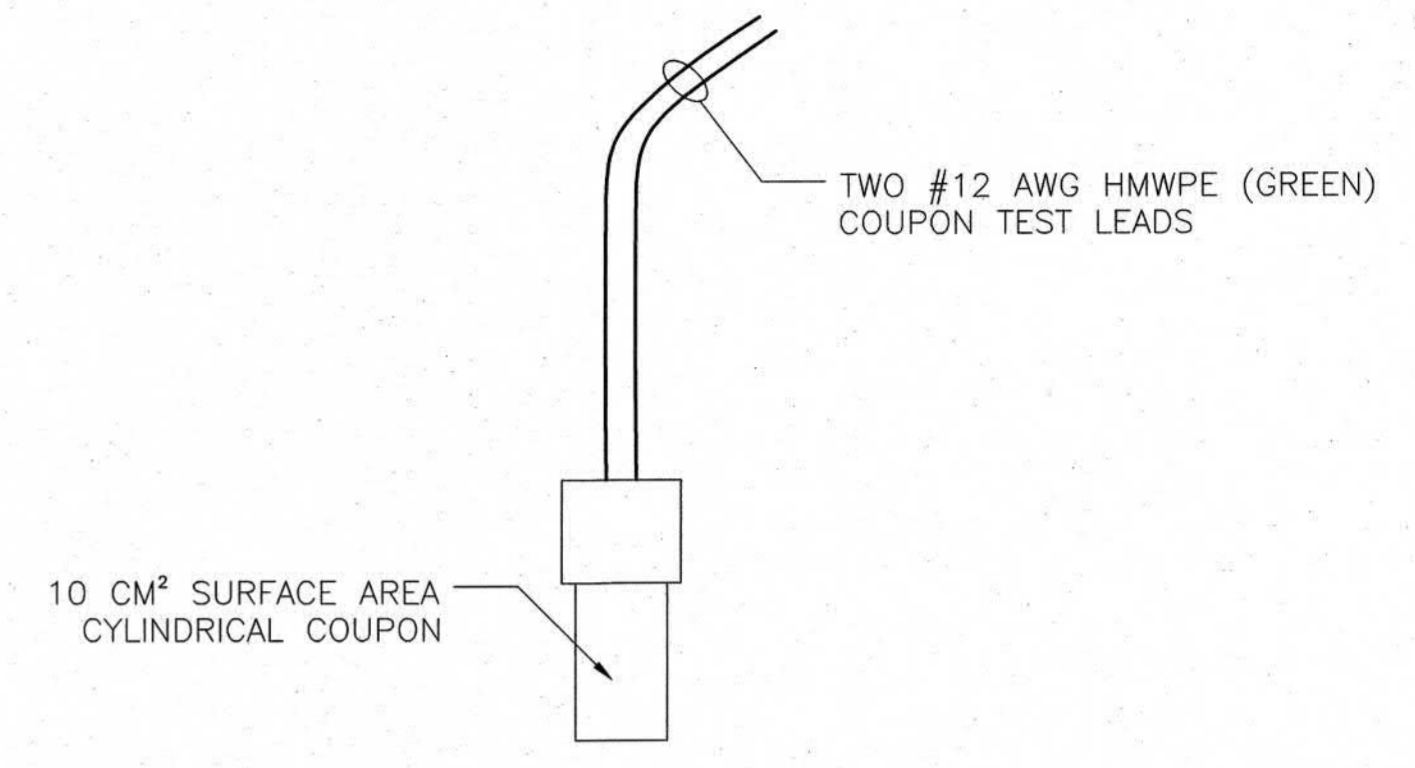
9/1/23	ADD	Addendum 2 BWS Signature
DATE		REVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
CATHODIC PROTECTION SITE PLAN CP-1
 KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Lanikea Beach (MP 306 to MP 354)
 Project No. 83B-01-09
 Scale: As Shown Date: May 2023

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	57	231



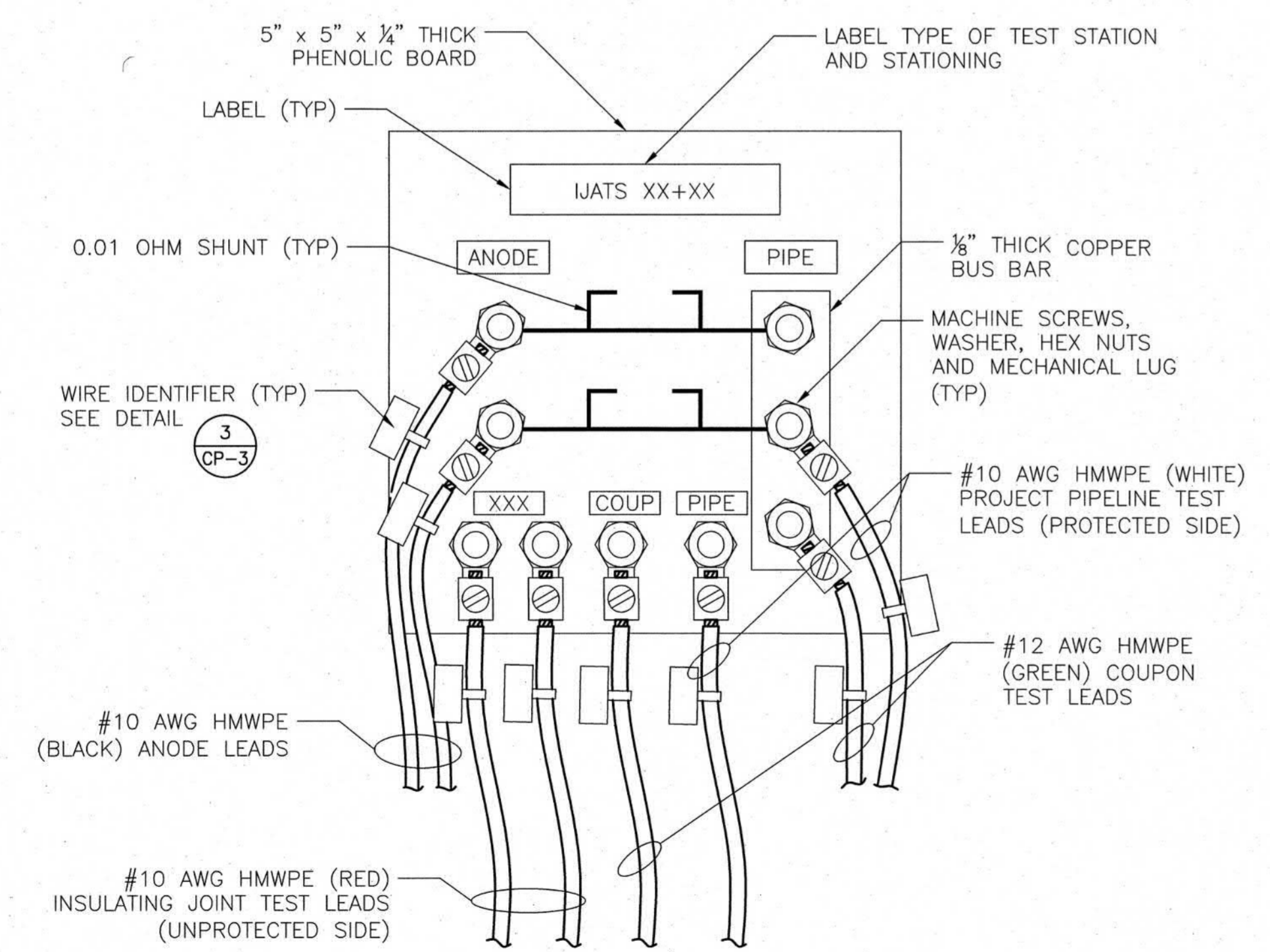
- NOTES:
1. NUMBER OF FLANGES MAY VARY. BOND TWO #2 AWG HMWPE (BLACK) JOINT BOND WIRES ACROSS ALL FLANGES.
 2. ISOLATE EXISTING PIPE FROM NEW FIRE HYDRANT LATERAL WITH DIELECTRIC INSULATING FLANGE KIT.
 3. COAT THE EXTERIOR OF THE INSULATING FLANGE WITH PETROLATUM WAX TAPE FOR A MINIMUM OF 3 FEET BEYOND THE GASKET WITH A MINIMUM OF 6 INCHES OF OVERLAP WITH THE FACTORY-APPLIED COATING ON THE PIPELINE.
 4. PLACE TEST STATION WITHIN 5' OF FIRE HYDRANT.
 5. TOP OF ANODE SHALL BE ALIGNED WITH THE BOTTOM OF THE PROJECT PIPELINE AND SPACED 5' FROM THE PIPELINE.
 6. COUPON SHALL BE INSTALLED 4" TO 12" FROM PROJECT PIPELINE.



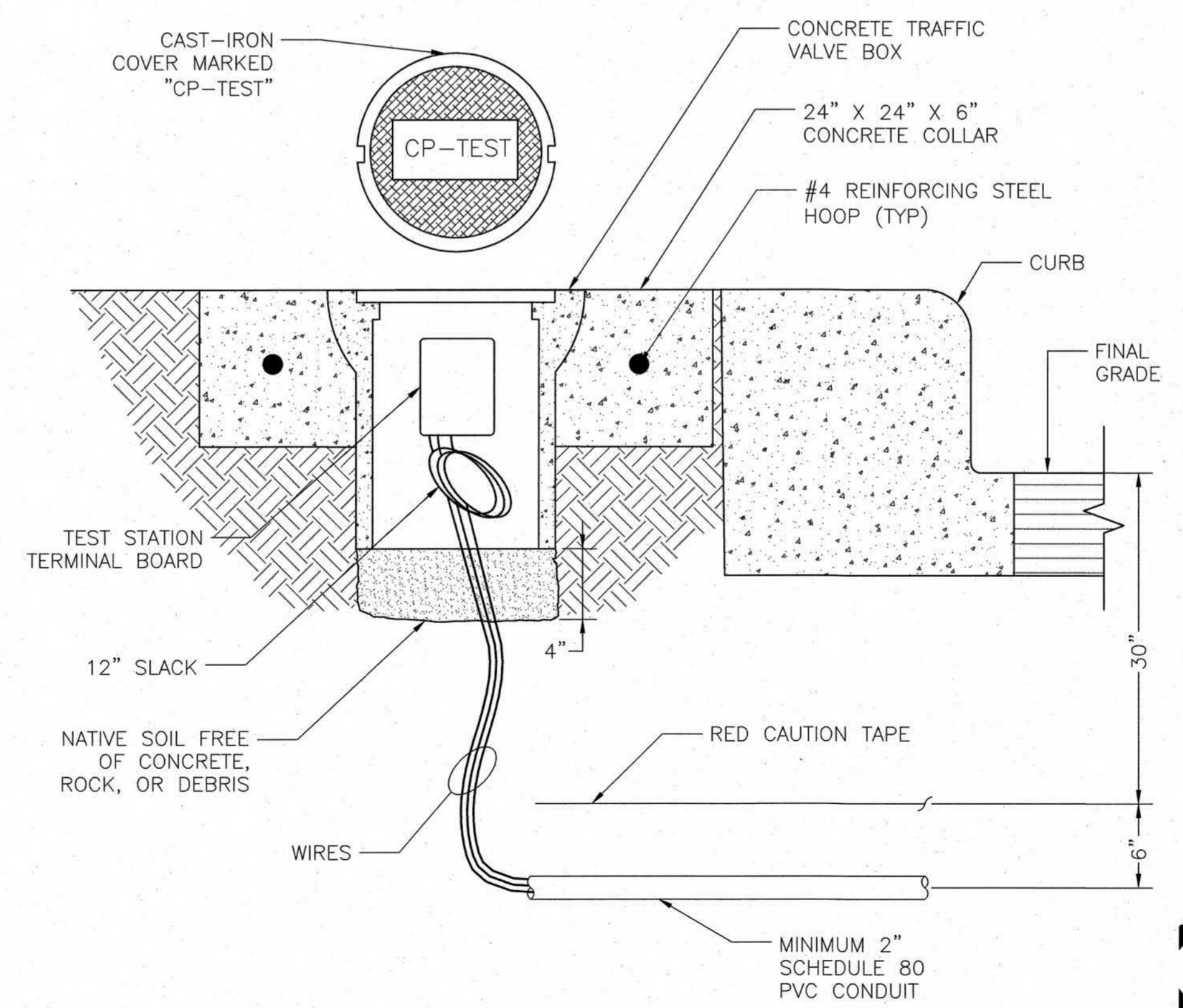
NOTE:
COUPON MATERIAL SHALL BE THE SAME AS THE PIPELINE.

ISOLATED FIRE HYDRANT
SCALE: NTS

COUPON DETAIL
SCALE: NTS



INSULATING JOINT ANODE TEST STATION (IJATS) TERMINAL BOARD DETAIL
SCALE: NTS

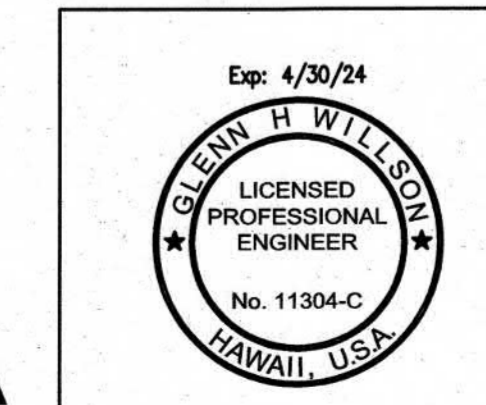


FLUSH-MOUNTED TEST STATION DETAIL
SCALE: NTS

APPROVED:

[Signature]
MANAGER AND CHIEF ENGINEERING, BWS
(FOR WORK AFFECTING BWS FACILITIES IN CITY/STATE RIGHT OF WAY AND BWS EASMENT ONLY)
DATE: 8/7/2023

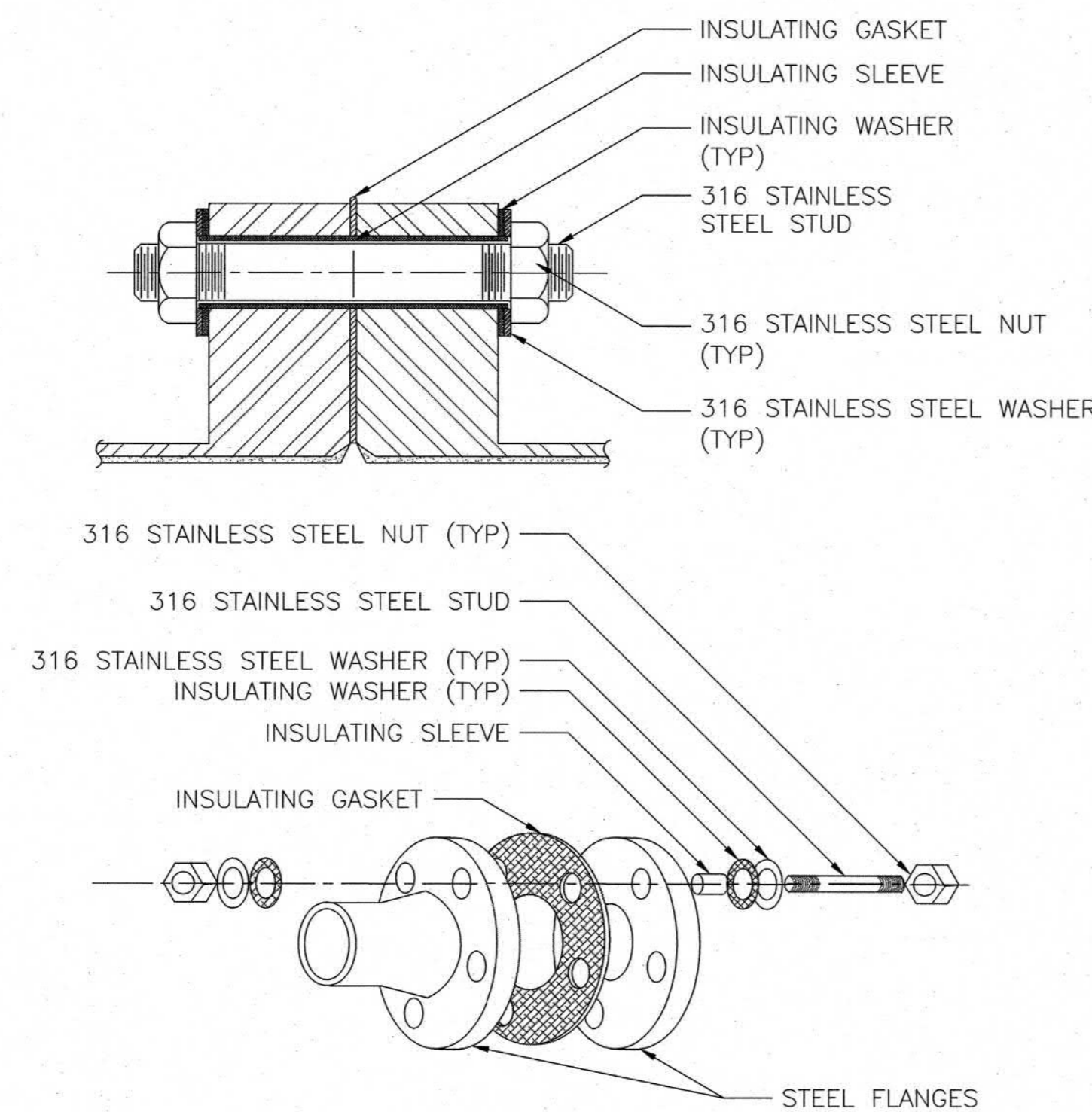
9/1/23	ADD	Addendum 2 BWS Signature
DATE	REVISION	



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CATHODIC PROTECTION DETAILS (1 OF 2)
CP-2
KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)
Project No. 83B-01-09
Scale: As Shown Date: May 2023

V&A
1000 Broadway, Suite 320
Oakland, CA 94607
Tel. (510) 903-6600, Fax (510) 903-6601
Project No. 23-0049

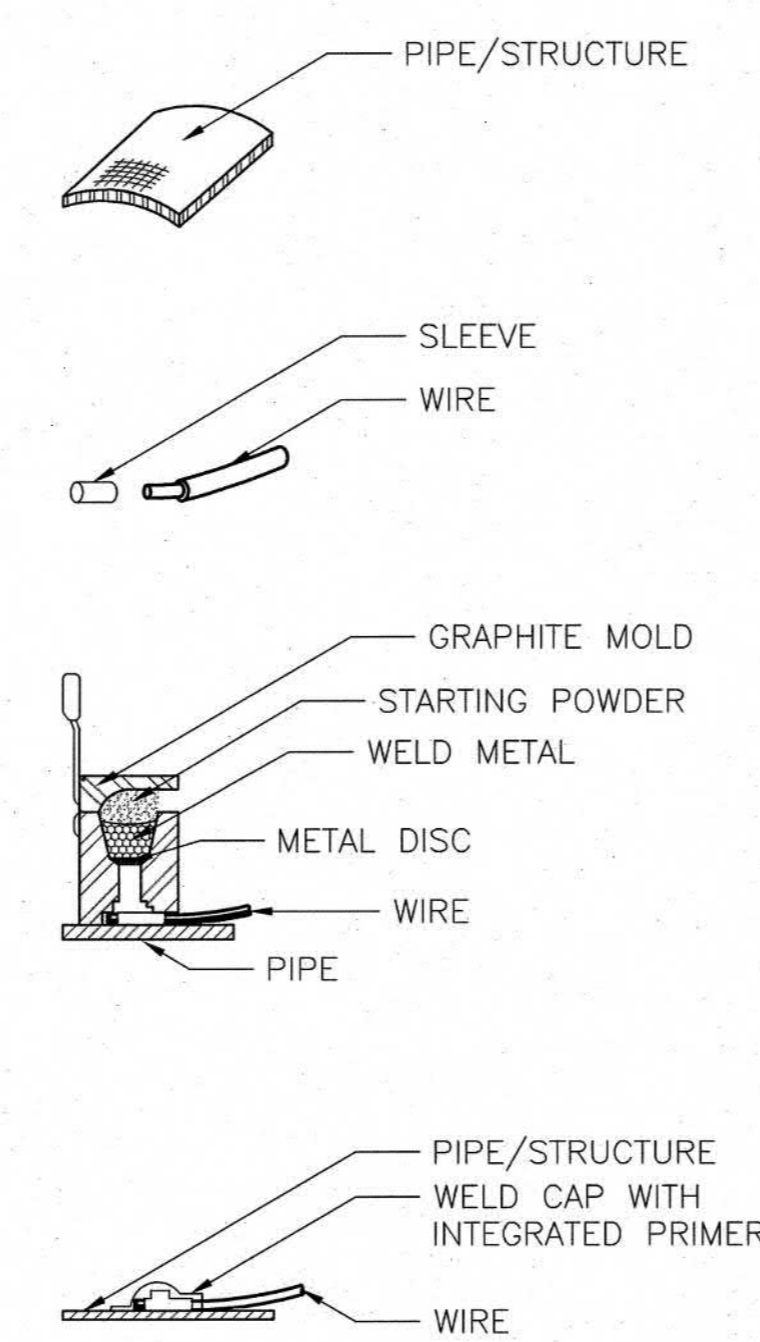
SURVEY PLOTTED BY	DATE
DRAWN BY	
CHECKED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTEBOOK	
No.	



NOTE:
PETROLATUM WAX TAPE NOT SHOWN

DIELECTRIC INSULATING FLANGE KIT
DETAIL WITH SECTION VIEW
SCALE: NTS

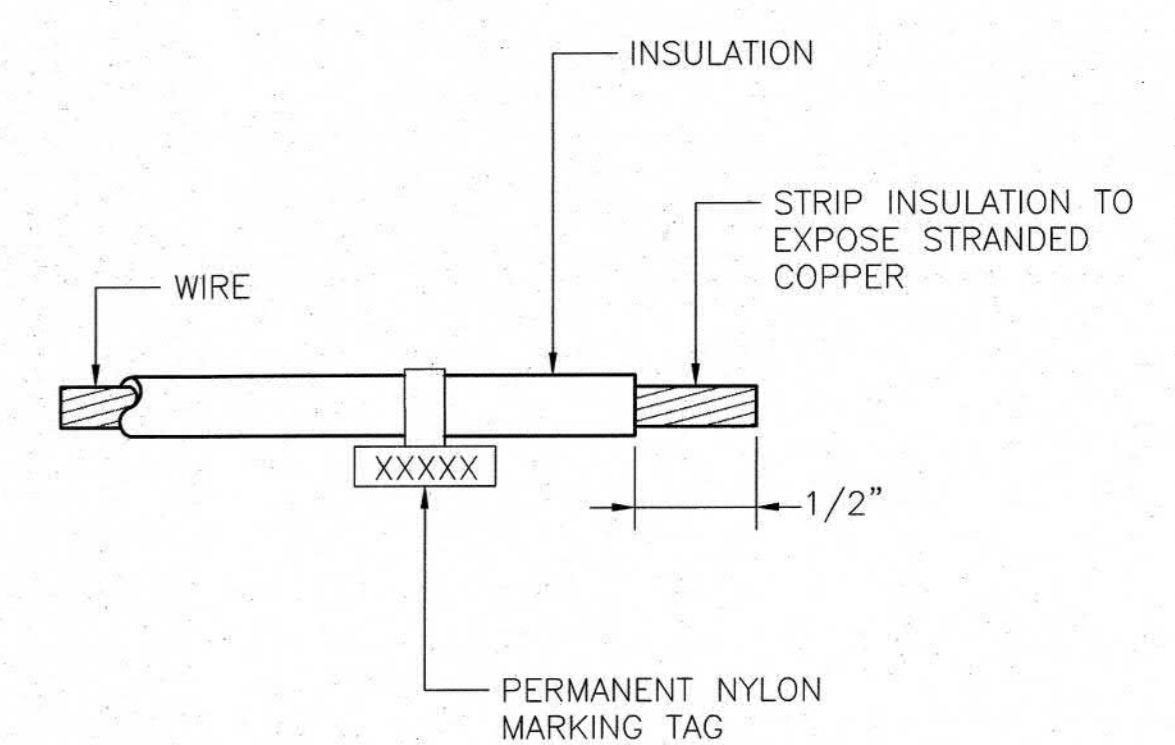
1
CP-3



- ALL WELDS SHALL BE 6" APART AT MINIMUM.
- GRIND PIPE/STRUCTURE TO BARE METAL AND CLEAN SURFACE. GROUND AREA SHALL BE LARGE ENOUGH FOR EXOTHERMIC WELD AND SMALL ENOUGH TO BE COMPLETELY COVERED BY WELD CAP.
- STRIP INSULATION FROM WIRE AND ATTACH SLEEVE.
- HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR. IGNITE WITH FLINT GUN. REMOVE SLAG FROM CONNECTION WITH CHIPPING HAMMER. TEST WELD WITH 22 OZ HAMMER.
- COVER CONNECTION WITH WELD CAP WITH INTEGRATED PRIMER. REPAIR ALL DAMAGE TO COATING AND LINING IN ACCORDANCE WITH COATING AND LINING MANUFACTURER'S RECOMMENDATIONS.

EXOTHERMIC WELD DETAIL FOR
DUCTILE IRON PIPE
SCALE: NTS

2
CP-3



WIRE IDENTIFIER SCHEDULE	
STRUCTURE	LABEL
12" WATER	12" W
6" WATER	6" W
GALVANIC ANODE	ANODE
COUPON	COUP

WIRE IDENTIFIER DETAIL
SCALE: NTS

3
CP-3

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

APPROVED:

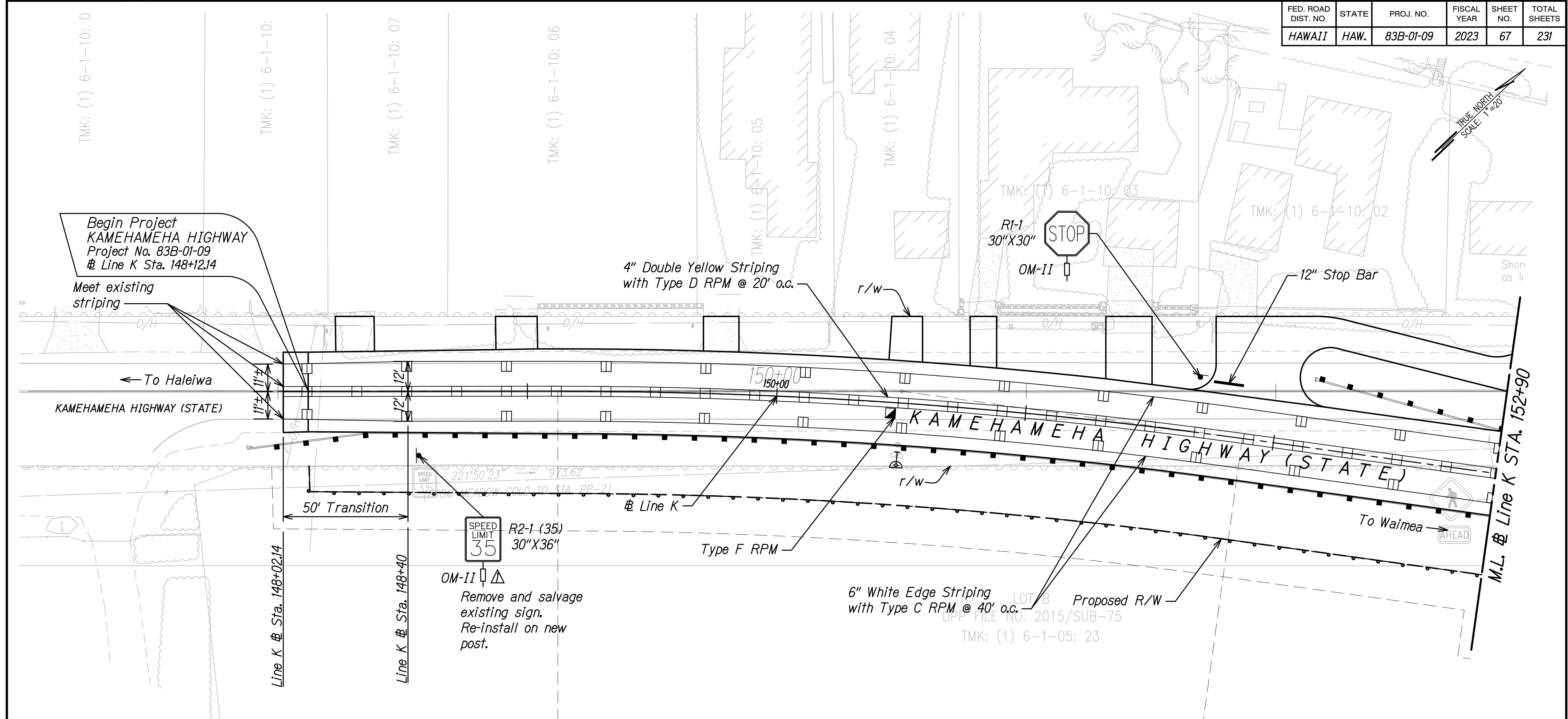
[Signature]
MANAGER AND CHIEF ENGINEERING, BWS*
(FOR WORK AFFECTING BWS FACILITIES IN CITY/STATE
RIGHT OF WAY AND BWS EASMENT ONLY)
DATE: 8/7/2023

V&A
1000 Broadway, Suite 320
Oakland, CA 94607
Tel. (510) 903-6600, Fax (510) 903-6601
Project No. 23-0049

Exp: 4/30/24
GLENN H. WILSON
LICENSED PROFESSIONAL ENGINEER
No. 11304-C
HAWAII, USA
[Signature]

9/1/23	ADD	Addendum 2 BWS Signature
DATE		REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION CATHODIC PROTECTION DETAILS (2 OF 2) CP-3 KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS Vicinity of Laniakea Beach (MP 3.06 to MP 3.54) Project No. 83B-01-09 Scale: As Shown Date: May 2023		

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	67	231



STAFFS PROVIDED BY	DATE
DRAWN BY	DESIGNED BY
TRACED BY	QUANTITIES BY
NOTE BOOK	CHECKED BY
No.	

9/1/23	ADD Addendum 2 Add Type-II OM
DATE	REVISION

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

 SIGNATURE: *Dexter S. Eji*

 EXPIRATION DATE OF THE LICENSE: 04/30/24

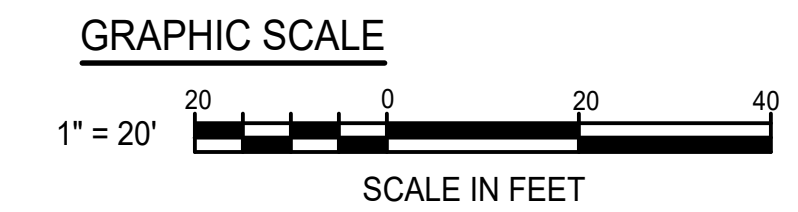
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

SIGNING AND PAVEMENT MARKINGS PLAN

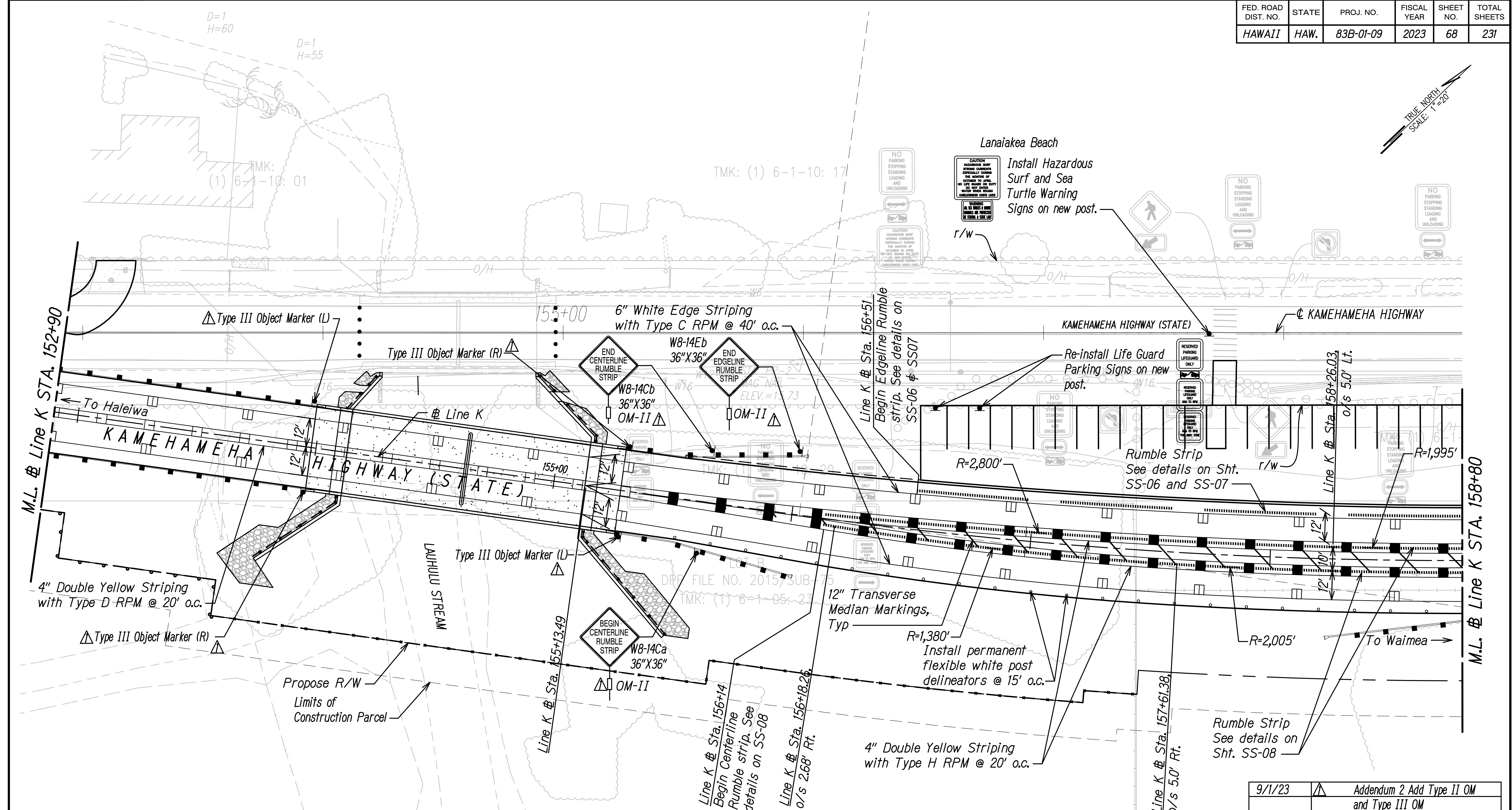
KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

Scale: 1"=20' Date: December 2022

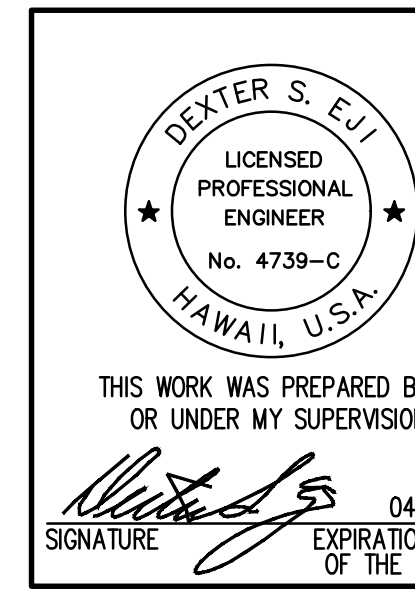
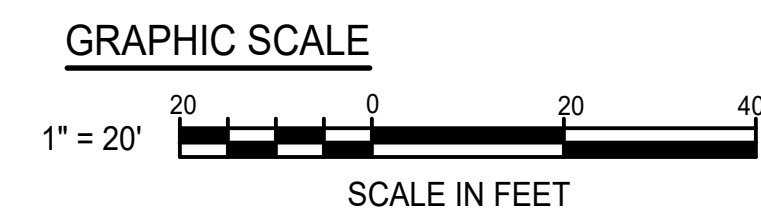
SHEET No. SS-02 OF 8 SHEETS



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	68	231



DATE	_____
DESIGNED BY	_____
DRAWN BY	_____
CHECKED BY	_____
NOTED BY	_____
QUANTITIES BY	_____
NO.	_____



9/1/23	▲	Addendum 2 Add Type II OM and Type III OM
DATE		REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

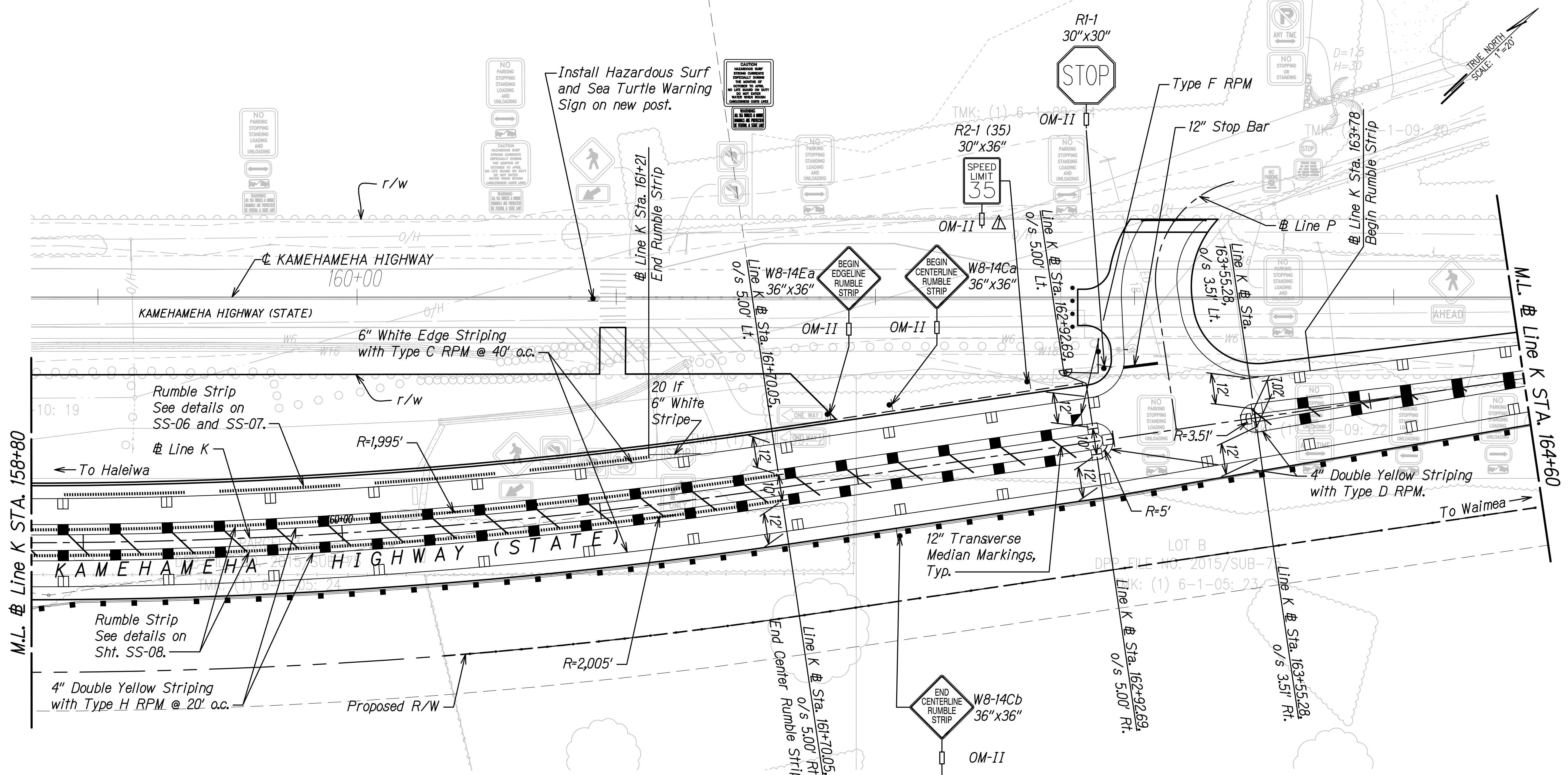
SIGNING AND PAVEMENT MARKINGS PLAN

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)
Project No. 83B-01-09

Scale: 1"=20' Date: December 2022

SHEET No. SS-03 OF 8 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	69	231



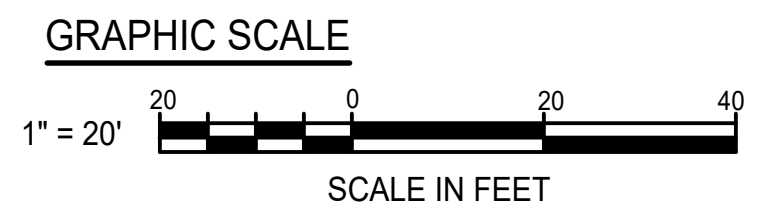
Install Hazardous Surf and Sea Turtle Warning Sign on new post.

