




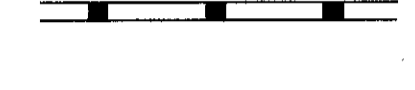





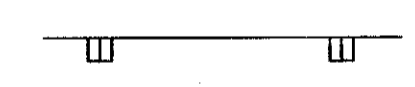
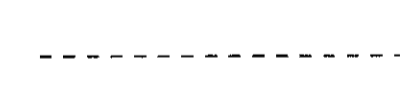
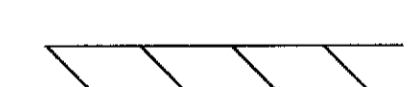
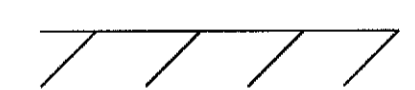





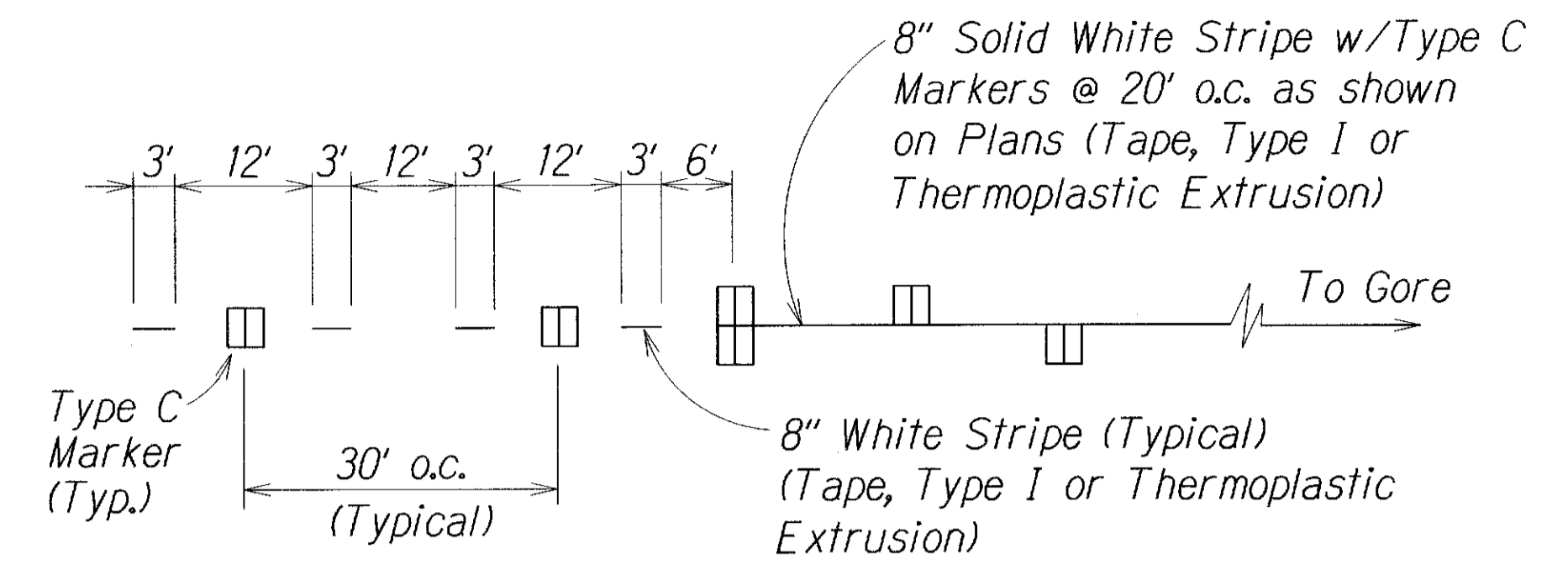
FED. ROAD DIST. NO.	STATE	FED-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	ADD.23	42

**LEGEND**

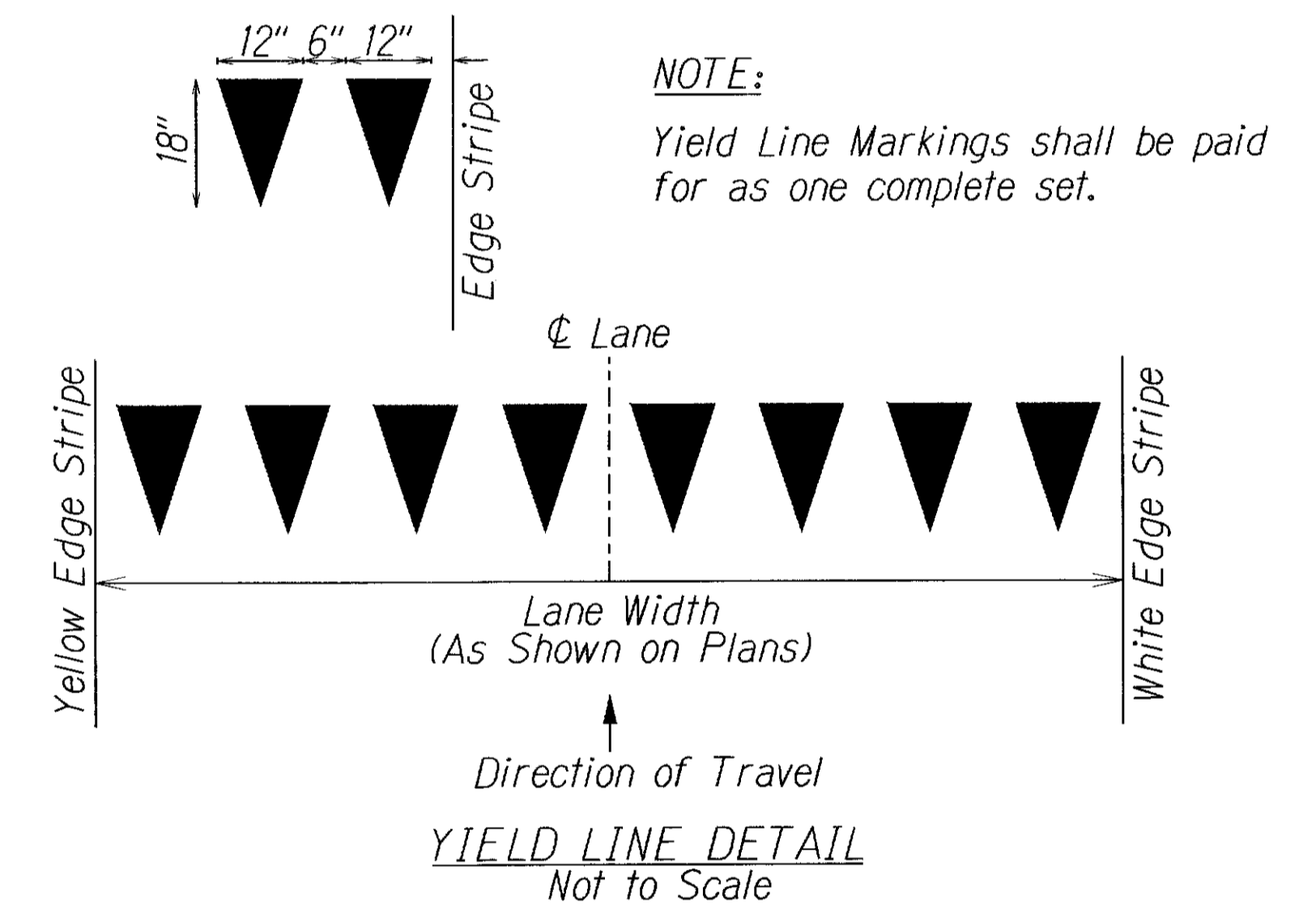
-  4 each Type A Raised Pavement Markers  
Type C Raised Pavement Markers @ 40'-0" o.c.
-  4 each Type J Raised Pavement Markers  
Type D Raised Pavement Markers @ 40'-0" o.c.
-  8" White Stripe with Type C Raised Pavement Markers @ 20'-0" o.c. (Tape, Type I or Thermoplastic Extrusion)
-  4" Double Solid Yellow with Type D Raised Pavement Markers @ 20'-0" o.c. (Tape, Type I or Thermoplastic Extrusion))
-  4" Double Solid Yellow Stripes with Type H Raised Pavement Markers @ 20'-0" o.c. (Tape, Type II or Thermoplastic Extrusion))
-  4" Yellow Edge Stripe with Type H Raised Pavement Markers @ 40'-0" o.c. (Tape, Type II or Thermoplastic Extrusion))
-  4" Double Solid White Stripes with Type C Raised Pavement Markers @ 20'-0" o.c. (Tape, Type I or Thermoplastic Extrusion)
-  Lane Change Restriction Marking  
4 each Type A Raised Pavement Markers  
Type C Raised Pavement Markers @ 20'-0" o.c.  
4" White Stripe (Tape, Type I or Thermoplastic Extrusion)
-  4" or 8" White Edge Stripe with Type C Raised Pavement Markers @ 40'-0" o.c. (Tape, Type II or Thermoplastic Extrusion)
-  4" White Guide Lines (Tape, Type III or Thermoplastic Extrusion except for bus bays)
-  Transverse Median Marking (Tape, Type II or Thermoplastic Extrusion)
-  Transverse Shoulder Marking (Tape, Type II or Thermoplastic Extrusion)
-  Channelizing Island or Deceleration Lane Gore (Tape, Type II or Thermoplastic Extrusion)
-  Crosswalk and Stop Line. All Stop Lines shall be 10'-0" from Crosswalk unless otherwise noted. The circled number indicates the number of lanes for payment (Tape, Type III or Thermoplastic Extrusion)
-  Pavement Arrow (Tape, Type III or Thermoplastic Extrusion)
-  Pavement Word (Tape, Type III or Thermoplastic Extrusion)
-  4 Each Type J Raised Pavement Markers  
Type D Raised Pavement Markers @ 40'-0" o.c.  
Type H Raised Pavement Markers (Reflective Surface facing no-passing direction)  
4" Single Solid Yellow Stripe (Tape, Type I or Thermoplastic Extrusion)
-  Extension of Edge Line, 4" Wide x 2'-0" Long White Stripe @ 10'-0" o.c. w/Type C Markers @ 40'-0" o.c. (Tape, Type III or Thermoplastic Extrusion)

**NOTES**

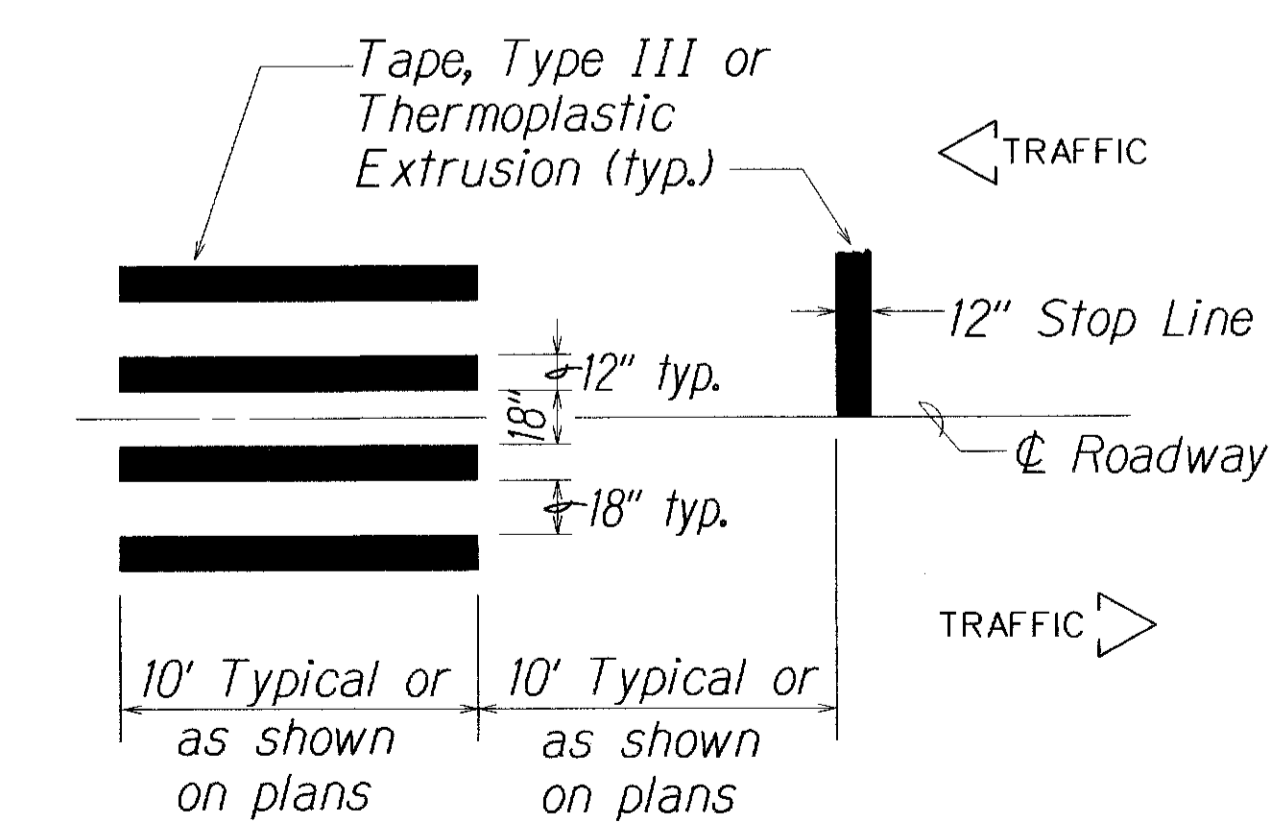
1. Layout of pavement markings and striping shall be done by the Contractor and approved by the Engineer prior to any installation work.
2. Existing pavement markings not incorporated in the final traffic pattern shall be removed as directed by the Engineer. Costs shall be incidental to the various pavement marking items.
3. Raised pavement markers shall not be installed within crosswalks.
4. Final locations of all signs shall be approved by the Engineer prior to any installation work.
5. Existing signs not shown on these plans shall remain as posted unless otherwise directed by the Engineer. Removal and disposal of existing signs and/or posts as designated on these plans shall be incidental to the various signing items.
6. Final locations of all Stop Lines shall be approved by the Engineer prior to installation.
7. All pavement striping shall be as noted on the legend or plans.
8. All preformed pavement marking tapes over existing pavement shall be applied with an approved primer as recommended by the tape manufacturer and as approved by the Engineer. The primer shall be allowed to dry to the tacky stage prior to tape application.
9. All pedestrian warning signs with supplemental sign shall be on a fluorescent yellow-green retroreflective background with a black legend and border.



**LANE DROP MARKING**  
Not to Scale



**YIELD LINE DETAIL**  
Not to Scale

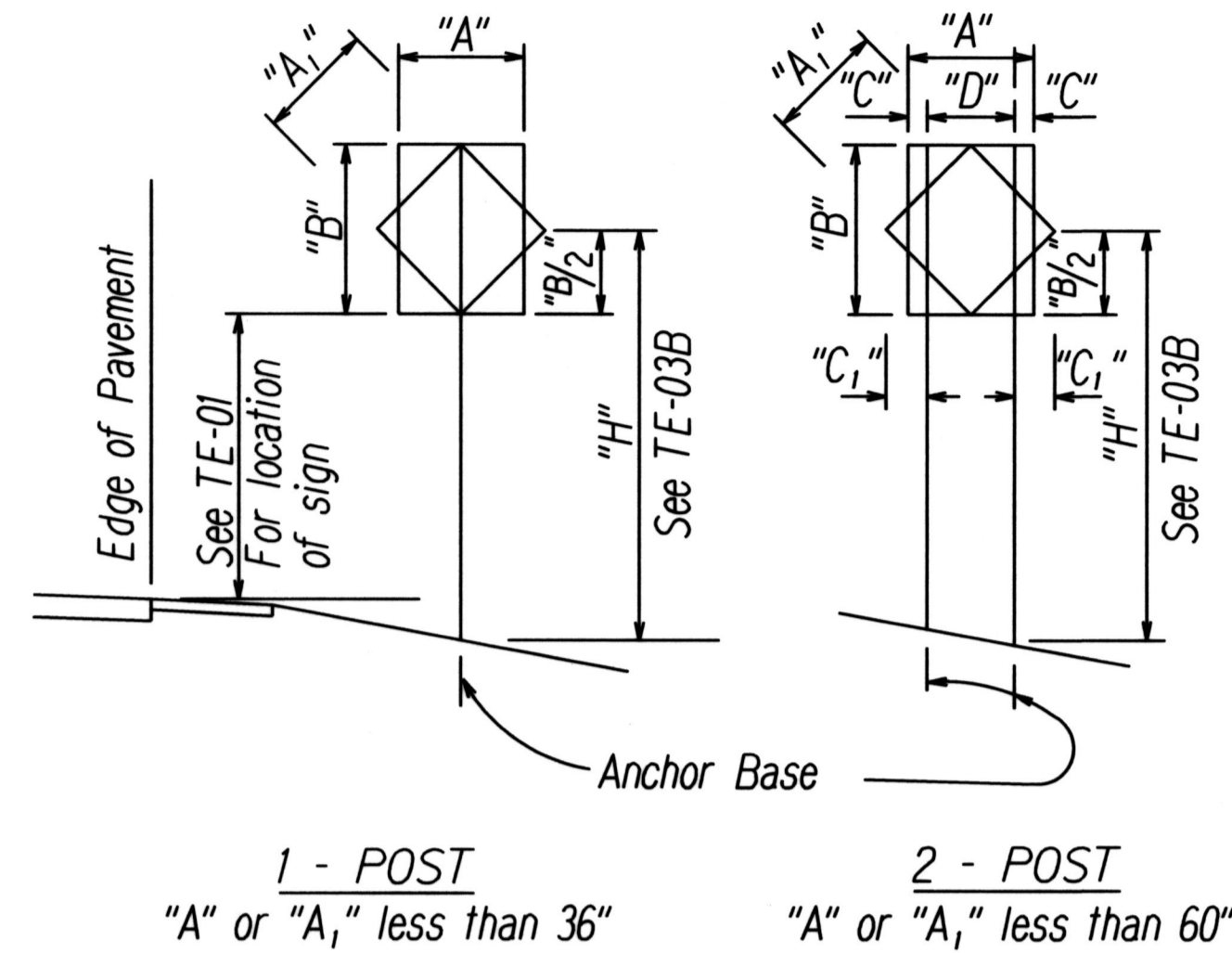


**CROSSWALK STRIPING DETAIL**  
Not to Scale

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

8/17/17	Move Traffic Signal Table to Plan Sheet No. ADD.38
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b>PAVEMENT MARKING</b>	
<b>LEGEND, DETAILS &amp; NOTES</b>	
<b>KALIHI STREET RESURFACING</b>	
<b>Nimitz Highway to School Street</b>	
<b>Federal Aid Project No. STP-063-1(024)</b>	
Scale: As Shown	Date: May 2017
SHEET No. <b>T1</b> OF 20 SHEETS	

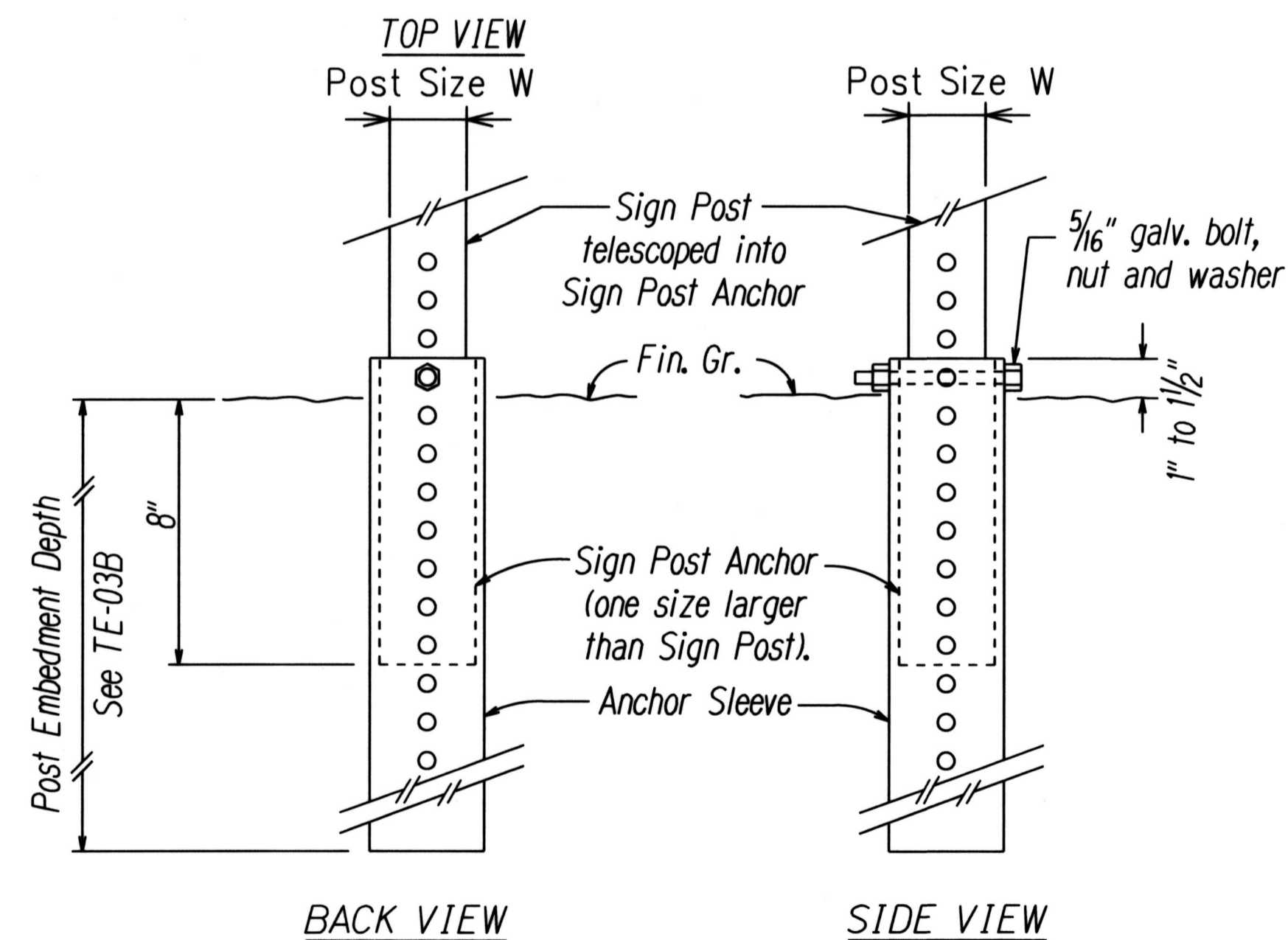
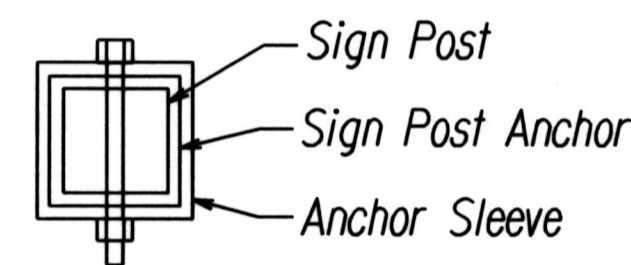
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	24	42



"A" or "A <sub>1</sub> "	"C"	"C <sub>1</sub> "
Less than 36"	6"	-
Greater than 36" and less than 48"	9"	19"
Greater than 48"	12"	24"

NOTE: Frame stiffeners are required when D is greater than 24"  
See General Notes.

