

ENHANCED VEHICLE CLASSIFICATION (EVC) SYSTEM NOTES

1. The location of new sensors shall be staked out in the field by the Contractor based on the location of permanent striping and markings, and approved by the Engineer prior to installation.
2. The Contractor shall inform the Engineer at least three days prior to saw cutting pavement and installing sensors.
3. Highway crossing conduits shall be provided with a minimum of 36" cover and shall be concrete encased, per Standard Plan TE-36.
4. The Contractor shall verify the location of existing utilities and underground structures whether or not shown on the plans.
5. The Contractor shall assume that underground utilities not shown on the plans may exist. The Contractor shall be responsible for contacting the different utility companies for information and toning.
6. The Contractor shall be held liable for any damages incurred to existing utilities and underground structures as a result of operations. All damaged portions shall be replaced in accordance with the standards and specifications of the affected utility company at no cost to the State.
7. Changes to the contract plans and specifications will not be permitted, unless approved by the Engineer in writing.
8. Saw cuts shall be made by wet cutting only.
9. After saw cutting is done, the saw cuts shall be cleaned of dust, dirt, and refuse with water applied by pressure washer. Residual water within the saw cuts shall be vacuumed using a wet/dry vacuum. The saw cuts shall then be dried using an air compressor.
10. After saw cuts are dried, any remaining debris stuck within the cuts shall be removed. The saw cuts must be completely clean and dry before inserting the sensors and filling cuts and any voids surrounding the sensors or their lead cables with sealant.
11. The collected slurry shall be disposed of appropriately (i.e., either placed in a filter fabric-lined filtration box or a filter fabric-lined dug up retention/percolation basin). After filtration/percolation, the filter fabric and the retained sediments and any excavated pavement material shall be disposed of appropriately.
12. Sensor lead cables shall be pulled into conduits where indicated. Cables shall be tested for acceptance before and after installation into conduits.
13. Piezo sensor lead cables shall be continuous with no splices.
14. Sensor lead cables shall be terminated in the controller cabinet and shall have a minimum of 12" additional slack.
15. The Contractor shall restore all affected areas to their original condition or better. This item of work shall not be paid for separately, but shall be considered incidental to work of other paid items.
16. Poles for solar panel assemblies and excavation warning signs shall be located no more than 20 feet from controller cabinets.

ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
NOTE BOOK <i>12. Jeff</i>	DRAWN BY _____	•
	TRACED BY _____	•
	DESIGNED BY _____	•
	QUANTITIES BY _____	•
N. <i>4th May 01 gpn</i>	CHECKED BY _____	•

1. Loop sensors shall consist of four turns of 1C #14 cable (meeting IMSA Spec. 51-3 or equivalent) embedded in a 3/8" wide by 4" deep saw cut, except as noted. Loop sensors shall be provided a minimum of 2" cover.
2. Loop sensors shall be staggered on roadways with lanes that are less than 12 feet in width, and centered in lanes relative to permanent striping and markings, as shown on contract plans or by direction of the Engineer.
3. After laying the loop sensor cable in four (4) turns within the 4" deep cut, 1" long pieces of backer rod shall be pressed in each foot of the loop and the loop lead saw cut, to anchor the wire in the bottom of the cut before applying the loop sealant. Backer rod shall be embedded at least 2" below the top of pavement. The backer rod shall be pressed into the saw cut with a blunt object such as a wooden paint stir stick. No sharp object (such as a screw driver) shall be used to press the backer rod into the saw cuts.
4. Loop sensor and lead cable shall be one continuous wire. Lead wires from the same loop shall be twisted in pairs, five twists per foot, from the end of the saw cut at the roadway edge to the pull box. Do not twist one loop pair with another loop pair.
5. Continuity of loop sensors and lead cables shall be tested and warrantied for one year from the date of acceptance by the Engineer.
6. Loop sensor lead cables shall be spliced to home-run cables (meeting IMSA Spec. 50-2 or equivalent) only at the closest pull box to the loop. Splices shall be made using a splice kit. Splice points of cables shall be suspended near the top of the pull box with a j-hook.
7. The Contractor shall label the loop and piezo sensor leads clearly to identify traffic direction, lane number, and sequence of loop and piezo sensors in each lane in each direction.
8. The left-most lane in the direction of traffic flow is designated as Lane 1, and the next lane to its right as Lane 2, and so on, as indicated on plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EVC TRAFFIC COUNTING
SYSTEM NOTES

KUHIO HIGHWAY RESURFACING
Waikaea Bridge to Maillihuna Road
Federal-Aid Project No. NH-056-1(063)

Date: Mar. 2023

SHEET No. 1 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-056-1(063)	2023	39	43

BOUNDARY LABEL LEGEND

ep = edge of pavement
etw = edge of travelway

LOOP LABEL LEGEND

N = North
S = South
A = Approaching
T = Trailing

N I T
└┐ Indicates approaching or trailing loop
└┐ Indicates lane number
└┐ Indicates direction

NOTES:

