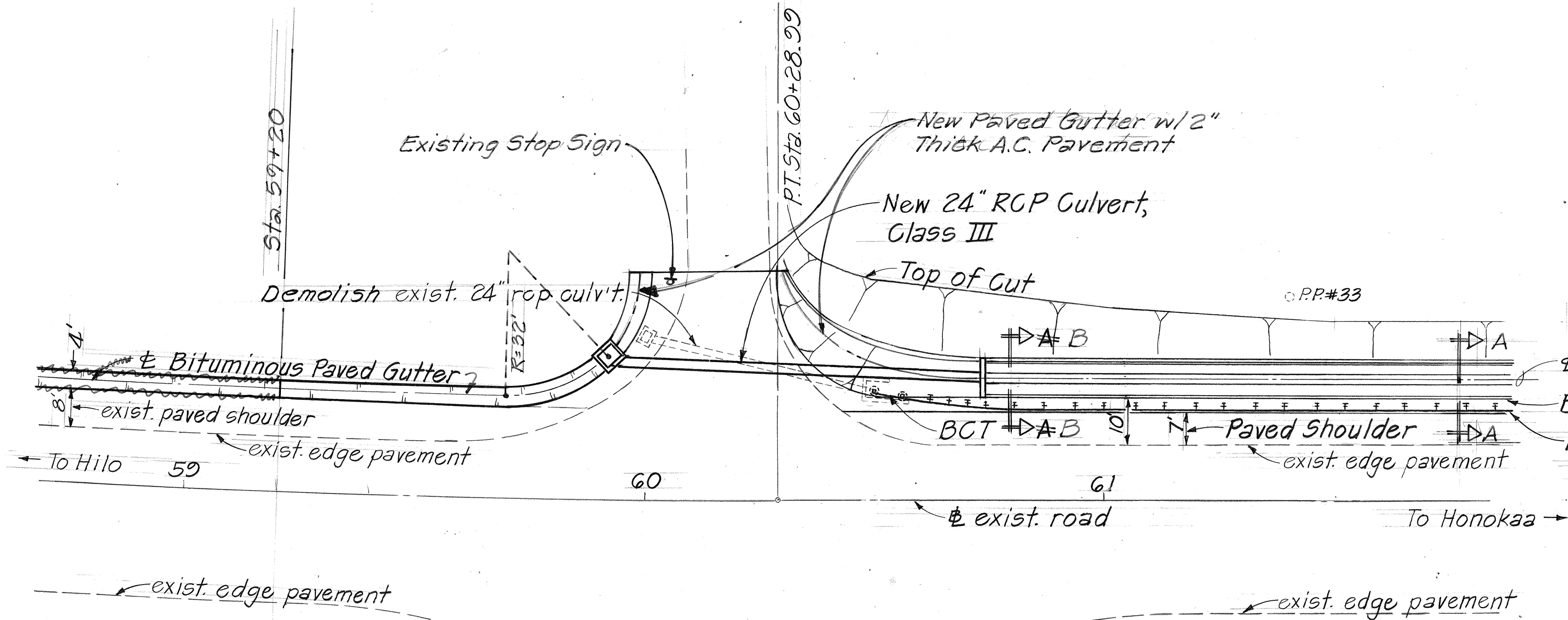
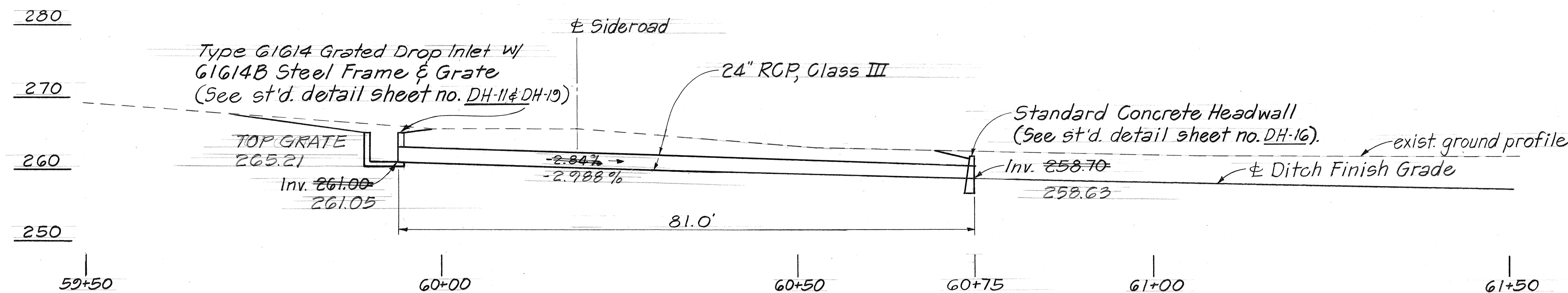


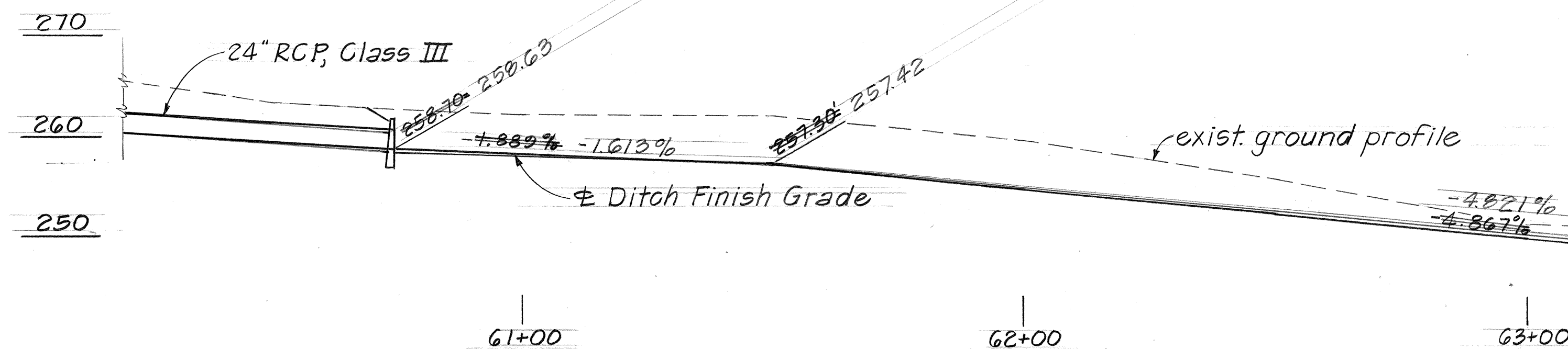
| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|-----------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 19J-02-85 | 1986        | 8         | 54           |



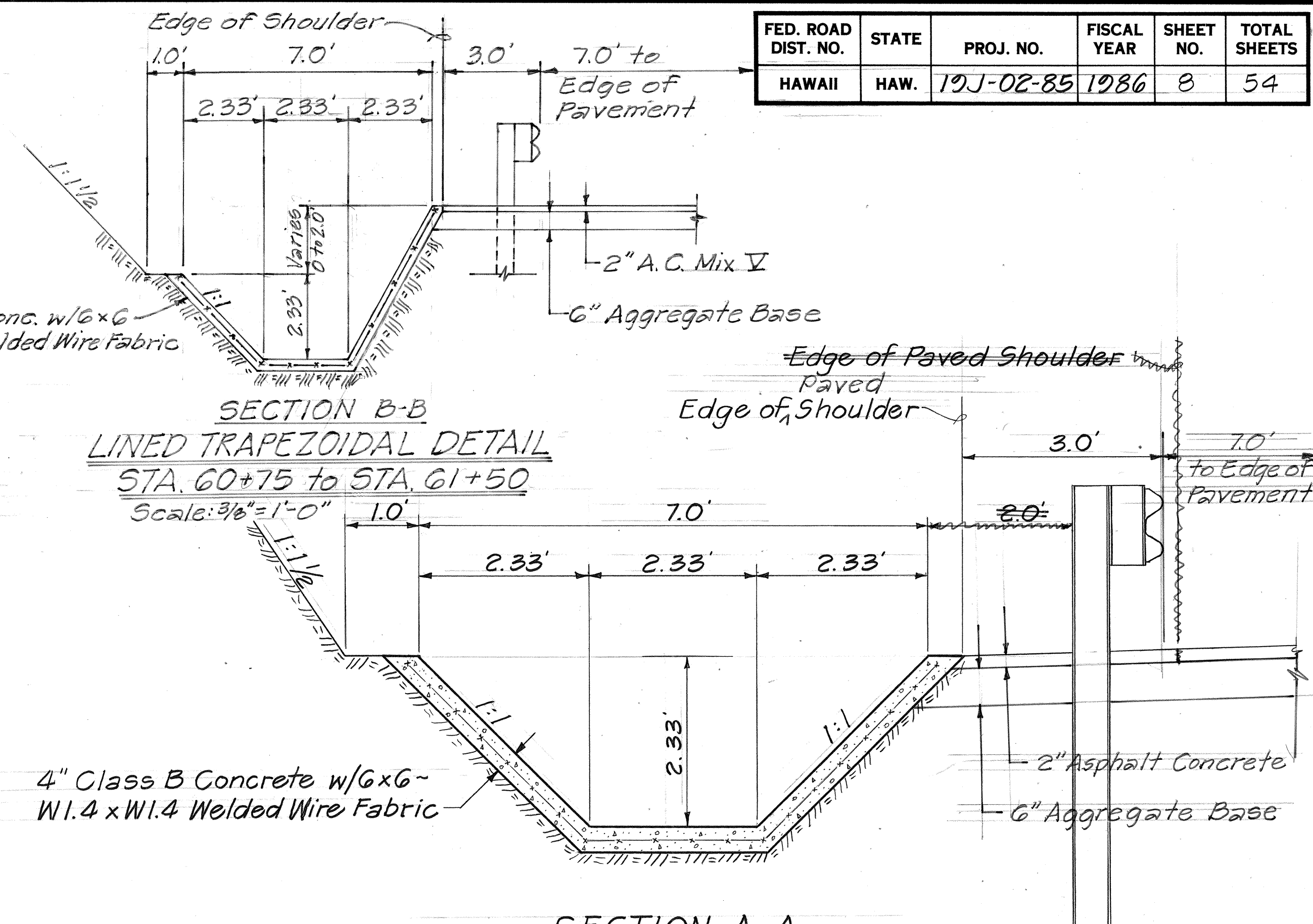
**PLAN**  
Scale: 1" = 20'



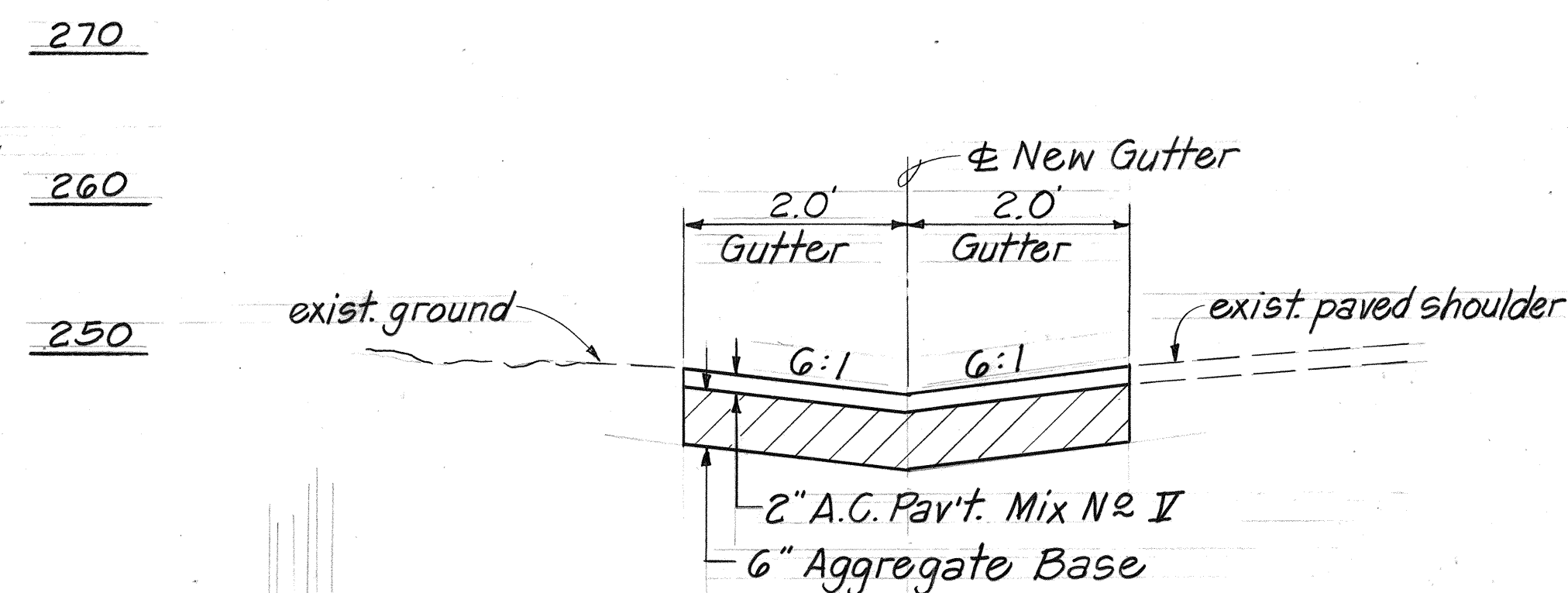
**PROFILE @ CULVERT**  
Scale: Hor. 1" = 10'  
Ver. 1" = 10'



