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DESIGN CRITERIA

- 700 Design Criteria Related To Highway Safety
(DO NOT PUT IN PLANS)

STANDARD SYMBOLS FOR KEY MAPS

	HIGHWAY WITH FULL CONTROL OF ACCESS
	CONTROLLED ACCESS HIGHWAY WITH FRONTAGE ROADS INTERCHANGE
	PROPOSED CONTROLLED ACCESS HIGHWAY
	DIVIDED HIGHWAY
	PAVED ROAD—HIGH TYPE
	BITUMINOUS ROAD—MEDIUM AND LOW TYPE
	GRAVEL OR STONE ROAD
	SOIL SURFACED ROAD
	GRADED AND DRAINED ROAD
	UNIMPROVED ROAD
	PRIMITIVE ROAD
	IMPASSABLE ROAD
	PRIVATE ROAD
	DISTANCE BETWEEN POINTS
	STREETS IN INSET AREAS OR DELIMITED URBAN COMPACT AREAS
	EXTENSION OF LOCAL ROADS WITHIN CITY LIMITS
	FEDERAL AID INTERSTATE HIGHWAY
	FEDERAL AID PRIMARY HIGHWAY
	FEDERAL AID SECONDARY HIGHWAY
	NATIONAL FOREST ROAD
	INTERSTATE HIGHWAY
	U. S. NUMBERED HIGHWAY
	STATE HIGHWAY
	RAILROAD
	ABANDONED RAILROAD OR LOGGING TRAM
	RAILROAD STATION OR PREPAY STATION
	GRADE CROSSING
	RAILROAD ABOVE
	RAILROAD BELOW
	AIRPORT, COMPLETE FACILITIES
	AIRFIELD, LIMITED FACILITIES
	LANDING AREA OR STRIP
	RUNWAYS
	CANAL OR DRAINAGE DITCH
	NARROW STREAM

	WIDE STREAM
	WIDE STREAM WITH DAM
	DAM WITH ROAD
	LAKE, RESERVOIR OR POND
	LAKE, RESERVOIR OR POND WITH DAM
	INTERMITTENT POND
	MARSH
	SWAMP
	HIGHWAY BRIDGE
	HIGHWAY GRADE SEPARATION
	PEDESTRIAN UNDERPASS OR OVERPASS
	STATE BOUNDARY LINE
	COUNTY BOUNDARY LINE
	CIVIL TOWNSHIP BOUNDARY
	FORBES PURCHASE LINE
	LAND SECTION LINE
	SURVEY BY OTHERS
	NATIONAL OR STATE PARK BOUNDARY
	NATIONAL OR STATE FOREST BOUNDARY
	SCHOOL
	COMMUNITY HALL
	POST OFFICE
	POLICE SCHOOL
	GARBAGE DUMP
	AUTO JUNKYARD
	SANITARY FILL
	SEWAGE DISPOSAL PLANT
	POWER PLANT
	POWER SUBSTATION
	RADIO OR TV CONTROL TOWER
	RADAR STATION
	ANIMAL SHELTER
	LOCKED GATE OR FENCE
	DIRECTIONAL ARROW
	TRIANGULATION STATION WITH NAME
	LOCATION OF SYMBOL

	LOCATION OF INSET BOUNDARY WITHIN MAP
	STATE CAPITAL
	OTHER CITY OR VILLAGE
	CORPORATE LIMITS
	DELIMITED URBAN COMPACT AREA BOUNDARY
	PICNIC GROUND
	BATHING BEACH SWIMMING POOL
	CAMP SITE, TRAILER PARK
	TOURIST COURT OR MOTEL
	CAMP OR LODGE
	SMALL STATE PARK
	NATIONAL FOREST PARK
	COUNTY PARK
	WAYSIDE PARK
	BOAT RAMP
	FIRE CONTROL HEADQUARTERS
	LOOKOUT TOWER
	FISH HATCHERY (POND)
	GAME CHECKING STATION
	PISTOL RANGE
	GOLF COURSE
	COUNTRY CLUB
	FIRE STATION
	RACE COURSE, SPEEDWAY
	DOG TRACK, RODEO ARENA
	RECREATION AREA, HISTORIC SITE
	DWELLING
	GROUP OF DWELLINGS
	SEASONAL DWELLING
	SEASONAL DWELLINGS CLOSELY SPACED
	CHURCH
	CEMETERY
	CHURCH AND CEMETERY
	BUSINESS
	GAUGING OR SMALL PUMPING STATION
	DAIRY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
STANDARD SYMBOLS					
Designed by	Checked by	Date	Approved by	Scale	Sheet No.
			<i>D. C. ...</i>		
Checked by	Date	Checked by	Date	Checked by	Date
COR	8/72	COR	8/72	COR	8/72
H. W. A.	Approved 7/11/75	80	1 of 3	002	

STANDARD SYMBOLS FOR PLAN SHEETS

SYMBOLS	
	STATE LINE
	COUNTY LINE
	TOWNSHIP LINE
	SECTION LINE
	CITY LINE
	BASE OR SURVEY LINE
	RIGHT-OF-WAY LINE
	LIMITED ACCESS LINE
	FENCE LINE
	NATIONAL OR STATE PARK OR FOREST
	GRANT LINE
	RAILROAD (DRAINAGE MAPS)
	RAILROAD (DETAIL PLANS)
	FENCE (LIMITED ACCESS)
	BOX CULVERT
	BRIDGE
	SIDE DRAIN PIPE
	STORM SEWER
	INLET
	MANHOLE
	TIED LONGITUDINAL JOINT
	KEYED LONGITUDINAL JOINT
	DOWELED TRANSVERSE EXPANSION JOINT
	DOWELED TRANSVERSE CONTRACTION JOINT
	TRANSVERSE CONTRACTION JOINT WITHOUT DOWELS
	TRIANGULATION STATION
	BENCH MARK
	POINT OF INTERSECTION
	NORTH POINT
	EDGES OF EXISTING PAVEMENT AND SIDEWALK
	BASE LINE
	CENTERLINE
	PROPERTY LINE
	DELTA ANGLE
	APPROXIMATE
	ROUND
	CURB
	CURB AND GUTTER
	WATER WELL, SPRING
	LEVEE
	RAILROAD MILE POST
	GATE
	PUMP ISLAND
	STORAGE TANK (SURFACE)
	STORAGE TANK (UNDERGROUND)

SYMBOLS	
	MINE OR QUARRY
	BORROW PIT
	CHURCH
	STORE
	RESIDENCE
	BARN
	SCHOOL
	STREAM
	SHORE LINE
	MARSH
	HEDGE
	TREES
	EDGE OF WOODED AREA
	SHRUBBERY
	GROVE OR ORCHARD
	DEFINITION OF SKEW
	CONCRETE
	WOOD
	RATE OF SUPERELEVATION

	UTILITY ADJUSTMENT SYMBOLS	
	EXISTING	PROPOSED
POWER POLE		
OVERHEAD POWER CABLE		
TELEPHONE POLE		
OVERHEAD TELEPHONE CABLE		
COMBINATION POLE		
GUY WIRE AND ANCHOR PIN		
BURIED POWER CABLE		
ELECTRIC DUCT		
BURIED TELEPHONE CABLE		
TELEPHONE DUCT		
TOWER		
LIGHT POLE		
GAS MAIN		
WATER MAIN		
SANITARY SEWER		
MANHOLE		
WATER METER		
VALVE		
FIRE HYDRANT		
UNDERGROUND CABLE TELEVISION		
OVERHEAD CABLE TELEVISION		

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS			
STANDARD SYMBOLS			
PROJECT NO. CDP 8/72 COR 8/72	DRAWING NO. 80	SHEET NO. 2 of 3	DATE 7/7/75
DESIGNED BY <i>DC Smith</i>		CHECKED BY 002	

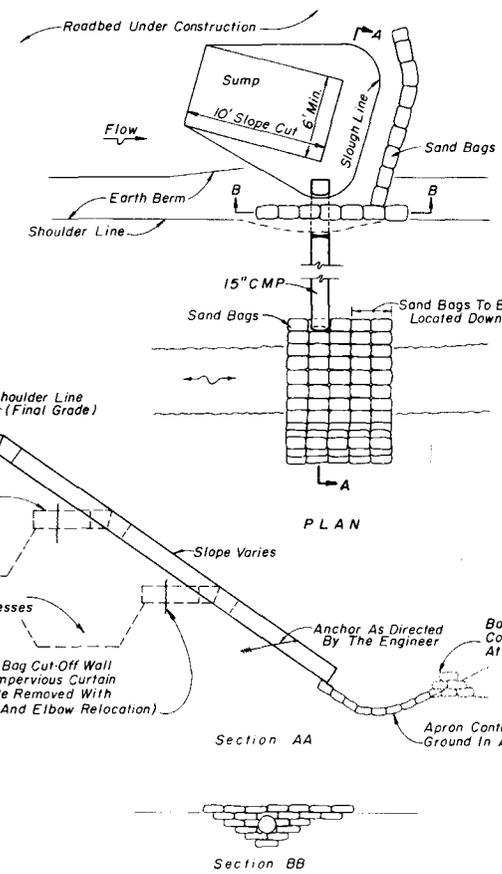
STANDARD SYMBOLS FOR PLAN SHEETS

TRAFFIC SIGNALS SYMBOLS		
	EXISTING	PROPOSED
TRAFFIC SIGNAL HEAD (SPAN WIRE MOUNTED)		
TRAFFIC SIGNAL HEAD (PEDESTAL MOUNTED)		
TRAFFIC SIGNAL HEAD (MAST ARM MOUNTED)		
TRAFFIC SIGNAL POLE (CONCRETE, WOOD, METAL)		
VEHICLE DETECTOR (LOOP)		
SIGNAL CABLE (ON MESSENGER WIRE)	-----	
CONDUIT	-----	
VEHICLE DETECTOR (OTHERS)		
PEDESTRIAN DETECTOR (PUSHBUTTON)		
PEDESTRIAN SIGNAL HEAD (POLE OR PEDESTAL MOUNTED)		
CONTROLLER CABINET (BASE MOUNTED)		
CONTROLLER CABINET (POLE MOUNTED)		
WALK - DON'T WALK FLASH	W - DW	FL.
SIGNAL FACE NUMBER		
ITEM NUMBER	630-113	
SIGNAL LENS		
PROGRAMED SIGNAL HEAD		
MESSENGER WIRE	-----	
POLE TABULATION CROSS REFERENCE		
POLE TABULATION CROSS REFERENCE (JOINT USE POLE)	*	
SIGNAL PHASE		

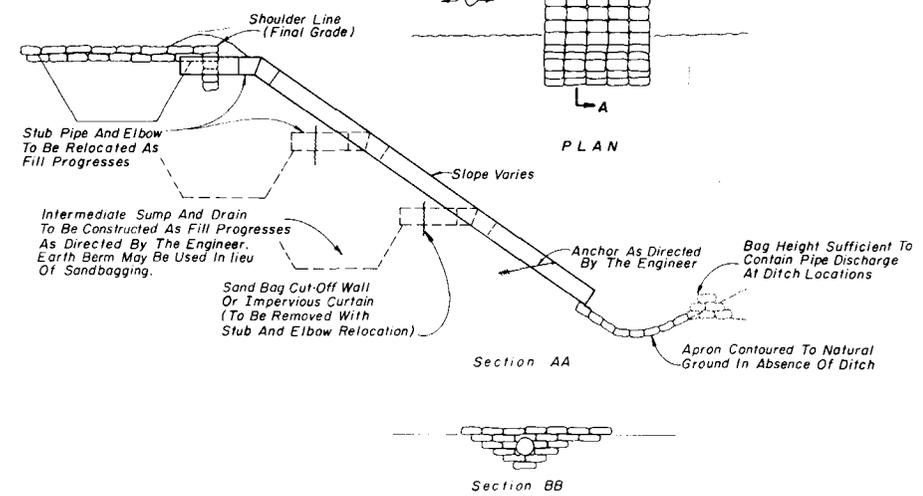
LIGHTING SYMBOLS	
	NEW POLE & LUMINAIRE
	EXISTING POLE & LUMINAIRE
	EXISTING POLE & LUMINAIRE TO BE REMOVED
	FINAL POSITION OF RELOCATED OR ADJUSTED POLE & LUMINAIRE
	NEW HIGH MAST LIGHTING TOWER
	CITY OR UTILITY OWNED LUMINAIRE & POLE
	PVC (POLYVINYL CHLORIDE) LIGHTING CONDUIT AND CONDUCTORS
	RIGID GALVANIZED LIGHTING CONDUIT AND CONDUCTORS
	CONCRETE LIGHTING PULL-BOX
	WATERPROOF LIGHTING PULL-BOX
	LIGHTING DISTRIBUTION POINT
	NEW JOINT USE POLE
	EXISTING USE POLE
	UNDER DECK LIGHTING FIXTURE

SIGNING AND PAVEMENT MARKING SYMBOLS	
PAVEMENT ARROW	
SINGLE SOLID LINE	
DOUBLE SOLID LINE	
SKIP LINE	
STOP BAR	
TRAFFIC SIGN (POST MOUNTED)	
TRAFFIC SIGN (OVERHEAD)	
SIGN NUMBER	
SIGN ITEM NUMBER	
TRAFFIC FLOW ARROW	

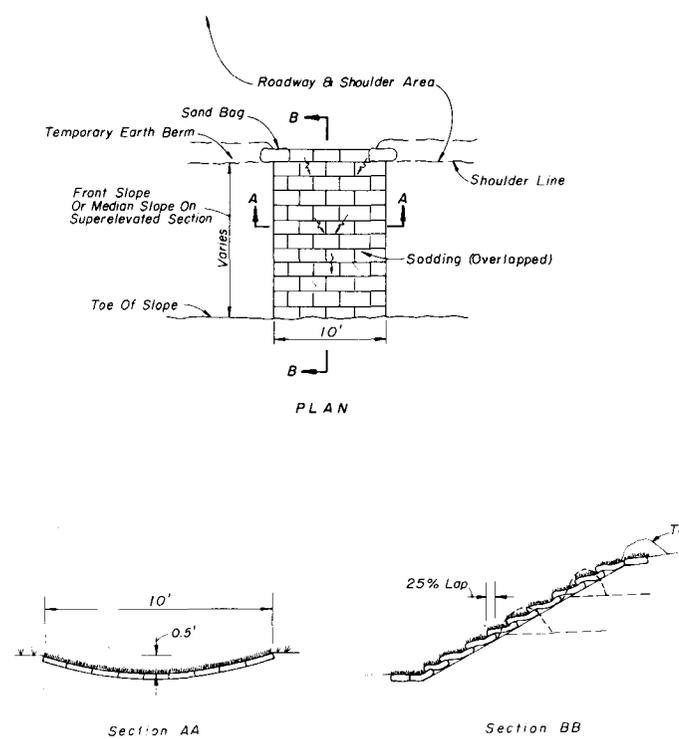
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
STANDARD SYMBOLS					
	Name:	Date:	Approved By:		
Designed By:	CDP	8/72	<i>J.C. Bull</i> Deputy Design Engineer, Roadways		
Drawn By:	CDP	8/72	Revised No.:	Sheet No.:	Index No.:
Checked By:	COR	8/72	80	3 of 3	002
F.H.W.A. Approved: 7/7/75					



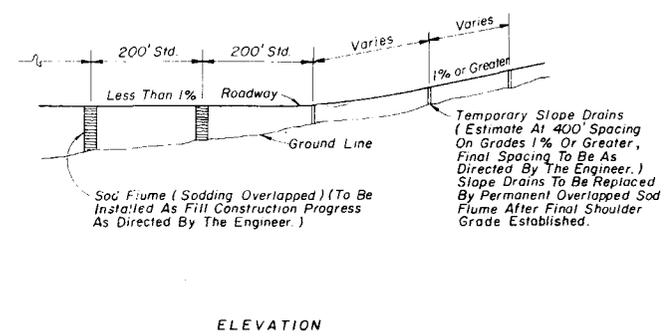
Note:
Slope drain pipe to be paid for as Slope Drains (Temporary) L.F., based on linear feet of pipe installed. Payment to be made for one installation per site, including one stub and elbow. Sump construction and maintenance and curtains to be included in cost for Slope Drains (Temporary). Sand bags to be paid for as Sandbagging C.Y.



TEMPORARY SLOPE DRAIN



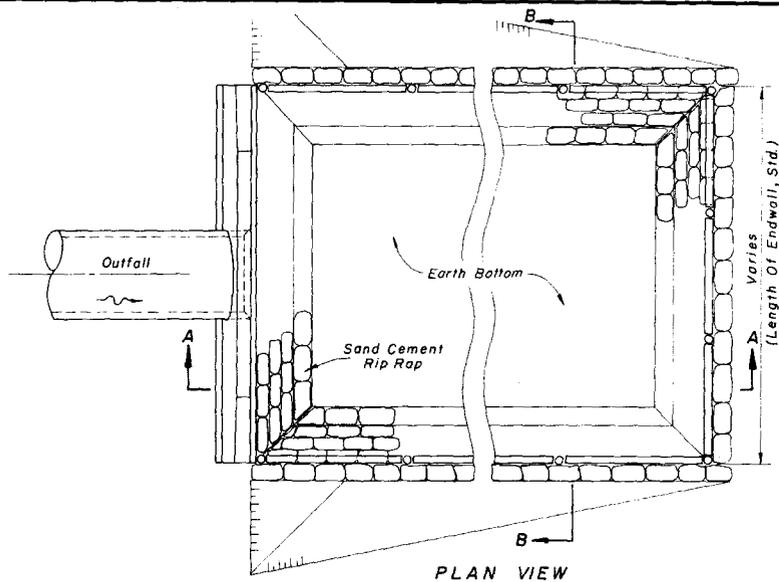
SOD FLUME (SODDING OVERLAPPED)



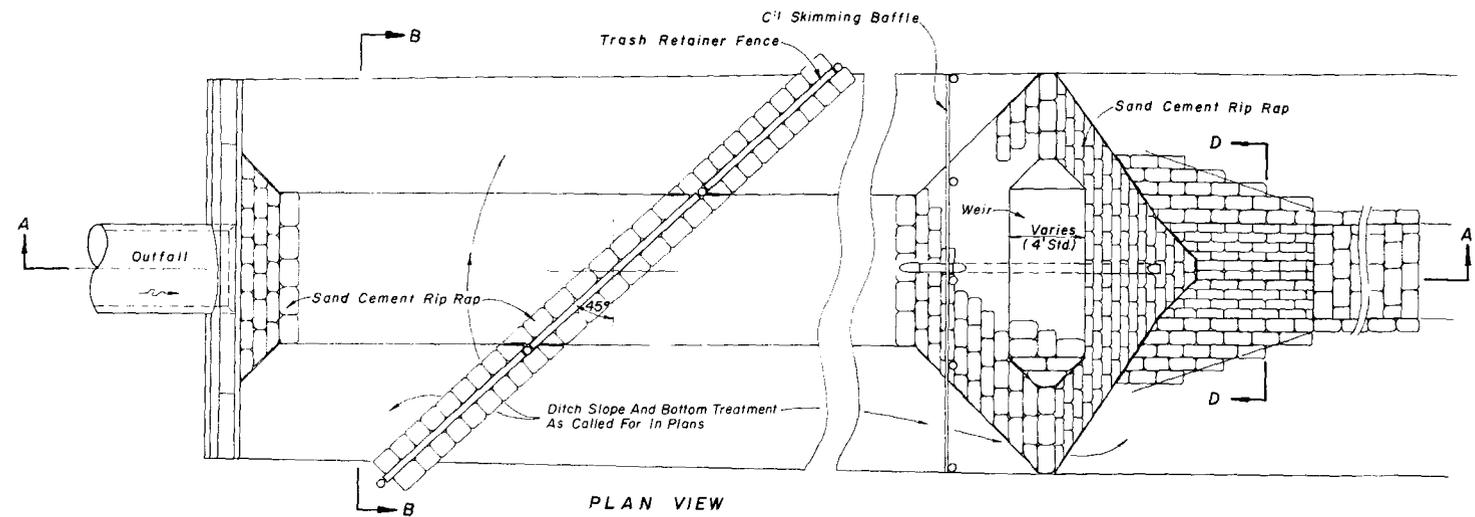
ELEVATION

SLOPE DRAIN APPLICATION

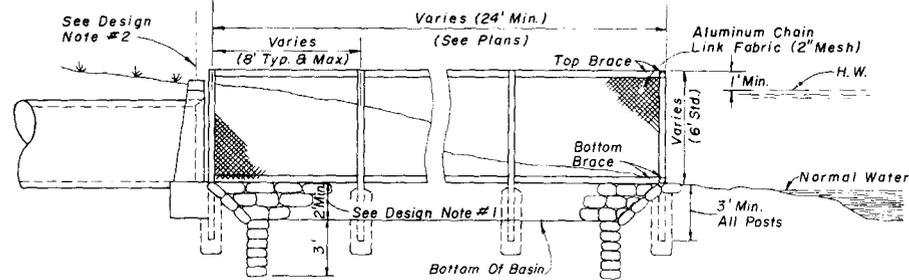
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
TEMPORARY SLOPE DRAIN AND SOD FLUME				
Designed by	Names	Dates	Approved By	
Drawn by			<i>D.C. Buehler</i> Deputy Design Engineer, Roadways	
Checked by	Revision No.	Sheet No.	Index No.	
F.H.W.A. Approved: 10/7/80	81	1 of 1	100	



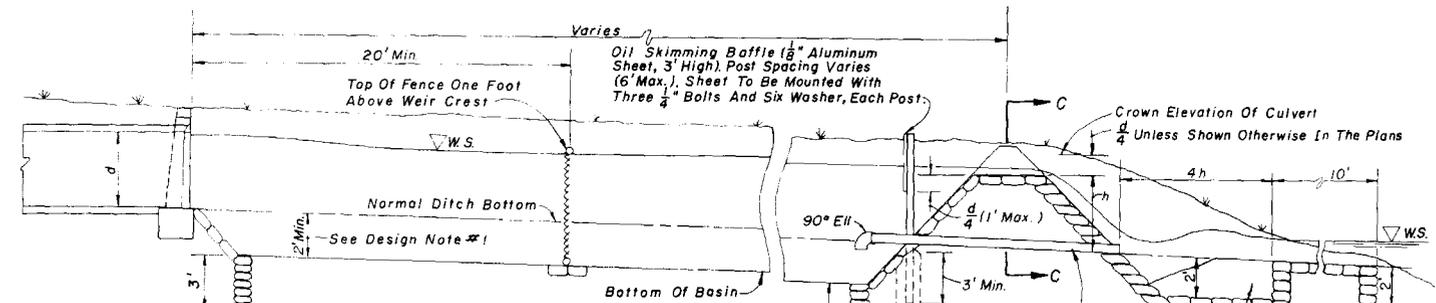
PLAN VIEW



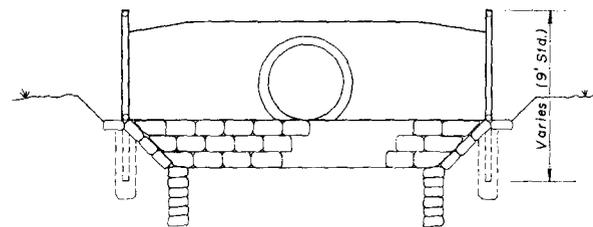
PLAN VIEW



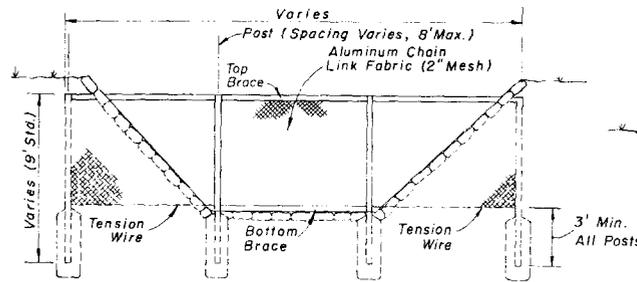
SECTION AA



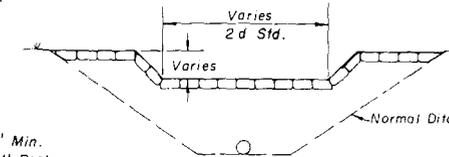
SECTION AA



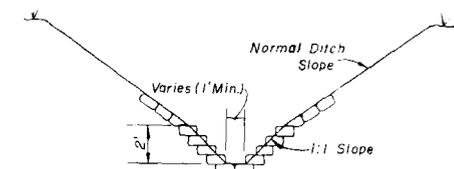
SECTION BB



SECTION BB



SECTION CC



SECTION DD

TYPE A

INTENDED FOR USE WHEN THE STORM SEWER OUTFALLS ADJACENT TO A SHORE LINE

TYPE B

INTENDED FOR USE WHEN THE STORM SEWER OUTFALLS IN AN OPEN DITCH

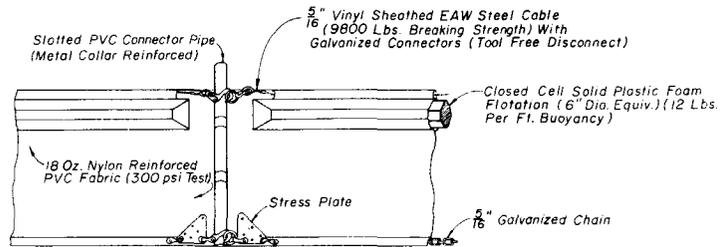
GENERAL DESIGN NOTES

1. Basins should be as deep as practical with a minimum depth of 2.0 feet.
2. In Type A, when the top of endwall is below high water, fence also will be required along the top of the endwall.
3. In Type B, the weir shall be located as far from the endwall as practical. On steep ditch grades two or more weirs may be required. Intermediate weirs shall be constructed without stilling basins.
4. In Type B, the 6" PVC pipe shall be constructed unless shown otherwise in the plans.

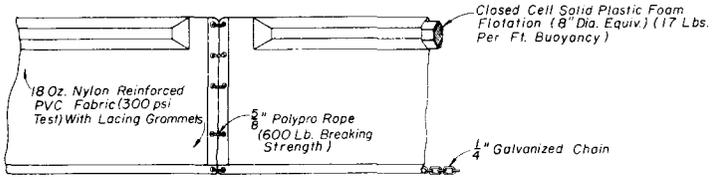
GENERAL CONSTRUCTION NOTES

1. Fence materials shall be aluminum or concrete only.
2. Aluminum posts shall be 3" diameter minimum. Aluminum rail braces shall be in accordance with Index 452. Concrete posts and rail braces shall be in accordance with 451. All posts to be set in concrete.
3. Fabric shall be installed to inside of posts and rail braces, and tied to posts and braces at 6" centers.
4. For additional details on fencing, see Index Nos. 451 and 452.
5. All basin slopes to be 1:1 unless detailed otherwise in the plans.
6. Sediment basins to be constructed prior to commencement of upland construction. Maintenance and clean out to be by the Contractor until acceptance of project by the Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRASH RETAINER AND SEDIMENT BASIN			
Designed by	WJR	5/74	Approved by <i>D.C. Arnold</i> Deputy District Engineer, Roadways
Drawn by			
Checked by	HLB	6/74	Revision No. 80
F. H. W. A. Approved 10/7/80		Sheet No. 1 of 1	Index No. 101

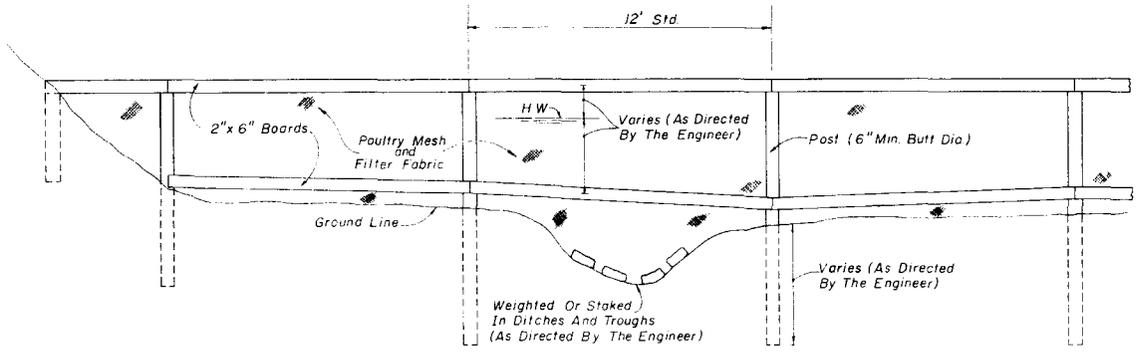


TYPE I

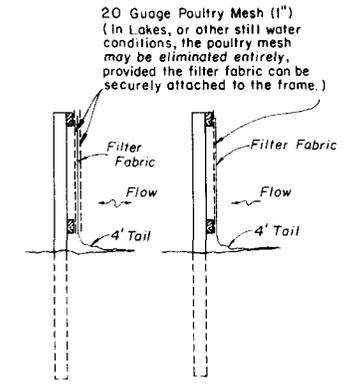


TYPE II

FLOATING SILT BARRIERS



ELEVATION

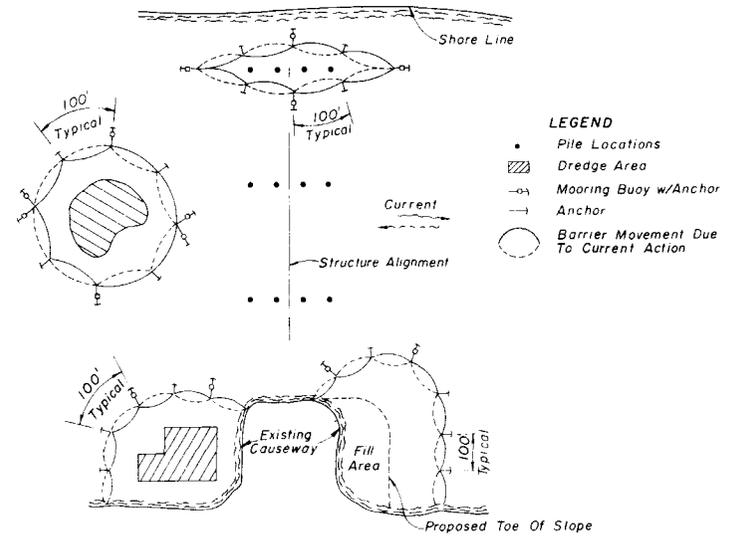


Tidal Currents Direct Currents

SECTIONS

NOTE: Filter Fabric Shall Meet The Requirement Of Section 985 Of The Standard Specifications.

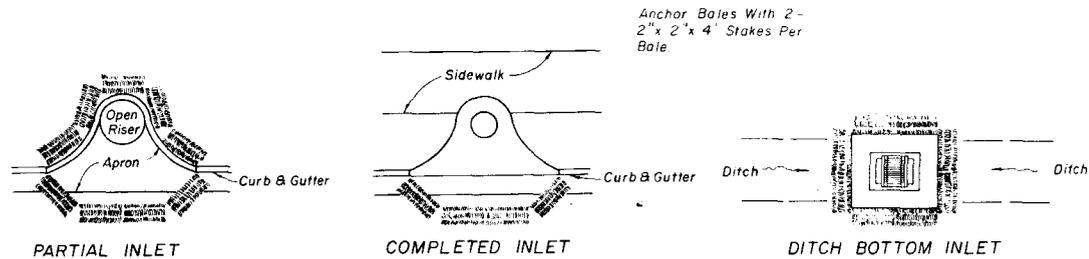
STAKED SILT BARRIER



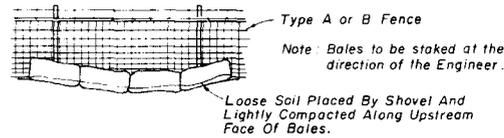
- NOTES:
- Number and spacing of anchors dependent on current velocities
 - Deployment of barrier around pile locations may vary to accommodate construction operations.
 - Navigation may require segmenting barrier during construction operations.
 - The above applications indicate Type I Floating Silt Barrier since anchors are shown, however, if conditions warrant, Type II Floating Silt Barrier may be used. For additional information see Standard Specifications.

FLOATING SILT BARRIER APPLICATIONS

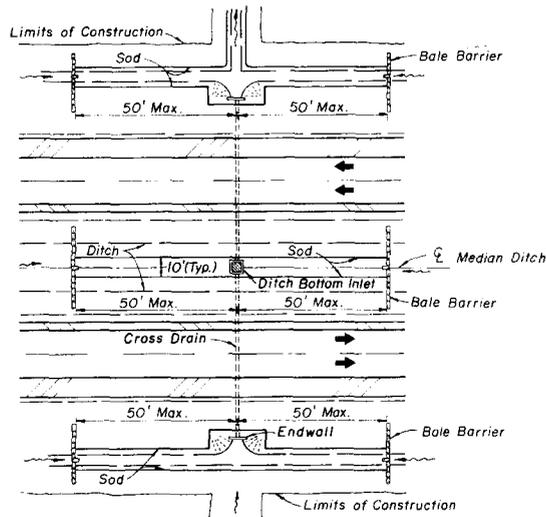
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
FLOATING AND STAKED SILT BARRIERS			
Designed by	Names	Date	Approved By
Drawn by			<i>J.C. ...</i> Scully Design Engineer, Roadways
Checked by			
Revision No.		Sheet No.	Index No.
F H W A Approved: 10/7/80		82	1 of 1 102



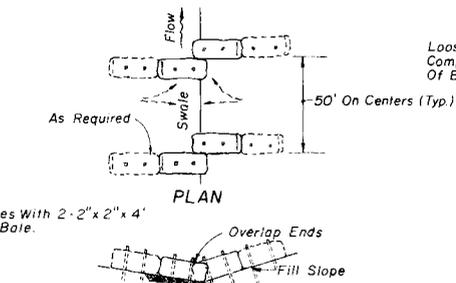
PROTECTION AROUND INLETS OR SIMILAR STRUCTURES



BALES BACKED BY FENCE

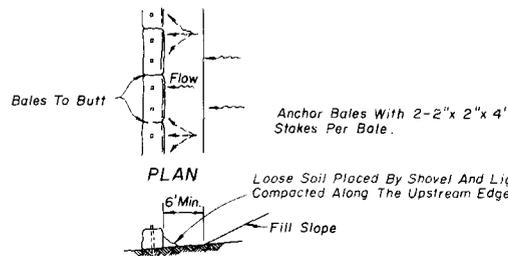


DITCH INSTALLATIONS AT DRAINAGE STRUCTURES



ELEVATION

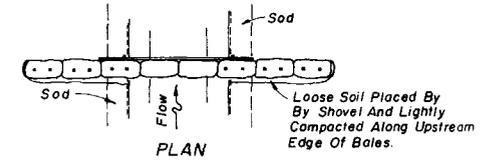
TO BE USED AT SELECTED SITES WHERE THE NATURAL GROUND SLOPES TOWARD THE TOE OF SLOPE



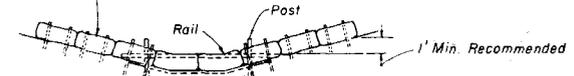
ELEVATION

TO BE USED AT SELECTED SITES WHERE THE NATURAL GROUND SLOPES AWAY FROM THE TOE OF THE SLOPE

BARRIERS FOR FILL SLOPES



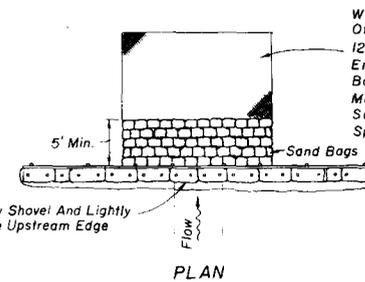
Anchor Bales With 2-2" x 2" x 4' Stakes Per Bale.



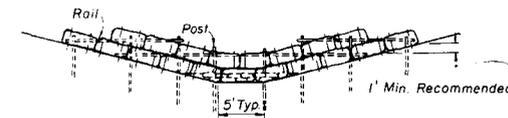
ELEVATION

Spacing: Bale barriers for paved ditches should be spaced in accordance with Chart I (Fig. 4.2.1) of the manual Highway Construction And The Environment (No. 0508).

BARRIER FOR PAVED DITCH



Loose Soil Placed By Shovel And Lightly Compacted Along The Upstream Edge Of Bales.



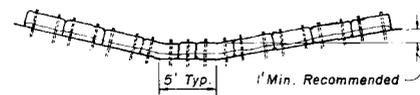
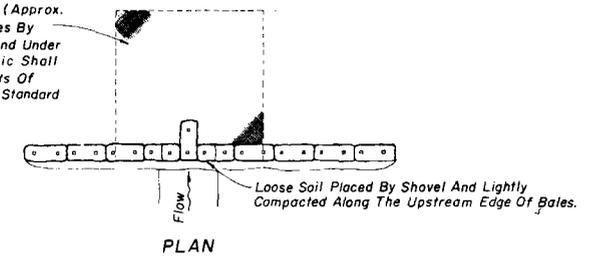
Anchor Lower Bales With 2-2" x 2" x 4' Stakes Per Bale. Anchor Top Bales To Lower Bales With 2-2" x 2" x 4' Stakes Per Bale.

ELEVATION

Application and Spacing: The use of Types I & II bale barriers should be limited to the conditions outlined in Chart I (Fig. 4.2.1) of the manual Highway Construction And Environment (No. 0508).

TYPE II

BARRIER FOR UNPAVED DITCHES



Anchor Bales With 2-2" x 2" x 4' Stakes Per Bale

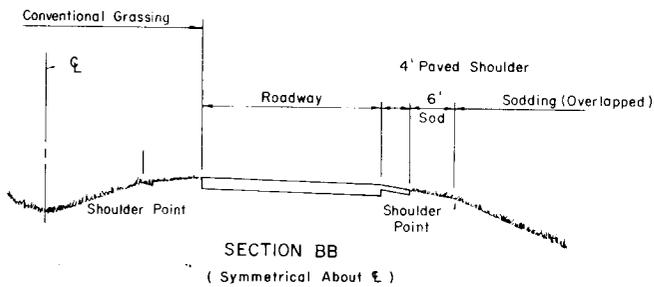
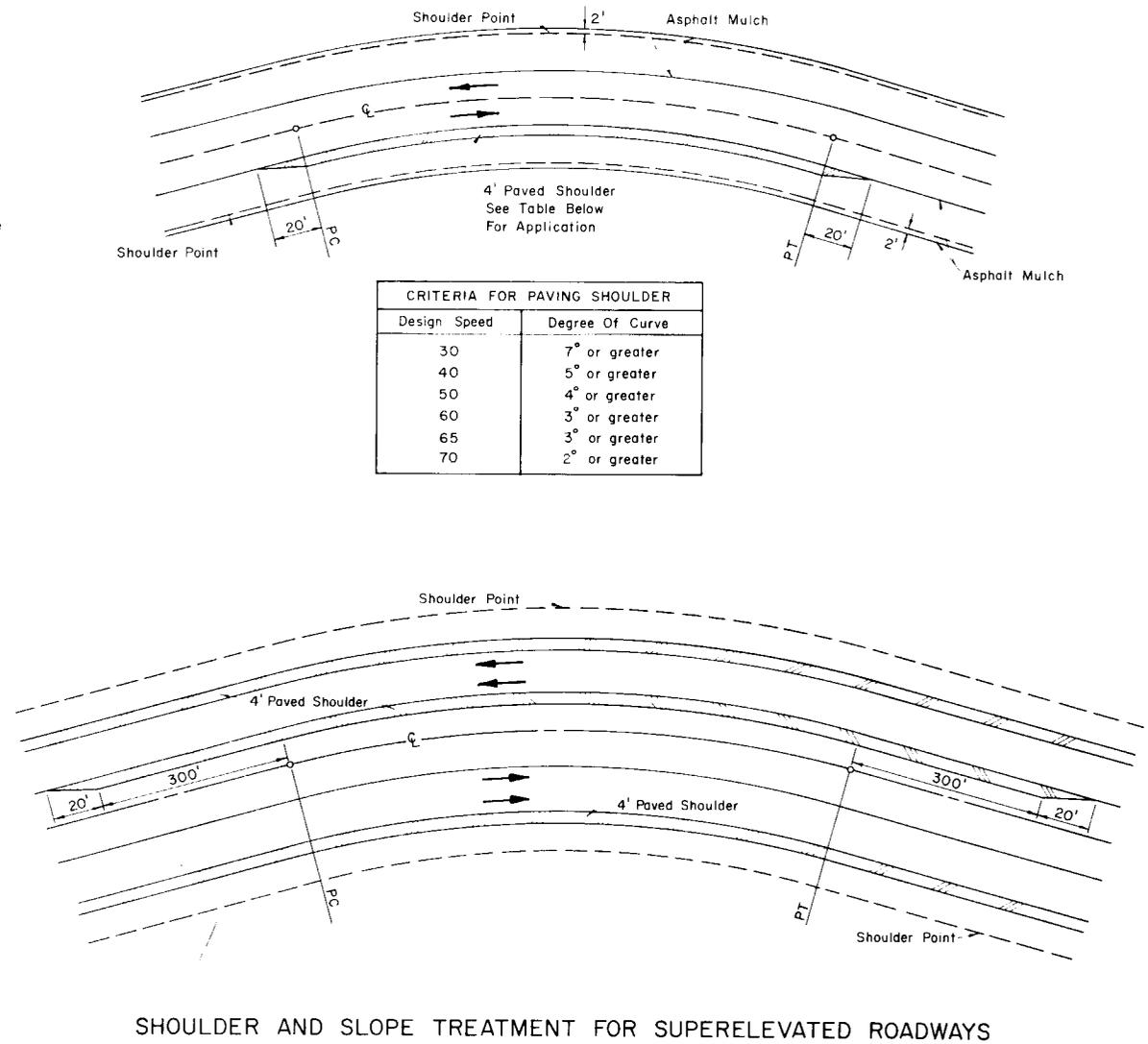
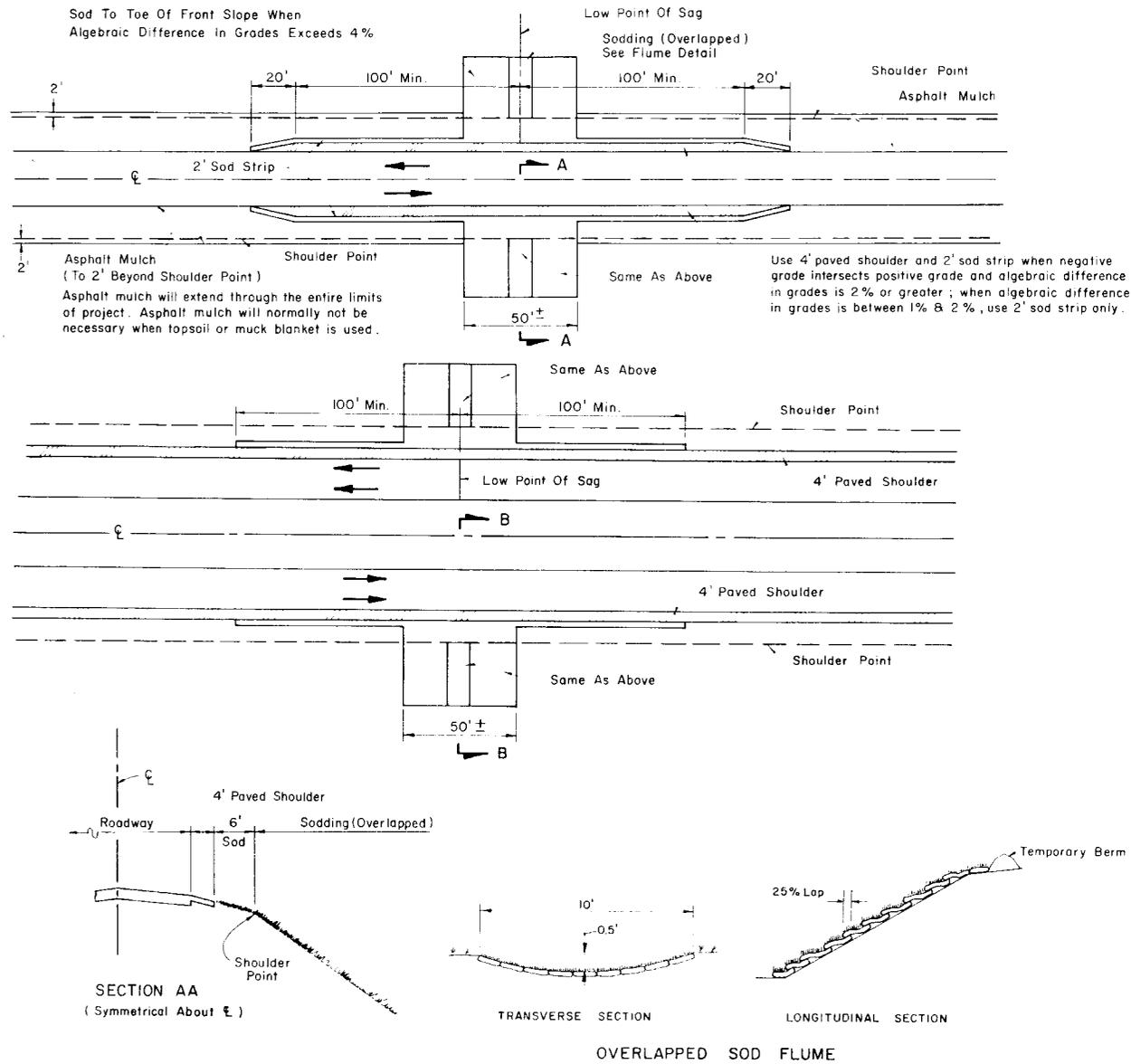
ELEVATION

TYPE I

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

BALED HAY OR STRAW BARRIERS

Names	Dates	Approved By		
Designed by	WJR	5/74	<i>Dr. [Signature]</i> Deputy Design Engineer, Roadways	
Drawn by				
Checked by	HLB	6/74	Revision No.	Sheet No.
F. H. W. A. Approved: 10/7/80			81	1 of 1



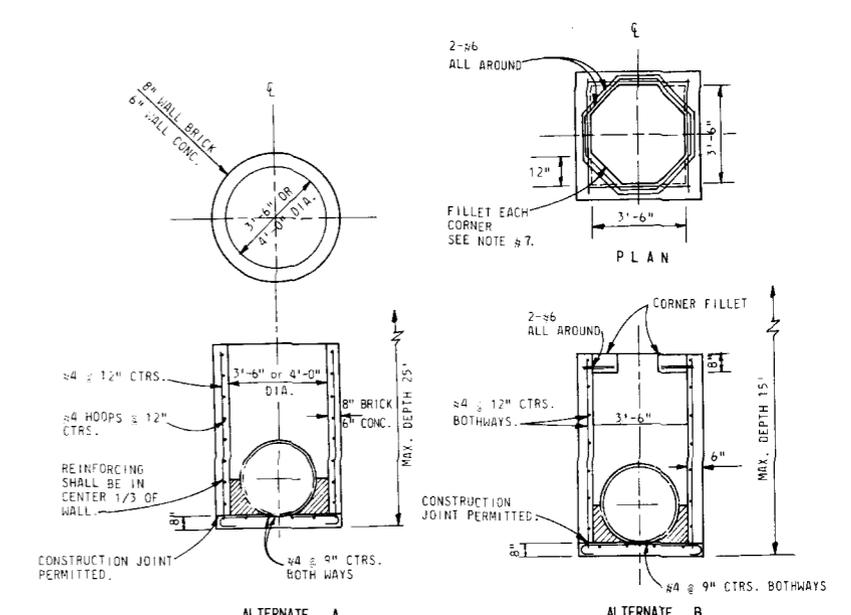
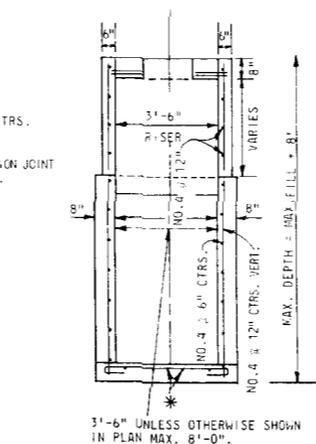
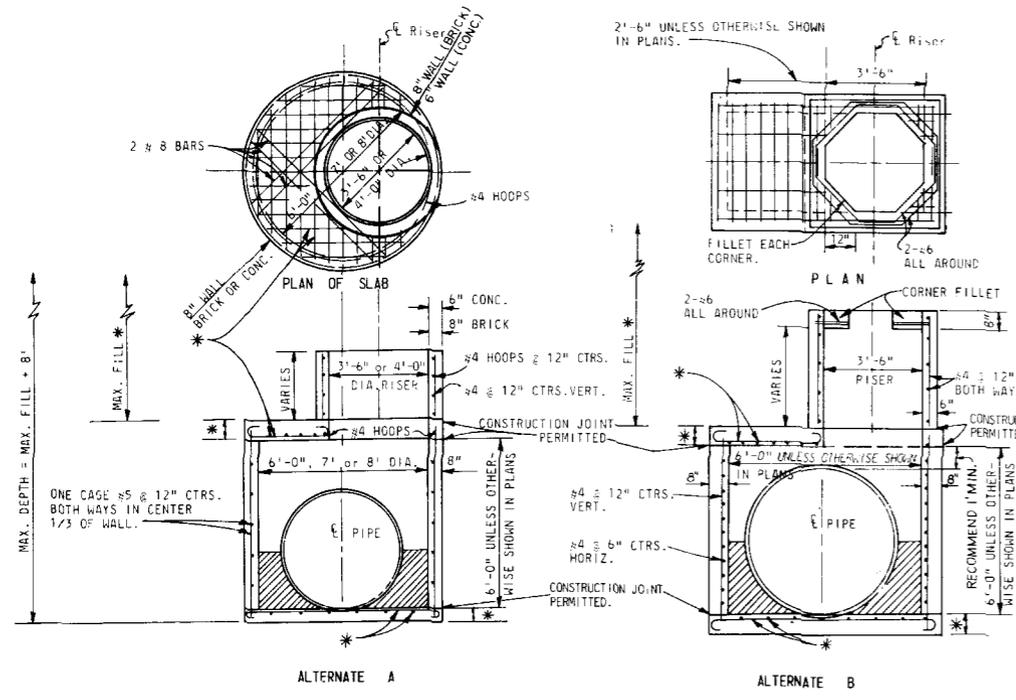
SHOULDER AND SLOPE TREATMENT IN SAG VERTICAL CURVES

GENERAL NOTES

1. For sodding adjacent to ditches and at headwalls, see Index No. 281.
2. All front slopes steeper than 4:1 are to be sodded.

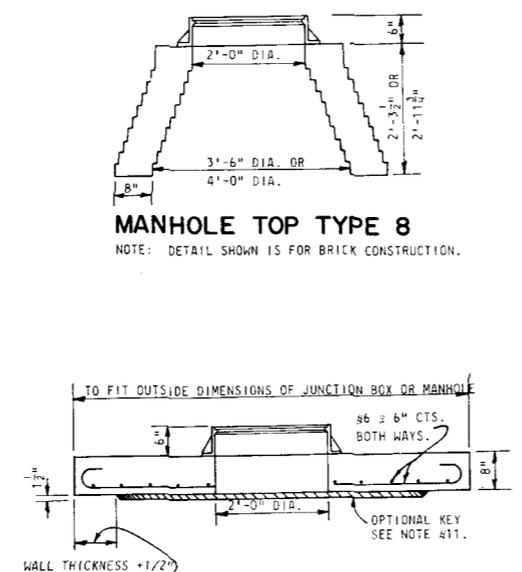
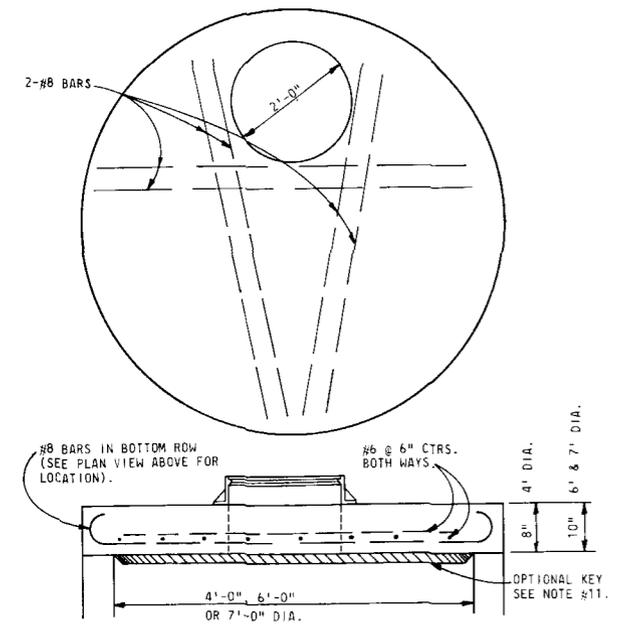
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
EROSION CONTROL DETAILS FOR PERMANENT CONSTRUCTION					
Designed by	HLG	Date	4/75	Approved By	
Drawn by				<i>E.C. [Signature]</i> Deputy Design Engineer, Roadways	
Checked by	DCB	4/75	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved: 10/77/80			81	1 of 1	104

TOP AND FLOOR SLAB TABLE TYPE J					
ALT. A	ALT. B	SLAB THICKNESS	ALLOWABLE FILL OVER TOP SLAB	REINFORCING TOP & FLOOR SLABS	
I.D.	BOX WIDTH	"	"	"	"
3'-6"	4'-0"	8"	2'	29'	#6 @ 6" CTRS. B...
5'-0"	6'-0"	8"	2'	25'	#6 @ 6" CTRS. B...
5'-0"	6'-0"	10"	2'	27'	#7 @ 6" CTRS. B...
6'-0"	6'-0"	8"	2'	20'	#6 @ 6" CTRS. B...
6'-0"	6'-0"	10"	2'	25'	#7 @ 6" CTRS. B...
7'-0" or 8'-0"	8'-0"	10"	2'	11'	#7 @ 6" CTRS. B...

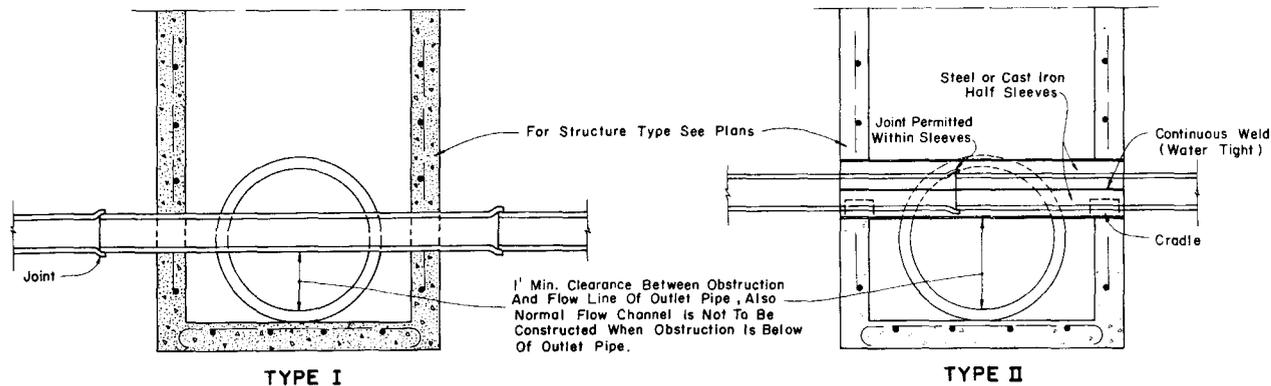


GENERAL NOTES

- WALLS OF CIRCULAR STRUCTURES (ALTERNATE A) MAY BE CONSTRUCTED OF CONCRETE OR BRICK, BUT RECTANGULAR STRUCTURES (ALTERNATE B) SHALL BE CONSTRUCTED OF CONCRETE ONLY. THE CONCRETE MAY BE CAST-IN-PLACE OR PRECAST.
- WALL REINFORCEMENT AND THICKNESS ARE FOR EITHER CAST-IN-PLACE OR PRECAST CONCRETE UNITS EXCEPT THAT THE MANUFACTURER MAY FURNISH PRECAST CIRCULAR UNITS IN ACCORDANCE WITH A.S.T.M. SPECIFICATION C-478 UP TO 96" IN DIA. OR PRECAST CIRCULAR UNITS A.S.T.M. SPECIFICATION C-76, TABLE III, FOR 3 WALL CONCRETE PIPE. TOP AND FLOOR SLAB THICKNESS AND REINFORCEMENT ARE FOR ALL TYPES OF CONSTRUCTION.
- ELLIPTICAL STEEL, ASTM SPECIFICATION C-76, TABLE III, B WALL, IS MODIFIED TO USE A CIRCULAR CAGE OF STEEL AREA EQUAL TO THAT OF THE ELLIPTICAL CAGE AND PLACED IN THE CENTER ONE-THIRD OF THE WALL. THIS MODIFICATION IS FOR PRECAST CIRCULAR UNITS PRODUCED IN ACCORDANCE WITH ASTM C-76.
- TOP AND FLOOR SLABS FOR TYPE J UNITS AND TYPE 7 MANHOLE TOPS SHALL BE OF CLASS II CONCRETE. CONCRETE AS SPECIFIED IN ASTM C-478 MAY BE USED FOR PRECAST UNITS.
- ANY INLET, MANHOLE OR JUNCTION BOX MAY BE USED IN CONJUNCTION WITH ANY INLET THROAT OR MANHOLE TOP. FOR EXAMPLE, AN INLET WITH A TYPE J BOX AND A TYPE 2 THROAT WOULD BE CALLED AN INLET TYPE J-2 IN THE PLANS. THE CONTRACTOR MAY AT HIS OPTION USE EITHER ALTERNATE A OR B STRUCTURES, UNLESS OTHERWISE SHOWN IN THE PLANS.
- RECTANGULAR STRUCTURES MAY BE ROTATED AS DIRECTED BY THE ENGINEER IN ORDER TO FACILITATE CONNECTIONS BETWEEN THE STRUCTURE WALLS AND STORM SEWER PIPES.
- THE CORNER FILLETS SHOWN FOR RECTANGULAR STRUCTURES ARE NECESSARY ONLY WHEN STRUCTURES ARE USED IN CONJUNCTION WITH CIRCULAR INLET THROATS (TYPES 1, 2, 3 & 4) OR WHEN USED ON SKEW WITH RECTANGULAR INLET THROATS (TYPES 5 & 6).
- INLET THROATS, RISERS OR MANHOLE TOPS SHALL BE SECURED TO STRUCTURES WITH A MINIMUM OF 6 - NO. 4 BARS 12" LONG OR AS SHOWN ON INDEX NO. 201
- STRUCTURES WITH DEPTHS OVER 14' ARE TO BE CHECKED FOR FLOTATION BY DESIGNER OF PROJECT DRAINAGE.
- ALL STEEL BARS SHALL HAVE 1 1/2" MINIMUM COVER UNLESS OTHERWISE SHOWN AND SHALL BE HOOKED WHERE INDICATED. HORIZONTAL STEEL IN RECTANGULAR STRUCTURES SHALL BE LAPPED A MINIMUM OF 24 BAR DIAMETERS AT CORNERS. ON PRECAST UNITS, FLOOR SLABS MAY BE SECURED TO STRUCTURE WALLS BY NO. 4 DOVEL BARS (A MINIMUM OF 6 DOVELS) PUSHED INTO THE WET CONCRETE AFTER THE FLOOR SLAB IS PLACED.
- TYPE 7 TOP SLABS MAY BE OF CAST-IN-PLACE OR PRECAST CONSTRUCTION. THE OPTIONAL KEY IS FOR PRECAST TOPS AND IS IN LIEU OF DOVELS. FRAME AND SLAB OPENINGS ARE TO BE OMITTED WHEN TOP IS USED OVER A JUNCTION BOX. FRAME CAN BE ADJUSTED WITH FROM ONE TO SIX COURSES OF BRICK.
- MANHOLE TOP TYPE B MAY BE OF CAST-IN-PLACE OR PRECAST CONCRETE CONSTRUCTION OR BRICK CONSTRUCTION. FOR CONCRETE CONSTRUCTION, THE CONCRETE AND STEEL REINFORCEMENT SHALL BE THE SAME AS THE SUPPORTING WALL UNIT. AN ECCENTRIC CONE MAY BE USED.
- LARGER THAN SPECIFIED STANDARD UNITS MAY BE SUBSTITUTED AT THE CONTRACTOR'S OPTION WHEN THESE UNITS WILL NOT CAUSE OR INCREASE THE SEVERITY OF UTILITY CONFLICTS. SUCH LARGER UNITS SHALL BE FURNISHED AT NO ADDITIONAL COST TO THE DEPARTMENT. LARGER ALTERNATE A UNITS CANNOT REPLACE ALTERNATE B UNITS WITHOUT APPROVAL OF THE ENGINEER. THIS NOTE APPLIES TO THIS INDEX ONLY.
- FOR SUPPLEMENTARY DETAILS SEE INDEX NO. 201



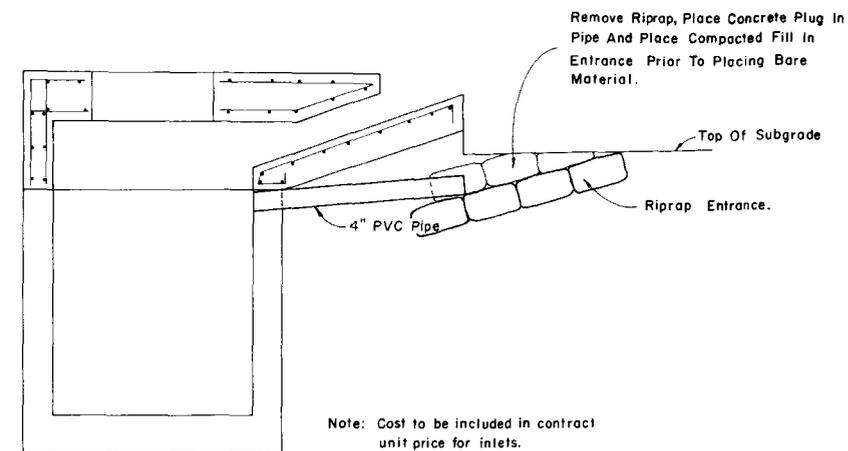
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STRUCTURE BOTTOMS TYPES J AND P			
Designed by	Names	Dates	Approved By
Drawn by			<i>De Anand</i> Deputy Design Engineer, Roadways
Checked by			
F.H.W.A. Approved: 5/1/75		Revision No. 81	Sheet No. 1 of 1
			Index No. 200



NOTE:
 1. No joints allowed inside Type I structure.
 2. Only cast iron or steel water mains will be allowed to pass directly through structure.
 3. Only cast iron sanitary sewer will be allowed to pass directly through structure.

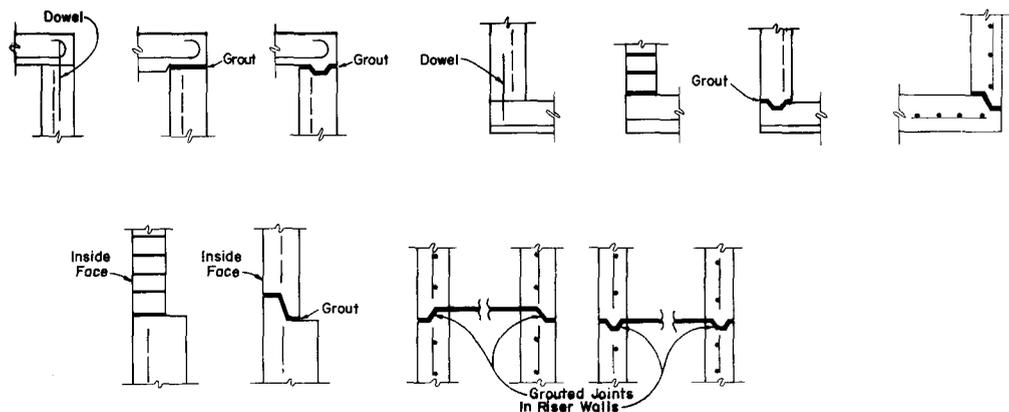
NOTE:
 1. Only water mains will be allowed to pass through a Type II structure.

DESIGNERS NOTE: "Sumped" conflict manholes shall not be used unless the system is hydraulically designed to take in account the headloss generated if the sump is completely blocked. "Sumped" conflict manholes must be larger than those normally provided.



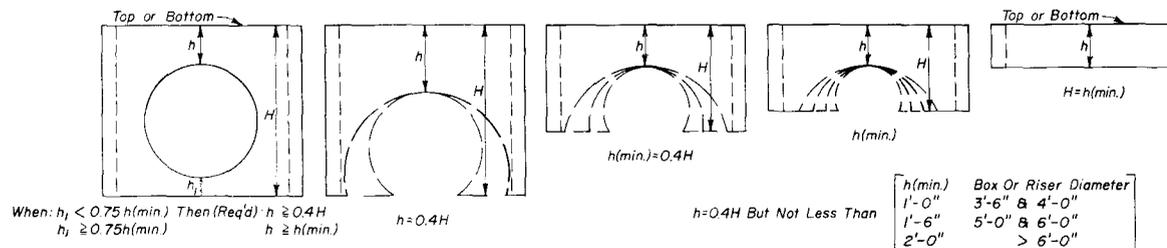
TEMPORARY SUBGRADE DRAINS

UTILITY PIPES THRU STORM SEWER STRUCTURES



- Any type joint may be used in conjunction with any other type joint. Brick wall and joint construction is permitted on circular units only.
- All grouted joints are to have a maximum thickness of 1".
- Keyways are to be a minimum of 1 1/2" deep.
- Joint dowels are to be #4 bars, 12" long with a minimum of 6 bars per joint evenly spaced.
- Minimum cover on reinforcing bars is 1/4".