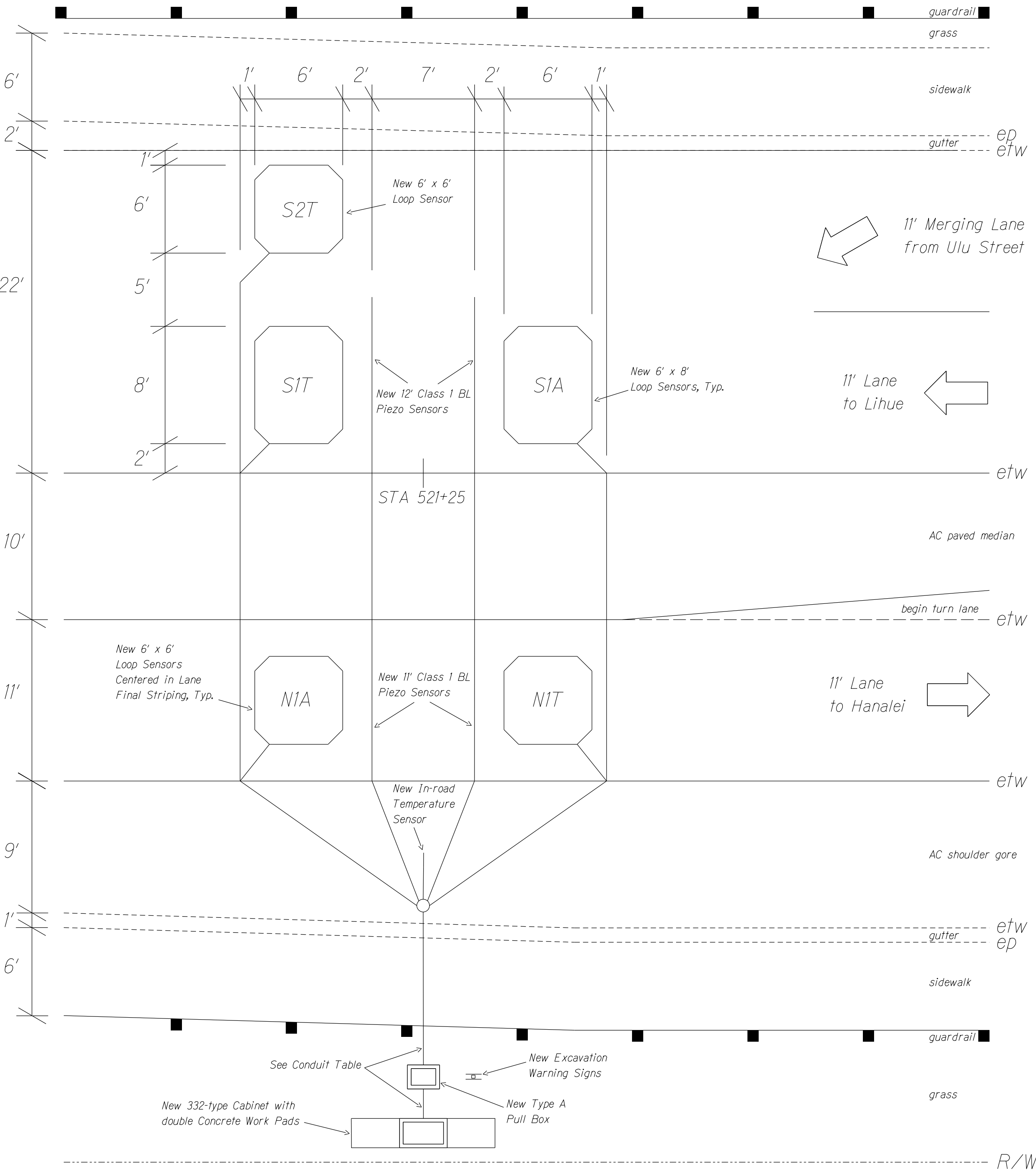
- All dimensions and callouts are typical unless otherwise noted on plan.
- Mount 200 Watt solar panel on top of cabinet (refer to Cabinet plan).
- Place Excavation Warning Signs no more than 20' from Cabinet (refer to Warning Sign plan).
- Refer to Sensor Details sheet for installation of Loop and Piezo Sensors.

Conduit Table:

Conduit* # - Size	Class 1 BL Sensor Lead Cables	2C #14 Loop Sensor Cable	In-Road Temperature Sensor Cable
1 - 2"	4	0	1
1 - 2"	0	4	0

*Conduits under pavement and at utility crossings shall be concrete encased per Standard Plan TE-36.

*Conduits in unpaved areas of the Right of Way shall be constructed per DUCT DETAILS on Standard Plan TE-35.