**PROFILE FOR DRAINAGE DITCH**  
STA. 60+60 LT. ~ STA. 64+50 LT.  
Scale: Hor. 1" = 20'  
Ver. 1" = 10'



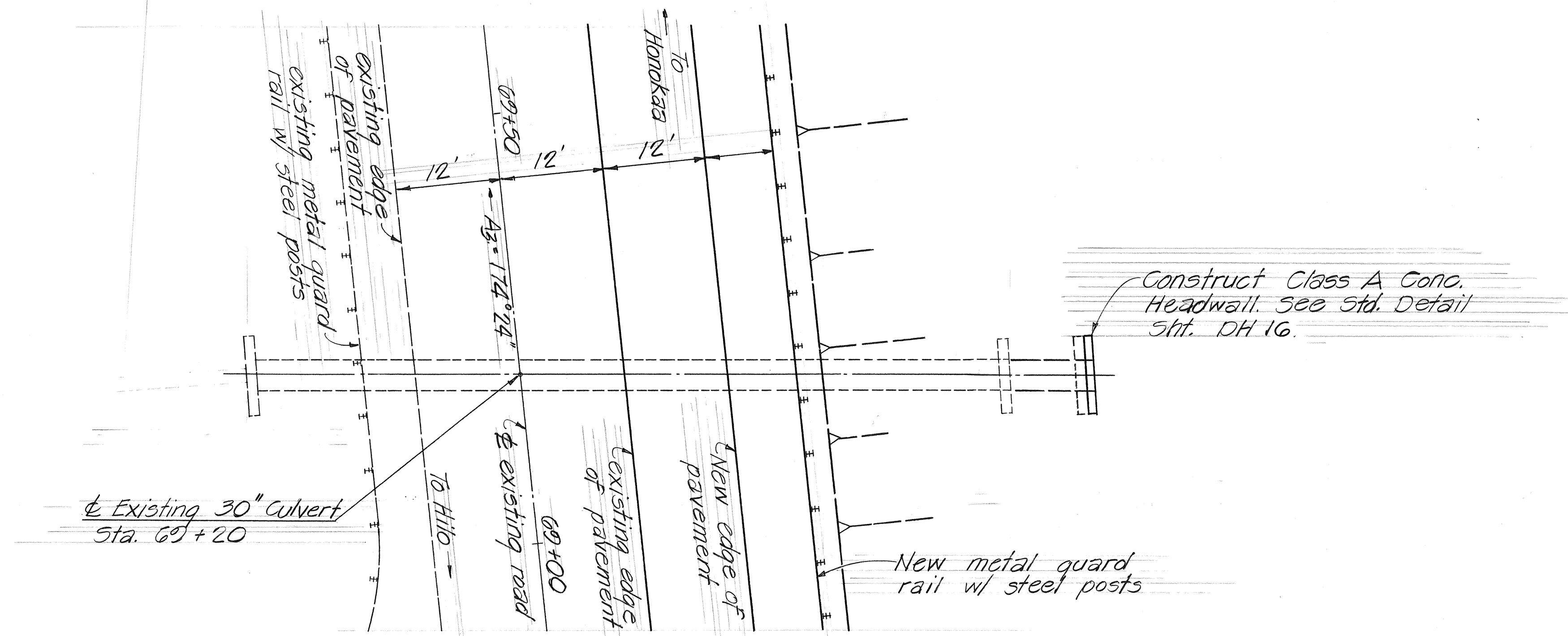
**SECTION A-A**  
**LINED TRAPEZOIDAL DITCH DETAIL ~ STA. 61+50 to 64+70**  
Scale: 3/4" = 1'-0"



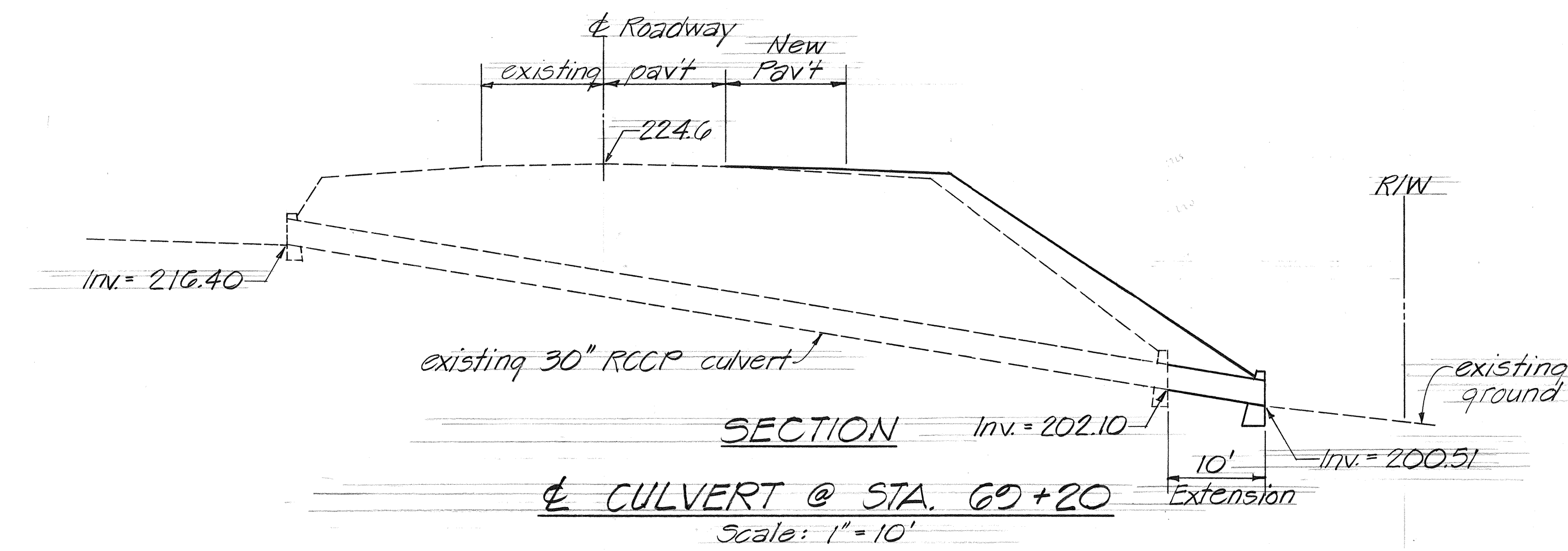
**TYPICAL SECTION**  
**PAVED GUTTERS**  
NOT TO SCALE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**DETAILS OF 36" RCP CULVERT**  
**AT STA. 60+18 LT.**  
HAWAII BELT ROAD  
TRUCK CLIMBING LANES AT PEPEKEO, UHI  
PROJECT NO. 19J-02-85  
Scale: As Noted Date: Nov, 1985  
SHEET NO. OF SHEETS

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|-----------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 19J-02-85 | 1986        | 9         | 54           |