OPTIONAL CONSTRUCTION JOINTS



COMPARATIVE SIDE VIEWS (SEGMENTS OF EQUAL DIAMETERS)
 MINIMUM DIMENSIONS FOR BOX AND RISER SEGMENTS

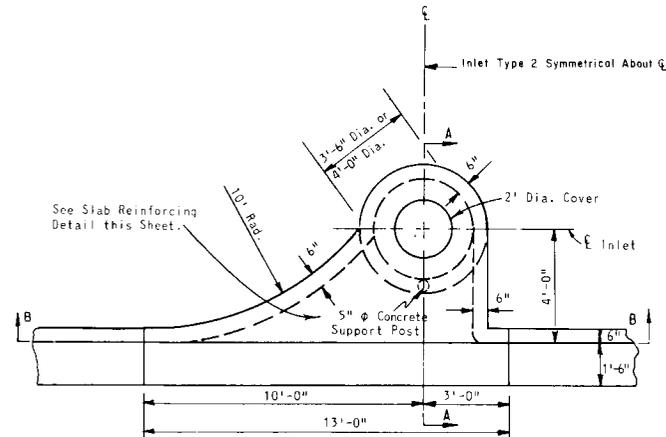
GENERAL NOTES

- For non-circular precast drainage structures either deformed or smooth welded wire fabric may be used based on substitution of equal steel areas provided:
 - The smooth welded wire fabric shall comply with ASTM A-185, and deformed welded wire fabric shall comply with ASTM A-497.
 - Substitution of equal areas of wire fabric for the reinforcing steel [AASHTO I.5.2 (B)] and provided the width and length of the unit is four times the width of the spacing of the cross wires [AASHTO I.5.20].
 - Wire shall be continuous around the box and spliced at a quarter point of one side with an overlap of not less than the spacing of the cross wires plus two inches [AASHTO I.5.22 (D)].

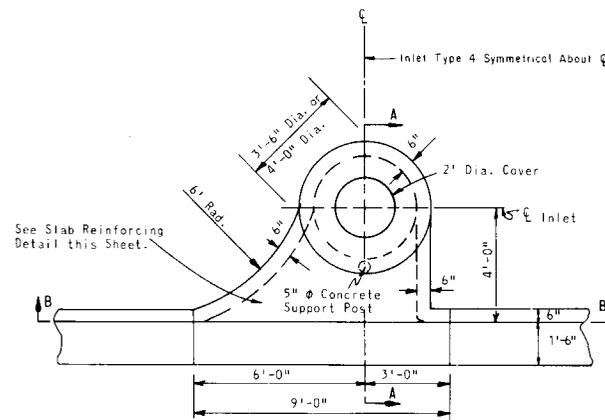
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS			
Designed by	Name	Date	Approved By
Drawn by	HLB	4/75	<i>P. J. ...</i> District Design Engineer, Roadways
Checked by	LMF	4/75	Revision No. Sheet No. Index No.
F. H. W. A.	Approved: 10/7/80	82	2 of 2 201

GENERAL NOTES

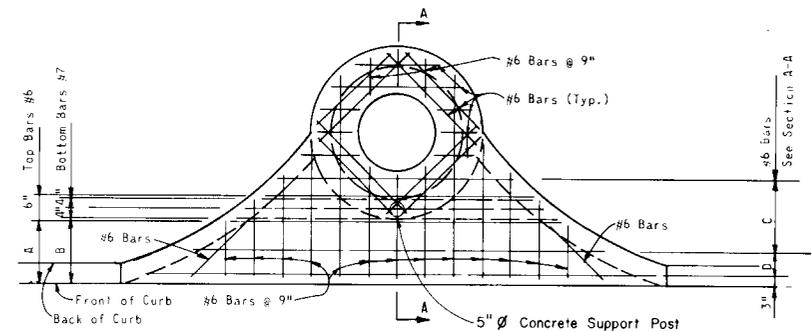
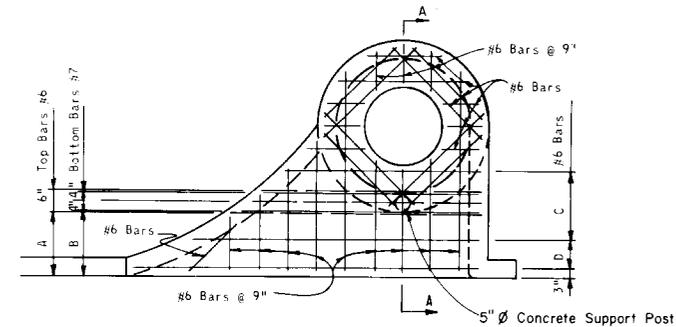
1. The finished grade and slope of the inlet tops are to conform with the finished cross slope and and grade of the proposed sidewalk and/or border.
2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
3. All steel in inlet tops shall have $\frac{1}{4}$ " minimum cover unless otherwise shown. Inlet tops shall be either cast-in-place or precast concrete.
4. The rear wall portion of inlet types 1, 2, 3 & 4 may be constructed with brick. Dowels to top slab required.
5. Only round concrete support post will be acceptable.
6. For supplemental details see index No. 201.
7. These inlets are to be used with Curb and Gutter Types E and F. Locate outside of pedestrian cross traffic if possible.
8. For structure bottoms see index No. 200.



INLET TYPE 1
Inlet Type 2 Symmetrical About C

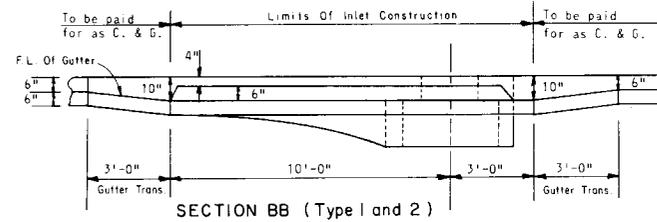


INLET TYPE 3
Inlet Type 4 Symmetrical About C

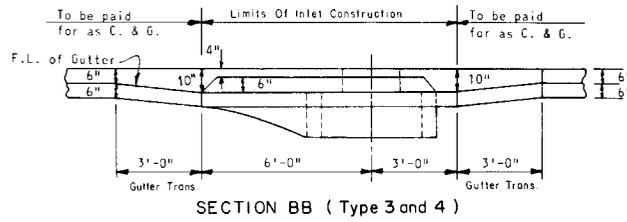


DIMENSION	3'-6"	4'-0"
A	1'-9"	1'-6"
B	1'-8"	1'-5"
C	1'-9"	1'-10 1/2"
D	9"	7 1/2"

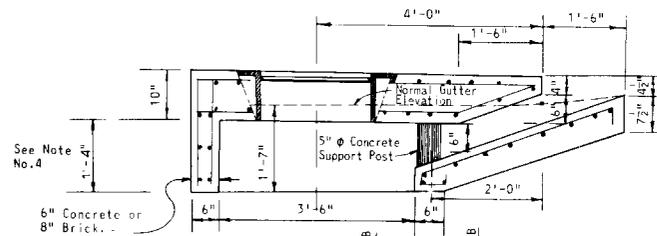
SLAB REINFORCING INLETS 1, 2, 3 and 4



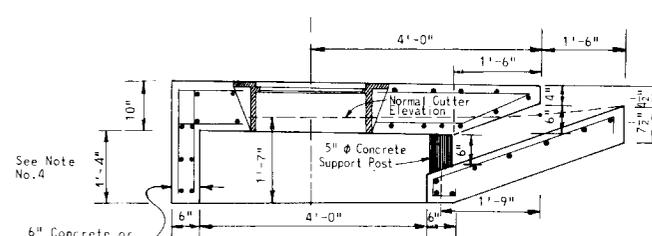
SECTION BB (Type 1 and 2)



SECTION BB (Type 3 and 4)

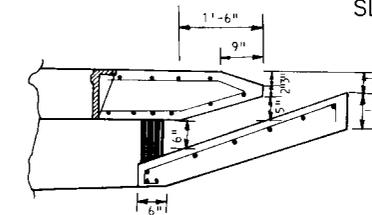


3'-6" Diameter



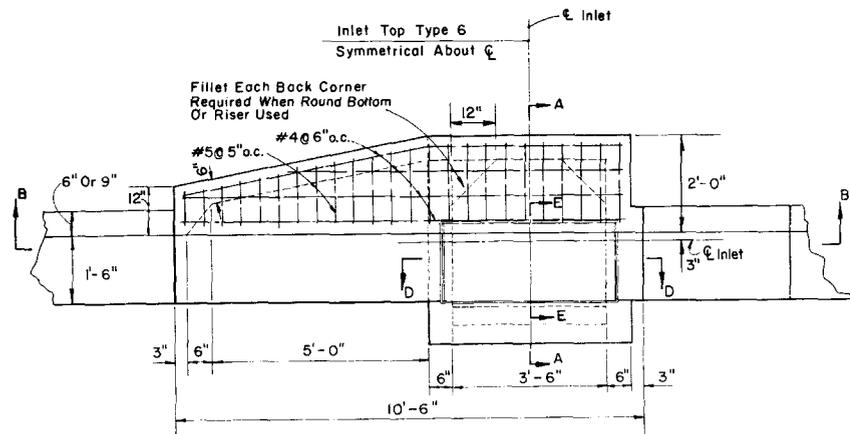
4'-6" Diameter

SECTIONS AA FOR INLETS TYPES 1, 2, 3, and 4

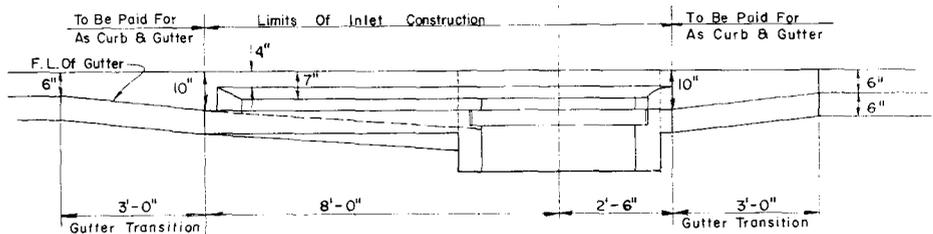


INLET TOP MODIFICATION FOR TYPE E CURB

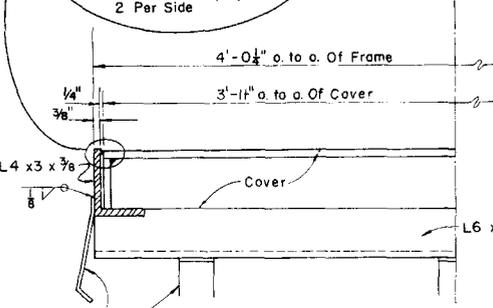
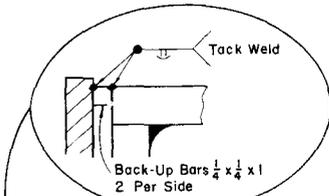
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB INLET TOPS TYPES 1, 2, 3, & 4			
Designed by	Names	Dates	Approved By
Drawn by			<i>J. C. Hill</i> Deputy Design Engineer, Roadways
Checked by			Revision No. Sheet No. Index No.
F.H.W.A. Approved: 5/1/75		82	1 of 1 210



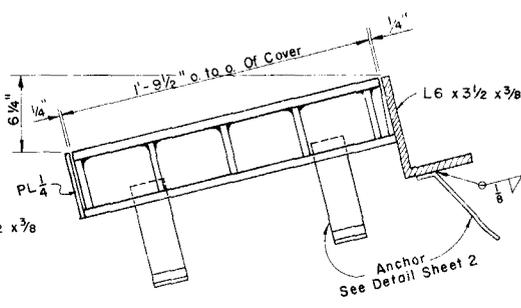
TOP VIEW
INLET TYPE 5
(Curb Inlet Top Type 6 Symmetrical With Left Half)



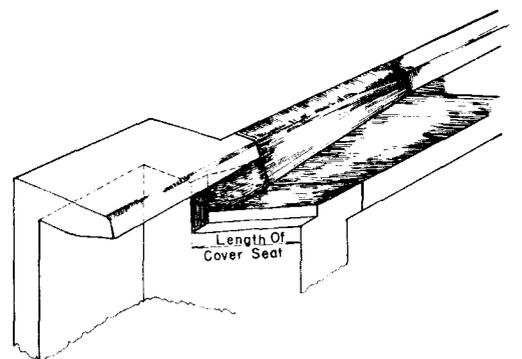
SECTION BB



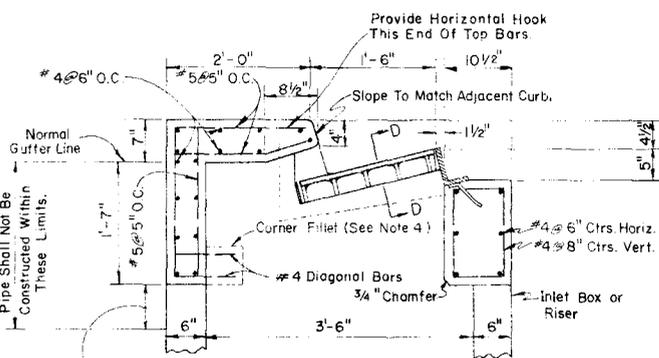
HALF SECTION DD
(For Steel Cover)



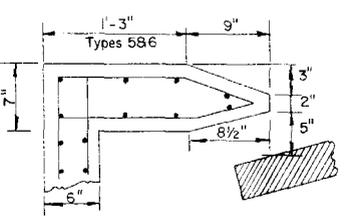
SECTION EE
(For Steel Cover)



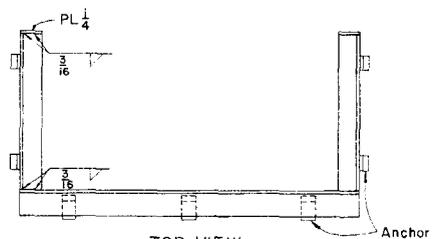
SKETCH SHOWING FRAME SEAT AND THROAT RECESS
(All Covers Are Removable)



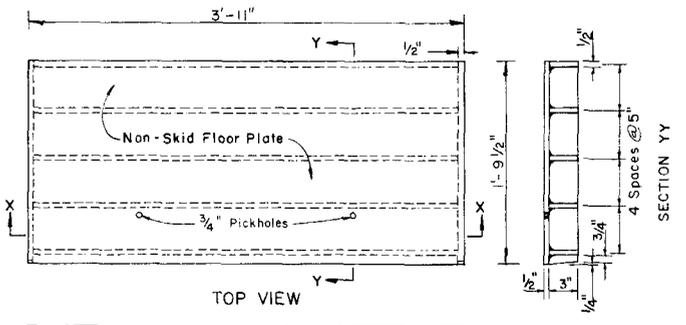
SECTION AA
(Showing Steel Cover)



INLET TOP MODIFICATION
FOR TYPE E CURB



TOP VIEW
FRAME
(For Steel Cover)

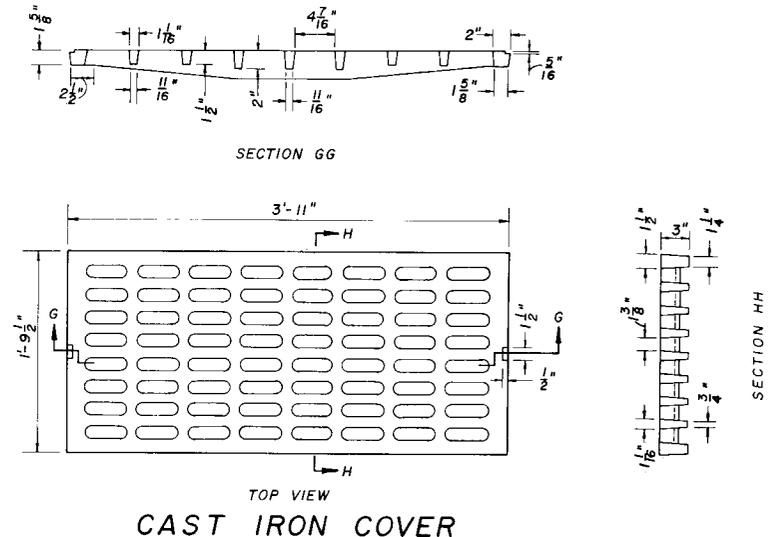
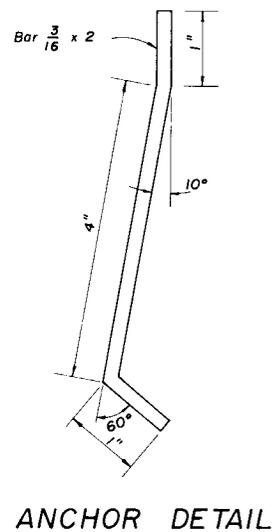
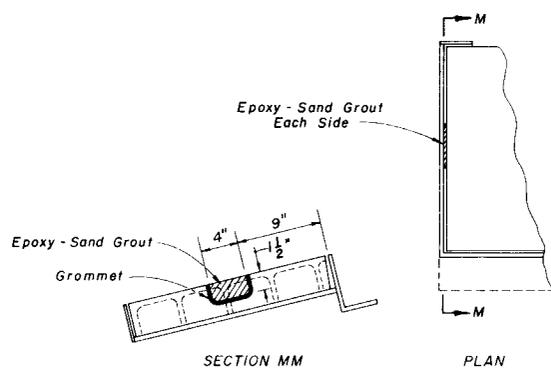
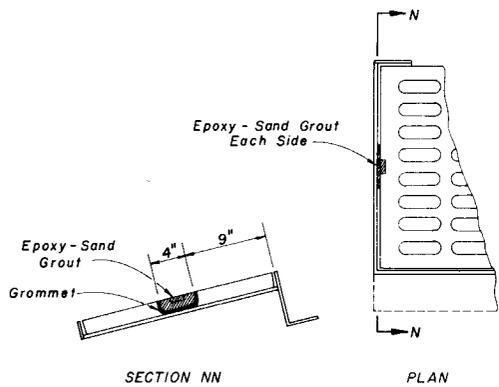


TOP VIEW
SECTION XX
STEEL COVER

(See Sheet 2 of 2 For Cast Iron Cover And Frame)

- GENERAL NOTES:
1. The finished grade and slope of the inlet tops are to conform with the finished cross slope and grade of the proposed sidewalk and/or parkway.
 2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
 3. All reinforcing steel shall have 1 1/2" minimum cover unless otherwise shown. Inlet tops shall be either cast-in-place or precast concrete.
 4. The corner fillets shown for rectangular throats are necessary only when throats are to be used in conjunction with circular inlet bottoms or when used on skew with rectangular inlet boxes.
 5. For inlet bottoms see Index No. 200.
 6. These inlet tops are designed for use with standard curb and gutter Type E and Type F. Locate outside of pedestrian cross traffic if possible.
 7. See Index 201 for supplemental details.
 8. All steel used for frame and cover shall meet the requirements of ASTM A-36.
 9. Either cast iron covers or steel covers may be used. Iron covers shall be Class No. 30 castings in accordance with ASTM A-48B.
 10. When Alternate "G" Cover is specified in plans either the cast iron cover and galvanized steel frame or the galvanized steel cover and frame must be used. Covers are to be grouted in accordance with the grouting detail shown on sheet 2 of 2, in lieu of tack welding.
 11. Tack weld cover to frame with back-up bars or clips.

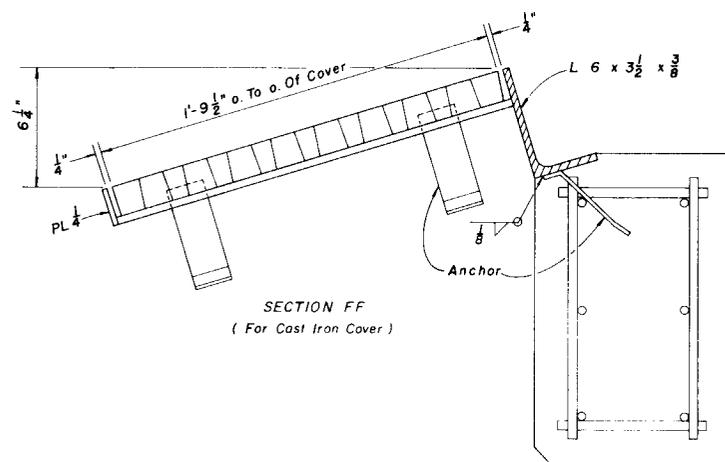
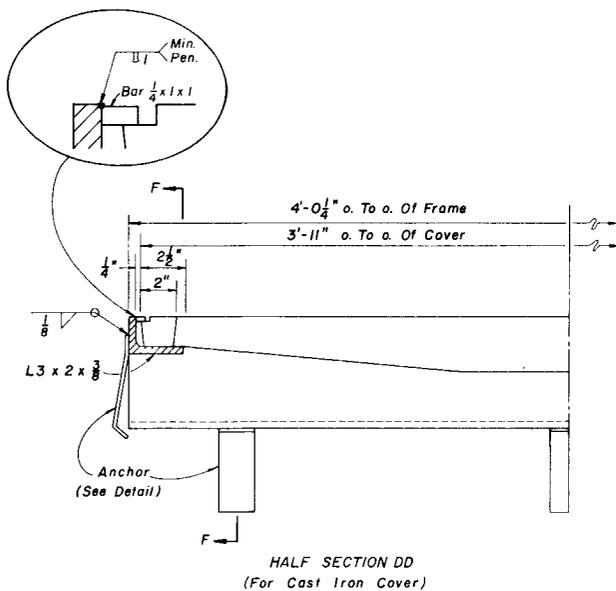
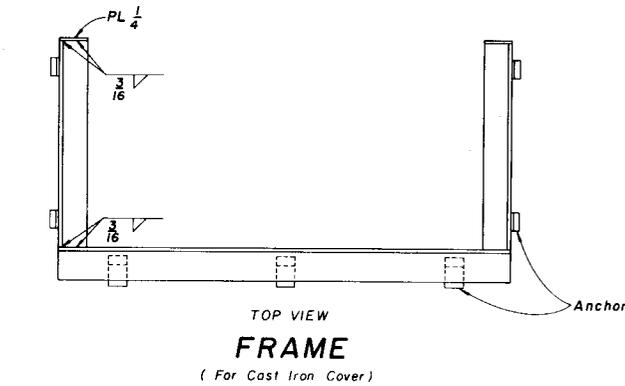
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB INLET TOPS TYPES 5 & 6			
Designer By:	Checked By:	Approved By:	<i>J.C. Phillips</i> Deputy Design Engineer, Roadways
Drawn By:	Revision No.:	Sheet No.:	
Checked By:	Index No.:	Index No.:	
F.H.W.A. Approved:	82	1 of 2	



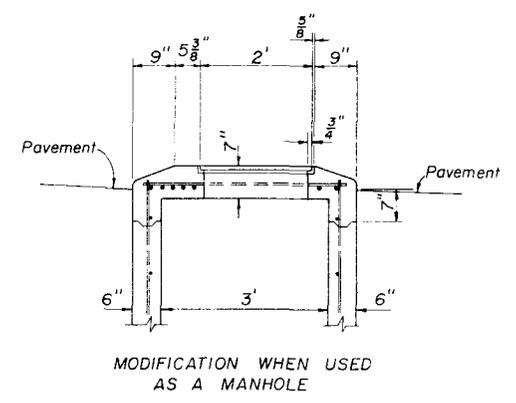
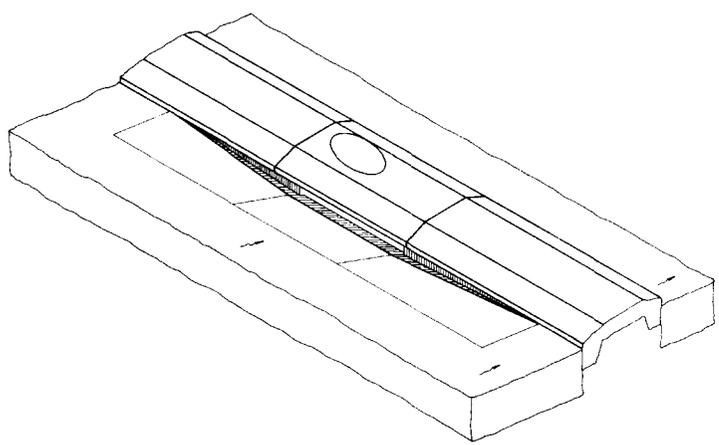
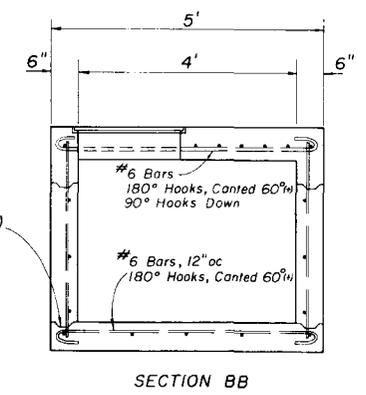
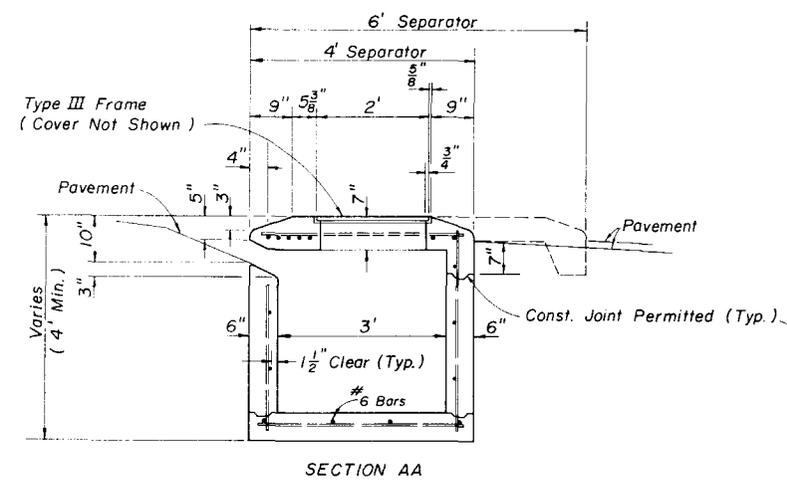
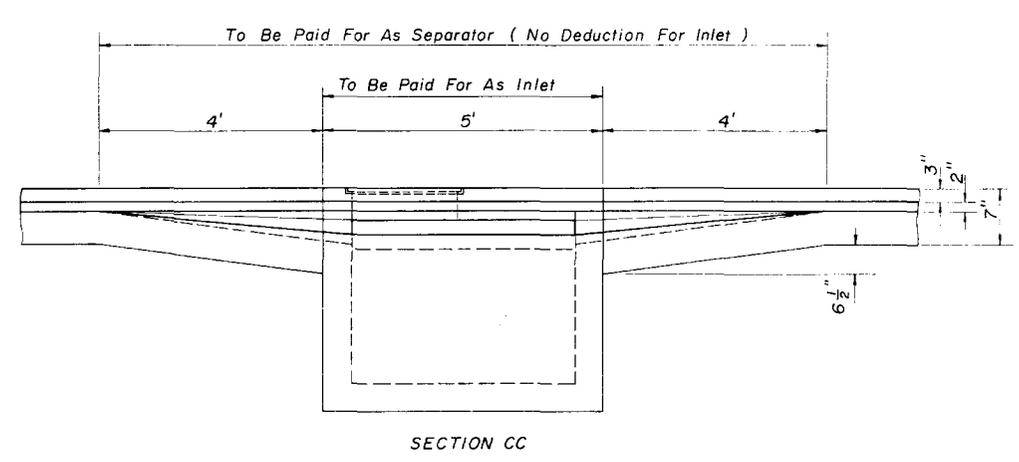
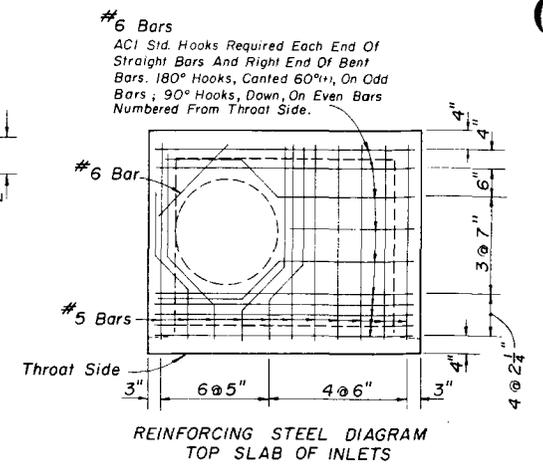
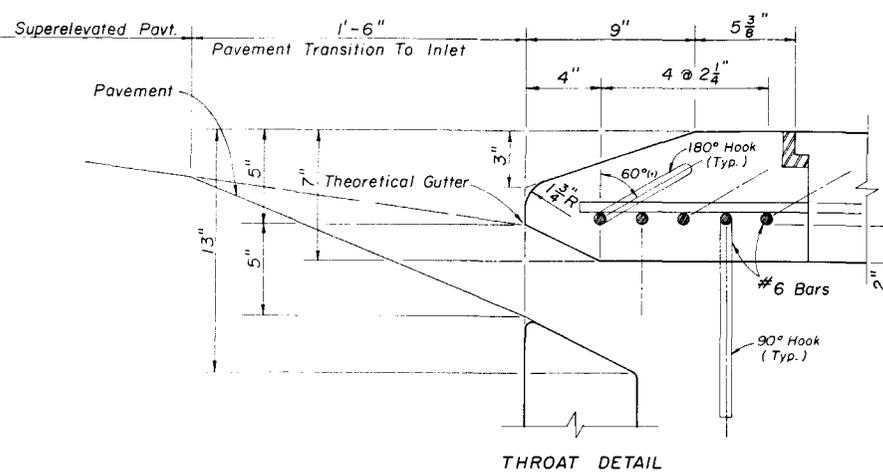
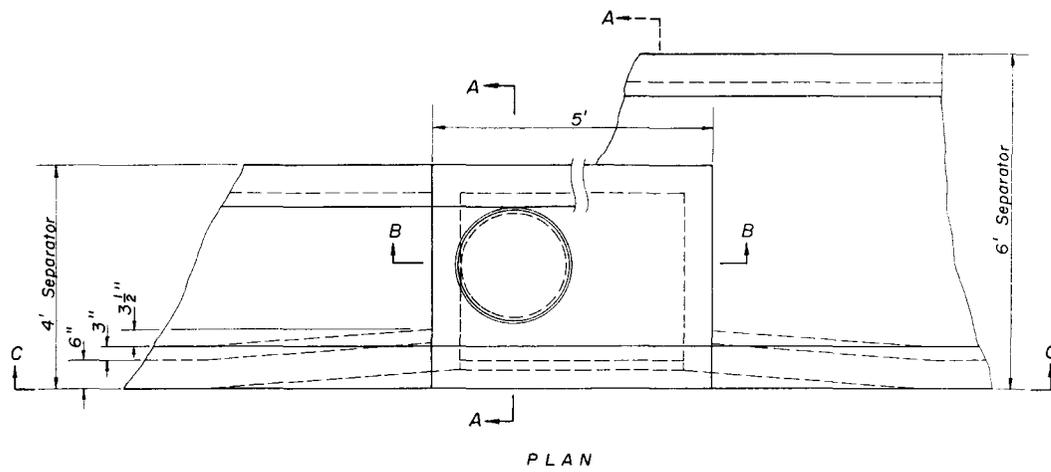
CAST IRON COVER AND GALVANIZED STEEL FRAME

GALVANIZED STEEL COVER AND FRAME

ALTERNATE G DETAIL

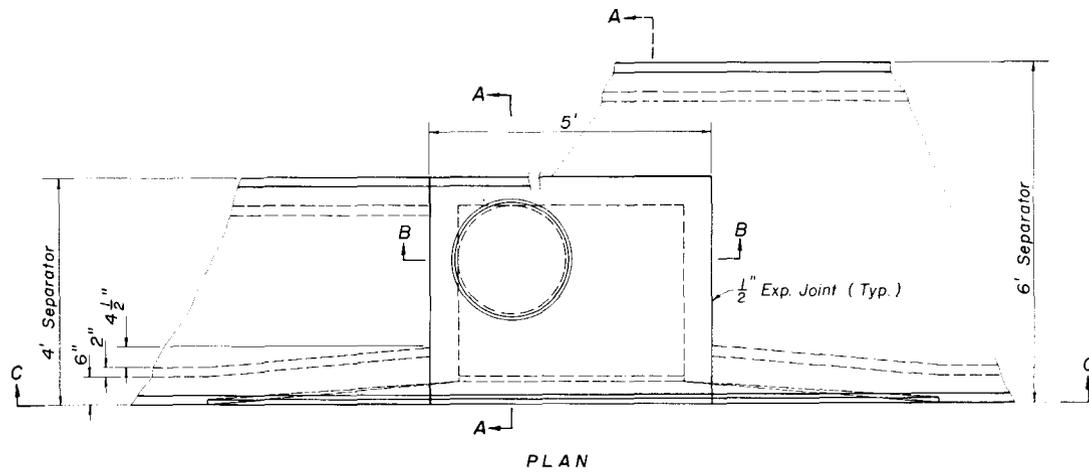


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CURB INLET TOPS TYPES 5 & 6					
Designed by	Names	Dates	Approved By		
Drawn by			<i>De Balleh</i> Deputy Design Engineer, Roadways		
Checked by			Revision No.	Sheet No.	Index No.
F.H.W.A. Approved:			82	2 of 2	211

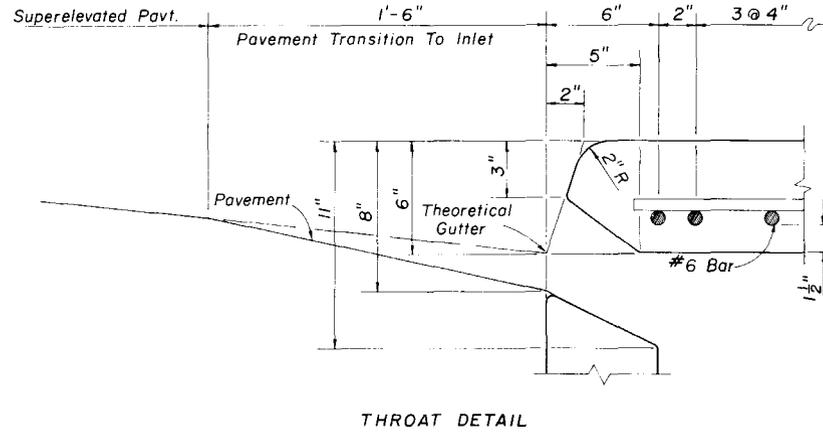


- GENERAL NOTES**
1. This inlet is used in Traffic Separators Types I and II that are located in medians constructed with Curbs Types A, B and E. Use of this Inlet on through traffic side of the separator is not permitted in medians with Curbs Types A and B. Locate inlet outside of pedestrian cross traffic.
 2. No. 4 reinforcing bars 12" centers unless otherwise noted.
 3. Cut and bend bars out of way of pipe when necessary. Bars to clear pipe by 1 1/2".
 4. For supplementary details see Index No. 201.
 5. Maximum recommended pipe sizes are 30" longitudinal and 36" transverse. For larger pipe, a J-B Bottom may be substituted.

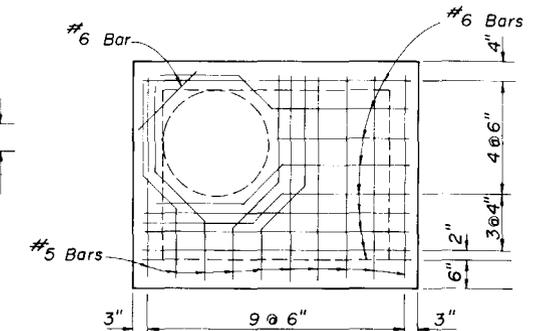
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB INLET TYPE 7			
Designed by	EGR	8/81	Approved By
Drawn by	HSD	8/81	
Checked by	JG	8/81	Deputy Design Engineer, Roadways
Revision No.		Sheet No.	Index No.
F.H.W.A. Approved: 10/8/81		82	1 of 1 212



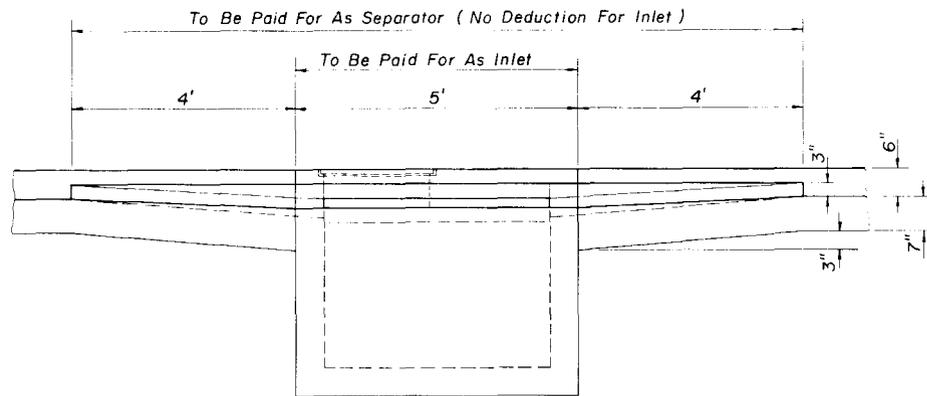
PLAN



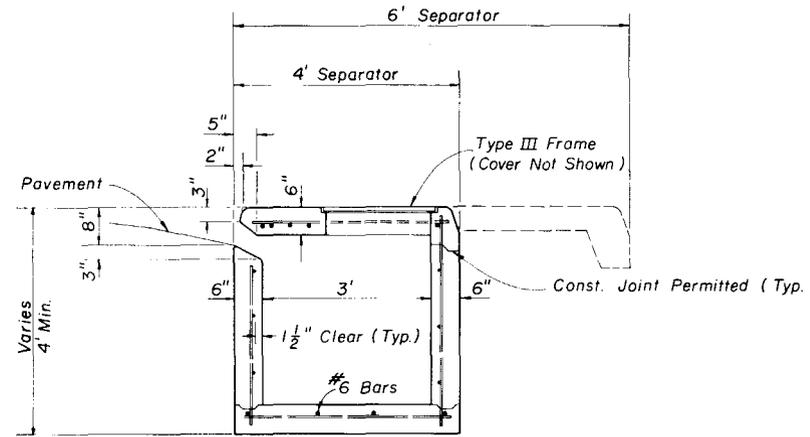
THROAT DETAIL



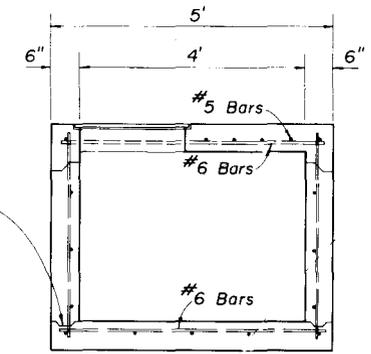
REINFORCING STEEL DIAGRAM
TOP SLAB OF INLET



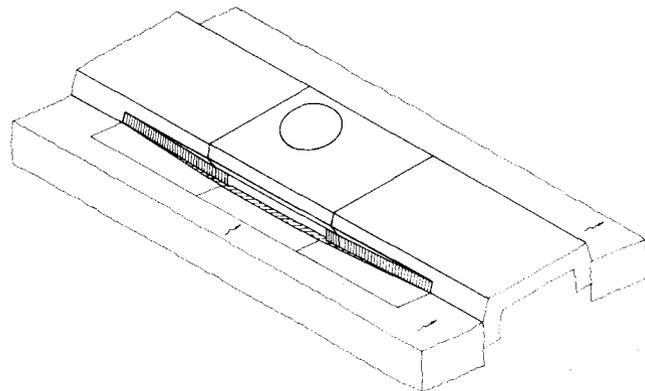
SECTION CC



SECTION AA



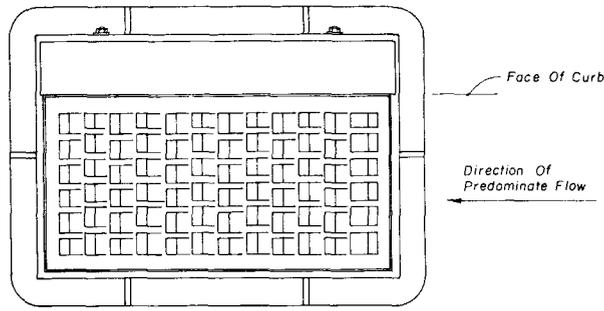
SECTION BB



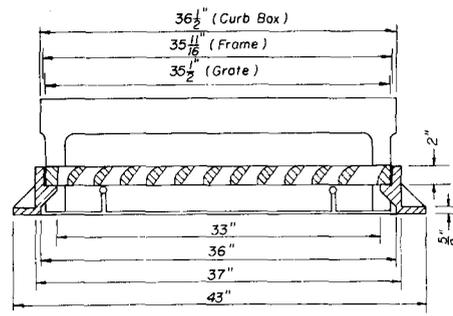
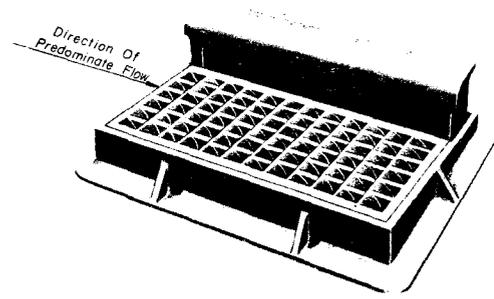
GENERAL NOTES

1. This inlet is to be used only in Traffic Separators Types IV and V that are located in medians constructed with Curbs Types D and F. Use of this inlet on the through traffic side of the separator should be avoided in medians constructed with Curb Type D (Curb Inlets Types 9 or 10 are recommended). Locate inlet outside of pedestrian cross traffic.
2. No. 4 reinforcing bars 12" centers unless otherwise noted.
3. Cut and bend bars out of way of pipe when necessary. Bars to clear pipe by 1 1/2".
4. For supplemental details see Index 201.

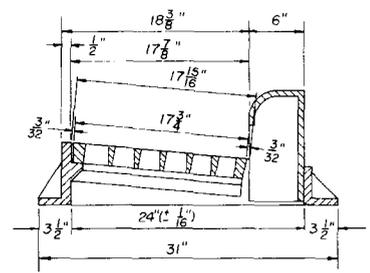
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
CURB INLET TYPE 8				
Designed by	Names	Dates	Approved By	
Drawn by	HSD	7/81	Deputy Design Engineer, Roadways	
Checked by	JG	7/81	Revision No	Sheet No
F.H.W.A. Approved:	10/8/81	82	1 of 1	213



TOP VIEW

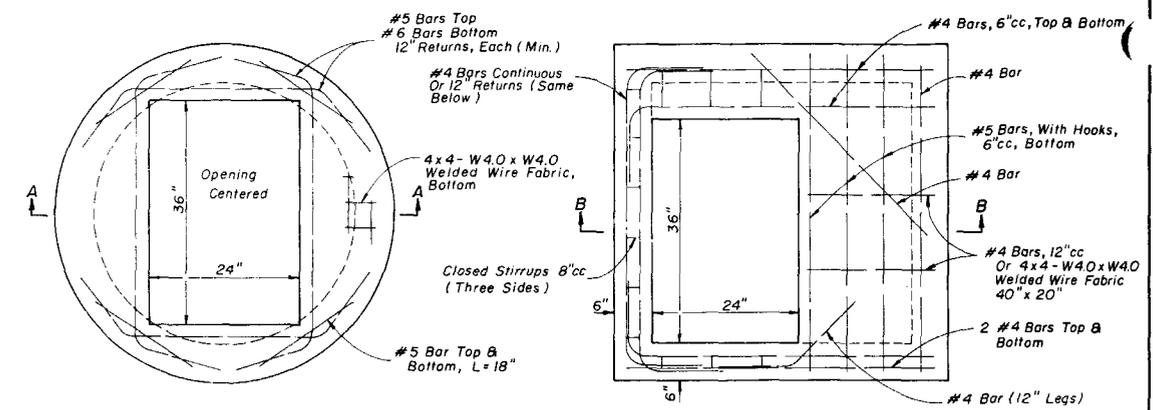


LONGITUDINAL SECTION



TRANSVERSE SECTION

FRAME AND GRATE



SECTION AA

SECTION BB

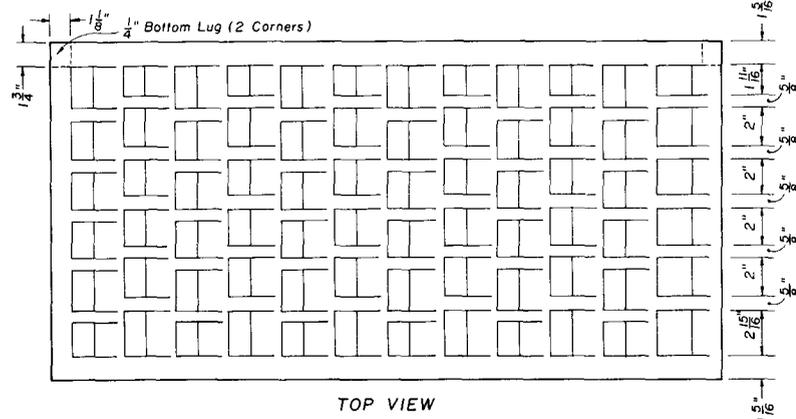
FOR BOTTOM TYPE P & RISER TYPE J (ALTERNATES A)

FOR BOTTOM TYPE P & RISER TYPE J (ALTERNATES B)

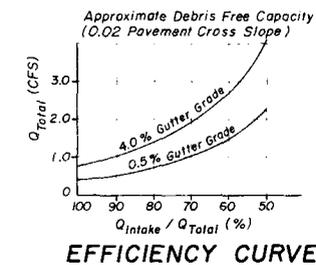
TOP SLABS

GENERAL NOTES

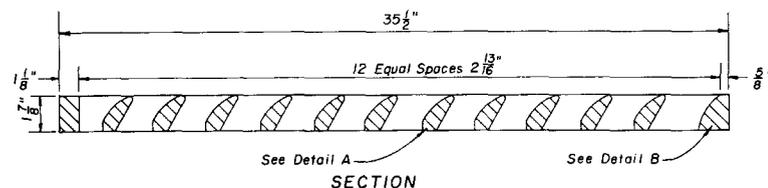
1. This inlet is primarily intended for locations with light to moderate flows where right of way does not permit the use of throat Curb Inlets Types 1 through 6. The typical application is on curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.
2. This inlet to be located in vertical faced curbs such as Curb and Gutter Type F. Grate shall be oriented with vanes directed toward predominate flow.
3. For structure bottoms and risers see Index No. 200. For supplemental details see Index 201.
4. All steel in slab tops shall have 1 1/4\"/>



TOP VIEW

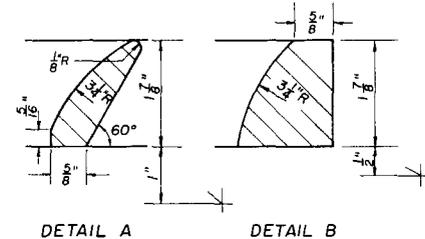


EFFICIENCY CURVE



SECTION

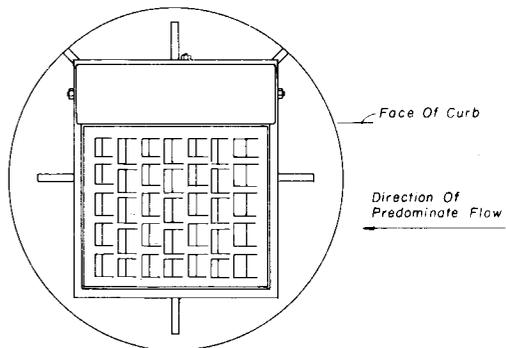
GRATE DETAIL



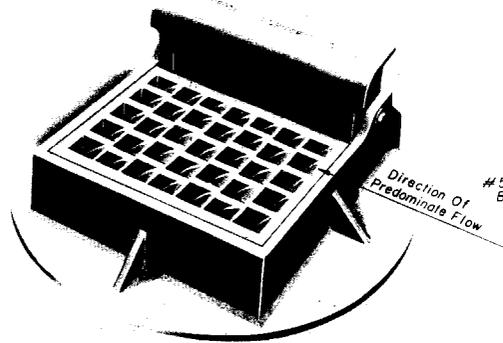
DETAIL A

DETAIL B

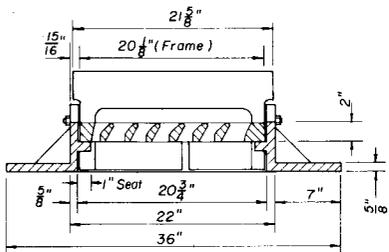
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
CURB INLET TYPE 9				
Designed by	EGR	Dates	Approved By	
Drawn by	HSD	1/81	Deputy Design Engineer, Roadways	
Checked by	JVG	1/81	Revision No.	Sheet No.
F.H.W.A. Approved: 10/8/81	82	1 of 1	214	



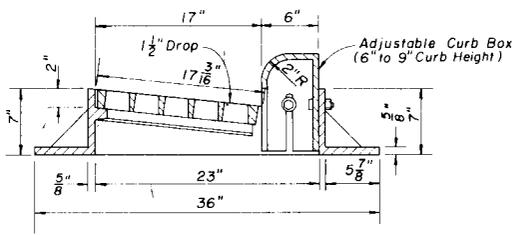
TOP VIEW



#5 Bars, With Hooks, 4" cc, Bottom, 4 Sides

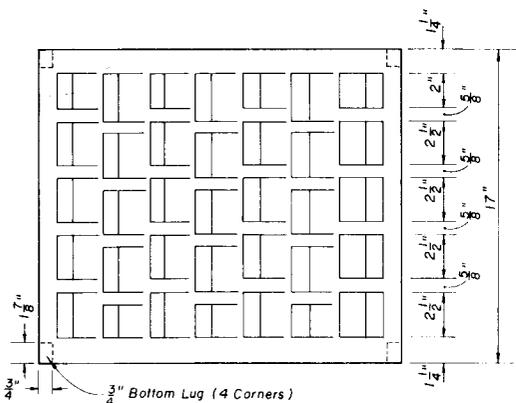


LONGITUDINAL SECTION

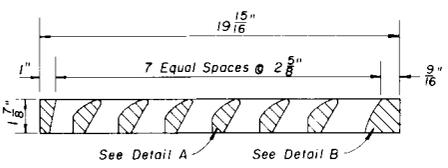


TRANSVERSE SECTION

FRAME AND GRATE

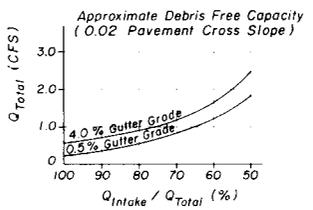


PLAN

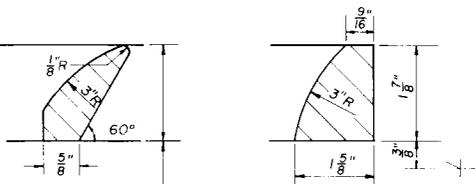


SECTION

GRATE DETAIL

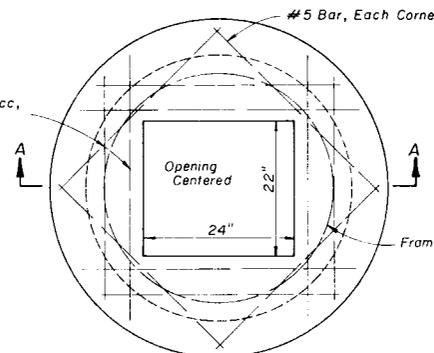


EFFICIENCY CURVE

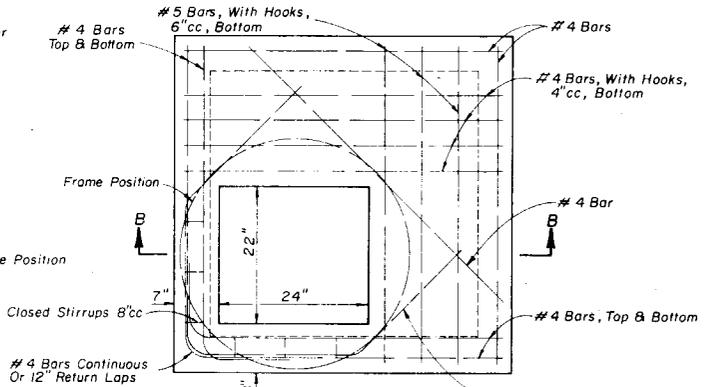


DETAIL A

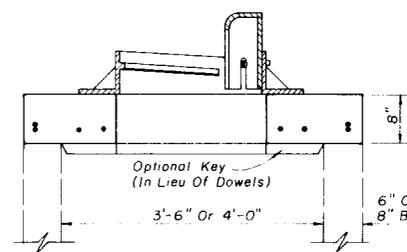
DETAIL B



TOP VIEW

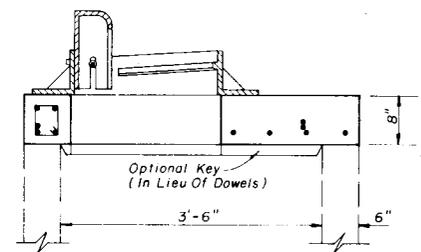


TOP VIEW



SECTION AA

FOR BOTTOM TYPE P & RISER TYPE J (ALTERNATES A)



SECTION BB

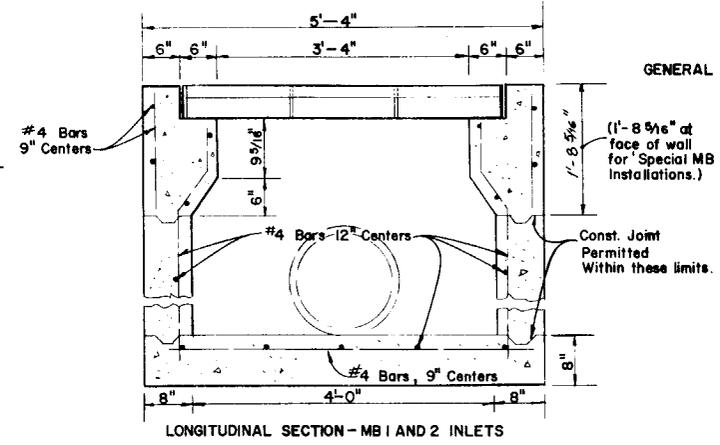
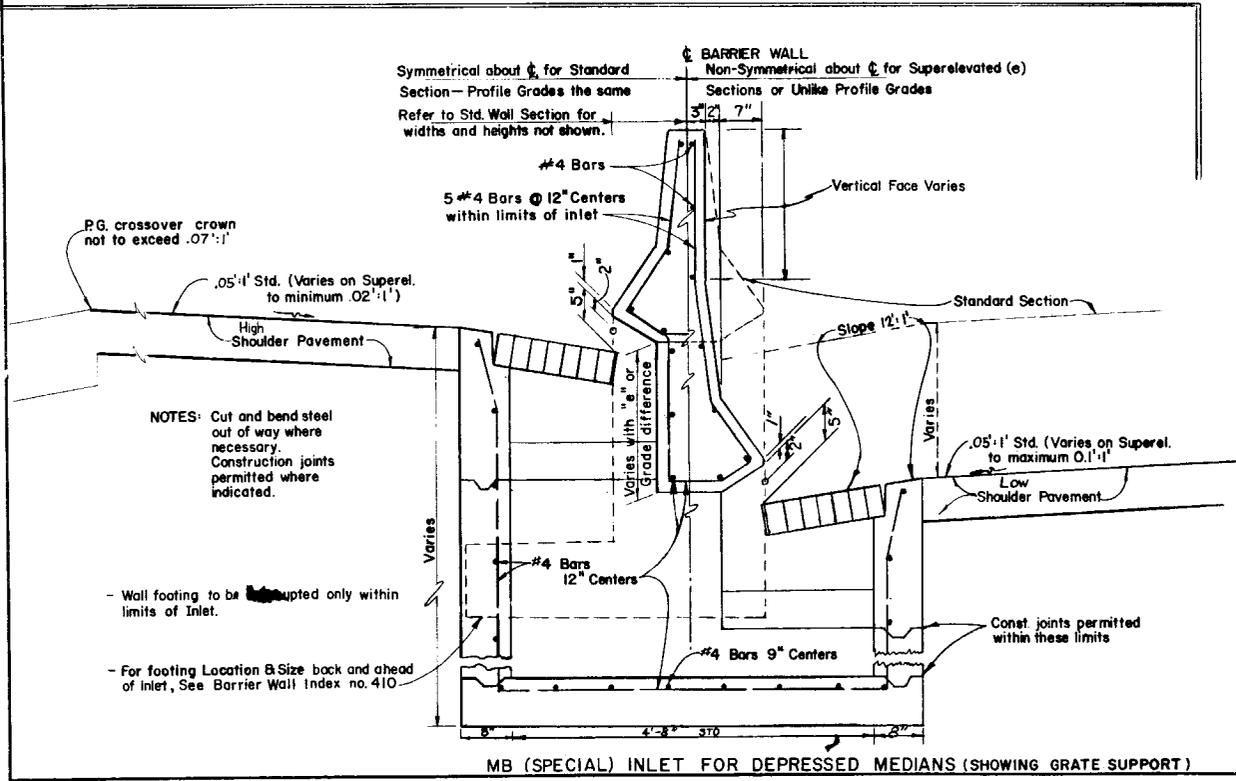
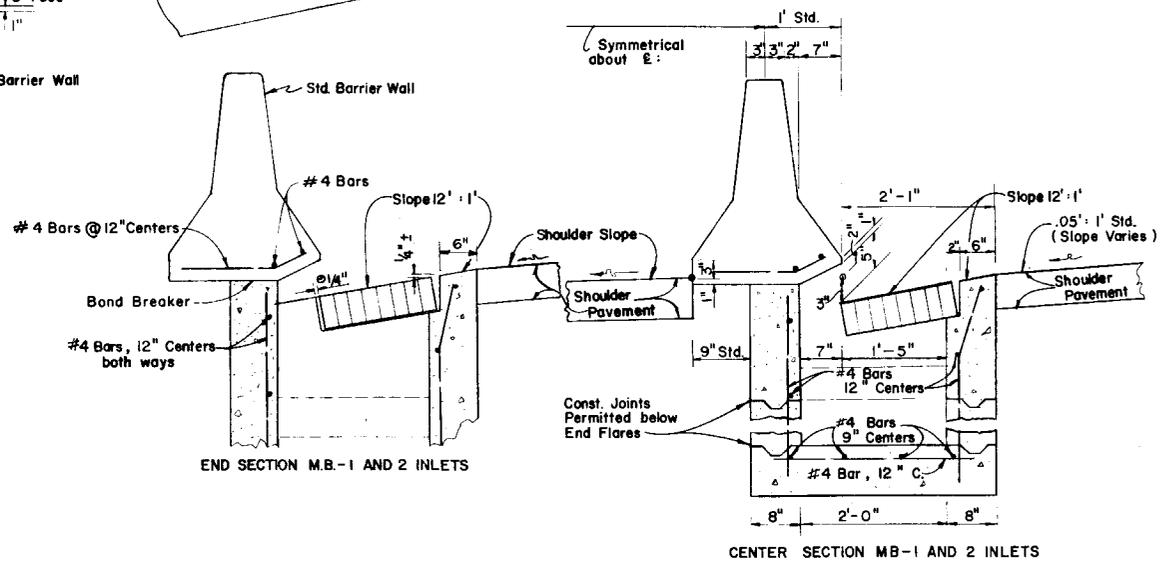
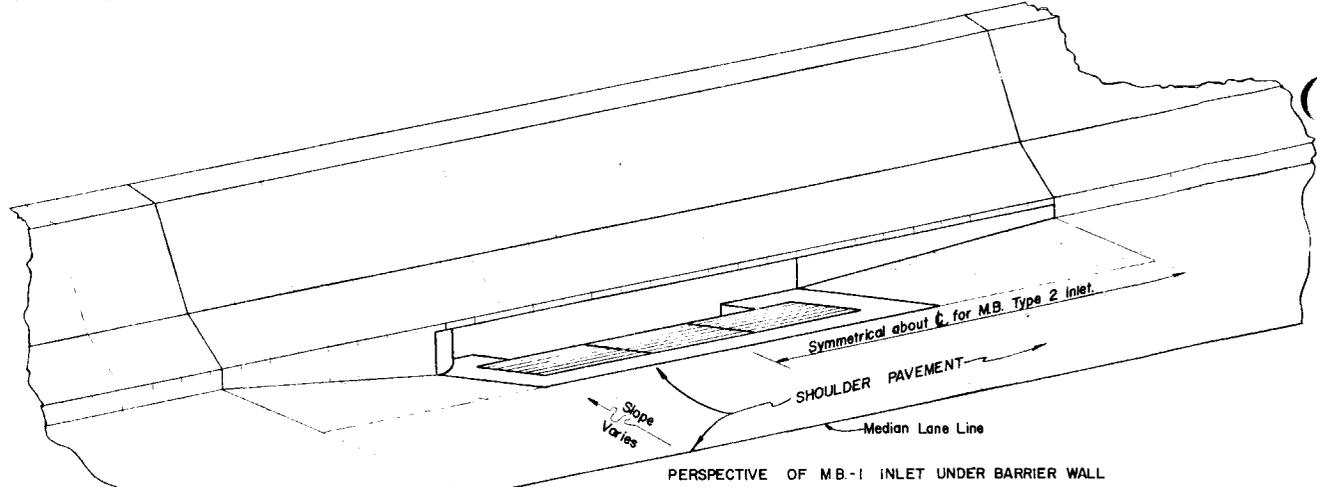
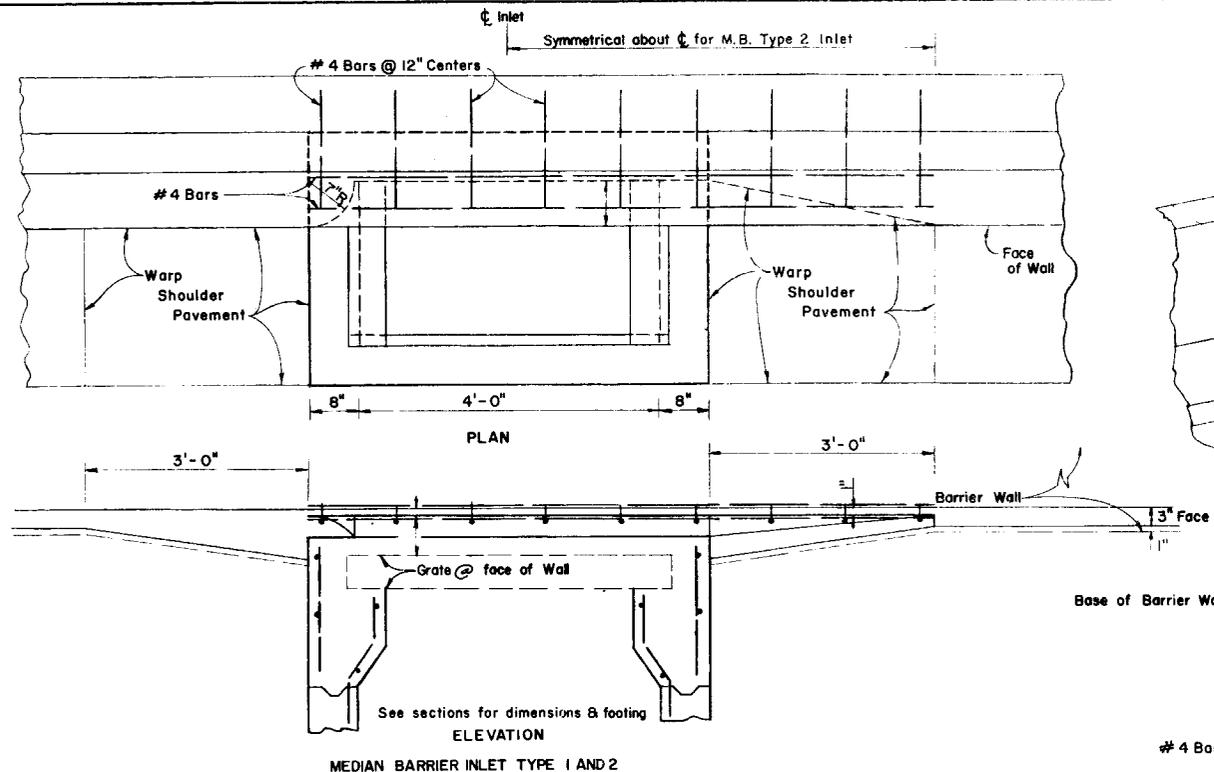
FOR BOTTOM TYPE P & RISER TYPE J (ALTERNATES B)

TOP SLABS

GENERAL NOTES

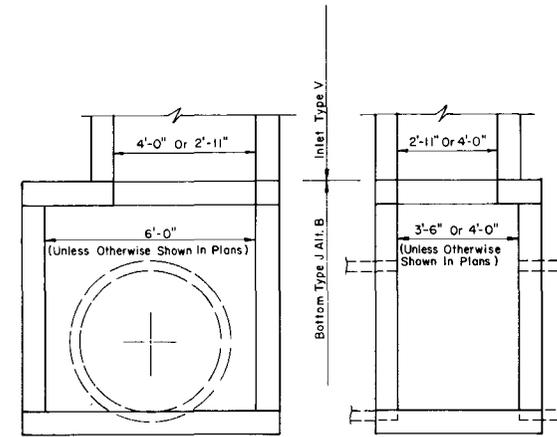
1. This inlet is primarily intended for locations with light flows where right of way does not permit the use of throated Curb Inlets Types 1 through 6. The typical application is on curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.
2. This inlet to be located in vertical faced curbs such as Curb and Gutter Type F. Grate shall be oriented with vanes directed toward predominate flow.
3. For structure bottoms and risers see Index No. 200. For supplemental details see Index 201.
4. All steel in slab tops shall have 1 1/4" minimum cover unless otherwise shown. Tops shall be either cast-in-place or precast concrete.
5. For Alternate B applications, top slab openings shall be placed such that 2 edges of inlet frame will be located directly above bottom or riser walls.
6. For bottom Type J applications without riser use top Type 7-T Index 200. Form opening in top slab as detailed above.
7. Frame may be adjusted with one to six courses of brick.
8. Inlet and grate detail shown is Neenah R-3065-L. Vaned grates with approximately equal openings will be permitted that satisfy AASHTO H-20 loading. Inlet and grate shall be Class 30 castings in accordance with ASTM A 48. Grates shall be reversible, left or right.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB INLET TYPE 10			
Designed By EGR	Dates	Approved By	
Drawn by HSD	1/81	Deputy Design Engineer, Roadways	
Checked by JVG	1/81		
FHWA Approved: 10/8/81		Revision No. 82	Sheet No. 1 of 1
		Index No. 215	



- GENERAL NOTES:
1. For standard barrier wall dimensions, see Index No. 410.
 2. For flow channel details see Index No. 201.
 3. For grate details see Index No. 220. In those rare situations where bicycle traffic is anticipated, the grate type should be changed to Index No. 221.
 4. Theoretical grade point at junction of 3" barrier wall face and pavement.
 5. For barrier wall dimensions, incorporating Light Standards within wall, refer to Index No. 410.
 6. Minimum cover for reinforcing steel shall be 2".