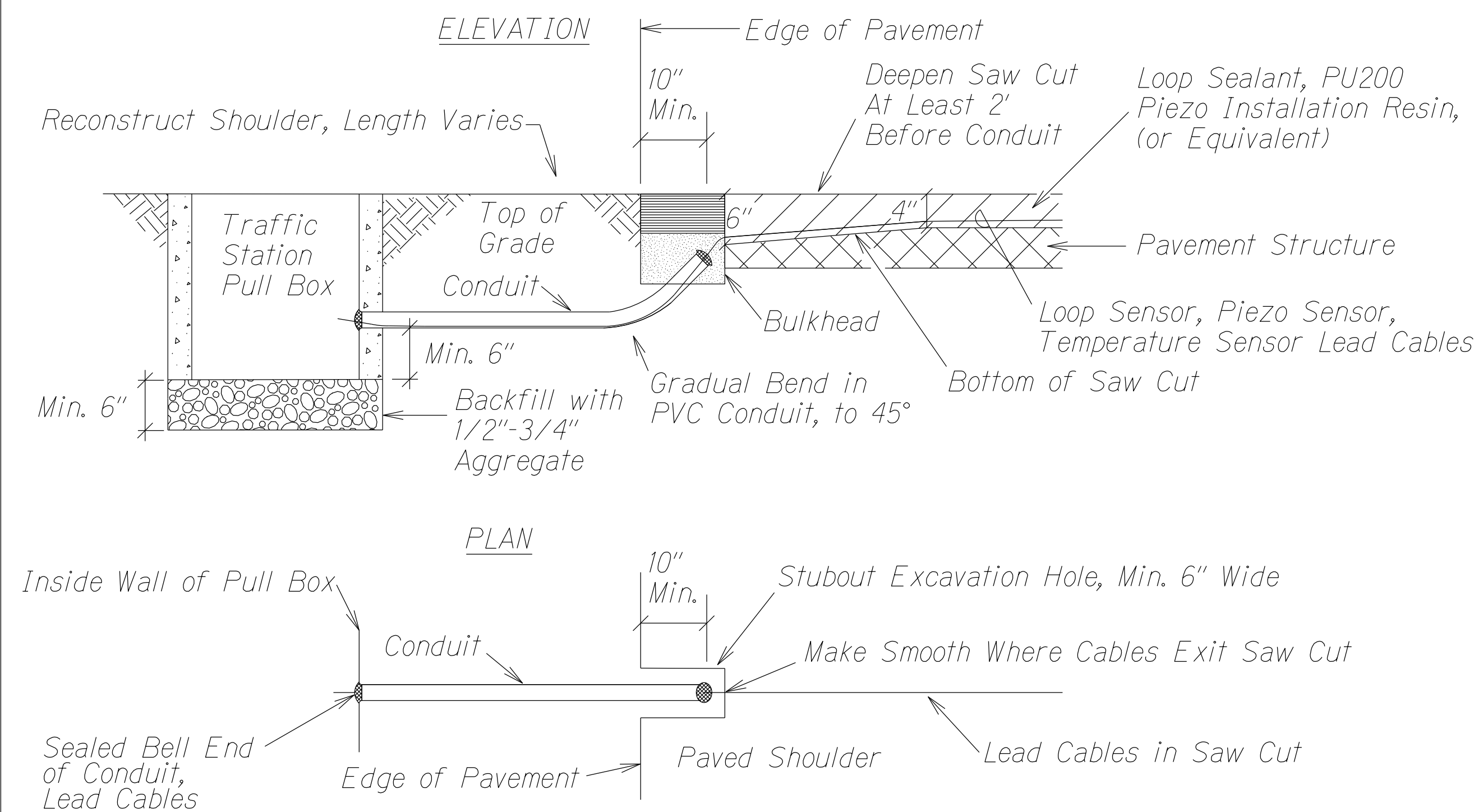


EVC TRAFFIC COUNTING SYSTEM LAYOUT AND LABELING
NEW EVC STATION - KUHIO HIGHWAY SR 56 MP 8.13



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**EVC TRAFFIC COUNTING
SYSTEM LAYOUT**
KUHIO HIGHWAY RESURFACING
Waikaea Bridge to Mailihuna Road
Federal-Aid Project No. NH-056-1(063)
Scale: As Shown Date: Mar. 2023
SHEET No. 2 OF 5 SHEETS