### TYPICAL INSTALLATION

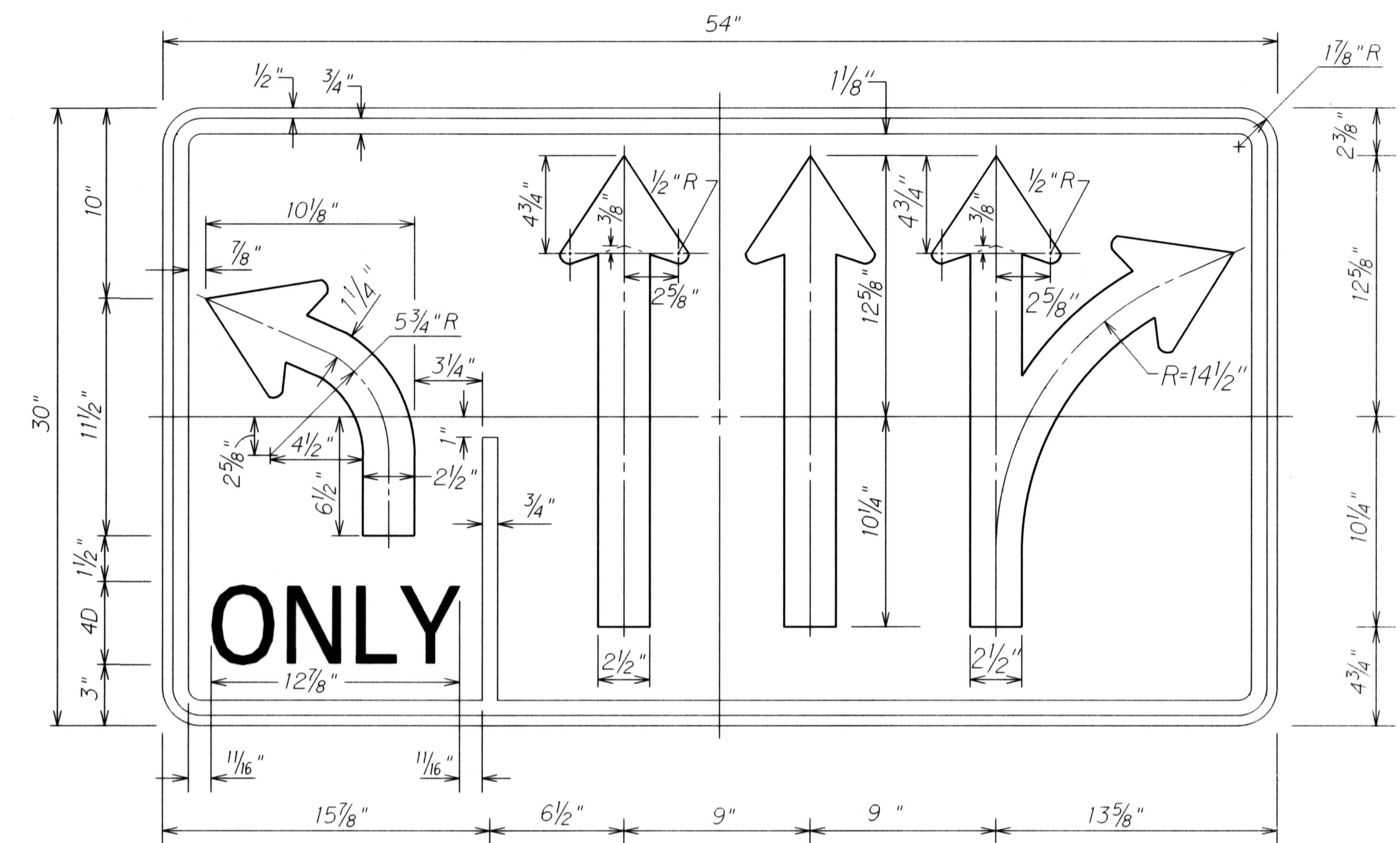


SIGN POST INSTALLATION

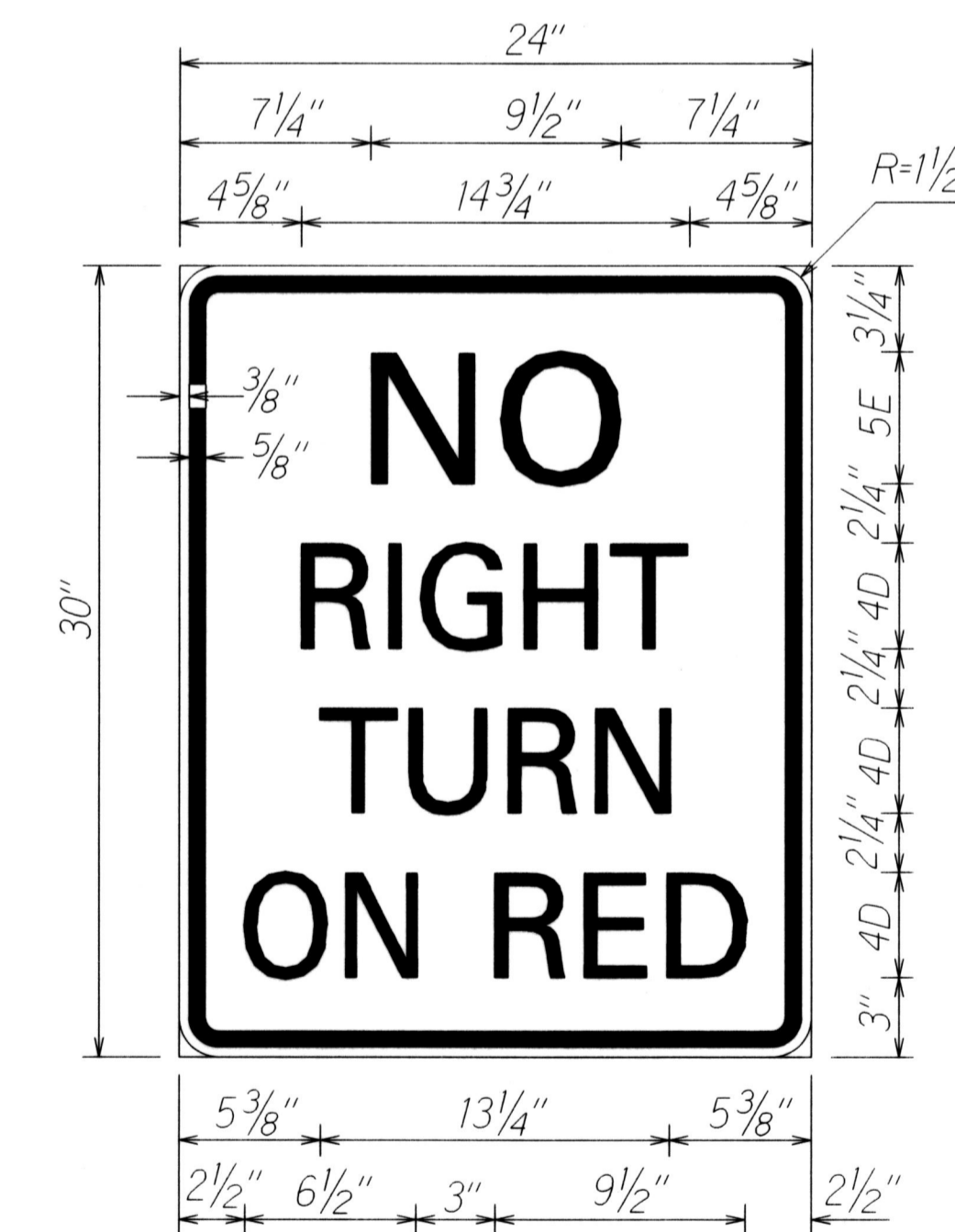
### ANCHOR BASE DETAIL

### GENERAL NOTES

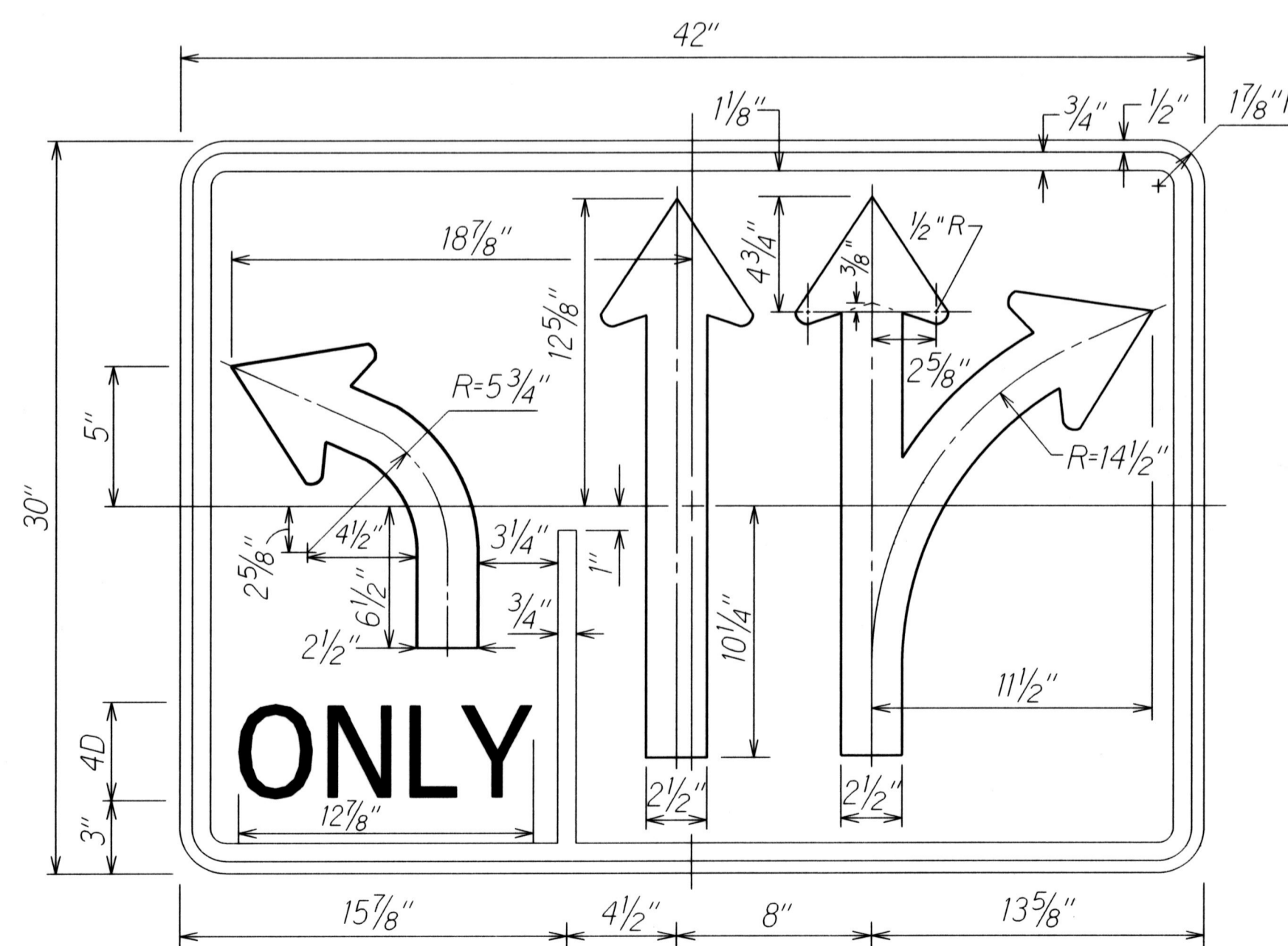
- Design Specifications:**
  - Design shall conform w/ the latest AASHTO Standard Specifications for the Structural Supports for Highway Signs, Luminaires & Traffic Signals and its interim supplements and modifications by the Highways Division, Department of Transportation State of Hawaii.
  - Latest HDOT Memorandum with subject title "Design Criteria for Bridges and Structures."
- Loads:**
  - Basic Wind Speed: 105 mph.
  - Recurrence Interval of 10 years.
- Materials:**
  - Post shall conform to the Standard Specifications.
  - All connection bolts shall be AASHTO M164 bolts and anchor bolts shall be AASHTO M314-105 bolt.
  - Lap splice nuts and bolts shall be M180, with an ultimate tensile strength of 180 ksi, min.
  - Aluminum members and surfaces in contact with structural steel shall be isolated with neoprene material as approved by the Engineer.
- General:**
  - See General Notes on B-01, TE-01, and TE-03B for additional information.
  - All square tube posts shall be 12 gauge unless otherwise specified or shown on the plans.
  - Square tube posts shall be perforated with 7/16"  $\phi$  holes, 1" o.c., 4 sides, along entire length of post.
  - All accessories, fittings and stiffener details (as required) shall be submitted to the Engineer for approval 20 days prior to installation.
  - Alternate designs in accordance with the plans and specifications shall use the Service Load Design Method and shall be stamped by a registered structural engineer of the State of Hawaii and submitted to the Engineer for approval.
  - All sign support posts without break away anchor base shall be outside of the clear zone or shielded by an appropriate traffic barrier system. The traffic barrier system shall be submitted to the Engineer for his approval.
  - The Contractor shall use templates while installing the anchor bolts. Anchor bolts shall be vertical.
  - Excavation and backfill shall be considered incidental to the cost of the sign foundation.



R3-9(L)  
Not to Scale  
Colors: Black on White



R10-11c(R)  
Not to Scale  
Colors: Black on White

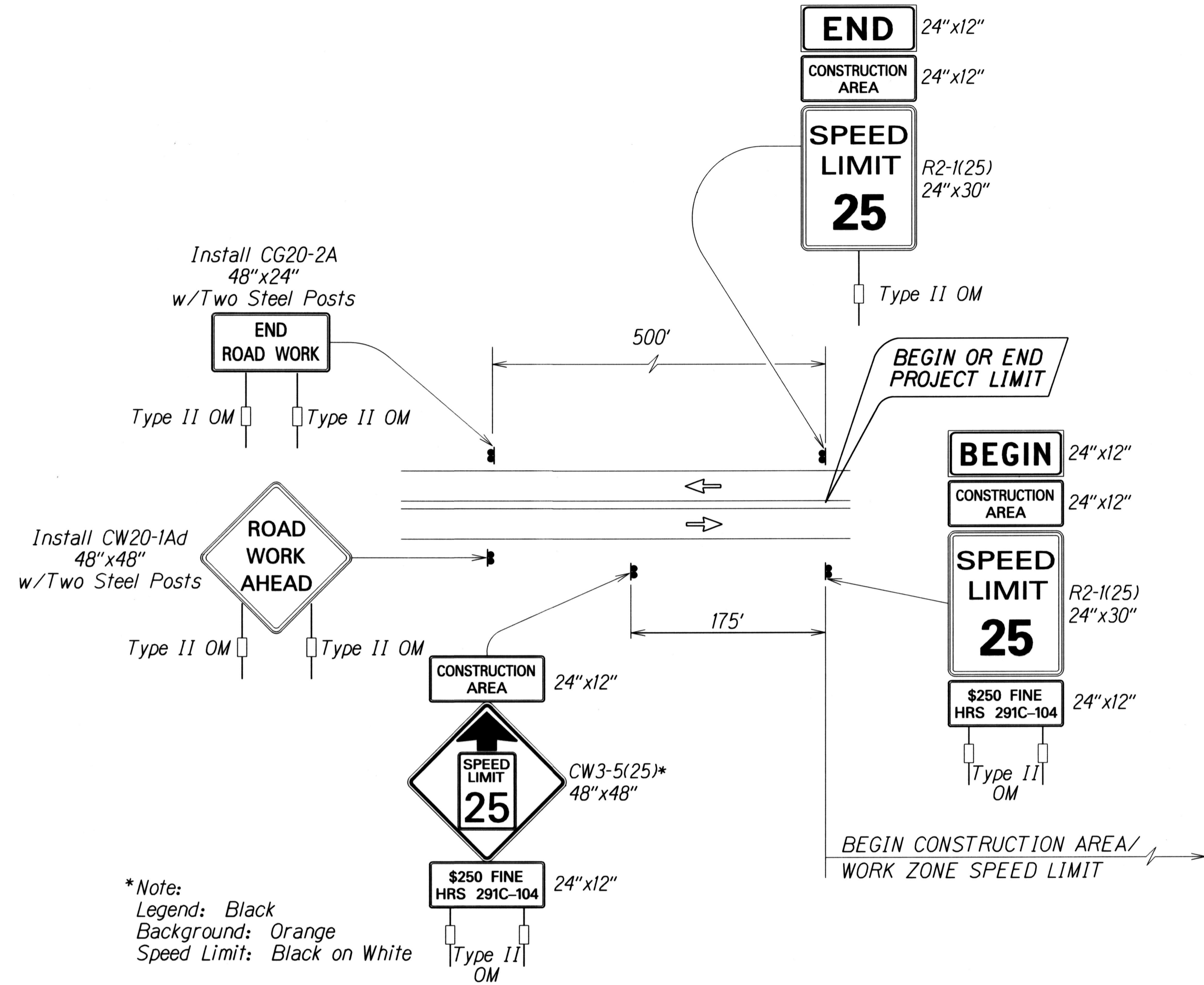


R3-13  
Not to Scale  
Colors: Black on White

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
DRAWN BY		
TRACED BY		
DESIGNED BY		
CHECKED BY		
DATE		

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**GALVANIZED SQUARE TUBE SIGN  
POST MOUNTING & SIGN DETAIL**  
KALIHI STREET RESURFACING  
Nimitz Highway to School Street  
Federal Aid Project No. STP-063-1(024)  
Scale: As Shown Date: May 2017  
SHEET No. T2 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	25	42

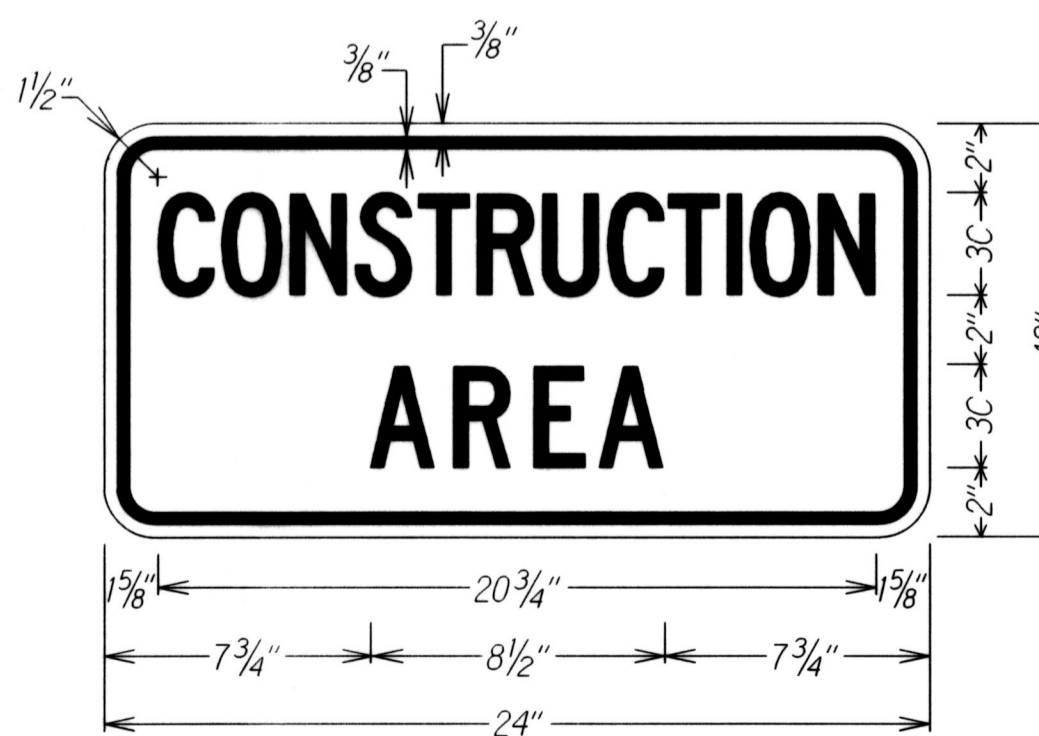


\*Note:  
 Legend: Black  
 Background: Orange  
 Speed Limit: Black on White

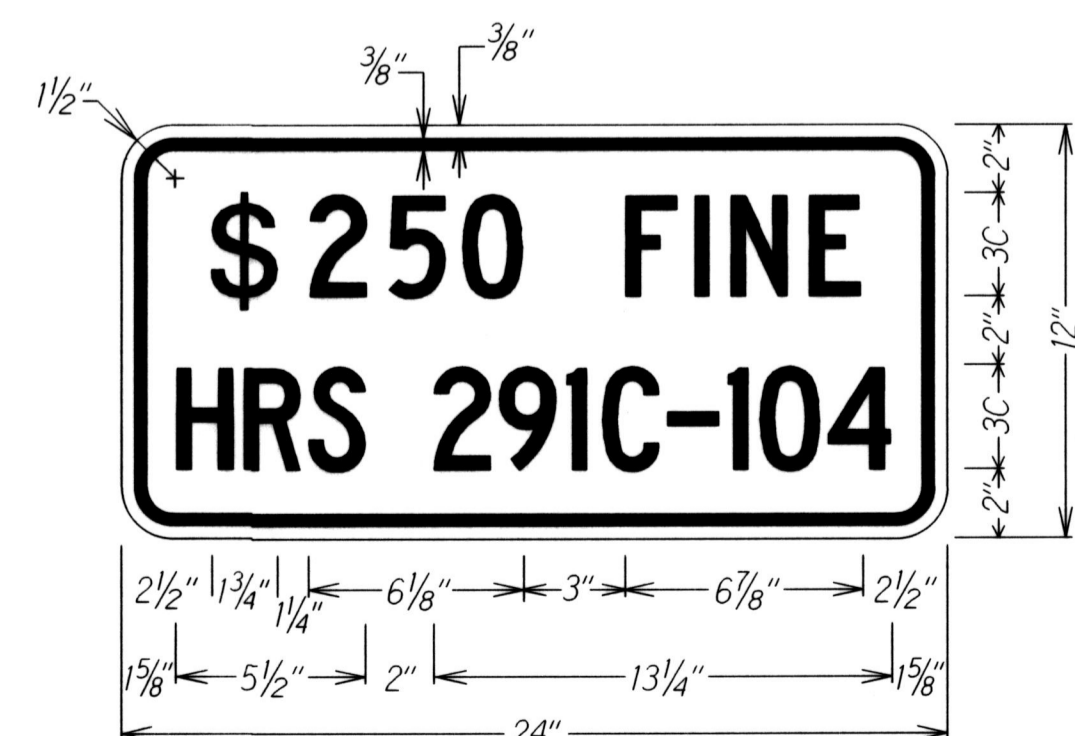
**Work Zone Note:**

1. This Work Zone Sign Plan is intended for use on long-term stationary work zones/construction phases (3 days or more). All work zones or construction phases less than 3 days duration will use Traffic Control Plans shown in Section 645 of the Special Provisions.
2. All existing regulatory speed limit signs with posts within the work zone/project limits shall be removed and replaced with work zone speed limit sign assemblies (R2-1(25) and CW3-5(25) with "CONSTRUCTION AREA" and "\$250 FINE HRS 291C-104" Supplemental Signs).
3. Construction sign assemblies shall be installed on both the approaching and trailing ends of each work zone as shown on this plan.
4. Each construction warning sign shall have a minimum of two (2) Type II OM. Each work zone speed limit assembly shall have a minimum of one (1) Type II OM. Installation of each Type II OM shall be considered incidental to Item No. 645.0100 - Traffic Control.
5. Upon the completion of all physical work or as directed by the Engineer, all construction signs and work zone speed limit assemblies shall be removed. All speed limit signs and posts that were existing at the start of the project within the work zone/project limits shall be restored back to their original locations and configurations.
6. Placement of construction signs shall not obstruct the path of pedestrians and bicyclists.
7. The removal and restoration of existing regulatory speed limit signs with new posts along with the installation, maintenance and removal of work zone speed limit sign assemblies shall be considered incidental to Item No. 645.0100 - Traffic Control.

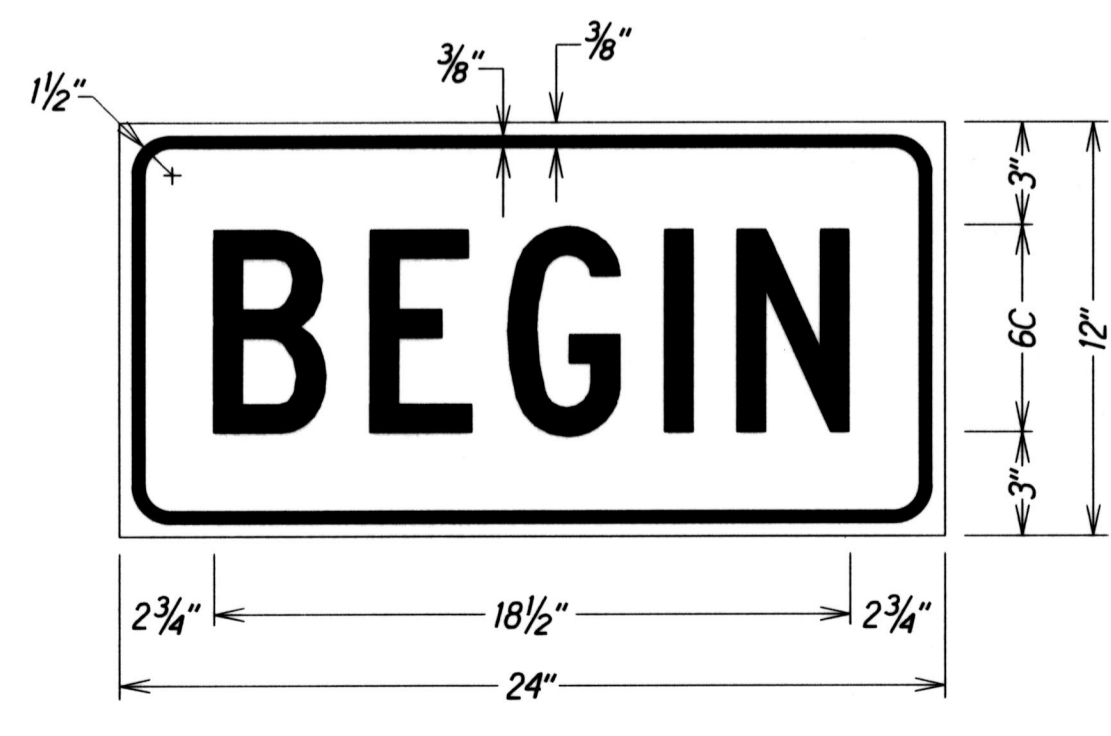
**TYPICAL DETAIL FOR CONSTRUCTION SIGNS  
 ON TWO LANE OR MULTILANE UNDIVIDED LOW SPEED HIGHWAY**



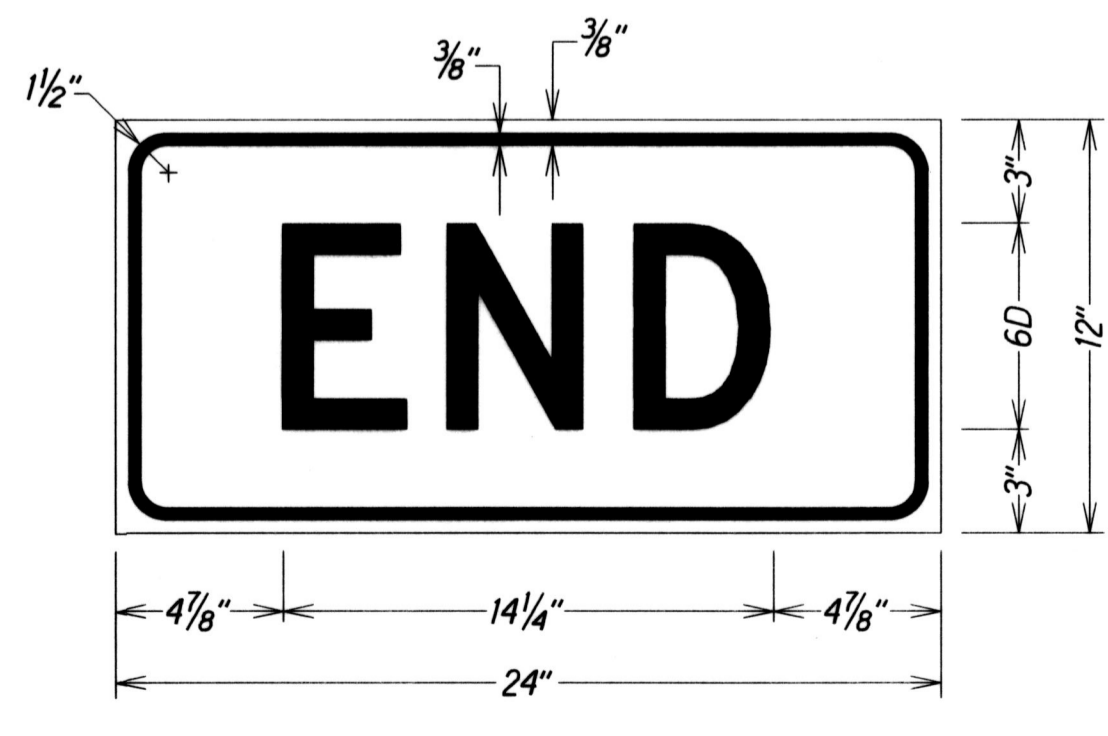
LEGEND: BLACK  
 BACKGROUND: ORANGE



LEGEND: BLACK  
 BACKGROUND: WHITE



LEGEND: BLACK  
 BACKGROUND: ORANGE

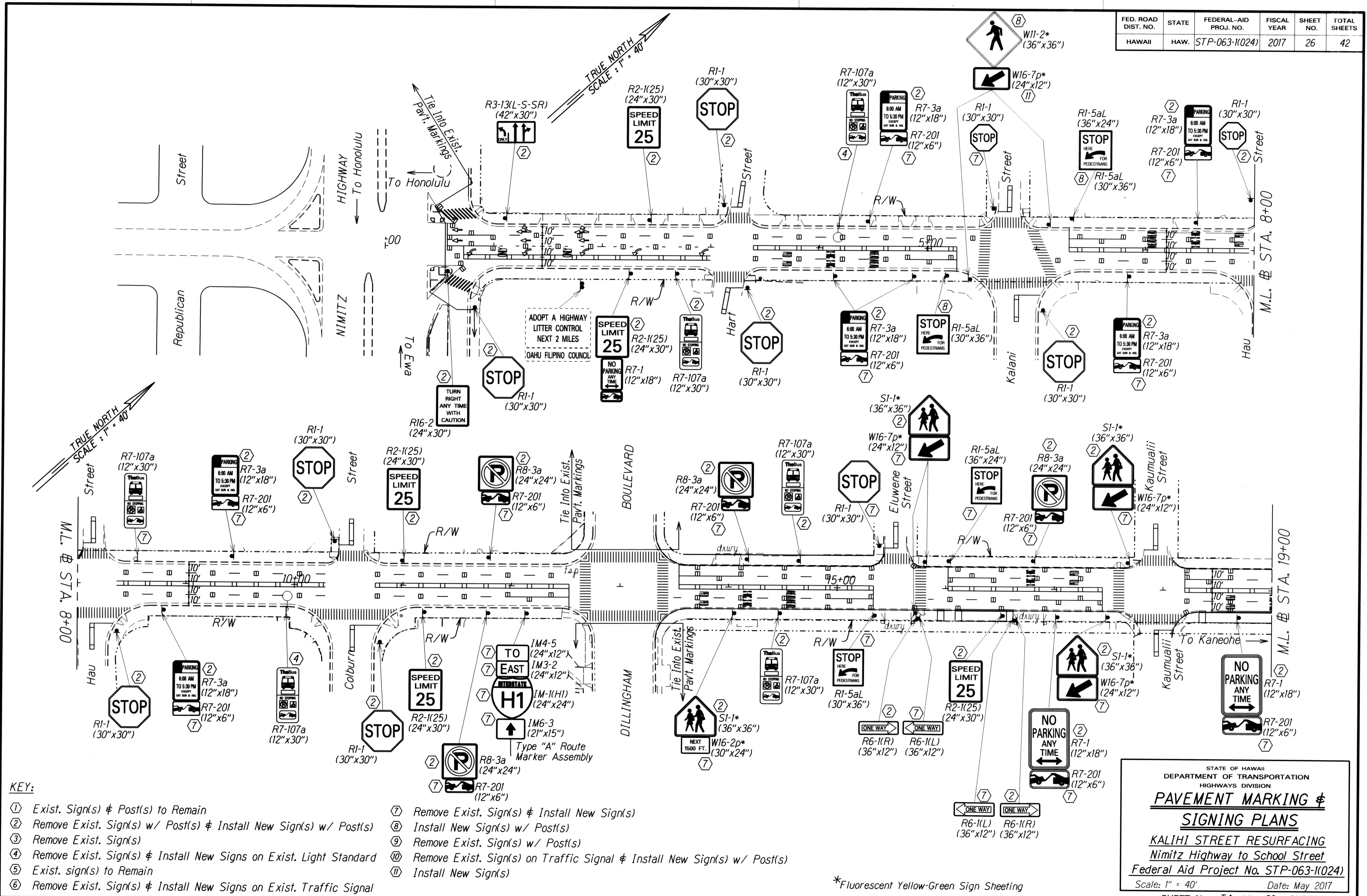


LEGEND: BLACK  
 BACKGROUND: ORANGE

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
TRACED BY		
DESIGNED BY		
CHECKED BY		
DATE		