6" White Edge Striping with Type C RPM @ 40' o.c.

Rumble Strip See details on SS-06 and SS-07.

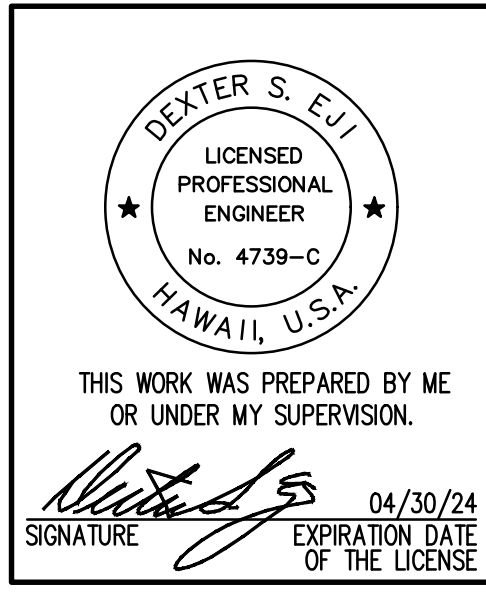
Rumble Strip See details on Sht. SS-08.

4" Double Yellow Striping with Type H RPM @ 20' o.c.



DATE	
STAFFS PROVIDED BY	
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

9/1/23	ADD	Addendum 2 Add Type-II OM
DATE		REVISION



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

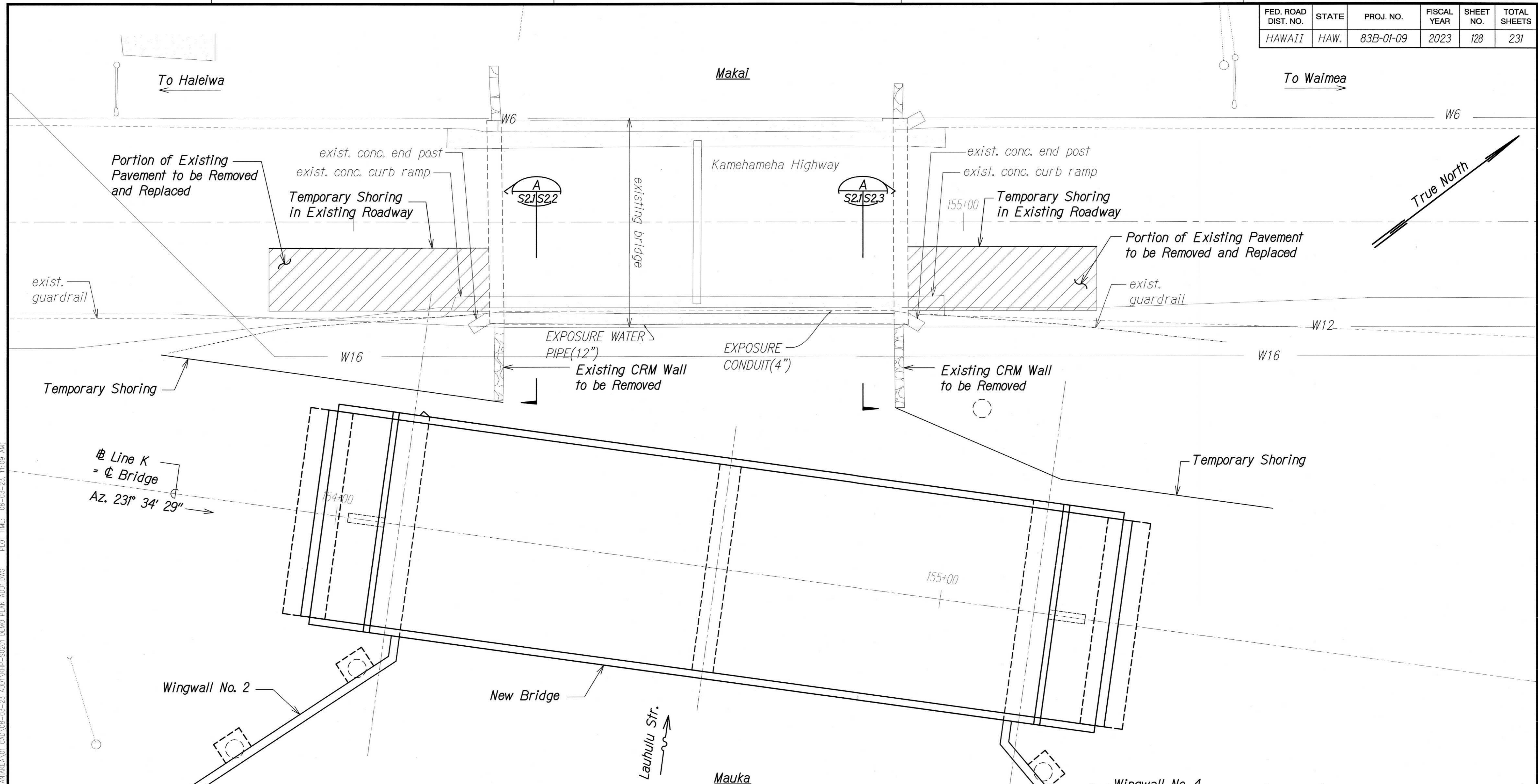
SIGNING AND PAVEMENT MARKINGS PLAN

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
Project No. 83B-01-09

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
SIGNATURE: [Signature] EXPIRATION DATE OF LICENSE: 04/30/24

Scale: 1"=20' Date: December 2022

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	128	231



NOTES:

- Demolition of existing structures shall not begin until a portion of the new bridge has been completed and traffic has been moved onto the new bridge. See Construction Sequence Shts. S12.1 to S12.5.
- Temporary shoring shown is schematic. The construction of Wingwall No. 1 and Wingwall No. 3 will require the removal of the existing mauka CRM walls and releasing the existing backfill as shown on Stage 14 on Shts. S12.4 and S12.5.
- The Contractor shall provide support for exposed utilities and replace any curb ramps, pavement, guardrails, and end posts that may be damaged during excavation at no cost to the State.

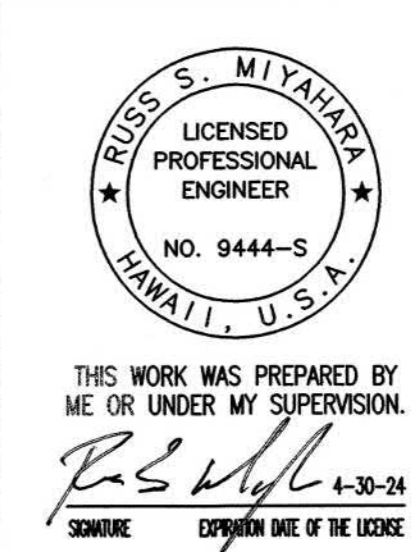
DEMOLITION PLAN

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

1 Approved:

[Signature]
 Manager and Chief Engineer, BWS
 (For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)

8/7/2023
 Date



8/3/23	1	Add. 2 BWS Signature
DATE		REVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

DEMOLITION PLAN

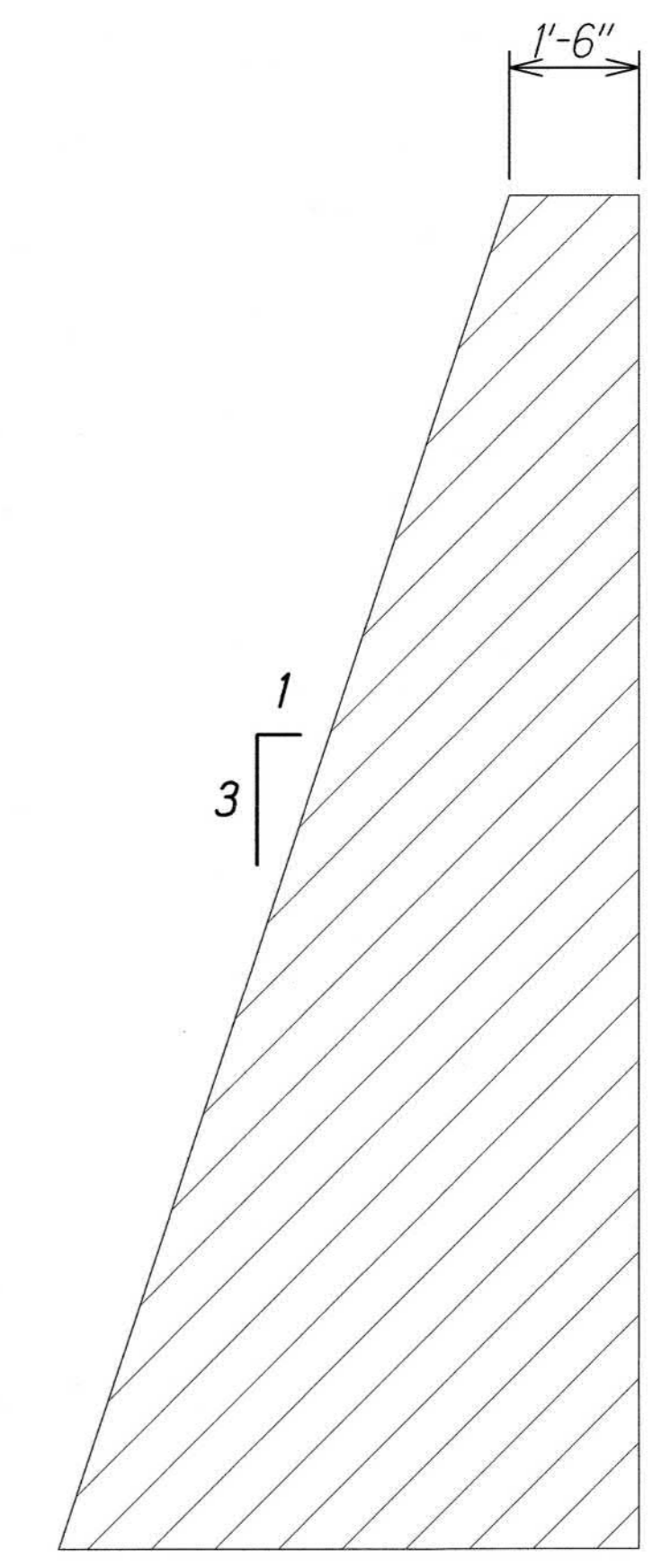
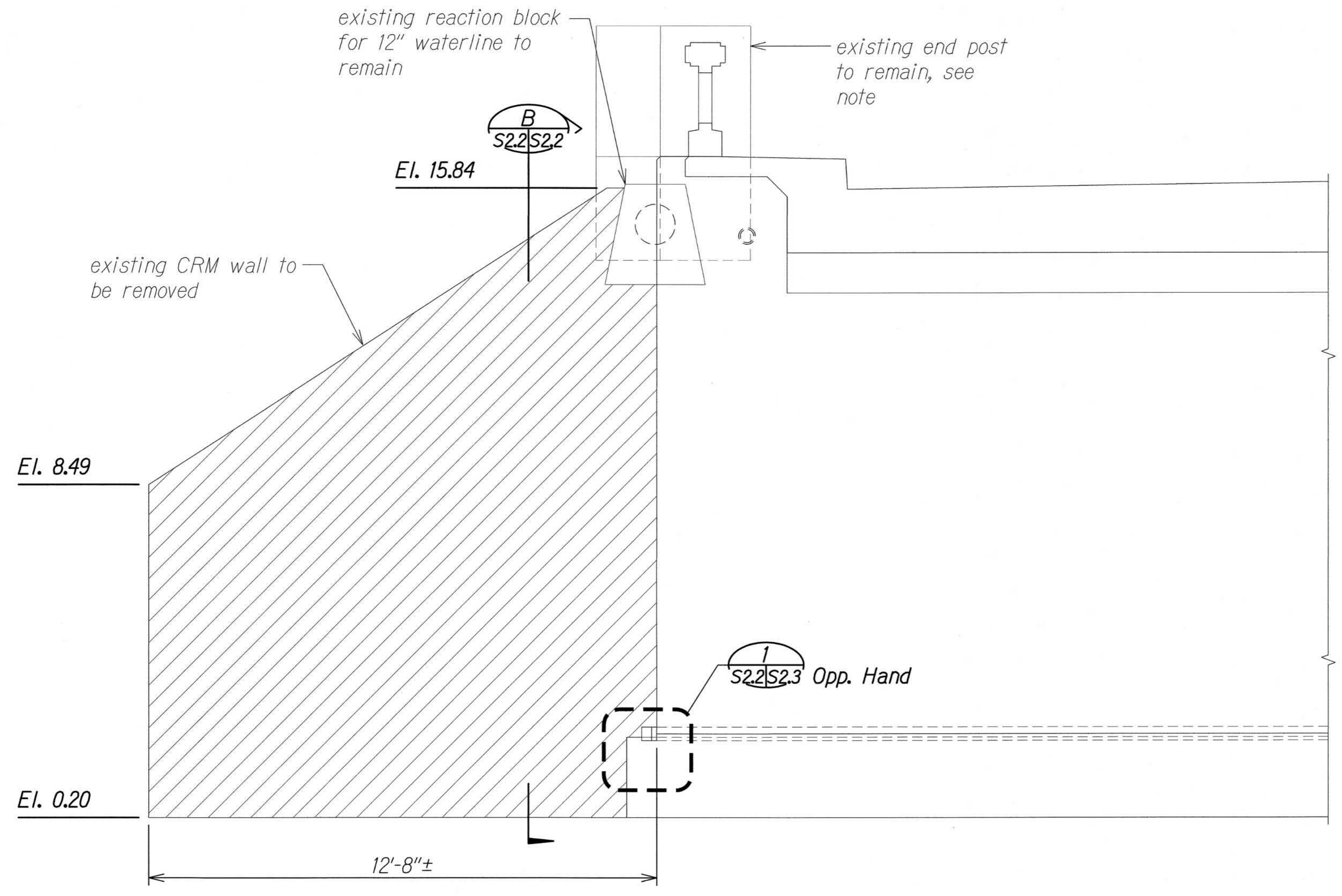
KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

Scale: As Noted Date: December 2022

ORIGINAL PLAN	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
CHECKED BY	
NO.	

DRAWING NAME: Z:\00 ONGOING\001 PROJECTS\22-015.1 KAM HWY LANIAKEA\01 CAD\08-03-23 ADD\KHP-S0201 DEMO PLAN ADD1.DWG PLOT TIME: 08-03-23, 11:09 AM

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	129	231



HALEIWA DEMOLITION ELEVATION A
 Scale: 1/2" = 1'-0" S2.1 | S2.2

SECTION B
 Scale: 1/2" = 1'-0" S2.2 | S2.2

NOTE:

The Contractor shall take caution when excavating under the existing end post. The end post may not be properly supported by the abutment and any damage to the existing end post shall be avoided.

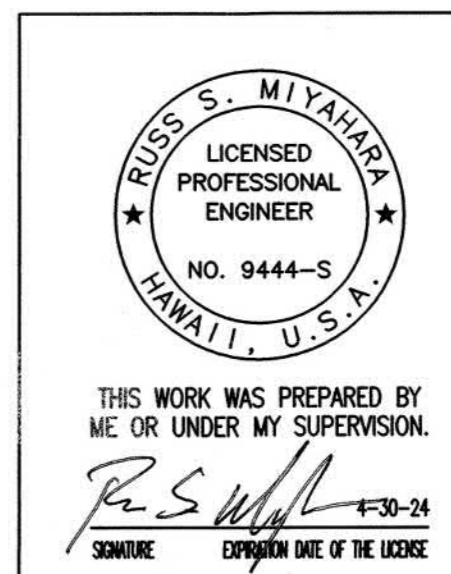
SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

DRAWING NAME: Z:\00 ONGOING\001 JP PROJECTS\22-0151 KAM HWY LANIKAEA\01 CAD\08-03-23 ADD\KHP-S0209 DEMO SECT ADD1.DWG PLOT TIME: 08-03-23, 11:06 AM

1 Approved:

[Signature]
 For: Manager and Chief Engineer, BWS*
 (For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)

8/1/2023
 Date



8/3/23	1 Add. 2 BWS Signature
DATE	REVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

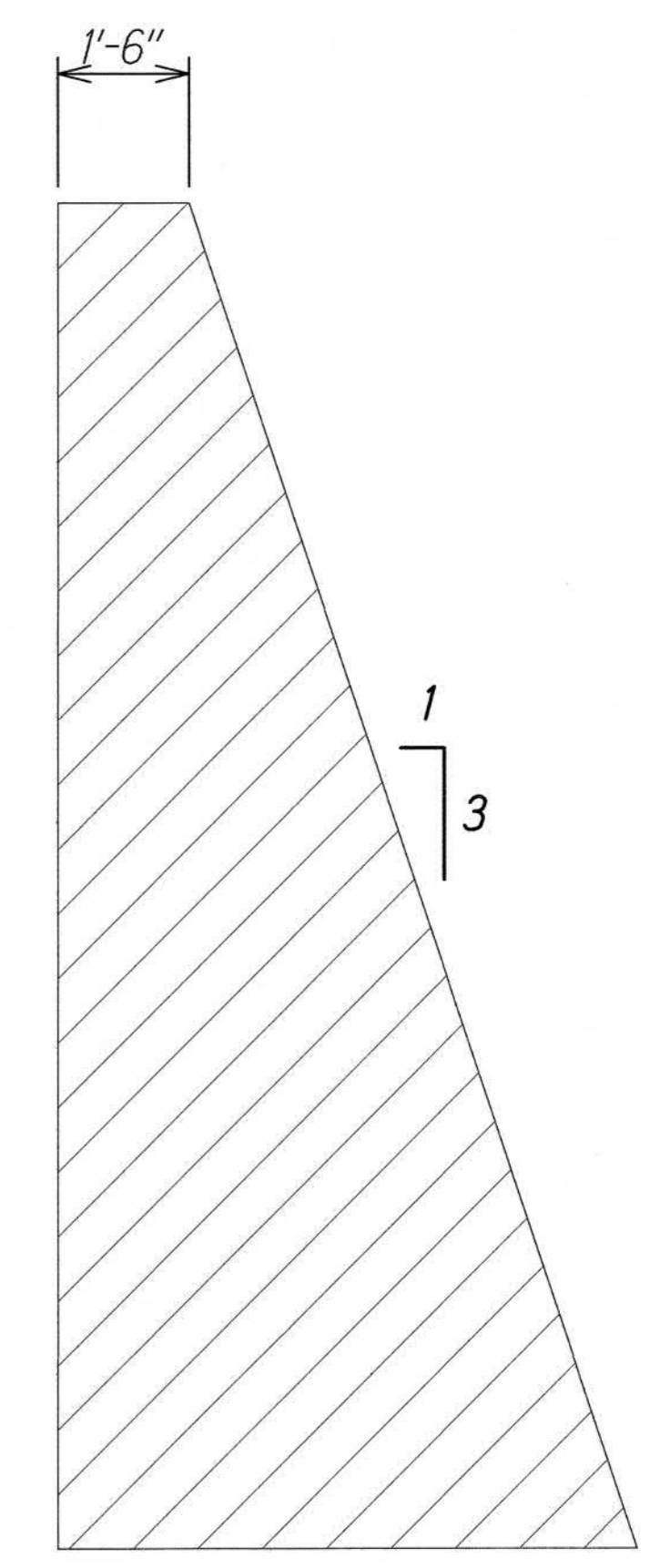
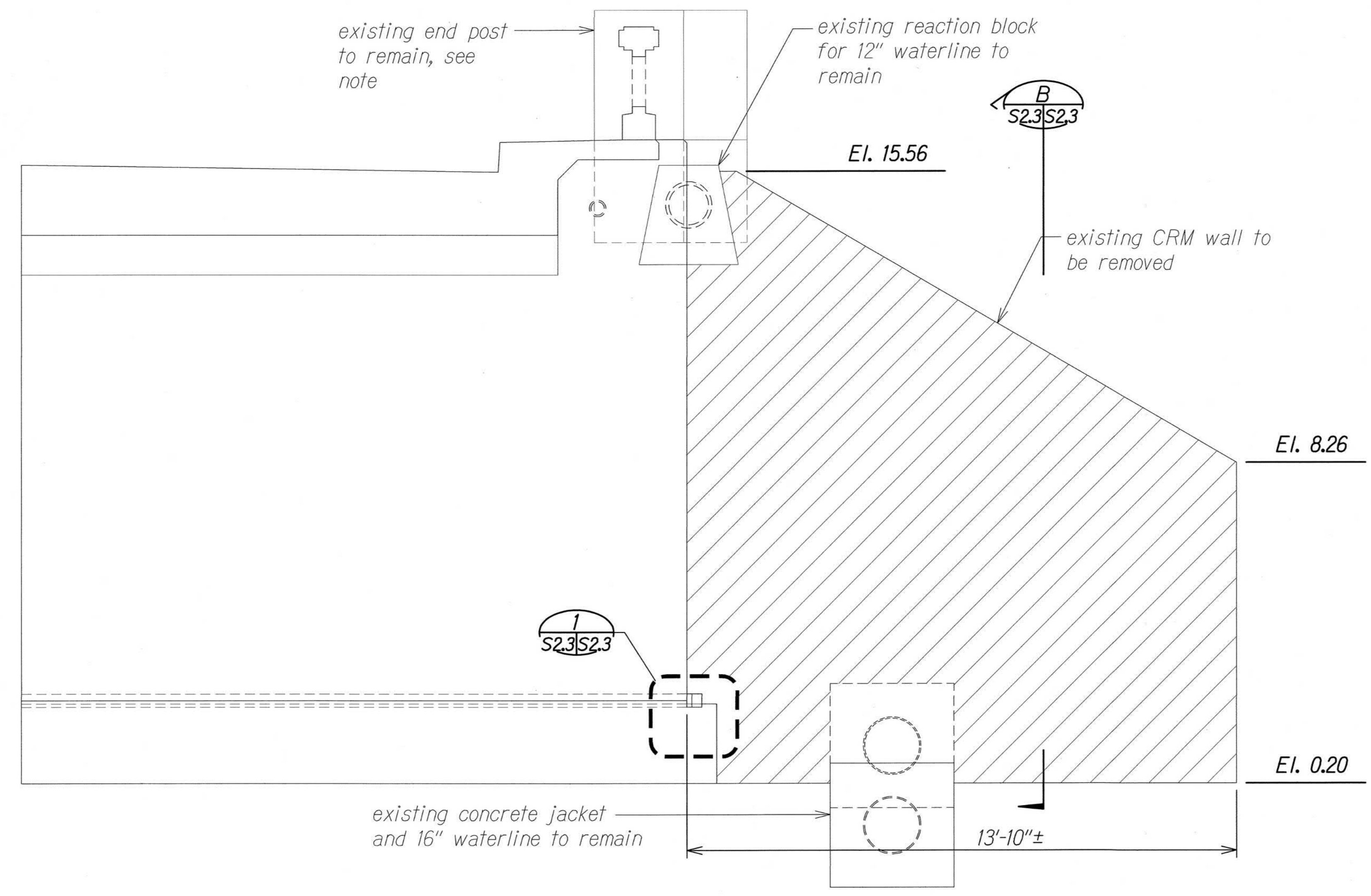
**DEMOLITION ELEVATION
 AND SECTION**

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Lanikaea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

Scale: As Noted Date: December 2022

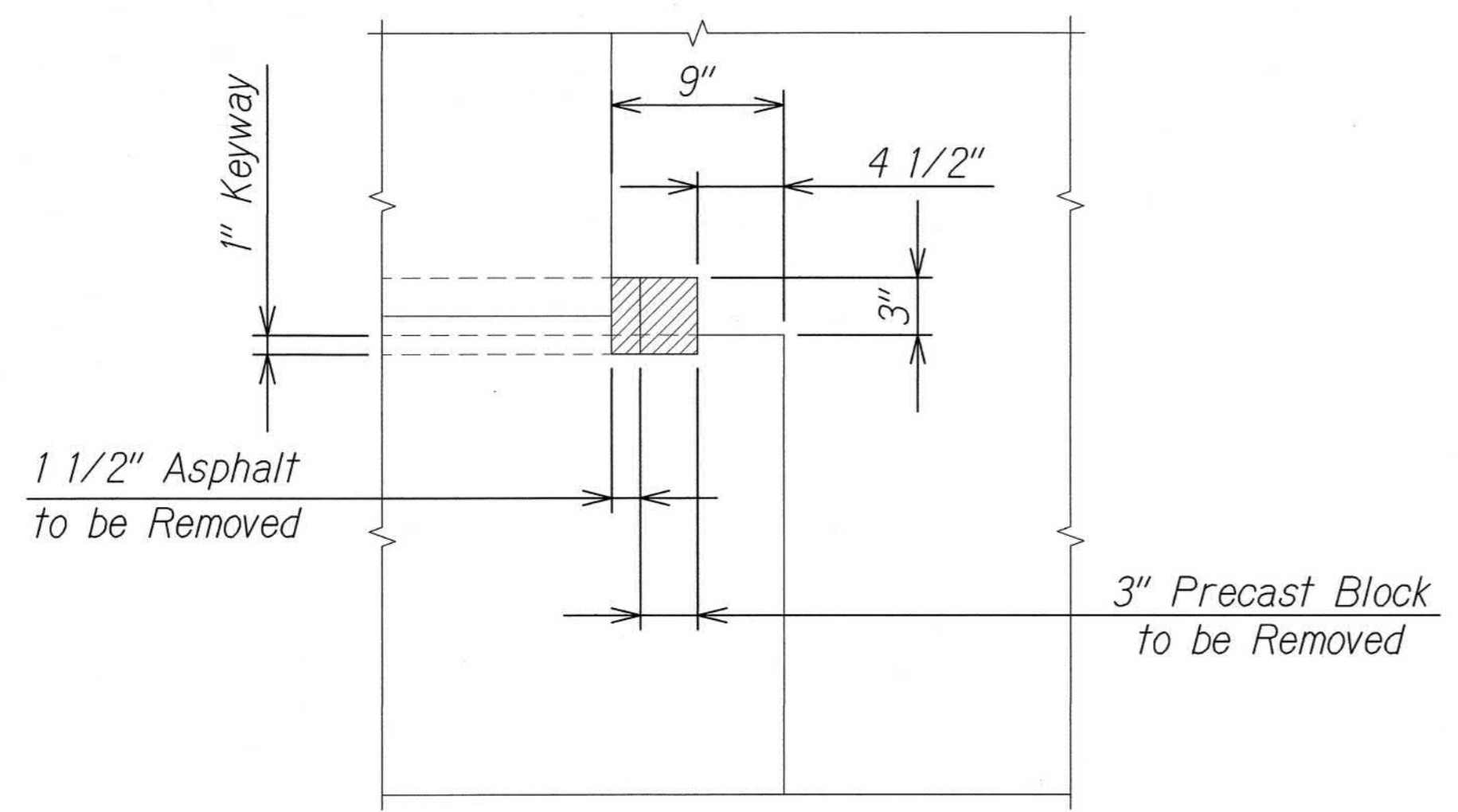
SHEET No. S2.2 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2023	130	231



WAIMEA DEMOLITION ELEVATION
 Scale: 1/2" = 1'-0"
 Section A: S2.1 | S2.3

SECTION B
 Scale: 1/2" = 1'-0"
 Section B: S2.3 | S2.3



DETAIL
 Scale: 1 1/2" = 1'-0"
 Section 1: S2.2 | S2.3

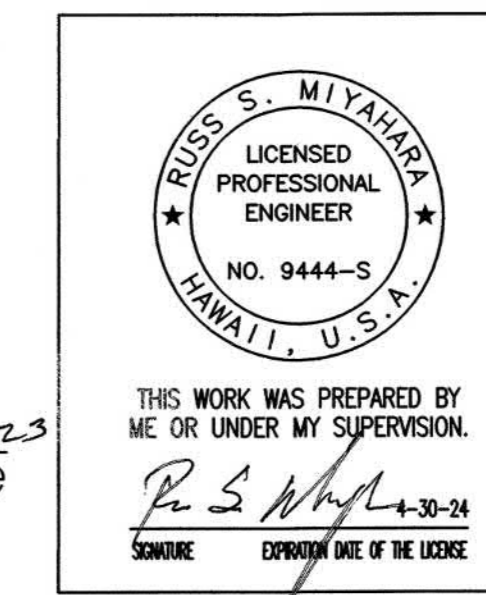
NOTE:

The Contractor shall take caution when excavating under the existing end post. The end post may not be properly supported by the abutment and any damage to the existing end post shall be avoided.

Approved:

Manager and Chief Engineer, BWS*
 (For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)

01/7/2023
 Date



DATE	REVISION
8/3/23	1 Add. 2 BWS Signature

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

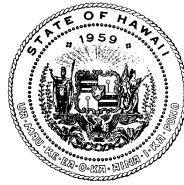
**DEMOLITION ELEVATION,
 SECTION, AND DETAIL**

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
 Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)
 Project No. 83B-01-09

Scale: As Noted Date: December 2022

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

DRAWING NAME: Z:\00_DWG\000\000\PROJECTS\22-015\1\KAWAHA\LANIAKEA\01_CAD\08-03-23_ADD1\WHP-S2022 DEMO SECT_ADD1.DWG PLOT TIME: 08-03-23, 11:06 AM



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

WQC1092.FNL.22

April 28, 2022

David S. Hobbie
Regional Regulatory Chief
Honolulu District
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Dear Mr. Hobbie:

**Subject: Blanket Section 401 Water Quality Certification (WQC) for
Certain 2021 Department of the Army (DA)
Nationwide Permits (NWP) and Activities
File No. WQC1092**

Purpose. This letter is a blanket Section 401 WQC (Blanket Certification) and sets forth applicable qualifications and activity-specific conditions to certain NWPs and activities, as described below. This Blanket Certification may be utilized by any applicant that is seeking authorization and/or verification from the U.S. Army Corps of Engineers (USACE), Honolulu District of the Pacific Ocean Division (POH) for work in Waters of the United States.

This Blanket Certification supersedes and replaces previous WQC0901.FNL.20 issued in May and November of 2020 (WQC0901). The following shall apply:

1. Requirements and conditions set forth in WQC0901 which are not set forth in this Blanket Certification shall no longer be applicable;
2. Activities covered under WQC0901 shall be subject to this Blanket Certification, including requirements and conditions different from or in addition to WQC0901;
3. Pending applications, including those currently under review by USACE or the Department of Health (DOH), shall be subject to this Blanket Certification.

Note: A previous version of this Blanket Certification was public noticed on September 23 and 24, 2020, for the proposed 2020 NWPs. Since the aforementioned public notices, the NWPs were reissued and modified in 2021, the federal Section 401 WQC regulations were revised, and the State Section 401 WQC rules were revised. This Blanket Certification incorporates these revisions.

Overview. The DA has published a list of NWP's and applicable general conditions that attach to those NWP's.¹ Certain NWP's may require a Section 401 WQC from the State of Hawaii. The DOH has the authority to issue a Blanket Certification and may qualify or condition the Blanket Certification. The conditions in this Blanket Certification become additional conditions to the NWP's. The qualifications would set forth the applicability of the Blanket Certification to a NWP or other described activity.

The DOH reviewed the NWP and General Conditions published in the Federal Register: Final Rules and the additional comments submitted by USACE POH. DOH believes that when all requirements and conditions contained in this Blanket Certification are fully complied with, there is a reasonable assurance that the activities will be conducted in a manner which will not violate the applicable State water quality standards and will comply with the applicable provisions of the CWA, Sections 301, 302, 303, 306, and 307.

The NWP's and activities in Item 2.a below do not require a Section 401 WQC. The NWP's and activities in Item 2.b below are covered under this Blanket Certification. The DOH has determined that projects authorized by the USACE POH for the NWP's and activities in Item 2.b below, subject to the requirements of the General Conditions in Item 3 below, will not cause adverse environmental impacts or effects; are in the public interest; and represent the optimum balance between economic development and environmental quality.

1. Term of this Blanket Certification

- a. This Blanket Certification becomes effective with respect to a specific project on **April 28, 2022**.
- b. This Blanket Certification will expire at midnight, **March 14, 2026**.
- c. This Blanket Certification's coverage is administratively extended to a certain project beyond midnight, March 14, 2026, when the USACE POH extends the project authorization/verification.

2. Coverage of this Blanket Certification

- a. The NWP's and activities listed below do not require a Section 401 WQC.
 - NWP 1 – Aids to Navigation
 - NWP 8 – Oil and Gas Structures on the Outer Continental Shelf

¹ The DA NWP authorizes activities under 1) Section 404 of the Clean Water Act (CWA), 2) Section 10 of the Rivers and Harbors Act of 1899 (RHA), and/or 3) a Letter of Permission. The NWP's were published on September 15, 2020, in the Federal Register, Volume 85, Number 179 and December 27, 2021, Volume 86, Number 245 (Federal Register).

- Projects in response to a public emergency proclaimed by the President of the United States or Governor of Hawaii where HRS Chapter 342D has been suspended
 - Any emergency project as determined by the Director of Health
 - Projects granted an exemption under Act 048 of 2017 (temporary exemption of certain bridge rehabilitation projects)
 - Activities exempt under CWA, Section 404(f)(1)
 - Directional drilling under a waterbody where entry and exit pits are located on land and all slurry/spoils/runoff is contained on land
 - Structures over a waterbody where debris and other pollutants associated with the installation, construction, and operation do not enter the waterbody
 - Installation of temporary Best Management Practices (BMPs) with inert material in State waters, excluding material used to divert or dam stream flow
 - Comprehensive Environmental Response, Compensation, and Liability Act actions with oversight from DOH Hazard Evaluation and Emergency Response (HEER) Office and/or EPA
 - DOH HEER response actions
 - Bridge inspections
 - Improvements or modifications to Department of Land and Natural Resources, Division of Boating and Ocean Recreation permitted existing offshore moorings installed prior to October 4, 2017
 - Coral transplant with National Oceanic and Atmospheric Administration oversight
 - Fireworks where visible debris is collected after event
 - Lanterns and rubber duckies collected after event
 - Ashes from funeral ceremonies 3 miles away from shore
 - After-The-Fact applications for USACE POH enforcement actions²
- b. The NWP's and activities listed below are hereby granted coverage under this Blanket Certification in the State of Hawaii if the applicant of the activity/discharge complies with the General Conditions (Item No. 3) and USACE POH provides notification (Item No. 4). Any person, including any public body, conducting activities authorized by these NWP's and activities that cannot or will not comply with this Blanket Certification must apply for and obtain an individual Section 401 WQC from DOH Clean Water Branch (CWB).
- NWP 2 – Structures in Artificial Canals
 - NWP 3 – Maintenance

² DOH has decided not to process After-The-Fact applications so the USACE POH can proceed with their enforcement action.