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
MEDIAN BARRIER INLETS TYPES 1 AND 2			
Designed by	AF	Date	9/73
Drawn by		Approved By	<i>D. C. Hill</i> Deputy Design Engineer, Roadways
Checked by	EGR	Revision No.	80
F.H.W.A. Approved: 10/8/76		Sheet No.	1 of 1
		Index No.	217

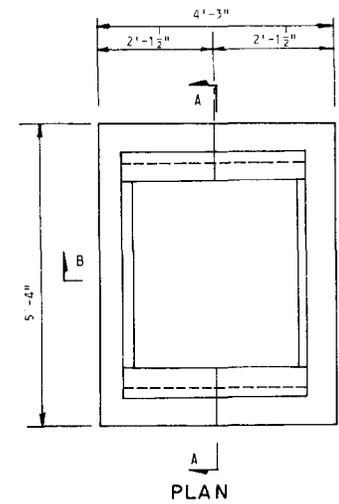


Note: Structure Bottom Type J, Alt. B Only. See Index 200.

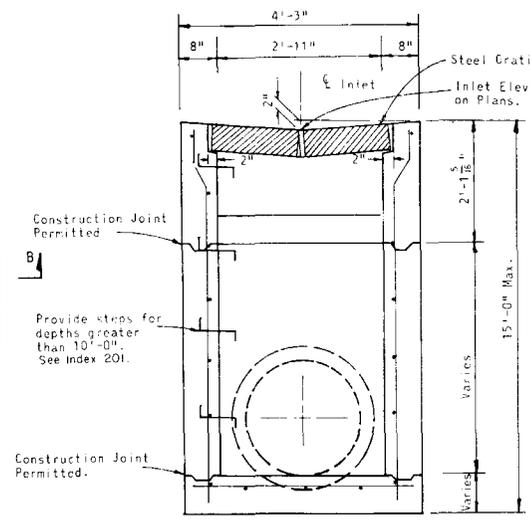
INLET WITH BOTTOM TYPE J
(For Pipes 30" Dia. And Larger)

GENERAL NOTES

1. All exposed edges and corners shall be tooled to $\frac{1}{4}$ " radius.
2. For supplementary details see index no. 201.
3. This inlet was designed for village swales, ditches, or other areas subject to heavy wheel loads where debris is minimum and it is subject to pedestrian and/or bicycle traffic.
4. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
5. Grate and top of structure shall be true to grade shown on plans.

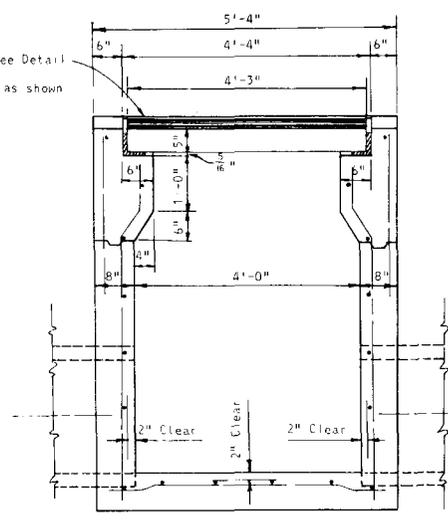


PLAN



SECTION BB

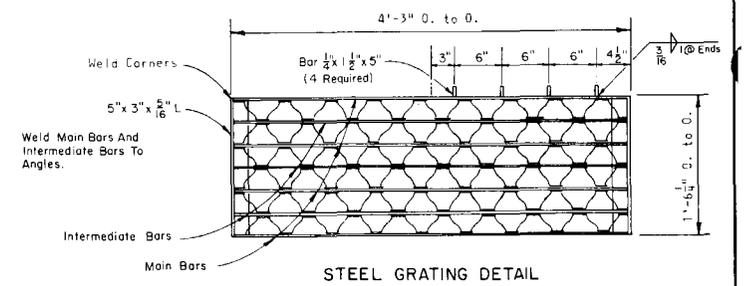
(For Pipes 24" Dia. And Under)



SECTION AA

NOTE: All Reinforcing Steel Bars are $\frac{3}{8}$ " ϕ @ 12" Ctrs.

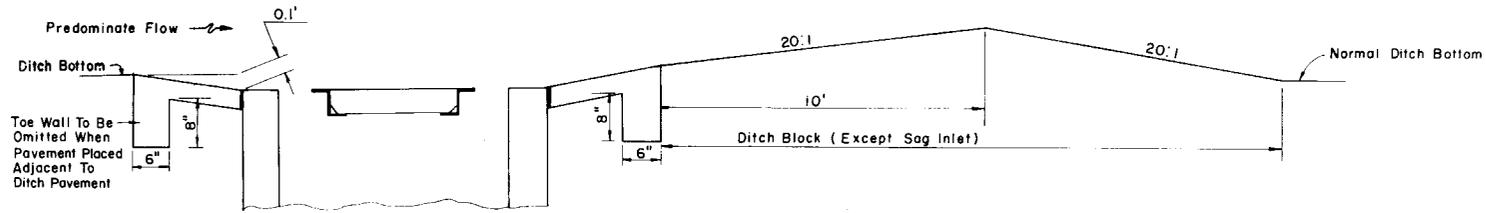
NOTE: Cut and bend bars out of way of pipe when necessary. Bars to clear pipe $1\frac{1}{2}$ ".



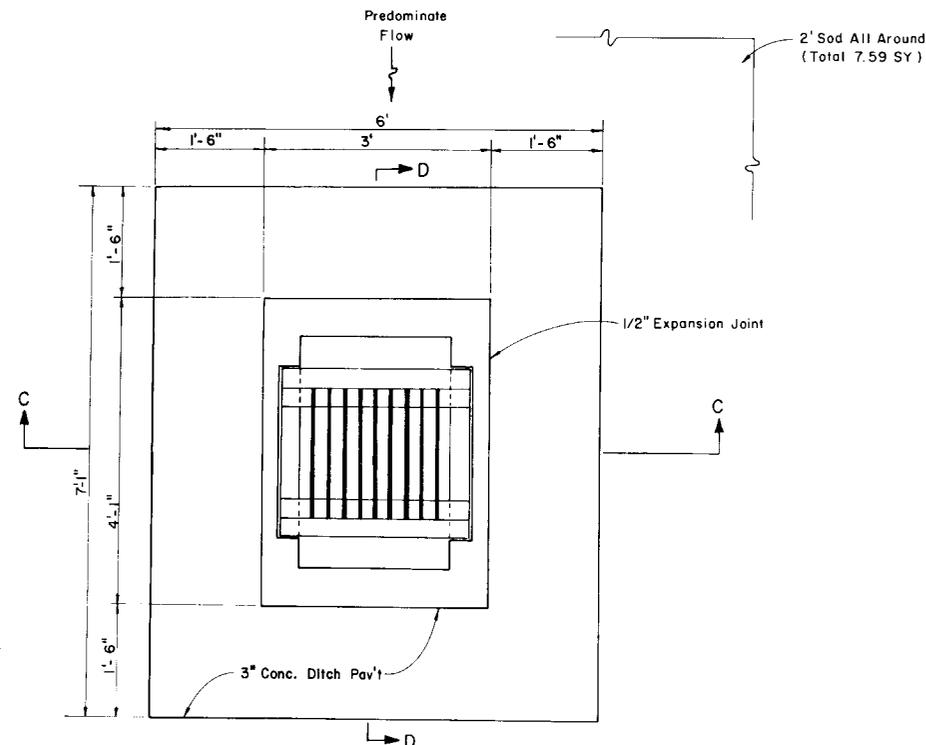
STEEL GRATING DETAIL

TWO REQUIRED PER INLET
 5" Steel Decking Main Bars 5" X $\frac{1}{4}$ "
 Intermediate Bars 1 1/2" X $\frac{1}{4}$ " Reticuline Bars 1 1/2" X $\frac{3}{16}$ "
 STEEL DECKING: MANUFACTURED BY BORDEN, FLORIDA STEEL, U.S. FOUNDRY IRVING, RELIANCE, GREULICH (OR EQUAL).

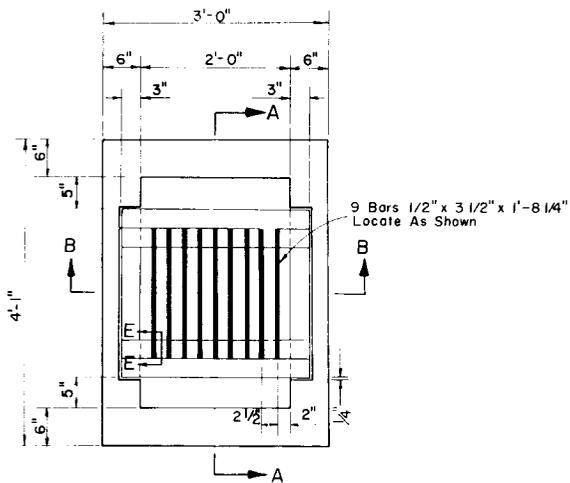
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
ROAD DESIGN				
GUTTER INLET TYPE V				
Designed by	Names	Dates	Approved By	
Drawn by	WHW	4/57	<i>J. Hall</i> Deputy Design Engineer, Roadways	
Checked by	RMM	4/57	Revision No.	Sheet No.
F.H.W.A. Approved: 5/1/75			81	1 of 1
				221



SECTION DD

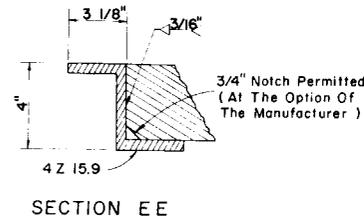


PAVEMENT DETAIL

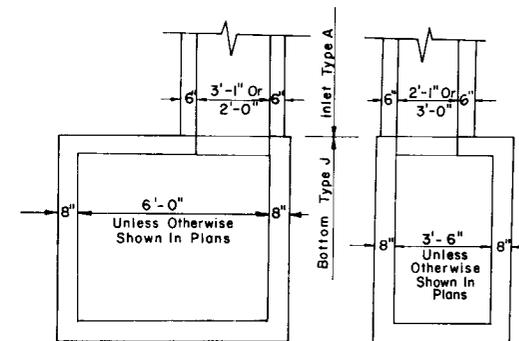


PLAN

Recommended Maximum Pipe Sizes
 2'-0" Side - 18" Pipe
 3'-1" Side - 24" Pipe
 For Larger Pipe Sizes See Note No. 9



SECTION EE

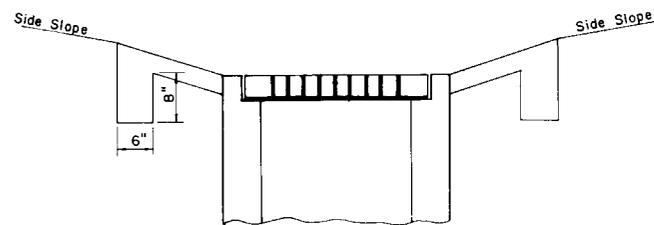


NOTES: Structure Bottom Type J, Alt. B only. See Index 200.
 Inlet to be oriented as required by Note # 5.

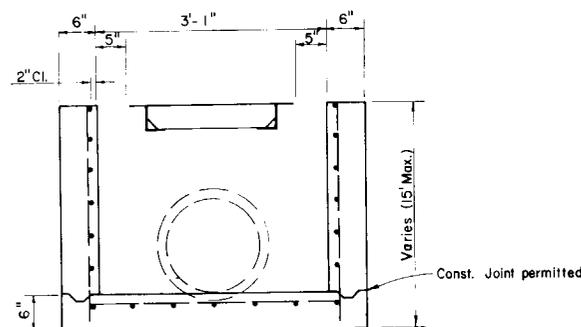
INLET WITH BOTTOM TYPE J

GENERAL NOTES

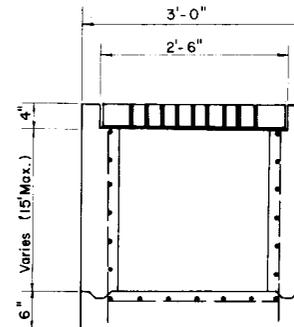
1. Cost of ditch paving to be included in cost of inlet.
2. Reinforcing - No. 4 bars at each 12" center both ways, 2" clearance to inside face.
3. Inlet to be used only where flow thru grate is less than 7 c.f.s.
4. Where material unsatisfactory for foundation is encountered at FL Elev. omit floor and carry walls down to satisfactory foundation. Backfill to FL with clean sand.
5. Direction of 1/2" x 3 1/2" bars to be in same direction as predominant flow.
6. Chamfer exposed edges. (3/4" chamfer.)
7. Cut and bend bars out of way of pipe when necessary. Bars to clear pipe by 1/2".
8. For supplemental detail, see Index 201.
9. Recommended maximum pipe sizes are for concrete pipe. Check larger sizes for fit. For larger pipe, Inlet Type B or Bottom Type J (see detail above) should be considered.
10. This inlet was designed for ditches, medians, or other areas subject to heavy wheel loads where debris may be a problem. It is not for use in areas subject to pedestrian and/or bicycle traffic.
11. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
12. Sodding to be paid for under contract unit price for Sodding, SY.



SECTION CC

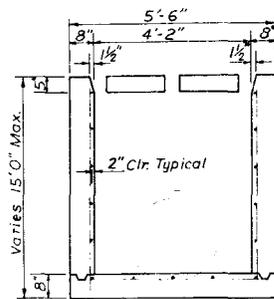
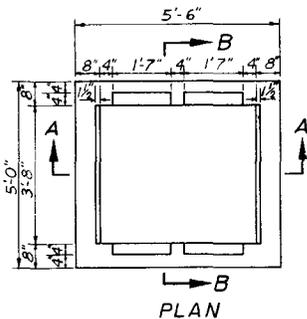


SECTION AA

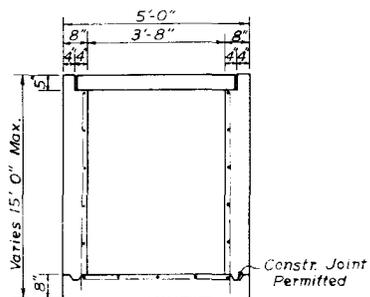


SECTION BB

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH BOTTOM INLET TYPE A			
Designed by	Notes	Date	Approved By
Drawn by			<i>De. [Signature]</i> Deputy Design Engineer, Roadways
Checked by			
Revision No.		Sheet No.	Index No.
F. H. W. A. Approved: 7/18/75		81	1 of 1
			230

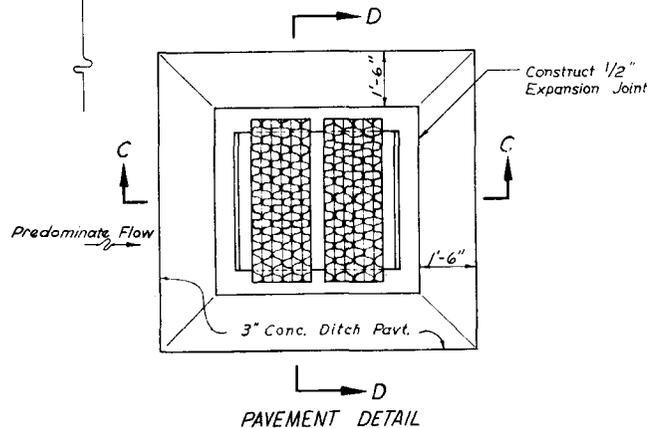


SECTION AA

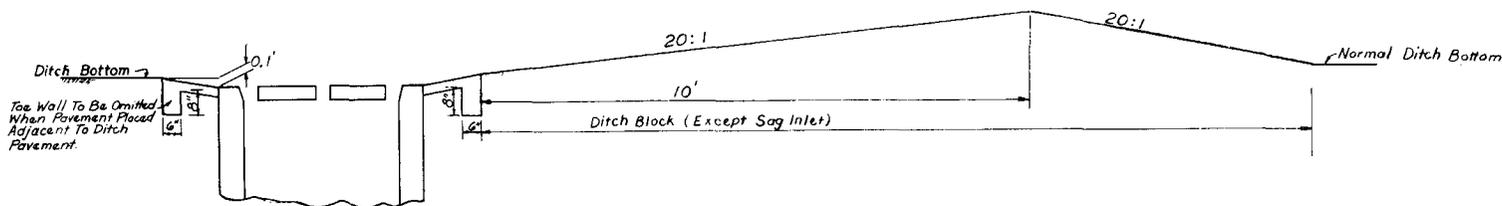


SECTION BB

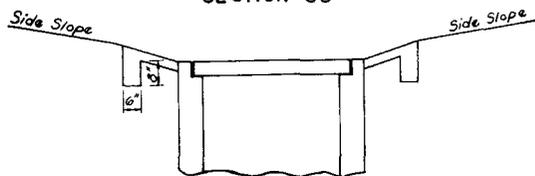
2' Sod All Around (Total 9.11 SY)



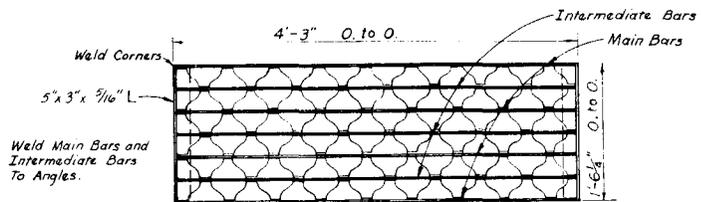
PAVEMENT DETAIL



SECTION CC



SECTION DD



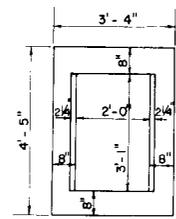
STEEL GRATING

TWO REQUIRED PER INLET
 5" Borden, Florida Steel, Irving, Reliance, Greulich, U.S. Foundry, (or equal)
 Main Bars 5 x 1/4" Intermediate Bars 1 1/2 x 1/2" Reticuline Bars
 1 1/4 x 3/16" (or equal).

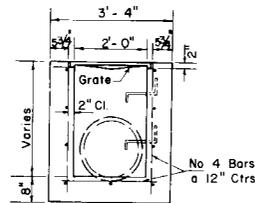
GENERAL NOTES:

1. COST OF DITCH PAVING TO BE INCLUDED IN COST OF INLET.
2. REINFORCING-N# 4 BARS AT 12" CENTERS BOTH WAYS 2" CLEARANCE TO INSIDE FACE.
3. FOR SUPPLEMENTARY DETAILS SEE INDEX NO. 201.
4. CUT AND BEND BARS OUT OF WAY OF PIPE WHEN NECESSARY; BARS TO CLEAR PIPE BY 1/2"
5. WHERE MATERIAL UNSATISFACTORY FOR FOUNDATION IS ENCOUNTERED AT FL. EL. OMIT FLOOR AND CARRY WALLS DOWN TO SATISFACTORY FOUNDATION. BACKFILL TO FL. WITH CLEAR SAND.
6. THIS INLET WAS DESIGNED FOR DITCHES, MEDIANS, OR OTHER AREAS SUBJECT TO HEAVY WHEEL LOADS WHERE DEBRIS MAY BE A PROBLEM (FOR MORE THAN 7 CFS THRU GRATE). IT IS NOT FOR USE IN AREAS SUBJECT TO PEDESTRIAN AND/OR BICYCLE TRAFFIC.
7. RECOMMEND 36" PIPE AS MAXIMUM SIZE FOR CONCRETE PIPE. FOR LARGER PIPE, J-B INLET SHOULD BE CONSIDERED.
8. WHEN ALTERNATE G GRATE IS SPECIFIED IN PLANS, THE GRATE IS TO BE HOT DIPPED GALVANIZED AFTER FABRICATION.
9. SODDING TO BE PAID FOR UNDER CONTRACT UNIT PRICE FOR SODDING, SY.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
DITCH BOTTOM INLET TYPE B				
Designed By	Names	Dates	Approved By	
Drawn by	HAB	4/67	<i>Jc. Kahl</i> District Design Engineer, Roadways	
Checked by	GCB	4/67		
F.H.W.A. Approved: 7/18/75			Revision No.	Sheet No.
			81	1 of 1
				231



PLAN

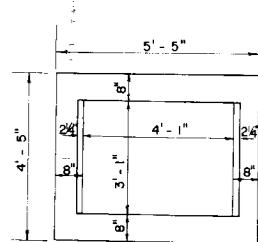


SECTION

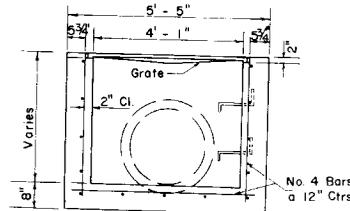
TYPE C

Recommended Maximum Pipe Size:

- 2'-0" Wall - 18" Pipe
- 3'-1" Wall - 24" Pipe



PLAN

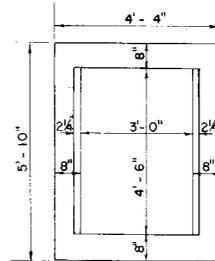


SECTION

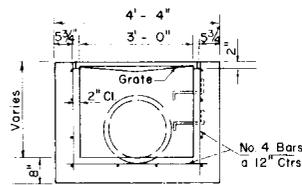
TYPE D

Recommended Maximum Pipe Size:

- 3'-1" Wall - 24" Pipe
- 4'-1" Wall - 36" Pipe



PLAN

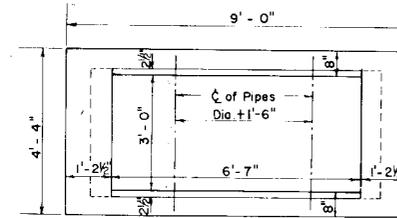


SECTION

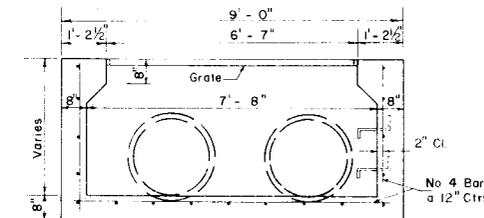
TYPE E

Recommended Maximum Pipe Size:

- 3'-0" Wall - 24" Pipe
- 4'-6" Wall - 42" Pipe



PLAN



SECTION

TYPE H

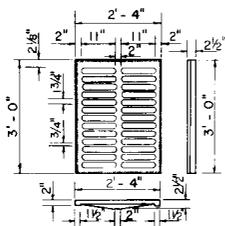
Recommended Maximum Pipe Size:

- 3'-0" Wall - 30" Pipe
- 7'-8" Wall - 1 - 66" Pipe
- 2 - 30" Pipe

GENERAL NOTES

1. These inlets are to be used in ditches, medians and other areas subject to infrequent traffic loadings but are not to be placed in areas subject to any heavy wheel loads.
2. Inlets subject to minimal debris are to be constructed without slots. Where debris is a problem inlets must be constructed with slots. The traversable slot inlet must be used where required for safety. The traversable slot modification is not adaptable to Inlet Type H. Slots may be constructed at either or both ends as shown on plans.
3. Either cast iron or steel grates may be used on inlets without slots and on inlets with non-traversable slots. Steel grates are required on inlets with traversable slots. Steel grating shall be Borden, Florida Steel, Irving, Reliance or equal.
4. All exposed corners and edges of concrete are to be chamfered 3/4".
5. Recommended maximum pipe sizes shown are for concrete pipe. Pipe sizes larger than those recommended must be checked for fit.
6. For supplementary details see Index No. 201.
7. Pavement to be used on inlets without slots and inlets with non-traversable slots only when called for in the plans; but required on all traversable slot inlets. Cost to be included in contract unit price for inlets. Quantities shown are for information only.
8. Sodding to be used on all inlets not located in paved areas and paid for under contract unit price for Sodding SY.

INLETS

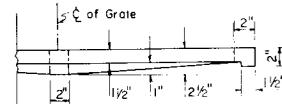


TYPE C

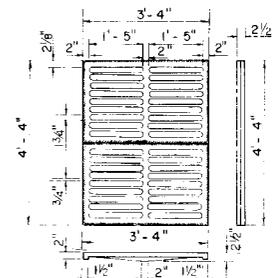
Approx. Weight 235 Lbs.

Note:

Type D inlet to be used only when slots are required in wide side of inlet. Cast Iron Grate not permitted.



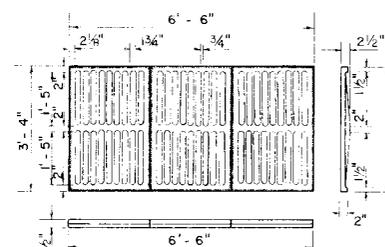
HALF SECTION CAST IRON GRATES



TYPE E

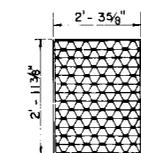
Approx. Weight 465 Lbs.

CAST IRON GRATING



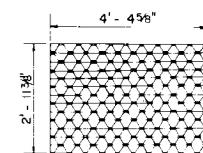
TYPE H

Approx. Weight 725 Lbs.



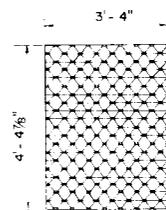
TYPE C

Straight Bars 2" x 3/16"
Reticuline Bars 1/4" x 3/16"
Approx. Weight 100 Lbs.



TYPE D

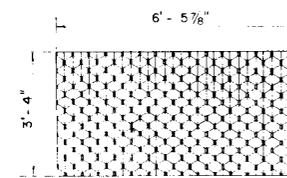
Straight Bars 2" x 3/16"
Reticuline Bars 1/4" x 3/16"
Approx. Weight 180 Lbs.



TYPE E

Straight Bars 2" x 3/16"
Reticuline Bars 1/4" x 3/16"
Approx. Weight 215 Lbs.

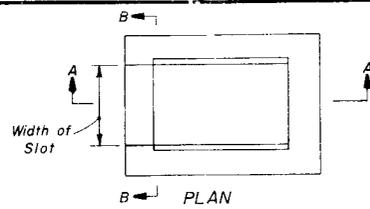
STEEL GRATING



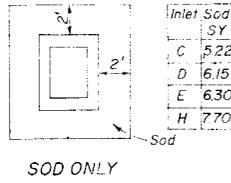
TYPE H

Straight Bars 2" x 3/16"
Reticuline Bars 1/4" x 3/16"
Approx. Weight 315 Lbs.

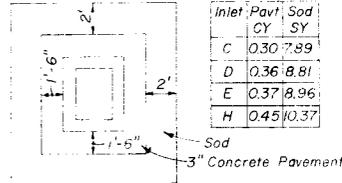
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH BOTTOM INLETS TYPES C, D, E & H			
Notes	Index	Approved By	
Drawn By		<i>D. C. Smith</i> Deputy Design Engineer, Roadways	
Checked By	EGR/JG 7/81	Revision No.	Sheet No.
Index No.			
H. W. A. Approved 10/7/80	82	1 of 2	232



PLAN



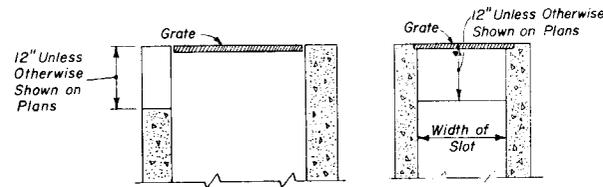
SOD ONLY



PAVT. AND SOD

Inlet	Sod	CY	SY
C	5.22		
D	6.15		
E	6.30		
H	7.70		

Inlet	Pavt.	Sod	CY	SY
C	0.30	7.89		
D	0.36	8.81		
E	0.37	8.96		
H	0.45	10.37		

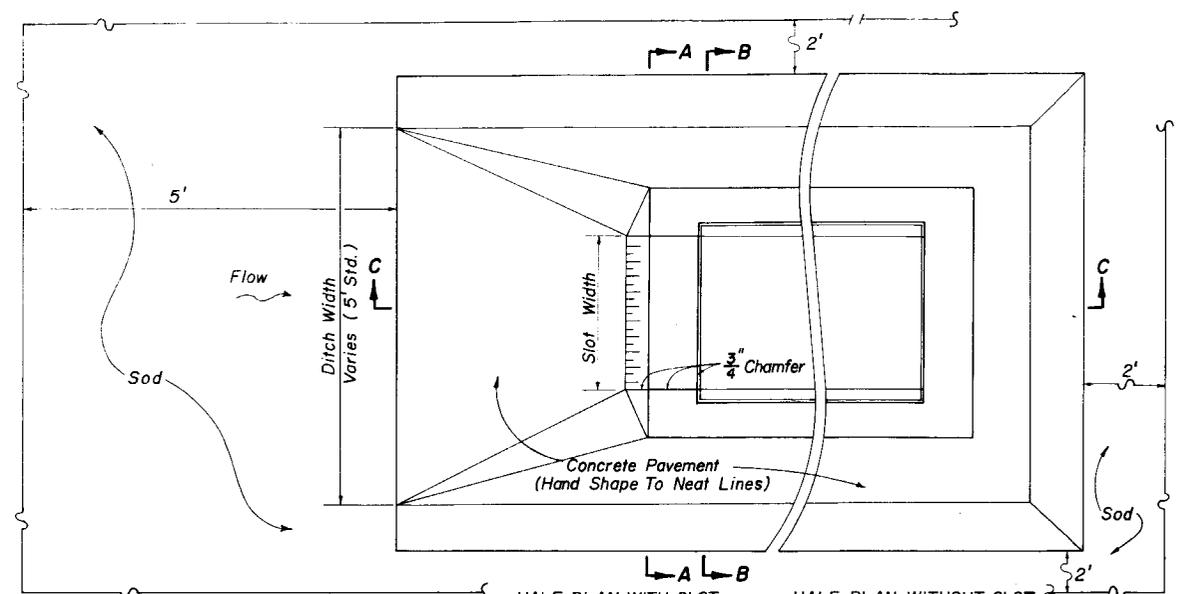


SECTION AA

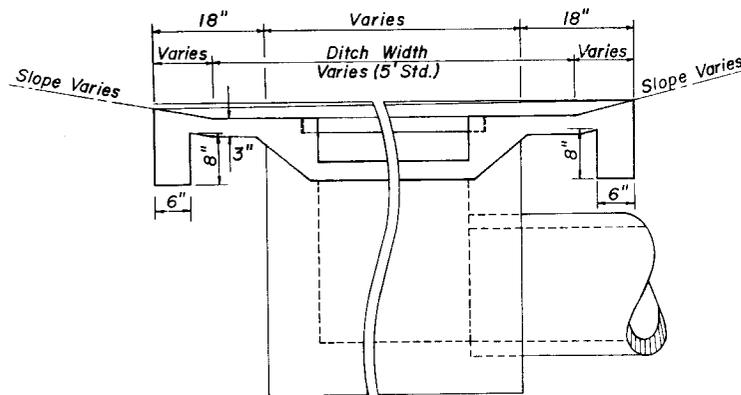
SECTION BB

NON-TRAVERSABLE SLOTS

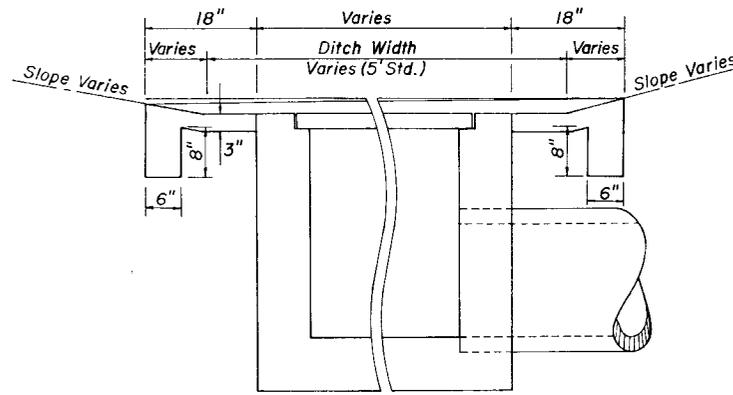
SODDING AND PAVEMENT FOR INLETS WITHOUT SLOTS AND INLETS WITH NON-TRAVERSABLE SLOTS



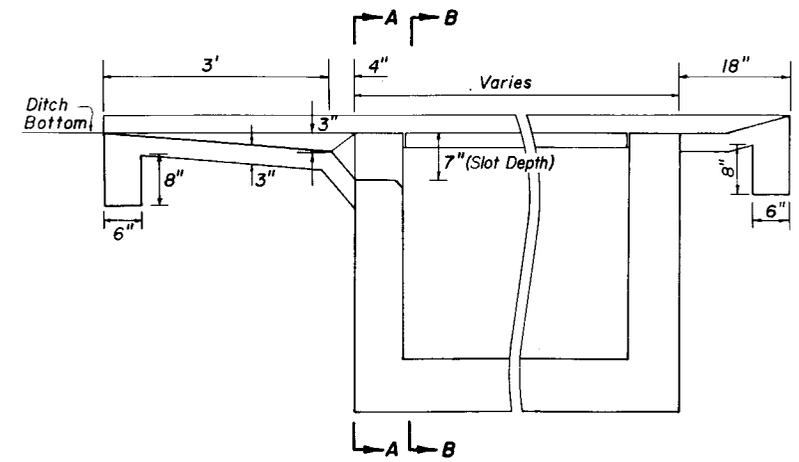
PLAN VIEW



SECTION AA



SECTION BB

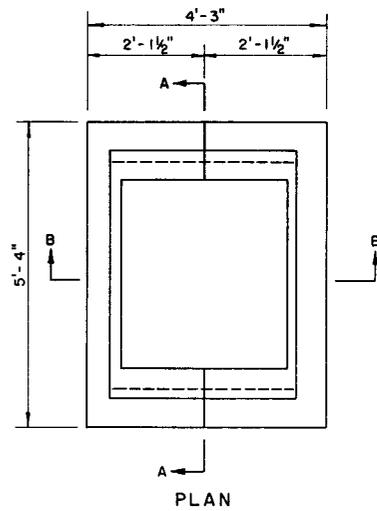
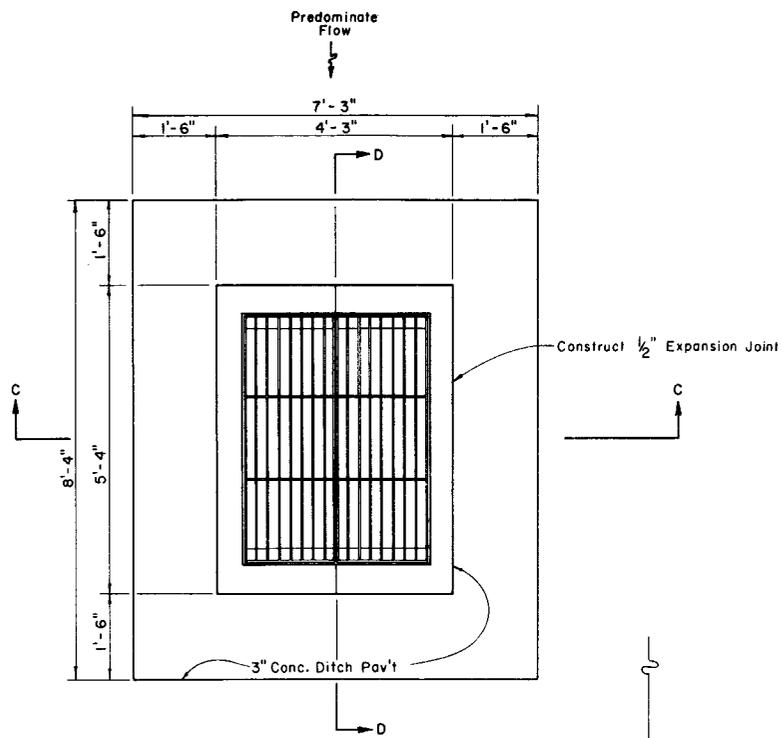


SECTION CC

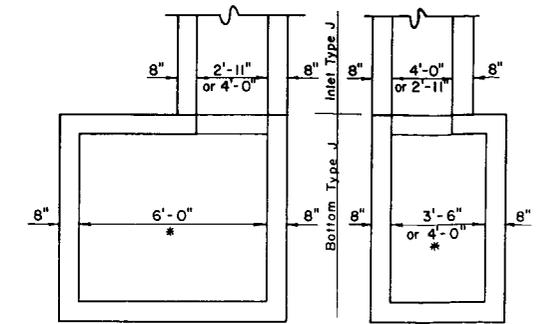
Inlet	PAVEMENT				SOD	
	Single Slot		Double Slot		Single Slot	Double Slot
	SY	CY	SY	CY	SY	SY
C	4.87	0.77	6.16	0.93	12.15	16.20
D	5.99	0.91	7.70	1.10	13.77	18.52
E	5.88	0.91	7.37	1.08	13.56	17.95

TRAVERSABLE SLOTS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
DITCH BOTTOM INLETS TYPES C, D, E, & H					
Designed by	E.G.R.	2/80	Approved By		
Drawn by	J.M.	2/80	<i>D.C. [Signature]</i> Deputy Design Engineer, Roadways		
Checked by	J.W.G.	2/80	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved: 10/7/80			82	2 of 2	232



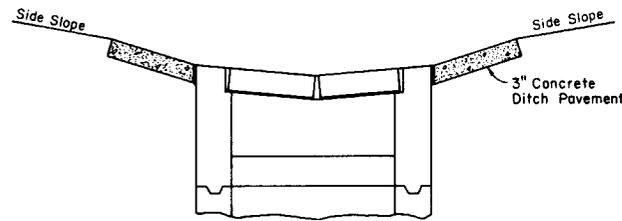
Recommended Maximum Pipe Sizes
 2'-11" Wall - 24"
 4'-0" Wall - 36"
 For Larger Pipe See Note B



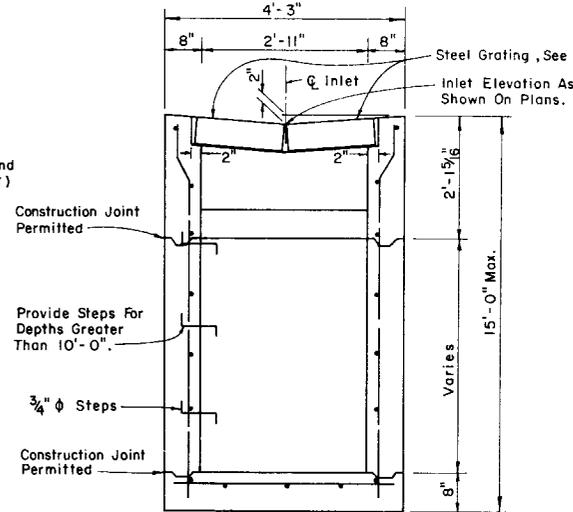
NOTES: Structure Bottom Type J, Alt. B Only. See Index 200. Inlet To Be Oriented As Required By Note # 4. Unless Otherwise Shown In Plans.

INLET WITH BOTTOM TYPE J

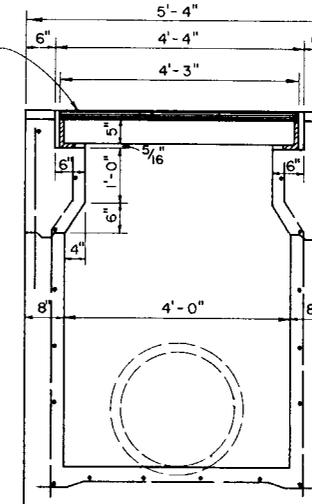
PAVEMENT DETAIL



SECTION CC

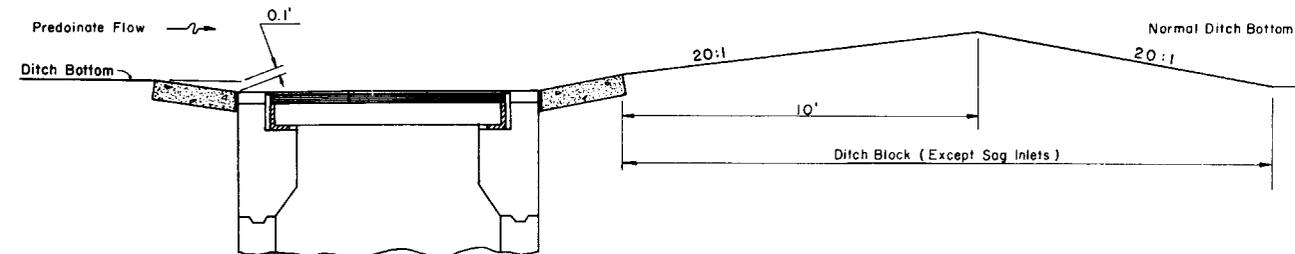


SECTION BB

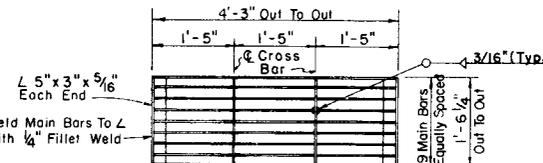


SECTION AA

Construction Joint Permitted
 Provide Steps For Depths Greater Than 10'-0"
 3/4" ϕ Steps
 Construction Joint Permitted



SECTION DD

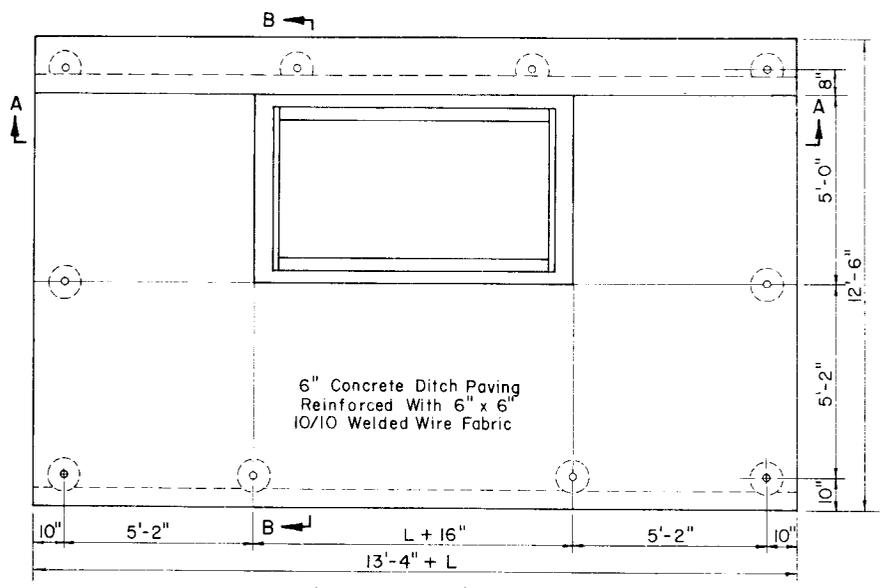


STEEL GRATING
 Note: Two Required Per Inlet
 Main Bars 5" x 1/4" (Notched For Cross Bars).
 Cross Bars 1 3/4" x 1/4" (Continuously Welded At Main Bar Notches).
 Main Bars And Cross Bars Flush On Top.

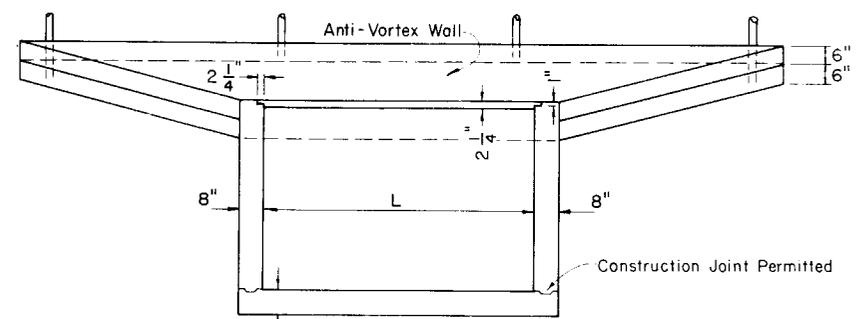
GENERAL NOTES

1. Cost of Ditch Paving to be included in cost of inlet.
2. Reinforcing - N[#] 4 bars at 12" centers both ways with 2" clearance to inside face.
3. Where material unsatisfactory for foundation is encountered at F.L. elevation omit floor and carry walls down to satisfactory foundation. Backfill to FL with cleansand.
4. Direction of 1/4" x 5" Main bars to be in same direction as predominant flow.
5. Chamfer exposed edges. (3/4" Chamfer)
6. Cut and bend bars out of way of pipe when necessary; Bars to clear pipe by 1 1/2".
7. For supplemental details, see Index 201.
8. Recommended maximum pipe sizes are for concrete pipe. Check larger sizes for fit. For larger pipe, a J-J inlet should be considered (see detail above).
9. This inlet is designed for ditches, medians or other areas subject to heavy wheel loads, where only light debris is expected and pedestrian traffic is anticipated. It is not for use in areas subject to bicycle traffic.
10. When alternate G grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
11. Sodding to be paid for under contract unit price for Sodding, SY.

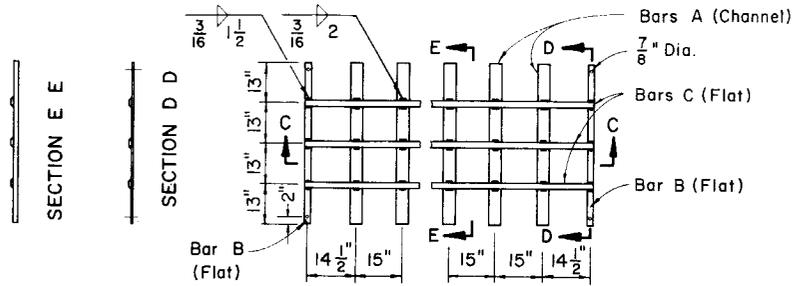
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH BOTTOM INLET TYPE J			
Designed by	Notes	Date	Approved By
Drawn by	L.M.F.	8/76	<i>J.C. Hill</i> Deputy Design Engineer, Roadways
Checked by	S.R.L.	8/76	Revision No.
F.H.W.A. Approved: 9/3/76		81	Sheet No. 1 of 1
			Index No. 234



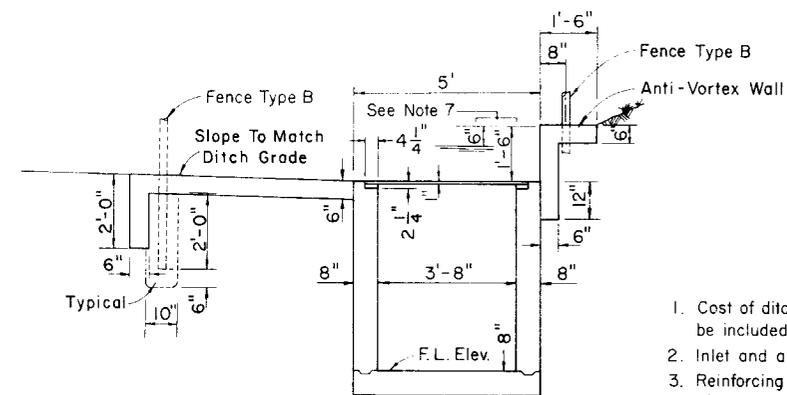
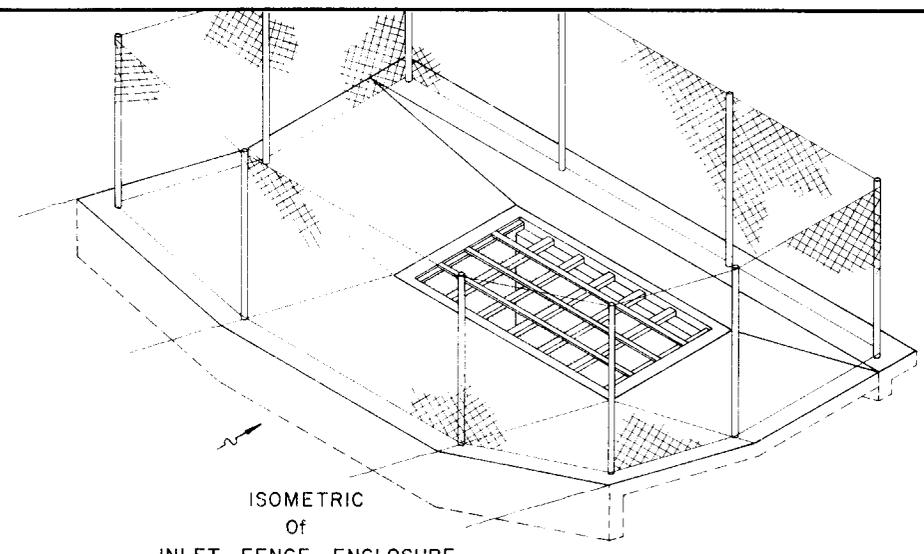
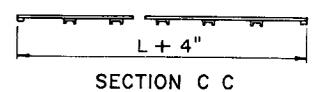
(Grate Not Shown)
PLAN



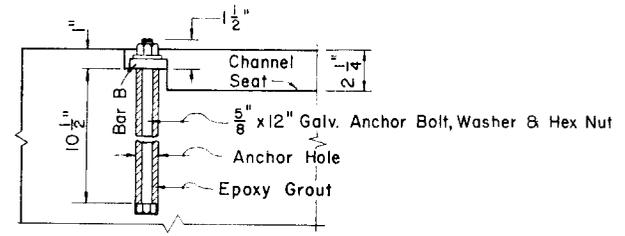
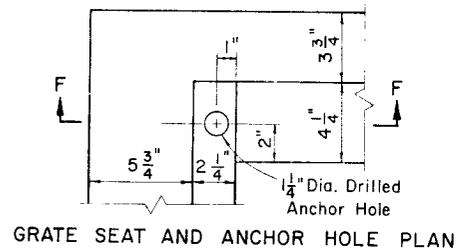
(Grate Not Shown)
SECTION AA



STEEL GRATE



(Grate Not Shown)
SECTION BB



GRATE QUANTITIES						
PIPE SIZE	L	BILL OF STEEL			STEEL WEIGHT	
		BAR	No. REQ'D	LENGTH	CHANNEL 4" x 5.4 #	FLAT 2" x 1/2 (34#)
30" x 36"	4'-9"	A	3	4'-4"	70	30
		B	2	4'-4"		
		C	3	5'-1"		
42" x 48"	6'-0"	A	4	4'-4"	94	30
		B	2	4'-4"		
		C	3	6'-4"		
54" x 60"	7'-3"	A	5	4'-4"	117	30
		B	2	4'-4"		
		C	3	7'-7"		
66" x 72"	8'-6"	A	6	4'-4"	140	30
		B	2	4'-4"		
		C	3	8'-10"		
SPECIAL	9'-9"	A	7	4'-4"	164	30
		B	2	4'-4"		
		C	3	10'-1"		
SPECIAL	11'-0"	A	8	4'-4"	187	30
		B	2	4'-4"		
		C	3	11'-4"		
SPECIAL	12'-3"	A	9	4'-4"	211	30
		B	2	4'-4"		
		C	3	12'-7"		
SPECIAL	13'-6"	A	10	4'-4"	234	30
		B	2	4'-4"		
		C	3	13'-10"		
SPECIAL	14'-9"	A	11	4'-4"	257	30
		B	2	4'-4"		
		C	3	15'-1"		
SPECIAL	16'-0"	A	12	4'-4"	281	30
		B	2	4'-4"		
		C	3	16'-4"		
SPECIAL	17'-3"	A	13	4'-4"	304	30
		B	2	4'-4"		
		C	3	17'-7"		
SPECIAL	18'-6"	A	14	4'-4"	328	30
		B	2	4'-4"		
		C	3	18'-10"		

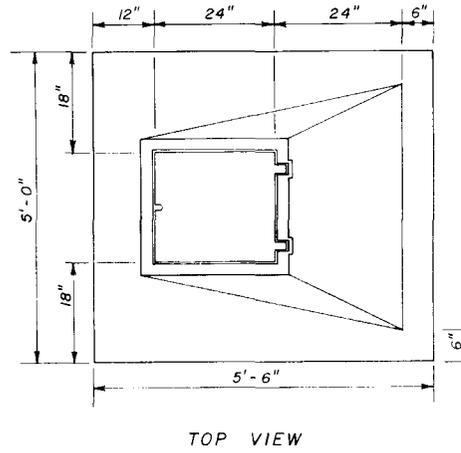
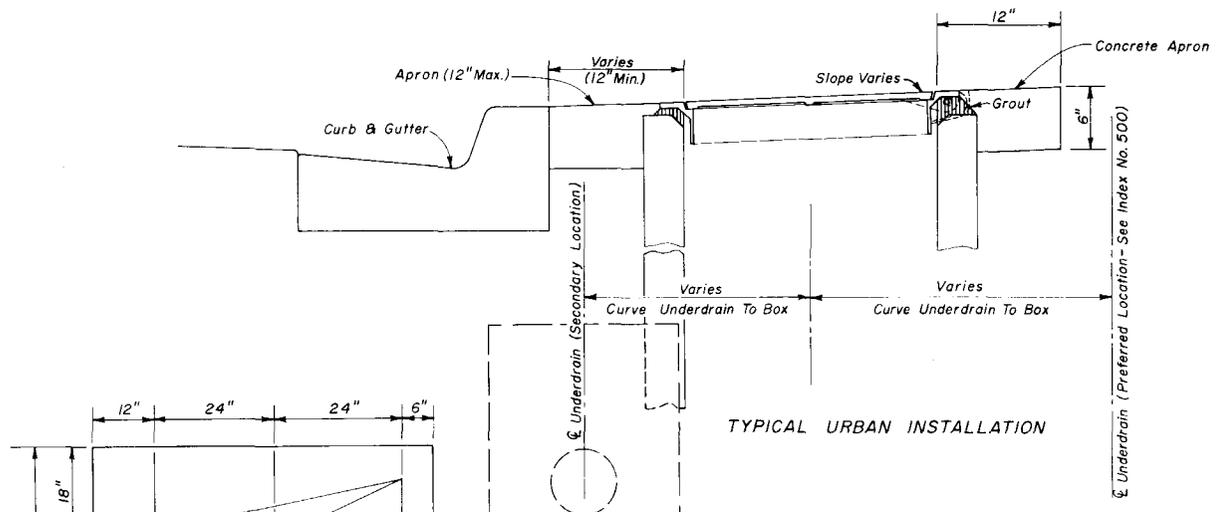
GENERAL NOTES

- Cost of ditch paving, anti-vortex wall, grate, concrete, reinforcing steel and fence enclosure to be included in the cost of inlet.
- Inlet and anti-vortex wall to be Class I Concrete.
- Reinforcing - No. 4 bars at 12" centers both ways, 1 1/2" clearance to inside face and bottom of inlet. Bend top and corner bars to clear anchor holes.
- Channel section C 3 x 6 may be used as an alternate for the C 4 x 5.4 channel.
- Channel and bar steel to be ASTM A588 weathering steel. Grating exposed to salt water shall be ASTM A 572, Grade 50, and galvanized in accordance with Section 962-7 of the Standard Specifications, and shall be designated in the plans as Alternate G.
- Fence enclosure shall be Fence Type B (Index No. 452). All posts to be set in concrete. A minimum of 10 posts required. Corner and approach side posts to be 3" nominal.
- Inlet length (L) shall be set by the designer for the greater of either culvert requirement or inlet pool not to exceed 12" depth.
- This inlet is to be used at locations having high flow rates, usually where an endwall could not be utilized without hazardous intake.

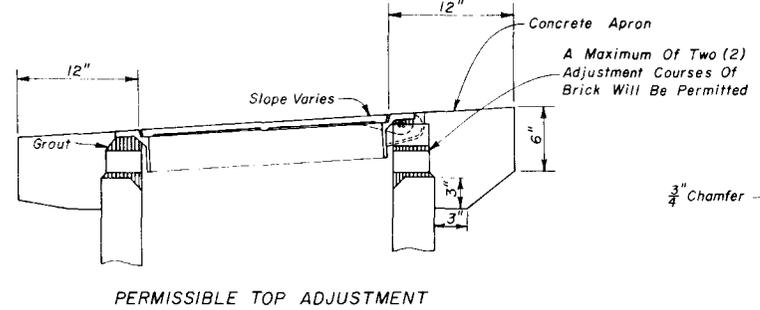
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**DITCH BOTTOM INLET
TYPE K**

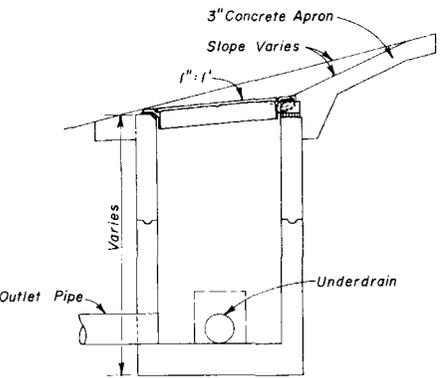
Designed by FHWA	Date	Approved By <i>J. P. Smith</i> Deputy Design Engineer, Roadways
Drawn by SM	6/79	Revision No.
Checked by JG	6/79	Sheet No. 1 of 1
F.H.W.A. Approved		Index No. 235



TOP VIEW

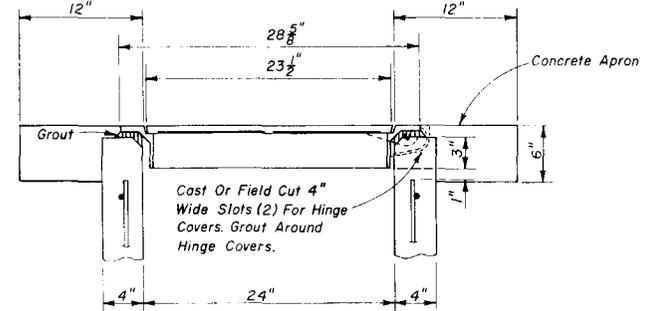


PERMISSIBLE TOP ADJUSTMENT



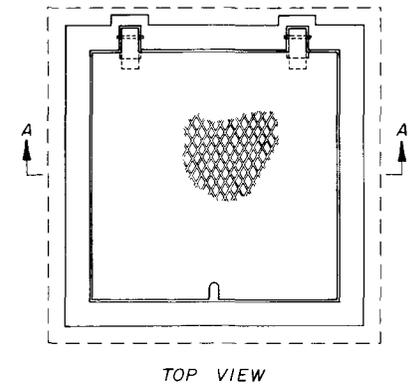
SECTION

TYPICAL INSTALLATION ON SLOPES

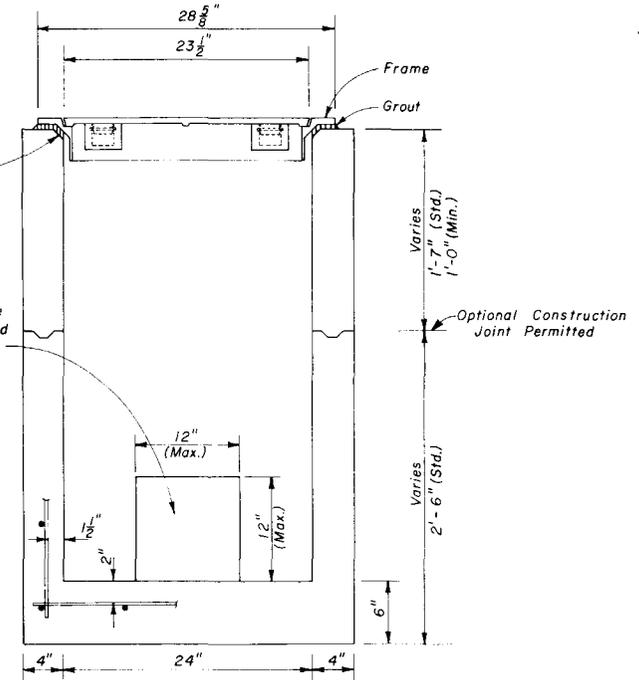


TYPICAL TOP AND APRON

Typical Opening, One Or More Sides. See Plans For Required Openings. Grout Fill To Be Included In Cost Of Box.