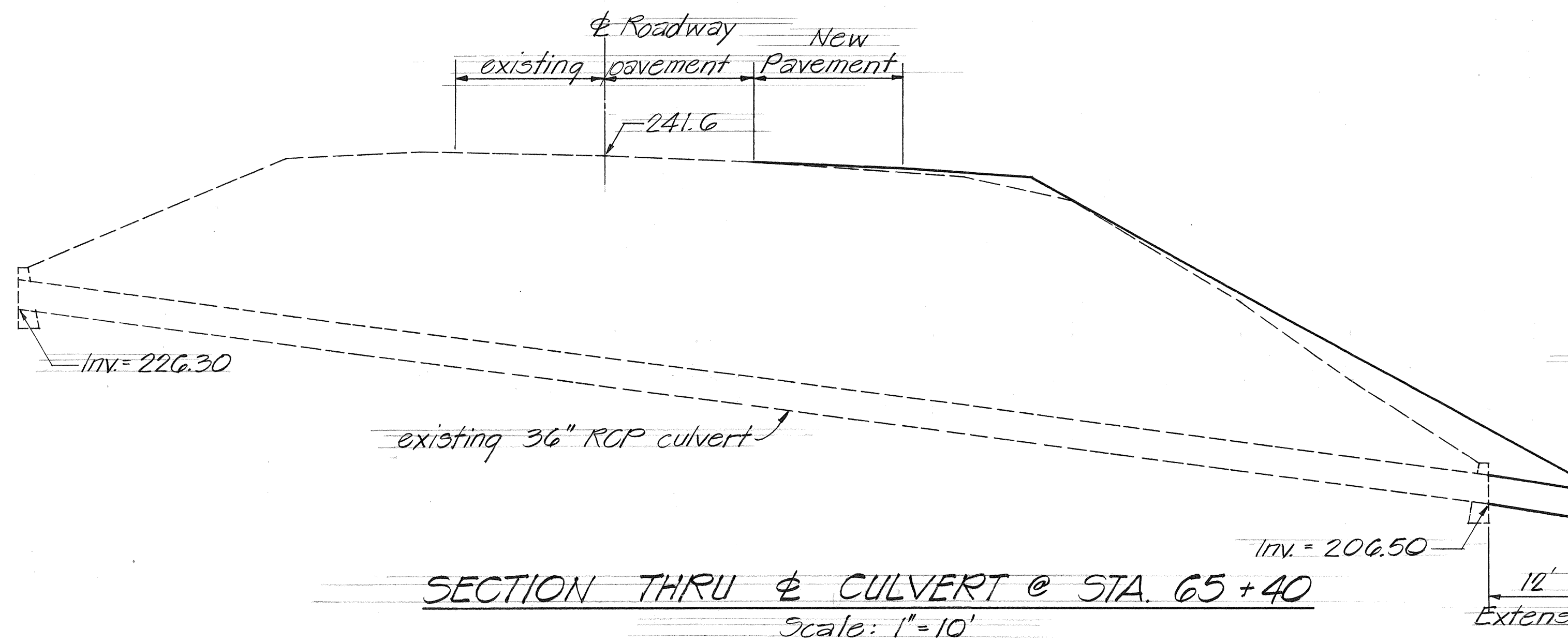
PLAN



SECTION

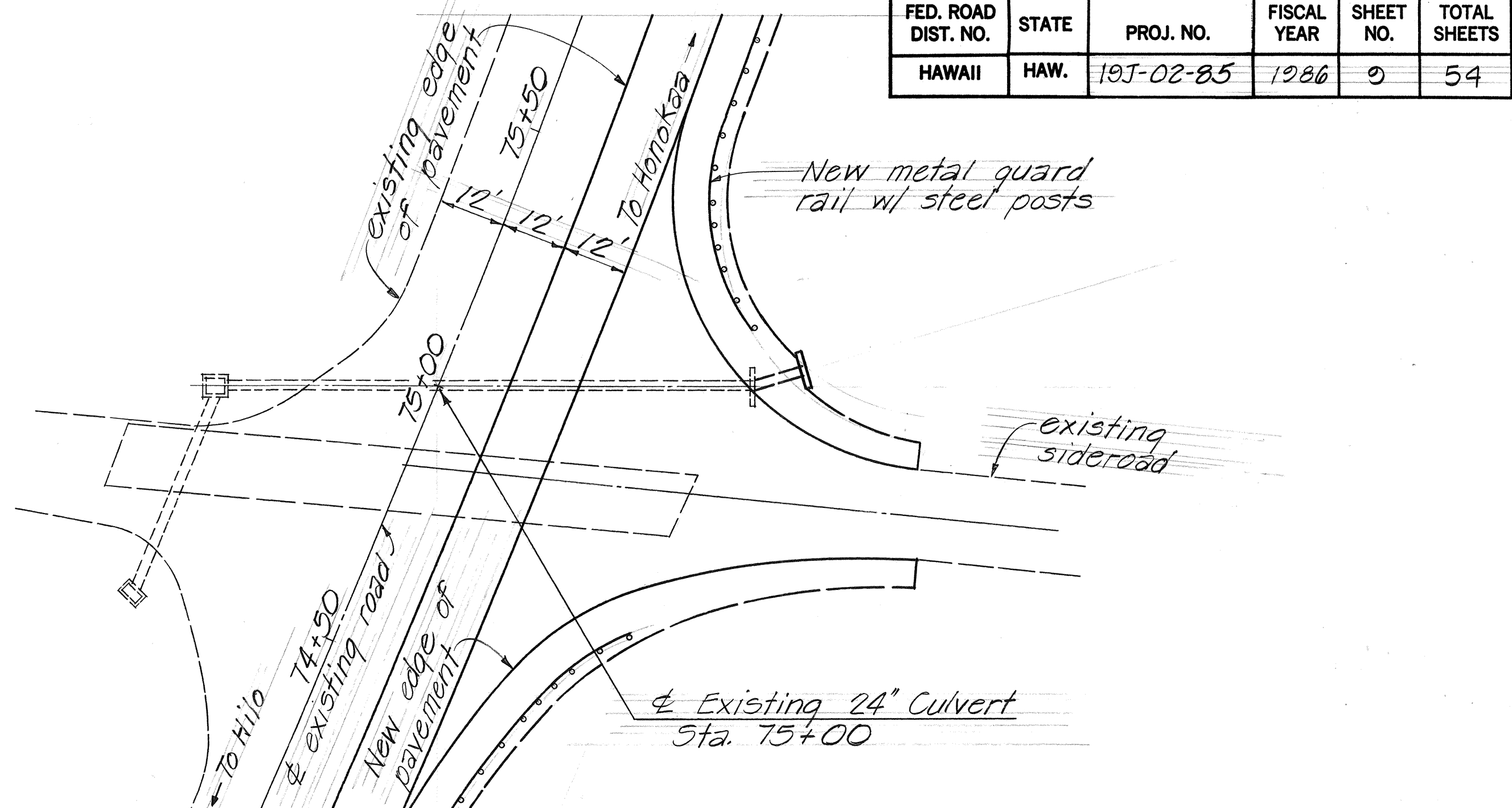
¢ CULVERT @ STA. 65+20

Scale: 1" = 10'



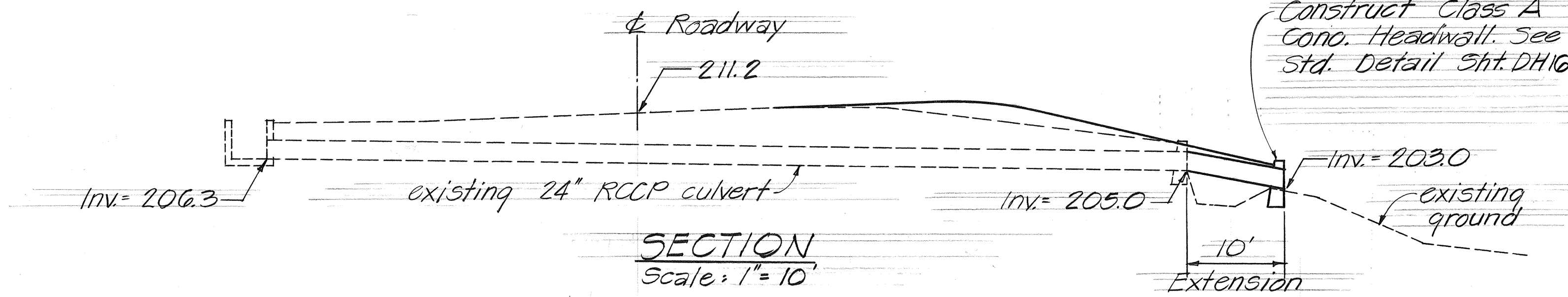
SECTION THRU ¢ CULVERT @ STA. 65+40

Scale: 1" = 10'



PLAN

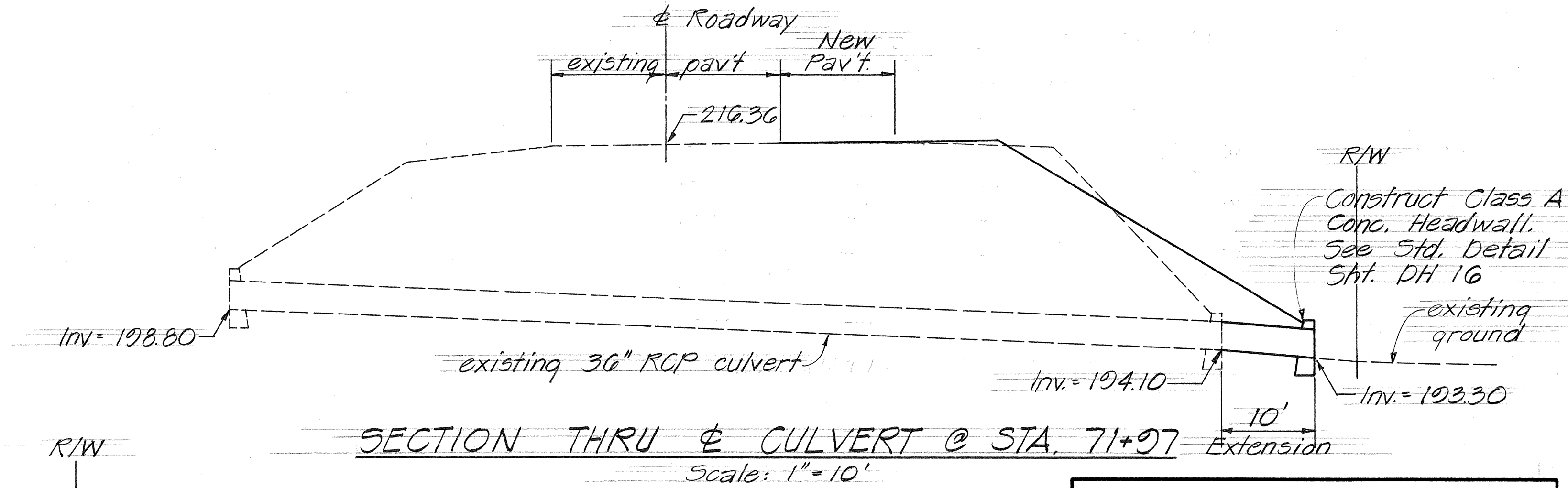
Scale: 1" = 20'



SECTION

Scale: 1" = 10'

¢ CULVERT @ STA. 75+00



SECTION THRU ¢ CULVERT @ STA. 71+97

Scale: 1" = 10'

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION

**PIPE CULVERT DETAILS**

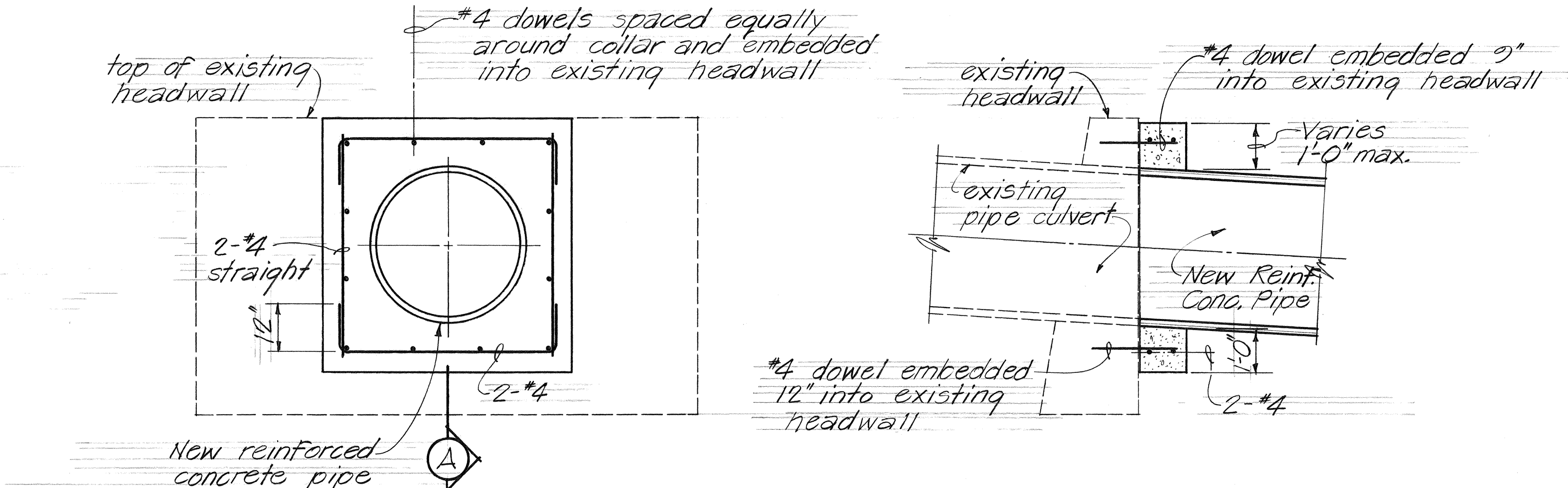
HAWAII BELT ROAD  
TRUCK CLIMBING LANES AT PEPEKEO, UHI

PROJECT NO. 19J-02-85

Scale: As Noted Date: Jan. 1985

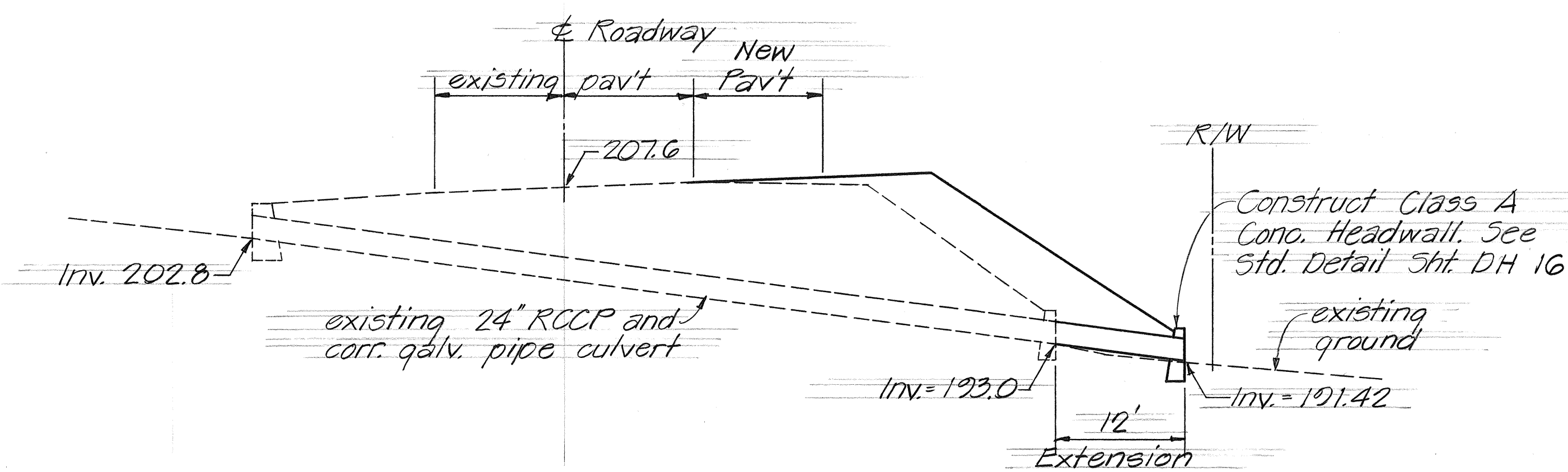
SHEET NO. OF SHEETS

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|-----------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 19J-02-85 | 1986        | 10        | 54           |