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION  
**LOW SPEED UNDIVIDED HIGHWAY**  
**WORK ZONE SIGNING PLAN, NOTES&DETAILS**  
 KALIHI STREET RESURFACING  
 Nimitz Highway to School Street  
 Federal Aid Project No. STP-063-1(024)  
 Scale: As Shown Date: May 2017

FED. ROAD DIST. NO.	STATE	FEDERAL-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	26	42



**KEY:**

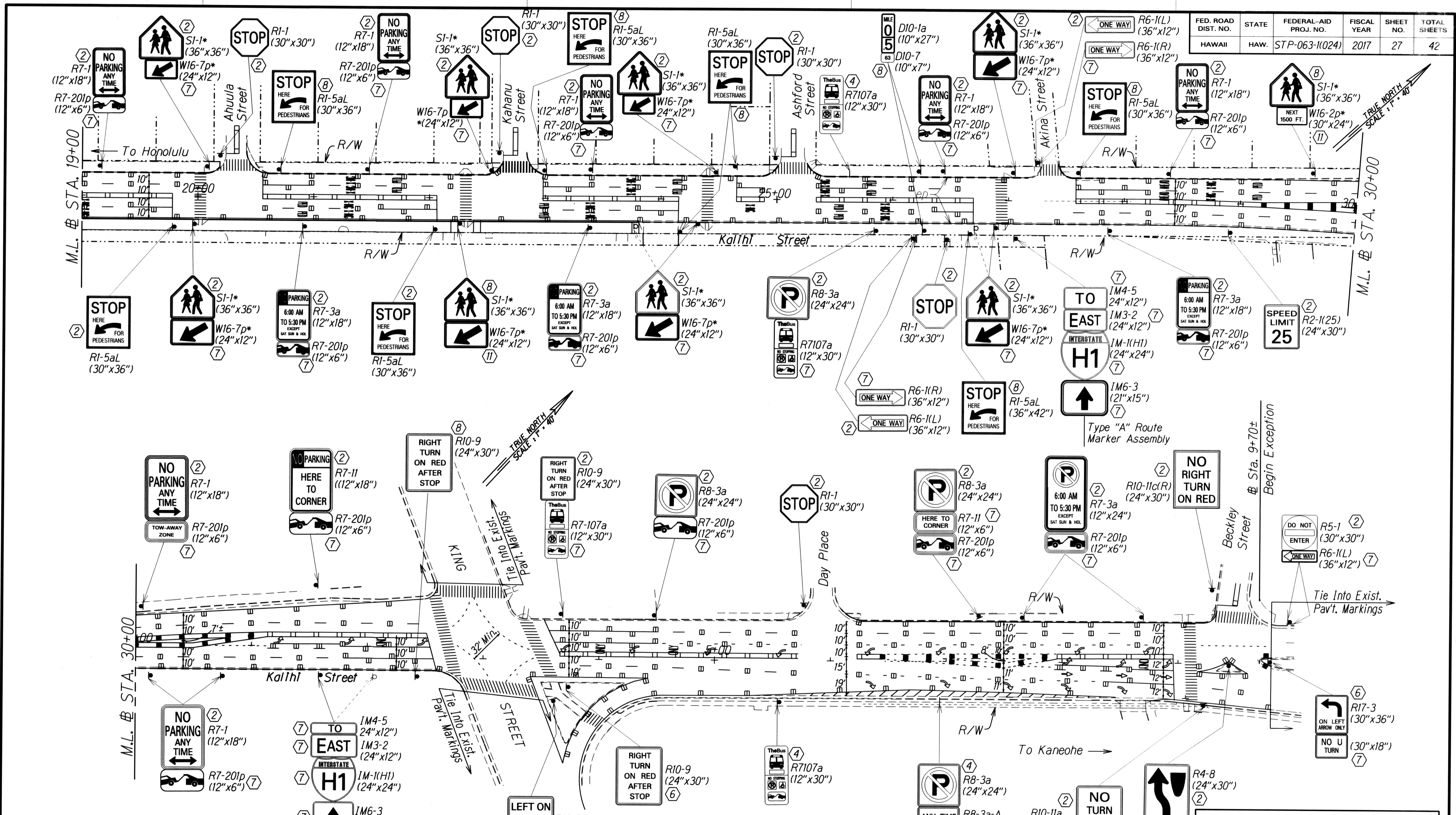
- ① Exist. Sign(s) & Post(s) to Remain
- ② Remove Exist. Sign(s) w/ Post(s) & Install New Sign(s) w/ Post(s)
- ③ Remove Exist. Sign(s)
- ④ Remove Exist. Sign(s) & Install New Signs on Exist. Light Standard
- ⑤ Exist. sign(s) to Remain
- ⑥ Remove Exist. Sign(s) & Install New Signs on Exist. Traffic Signal
- ⑦ Remove Exist. Sign(s) & Install New Sign(s)
- ⑧ Install New Sign(s) w/ Post(s)
- ⑨ Remove Exist. Sign(s) w/ Post(s)
- ⑩ Remove Exist. Sign(s) on Traffic Signal & Install New Sign(s) w/ Post(s)
- ⑪ Install New Sign(s)

SURVEY LOCATED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 ORIGINAL PLAN: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
 TRACED BY: \_\_\_\_\_  
 DESIGNED BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 NOTE BOOK: \_\_\_\_\_  
 SCALE: 1" = 40'

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION  
**PAVEMENT MARKING & SIGNING PLANS**  
 KALIHI STREET RESURFACING  
 Nimitz Highway to School Street  
 Federal Aid Project No. STP-063-1(024)  
 Scale: 1" = 40' Date: May 2017  
 SHEET No. T4 OF 20 SHEETS

\*Fluorescent Yellow-Green Sign Sheeting

FED. ROAD DIST. NO.	STATE	FEDERAL-AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	27	42



- KEY:**
- ① Exist. Sign(s) & Post(s) to Remain
  - ② Remove Exist. Sign(s) w/ Post(s) & Install New Sign(s) w/ Post(s)
  - ③ Remove Exist. Sign(s)
  - ④ Remove Exist. Sign(s) & Install New Signs on Exist. Light Standard
  - ⑤ Exist. sign(s) to Remain
  - ⑥ Remove Exist. Sign(s) & Install New Signs on Exist. Traffic Signal
  - ⑦ Remove Exist. Sign(s) & Install New Sign(s)
  - ⑧ Install New Sign(s) w/ Post(s)
  - ⑨ Remove Exist. Sign(s) w/ Post(s)
  - ⑩ Remove Exist. Sign(s) on Traffic Signal & Install New Sign(s) w/ Post(s)
  - ⑪ Install New Sign(s)

DATE: \_\_\_\_\_  
 SURVEY BLAZED BY: \_\_\_\_\_  
 ORIGINAL PLAN DRAWN BY: \_\_\_\_\_  
 NOTE BOOK DESIGNED BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

**PAVEMENT MARKING &  
 SIGNING PLANS**

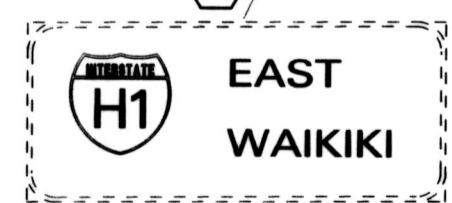
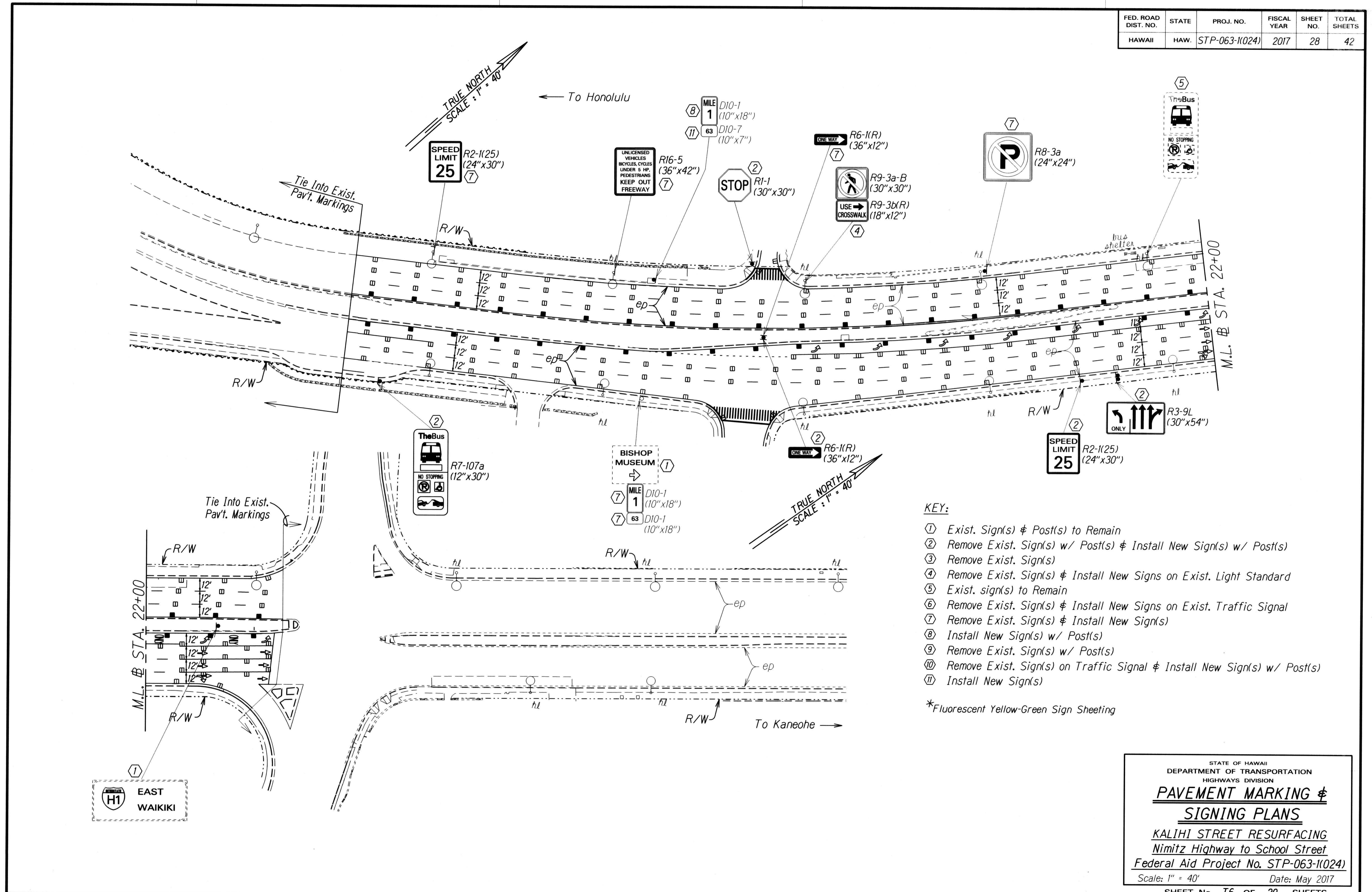
**KALIHI STREET RESURFACING**  
 Nimitz Highway to School Street  
 Federal Aid Project No. STP-063-1(024)

Scale: 1" = 40' Date: May 2017

SHEET No. 75 OF 20 SHEETS

\*Fluorescent Yellow-Green Sign Sheeting

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-11024	2017	28	42



- KEY:**
- ① Exist. Sign(s) & Post(s) to Remain
  - ② Remove Exist. Sign(s) w/ Post(s) & Install New Sign(s) w/ Post(s)
  - ③ Remove Exist. Sign(s)
  - ④ Remove Exist. Sign(s) & Install New Signs on Exist. Light Standard
  - ⑤ Exist. sign(s) to Remain
  - ⑥ Remove Exist. Sign(s) & Install New Signs on Exist. Traffic Signal
  - ⑦ Remove Exist. Sign(s) & Install New Sign(s)
  - ⑧ Install New Sign(s) w/ Post(s)
  - ⑨ Remove Exist. Sign(s) w/ Post(s)
  - ⑩ Remove Exist. Sign(s) on Traffic Signal & Install New Sign(s) w/ Post(s)
  - Ⓜ Install New Sign(s)

\*Fluorescent Yellow-Green Sign Sheeting

ORIGINAL PLAN  
 SURVEY PLOTTED BY  
 DATE  
 DRAWN BY  
 TRACED BY  
 DESIGNED BY  
 CHECKED BY  
 NOTE BOOK  
 No. 21110003

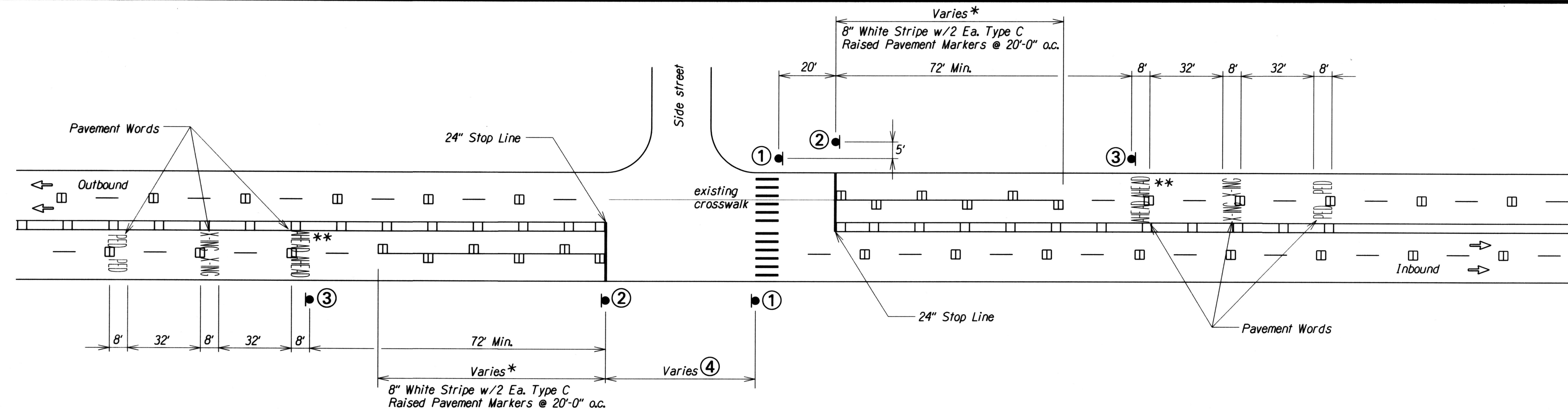
STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

**PAVEMENT MARKING & SIGNING PLANS**

**KALIHI STREET RESURFACING**  
 Nimitz Highway to School Street  
 Federal Aid Project No. STP-063-11024

Scale: 1" = 40'      Date: May 2017  
 SHEET No. T6 OF 20 SHEETS

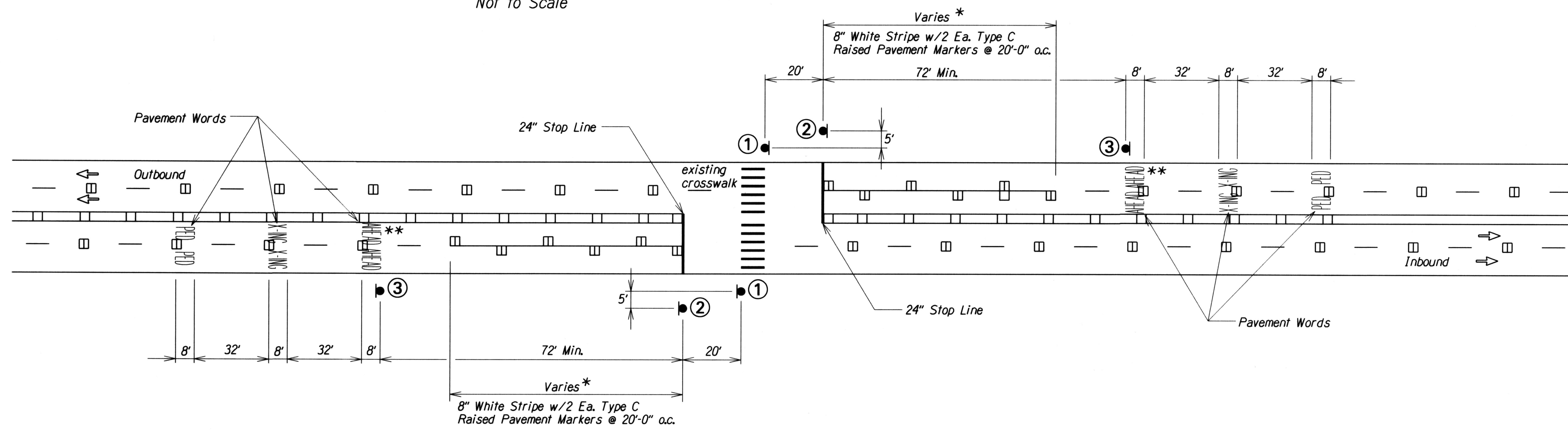
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	29	42



**TYPICAL UNSIGNALIZED INTERSECTION MARKINGS (A)**

(NO LEFT TURN STORAGE LANES)

Not to Scale



**TYPICAL MIDBLOCK CROSSWALK MARKINGS (B)**

Not to Scale



R1-5c(L)

Colors: Black on White

\* See Project Pavement Marking Plans  
 \*\* Do Not Install "AHEAD" Pavement Word If Not Shown In Project Pavement Marking Plans

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

<p>①</p> <p>OR</p> <p>W16-7p 24\"/&gt; <p>Black legend on flourescent yellow green background</p> </p>	<p>②</p> <p>OR</p> <p>W16-9p 24\"/&gt; <p>Black legend on flourescent yellow green background</p> </p>	<p>③</p> <p>Black legend on white background See detail on this sheet.</p>	<p>④</p> <p>NOTE:</p> <p>If Distance is &lt;50', Offset "STOP HERE FOR PEDESTRIANS" sign 5' horizontally with crossing sign. If insufficient space to offset, install sign as directed by the Engineer.</p>
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STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION  
**MIDBLOCK CROSSWALK  
 SIGNING & MARKINGS**  
 KALIHI STREET RESURFACING  
 Nimitz Highway to School Street  
 Federal Aid Project No. STP-063-1(024)  
 Scale: As Shown Date: May 2017  
 SHEET No. 77 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	30	42

TRAFFIC SIGNAL NOTES

- The locations of the Traffic Signal Standards, Traffic Signal Standards w/Mast Arms, Pedestrian Push Buttons, Traffic Controller, Pullboxes, Conduits and Loop Detectors shall be staked out in the field by the Contractor and approval of the locations shall be obtained from the Engineer prior to construction and installation.
- All splicing shall be done in the pullboxes.
- Furnishing and installing the conduit stubouts (pullboxes to edge of pavement) will not be paid for separately but shall be considered incidental to the various contract items.
- A solid #8 bare copper wire shall be pulled with the traffic signal control cable for equipment ground. Cost shall be incidental to the installation of the control cable.
- All Traffic signal controller equipment shall be completely wired in the cabinet and shall control the traffic signals as called for in the plans.
- The loop amplifier units furnished for this project shall be capable of operating the loop detector configurations shown on the plans. Cost for the loop amplifier shall be incidental to the installation of the loop detector.
- Should any defect be encountered during the warranty period, the manufacturer will be notified and he shall promptly correct such defect. Service call (by factory qualified representative) during the warranty period for repairs or other maintenance shall be answered within 24 hours and shall be done at no expense to the State. All repairs shall be done as soon as possible.
- All traffic signal work shall conform to the requirements of the "Manual On Uniform Traffic Control Devices For Streets And Highways", Federal Highway Administration (1988) and Amendments.
- Locations of traffic markings and markers (lane lines, Stop lines, crosswalk, etc.) shown on the plans shall be verified with the Engineer prior to the installation of the traffic signal system.
- All Conduits between pullboxes and Traffic Signal/Highway Lighting Standards shall not be paid for separately but shall be considered incidental to the various contract items.
- All Signal-Drop Cables (Type 5 Cables) from the various Types of Traffic Signal Head on the traffic signal standards and mast arms to the pullboxes shall not be paid for separately but considered incidental to the Traffic Signal Head.
- After installing all the traffic signal cables, the Contractor shall duct seal all conduits in the pullboxes, traffic signal standards and traffic signal controller cabinet concrete base. The duct seal material shall be approved by the Traffic Signal Inspector/Engineer and shall not be paid for separately but considered incidental to the direct buried and/or concrete encased conduits.
- After installing the Traffic Signal System, the Contractor shall apply grease to all parts of the Traffic Signal System (i.e. fittings, brackets, nipples, elbows, screws, signal head assemblies, bolts, hinges, etc.) as directed by the Traffic Signal Inspector, to prevent rust and corrosion. The grease material shall be approved by the Signal Inspector.
- Connecting into existing traffic signal system and making all necessary adjustments shall not be paid for separately, but considered incidental to the various traffic signal contract items.
- The Contractor shall notify the Traffic Control Branch, Department of Transportation Services, City & County of Honolulu, (Phone No. 768-8388) two weeks prior to commencing any work on the traffic signal system.