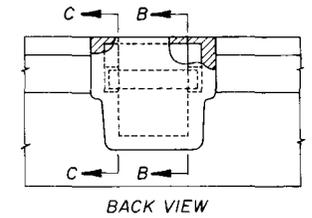


TOP VIEW

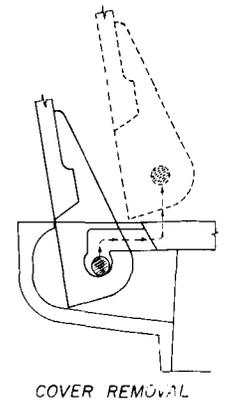


SECTION AA

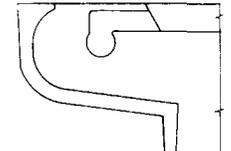
BOX AND TOP



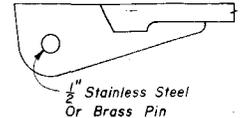
BACK VIEW



COVER REMOVAL



SECTION CC



SECTION BB

HINGE DETAIL

GENERAL NOTES

1. Cast iron cover and frame to be Neenah Foundry Company R-6660-JH, U.S. Foundry and Manufacturing Corporation No. A-632 or equal. Neenah R-6660-JH detailed this index.
2. Box to be Class I Concrete, reinforced with No.3 bars on 8" centers both ways, sides and bottom.
3. Concrete apron to be included in the contract unit price for Underdrain Inspection Box.
4. All covers shall be furnished with pick holes. Fitted lifts or handles are not permitted.
5. Manhole Type P Alternate A, Index 200, with Type I Frame and Cover, Index 201, may be used in lieu of the box detailed on this sheet, and is recommended when high ADT increases chance of repeated vehicle loadings.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
UNDERDRAIN INSPECTION BOX				
Designed by	WS	Date	5/81	Approved By
Drawn by	JM	Date	5/81	Deputy Design Engineer, Roadways
Checked by	JVG	Date	5/81	Revision No. Sheet No. Index No.
F.H.W.A. Approved:		82	1 of 1	245

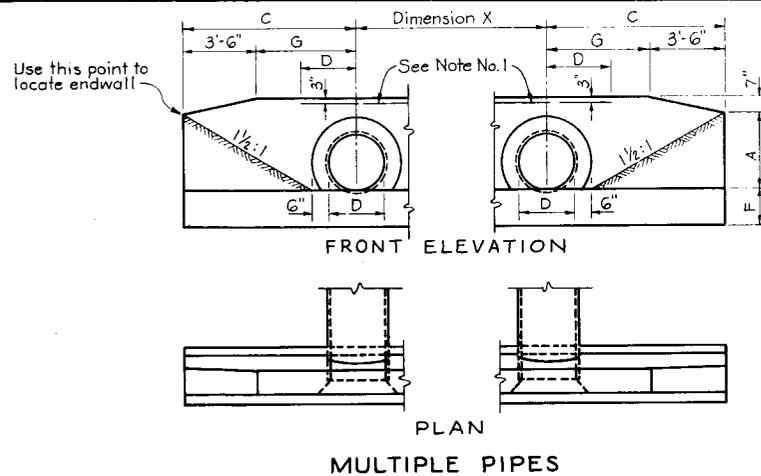
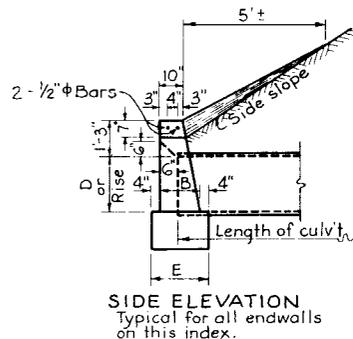
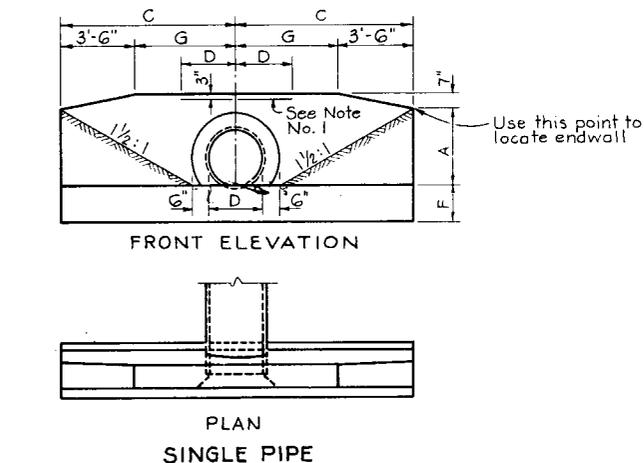
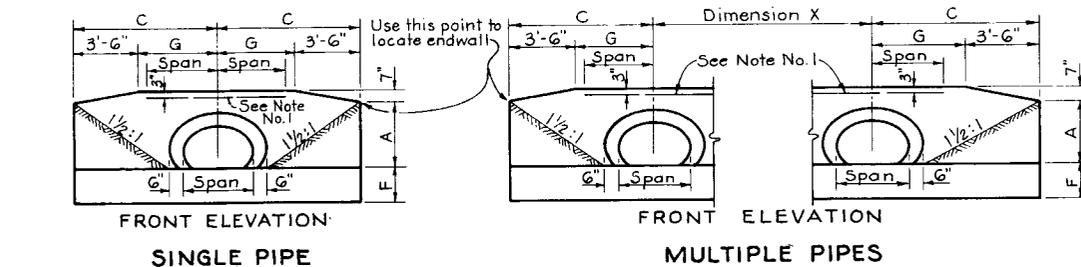


TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR ROUND PIPE CULVERT ENDWALLS																								
CONSTRUCTION DATA										QUANTITIES IN ONE ENDWALL CU. YDS. OF CLASS I CONCRETE														
D	AREA OF OPENING SQUARE FEET				DIMENSIONS						ONE PIPE CULVERT		TWO PIPE CULVERT		THREE PIPE CULVERT		FOUR PIPE CULVERT		D					
	1 PIPE	2 PIPES	3 PIPES	4 PIPES	A	B	C	E	F	G	X	CONC.	C.M.	C.I.	CONC.	C.M.	C.I.	CONC.		C.M.	C.I.	CONC.	C.M.	C.I.
15"	1.23	2.46	3.69	4.92	1'-11"	1'-2"	4'-0"	1'-10"	1'-2"	0'-6"	2'-7"	1.23	1.24	1.24	1.59	1.62	1.61	1.94	1.99	1.98	2.30	2.37	2.36	15"
18"	1.77	3.54	5.31	7.08	2'-2"	1'-3"	4'-6"	1'-11"	1'-3"	1'-0"	2'-10"	1.56	1.59	1.58	1.99	2.04	2.03	2.43	2.51	2.49	2.86	2.96	2.94	18"
21"	2.41	4.82	7.23	9.64	2'-5"	1'-4"	5'-0"	2'-0"	1'-4"	1'-6"	3'-2"	1.97												21"
24"	3.14	6.28	9.42	12.56	2'-8"	1'-4"	5'-6"	2'-0"	1'-4"	2'-0"	3'-5"	2.24	2.29	2.28	2.82	2.91	2.89	3.39	3.52	3.48	3.97	4.14	4.09	24"
27"	3.98	7.96	11.94	15.92	2'-11"	1'-5"	6'-0"	2'-1"	1'-5"	2'-6"	3'-10"	2.73												27"
30"	4.91	9.82	14.73	19.64	3'-2"	1'-6"	6'-6"	2'-2"	1'-6"	3'-0"	4'-3"	3.26	3.34	3.32	4.13	4.28	4.24	4.98	5.20	5.14	5.84	6.13	6.05	30"
36"	7.07	14.14	21.21	28.28	3'-8"	1'-8"	7'-6"	2'-4"	1'-8"	4'-0"	5'-1"	4.53	4.64	4.61	5.73	5.95	5.89	6.92	7.25	7.17	8.13	8.57	8.46	36"
42"	9.62	19.24	28.86	38.48	4'-2"	1'-10"	8'-6"	2'-6"	2'-0"	5'-0"	6'-0"	6.33	6.49	6.45	8.11	8.43	8.35	9.90	10.38	10.26	11.68	12.32	12.16	42"
48"	12.57	25.14	37.71	50.28	4'-8"	2'-1"	9'-6"	2'-9"	2'-0"	6'-0"	6'-9"	8.15	8.38	8.32	10.40	10.85	10.74	12.64	13.34	13.17	14.89	15.82	15.59	48"
54"	15.90	31.80	47.70	63.60	5'-2"	2'-6"	10'-6"	3'-2"	2'-3"	7'-0"	7'-8"	11.71			15.23			18.77			22.29			54"



CONCRETE ENDWALLS FOR ROUND PIPE CULVERTS



CONCRETE ENDWALLS FOR METAL PIPE ARCH CULVERTS AND CONCRETE ELLIPTICAL PIPE CULVERTS

TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR METAL PIPE ARCH CULVERT ENDWALLS																			
CONSTRUCTION DATA										QUANTITIES IN ONE ENDWALL CU. YDS. OF CLASS I CONCRETE									
SPAN	RISE	AREA OF OPENING SQUARE FEET				DIMENSIONS						1 PIPE				SPAN	RISE	EQUIV. ROUND PIPE	
		1 PIPE	2 PIPES	3 PIPES	4 PIPES	A	B	C	E	F	G	X	1 PIPE	2 PIPES	3 PIPES				4 PIPES
28"	20"	2.8	5.6	8.4	11.2	2'-4"	1'-3"	5'-2"	1'-11"	1'-3"	1'-8"	3'-5"	1.78	2.31	2.83	3.36	28"	20"	24"
35"	24"	4.3	8.6	12.9	17.2	2'-8"	1'-4"	5'-11 1/2"	2'-0"	1'-4"	2'-5 1/2"	4'-0"	2.34	3.03	3.72	4.40	35"	24"	30"
42"	29"	5.9	11.8	17.7	23.6	3'-1"	1'-5"	6'-10 1/2"	2'-1"	1'-5"	3'-4 1/2"	4'-9"	3.13	4.06	4.99	5.93	42"	29"	36"
49"	33"	8.4	16.8	25.2	33.6	3'-5"	1'-6"	7'-8"	2'-2"	1'-6"	4'-2"	5'-6"	3.83	5.00	6.16	7.32	49"	33"	42"
57"	38"	10.6	21.2	31.8	42.4	3'-10"	1'-7"	8'-7 1/2"	2'-3"	1'-7"	5'-1 1/2"	6'-4"	4.87	6.31	7.74	9.18	57"	38"	48"
64"	43"	13.2	26.4	39.6	52.8	4'-3"	1'-8"	9'-6 1/2"	2'-4"	1'-8"	6'-0 1/2"	7'-1"	5.88	7.64	9.40	11.15	64"	43"	54"
71"	47"	16.9	33.8	50.7	67.6	4'-7"	1'-10"	10'-4"	2'-6"	2'-0"	6'-10"	7'-10"	7.80	10.15	12.49	14.85	71"	47"	60"

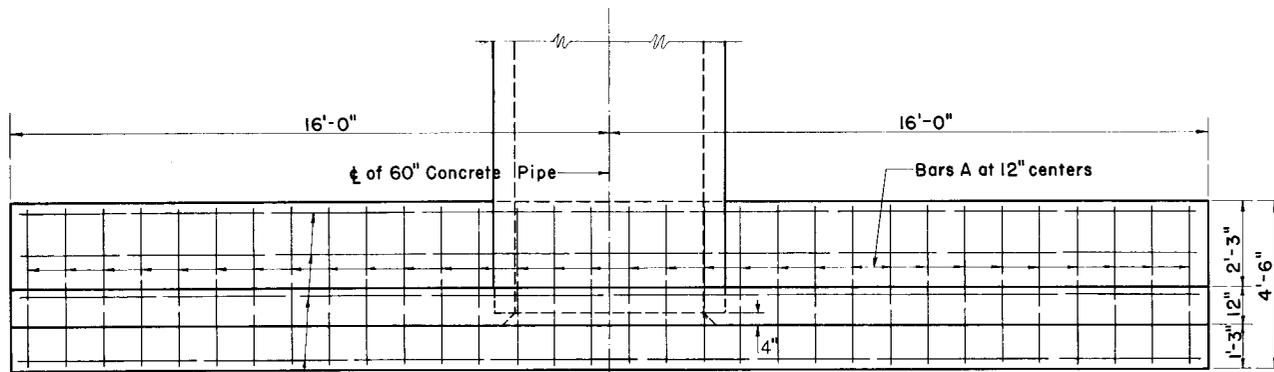
TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR CONCRETE ELLIPTICAL PIPE CULVERT ENDWALLS																			
CONSTRUCTION DATA										QUANTITIES IN ONE ENDWALL CU. YDS. OF CLASS I CONCRETE									
RISE	SPAN	AREA OF OPENING SQUARE FEET				DIMENSIONS						1 PIPE				RISE	SPAN	EQUIV. ROUND PIPE	
		1 PIPE	2 PIPES	3 PIPES	4 PIPES	A	B	C	E	F	G	X	1 PIPE	2 PIPES	3 PIPES				4 PIPES
19"	30"	3.10	6.20	9.30	12.40	2'-3"	1'-4"	5'-1 1/2"	2'-0"	1'-4"	1'-7 1/2"	4'-2"	1.89	2.55	3.22	3.88	19"	30"	24"
24"	28"	4.98	9.96	14.94	19.92	2'-8"	1'-5"	6'-3"	2'-1"	1'-5"	2'-9"	5'-2"	2.64	3.55	4.48	5.39	24"	28"	30"
29"	43"	7.13	14.26	21.39	28.52	3'-1"	1'-6"	7'-0"	2'-2"	1'-6"	3'-6"	6'-0"	3.32	4.48	5.64	6.80	29"	43"	36"
34"	53"	9.82	19.64	29.46	39.28	3'-6"	1'-7"	7'-11 1/2"	2'-3"	1'-7"	4'-5 1/2"	7'-1"	4.24	5.76	7.29	8.81	34"	53"	42"
38"	60"	12.45	24.90	37.35	49.80	3'-10"	1'-8"	8'-9"	2'-4"	1'-8"	5'-3"	7'-11"	5.22	7.16	9.10	11.05	38"	60"	48"
43"	68"	15.94	31.88	47.82	63.76	4'-3"	1'-10"	9'-8 1/2"	2'-6"	1'-10"	6'-3 1/2"	8'-10"	6.63	9.01	11.39	13.77	43"	68"	54"
48"	76"	19.89	39.78	59.67	79.56	4'-8"	2'-1"	10'-8"	2'-9"	2'-0"	7'-2"	9'-9"	8.66	11.74	14.82	17.91	48"	76"	60"
53"	83"	24.02	48.04	72.06	96.08	5'-1"	2'-6"	11'-7"	3'-2"	2'-6"	8'-1"	10'-7"	12.50	16.98	21.47	25.97	53"	83"	66"
58"	91"	28.76	57.52	86.28	115.04	5'-6"	2'-10"	12'-6 1/2"	3'-6"	2'-10"	9'-0 1/2"	11'-4"	16.46	22.26	28.05	33.85	58"	91"	72"

- GENERAL NOTES**
- Reinforcing Steel grade 40 or 60. Cost of bars shall be included in the contract unit price for concrete.
 - For sodding around endwall see detail on Index No. 281.
 - Provide 20' transition from endwall to ditch slopes where sideslopes on outfall ditches are flatter than 1 1/2:1.

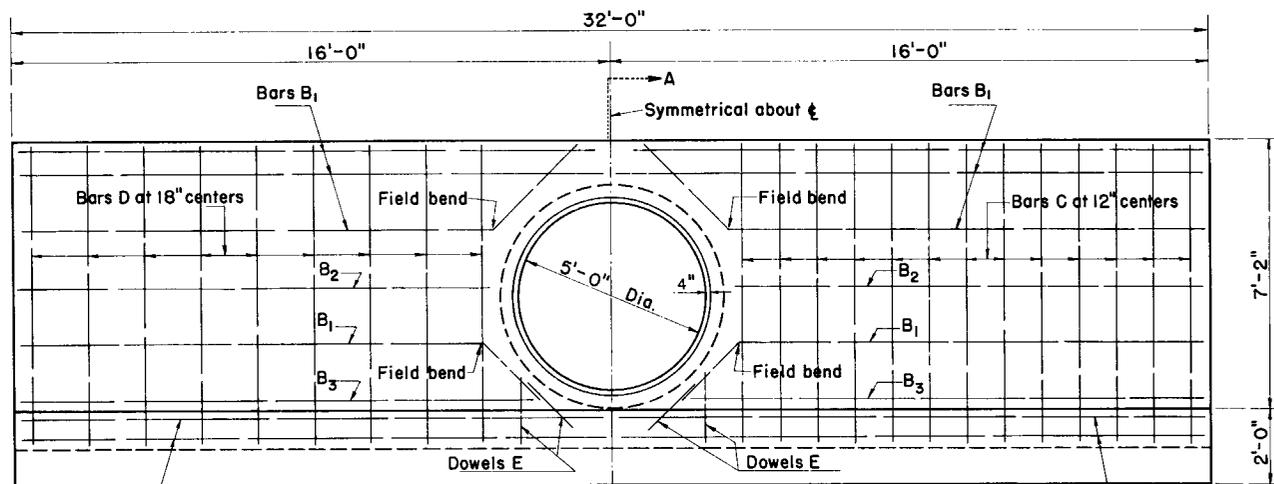
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**STRAIGHT CONCRETE ENDWALLS
SINGLE AND MULTIPLE PIPE**

Checked by: HAB 5/73
Approved By: J.C. Smith
Checked by: LMF 5/73
Checked by: J.C. Smith
Date: 8/30/77
Sheet No: 81
Page No: 1 of 1
File No: 250

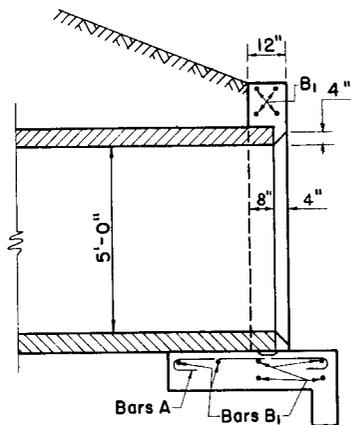


PLAN
(Showing Bar In Footing)



HALF ELEVATION
(Showing Bars In Front Face Of Wall)

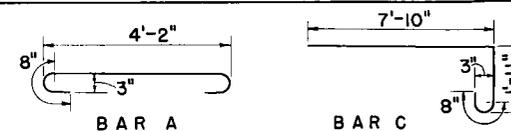
NOTE: Cut and Field bend Bars B₁ as shown
HALF ELEVATION
(Showing Bars In Back Face Of Wall)



SECTION A A

BILL OF REINFORCING STEEL					
MARK	SIZE	Nº REQ'D.	LENGTH	LOCATION	BENDING
A	Nº 4	32	5'-3"	Footing	Bend
B ₁	Nº 4	14	31'-6"	Footing and Wall	Straight
B ₂	Nº 4	4	12'-4"	Wall	Straight
B ₃	Nº 4	4	13'-9"	Wall	Straight
C	Nº 4	26	10'-3"	Wall	Bend
D	Nº 4	18	7'-10"	Wall	Straight
E	Nº 4	8	1'-8"	Footing and Wall	Straight

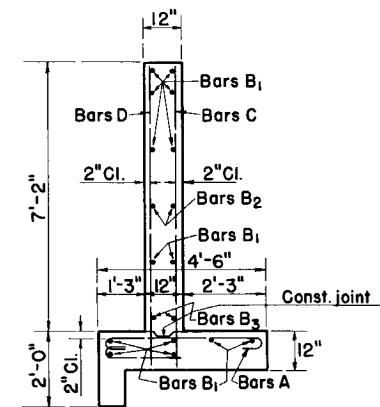
BENDING DIAGRAMS



NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Concrete Class II	Cu. Yd.	13.56
Reinforcing Steel	Pound	758

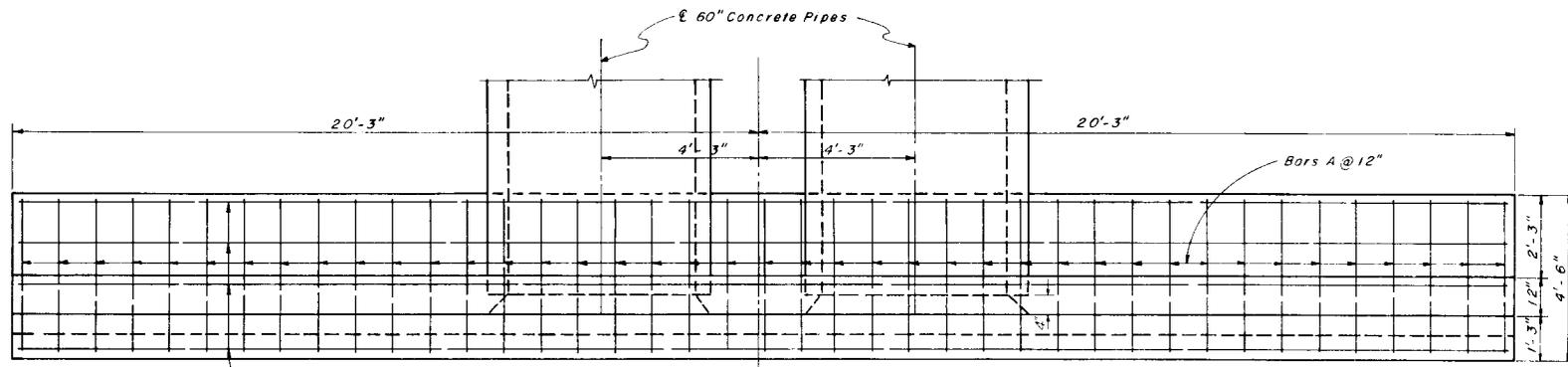


TYPICAL SECTION THRU ENDWALL

GENERAL NOTES

DESIGN SPECIFICATIONS: A.A.S.H.O., 1973
 CHAMFER: All exposed edges and corners to be chamfered $\frac{3}{8}$ " unless otherwise shown
 REINFORCING STEEL: Grade 40 or 60
 SODDING: See Index 281

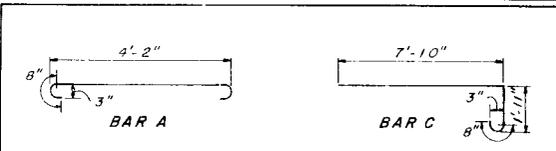
STATE OF TEXAS DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 60" CONCRETE PIPE					
Desig. No.	Name	Date	Approved By		
Drawn By	TWJ	11/49	<i>De Balleh</i> Deputy Design Engineer, Roadways		
Checked By	WHM	11/49			
Rev. No.	81	1 of 2	Index No. 251		
K. H. W. A. Approved: 3/20/75					



PLAN
(Showing Bars in Footing)

BILL OF REINFORCING STEEL					
MARK	SIZE	No. REQ'D	LENGTH	LOCATION	BENDING
A	4	41	5'-3"	Footing	Bend
B ₁	4	10	40'-2"	Footing & Wall	Straight
B ₂	4	4	12'-6"	Wall	Straight
B ₃	4	4	13'-9"	Wall	Straight
B ₄	4	4	6'-0"	Wall	Field Bend
B ₅	4	2	2'-2"	Wall	Straight
B ₆	4	8	15'-0"	Wall	Field Bend
C	4	29	10'-3"	Footing & Wall	Bend
D	4	20	7'-10"	Footing & Wall	Straight
E	4	16	1'-8"	Footing & Wall	Straight

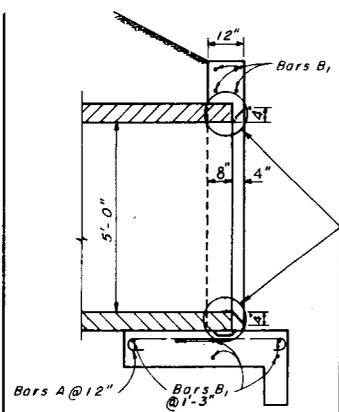
BENDING DIAGRAMS



NOTE: All Bar dimensions are out to out.

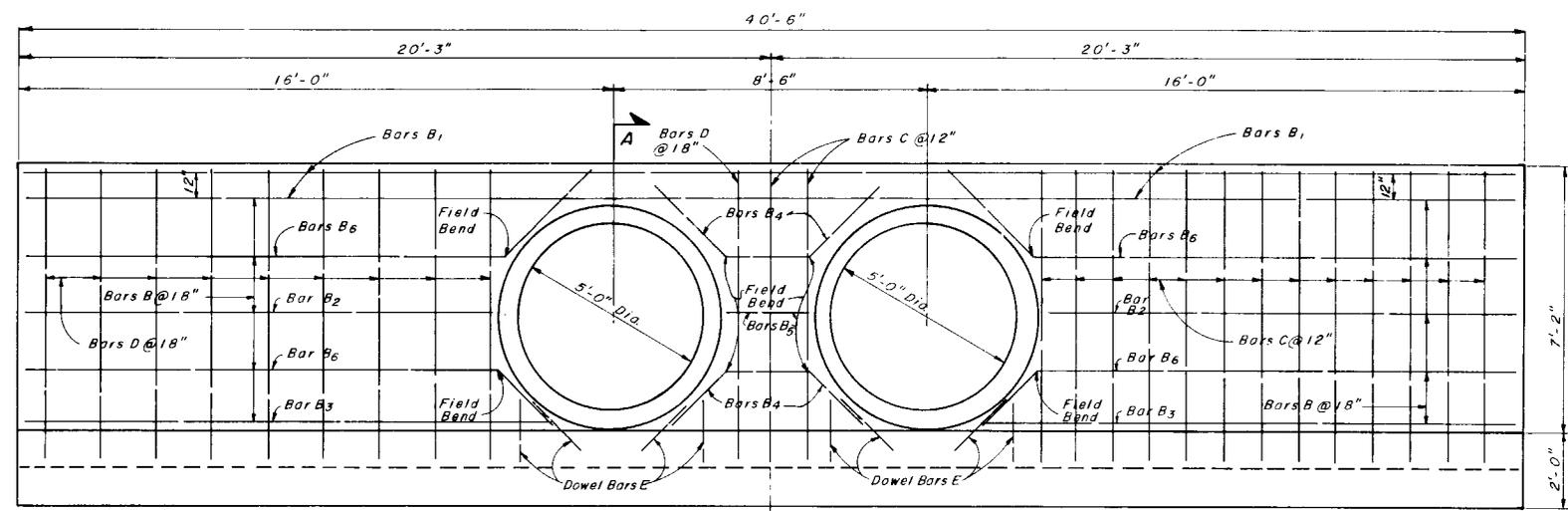
ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class II Concrete	Cu Yd	16.39
Reinforcing Steel	Lb	901



SECTION AA

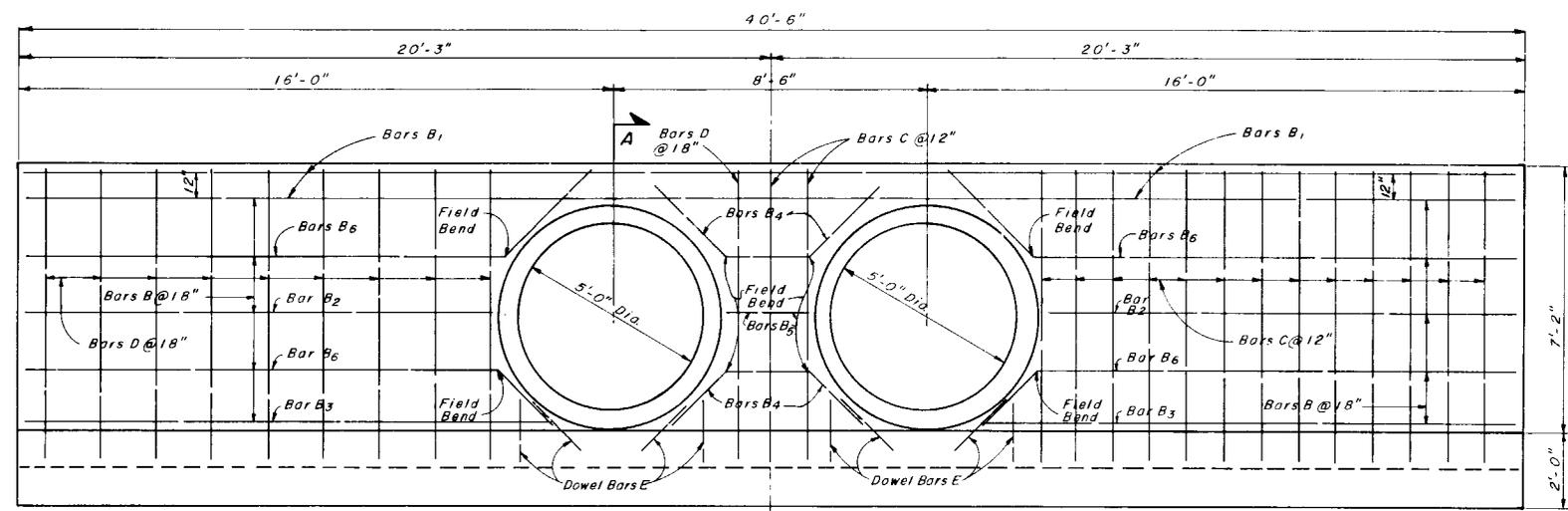
ALTERNATE ENTRANCE



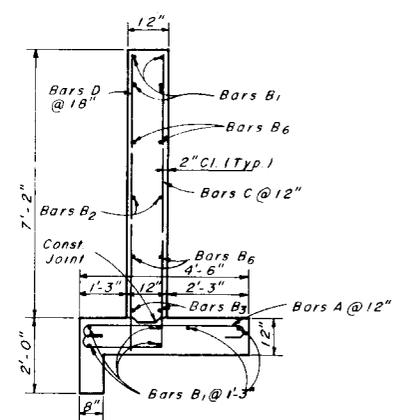
HALF ELEVATION
(Showing Bars in Front Face of Wall)

A

Symmetrical about E



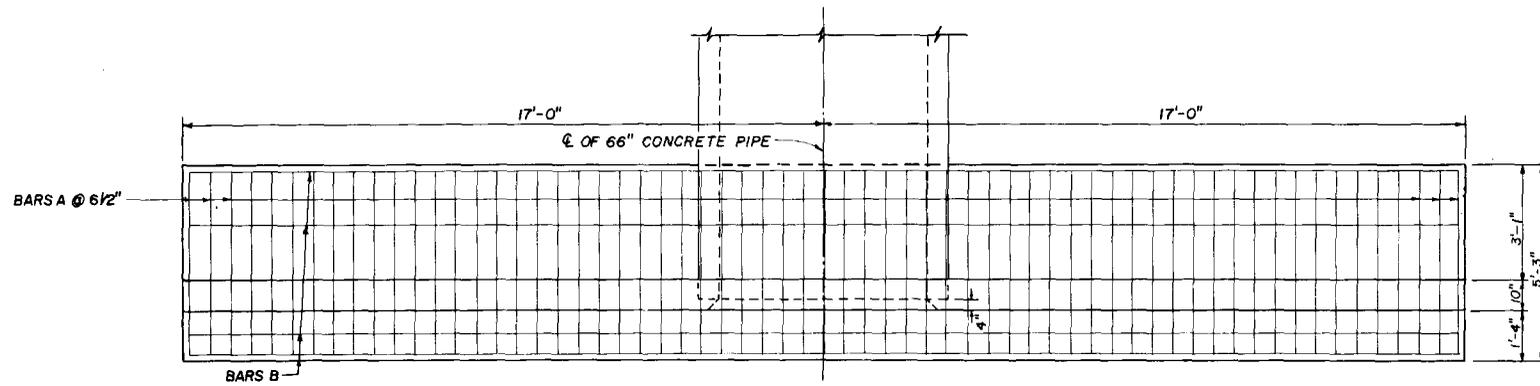
HALF ELEVATION
(Showing Bars in Back Face of Wall)



TYPICAL SECTION THRU ENDWALL

GENERAL NOTES
 DESIGN SPECIFICATIONS: A.A.S.H.O. 1973
 CHAMFER: All Exposed Edges and Corners to be Chamfered 3/4" unless otherwise shown.
 MAXIMUM WORKING STRESSES:
 Class II Concrete 1360PSI
 Reinforcing Steel 20000PSI
 REINFORCING STEEL: Grade 40 or 60
 SODDING: See Index 281

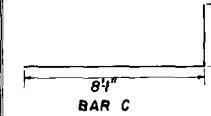
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 60" CONCRETE PIPE					
Designed by	Names	Dates	Approved By		
Drawn by	TWJ	11/49	De Anillo Deputy Design Engineer, Roadworks		
Checked by	WHM	11/49	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved: 3/20/75			81	2 of 2	251



PLAN
(Showing Bars In Footing)

BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING
A	5	63	4'-11"	FOOTING	STRAIGHT
B	4	17	33'-6"	FOOTING & WALL	"
C	5	34	9'-10"	WALL	BEND
D	4	20	8'-1"	"	STRAIGHT
E	4	4	1'-8"	"	"

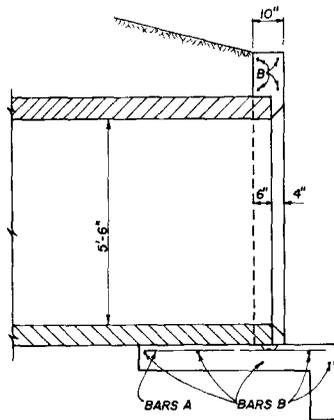
BENDING DIAGRAMS



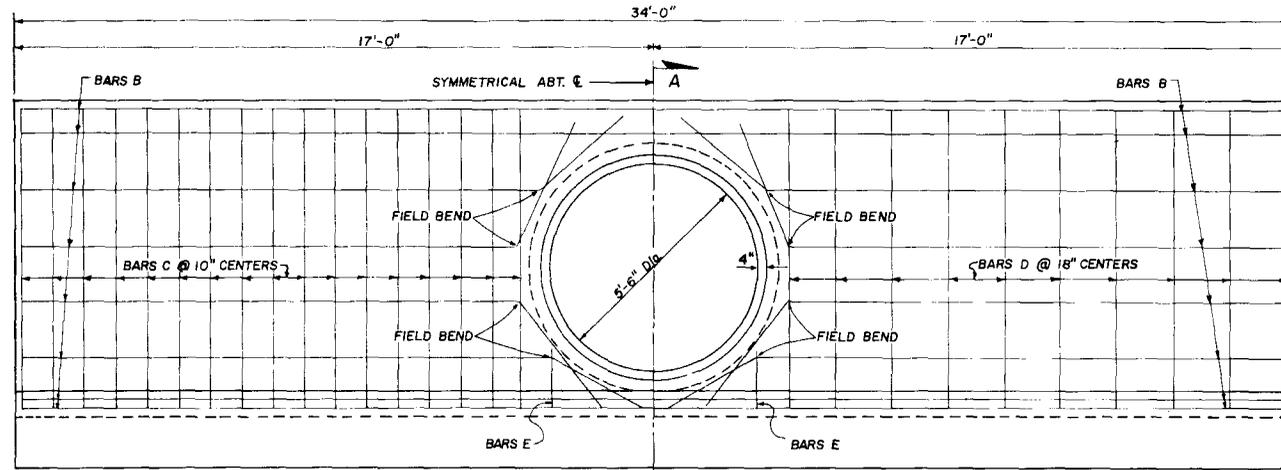
NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
CONCRETE, CLASS II	CU. YD.	12.60
REINFORCING STEEL	LB.	1167



SECTION A A



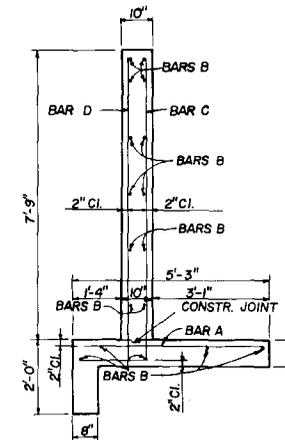
NOTE: CUT AND FIELD BEND BARS B AS SHOWN.

HALF ELEVATION
(Showing Bars In Back Face Of Wall)

HALF ELEVATION
(Showing Bars In Front Face Of Wall)

GENERAL NOTES

DESIGN SPECIFICATION: A.A.S.H.O., 1973
 CHAMFER: ALL EXPOSED EDGES AND CORNERS TO BE CHAMFERED 3/4" UNLESS OTHERWISE NOTED
 REINFORCING STEEL: GRADE 40 OR 60
 SODDING: SEE INDEX 281

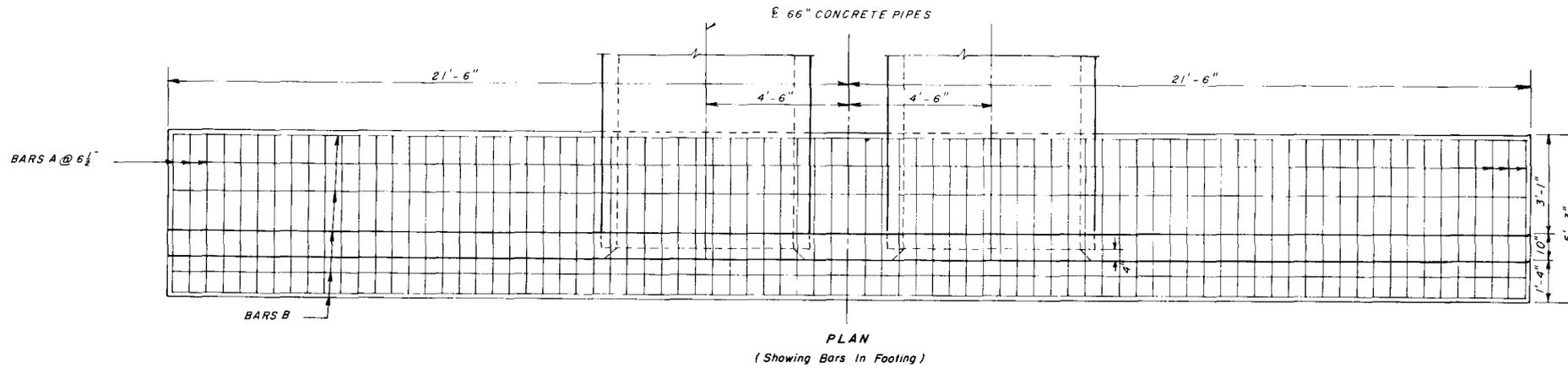


TYPICAL SECTION THRU ENDWALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

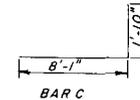
STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 66" CONCRETE PIPE

Names	Dates	Approved By
Designed by: J.L.W.	3/54	<i>De Rudder</i> Dputy Design Engineer, Roadways
Drawn by:		
Checked by: RCB	3/54	Revision No. 1 of 2
F.H.W.A. Approved: 10/7/80	81	Index No. 252



BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING
A	5	80	4'-11"	FOOTING	STRAIGHT
B	4	17	42'-8"	FOOTING&WALL	STRAIGHT
C	5	37	9'-11"	WALL	BEND
D	4	22	8'-1"	WALL	STRAIGHT
E	4	8	1'-8"	WALL	STRAIGHT

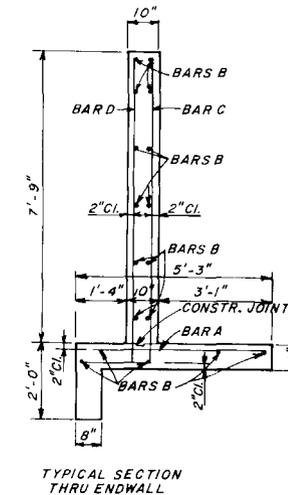
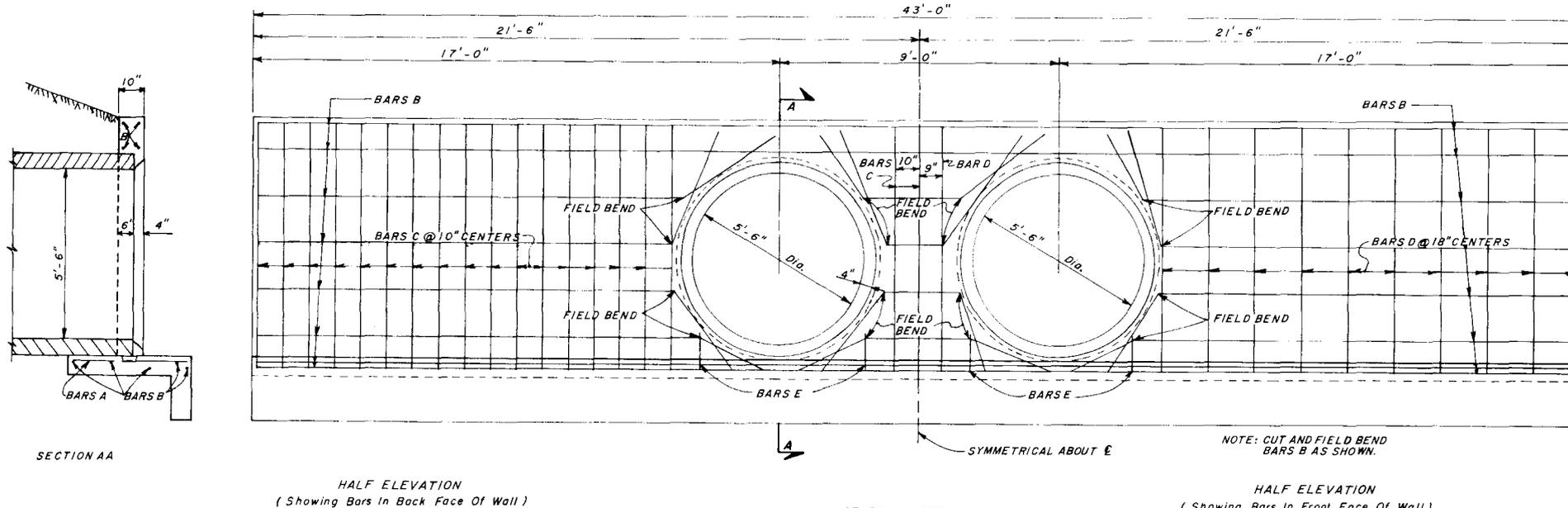
BENDING DIAGRAMS



NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
CONCRETE, CLASS II	C. Y.	15.35
REINFORCING STEEL	L. B.	1,406



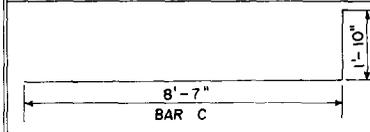
NOTE: CUT AND FIELD BEND BARS B AS SHOWN.
HALF ELEVATION
(Showing Bars In Front Face Of Wall)

GENERAL NOTES
 DESIGN SPECIFICATIONS: DESIGNED IN ACCORDANCE WITH THE 1977 EDITION OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES AND APPROVED REVISIONS.
 CHAMFER: ALL EXPOSED EDGES AND CORNERS TO BE CHAMFERED $\frac{3}{8}$ " UNLESS OTHERWISE NOTED.
 MAXIMUM WORKING STRESSES:
 CLASS II CONCRETE 1,360 PSI
 REINFORCING STEEL: GRADE 40 OR 60.
 SODDING: SEE INDEX 281.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 66" CONCRETE PIPE					
Designed by	J SP	Date	11/79	Approved By	<i>Jc Bill</i>
Drawn by	FWT	Date	11/79	Deputy Design Engineer, Roadways	
Checked by		Revision No.		Sheet No.	Index No.
FHWA Approved: 10/7/80			81	2 of 2	252

BILL OF REINFORCING STEEL					
MARK	SIZE	No. Req'd	LENGTH	LOCATION	BENDING
A	5	68	4' - 11"	FOOTING & WALL	STRAIGHT
B	4	17	35' - 8"	FOOTING & WALL	"
C	5	34	10' - 5"	WALL	BEND
D	4	20	8' - 7"	WALL	STRAIGHT
E	4	4	2' - 6"	WALL	"
F	4	4	1' - 6"	WALL	"

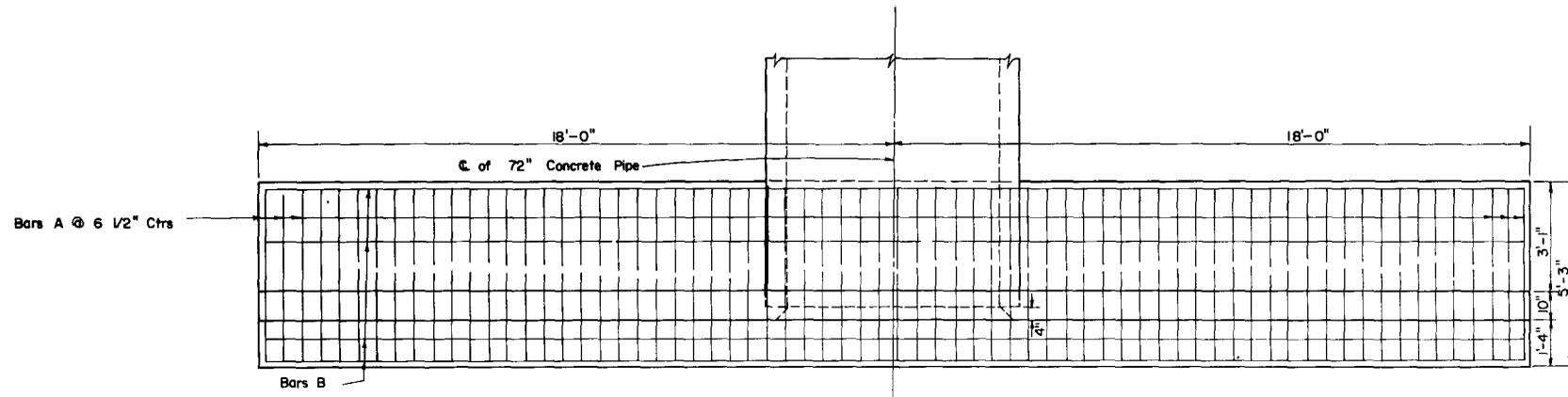
BENDING DIAGRAMS



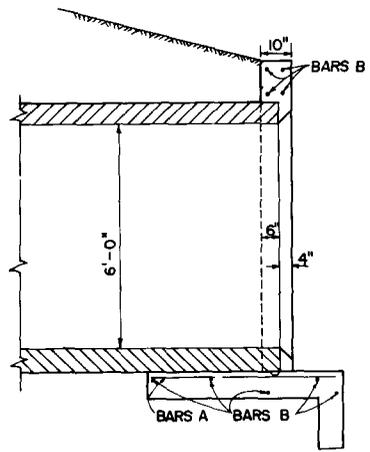
NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES

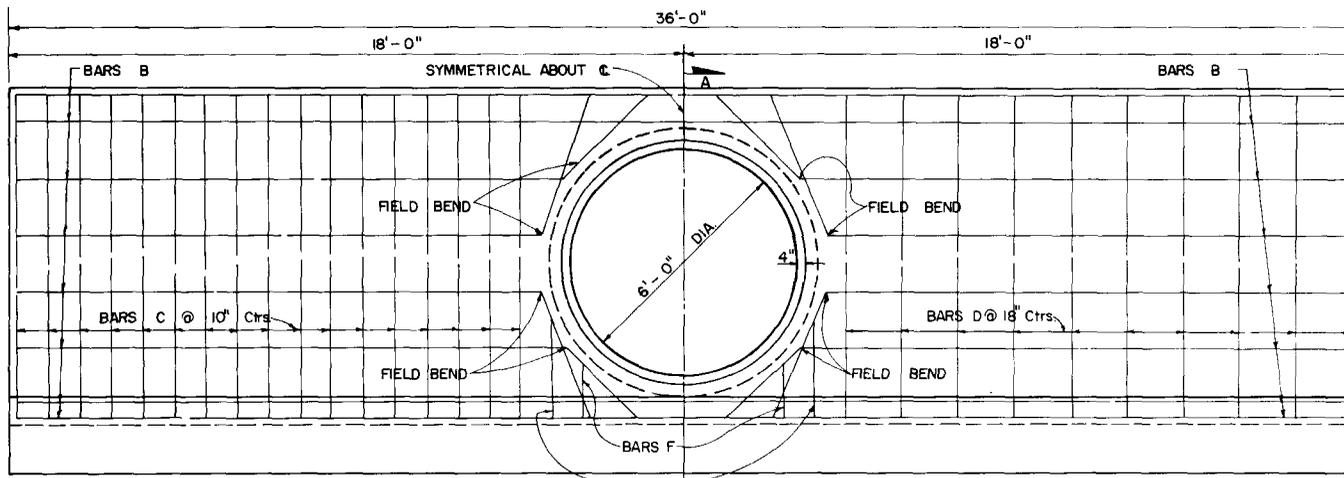
ITEMS	UNIT	QUANTITY
CONCRETE CLASS II	CU. YD.	13.76
REINFORCING STEEL	LB.	1249



PLAN
(Showing Bars In Footing)



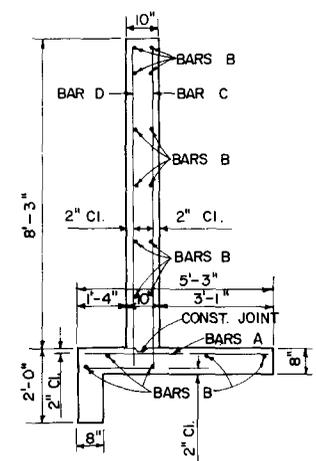
SECTION A A



HALF ELEVATION
(Showing Bars In Back Face Of Wall)

NOTE: Cut and Field Bend Bars B as shown.

HALF ELEVATION
(Showing Bars In Front Face Of Wall)



TYPICAL SECTION THRU ENDWALL

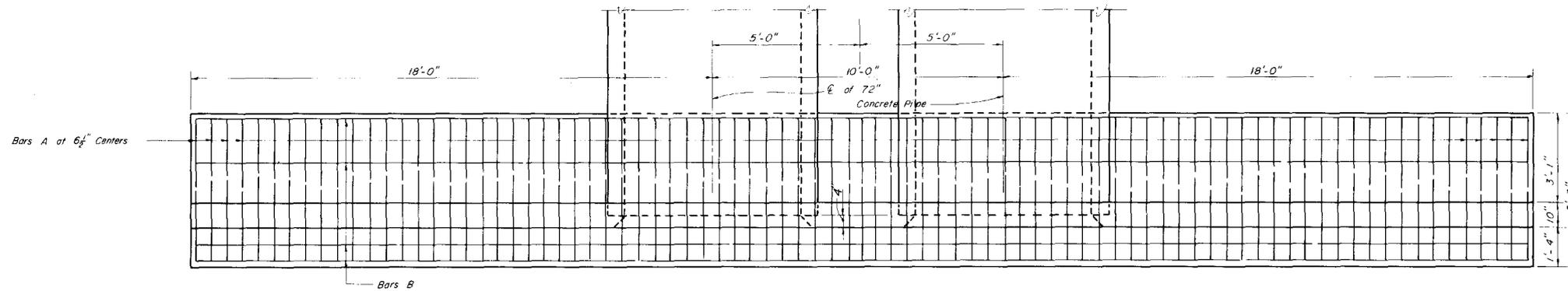
GENERAL NOTES

DESIGN SPECIFICATIONS: A.A.S.H.O., 1973
 CHAMFER: All exposed edges and corners to be chamfered 3/4"
 unless otherwise noted.
 REINFORCING STEEL: GRADE 40 or 60
 SODDING: See Index 281

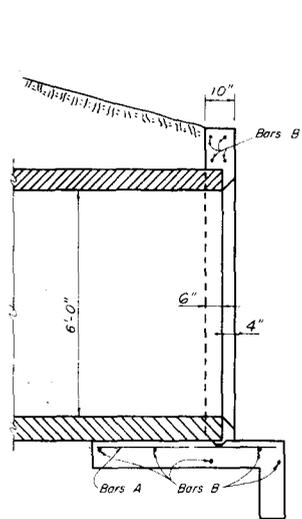
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 72" CONCRETE PIPE**

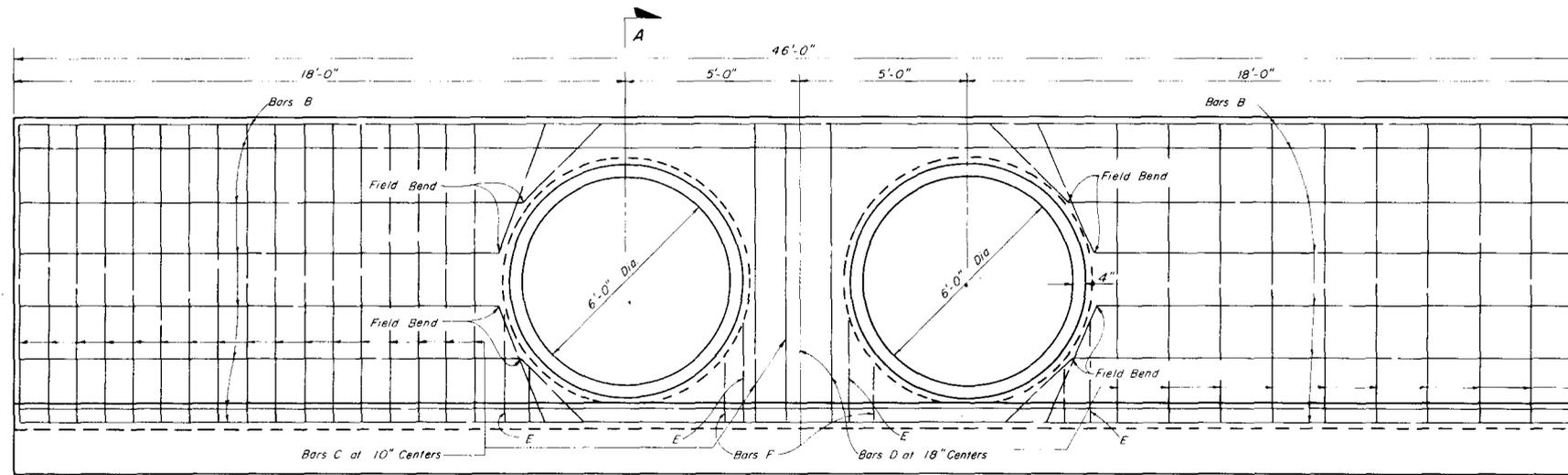
Designed by	EVC	Date	10/55	Approved By	<i>Jc. Bull</i>
Drawn by					Deputy Design Engineer, Roadways
Checked by	WHW	Date	10/55	Revision No.	Sheet No.
F.H.W.A. Approved:	3/20/75	81	1 of 2	Index No.	253



PLAN
(Showing Bars In Footing)

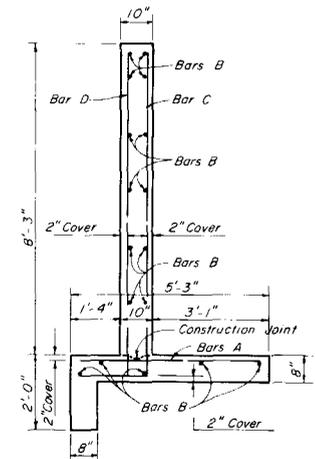


SECTION A A



HALF ELEVATION
(Showing Bars In Back Face Of Wall)

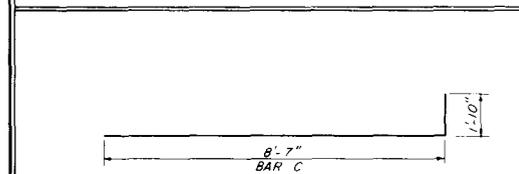
NOTE: Cut and Field Bend Bars B as shown



TYPICAL SECTION
THRU ENDWALL

BILL OF REINFORCING STEEL					
Mark	Size	No Req'd	Length	Location	Bending
A	5	85	4'-11"	Footing	Straight
B	4	17	45'-8"	Footing & Wall	"
C	5	38	10'-5"	Wall	Bend
D	4	23	8'-7"	Wall	Straight
E	4	8	2'-6"	Wall	"
F	4	8	1'-6"	Wall	"

BENDING DIAGRAM

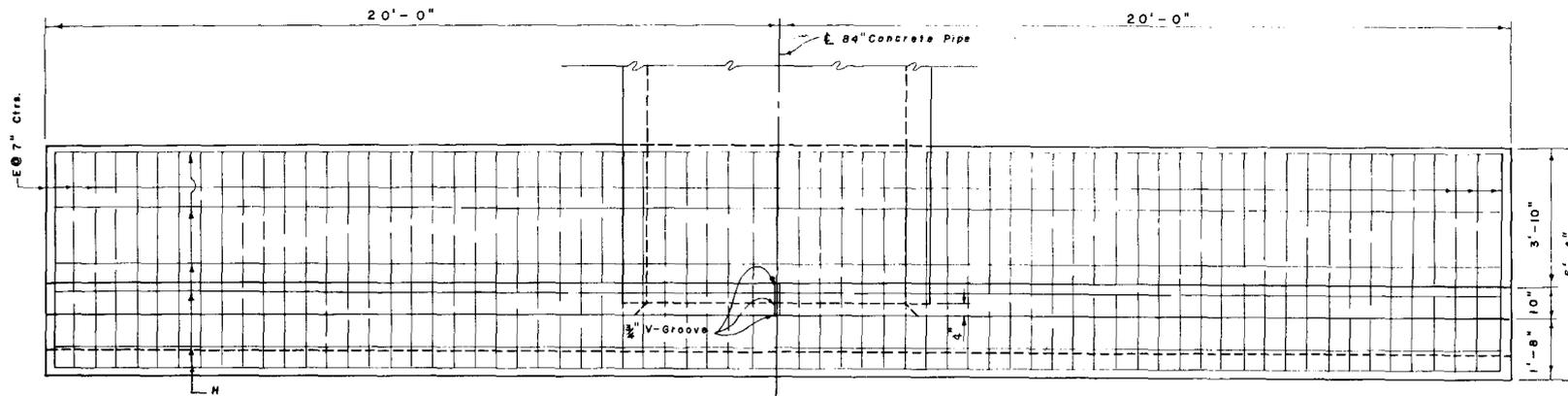


NOTE: All Bar dimensions are out-to-out

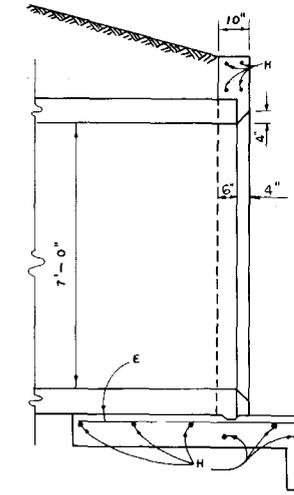
ESTIMATED QUANTITIES		
Item	Unit	Quantity
Class II Concrete	Cu Yd	16.74
Reinforcing Steel	Lb	1519

GENERAL NOTES
DESIGN SPECIFICATIONS: AASHTO 1973
CHAMFER: All exposed edges and corners to be chamfered $\frac{1}{4}$ " unless otherwise noted.
REINFORCING STEEL: Grade 40 or 60
SODDING: See Index 281

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 72" CONCRETE PIPE			
Designed By	Names	Dates	Approved By
Drawn By	EVC	10/55	<i>J. C. Ruppel</i> Deputy Design Engineer, Roadways
Checked by	WHW	10/55	Revision No. Sheet No. Index No.
F.H.W.A. Approved	7/7/75	81	2 of 2 253



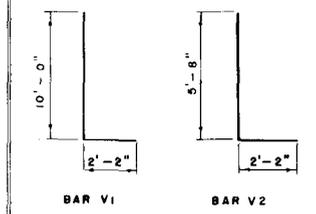
PLAN
Showing Bars in Footing



SECTION A A

BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D.	LENGTH
E	6	69	6'-0"
H	4	20	39'-8"
V ₁	6	26	12'-2"
V ₂	6	26	7'-10"
V ₃	4	22	10'-0"
V ₄	4	4	2'-0"

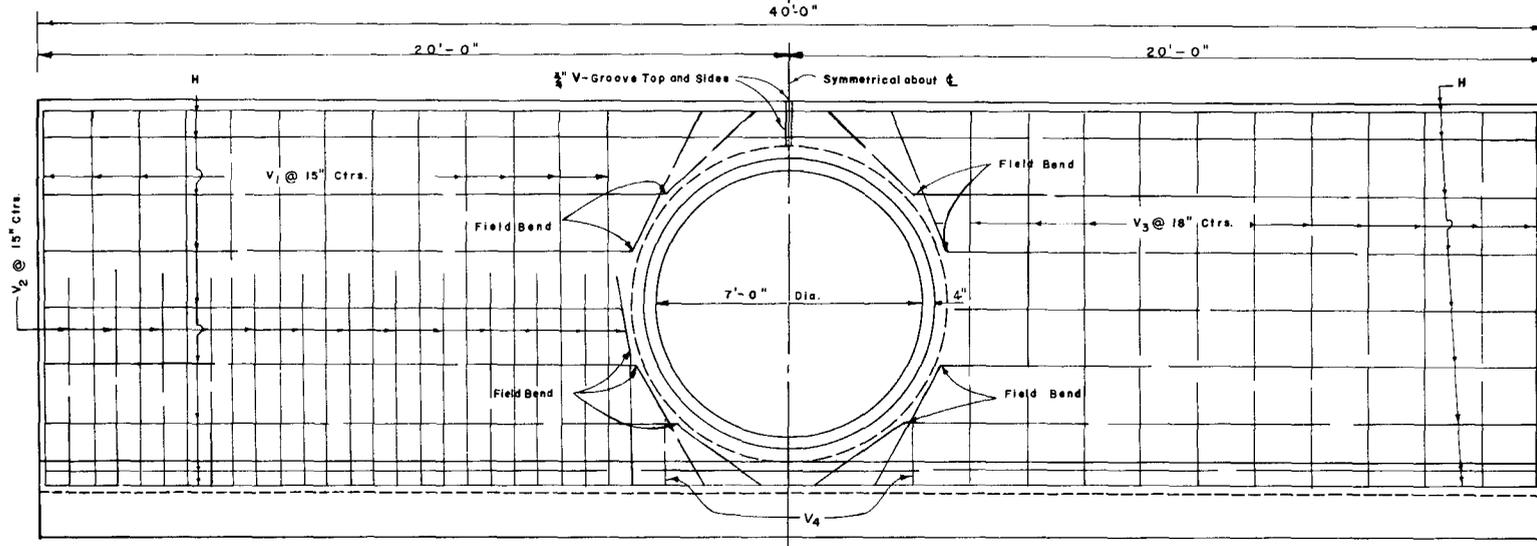
BENDING DIAGRAM



NOTE: All Bar Dimensions are out-to-out.

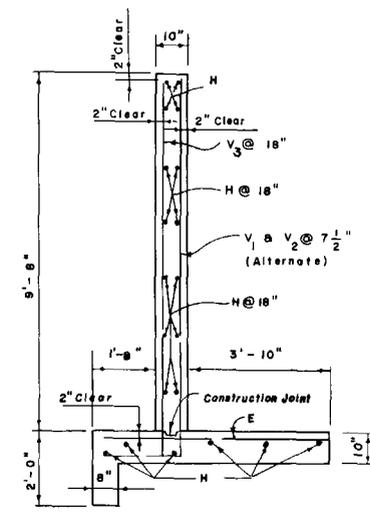
ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Concrete, Class II	Cu. Yd.	19.3
Reinforcing Steel	Lb.	2,085



HALF ELEVATION
Showing Bars in Back Face of Wall

HALF ELEVATION
Showing Bars in Front Face of Wall



TYPICAL SECTION THRU
ENDWALL

NOTE: Cut and Field Bend Bars H as shown

GENERAL NOTES

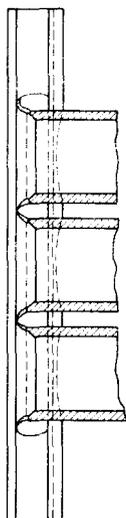
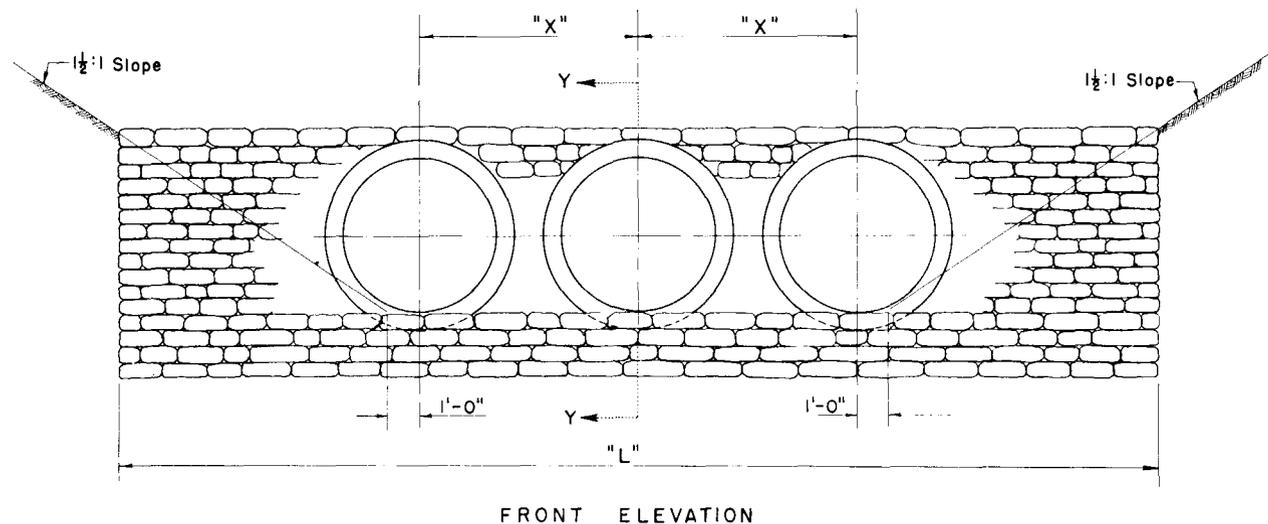
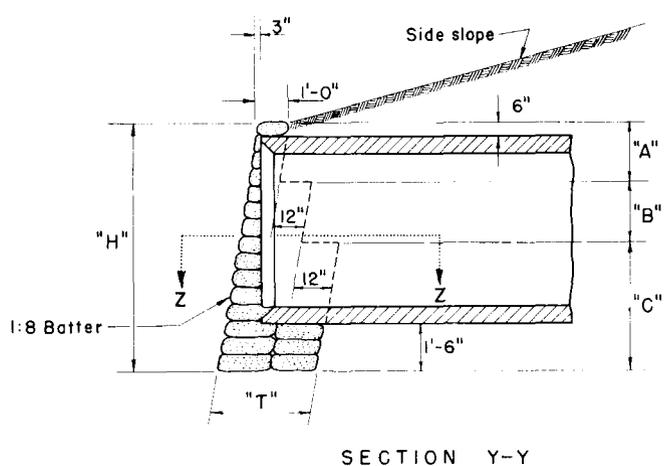
DESIGN SPECIFICATIONS: A.A.S.H.O. 1973
 CHAMFER: All exposed edges and corners to be chamfered 3/4" unless otherwise noted.
 REINF. STEEL: Grade 40 to 60.
 SODDING: See Index 281

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**STRAIGHT CONCRETE ENDWALL
SINGLE 84" CONCRETE PIPE**

Designed by	Names	Dates	Approved By
Drawn by	WHW	7/58	<i>J. C. Bell</i> Deputy Design Engineer, Roadways
Checked by	HCG	7/58	
F.H.W.A. Approved:	3/20/75	81	

Revision No. 1 of 1
Sheet No. 255



SECTION Z-Z

SIZE OF PIPE	TABLE OF DIMENSIONS						QUANTITIES FOR ONE ENDWALL							
	H	T	A	B	C	X	ONE PIPE CULVERTS		TWO PIPE CULVERTS		THREE PIPE CULVERTS		FOUR PIPE CULVERTS	
							L	RIPRAP CU. YDS.	L	RIPRAP CU. YDS.	L	RIPRAP CU. YDS.	L	RIPRAP CU. YDS.
18"	3'-10"	1'-0"	3'-10"	0'-0"	0'-0"	2'-10"	8'-0"	1.04	10'-10"	1.34	13'-8"	1.65	16'-6"	1.95
24"	4'-5"	2'-0"	2'-0"	2'-5"	0'-0"	3'-5"	9'-8"	2.22	13'-1"	2.85	16'-6"	3.49	19'-11"	4.13
30"	5'-0"	2'-0"	2'-0"	3'-0"	0'-0"	4'-3"	11'-3"	2.94	15'-6"	3.81	19'-9"	4.67	24'-0"	5.54
36"	5'-7"	2'-0"	2'-0"	3'-7"	0'-0"	5'-1"	12'-11"	3.79	18'-0"	4.91	23'-1"	6.04	28'-2"	7.17
42"	6'-3"	3'-0"	2'-0"	2'-0"	2'-3"	6'-0"	14'-7"	5.94	20'-7"	7.83	26'-7"	9.71	32'-7"	11.60
48"	6'-10"	3'-0"	2'-0"	2'-0"	2'-10"	6'-9"	16'-3"	7.45	23'-0"	9.81	29'-9"	12.16	36'-6"	14.51
54"	7'-6"	3'-0"	2'-0"	2'-0"	3'-6"	7'-8"	18'-0"	9.22	25'-8"	12.12	33'-4"	15.02	41'-0"	17.92
60"	8'-2"	3'-0"	2'-0"	2'-0"	4'-2"	8'-6"	19'-9"	11.23	28'-3"	14.75	36'-9"	18.27	45'-3"	21.79
66"	8'-7"	3'-0"	2'-0"	2'-0"	4'-7"	9'-2"	21'-7 1/2"	12.92	30'-9 1/2"	15.18				
72"	9'-2"	3'-0"	2'-0"	2'-0"	5'-2"		23'-3"	15.07						
84"	10'-4"	3'-0"	2'-0"	2'-0"	6'-4"		26'-6"	18.72						

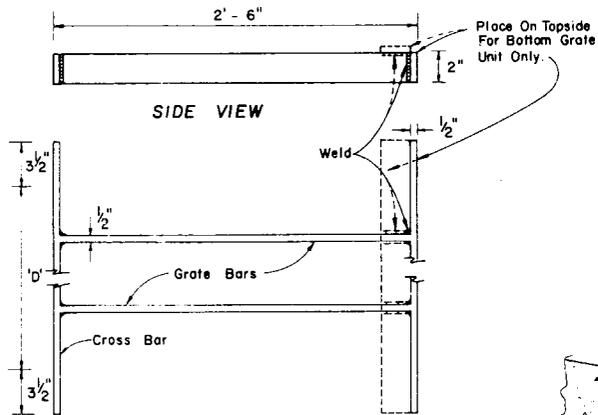
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT SAND-CEMENT ENDWALLS

Approved By: *De Kuhl*
Deputy Design Engineer, Roadways

Checked By: *EH* Date: 5/48
Designed By: *HB* Date: 5/48
Revision No.: Sheet No.: Index No.:

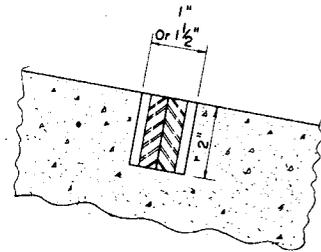
Approved: 12/6/76 80 1 of 1 **258**



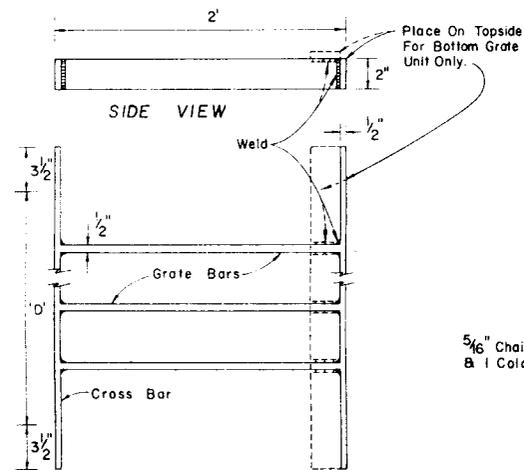
GRATE TYPE NO. 1

Pipe Size	Grate Bars Req'd.	Grate Wt.
15"	2	28.93

Bars to be evenly spaced across dimension 'D'. All bars 1/2" x 2".