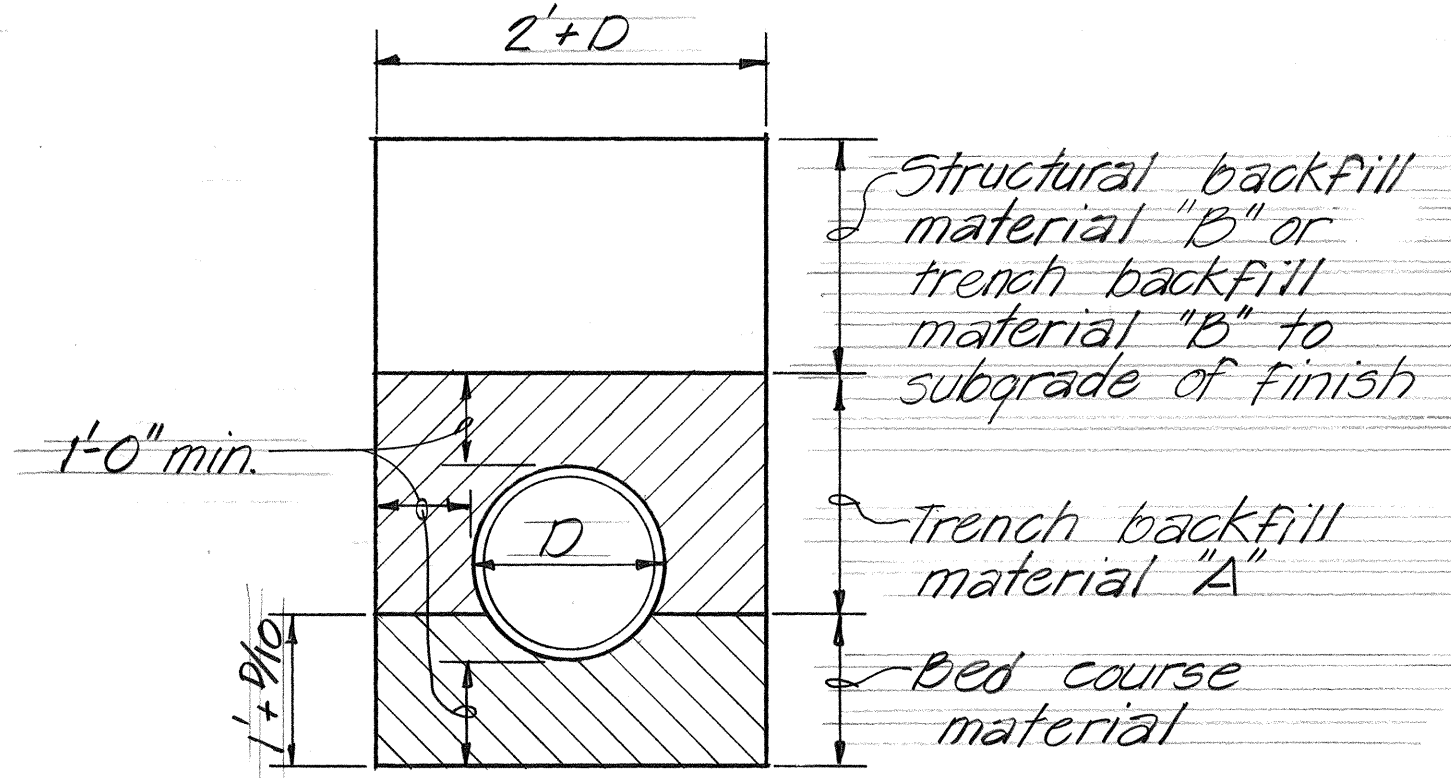


ELEVATION SECTION A

REINFORCED CONCRETE COLLAR DETAIL  
Not to Scale



SECTION THRU  $\phi$  CULVERT @ STA. 79+00  
Scale: 1"=10'



TYPICAL SECTION OF TRENCH BACKFILL MATERIAL  
Not to Scale

ESTIMATED QUATITIES

| DRAINAGE FACILITY | STATION     | DESCRIPTION | Structure Excavation | Ditch and Channel Excavation | Class "A" Concrete | Reinforcing Steel | Bed Course Material | 24-Inch Reinf. Conc. Pipe, Class III | 30-Inch Reinf. Conc. Pipe, Class III | 36-Inch Reinf. Conc. Pipe, Class III | Grouted Rubble Slope Protection |
|-------------------|-------------|-------------|----------------------|------------------------------|--------------------|-------------------|---------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------|
|                   |             |             | C.Y.                 | C.Y.                         | C.Y.               | Lb.               | C.Y.                | L.F.                                 | L.F.                                 | L.F.                                 | C.Y.                            |
| A                 | 60 + 18 Lt. |             | 64.2                 |                              | 2.2                | 321               | 12.4                | 66.0                                 |                                      |                                      | 7.2                             |
| B                 | 65 + 40 Rt. |             | 16.5                 |                              | 3.8                | 110               | 2.3                 |                                      |                                      | 12.0                                 |                                 |
| C                 | 69 + 20 Rt. |             | 12.9                 |                              | 3.1                | 100               | 1.6                 |                                      | 100                                  |                                      |                                 |
| D                 | 71 + 27 Rt. |             | 14.3                 |                              | 3.8                | 110               | 1.8                 |                                      |                                      | 100                                  |                                 |
| E                 | 75 + 00 Rt. |             | 9.6                  |                              | 2.3                | 80                | 1.9                 | 100                                  |                                      |                                      |                                 |
| F                 | 79 + 00 Rt. |             | 11.1                 |                              | 2.3                | 80                | 2.3                 | 12.0                                 |                                      |                                      |                                 |
|                   |             |             |                      |                              |                    |                   |                     |                                      |                                      |                                      |                                 |
|                   |             |             |                      |                              |                    |                   |                     |                                      |                                      |                                      |                                 |
|                   |             |             |                      |                              |                    |                   |                     |                                      |                                      |                                      |                                 |
| TOTALS            |             |             | 128.6                |                              | 38.2               | 801               | 22.3                | 88.0                                 | 100.0                                | 22.0                                 | 7.2                             |

|               |                   |      |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| DESIGNED BY   | DRAWN BY          |      |
| NOTED BY      | CHECKED BY        |      |
| NO.           |                   |      |

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION

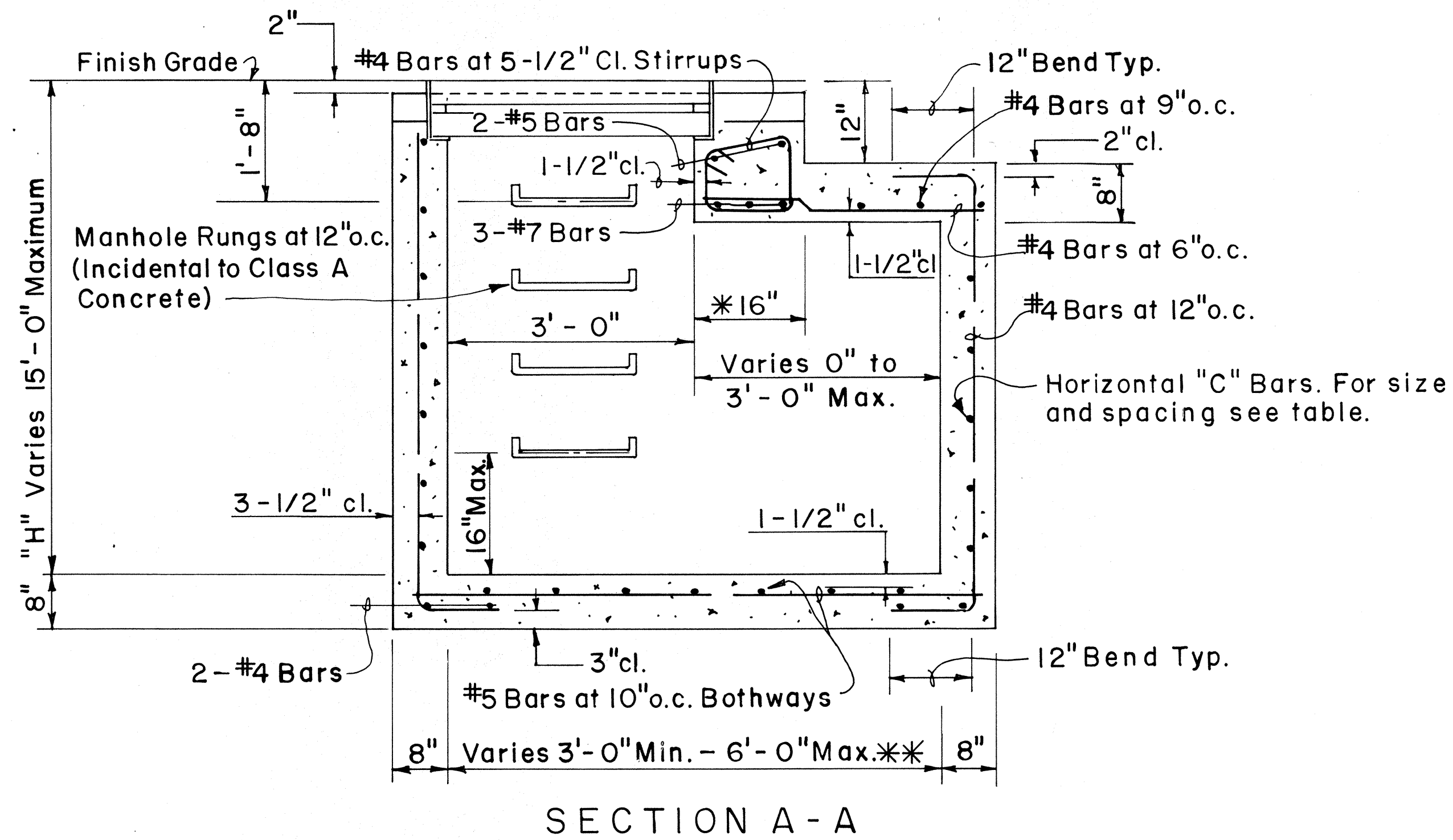
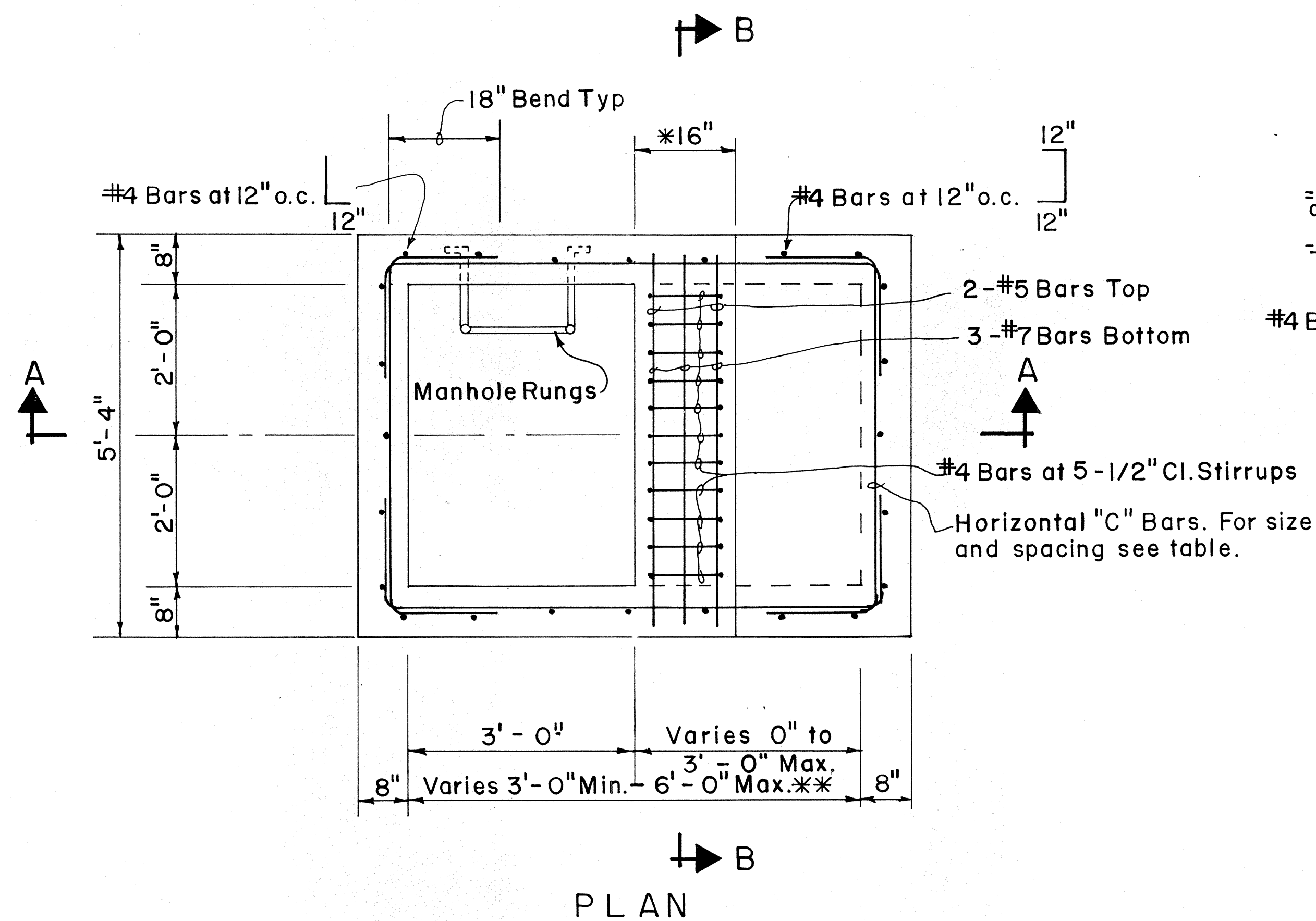
PIPE CULVERT DETAILS