ORIGINAL PLAN	DATE
NOTED BY	
DESIGNED BY	
CHECKED BY	

HIGHWAY LIGHTING LEGEND

<u>NEW</u>	<u>EXISTING</u>	
— HL —	--- hl ---	Highway Lighting Conduit
■	□ hl	Type A Pullbox (Hwy. Ltg.)
●	○	Highway Lighting Standard

TRAFFIC SIGNAL LEGEND

<u>NEW</u>	<u>EXISTING</u>	
—	---	Traffic Signal Conduit
△ 1 △ 2 △ 3	△ 1 △ 2 △ 3	Conduit Run Numbers
(A) (B) (C)	(A) (B) (C)	Equipment description, installation or item no.
□ M	□ M	Traffic Signal Master Controller Door Indicates Front of Cabinet
□ C	□ C	Traffic Signal Controller Door Indicates Front of Cabinet
□	□	Meter Pedestal
←	←	12" RYG Traffic Signal Head
← R ↑ Y ↑ G	← R ↑ Y ↑ G	12" R ↑ Y ↑ G Traffic Signal Head
← R ← Y ← G	← R ← Y ← G	12" ← R ← Y ← G Traffic Signal Head
← R ← Y ← G	← R ← Y ← G	12" ← R ← Y ← G Traffic Signal Head (Programmed Visibility)
← R Y G ←	← R Y G ←	12" RYG ← Fiber Optic Traffic Signal Head
△	△	Type I Standard and Attached Signals
△ 12' 24'	△ 12' 24'	Type II Standard with Signal Mast Arm and Attached Signals (Nos. indicates mast arm length & distance between signal heads as specified on plans)
△ 8' 24'	△ 8' 24'	Type III Standard with Luminaire and Signal Mast Arm and Attached Signals (Nos. indicates mast arm lengths & distance between signal heads as specified on plans)
Y	Y	Flashing Beacon, One Signal Section, "Y" indicates 12" Yellow Lens
⊗	⊗	Opticom Receiver (Arrow indicates direction detector faces)
•	•	Pipe Guard
□	□	Pedestrian Signal Head
□	□ t a p b	Type A Pullbox
□	□ t a p b	Type B Pullbox
□	□ t a p b	Type C Pullbox
□	□	Loop Detectors

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**TRAFFIC SIGNAL NOTES  
AND LEGEND**

**KALIHI STREET RESURFACING**  
Nimitz Highway to School Street  
Federal Aid Project No. STP-063-1(024)

Scale: As Shown      Date: May 2017

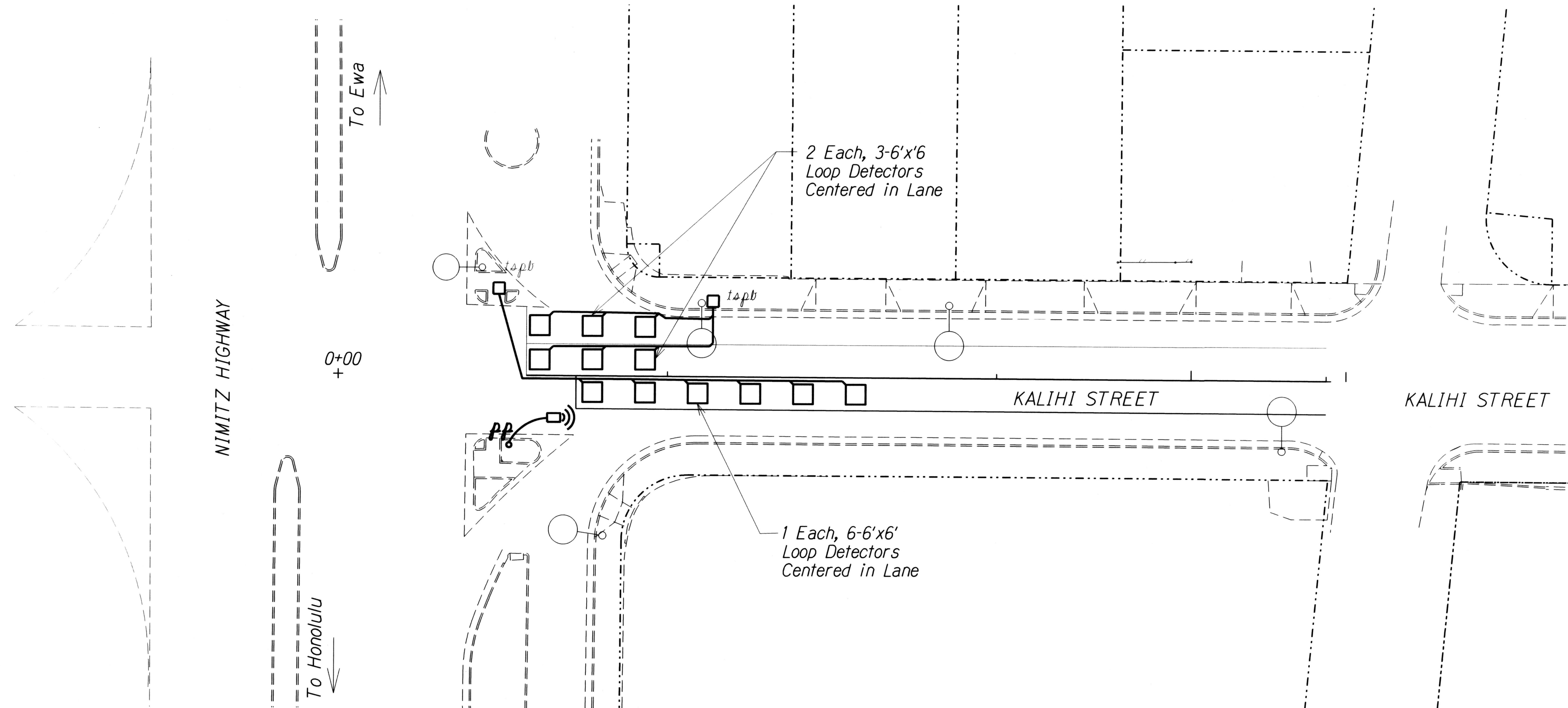
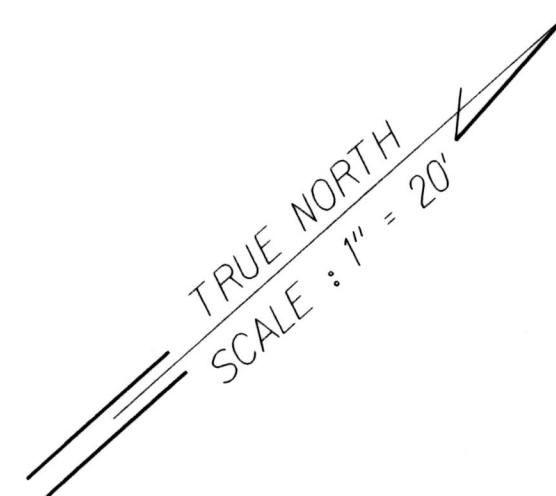
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	31	42

**TRAFFIC SIGNAL LEGEND:**

- t<sub>sp</sub> Existing Traffic Signal Pole
- TSP New Traffic Signal Pole
- Ⓜ Temporary Microwave Detector
- New Loop Detectors
- t<sub>spb</sub> Existing Traffic Signal Pullbox
- - - - Existing Conduit
- - - - New Conduit
- TSPB<sub>NEW</sub> New Traffic Signal Pullbox A
- ⊠ TSPB<sub>NEW</sub> New Traffic Signal Pullbox B
- New L.E.D Pedestrian Countdown Module

**NOTES:**

1. Loop detector location and quantity shown on this plan are only approximate. Contractor shall coordinate with C&C DTS Signal Shop (Supervisor Wally Nakihira @ 564-6101) for all traffic signal-related work. Schedule with C&C DTS Signal Shop at least two weeks in advance of the actual work, including pavement cold planing removing the existing loop detector.
2. Contractor shall perform all traffic signal-related work following field instructions from DTS Signal Shop personnel. Such field instructions shall include, but not limited to, the final location and quantity of the temporary microwave sensors and permanent detector loops. DTS Signal Shop personnel will be responsible for traffic signal controller programming at the traffic signal cabinet to accommodate the temporary and permanent operations.
3. Contractor shall promptly take down and turnover the temporary microwave sensors to DTS when the permanent detector loops are in place and operational. Contractor shall perform all necessary work to restore traffic signal system back to a neat appearance of the electrical trade.



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

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**LOOP DETECTOR PLAN**

**KALIHI STREET RESURFACING**  
**Nimitz Highway to School Street**  
**Federal Aid Project No. STP-063-1(024)**

Scale: 1"=20'      Date: May 2017

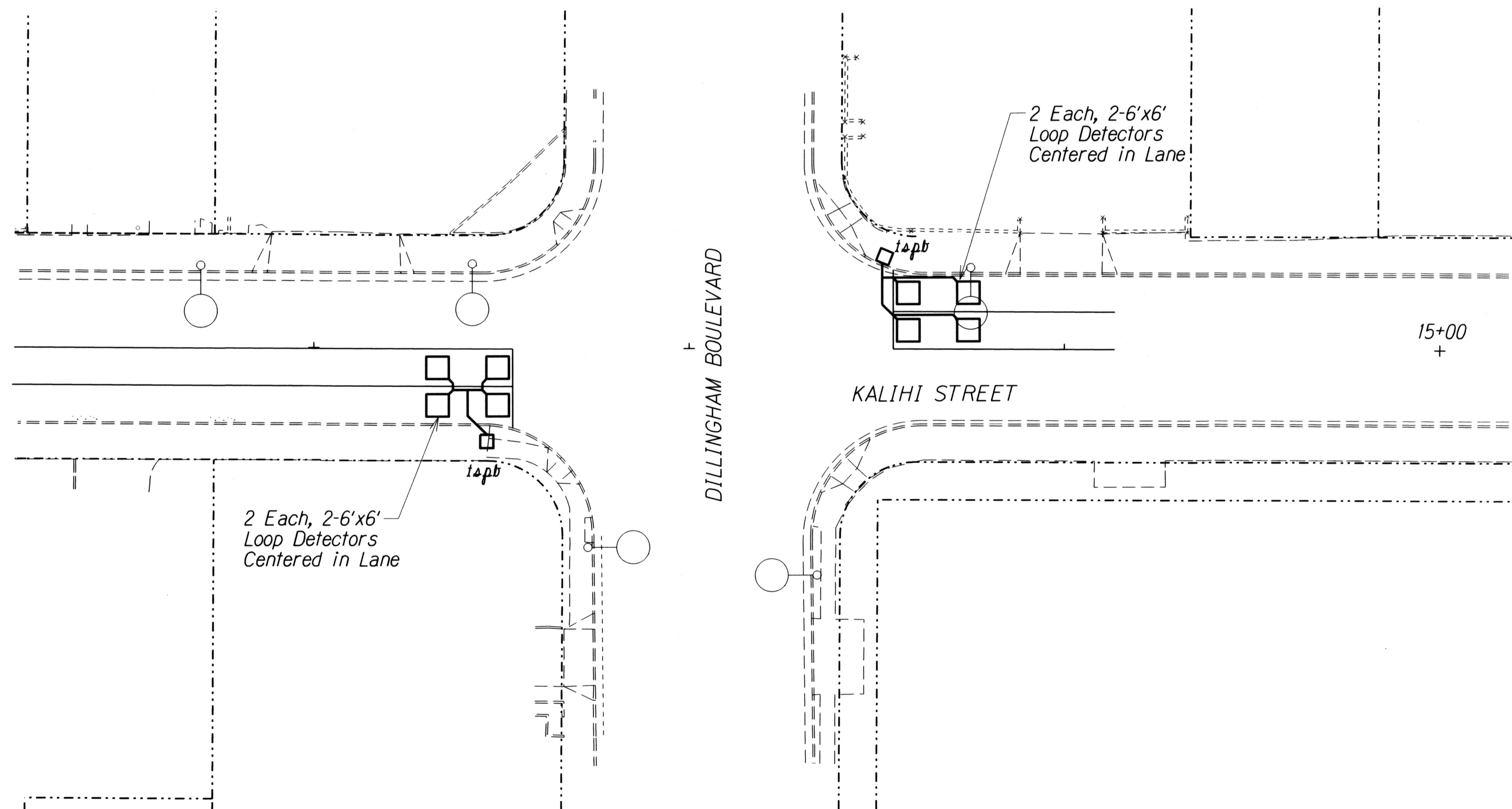
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	32	42

**TRAFFIC SIGNAL LEGEND:**

- *tsp* Existing Traffic Signal Pole
- *TSP* New Traffic Signal Pole
- (((□ Temporary Microwave Detector
- □ New Loop Detectors
- *tspb* Existing Traffic Signal Pullbox
- Existing Conduit
- - - - New Conduit
- *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox A
- ⊠ *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox B
- — New L.E.D Pedestrian Countdown Module

**NOTES:**

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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**LOOP DETECTOR PLAN**

**KALIHI STREET RESURFACING**  
Nimitz Highway to School Street  
Federal Aid Project No. STP-063-1(024)

Scale: 1"=20'      Date: May 2017

SHEET No. T10 OF 20 SHEETS

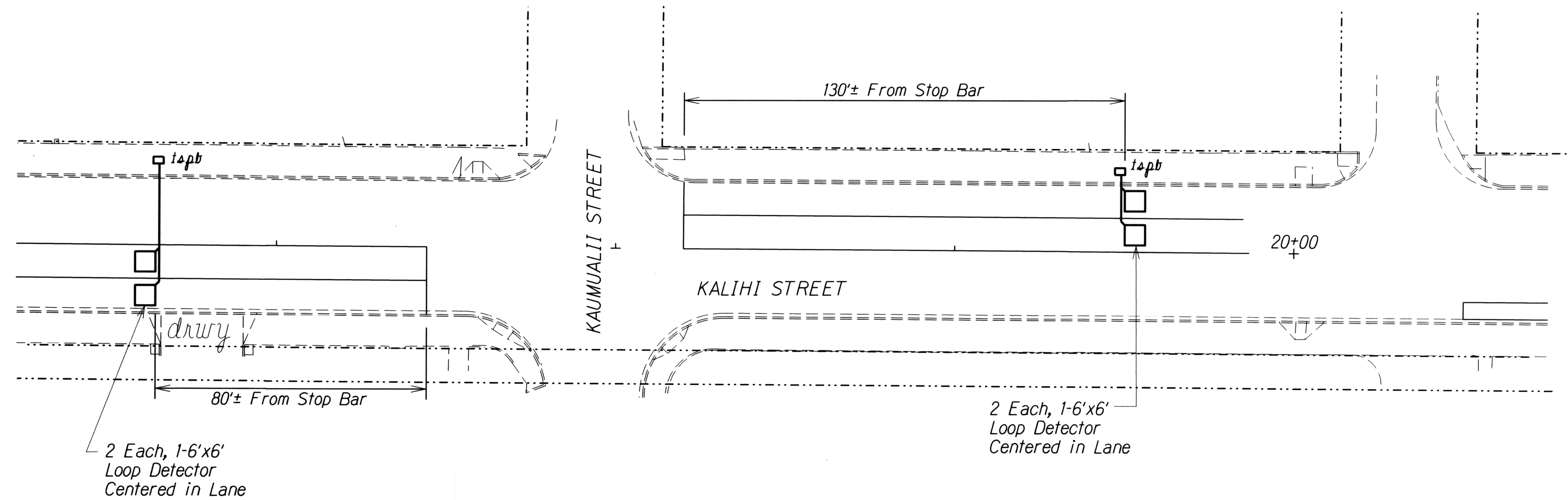
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	33	42

**TRAFFIC SIGNAL LEGEND:**

- *tsp* Existing Traffic Signal Pole
- *TSP* New Traffic Signal Pole
- Ⓚ Temporary Microwave Detector
- □ New Loop Detectors
- *tspb* Existing Traffic Signal Pullbox
- - - - Existing Conduit
- - - - New Conduit
- *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox A
- ⊠ *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox B
- — New L.E.D Pedestrian Countdown Module

**NOTES:**

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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**LOOP DETECTOR PLAN**

**KALIHI STREET RESURFACING**  
**Nimitz Highway to School Street**  
**Federal Aid Project No. STP-063-1(024)**

Scale: 1"=20' Date: May 2017

SHEET No. *11* OF 20 SHEETS

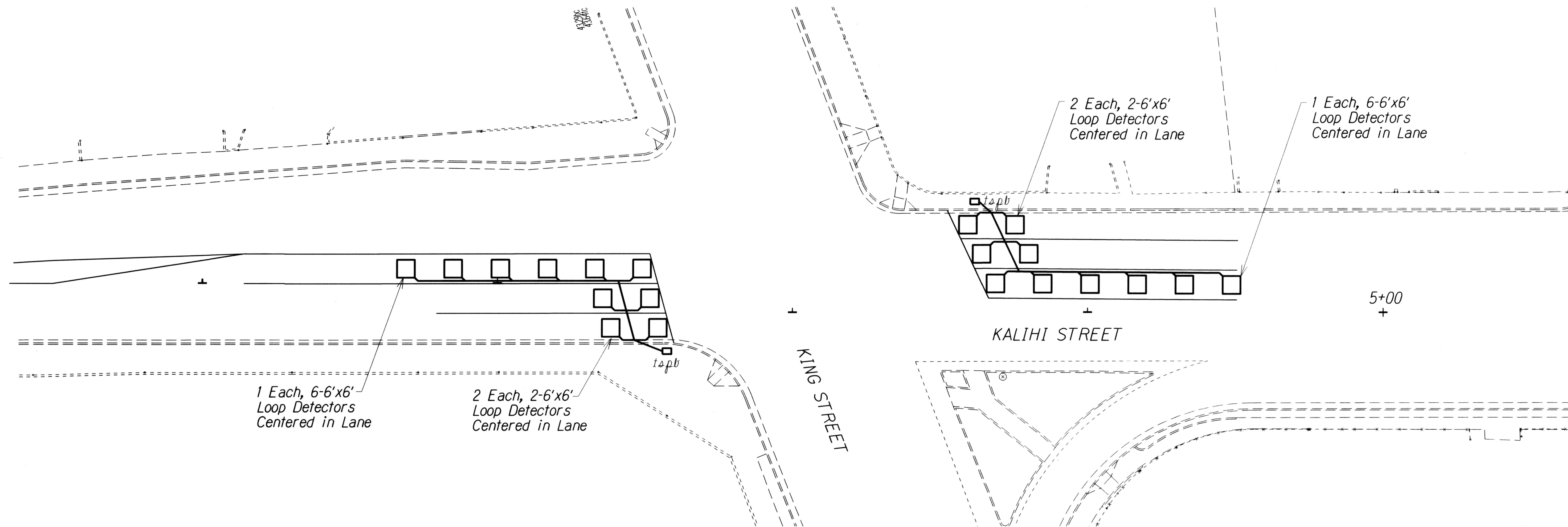
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	34	42

**TRAFFIC SIGNAL LEGEND:**

- *tsp* Existing Traffic Signal Pole
- *TSP* New Traffic Signal Pole
- ⌋ Temporary Microwave Detector
- New Loop Detectors
- *tspb* Existing Traffic Signal Pullbox
- Existing Conduit
- - - - New Conduit
- *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox A
- ⊗ *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox B
- New L.E.D Pedestrian Countdown Module

**NOTES:**

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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**LOOP DETECTOR PLAN**

**KALIHI STREET RESURFACING**  
Nimitz Highway to School Street  
Federal Aid Project No. STP-063-1(024)

Scale: 1"=20'      Date: May 2017

SHEET No. 12 OF 20 SHEETS

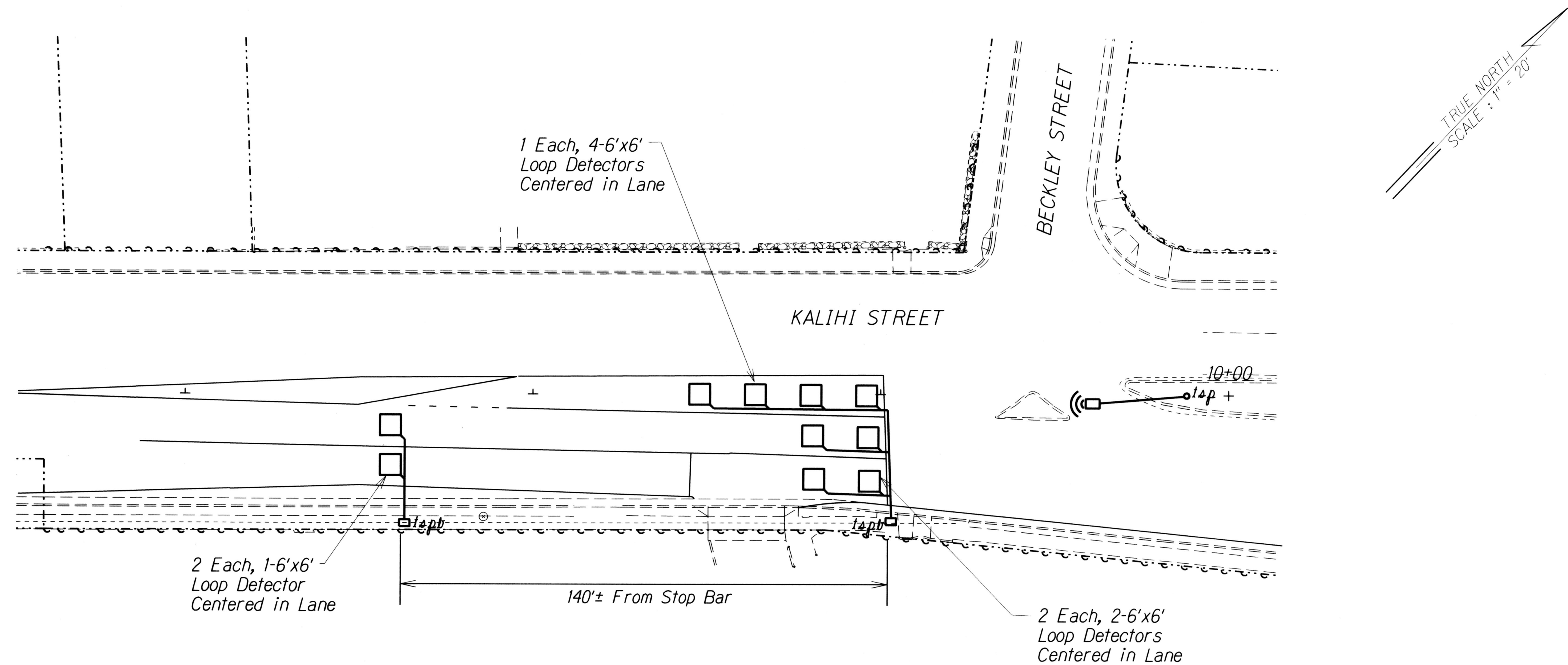
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	35	42

**TRAFFIC SIGNAL LEGEND:**

- *tsp* Existing Traffic Signal Pole
- *TSP* New Traffic Signal Pole
- Ⓚ Temporary Microwave Detector
- □ New Loop Detectors
- *tspb* Existing Traffic Signal Pullbox
- - - Existing Conduit
- - - - New Conduit
- *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox A
- ⊠ *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox B
- — New L.E.D Pedestrian Countdown Module

**NOTES:**

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ORIGINAL PLAN	
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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**LOOP DETECTOR PLAN**

**KALIHI STREET RESURFACING**  
**Nimitz Highway to School Street**  
**Federal Aid Project No. STP-063-1(024)**

Scale: 1"=20'      Date: May 2017

SHEET No. 113 OF 20 SHEETS

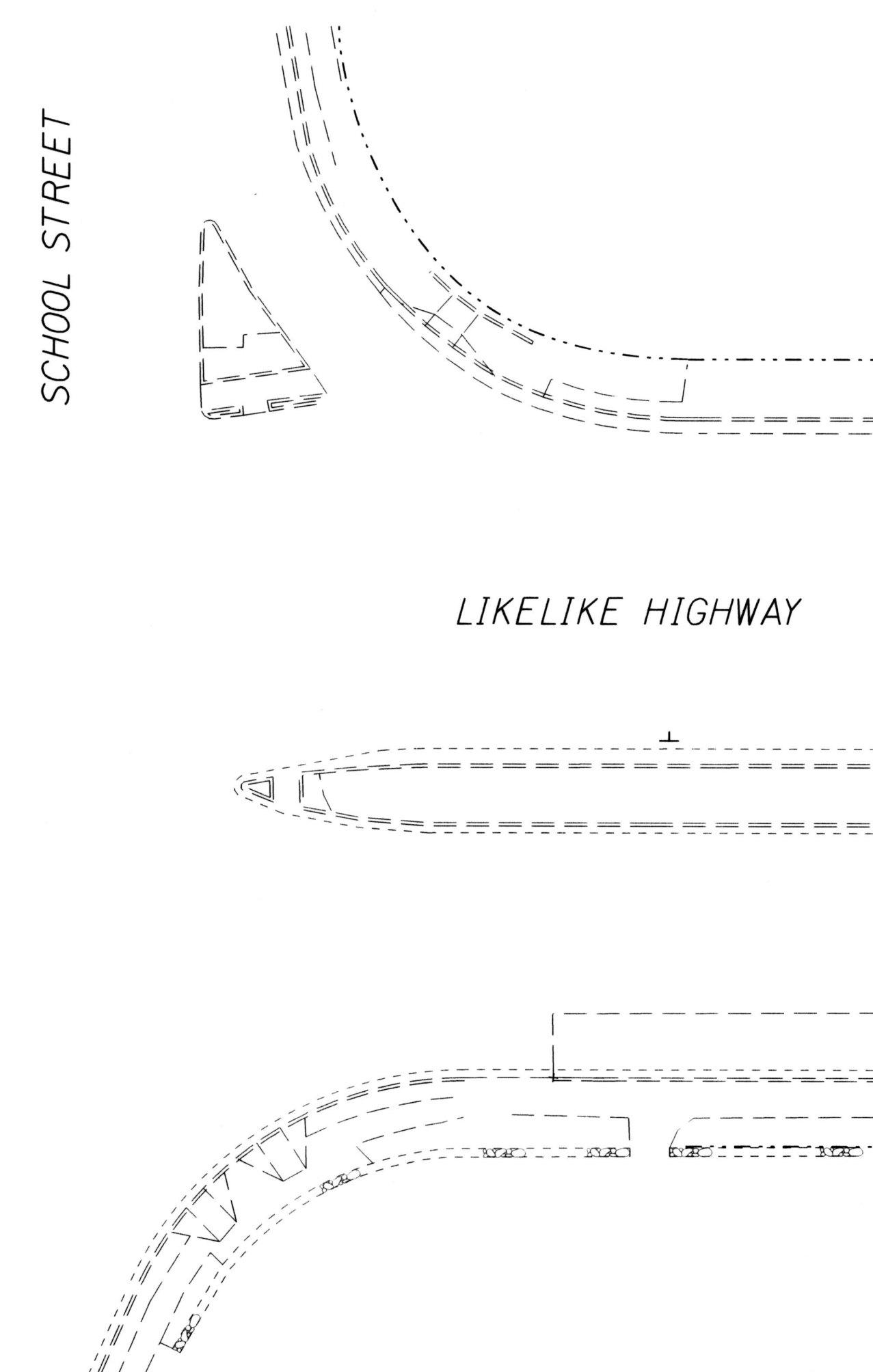
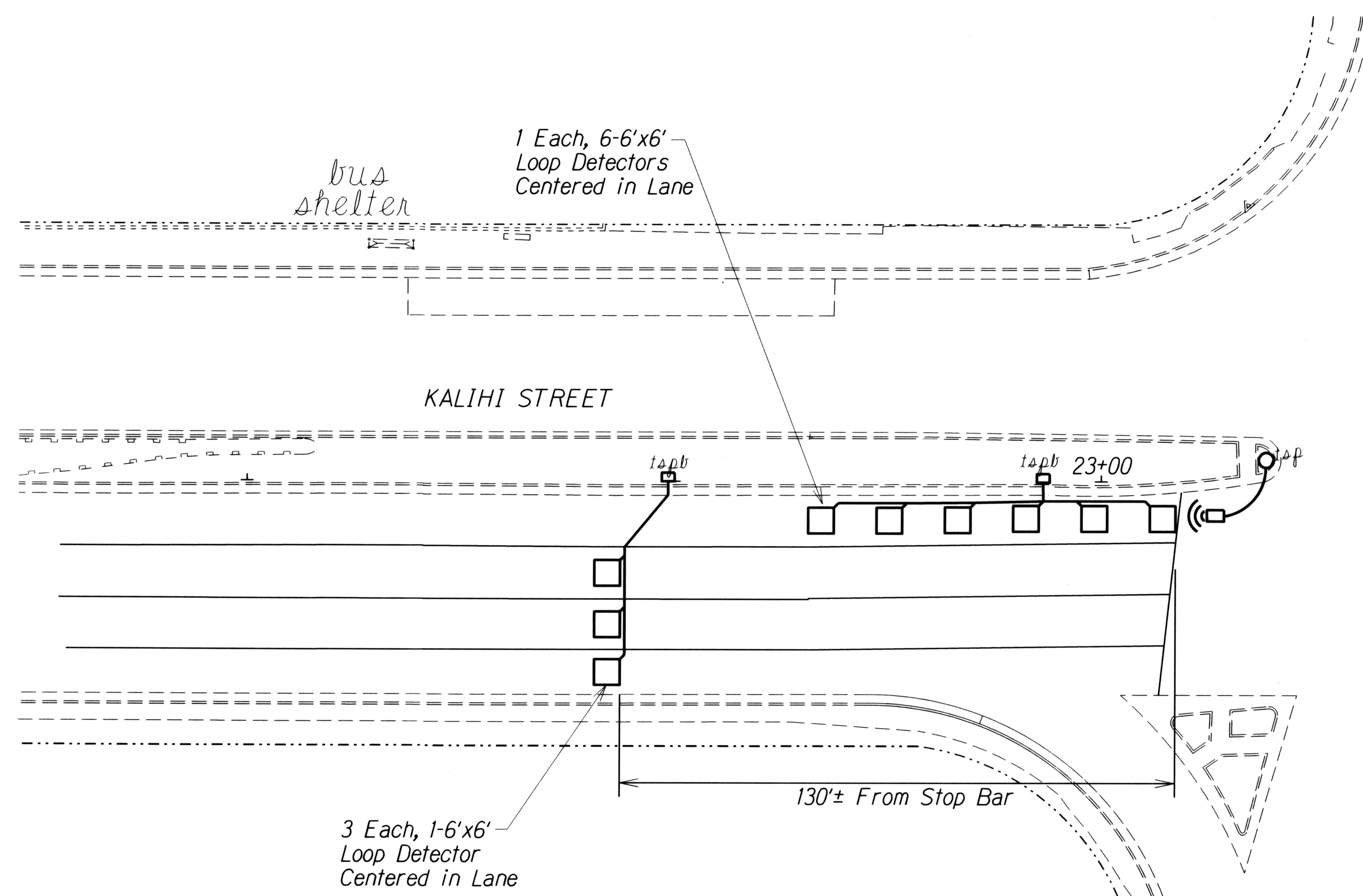
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	36	42