- NWP 4 – Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities
- NWP 5 – Scientific Measurement Devices
- NWP 6 – Survey Activities
- NWP 7 – Outfall Structures and Associated Intake Structures
- NWP 9 – Structures in Fleeting and Anchorage Areas
- NWP 10 – Mooring Buoys
- NWP 11 – Temporary Recreational Structures
- NWP 12 – Oil or Natural Gas Pipeline Activities
- NWP 13 – Bank Stabilization
- NWP 14 – Linear Transportation Projects
- NWP 15 – U.S. Coast Guard Approved Bridges
- NWP 16 – Return Water from Upland Contained Disposal Areas
- NWP 17 – Hydropower Projects
- NWP 18 – Minor Discharge
- NWP 19 – Minor Dredging
- NWP 20 – Response Operations for Oil or Hazardous Substances
- NWP 22 – Removal of Vessels
- NWP 23 – Approved Categorical Exclusions
- NWP 25 – Structural Discharges
- NWP 27 – Aquatic Habitat Restoration, Establishment, and Enhancement Activities
- NWP 28 – Modifications of Existing Marinas
- NWP 29 – Residential Developments
- NWP 31 – Maintenance of Existing Flood Control Facilities
- NWP 32 – Completed Enforcement Actions
- NWP 33 – Temporary Construction, Access and Dewatering
- NWP 35 – Maintenance Dredging of Existing Basins
- NWP 36 – Boat Ramps
- NWP 37 – Emergency Watershed Protection and Rehabilitation
- NWP 38 – Cleanup of Hazardous and Toxic Waste
- NWP 39 – Commercial and Institutional Developments
- NWP 40 – Agricultural Activities
- NWP 41 – Reshaping Existing Drainage Ditches
- NWP 42 – Recreational Facilities
- NWP 43 – Stormwater Management Facilities
- NWP 45 – Repair of Uplands Damaged By Discrete Events
- NWP 46 – Discharges in Ditches
- NWP 48 – Commercial Shellfish Mariculture Activities
- NWP 51 – Land-Based Renewable Energy Generation Facilities
- NWP 53 – Removal of Low-Head Dams
- NWP 54 – Living Shorelines

- NWP 55 – Seaweed Mariculture Activities
- NWP 56 – Finfish Mariculture Activities
- NWP 57 – Electric Utility Line and Telecommunications Activities
- NWP 58 – Utility Line Activities to Water and Other Substances
- NWP 59 – Water Reclamation and Reuse Facilities
- Letters of Permission – Section 10 only activities with no discharge of fill material
- Any activity conducted in compliance with DOH pre-approved Standard Operating Procedures

c. Limitations on Coverage

This Blanket Certification shall not cover:

- (1) Discharge(s) regulated under CWA, Section 402.
- (2) Any project that may result in downstream/downdrift post construction impacts to the physical, chemical, and/or biological environment.
- (3) Concrete lining any section of natural streambed or bank.³
- (4) Projects involving the removal of dams, impoundments, structures, or sand bars that will result in the downstream/downdrift mobilization of material, sediment, and/or water pollutants.
- (5) Waste Discharges to natural lakes and anchialine pools as specified in HAR 11-54 or any State waters.
“Waste” means sewage, industrial and agricultural matter, and all other liquid, gaseous, or solid substance, including radioactive substance, whether treated or not, which may pollute or tend to pollute the waters of this State. Hawaii Revised Statutes (HRS) §342D-1.
Non-contaminated and suitable dredge and fill material authorized under a 2021 NWP is not considered waste.
- (6) New sewage discharges and new industrial discharges to estuaries as specified in HAR 11-54. New industrial discharges do not include the repair and/or replacement within the footprint of an existing structure.
- (7) New sewage and industrial discharges to Embayments: Class AA and Class A as identified in HAR 11-54. New industrial discharges do not include the repair and/or replacement within the footprint of an existing structure.

³ This type of activity is prohibited as it will result in adverse post construction impacts by eliminating ground water recharge, raising pH, and lowering dissolved oxygen or causing downstream bank erosion.

3. General Conditions

The applicant of the activity/discharge shall:

- a. Report any non-compliance with the conditions of this Blanket Certification to the USACE POH. Do not report or submit compliance related information to DOH. This Blanket Certification is a condition of the USACE POH permit.⁴
- b. Maintain records at the project site or in the nearby field office demonstrating that all Blanket Certification requirements have been fully complied with.
- c. Ensure that all activities are conducted in a manner that will comply with the "Basic Water Quality Criteria Applicable to All Waters" as specified in HAR 11-54.
- d. Ensure that all material(s) placed or to be placed in State waters are free of waste metal products, organic materials, debris, and any pollutants at toxic or potentially hazardous concentrations to aquatic life as specified in HAR 11-54.
- e. Ensure that the activities will not permanently interfere with or become injurious to any designated uses and/or existing uses of the receiving State water. Any permanent adverse impacts to the designated uses and/or existing uses of the receiving State water is a violation of HAR Chapter 11-54.
- f. Ensure that pollution control measures and BMPs are utilized that prevent water pollutants from leaving the in-water work area authorized by the USACE POH permit.⁵ Any visual plume emanating from the authorized in-water work area is a violation of HAR Chapter 11-54.
- g. Ensure that all construction debris from any portion of the activities (including but not limited to debris caused by hydraulic saws, water jets, or drilling equipment) are contained and prevented from entering or re-entering State waters. All construction debris and sidecast material shall be properly removed from the aquatic environment and disposed of at an upland State and county approved site. Before the start of the activities, a Solid Waste Disclosure Form for Construction Sites shall be completed and returned to the DOH's Solid and Hazardous Waste Branch,

⁴ With respect to USACE projects granted coverage under Item 2.c above, non-compliance reports from USACE POH should be submitted to DOH CWB.

⁵ With respect to USACE projects granted coverage under Item 2.c above, the relevant in-water work area is identified in the USACE project.

Office of Solid Waste Management. No construction material or construction related materials shall be stockpiled in the aquatic environment or stored or placed in ways that will disturb the aquatic environment. The Solid Waste Disclosure Form for Construction Sites is available online at:

<https://health.hawaii.gov/shwb/files/2018/04/swdiscformapr2018.pdf>.

- h. Utilize only BMPs that are inert and not sources of pollution themselves. Examples of inappropriate in-water porous material BMPs include but are not limited to: compost biosocks since they are a source of nutrients; and a soil berm since the soil particles will erode.
- i. Collect activity/discharge related water pollutants utilizing appropriate catchment/detention devices (e.g. construction debris, airborne particulates, dust, concrete slurry, concrete chips, concrete surface preparation washing effluent, excess water and overflow from boring related activity, horizontal directional drilling slurry, etc.) from localized work areas and minimize or prevent the release of these water pollutants into State waters, including the in-water work area.
- j. Utilize BMPs for all upland project activity to minimize the discharge of water pollutants into State waters, including the designated in-water work area.
- k. For a stream, ditch, or gulch: Allow unimpeded flow around the in-water work area to allow for aquatic animal migration and/or to prevent work site and downstream flooding situations. The unimpeded flow shall be equivalent to a 2-year, 24-hour duration storm event and/or the existing flow capacity of the stream, ditch, or gulch. Pumped diversions may be utilized if the stream, ditch, or gulch is dry or there is only standing/ponded water without the existence of living aquatic animals.
- l. Not discharge any type of wash water and/or effluent into State waters without first obtaining from DOH a National Pollutant Discharge Elimination System (NPDES) permit authorizing such type of water pollutant discharge to State waters.
- m. Not allow any concrete truck wash water to be disposed by percolation into the ground.
- n. Ensure that all areas temporarily impacted, either directly or indirectly, by the project construction activities are fully restored to its pre-construction conditions. For example: Incidental construction debris is cleaned up prior to removal of BMPs; remove all scientific measurement devices and any other structures or fills associated with installation and use of these

devices (e.g., foundations, anchors, buoys, lines, etc.) when no longer in use; etc.

- o. When projects involve dredging/excavation activities:
- (1) Be required to check the DOH, HEER Office Sites, Incidents and Records through the “Viewer” in iHEER at: <https://eha-cloud.doh.hawaii.gov/iheer>.⁶
 - (2) Be required to contact the HEER Office at (808) 586-4249 and through e-permitting Form “Notification of Construction Activities” at Form Finder <https://eha-cloud.doh.hawaii.gov/epermit/finder> if contaminated soil, sediment, vapor, or groundwater is known to be present at your project site. The applicant shall notify the HEER Office at least 90 days prior to surface and subsurface disturbing activities that may disturb the ground surface at HEER sites. If the 90-days prior notification is missed, the applicant shall notify the HEER Office as soon as possible to avoid any potential delays regarding the covered project.
 - (3) Contain return flow or runoff from upland dredged spoils dewatering site(s)/disposal site(s), including the confined disposal facility (CDF), which shall be contained on land and not allowed to discharge and/or re-enter any State waters without first obtaining the required discharge permit from USACE POH or CWB. Unless authorized by a USACE POH or NPDES permit, the applicant shall not allow any runoff, return flow, or airborne particulate pollutants from the excavated or dredged material dewatering or stockpiling site, including the CDF, to enter or re-enter State waters.
 - (4) Properly deploy warning signs, which shall be maintained until the portion of the in-water work is completed and the affected area water quality has returned to its preconstruction condition and turbidity control devices have been removed from the waterway.
- p. When projects involve moorings:
- (1) Avoid locating moorings (including anchors and floats) in sensitive aquatic habitats such as coral reefs, fish spawning areas, and submerged aquatic vegetation (unless location is acceptable to the Department of Land and Natural Resources, Division of Aquatic Resources or the National Oceanic Atmospheric Administration);
 - (2) Ensure moorings (including anchors and floats) are made of clean, inert material. Treated lumber shall not be used as it may contain

⁶ The HEER Office is currently updating site information for sites. Most, but not all, sites may be displayed on the viewer map. Site Document data upload is ongoing and not all documents may be currently available via this website. To get the complete record for the site, a record request form can be filled and submitted to the HEER Office. Users will then be notified when they are able to download all information via the iHEER system website.

- compounds that can be released into the water and become toxic to the aquatic environment;
- (3) Pre-cast and cure concrete anchors, if required, away from State waters prior to use to prevent seepage of potentially toxic substances into the waterbody;
 - (4) Locate moorings in depths that allow structures and vessels to remain afloat at the lowest possible water levels and that prevent propellers from disturbing bottom sediments;
 - (5) Select mooring anchors of an adequate size to secure vessels or structures and prevent the anchor from shifting or dragging along the bottom of the State water;
 - (6) Size the length of mooring lines, chains, or cables to avoid excess line, chain, or cable accumulation on the bed of the State water;
 - (7) Ensure native beach material such as logs, sand, gravel, and boulders that are important components of fish habitat are not used as mooring structures and are left in place on the foreshore;
 - (8) Properly dispose of derelict or unused floats, lines, chains, or cables in accordance with appropriate laws and rules; and
 - (9) Ensure moorings are kept in good repair by regularly inspecting and maintaining the structure. Mooring maintenance must be performed into perpetuity (or until it is properly disposed of) or it will itself become a pollution source.
4. USACE POH shall e-mail to CWB (cleanwaterbranch@doh.hawaii.gov and darryl.lum@doh.hawaii.gov) a pdf copy of all issued final verifications. This Blanket Certification coverage shall become valid with respect to an activity only when USACE POH notifies CWB via email of a project authorization/verification and conditions of this Blanket Certification have been incorporated as part of the USCE POH final verification; provided, that this email notification requirement shall not apply to activities that do not require a pre-construction notification, and this Blanket Certification shall automatically become valid with respect to such activities.


Mr. David S. Hobbie
April 28, 2022
Page 10

WQC1092.FNL.22

If you agree with the terms and conditions of this Blanket Certification, please sign and date below; make a copy for your administrative record; and submit this entire letter with your original signature to CWB within 14 calendar days from your signature date.

If you have any questions, please contact Mr. Darryl Lum of the Engineering Section, CWB, at (808) 586-4309.

Sincerely,


for
ELIZABETH A. CHAR, M.D.
Director of Health

- c: Regulatory Office, POH, COE [via e-mails linda.speerstra@usace.army.mil only]
- Ms. Debra Mendes, CZM Program, Office of Planning, DBEDT
[via e-mail debra.l.mendes@hawaii.gov only]
- U.S. Fish and Wildlife Service [via e-mail pifwo_admin@fws.gov only]
- U.S. National Marine Fisheries Service [via e-mail pirohonolulu@noaa.gov only]
- Division of Aquatic Resources, DLNR [via e-mail dlnr.aquatics@hawaii.gov only]
- CWRM, DLNR [via e-mail dlnr.cwrn@hawaii.gov only]
- OCCL, DLNR [via e-mail dlnr.occl@hawaii.gov only]
- DHO (Hawaii, Maui, Kauai) and EHS, Molokai/Lanai [via e-mail only]

I AGREE WITH THE TERMS AND CONDITIONS OF THIS LETTER:



David S. Hobbie
Regional Regulatory Chief
Honolulu District

DATE



US Army Corps of Engineers, Honolulu District

DEPARTMENT OF THE ARMY PERMIT
COMPLIANCE CERTIFICATION

File Number: POH-2016-00040

Project Title: HDOT, Kamehameha Highway Pedestrian Safety Project, Laniakea Beach, Haleiwa, Oahu, HI

Subject: Department of the Army Permit Compliance Certificate

PERMIT TYPE: Nationwide Permit #14, (Linear Transportation Projects)

NAME OF PERMITTEE: Sergio Abcede

DATE OF ISSUANCE: August 2, 2023

DATE OF EXPIRATION: March 14, 2026

The permittee must, upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address or via email within thirty (30) days of completion of work:

Honolulu District US Army Corps of Engineers
Regulatory Branch
Building 230, CEPOH-RO
Fort Shafter, HI 96858-5440
Email: CEPOH-RO@usace.army.mil

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with the terms and conditions of this permit, you are subject to permit suspension, modification or revocation.

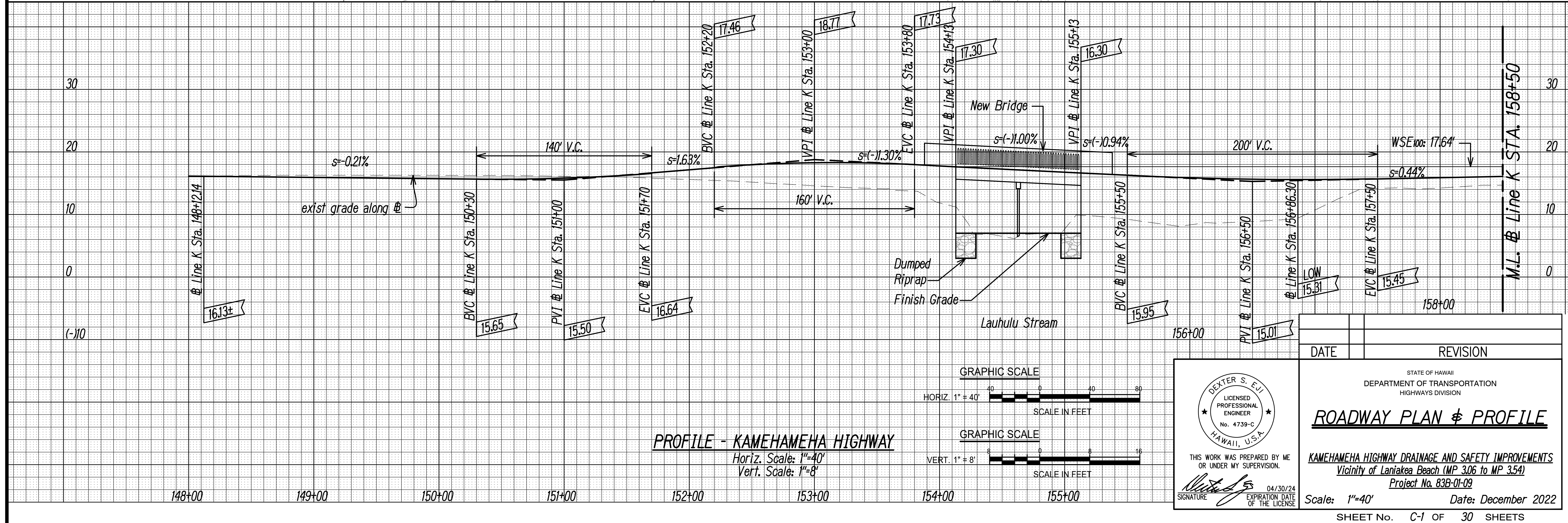
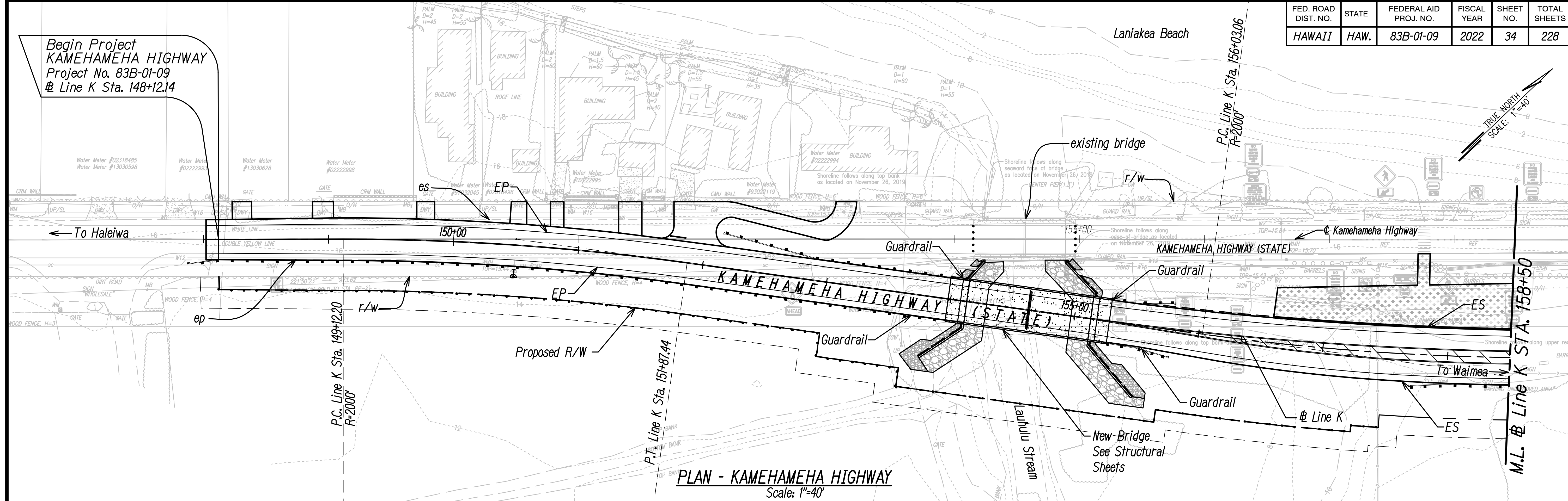
I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

Signature of Permittee

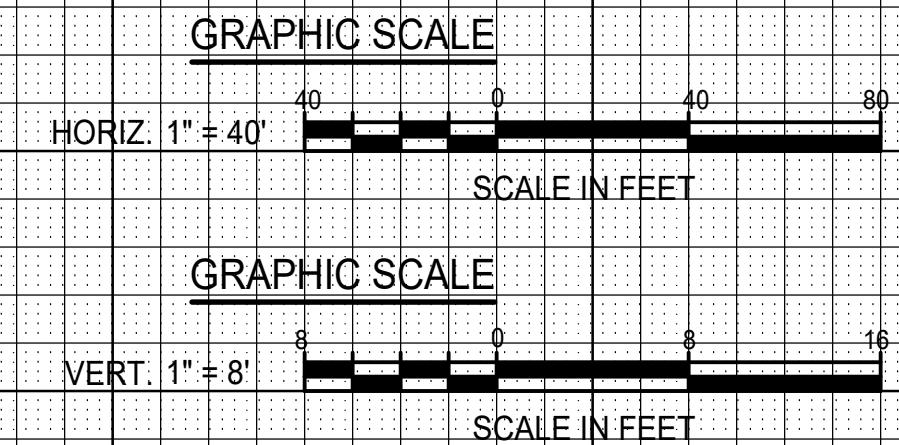
Date

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83B-01-09	2022	34	228

Begin Project
KAMEHAMEHA HIGHWAY
Project No. 83B-01-09
@ Line K Sta. 148+12.14



DATE	BY
DESIGNED BY	QUANTITIES BY
CHECKED BY	



DEXTER S. EJI
LICENSED PROFESSIONAL ENGINEER
No. 4739-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
SIGNATURE: [Signature]
EXPIRATION DATE OF LICENSE: 04/30/24

DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN & PROFILE

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS
Vicinity of Lanikea Beach (MP 3.06 to MP 3.54)
Project No. 83B-01-09

Scale: 1"=40' Date: December 2022

SHEET No. C-1 OF 30 SHEETS



Looking toward the ocean from the middle of the Lauhulu stream bed.



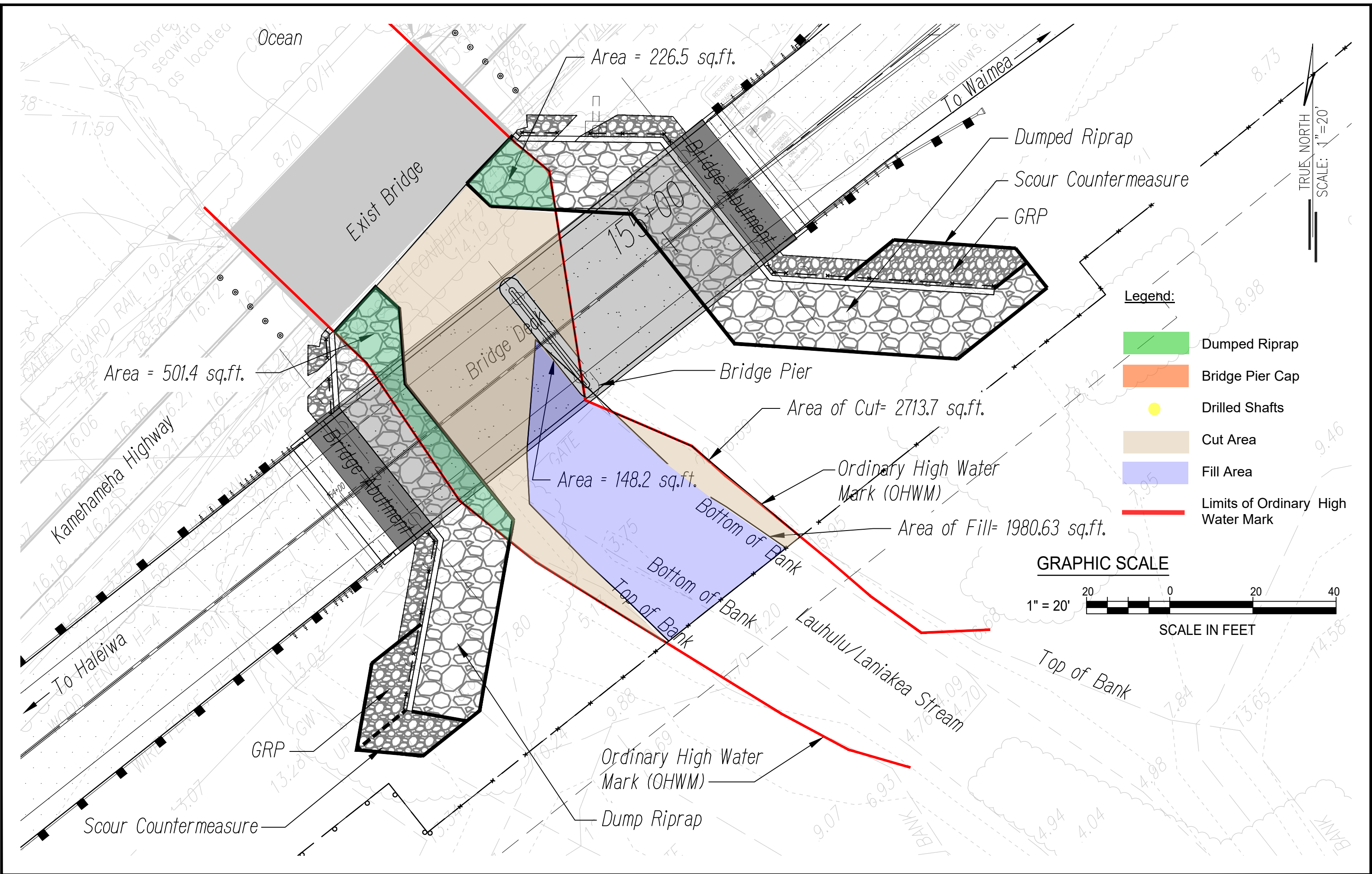
Looking toward the ocean from the approximate location of the new bridge.



View from under existing bridge to location of new bridge.



View of existing bridge from beach.



Area = 226.5 sq.ft.

Area = 501.4 sq.ft.

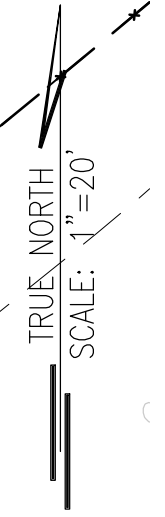
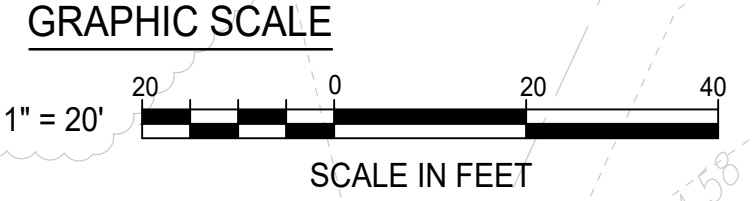
Area = 148.2 sq.ft.

Area of Cut = 2713.7 sq.ft.

Area of Fill = 1980.63 sq.ft.

Legend:

- Dumped Riprap
- Bridge Pier Cap
- Drilled Shafts
- Cut Area
- Fill Area
- Limits of Ordinary High Water Mark



Kamehameha Highway Drainage and Safety Improvements
 Vicinity of Laniakea Beach
 Proj No. 83B-01-09

Fill Material Calculations

Assumptions:

Finish Grade Elevation= 7' MSL
 Water Surface Elevation within OHWM = 6' MSL
 Length of Drilled Shafts = 60'

Dump Rip Rap

	Area	Thickness below WSL	Volume (CF)	Volume (CY)
Haleiwa	501.4	3	1504.2	55.71
Waimea	226.54	3	679.62	25.17
			Total	80.88

Drilled Shafts

No of drilled shafts	Length	Diameter	Volume (CF)	Volume (CY)
3	60	3	635.85	23.55

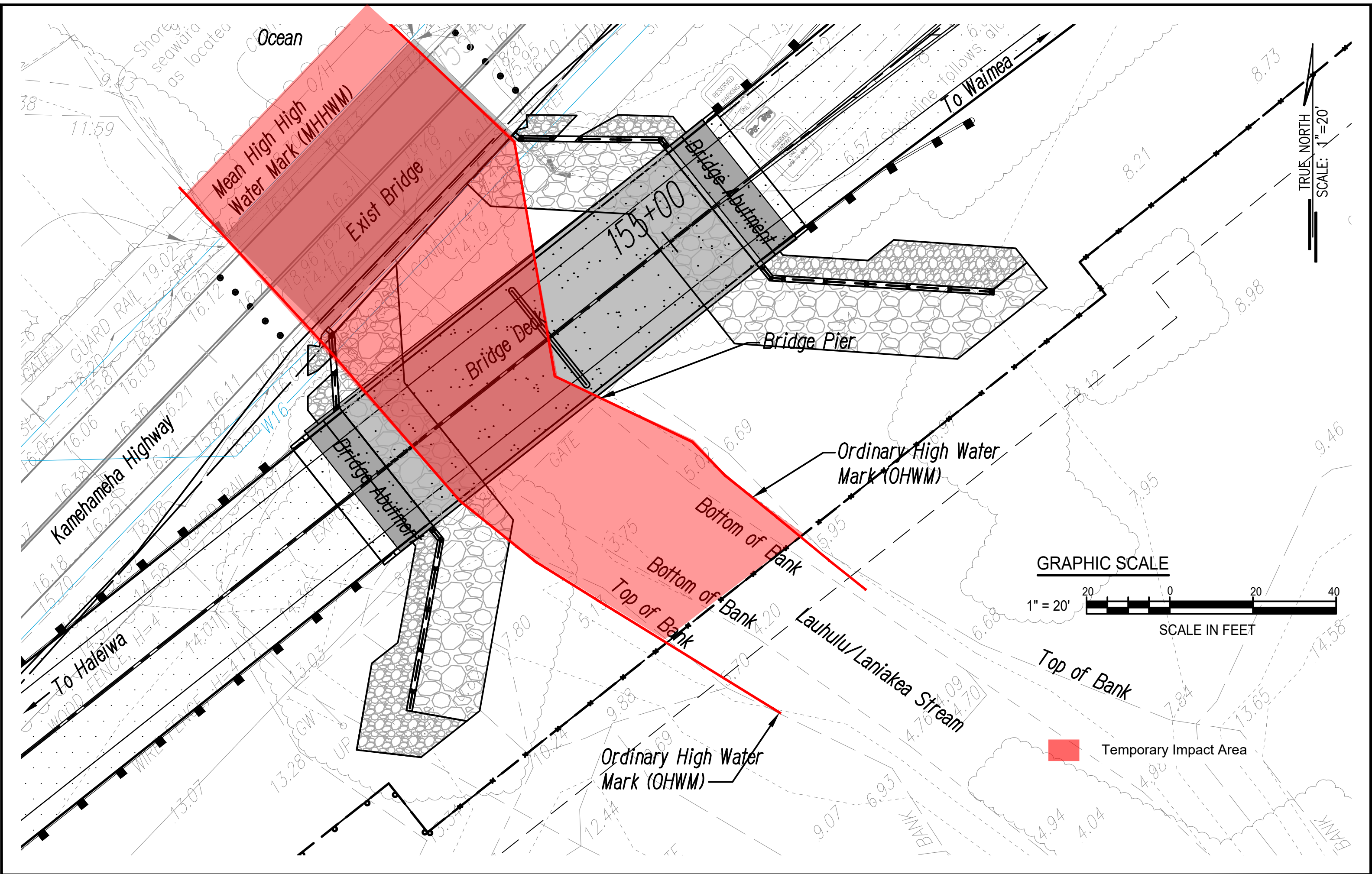
Pier Cap

Area	Thickness	Volume (CF)	Volume (CY)
148.2	3	444.6	16.47

Total Concrete Fill Material 40.02

Fill Material above WSL to finish grade

Area	Thickness	Volume (CF)	Volume (CY)
1980.63	1	1980.63	73.36





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

August 2, 2023



SUBJECT: Nationwide Permit Verification for HDOT, Kamehameha Highway Pedestrian Safety Project, Laniakea Beach, Haleiwa, Oahu, HI Department of the Army File No. POH-2016-00040

Sergio Abcede
Highways Administrator
Hawaii Department of Transportation
869 Punchbowl St.
Honolulu, HI 96813

Dear Mr. Abcede:

The Honolulu District, U.S. Army Corps of Engineers (Corps), Regulatory Branch has completed review of your Pre-Construction Notification dated June 6, 2023 requesting authorization for the proposed new bridge construction located in Laniakea Steam near the Kamehameha Highway. Please reference Department of the Army (DA) file number POH-2016-00040 in any future correspondence related to this permit.

This letter verifies your activity complies with the terms and conditions of Nationwide Permit (NWP) #14, (Linear Transportation Projects) issued on issued on March 15, 2021. This NWP verification letter is being issued pursuant to Section 404 of the Clean Water Act for the discharge of dredged and/or fill material into waters of the U.S. You are authorized to conduct the following work below the ordinary high water mark (OHWM) as described below and as depicted on the enclosed drawings (Enclosure 1):

- Installation of three three ft diameter shafts drilled 60 deep below the OHWM capped with a pier cap for the purpose to support a central pier for the bridge.
- Dumping ungrouted riprap on the inside of the abutments on either side of the stream. Approximately 55.71 cy of riprap below the OHWM on the Haleiwa side of the stream. Approximately 25.17 cy of riprap on the Waimea side of the stream for a total of approximately 80.88 cy if riprap.
- A temporary platform below the OHWM constructed from approximately 73.36 cy of geotextile fabric and gravel to be removed upon completion of the project.

Based upon the information and plans you provided, we hereby verify that the work described above, which would be performed in accordance with the enclosed plan (sheets 1-6), dated December 2022, is authorized by Nationwide Permit (NWP) No. 14, Linear Transportation Projects. NWP No. 14 and its associated Regional and General

Conditions can be accessed at:

<https://www.poh.usace.army.mil/Missions/Regulatory/Permits/Nationwide-Permits/>. You must comply with all terms and conditions associated with NWP No. 14.

Verification of your project under this NWP is valid until **March 14, 2026** unless this NWP is modified, reissued, or revoked prior to that date. It is incumbent upon you to remain informed of changes to the NWPs. If the Corps modifies, reissues, or revokes any NWP at an earlier date, we will issue a public notice announcing the changes. Failure to comply with all terms and conditions of this NWP verification invalidates this authorization and could result in a violation of the Clean Water Act **and/or** Rivers and Harbors Act and subsequent enforcement action. This authorization does not relieve you of the responsibility to obtain any other federal, state, and/or local authorizations required by law.

Your project complies with the requirements of the Clean Water Act, Section 401 Blanket Water Quality Certification (WQC) WQC1092.FNL.20 issued for this Nationwide Permit by the State of Hawaii Department of Health, Clean Water Branch. You are responsible for complying with the attached General Conditions of this WQC (Enclosure 2).

Your project complies with the requirements of the Coastal Zone Management Consistency Concurrence for this Nationwide Permit issued by the State of Hawaii Department of Business, Economic Development and Tourism, Office of Planning during the Nationwide Permit reissuance process in 2021.

Finally, General Condition #30 requires a signed certification be submitted to this office upon completion of work. Therefore, please sign, date and return the enclosed *Compliance Certification* form (Enclosure 3) within 30 days of completion of work to the email address specified below or to the mailing address indicated on the letterhead above.

Thank you for your cooperation with the Honolulu District Regulatory Program. Should you have any questions related to this authorization, please contact me at 808-835-4307 or via e-mail at Michael.A.Maaninen@usace.army.mil. You are encouraged to provide comments on your experience with the Honolulu District Regulatory Office by accessing our web-based customer survey form at <https://regulatory.ops.usace.army.mil/ords/f?p=136:4>.

Sincerely,

A handwritten signature in cursive script, appearing to read "Michael Maaninen".

Project Manager, Regulatory Branch

Enclosures

Electronic cc:

State of Hawaii Department of Health, Clean Water Branch

Darryl C Lum darryl.lum@doh.hawaii.gov

State of Hawaii Office of Planning, Coastal Zone Management Program

Debra.L.Mendes@hawaii.gov

JOSH GREEN, M.D.
GOVERNOR OF HAWAII
KE KIA'AINA O KA MOKU'AINA 'O HAWAII



KENNETH S. FINK, MD, MGA, MPH
DIRECTOR OF HEALTH
KA LUNA HO'OKOLE

STATE OF HAWAII
DEPARTMENT OF HEALTH
KA 'OIHANA OLAKINO
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
EMD/CWB

R10H138.FNL.23

April 21, 2023

Via e-mail george.abcede@hawaii.gov only

Mr. Sergio George G. Abcede
Highways Administrator
State of Hawaii
Department of Transportation
Highways Division
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Abcede:

**Subject: NOTICE OF GENERAL PERMIT COVERAGE (NGPC)
National Pollutant Discharge Elimination System (NPDES)
Kamehameha Highway Drainage and Safety Improvements,
Vicinity of Laniakea Beach (M.P. 3.06 to M.P. 3.54)
Haleiwa, Island of Oahu, Hawaii
File No. HIR10H138**

This letter is to notify you that:

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

(Permittee) is now covered under the NPDES General Permit authorizing discharges of storm water associated with construction activities. This only authorizes the Permittee to discharge to certain receiving State waters discharge point(s) from certain project location(s), all as identified in the Notice of Intent (NOI) e-Permitting Submission:

HPK-V4DK-Z1X5X
(submitted online on March 14, 2023);

provided that Permittee shall comply with applicable administrative rules¹ and the information submitted in the NOI (Administrative Requirements).

Unauthorized Discharges. Discharges of any pollutants not authorized by or not in accordance with HAR Chapter 11-55 Appendix C, including unauthorized discharges of storm and non-storm water, process and non-process wastewater, toxics, nutrients, and other water pollutants to State waters are prohibited. This NGPC cannot be modified (not including changes to contact information), including additions of discharge point locations.

Term. This NGPC shall take effect on the date of this letter. **This NGPC shall expire at midnight, February 8, 2024**, or when amendments to HAR Chapter 11-55 Appendix C, are adopted, whichever occurs first.

Certain Requirements. As a reminder, this NGPC requires the Permittee, among other things, to do the following.

1. Notify the Department of Health (DOH) of the construction start date within seven (7) calendar days before the start of construction activities.
2. Complete and submit the Solid Waste Disclosure Form for Construction Sites to the DOH, Solid and Hazardous Waste Branch, Solid Waste Section, as specified on the form within seven (7) calendar days before the start of the construction activities. The form can be downloaded at: <https://health.hawaii.gov/shwb/files/2018/04/swdiscformapr2018.pdf>.
3. Implement the Storm Water Pollution Prevention Plan (SWPPP) in accordance with HAR Chapter 11-55, Appendix C. The Director of Health reserves the right to require the Permittee to modify the SWPPP.
4. In the event there are any revisions to the information submitted in the NOI (with the exception of changes to contact person information for non-transfer of ownership and changes to the SWPPP), submit a new NOI with filing fee and obtain a new NGPC.
5. Complete and submit the Notice of Cessation (NOC) within seven (7) calendar days after the end of the month that the subject project was completed.

Compliance Submittals. All NGPC compliance submittals, including the NOC, Notification of Start of Construction or Discharge, Discharge Monitoring Report, and other required information shall be submitted on the CWB Compliance Submittal Form for Individual NPDES Permits and NGPCs.

¹ Hawaii Administrative Rules (HAR) Chapter 11-54; HAR Chapter 11-55; HAR Chapter 11-55, Appendix A; HAR Chapter 11-55, Appendix C. HAR Chapters 11-54 and 11-55 are available on the DOH, Clean Water Branch website at: <https://health.hawaii.gov/cwb/>.

This form shall be completed on the e-Permitting Portal located at:
<https://eha-cloud.doh.hawaii.gov/epermit>.

Other Authorizations. The Permittee is responsible for obtaining other Federal, State, or local authorizations as may be required by law.


Failure to Comply. Failure to comply with Administrative Requirements is an enforceable violation and this NGPC may be terminated. Violations may be enforced pursuant to Hawaii Revised Statutes (HRS) Chapter 342D and are punishable by civil and criminal penalties thereunder.

Falsification of Information. Providing information (including in the NOI) that does not accurately describe what is actually occurring at the project site/facility, may result in criminal penalties for the Permittee and their authorized representative as provided in Clean Water Act², Section 309 and HRS § 342D-35.

DOH Survey. Please complete the DOH Customer Satisfaction Survey regarding your request for General Permit coverage. This brief survey is available on the e-Permitting Portal located at: <https://eha-cloud.doh.hawaii.gov/epermit>. Please use the Application Finder button and search for the "Customer Satisfaction Survey."

