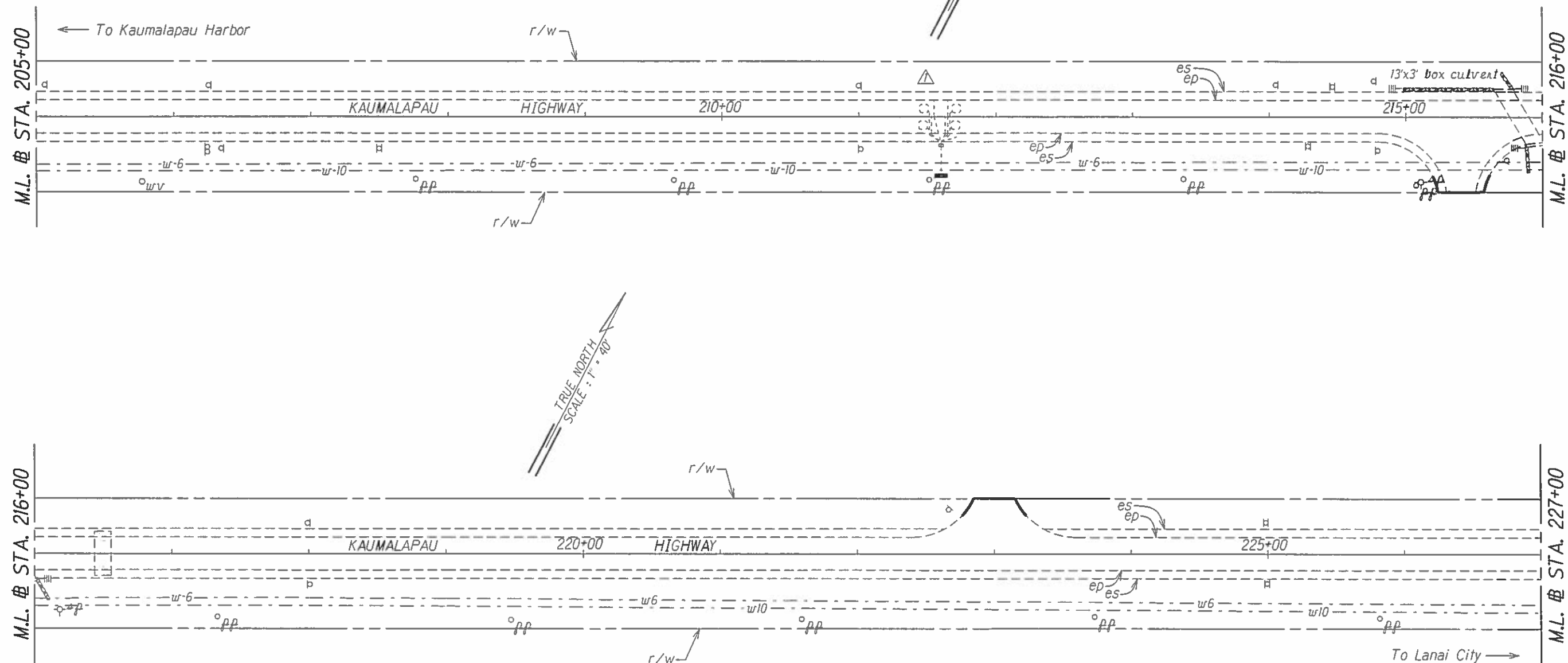


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	440A-01-16M	2016	ADD.11	26



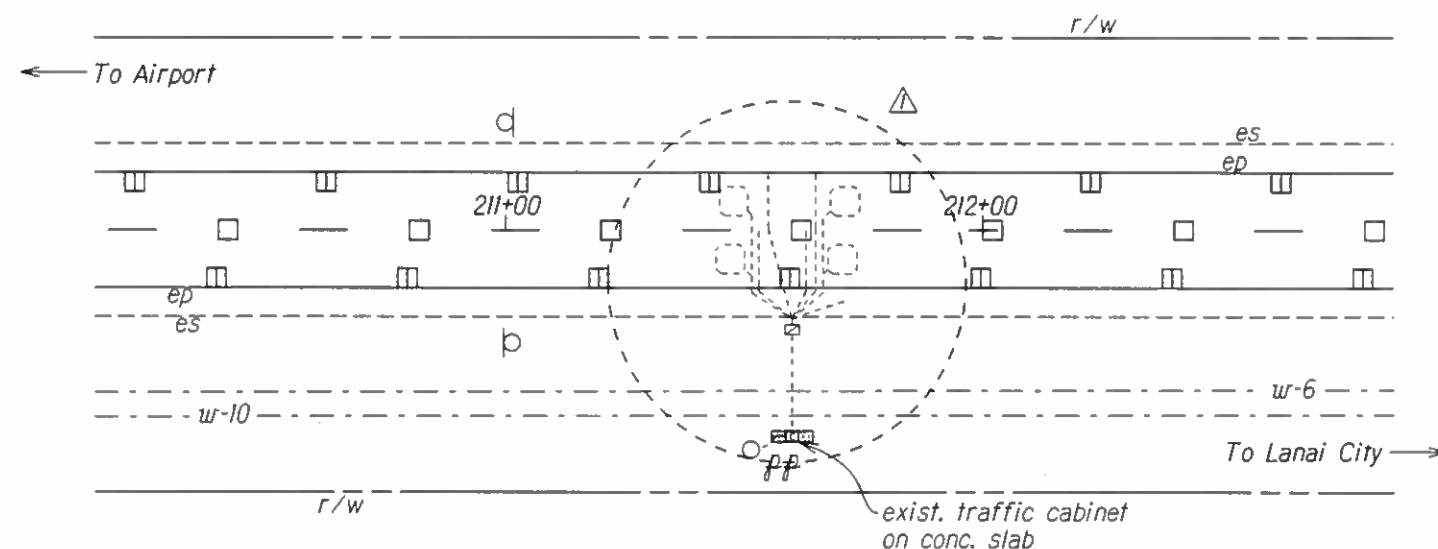
SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
CHECKED BY	
IN CHARGE	

2-24-16 Existing location relocated.

DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