**TRAFFIC SIGNAL LEGEND:**

- *tsp* Existing Traffic Signal Pole
- *TSP* New Traffic Signal Pole
- Ⓢ Temporary Microwave Detector
- □ New Loop Detectors
- *tspb* Existing Traffic Signal Pullbox
- Existing Conduit
- - - - New Conduit
- *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox A
- ⊠ *TSPB*<sub>NEW</sub> New Traffic Signal Pullbox B
- New L.E.D Pedestrian Countdown Module

**NOTES:**

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SURVEY PLOTTED BY	DATE
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DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

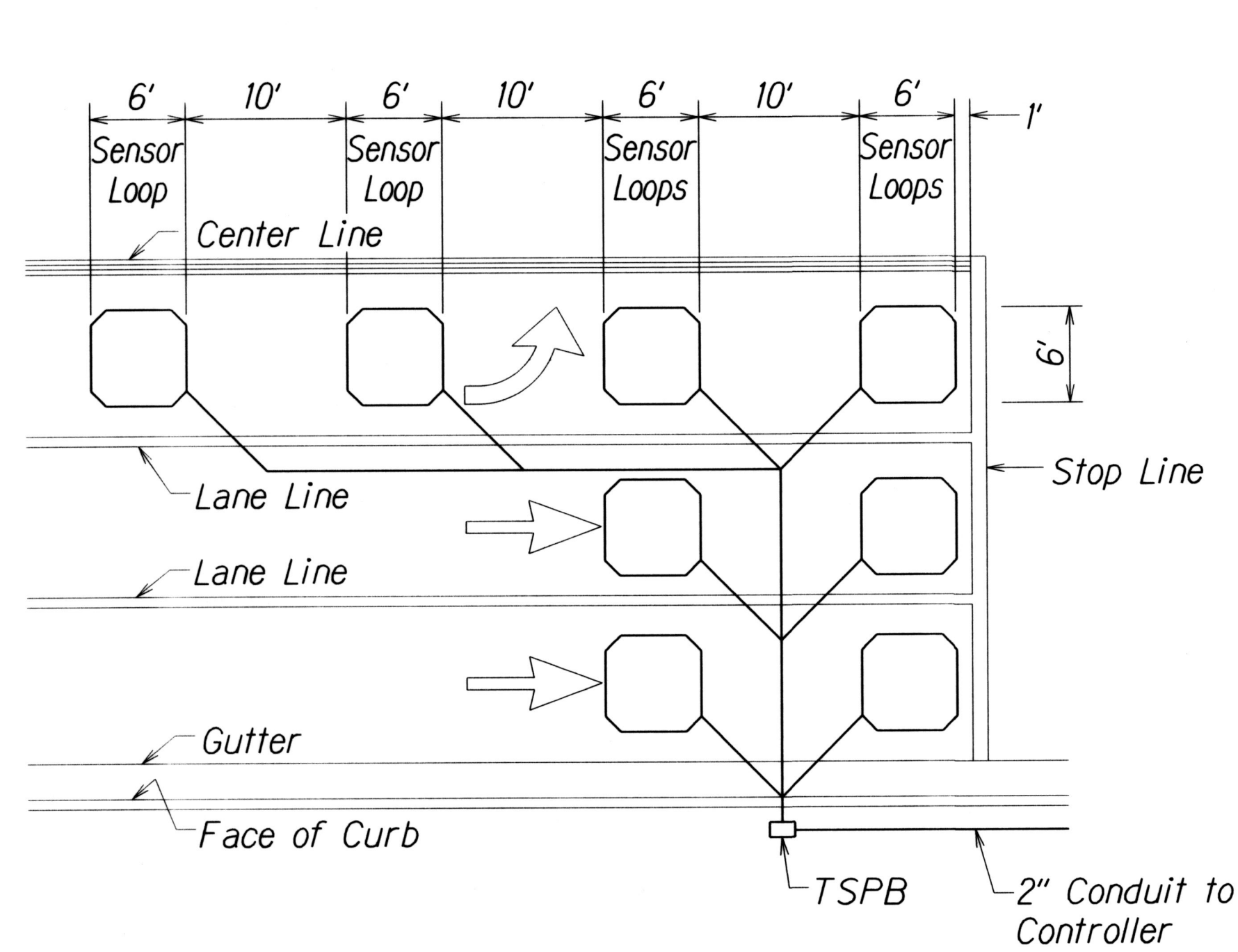
**LOOP DETECTOR PLAN**

**KALIHI STREET RESURFACING**  
**Nimitz Highway to School Street**  
**Federal Aid Project No. STP-063-1(024)**

Scale: 1"=20'      Date: May 2017

SHEET No. T14 OF 20 SHEETS

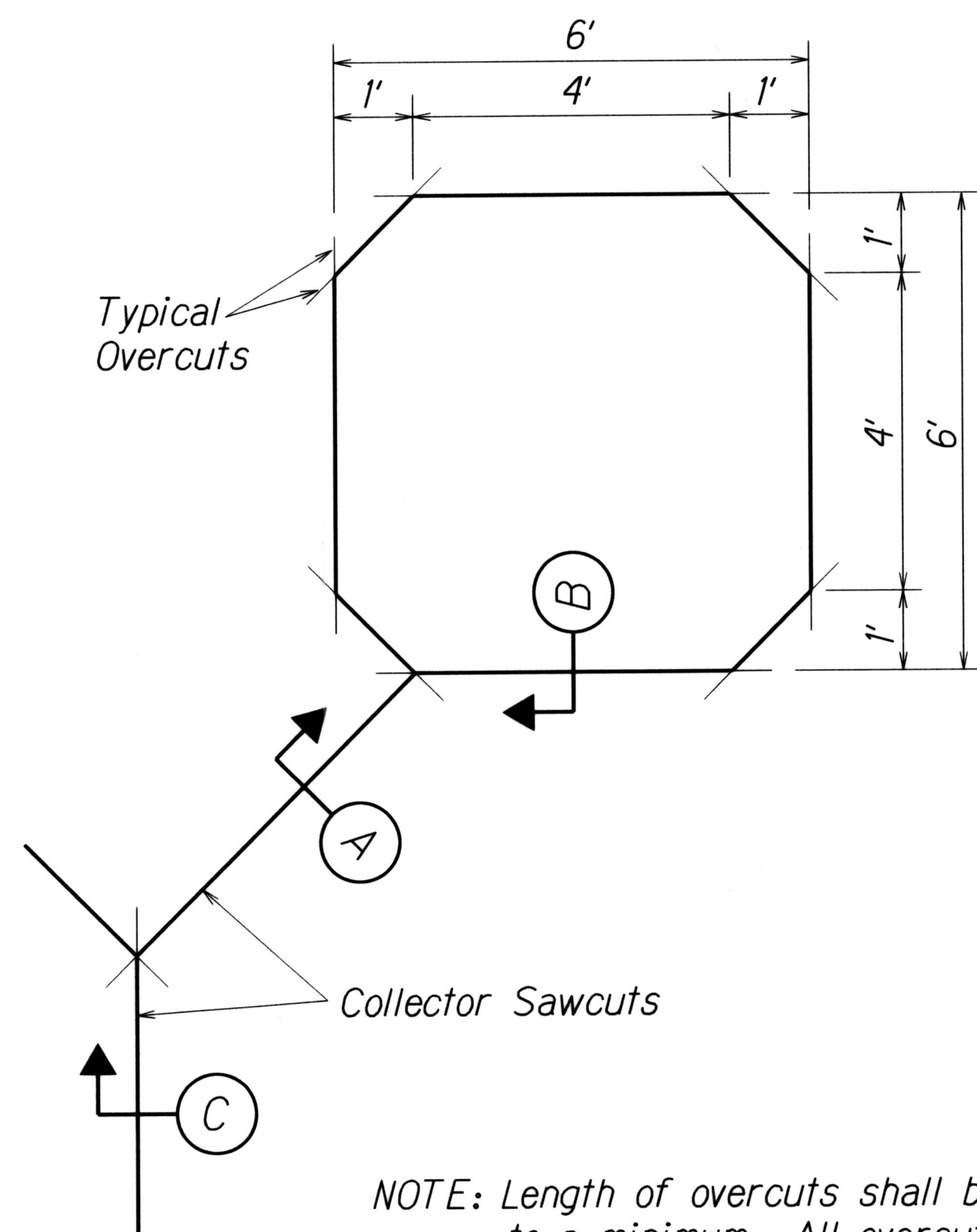
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	37	42



**NOTES:**

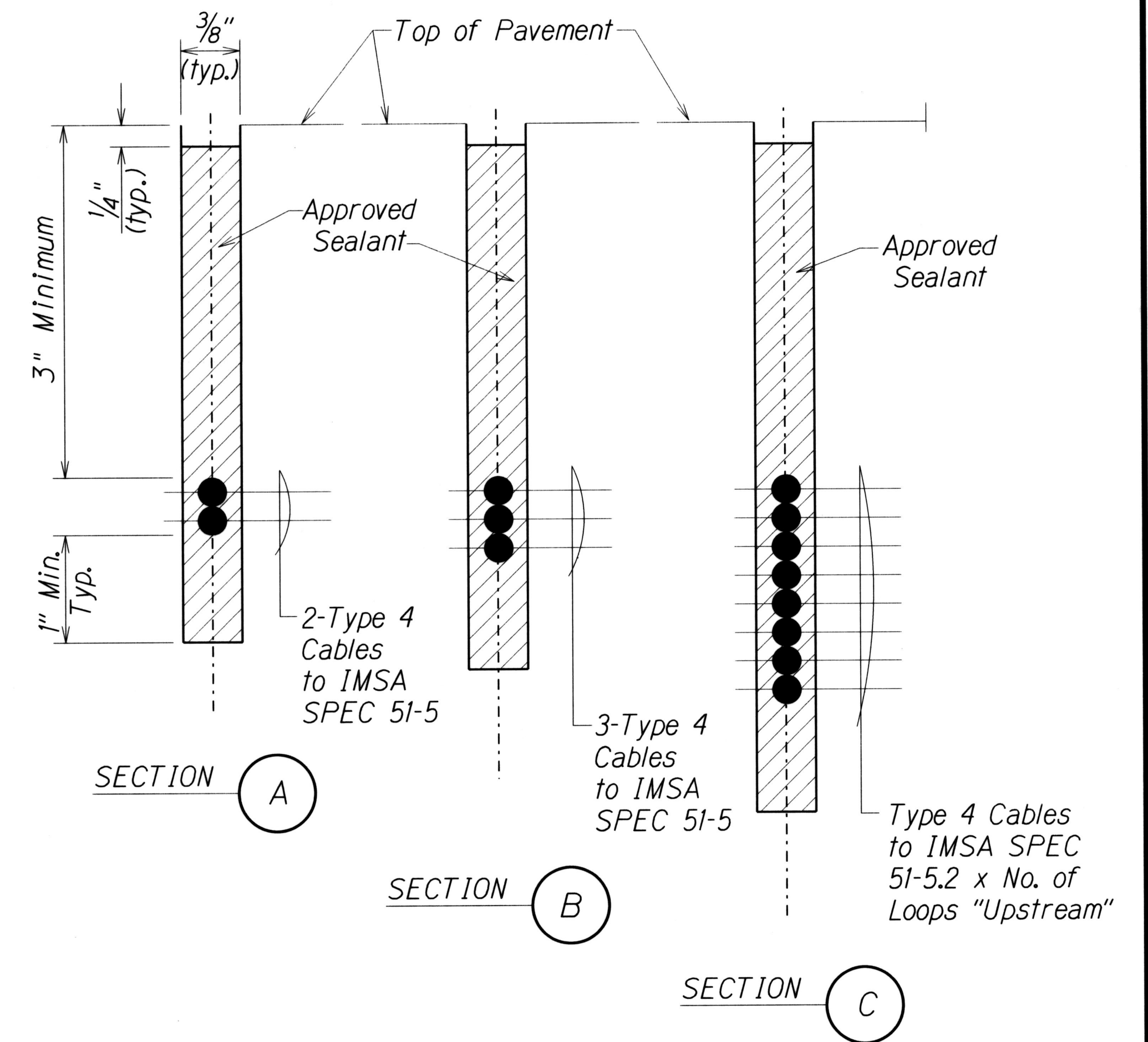
1. Center sensor loops in lanes.
2. Collector cables shall be twisted 2 turns per foot.
3. Number of loops and locations vary. See project plans.
4. Number and locations of collector sawcuts may be varied in the field to suit.

TYPICAL SENSOR LOOP LAYOUT



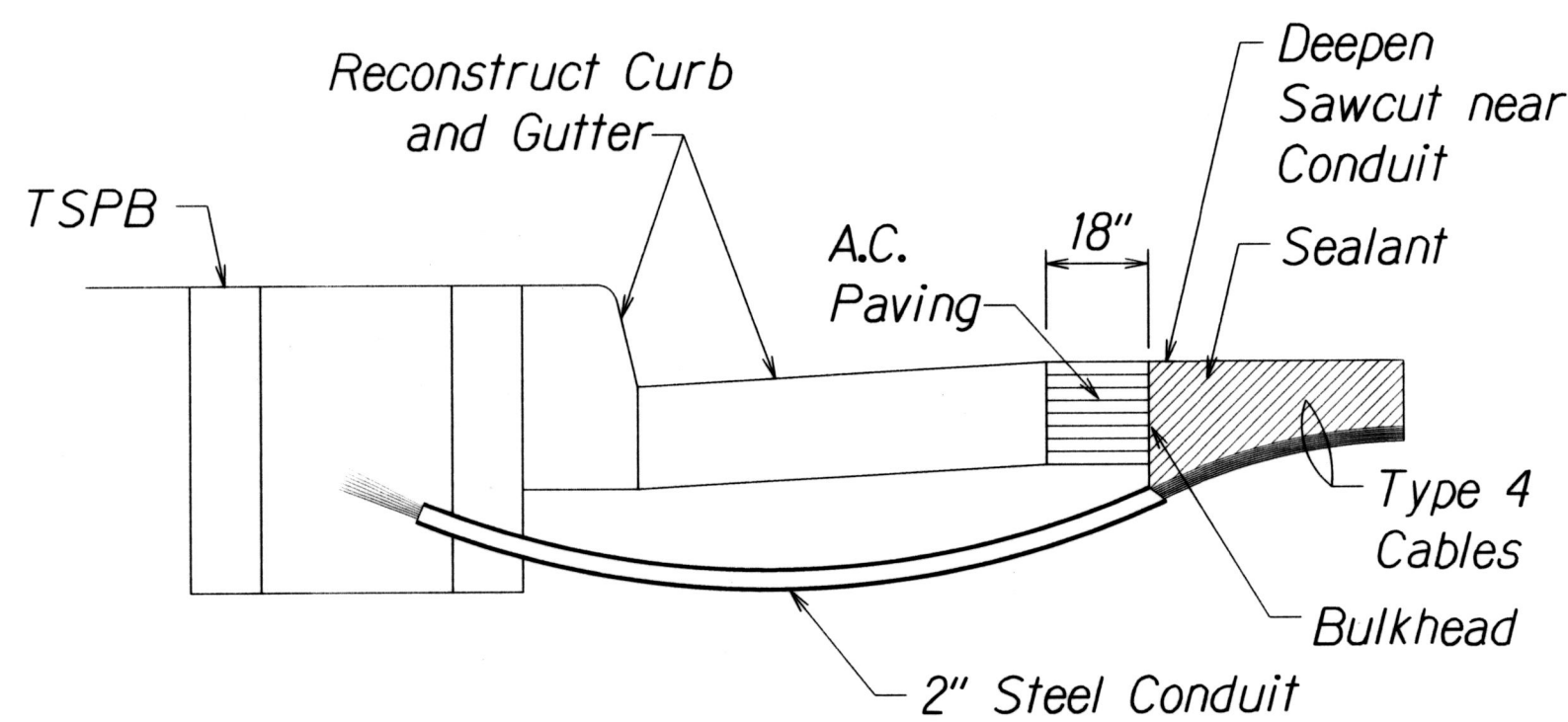
NOTE: Length of overcuts shall be kept to a minimum. All overcuts shall be back filled with hot tar.

TYPICAL SENSOR LOOP SAWCUT DETAIL



TYPICAL SECTION THROUGH SENSOR LOOP

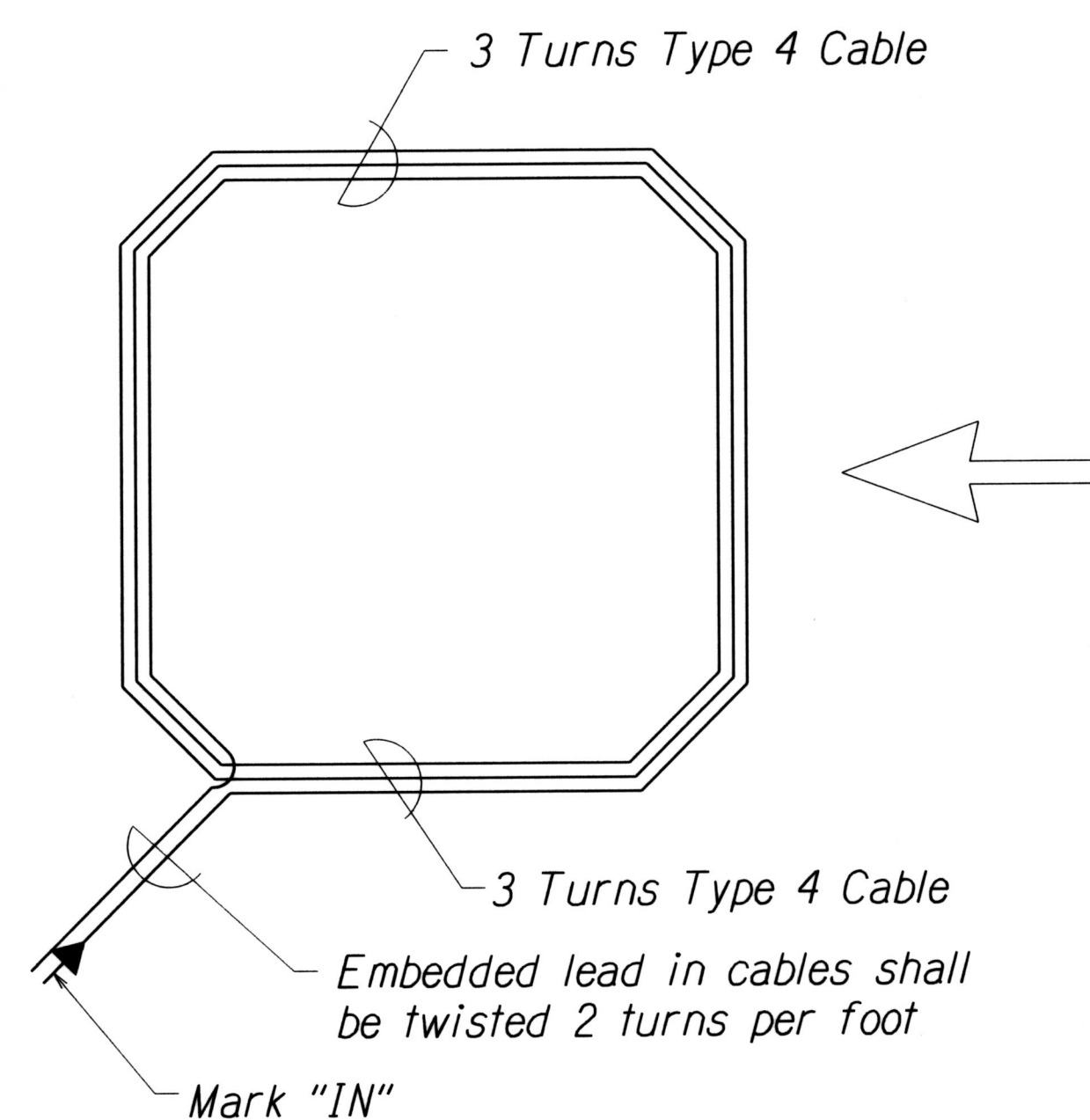
Not to Scale



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 hot tar in sawcut.
4. Backfill over conduit with new A.C.
5. Reconstruct curb and gutter as required.

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY



TYPICAL SENSOR LOOP WIRING DIAGRAM

Not to Scale

DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
TRACED BY	_____
NO. OF BOOKS	_____
CHECKED BY	_____
NO.	_____

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**LOOP DETECTOR DETAILS**

**KALIHI STREET RESURFACING**  
Nimitz Highway to School Street  
Federal Aid Project No. STP-063-1(024)

Scale: As Shown      Date: May 2017

SHEET No. T15 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	ADD.38	42

NEW TRAFFIC SIGNAL ASSEMBLY W/ LED SIGNAL LIGHTS & TRAFFIC SIGNAL BACK PLATE*				
STREET NAME/INTERSECTION	SOUTH BOUND (SB)		NORTH BOUND (NB)	
	STANDARD TRAFFIC SIGNAL HEAD	PROGRAMMABLE VISIBILITY TRAFFIC SIGNAL HEAD	STANDARD TRAFFIC SIGNAL HEAD	PROGRAMMABLE VISIBILITY TRAFFIC SIGNAL HEAD
Nimitz Highway	—	—	1	1
Dillingham Boulevard	—	—	—	—
Kaumualii Street	2	—	2	—
King Street	2	1	2	1
Beckley Street	2	—	2	—

\* Replace existing mast arm mounted traffic signal head (including programmable-visibility signal heads) with new traffic signal head with LED optical units and traffic signal back plate.

ORIGINAL PLAN	DESIGNED BY	DATE
NOTE BOOK	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

8/17/17	Duplicate Sheet - Deleted Notes and Symbols. Added Traffic Signal Table.
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION  <b>TRAFFIC SIGNAL</b> <b>MISCELLANEOUS</b>  <b>KALIHI STREET RESURFACING</b> <i>Nimitz Highway to School Street</i> Federal Aid Project No. STP-063-1(024) Scale: As Shown      Date: July 2017	
SHEET No. T16 OF 20 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	39	42

NEW DESIGN REQUIREMENTS FOR LUMINAIRES, POLE STANDARDS AND TRAFFIC SIGNAL STANDARDS

1. Highway Lighting Pole Standards, Bracket Arms, Traffic Signal Standards and Mast Arms to be furnished for this project shall conform to the 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", 4th Edition, and the 2002 Interim Revisions, published by the American Association of State Highway and Transportation Officials.
2. In addition, the following modifications for the 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" shall be used in the design and manufacture of structural supports for highway luminaires and traffic signals.
3. Basic Wind Speed [Article 3.8.2] to determine the design wind pressure shall be 105 mph. For unusual or differing exposure conditions, the Basic Wind Speed should be increased using rational procedures and sound engineering judgement. Alternatively, the design wind pressure may be increased by using a higher Wind Importance Factor [Table 3-2] corresponding to a recurrence interval of at least one level greater than recommended.
4. Wind Importance Factor [Article 3.8.3] noted in Table 3-2 used to determine the design wind pressure for overhead cantilevered sign support structures over:
  - a. freeways shall be based on a recurrence interval of 100 years.
  - b. ramps and other highways with "high" ADT shall be based on a recurrence interval of 100 years unless otherwise directed.
5. Height and Exposure Factor [Article 3.8.4]. For sign and luminaire support structures on bridges, the Height and Exposure Factor shall be determined based on the maximum height they are above the surrounding ground. For severe exposure conditions such as along the coastline, the factor shall be increased based on the latest ASCE Standard No. 7, Minimum Design Loads for Buildings and Other Structures.
6. Fatigue Importance Factors [Article 11.6] noted in Table 11-1 for Overhead Cantilevered Sign, Traffic Signal and Luminaire Support Structures shall be based on the following:
  - a. Fatigue Category I - for all structures where failure would result in the structure falling onto the travel way.
  - b. Fatigue Category II - for all others.
7. Galloping [Article 11.7.1]. Overhead cantilevered sign and traffic signal support structures shall be designed for Galloping-induced cyclic loads unless approved vibration mitigation devices are installed.
8. Vortex Shedding [Article 11.7.2]. Nontapered lighting structures shall be designed to resist Vortex Shedding-induced loads including cantilevered mast arms and lighting structures that have tapers less than 0.14 in/ft.
9. Natural Wind Gust [Article 11.7.3]. Overhead cantilevered sign, traffic signal and high-level lighting support structures shall be designed to resist an equivalent static Natural Wind Gust pressure. For unusual or differing exposure conditions, the equivalent static Natural Wind Gust pressure should be increased using references noted in the specifications.
10. Truck-Induced Gust [Article 11.7.4]. Overhead cantilevered sign and traffic signal support structures shall be designed to resist an equivalent static Truck Gust pressure range based on a truck speed of 65 mph. At the option of the State of Hawaii, Department of Transportation, a lower truck speed may be used in areas with design speeds not exceeding 45 mph.
11. The Contractor shall submit shop drawings accompanied by complete and detailed engineering computations from the equipment manufacturer to the Engineer for approval.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