If you have any questions, please contact the CWB Enforcement Section or Mr. Darryl Lum of the Engineering Section at (808) 586-4309.

Sincerely,



JOANNA L. SETO, P.E., CHIEF
Environmental Management Division

BGS:ki

- c: Ms. Jan Reichelderfer, WSP USA [via e-mail jan.reichelderfer@wsp.com only]
Mr. Robert Sun, HDOT [via e-mail robert.sun@hawaii.gov only]
Oahu District Engineer, HDOT [via e-mail mike.medeiros@hawaii.gov only]
DOH-HEER [via e-mail heernotify@gmail.com only]

² Federal Water Pollution Control Act, 33 USC § 1251, *et seq.*

An Archaeological Monitoring Plan for the Proposed Realignment of Kamehameha Highway in the Vicinity of Laniākea Beach

TMK: (1) 6-1-005:023 and 024; 6-1-009:021 and 022;
and 6-1-010:019 and 020

Kawailoa Ahupua'a
Waialua District
Island of O'ahu

DRAFT VERSION



Prepared By:
Carol Oordt, M.A.
and
Nick Belluzzo, M.A.

Prepared For:

WSP USA Inc.
1001 Bishop Street,
Suite 2400
Honolulu, HI 96813

March 2023



Archaeology • History • Anthropology • Architectural History

Hilo Office: (808) 969-6066 Fax: (808) 443-0065
507-A E. Lanikaula Street, Hilo, HI 96720

Honolulu Office: (808) 439-8089 Fax: (808) 439-8087
820 Milliani Street, Suite 700, Honolulu, HI 96813

ASM Project Number 41130.00

DRAFT

An Archaeological Monitoring Plan for the Proposed Realignment of Kamehameha Highway in the Vicinity of Laniākea Beach

TMK: (1) 6-1-005:023 and 024; 6-1-009:021 and 022;
and 6-1-010:019 and 020

Kawailoa Ahupua‘a
Waialua District
Island of O‘ahu

DRAFT

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1. INTRODUCTION

At the request of WSP, on behalf of the State of Hawai'i Department of Transportation (HDOT), ASM Affiliates (ASM) has prepared this archaeological monitoring plan for the proposed Kamehameha Highway Pedestrian Safety Project in the vicinity of Laniākea Beach, Kawailoa Ahupua'a, Waiialua District, O'ahu (Figures 1 - 4). This archaeological monitoring plan has been prepared in compliance with the Department of Land and Natural Resources-State Historic Preservation Division's (DLNR-SHPD) Rules Governing Standards for Archaeological Monitoring Studies and Reports as contained in Hawai'i Administrative Rules (HAR) 13§13-279. As the highway improvements are being conducted with aid of monies from the Federal Highway Administration (FHWA), this plan has also been prepared in compliance with commitments made during the National Historic Preservation Act (NHPA) Section 106 process, and historic preservation review under Hawaii Revised Statutes (HRS) §6E-8, and any additional work that is performed during the monitoring project will be consistent with the *Secretary of the Interior's Standards and Guidelines for Archaeological Documentation* (48 FR 44734-370). A description of the proposed Undertaking and the Area of Potential Effects (APE) is presented below, followed by a summary of known historic properties, prior archaeological studies, and anticipated archaeological remains in the vicinity of the proposed project, and an outline of the procedures to be followed and implemented during the archaeological monitoring and subsequent reporting effort.

PROPOSED UNDERTAKING

The HDOT is proposing to improve Kamehameha Highway in the vicinity of Laniākea Beach. While funding when the project started in 2011 was specifically intended to address shoreline erosion, the major project purpose is now improving pedestrian safety. The proposed project will also address or accommodate coastal erosion to improve roadway reliability; relieve congestion to reduce travel times through the area; and provide safe facilities and access for vehicles, pedestrians, and cyclists. The entirety of the proposed alignment route is shown in Figure 5 and close-ups of the southern half and northern half are shown in Figures 6 and 7. Improving this section of Kamehameha Highway was identified as a priority in the 2003 *Statewide Highway Shoreline Protection Study* (Edward K. Noda and Associates 2003), which noted imminent or actual highway damage due to waves; and in the *North Shore Sustainable Communities Plan* (City and County of Honolulu 2011) that identified serious traffic congestion in this area. Concerns raised by the community included the need to address traffic congestion that impacts emergency vehicle response time, the desire to promote alternative modes of transportation and minimize the number of cars on the roadway, and the need for roadway improvements that correct safety deficiencies.

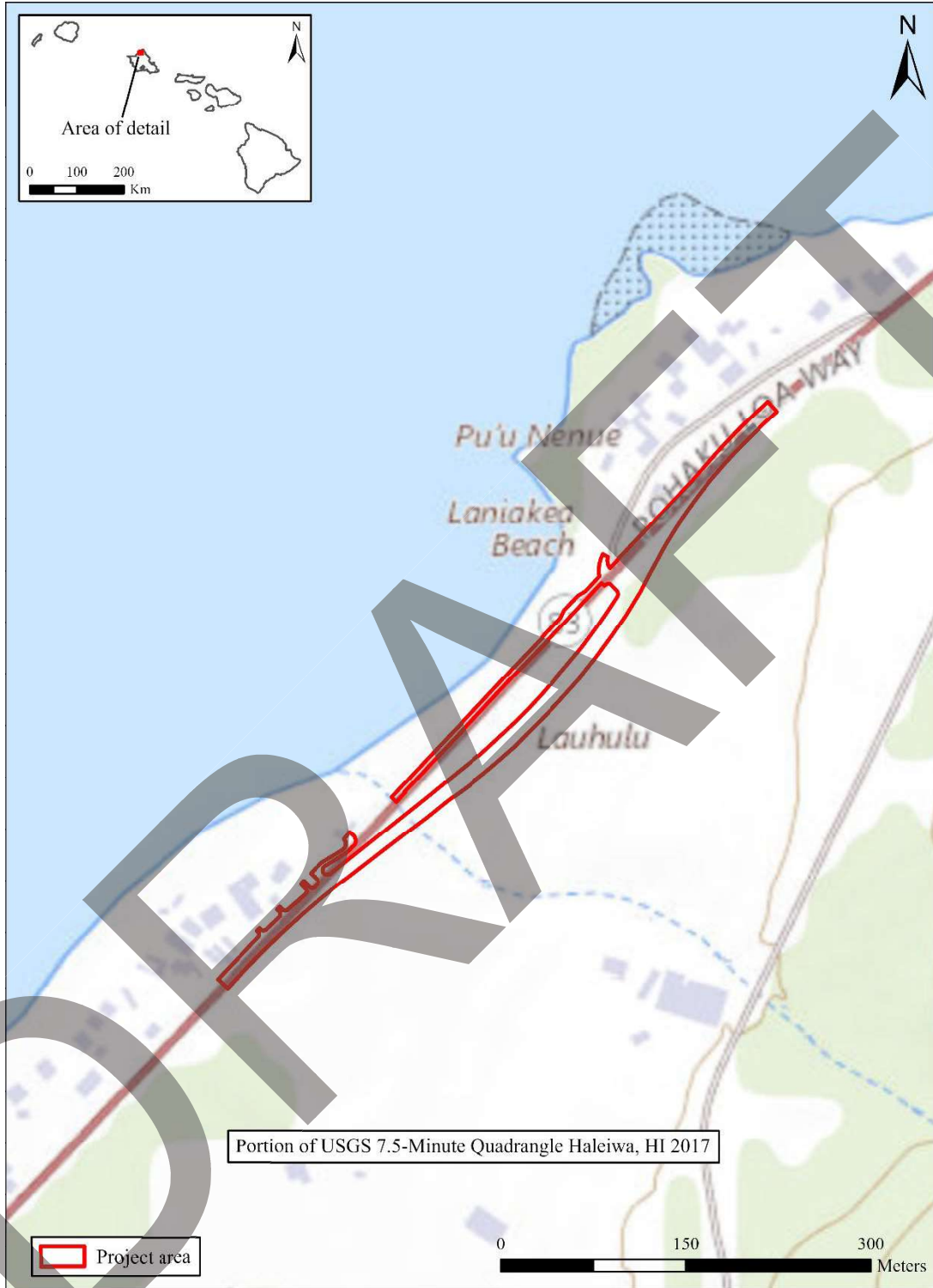


Figure 1. Portion of a 1996 USGS 7.5 Quadrangle Haleiwa with project area.

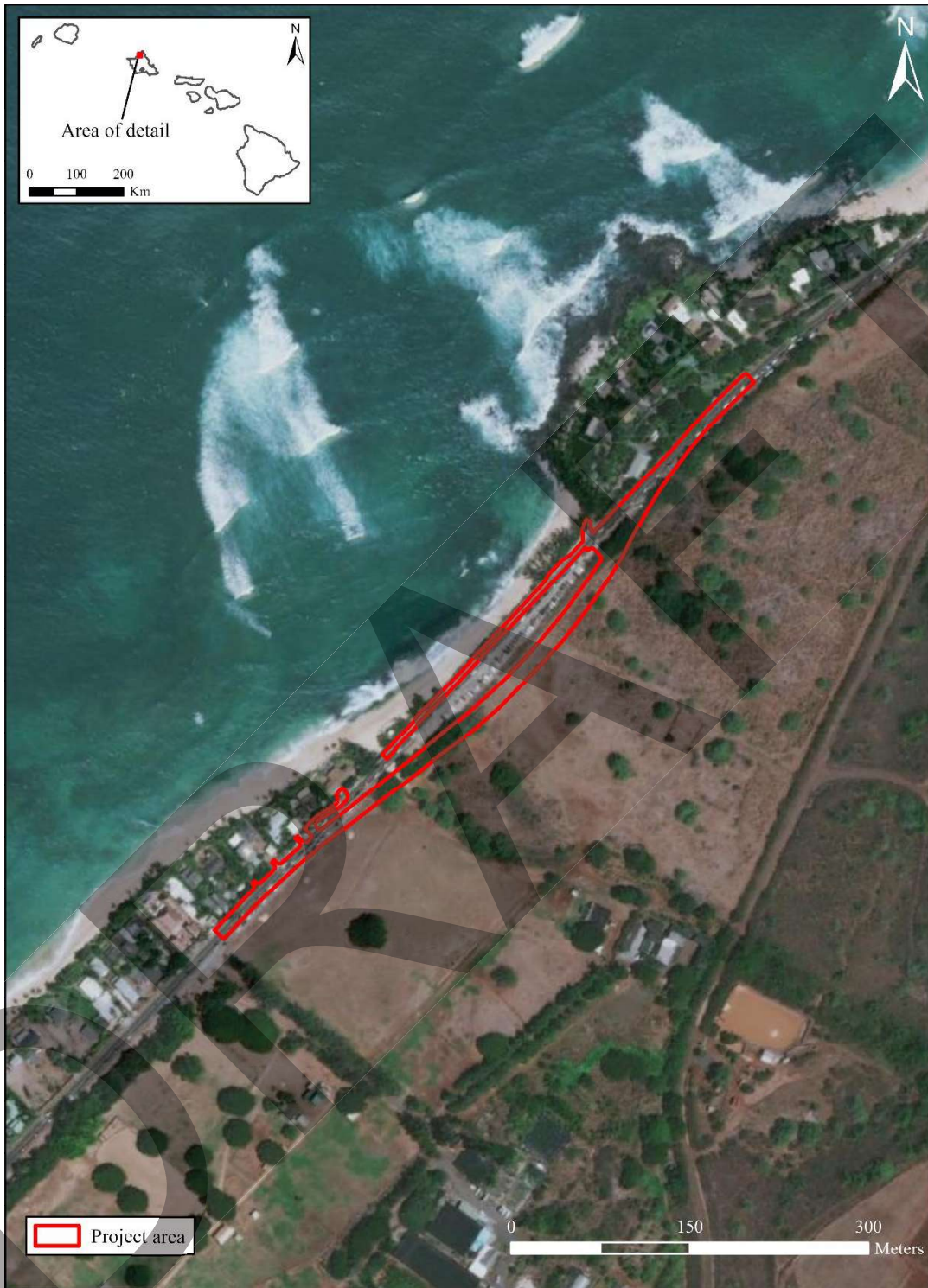


Figure 2. Recent satellite imagery with project area.

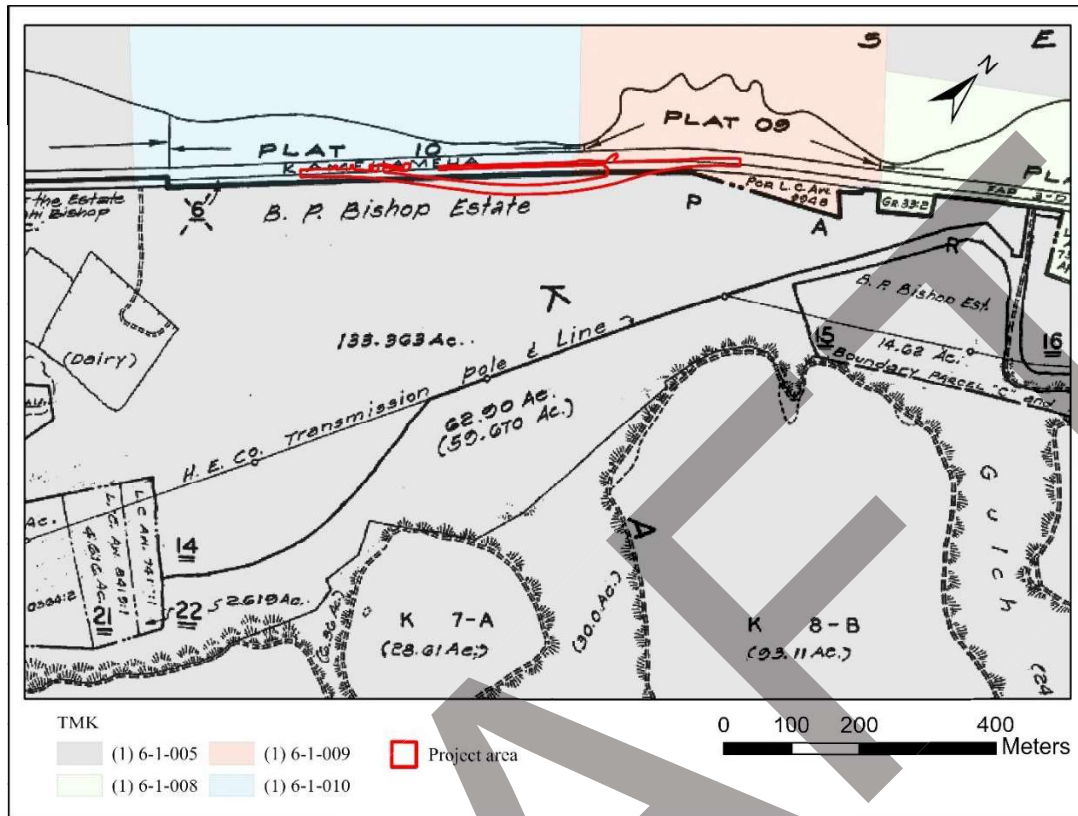


Figure 3. Tax Map Key (TMK) map for plats (1) 6-1-005, -009, and -010.

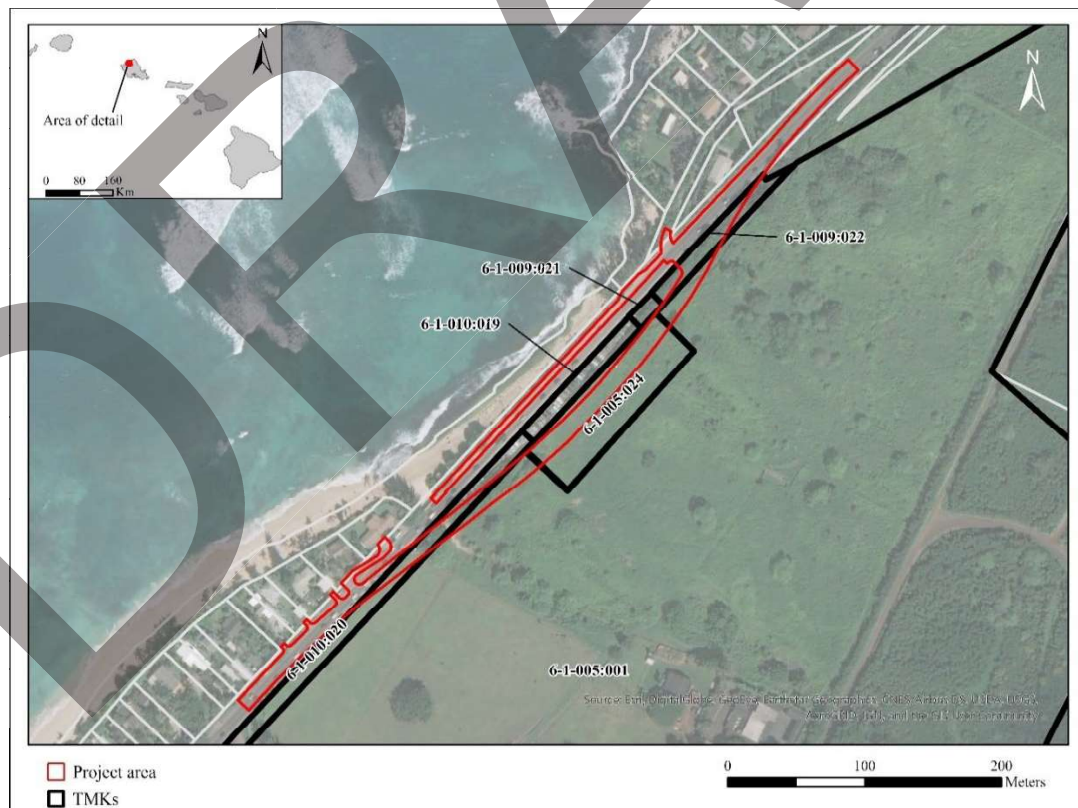


Figure 4. Aerial with project area outlined in red and TMK parcels shown outlined in black.

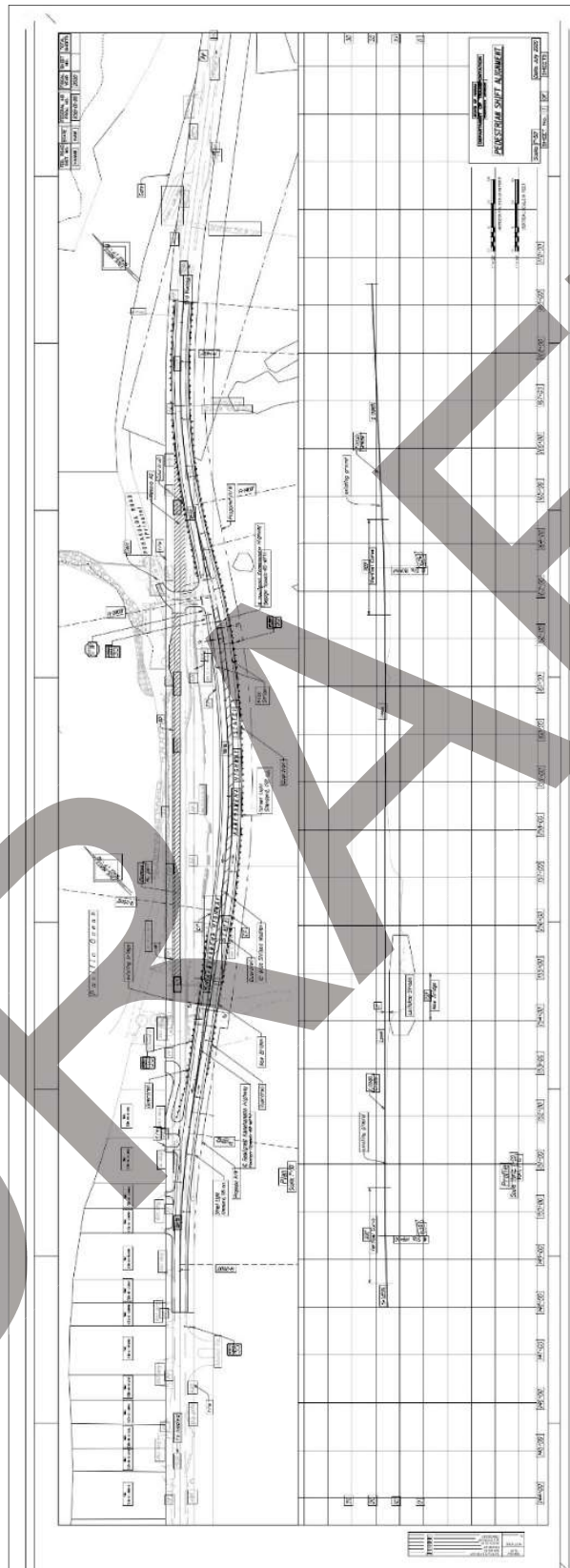


Figure 5. Proposed alignment route in the vicinity of Laniākea Beach.

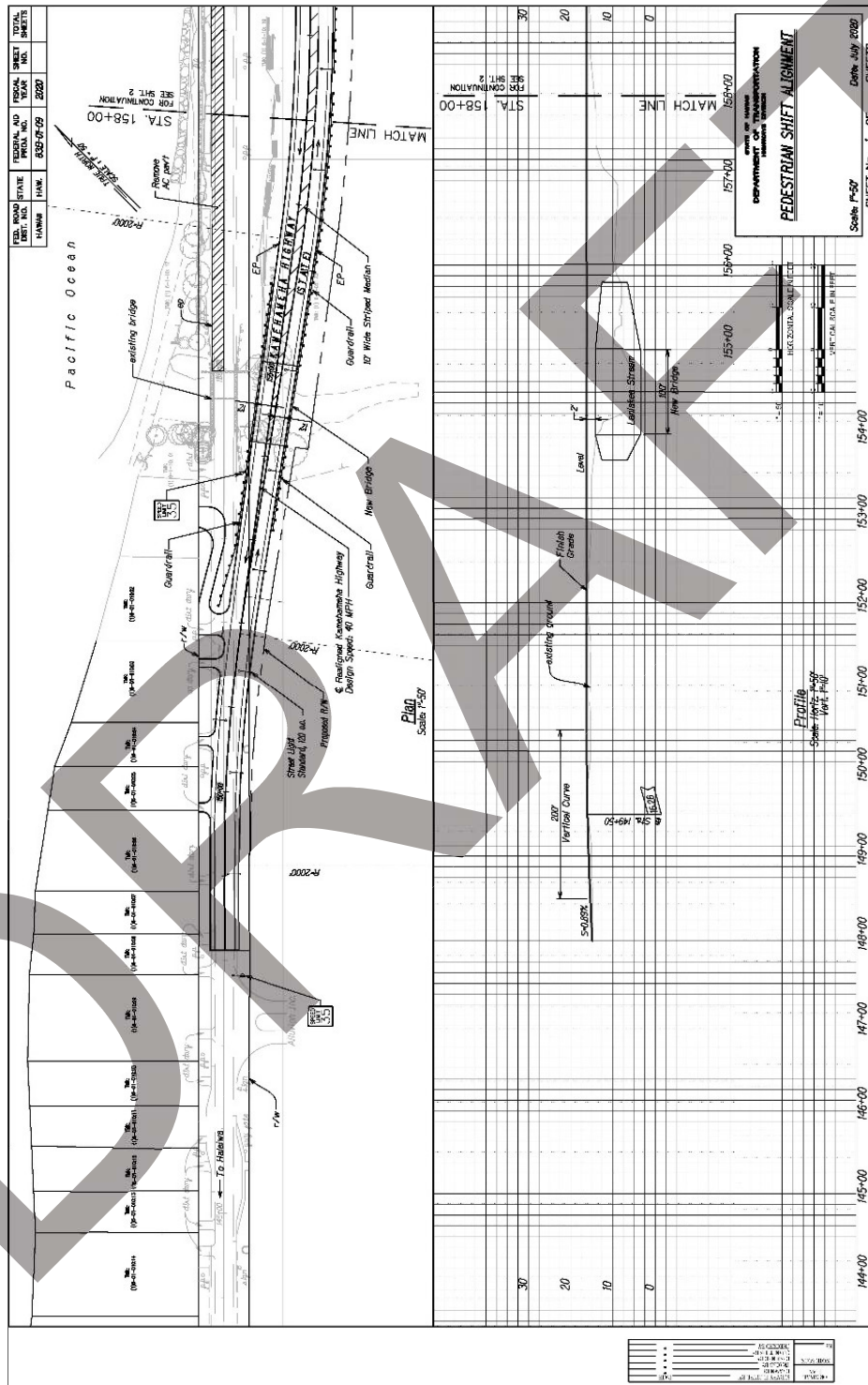


Figure 6. Close up of the southern section of the proposed alignment.



Figure 7. Close up of the northern section of the proposed alignment.

PROJECT AREA

The project area is located roughly two miles northeast of Hale'iwa Town within the coastal lowlands of the *ahupua'a* of Kawailoa in the Waialua District, Island of O'ahu and will extend for roughly 600 meters between the driveway entrance to Kawailoa Ranch (former Meadow Gold Dairy) to the northern side of the Highway's intersection with Pohakuloa Way (see Figure 3) and include the following TMKs: (1) 6-1-005:023 and 024; 6-1-009:021 and 022; and 6-1-010:019 and 020. The proposed project area includes the existing portion of Kamehameha Highway near Laniākea Beach and the proposed realignment route which extends eastward (*mauka*) onto adjacent lands and reconnects with the existing Kamehameha Highway.

The elevation within the study area ranges between sea level and 15 feet above sea level. The underlying geology in the northern portion of the project area is Ko'olau Basalt that is dated to between 1.8 to 3 million years (mapped in Figure 9 as "QTKl"). Moving in a southerly direction this basalt gives way (may be superseded by) alluvial deposits (mapped in Figure 9 as "Qa") and ultimately beach deposit (mapped in Figure 9 as "Qbd") occupy the southern half of the study corridor. Overlaying the geology, the soils within the study area are primarily mapped as Waialua silty clay (mapped in Figure 8 as "WkA," on a 0 to 3 percent slope) with a small amount of Waialua stony silty clay (mapped in Figure 8 as "WIB," on a 3 to 8 percent slope); the soil mapping also shows small amounts of Beaches (mapped in Figure 8 as "BS") and Jaucas sand (mapped in Figure 8 as "JaC" on a 0 to 15 percent slope) within the project area (Foote, et al. 1972). Subsurface testing of the area, conducted as part of an archaeological inventory survey for the current project (Rechtman and Lauko 2021), demonstrated that sandy deposits occupy the entirety of portions of the project area which lie to the south of Lauhulu Stream drainage, a much greater extent than the soil mapping indicates.

Located within the subtropical climate zone, the mean annual precipitation within the current study area is roughly thirty-seven inches, with rainfall steadily increasing between the months of September through January. Rainfall gradually decreases between the months of February through August (Giambelluca, et al. 2013). The climate is relatively warm with a mean annual temperature ranging from 70° Fahrenheit during the winter months to 77° during the summer months (Giambelluca, et al. 2014). Vegetation within the study corridor reflects the fact that it has been used for grazing purposes for over a century. The area south of Lauhulu Stream drainage consists of grassed open pasture (Figures 10 and 11) and the area north of the stream drainage, based on underlying soils, contains a mix of grassed open pasture, *koa hāole* or *ēkoa* (*Leucaena leucocephala*), guinea grass (*Megathyrsus maximus*), *hau* (*Hibiscus tiliaceus*), Date Palms (*Phoenix* sp.), *kiawe* (*Prosopis pallida*), banyan (*Ficus benghalensis*), and mixed weed and grass species (Figures 12 - 15).

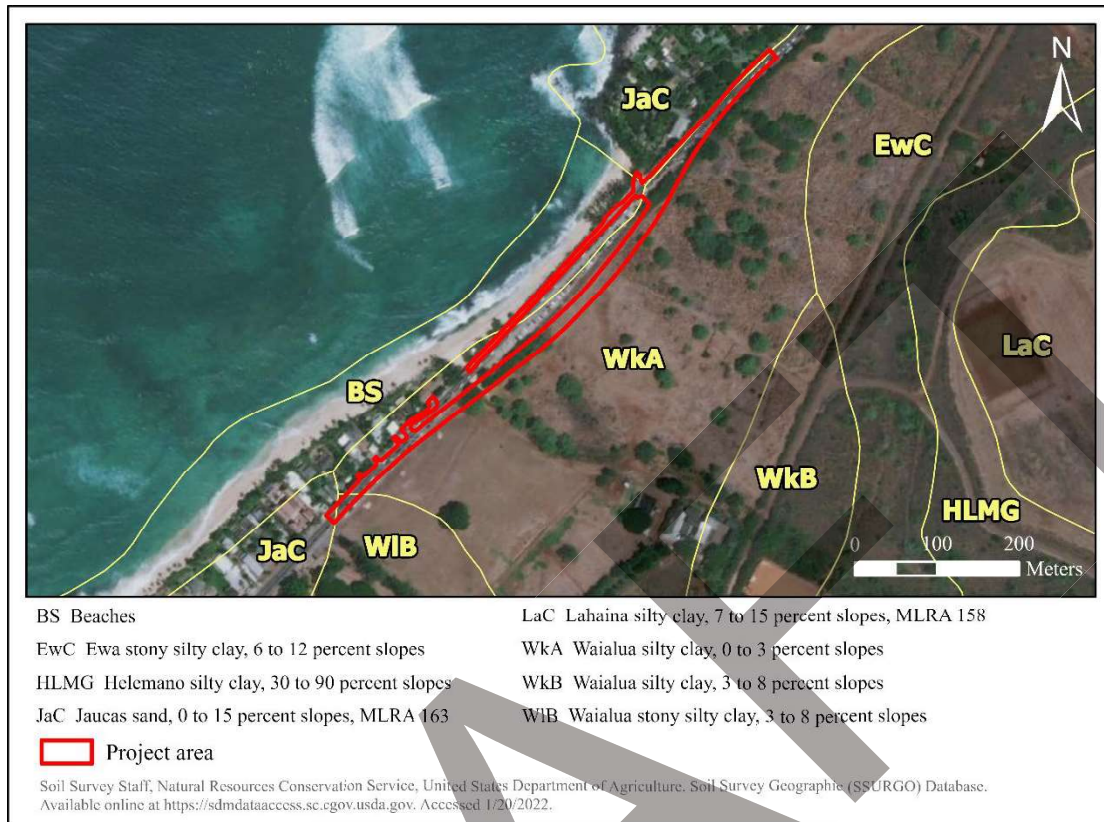


Figure 8. Aerial with soil survey overlay (Soil Survey Staff 2020).

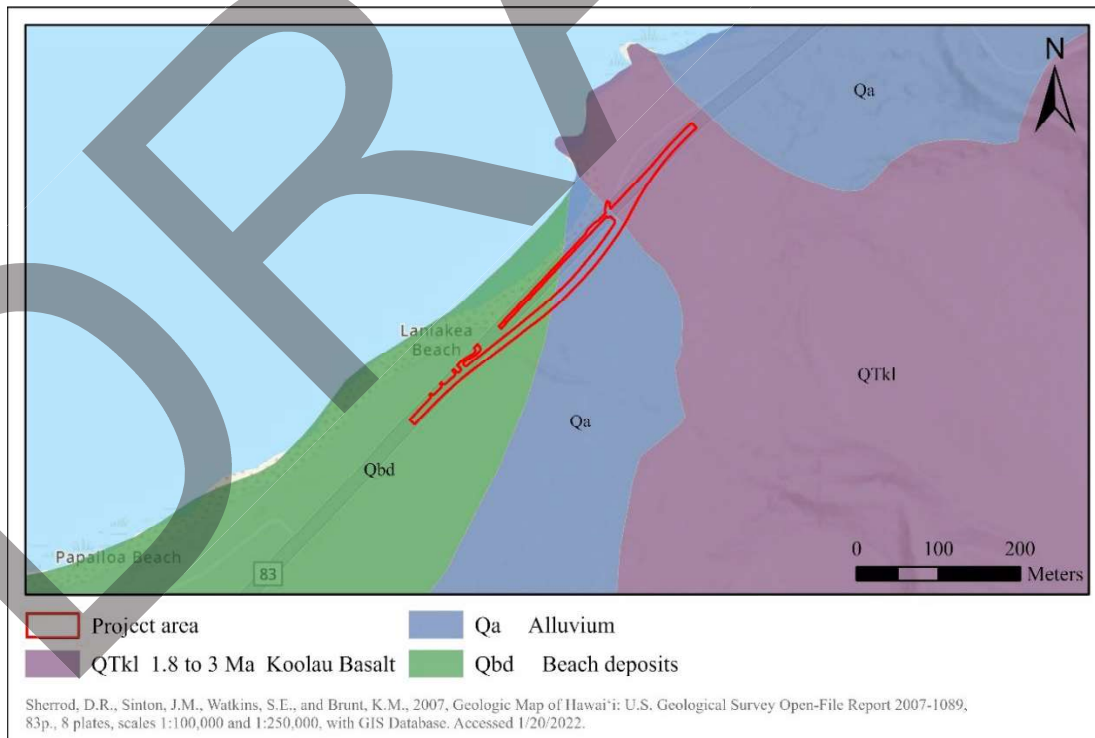


Figure 9. Portion of USGS map with geological overlay (Sherrod, et al. 2007).



Figure 10. Grassed open pasture in the southern portion of the project area, view to the northeast.



Figure 11. Edge of grassed open pasture at Lauhulu Stream drainage (in background), view to the north.



Figure 12. *Hau* and *kiawe* on the northern side of Lauhulu Stream, view to the northeast.



Figure 13. Grassed open pasture in the north-central portion of the project area, view to the northeast.



Figure 14. Grass and tree species in the northern portion of the project area, view to the northeast.



Figure 15. *Ēkoa* and banyan with mixed grasses in the northern section of the project area, view to the northeast.

2. CULTURE-HISTORICAL CONTEXT AND AHUPUA‘A SETTLEMENT PATTERNS

In an effort to provide a comprehensive and holistic understanding of the current project area, archival and historical data relevant to Kawaioloa Ahupua‘a along with the general settlement patterns for the Waialua District are presented.

CULTURE-HISTORICAL CONTEXT

The project area is located in the *ahupua‘a* of Kawaioloa, which has been translated by Pukui et al. (1974:98) as “the long water.” Kawaioloa is one of several *ahupua‘a* that together form the *moku* (district) of Waialua (Figure 16), whose literal translation means “two waters” (J. Clark 2002:373). It has been reported that the name Waialua “...refers to the confluence of two (*a lua*) streams (*wai*) to form the Waialua River” (Handy, et al. 1991:466). However, with respect to the naming of Waialua, Thrum (1901:8) reported the following:

Waialua district, Oahu, is said by natives to take its name from a *loi* (taro patch) situate near the former Halstead residence, and not from its twin streams as is generally supposed; the natural definition of the name being two waters. It was an ancient saying of the people that if one visited and traveled through the district and did not see this identical *loi* he had not seen Waialua.

In S. K. Kuhano’s 1873 report on the ancient land divisions of O‘ahu, he explained that the *moku* of Waialua was traditionally comprised of fourteen *ahupua‘a*: Ka‘ena, Keālia, Kawaihāpai, ‘Auku‘u, Kikahi, Mokulē‘ia 1, Mokulē‘ia 2, Kamananui, Pa‘ala‘a, Kawaioloa, Lauhulu, Kukuiloloa, Punanue, and Kāpaeloa (c.f. Kame‘eleihiwa 1992a). Research revealed that the current project area extends across the traditional land divisions of Kukuiloloa and Punanue, which were two of four land division that were subsumed into Kawaioloa Ahupua‘a at the time of the 1848 *Māhele ‘Āina*. While this report will refer to the single post-*Māhele* Kawaioloa Ahupua‘a, information specific to Kukuiloloa and Punanue, although limited, are also included.

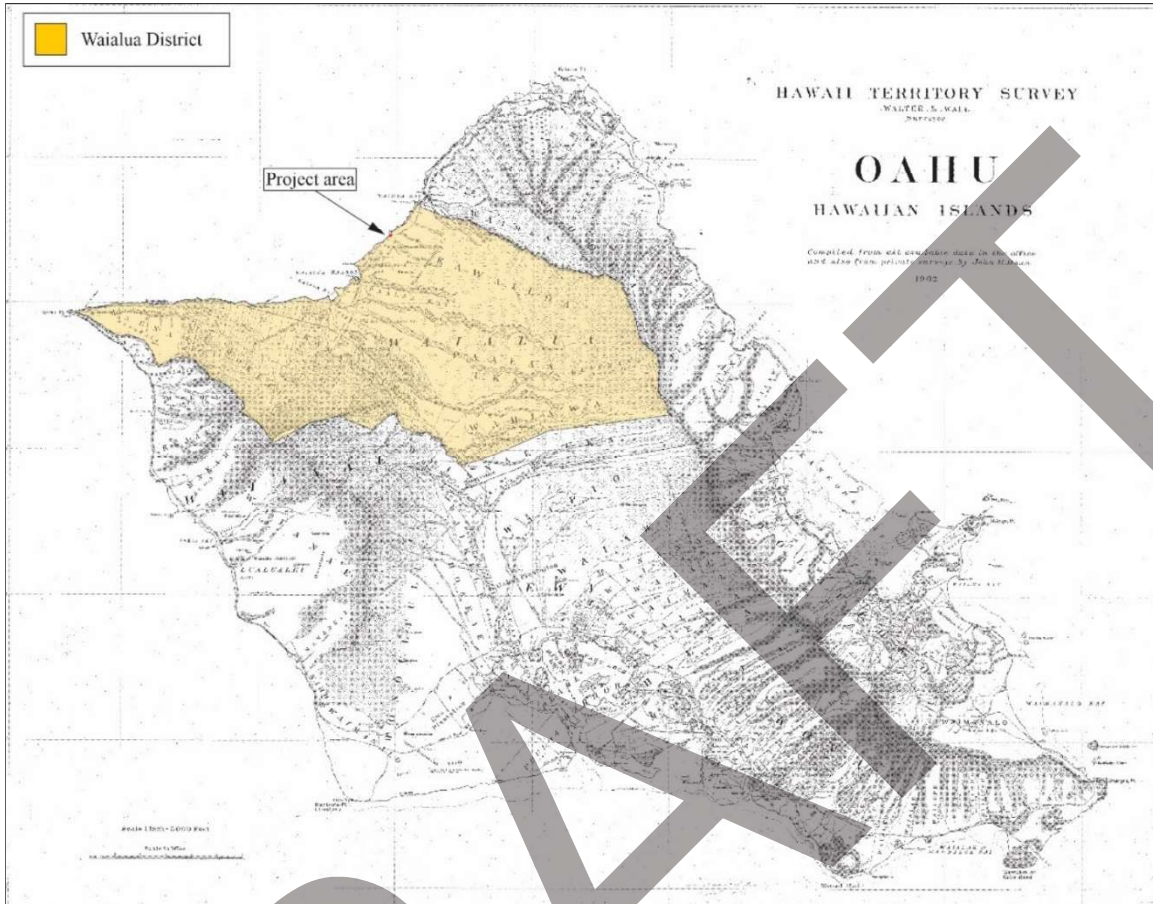


Figure 16. Hawai‘i Registered Map No. 2374 by J. M. Donn from 1902 showing the project area (shaded red) within the Kawailoa Ahupua‘a, Waialua District.