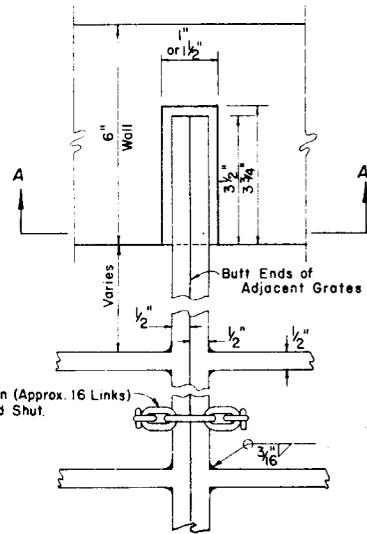
SECTION AA



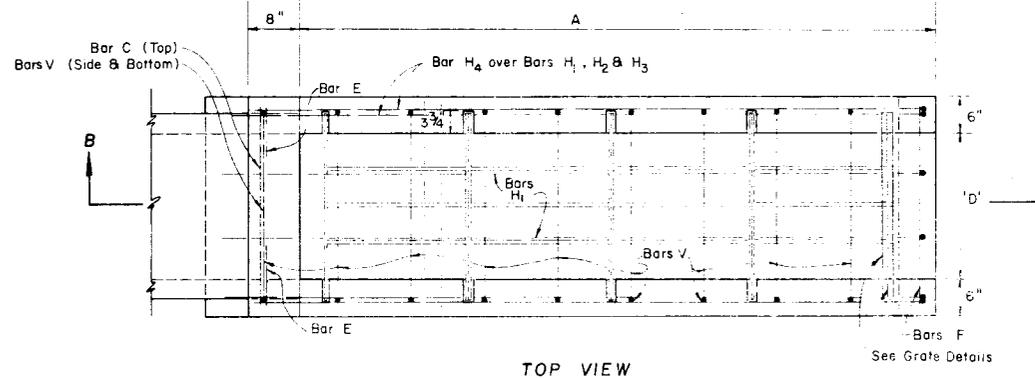
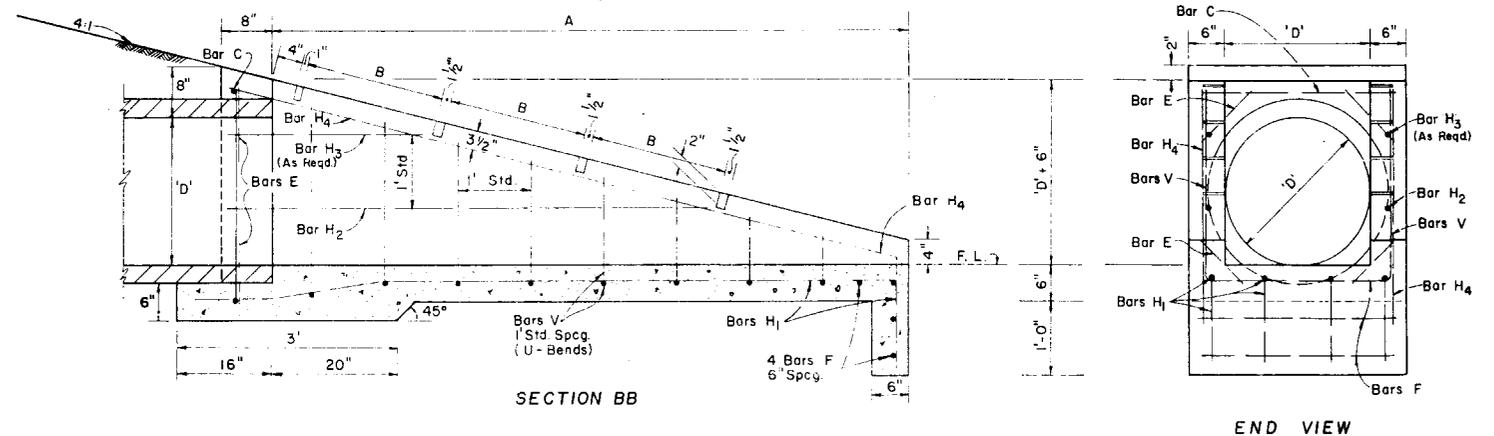
GRATE TYPE NO. 2

Pipe Size	Grate Bars Req'd.	Grate Wt.
18"	3	33.69
24"	4	43.63
30"	5	53.55

Bars to be evenly spaced across dimension 'D'. All bars 1/2" x 2".



GRATE, SEAT, WELD & CHAIN DETAIL



RATE OF SLOPE	PIPE SIZE 'D'	TABLE OF DIMENSIONS AND QUANTITIES				NUMBER OF GRATES REQ'D		TOTAL GRATE WT.(lbs.)	SODDING (SY)
		A	B	CONC. CLASS I (CY)	REINF. STEEL(LB.)	GRATE TYPE NO. 1	GRATE TYPE NO. 2		
4:1	15"	5.67	2.38'	0.85	56	2	0	57.86	14.5
	18"	6.67	1.875'	1.01	73	0	3	101.08	15.8
	24"	8.67	1.875'	1.65	97	0	4	174.52	18.4
	30"	10.67	1.875'	2.33	129	0	5	267.75	21.0

GENERAL NOTES

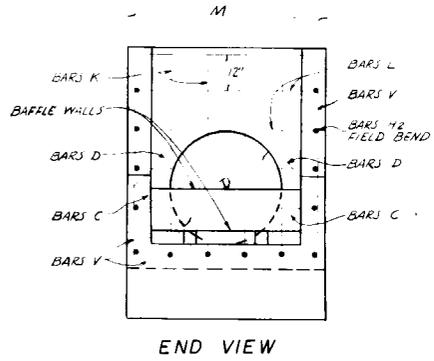
- This endwall is to be used only in the clear recovery area for the drainage of medians and other areas having low design velocities and negligible debris.
- Reinforcing Steel: All bars are size #4. Spacings shown are center to center. Laps to be 12" minimum. Clearance is 2" except as noted. Square welded wire fabric (two cages max.) having an equivalent cross sectional area (0.20 sq. in.) may be substituted for bar reinforcement.
- Grates to be ASTM A 588 weathering steel. If exposed to salt water, (Specific locations will be designated in plans) grate to be fabricated from ASTM A 572, Grade 50, then galvanized.
- Endwall to be paid for per each. Payment shall include cost of concrete, reinforcing steel, grate, and accessories. Quantities shown are for estimating purposes only.
- Sod slopes 5' each side and above endwall. Sodding to be paid for under contract unit price for Sodding.
- Precasting of this endwall will be permitted. Precast units shall conform to the dimensions shown or in accordance with approved shop drawings. Request for shop drawing approval shall be directed to the D. O. T. Engineer of Drainage.
- Concrete meeting the requirements of ASTM C 478 (4,000 PSI) may be used in lieu of Class I concrete for precast units.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**U-TYPE CONCRETE ENDWALLS
WITH GRATES
15" TO 30" PIPE**

Names	Dates	Approved By
Designed by EGR	6/77	<i>De F...</i> District Design Engineer, Roadways
Drawn by HKH	6/77	
Checked by JVG	6/77	
Revision No.	Sheet No.	Index No.
81	1 of 1	260

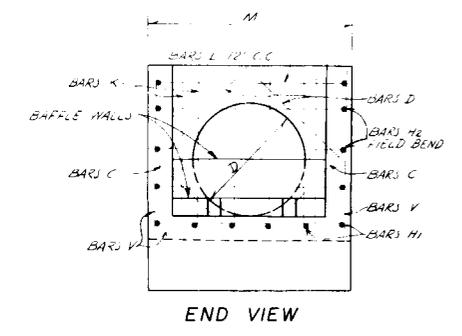
F.H.W.A. Approved: 7/15/77



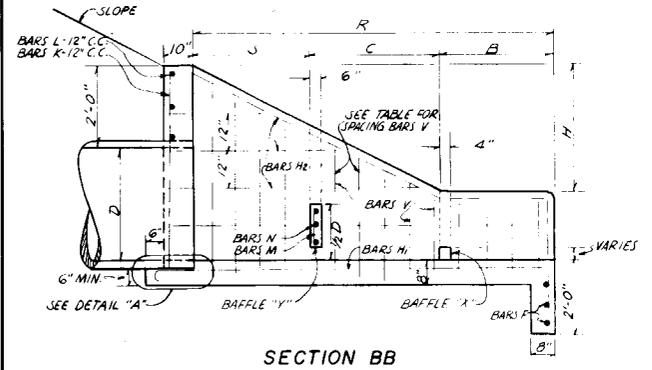
END VIEW

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL SECTION AA

RATE OF SLOPE	PIPE SIZE "D"	AREA OF OPENING SQ. FT.	R	H	M	BAFFLE LOCATIONS (WHEN REQUIRED)			CONCRETE CLASS I CU. YD.	REINFORCING STEEL LBS.
						S	B	C		
2:1	15"	1.23	3'-3"	1'-7 1/2"	3'-7"				0.89	49
	18"	1.77	3'-9"	1'-10 1/2"	3'-10"				1.05	60
	24"	3.14	4'-9"	2'-4 1/2"	4'-4"				1.40	82
4:1	15"	1.23	3'-4"	1'-10"	3'-7"	2'-6"	2'-6"	2'-4"	1.88	146
	18"	1.77	3'-4"	2'-0"	3'-10"	2'-10"	2'-10"	2'-8"	1.84	139
	24"	3.14	4'-9"	3'-7"	4'-10"	3'-6"	3'-6"	3'-4"	2.53	139
6:1	15"	1.23	11'-6"	3'-11"	3'-7"	3'-10"	3'-10"	3'-10"	3.34	236
	18"	1.77	13'-0"	2'-2"	3'-10"	4'-4"	4'-4"	4'-4"	2.13	145
	24"	3.14	16'-0"	2'-8"	4'-4"	5'-4"	5'-4"	5'-4"	3.59	227
	30"	4.31	19'-0"	3'-2"	4'-10"	6'-4"	6'-4"	6'-4"	4.81	333



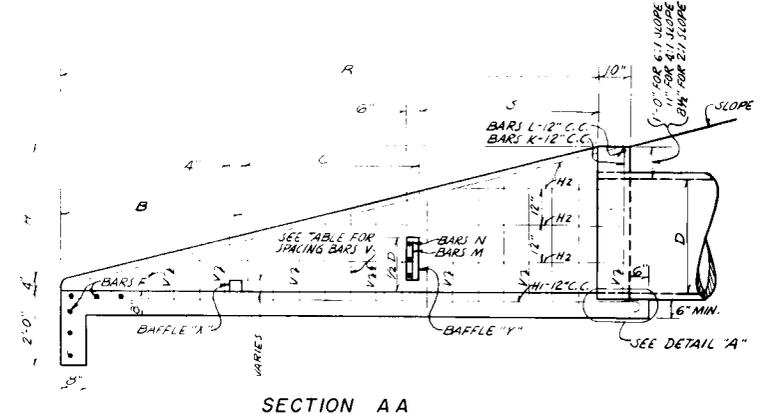
END VIEW



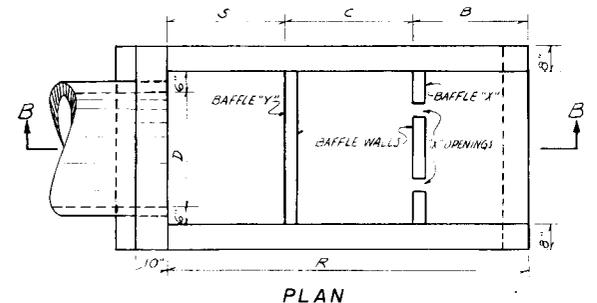
SECTION BB

TABLE OF DIMENSIONS AND QUANTITIES FOR BAFFLES SECTION AA

PIPE SIZE "D"	X BAFFLE OPENINGS			Y BAFFLE OPENING VERTICAL CLEARANCE	Y BAFFLE REINFORCING STEEL		CONCRETE CLASS I CU. YD.	REINFORCING STEEL LBS.
	WIDTH	HEIGHT	LENGTH		BARS M	BARS N		
15"	4"	4"	4"	4"	3 #4	1 #4	0.03	4
18"	4"	4"	4"	4"	4 #4	2 #4	0.04	3
24"	5"	5"	4"	4"	5 #4	3 #4	0.15	12
30"	5"	5"	4"	4"	6 #4	4 #4	0.07	18



SECTION AA



PLAN

ENDWALL WITH BAFFLES FOR 2:1 SLOPE

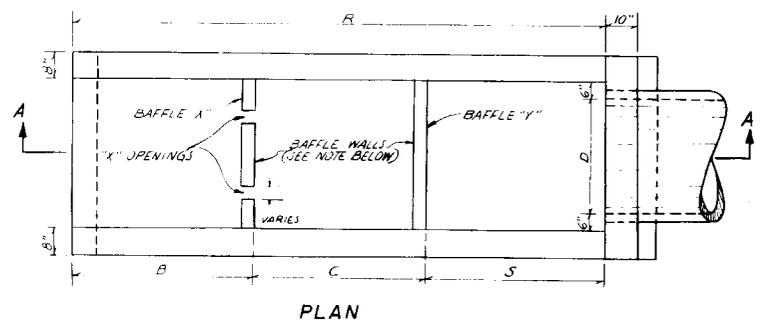
TABLE OF DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL WITH BAFFLES FOR 2:1 SLOPE SECTION BB

PIPE SIZE "D"	AREA OF OPENING SQ. FT.	R	H	M	S	B	C	X BAFFLE OPENINGS			Y BAFFLE OPENING VERTICAL CLEAR	Y BAFFLE REINFORCING STEEL		CONCRETE CLASS I CU. YD.	REINFORCING STEEL LBS.
								WIDTH	HEIGHT	LENGTH		BARS M	BARS N		
15"	1.23	5'-9"	2'-3 1/2"	3'-7"	2'-3"	1'-3"	2'-3"	4"	4"	4"	4"	3 #4	1 #4	1.61	39
18"	1.77	6'-6"	2'-5"	3'-10"	2'-6"	1'-6"	2'-6"	4"	4"	4"	4"	4 #4	2 #4	1.89	42
24"	3.14	8'-0"	2'-8"	4'-4"	3'-0"	2'-0"	3'-0"	5"	5"	4"	4"	5 #4	3 #4	2.52	193
30"	4.31	9'-6"	2'-11"	4'-10"	3'-6"	2'-6"	3'-6"	5"	5"	4"	4"	6 #4	4 #4	3.34	241

* NOTE: CONCRETE AND REINFORCING STEEL QUANTITIES IN THIS TABLE INCLUDE BAFFLE QUANTITIES.

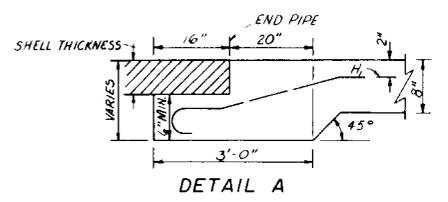
GENERAL NOTES

1. BAFFLES TO BE CONSTRUCTED ONLY AT LOCATIONS SPECIFIED IN THE PLANS.
2. WHEN STEEL GRATING IS REQUIRED ON ENDWALL SEE SHEET NO. 2 FOR MOUNTING DETAILS.
3. FOR SODDING AROUND ENDWALL SEE INDEX NO. 281.
4. REINFORCING - NO. 4 BARS 2" CLEARANCE EXCEPT AS NOTED.



PLAN

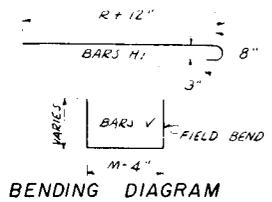
ENDWALL WITH OR WITHOUT BAFFLES FOR 4:1 AND 6:1 SLOPES AND WITHOUT BAFFLES FOR 2:1 SLOPE



DETAIL A

V & F BAR SPACING

PIPE DIAMETER	C. C.
15"	12"
18"	12"
24"	10"
30"	10"

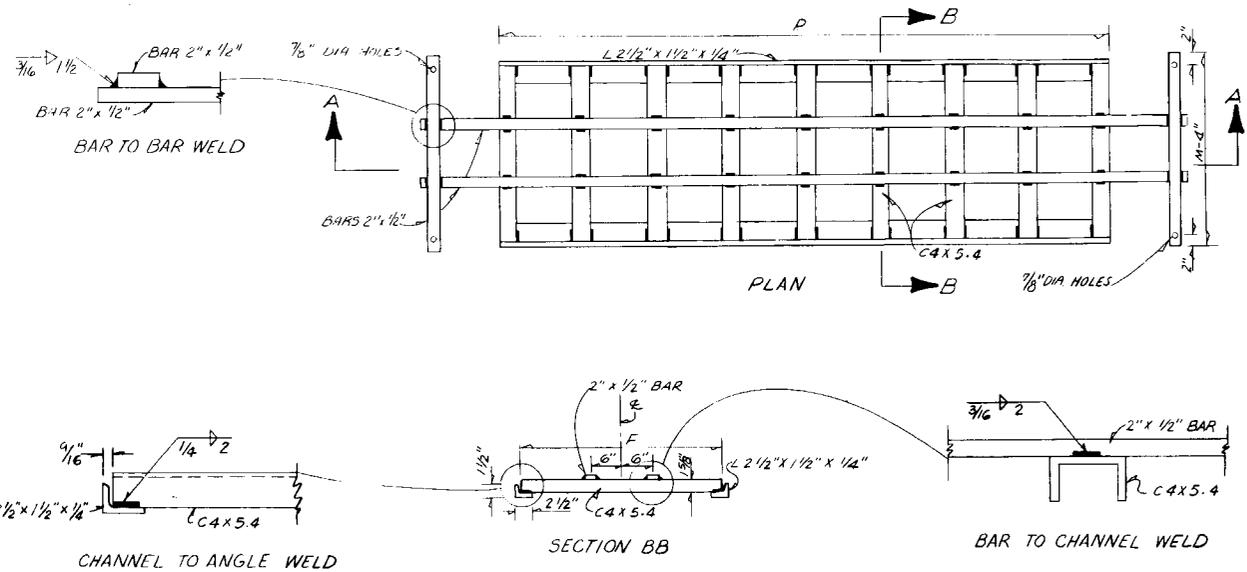
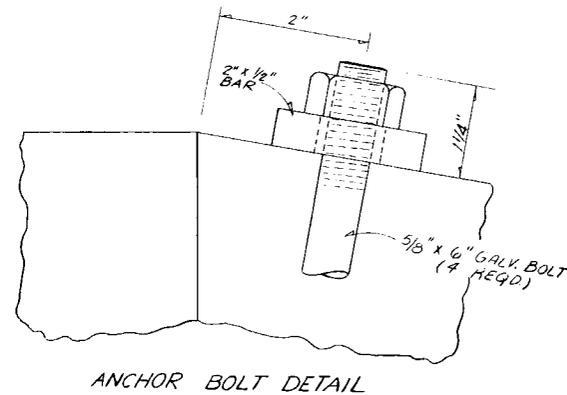
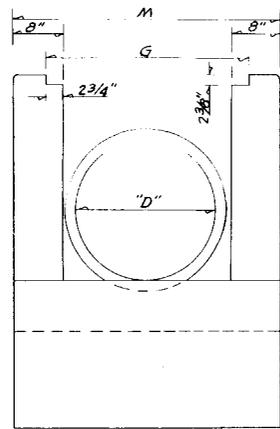
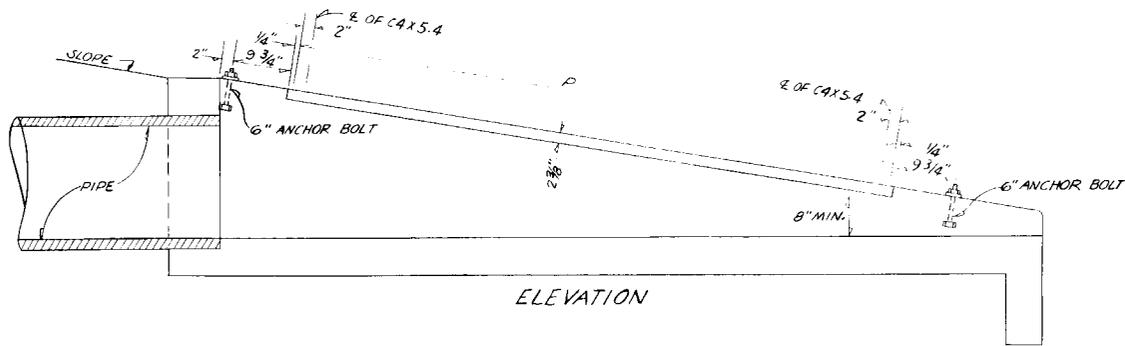


BENDING DIAGRAM

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

U-TYPE CONCRETE ENDWALLS
BAFFLES AND GRATE OPTIONAL
15" TO 30" PIPE

Designed by	Names	Dates	Approved By
Drawn by	CDP	7/71	<i>De Paul</i> Deputy Design Engineer, Roadways
Checked by			Revision No.
I. H. W. A. Approved: 3/20/75			Sheet No. 81
			Index No. 1 of 2
			261



STEEL GRATE

MOUNTING FOR STEEL GRATE

STEEL GRATING USE CRITERIA

- GRATED HEADWALL AND/OR ENDWALL TO BE USED ON PIPE CULVERTS WHEN IN THE DESIGNATED CLEAR RECOVERY AREA AND WHEN ANY OF THE FOLLOWING CONDITIONS EXIST:
 - DRAINAGE AREA TO CULVERT CONSISTS OF MEDIAN OR INFIELD AREAS OR AREAS WHERE DEBRIS AND/OR DRIFT IS NEGLIGIBLE.
 - RUNOFF TO CULVERT IS BY SHEET FLOW OR IN SUCH ILL DEFINED CHANNELS THAT DEBRIS TRANSPORT IS NOT CONSIDERED A MAJOR PROBLEM.
 - RUNOFF TO CULVERT IS MINOR, EXCEPT ON AN INFREQUENT BASIS (10 TO 15 YEAR FREQUENCY); FOR EXAMPLE A DRAINAGE BASIN IN FLAT SANDY TERRAIN WITH NORMALLY LOW GROUND WATER TABLE.
 - AREAS WHERE CULVERT BLOCKAGE WITH RESULTANT BACKWATER WOULD NOT SERIOUSLY AFFECT ROADWAY EMBANKMENT, TRAFFIC OPERATION OR UPLAND PROPERTY.
- STEEL GRATING TO BE USED ONLY WHERE CALLED FOR IN PLANS AND ONLY ON HEADWALLS AND/OR ENDWALLS HAVING EITHER 4:1 OR 6:1 RATES OF SLOPE.

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRATE

RATE OF SLOPE	SIZE PIPE "D"	G	2 EACH BARS @ 3.4 LBS./L.F.			(A) CHANNELS @ 5.4 LBS./L.F.			2 ANGLES @ 3.2 LBS./L.F.			TOTAL WEIGHT LBS.
			L	M-4"	LBS.	(X)	F	LBS.	P	LBS.		
6:1	15"	2'-8 1/2"	9'-3"	3'-3"	85	8	2'-6 1/2"	111	7'-4"	47	243	
	18"	2'-11 1/2"	10'-3"	3'-6"	94	9	2'-9 1/2"	137	8'-4"	54	282	
	24"	3'-5 1/2"	13'-3"	4'-0"	117	12	3'-3 1/2"	215	11'-4"	73	405	
	30"	3'-11 1/2"	16'-3"	4'-6"	141	15	3'-9 1/2"	310	14'-4"	92	543	
4:1	15"	2'-8 1/2"	6'-3"	3'-3"	65	5	2'-6 1/2"	70	4'-4"	28	163	
	18"	2'-11 1/2"	7'-3"	3'-6"	73	6	2'-9 1/2"	92	5'-4"	35	200	
	24"	3'-5 1/2"	9'-3"	4'-0"	90	8	3'-3 1/2"	144	7'-4"	47	281	
	30"	3'-11 1/2"	11'-3"	4'-6"	107	10	3'-9 1/2"	206	9'-4"	60	373	

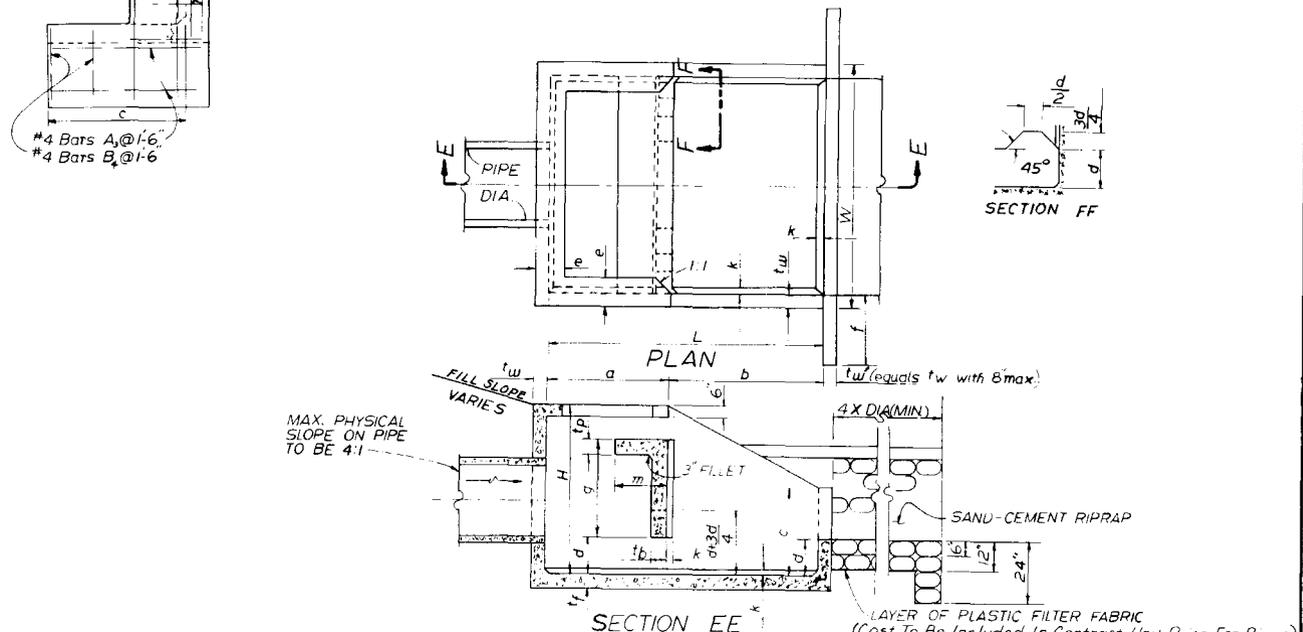
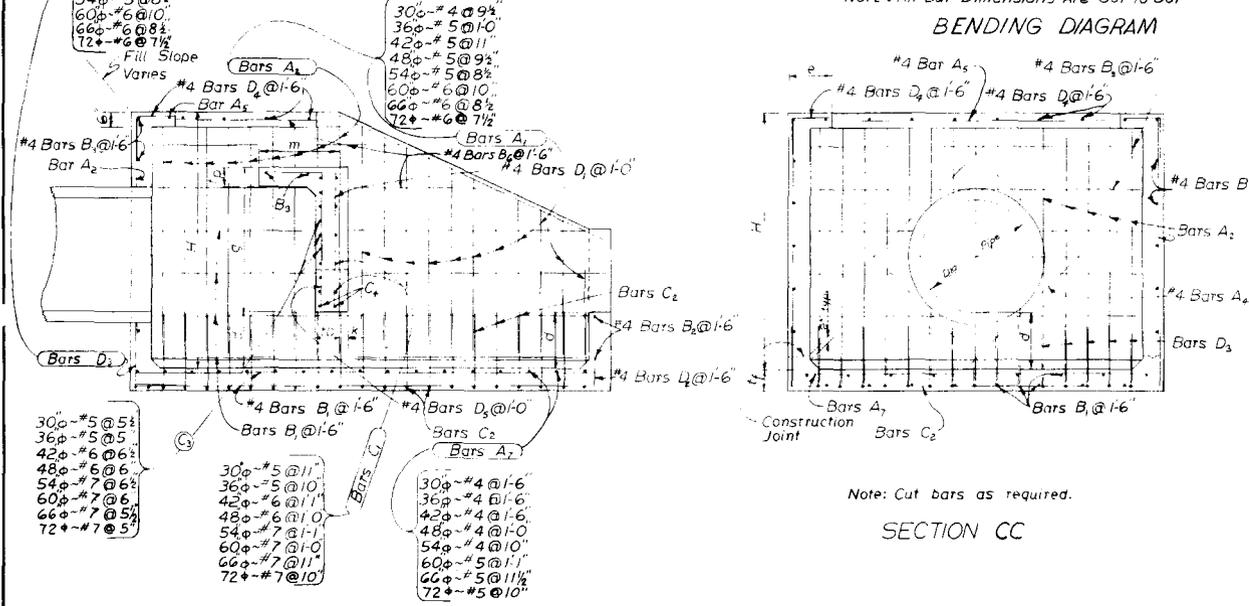
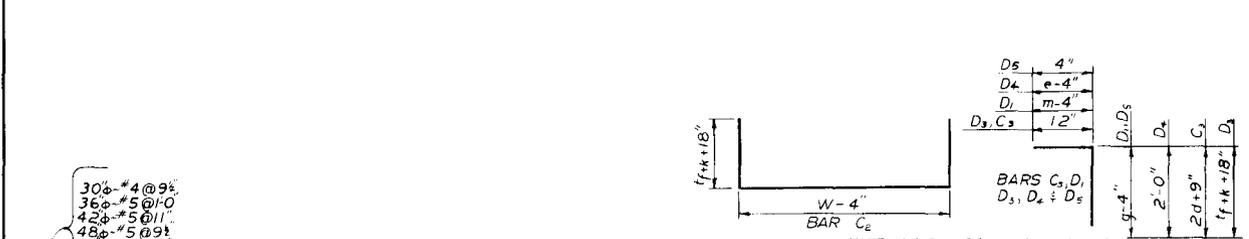
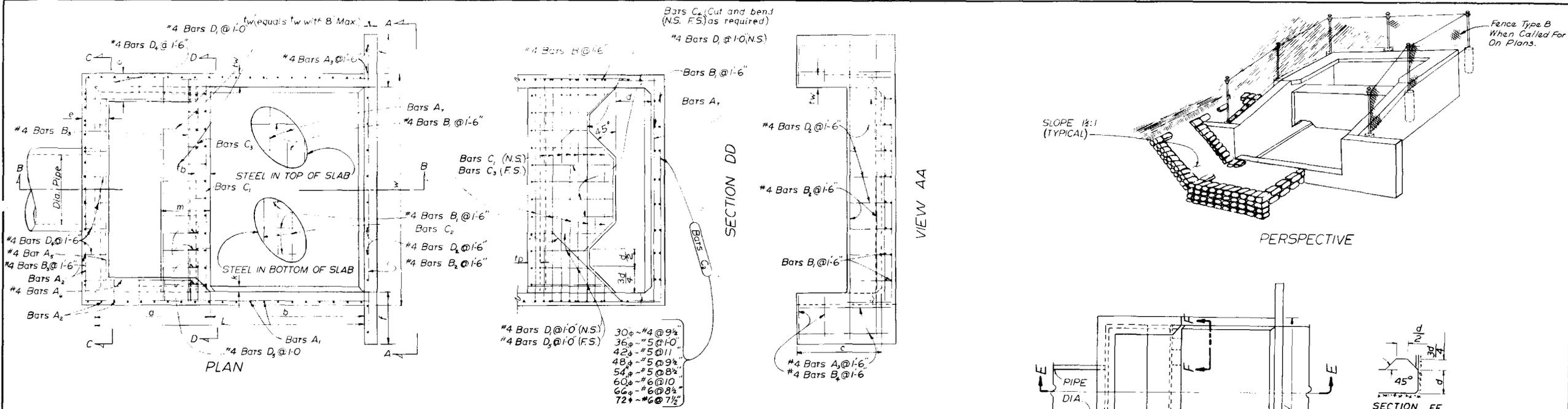
GENERAL NOTES:

- COST OF GRATING TO BE PAID FOR AS ENDWALL GRATE PER POUND, TABULATED QUANTITY.
- COST OF GALVANIZED BOLTS AND NUTS TO BE INCLUDED IN BID PRICE FOR ENDWALL GRATE.
- ALL ANGLE, CHANNEL AND BAR STEEL TO BE A.S.T.M. A-588 WEATHERING STEEL EXCEPT AS NOTED IN GENERAL NOTE NO. 4.
- WHEN GRATING WILL BE EXPOSED TO SALT WATER ALL ANGLE, CHANNEL AND BAR STEEL TO BE A.S.T.M. A-572 GRADE 50, GALVANIZED. SPECIFIC LOCATIONS WILL BE DESIGNATED IN PLANS.
- CHANNEL SECTION C3X6.0 MAY BE SUBSTITUTED FOR C4 X 5.4 CHANNEL.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**U-TYPE CONCRETE ENDWALLS
BAFFLES AND GRATE OPTIONAL
15" TO 30" PIPE**

Designed by	Names	Dates	Approved By
Drawn by	CDP	7/71	<i>De Hall</i> Deputy Design Engineer, Roadways
Checked by			Revision No.
F.H.W.A. Approved:			Sheet No.
	81	2 of 2	Index No. 261



SIZE	PIPE DIA. INCHES	AREA SQ. FT.	MAX DISCHARGE Q	FEET AND INCHES											CONCRETE CLASS I CU YD	REIN. STEEL LBS.	SAND CEMENT RIPRAP CY				
				W	H	L	a	b	c	d	e	f	g	m				t _w	t _f	t _b	t _p
30	4.91	5.9	9.0	6-3	10-8	4-7	6-1	3-4	1-4	1-2	2-6	3-0	1-11	6	6-1/2	7	7	3	6.72	736	10.6
36	7.07	85	10-5	7-3	12-4	5-3	7-1	3-10	1-7	1-3	3-0	3-6	2-3	7	7-1/2	8	8	3	10.34	1072	13.6
42	9.62	115	11-10	8-0	14-0	6-0	8-0	4-5	1-9	1-6	3-0	3-11	2-6	8	8-1/2	9	8	4	14.82	1429	17.5
48	12.57	151	13-3	9-0	15-8	6-9	8-11	4-11	2-0	1-7	3-0	4-5	2-10	9	9-1/2	10	8	4	20.36	2000	22.1
54	15.90	191	14-8	9-9	17-4	7-4	10-0	5-5	2-2	1-10	3-0	4-11	3-0	10	10-1/2	10	8	4	27.19	2659	27.2
60	19.63	236	16-1	10-9	19-0	8-0	11-0	5-11	2-5	1-11	3-0	5-4	3-4	11	11-1/2	11	8	6	34.49	3552	32.5
66	23.76	285	17-3	11-6	20-6	8-8	11-10	6-5	2-7	2-1	3-0	5-9	3-7	12	12-1/2	12	8	6	42.82	4472	38.3
72	28.27	339	18-6	12-3	22-0	9-3	12-9	6-11	2-9	2-3	3-0	6-2	3-9	12	12-1/2	12	8	6	50.68	5426	44.5

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

U-TYPE CONCRETE ENDWALL ENERGY DISSIPATOR
30" To 72" PIPE

Designed By: HAB 10/69
Drawn by: HW 10/69
Checked by: DEK 11/69

Approved By: [Signature]
Deputy Design Engineer, Roadways

Revision No. 1/69
Sheet No. 1 of 1
Index No. 264

F.H.W.A. Approved: 3/20/75

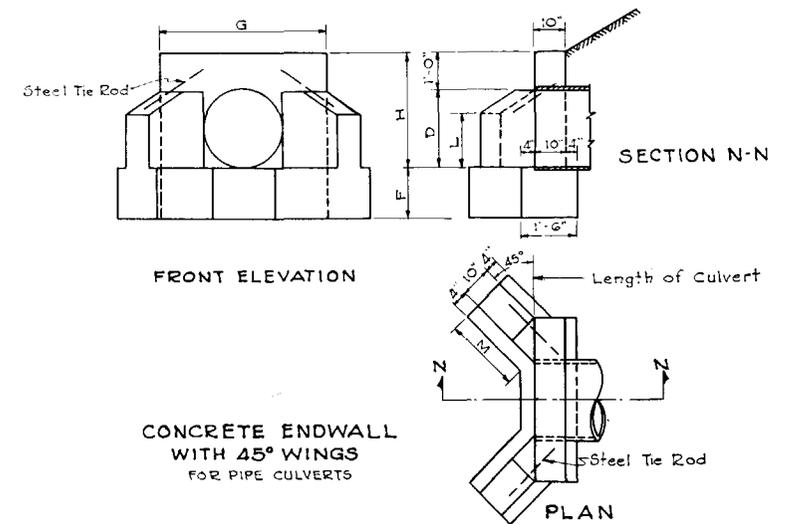
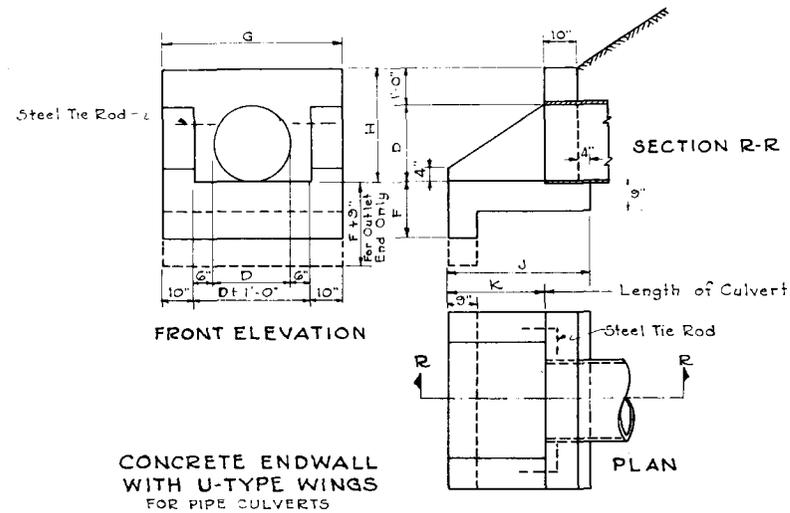


TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH U-TYPE WINGS

Opening	DIMENSIONS						QUANTITIES IN ONE ENDWALL						Steel Tie Rods
	Area Sq Ft	Wall			Footing		Total Cu. Yds. Concrete, Class I						
		G	H	K	F	J	Conc Pipe Inlet	Conc Pipe Outlet	C.M. Pipe Inlet	C.M. Pipe Outlet	C.I. Pipe Inlet	C.I. Pipe Outlet	
12"	0.8	3'-8"	2'-0"	1'-0"	1'-3"	2'-2"	0.50	0.57	0.51	0.59	0.51	0.59	none
15"	1.2	3'-11"	2'-3"	1'-5"	1'-5"	2'-7"	0.61	0.69	0.64	0.72	0.63	0.72	none
18"	1.8	4'-2"	2'-6"	1'-9"	1'-3"	2'-11"	0.72	0.81	0.76	0.84	0.76	0.84	none
24"	3.1	4'-8"	3'-0"	2'-6"	1'-6"	3'-8"	1.03	1.13	1.08	1.18	1.08	1.18	2-3/4" x 2'-0"
30"	4.9	5'-2"	3'-6"	3'-3"	1'-6"	4'-5"	1.35	1.46	1.43	1.53	1.42	1.53	2-3/4" x 2'-0"
36"	7.1	5'-8"	4'-0"	4'-0"	1'-9"	5'-2"	1.75	1.87	1.86	1.98	1.84	1.96	2-3/4" x 2'-6"
42"	9.6	6'-2"	4'-6"	4'-9"	2'-0"	5'-11"	2.21	2.34	2.34	2.47			2-3/4" x 2'-6"
48"	12.6	6'-8"	5'-0"	5'-6"	2'-0"	6'-8"	2.66	2.80	2.83	2.97			2-3/4" x 3'-0"

TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH 45° WINGS

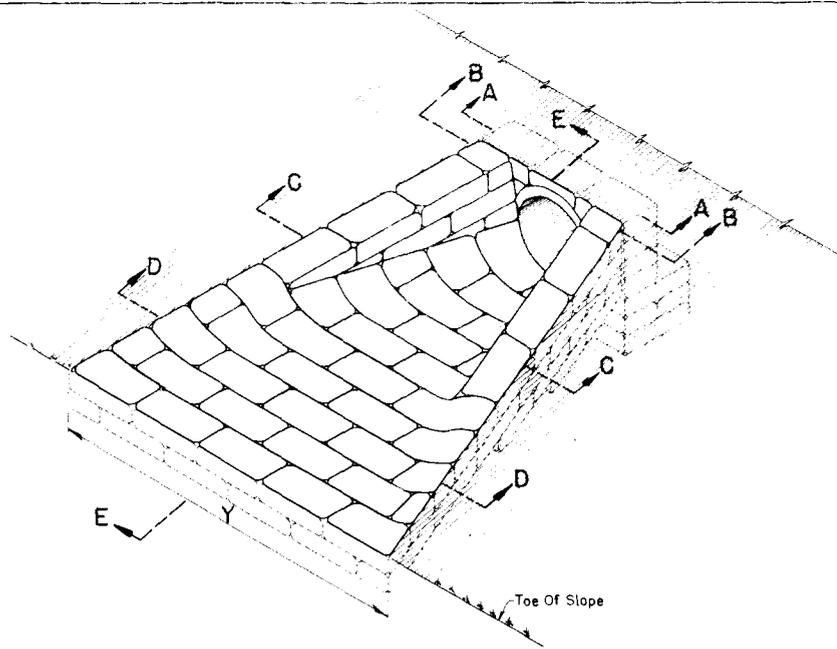
Opening	DIMENSIONS						QUANTITIES IN ONE ENDWALL					
	Area Sq Ft	Wall				Footing	Concrete, Class I			Steel Tie Rods		
		H	G	L	M		Conc. Pipe	C.M. Pipe	C.I. Pipe			
18"	1.8	2'-6"	3'-10"	1'-2"	1'-7"	1'-3"	0.76	0.79	0.79	0.79	0.79	none
24"	3.1	3'-0"	4'-4"	1'-5"	2'-1"	1'-4"	1.03	1.08	1.08	1.08	1.08	2-3/4" x 2'-0"
30"	4.9	3'-6"	4'-10"	1'-9"	2'-5"	1'-6"	1.34	1.42	1.41	1.41	1.41	2-3/4" x 2'-0"
36"	7.1	4'-0"	5'-4"	2'-0"	2'-11"	1'-8"	1.74	1.85	1.84	1.84	1.84	2-3/4" x 3'-0"
42"	9.6	4'-6"	5'-10"	2'-3"	3'-6"	2'-0"	2.36	2.49				2-3/4" x 3'-0"
48"	12.6	5'-0"	6'-4"	2'-6"	4'-0"	2'-0"	2.76	2.92				2-3/4" x 3'-0"
15"	1.2	2'-3"	3'-7"	1'-0"	1'-3"	1'-3"	0.56	0.61	0.61	0.61	0.61	none

Note:
Chamfer all exposed edges 3/4".
Provide good foundation under pipes using concrete, if natural conditions are very bad.
Where tie rods are required the cost of same shall be included in the unit price bid for Concrete. } Rev G-14-4G
For sodding around endwalls see Index No. 281.

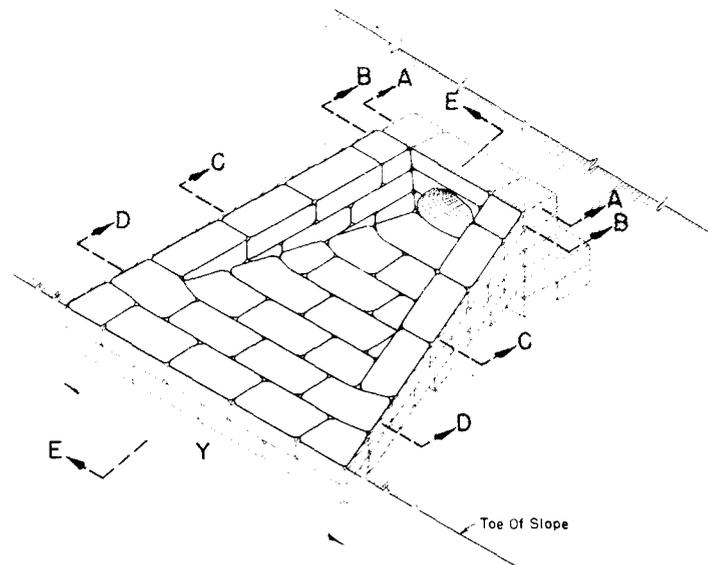
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**WINGED CONCRETE ENDWALLS
SINGLE ROUND PIPE**

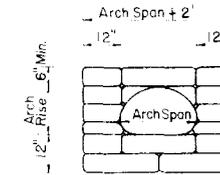
Designed by	Names	Dates	Approved By
Drawn by	T/J/K	12/31	<i>J. A. Hall</i> Deputy Design Engineer, Roadways
Checked by	GEF	3/32	Revision No. Sheet No. Index No.
F. H. W. A. Approved:	3/20/75	80	1 of 1 266



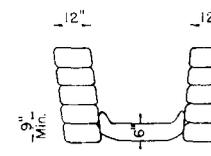
ISOMETRIC



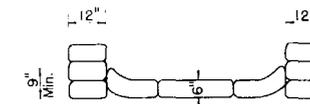
ISOMETRIC



SECTION A A



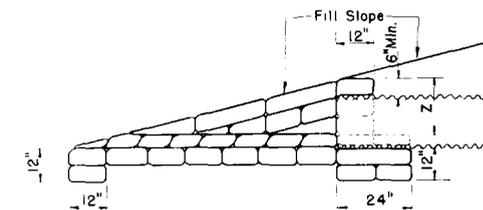
SECTION B B



SECTION C C



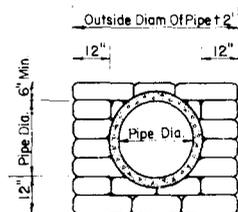
SECTION D D



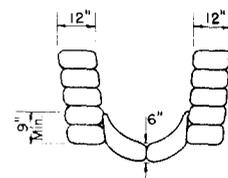
SECTION E E

DETAILS FOR SINGLE METAL PIPE ARCH CULVERTS

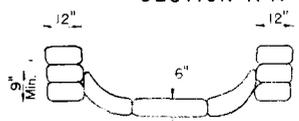
NOTE: For Multiple Metal Pipe Arch Culvert spacing between Arch centers = X



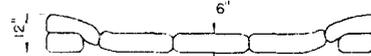
SECTION A A



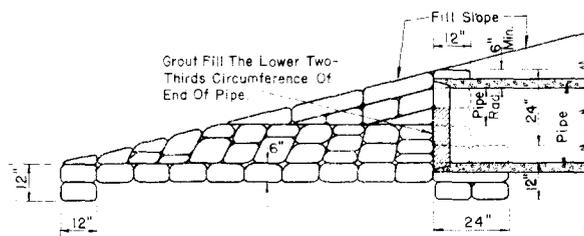
SECTION B B



SECTION C C



SECTION D D



SECTION E E

DETAIL FOR SINGLE PIPE CULVERT

NOTE: For Multiple Pipe Culvert spacing between pipe centers = X

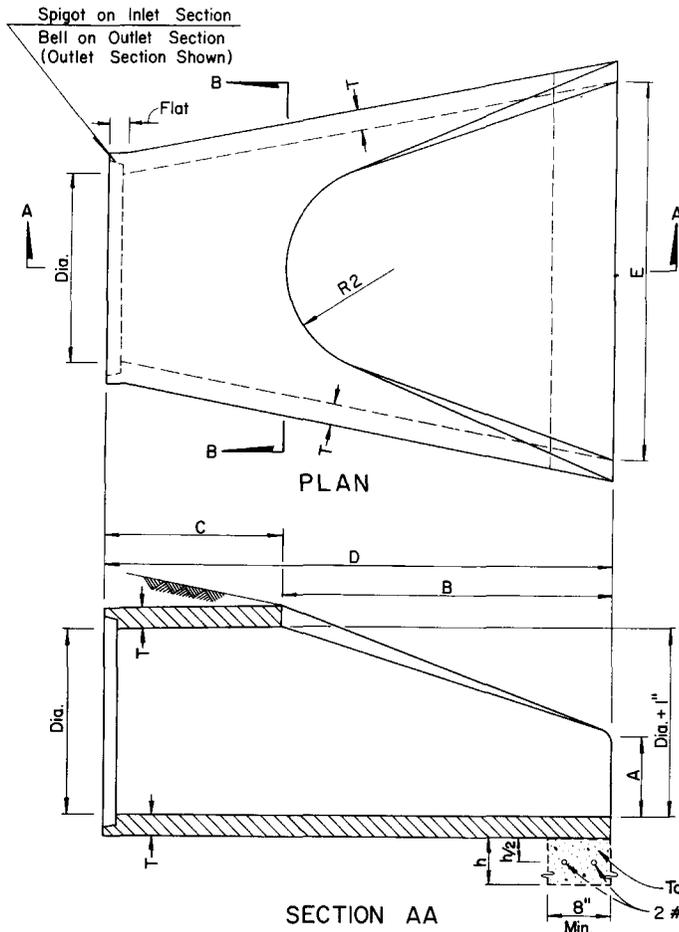
Span	Rise	Dimensions				Quantity of Sand-Cement Riprap in Cu. Yds. for One Endwall													
		X		Y		Z		For 2:1 Slopes				For 4:1 Slopes				For 6:1 Slopes			
		1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch		
17"	13"	2'-6"	6'-6"	9'-0"	11'-6"	14'-0"	17'-7"	1.0	1.5	2.0	2.5	1.5	2.2	2.9	3.6				
21"	15"	2'-10"	7'-6"	10'-4"	13'-2"	16'-0"	19'-9"	1.2	1.8	2.4	3.0	1.9	2.7	3.5	4.3				
25"	20"	3'-5"	9'-3"	12'-8"	16'-1"	19'-6"	23'-0"	1.7	2.5	3.3	4.1	2.6	3.7	4.9	6.0				
35"	24"	4'-0"	11'-0"	15'-0"	19'-0"	23'-0"	27'-0"	2.2	3.1	4.0	4.9	3.4	4.7	6.0	7.3				
42"	29"	4'-9"	12'-9"	17'-6"	22'-3"	27'-0"	32'-0"	2.9	4.1	5.0	6.5	4.5	6.1	7.7	9.3				
48"	33"	5'-6"	14'-6"	20'-0"	25'-6"	31'-0"	37'-0"	3.5	4.9	6.3	7.7	5.5	7.4	9.3	11.2				
57"	38"	6'-4"	16'-6"	22'-10"	29'-2"	35'-6"	42'-0"	4.4	6.1	7.8	9.5	6.9	9.2	11.5	13.8				
64"	43"	7'-1"	18'-3"	25'-4"	32'-5"	39'-6"	47'-0"	5.1	7.0	8.9	10.8	8.1	10.7	13.3	15.9				
71"	47"	7'-10"	20'-0"	27'-10"	35'-8"	43'-6"	52'-0"	5.9	8.1	10.3	12.5	9.5	12.4	15.3	18.2				

Pipe Diam	Dimensions				Quantity of Sand-Cement Riprap in Cu. Yds. for One Endwall											
	X		Y		For 2:1 Slopes		For 4:1 Slopes		For 6:1 Slopes							
	1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes				
15"	2'-7"	7'-0"	9'-7"	12'-2"	1.2	1.6	2.1	2.6	1.7	2.4	3.0	3.6				
18"	2'-10"	8'-0"	10'-10"	13'-8"	1.4	2.0	2.6	3.1	2.1	2.9	3.7	4.4				
24"	3'-5"	10'-0"	13'-5"	16'-10"	1.9	2.7	3.6	4.3	2.9	4.0	5.1	6.3				
30"	4'-3"	12'-0"	16'-3"	20'-6"	2.5	3.6	4.8	5.9	3.8	5.4	7.0	8.6				
36"	5'-1"	14'-0"	19'-1"	24'-2"	3.1	4.6	6.2	7.7	4.8	7.0	9.2	11.4				
42"	6'-0"	16'-0"	22'-0"	28'-0"	3.8	5.8	7.7	9.7	6.0	8.8	11.7	14.5				
48"	6'-9"	18'-0"	24'-9"	31'-6"	4.5	7.0	9.4	11.8	7.2	10.8	14.3	17.9				
54"	7'-8"	20'-0"	27'-8"	35'-4"	5.3	8.3	11.3	14.2	8.5	12.9	17.3	21.7				
60"	8'-6"	22'-0"	30'-6"	39'-0"	6.2	9.7	13.3	16.9	10.0	15.3	20.6	25.9				

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

U-TYPE SAND-CEMENT ENDWALLS

Designed by	JEP	Date	12/48	Approved By	<i>J. C. Paul</i>
Drawn by	HW	Sheet No.	3/54	Checked by	CDD
Checked by	CDD	Revision No.	3/54	Sheet No.	1 of 1
F. H. W. A. Approved	8/30/77	81			268



DIA.	T	REINF. Sq. In./ Lin. Ft.	BELL or SPIGOT	A	B	C	D	E	P	R1	R2	FLAT	WEIGHT (LBS.)	TOE WALL	
														h	CLASS I CONC (Misc.) CY
12"	2"	0.07	1 1/2"	4"	2'-0"	4'-0 7/8"	6'-0 7/8"	2'-0"	19 15/16"	10 1/8"	9"	3 1/2"	530	12"	.06
15"	2 1/4"	0.07	2"	6"	2'-3"	3'-10"	6'-1"	2'-6"	24 5/16"	12 1/2"	11"	3 1/2"	740	12"	.07
18"	2 1/2"	0.07	2 1/2"	9"	2'-3"	3'-10"	6'-1"	3'-0"	29"	15 1/2"	12"	4"	990	15"	.11
21"	2 3/4"	0.07	2 1/4"	9"	2'-11"	3'-2"	6'-1"	3'-6"	31 5/8"	16 1/8"	13"	4"	1280	15"	.12
24"	3"	0.07	2 1/2"	9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	33 3/16"	16 13/16"	14"	4 1/2"	1520	18"	.17
27"	3 1/4"	0.148	2 1/2"	10 1/2"	4'-0"	2'-1 1/2"	6'-1 1/2"	4'-6"	36"	18 3/4"	14 1/2"	4 1/2"	1930	18"	.19
30"	3 1/2"	0.148	3"	1'-0"	4'-6"	1'-7 3/4"	6'-1 3/4"	5'-0"	37"	18 1/2"	15"	5"	2190	21"	.24
36"	4"	0.148	3 1/2"	1'-3"	5'-3"	2'-10 3/4"	8'-1 3/4"	6'-0"	47 13/16"	24 5/16"	20"	5 1/2"	4100	21"	.29
42"	4 1/2"	0.148	3 3/4"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	53 7/8"	27 1/2"	22"	5 1/2"	5380	24"	.36
48"	5"	0.148	4 1/4"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	56 1/2"	28 1/2"	22"	5 3/4"	6550	24"	.39
54"	5 1/2"	0.174	4 3/4"	2'-3"	5'-5"	2'-11"	8'-4"	7'-6"	65 1/2"	33 1/8"	24"	6 1/4"	8040	24"	.42
60"	6"	0.174	5"	2'-6"	5'-0"	3'-3"	8'-3"	8'-0"	72 1/2"	36 1/8"	24"	6 3/4"	8750	24"	.44
66"	6 1/2"	0.174	5 1/2"	2'-0"	6'-6"	1'-9"	8'-3"	8'-6"	72"	36 1/8"	24"	7 1/4"	10630	24"	.47
72"	7"	0.174	6"	2'-0"	6'-6"	1'-9"	8'-3"	9'-0"	77 15/16"	38 15/16"	24"	7 3/4"	12520	24"	.50

GENERAL NOTES

- Flared end sections shall conform to the requirements of ASTM 76 with the exception that dimensions and reinforcement shall be as prescribed in the table above. Circumferential reinforcement may consist of either one cage or two cages of steel. Compressive strength of concrete shall be 4000 psi. Shop drawings for flared end sections having dimensions other than above must be submitted for approval to the Engineer of Drainage.
- Connections between the flared end section and the pipe culvert may be any of the following types unless otherwise shown on the plans.
 - Joints meeting the requirements of Section 941-1.5 of the Standard Specifications.

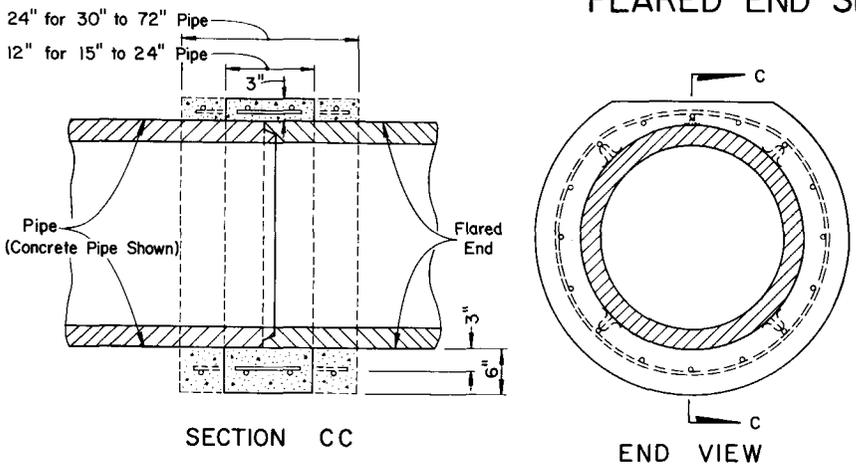
The manufacturer of the flared end section shall identify the manufacturer of the pipe culvert and certify that the flared end section is suited to joining the pipe culvert.
 - Joints sealed with preformed plastic gaskets.

The gaskets shall meet the requirements of Section 942-2 of the Standard Specifications and the minimum sizes for gaskets shall be as that specified for equivalent sizes of elliptical pipe.
 - Reinforced concrete jackets, as detailed on this drawing.

Cost of the reinforced concrete jacket to be included in the contract unit price for the flared end section.

When non-coated corrugated metal pipe is called for in the plans, the pipe shall be bituminous coated in the jacketed area as specified on Index 280. Bituminous coating to be included in the contract unit price for the pipe culvert.
- Toe walls shall be constructed when shown on the plans or at locations designated by the Engineer. Toe walls are to be cast in-place with Class I Concrete and paid for under the contract unit price for Class I Concrete (Miscellaneous). Reinforcing steel to be included in cost of toe wall.
- Sodding shall be placed about the flared end section in accordance with Index 281, and paid for under the contract unit price for Sodding.
- On skewed pipe culverts the flared end sections shall be placed in line with the pipe culvert. Side slopes shall be warped as required to fit the flared end sections.

FLARED END SECTION



REINFORCED CONCRETE JACKET DETAIL

DESIGN NOTES

- Flared end sections are intended for use outside the clear recovery area on median drain and cross drain installations. Flared end sections are not intended for side drain installations.
- Reinforced concrete jackets shall be used at all locations where high velocities and/or highly erosive soils may cause disjuncting. These locations will be shown on the plans.
- Toe walls shall be used whenever the anticipated velocity of discharge and soil type are such that erosive action would occur. Toe walls are not required where ditch pavement is provided, except when disjuncting would occur if the ditch pavement should fail.