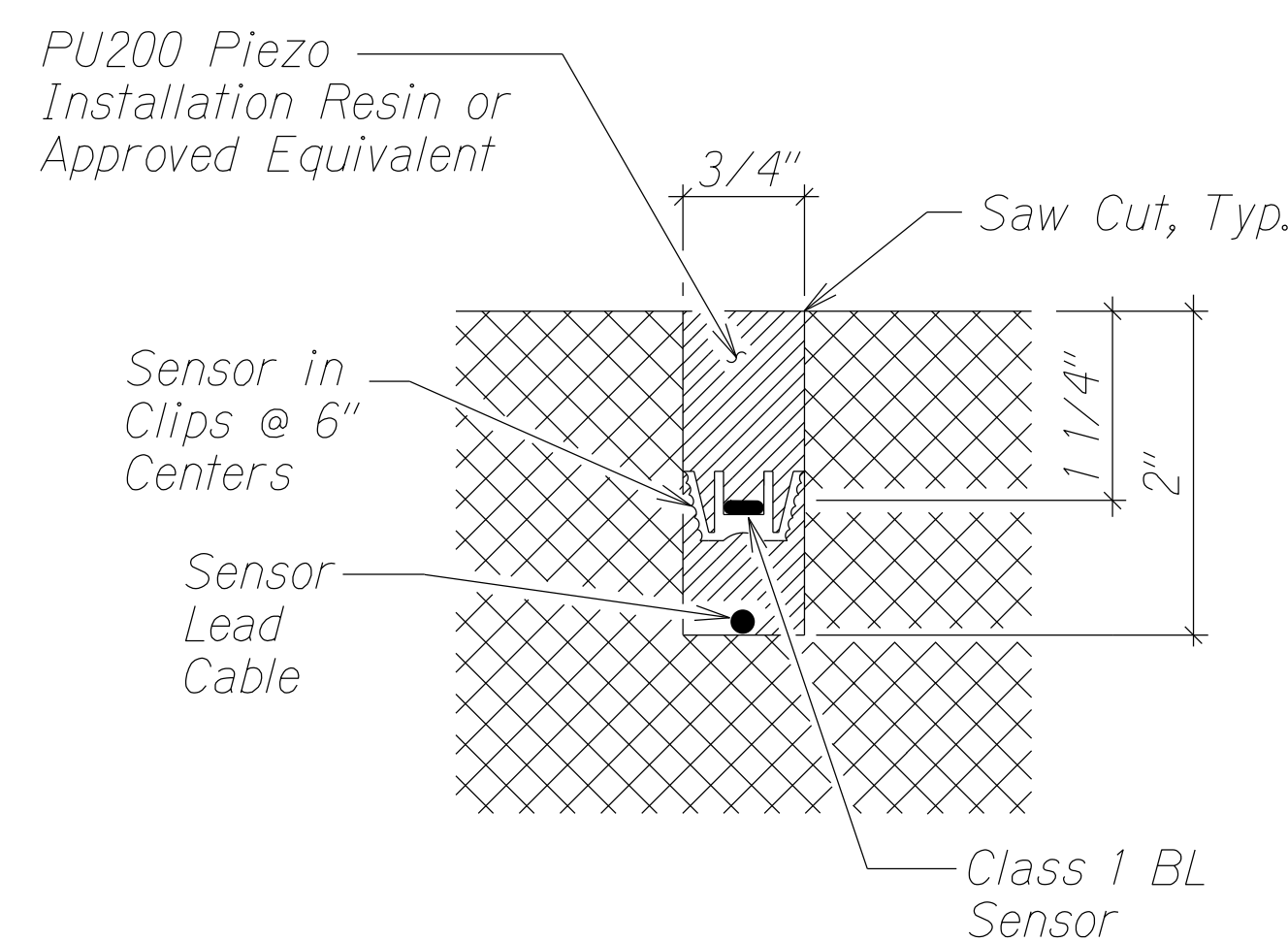
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-056-1(063)	2023	40	42



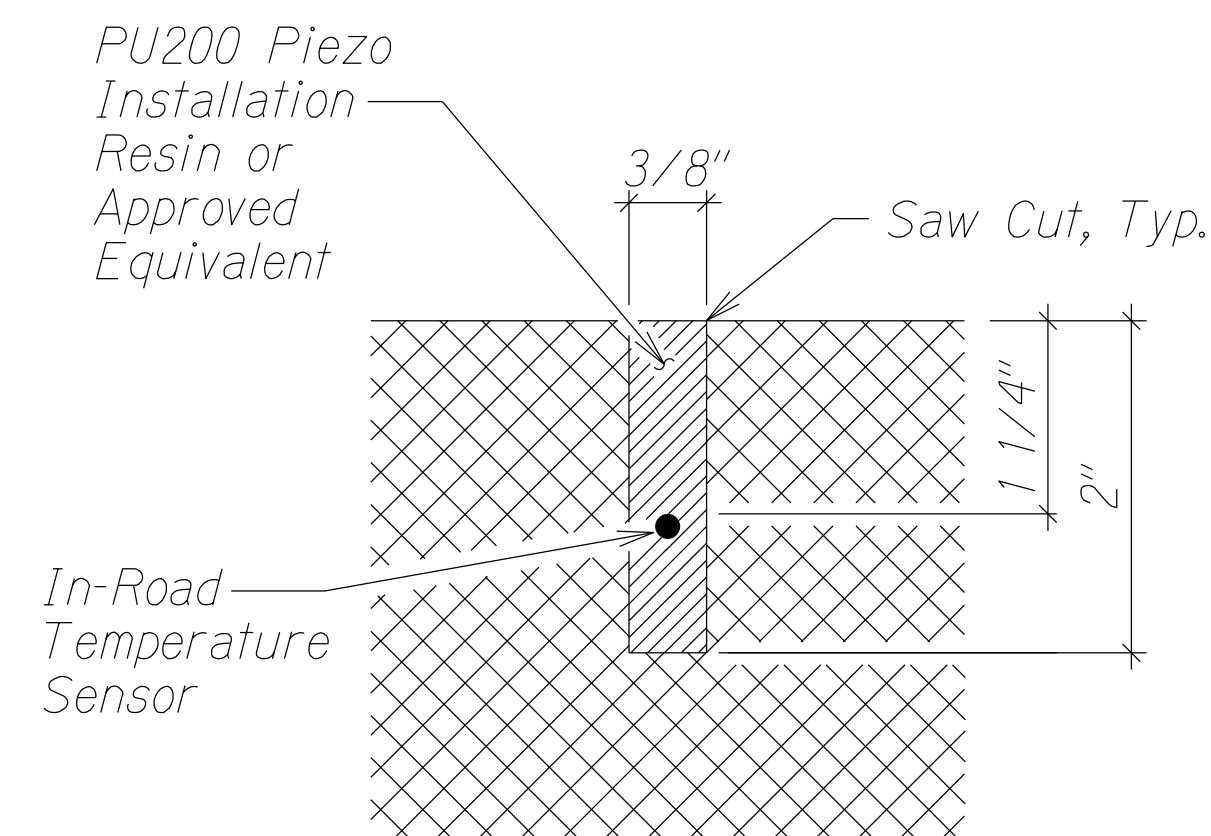
EDGE OF ROADWAY DETAILS
Not to Scale

NOTES ON CONSTRUCTION AT END OF SAW CUT:

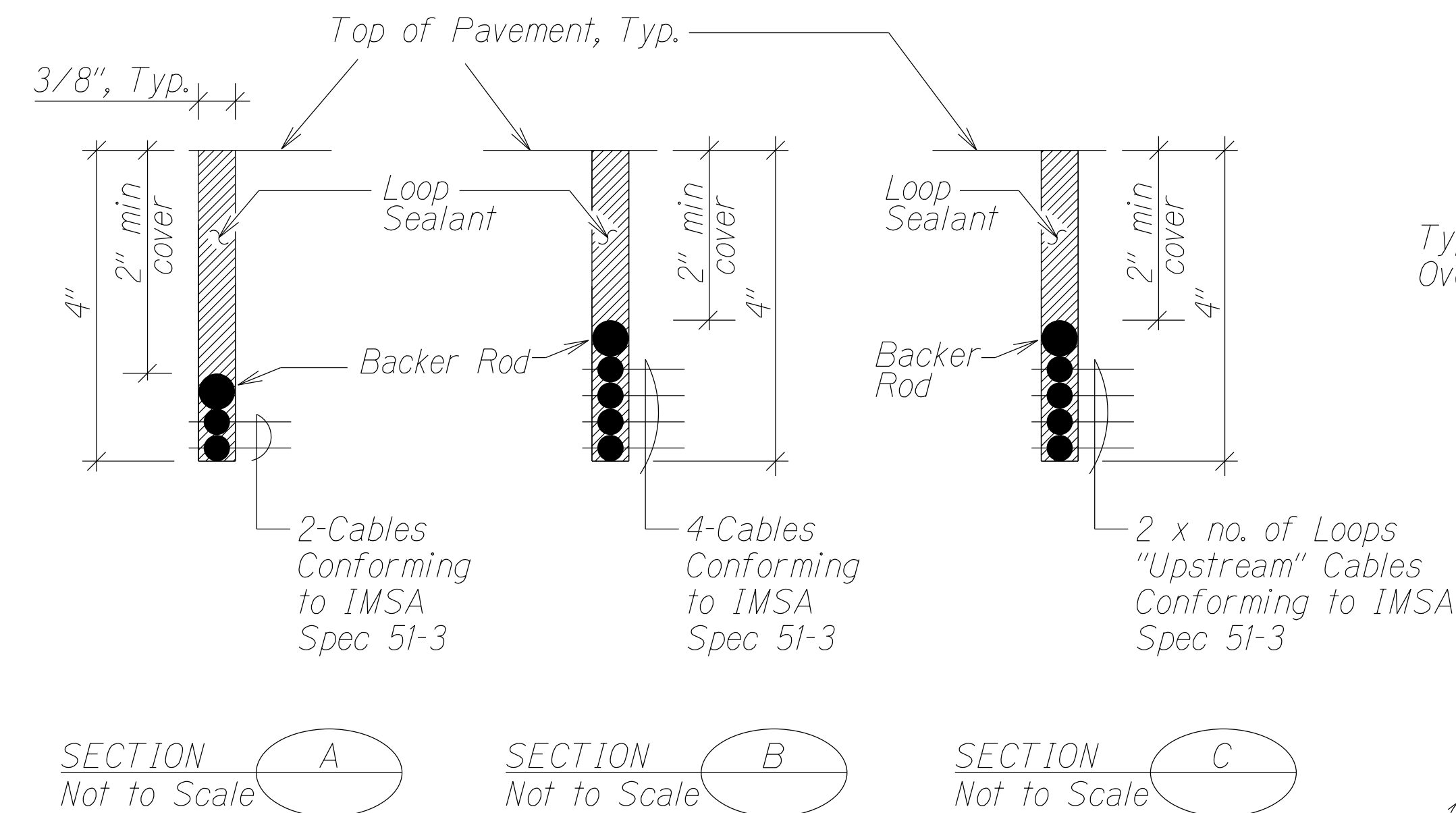
- Conduit stubout should be installed at least 10 inches in from the edge of pavement. If the depth of pavement is 4 inches or less at the edge, conduit stubout should be installed at least 12 inches in from the edge of pavement.
- Install bell ends on conduit and seal with duct seal compound after installation of lead cables.
- Install temporary bulkhead/dam across saw cut to keep sealant in saw cut as it is placed..
- Place loop sealant, PU200 piezo installation resin (or equivalent) in saw cut.
- Place sand to cover exposed lead cables and protect and separate them from backfill.
- Backfill over sand with new A.C. cold mix in stubout excavation hole.
- Reconstruct shoulder, curb, and gutter as required.