HAWAII BELT ROAD  
TRUCK CLIMBING LANES AT PEPEKEO, VIII  
PROJECT NO. 19J-02-85

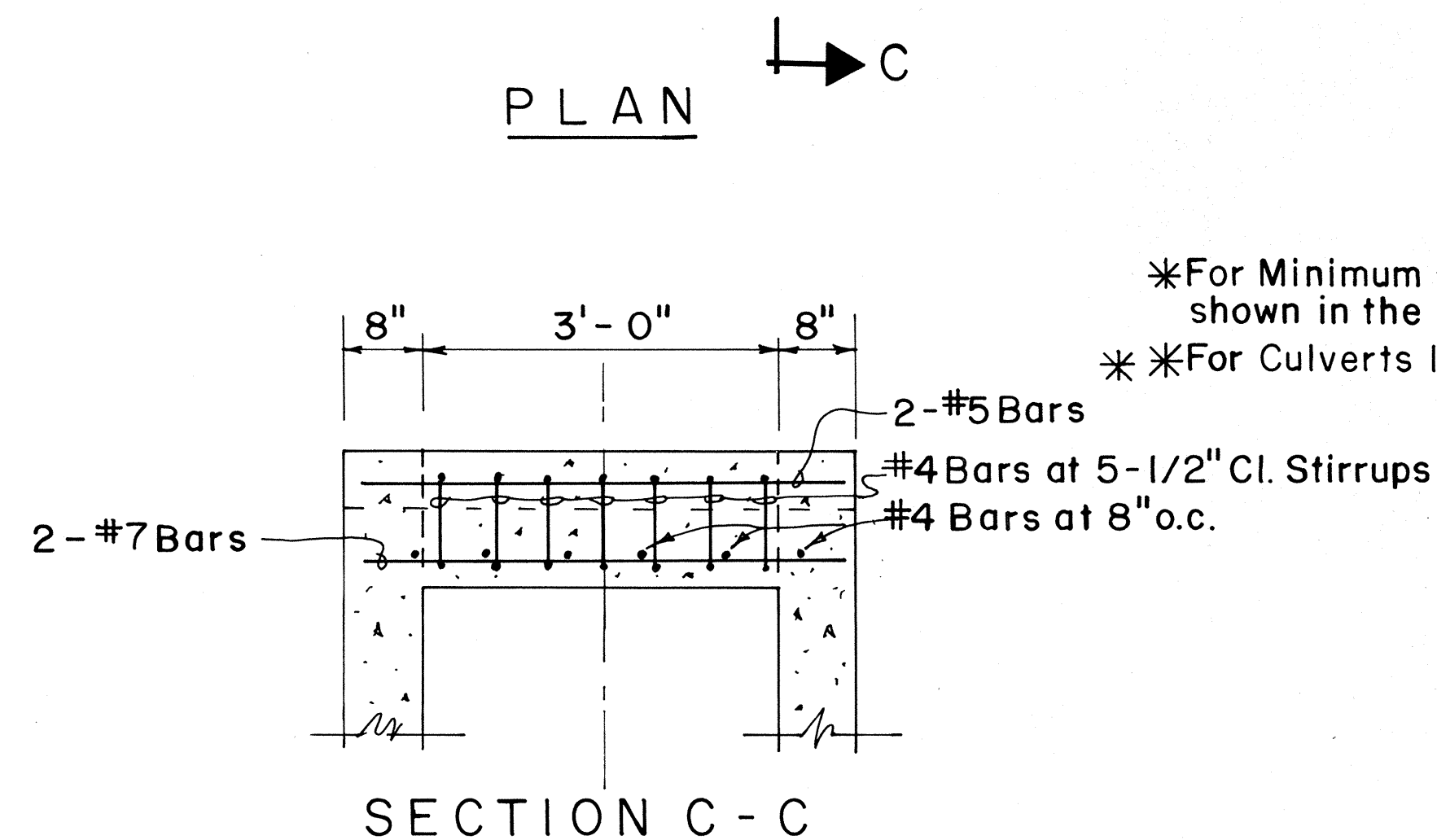
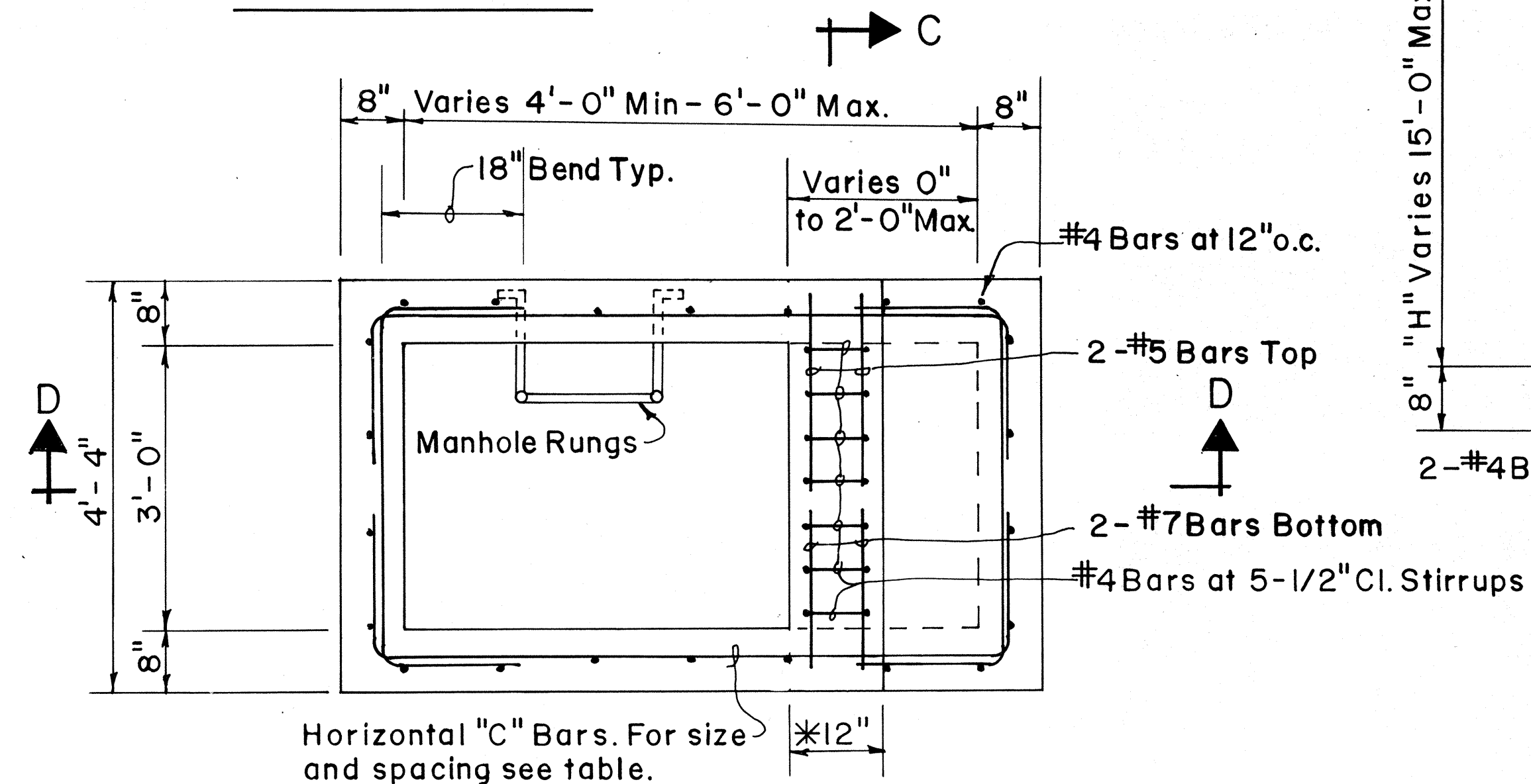
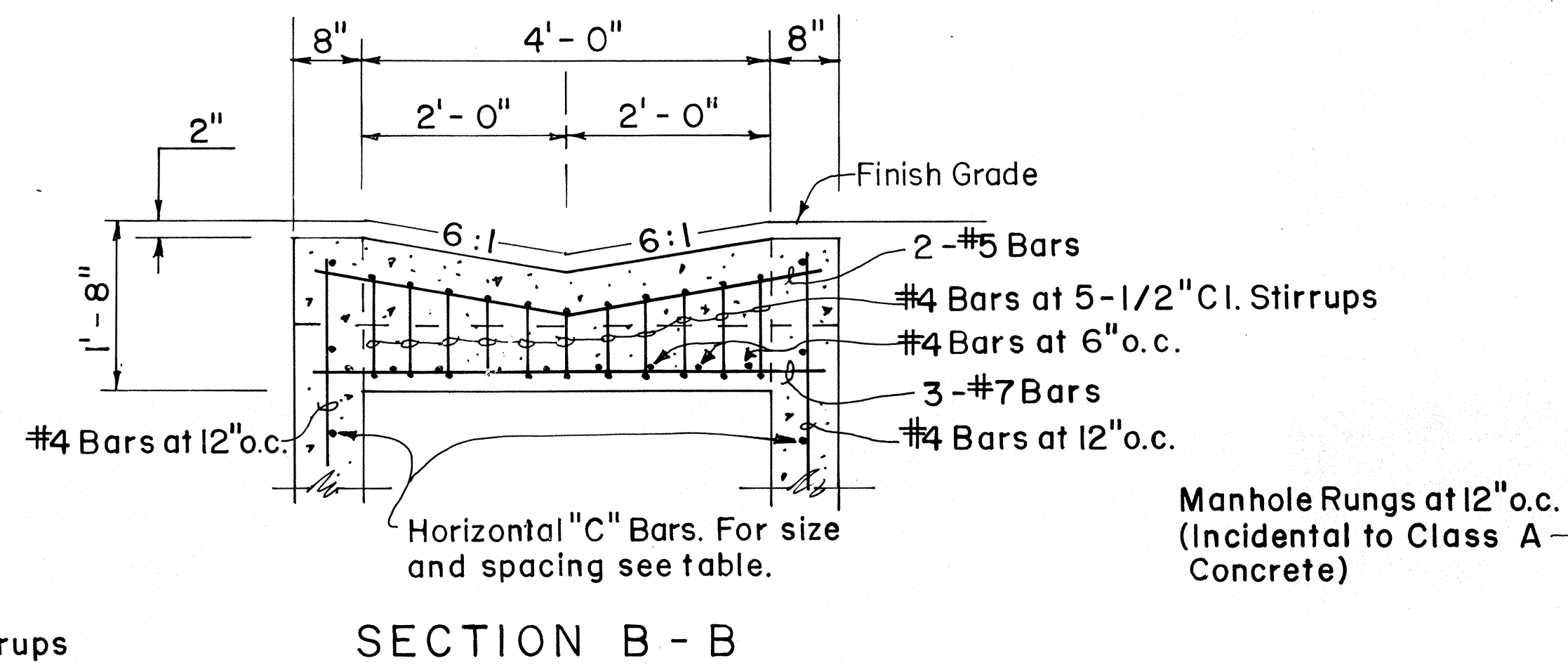
Scale: As Noted Date: Jan. 1985