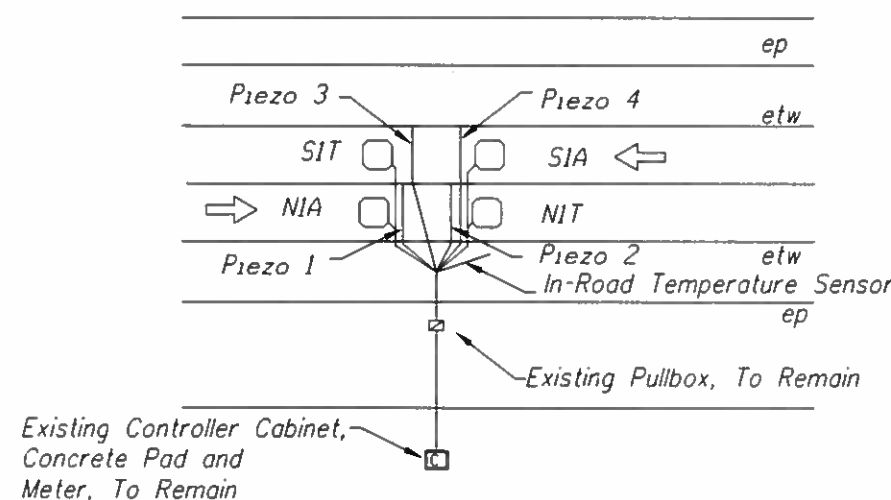
ROADWAY PLANS
KAUMALAPAU HIGHWAY PAVEMENT
PREVENTIVE MAINTENANCE
Airport Road to Lanai City
Project No. 440A-01-16M
Scale: 1" = 40' Date: September, 2015
SHEET No. 3 OF 7 SHEETS



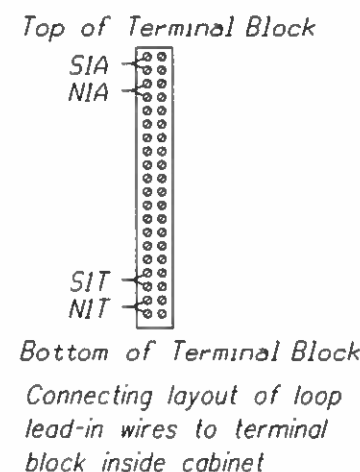
KAUNALAPAU HIGHWAY
ROUTE 440, M.P. 4.073
 Scale: 1" = 20'