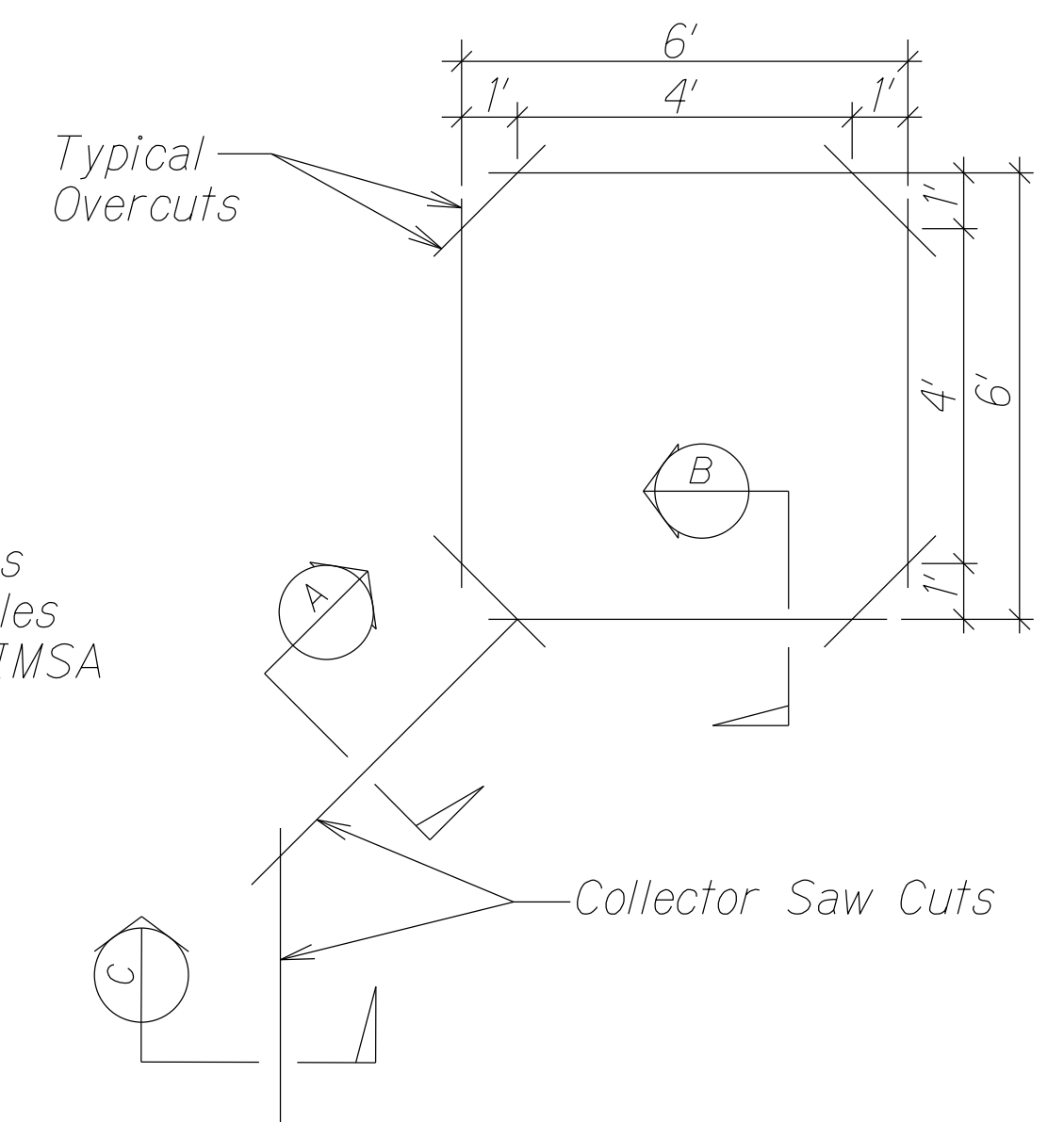
PIEZO SENSOR SAW CUT SECTION DETAIL
Not to Scale