Kawailoa, with its expansive well-watered landscape including the Anahulu River Valley (Figure 17), is considered one of the ecological centers for Waialua during both Precontact and Historic times. In describing the general characteristics of Waialua as it appeared during their study conducted in the 1930s, Handy et al. in their book *Native Planters in Old Hawai‘i* provided the following description:

Waialua, on its seaward slopes, was as generously endowed with water as any area on Oahu. Much of the gently sloping and level land now covered by sugar cane, the sugar mill, and the town was formerly covered with wet-taro terraces. And beyond these was a great spread of *kula* land with red soil (where sugar cane now flourishes) which was ideal terrain for sweet-potato planting. The Wai‘anae range gave this area rich hinterland. Waialua had a fine bay with a broad beach, and there were several fishponds which are described below. Altogether this was the most bounteously endowed area on the sunset coast. (Handy, et al. 1991:465-466)

As indicated by the subject *ahupua‘a* and *moku* names, *wai* (freshwater) was and continues to be a culturally important natural resource. Valued for its life-giving properties, *wai* permeated all aspects of traditional life. The word *wai* is found in several other words associated with water such as *kahawai* (river, stream, creek), *punawai* (spring), *‘auwai* (irrigation ditch), *lokowai* (freshwater pond, lake). The term *waiwai* (lit. water-water) is used to express the idea of prosperity and wealth of an individual or a place and refers to the abundance and access to fresh water (Handy, et al. 1991). The term *kānāwai* (law, rule, ordinance, to learn from experience) is also associated with water. The concept of *kānāwai* is said to originate from the customary practice of sharing water between neighbors especially for irrigated fields. Given that traditional irrigated fields were built along the water system, it was a customary practice for Hawaiian farmers to take only what water they needed, and to ensure those located below them had access to an ample and clean supply of water (Handy, et al. 1991). *Wai* was not just revered for its physical and life-sustaining properties but also for its spiritual importance.



Figure 17. Anahulu River located to the west of the current project area (Hawai‘i State Archives, PP-41-09-008).

Wai is considered a *kinolau* (physical manifestation) of the *akua* (deity) Kāne, who along with his companion Kanaloa (whose dominion was over the ocean), came to Hawai‘i from Kahiki (the ancestral homeland of the Hawaiian gods and people). Legend has it that Kāne and Kanaloa both enjoyed consuming ‘*awa*, a drink prepared by mixing the root of the ‘*awa* plant with fresh water. In their travels, they stopped at various places around the Hawaiian Islands and opened new freshwater springs from which they prepared their favorite drink (Handy, et al. 1991). The ‘*ōlelo no‘eau* (Hawaiian proverb) “*He huewai ola ke kanaka na Kāne*” literally translates as “[m]an is Kāne’s living water gourd,” and emphasizes the relationship that Hawaiians have to freshwater, and thereby to the deity Kāne (Pukui 1983:68). Handy et al. elaborated on the spiritual relationship that Native Hawaiians have to water:

Fresh water as a life-giver was not to the Hawaiians merely a physical element; it had a spiritual connotation. In prayers of thanks and invocations used in offering fruits of the land, and in prayers chanted when planting, and in prayers for rain, the “Water of Life of Kane” is referred to over and over again. Kane—the word means “male” and “husband”—was the embodiment of male procreative energy in fresh water, flowing on or under the earth in springs, in streams and rivers, and falling as rain (and also as sunshine), which gives life to plants. (Handy, et al. 1991:64)

Wai was also valued for its purifying properties. The continuous *mauka* to *makai* flow of *wai* provided fresh drinking water, supplied water to irrigated fields, and fishponds, recharged groundwater supplies and sustained productive estuaries and fisheries by transporting nutrients from the uplands to the sea (Sproat 2009). Because a flowing river was considered a vital artery for both the land and man, great care was paid to maintaining clean rivers. To that end, domestic duties involving the use of water were dispersed along the length of the river. For instance, “there was a place for bathing (‘*au‘au*) low down in the stream; a place up farther along the stream for washing utensils or soaking calabashes; still farther up were dams for ‘*auwai*; and above the dams was the place where drinking water was taken” (Handy, et al. 1991:61). Because of the high degree of dependency on *wai* to furnish and satisfy life’s needs, *wai* was a public trust resource that was considered inalienable.

Freshwater captured by the Ko‘olau Mountain on the east and the Wai‘anae Mountains on the west provided an abundance of freshwater that helped to shape the physical landscape, settlement, and cultural traditions of Waialua and Kawaiiloa.

Settlement Patterns and Cultural Traditions of Kawaiiloa Ahupua‘a and the Waialua District

During the Precontact and early Historic periods, densely populated areas of Waialua were centered along the floodplains near Kaiaka and Waialua bays, located to the southwest of the current study area in eastern Mokolē‘ia, Kamananui, Pa‘ala‘a, and western Kawaiiloa Ahupua‘a. Based on descriptions given by Handy et al. (1991:464), the lands lying westward from Waimea to western Kawaiiloa were considered a “...long, rather barren strip of coastal

2. Culture-Historical Context and Ahupua'a Settlement Patterns

land..." and that the areas beyond this were "rich in agricultural potential..." In the second volume of *Anahulu* titled *The Archaeology of History*, Kirch (1992) reconstructed the settlement patterns of late Precontact coastal Waialua based on Thrum and McAllister's descriptions of former archaeological sites, which he depicted on a map that has been reproduced here (Figure 18). According to Sahlins (1992:20), "Kamananui was the ritual and political center of Waialua" until the late 1820s, when "the political center shifted to the Anahulu Valley." Kirch (1992) originally suggested that Anahulu became more intensively used and modified after Kamehameha I occupied O'ahu in 1804. However in more recent reevaluations of dates from sites in Anahulu Valley, Dega and Kirch (2002), proposed that during the late A.D. 1700s, the upper portions of Anahulu Valley were abandoned and the middle and lower portions of the valley were the loci of agricultural and residential activity.

Prior to that, it appears that the settlement of *mauka* lands in Kawailoa (Kawailoa-uka) did not begin until the 14th century and remained rather limited until the late 16th century (Kirch 1992). The fertile and well-watered lands of Kamananui, Pa'ala'a, and western Kawailoa comprised the agricultural and aquacultural center of Waialua District, which has been described by (Sahlins 1992:20):

Geographically this heartland of Waialua consisted of the area around the neighboring bays—they are about a mile apart—of Kaiaka and Waialua. Into these bays, from their origins in narrow gorges deep in the mountains flowed four major streams. Dense settlements of people and large complexes of irrigated taro fields were situated on the floodplains of these streams. At Kamananui, the lowland fields were watered by means of a ditch some two miles long, the longest such waterway on O'ahu (McAllister 1933:133; Handy and Handy 1972:466). Irrigation on a smaller scale extended for a considerable distance up the river valleys, while rainfall agriculture was practiced on the adjoining slopes, upland plains (*kula*), and forest clearings in the higher gulches. Around Waialua Bay were two large and famous brackish water fish ponds 'Uko'a and Lokoea. Fish were also raised in the many smaller ponds of the same area as well as in taro pondfields (*lo'i*). Given such intensive production, the core region must have supported the substantial majority of the Waialua population, which was probably on the order of 6,000 to 8,000 people just before the coming of the Haole.

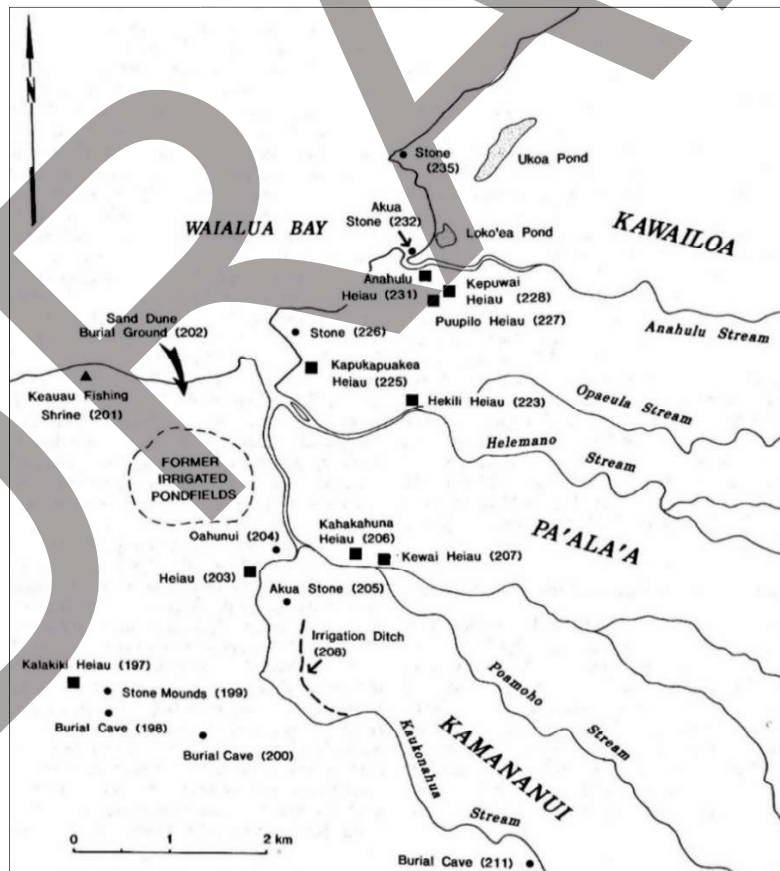


Figure 18. Map of major archaeological sites in coastal Waialua (Kirch 1992:18).

As evidenced by the following description from the 1930s given by Handy et al., Waialua was famed for its fishponds and extensive irrigated taro fields such as Lokoea and 'Ukoa (Figure 19):

Two large fishponds were among Waialua's greatest assets. Ukoa was a long, narrow fresh-water pond about a mile in length. Laniwai (Sky-water) was its *mo'o* guardian. With her lived her brother, Puhī-'ula (Red-eel). The pond was said to be connected with the ocean by a tunnel, through which the *mo'o* would go to bathe in the sea (McAllister, 1933, p. 142). Another pond named Lokoea is mentioned elsewhere. (*Ku'oko'a*, November 5, 1864) but this is not described

McAllister (1933, p. 133) also reports on Luakini fishpond, "once located on the summit of Mount Ka'ala," a fresh-water pond which was stocked with various shore or grazing fish, "*hinalea, wuwoa*, a kind of mullet and others," according to the native tradition. Kamaoha was the name of the *mo'o* goddess who dwelt in this pond. When McAllister visited the site, there was only a swamp.

The longest irrigation ditch on Oahu was at Waialua. It was about two miles long. "Along part of its course the ditch [water] flowed along the side of a hill about 50 feet high...the old ditch was made by piling stones on the lower side, with a rubble fill" (McAllister, 1933, p. 133). This ditch was rebuilt by Waialua Sugar Plantation and used for many years. The old ditch evidently irrigated taro *lo'i* in the area where the plantation mill stands. (Handy, et al. 1991:466)

In *Fragments of Hawaiian History*, Historian John Papa 'Ī'ī (1800-1870) recounts details of the extensive trail networks throughout O'ahu as he had experienced them in the early 19th century. 'Ī'ī mentions Kawailoa and the broader district of Waialua in his discussion of trails that connected the coastline with locales in the central plains of O'ahu. Over time, many of the trails became roadways including Kamehameha Highway which comprises much of the current project area (Figure 20).

When travelers arrived in Kaena in the morning, they escaped the heat, for they were cooled by the Moae breeze. They rested at Waiakaaiea until afternoon, then continued traveling along the level places of Kawaihapai and Mokuleia, thence across the mouth of the Kaiaka River and over the sand to the plains of Paalaa and Kawailoa to Kamani, a village with a pond, the boundary walls of which separated it from the Anahulu River.

On the opposite bank lies Maeaea, a sandy beach with a canoe landing and a good harbor for ships. A village stood at Leepoko Point, and nearby were the ponds of Ukoa and Lokoea, with many homes about them. Between the sandy stretch of Maeaea and the houses at Ukoa, on the seaward side, was the trail from Kamani to the place in front of the sluice gate of Lokoea, and on to Koolauloa.

From the stream of Anahulu and from Kamani, above the houses and taro patches, a trail stretched along in front of Kuokoa's house lot and the church. This trail went on to meet the creeks of Opauala and Halemano, the sources of the stream of Paalaa, on down to the stream of Poo a Moho, and on to the junction where the Mokuleia trail branched off to Kamananui and Keawawahie, to Kukanihiko, the birthplace of chiefs. (Ii 1993:98)

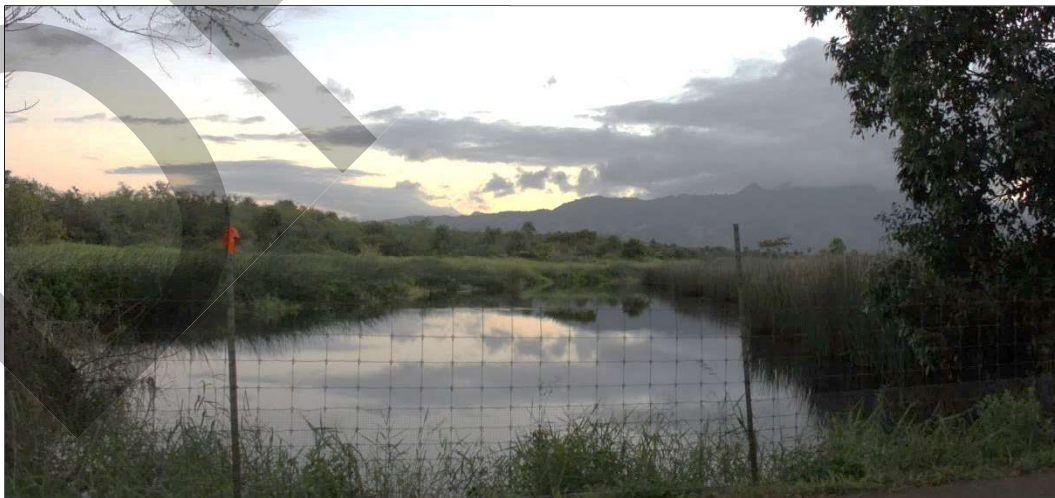


Figure 19. 'Uko'a Pond located southwest of the current project area.

He Mo'olelo Ka'ao Hawai'i no Lauka'ie'ie

Hawaiian historian, Moses Manu, published an ongoing column in the Hawaiian language newspaper *Ka Leo O Ka Lāhui* about the legendary account titled *He Mo'olelo Ka'ao Hawai'i no Lauka'ie'ie*. The story begins in Waipi'o on Hawai'i Island with the mysterious birth of Lauka'ie'ie who was taken with the permission of her parents and raised by the mountain goddess Hinaulu'ōhi'a. Lauka'ie'ie's parents had another child, this time a boy, who they named Makanike'oe, and the brother and sister were raised separately with no knowledge of each other. As the brother and sister matured, it was decided by their guardians that they would make suitable mates for each other, however, Lauka'ie'ie had set her eyes on another individual. A portion of the story published in the January 17, 1894 edition describes the travels of Makanike'oe through Waialua arriving from the north.

Upon departing the Ko'olauloa District and entering the Waialua District from the north, Makanike'oe and a companion stopped at the sands of Waimea to observe the imposing beauty of the land. As he reached Pupukea he came upon the guardian of the roadway, Keahuohapuu, who kept watch over the Ko'olauloa and Waialua boundary. The guardian paid little heed to Makanike'oe and he continued onward. Without delay, he quickly arrived at Kahokuwelowelo at Punanue and walked the plains of Lauhulu, where a multitude of people could be seen shouting as they watched Maaeaea, the famed girl who rides the waves of Pua'ena.

As he watched Maaeaea effortlessly riding the waves of Pua'ena, he heard the inviting calls of Laniwahine, who sat wading in her large pond of 'Uko'a. Cautious of not heeding the tempting calls of Laniwahine, Makanike'oe hurried past and made his way towards Mokulē'ia and Kawaihapai. (M. Manu 1894)

Kalamainu'u, Mo'o 'Aumakua of Waialua

Kalamainu'u, a *mo'o 'aumakua* (water spirit ancestor), resided at Makaleha, Mokulē'ia in Waialua on O'ahu (Kamakau 1976:80). To the west of Makaleha is a ravine called Waile'a where Kalamainu'u lived with her tongue stretched to the back of the cave. Her tongue also served as a surfboard for Puna'aikoa'e, her lover, with whom she spent every night and day. Puna'aikoa'e did not know that his lover was a *mo'o* and after a few months, he grew pale and frail. One day he was able to hike to the ridge and saw the surf break at Pua'ena, Waialua. He longed to surf and Kalamainu'u allowed him but warned not to talk to anyone on his way to the beach even if they called him by name. Puna'aikoa'e made his way towards the beach passing Pu'e'a, Hinalē's *heiau*, Makapu'uhale, and Kanoa where two men—Hinalē and 'Akilolo—were cultivating their crops. The pair called out to Puna'aikoa'e but he ignored them as he was instructed by Kalamainu'u. After several failed attempts of getting Puna'aikoa'e's attention, the two men ran towards the beach and said:

“We speak to you of life; if you refuse to listen you will die.”

Puna'aikoa'e turned and looked at them and said, “My wife laid down her decree saying that I must speak to no one; but perhaps she does not know that I am talking to you two.”

The men said, “Your wife is an *akua*; we cannot hide our talking together. She is Kalamainu'u, a *mo'o* of ‘forty thousand’ (*kini*) *mo'o*, a *mo'o* of ‘four hundred thousand’ (*lehu*) *mo'o*. Those are bodies of your wife. Because we pity you, we are telling you this. The surfboard you are carrying is your wife's tongue.” (1976:80)

Puna'aikoa'e asked for advice on how to be saved and the two suggested he escape to Hawai'i Island, bathe in freshwater and then see his wife, Kalamainu'u. However, on his return to their cave, he encountered the *mo'o* body of Kalamainu'u. They had warned him, “When she shows you her *akua* forms, be courageous or you will die. Instead, she will come to kill the two of us” (1976:80). Puna'aikoa'e was filled with terror but withstood it courageously. Kalamainu'u traveled *makai* to Hinalē and 'Akilolo and chased them until they disappeared into the ocean floor. Tired from chasing the pair of men, two of her companions—Kuaō and Ahilea—asked how they could be of assistance to Kalamainu'u. She explained the story from beginning to end about Hinalē and 'Akilolo. Kuaō and Ahilea offered Kalamainu'u the following advice in detail:

They were certainly in the wrong; they were supposed to be good brothers. You should kill them.

They like '*ohiki* crabs of this beach, to eat with the sweet potatoes which they cultivate in Kanoa, Keone'ae, and the uplands of Makaleha, but they are unskilled in torch fishing. You can cause their deaths through the their fondness of '*ohiki*. Go gather some '*inalua* vines, observing a kapu, and on your return weave them into a trap. Begin at the entrance and when the part that goes in [the funnel] is finished, then bend [the warps] back to form the container. Spread apart (*pu'umana a'e*) the '*inalua kukula* [the warps], and bend them to shape the round part of the basket. When you see that the container has filled out and is big enough, then decrease its size by pushing together (*hu'e*) the

'inalua kukula until the *hina'i* is completed. When the weaving of the *hina'i* is completed, the *kapu* will be over. Then go and dig *'ohiki* crabs, take the *hina'i* into the sea, put in a crevice so that the sea runs in and out. The name of such a 'good place' is *au* [haunt]. Remove pebbles until the *hina'i* is properly balanced. Then go to a coral head, chew the *'ohiki*, dive into the sea and place them in the *hina'i* and then go off to some distance. After a while dive again—*Hinale* and *'Akilolo* will have come to eat their favorite food and you will find your enemies there in the *hina'i*. (1976:82)

Kalamainu'u heeded their advice and followed their instructions. She killed *Hinale* and *'Akilolo* tearing them into pieces, which became the *hīnālea* (wrasse; *Labridae*) fish. *Kamakau* adds that those who wove *hina'i hīnālea* (specially made baskets for wrasses) observed these *kapu* and *hīnālea* were plentiful. It is also said that because there was so much *hīnālea* caught by setting traps, the waters from *Kumalaekawa* to *Ka'ena* had a distinct stench that emitted when they were dried. *Kalamainu'u* became an *'aumakua* for trap fishing (*Kamakau* 1976:82).

Ka-lo-aikanaka

Ka-lo-aikanaka or *Lo*, the man-eater, was the chief of a band of non-native cannibals that were banished to the foothills of *Waimea Ahupua'a* on *Kaua'i* (*Beckwith* 1970). *Ka-lo-aikanaka's* daughter was beautiful and eventually married a *Kaua'i* chief but was later sentenced to death for breaking a *kapu*. The band of cannibals retaliated by feasting on flesh and were ordered to leave the island. *Ka-lo-aikanaka* and his men first landed in the *ahupua'a* of *Kawailoa* before moving *mauka* towards the mountain of *Hā'upu* (*Beckwith* 1970). *Ka-lo-aikanaka's* servant, *Kaanokaewa*, built his home across the pass at a place known as *Kanewai*, and began to harm travelers by pushing them over the cliff. *Kaanokaewa's* wife, *Kahoehua* sees that her brothers are being pushed over and sacrificed to satisfy *Ka-lo-aikanaka's* insatiable appetite for human flesh. Her youngest brother, *Napopo*, escaped to *Kaua'i* where he learned the art of *lua* (hand-to-hand fighting). Upon *Napopo's* return to *O'ahu*, he fought with *Kaanokaewa* where both fell off the cliff and died. *Ka-lo-aikanaka* is obliged to sail with his band of followers to another land (*Beckwith* 1970).

Keaomelemele

The legendary account of *Keaomelemele* first appeared in *Ka Nūpepa Kū'oko'a* and was printed from 1861 to 1927 (*Moses Manu* 2002). The story of *Keaomelemele* was printed in a serial column beginning in September 1884 and ended in June 1885, appearing every week in approximately thirty-one *helu* (sections). The *mo'olelo* introduces *Mooi'aneā*, a supernatural *mo'o*, as well as male deities *Kū* and *Olopana* and female deities *Hiilei* and *Hinawe'elani* (*Moses Manu* 2002). The males and females were separated at birth to preserve their *mana* and at a later time, *Mooi'aneā* decided to introduce the children to each other one by one. First, *Kū* and *Hinawe'elani* met and immediately they fell in love. The pair eventually had five children together—*Kanaiakeakua* (m), *Paliuli* (f), *Keaomelemele* (f), *Kaumailiula* (m), and *Kaulanaikapokii* (f). The beginning of the *mo'olelo* centers around *Nu'uanu*, *O'ahu*, and the upper reaches of the valley. However, there is also a great deal of traveling done by all parties throughout the *pae 'āina* (archipelago) and a portion of their journey takes them through the current project area vicinity including the lands of *Pua'ena* and *Lauhulu*. The following passage describes *Mooi'aneā* traveling with her family to *Kawailoa Ahupua'a* to find a *kia'i* to guard her lands:

The great lizard made her decision and chose *Wewehilani* to guard the three lands. He was a lizard who was related to her and to him she gave everything including the authority. *Mooi'aneā* stood up and came after giving her last orders, "I am going because of the request of my lordly brothers, therefore, take care of the sacred borders of the Pillars of *Kahiki*." She left after she had finished speaking. It was said in this legend that before she left, she covered the islands with rain clouds and great darkness and they were invisible all night long. She arrived first at *Puaena* in *Waialua*. There she arranged her great company of lizards. The plain of *Lauhulu* in *Waialua* was covered with them. This was the first time that the supernatural lizards arrived on these islands. It was through the will of *Mooi'aneā*. This is how we know of the number of lizards, she set them two by two in the procession. When the first of the lizards reached the incline of *Kapukaki* (Red Hill). The last ones were still in *Lauhulu* and between the two places, from *Waialua* to *Ewa*, the places were covered with lizards. (*Moses Manu* 2002:157)

Pua'ena

Pua'ena Point is located southwest of the study area *makai* of *'Ukoa* fishpond (Figure 21). *Pua'ena Point* was the resting place for beloved *O'ahu* chief, *Elani* (*Sterling and Summers* 1978). He was placed on a ledge of rocks at the point where his body decomposed. His resting place became known as *Kahakakau Kanaka* or "the ledge where the man was placed" (*Alameida* 1994:28). The smell of his decomposing body wafted towards *Hale'iwa* and this area

became known as Māeaea or stench. On the other side of the point, the area became known as Kupava. The term Kupava is closely related to the word *kūpaoa* or “overwhelming smell” (Alameida 1994; Sterling and Summers 1978).



Figure 21. Pua‘ena Point (right) and project area located just beyond the edge of photo (UHM SOEST 2005).

The many *‘ōlelo no‘eau* (Hawaiian proverbs) and *mele* (songs) confirm a direct relationship which existed between the landscape of Kawaiiloa and the greater Waialua. For example, the saying, “*Ka ‘ehu kai o Pua‘ena*” or “the sea sprays of Pua‘ena” describes the misty appearance of the area from the surf, which was a known ancient surfing area (Fornander 1918-1919:616; Pukui 1983:140; Pukui, et al. 1974:190). The following *mele*, *Koni Au I Ka Wai*, written by King David Kalākaua describes the desire to visit the Kawaiiloa shoreline and to feel the sea spray of Pua‘ena, but is also a play on words or *kaona* (nuanced meaning) to the act of lovemaking (Kalākaua 1916).

<i>Koni au, koni au i ka wai,</i>	I throb, I throb for liquid
<i>Koni au i ka wai hu ‘ihu ‘i</i>	I throb for cool liquid
<i>I ka wai ali ‘i, ‘o ke kini lā</i>	Royal liquid, gin
<i>‘Olu ai ka nohona o ka la ‘i</i>	To make life cool and peaceful
<i>Ho ‘ohihi kahi mana ‘o</i>	In me springs a desire
<i>I ka ‘ehu kai o Pua‘ena</i>	For the sea spray of Pua‘ena
<i>Kai hāwanawana i ka la ‘i lā</i>	The whispering waters and peace
<i>I ka la ‘i wale a ‘o Waialua</i>	Of the shores of Waialua
<i>Alia ‘oe e ka ‘ehu kai</i>	Wait, o sea spray
<i>E lelehune nei i ke one</i>	Misting on the sands
<i>One hanau o ke kupuna la</i>	The birthsands of ancestors
<i>Pu‘ili lau li ‘i o ka uka</i>	Small-leafed bamboo of the uplands
<i>‘Akahi ho ‘i au la ‘ike</i>	Finally I have known
<i>I na la ‘i ‘elua</i>	Two-fold peace
<i>‘Ehua maua i ka la ‘i la</i>	We two in peace
<i>Kapipi i ka pali</i>	Liquid spattering on the cliff (Kalākaua 1916).

‘Ōlelo No‘eau of Kawaiiloa and Waialua

The oral tradition of Hawai‘i is perhaps best preserved in *‘ōlelo no‘eau*, which has been passed down throughout the generations. The following *‘ōlelo no‘eau* speak of Kawaiiloa Ahupua‘a and the greater Waialua. The following

proverbs illustrate the character of Kawailoa and Waialua in great detail and appear below as they were interpreted and published in *'Ōlelo No'eau, Hawaiian Proverbs & Poetical Sayings* by Mary Kawena Pukui (1983).

I Waialua ka po'ina a ke kai, o ka leo ka 'Ewa e ho'olono nei.

The dashing of the waves is at Waialua but the sound is being heard at 'Ewa.

Sounds of fighting in one locality are quickly heard in another. (Pukui 1983:137).

Like no Ka'ena me Waialua.

Ka'ena and Waialua are one.

Ka'ena Point is in Waialua. Similar to the saying, "Six of one and half a dozen of the other." (ibid:215).

Pupuhi ka i'a o Uko'a.

The fish of Uko'a is gone.

Uko'a is a famous pond in Waialua, O'ahu. Said of one who takes flight or of something quickly and secretly taken. (ibid:301).

Waialua, 'āina ku pālua i ka la'i.

Waialua, land that stands doubly becalmed.

Said in admiration for Waialua, O'ahu, where the weather was usually pleasant and the life of the people tranquil. (ibid.:318).

Chiefly Rule in Waialua

According to Hawaiian historian Samuel Kamakau, Waialua is known as the birthplace of the first Hawaiian chief: "Kapawa was the first chief to be set up as a ruling chief. This was at Waialua, Oahu, and from then on, the group of Hawaiian Islands became established as chief-ruled kingdoms" (1964:3). Kamakau (1991) further states that Kapawa was born at Kūkaniloko, the sacred birthplace built by his parents Nanakāoko (m) and Kahihioalani (f) both of whom were descendants of the famed 'Ulu line of chiefs. Fornander (1969) goes on to say that the distinction and privileges conferred upon the *ali'i* born at Kūkaniloko were so sought after that despite the decayed state of the sacred site in the late 18th-century, Kamehameha I had wanted Liholiho to be born there; however, Keōpuolani was unable to travel there for their son's birth due to illness.

In addition to Kūkaniloko being noted as the birthplace of Kapawa, Kamakau (1991:39), also describes it as the birthplace of many other distinguished *ali'i* including Mā'ilikūkahī, Kalanimanuiā [Kalaimanuiā], and Kākuhihewa, all of whom are celebrated O'ahu chiefs and noted for their deeds and establishing traditions that ultimately shaped different aspects of Precontact Hawaiian culture. In relating information about the life and accomplishments of Mā'ilikūkahī, Kamakau (1991:53) explains that:

Pua'a-a-Kahuoi was the father and Nononui the mother of Mā'ili-kūkahī. He was born at Kūkaniloko and was named the *ali'i kapu* for the land because of his dedication by the chiefs and priest and people; he had been vowed as such before the gods and had been anointed by the *kahuna*. Chiefs born at Kūkaniloko were the *akua* of the land and were *ali'i kapu* as well.

Kamakau (1991) goes on to add that that at about the age of twenty, Mā'ilikūkahī was chosen as the *mō'i ho'oponopono o ke aupuni* (administrator of the government), and after a rebellion, he replaced the *mō'i ali'i* (head chief) Haka, whose reign is characterized by his mistreatment of the chiefs and people. At the age of twenty-nine, Mā'ilikūkahī became *mō'i ali'i*, where he was taken to the *heiau* of Kapukapuākea in Pa'ala'a-kai in Waialua and consecrated and proclaimed as the *ali'i o ka moku* (chief of the island). Unlike other chiefs who took their kingdoms by force, the ceremonies conducted at Kapukapuākea for Mā'ilikūkahī were reserved for the "chiefs of Pōkano" or those chiefs who had maintained an absolutely pure royal bloodline since ancient times (Pukui in Kamakau 1991:54). Mā'ilikūkahī then moved O'ahu's royal center from Waialua and 'Ewa to Waikīkī in Honolulu. Another important hallmark of Mā'ilikūkahī's reign was his formalization of the land division system on O'ahu—a system that appears to have been later implemented on the other islands. Kamakau (1991:54-55) writes:

When the kingdom passed to Mā'ili-kūkahī, the land divisions were in a state of confusion; the *ahupua'a*, the *kū* [*'ili kūpono*], the *'ili 'āina*, the *mo'o 'āina*, the *paukū 'āina*, and the *kīhāpai* were not clearly defined. Therefore Mā'ili-kūkahī ordered the chiefs, *ali'i*, the lesser chiefs, *kaukau ali'i*, the warrior chiefs, *pū'ali ali'i*, and the overseers, *luna* to divide all of O'ahu into *moku* and *ahupua'a*, *'ili kūpono*, *'ili 'āina*, and *mo'o 'āina*. There were six districts, *moku*, and six district

chiefs, *ali'i nui 'ai moku*. Chiefs were assigned to the *ahupua'a* – if it was a large *ahupua'a*, a high chief, an *ali'i nui*, was assigned to it. Lesser chiefs, *kaukau ali'i*, were placed over the *kūpono* lands, and warrior chiefs over *'ili 'āina*. Lands were given to the *maka'āinana* all over O'ahu.

Once the land division system was ordered, Mā'ilikūhahi commanded that all classes of people cultivate the land with food and animals and that stealing would not be tolerated and punishable by death. He forbade theft, especially between the chiefs and *maka'āinana* lest they face death. He suspended the practice of human sacrifices at the *heiau luakini* and ordered that the eldest child of each family be cared for by him. Despite efforts from the Maui and Hawai'i Island chiefs to conquer O'ahu, Mā'ilikūhahi managed to eliminate his enemies and maintain peace over his kingdom. Because of his great concern for the prosperity of his kingdom, the people willingly obliged to Mā'ilikūhahi's commands, and he ruled peaceably and religiously. Kamakau (1991) stated that because of Mā'ilikūhahi's character as an *ali'i* the population of Waialua grew during his reign.

In addition to Mā'ilikūhahi, Kalanimanua, the famous chiefess who "lived *mauka* of Wahiawā" was born at Kūkaniloko around A.D. 1100 (Kamakau 1991:57). Similar to the rule of Mā'ilikūhahi, Kalanimanua's reign was peaceful, religious, and productive. She accordingly relieved the chiefs and *maka'āinana* of their taxes and engaged in no wars during her reign. Kalanimanua commanded that the chiefs and men erect *heiau* and construct *mua* (men's houses) to pray to their gods and ordered the construction of the fishponds Pā'ai, Opu, and Kapa'akea. Kalanimanua was married to Lupe-kapu-ke-aho-makali'i (Lupe), who was in the royal court of Mā'ilikūhahi, and together they had four children. During the reign of his wife, Lupe promoted the occupations of longline fishing and farming. After ruling for nearly sixty-five years, shortly before her death, Kalanimanua proclaimed her eldest son Kū-a-Manuia head of the kingdom, and to her daughter Kekela, she gave the lands of Waialua and Ko'olauloa. Unlike his benevolent parents, Kū-a-Manuia's manner of rule was harsh and he sought to take control over all of O'ahu, of which portions were ruled by his siblings. However, in his attempt to wage war on his younger brother Ka'ihikapu-a-Manuia, who held the allegiance of the *maka'āinana* and the other siblings, Kū-a-Manuia was killed. Ka'ihikapu-a-Manuia ruled peacefully over his kingdom and ordered the restoration of *heiau* that were destroyed during his elder brother's reign and made circuits around the island to initiate the new construction of *heiau* in honor of the deities, Lono, Kāne, and Kanaloa.

Ka'ihikapu-a-Manuia was married to Ka'ū-nui-a-Kānehoalani, who held the status as a "Kumuhonua, a *wohi*, and a *lō*" and to them was born Kākuhihewa (Kamakau 1991:61). In providing additional insight into the *lō* chiefs and their association to the uplands of Waialua, Kamakau (1964:5) explains:

The chiefs of Lihue, Wahiawa, and Halemano on O'ahu were called *Lo* chiefs, *po'e Lō Ali'i* ["people from whom to obtain a chief?"], because they preserved their chiefly kapus. The man had kapus, and the women had kapus, and when they joined their kapus and children were born, the children preserved their kapus. They lived in the mountains (*i kuahiwi*); and if the kingdom was without a chief, there in the mountains could be found a high chief (*ali'i nui*) for the kingdom. Or if a chief was without a wife, there one could be found—one from chiefly ancestors. Kauakahi'ailani, Ma'ilikukahi, Kalona, Piliwale, Kukaniloko, Pa'akanilea [Pa'akanilea], Ka'akaualani, Ka'au, Lale, Paoakalani, Pakapakaua, Nononui, Kokoloea, and a great many others were *Lo* chiefs.

After the death of Ka'ihikapu-a-Manuia, his son Kākuhihewa, inherited his kingdom as well as the status of *ali'i kapu* (Kamakau 1991). Born at Kūkaniloko, Kākuhihewa was ushered into his royal status following all the customs and ceremonies of the *ali'i* born at the sacred royal birth center. He was later taken to the 'Ewa District and raised by his *kahu* (attendant) in the lands of Wipi'o, Waiawa, and Mānana. Kamakau (1991:68) goes on to describe Kākuhihewa's love for his lands stating that:

'Ewa was a land much loved by Kākuhihewa. The warmth of Wai'anae and Wai'alua; the thickness of the *poi* of Wai'anae; the sweetness of the *poi* of Kamaile; the soft mullet of Lualualei; the two calm places of Wai'alua, 'Uko'a and Loko Ea, the centers of choice fish; the delicious *poi* of Ke-awāwa-ihe—all these were loved by the chief.

Kākuhihewa's reign mirrored those of his predecessors as he restored peace by populating the lands with loyal supporters who cultivated it to an extent previously unseen. Kamakau (1991:69) opines that during Kākuhihewa's reign, "O'ahu became known for its productiveness; its smell reached Kaua'i there was so much cultivation." Accordingly, Kamakau (1991:70) reports that O'ahu was so abundant that it attracted chiefs from Hawai'i Island and Maui which resulted in a mixing of the genealogies and was "one of the things that bound the chiefs together in ancient times." Skilled in the art of spear throwing, combat, and shooting rats with bows and arrows (*pana'iole*), Kākuhihewa established Pāmoa, his massive royal center at 'Ālele, Kailua. Because of his great benevolence and many deeds,

O‘ahu became known as “*ke one o Kākuhihewa*” (the sands of Kākuhihewa) and “O‘ahu-a-Kākuhihewa” (O‘ahu of Kākuhihewa) (Kamakau 1991:69, 70).