LOOP LABEL LEGEND:
 N = North
 S = South
 A = Approaching
 T = Trailing

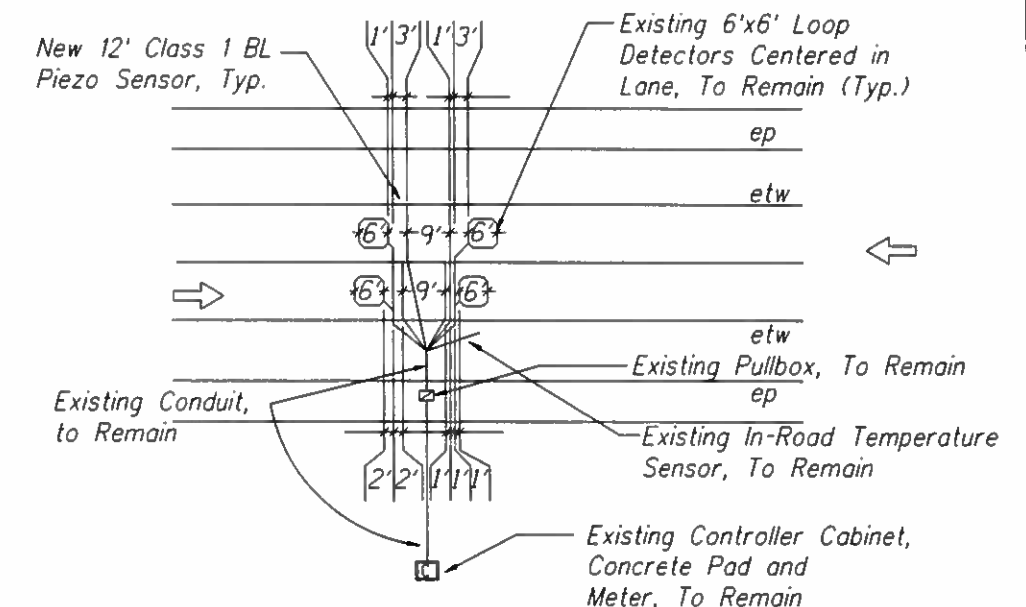
N2T
 Indicates approaching or trailing loop
 Indicates lane number
 Indicates directions*



△ LABELING OF LOOPS AND PIEZOS
 Not to Scale



△ TYPICAL TWO-LANE ROADWAY TERMINAL BLOCK WIRING DETAILS
 Not to Scale



Conduit 'A' Table:

Conduit # - Size	Class 1 BL Sensor Lead Cables	2C #18 Loop Detector Cable	In-Road Temperature Sensor Cable
1-2"	4	4	1

- *NOTES:**
- All dimensions and callouts are typical unless otherwise noted on plan.
 - Contractor shall coordinate service agreements and connections to electrical and communication service. Contractor shall also contact the appropriate State Dept of Transportation Representative for service agreement. (Highways Planning, contact Goro Sulijoadikusumo P.E. at 587-1839).

△ COUNTING STATION LAYOUT DETAIL
 Not to Scale

2-24-16	Existing location relocated. Added Traffic Loop Details.
DATE	REVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
TRAFFIC COUNTING STATION DETAILS
KAUNALAPAU HIGHWAY PAVEMENT PREVENTIVE MAINTENANCE
Airport Road to Lanai City
Project No. 440A-01-16M
 Scale: 1" = 20' Date: October, 2015
 SHEET No. 1 OF 3 SHEETS

ELECTRONIC VEHICLE COUNTING (EVC) SYSTEM NOTES SENSOR LOOP LAYOUT NOTES (CONTINUED)

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	440A-01-16M	2016	ADD.19S-1	26