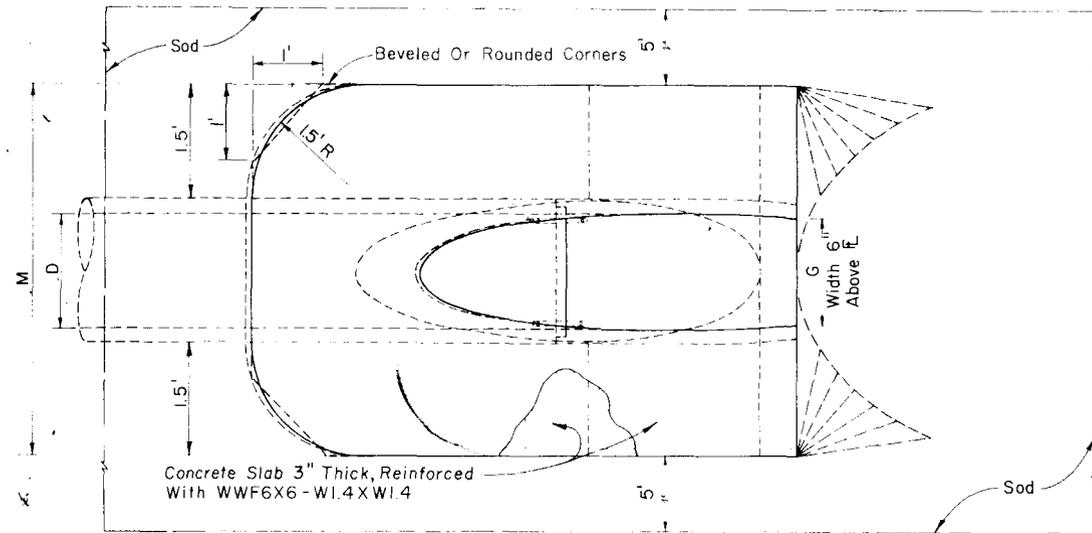
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FLARED END SECTION

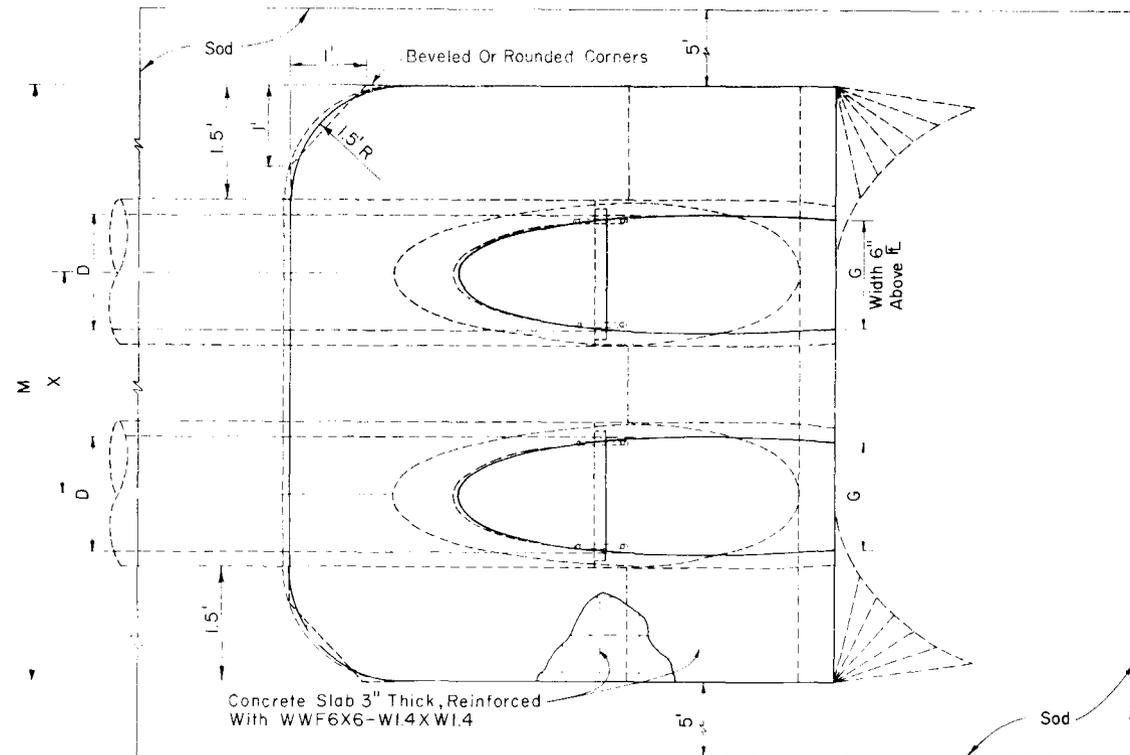
Designed by	EGR	9/77	Approved By	<i>De Breda</i> Deputy Design Engineer, Roadways		
Drawn by	HKH	9/77	Revision No.			Sheet No.
Checked by	JVG	9/77	82			1 of 1
S.M.W.A. Approved 9/23/77			Index No.	270		

DIMENSIONS AND QUANTITIES

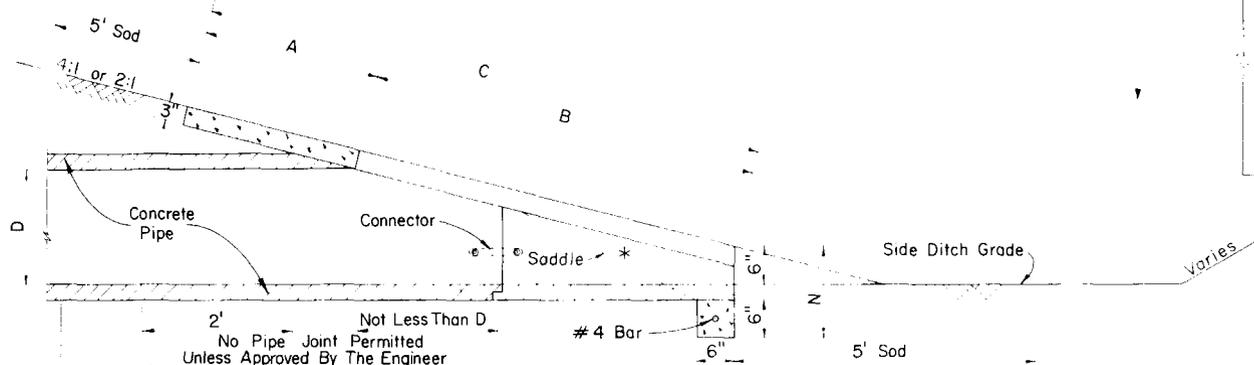
	D	X	A	B	C	E	F	G	M				N	CONCRETE (CU YDS.)				SODDING (SQ YDS.)							
									Single		Triple			Single		Double		Single		Double		Triple		Quad	
									Pipe	Pipe	Pipe	Pipe		Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe
2:1 Slope	15"	2'-7"	1.92'	2.18'	4.10'	2.06'	5'	1.22'	4.63'	7.21'	9.79'	12.37'	1.19'	0.27	0.41	0.54	0.67	20.83	23.70	26.57	29.43				
	18"	2'-10"	1.97'	2.74'	4.71'	2.56'	6'	1.41'	4.92'	7.75'	10.58'	13.42'	1.21'	0.31	0.45	0.60	0.75	21.82	24.97	28.10	31.27				
	24"	3'-5"	2.06'	3.85'	5.91'	3.66'	7'	1.73'	5.50'	8.92'	12.33'	15.75'	1.25'	0.39	0.59	0.78	1.00	23.82	27.62	31.78	36.21				
	30"	4'-1"	2.15'	4.08'	7.10'	4.56'	8'	2.00'	6.09'	10.33'	14.58'	18.83'	1.29'	0.46	0.76	1.04	1.32	25.81	30.52	35.26	39.98				
	36"	4'-5"	2.24'	4.33'	8.33'	5.56'	9'	2.24'	6.67'	11.75'	16.83'	21.92'	1.33'	0.56	0.94	1.33	1.71	27.76	33.46	39.10	44.76				
	42"	5'-0"	2.34'	4.72'	9.55'	6.56'	10'	2.45'	7.25'	13.25'	19.25'	25.25'	1.38'	0.66	1.15	1.66	2.15	29.80	36.47	43.13	49.80				
	48"	5'-6"	2.43'	5.33'	10.75'	7.56'	11'	2.65'	7.83'	14.58'	21.33'	28.08'	1.42'	0.76	1.37	1.96	2.57	31.79	39.29	46.79	54.29				
	54"	6'-0"	2.52'	6.04'	11.96'	8.56'	12'	2.83'	8.42'	16.08'	23.75'	31.42'	1.46'	0.87	1.62	2.38	3.14	33.79	42.30	50.82	59.34				
60"	6'-6"	2.62'	6.83'	13.18'	9.56'	14'	3.00'	9.00'	17.50'	26.00'	34.50'	1.50'	0.99	1.90	2.81	3.73	35.78	45.22	54.67	64.11					
66"	7'-0"	2.71'	7.68'	14.39'	10.56'	15'	3.18'	9.58'	18.75'	27.92'	37.08'	1.54'	1.11	2.15	3.21	4.27	37.78	48.00	58.13	68.31					
72"	7'-6"	2.80'	8.60'	15.60'	11.56'	16'	3.30'	10.16'	20.16'	30.16'	40.16'	1.58'	1.24	2.46	3.68	4.90	39.77	50.88	61.99	73.10					
4:1 Slope	15"	2'-7"	2.27'	4.09'	6.36'	4.03'	8'	1.22'	4.63'	7.21'	9.79'	12.37'	1.19'	0.40	0.61	0.80	1.00	23.33	26.20	29.07	31.93				
	18"	3'-0"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.92'	7.75'	10.58'	13.42'	1.21'	0.47	0.69	0.91	1.14	24.90	28.04	31.19	34.34				
	24"	3'-5"	2.53'	6.18'	9.71'	7.03'	11'	1.73'	5.50'	8.92'	12.33'	15.75'	1.25'	0.60	0.90	1.21	1.52	26.82	30.82	35.61	39.41				
	30"	4'-1"	2.70'	7.25'	11.95'	9.03'	13'	2.00'	6.09'	10.33'	14.58'	18.83'	1.29'	0.76	1.19	1.63	2.07	31.16	35.88	40.60	45.32				
	36"	4'-5"	2.87'	8.31'	14.18'	11.03'	15'	2.24'	6.67'	11.75'	16.83'	21.92'	1.33'	0.89	1.48	2.05	2.63	34.23	39.93	45.58	51.23				
	42"	5'-0"	3.05'	9.37'	16.42'	13.03'	17'	2.45'	7.25'	13.25'	19.25'	25.25'	1.38'	1.05	1.82	2.57	3.34	37.42	44.09	50.76	57.42				
	48"	5'-6"	3.22'	10.43'	18.65'	15.03'	19'	2.65'	7.83'	14.58'	21.33'	28.08'	1.42'	1.21	2.15	3.07	4.00	40.54	48.04	55.54	63.04				
	54"	6'-0"	3.39'	11.49'	20.88'	17.03'	21'	2.83'	8.42'	16.08'	23.75'	31.42'	1.46'	1.39	2.55	3.72	4.88	43.68	52.19	60.71	69.23				
60"	6'-6"	3.56'	12.55'	23.11'	19.03'	23'	3.00'	9.00'	17.50'	26.00'	34.50'	1.50'	1.59	3.02	4.44	5.86	46.80	56.24	65.69	75.13					
66"	7'-0"	3.73'	13.62'	25.35'	21.03'	25'	3.18'	9.58'	18.75'	27.92'	37.08'	1.54'	1.91	3.66	5.40	7.15	48.82	59.01	69.18	79.36					
72"	7'-6"	3.91'	14.68'	27.59'	23.03'	27'	3.30'	10.16'	20.16'	30.16'	40.16'	1.58'	2.12	4.18	6.24	8.30	51.94	63.06	74.17	85.28					



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

Paid For As F (Pipe To Be Included Under Unit Price For Mitered End Section)
 Cross Drain Pipe Culv.

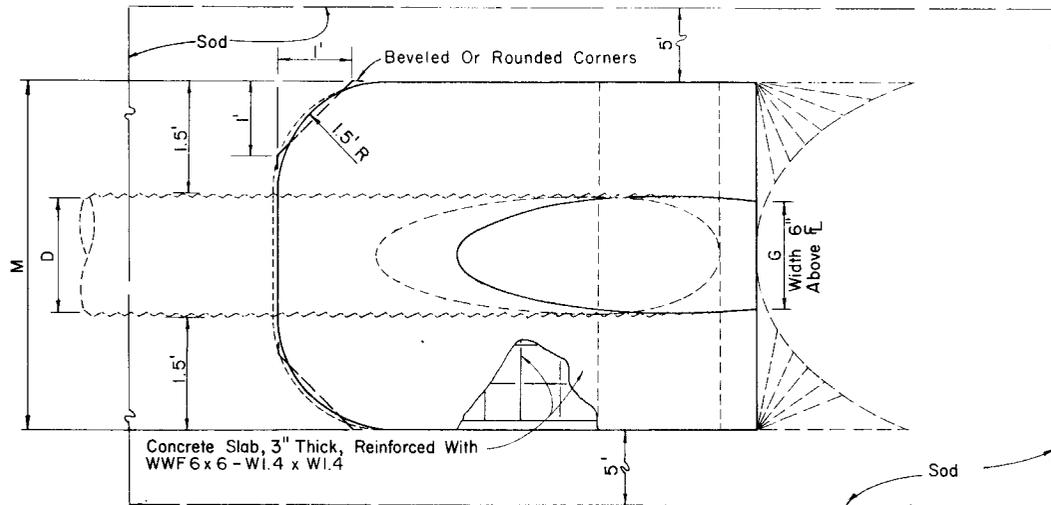
* Slope 4:1 Miter: To ϕ Pipe For Pipes 18" And Smaller.
 2:1 For Pipes 24" And Larger.
 2:1 Miter: To ϕ Pipe For Pipes 18" And Smaller
 1:1 For Pipes 24" And Larger.

NOTE: See Sheet 5 for Details and Notes

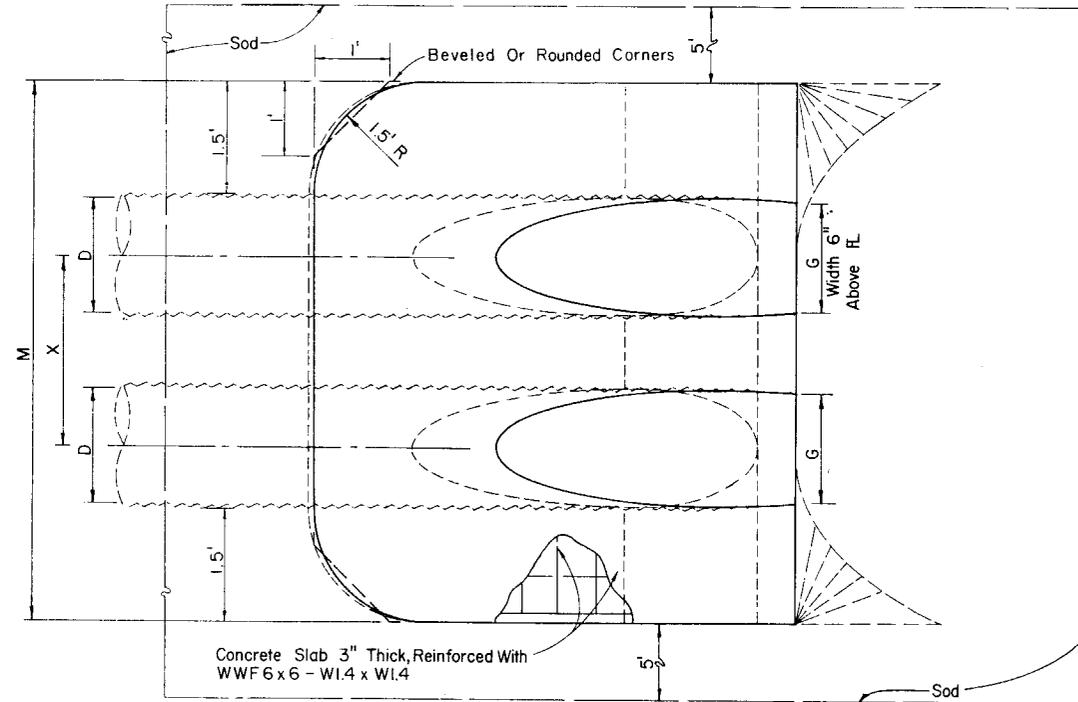
STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS			
CROSS DRAIN MITERED END SECTION			
SINGLE AND MULTIPLE ROUND CONCRETE PIPE			
Project: DCB 6/78	Drawn by: <i>J. C. ...</i>	Checked by: <i>J. C. ...</i>	Date: 7/21/78
Project: KNM 6/78	Scale: 1" = 10'-0"	Sheet: 82	Of 5
A.A. Approved: 7/21/78			272

DIMENSIONS AND QUANTITIES

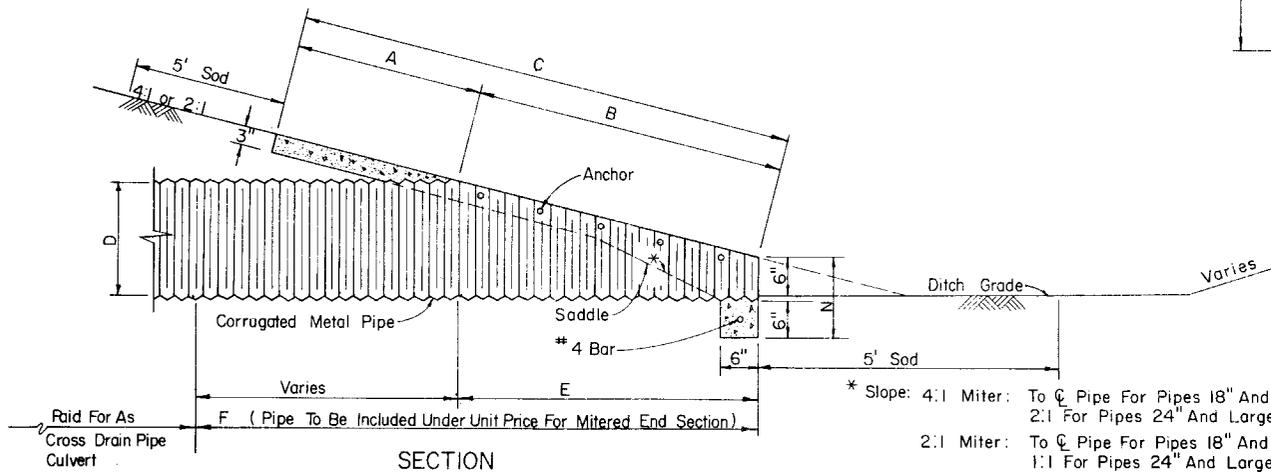
	D	X	A	B	C	E	F	G	M				N	CONCRETE (CU YDS.)				SOODING (SQ YDS.)							
									Single		Double			Triple		Quad		Single		Double		Triple		Quad	
									Pipe	Pipe	Pipe	Pipe		Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe	Pipe
2:1 Slope	15"	2'-7"	2.5'	1.68'	4.18'	1.50'	5'	1.23'	4.33'	6.92'	9.50'	12.08'	1.04'	0.24	0.37	0.51	0.64	20.58	24.46	28.32	29.19				
	18"	2'-10"	2.5'	2.24'	4.74'	2.00'	6'	1.41'	4.58'	7.42'	10.25'	13.08'	1.04'	0.26	0.43	0.61	0.78	21.43	24.65	27.78	30.92				
	24"	3'-5"	2.5'	3.35'	5.85'	3.00'	7'	1.73'	5.08'	9.50'	11.92'	15.33'	1.04'	0.32	0.52	0.72	0.91	23.28	27.07	30.87	34.66				
	30"	4'-3"	2.5'	4.47'	6.97'	4.00'	8'	2.00'	5.58'	9.85'	14.08'	18.33'	1.04'	0.38	0.64	0.91	1.18	25.07	29.79	34.51	39.23				
	36"	5'-1"	2.5'	5.59'	8.09'	5.00'	9'	2.24'	6.08'	11.17'	16.25'	21.33'	1.04'	0.44	0.78	1.13	1.48	26.87	32.52	36.17	43.81				
	42"	6'-0"	2.5'	6.71'	9.21'	6.00'	10'	2.45'	6.58'	12.58'	18.58'	24.58'	1.04'	0.51	0.96	1.41	1.87	28.67	35.33	42.00	48.67				
	48"	7'-0"	2.5'	7.83'	10.33'	7.00'	11'	2.65'	7.08'	13.83'	20.58'	27.33'	1.04'	0.57	1.09	1.63	2.15	30.47	37.97	45.47	52.97				
	60"	8'-6"	2.5'	10.06'	12.55'	9.00'	13'	2.83'	7.58'	15.25'	22.92'	30.58'	1.04'	0.65	1.32	1.99	2.66	32.26	40.78	49.30	57.81				
4:1 Slope	15"	2'-7"	2.5'	3.09'	5.59'	3.0'	7.0'	1.23'	4.33'	6.92'	9.50'	12.08'	1.04'	0.31	0.47	0.63	0.79	22.14	25.02	27.89	30.76				
	18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4.58'	7.42'	10.25'	13.08'	1.04'	0.34	0.53	0.71	0.90	23.57	26.72	29.87	33.01				
	24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	5.08'	8.50'	11.92'	15.33'	1.04'	0.44	0.69	0.92	1.18	26.41	30.21	34.01	37.80				
	30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	5.58'	9.83'	14.08'	18.33'	1.04'	0.53	0.88	1.25	1.60	29.27	33.99	38.71	43.43				
	36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	6.08'	11.17'	16.25'	21.33'	1.04'	0.62	1.07	1.53	2.00	32.11	37.77	43.41	49.06				
	42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	6.58'	12.58'	18.58'	24.58'	1.04'	0.71	1.30	1.92	2.52	34.96	41.62	48.29	54.96				
	48"	7'-0"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	7.08'	13.83'	20.58'	27.33'	1.04'	0.80	1.54	2.29	3.02	37.80	45.30	52.80	60.30				
	60"	8'-6"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	7.58'	15.25'	22.92'	30.58'	1.04'	0.91	1.83	2.74	3.67	40.64	49.17	57.69	66.20				



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE

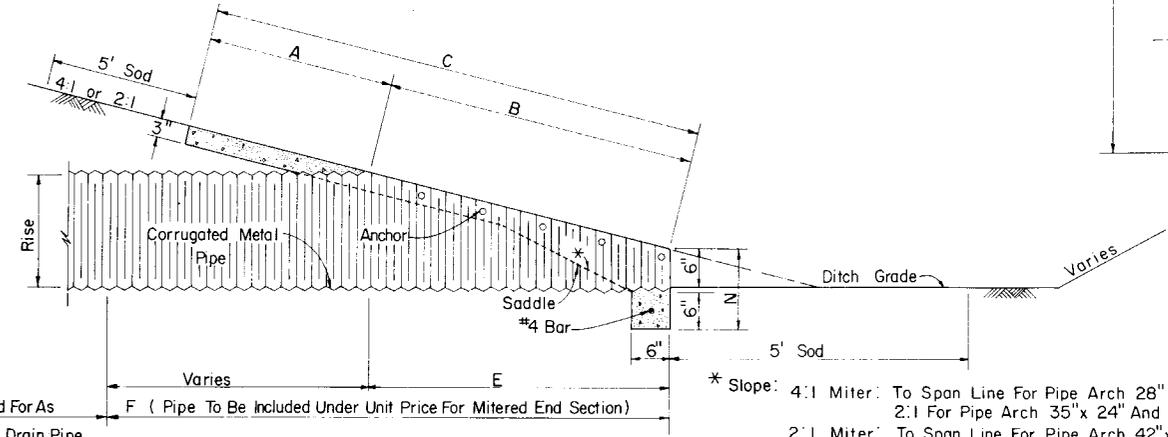
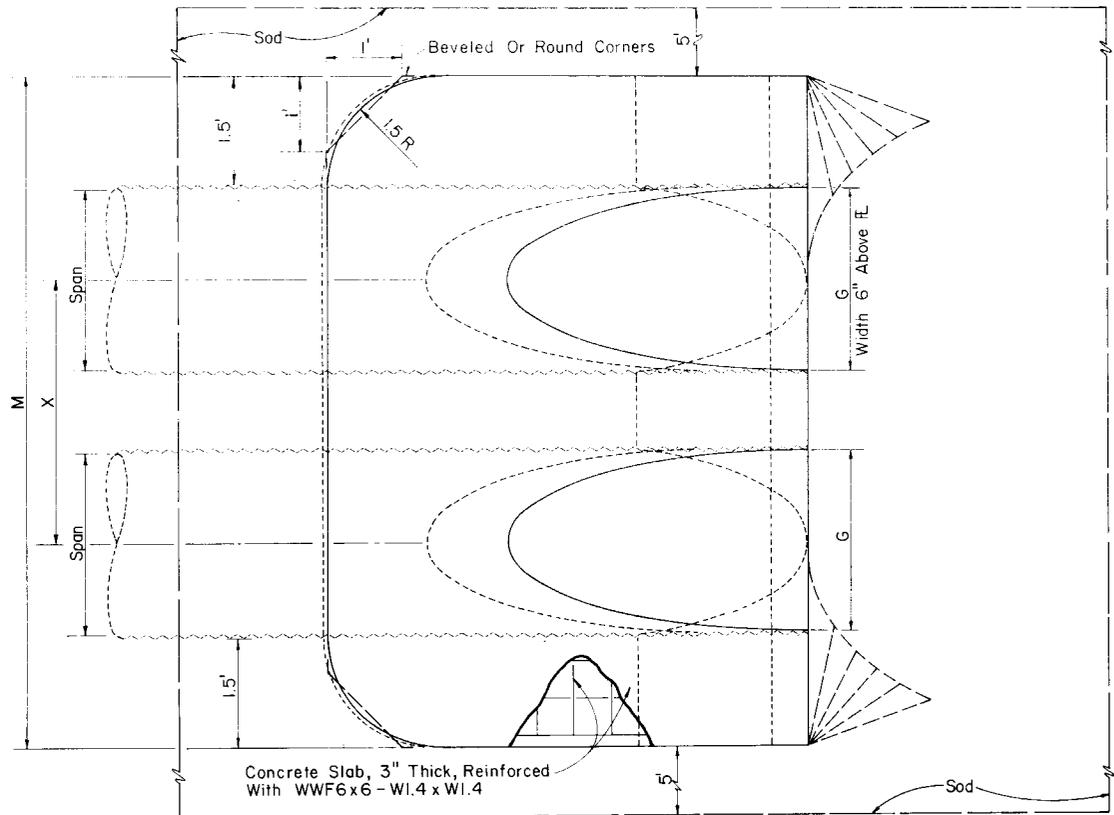
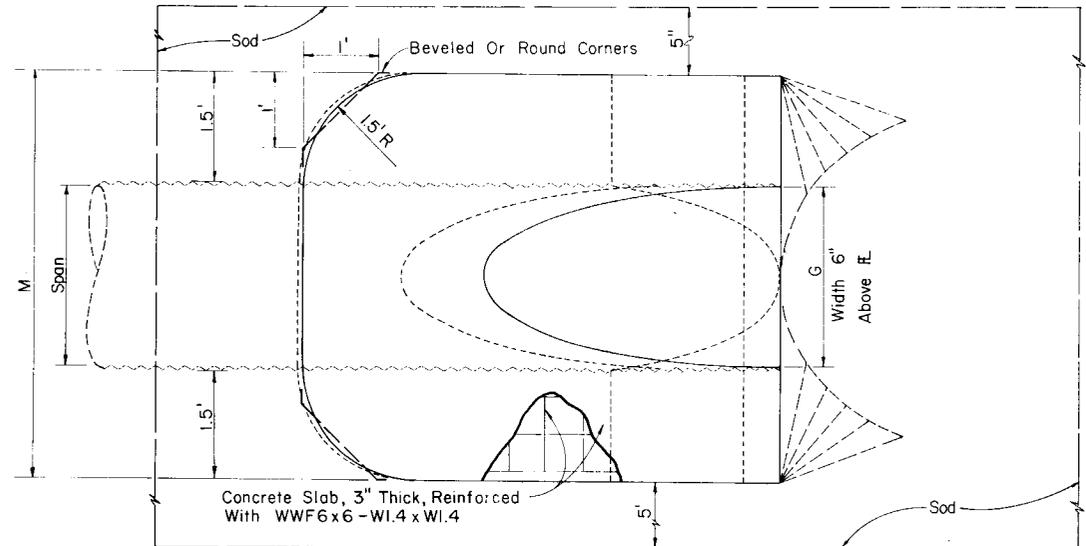


SECTION

NOTE: See Sheet 5 for Details and Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CROSS DRAIN MITERED END SECTION					
SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE					
Designed By	DCB	Dates	6/78	Approved By	
Drawn By					<i>De... ..</i>
Checked By	KNM	6/78	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved:	7/21/78	82	2 of 5	272	

1974 AASHTO		DIMENSIONS AND QUANTITIES																				
	SPAN	RISE	X	A	B	C	E	F	G	M				N	CONCRETE (CU YDS)				SODDING (SQ YDS)			
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
2:1 Slope	17"	15"	2'-0"	2.5'	1.30'	3.80'	1.17'	4'	1.39'	4.50'	7.00'	9.50'	12.00'	1.04'	0.25	0.37	0.49	0.61	20.34	23.12	25.90	28.68
	21"	19"	2'-2"	2.5'	1.68'	4.17'	1.50'	5'	1.76'	4.83'	7.67'	10.50'	13.33'	1.04'	0.26	0.39	0.53	0.66	21.13	24.29	27.43	30.58
	25"	23"	2'-4"	2.5'	2.61'	5.11'	2.33'	6'	2.22'	5.42'	8.83'	12.25'	15.67'	1.04'	0.32	0.49	0.66	0.83	22.83	26.62	30.42	34.22
	29"	27"	2'-6"	2.5'	3.35'	5.85'	3.00'	7'	3.55'	6.00'	10.00'	14.00'	18.00'	1.04'	0.37	0.58	0.79	1.00	24.29	28.73	33.18	37.62
	33"	31"	2'-8"	2.5'	4.29'	6.79'	3.83'	8'	4.93'	7.17'	12.67'	18.17'	24.67'	1.04'	0.42	0.69	0.96	1.22	25.98	31.26	36.53	41.81
	37"	35"	3'-0"	2.5'	5.03'	7.53'	4.50'	9'	6.34'	9.34'	14.17'	20.50'	28.83'	1.04'	0.49	0.82	1.15	1.48	27.46	33.57	39.68	45.78
4:1 Slope	17"	15"	2'-0"	2.5'	2.41'	4.91'	2.33'	7'	1.39'	4.50'	7.00'	9.50'	12.00'	1.04'	0.28	0.42	0.56	0.70	21.58	24.36	27.13	29.91
	21"	19"	2'-2"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	4.83'	7.67'	10.50'	13.33'	1.04'	0.32	0.49	0.66	0.78	22.70	25.85	29.00	32.14
	25"	23"	2'-4"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	5.42'	8.83'	12.25'	15.67'	1.04'	0.40	0.60	0.82	1.03	25.27	29.06	32.86	36.66
	29"	27"	2'-6"	2.5'	6.18'	9.68'	6.00'	10'	3.55'	6.00'	10.00'	14.00'	18.00'	1.04'	0.49	0.77	1.05	1.33	27.43	31.88	36.32	40.77
	33"	31"	2'-8"	2.5'	7.90'	10.40'	7.67'	12'	5.27'	6.58'	11.33'	16.08'	20.83'	1.04'	0.57	0.92	1.27	1.62	29.99	35.27	40.52	45.82
	37"	35"	3'-0"	2.5'	9.28'	11.78'	9.00'	14'	6.34'	7.17'	12.67'	18.17'	23.67'	1.04'	0.65	1.08	1.50	1.93	32.18	38.29	44.40	50.51
4:1 Slope	41"	39"	3'-2"	2.5'	11.00'	13.50'	10.67'	16'	8.34'	9.34'	14.17'	20.50'	26.83'	1.04'	0.76	1.30	1.83	2.37	34.92	41.87	48.90	55.93
	45"	43"	3'-4"	2.5'	13.00'	15.50'	12.33'	17'	9.34'	10.67'	15.50'	22.58'	29.67'	1.04'	0.87	1.55	2.18	2.83	37.98	45.24	53.11	60.99
	49"	47"	3'-6"	2.5'	14.09'	16.59'	13.67'	19'	10.67'	12.00'	16.83'	24.67'	32.50'	1.04'	0.95	1.68	2.43	3.17	39.96	48.26	56.97	65.67



* Slope: 4:1 Miter: To Span Line For Pipe Arch 28"x 20" And Smaller
 2:1 For Pipe Arch 35"x 24" And Larger.
 2:1 Miter: To Span Line For Pipe Arch 42"x 29" And Smaller (Vertical For 17"x 13")
 1:1 For Pipe Arch 49"x 33" And Larger.

NOTE: See Sheet 5 For Details And Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
 ROAD DESIGN

**CROSS DRAIN
 MITERED END SECTION**
 SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH

Approved By: *De Paul*
 Design Engineer, Roadwork

Checked By: D.C.B. 6/78
 Drawn By: K.N.M. 6/78

Sheet No: 3 of 5
 Project No: 82
 Date: 7/21/78

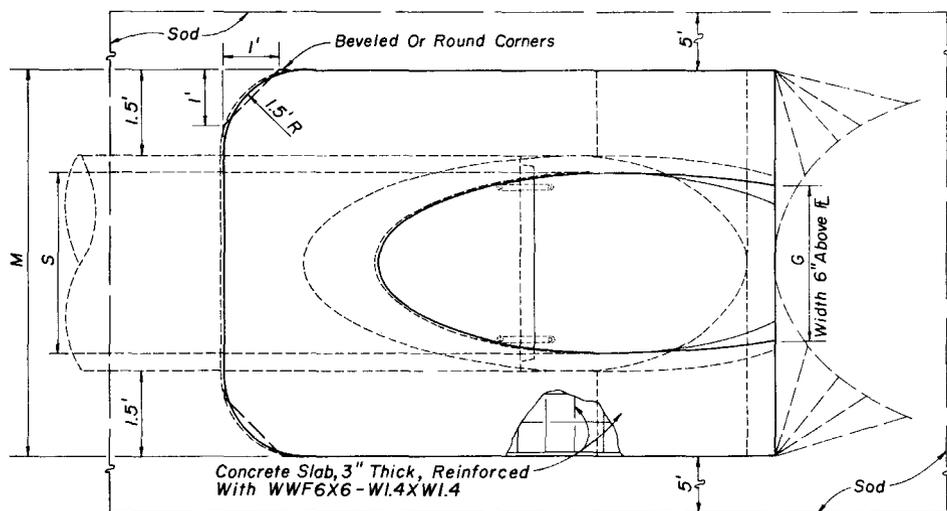
Paid For As
 Cross Drain Pipe
 Culvert

F (Pipe To Be Included Under Unit Price For Mitered End Section)

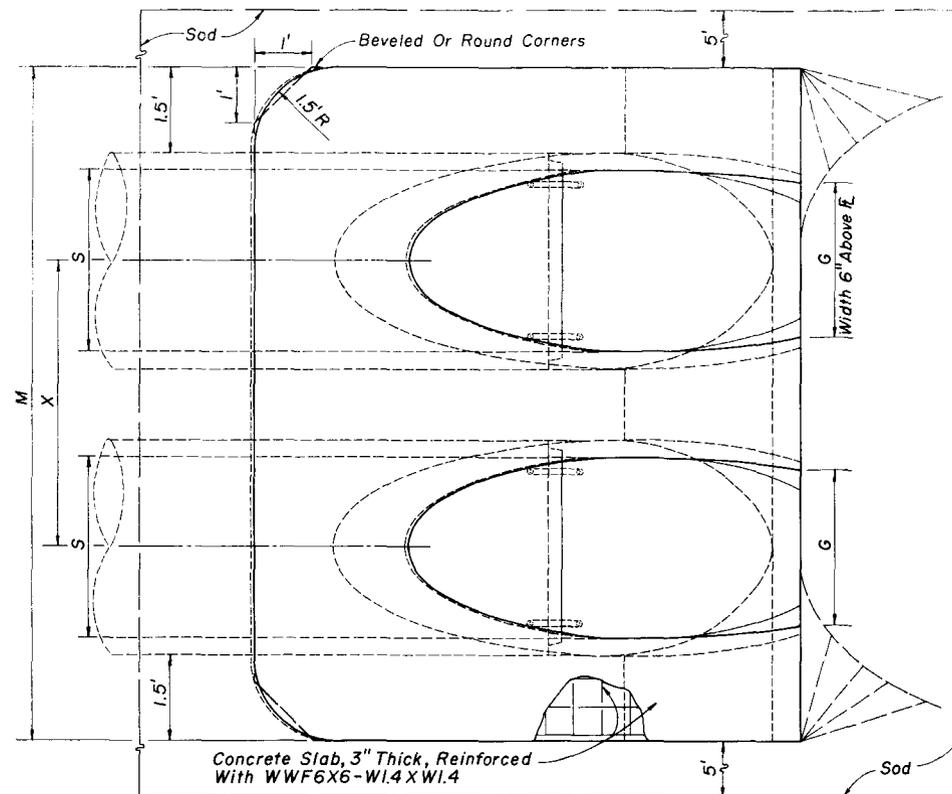
SECTION

DIMENSIONS & QUANTITIES

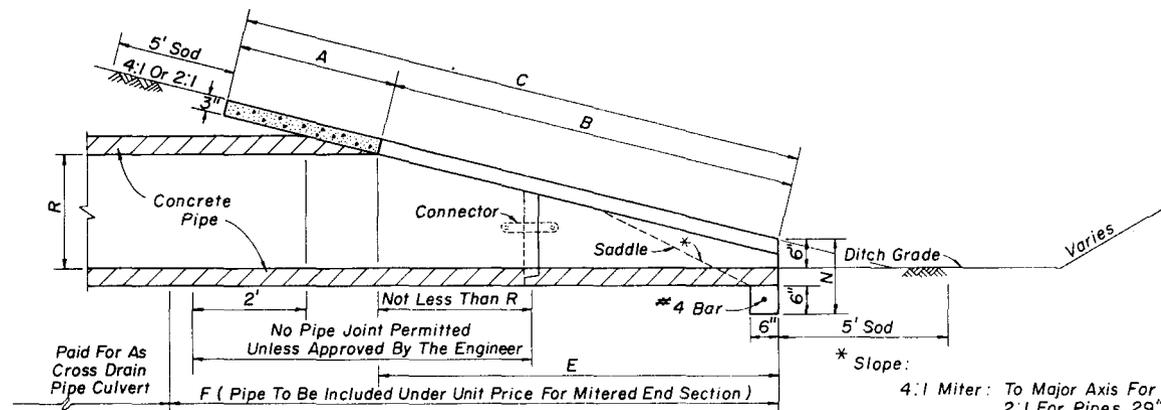
	Rise R	Span S	X	A	B	C	E	F	G	M				N	CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
2:1 Slope	12"	18"	2'-10"	1.97'	1.62'	3.59'	1.56'	4'	1.50'	4.92'	7.75'	10.58'	13.42'	1.21'	0.19	0.33	0.45	0.57	20.67	23.82	26.96	30.12
	14"	23"	3'-4"	2.01'	1.99'	4.00'	1.89'	5'	1.90'	5.38'	8.71'	12.04'	15.38'	1.23'	0.25	0.40	0.55	0.69	21.64	25.34	29.04	32.75
	19"	30"	4'-0"	2.11'	2.92'	5.03'	2.73'	6'	2.37'	6.04'	10.04'	14.04'	18.04'	1.27'	0.34	0.55	0.75	0.95	23.52	27.96	32.41	36.85
	24"	38"	5'-0"	2.20'	3.85'	6.05'	3.56'	7'	2.85'	6.79'	11.79'	16.79'	21.79'	1.31'	0.43	0.71	1.00	1.28	25.48	31.04	36.60	42.15
	29"	45"	5'-11"	2.34'	4.79'	7.13'	4.39'	8'	3.19'	7.50'	13.42'	19.33'	25.25'	1.38'	0.52	0.90	1.27	1.65	27.47	34.05	40.62	47.20
	34"	53"	7'-0"	2.43'	5.72'	8.13'	5.23'	9'	3.57'	8.25'	15.26'	22.26'	29.25'	1.42'	0.62	1.11	1.60	2.09	29.44	37.22	45.00	52.77
	39"	60"	7'-10"	2.52'	6.46'	8.98'	5.89'	9'	3.95'	8.92'	16.75'	24.58'	32.42'	1.46'	0.70	1.29	1.87	2.46	31.11	39.91	48.51	57.22
	43"	68"	8'-11"	2.62'	7.39'	10.01'	6.73'	10'	4.28'	9.67'	18.58'	27.50'	36.42'	1.50'	0.81	1.54	2.26	2.99	33.08	42.98	52.90	62.81
	48"	76"	9'-11"	2.71'	8.33'	11.04'	7.56'	11'	4.59'	10.42'	20.33'	30.25'	40.17'	1.54'	0.93	1.79	2.66	3.53	35.06	46.07	57.10	68.12
	53"	83"	10'-8"	2.80'	9.26'	12.06'	8.39'	12'	4.77'	11.08'	21.75'	32.42'	43.08'	1.58'	1.04	2.04	3.03	4.02	36.93	48.78	60.64	72.48
58"	91"	11'-8"	2.90'	10.19'	13.09'	9.23'	13'	5.01'	11.83'	23.50'	35.17'	46.83'	1.63'	1.17	2.33	3.49	4.66	38.91	51.87	64.84	77.80	
4:1 Slope	12"	18"	2'-10"	2.36'	3.06'	5.42'	3.03'	5'	1.50'	4.92'	7.75'	10.58'	13.42'	1.21'	0.30	0.45	0.61	0.76	22.71	25.85	29.00	32.15
	14"	23"	3'-4"	2.44'	3.75'	6.19'	3.70'	6'	1.90'	5.38'	8.71'	12.04'	15.38'	1.23'	0.36	0.56	0.76	0.95	24.07	27.77	31.47	35.18
	19"	30"	4'-0"	2.62'	5.47'	8.09'	5.36'	8'	2.37'	6.04'	10.04'	14.04'	18.04'	1.27'	0.51	0.79	1.08	1.36	26.92	31.36	35.81	40.25
	24"	38"	5'-0"	2.79'	7.18'	9.97'	7.03'	10'	2.85'	6.79'	11.79'	16.79'	21.79'	1.31'	0.68	1.10	1.53	1.96	29.84	35.40	40.95	46.51
	29"	45"	5'-11"	3.05'	8.90'	11.95'	8.70'	12'	3.19'	7.50'	13.42'	19.33'	25.25'	1.38'	0.86	1.45	2.04	2.63	32.83	39.41	45.97	52.55
	34"	53"	7'-0"	3.22'	10.62'	13.84'	10.36'	13'	3.57'	8.25'	15.26'	22.26'	29.25'	1.42'	1.02	1.81	2.60	3.39	35.76	43.54	51.32	59.10
	39"	60"	7'-10"	3.39'	11.99'	15.38'	11.70'	15'	3.95'	8.92'	16.75'	24.58'	32.42'	1.46'	1.18	2.14	3.10	4.05	38.22	46.92	55.62	64.33
	43"	68"	8'-11"	3.56'	13.71'	17.27'	13.36'	17'	4.28'	9.67'	18.58'	27.50'	36.42'	1.50'	1.36	2.58	3.79	4.99	41.15	51.05	60.96	70.87
	48"	76"	9'-11"	3.73'	15.43'	19.16'	15.03'	19'	4.59'	10.42'	20.33'	30.25'	40.17'	1.54'	1.59	3.05	4.51	5.97	44.08	55.10	66.12	77.14
	53"	83"	10'-8"	3.91'	17.15'	21.06'	16.70'	20'	4.77'	11.08'	21.75'	32.42'	43.08'	1.58'	1.80	3.50	5.19	6.88	46.93	58.78	70.64	82.48
58"	91"	11'-8"	4.08'	18.87'	22.95'	18.36'	22'	5.01'	11.83'	23.50'	35.17'	46.83'	1.63'	2.04	4.04	6.05	8.05	49.86	62.83	75.80	88.75	



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

* Slope:
 4:1 Miter: To Major Axis For Pipes 24"x 38" And Smaller.
 2:1 For Pipes 29"x 45" And Larger.
 2:1 Miter: To Major Axis For Pipes 29"x 45" And Smaller.
 1:1 For Pipes 34"x 53" And Larger.

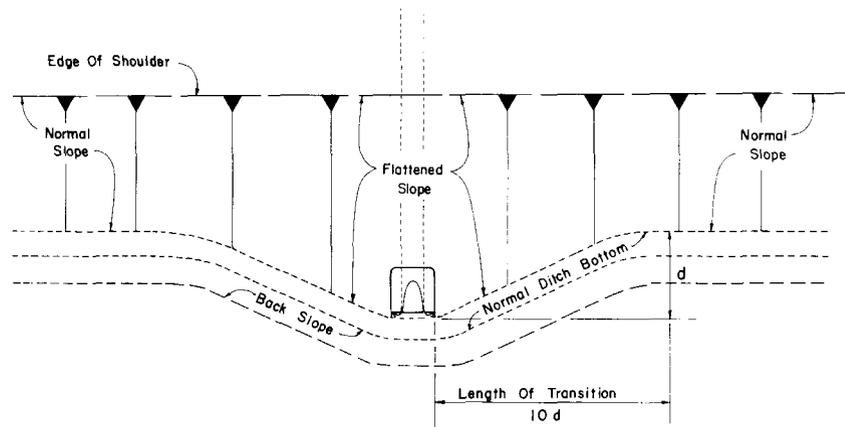
Note: See Sheet 5 For Details And Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CROSS DRAIN MITERED END SECTION SINGLE AND MULTIPLE ELLIPTICAL CONCRETE PIPE			
Designed by	EGR	Date	6/81
Drawn by	HSD	Date	6/81
Checked by	JVG / JBW	Date	6/81
F.H.W.A. Approved:		Revision No.	82
		Sheet No.	4 of 5
		Index No.	272

GENERAL NOTES

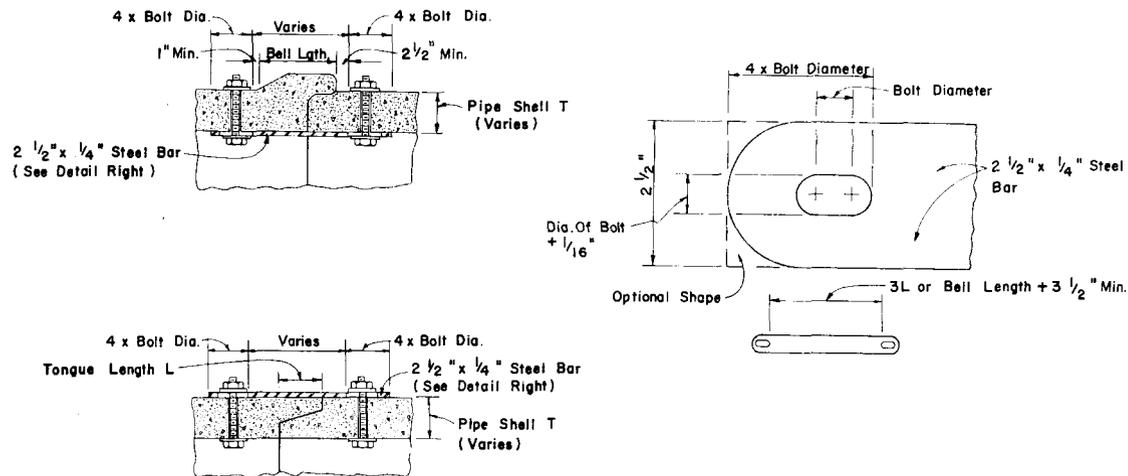
1. The cost of all pipe(s), reinforcing, connectors, anchors and concrete shall be included in the contract unit price for mitered end section, each. Sodding not included.
2. The reinforced concrete slab shall be constructed for all sizes of cross drain pipe and cast in place with Class I concrete.
3. Concrete pipe used in the assembly of mitered end sections shall be selective lengths to avoid excessive connections.
4. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
5. That portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing of the concrete.
6. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of cross drain pipe; corrugated steel pipe mitered end sections may be used with any type of cross drain pipe except aluminum pipe; and, corrugated aluminum mitered end sections may be used with any type of cross drain pipe except steel pipe. When bituminous coated metal pipe is specified for cross drain pipe, mitered end sections shall be constructed with like pipe or concrete pipe.

When the mitered end section pipe is dissimilar to the cross drain pipe, a concrete jacket shall be constructed in accordance with Standard Index 280.
7. When existing multiple cross drain pipes are spaced other than the dimensions shown in this detail, or have non-parallel axes, or have non-uniform sections, the mitered end sections will be constructed either separately as single pipe mitered end sections or collectively as multiple pipe end sections as directed by the Engineer; however, mitered end sections will be paid for each, based on each independent pipe end.
8. Slope and ditch transitions shall be used when the normal roadway slope must be flattened to place end section outside clear recovery area. See detail left.
9. Cross Drain - Mitered End Sections only to be used outside of clear recovery area.



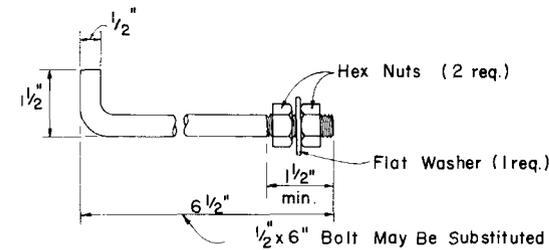
PLAN

SLOPE AND DITCH TRANSITIONS



All bars, bolts, nuts and washers are to be galvanized steel.
 Bolt diameters shall be $\frac{3}{8}$ " for 15" to 36" pipe and $\frac{5}{8}$ " for 42" to 72" pipe.
 Two connectors required per joint, located 60° right and left of bottom center of pipe.
 Bolt holes in pipe shell are to be drilled.

CONCRETE PIPE CONNECTOR



Anchors required for CMP only.
 Anchor, washer and nuts to be galvanized steel.
 Bend anchor where required to center in concrete slab. Damaged surfaces to be repaired after bending. Anchors are to be spaced a distance equal to four (4) corrugations. Place the anchors in the outside crest of corrugation.
 Flat washers to be placed on inside wall of pipe.

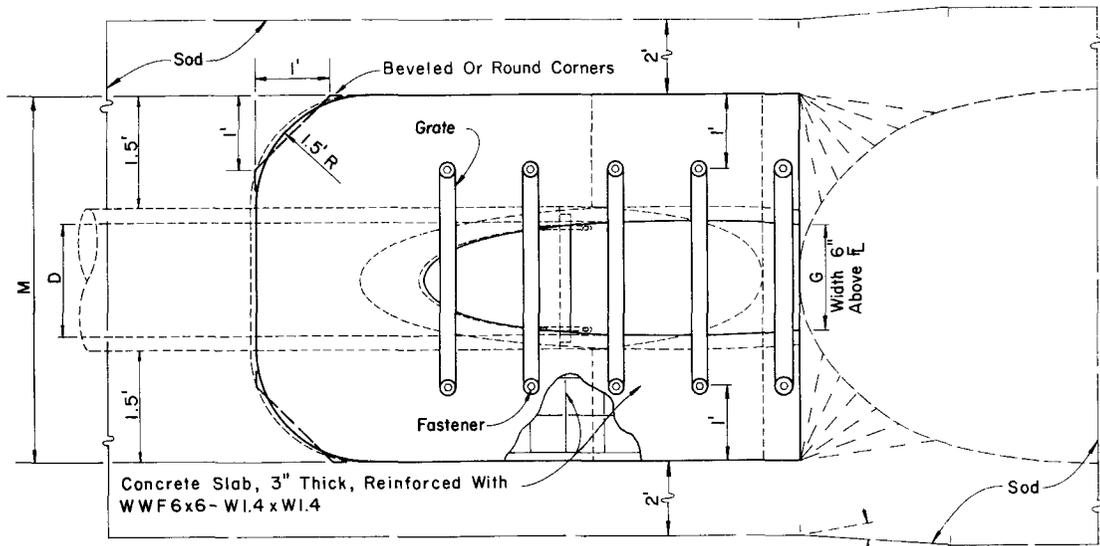
ANCHOR DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
CROSS DRAIN MITERED END SECTION SPECIAL DETAILS AND NOTES				
Designed by	DCB	Date	6/78	Approved By
Drawn by				<i>DePaul</i> Deputy Design Engineer, Roadways
Checked by	KNM	6/78	Revision No.	Sheet No.
R.H.W.A. Approved:	7/21/78	82	5 of 5	272

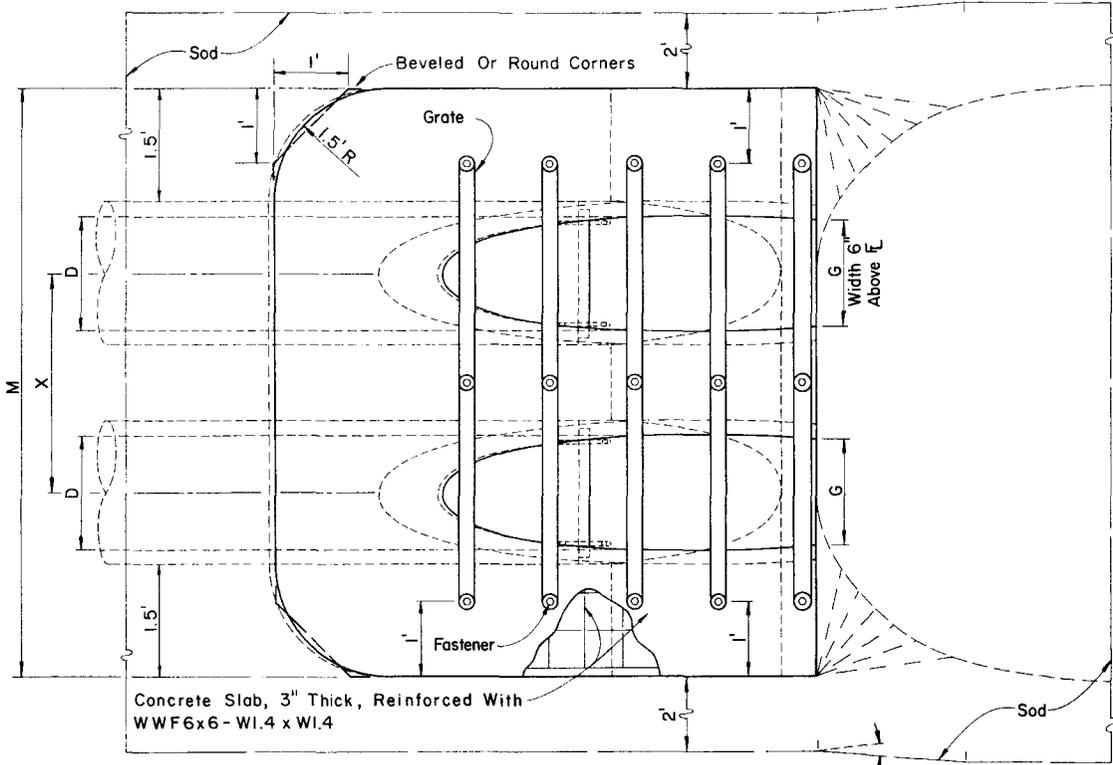
DIMENSIONS & QUANTITIES INCLUDED IN COST

D	X	A	B	C	E	F	G	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
								Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
15"	2'-7"	2.27'	4.09'	6.36'	4.03'	8'	1.22'	4.63'	7.21'	9.79'	12.37'	1.19'			0.40	0.61	0.80	1.00	8.69	10.41	12.13	13.86
18"	2'-10"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.92'	7.75'	10.58'	13.42'	1.21'			0.47	0.69	0.91	1.14	9.39	11.25	13.14	15.02
24"	3'-5"	2.53'	7.18' Δ	9.71'	7.03' Δ	11'	1.73'	5.50'	8.92'	12.33'	15.75'	1.25'			0.60	0.90	1.21	1.52	10.76	13.03	15.31	17.59
30"	4'-3"	2.70'	9.25'	11.95'	9.03'	13'	2.00'	6.08'	10.33'	14.58'	18.83'	1.29'	2 1/2"	3"	0.76	1.19	1.63	2.07	12.14	14.97	17.81	20.64
36"	5'-1"	2.87'	11.31' ◇	14.18'	11.03' ◇	15'	2.24'	6.67'	11.75'	16.83'	21.92'	1.33'	2 1/2"	3"	0.89	1.48	2.05	2.63	13.52	16.92	20.30	23.69
42"	6'-0"	3.05'	13.37'	16.42'	13.03'	17'	2.45'	7.25'	13.25'	19.25'	25.25'	1.38'	2 1/2"	3 1/2"	1.05	1.82	2.57	3.34	14.90	18.90	22.90	26.90
48"	6'-9"	3.22'	15.43'	18.65'	15.03'	19'	2.65'	7.83'	14.58'	21.33'	28.08'	1.42'	2 1/2"	3 1/2"	1.21	2.15	3.07	4.00	16.28	20.78	26.50	29.78
54"	7'-8"	3.39'	17.49'	20.88'	17.03'	21'	2.83'	8.42'	16.08'	23.75'	31.42'	1.46'	3"	4"	1.39	2.55	3.72	4.88	17.67	22.78	27.89	33.00
60"	8'-6"	3.56'	19.55'	23.11'	19.03'	23'	3.00'	9.00'	17.50'	26.00'	34.50'	1.50'	3"	4"	1.59	3.02	4.44	5.86	19.04	24.71	30.38	36.04

Δ 6.42' ◇ 6.25' Dimensions permitted to allow use of 8' standard pipe lengths.
 ◇ 10.40' ◇ 10.10' Dimensions permitted to allow use of 12' standard pipe lengths.
 ◇◇ Concrete slab shall be deepened to form bridge across crown of pipe. See section below.

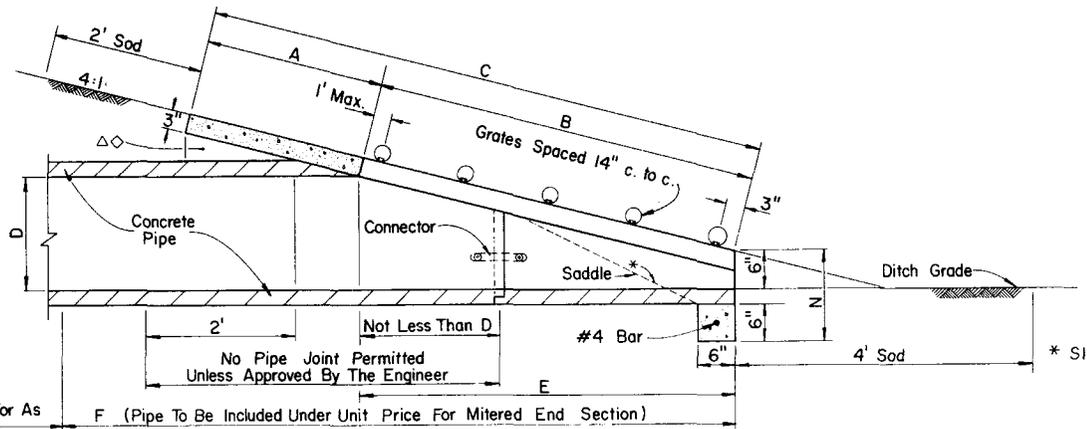


TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE

Note: See Sheet 5 for details and 6 for notes.



SECTION

* Slope:
 To ϕ Pipe For Pipes 18" And Smaller.
 2:1 For Pipes 24" And Larger.

Paid For As Side Drain Pipe Culv. F (Pipe To Be Included Under Unit Price For Mitered End Section)

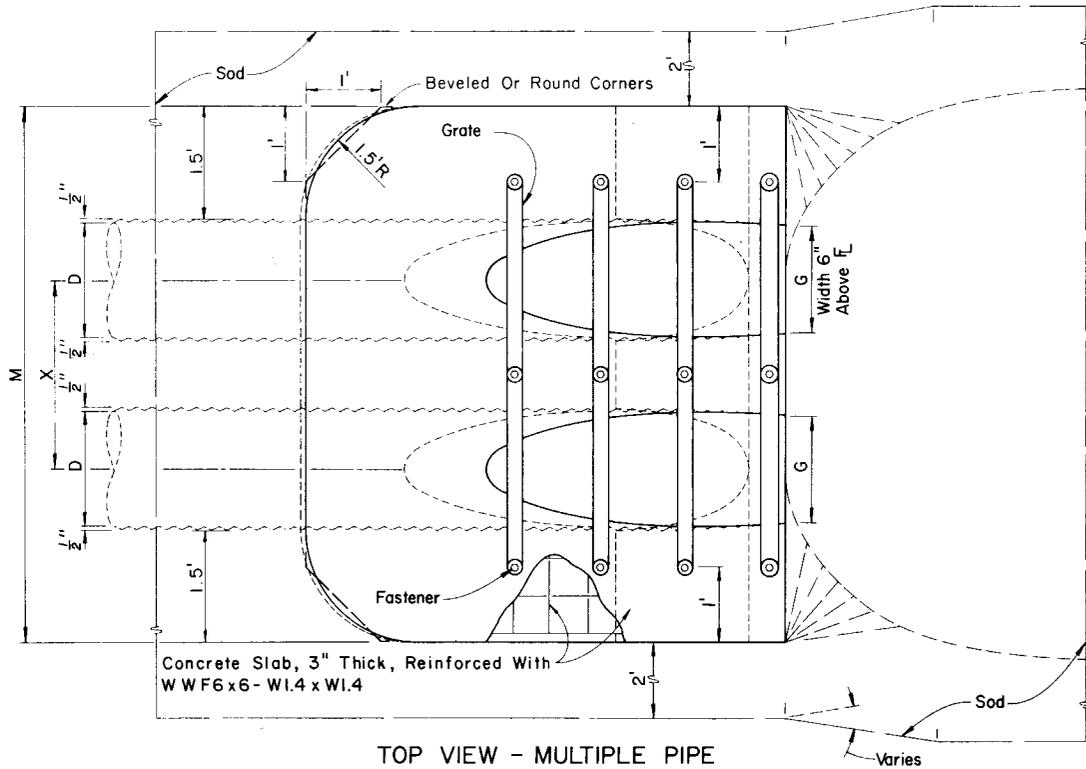
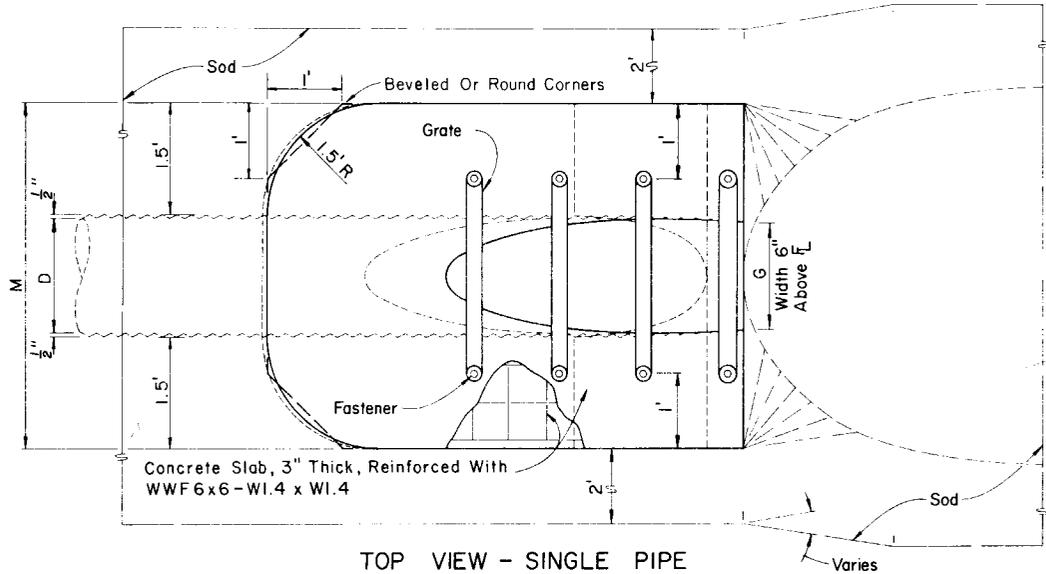
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**SIDE DRAIN
MITERED END SECTION
SINGLE AND MULTIPLE ROUND CONCRETE PIPE**

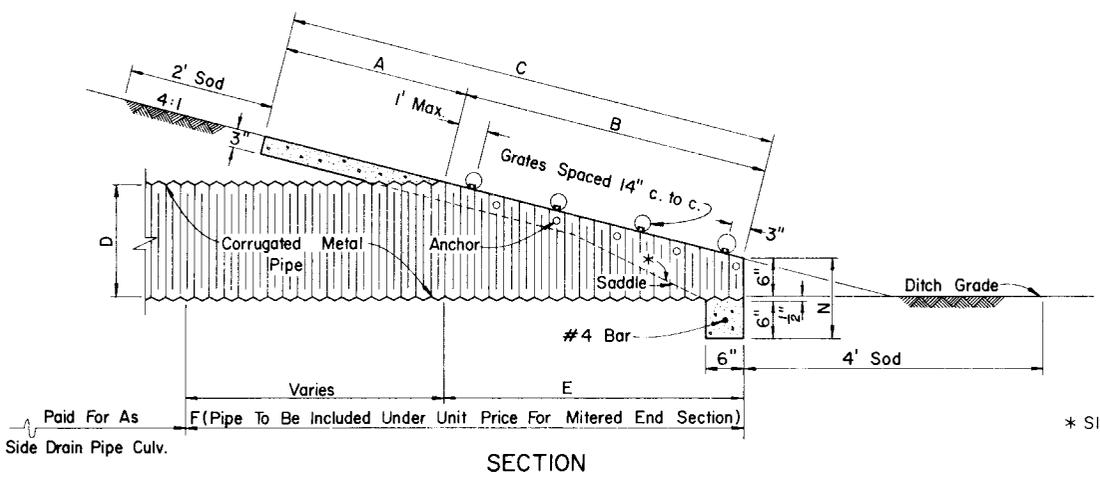
Designed by	EGR	6/78	Approved By <i>J. C. [Signature]</i> Deputy Design Engineer, Roadways
Drawn by	HKH	6/78	
Checked by	JVG	6/78	
Revision No.			Sheet No.
F.H.W.A. Approved: 10/21/77			82
			1 of 6
			273

DIMENSIONS & QUANTITIES

D	X	A	B	C	E	F	G	M				N	GRATE SIZES				CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
								Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		
15"	2'-7"	2.5'	3.09'	5.59'	3.0'	7.0'	1.23'	4.33'	6.92'	9.50'	12.08'	1.04'			0.31	0.47	0.63	0.79	8.15	9.88	11.59	13.31		
18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4.58'	7.42'	10.25'	13.08'	1.04'			0.34	0.53	0.71	0.90	8.77	10.67	12.55	14.44		
24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	5.08'	8.50'	11.92'	15.33'	1.04'			0.44	0.69	0.92	1.18	10.02	12.30	14.59	16.86		
30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	5.58'	9.83'	14.08'	18.33'	1.04'			0.53	0.88	1.25	1.60	11.28	14.12	16.95	19.77		
36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	6.08'	11.17'	16.25'	21.33'	1.04'	2 1/2"	3"	0.62	1.07	1.53	2.00	12.52	15.92	19.30	22.69		
42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	6.58'	12.58'	18.58'	24.58'	1.04'	2 1/2"	3 1/2"	0.70	1.30	1.92	2.52	13.77	17.78	21.77	25.77		
48"	6'-9"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	7.08'	13.83'	20.58'	27.33'	1.04'	2 1/2"	3 1/2"	0.80	1.54	2.29	3.02	15.02	19.53	24.02	28.52		
54"	7'-8"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	7.58'	15.25'	22.92'	30.58'	1.04'	3"	4"	0.90	1.83	2.74	3.67	16.27	21.39	26.49	31.61		
60"	8'-6"	2.5'	18.55'	21.05'	18.0'	22.0'	3.00'	8.08'	16.58'	25.08'	33.58'	1.04'	3"	4"	1.02	2.15	3.27	4.39	17.52	23.19	28.85	34.52		



Note:
See Sheet 5 for details and Sheet 6 for notes.