By the 17th-century, King Kualī‘i asserted his power over the priests in the Waimea area as part of his successful campaign to unify the entire Island of O‘ahu. Following unification, Kualī‘i continued to rule with the aid of the *kahuna nui*. *Kālaïmoku* was a special category of *kahuna nui* that advised chiefs concerning secular matters. A well-known *kālaïmoku* from Waimea, known as Kaopulupulu, became a prominent adviser to powerful rulers, first to Chief Kamahana and later to Chief Kahahana from the Island of Maui. However, the prophetic abilities of the charismatic Kaopulupulu lead to his fall-out with both these corrupt chiefs; by 1773 Chief Kamahana was removed, while later on the new Chief Kahahana had Kaopulupulu executed (Fornander 1969:129). During all this political intrigue that affected the entire Island of O‘ahu, Kaopulupulu officiated at both of the prominent *heiau* at Waimea; one being Pu‘u o Mahuka (Figure 22) on a high bluff north of where the river enters the ocean and the other being Kupopolo (Figure 23) near the beach south of the river mouth (Takemoto 1974:5).

Of the two *heiau*, more orally-transmitted information is available for the massive Pu‘u o Mahuka than for the smaller Kupopolo. Bingham (McAllister 1933:148) recorded a tradition that huge fires lit on an altar at Pu‘u o Mahuka can be seen as far as the Island of Kauai. The same tradition also claims that this *heiau* was the birthplace of prominent *ali‘i*. It is said that the much smaller Kupopolo Heiau, like Pu‘u o Mahuka, was used for human sacrifices, among other activities (Cluff 1968).

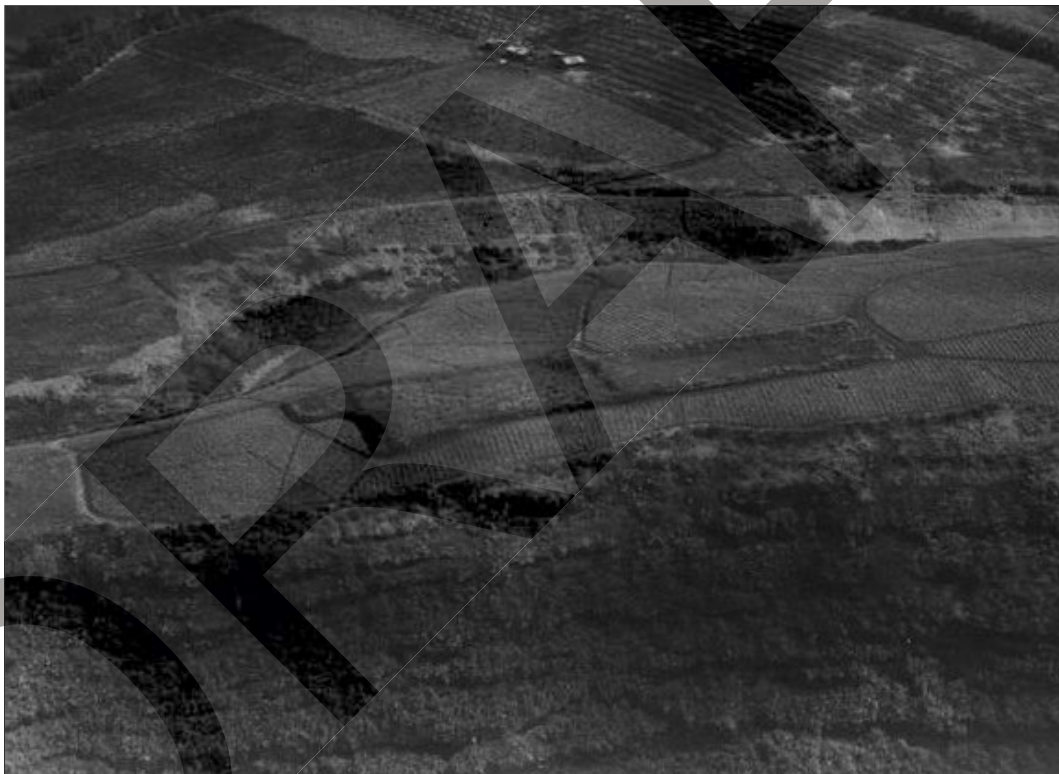


Figure 22. Pu‘u o Mahuka Heiau above Waimea Bay ca. 1930s (Hawai‘i State Archives, PP-35-7-025).



Figure 23. Kupopolo Heiau ca. 1905 looking *makai* (Hawai'i State Archives, Thrum's Collection PP-35-7-019)

In addition to the aforementioned *heiau*, historical accounts concerning Kaopulupulu describes his travels through the project area vicinity and Kahōkūwelowelo Heiau before proceeding to Waikīkī to meet the *ali'i* (chief), Kahahana. Kahekili, king of Maui, placed Kahahana, his foster son, as ruler of O'ahu. Kahahana chose to reside in the *'ili* of Ulukou in Waikīkī with his friend and companion, Alapai (Thrum 1907). Kahahana heard of Kaopulupulu from Kahekili and the circle of other *ali'i* in Waikīkī, in which he had a messenger send for the priest whose residence was in Waimea Ahupua'a. Kaopulupulu's profession enabled him to foresee the intentions of Kahahana if he were to join his court. After receiving the royal order from the messenger, Kaopulupulu replied, "You return first and tell him that on the morning after the fourteenth night of the moon (*po o akua*), I will reach the place of the King" (Thrum 1907:205). Kaopulupulu bid farewell to his household and began to travel towards Punanue to Kahōkūwelowelo Heiau, a temple for priests only:

Entering the temple he prayed for success in his journey, after which he proceeded along the plains of Lauhulu till reaching the Anahulu stream, thence by Kemoo to Kukaniloko, the shelter of whose prominent rock chieftainesses of Oahu were wont to choose for their place of confinement (Thrum 1907:206).

In the *ahupua'a* of Pa'ala'a near the mouth of the Helemano Stream and Poamoho Stream (Figure 24), stood the *luakini heiau* (sacrificial temple) of Kapukapuakea. The *heiau* was uniquely constructed as it was erected by Menehune, a legendary race of people who worked at night building traditional sites such as fishponds and roads (McAllister 1933; Sahlins 1992). As previously mentioned, Kamakau (1991) related that Kapukapuakea was also the site where high chief Ma'ilikūkahi was bestowed by priests to be the ruler of O'ahu:

He [Ma'ilikūkahi] was taken to the *heiau* of Kapukapuakea and anointed by the kahunas to rule as Mō'i [king]. At the end of this ceremony he was taken inside the *heiau* to have his navel cord cut [symbolically] just as at the birth of a chief. After, another important ceremony, that of circumcision [*'oki poepoe*] was enacted...When this ritual was over he was installed as ruler of the island. (Kamakau 1991:54)



Figure 24. Helemano Stream (above right) and Poamoho Stream (below right) emptying into Kaiaka Bay; where the streams converge to the bay is the former location of Kapukapuakea Heiau (UHM SOEST 2005).

According to Kame'eleiwi (1992b:106) "...in 1829, Waialua, O'ahu was controlled by Kekuapi'ia Nāmāhana [younger sister of Ka'ahumanu], who had probably received it from her brother Kahekili Ke'eaumoku at his death." Kame'eleiwi (1992b) goes on to add that Nāmāhana served a short term as the *kia'āina* (governor) of O'ahu in 1824 and that through an arrangement made several years prior by Kamehameha I, became married to Gideon La'anui. Both Nāmāhana and La'anui established their residence along the Anahulu River in Kawailoa. In her 1920 publication, Elizabeth Pratt provided the following excerpt of their life at Waialua:

Likewise Laanui and Piia were one of the first couples to be married by Mr. Bingham. Their favorite dwelling place was at Waialua, Island of Oahu. They found the climate there so salubrious and balmy that they loved it, visiting Honolulu only when their presence at court was demanded. (Pratt 1920)

Just before her death in 1829, Nāmāhana, requested that her lands, including those in Waialua pass to her husband, La'anui (Pratt 1920; Sahlins 1992). By the 1830s La'anui became the resident chief of Kawailoa and other parts of Waialua. He also served in other capacities including tax assessor and collector, maintained vital statistics for the district, functioned as a magistrate, and enforced the *kapu* of the higher ranking *ali'i* such as Elizabeth Kīna'u, who was the *Kuhina Nui* (Premier) (Sahlins 1992). La'anui also took the liberty bestowed to him by Kīna'u to appoint new *konohiki* to oversee the lands, including a man named Lota Ku'oko'a. Through La'anui's efforts, Ku'oko'a became

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the *konohiki* of the royal fishpond of 'Uko'a in Kawaihoa (Sahlins 1992). La'anui remained in power until his death in 1849, a year after the *Māhele 'Āina* had commenced. During the 1830s, while La'anui was serving as the resident chief of Waialua, Mataio Kekūanaō'a, father of Victoria Kamāmalu and *Kia 'āina* of O'ahu, had a notable presence in Waialua.

A Brief History of Hawai'i After Western Contact

The arrival of Western explorers in Hawai'i in 1778 was the beginning of the end of traditional Hawaiian society. At the time that western explorers first made contact on O'ahu, Kamananui "was the ritual and political center of Waialua" (Sahlins 1992:20). However, by the late 1820s, the political center of Waialua had shifted over to the Anahulu Valley in Kawaihoa Ahupua'a; "corresponding to a change in the residence of the ruling chief, this political development entailed a redrawing of *ahupua'a* boundaries" (Sahlins 1992:20). Sahlins (1992:20-21) explains the subsequent re-assignment of Waialua lands and the lasting impact of the shift in the location of political power as follows:

Until 1824, the two royal fish ponds of Lokoea and 'Uko'a, although spatially separated from Kamananui (by the intervening *ahupua'a* of Pa'ala'a and Kawaihoa), were nonetheless controlled directly from there, by stewards (*konohiki*) of Kamananui proper. Likewise the remote fishing community of Kapaeloa at the eastern border of Waialua: it was considered part of Kamananui until the late 1840s; the local people held their lands from and "under" a lesser chieftain of Kamananui. The ruling *ahupua'a* of Kamananui thus encompassed certain detached lands—which gave it privileged access to important piscine resources. However, in the early nineteenth century, when the Waialua chiefship gravitated to Kawaihoa, these outlying sections were taken into the latter land. . .

The historic shift in political domination from Kamananui to Kawaihoa was paralleled by a transfer of the ceremonial center of the *moku*. In effect the Protestant mission of Waialua, founded in Kawaihoa in 1832, usurped the ritual hegemony from the temples of human sacrifice (*po'okanaka*) that not long before had sanctified the landscape of Kamananui. The *ahupua'a* of Kamananui was the site of two temples (*heiau*) of the royal or *luakini* class (cf. Valeri 1985). These *heiau* were probably presided over by an O'ahu form of the god Kū, the god of conquests and human sacrifice specially associated with kingship (Sterling and Summers 1978:103-4; Thrum 1906a:47, 1906b:52; cf. Valeri 1985). The shift of dominance from Kamananui to Kawaihoa corresponded to a change in tabu systems.

Twenty years after sandalwood was first exploited on the Hawaiian Islands, King Kamehameha I, and subsequently various powerful chiefs, gained a monopoly over the sandalwood trade. Judging from historical documents, people living in the Waialua area were known for cutting sandalwood in the interior mountain forests. In a scramble to obtain foreign goods, chiefs in the area had commoners work very hard to cut and transport the sandalwood to the coast (Kirch 1985:314). Preoccupation with sandalwood extraction resulted in the abandonment of several residential homesteads in the upper Anahulu valley. The return of Kamehameha I with his court to Hawai'i Island in 1812 led to additional abandonment; by 1820 the upper valley was almost deserted.

During the late 18th-century, when western explorers first made contact with O'ahu, Kamananui "was the ritual and political center of Waialua" (Sahlins 1992:20). Written accounts left by early visitors to the Island of O'ahu, such as those presented below, offer valuable insight into what life may have been like for the residents of Kawaihoa and the greater district of Waialua. Many of these historical accounts were penned by seafaring men who dropped anchor at or near what they refer to as Waialua Bay. However, according to Sahlins because Kamananui Ahupua'a, which encompasses Kaiaka Bay "was the political center of the *moku* of Waialua, and the settlement there was thus known as Waialua, at least to Haole, as it still is" these unwitting visitors mistakenly called it Waialua Bay rather than Kaiaka Bay (Sahlins 1992:20 n.27).

In 1819, Kamehameha died and the *kapu* system that governed all aspects of traditional Hawaiian society was symbolically abolished when Liholiho, the son of Kamehameha and heir apparent ate in the presence of his biological mother Keōpūolani and *hānai* (adoptive mother) Ka'ahumanu. These two women were of high rank and of the two, Ka'ahumanu was designated as the *Kuhina Nui* or regent of the islands. In 1820, the first Protestant missionaries landed on Hawai'i Island and within several years they had converted many *ali'i* and established a firm foothold in the islands. By establishing mission stations around the islands, they were able to influence the greater population of *maka'āinana* (Ellis 1827; Fornander 1969; Kamakau 1992). To accomplish their goal of religious conversion, these early missionaries started schools, thereby introducing reading and writing into Hawaiian culture and formalizing Hawaiian orthography. One of the first missionaries to arrive in Waialua was Reverend John S. Emerson.

With the complete collapse of the sandalwood trade in 1829, chiefs who accumulated debt fell back to an earlier strategy of supplying provisions and other materials, such as *wauke* bark for caulking to visiting ships, especially whalers (Kirch 1985). In the early 1830s, the *konohiki* in the Waialua area gave land to cultivators with the aim of once again increasing the agricultural output of the area. Archaeological evidence suggests that previously abandoned terraces and canals were re-used and re-arranged to accommodate the newly placed cultivators. Taro, yams, bark cloth, and sweet potatoes were important products aimed to supply ships.

In July of 1832, Reverend Emerson and his wife Ursula landed in Waialua Bay where they was greeted by *ali'i*, La'anui, who resided near the Anahulu River (O. P. Emerson 1928). The Emersons' authored their daily encounters that entailed (but not limited to) interacting with residents, field trips around the island, introduction to new foods, describing the island's landscape, the establishment of the Protestant faith, and the construction of a church. In September of 1832, Ursula noted in her diary that her husband attempted to deliver his sermon in Native Hawaiian with La'anui present. She continued thusly:

We are very anxious to be able to speak this strange tongue with facility, but feel that it will be a long time before we can say all we wish. I tried today to teach the natives who live with us, and longed to be able to teach them as I could English children, but I could say so few words! For several weeks I have learned less by study than by daily intercourse with the natives, being obliged to talk to those living with us and in trading with those who frequently call to buy native books. You may think its strange that we do not give the books away. We do give away many, but where there is so little incentive to industry or exertion, it is important to encourage the natives to buy what they receive from us, and they value the books much more than if they were simply gifts. (O. P. Emerson 1928:61)

The following year, a meeting house estimated to hold approximately 2,000 people was erected near La'anui's home where the former Haleiwa Hotel stood in Hale'iwa. Mrs. Emerson's brother, Joseph, presided over the dedication and first service on September 25th, 1833 with Dr. Judd, Mr. Bingham, and Mr. Brinsmade in attendance (O. P. Emerson 1928). La'anui demanded residents of the district attend the service or there would be consequences. With respect to the schools in Kawailoa, in Emerson's 1836 mission station report, he stated the following:

Our children's schools, under our superintendence at Kawailoa, embrace upwards of 100 children & a few adult females—these schools are under our weekly & sometimes daily inspection, yet taught by 5 men to whom we have given some compensation—In these schools, 30 have learned to read, during the year & many others have made some progress in Geog. Arithmetick & the knowledge of Animals. (J. S. Emerson 1836:2)

In 1865, Mr. and Mrs. Orramel H. Gulick opened the Waialua Female Seminary to further Emerson's efforts, which enrolled thirty-seven students and was known as *Hale Iwa* (O. P. Emerson 1928:227). Students were selected by pastors with the goal of raising "educated women, who might make teachers, and suitable partners for native Hawaiian ministers and missionaries" (American Board of Commissioners for Foreign Missions 1869:282). The following passage further describes their education at the seminary:

It is not sought to impart to these daughters of Hawaii all the accomplishments and refinement of the highest type of civilization, but to give them as thorough an education, in their mother tongue, as their literature will afford. All the instruction, thus far, has been in the Hawaiian language, but English is about to be introduced. The branches pursued are Written and Mental Arithmetic, Algebra, Geography, Composition, Singing, Anatomy, Astronomy, History, Natural Theology, and Moral Philosophy. (American Board of Commissioners for Foreign Missions 1869:282)

Teachers of the school consisted of the Gulicks, E.W. Lyons, and a former graduate named Kaloke or Charlotte (American Board of Commissioners for Foreign Affairs 1869). In 1871, Mary Green took over the school as principal. In January 1882, Ms. Green became ill, closing the school, and returning to her hometown of Makawao on Maui (O. P. Emerson 1928:227).

The *Māhele* 'Āina of 1848

By the mid-19th century, the ever-growing population of Westerners in the Hawaiian Islands forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership. By 1840 the first Hawaiian constitution had been drafted and the Hawaiian Kingdom shifted from an absolute monarchy into a constitutional government. Convinced that the feudal system of land tenure previously practiced was not compatible with a constitutional government, the *Mō'i* (King) Kamehameha III and his high-ranking chiefs decided to separate and define the ownership of all lands in the Kingdom (King n.d.). This change was further promoted by

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missionaries and Western businessmen in the islands who were generally hesitant to enter business deals on leasehold lands that could be revoked from them at any time. After much consideration, it was decided that three classes of people each had one-third vested rights to the lands of Hawai'i: the *Mō'i*, the *ali'i* and *konohiki*, and the native tenants (*hoa'āina*). In 1862 the legislature created the Board of Commissioners to Quiet Land Titles (more commonly known as the Land Commission), first to adopt guiding principles and procedures for dividing the lands and granting land titles, and then to act as a court of record to investigate and ultimately award or reject all claims brought before them. All land claims, whether by chiefs for entire *ahupua'a* or *'ili kūpono*, or by tenants for their house lots and gardens, had to be filed with the Land Commission within two years of the effective date of the Act (February 14, 1846) to be considered. This deadline was extended several times for chiefs and *konohiki*, but not for native tenants (Soehren 2008).

The King and some 245 chiefs (Kuykendall 1938) spent nearly two years trying unsuccessfully to divide all the lands of Hawai'i amongst themselves before the whole matter was referred to the Privy Council on December 18, 1847 (King n.d.). Once the King and his chiefs accepted the principles of the Privy Council, the *Māhele 'Āina* (Land Division) was completed in just forty days (on March 7, 1848), and the names of all of the *ahupua'a* and *'ili kūpono* (nearly independent *'ili* land division within an *ahupua'a*, that paid tribute to the ruling chief and not to the chief of the *ahupua'a*) of the Hawaiian Islands and the chiefs who claimed them, were recorded in the *Buke Māhele* (*Māhele Book*) (Buke Māhele 1848; Soehren 2008). As this process unfolded King Kamehameha III, who received roughly one-third of the lands of Hawai'i, realized the importance of setting aside public lands that could be sold to raise money for the government and also purchased by his subjects to live on. Accordingly, the day after the division with the last chief was recorded in the *Buke Māhele*, the King commuted about two-thirds of the lands awarded to him to the government (King n.d.). Unlike the King, the chiefs and *konohiki* were required to present their claims to the Land Commission to receive their Land Commission Awards (LCAw.). The chiefs who participated in the *Māhele* were also required to provide to the government commutations of a portion of their lands in order to receive a Royal Patent giving them title to their remaining lands. The lands surrendered to the government by the King and chiefs became known as "Government Land," while the lands personally retained by the King became known as "Crown Land," and the lands received by the chiefs became known as "*Konohiki Land*" (Chinen 1958:vii; 1961:13). To expedite the work of the Land Commission, all lands awarded during the *Māhele* were identified by name only, with the understanding that the ancient boundaries would prevail until the lands could be formally surveyed.

Disposition of Kawailoa Ahupua'a

At the time of the 1848 *Māhele 'Āina*, Kawailoa Ahupua'a was claimed by a very young Victoria Kamāmalu, daughter of Mataio Kekūānāo'a and Elizabeth Kīna'u, and was awarded as *'āpana* (parcel) 33 of LCAw. 7713. In addition to the lands of Kawailoa Ahupua'a proper, this award included the lands lying to the north including Lauhulu, Kukuiloloa, and Puanue where the current study area is located as well as Kapaeloa. Kamāmalu was also awarded Pa'ala'a Ahupua'a (*'āpana* 34 of LCAw. 7713) located to the south of Kawailoa. Although only nine years old at the time of the *Māhele*, Kamāmalu had inherited all of her mother's lands in Waialua which made her, at that time, the third-largest landholder of the Hawaiian Kingdom (Kame'eiehiwa 1992a). Kamāmalu had controlled portions of 163 *ahupua'a* on nearly every island, including 79 of the 86 *ahupua'a* on O'ahu (Alameida 1994; Kame'eiehiwa 1992b). To satisfy the one-third commutation fee required by the Land Commission, Kamāmalu relinquished all of her lands in western Waialua between the *ahupua'a* of Kamananui and Ka'ena to the *Mō'i* who then placed them into the inventory of Government lands (Kame'eiehiwa 1992a). Hawai'i Registered Map No. 1606 (Figure 25) from 1892 shows the lands claimed by and awarded to Kamāmalu at the time of the 1848 *Māhele 'Āina*.

After the death of Kamāmalu in 1866, her lands were inherited by her father, Mataio Kekūānāo'a who then passed them to his son, Lota (Lot) Kapuāiwa (Kamehameha V). Upon the death of Kapuāiwa, the land was acquired, by way of petition, by his half-sister, Luka (Ruth) Ke'elikōlani. Upon the death of Ke'elikōlani in 1884, her estate was inherited by her cousin, Bernice Pauahi Bishop. When Pauahi died in 1884, her lands were placed in trust for the establishment of Kamehameha Schools (Kame'eiehiwa 1992a). Kamehameha Schools is currently the second-largest landowner in Waialua, with a land area of 25,291 acres and includes portions of the proposed project area (Cardno 2018).

with the Land Commission, who assigned a number to each claim, and that number (the Native Register) was used to track the claimant through the entire land claims process. The native tenants registering their *kuleana* were then required to have at least two individuals (typically neighbors) provide testimony to confirm their claim to the land. Those testimonies given in Hawaiian became known as the Native Testimony, and those given in English became known as Foreign Testimony. Upon provision of the required information, the Land Commission rendered a decision, and if successful, the tenant was issued the LCAw. Finally, to extinguish any government interest in the property, the holder of a LCAw. obtained a Royal Patent Grant from the Minister of the Interior upon payment of the commutation fee. The information recorded in the Native Register and Native and Foreign Testimony provides insight into land use and settlement patterns during the mid-19th century. The details of the *kuleana* awards in the project area vicinity are further discussed below.

Within all of Kawaioloa Ahupua'a, some ninety-five *kuleana* claims were awarded, the bulk of which are located to the southwest of the current project area in the vicinity of 'Uko'a Fishpond, Loko Ea Fishpond, and along the banks of the Anahulu Stream (Commissioner of Public Lands 1929). The general distribution of the *kuleana* parcels awarded in all of Kawaioloa is shown in Hawai'i Registered Map No. 2054 (Figures 26 and 27) and the six *kuleana* awardees within the immediate project area vicinity are listed in Table 1 and further discussed below.

Table 1. *Kuleana* Awards within the Project Area Vicinity

<i>LCAw. No</i>	<i>Awardee</i>	<i>'Ili</i>	<i>Acres</i>	<i>Year Awarded</i>	<i>Royal Patent Grant No.</i>	<i>No. of Parcels Awarded</i>
7374	Kapule	Punanue	0.20	1853	1463	2
7417	Kaukaliu	Kukuiloloa	0.53	1853	1468	1
8419	Kealainanea	Kukuiloloa	4.87	1853	1464	2
9948	Lole	Punanue	3.77	n/a	3067	1
10256	Makalii	Punanue	6.40	1856	3499	1
10364	Nonokaehu	Lauhulu	12.43	1853	1458	3

In Punanue, a total of three *kuleana* were awarded: LCAw. 7374 to Kapule, LCAw. 9948 to Lole, and LCAw. 10256 to Makalii. In Kukuiloloa and south of Kawaioloa Ranch are two *kuleana* lots identified as LCAw. 7417 to Kaukaliu and LCAw. 8419:1 awarded to Kealainanea. Adjacent to Kealainanea's *kuleana* lot in Lauhulu is LCAw. 10364:2 awarded to Nonokaehu (see Figure 25). The location of LCAw. 9948 to Lole and another lot awarded to LCAw. 7374 are not shown in Hawai'i Registered Map No. 2054. However, a review of a 1951 Tax Maps for the City and County of Honolulu places these two *kuleana* awards *makai* of Kamehameha Highway to the southwest of LCAw. 7374 to Kapule.

Kuleana Claims in Punanue

A review of the land claim documents for Makalii indicates that claims were made for two parcels, only one of which was awarded. Makalii's claim for his second parcel was for a *pali 'uala* (sweet potato cliff) in the *'ili* of Kapaeloa. While Makalii's *kuleana* parcel is shown in Hawai'i Registered Map No. 2054 as being in Punanue, it may well be that the boundaries of Kapaeloa and or Punanue were reconfigured after the *kuleana* claims were made. Additionally, Makalii's Native Register document indicates that his lot was not isolated (see Figure 26). At the time the claim was made Makalii described neighbors on either side of the awarded lot, thus suggesting the presence of other native tenants in this area. The second claim in Punanue made by Kapule (LCAw. 7374) described several parcels dispersed across Waialua, however, the lot in Punanue was a *pāhale* (house lot). Similarly, the third claim in Punanue made by Lole (LCAw. 9948) was for a house lot.

Kuleana Claims in Kukuiloloa

With respect to the *kuleana* claims made by Kaukaliu, multiple lots dispersed across Waialua are described in the Native Testimony, however with respect to the lot within Kukuiloloa, which was the only parcel that was awarded, Kaukaliu states that this lot was used to plant *'uala* (sweet potato), *noni* (Indian mulberry), *kō* (sugarcane), *mai'a* (banana), and *wauke* (paper mulberry). Regarding Kealainanea's claim, six lots were described, only two of which were awarded. A review of the Kealainanea's LCAw. document indicates that Apana 1, shown as being in Kukuiloloa (see Figure 26) was a partially enclosed lot used for cultivating *'uala*. Also noted in the Native Register for Kealainanea is the presence of *kula pipi* (cattle pasture) on the east and south side of the parcel, which was likely associated with the nearby Kawaioloa Ranch, whose location is shown in the area north of Kealainanea's *kuleana* award (see Figure 26).

Kuleana Claims in Lauhulu

Concerning the *kuleana* claim made by Nonokaehu (LCAw. 10364), although no specific land use is described, Nonokaehu did indicate that he held five lots only three of which were awarded.

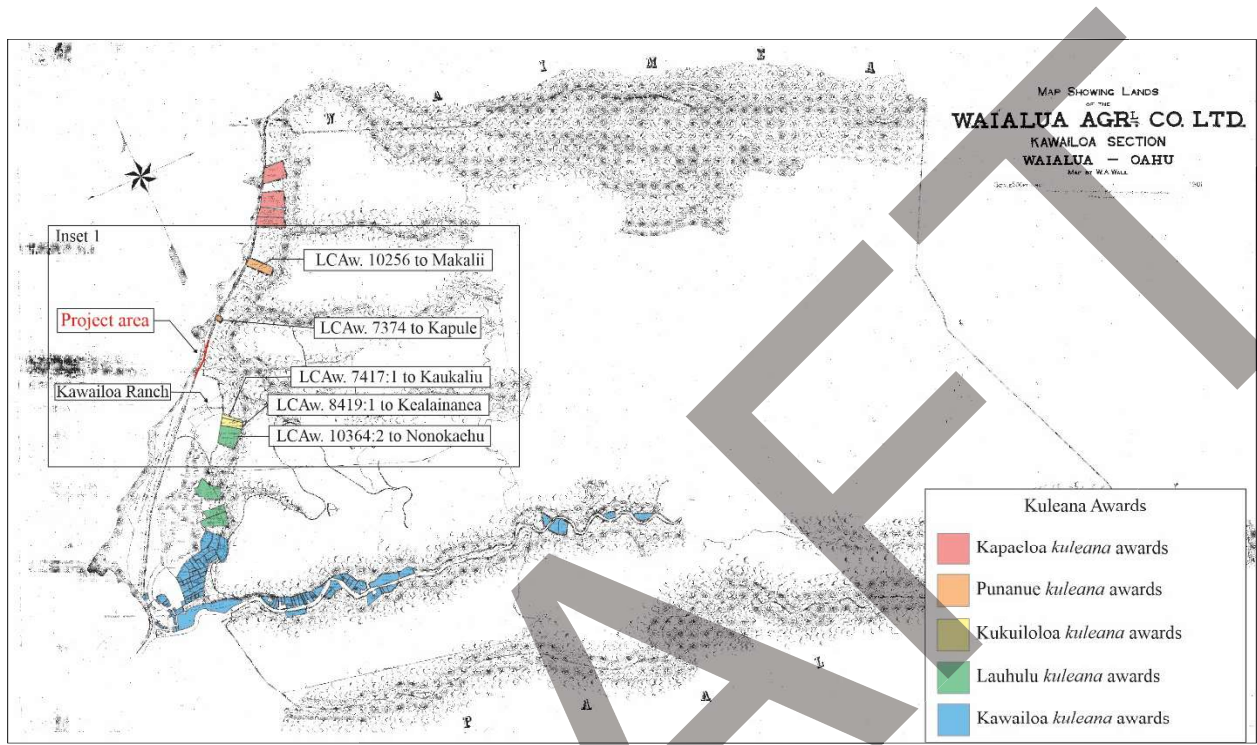


Figure 26. Hawai'i Registered Map 2054 from 1901 showing lands of the Waialua Agricultural Company in Kawaiiloa and the location of the *kuleana* parcels.

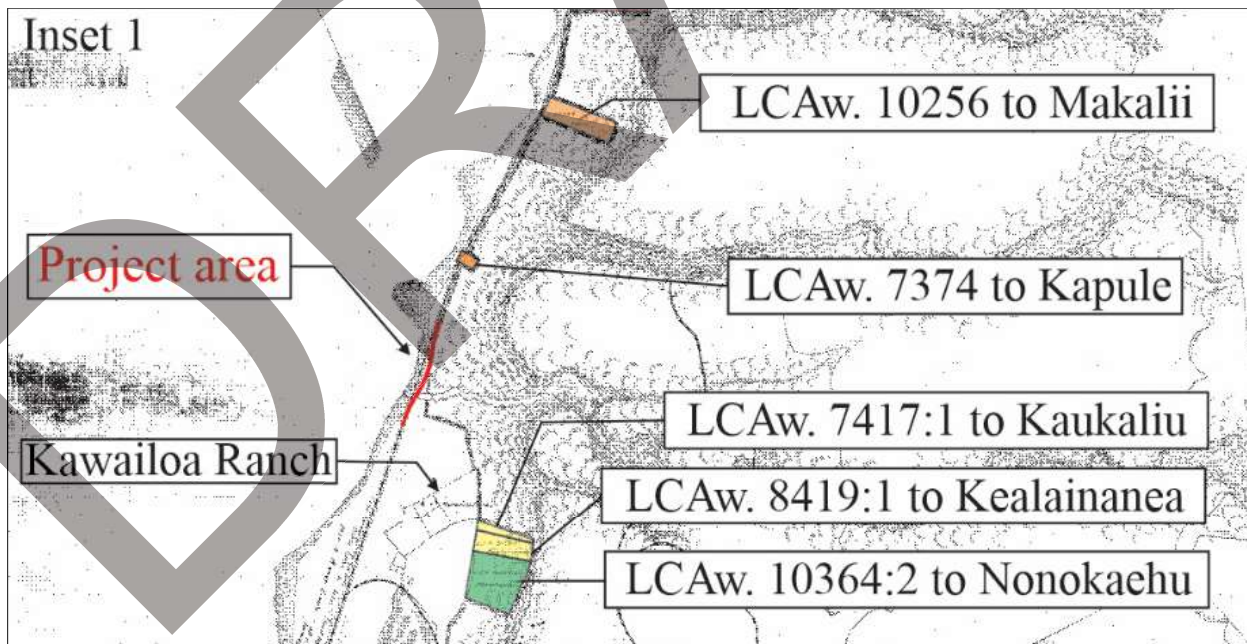


Figure 27. Inset 1, a portion of Hawai'i Registered Map No. 2054 showing a close up of the proposed project area vicinity.

Government Land Grants

Section 4 of the 1850 the *Kuleana* Act (Enabling Act), required that segments of Government land (allocated during the *Māhele*) on each island be made available for purchase by the native tenants. Unlike the parcels awarded by the Land Commission, which averaged 2.57 acres each, the land grant parcels were often substantially larger (Van Dyke 2008). The Act resolved that portions of the Government Lands should be set aside and sold as grants ranging in size from one to fifty acres for fifty cents per acre. The stated goal of this program was to enable native tenants, many of whom were insufficiently awarded, failed to file a claim or were not awarded land through the *Kuleana* Act to purchase lands of their own (Van Dyke 2008). Despite the stated goal of the land grant program, this provided the mechanism that allowed many foreigners to acquire large tracts of the Government Lands and was a direct result of the passing of the heavily debated Alien Land Ownership Act of July 10, 1850. As noted by Van Dyke (2008), although most of the individual purchasers were Hawaiians, foreigners had managed to acquire nearly two-thirds of the total land area.

Although Kawailoa Ahupua'a was retained by the *ali'i* Kamāmalu, a single parcel located to the northeast of the current study area, identified as parcel 2 of Grant 33, was purchased by the Board of Education. While little information is known about this grant, J.S. Emerson's 1836 mission station report (previously described above), noted the presence of at least one school in Kawailoa. It is unclear from the historical records whether the school noted by Emerson is in reference to this land grant.

Commercial Sugar Industry and O'ahu Railroad and Land

The first sugarcane milled in the Waialua area dates to ca. 1840 and the missionary Rev. John Emerson, who set up a small mill powered by horses that made sugar and molasses for the natives on shares (Kuykendall 1938). The first commercially grown sugar in Waialua can be traced back to the Levi and Chamberlain Sugar Company in ca. 1865 (Wilcox 1996). In 1875, the sugar plantation at Waialua was purchased by R. Halstead and Gordon, and later owned by the Halstead brothers. In 1898 when the O'ahu Railway and Land Company's (O. R & L. Co.) railroad reached the Halstead brother's plantation at Waialua, the small mill did not produce much freight and large tracts of the surrounding land remained uncultivated (Dorrance and Morgan 2000). Benjamin Dillingham, who founded the O. R & L. Co., encouraged Castle & Cooke to purchase the Halstead brother's plantation. In that same year, Castle & Cooke formed the Waialua Agricultural (later changed to Sugar) Company primarily on lands leased from the Bishop Estate and Dillingham (Dorrance and Morgan 2000). Castle & Cooke hired William Goodale from the Onomea Plantation on Hawai'i Island as the first plantation manager.

Goodale described the plantation's humble beginnings in his final report as a manager, writing that, "at the time Waialua Agricultural Co., Ltd., was organized in October, 1898, it took over the old Halstead Plantation with about 600 acres of cane, certain leases of large tracts of unimproved land covered with lantana and stones, several hundred acres of rice and ranch land, a small mill, one five million gallon pumping station, no reservoirs or railroads, one small set of steam plows and other equipment of a small plantation" (Goodale in J. R. K. Clark 2007:57). Early in the plantation's history sugarcane did not extend higher than the 200-foot contour above sea level.

In the first years of ownership, Castle & Cooke expanded the acreage of the plantation, built a new mill, put in a railway system, and developed reliable water supply, utilizing both ground and surface water. The strategy resulted in sugar yields increasing from 5,000 tons in 1900 to nearly 20,000 tons in 1905 (Wilcox 1996). Hawai'i Registered Map No. 2054 from 1901 shows the extent of the Waialua Agricultural Company's lands in Kawailoa and shows ditches paralleling the 300-foot and 500-foot contours, a railway extending from the main O. R & L. Co. line along the coast into the Kawailoa fields, a collection of buildings and water tanks (an early plantation camp) located above the *pali* (cliff) and along the railroad tracks in the vicinity of Kawailoa Road, a pump house (Pump # 4) with a waterline running to the upper ditch line (following Kawailoa Road), and two reservoirs.

Above the sugarcane fields in Kawailoa pineapples were grown, and below the *pali*, in the swampy areas surrounding 'Uko'a Pond, rice was cultivated. The sugar and pineapple companies modified and utilized most of the land clearing original vegetation, leveling landforms, digging ditches, constructing reservoir walls, and building roads and railroads. Substantial amounts of foreign laborers (mostly Chinese, Filipino, and Japanese) were imported to work the fields, with labor camps dotting the landscape. Many of the *mauka* lands were leased to the Hawaiian Pineapple Company, which was founded by James Dole in 1901. The Waialua Agricultural Co. and Hawaiian Pineapple Co. operated in such close proximity to one another that the field boundaries often changed. Castle & Cooke purchased a 21% share of the pineapple company in 1932, and the entire company in 1961. The name of the company was changed to Dole Food Company, Inc. in 1991.

Waialua Agricultural Company had the largest water storage capacity in Hawai'i, and arguably the most efficient irrigation system. The distribution system was especially flexible with interconnected ditches that allowed water to be

sent to any part of the plantation (Wilcox 1996). The Waialua Agricultural Company also had steam and electric powered pumping stations that sent groundwater from wells in the lower elevations of the plantation to the ditches in the upper elevations (Wilcox 1996). Developed between 1902 and 1911, the plantation had four surface water collection systems — the Wahiawa, Helemano, Opaaula, and Kamananui systems. On February 3, 1911, in the Waialua Agricultural Co. annual report for the year 1910, W. W. Goodale (1911:4), reported that:

[Kamananui Ditch], referred to in the Annual reports of the years 1902, 1904 and 1909, was commenced in 1903, but abandoned in 1904. At that time 1,068 feet of tunnels had been excavated. On June 10, 1910 we began work again and have carried it on as rapidly as possible since that time.

The ditch will deliver the water of the Kamananui stream at a point at a point 669 feet above sea level on the upper lands of Kawailoa and on the line of the ditch that crosses the plantation carrying the water from the Wahiawa reservoir.