1. The location of new sensor loops and piezo sensors shall be staked out in the field by the Contractor 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 sensor loops and piezo sensors.
3. Pull in in-bound lanes sensor loop cable and piezo sensor lead cables into conduit, where indicated. Cables shall be tested for acceptance before and after installation into conduit.
4. Piezo lead cables shall be continuous with no splices.
5. The Contractor shall restore all affected areas to their original condition. This item of work shall not be paid for separately, but shall be considered incidental to work of other paid items.
6. The Contractor shall verify the location of the existing utilities and underground structures whether or not it is shown on the plans.
7. The Contractor shall assume that existing underground utilities not shown on the plans may exist. The contractor shall be responsible for contacting the different utility companies for information and toning.
8. The Contractor shall be held liable for any damages incurred to the existing utilities and underground structures as a result of his operations. All damages portions shall be replaced in accordance with the standards and specifications of the affected utility company at no cost to the State.
9. Changes to the contract plans and specifications will not be permitted, unless approval by the Engineer in writing.
10. All cables are to be terminated within the EVC cabinet shall have a minimum 12" additional slack.
11. Highway crossing conduit shall be provided with 36" cover.
12. Vacuum, pressure wash and air dry by air compressor and clean sawcut thoroughly before installing sensors and/or cables and filling with epoxy loop sealant or AS475 Axle Sensor Grout.
13. All Saw-cutting Slurry shall be Wet Vacuumed, either simultaneous with or immediately after the Saw-cutting operations. The collected Slurry shall be disposed of appropriately (i.e., either, placed in a Filter Fabric Lined Filtration Box or in a Filter Fabric Lined Dug Up Retention/Percolation Basin, and after Filtration/Percolation, the Filter Fabric and the retained sediments, disposed of appropriately).
14. Dry saw-cutting shall not be permitted.

3. Continuity of sensor loops and lead-in wires shall be tested and warranted for one year from date of acceptance by the Contractor.
4. Sensor loop lead cables shall be spliced only at the final pullbox to the EVC cabinet. Splice point of cables must be suspended near the top of the pullbox with a j-hook.
5. Splices shall be made by use of a splice kit.
6. All sensor loop lead cables shall be crimped with open end lugs that will fit into the terminal board slots snugly.
7. Stagger sensor loops on roadways with lanes that are less than 12 feet in width.
8. The Contractor shall connect the sensor loop wires on each terminal slot, as shown on plans.
9. The left lane in the direction of traffic flow is designated as lane 1, and the lane next to its right as lane 2 and so on as indicated on plans.
10. All sensor loop lead wires in the EVC cabinet and the pullboxes shall be identified and labeled by direction of traffic flow and lane number as shown on plans.
11. Only one sensor loop shall be placed per saw cut.

SENSOR LOOP LAYOUT NOTES

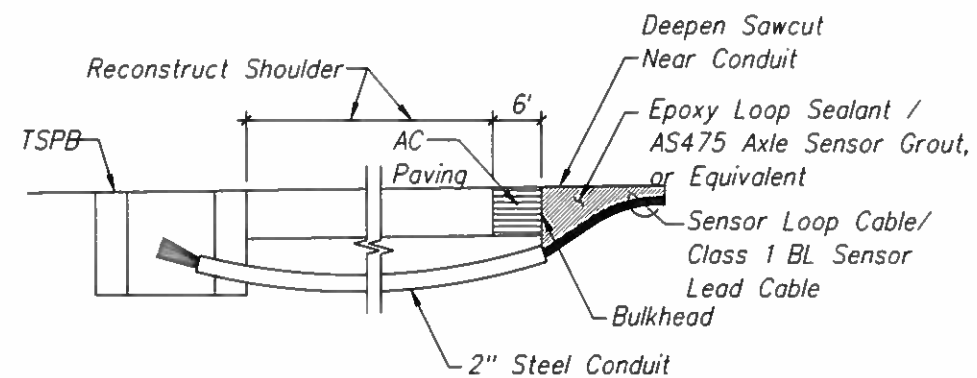
1. Detector loop shall consist of four turns of 1C #14 cable meeting IMSA Spec 51-3 or equivalent embedded in a 3/8" wide by 4" deep sawcut, except as noted.
2. Sensor loop and lead cable shall be one continuous wire. Lead wires from the same loop shall be twisted in pairs, five twists per foot from the edge of paved shoulder to the pullbox. Do not twist one loop pair with another loop pair.