* Slope:
To ϕ Pipe For Pipe 18" And Smaller
2:1 For Pipe 24" And Larger

Paid For As
Side Drain Pipe Culv.
F (Pipe To Be Included Under Unit Price For Mitered End Section)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

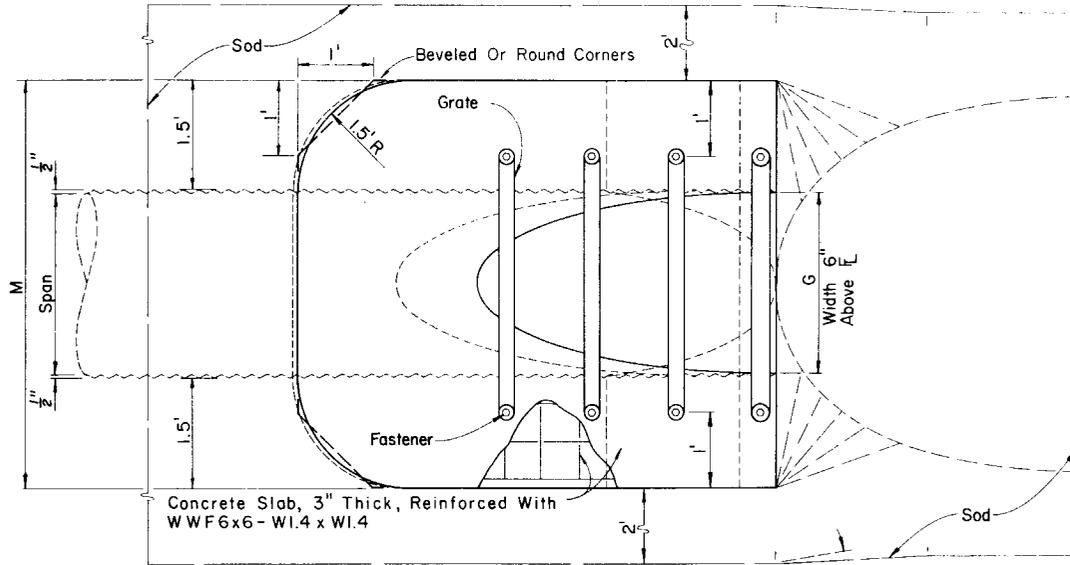
SIDE DRAIN MITERED END SECTION

SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE

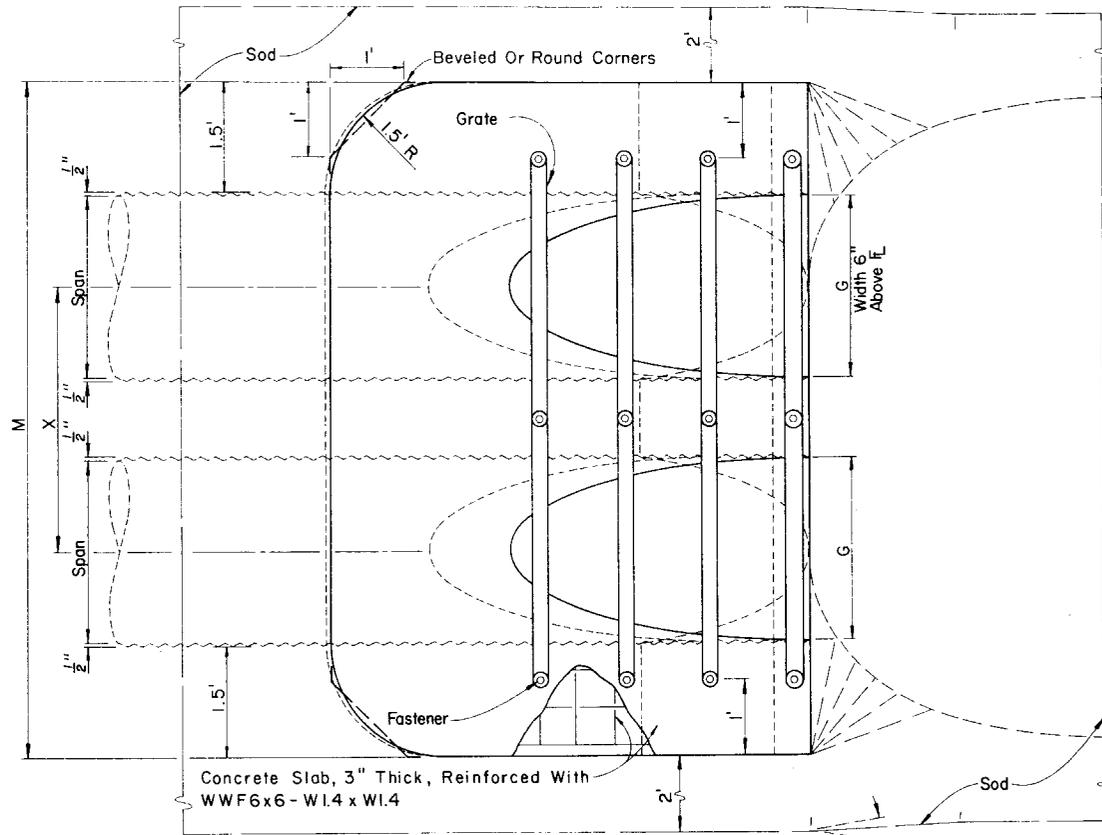
Designed by	EGR	8/77	Approved By	<i>De. K. Hall</i> Deputy Design Engineer, Roadways	
Drawn by	HKH	8/77	Checked by	JVG	8/77
Revision No.			Sheet No.	2 of 6	
F.H.W.A. Approved: 10/21/77			82	273	

DIMENSIONS & QUANTITIES

1974 AASHTO		X	A	B	C	E	F	G	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
Span	Rise								Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
17"	13"	2'-6"	2.5'	2.41'	4.91'	2.33'	7'	1.39'	4.50'	7.00'	9.50'	12.00'	1.04'			.28	.42	.56	.70	7.96	9.62	11.29	12.96
21"	15"	2'-10"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	4.83'	7.67'	10.50'	13.33'	1.04'			.32	.49	.66	.78	8.48	10.37	12.26	14.15
28"	20"	3'-5"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	5.42'	8.83'	12.25'	15.67'	1.04'			.40	.60	.82	1.03	9.64	11.91	14.19	16.47
35"	24"	4'-0"	2.5'	6.18'	8.68'	6.00'	11'	2.55'	6.00'	10.00'	14.00'	18.00'	1.04'	2 1/2"	3"	.49	.77	1.05	1.33	10.63	13.30	15.97	18.63
42"	29"	4'-9"	2.5'	7.90'	10.40'	7.67'	12'	2.97'	6.58'	11.33'	16.08'	20.83'	1.04'	2 1/2"	3 1/2"	.57	.92	1.27	1.62	11.78	14.95	18.12	21.28
49"	33"	5'-6"	2.5'	9.28'	11.78'	9.00'	14'	3.34'	7.17'	12.67'	18.17'	23.67'	1.04'	2 1/2"	3 1/2"	.65	1.08	1.50	1.93	12.79	16.45	20.12	23.79
57"	38"	6'-4"	2.5'	11.00'	13.50'	10.67'	16'	3.65'	7.83'	14.17'	20.50'	26.83'	1.04'	3"	4"	.76	1.30	1.83	2.37	13.99	18.22	22.44	26.66
64"	43"	7'-1"	2.5'	12.71'	15.21'	12.33'	17'	3.89'	8.42'	15.50'	22.58'	29.67'	1.04'	3"	4"	.87	1.55	2.18	2.83	15.15	19.86	24.59	29.31
71"	47"	7'-10"	2.5'	14.09'	16.59'	13.67'	19'	4.14'	9.00'	16.83'	24.67'	32.50'	1.04'	3"	4"	.95	1.68	2.43	3.17	16.15	21.37	26.59	31.82

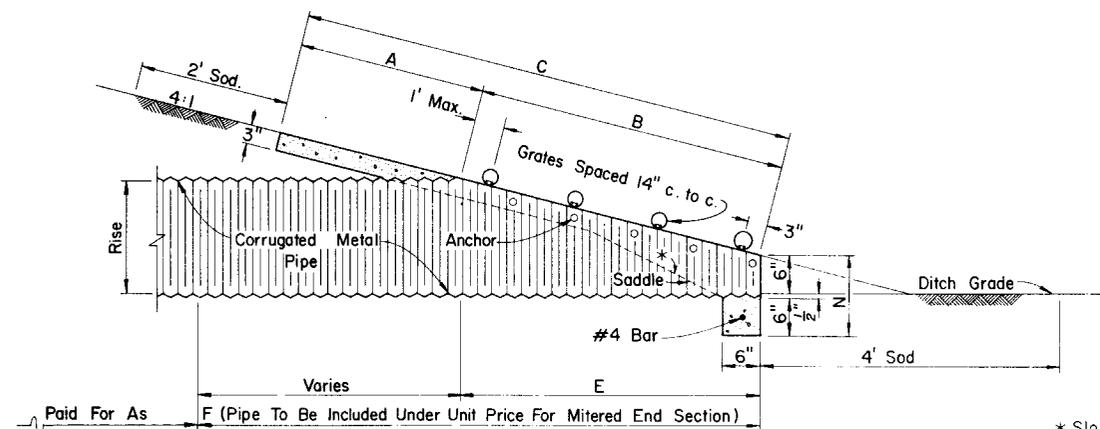


TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE

Note:
See Sheet 5 for details and Sheet 6 for notes.



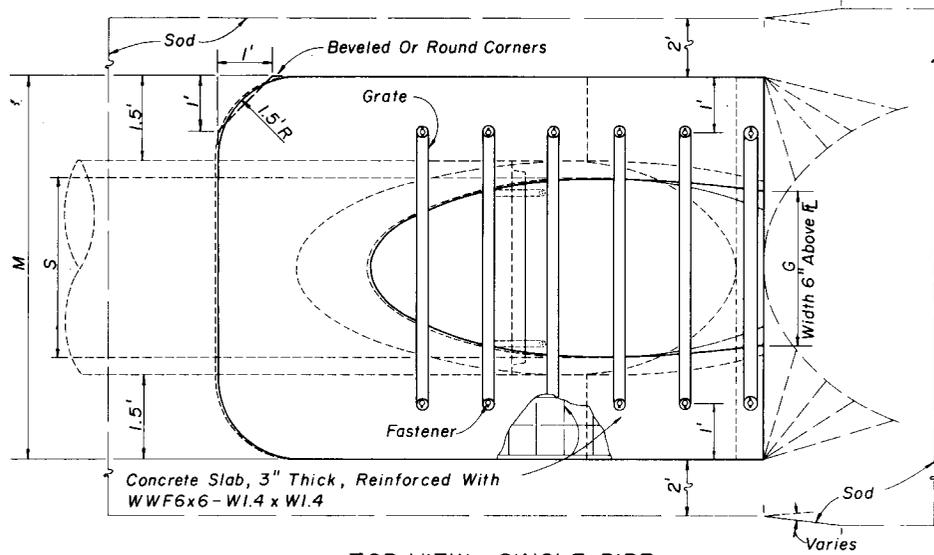
SECTION

* Slope:
To Span Line For Pipe Arch 28" x 20" And Smaller
2:1 For Pipe Arch 35" x 24" And Larger

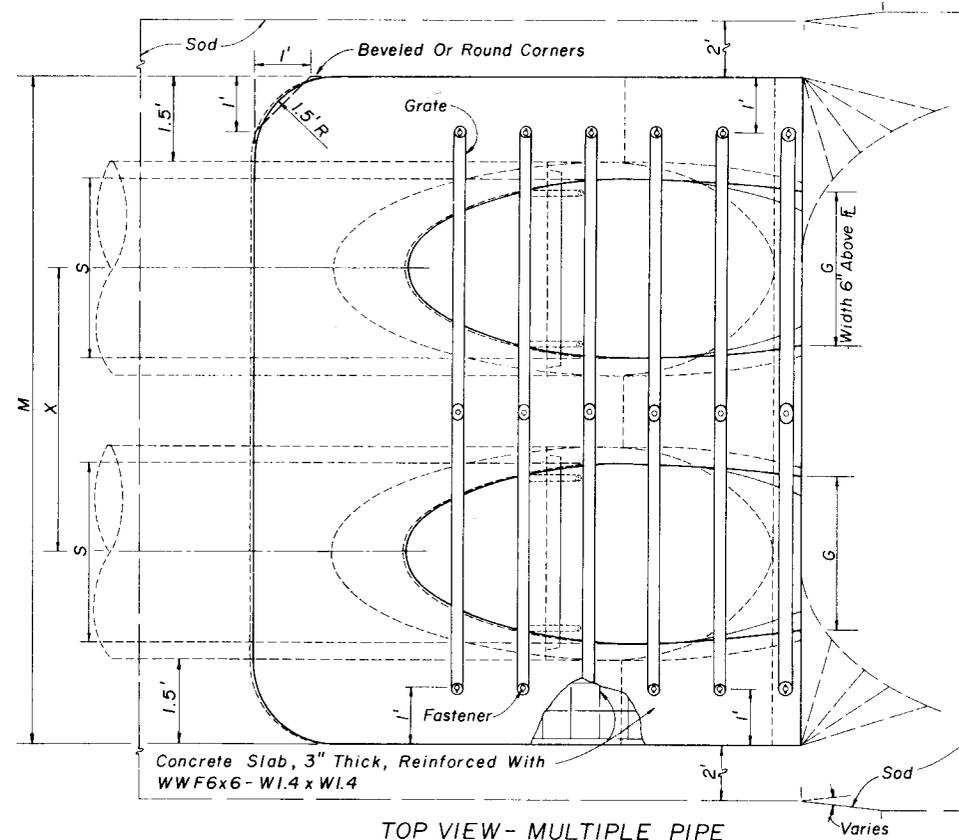
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SIDE DRAIN MITERED END SECTION			
SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARC			
Designed by	Names	Dates	Approved By
Drawn by	Checked by	Revision No.	Sheet No.
F. H. W. A. Approved: 10/21/77			Index No.

82 3 of 6 273

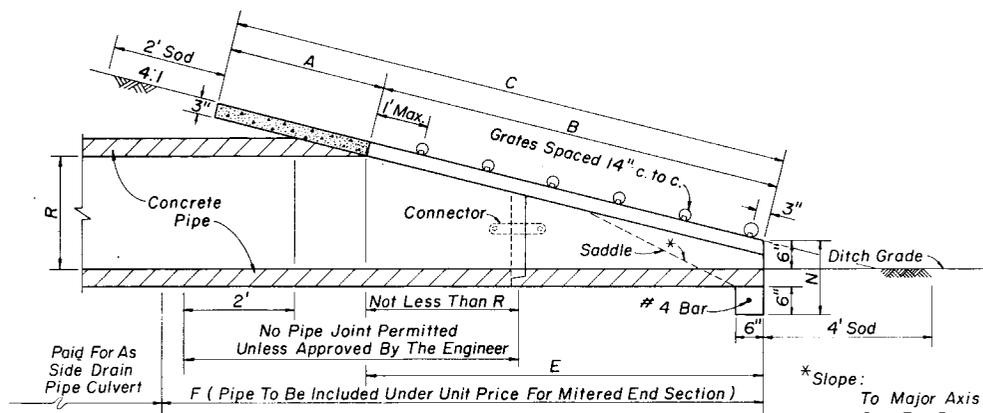
Rise R	Span S	X	A	B	C	E	F	G	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
									Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
12"	18"	2'-10"	2.36'	3.06'	5.42'	3.03'	5'	1.50'	4.92'	7.75'	10.58'	13.42'	1.21'			0.30	0.45	0.61	0.76	8.46	10.35	12.24	14.13
14"	23"	3'-4"	2.44'	3.75'	6.19'	3.70'	6'	1.90'	5.38'	8.71'	12.04'	15.38'	1.23'			0.36	0.56	0.76	0.95	9.11	11.33	13.55	15.78
19"	30"	4'-0"	2.62'	5.47'	8.09'	5.36'	8'	2.37'	6.04'	10.04'	14.04'	18.04'	1.27'			0.51	0.79	1.08	1.36	10.40	13.06	15.73	18.40
24"	38"	5'-0"	2.79'	7.18'	9.97'	7.03'	10'	2.85'	6.79'	11.79'	16.79'	21.79'	1.31'	2 1/2"	3"	0.68	1.10	1.53	1.96	11.73	15.06	18.40	21.73
29"	45"	5'-11"	3.05'	8.90'	11.95'	8.70'	12'	3.19'	7.50'	13.42'	19.33'	25.25'	1.36'	2 1/2"	3 1/2"	0.86	1.45	2.04	2.63	13.08	17.03	20.97	24.92
34"	53"	7'-0"	3.22'	10.62'	13.94'	10.36'	13'	3.57'	8.25'	15.25'	22.25'	29.25'	1.42'	3"	3 1/2"	1.02	1.81	2.60	3.39	14.42	19.09	23.76	28.42
38"	60"	7'-10"	3.39'	11.99'	15.38'	11.70'	15'	3.95'	8.92'	16.75'	24.58'	32.42'	1.46'	3"	4"	1.18	2.14	3.10	4.05	15.56	20.78	26.00	31.22
43"	68"	8'-11"	3.56'	13.71'	17.27'	13.36'	17'	4.28'	9.67'	18.58'	27.50'	36.42'	1.50'	3"	4"	1.38	2.58	3.79	4.99	16.90	22.84	28.78	34.73
48"	76"	9'-11"	3.73'	15.43'	19.16'	15.03'	19'	4.59'	10.42'	20.33'	30.25'	40.17'	1.54'	Special	Special	1.59	3.05	4.51	5.97	18.24	24.84	31.46	38.07
53"	83"	10'-8"	3.91'	17.15'	21.06'	16.70'	20'	4.77'	11.08'	21.75'	32.42'	43.08'	1.58'	Special	Special	1.80	3.50	5.19	6.88	19.52	26.63	33.75	40.85
58"	91"	11'-8"	4.08'	18.87'	22.95'	18.36'	22'	5.01'	11.83'	23.50'	35.17'	46.83'	1.63'	Special	Special	2.04	4.04	6.05	8.05	20.86	28.64	36.42	44.19



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

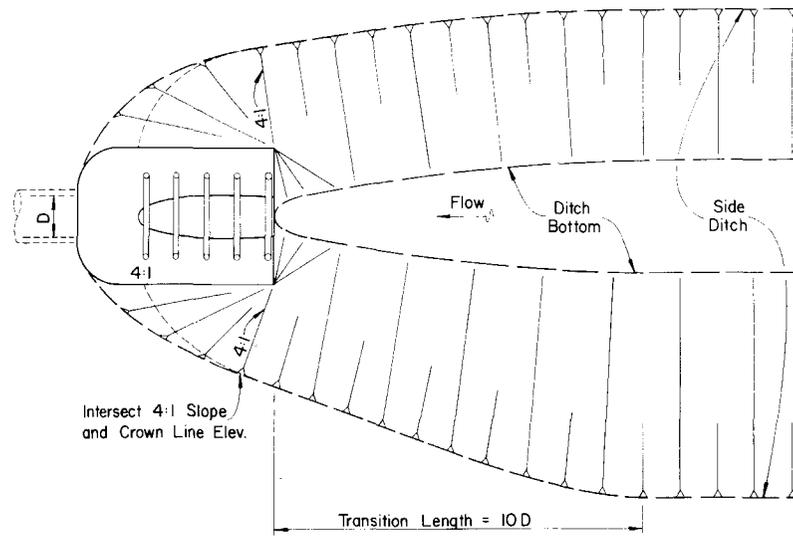
Note:
See Sheet 5 for details and Sheet 6 for notes.

* Slope:
To Major Axis For Pipes 24" x 38" And Smaller.
2:1 For Pipes 29" x 45" And Larger.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SIDE DRAIN MITERED END SECTION SINGLE AND MULTIPLE ELLIPTICAL CONCRETE PIPE			
Designed by	EGR	Date	6/81
Drawn by	HSD	Date	6/81
Checked by	JVG/JBW	Date	6/81
Approved By		Deputy Design Engineer, Roadways	
F. H. W. A. Approved:		Revision No.	Sheet No.
		82	4 of 6
		273	

GENERAL NOTES

1. Mitered end sections shall be paid for as mitered end section, each, based on each independent pipe end.
2. The cost of all pipe(s), grates, fasteners, reinforcing, connectors, anchors and concrete shall be included in the contract unit price for mitered end section, each. Sodding not included.
3. The reinforced concrete slab shall be constructed for all sizes of side drain pipe and cast in place with Class I concrete.
4. Round pipe size 30" or greater, pipe-arch size 35" x 24" or greater and elliptical pipe 19" x 30" or greater shall be grated unless excepted in the plans. Smaller sizes of pipe shall be grated only when called for in plans. The lower grate on trailing downstream ends on divided highways shall be omitted.
5. Grates are to be fabricated from steel ASTM A 53, Grade B, pipe. The lower grate on all traffic approach ends shall be Schedule 80 and all remaining grates shall be Schedule 40.
Grates subject to salt free and corrosive free environment may be fabricated from galvanized pipe, with base metal exposed during fabrication repaired as specified in Section 562, Standard Specifications; or, fabricated from black pipe and hot dipped galvanized after fabrication in accordance with ASTM A 123. Grates subject to salt water or highly corrosive environment shall be hot dipped galvanized after fabrication in accordance with ASTM A 123.
6. Concrete pipe used in the assembly of mitered end sections shall be of selective lengths to avoid excessive connections.
7. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
8. That portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing of the concrete.
9. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of side drain pipe; corrugated steel pipe mitered end sections may be used with any type of side drain pipe except aluminum pipe; and, corrugated aluminum mitered end sections may be used with any type of side drain pipe except steel pipe. When bituminous coated metal pipe is specified for side drain pipe, mitered end sections shall be constructed with like pipe or concrete pipe. Bituminized-Fiber pipe mitered end sections constructed in accordance with the details shown for corrugated metal pipe (including anchor bolts, apron, etc.) may be used with any type of 15", 18", or 24" side drain pipe.
When the mitered end section pipe is dissimilar to the side drain pipe, a concrete jacket shall be constructed in accordance with Standard Index 280.
10. When existing multiple side drain pipes are spaced other than the dimensions shown in this detail, or have non-parallel axes, or have non-uniform sections, the mitered end sections will be constructed either separately as single pipe mitered end sections or collectively as multiple pipe end sections as directed by the Engineer; however, mitered end sections will be paid for each, based on each independent pipe end.
11. Ditch transitions shall be used on all grades in excess of 3% as directed by the Engineer.



PLAN
DITCH TRANSITION

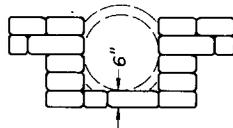
DESIGN NOTES

1. In critical hydraulic locations, grates shall not be used until potential debris transport has been evaluated by the drainage engineer and appropriate adjustments made. Ditch grades in excess of 3% or pipe with less than 1.5' of cover and grades in excess of 1% will require such an evaluation (General Note 4).
2. The design engineer shall determine highly corrosive locations and specify in the plans when the grates shall be hot-dipped galvanized after fabrication (General Note 5).
3. The design engineer shall determine and designate in the plans which alternate types of mitered end section will not be permitted. The restriction shall be based on corrosive or structural requirements.

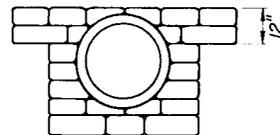
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SIDE DRAIN MITERED END SECTION NOTES & INFORMATION			
Designed by	Names	Dates	Approved By
Designed by	EGR	8/77	<i>De [Signature]</i> Deputy Design Engineer, Roadways
Drawn by	HKH	8/77	
Checked by	JVG	8/77	Revision No.
F H W A. Approved: 10/21/77			Sheet No.
			Index No.
			82 6 of 6 273



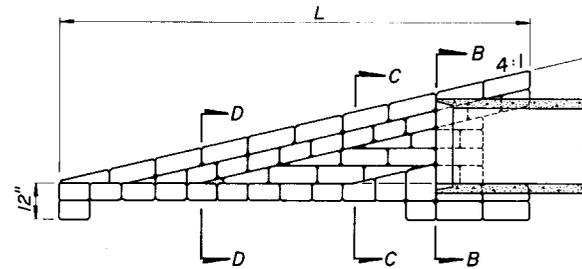
SECTION DD



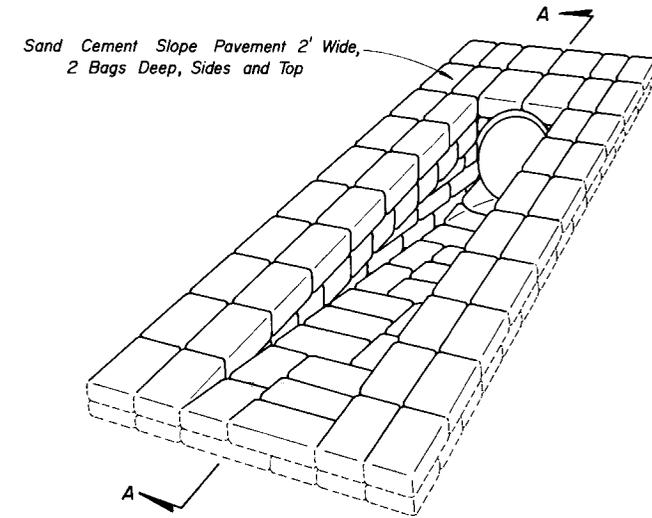
SECTION CC



SECTION BB

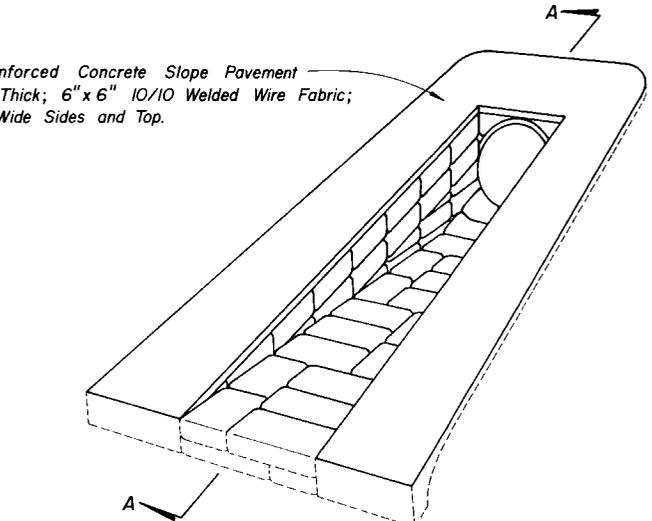


SECTION AA

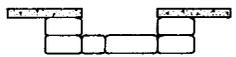


ISOMETRIC

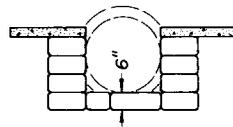
ESTIMATED QUANTITIES & DIMENSIONS					
PIPE SIZE	L CMP	L Conc. Pipe	SAND-CEMENT RIPRAP (Cu. Yd.)	Bags (Jute)	SOD (Sq. Yd.)
15"	8'-2"	8'-9"	2.2	90	8.40
18"	9'-2"	9'-10"	2.5	100	9.10
24"	11'-2"	12'-0"	3.5	140	10.40



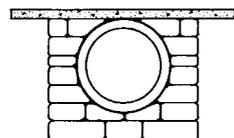
ISOMETRIC



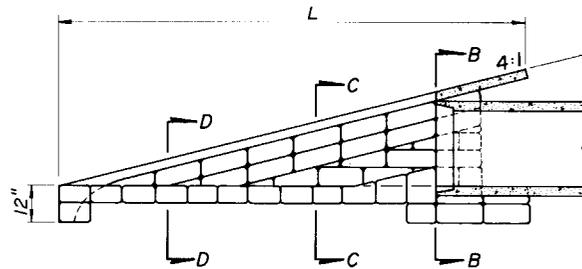
SECTION DD



SECTION CC



SECTION BB



SECTION AA

ESTIMATED QUANTITIES & DIMENSIONS						
PIPE SIZE	L CMP	L Conc. Pipe	SAND-CEMENT RIPRAP (Cu. Yd.)	Bags (Jute)	CONCRETE (Cu. Yd.)	SOD (Sq. Yd.)
15"	8'-2"	8'-9"	1.0	40	0.45	8.40
18"	9'-2"	9'-10"	1.4	60	0.50	9.10
24"	11'-2"	12'-0"	2.0	80	0.60	10.40

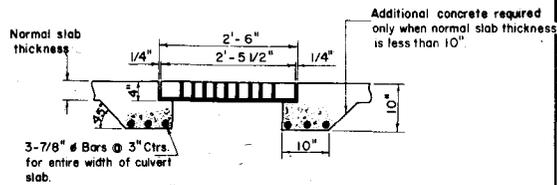
GENERAL NOTE

1. Details for concrete and round corrugated metal pipe, concrete pipe shown.
2. Sod slopes 2' each side and top and ditch 4' beyond toe.

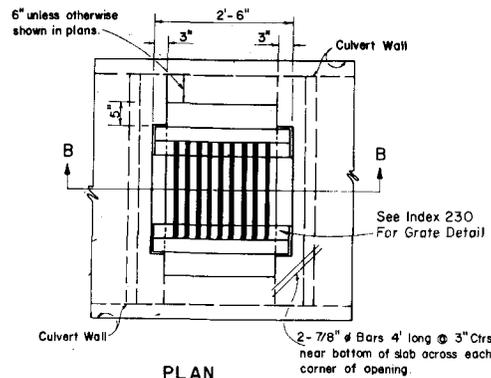
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**SIDE DRAIN
MITERED END SECTION**
SINGLE ROUND CONCRETE & CORRUGATED METAL PIPE

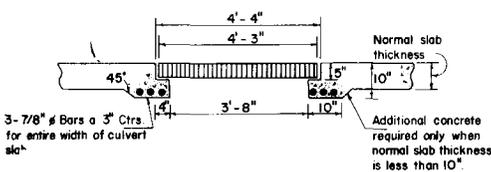
Designed by EGR 10/77	Checked by HKH 10/77	Drawn by JVG 10/77	Approved By <i>J. C. Ball</i> Roadway Design Engineer, Roadways
Project No. 10/23/78	Sheet No. 80	Index No. 1 of 1	274



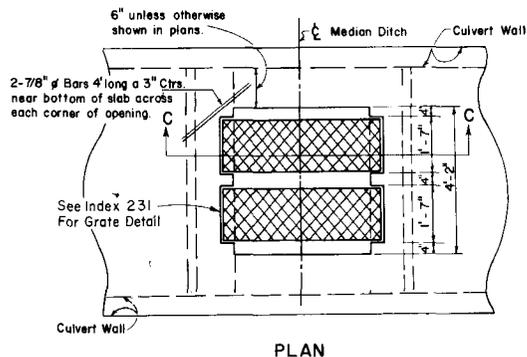
SECTION BB



INLET TYPE A GRATE



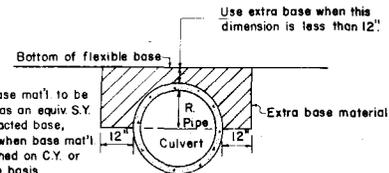
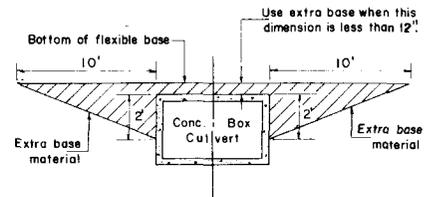
SECTION CC



INLET TYPE B GRATE

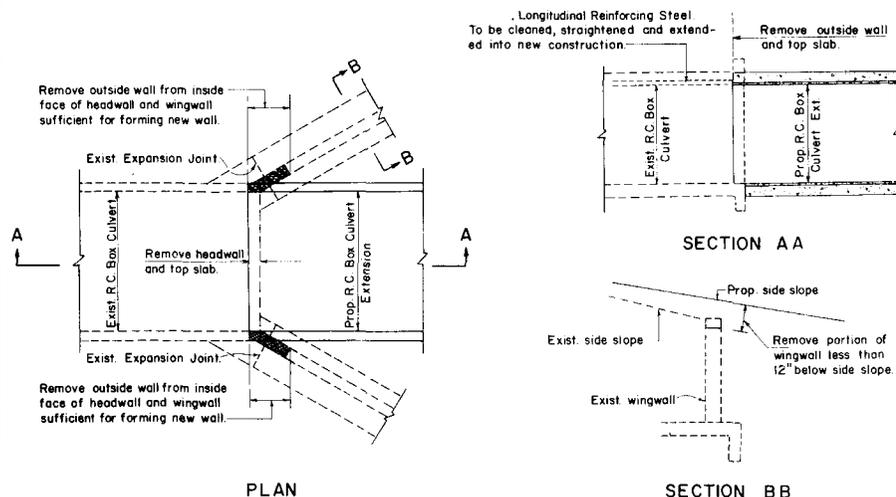
INLET IN TOP OF BOX CULVERT

NOTE:
 1. Cost of Steel Grating to be included in cost of Box Culvert.
 2. All steel shall be 1/4" clear.

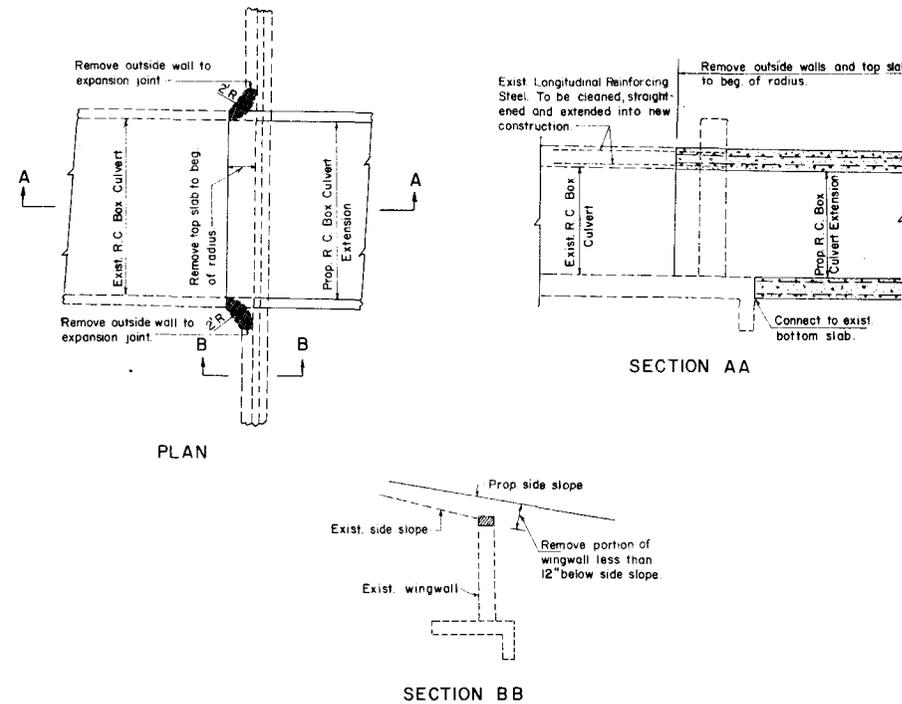


NOTE: Extra base mat'l to be paid for as an equiv. S.Y. of compacted base, except when base mat'l is furnished on C.Y. or Tonnage basis.

EXTRA BASE FOR THE PROTECTION OF CULVERTS WITH LESS THAN MINIMUM COVERS



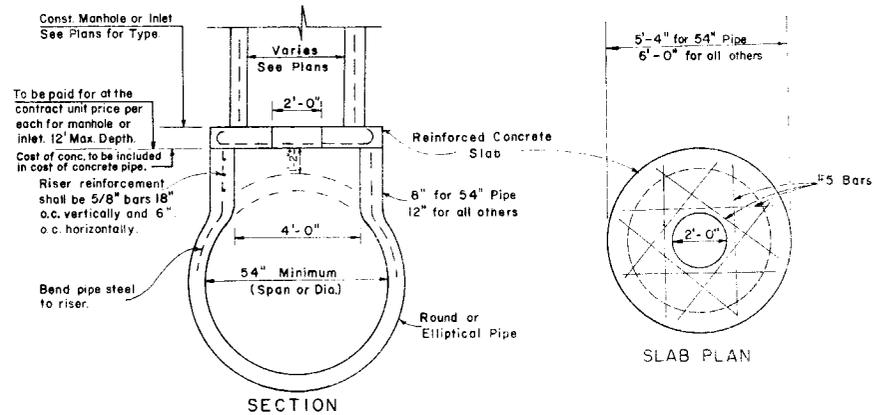
FLARED ENDWALL



STRAIGHT ENDWALL

CONNECTION DETAILS FOR BOX CULVERT EXTENSIONS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
MISCELLANEOUS DRAINAGE DETAILS				
Designed by	Name	Date	Approved By	
Drawn by			<i>J. C. ...</i> Deputy Design Engineer, Roadways	
Checked by			Revision No.	Sheet No.
F.H.W.A. Approved: 11/16/78			81	1 of 3
				280



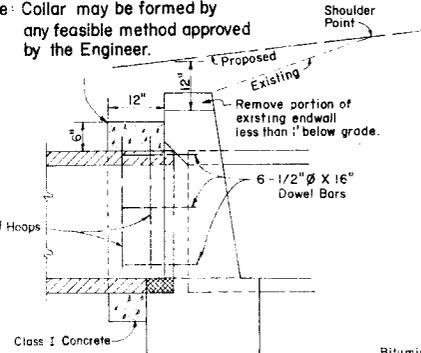
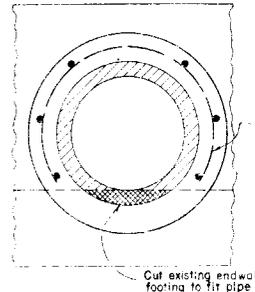
To be paid for at the contract unit price per each for manhole or inlet. 12' Max. Depth.
 Cost of conc. to be included in cost of concrete pipe.
 Riser reinforcement shall be 5/8" bars 18" o.c. vertically and 6" o.c. horizontally.
 Bend pipe steel to riser.

Reinforced slabs are required when inlet or manhole riser is less than 4' in diameter or when Type P, Alt. B manhole or inlet riser is used. For optional construction joints see Index NO. 201.

INLETS OR MANHOLES ON INTEGRAL PRECAST CONCRETE RISER FOR CONCRETE PIPE

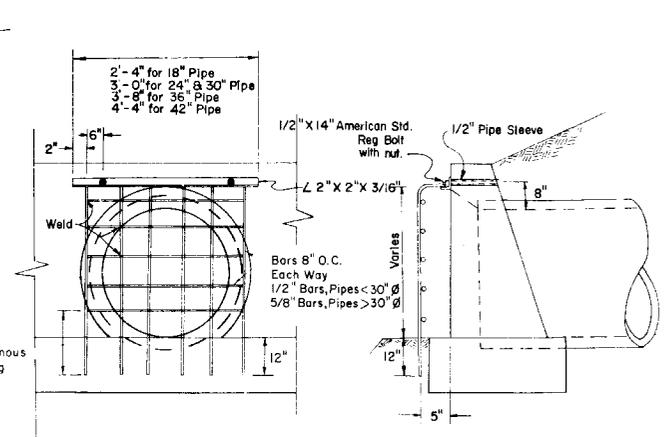
Cost of Concrete and Reinforcing Steel to be included in Contract Unit Price for Pipe Culvert.

Note: Collar may be formed by any feasible method approved by the Engineer.



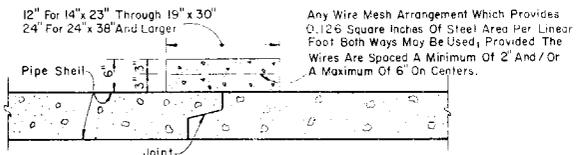
Note: Spigot end to be placed in existing Endwall regardless of direction of flow.

CONCRETE COLLAR FOR EXTENSION OF EXISTING PIPE CULVERTS

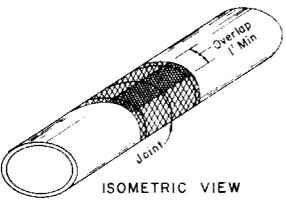


GUARD AT PIPE ENDS

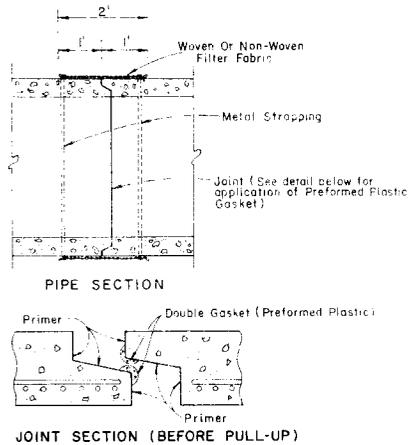
Notes: Guards to be constructed only at locations specified in detail plans. Cost of guard bolts, nuts and sleeves to be included in the contract unit price for concrete.



CONCRETE JACKET



ISOMETRIC VIEW

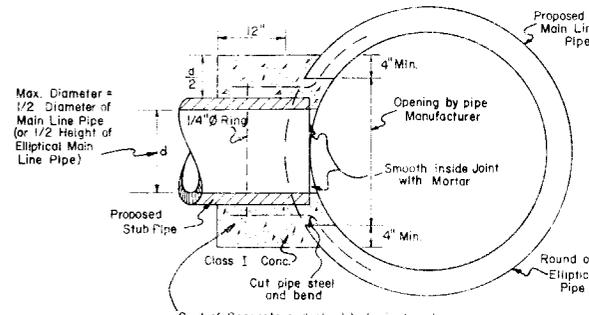


JOINT SECTION (BEFORE PULL-UP)

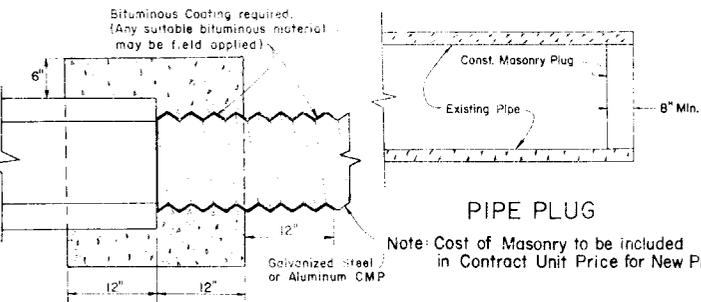
FILTER FABRIC JACKET

ELLIPTICAL CONCRETE PIPE JOINTS

Cost of concrete jacket and filter fabric jacket to be included in cost of Elliptical Concrete Pipe Culverts.



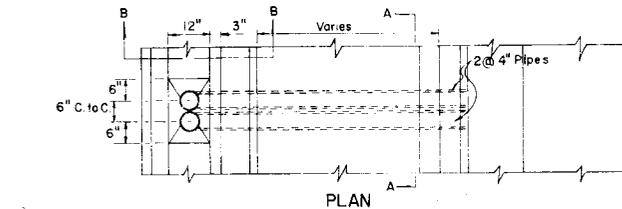
CONCRETE COLLAR FOR JOINING MAINLINE PIPE AND STUB PIPE



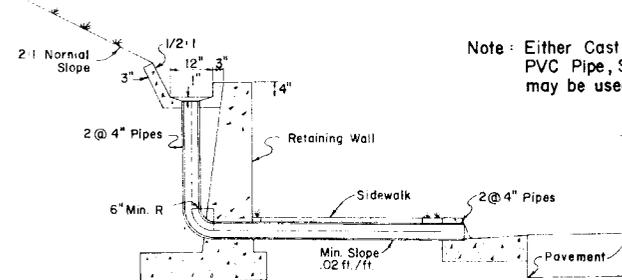
PIPE PLUG

CONCRETE JACKET FOR CONNECTING DISSIMILAR TYPES OF PIPE

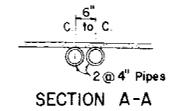
Note: COST OF CONCRETE AND BITUMINOUS COATING TO BE INCLUDED IN CONTRACT UNIT PRICE FOR NEW PIPE.



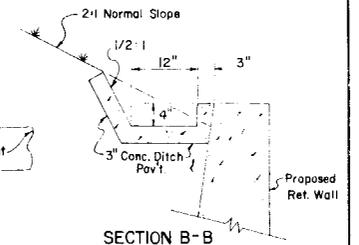
PLAN



ELEVATION



SECTION A-A



SECTION B-B

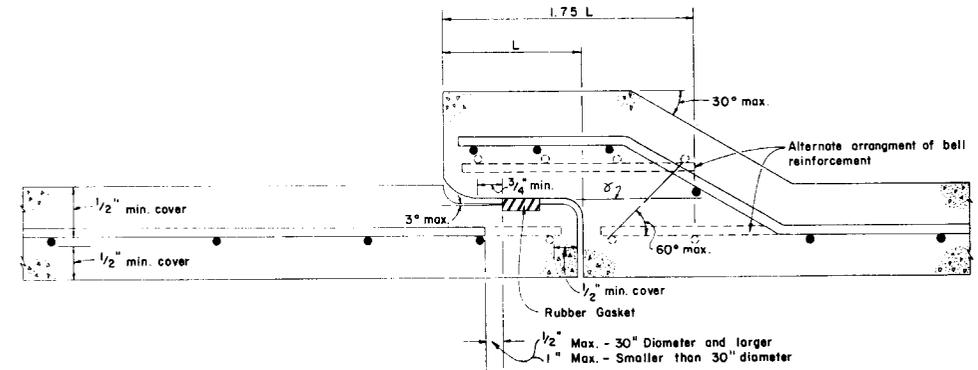
CONCRETE GUTTER AND DRAINS AT RETAINING WALLS

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS			
MISCELLANEOUS DRAINAGE DETAILS			
Project No.	Sheet No.	Approved By	
		<i>Dr. Buller</i>	
Project Name	Sheet No.	81	2 of 3
File No.	Sheet No.		280

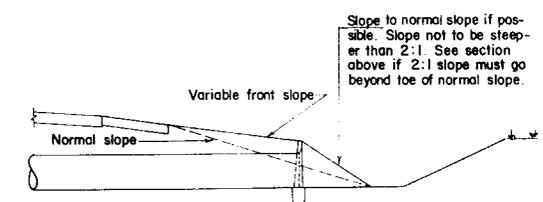
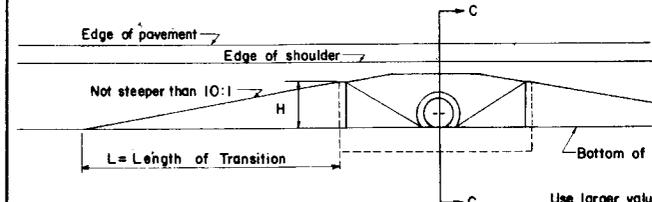
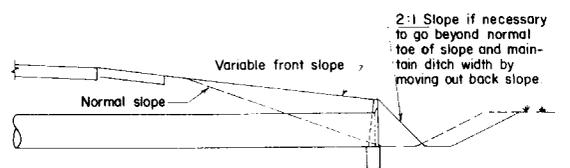
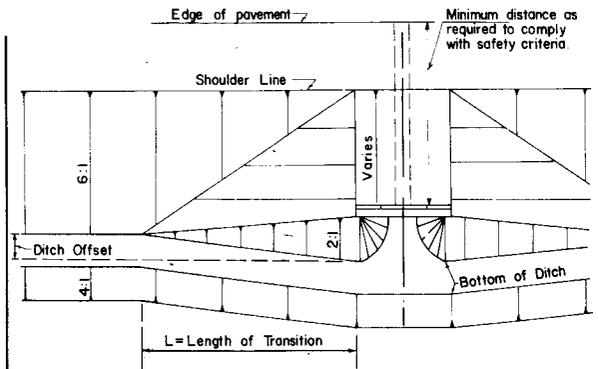
GENERAL NOTES

All cross drain and side drain pipe structures to be constructed to a length that will be a multiple of 4' joint lengths furnished to the nearest multiple length equal to, or above that shown in plans except when additional length would require construction outside the right of way.

SCHEDULE OF BELL REINFORCEMENT		
Classes - III, IV, V; Wall- A,B,C		
Nominal Pipe Diameter	Design Bell Reinforcement	Maximum Reinforcement Under Tolerance
	SQUARE INCHES	SQUARE INCHES
15"	0.12	0.010
18"	0.16	0.010
24"	0.20	0.010
30"	0.24	0.010
36"	0.28	0.010
42"	0.32	0.010
48"	0.36	0.011
54"	0.40	0.012
60"	0.45	0.0135
66"	0.50	0.015
72"	0.55	0.0165
78"	0.60	0.018
84"	0.65	0.0195
90"	0.70	0.021
96"	0.75	0.0225
102"	0.80	0.024
108"	0.85	0.0255



DETAIL OF BELL & SPIGOT CONCRETE PIPE JOINT USING ROUND RUBBER GASKET

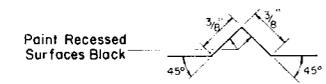


NOTE: Filling or excavation of variable slopes to be done during normal grading operations.

SECTION CC

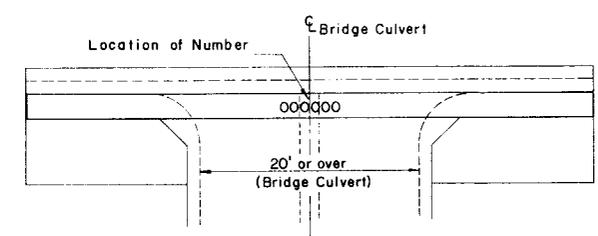
- Use larger value of either:
1. $L = 10 \times H$ (No maximum)
 2. $L = 10 \times \text{Ditch Offset}$ (Maximum $L = 100'$)

METHOD FOR SETTING LIMITS OF VARIABLE FRONT SLOPES AT DRAINAGE STRUCTURES



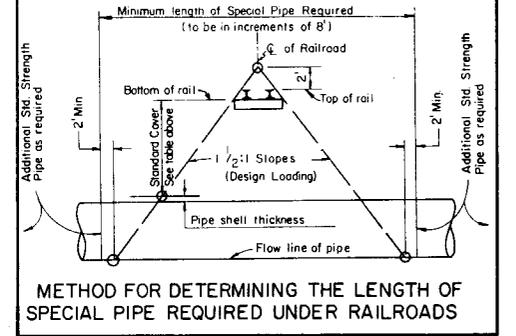
SECTION THRU RECESSED "V" GROOVE TO FORM INSCRIBED FIGURES

The number is to be placed in the center of the top surface of all BRIDGE CULVERT headwalls. Black Plastic Figures 3" in height as approved by the Engineer may be used in lieu of Figures formed by 3/8" V Grooves. "V" Grooves shall be formed by preformed Figures.



TOP VIEW OF HEADWALL BRIDGE CULVERT NUMBER LOCATION For Bridge Number See Key Map

RAILROAD COMPANY	CLEARANCE BELOW BOTTOM OF RAIL (FEET)	STRENGTH ASTM (C76) CLASS
APALACHICOLA NORTHERN	4.0	IV
ATLANTA AND ST. ANDREWS BAY	3.0	IV
FLORIDA EAST COAST	5.5	IV
LOUISVILLE AND NASHVILLE	4.6	IV
ST. LOUIS - SAN FRANCISCO	4.5	IV WALL B
SEABOARD COASTLINE	5.5	IV
SOUTHERN RAILWAY SYSTEM		
GEORGIA SOUTHERN AND FLORIDA	5.5	V
LIVE OAK, PERRY AND SOUTH GEORGIA	5.5	V
ST. JOHNS RIVER TERMINAL	5.5	V



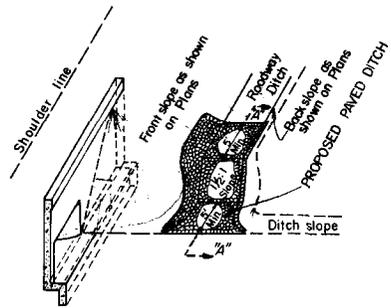
* Clearance is for casing pipe. All subgrade carrier pipelines and wirelines will be installed within a casing pipe which will extend from Right-of-Way line to Right-of-Way line.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MISCELLANEOUS DRAINAGE DETAILS

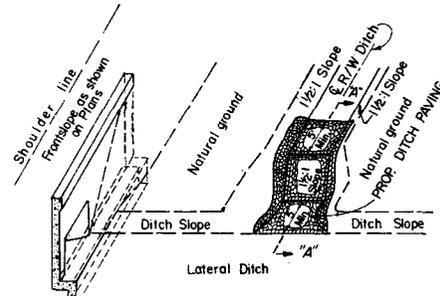
Designed by	Checked by	Approved By	<i>J.C. Bull</i> Deputy Design Engineer, Roadways
Drawn by	Reviewed by	Revision No.	
Sheet No.	3 of 3	Index No.	280

H.W.A. Approved: 11/16/78

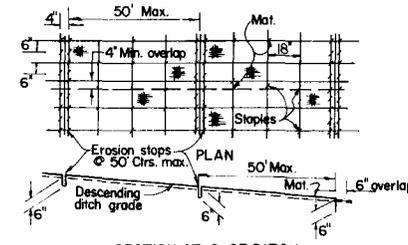


JUNCTION OF ROADWAY DITCH AND LATERAL DITCH

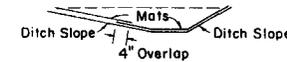
* Soil cement or misc. asphalt will not be permitted for this type of construction.



JUNCTION OF R/W DITCH AND LATERAL DITCH

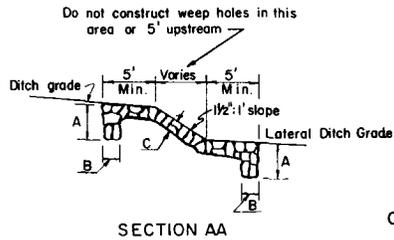


SECTION AT C OF DITCH



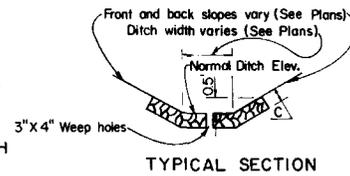
CROSS SECTION OF DITCH

MATting FOR EROSION CONTROL

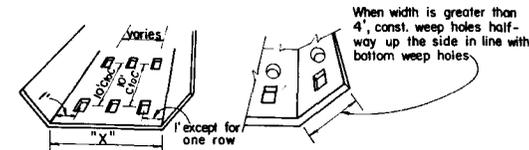


SECTION AA

PROFILE OF DITCH PAVT. AT LOCATIONS OTHER THAN JUNCTION WITH LATERAL DITCH



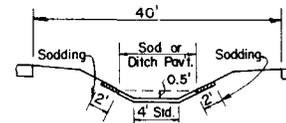
TYPICAL SECTION



When "X" = 1' to 4' Const. 1 Row (centered)
 "X" = 5' to 7' Const. 2 Rows
 "X" = 8' to 12' Const. 3 Rows
 "X" = 13' to 17' Const. 4 Rows
 "X" = 18' to 22' Const. 5 Rows

Notes: All weep holes to be 3" x 4" rectangle or 4" or 5" Dia. circular hole. 1/2 Cu. ft. (12" x 12" x 6") of No. 6 aggregate to be placed under each hole. 1 Sq. ft. of galvanized wire mesh (1/4" openings) shall be placed between the aggregate and the concrete. Cost of holes, aggregate and wire mesh to be included in the cost of ditch pavement.

SCHEDULE OF MIN. DIMENSIONS			
TYPE OF PAVEMENT	A	B	C
Concrete	24"	6"	3"
Rubble	24"	12"	9"
Sand-Cement	24"	12"	4"
Soil-Cement	24"	12"	4"
Misc. Asphalt	24"	12"	4"
Salvaged Concrete	24"	12"	13"

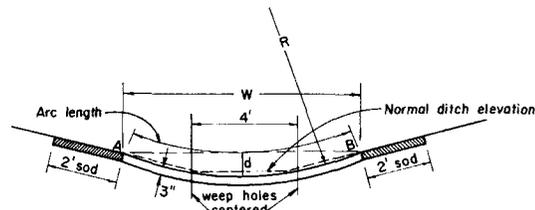


40' MEDIAN

WEEP HOLE ARRANGEMENT

GENERAL NOTES

- Type of ditch pavement shall be as shown on plans.
- In concrete ditch pavement, contraction joints are to be spaced at 25' maximum intervals, or as directed by the Engineer. Contraction joints may be either formed (construction joint) or tooled. No open joints will be permitted.
- Salvaged concrete ditch pavement shall consist of concrete pavt., sidewalk, curb and gutter with a 3 sq. ft. minimum surface area.
- All joints shall be grouted when rubble, sand cement or salvaged concrete paving is used for ditch paving.
- Toewalls are to be used with all ditch paving. A toewall is not required adjacent to drainage structures.
- When directed by the Engineer, weep hole spacing may be reduced to 5' minimum.
- For junction of R/W ditch spillway and lateral ditch, sides of paving to be 1' high minimum.
- Lip at end of ditch pavement shall normally be located downstream of D.P.I. or on flatter grades where there is a decrease in ditch velocity.



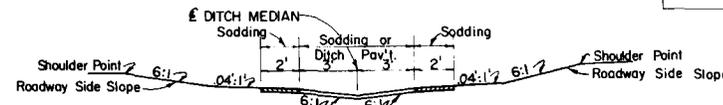
TO REPLACE:	W	d	R	No. of rows of weep holes	Arc Length
6' Median Swale	6'	.24'	19'	0	6.0
6:1 Front Slopes; 4:1 Back Slope					
5' B.W. Ditch	10'	.67'	19'	2	10.1
4' B.W. Ditch	9'	.54'	19'	2	9.1
4:1 Front slope & Back slope					
5' B.W. Ditch	9'	.74'	14'	2	9.2
4' B.W. Ditch	8'	.58'	14'	1	8.1

ALTERNATE DITCH PAVEMENT

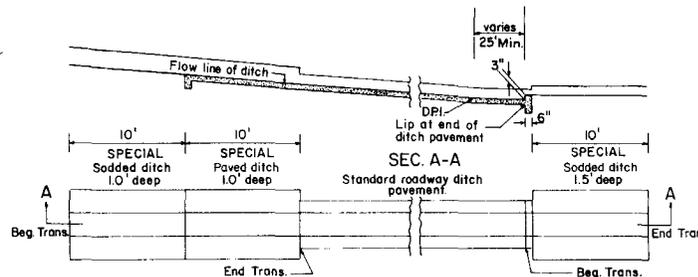
For use only where side slopes are 4:1 or flatter. Point "A" and "B" are to be the same elevation and should be used to locate the paved section.



ROADWAY SIDE DITCH

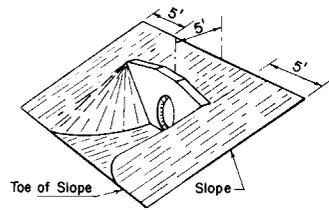


SWALED MEDIAN (No Weep Holes)

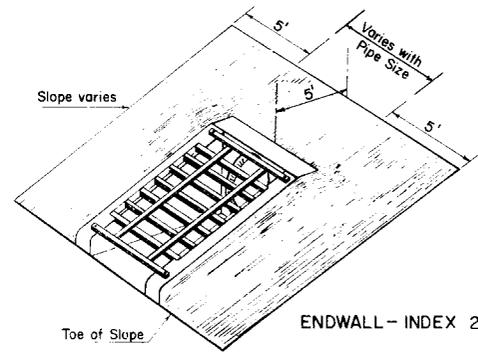


TRANSITIONS FROM PAVED TO UNPAVED SECTION

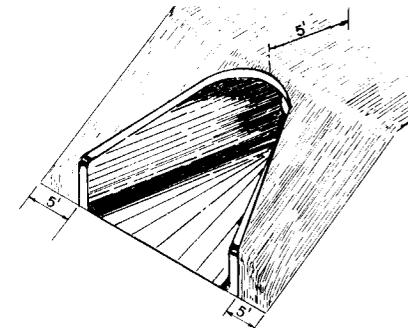
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH PAVEMENT & SODDING			
Designed by	Name	Date	Approved By
Drawn by			<i>J. C. Hill</i> Deputy Design Engineer, Roadways
Checked by	Revision No.	Sheet No.	Index No.
F. H. W. A. Approved 5/11/75	82	1 of 2	281



ENDWALL - INDEX 250



ENDWALL - INDEX 261



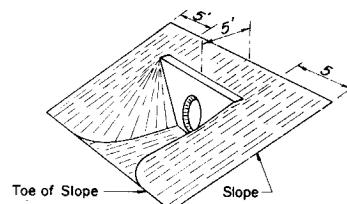
ENDWALL - INDEX 270

SODDING QUANTITIES (SY)												
PIPE SIZE	INDEX 250									INDEX 266		
	2:1 SLOPE			4:1 SLOPE			6:1 SLOPE			2:1 SLOPE	4:1 SLOPE	6:1 SLOPE
	1-PIPE	2-PIPE	3-PIPE	1-PIPE	2-PIPE	3-PIPE	1-PIPE	2-PIPE	3-PIPE			
12"										14.73	20.61	26.71
15"										16.72	23.80	31.12
18"	25	28	31	35	40	45	45	51	57	18.83	27.22	35.93
21"												
24"	30	34	39	43	50	57	57	65	74	23.42	34.74	46.50
27"												
30"	35	42	48	53	62	72	70	86	95	28.51	43.18	58.42
36"	42	50	58	63	76	88	85	102	118	30.08	52.53	71.70
42"	49	59	70	75	91	107	101	123	144	40.16	63.80	86.32
48"	56	69	86	87	107	126	119	143	172	46.74	74.01	102.30
54"	64	79	94	100	124	140	137	170	203			
60"							157					

Note: These quantities are for one pipe.

SODDING QUANTITIES (SY)						
PIPE SIZE	INDEX 261			INDEX 270		
	2:1 SLOPE	4:1 SLOPE	6:1 SLOPE	2:1 SLOPE	4:1 SLOPE	6:1 SLOPE
12"				15.14	14.44	14.30
15"	14.77	17.18	22.55	15.57	14.84	14.70
18"	15.46	18.76	24.35	16.06	15.31	15.17
21"				16.33	15.56	15.41
24"	16.44	20.93	27.96	16.60	15.80	15.64
27"				16.91	16.08	15.92
30"	18.24	23.43	31.57	17.17	16.32	16.15
36"				17.53	16.63	16.45
42"				22.07	20.82	20.58
48"				22.40	21.10	20.85
54"				23.86	22.49	22.22
60"				24.79	23.39	23.12
66"				24.49	23.04	22.76
72"				25.26	23.77	23.48

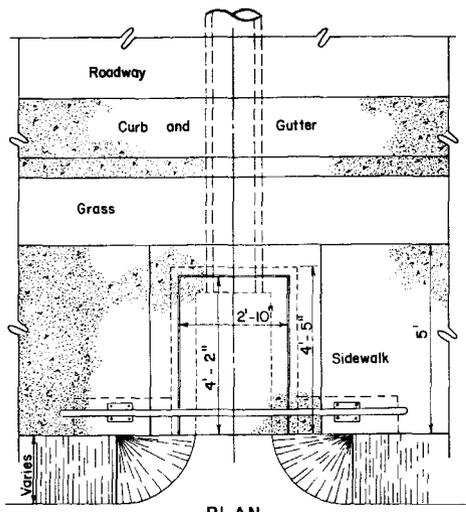
Note: Quantity for 2:1 is for endwall with baffles.



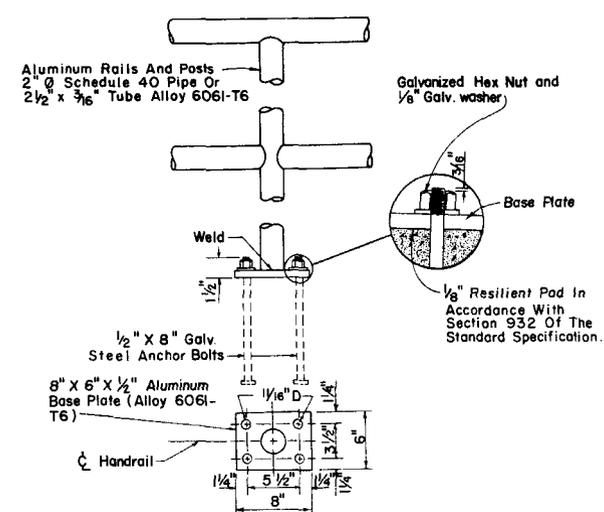
STRAIGHT ENDWALLS

NOTE: All straight endwalls except index 250 will require sodding as shown in this drawing. Quantities for each particular case to be determined by the designer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH PAVEMENT & SODDING			
Checked by	Designed by	Approved by	<i>J. J. ...</i>
Drawn by	Reviewed by	Quantity	
Checked by	Drawn by	Sheet No.	2 of 2
Checked by	Drawn by	Scale	281

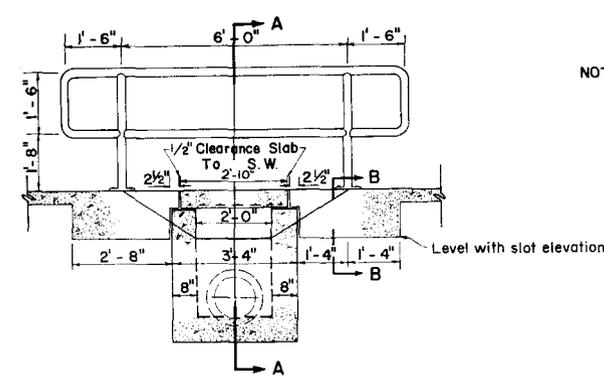


PLAN

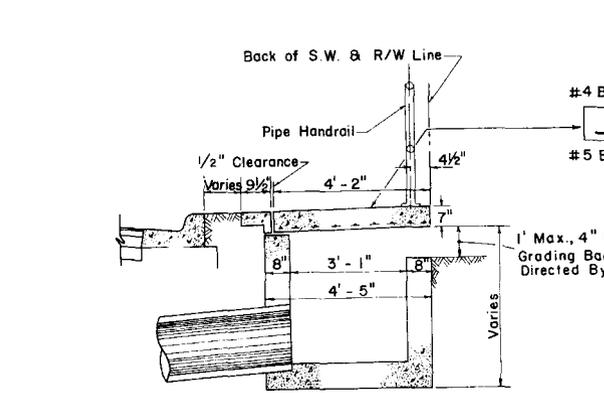


HANDRAIL DETAIL

NOTES: 1. All fixed joints to be either welded all around and ground smooth or standard pipe rail fittings at the contractors option. Post shall be connected to base by weld only. Weld filler to be alloy ER5356, ER5556, or ER5183.
 2. Nuts, washer, and bolts to be hot dip galvanized in conformance with ASTM A-153. After the nuts have been tightened, the anchor bolt threads shall be distorted or the nuts and bolts spot welded and coated with zinc compound.