SHEET NO. 2 OF SHEETS

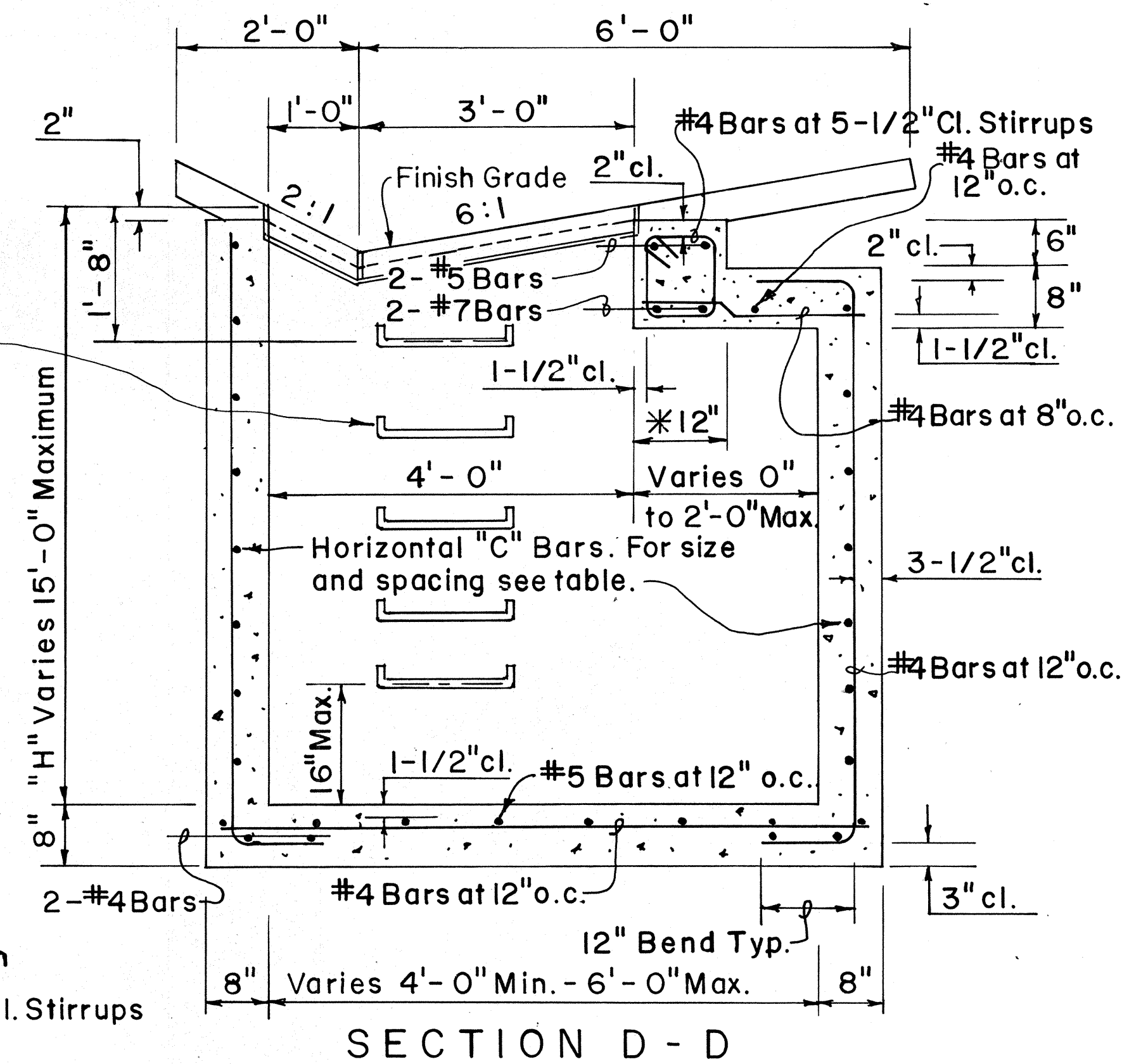
| FED. ROAD DIST. NO. | STATE | FED-AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|-------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 101-02-85         | 1986        | 11        | 54           |



TYPE 61614 GRATED DROP INLET



TYPE 61214 GRATED DROP INLET



| "H"         | "C" BARS       |
|-------------|----------------|
| 5'-0" Max.  | #4 at 10" o.c. |
| 10'-0" Max. | #5 at 9" o.c.  |
| 15'-0" Max. | #5 at 6" o.c.  |

\*For Minimum size box, eliminate beam and use typical wall and wall reinforcing shown in the top portion.  
 \*\*For Culverts larger than 30", the minimum dimension shall be D'.

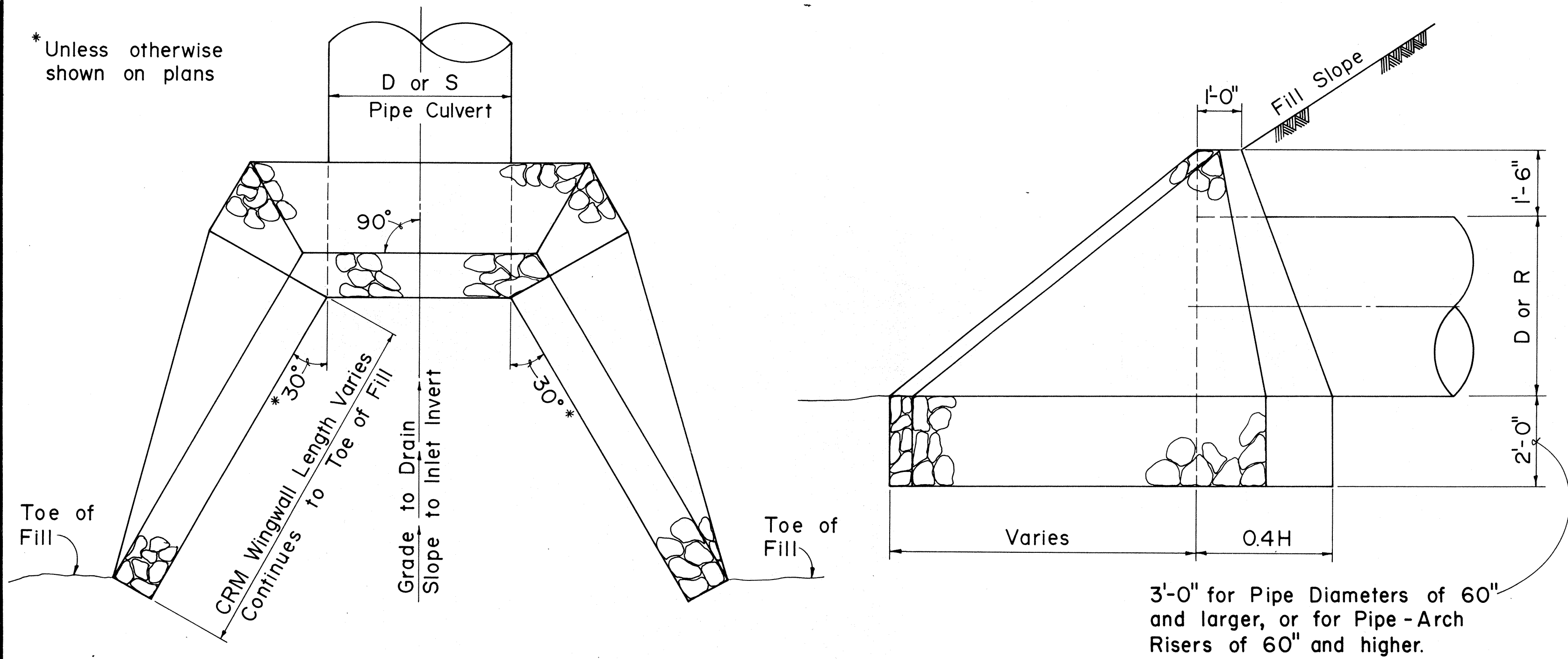
APPROVAL RECOMMENDED:  
 HYDRAULIC DESIGN ENGINEER DATE 10-4-85  
 APPROVED:  
 ASSISTANT CHIEF, ENGINEERING DATE 10-7-85

| NO. | REVISION | APPROVED BY | DATE |
|-----|----------|-------------|------|
|     |          |             |      |

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION  
 STANDARD DETAILS  
 TYPE 61614 & 61214  
 GRATED DROP INLET  
 Not to Scale Sept, 1985  
 SHEET NO. OF SHEETS DH11

|               |      |
|---------------|------|
| ORIGINAL PLAN | DATE |
| DRAWN BY      |      |
| DESIGNED BY   |      |
| CHECKED BY    |      |
| NO.           |      |

| FED. ROAD DIST. NO. | STATE | FED. PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|----------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 101-0285       | 1986        | 12        | 54           |