The ditch is 20, 175.5 feet long, with 17,852.5 feet of tunnels, 325 feet of flume and 1,998 feet of open ditch.

On December 31, 1910, 13,832.5 feet of total length, had been completed leaving 6,343 feet unfinished. The entire cost of the work will be about \$69,628.00, of which amount \$35,561.00 had been paid on December 31, 1910. Water should be running in the ditch on or about May 1, 1911.

The Kamananui Ditch was completed on December 7, 1911 at a total cost of \$76,963.81. From the outset it carried an average of 2,188,471 gallons of water a day to the Kawailoa fields (Goodale 1912). For the year 1910, it was reported that “the Opaaula Ditch system delivered during the year 2,112,401,438 gallons of water, used entirely on Kawailoa” (Goodale 1911:4). The Kamananui ditch system was redesigned and realigned in the mid-1920s to increase its water carrying capacity and to allow it to function independent of the Opaaula ditch system (Wilcox 1996). Due to the innovative efforts of Goodale, a self-propelled drag-line excavator was digging new ditches by 1920. The same machine could also lift harvested cane bundles onto railway cars in the field (Dorrance and Morgan 2000).

When William Goodale retired in 1923, after 25 years as the plantation’s manager, he summarized the growth of the Waialua Agricultural Company in the annual report for that year, writing “we now have 70 million gallons per day pumping capacity, 30 miles of permanent railway, the Wahiawā reservoir, capacity 2,540,000 gallons, and 33 other reservoirs, ditches to bring the water to Poanoho, Halemano, Opaaula, Kawaiiki, Kamananui and Waimea gulches, a good mill, six locomotives, cane cars, six plow engines and plows, tractors, trucks, buildings, and about 9,000 acres of cane” (Goodale in J. R. K. Clark 2007:57-58). Goodale had also installed a 450-kilowatt hydroelectric plant in the uplands of Kawailoa that supplied not only plantation’s needs, but when excess energy was produced, it was sold to the Hawaiian Electric Co. (Dorrance and Morgan 2000). Goodale’s management had made the Waialua plantation one of the most productive in the Hawaiian Islands. In 1925, shortly after his retirement, sugar production had grown to 32,585 tons annually (Dorrance and Morgan 2000).

A 1924 Hawai'i Territory Survey map of the Kawailoa Forest Reserve prepared by C. Murray (Figure 28 shows the upper limits of the sugarcane fields near the 650-foot contour in the Kawailoa fields and the 400-foot contour in the Waimea fields. The upper Waimea and Kawailoa fields in the northern section of the plantation are shown as planted in pineapples and the upper fields in the southern section of the Kawailoa tablelands (along the Kawailoa Road Corridor) are shown as a eucalyptus forest. Eucalyptus was first introduced from Australia by the Waialua Agricultural Company in the late nineteenth century to counteract deforestation and erosion caused by cattle (Sahlins 1992:169). Eucalyptus and other trees were also planted by the plantation as sources of lumber, fencing, and firewood (Goodale 1911, 1912).

Plantation camps were spread across the company’s lands to allow workers to walk to the fields. The largest camp in the Kawailoa section of the plantation between Mid-Line Road and Ashley Road along a spur of the Waialua Plantation Railroad would eventually be known as Kawailoa Japanese Camp. The camp between Ashley Road and Mid-line Road was known as Camp 8. Kawailoa Camp was the largest of the company’s villages. This large camp actually comprised the Waialua Agricultural Company’s Camps 2, 3, 4, 5, and 6. The majority of the residents at Kawailoa Camp were Japanese. At its height, the camp included over 500 homes, an elementary school, a gym, a swimming pool, a theater, two stores, two barber’s shops, three community *furo* (Japanese term for a type of bath), a Japanese-language school, and a Buddhist temple (the Kawailoa Ryusenji Soto Mission) (J. R. K. Clark 2007). The plantation built and maintained the homes, but the residents paid monthly rent, and they were owned by the Bishop Estate. A third camp shown along Ashley Road at an elevation of 600 feet above sea level on the 1929 map was not depicted on the 1924 map and may have been constructed during the intervening period. This camp, known as the Waimea Camp, was operated by the Hawaiian Pineapple Company until it was removed in ca. 1960. The location of the above-described camps is depicted in a portion of the 1929 USGS map (Figure 29).

AMP for the Proposed Realignment of Kamehameha Highway in the Vicinity of Laniākea Beach, Kawailoa, Waialua, O‘ahu

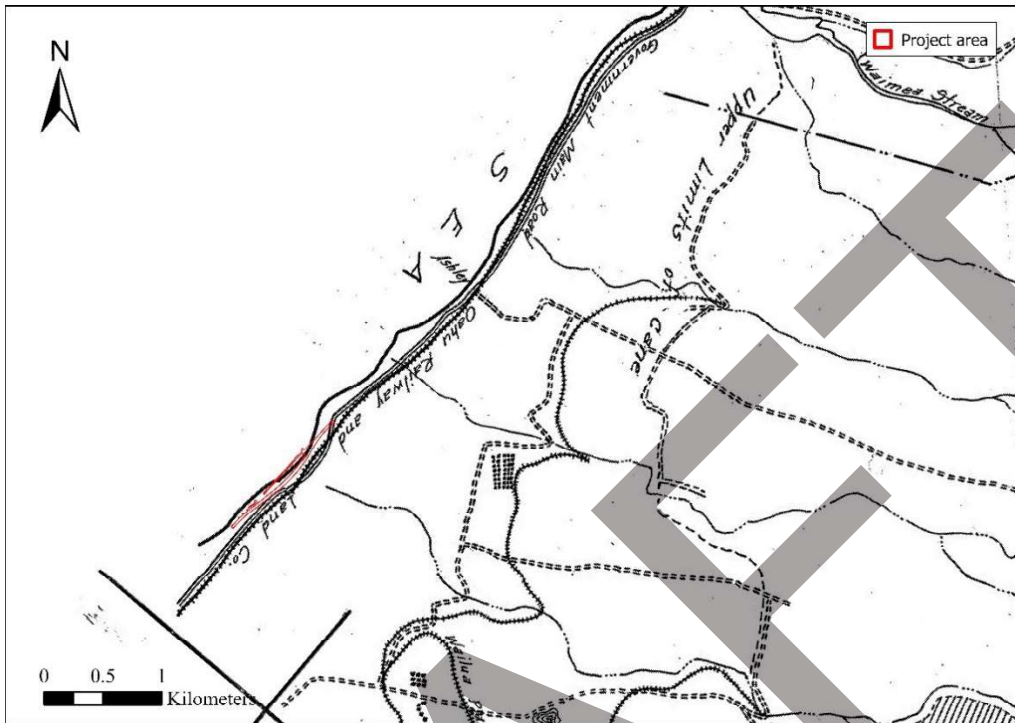


Figure 28. Portion of Plat Map 2069, Kawailoa Forest Reserve map from 1924 by C. Murray depicting upper reaches of sugarcane.

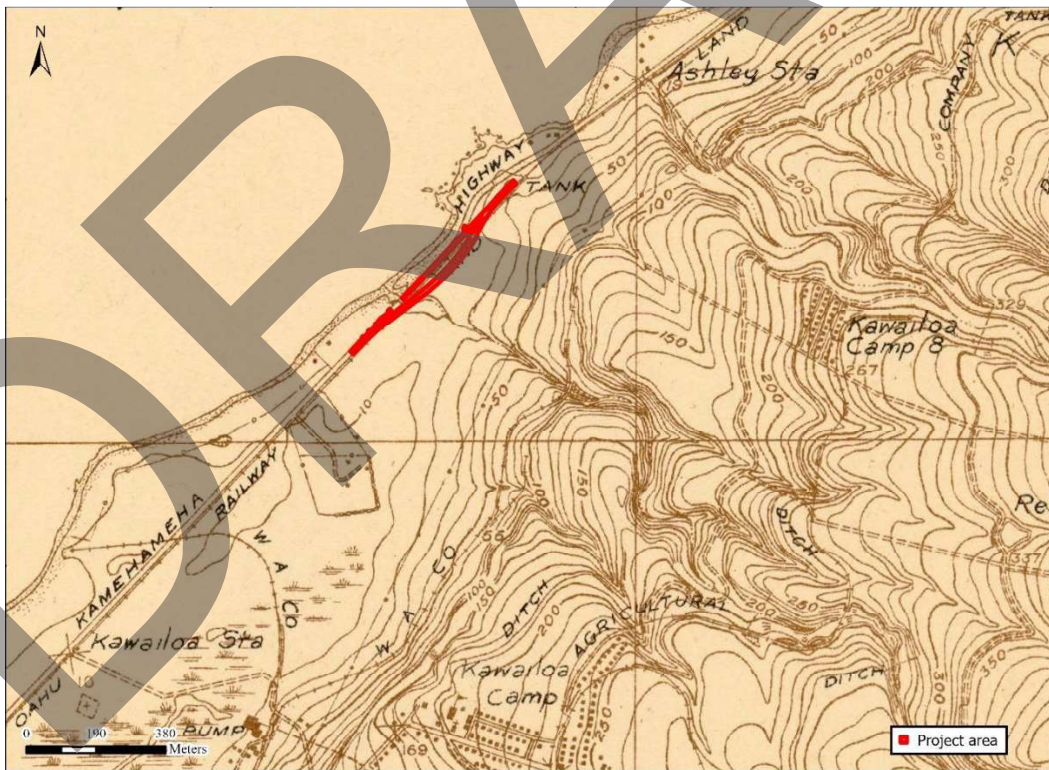


Figure 29. Portion of 1929 USGS, Haleiwa Quadrangle showing various plantation camps and infrastructure. In addition to the plantation camps, the 1929 U.S.G.S. quadrangle also shows irrigation ditches following contours at roughly every 100-foot change in elevation up to about the 650-foot contour in the Kawailoa fields and the 400-foot contour in the Waimea fields, with water

pipes (siphons) connecting the various ridgelines, and reservoirs feeding into ditches that are oriented upslope/downslope. Ashley Road and Mid-Line Road mostly match their current alignments shown in 1929; ditches are shown following the edge of Mid-Line Road. Rice paddies still occupy the swampy area surrounding 'Uko'a Pond. By 1936 improved irrigation and infrastructural development at the plantation had drastically increased sugar production output, which reached 54,671 tons in that year (Dorrance and Morgan 2000).

Military Operations in Kawailoa

Prior to the United States' involvement in World War II (WWII), the Hawaiian Defense Project revision of 1939 set into motion a large-scale modernization of the defenses of the Hawaiian Islands (Bennett 2002). During 1939 and the early 1940s defenses of O'ahu's north shore were vastly improved. These coastal defenses establishment of the Kawailoa Military Reservation and the Waimea Military Reservation, along with the Hale'iwa Airfield (Figure 30). Following the Japanese bombing of Pearl Harbor on December 7, 1941 and the United States involvement in WWII, the U. S. military drastically increased its coastal defenses on the north shore of O'ahu. Drum Road, which runs inland from Helemano to the Army's Kahuku training range and was constructed by the United States Army in the 1920s and 30s, was improved in the early years of the war to handle increased military vehicle traffic and to provide an alternative route to the north of the island in the event of potential damage to Kamehameha Highway.



Figure 30. Haleiwa Field, ca. 1943-1944 (Hawai'i Aviation).

In 1942, the United States Army built Battery Carroll Riggs at the location of Opaepala plantation camp in an area that is currently known as Opaepala Ranch (Bennett 2002:49). Containing two 8-inch guns salvaged from the U. S. S. Lexington and U. S. S. Saratoga Navy ships, the battery was used to protect the north and west shores of O'ahu during WWII (Takamura 1995). Underground command posts and ammunition supply rooms were complimented by above-ground observation posts and towers. A few anti-aircraft gun emplacements occurred on the periphery of the battery.

Located on the level landform south of Battery Riggs and Opaepala River, Brodie Camp No. 4 had a cable hut and a 100-pair cable installed prior to 1939 (Bennett 2002:42, 49). This cable was part of a tactical network of subterranean communication cables, or trunk lines, through the northwestern interior portion of O'ahu. Numerous cable huts, concrete pedestals, manholes, and actual cables are physical testimony of this circum-island command and fire control communication system. A map prepared by Bennett (2002) shows that the two main lines of the cable ran (1) along the coast, and (2) from Brodie Camp No. 4 across the tablelands and gulches to Waimea Valley and then down to Fire Control Station "O" to the north of Waimea Bay. In 1939 an extension from the main cable was connected to Fire Control Station "T" at Battery Kawailoa (Bennett 2002); other extensions likely connected to Batteries Hale'iwa, Ashley, Waimea, and Pupukea, as well. The cable network was designed so that if any of the trunk lines were cut or damaged, they could be rerouted through other circuits to prevent a total shut down of communications while they

were fixed (Bennett 2002:44). Although many of these coastal defenses were dismantled after 1945, intact segments of this robust command and fire control cable system infrastructure are currently used by Verizon Hawaii.

Kawailoa Post-1950s

Following the war, by the end of 1947, the O'ahu Railway and Land Company, with its ailing infrastructure, went out of business, and by 1950 much of the railroad infrastructure had been dismantled. The Waialua Agricultural Co. also dismantled its plantation railways and began hauling the sugarcane by truck. During the modern era, the plantation would eventually grow to include over 12,000 acres of cultivated lands. By 1991, the renamed Waialua Sugar Company, which had merged with the Hawaiian Pineapple Company (in 1961), and was now operated by the Dole Food Co., Inc., the successor to Castle & Cook, produced 62,255 tons of sugar (Dorrance and Morgan 2000). By this time sugar production in the Hawaiian Islands had become largely unprofitable. In 1996 the Waialua Sugar Company, the last sugar plantation to operate on O'ahu, harvested its final crop of sugarcane. In 1998, after 100 years of operation, the company closed its doors for good.

When the Waialua Sugar Co. shut down, it voluntarily surrendered its lease of 24,000 acres of agricultural and conservation land to the Bishop Estates (Kamehameha Schools), the recipient entity of the lands amassed by Victoria Kamāmalu and other *ali'i* following the *Māhele 'Āina* of 1848 (IMUA 2005; Kame'eleihiwa 1992a). Currently, Kamehameha Schools operates the Kawailoa Plantation on this land, leasing plots to individual farmers for diversified agricultural purposes. Roughly 3,600 acres of land, mostly below the 400-foot elevation contour, is suitable for crops that are currently grown there including corn, lettuce, asparagus, plumeria, banana, tuberose, taro, and *noni*. Above the agricultural areas, Kamehameha Schools has planted *koa* trees in some areas, and large areas (mostly above the 650-foot contour) have been fenced for a cattle lease. Some of the water and electrical services on the leased lands are still provided by the infrastructure installed by the Waialua Agricultural Co. between 1898 and 1950 (IMUA 2005).

The current project area is a portion of the former location of Meadow Gold Dairy. The Dairymen's Association, Ltd. was created in August of 1897 and was comprised of seven dairies: Waialae Ranch Dairy, Kaipu Dairy, Manoa Dairy, Honolulu Dairy, Nu'uuanu Valley Dairy, Woodlawn Dairy, and Kapahulu Dairy (Kimura 2016). The main site of operations occurred at Waialae Ranch and included improved pasteurization equipment and automatic bottling. In December of 1949, the company introduced a young calf to the people of Hawai'i and held a territory-wide contest for children to name it. The following year a name was selected and Lani Moo was the ambassador for the Dairymen's Association where she was the star attraction amongst a small zoo at the Waialae site (Kimura 2016). In December of 1956, the lease expired on the Waialae property where Bishop Estate planned a major residential development and golf course, which became The Kahala Hotel & Resort and the Waialae Country Club. The Dairymen's Association moved to a location across from Laniākea Beach in 1957, which they had also leased from Bishop Estate (J. Clark 2002). This included relocating Lani Moo and the zoo, which *keiki* (children) and residents would visit (Kimura 2016). Surfers nicknamed the surf break opposite this property as "Dairymen's" for the proximity, but also the distinct smell of the pasture when offshore winds occurred (J. Clark 2002). In 1959, the Dairymen's Association changed its name to Meadow Gold Dairies. The dairy eventually closed at the Kawailoa site in 1990 and moved to Waimanālo. The Kamehameha Schools portion of the current study area is currently leased as a horse boarding and equestrian facility.

PREVIOUS ARCHAEOLOGICAL STUDIES

This section of the report is divided between those studies conducted in broader vicinity of the project area (Table 2 and Figure 31) and those studies conducted within and in the immediate vicinity of the current project area (Table 3 and Figure 32).

Table 2. Prior studies conducted in the general vicinity of the project area.

<i>Year</i>	<i>Author(s)</i>	<i>Type of Study</i>
1968	Cluff	Surface Survey
1981	Welch	Reconnaissance Survey
1982	Athens and Shun	Archaeological Investigations and Mapping
1982	Hommon	Reconnaissance Survey
1988	Bath	Burial Report
1989	Smith and Masse	Burial Recovery
1990	McMahon	Burial Recovery
1995	Athens et al.	Paleoenvironmental Investigations
1995	Masterson et al.	Reconnaissance Survey
1998	Borthwick et al.	Inventory Survey
2006	Hammatt and Shideler	Literature Review and Field Inspection
2011	Rechtman et al.	Inventory Survey
2012	Tulchin and Hammatt	Inventory Survey
2014	Sroat et al.	Archaeological Monitoring
2015	Rechtman and Clark	Inventory Survey
2015	Morriss and Hammatt	Inventory Survey
2016	Carroll et al.	End of Year Report for Field School
2016	Monahan and Thurman	Reconnaissance Survey
2016	Nohopapa Hawai‘i	Archaeological Investigation

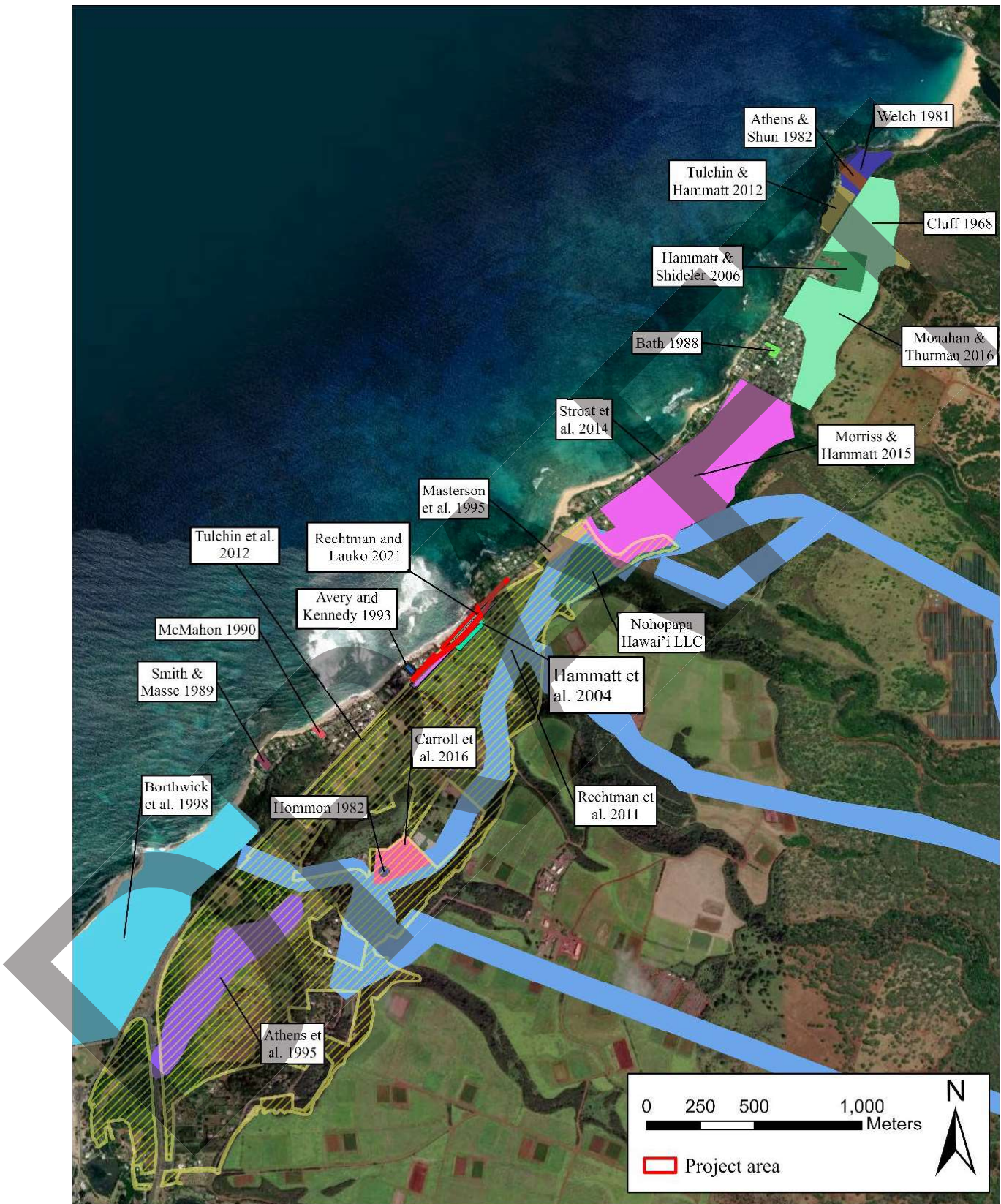


Figure31. Prior studies conducted in the general project area vicinity.

Table 3. Prior studies conducted within and in the immediate vicinity of the project area.

<i>Year</i>	<i>Author(s)</i>	<i>Type of Study</i>	<i>Ahupua'a</i>
1993	Avery and Kennedy	Field Inspection and Archaeological Monitoring	Kawailoa
2004	Hammatt et al.	Inventory Survey	Kawailoa
2012	Tulchin et al.	Reconnaissance Survey	Kawailoa
2013	MKE and Fung	Historic Bridge Inventory and Evaluation	Kawailoa
2021	Reachtman and Lauko	Inventory Survey	Kawailoa

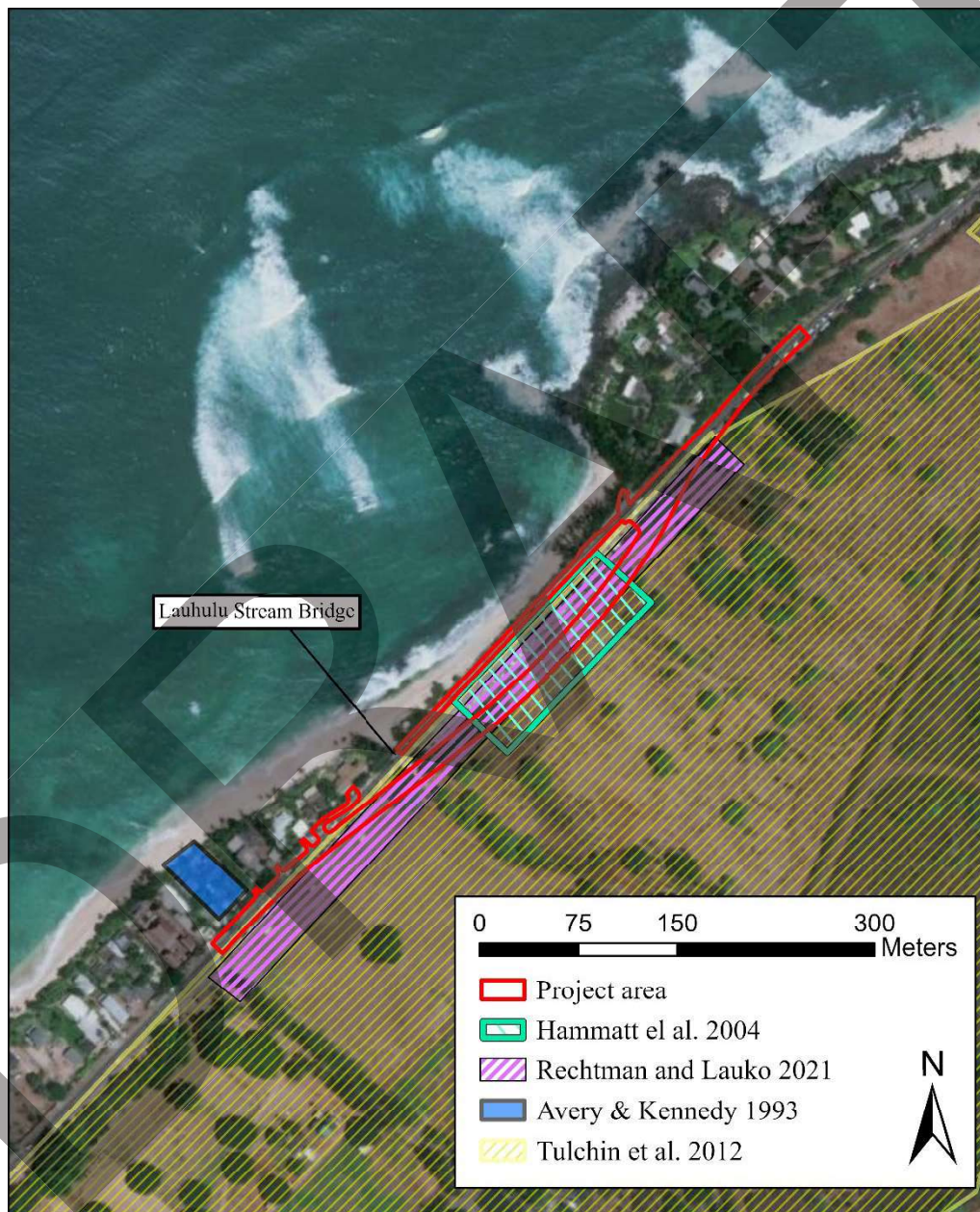


Figure 32. Prior studies conducted within and in the immediate vicinity of the project area

Prior Studies Conducted in the Broader Study Area Vicinity

The earliest published descriptions of archaeological sites near the project area were compiled by Thrum (1906) and McAllister (1933). These early descriptions were of sites that were readily visible on the surface, such as *heiau* platforms, stone mounds, caves, ditches, ponds, and unusual-looking stones (Table 4). From various sources, McAllister (1933) compiled stories concerning the sites and plotted them on maps based on actual surface remains or remembered former locations (Figure 33). McAllister described the sites and features in terms of ethnographic accounts that he and Thrum collected from people familiar with local history. The orally transmitted traditions recall interesting information on chiefs, priests, fishing, cultivation, deities, myths, rituals, and site functions. Among other things, the stories show how interconnected different parts of the landscape were in the minds of the people and how certain rituals were deemed necessary for subsistence purposes.

Table 4. Early-recorded sites in the general vicinity of the project area.

<i>Site Number</i>	<i>Site Type</i>	<i>Area/Ahupua'a</i>	<i>Author (date)</i>
197	Kalakiki Heiau	Waialua/Kamananui	McAllister (1933)
198	Burial Cave	Waialua/Kamananui	McAllister (1933)
199	Stone Mounds	Waialua/Kamananui	McAllister (1933)
200	Burial Cave	Waialua/Kamananui	McAllister (1933)
201	Keauau Fishing Shrine	Waialua/Kamananui	McAllister (1933)
202	Sand Dune Burials	Waialua/Kamananui	McAllister (1933)
203	Heiau	Waialua/Kamananui	McAllister (1933)
204	Oahunui Stone	Waialua/Kamananui	McAllister (1933)
205	Akua Stone	Waialua/Kamananui	McAllister (1933)
206	Kahakahuna Heiau	Waialua/Pa'ala'a	McAllister (1933)
207	Kawai Heiau	Waialua/Pa'ala'a	McAllister (1933)
208	Irrigation Ditch	Waialua/Kamananui	McAllister (1933)
211	Burial Cave	Waialua/Kamananui	McAllister (1933)
223	Hekili Heiau	Waialua/Kawailoa	McAllister (1933)
225	Kapukapuakea Heiau	Waialua/Kawailoa	McAllister (1933)
226	Pohaku Lanai Stone	Waialua/Kawailoa	McAllister (1933)
227	Puupilo Heiau	Waialua/Kawailoa	McAllister (1933)
228	Kepuwai Heiau	Waialua/Kawailoa	McAllister (1933)
229	Kawaipuolo Spring	Waialua/Kawailoa	McAllister (1933)
231	Anahulu Heiau	Waialua/Kawailoa	McAllister (1933)
232	Akua Stone	Waialua/Kawailoa	McAllister (1933)
235	Stone for Healing	Waialua/Kawailoa	McAllister (1933)
236	'Uko'a Pond	Waialua/Kawailoa	McAllister (1933)
237	Iiilikea Heiau	Waialua/Kawailoa	McAllister (1933)
238	Puupea Heiau	Waialua/Kawailoa	McAllister (1933)
239	Punanue Akua Stone	Waialua/Kawailoa	McAllister (1933)
240	Kohokuwelowelo	Waialua/Kawailoa	McAllister (1933)
241	Kupopolo Heiau	Waialua/Kawailoa	McAllister (1933)
242	Stone in Rock Shelter	Waialua/Kawailoa	McAllister (1933)

Southwest of the current study area, McAllister (1933:197) mentions a small *heiau*, reputedly destroyed, near Kawailoa Gorge (the Anahulu River valley). According to local spokespeople, the small *heiau* was for the purposes of "husbandry," or, agricultural productivity. Another *heiau*, known as 'Ili'ilikea (Site 237) (Sterling and Summers 1978:121), was located northeast of 'Uko'a pond in a sugarcane field. This *heiau*, with its well-defined walls, was reputedly destroyed in 1916 by the Waialua Agricultural Company. A third *heiau*, called Puupea (Site 238), which was not well remembered by old Hawaiians during McAllister's time, was described by Sterling and Summers (1978:121) as a few scattered stones located at Punanue Point not more than fifty feet from the beach. An *akua* stone

called Puanue (Site 239) was said to be located at the point near Puupea Heiau. Kohokuwelowelo (Site 240), located to the northeast of the current study area and inland of Cane Haul Road south of its intersection with Ashley Road (see Figure 32), was described by McAllister (1933) as a former dwelling place of priests that the commoners never approached. The site had a steep approach from the north, west and south, but from the east it was gradual. McAllister prepared a sketch map of the site (in Sterling and Summers 1978:122) showing several interconnected, partially enclosed, terraces with dirt floors and a number of small rock platforms. He also noted the presence of low walls and a pavement 200 feet seaward of Kohökūwelowelo at a lower elevation (Sterling and Summers 1978:122).



Figure 33. Portion of McAllister's (1933) map of sites located in the general vicinity of the current project area, which is outlined in red (from Sterling and Summers 1978). With the advent of Cultural Resource Management (CRM) work in the 1970s, archaeologists started to record less noticeable sites. In 1981, Bishop Museum staff conducted an archaeological reconnaissance survey (see Figure 31), which yielded ten historic properties (Welch 1981). Sites identified included a *heiau*, a waterhole, enclosures, two stone walls, rock shelters, midden scatter, midden deposit, stone platforms, and a railroad bed. In 1982, Hommon reported a partial enclosure with an attached pavement on top of a bedrock outcrop near the intersection of Kawaiolo Drive and Cane Haul Road (see Figure 31). Hommon (1982) interpreted the pavement as a possible foundation for a surface structure that was no longer present but was not able to determine the age or function of the site based solely upon the surface remains.

Near the bottom of a cliff line well to the northeast of the project area (see Figure 31), Cluff (1968) found a series of rock art panels with pecked depictions of human figures and dogs. This rock art rock shelter is not far from the coast and slightly southeast from the Kupopolo Heiau (Site 241), located on the narrow coastal plain south of Waimea River mouth. Pecked triangular-bodied human figures and dogs with curved tails are depicted within the shelter, as are some incised motifs. On the opposite side of Kamehameha Highway from Kupopolo Heiau (Site 241) and the petroglyphs, Athens and Shun (1982) discovered twelve sites on the coastline. These sites included two prehistoric midden areas, two stone-walled enclosures, two small rock shelters, a stone pile complex, a stone platform, a stone

wall, a *heiau* platform, a natural waterhole, and the O'ahu Railway and Land Company's railroad bed. Taken together, the Precontact sites recorded by Cluff (1968) and Athens and Shun (1982) were probably a southern extension of the Waimea River settlement spilling out of the valley down the coast.

Sites within the Waimea River Valley are among the first recorded within the general vicinity of the study area, considering that many are prominent features and/or features recalled in local oral histories. McAllister (1933) recorded four *heiau*, two fishing shrines, two rock shelters with burials, one rock shelter with a sacred stone, a boundary stone, and a prominent stone-walled agricultural terrace complex within the valley. Moore and Luscomb (1974) recorded an additional thirty-two sites within the valley, indicating that it was densely populated in both Precontact and early Historic times. Reported excavation results of previously discovered sites within the Waimea River Valley comes from two of Mitchell's excavations. The first set of excavations, on a *heiau*-like platform structure and associated walls and piles against the southern slopes of the valley, labeled Site D7-26, were reported by Mitchell (1977). In 1985 and 1986, Mitchell reported work on a separate stepped-platform structure, labeled Site D7-23, near its northern entrance. Whereas a radiocarbon assay of a coral fragment from the Site D7-23 platform yielded a calibrated date range of A.D. 1470 to 1700, the recovery of ceramic sherds, bottle glass, a nail, and a button from associated midden deposits suggests that the structure dates to the Historic Period.

In 1988, isolated human remains were found at Kuwai Place (see Figure 31) and reported to SHPD and designated as SIHP Site 5080-01-3724 (Bath 1988). South of the project area near Papailoa Road (see Figure 31), burials were reported and designated as SIHP Site 50-80-04-4240 (McMahon 1990; Smith and Masse 1989).

In 1995, Athens et al. (1995) built upon earlier studies at 'Uko'a Pond (SIHP Site 50-80-04-236), southeast of the current project area (see Figure 31). The paleoenvironmental study yielded core samples of eighteen stratigraphic layers with human occupation dating back 1,000 years. Although fish, ducks, and bulrushes used to be abundant within 'Uko'a pond, there is no mention in the historical record or any archaeological evidence that the pond was ever enhanced or modified through the construction of walls, gates, or canals (see discussion in Athens, et al. 1995). Historic sources, dating back to 1815, describe 'Uko'a pond as the property of the *ali'i*; fish could only be taken out with the local chief's permission (Athens et al. 1995:23-24). However, Land Commission Award documents suggest that by the time of the *Māhele* in 1848, royal control over fishing rights in the pond were virtually non-existent. At this time the *makai* edge of the pond contained seven small house sites and communally cultivated sweet potato plots (Athens et al. 1995:26). Four households made claim to aquatic resources in the pond, which included goby, surgeon, mullet, freshwater shrimp, and seaweed.

In 1995, Cultural Surveys Hawaii (CSH) (Masterson, et al. 1995) conducted an archaeological reconnaissance survey of an approximately 3-acre parcel at Kawailoa Beach (see Figure 30) where stacked boulder walls, a historic bridge constructed of mortar, and segment of the OR&L Railway right-of-way (SIHP Site 50-80-12-9714) were identified. Waimea Falls Cultural Historian, Rudy Mitchell, was consulted and indicated that the stacked boulder walls were likely remnants of Pu'upea Heiau but were impacted by historic and recent bulldozing based on scarring.

An inventory survey with subsurface testing was conducted in 1998 by Borthwick et al. (1998) on a 140-acre parcel in the vicinity of Pua'ena Point (see Figure 30). Among the sites they recorded were a Precontact coral ledge (SIHP Site 50-80-04-234), a human burial (-5495), WWII-era concrete features (-5641, -5642, and -5643), a historic trash dump (-5644), and disturbed Precontact cultural layers (-5661 and -5916). The burial was found in a former *kuleana* house lot in a flexed position suggesting it was a traditional Hawaiian burial.

CSH (Hammatt and Shideler 2006) conducted an archaeological literature review and field inspection of an approximately seven-acre parcel in the *mauka* region of Tūtū Street (see Figure 31). Traditional Hawaiian walls and rock structures were recorded during their inspection.

In 2011, Rechtman Consulting (Rechtman, et al. 2011) conducted an archaeological inventory survey for the then proposed Kawailoa Wind Farm on approximately 300-acres *mauka* and to the north and south of the current study area (see Figure 31). Seventeen Historic Period sites (SIHP Sites 50-80-04-7155 through -7171) were recorded, relating to plantation and military infrastructure (Rechtman et al. 2011). No Precontact sites were found on the surface of the wind farm project area during the inventory survey nor were any subsurface sites (of any kind) discovered during subsequent archaeological monitoring of the wind farm development activities (Gross and Rechtman 2019).

Tulchin and Hammatt (2012) of CSH conducted an archaeological inventory survey *makai* of Kamehameha Highway for the proposed Kamehameha Schools' Kāpaeloa Cultural Learning Center, across from Kupopolo Heiau on an approximately three and a half-acre parcel (see Figure 31), which included subsurface testing and Ground Penetrating Radar (GPR). Three historic properties were identified including a remnant of a Historic home site that consisted of a terrace, wall, alignment, and a wastewater treatment system (SIHP Site 7144). SIHP Site 2489 was a

previously identified section of the O.R.&L. railroad berm. SIHP Site 7145 is also part of a Historic house site and consists of a terrace, dirt road, and clearing with stone alignment and concrete foundations for a modern shower structure. GPR was performed in two locations and a total of fourteen test trenches were excavated where subsurface anomalies were discovered; no subsurface cultural layers or material were found.

Also in 2012, CSH conducted archaeological monitoring at a private residence (see Figure 31) along Kamehameha Highway (Sroat, et al. 2014). The existing home was to be demolished for the construction of a new residential structure with an attached garage and deck. No historic properties were found during monitoring.

In 2014, ASM Affiliates undertook an archaeological inventory survey (Rechtman and Clark 2015) of a roughly 360-acre area *mauka* and to the north of the current study area (see Figure 31) associated with the Kawailoa Solar Power Project. As a result of that study, one previously identified site (SIHP Site 7171) and one newly identified site (SIHP Site 7716) were recorded. Both sites date from the Historic Period and both were related to plantation infrastructure. No Precontact sites were observed, and archaeological monitoring was recommended. That monitoring has been occurring off and on since 2017, and to date one subsurface feature has been recorded. In 2018 a small earth oven (*imu*) was documented and yielded a radiocarbon date of "1416-1490 cal AD" with a 94% probability (BETA 554725).