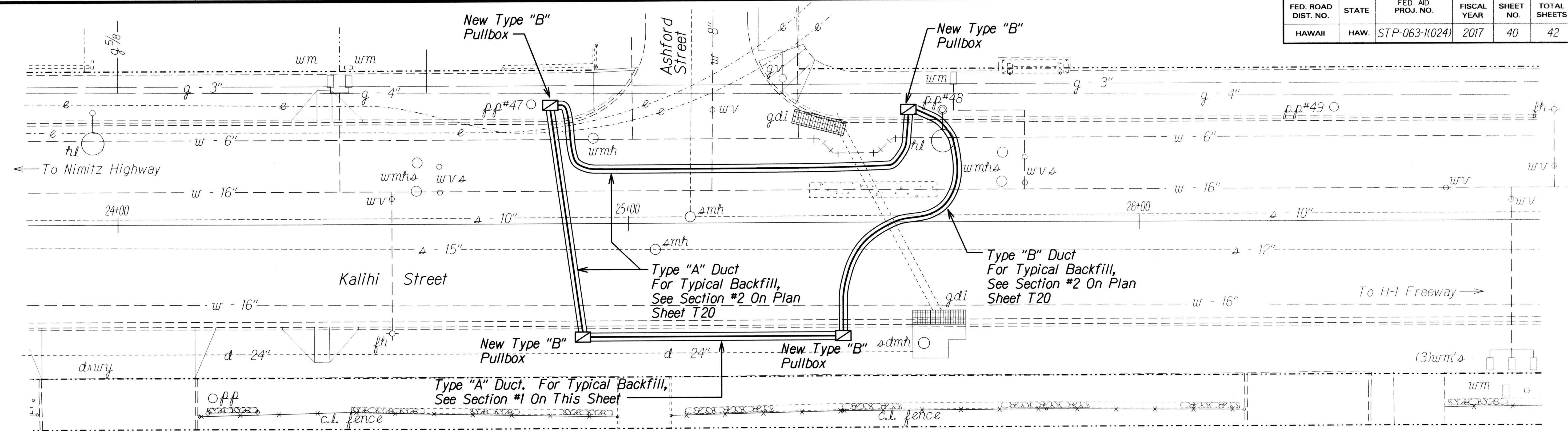
**TRAFFIC SIGNAL**  
**LEGEND AND NOTES**

**KALIHI STREET RESURFACING**  
*Nimitz Highway to School Street*  
*Federal Aid Project No. STP-063-1(024)*

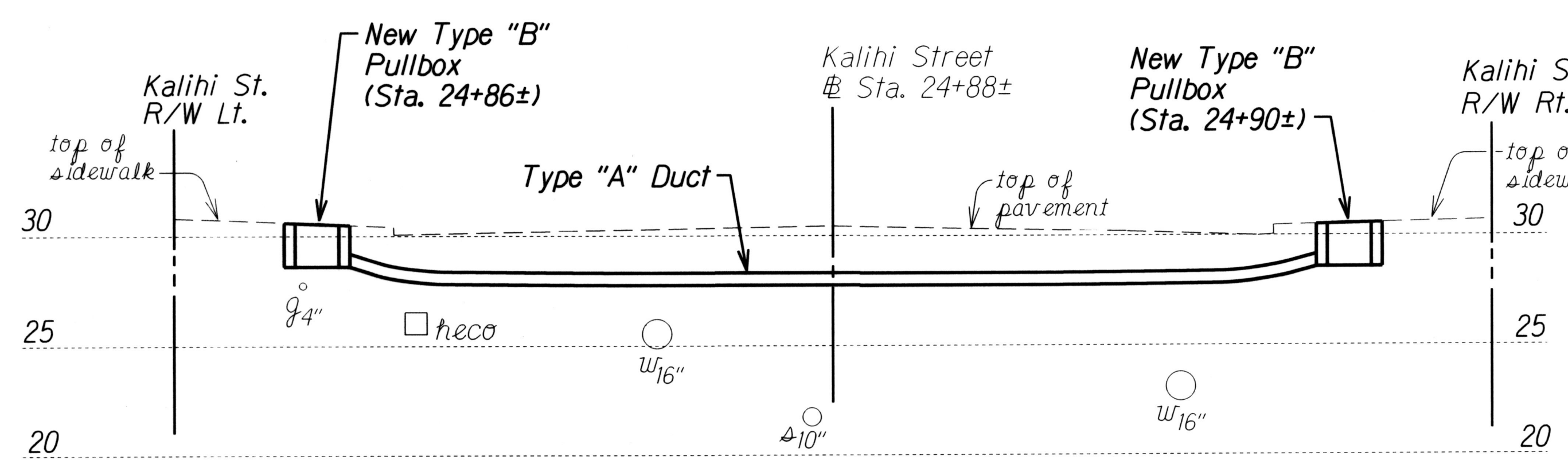
Scale: As Shown      Date: July 2017

SHEET No. 117 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	40	42

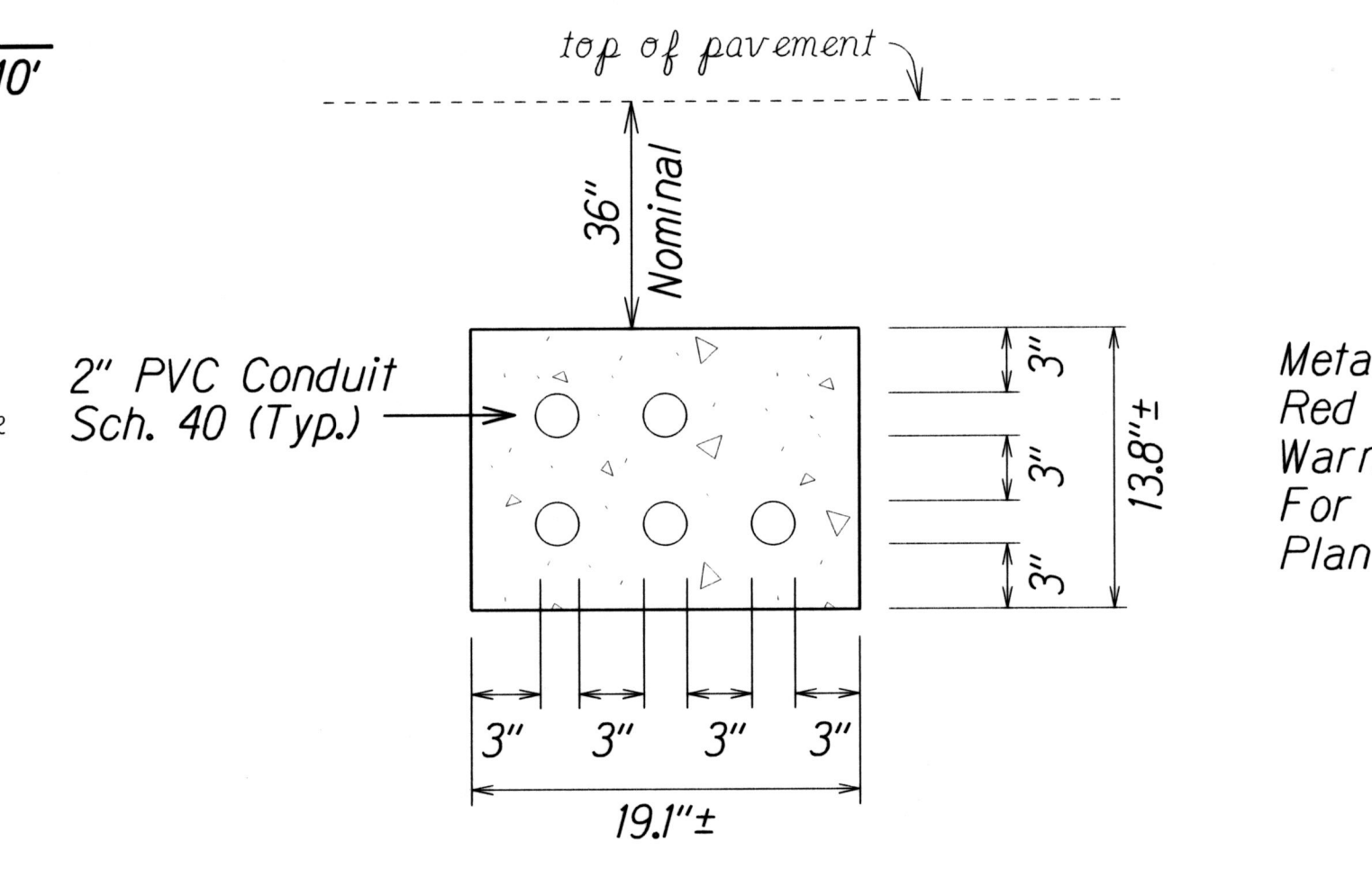


**PLAN**  
Scale: 1"=10'



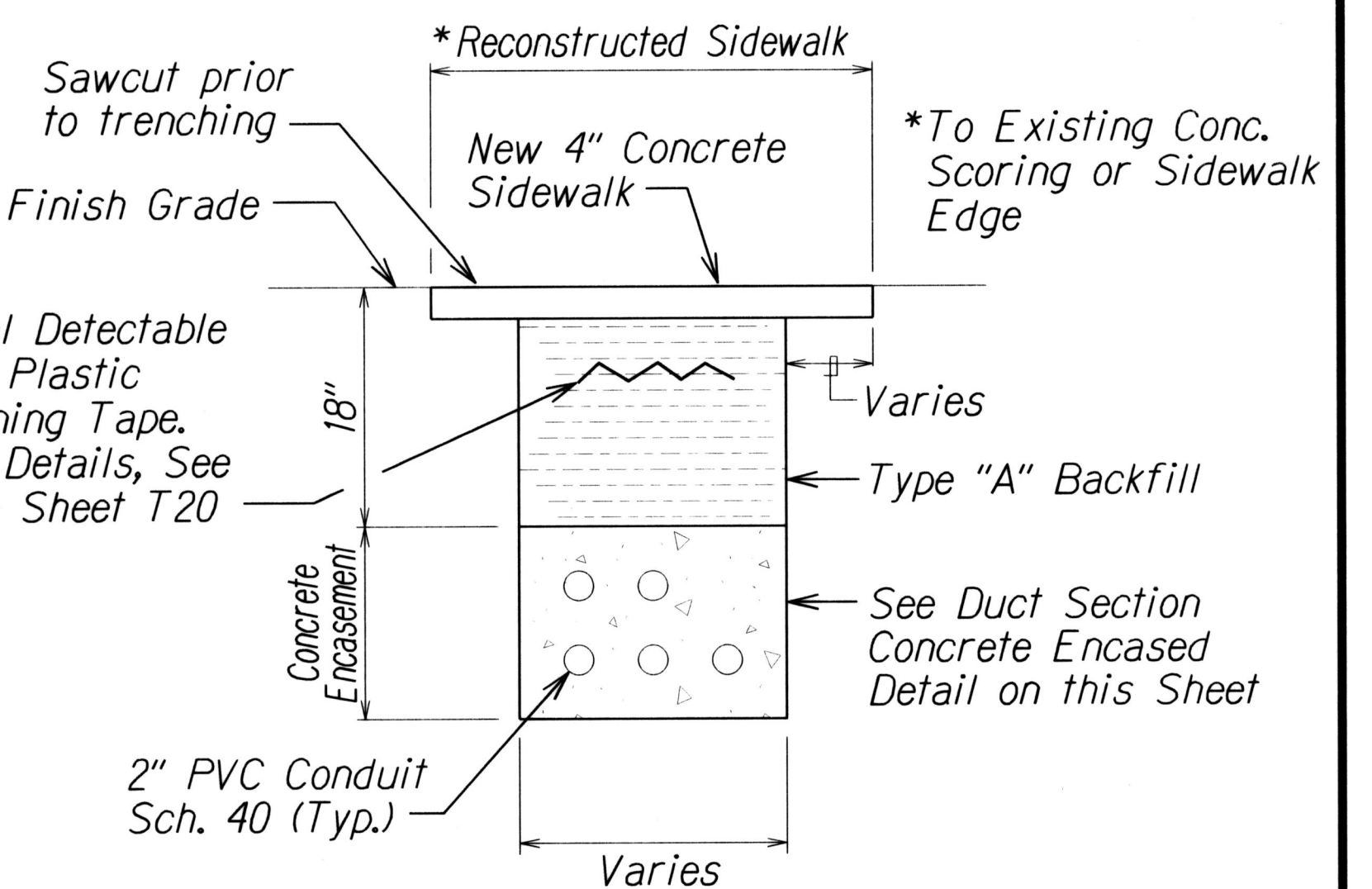
**TRAFFIC SIGNAL DUCTLINE CROSSING AT STA. 24+88±**

Scale: Horiz. 1"=5'  
Vert. 1"=5'



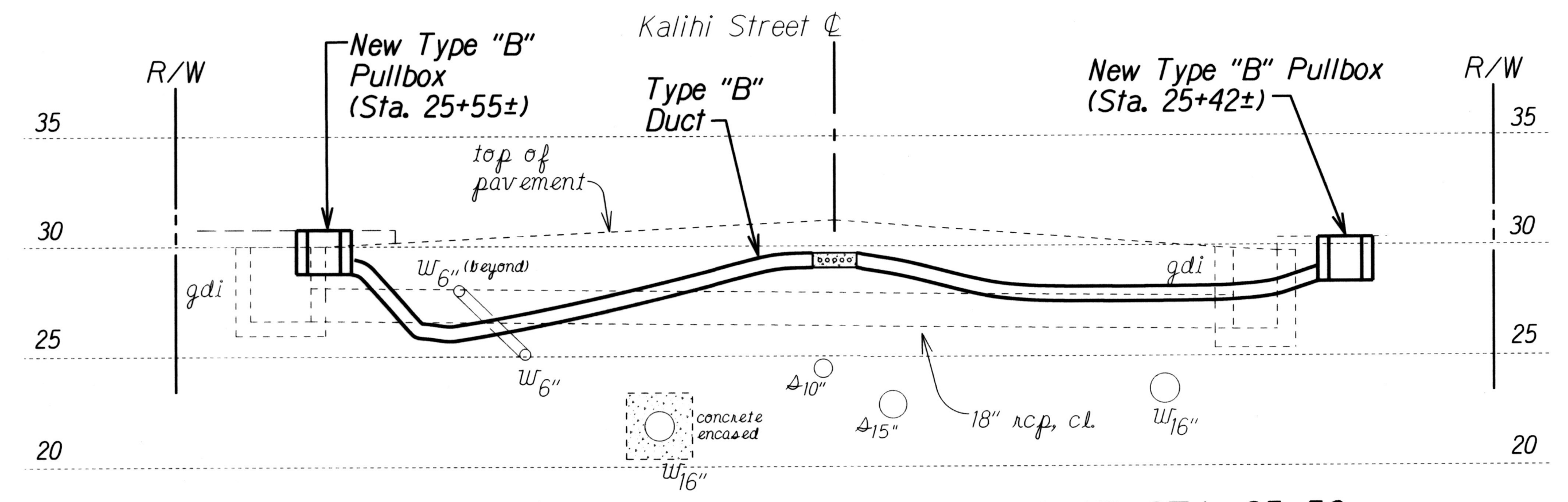
**TYPE "A" DUCT SECTION CONCRETE ENCASED**

Not To Scale



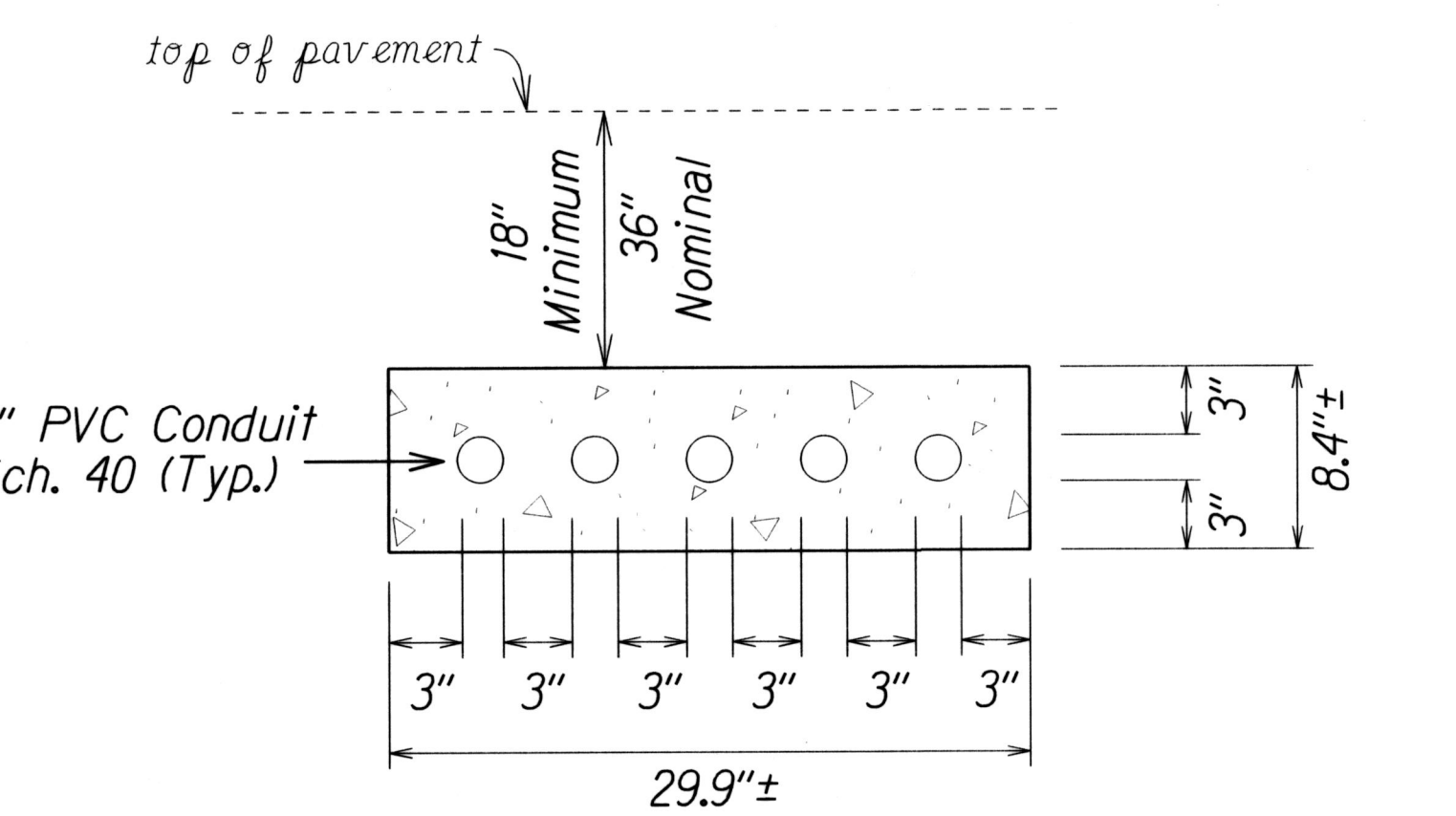
**① TYPICAL BACKFILL SECTION WITH CONCRETE ENCASED DUCTS UNDER SIDEWALK AREAS**

Not To Scale



**TRAFFIC SIGNAL DUCTLINE CROSSING AT STA. 25+50±**

Scale: Horiz. 1"=5'  
Vert. 1"=5'



**TYPE "B" DUCT SECTION CONCRETE ENCASED**

Not To Scale

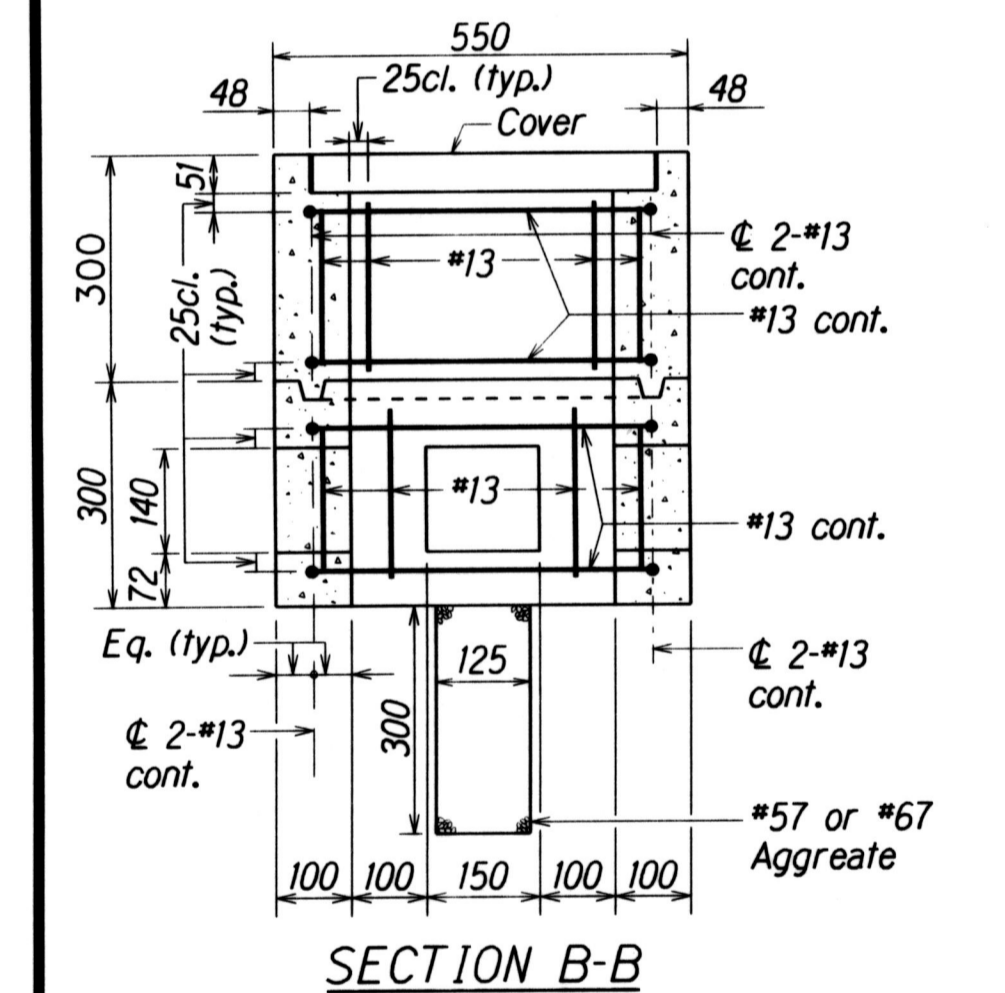
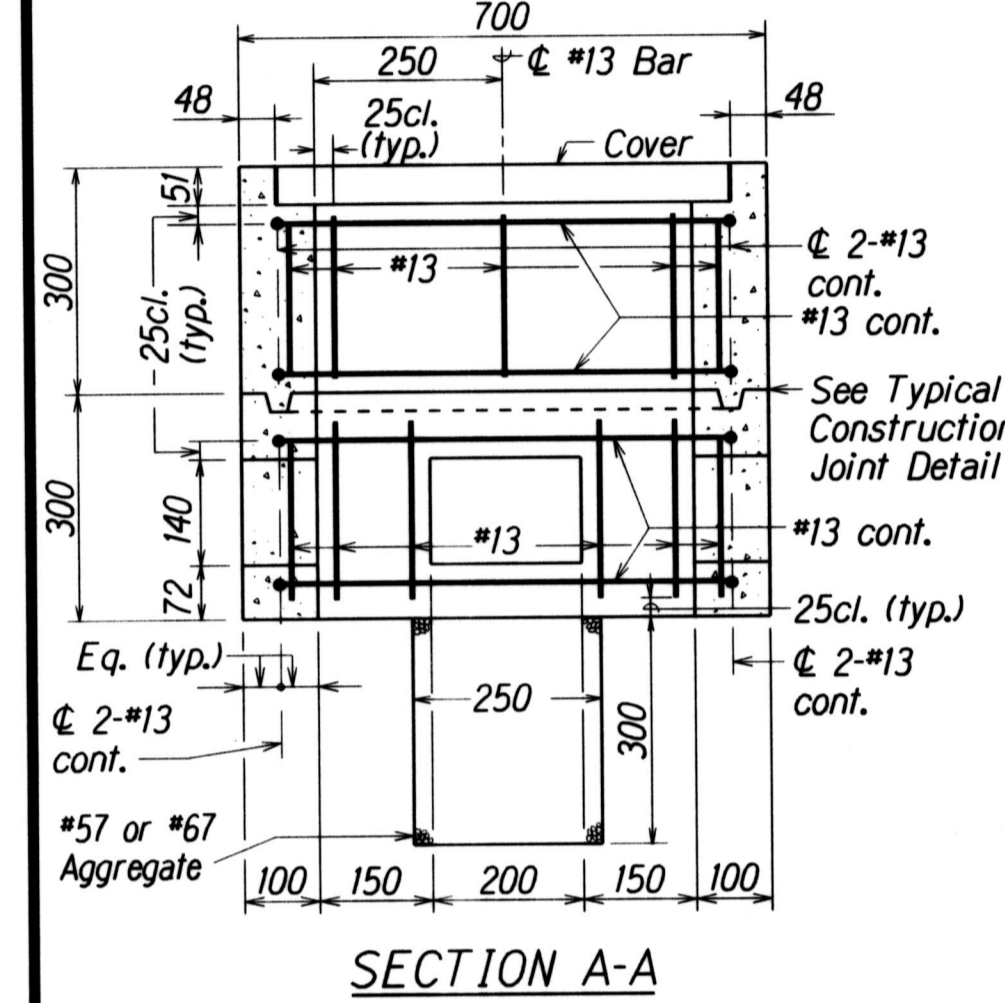
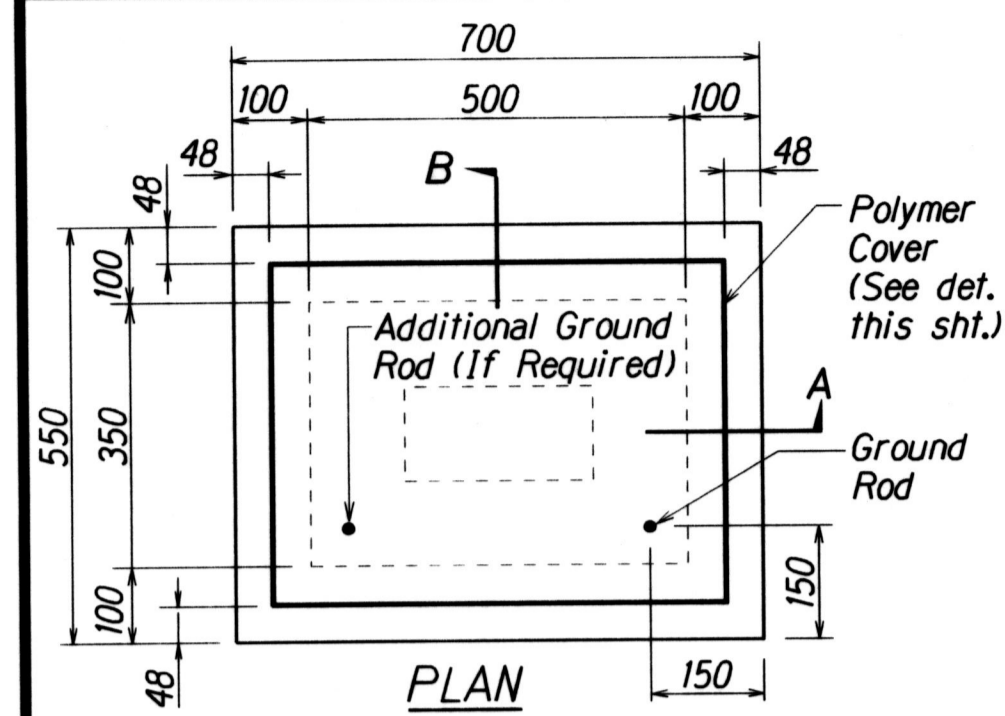
SURVEY PLOTTED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
 TRACED BY: \_\_\_\_\_  
 DESIGNED BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 ORIGINAL PLAN NOTE BOOK NO. 2