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	

2-24-16 Added Sheet.

DATE	REVISION
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
TRAFFIC COUNTING
STATION DETAILS
KAUMALAPAU HIGHWAY PAVEMENT
PREVENTIVE MAINTENANCE
Airport Road to Lanai City
Project No. 440A-01-16M
Scale: 1" = 20' Date: October, 2015
SHEET No. 2 OF 3 SHEETS

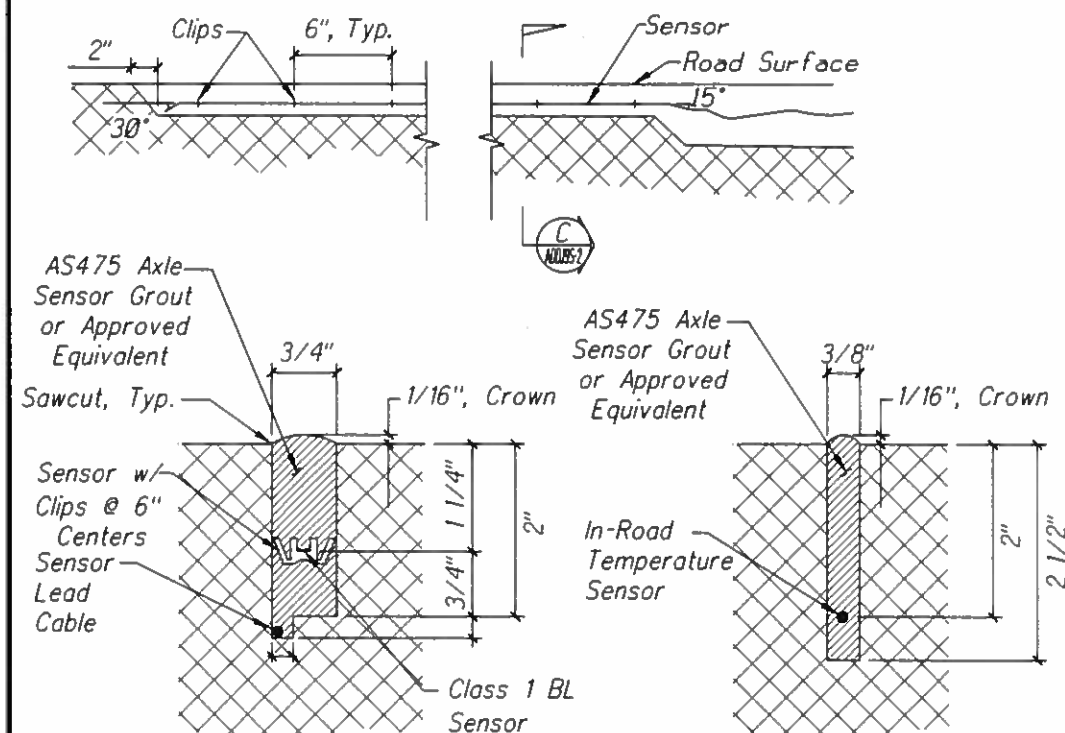


NOTES ON CONSTRUCTION AT END OF SAWCUT:

1. Seal roadway end of conduit after installation of conductors.
2. Install bulkhead across conduit trench.
3. Place Epoxy Loop Sealant or AS475 Axle Sensor Grout or Equivalent in sawcut.
4. Backfill over conduit with new AC.
5. Reconstruct curb and gutter as required.