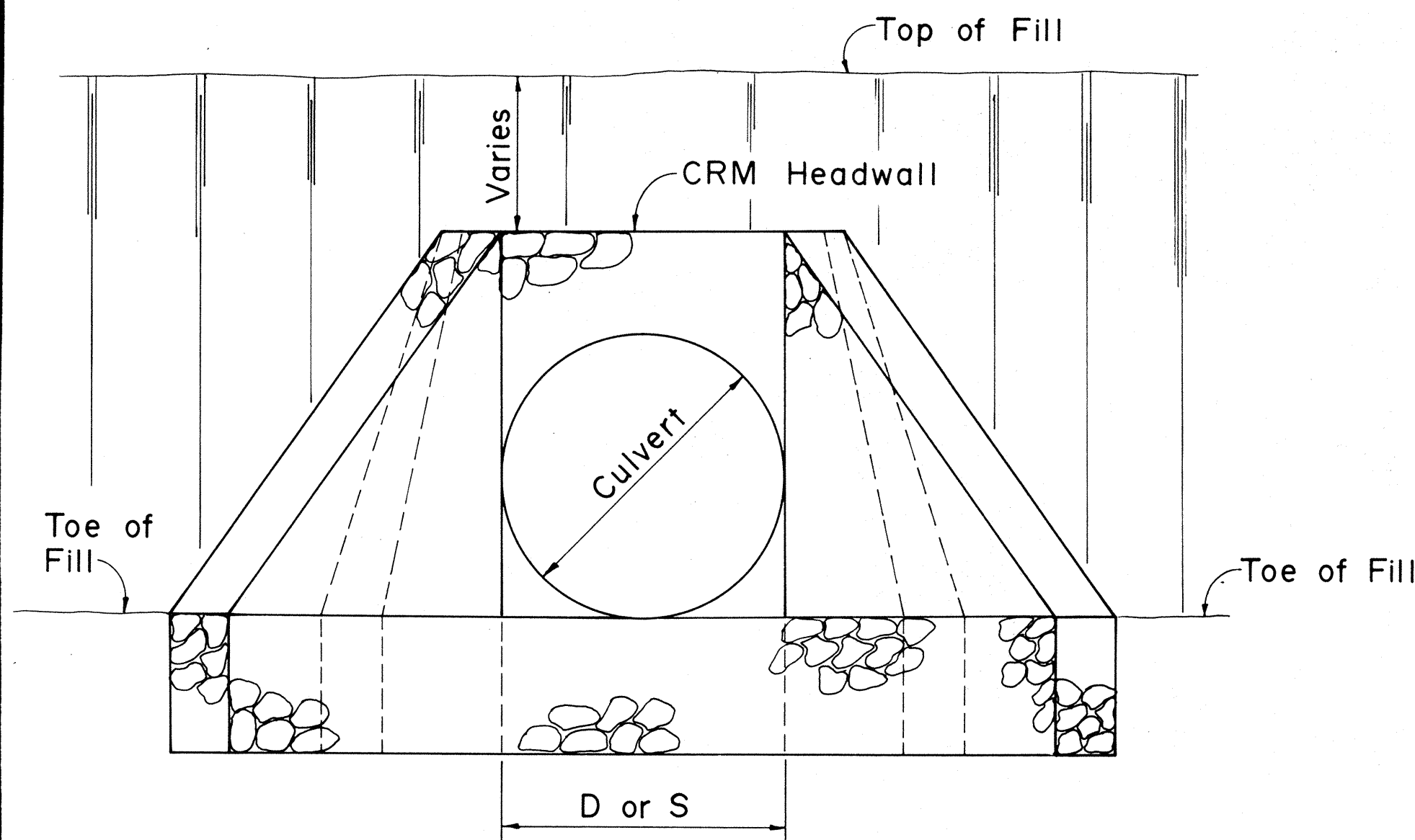


PLAN

SIDE ELEVATION

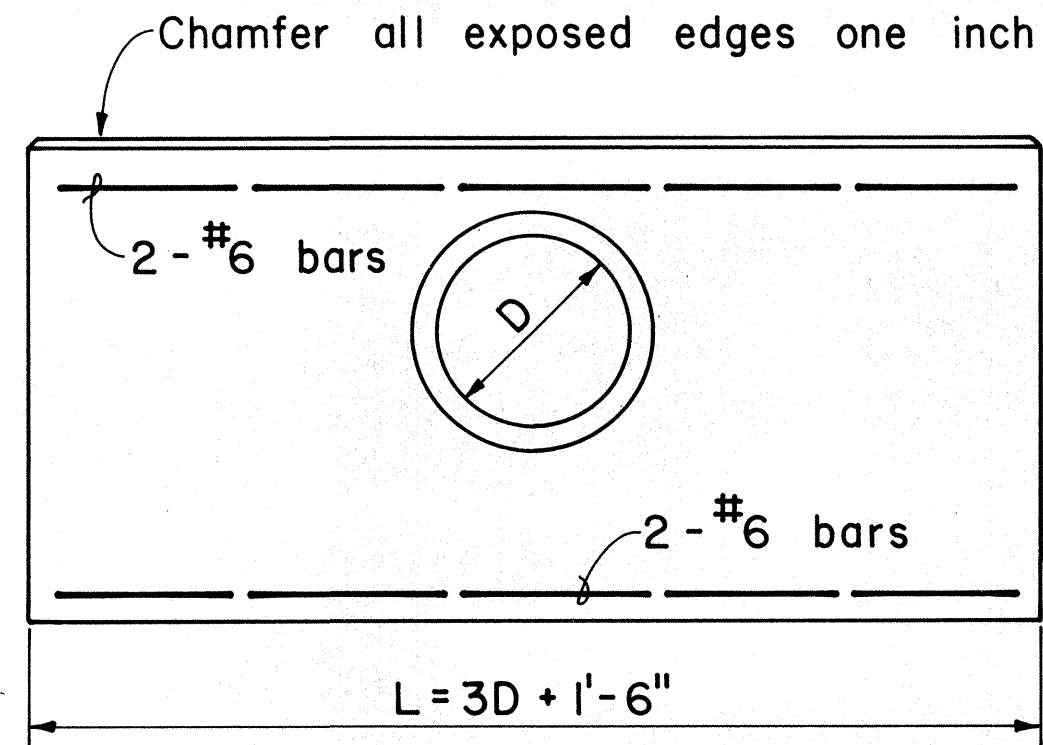
NOTE:

D = Diameter of Pipe Culvert  
R = Rise of Pipe-Arch Culvert  
S = Span of Pipe Arch Culvert

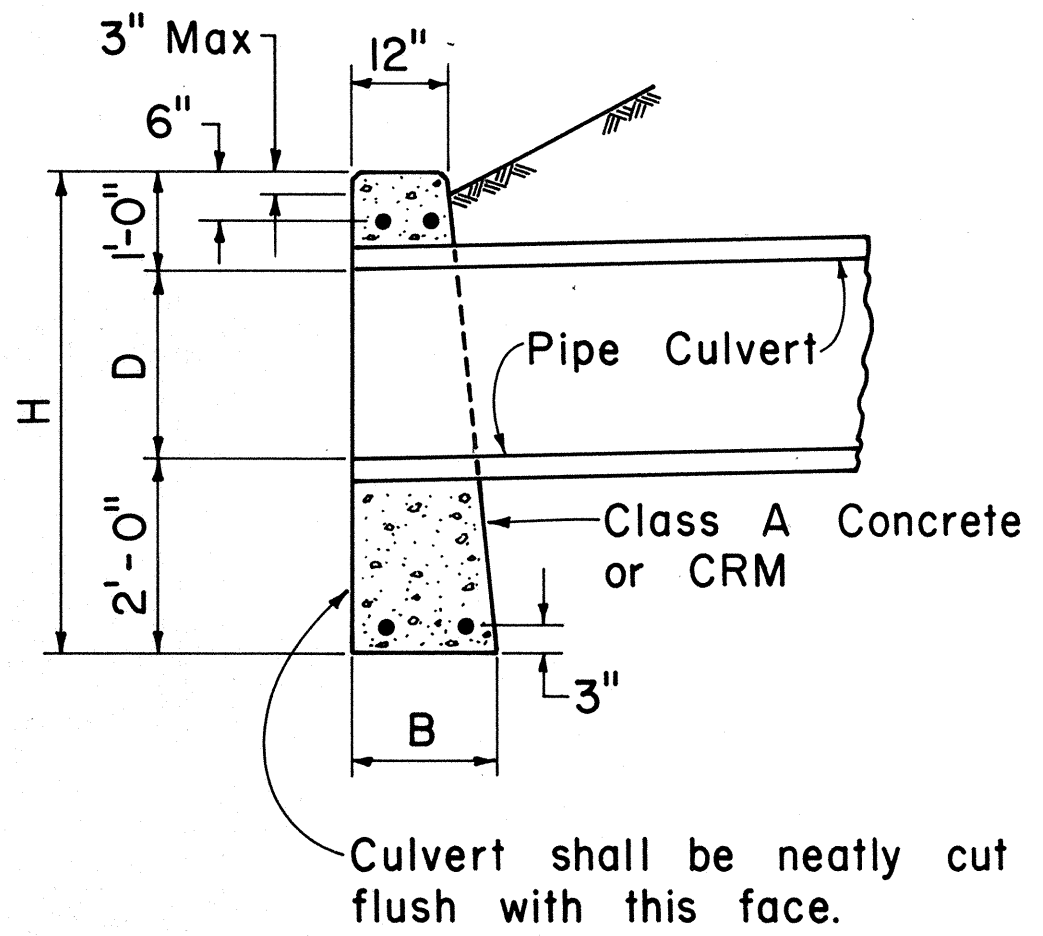


FRONT ELEVATION

CEMENT RUBBLE MASONRY STRUCTURE



ELEVATION



SECTION

| DATA FOR CONC. HDWL. |       |        |       |
|----------------------|-------|--------|-------|
| D                    | B     | L      | H     |
| 18"                  | 1'-6" | 6'-0"  | 4'-6" |
| 24"                  | 1'-6" | 7'-6"  | 5'-0" |
| 30"                  | 2'-0" | 9'-0"  | 5'-6" |
| 36"                  | 2'-0" | 10'-6" | 6'-0" |
| 42"                  | 2'-6" | 12'-0" | 6'-6" |
| 48"                  | 2'-6" | 13'-6" | 7'-0" |

| DATA FOR CRM HDWL. |       |        |       |
|--------------------|-------|--------|-------|
| D                  | B     | L      | H     |
| 18"                | 1'-9" | 6'-0"  | 4'-6" |
| 24"                | 2'-0" | 7'-6"  | 5'-0" |
| 30"                | 2'-3" | 9'-0"  | 5'-6" |
| 36"                | 2'-6" | 10'-6" | 6'-0" |