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION  
**TRAFFIC SIGNAL PLAN**  
**KALIHĪ STREET RESURFACING**  
 Nimitz Highway to School Street  
 Federal Aid Project No. STP-063-1(024)  
 Scale: As Shown Date: July 2017  
 SHEET No. T18 OF 20 SHEETS

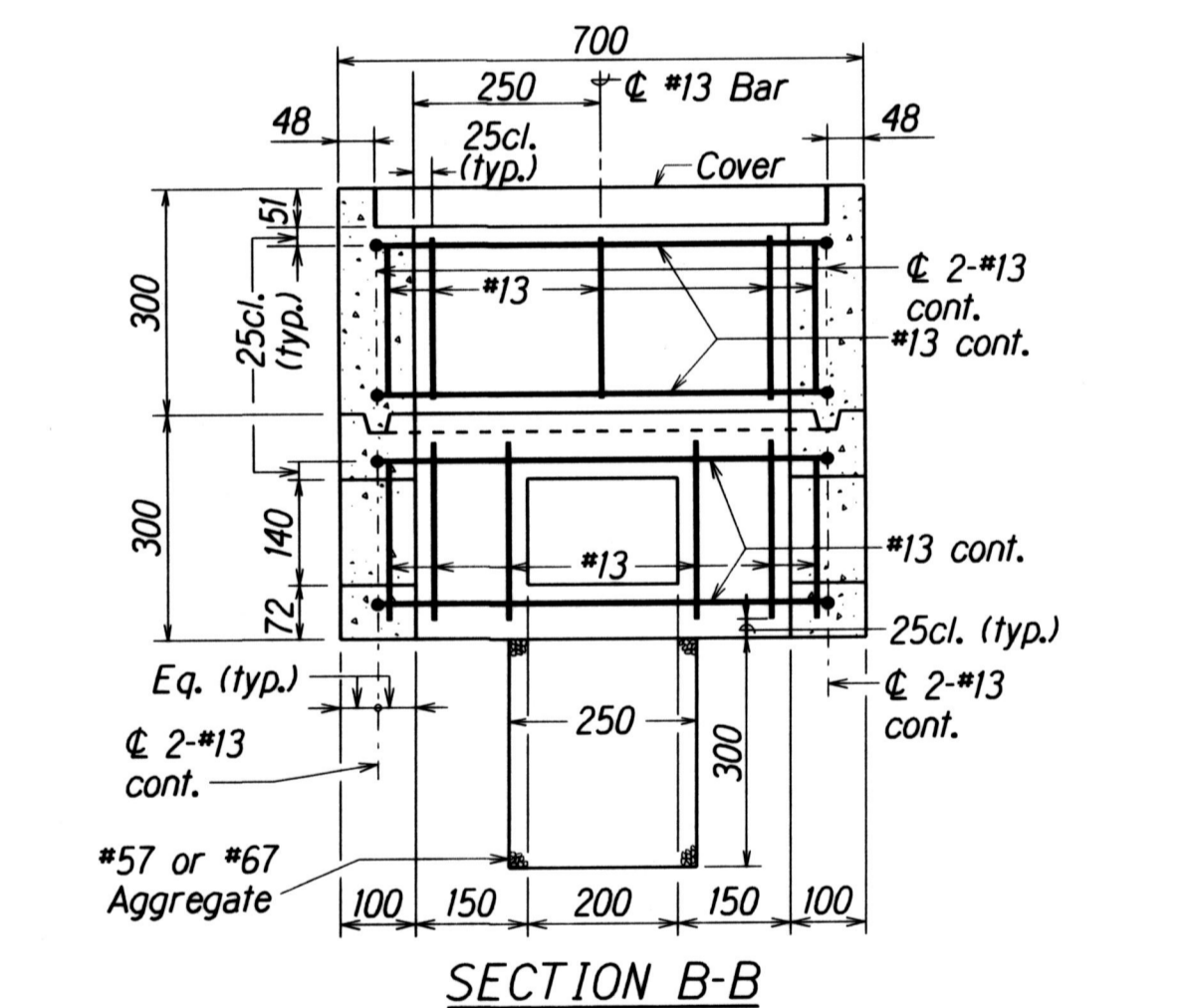
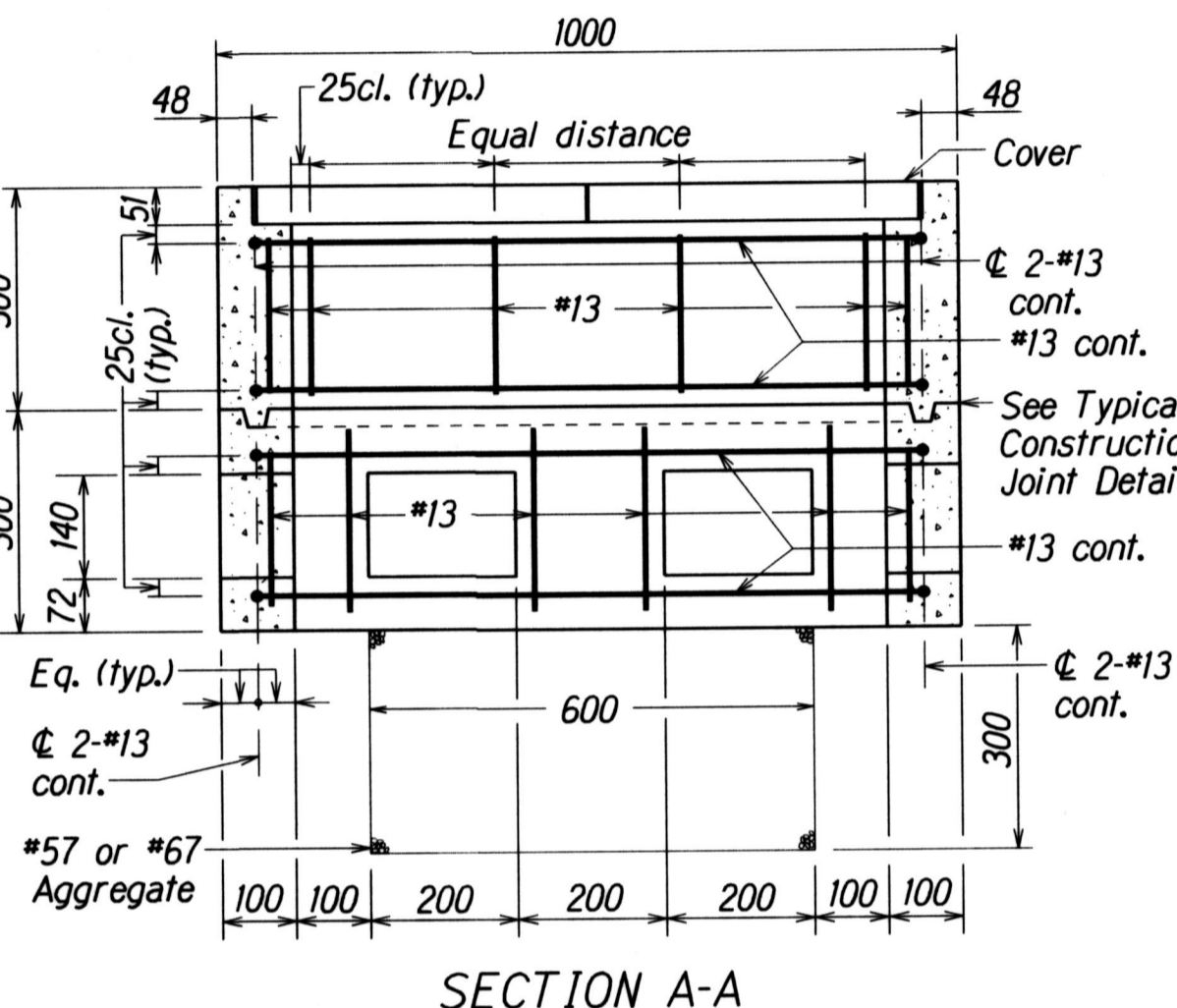
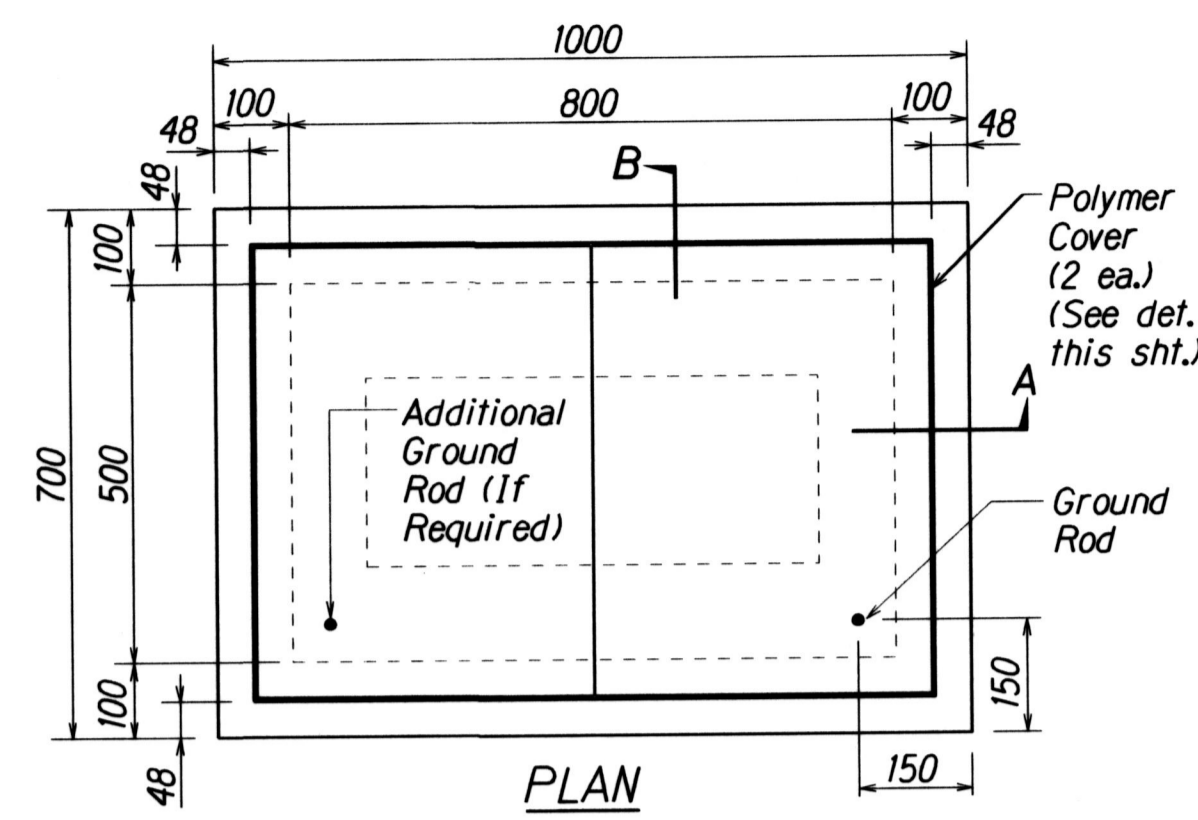
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	41	42

**GENERAL NOTES**

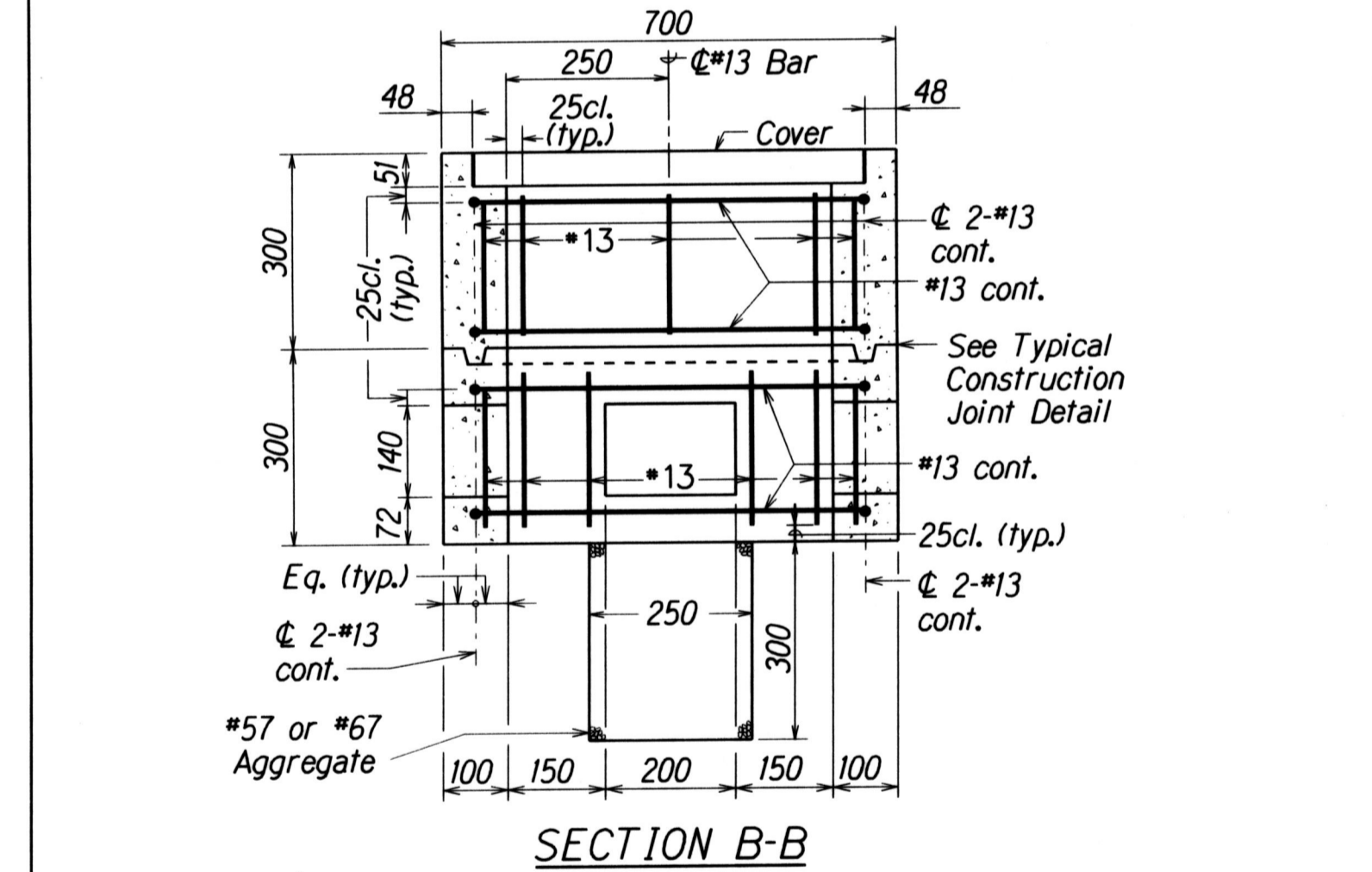
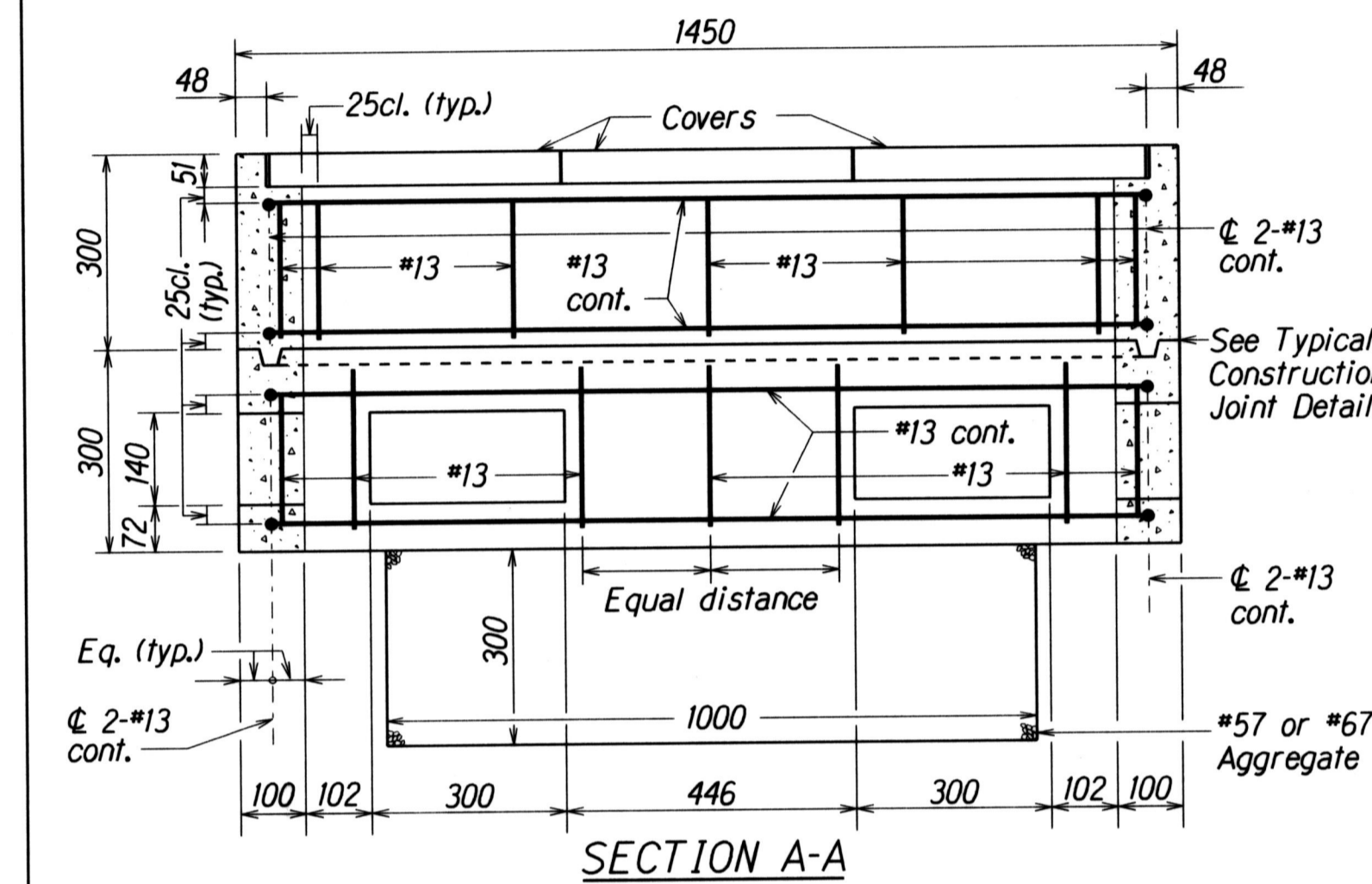
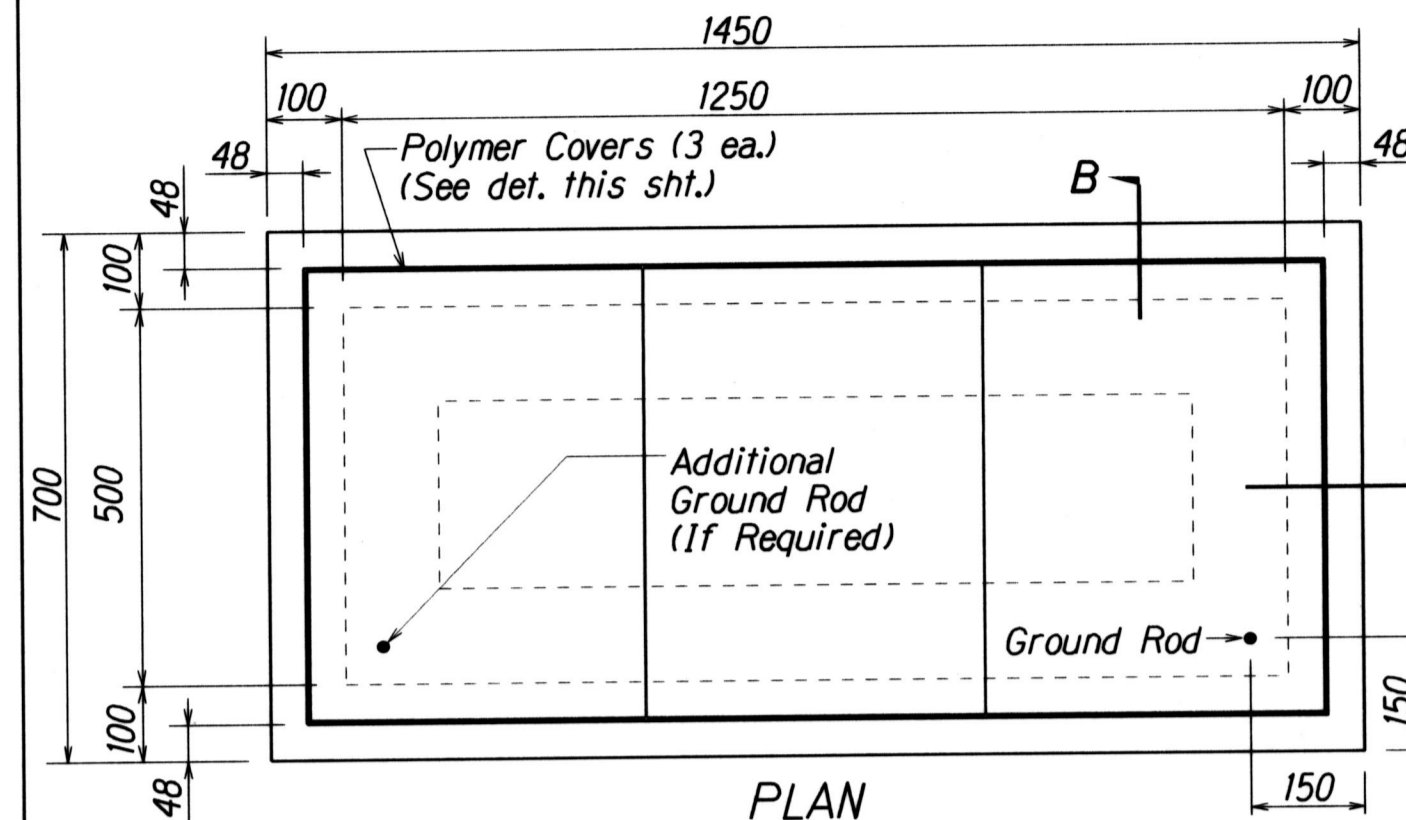
1. Provide a minimum of one 16  $\phi$  x 2.5m Copperweld Ground Rod in each pullbox. When directed by the Traffic Signal Inspector/Engineer, install additional Ground Rods. Cost of Ground Rods shall be incidental to the pullboxes.
2. All pre-cast concrete pullboxes shall be manufactured in two pieces.
3. The pullbox with cover shall be capable of supporting an MS 18 Loading.
4. The maximum weight of the pullbox cover shall not exceed 27 kilograms.
5. The openings for the conduits on all pullboxes shall be pre-cast concrete knockouts.
6. After installing the conduits in the openings of the pullboxes, the Contractor shall fill the excess opening in the pre-cast knockouts with concrete mortar.
7. Prior to installing the pullboxes, the Contractor shall level the bottom of the trench and achieve a minimum of 95% relative compaction of the bottom of the trench.
8. All concrete shall be Class A (21 MPa (3,000 psi), min.)
9. Rebars shall be Grade 300 and all lapped splices shall be 360mm minimum.
10. The #57 or #67 size aggregate shall conform to latest version of AASHTO M43 (ASTM D 448).
11. Type "C" Pullbox shall be installed in a location protected from vehicular traffic (i.e. raised sidewalk, behind A.C. curbs, traffic signal standard or pipe guards).