CSH completed an archaeological inventory survey in 2015 for Kamehameha Schools' Pūnanue Parcels (Morris and Hammatt 2015a, 2015b, 2015c). The approximately seventy-seven-acre property (see Figure 31) yielded twenty-three historic properties dating from both the Precontact and Historic periods, and included a historic pump house (SIHP Site 50-80-04-7609); multiple agricultural complexes (-7608, -7610, -7611, -7612, -7613, -7615, -7616, -7618, -7619, -7629); a boundary wall (-7615); a trail and terrace (-7617); a habitation site (-7620); a Historic complex related to a Meadow Gold Dairy Workers' camp (-7621); a wall (-7622, -7623, -7624); habitation complex (-7625); complexes associated with habitation and agriculture (-7626 and -7628); a historic ranching wall (-7627); and an Oahu Railway and Land Company railway berm and two associated culverts (-5791).

Carroll et al. (2016) wrote an End of Year Report for the archaeological field school at 'Uko'a Pond (see Figure 30). The field school was taught through the University of Hawai'i at Mānoa's (UHM) Anthropology Department in collaboration with Kamehameha Schools and the Waiāluā Hawaiian Civic Club.

In 2016, TCP Hawai'i LLC (Monahan and Thurman 2016) conducted an archaeological reconnaissance survey in the vicinity of Kupopolo Heiau (see Figure 30). The approximately 56-acre parcel yielded traditional and historic-era petroglyphs; Precontact and Historic period burials; rockshelters; agricultural complexes, and other sites.

In 2016, Nohopapa Hawai'i, LLC (2016) conducted an archaeological investigation of approximately 6.4-acres (see Figure 30) that included the *pu'u* and *heiau* complex known as Hōkūwelowelo (also known as Kahōkūwelowelo and Kohōkūwelowelo). The *heiau* is associated with the *Kāhuna Nui* class; traditions of priestly knowledge; and astronomical observation. Their study detailed the broader landscape and included oral and ethnohistorical information, land use and patterns, previous archaeological studies and results, an investigation of the study area; and concluded with a discussion on research questions and mitigation recommendations. Eleven archaeological sites were identified spanning from the Precontact Period (terrace and wall complex related to religious ceremonies; enclosure complexes; modified outcrops and pits) to historic times (ranching walls; C-shape structures for military-use; boulder walls; and a collapsed concrete bunker).

Prior Studied Conducted within and in the Immediate Vicinity of the Current Study Area

Five prior studies were conducted within and in the immediate vicinity of the current study area (see Table 3 and Table 5). The first of these studies occurred in 1993, when Avery and Kennedy (1993) responded to an inadvertent discovery (Dagher 1993) of human skeletal remains on TMK: (1) 6-1-010:006 (see Figure 32), situated *makai* of Kamehameha Highway and directly west of the southern end of the current study area. Disturbed skeletal remains of three individuals were documented and recorded as SIHP Site 50-80-04-4670. The remains were unearthed while digging footing trenches for a single-family residence, and as reported by Avery and Kennedy (1993), no in situ remains were observed and no positive stratigraphic associations could be made for the skeletal remains. Monitoring was carried out for the remainder of the subsurface development activities and no subsurface cultural deposits nor additional skeletal remains were encountered.

In 2004, Cultural Surveys Hawai'i (CSH; Hammatt, et al. 2004) conducted an archaeological inventory survey of an approximately three-acre parcel (TMK:(1) 6-1-005-014 por.; identified today as (1) 6-1-005:024) within the current project area limits (see Figure 32). This study was for the proposed Laniākea Beach Support Park that called for the creation of a parking area, landscaping, picnic tables, and a comfort station. As a result of a 100% surface

survey and the excavation of nine backhoe trenches, there were no historic properties nor cultural deposits encountered. Although outside of their project area, Hammatt et al. (2004) noted a site with multiple features located to the northeast that consisted of a platform and a terrace/enclosure with internal alignments. Also noted was the former O.R.&L railroad right-of-way situated on the northwest boundary of their project area along Kamehameha Highway. Hammatt et al. (2004:42) concluded that “subsurface testing indicated three relatively discrete stratigraphic soil sequences . . . [i]n the southwest corner . . . adjacent to Kamehameha Highway beach or Jaucus sands dominated the sequence. Inland (east) of the sand area the sequence is prominently deep alluvial soil. The northern third of the project area (north of the fence line) has shallow alluvial soils over bedrock.” However, they did recommend that a program of “archaeological monitoring program be instituted during any future development in the project area due to known burials in sandy deposits in Kawailoa.” (Hammatt et al. 2004:42).

In 2011, CSH (Tulchin, et al. 2012) conducted an archaeological reconnaissance survey of the Kamehameha Schools Kawailoa Ranch property that included the current project area (see Figure 32). Eighty-two historic properties were recorded which included stacked-stone walls, platforms, terraces, enclosures, mounds, modified stone outcrops, stone and mortar foundations, concrete irrigation ditches, and concrete bunkers. Fifteen of these sites were associated with the Precontact to early Historic era, while forty-one sites were associated with the Plantation era. Ten sites were associated with ranching, eight sites were related to WWII military activities, and the approximate time period of eight sites were deemed indeterminate. Interpretation of sites included possible burials, permanent and temporary habitation, ceremonial, ranching, and military. Of the eighty-two sites recorded by Tulchin et al. (2012), three sites (temporary site CSH 19, CSH 20 and CSH 29) were recorded very close to the north and northeastern boundary of the current project area (Figure 33). Site CHS 19 was describe as a metal bunker associated with World War II era military activities. Site CSH 20 was described as a stone-lined depression extending from an outcrop measuring 3.5 x 2 meters, which they interpreted to be used for water collection or ranching activities. Site CSH 29 was described as an enclosure/modified outcrop. The functional interpretation was indeterminate.

In the *Hawaii State Historic Bridge Inventory and Evaluation* (MKE and Fung 2013), the bridge carrying Kamehameha Highway over Lauhulu Stream (see Figure 32) was identified as a significant historic property (Bridge No. 003000830300339). MKE and Fung concluded that “[t]his bridge is eligible [for the NRHP] under Criterion C for its association with early developments in concrete bridge construction in Hawaii. It is a good example of a 1930’s reinforced concrete bridge that is typical of its period in its use of materials, method of construction, craftsmanship, and design” (2013:4-123). The bridge is within the current project area.

In 2021, ASM Affiliates (Rechtman and Lauko (2020) conducted an archaeological inventory survey as part of the current project. The 4.45-acre study corridor was located along the southeast boundary of the current project area and included a portion of Kamehameha Highway and the proposed realignment route which meanders eastward (*mauka*) onto adjacent lands and reconnects with the existing Kamehameha Highway (Figure 32). The survey area did not include the developed part of Kamehameha Highway which is included in the current project area. As a result of the 100% surface survey, one newly identified site (SIHP Site 8949) and one previously documented site (Lauhulu Stream Bridge, SIHP Site 8080) were identified. SIHP Site 8949 was identified as a modified outcrop, interpreted as having a ceremonial function due to its shape, the presence of coral on its surface, upright stones located as one end of the outcrop and the lack of habitation debris associated with the site. Site 8949 was determined as significant under both Criterion d and Criterion e. SIHP Site 8080 is a concrete slab bridge carrying Kamehameha Highway over Lauhulu Stream. This bridge had been identified in the *Hawaii State Historic Bridge Inventory and Evaluation* (MKE and Fung 2013) as Bridge No. 003000830300339. With respect to its significance, and retaining all aspects of integrity, MKE and Fung concluded that “[t]his bridge is eligible under Criterion C for its association with early developments in concrete bridge construction in Hawaii.” Citing it as “a good example of a 1930’s reinforced concrete bridge that is typical of its period in its use of materials, method of construction, craftsmanship, and design” (2013:4-123). In addition to the ground survey, seven test trenches were excavate with a Komastu PC 35MR hydraulic excavator to test for the presence of buried cultural deposits. The results of the subsurface testing were negative with respect to subsurface cultural deposits; however, the profile of three test trenches (TT-1,-2,-3), located on the southern side of the Lauhulu Street, consisted of a thin surface layer of sandy clay overlaying Jaucus sand deposits. Rechtman and Lauko (2020)(2021:70) observe that “such deposits have the potential for containing burials” and thus, recommend that archaeological monitoring for subsequent construction.

Table 5. Previous archaeological studies in the immediate vicinity of the Project Area

<i>Year</i>	<i>Author</i>	<i>Type of Study</i>	<i>Findings/Results</i>
1993	Avery and Kennedy	Field Inspection and Archaeological Monitoring	3 sets of human skeletal remains (SIHP Site 50-80-04-4670)
2004	Hammatt et al.	Inventory Survey	No findings but noted multiple features consisting of a platform and a terrace/enclosure northeast of survey boundary and O.R.&L railroad northwest of boundary. Additionally recommended archaeological monitoring for further work in the area.
2012	Tulchin et al.	Reconnaissance Survey	Eighty-two historic sites
2021	Rechtman and Lauko	Archaeological Inventory Survey	Lauhulu Stream Bridge, SIHP Site 50-80-04-8080

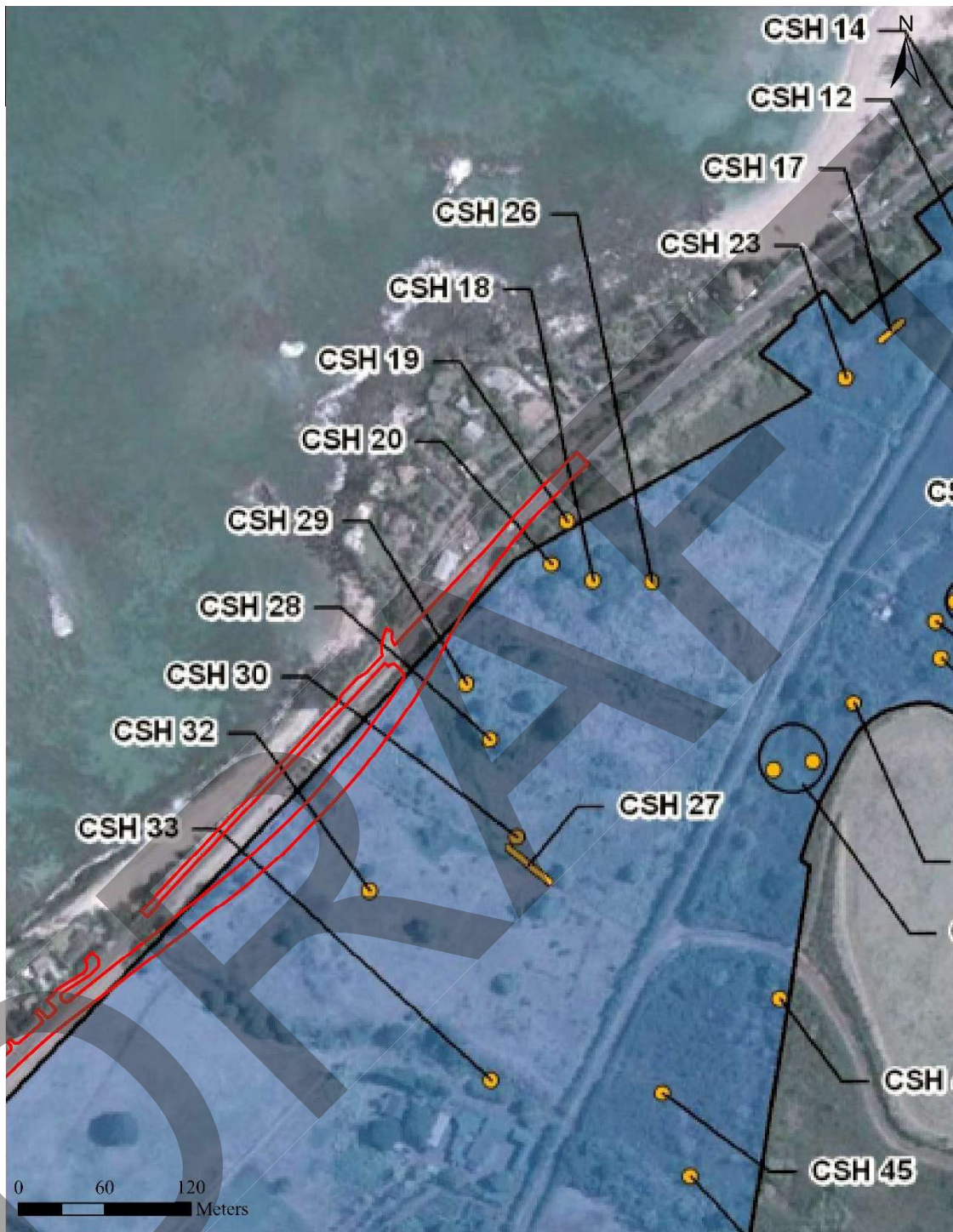


Figure 34. A portion of Tulchin et al. (2012:83) site distribution map with northern section of the current study area shaded red.

3. HISTORIC PROPERTIES AND ANTICIPATED REMAINS

Kawailoa Ahupua‘a was of great important in Precontact and historic times and the *ahupua‘a* contains numerous significant cultural sites and archaeological deposits, including *heiau*, fishponds, (place of refuge), petroglyphs, burial areas, and Historic Period structures and bridges. Only one historic property, Lauhulu Strem Bridge (SHIP Site 8080) lies within the footprint of the project area (Figure 35).

KNOWN HISTORIC PROPERTIES WITHIN THE VICINITY OF THE AREA OF POTENTIAL EFFECT

Lauhulu Stream Bridge (SHIP Site 8080)

Built in 1937, Lauhulu Stream Bridge carries Kamehameha Highway over Lauhulu Stream. MKE and Fung (2013:4-123) (Figure 35). MKE and Fung (2013) identified the bridge as a significant historic property (Bridge No. 003000830300339) under Criterion c “for its association with early developments in concrete bridge construction in Hawaii.” They cited the bridge as “ a good example of a 1930’s reinforced concrete bridge that is typical of its period in its use of materials, method of construction, craftsmanship, and design.” Subsequent survey by Rechtman and Lauko (2021:71) found the bridge is currently in the same condition as it was when it was earlier evaluated, with no diminished integrity. Therefore, the Lauhulu Stream Bridge continues to be evaluated as significant under Criterion c as a representative example of 1930s engineering and design in the context of roadway construction in Hawai‘i. Lauhulu Stream Bridge will not be physically impacted by the proposed roadway realignment project and will remain in place for pedestrian use. A draft preservation plan has been prepared for the bridge (Belluzzo and Oordt 2023).

Ceremonial Modified Outcrop (SIHP Site 8949)

Site 8949 is a modified bedrock outcrop interpreted to be a possible ceremonial site (Figure 35). Given this functional interpretation, the site is assessed as significant under Criterion d as a potential source of information relative to Precontact ceremonial activities within a cultural landscape where several other functionally similar sites have been identified, and under Criterion e for the cultural value that Hawaiian communities assign to such sites. While identified to be partially within the study corridor from Rechtman and Lauko (2021), this site falls outside of the proposed development footprint, and once roadway construction is complete the realignment Kamehameha Highway will be no closer to Site 8949 than it is currently. Additionally, the area of Site 8949 will not be acquired by the HDOT, but rather will remain under the ownership and control of Kamehameha Schools. Thus, beyond making sure the site is protected during construction activities, any long-term treatment of the site is not within the purview of the HDOT.



Figure 35. Aerial image of Lahulu Stream Bridge (SHIP Site 8080) and ceremonial modified outcrop (SIHP Site 8949) within current project area.

Anticipated Archaeological Remains

Given the known/potential historic properties within and the findings of prior archaeological studies conducted in the vicinity of the project area including the AIS for the current project (Rechtman and Lauko 2021), the locations of anticipated archaeological remains for the proposed undertaking are now discussed. Although Rechtman and Lauko (2021) did not observe intact buried cultural deposits within the current project area, the project area may still contain undiscovered intact deposits, including human burials. The northern portion of the project area and the central east portion of the project area, which consists of the already existing developed highway, are moderately likely to yield cultural materials as these areas consist of Beach and Jaucas sand deposits. As demonstrated in studies conducted on the *makai* side of Kamehameha Highway, such deposits have the potential for containing burials (Avery and Kennedy 1993; Smith and Masse 1989). Additionally, Rechtman and Lauko (2021:70) demonstrated that the soil profile on the

southern side of the Lauhulu Stream drainage was inconsistent with the soil survey and instead, consisted of a relatively thin surface layer of sandy clay loam underlain by Jaucas sand deposits. Therefore, the southern portion of the project area may also yield human burials. The central portion of project area may also contain buried cultural deposits as its stratigraphic profile consists of Waialua silty clay, 0 to 3 percent slopes overlaying alluvium. Waialua silty clay soils were often used for irrigated sugarcane and truck crops; thus, cultural deposit associated with agriculture may be present within the project area (Soil Survey Staff 2022).

4. THE MONITORING EFFORT

Prior to the start of any proposed subsurface development activities, a meeting will be held among the construction contractor, the project proponent, the project's Principal Archaeologist and primary archaeological monitor to ensure that any protective conditions placed on the project by DLNR-SHPD with respect to Sites 8080 and 8949 will be established prior to initiating construction. Also prior to the initiation of construction, the project's Principal Archaeologist and the primary archaeological monitor will meet with the equipment operators to discuss the procedures for monitoring. It will be explained that the monitoring archaeologist(s) has/have the authority to halt ground-disturbing activities in the event that cultural resources are encountered. If cultural resources identified during monitoring are deemed significant, DLNR-SHPD will be notified and consultation will be coordinated as appropriate with any groups or organizations. Additionally, DLNR-SHPD will be notified upon the onset and completion of the monitoring activities. Any change in status of the monitoring (i.e., a shift from on-site to on-call) will occur only with prior written approval from DLNR-SHPD.

FIELD METHODS

A qualified archaeological monitor(s) will be present on-site to observe all subsurface ground-disturbing activities. When on site, monitors will keep a daily log of activities performed and any discoveries made. Monitors will inspect all exposed soil and sediments, and the stratigraphic profiles of any deep cuts will be examined. A sampling of stratigraphic profiles of excavated areas without archaeological resources will be documented using scaled profile drawings at least one meter wide and photographs with a legible scale in order to provide useful information regarding the absence of cultural materials in a given area. Profile locations will be documented using a Global Positioning System (GPS) point collected using a submeter accurate system. At least one 2-meter-long profile will be included in the Archaeological Monitoring Report for reference. Documented stratigraphy will be recorded on project area maps. Profile walls, and trench floors when applicable, will be cleaned using a hand trowel prior to documentation, unless entering the excavated area poses a threat to safety. All stratigraphic documentation will include recording the depths in centimeters below surface from top to bottom of each stratigraphic layer, and the soil attributes of each stratigraphic layer using USDA soil descriptions and Munsell soil color charts. This practice will be followed in an effort to identify previously undiscovered and undisturbed cultural deposits, features, artifacts, and human skeletal material. If any such resources are encountered the following procedures will be initiated:

Cultural Deposits

The monitor will notify DLNR-SHPD if non-burial historic properties are identified. All cultural deposits and sequences (including representative natural sequences) identified during the monitoring effort will be mapped, representative scaled profile drawings and plan views will be prepared, photographs will be taken, and the soils will be described in detail (using standard USDA soil descriptions and Munsell colors).

If intact cultural deposits are discovered during monitoring, an assessment will be made as to their integrity and significance using the criteria enumerated in HAR 13§13-275-6(b). If the deposit is deemed significant and is likely to be further impacted by demolition activities, work in the affected area will be curtailed, and an appropriate mitigation strategy will be developed in consultation with DLNR-SHPD.

Cultural Features

Subsurface cultural features will be fully described, drawn, and photographed. Provenience information will also be recorded and related to an established project datum ensuring accurate horizontal and vertical placement. The limits of the feature will be defined, if possible without further excavation, and any natural or cultural associations (including surrounding soil) will be noted. Where appropriate, samples for further analyses will be recovered and processed. The locations from where stratigraphy as well as any in situ findings are exposed and documented will be recorded using a handheld GPS unit with submeter accuracy. The location from where the GPS data is gathered will also be recorded with the archaeologist's field notes and provided in the archaeological monitoring report. For example, "all GPS points

were taken from the northern most corner of an exposed stratigraphic profile.” All data collection will be overseen in the field by an archaeologist meeting the Secretary of the Interior’s qualifications for archaeological professionals.

Artifacts

Artifacts observed in the removed soil will be recovered and their general provenience recorded. All artifacts encountered will be documented in situ when possible, in scaled stratigraphic and/or plan view drawings, photographed in the field with a legible scale and north arrow, and the location of the find will be documented with a GPS using submeter accuracy and on project plans. All traditional Precontact Hawaiian artifacts and diagnostic post-Contact artifacts will be recovered for laboratory analysis. The precise locations of any items found in situ will be recorded and the items photographed and recovered for subsequent laboratory analysis. All collected artifacts shall be labeled with provenience information and the date of the find, at minimum. As appropriate, sampling will include the collection of representative bulk sediment samples, and/or on-site screening of measured volumes of feature fill to determine feature contents. When additional data may be gleaned from exposed stratigraphy, soil sampling may occur using standard archaeological methods appropriate to the type of data to be analyzed. Any observed associations will also be documented, and the surrounding soil will be fully described using standard USDA soil descriptions and Munsell colors. When additional data may be gleaned from exposed stratigraphy, soil sampling may occur using standard archaeological methods appropriate to the type of data to be analyzed. All data collection will be overseen in the field by an archaeologist meeting the Secretary of the Interior’s qualifications for archaeological professionals.

Human Skeletal Remains

If human skeletal remains are encountered during the monitoring effort, the on-site monitor will halt all ground-disturbing activity in the immediate area of the discovery, stabilize the remains, and contact the appropriate authorities. DLNR-SHPD staff from the Archaeology Branch and from the History and Culture Branch will be notified immediately, and the monitor will notify the appropriate on-site construction personnel, the Police, and Medical Examiner, as appropriate. If the skeletal material is determined to be Historic or Precontact (as opposed to recent), the monitoring archaeologist will direct the applicant to seek DLNR-SHPD guidance on how to proceed with the discovery, and the human skeletal remains will be handled in compliance with HRS Chapter 43.6, HAR §13-300, and DLNR-SHPD directives. If the remains are determined to be recent, the Honolulu Police Department will be contacted.

TREATMENT OF RECOVERED REMAINS

All recovered material will be temporarily stored within a secure location. The recovered items will be recorded in a field catalog, and upon completion of the monitoring fieldwork the disposition of the items will be as follows:

Cultural Material

Artifacts from intact contexts will be analyzed; those recovered from fill will simply be cataloged. Analyzed items will be cleaned, weighed, measured, photographed, and illustrated (if appropriate). Analysis will include formal description and functional interpretation. The identification of artifacts, vertebrate faunal remains, and invertebrate faunal remains will include comparison with reference collections and materials, as needed.

Recovered Samples

All recovered samples (soil, charcoal, etc.) will be initially processed by the qualified archaeological monitor before being dispersed to the appropriate institutions for detailed analysis.

Human Skeletal Remains

If DLNR-SHPD determines that the removal of buried human remains is an appropriate course of action, then a treatment/reburial plan will be developed in consultation with DLNR-SHPD and other consulted parties, as appropriate in accordance with Hawai‘i State law as outlined in HAR 13§13-300.

REPORTING

Within 30 days following completion of archaeological monitoring, an end of field report pursuant to HAR 13§13-282 will be submitted to DLNR-SHPD. A draft monitoring report will be prepared and submitted to DLNR-SHPD for review and acceptance within 60 days of completion of fieldwork. This report will follow the specifications contained in HAR 13§13-279-5. If any human skeletal remains are recovered as part of the monitoring project, they will be summarized in the final monitoring report following procedures contained in HAR §13-300.

CURATION OF RECOVERED ITEMS

Any material recovered during the project will be temporarily stored for a period of no more than one year following submission of the final monitoring report, during which time arrangements will be made for permanent curation in consultation with the respective landowner and DLNR-SHPD. It will be the respective landowner's responsibility to secure permanent curation in an acceptable facility; included in this responsibility are the costs associated with long-term curation.

DRAFT

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Kamehameha Highway Drainage and Safety Improvements
 Vicinity of Laniakea Beach
 Project No. 83B-01-09
 ADDENDUM 2

RFI #	Description	Response
1	Due to a heavy volume of projects that we are bidding right now, we would like to humbly request a 1 month bid extension for the subject project.	See Addendum 1 for updated Bid Opening Date
2	Our Estimating Department is at our Maui Office we would kindly ask to postpone the bid date to the following week. We previously requested an extension and we understand if it is not possible.	See Addendum 1 for updated Bid Opening Date
3	1.Item #606.4000 End Anchorage System- Please provide details and locations	End Anchorage System removed from project. Number of MSKT-TL3 end treatments increased to 6.
4	2.Item #606.3000 Terminal Section MSKT– Plans call for MSKT-TL3 (50 ft). Per sheets 37-40, MSKT callout is 25 ft. Please advise if TL2 (25 FT) is required, in place of TL3	Use 50 ft length on MSKT-TL3 end treatments.
5	Section 621.01(A)(2) on page 621-1a of the Project Specs states that the Contractor’s Botanist/Arborist needs to have 5 years minimum experience and shall be approved by the Engineer. Is there a list of qualified botanists/arborists that can be provided to the Contractor prior to bid opening?	No list will be provided. It is the Contractor's responsibility to source a Botanist/Arborist.
6	Section 621.01(A)(13) on page 621-3a of the Project Specs states that the Contractor’s Wildlife Biologist needs to have 5 years minimum experience and shall be approved by the Engineer. Is there a list of qualified Wildlife Biologists that can be provided to the Contractor prior to bid opening?	No list will be provided. It is the Contractor's responsibility to source a Wildlife Biologist.
7	Is Invasive Species Management considered a service or does the general contractor need to list a subcontractor for Invasive Species Management?	How the Contractor meets the requirements is at their discretion. HDOT is not dictating how this requirement will be met.
8	Is Item 607.1020 4-Foot High Tensile Hinge Joint Fence for both temporary and permanent fence? Plan Sheet 24 shows Hinge Joint Fence for temporary fence and Plan Sheet 38 shows Hinge Joint Fence for permanent installation.	The High Tensile Hinge Joint Fence with Geotextile Fabric used during construction is meant to keep the livestock on the ranch from entering the construction area. The High Tensile Hinge Joint Fence will be used in the permanent fencing to keep livestock from leaving the ranch area.

9	Is Geogrid required under grass pavers? Project Spec Section 652.03(D)(3) states that geogrid to be installed as shown on drawings but Typical Sections on Plan Sheet 27 and Detail 2 on Plan Sheet 200 do not show geogrid. Please clarify.	Plans revised to show geogrid. See ADD Sht40S-1
10	Geogrid quantity seems low. Does geogrid go under all new roadway, reconstructed roadway, and grass pavers?	Geogrid should be under all new pavement, reconstructed pavement and under new grass pavers. Quantities and detail revised
11	Permeable Separator (geotextile) quantity seems low. Does geotextile go under all new roadway, reconstructed roadway, and grass pavers?	Permeable separator should be under all new pavement, reconstructed pavement and under new grass pavers. Quantities revised
12	Please clarify if concrete and/or plastic grass pavers are acceptable. Detail 2 on Plan Sheet 200 calls out Geoblock (plastic) grass paver but Project Spec Section 652.03(C)(1) states that grass pavers shall be premanufactured concrete blocks.	Concrete and plastic grass pavers are acceptable.
13	Requesting to use Geoblock as acceptable grass pavers. Please see attached Geoblock product data sheet and drawings (Attachment #01).	Geoblocks are acceptable.
14	Requesting to use Geoblock 5150 as acceptable grass pavers. Please see attached Geoblock 5150 product data sheet and drawings (Attachment #02).	Geoblocks are acceptable.
15	Requesting to use Geopave as acceptable grass pavers. Please see attached Geopave product data sheet and drawings (Attachment #03).	Geopave is acceptable
16	Requesting approval to use Grass Blocks as acceptable grass pavers. Please see attached Grass Blocks product data sheet and safety data sheet (Attachment #04).	Grass Blocks are acceptable
17	Requesting an electronic copy of geotechnical engineering report mentioned in Note 1 on Plan Sheet 19.	Report will be made available upon award
18	Are any of the existing overhead lines or power poles being relocated or moved on this project?	There are no overhead lines or utility poles being moved or relocated by this project

19	<p>1. Please clarify the difference between the guardrail end terminals as shown on the plans and proposal items 606.3000 and 606.4000. The plans call out 2 each, MSKT-SP-MGS-TL-3 and 4 each, MSKT-SP-TL-3. According to the supplier there is no difference between the two systems. If there are differences between the two systems please clarify so we can install what is required. Also, are the bid item quantities correct?</p>	<p>1. Proposal schedule updated in Addendum. 2. Callout revised in to read MSKT-SP-MGS TL-3. 3. Bid quantities updated.</p>
20	<p>2. Please clarify the detail for the thrie beam end post. Pages 184 and 185 of the plans call out a W6x9 post to be used. The standard guardrail post is W6x8.5. Can a standard guardrail post W6x8.5 be used in lieu of the W6x9, or will custom W6x9 post have to made for this project?</p>	<p>Yes, W6x8.5 can be used in lieu of W6x9.</p>
21	<p>3. Please clarify the required blockout to be used. Per detail B/S10.3/S10.7 the detail shows a 12" blockout to be used on the balance of the guardrail. But, the guardrail details on page 63 shows a standard 8" blockout. Please clarify the blockouts required and exactly where the change from 12" to 8" occurs.</p>	<p>See Shts S10.3 and section cuts (page 181). The first 4 posts closest to the end post are W6x15. They are located closer to the roadway and uses 8" blockout. The remaining posts are W6x9 with the 12" blockout.</p>
22	<p>Please provide exact details for the material to be used for the High Tensile Hinge Joint Fence. This is not a standard product so there are no material specifications for the type of fence required. We will need to know at least the following information. 1. Guage of wire. 2. spacing of the individual wires – both vertical and horizontal. 3. Is the fence welded or woven. 4. What are the post made of – wood? If wood, treated? Is there a required species? 5. How are the post to be installed – driven into the ground? Holes dug and backfilled around? 6. How is the fence attached to the post – staples, ties? 7. How is the buttress installed – attached to post, depth in ground. 8. Per detail on sheet C-20 there is no ranch so what side is the fence installed to on the post? 9. Is there a required space between the ground and the bottom of the fence?</p>	<p>High Tensile Hinge Joint Fencing is commercially available in the State of Hawaii. 1. 12.5 ga wire class 3 galvanization; 2. 6"x6" spacing both directions; 3. Neither, the vertical wires are connected to the horizontal wire with a hinge joint, 4. Post may be pine or oak. The posts shall be pressure treated against rot and insects; 5. Posts shall be installed by digging a hole with an auger then backfilled with soil and tamped into place.; 6. The fence shall be attached to end posts using wires and to the intermediate posts using staples; 7, The buttress post shall be installed a minimum 2' deep into the ground. the top of the buttress shall be chamfered to fit snug against the post, doweled and nailed in place; 8. Wire fencing should be installed on the side with the livestock; 9. Install High Tensile Hinge Joint Fence 1" above the ground.</p>
23	<p>Please clarify the diameter of the pipe bollards. Is the 4" pipe ID or OD measurement?</p>	<p>4" Inside Diameter.</p>

24	<p>Please clarify the Temporary fence plan page 24. From sta 147 to sta 157 high tensile hinged joint fence is to be installed and removed at the end of the project. From sta 160 to sta 169 standard 4 ft high chain link fence is to be installed and removed at the end of the project. Is this correct as bid item 607.1030 for temporary fence has a quantity of only 1020 ft which will only account for the high tensile hinged joint fence. How is the temporary 4 ft chain link fence accounted for? This cannot be the permanent fence since page 24 shows the 4 ft chain link fence outside of the R/W whereas the permanent fence is on the R/W. Please clarify.</p>	Quantity of 4' high chain link fence revised. See Proposal Schedule
25	<p>Please clarify the 4 ft chain link fence at the abutment walls. page 50 calls out 4 ft chain link fence only on the upstream side wingwalls. But, the drawing appears to show fence on the down stream side wingwalls but they are not called out on the plan. is there fence on the downstream side wingwalls?</p>	Install 4 ft chain link fence on downstream wingwalls. Sht 50 revised. Quantity on Proposal Schedule revised.
26	<p>There are 2 cattle gates to be installed per the plans. Page 24 shows a temporary cattle gate to be installed and removed and page 39 shows a new permanent cattle gate to be installed</p> <p>a. There is no proposal item for these – where are these gates accounted for?</p> <p>b. What are the widths of these gates?</p>	a. Proposal Schedule updated to include cattle gates; b. 20' span.
27	<p>In regards to the sign plans pages 68 and 69. Please clarify if all of the new “Rumble Strip” sign post are supposed to have OM-II mounted on the new post. The plan shows only 3 of the 6 new post to have them. If all of the new sign post are supposed to have them please correct the quantity for proposal item 632.1000.</p>	Quantity of OM-II revised.
28	<p>Please clarify proposal item 632.1010 type III object marker – we cannot find any type III markers on the plans.</p>	Object III marker to be installed at end post of the bridge. Plans revised to indicate Type III Object Marker.

29	<p>Please clarify the quantities of the following proposal items</p> <p>a. Proposal item 607.1000 4 ft chain link fence bid quantity is 900 LF but from plans pages 38, 39, and 40 it appears to be over 1200 LF.</p> <p>b. Proposal item 607.1020 4 ft high tensile hinge joint fence bid quantity is 1140 LF but from plans sheet 38 there is only 210 LF shown</p> <p>c. Proposal item 607.1040 4 ft bollard bid quantity is 10 each. But plan page 38 and 39 show 14 each.</p>	Quantities revised.
30	Please provide load capacity of the existing bridge, so that we can accurately provide and estimate for he work.	Based on the available inspection reports and load ratings, the bridge capacity is 77 kips. The contractor shall retain the services of a structural engineer to verify this. The Contractor will also be required to obtain the necessary permits if they exceed this load.
31	JITT Training - please confirm that JITT training will only be done on one day and will be for Drilled Shafts/Mass Concrete only. If not, please confirm what the Engineer is considering "new technology".	Duration of JITT shall be as specified in Special Provisions Section 695. Just in Time Training is required for Mass Concrete.
32	What is the roadway section (with thicknesses and materials) required for the temporary asphalt shoulders to be installed in Traffic Control Plan - Phase 2A (Sheets TCP-05(79), TCP-06(80)) along the makai side of Kamehameha Highway.	<p>Based on the potential clayey subgrade anticipated and a Traffic Index of 6.5 for six months of traffic loading, the following pavement section may be used for the temporary pavement section design:</p> <p>Flexible Pavement (Temporary Roadway)</p> <p>3.0 Inches Asphaltic Concrete</p> <p>12.0 Inches Aggregate Base Course (95 Percent Relative Compaction)</p> <p>15.0 Inches Total Pavement Thickness on Compacted Subgrade</p> <p>The pavement subgrade soils should be scarified to a depth of at least 8 inches, moisture-conditioned to above the optimum moisture content, and compacted to no less than 95 percent relative compaction. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same soil determined in accordance with AASHTO T180 (ASTM D1557). Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density.</p>

33	Do bollards need to be provided for Fire Hydrant Lateral B, similar to Fire Hydrant Lateral A?	BWS did not request bollards be installed at FH Lateral B during their review
34	Note 3 on Sheet ESC-1(16) says, "Contractor to phase installation of BMPs to maintain public access to Laniakea Beach." Please provide location of public access and guidance for phasing of work.	Phasing of the work and the BMPs is the responsibility of the Contractor per their means and methods.

KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS, VICINITY OF LANIAKEA BEACH (MP 3.06 TO MP 3.54) PROJECT

PROJECT NO. 83B-01-09, DISTRICT OF WAIALUA, ISLAND OF OAHU

Meeting will begin as advertised in HlePRO.

Microsoft Teams Meeting Items

1. Meeting Attendees

From Microsoft Teams Meeting : Attendees Per the Meeting

Please sign in by writing your name, company, phone number and email address in chat bar. if you are joining us through phone, please email the information at yishan.li@hawaii.gov.

Todd Nishioka, WSP, 808-566-2212, todd.nishioka@wsp.com

Valentin E Bueno 808-566-2231

Malie McClellan, WSP, 808-561-1324, malie.mcclellan@wsp.com

Keith MacKenzie, Healy Tibbitts Builders, Inc, 862-368-5747, kvmackenzie@healytibbon.com

Sean O'Kelly, Global Specialty Contractors Inc., 808-843-8881, seano@globalspecialty.net

Kenta Okada, Healy Tibbitts Builders, Inc., Keokada@healytibbon.com, 808-728-4447

Jason Ames, Grace Pacific, 808-520-6335, james@gracepacific.com

2. Pre-Bid Meeting Statements: August 1, 2023 at 9:00 a.m.

Statement provided by HDOT:

Welcome, everybody. This is the pre-bid meeting for the Kamehameha Highway Drainage and Safety Improvements, Vicinity of Laniakea Beach project. The Project No. is 83B-01-09 and it utilizes only State funds.

My name is Yishan Li and I am the HDOT Project Engineer.

Robert Sun is the Project Manager but he is unable to attend this meeting today.

Please sign in by writing your name, company, phone number and email address in chat bar. if you are joining us through phone, please email the information at yishan.li@hawaii.gov.

Anything said at this meeting is for clarification only, the bid documents shall govern over anything said today and discrepancies shall be clarified by addendum.

As specified in the Notice to Bidders, ALL requests for information (RFI) shall be received in writing to Robert Sun, Project Manager, via email at robert.sun@hawaii.gov no later than 14 calendar days before

bid opening. Therefore, the deadline is August 10. Questions received after the deadline will not be addressed. Verbal requests for information will not receive a response.

To further ensure a reply from HDOT, please cc me on all questions transmitted to Mr. Sun. My email is yishan.li@hawaii.gov

The project scope of work consists of realigning Kamehameha Highway in the vicinity of Lauhulu Stream Bridge and Pohakuloa Way. The project includes placing new AC pavement; removing existing pavement; constructing a two span bridge and associated improvements; adjusting and relocating utilities; installing fencing, guardrail, signs, and pavement markings; installing landscaping and pavers; and implementing erosion control and traffic control measures.

The estimated cost of construction is between \$15,000,000 and \$20,000,000.

Bids are currently scheduled to open on August 24.

This ends HDOT's presentation for the project.