CONCRETE OR CRM HEADWALL

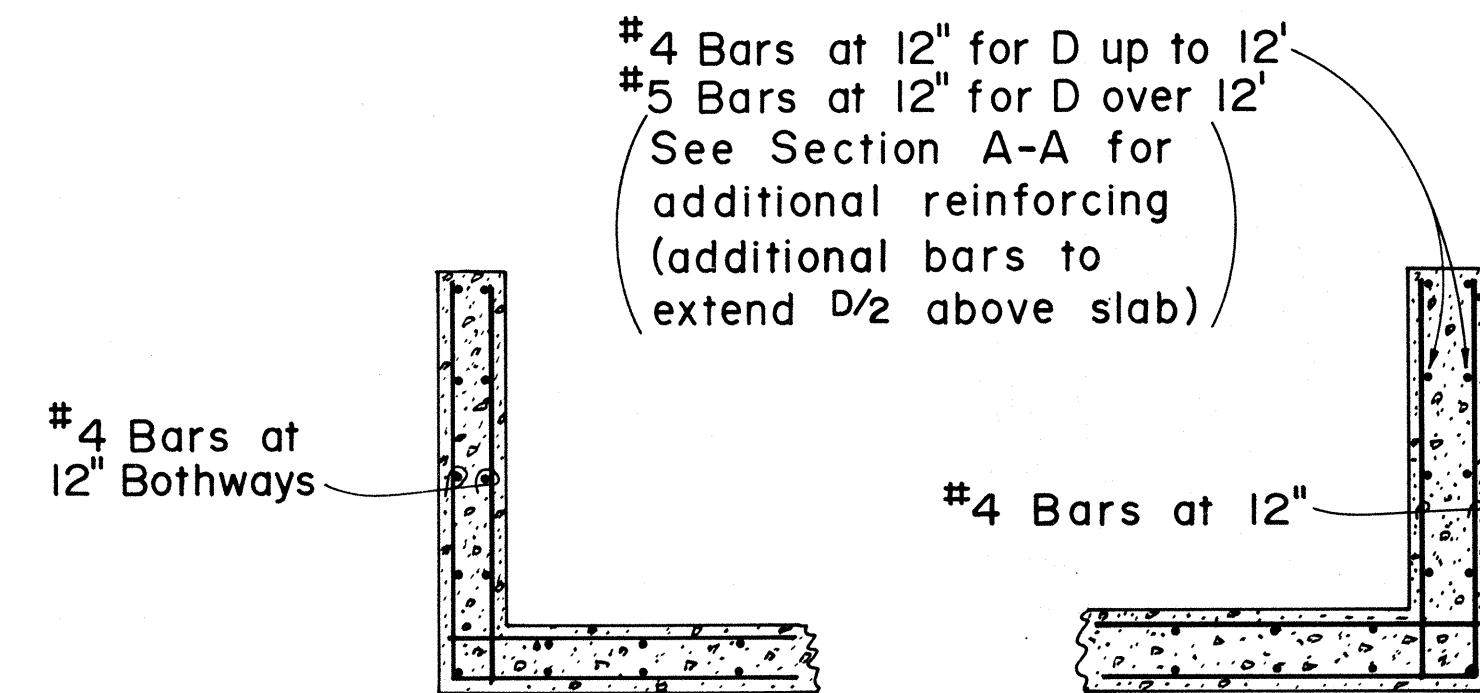
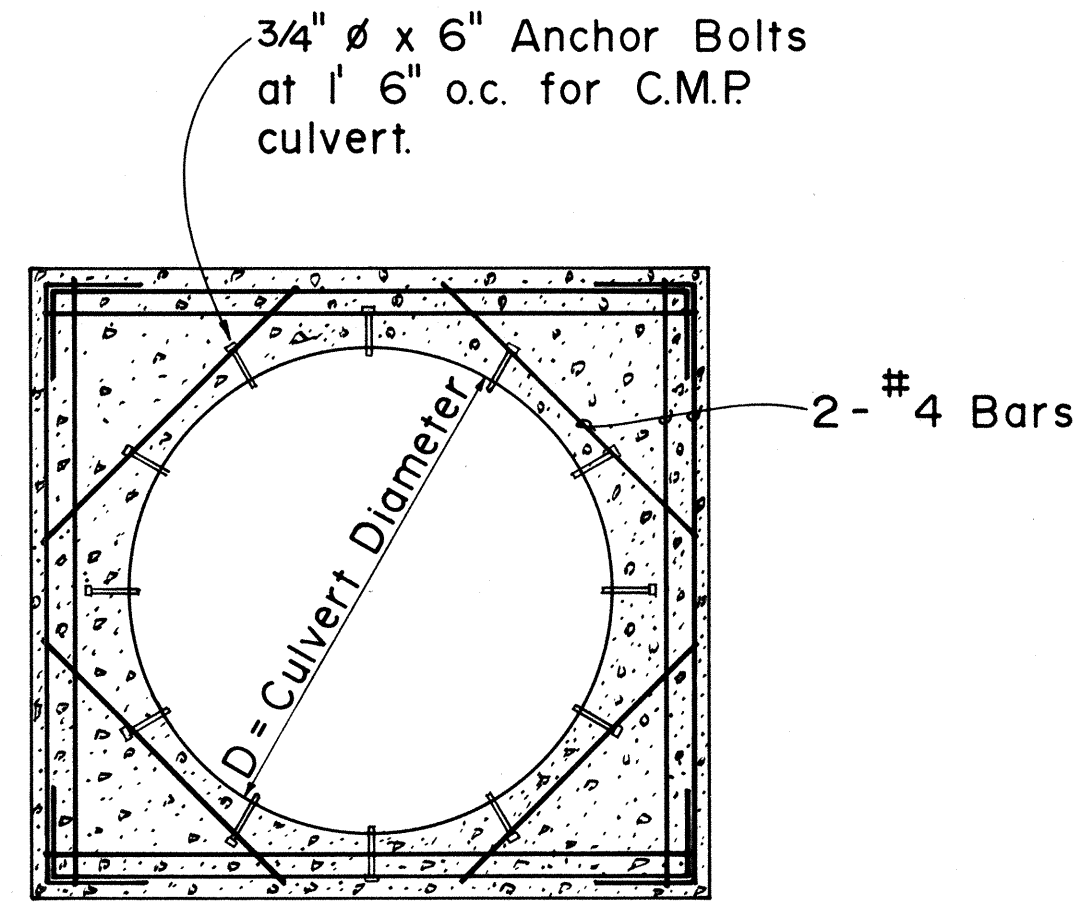
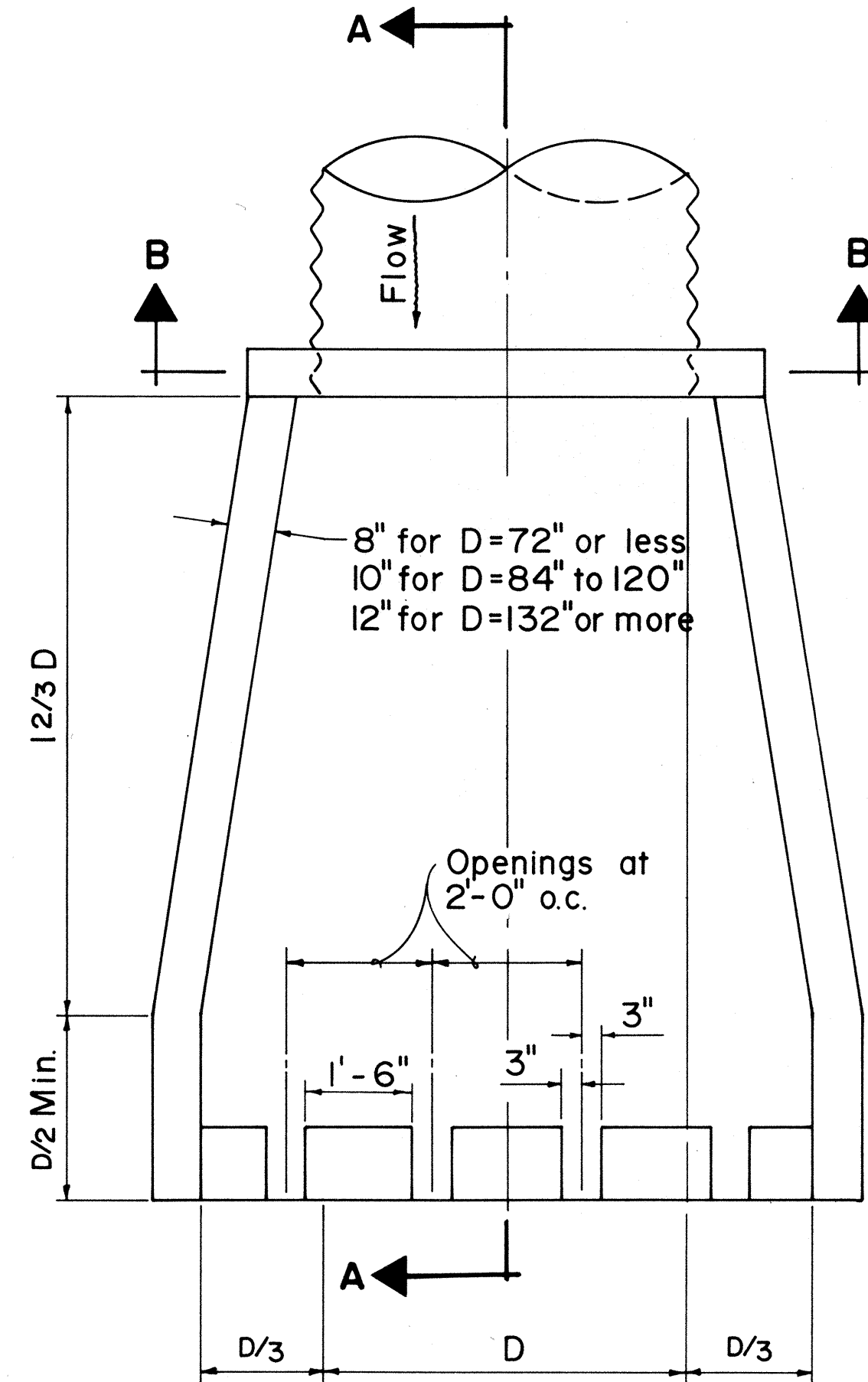
APPROVAL RECOMMENDED:  
*P. Palano* 6-19-79  
HYDRAULIC DESIGN ENGINEER DATE  
APPROVED:  
*Shirley Palano* 6-22-79  
ASSISTANT CHIEF, ENGINEERING DATE

| NO. | REVISION                                                         | APPROVED BY | DATE    |
|-----|------------------------------------------------------------------|-------------|---------|
| 1.  | Supersedes Sht. DH 16 approved 12-17-69                          | H.P.        | 6/22/79 |
| 2.  | Supersedes Sht. DH 10 approved 6-79 and Sht. DH 16 approved 6-79 | OTM         | 10/7/85 |

|                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STATE OF HAWAII<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION<br>STANDARD DETAILS<br>CONCRETE AND CEMENT<br>RUBBLE MASONRY STRUCTURES<br>Not To Scale Date: Dec. 1977 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

SHEET No. OF SHEETS DH 16

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 191-02-05          | 1986        | 13        | 54           |



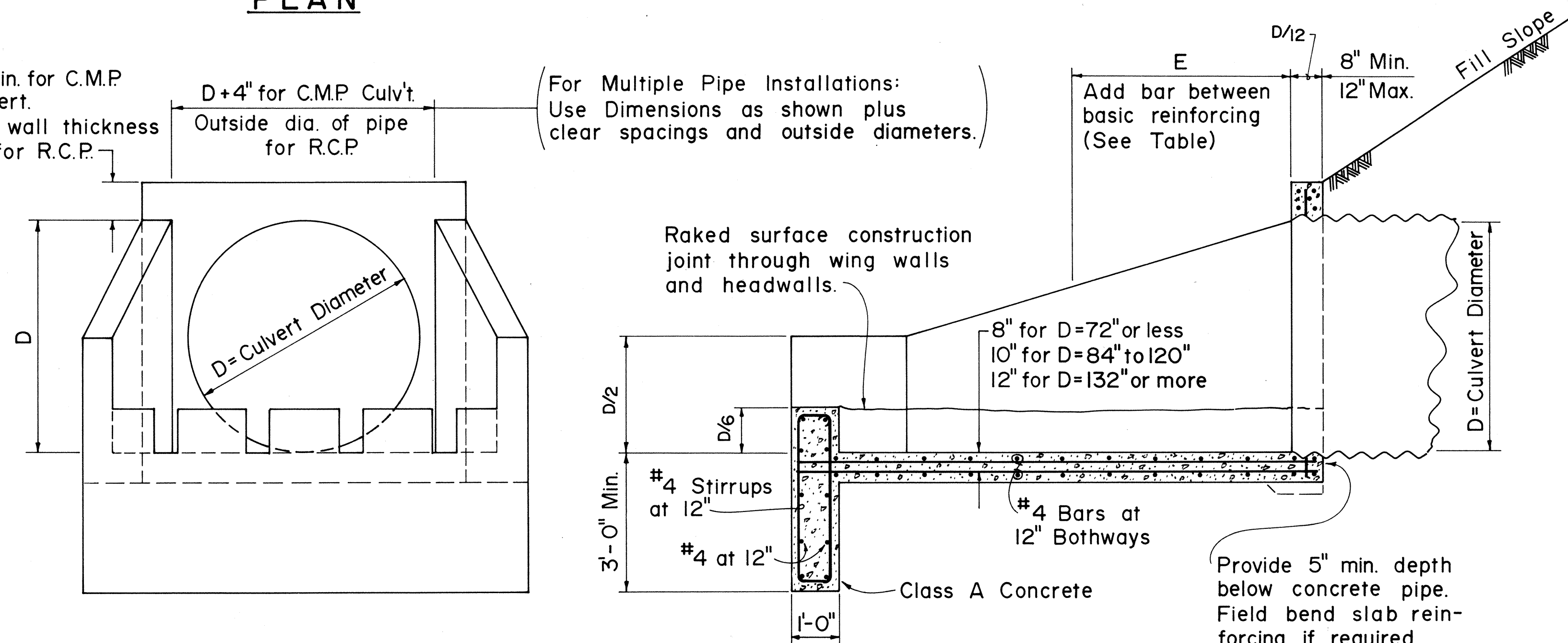
8" WING WALL 10" TO 12" WING WALLS

TYPICAL WING WALL REINFORCING

10" Min. for C.M.P. Culvert.  
Pipe wall thickness + 8" for R.C.P.

$D+4"$  for C.M.P. Culv't.  
Outside dia. of pipe for R.C.P.

(For Multiple Pipe Installations: Use Dimensions as shown plus clear spacings and outside diameters.)



| CULVERT DIA. (INCHES) | ADD BAR SIZE | E (FEET) |
|-----------------------|--------------|----------|
| 108                   | #4           | 3        |
| 120                   | #4           | 5        |
| 144                   | #5           | 8        |
| 180                   | #7           | 11       |

ADDITIONAL REINFORCING

APPROVAL RECOMMENDED:

*P. Sakano*  
HYDRAULIC DESIGN ENGINEER 6-19-79 DATE

APPROVED:

*Robert Zalewski*  
ASSISTANT CHIEF, ENGINEERING 6-22-79 DATE

| NO. | REVISION                                | APPROVED BY | DATE    |
|-----|-----------------------------------------|-------------|---------|
| 1.  | Supersedes Sht. DH 15 approved 12-17-69 | H.P.        | 6/22/79 |

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

STANDARD DETAILS  
OUTLET STRUCTURE

Not To Scale Date: Dec. 1977

SHEET NO. OF SHEETS DH19

OUTLET STRUCTURE FOR CULVERT SIZES 48 IN. TO 180 IN. DIAMETER

|                   |      |
|-------------------|------|
| ORIGINAL PLAN     | DATE |
| SURVEY PLOTTED BY |      |
| DRAWN BY          |      |
| DESIGNED BY       |      |
| NOTED BY          |      |
| CHECKED BY        |      |
| NO.               |      |