TEMPERATURE SENSOR SAW CUT SECTION DETAIL
Not to Scale



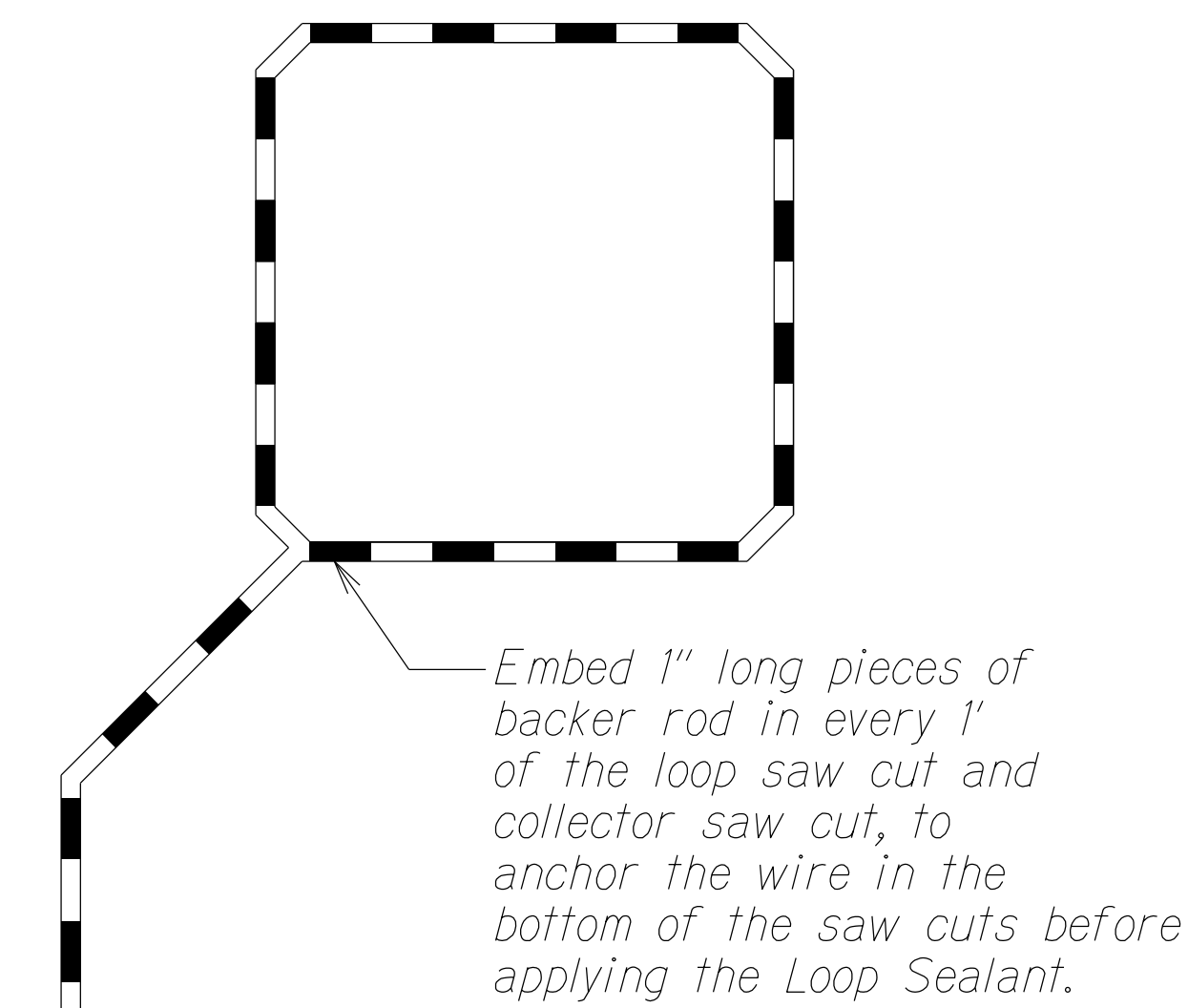
TYPICAL SECTIONS LOOP SENSORS
Not to Scale



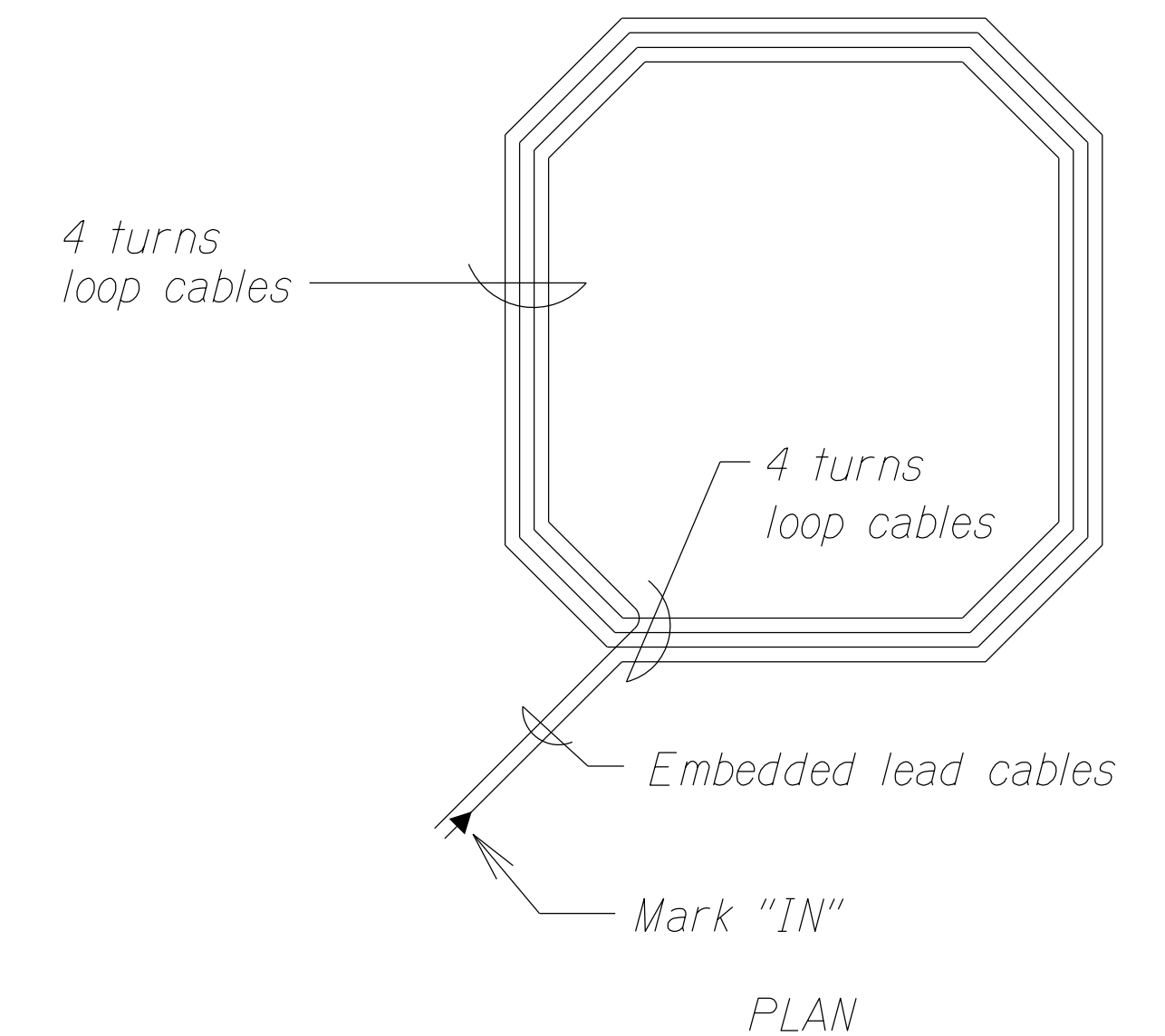
TYPICAL LOOP SENSOR SAW CUT DETAIL
Not to Scale