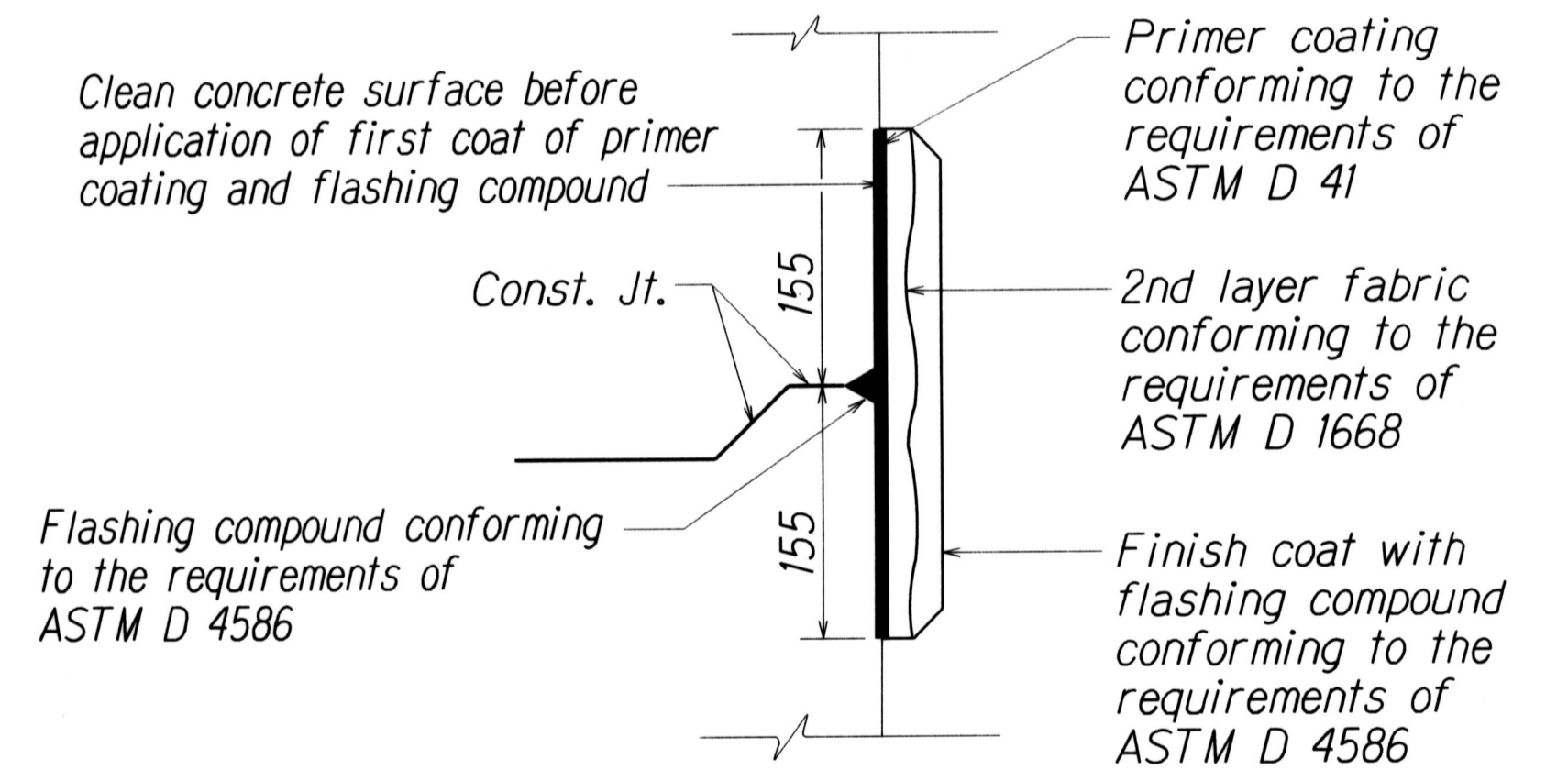
**TYPE "A" PULLBOX**  
(Old Type "B")



**TYPE "B" PULLBOX** (Old Type "C")

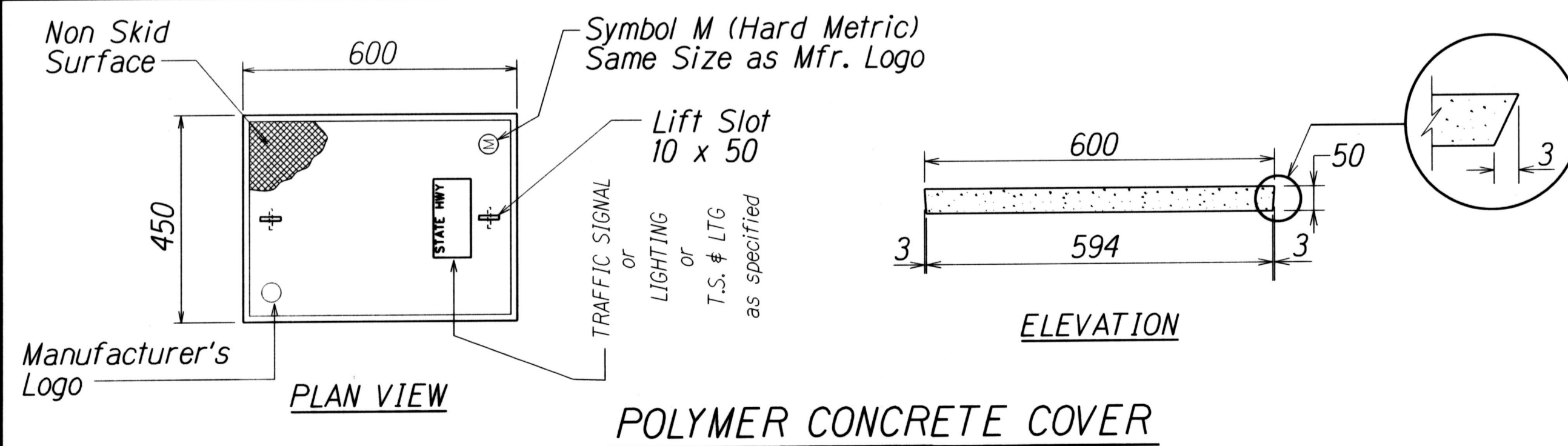


**TYPE "C" PULLBOX** (Old Type "D")

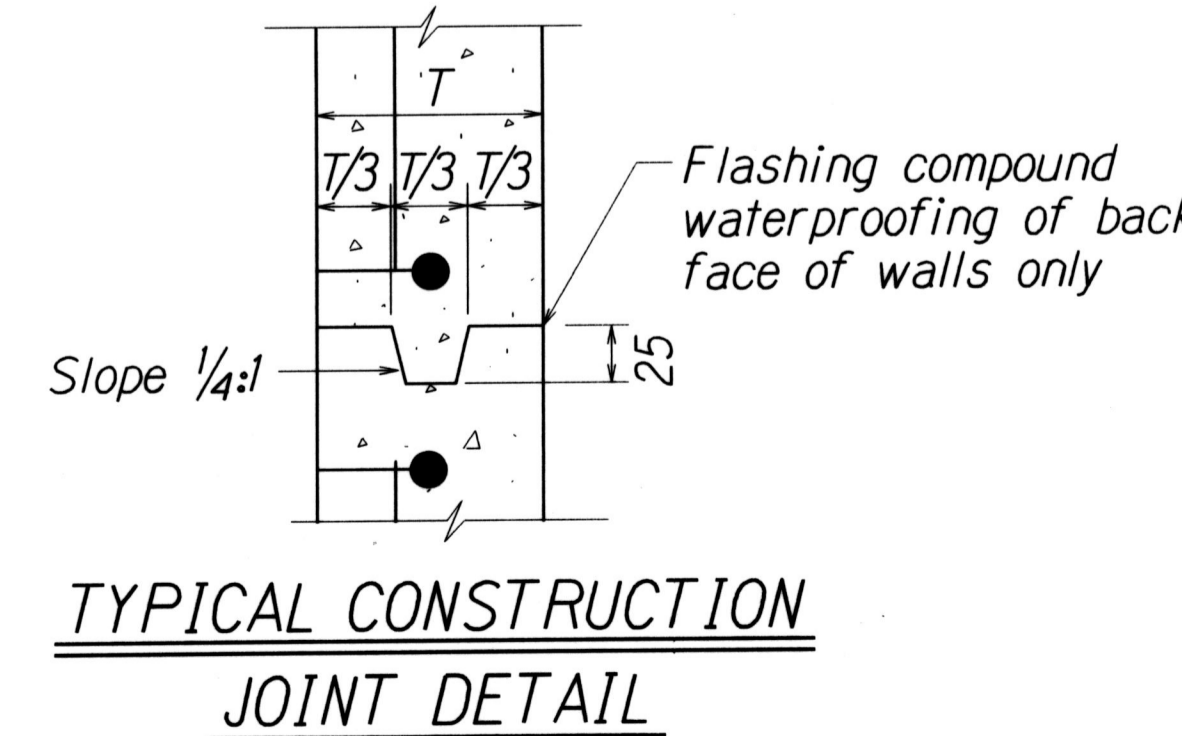


**TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS**

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



**POLYMER CONCRETE COVER**



**TYPICAL CONSTRUCTION JOINT DETAIL**

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

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**PULLBOX & COVER DETAILS**

**KALIHI STREET RESURFACING**  
Nimitz Highway to School Street  
Federal Aid Project No. STP-063-1(024)

Scale: As Shown Date: July 2017  
SHEET No. 119 OF 20 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(024)	2017	42	42

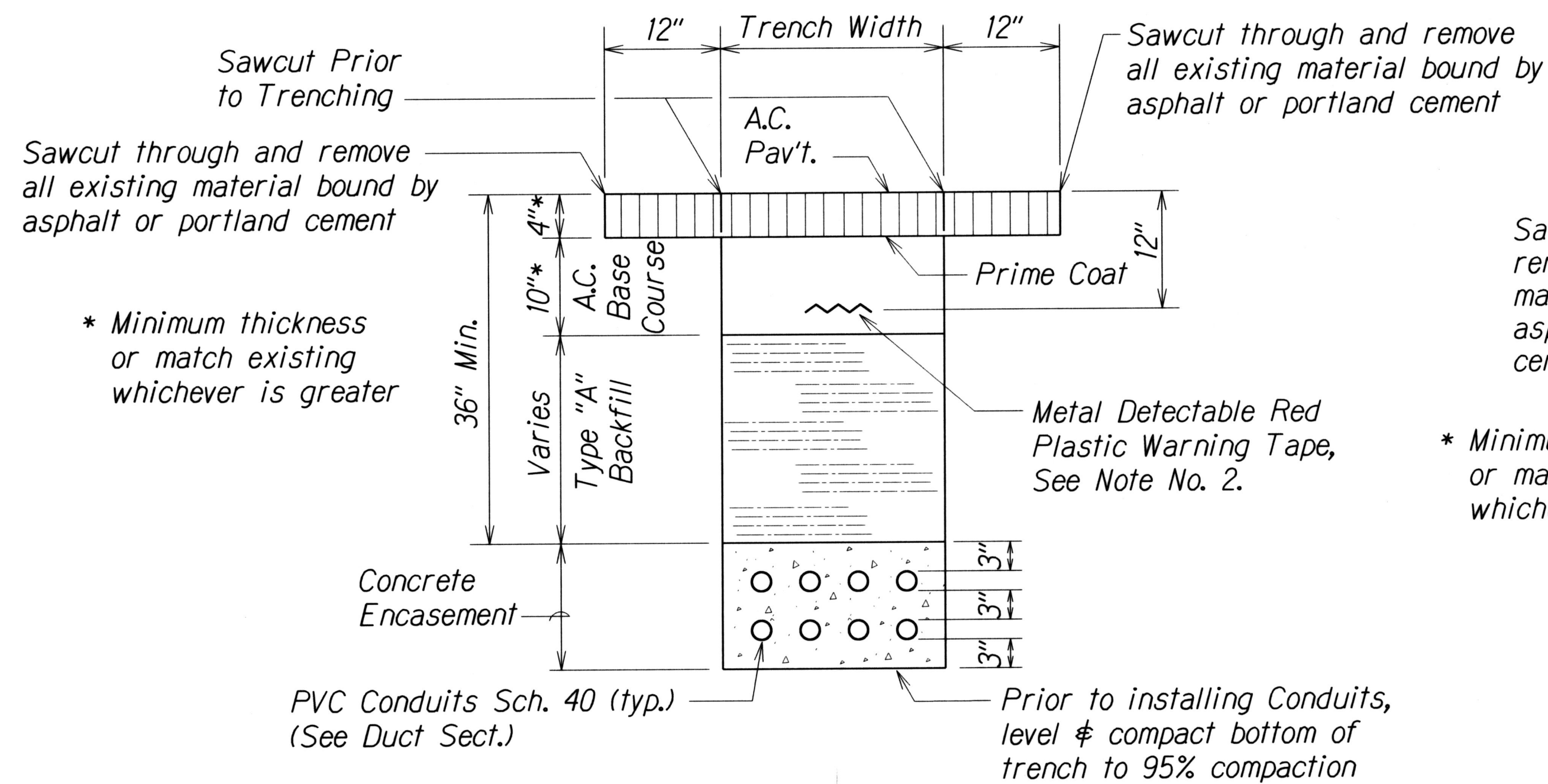
**STATE RIGHT-OF-WAY BACKFILL NOTES**

- Trench Backfill Material "A" CLSM, Earth, or Earth and Gravel. If Earth and Gravel used, the maximum shall contain not more than 50% by volume of rock particles. Maximum 8" loose fill per lift. Obtain 95% compaction for each lift.
- Concrete 3000 psi compressive strength @ 3 days.

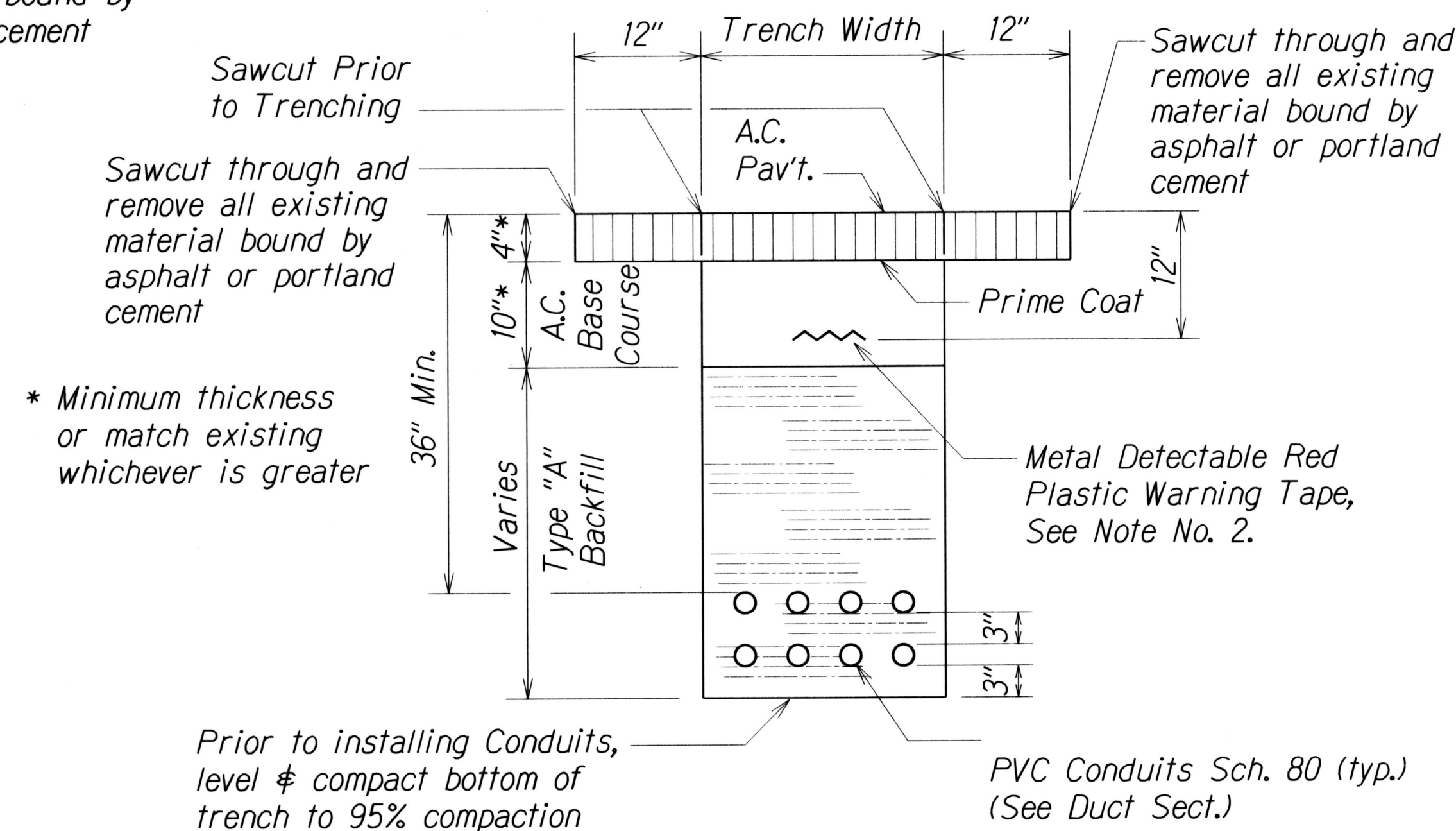
NOTE: Base Course & Sub-Base Course per 1994 State Standard Specifications for Highway Construction.

**GENERAL NOTES**

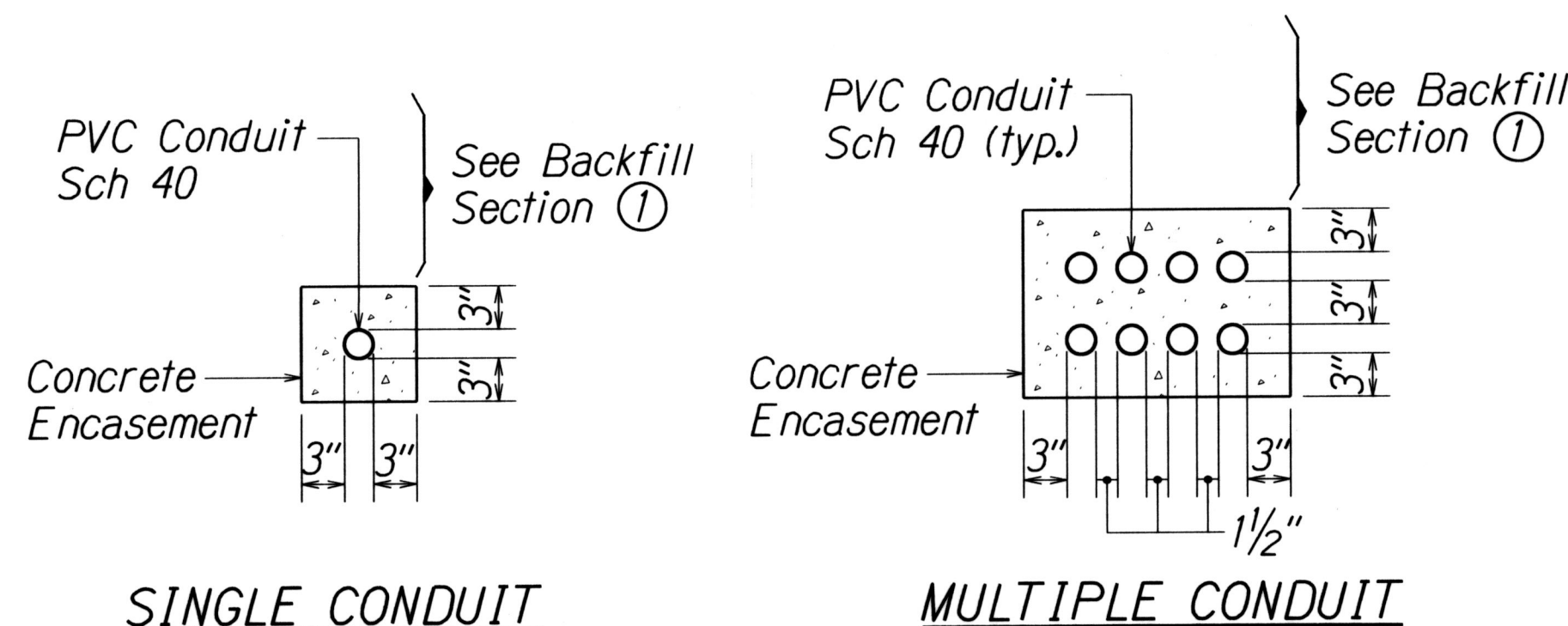
- If trench is located on unpaved area, the Contractor shall replace 10" A.C. Base Course and 4" A.C. Pavement with Type "A" backfill material.
- The Metal Detectable Red Plastic Warning Tape shall be a minimum 5 mils thick and 4" wide with a continuous metallic backing and corrosion resistant 1± mil thick foil core. The message on the tape shall read, "CAUTION - STATE TRAFFIC SIGNAL AND/OR HWY LIGHTING BURIED BELOW," utilizing 1/2 inches series "C" black lettering. The message will be repeated with a 4 1/4" spacing between top line of message and start of next repeat.
- The Contractor may begin backfilling the conduit trench when the concrete reaches 3000 psi compressive strength after 3 days.
- Maximum four (4) Conduits per row for multiple conduit duct section.
- For direct buried duct sections, the concrete jacket required at the conduit by-pass for various utilities, shall not be paid for separately but considered incidental to the direct buried conduits.
- After installing all the traffic signal cables, the Contractor shall duct seal all conduits in the pullboxes, traffic signal standards and traffic signal controller cabinet concrete base. The duct seal material shall be approved by the Traffic Signal Inspector/Engineer and shall not be paid for separately but considered incidental to the direct buried and/or concrete encased conduits.



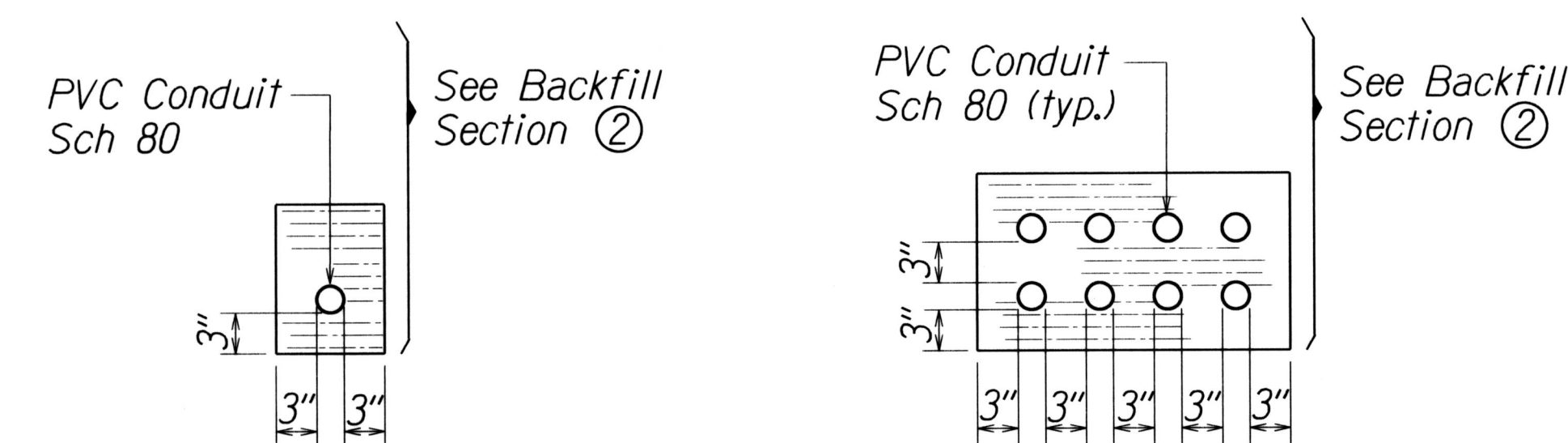
② TYPICAL BACKFILL SECTION WITH CONCRETE ENCASED DUCTS



③ TYPICAL BACKFILL SECTION DIRECT BURIED DUCTS



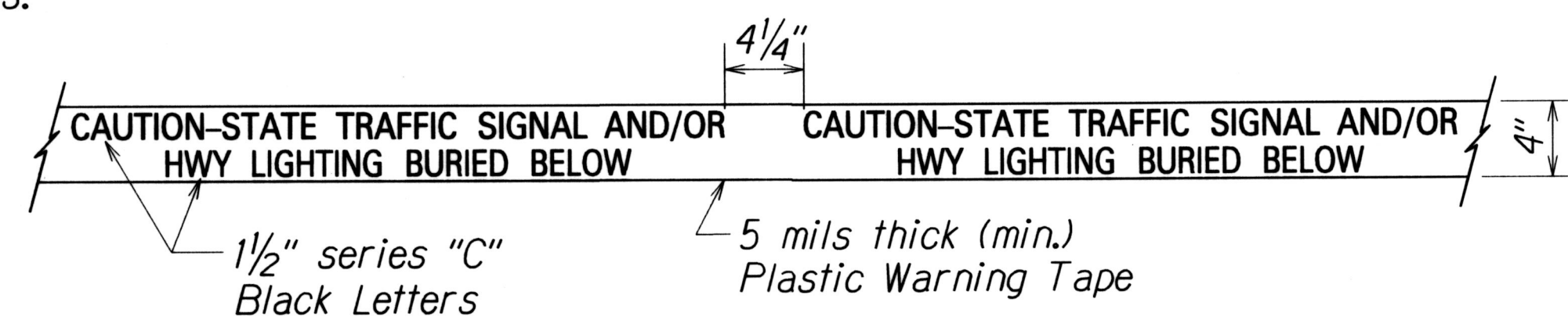
SINGLE CONDUIT MULTIPLE CONDUIT  
DUCT SECTIONS - CONC. ENCASED



SINGLE CONDUIT MULTIPLE CONDUIT  
DUCT SECTIONS - DIRECT BURIED

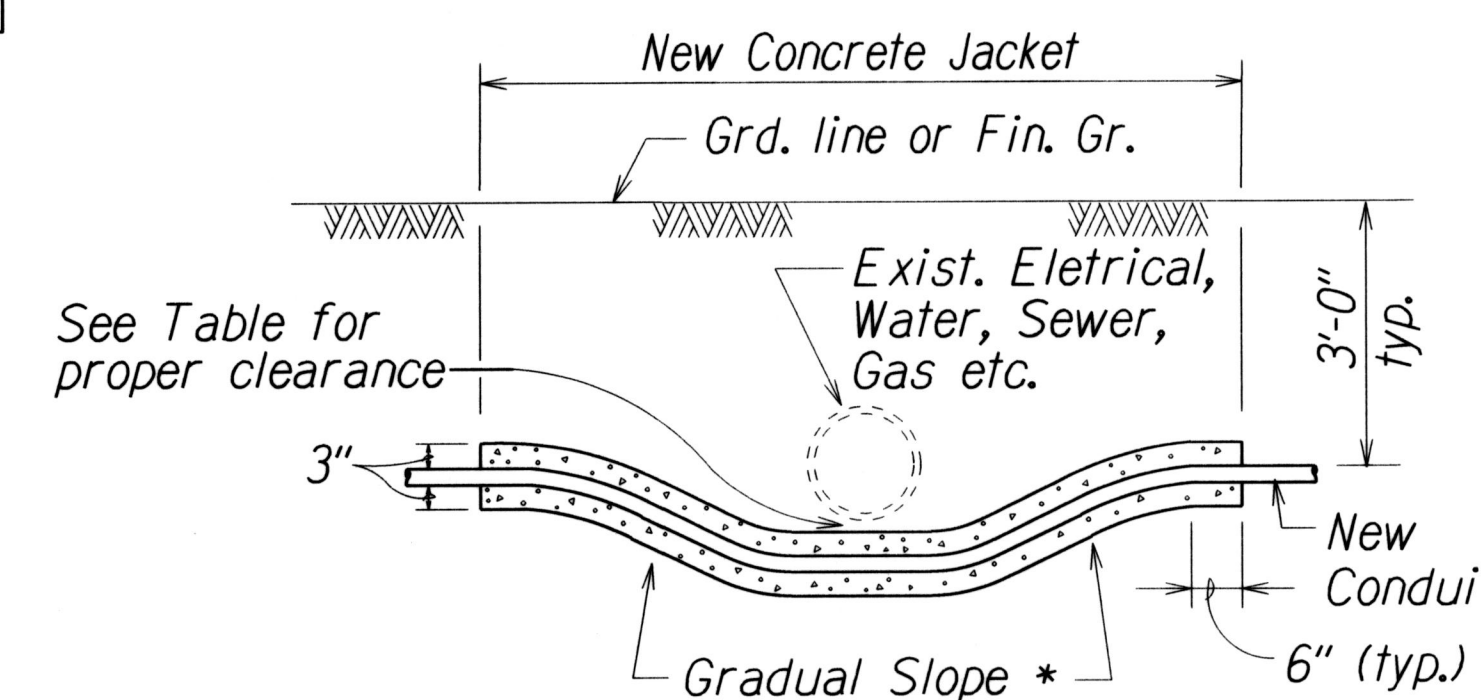
UTILITY	CLEARANCE
Water	See Note**
Sewer	24" Min. or Provide 6" Thick Reinforced Conc. Jacket
Drain	12" Min.
HECO/HTCO/CATV	3" Min.
AT&T	12" Min.

\*\*At the electrical/signal ductline water crossing, install all electrical/signal ductline elevations to maintain 6" vertical clear separation from all waterlines (12" clear for all electrical/signal ductline structures larger than 16") at no cost to the Board of Water Supply.



For additional information see note no. 2.

METAL DETECTABLE RED PLASTIC WARNING TAPE



\* To be determined by County Electrical Inspector/Engineer

CONDUIT BY-PASS DETAIL AT VARIOUS UTILITIES

Not to Scale

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**TRAFFIC SIGNAL DETAILS**

**KALIHI STREET RESURFACING**  
Nimitz Highway to School Street  
Federal Aid Project No. STP-063-1(024)

Scale: As Shown Date: July 2017  
SHEET No. T20 OF 20 SHEETS