DETAIL OF SENSOR LOOP/CLASS 1 BL SENSOR AT EDGE OF ROADWAY

Not to Scale



SECTION C

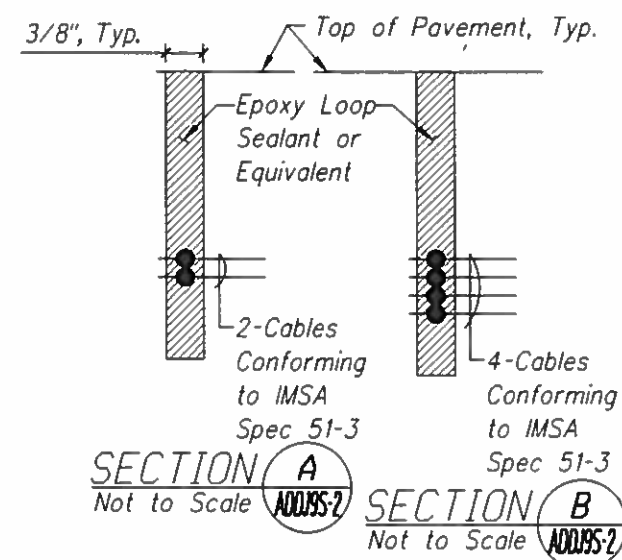
Not to Scale

PIEZOELECTRIC SENSOR INSTALLATION DETAIL

Not to Scale

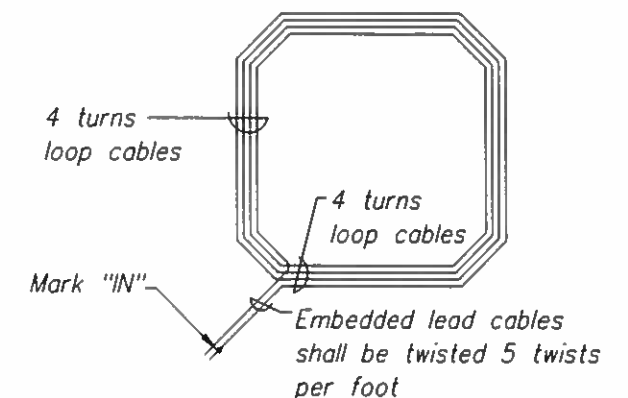
IN-ROAD TEMPERATURE SENSOR INSTALLATION DETAIL

Not to Scale



TYPICAL SECTION THROUGH SENSOR LOOP

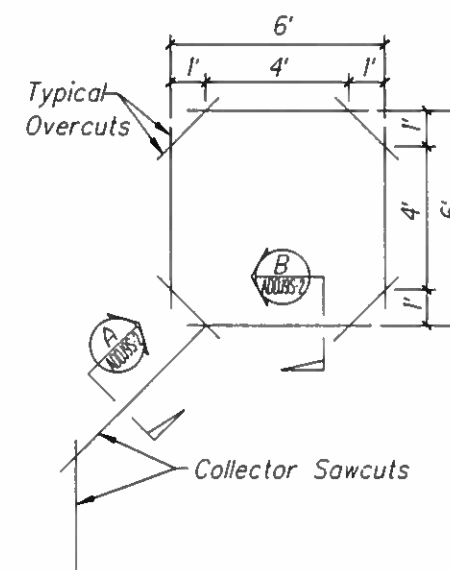
Not to Scale



PLAN

TYPICAL SENSOR LOOP WIRING DIAGRAM

Not to Scale



TYPICAL SENSOR LOOP SAWCUT DETAIL

Not to Scale

NOTES:

1. Length of overcuts shall be kept to a minimum. All overcuts shall be backfilled with 3M Loop sealant.
2. All saw-cutting slurry shall be wet vacuumed, either simultaneous with or immediately after the saw-cutting operations, and the collected slurry disposed of appropriately (i.e., either, placed in a filter fabric lined filtration box or in a filter fabric lined dug up retention/percolation basin, and after filtration/percolation, the filter fabric and the retained sediments, disposed of appropriately).

2-24-16 Added Sheet.