LOOP SENSOR SAW CUT NOTES:

Length of overcuts shall be kept to a minimum. All overcuts shall be backfilled with Loop Sealant.



TYPICAL LOOP SENSOR BACKER ROD PLACEMENT DIAGRAM
Not to Scale



TYPICAL LOOP SENSOR WIRING DIAGRAM
Not to Scale

STATE OF HAWAII	
DEPARTMENT OF TRANSPORTATION	
HIGHWAYS DIVISION	
EVC TRAFFIC COUNTING	
SYSTEM SENSOR DETAILS	
KUHIU HIGHWAY RESURFACING	
Waikaea Bridge to Mailihuna Road	
Federal-Aid Project No. NH-056-1(063)	
Scale As Noted	Date: Mar. 2023
SHEET No. 3 OF 5 SHEETS	

Lock washer

Amber Reflectors

2" x 2" square 12 gauge 10' long

Galvanized Square Tube Sign Post

5/16" ϕ x 3" galvanized bolt, nut, lock washer & 7/8" x 0.06" stainless steel flat washers with neoprene rubber gaskets on both front and back sides of both signs

Diagram illustrating the assembly of a sign post:

- Lock washer
- Sign plates
- 2" x 2" square 12 gauge 10' long Galvanized Square Tube Sign Post
- 5/16" Ø x 3" galvanized bolt, nut, lock washer 7/8" x 0.06" stainless steel flat washers with neoprene rubber gaskets on both front and back sides of both signs

Technical drawing of a rectangular plate with rounded corners. The plate is centered on a vertical centerline, indicated by a dashed line. The overall width is 6 inches, with two 3-inch segments from the centerline to the side edges. The overall height is 12 inches, with two 1-inch segments from the horizontal centerline to the top and bottom edges. The corners are rounded with a radius of 1/2 inch. Two 3/8 inch diameter bolt holes are shown, one near the top and one near the bottom, centered on the vertical centerline. The drawing includes break lines at the top and bottom edges, indicating that the plate continues. Annotations include: "Radius all corners 1/2 inch" pointing to the rounded corners; "3/8 inch \varnothing bolt hole, typ." pointing to one of the bolt holes; "3 inch" dimensions for the horizontal segments; "12 inch" for the total height; and "1 inch" dimensions for the vertical segments from the centerline.

Radius all corners 1-1/2"

Sign plates

6"

6"

18"

1"

1"

1"

6"

3/8" \varnothing bolt hole, typ.

Sign post shall have 7/16" prepunched holes on 1" centers

NOTES:

1. *Text on signs shall be centered both ways and shall be black text on yellow non-retro reflective background.*
2. *Existing station name shall be used on ID plates added as a retrofit. For new stations, use new HWY-PH station ID.*
3. *Station ID signs shall be placed directly below Warning signs.*
4. *Sign plates shall be 0.063 thick aluminum, single sided.*

- NOTES:

1. Two (2) reflectors shall be mounted on either side of the post and below the Warning and Station ID signs on the same post.
2. Bottom of reflectors shall be 4' above finished grade.
3. Reflector plates shall be oriented perpendicular to the roadway and to the Warning and Station ID signs higher on the post.

NOTES:

1. Two (2) warning sign plates and two (2) station ID plates shall be mounted back to back, parallel to the roadway.
2. Bottom of Station ID signs shall be 7' above finished grade.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGWAYS DIVISION

EVC TRAFFIC COUNTING
SYSTEM SIGNS

KUHOI HIGHWAY RESURFACING
Waikaea Bridge to Mailihuna Road
Federal-Aid Project No. NH-056-I(063)

Scale: As Noted *Date: Mar. 2023*

ORIGINAL PLAN	SURVEY PLOTTED BY _____ DATE _____
NOTE BOOK	DRAWN BY _____
163/147	DESIGNED BY _____
4/11/2005	TRACED BY _____
	QUANTITIES BY _____
	CHECKED BY _____