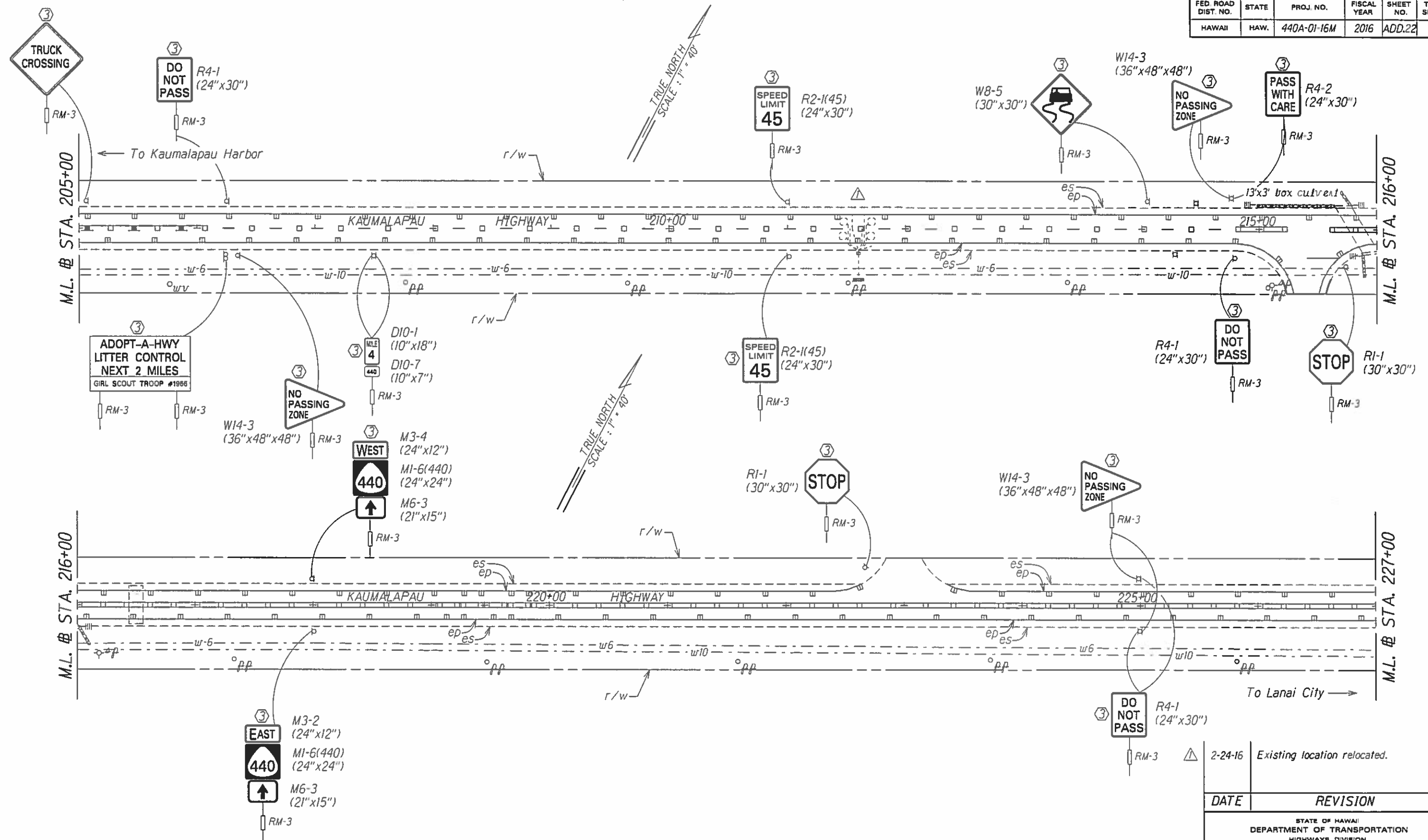
DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**TRAFFIC COUNTING
STATION DETAILS**
KAUALAPAU HIGHWAY PAVEMENT
PREVENTIVE MAINTENANCE
Airport Road to Lanai City
Project No. 440A-01-16M
Scale: 1" = 20' Date: October, 2015

SHEET No. 3 OF 3 SHEETS

ADD. 19S-2

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	440A-01-16M	2016	ADD.22	26



SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
N.	

KEY:

- ① Exist. Sign(s) & Post(s) to Remain
- ② Remove Exist. Sign(s) & Post(s)
- ③ Remove Exist. & Install New Sign(s) & Post(s)
- ④ Install New Sign(s) & Post(s)

DATE	REVISION
2-24-16	Existing location relocated.
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION SIGNING & PAVEMENT MARKING PLAN KAUMALAPAU HIGHWAY PAVEMENT PREVENTIVE MAINTENANCE Airport Road to Lanai City Project No. 440A-01-16M Scale: 1" = 40' Date: September, 2015	
SHEET NO. 3 OF 7 SHEETS	