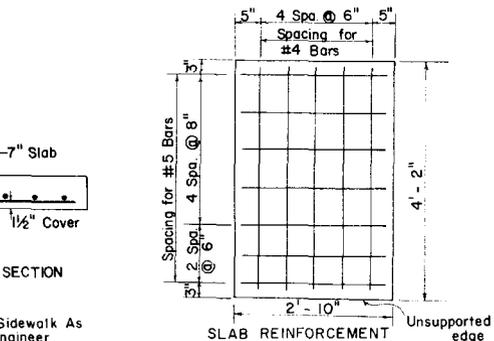
FRONT ELEVATION



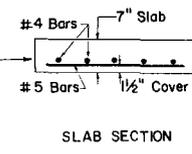
SECTION A - A

INLET TYPE C (MODIFIED)

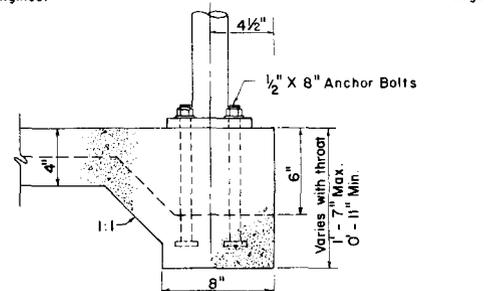
To be paid for as each
 For additional details see Index No. 232



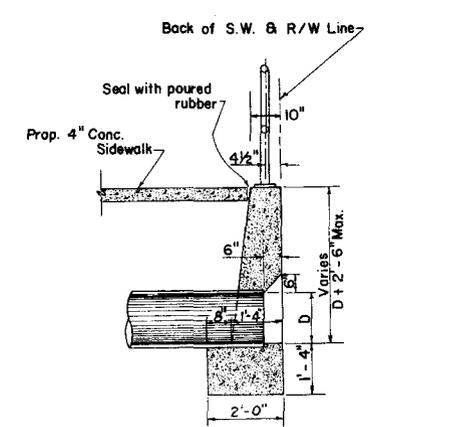
SLAB REINFORCEMENT



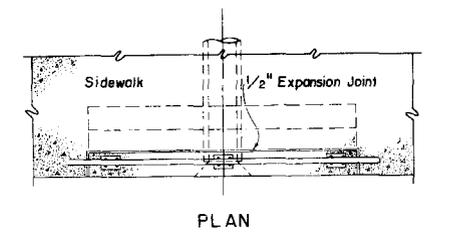
SLAB SECTION



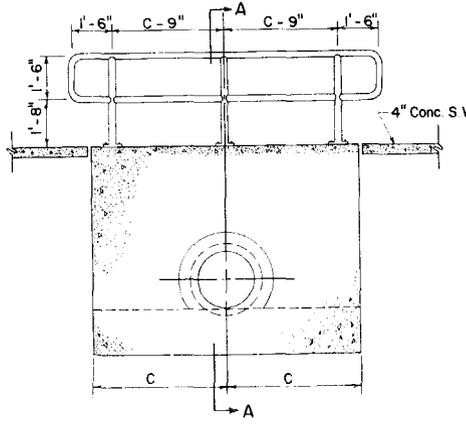
SECTION BB



SECTION AA



PLAN

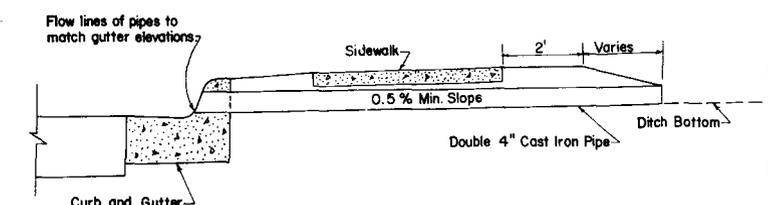


FRONT ELEVATION

SPECIAL ENDWALL

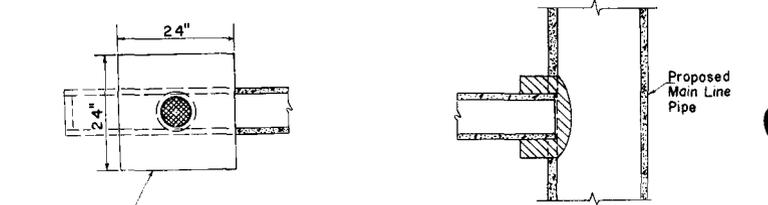
Pipe Size	"C" Value
15"	4'-9"
18"	5'-3"
24"	6'-3"
27"	6'-9"

Maximum pipe size shall be 27".
 Grading back of sidewalk varies and shall be done as directed by the Engineer.



SHALLOW DITCHES

To be constructed at locations as directed by the engineer.



YARD DRAINS

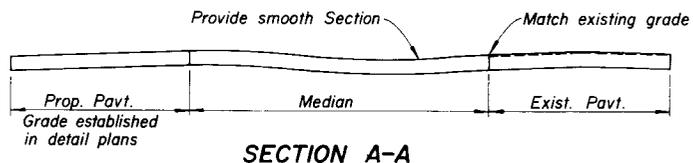
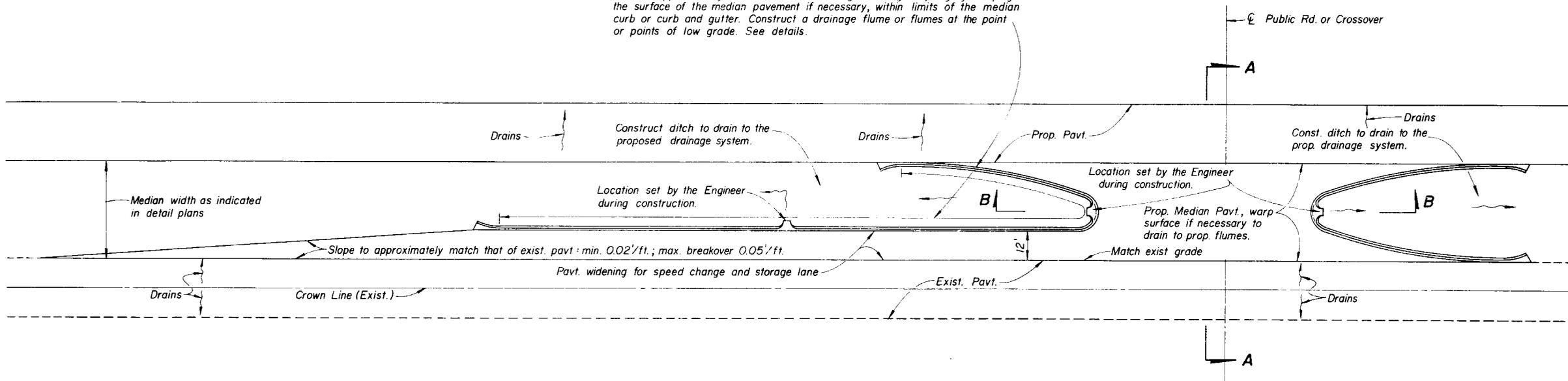
- YARD DRAIN ITEM INCLUDES:
- 15" X 15" X 12" Conc. Tee 4' Long
 - One (1) Grate - Neenah No. R - 4030, Phoenix No. P-1058, U.S. Foundry #5605 or equivalent.
 - 12" Conc. Pipe as necessary.
 - 0.04 Cu. Yds. Conc. for slab.

NOTE: Cost of plugs and collars to be included in Bid Price for 15" Conc. Pipe. For Collar and Plug Detail see Index No. 280.

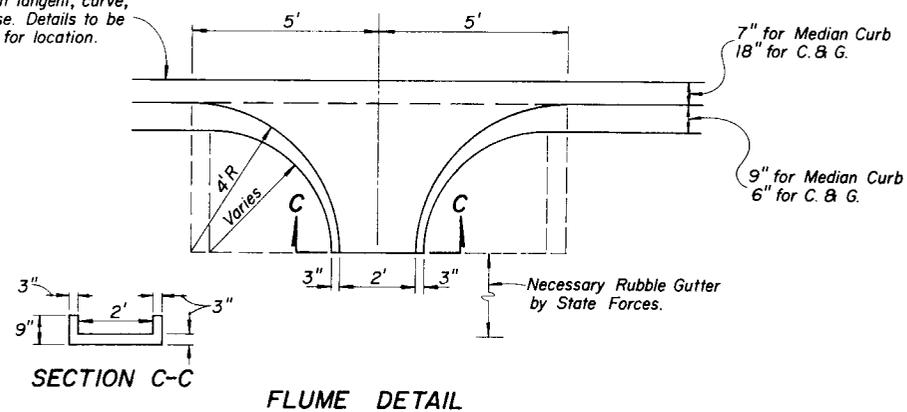
Yard Drains may be constructed at the option of the property owner as shown on the plans.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
BACK OF SIDEWALK DRAINAGE			
Design by	Name	Date	Approved By
Drawn by			<i>Dr. [Signature]</i>
Checked by			Project Engineer, Roadways
F.H.W.A. Approved 5/11/75	Max. Sheet No. 81	Sheet No. 1 of 1	Index No. 282

Provide approximately a minimum of 0.20% grade on gutter, slightly warping the surface of the median pavement if necessary, within limits of the median curb or curb and gutter. Construct a drainage flume or flumes at the point or points of low grade. See details.



May be on tangent, curve, or at nose. Details to be modified for location.

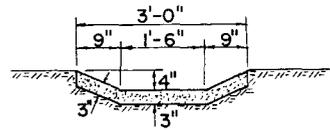


(May drain from any point as established by the Engineer)

GENERAL NOTES: These details are to apply to projects which provide for the conversion of 2-lane sections to 4-lane divided highway sections and for superelevated sections of new 4-lane divided highways. Location of low point or points in gutters is to be set by the Engineer during construction and will establish locations of flumes. The number of flumes is to be maintained at a minimum. Plans for median openings to conform to detail plans. Layout above is illustration only. Cost of flumes to be included in the contract price for Median Curb or Curb and Gutter.

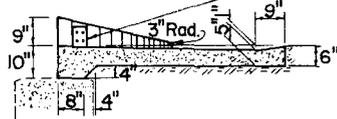
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
MEDIAN OPENING FLUME			
Designed By	Date	Checked By	Date
CHR	3/59		
Drawn By			
Checked By	3/59		
Approved By	3/20/75	80	1 of 1
			283

Note: Set reflector plates on right hand curb at bridge ends as shown. Plates to be furnished by D.O.T. and installed by the contractor. Cost of installing plates to be included in the contract unit price for concrete ditch pavement (3" thick).

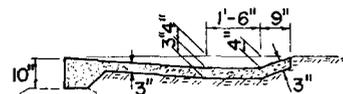


SECTION AA

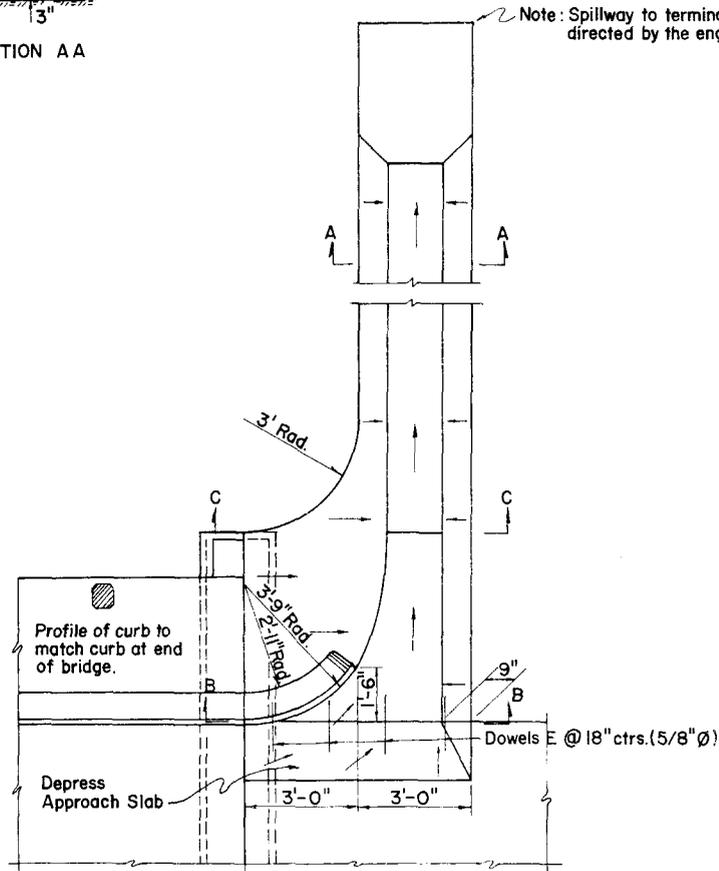
Note: Spillway to terminate as directed by the engineer.



SECTION BB

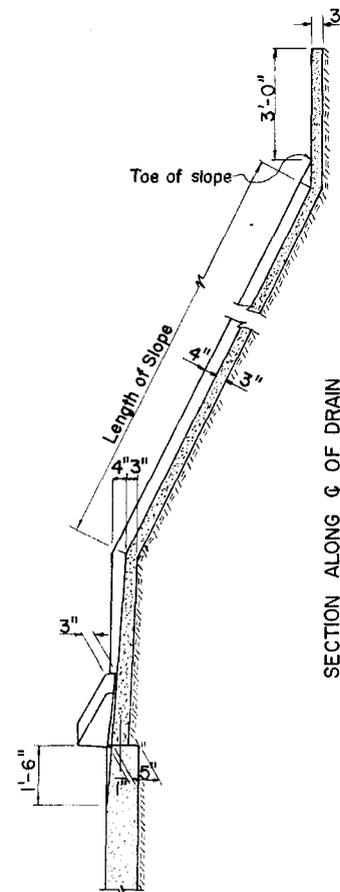


SECTION CC



BRIDGE APPROACH SLAB

PLAN



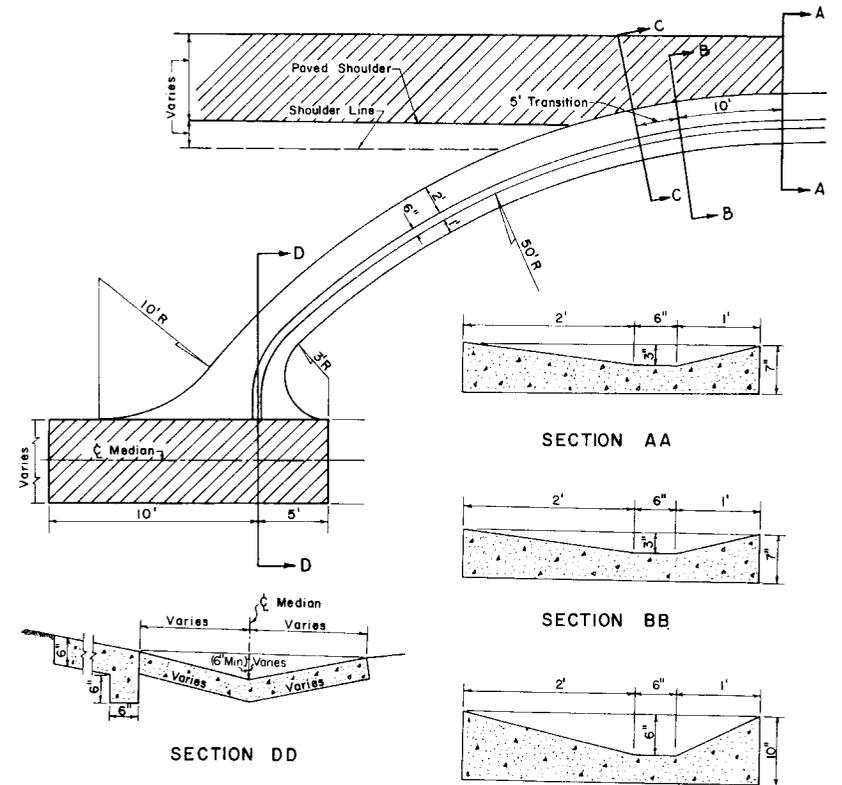
SECTION ALONG C OF DRAIN

Dowels to be included in the contract unit price for concrete ditch pavement (3" thick).

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete Ditch Pavement (3" Thick)	Sq. Yd.	* 10.87

*Quantity shown above includes pavement for 10 ft. " Length of Slope ".
For each additional foot of slope length add 0.349 sq. yds.

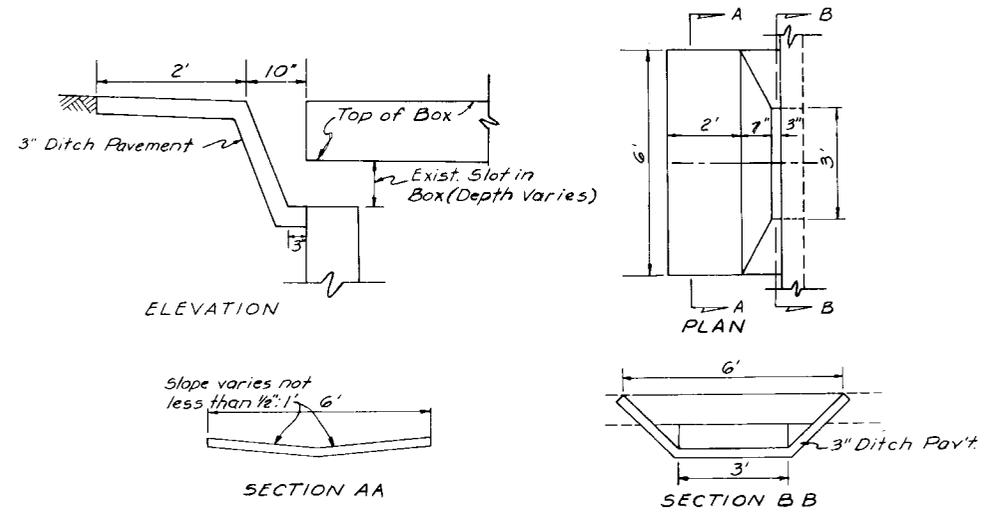
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE SPILLWAYS BRIDGE END SPILLWAY			
Designed By	Checked By	Approved By	
C. E. S.	12/51	<i>J. L. F.</i> Deputy District Engineer, Roadways	
Drawn By	Checked By	Revision No.	Sheet No.
H. L. F.	12/51	81	1 of 2
Approved	3/20/75		284



- NOTES:
1. Spillway to be paid for as shoulder gutter.
 2. If spillway empties into a shallow or median ditch, the detail should be modified as necessary.

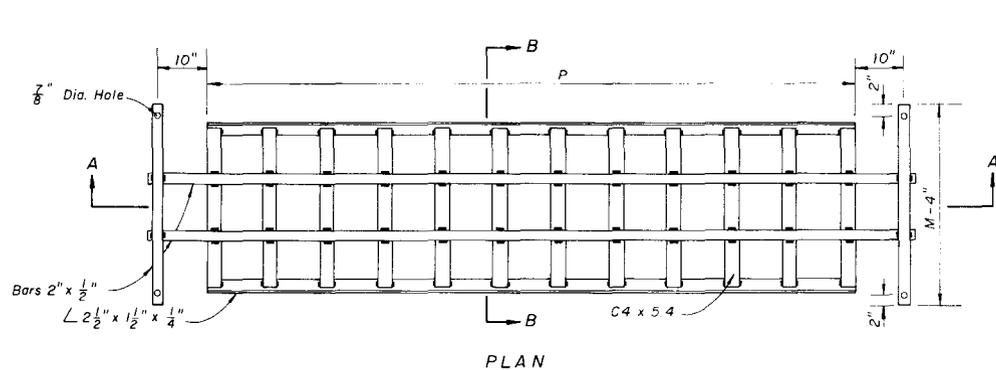
DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER
 (TO BE USED WHERE INLETS, PIPES & ENDWALLS ARE IMPRACTICAL)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE SPILLWAYS SHOULDER GUTTER SPILLWAY			
Designed by	Names	Dates	Approved By
Drawn by			<i>J.C. Miller</i> Deputy Design Engineer, Roadways
Checked by			
Revision No.		Sheet No.	Index No.
F.H.W.A. Approved: 11/16/78		81	2 of 2 284

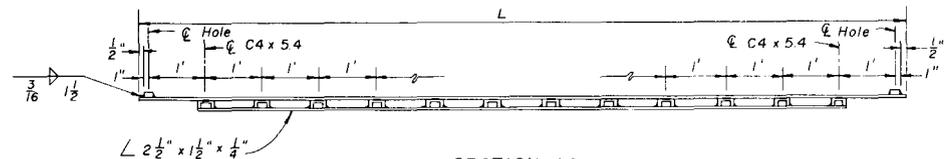


**SAFETY MODIFICATION FOR
INLETS IN BOX CULVERTS**

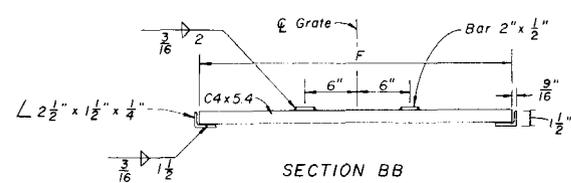
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SAFETY MODIFICATIONS FOR INLETS IN BOX CULVERTS			
Designed by	HAB	7/67	Approved By <i>De. Hill</i> Senior Design Engineer, Roadways
Drawn by	MJT	7/67	
Checked by	DWS	7/67	
F.H.W.A. Approved 3/20/75		Revision No. 81	Sheet No. 1 of 1
			Index No. 293



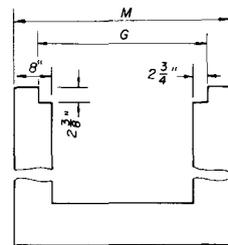
PLAN



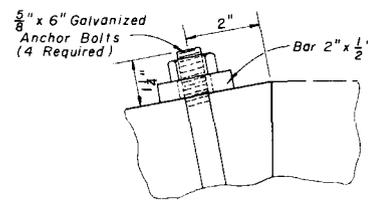
SECTION AA



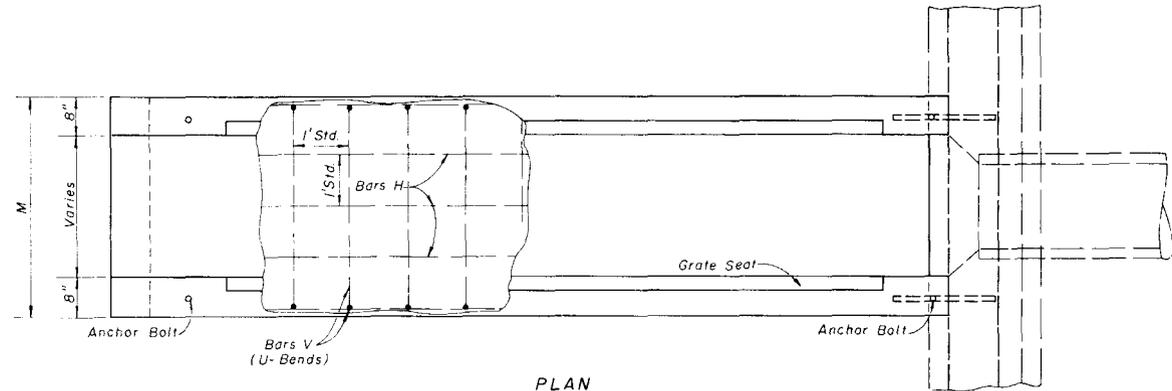
SECTION BB
GRATE DETAIL



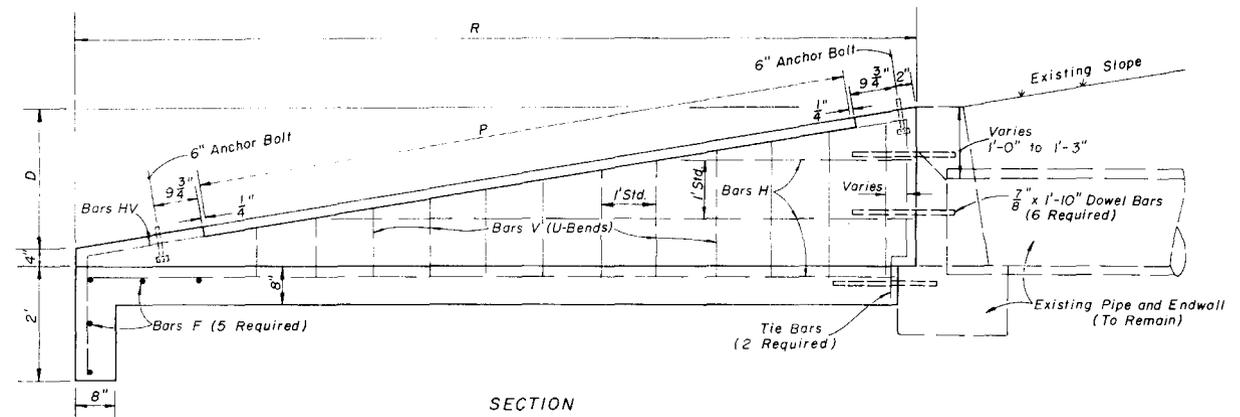
GRATE SEAT DETAIL



ANCHOR BOLT DETAIL



PLAN



SECTION

GENERAL NOTES

1. Cost of grate to be paid for as Endwall Grate per pound, tabulated quantity.
2. Cost of galvanized bolts and nuts to be included in bid price for Endwall Grate.
3. Grate to be ASTM A 588 weathering steel. If exposed to salt water (locations designated in plans) grate to be fabricated from ASTM A 572, Grade 50, then galvanized.
4. Reinforcing Steel: All bars are size #4. Spacings shown are center to center. Laps to be 12" minimum. Clearance is 2" except as noted. Square welded wire fabric (two cages max) having an equivalent cross sectional area (O20 sq. in.) may be substituted for bar reinforcement.
5. The cost of dowel bars and epoxy mortar to be included in the bid price for reinforcing steel.
6. Drill 1 3/8" holes 8" deep with a rotary drill in existing endwall for dowel bars. Holes shall be thoroughly cleaned prior to placing dowel bars and epoxy.
7. For use criteria see Index 261.
8. Channel section C3 x 6.0 may be substituted for C4 x 5.4 channel.

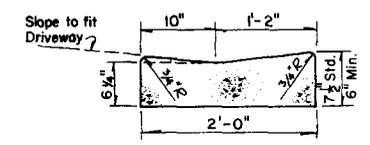
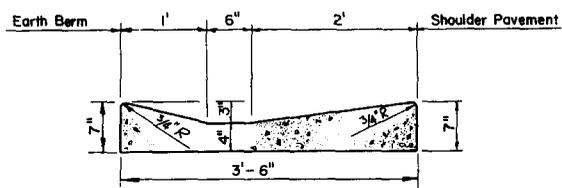
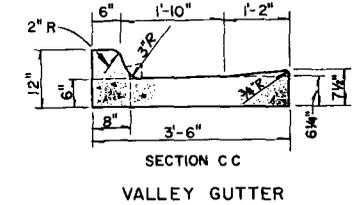
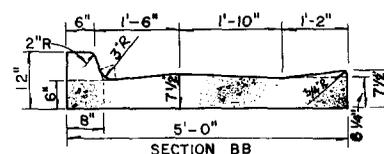
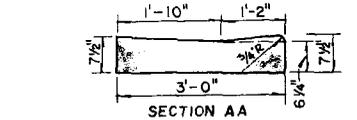
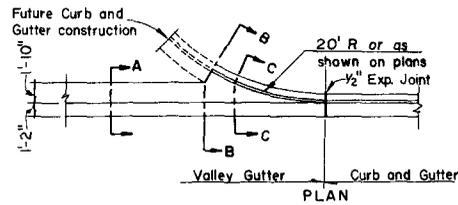
DIMENSIONS AND QUANTITIES PER GRATE										
Slope	Pipe Size	Channels @ 5.4 Lbs./L.F.		Bars @ 3.4 Lbs./L.F. (2 ea.)		Angles @ 3.2 Lbs./L.F. (2)		Total Weight - Lbs.		
		Quantity	F	Lbs.	L	M-4"	Lbs.			P
6:1	15"	10	2'-6 7/8"	139	11'-3"	3'-3"	99	9'-4"	60	298
	18"	12	2'-9 3/8"	163	13'-3"	3'-6"	114	11'-4"	73	370
	24"	15	3'-3 3/8"	269	16'-3"	4'-0"	138	14'-4"	92	499
	30"	18	3'-9 3/8"	372	19'-3"	4'-6"	162	17'-4"	111	645
4:1	15"	6	2'-6 3/8"	83	7'-3"	3'-3"	71	5'-4"	34	188
	18"	7	2'-9 3/8"	107	8'-3"	3'-6"	90	6'-4"	41	228
	24"	9	3'-3 3/8"	161	10'-3"	4'-0"	97	8'-4"	53	311
	30"	11	3'-9 3/8"	227	12'-3"	4'-6"	114	10'-4"	66	407

DIMENSIONS AND QUANTITIES PER U-ENDWALL									
Pipe Size	G	M	D	R	P	Class I Concrete - CY	Reinforcing Steel - Lbs.		
15"	2'-8 1/2"	3'-7"	2'-2"	13'-0"	9'-4"	2.12	167		
18"	2'-11 1/2"	3'-10"	2'-5"	14'-6"	11'-4"	2.53	173		
24"	3'-5 1/2"	4'-4"	2'-11"	17'-6"	14'-4"	3.48	238		
30"	3'-11 1/2"	4'-10"	3'-5"	20'-6"	17'-4"	4.57	315		
15"	2'-8 1/2"	3'-7"	2'-2"	8'-8"	5'-4"	1.44	120		
18"	2'-11 1/2"	3'-10"	2'-5"	9'-8"	6'-4"	1.72	130		
24"	3'-5 1/2"	4'-4"	2'-11"	11'-8"	8'-4"	2.36	167		
30"	3'-11 1/2"	4'-10"	3'-5"	13'-8"	10'-4"	3.09	225		

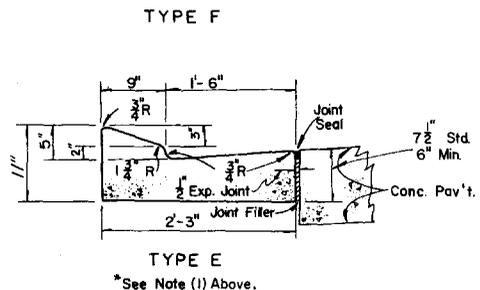
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SAFETY MODIFICATIONS FOR ENDWALLS

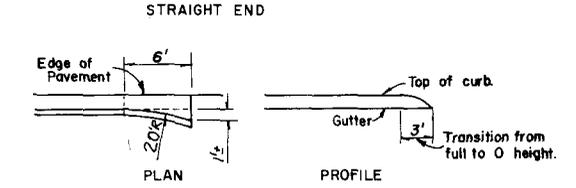
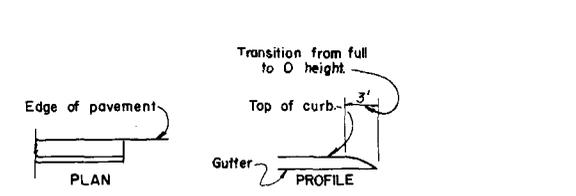
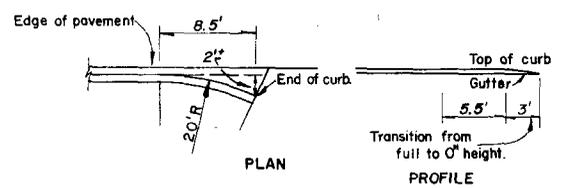
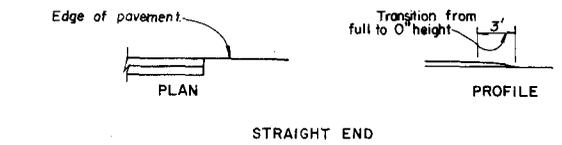
Designed By	Names	Dates	Approved By	<i>De Bull</i>
Drawn By				Deputy Design Engineer, Road Dept.
Checked by			Revision No.	Sheet No.
F.H.W.A. Approved:	80	1 of 1		295



* Note (1) : When used on high side of roadways, the cross slope of the gutter shall match the cross slope of the adjacent pavement and the thickness of the lip shall be 6", unless otherwise shown on plans.

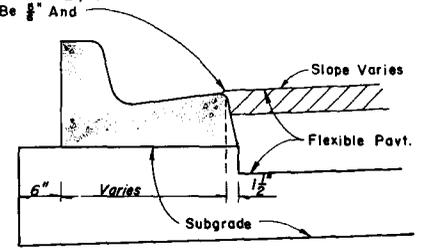
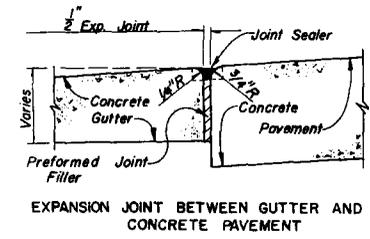


* See Note (1) Above.

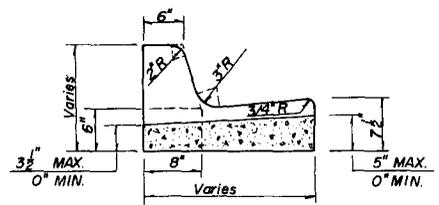


MEDIAN CURB AND GUTTER ENDINGS

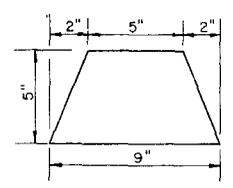
Pavement Surface To Be 1/4" Above Lip Of Gutter Except FC-2 Shall Be 3/8" And FC-3 3/4" Above Lip.



Note: When Curb and Gutter, Shoulder Gutter, Valley Gutter and Drop Curb are constructed adjacent to flexible base, the Face at the lip of the gutter shall be sloped as shown in this detail.

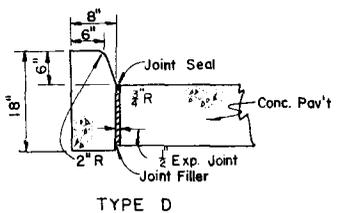
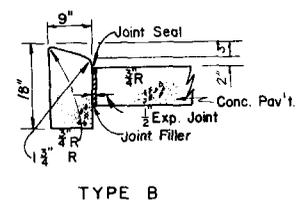
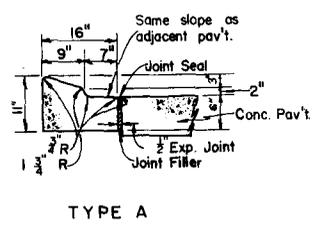


CONTRACTION JOINT IN CURB OR CURB AND GUTTER. JOINTS 10' CENTER TO CENTER MAXIMUM
Note: Joint on Tangent sections and flat curves should match where Curb and Gutter is adjacent to P.C.C. Pavement.



ASPHALTIC CONCRETE CURB

CONCRETE CURB AND GUTTER



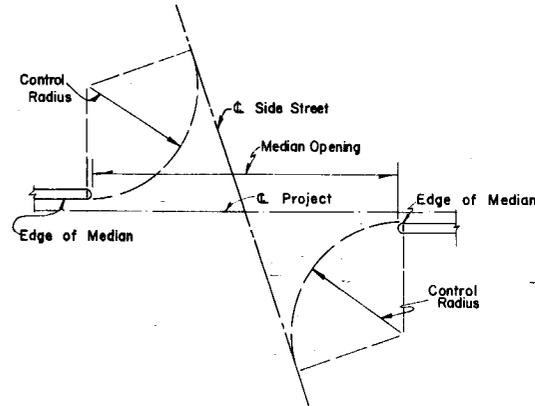
CONCRETE CURB

Note: When Curb or Curb and Gutter is constructed adjacent to Flexible Pavement, the 1/2" Expansion Joint shown above will not be used.

GENERAL NOTES

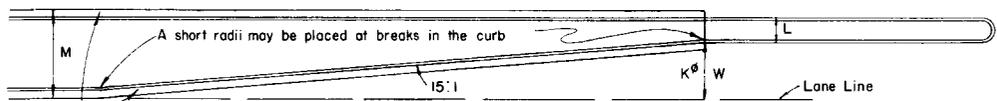
1. For Curb and Gutter and Traffic Separator provide 1/8" - 1/4" contraction joints at 10' centers.
2. All Curb and Gutter Details are shown for construction adjacent to Concrete Pavement, unless otherwise noted.
3. End of Curbs Types B and D shall transition from full to zero height in 3 feet.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB & CURB AND GUTTER			
Designed By	Names	Dates	Approved By
Drawn By			<i>J. C. Bullard</i> Deputy Design Engineer, Roadways
Checked By			Revision No.
F.H.W.A. Approved: 7/7/75	82	Sheet No. 1 of 1	Index No. 300

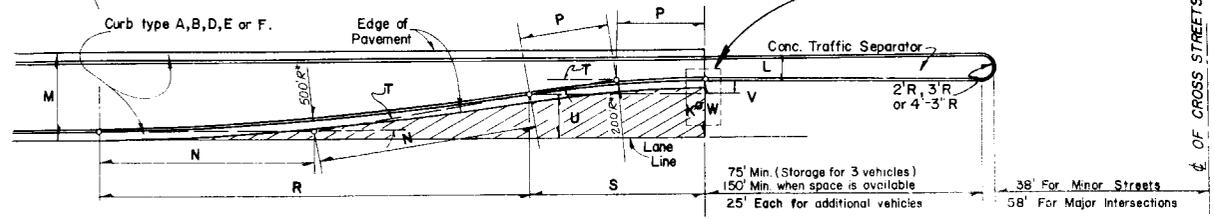


DESIGN VEHICLE	MEDIAN OPENING 90°	CONTROL RADIUS EDGE OF LANE
P	76	40'
SU	96	50'
WB-40&WB-50	146	75'

METHOD OF DETERMINING MEDIAN OPENINGS AT SKEWED SIDE STREETS



ALTERNATE I



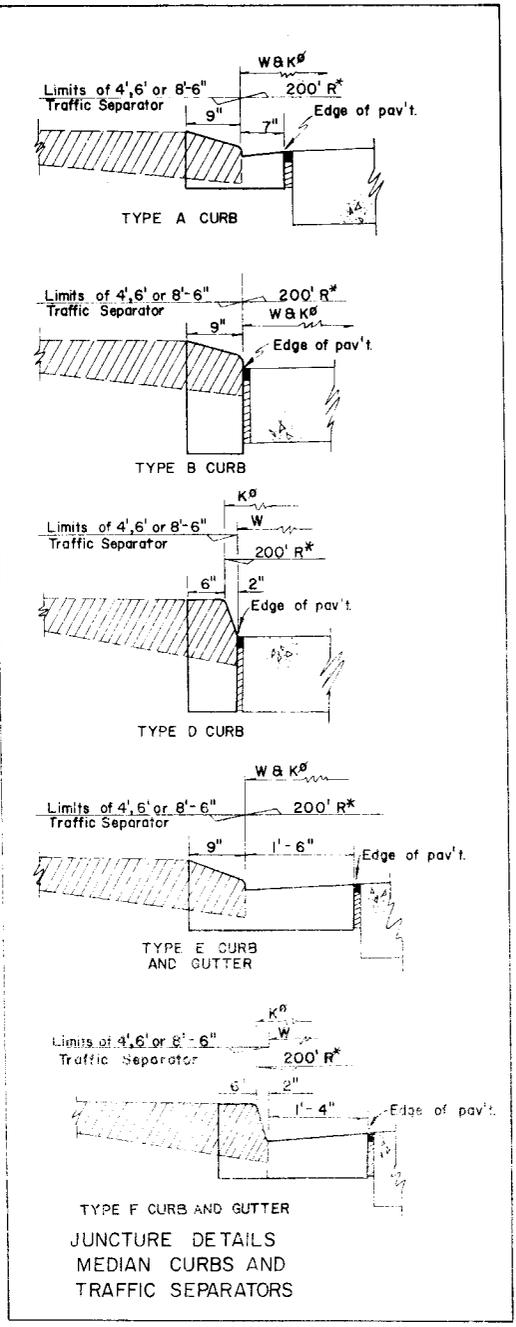
* Radii are measured from face of curb, regardless of curb type. These radii are minimums recommended for urban construction. For rural primary construction, the radii are to be in conformity with the design speed of the highway where practicable.
 † Dimensions K and W are identical except when median curb is type D or curb and gutter type F.
 ‡ Dimension K is from lane line to the face of curb. Dimension W is from lane line to traffic separator.

ALTERNATE II

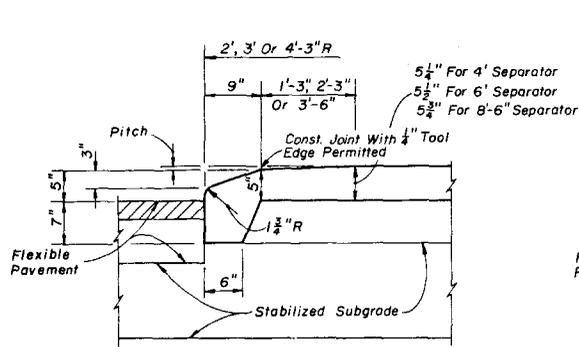
NOTE: HACHURED PORTION INDICATES AREA GIVEN IN TABLE BELOW

TABLE OF DIMENSIONS AND QUANTITIES FOR MEDIAN STORAGE LANES												
L	M	CURB TYPE	N	P	R	S	T	U	V	K [†]	W	AREA SQ. FT.
4'	15'-6"	A	43.12	17.25	85.60	34.24	09° 51' 25.3"	7.96	2.95	10'-11"	10'-11"	629.9
		B	45.50	18.20	90.26	36.10	10° 24' 00.1"	8.21	3.29	11'-6"	11'-6"	622.1
		D	45.50	18.20	90.26	36.10	10° 24' 00.1"	8.38	3.12	11'-8"	11'-6"	622.0
		E	39.09	15.63	77.68	31.07	08° 56' 16.7"	7.57	2.43	10'-0"	10'-0"	389.2
		F	39.84	15.94	79.18	31.67	09° 06' 42.8"	7.81	2.36	10'-4"	10'-2"	418.6
		F	47.14	18.86	93.44	37.38	10° 46' 16.8"	9.39	3.52	12'-11"	12'-11"	690.2
4'	17'-6"	A	49.34	19.73	97.72	39.09	11° 16' 15.0"	9.64	3.86	13'-6"	13'-6"	790.5
		B	49.34	19.73	97.72	39.09	11° 16' 15.0"	9.81	3.69	13'-8"	13'-6"	790.4
		D	43.46	17.39	86.28	34.51	09° 56' 10.9"	9.00	3.00	12'-0"	12'-0"	542.1
		E	44.15	17.66	87.63	35.05	10° 05' 35.7"	9.24	2.93	12'-4"	12'-2"	568.0
		F	43.12	17.25	85.60	34.24	09° 51' 25.3"	7.96	2.95	10'-11"	10'-11"	629.9
		F	47.14	18.86	93.44	37.38	10° 46' 16.8"	9.39	3.52	12'-11"	12'-11"	690.2
6'	17'-6"	A	45.50	18.20	90.26	36.10	10° 24' 00.1"	8.21	3.29	11'-6"	11'-6"	622.1
		B	45.50	18.20	90.26	36.10	10° 24' 00.1"	8.38	3.12	11'-8"	11'-6"	622.0
		D	39.09	15.63	77.68	31.07	08° 56' 16.7"	7.57	2.43	10'-0"	10'-0"	389.2
		E	39.84	15.94	79.18	31.67	09° 06' 42.8"	7.81	2.36	10'-4"	10'-2"	418.6
		F	47.14	18.86	93.44	37.38	10° 46' 16.8"	9.39	3.52	12'-11"	12'-11"	690.2
		F	49.34	19.73	97.72	39.09	11° 16' 15.0"	9.64	3.86	13'-6"	13'-6"	790.5
6'	19'-6"	A	49.34	19.73	97.72	39.09	11° 16' 15.0"	9.81	3.69	13'-8"	13'-6"	790.4
		B	43.46	17.39	86.28	34.51	09° 56' 10.9"	9.00	3.00	12'-0"	12'-0"	542.1
		D	44.15	17.66	87.63	35.05	10° 05' 35.7"	9.24	2.93	12'-4"	12'-2"	568.0
		E	47.14	18.86	93.44	37.38	10° 46' 16.8"	9.39	3.52	12'-11"	12'-11"	690.2
		F	49.34	19.73	97.72	39.09	11° 16' 15.0"	9.64	3.86	13'-6"	13'-6"	790.5
		F	49.34	19.73	97.72	39.09	11° 16' 15.0"	9.81	3.69	13'-8"	13'-6"	790.4
8'-6"	22'-0"	A	43.46	17.39	86.28	34.51	09° 56' 10.9"	9.00	3.00	12'-0"	12'-0"	542.1
		B	44.15	17.66	87.63	35.05	10° 05' 35.7"	9.24	2.93	12'-4"	12'-2"	568.0
		D	47.14	18.86	93.44	37.38	10° 46' 16.8"	9.39	3.52	12'-11"	12'-11"	690.2
		E	49.34	19.73	97.72	39.09	11° 16' 15.0"	9.64	3.86	13'-6"	13'-6"	790.5
		F	49.34	19.73	97.72	39.09	11° 16' 15.0"	9.81	3.69	13'-8"	13'-6"	790.4
		F	43.46	17.39	86.28	34.51	09° 56' 10.9"	9.00	3.00	12'-0"	12'-0"	542.1

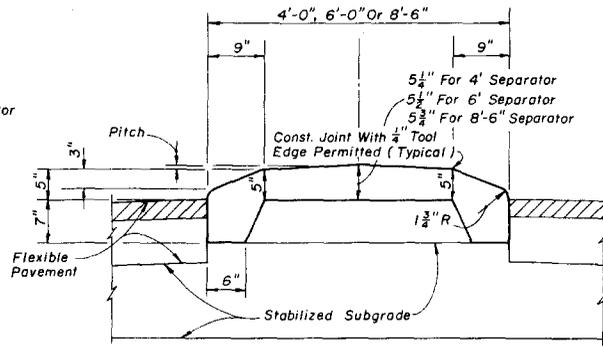
Note: The table above is applicable only where median storage lanes occur on tangent construction.



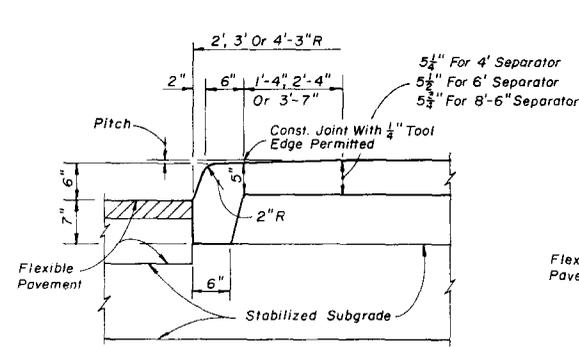
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
MEDIAN STORAGE LANES			
Designed by	Checked	Drawn by	Approved by
Drawn by	SHG	6/73	<i>De Rube</i> Deputy Design Engineer, Roadways
Checked by	AF	6/73	Revision No.
F.H.W.A. Approved: 7/7/75		81	Sheet No. 1 of 1
		Index No. 301	



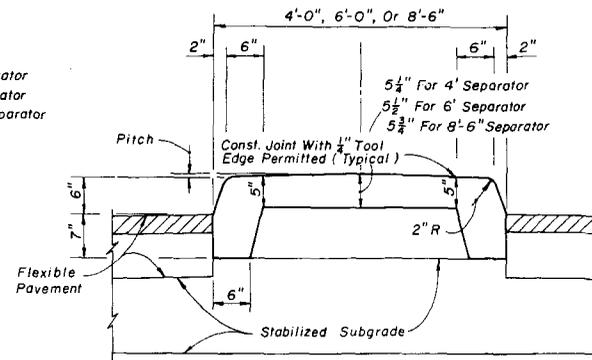
LONGITUDINAL SECTION (NOSE)



TRANSVERSE SECTION



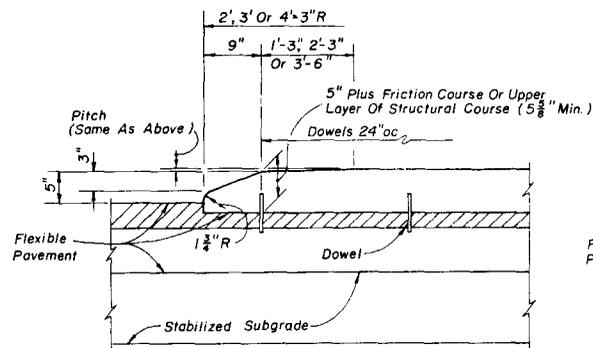
LONGITUDINAL SECTION (NOSE)



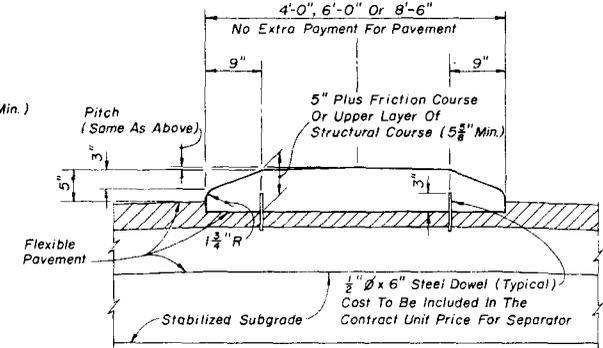
TRANSVERSE SECTION

OPTION I

OPTION I

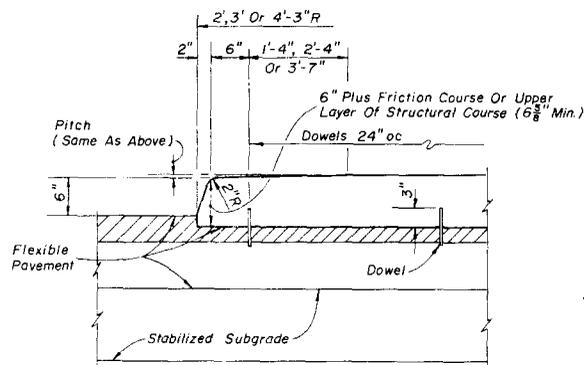


LONGITUDINAL SECTION (NOSE)

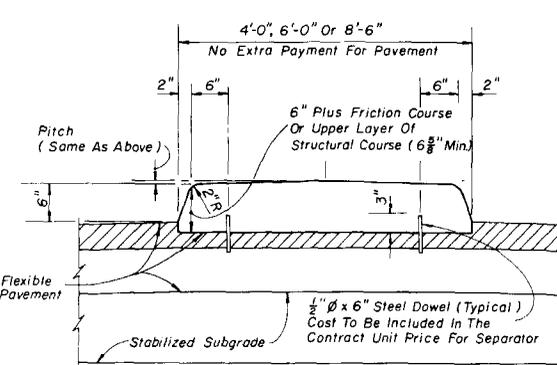


TRANSVERSE SECTION

OPTION II



LONGITUDINAL SECTION (NOSE)

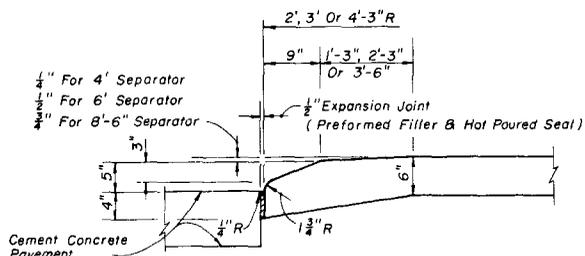


TRANSVERSE SECTION

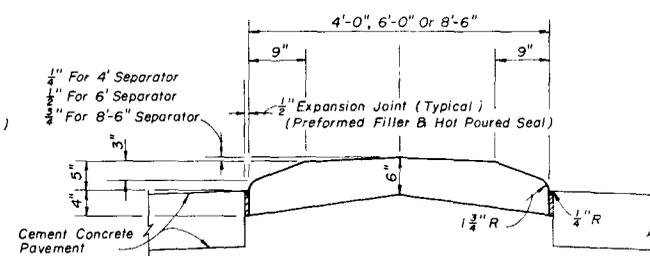
OPTION II

TYPE I CONCRETE TRAFFIC SEPARATOR

TYPE IV CONCRETE TRAFFIC SEPARATOR

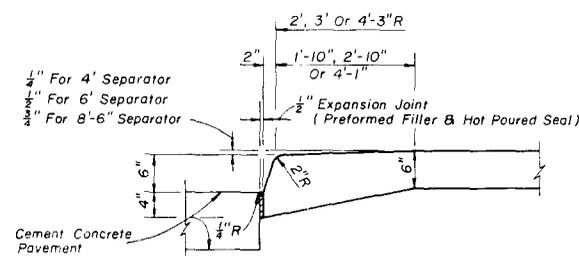


LONGITUDINAL SECTION (NOSE)

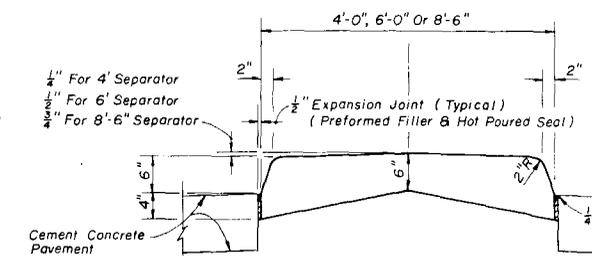


TRANSVERSE SECTION

TYPE II CONCRETE TRAFFIC SEPARATOR



LONGITUDINAL SECTION (NOSE)



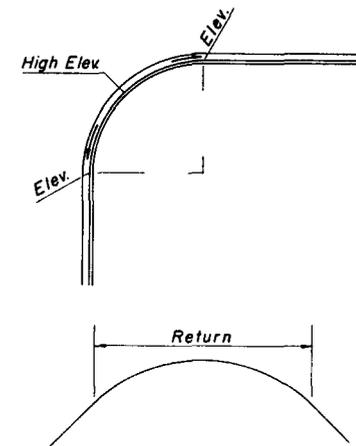
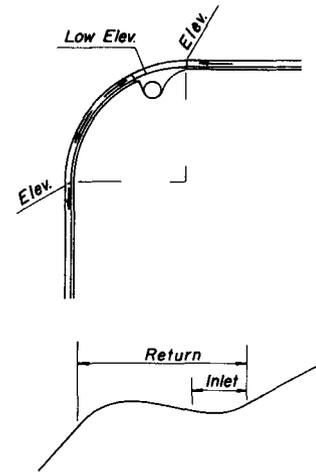
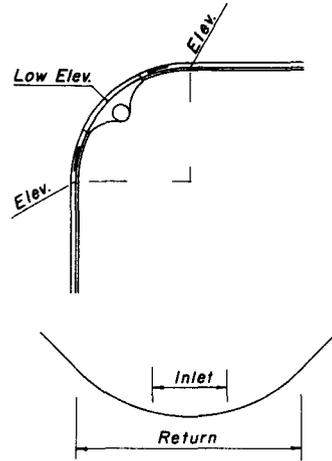
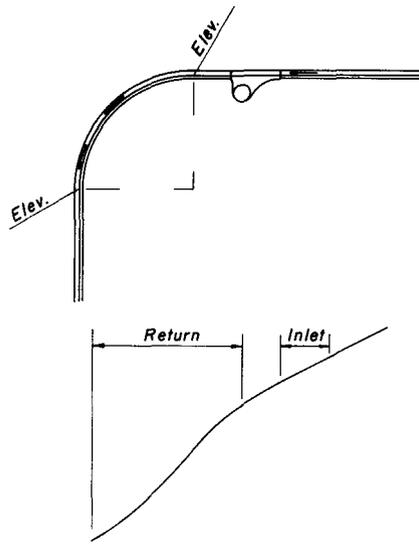
TRANSVERSE SECTION

TYPE V CONCRETE TRAFFIC SEPARATOR

NOTES

- Separators Types I and IV are to be used with flexible pavement. Separators Types II and V are to be used with rigid pavement.
- Either Option I or Option II may be used for Types I and IV separators except when a specific option is called for in the plans.
- Separators having widths other than 4', 6' or 8'-6" shall be detailed in the plans as special separators and paid for under the contract unit price for either Concrete Traffic Separator (Special) (___ Wide) LF or (Special)(VW) SY.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC SEPARATORS			
Designed by	HSD	Date	9/81
Drawn by	JVG	Checked by	JVG
Checked by	JVG	Approved by	[Signature]
F.H.W.A. Approved:		Revision No.	82
		Sheet No.	1 of 1
		Index No.	302

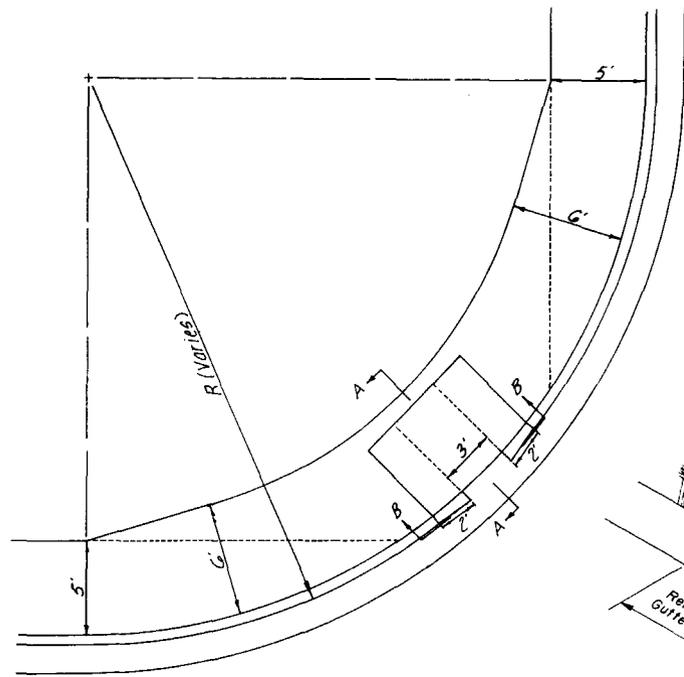


TYPICAL RETURN PROFILES
INCLUDING DETAIL SHOWING LOCATION OF INLETS ON RETURN

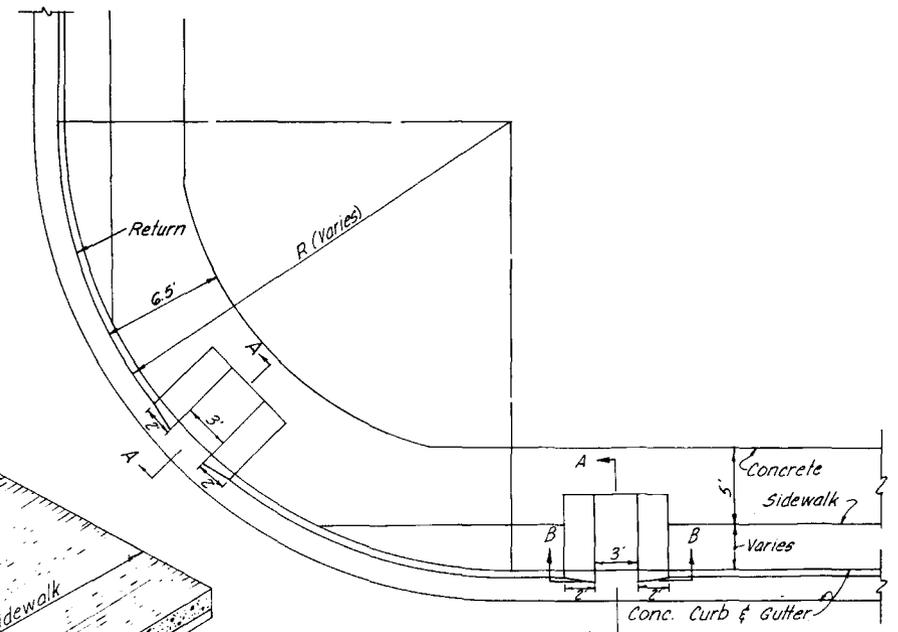
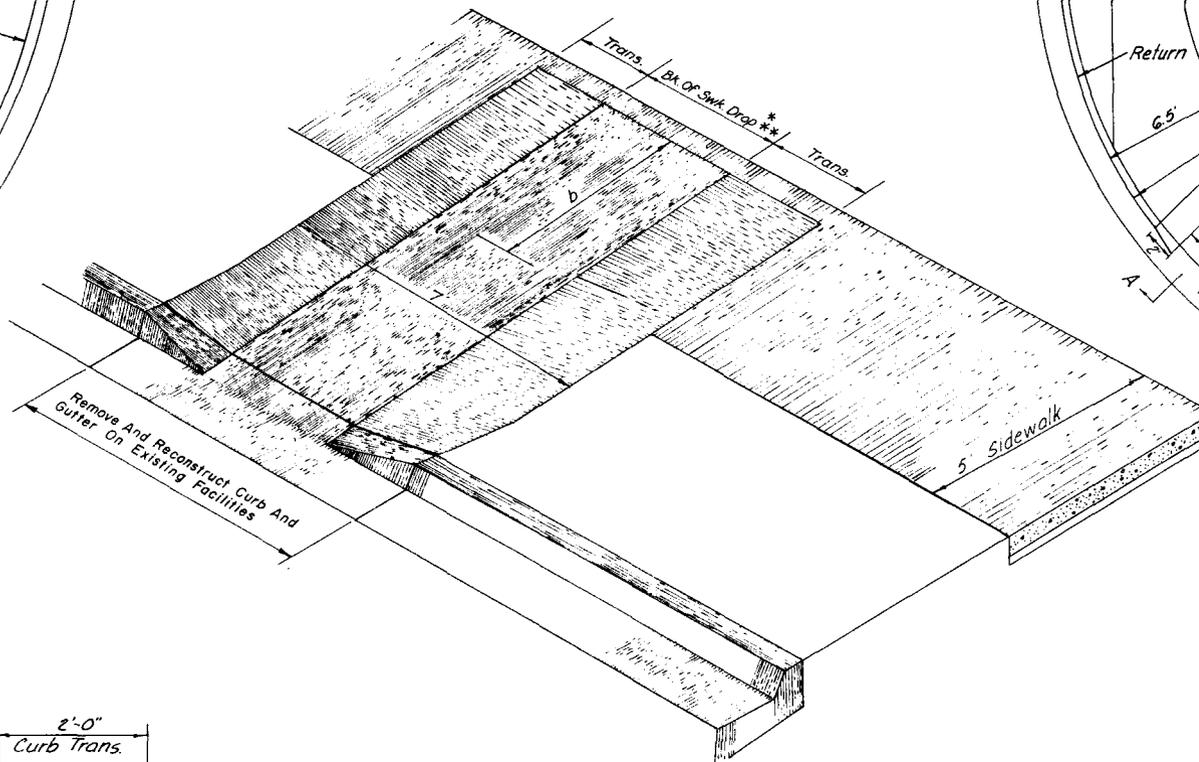
NOTE :

1. On normal intersections, profiles need not be included in the plans as the above typicals adequately present the desired configuration.
2. For major intersections, where extreme grades are involved or where it is deemed necessary to include profiles in order to present adequate design data; return profiles may be included in the plans.
3. Inlet locations and low points should be located, as much as possible, to be compatible with pedestrian traffic and drop curb location.
4. A minimum 0.2% grade should be maintained on all sag grades outside inlet limits.

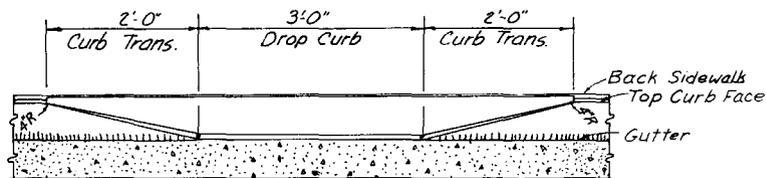
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CURB RETURN PROFILES					
Designed by	Names	Dates	Approved By		
Drawn by			<i>DeMull</i> Deputy Design Engineer, Roadways		
Checked by			Revision No.	Sheet No.	Index No.
F.H.W.A. Approved: 7/7/75			80	1 of 1	303



PLAN
(SIDEWALK ADJOINING CURB)



PLAN
(SIDEWALK BACK OF UTILITY STRIP)



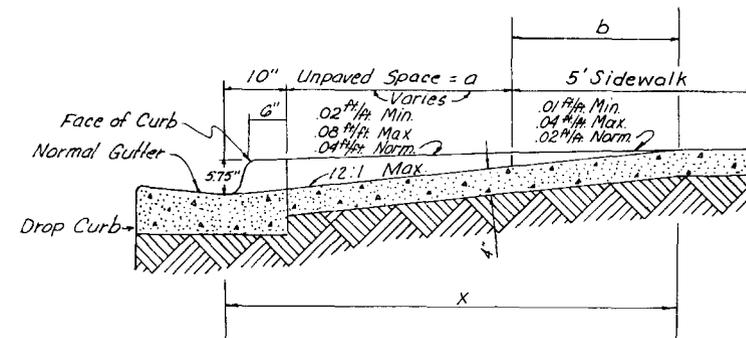
Section B B

NOTE: See Sheet 2 of 2 For General Notes.

S.W.	a	SW+a+10"	x	b
5'	0	5.8	5.8	5.0*
6'	0	6.8	6.8	6.0**
7'	0	7.8	7.3	6.5**
8'	0	8.8	7.3	6.5**
5'	2.0	7.8	7.8	5.0
5'	2.5	8.3	8.1	4.8
5'	3.0	8.8	8.3	4.4
5'	3.5	9.3	8.4	4.1
5'	4.0	9.8	8.6	3.8
5'	4.5	10.3	8.7	3.4
5'	5.0	10.8	8.9	3.1

$b = x - (a + 10")$

b = distance from front edge of sidewalk to back point of 12:1 slope.
 * Back Of Sidewalk Drop Required For All Sidewalk Slopes.
 ** Back Of Sidewalk Drop Required For Sidewalk Slopes 0.04 And Part 0.02.

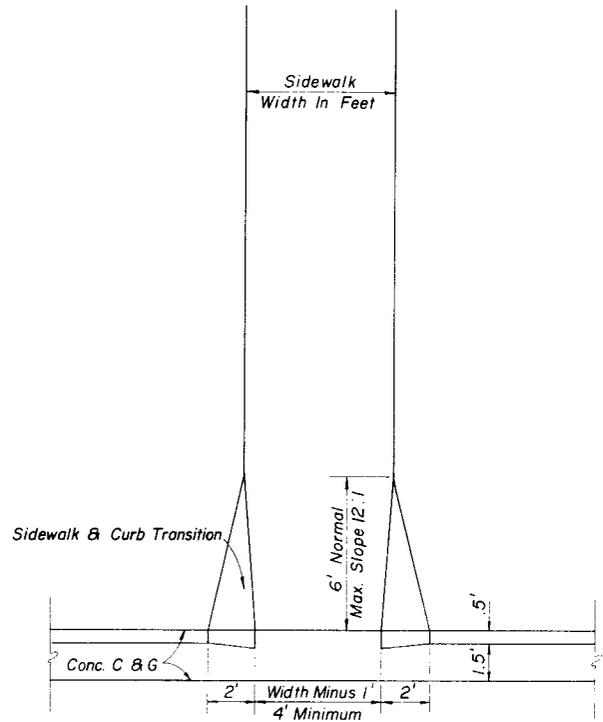


Section A A

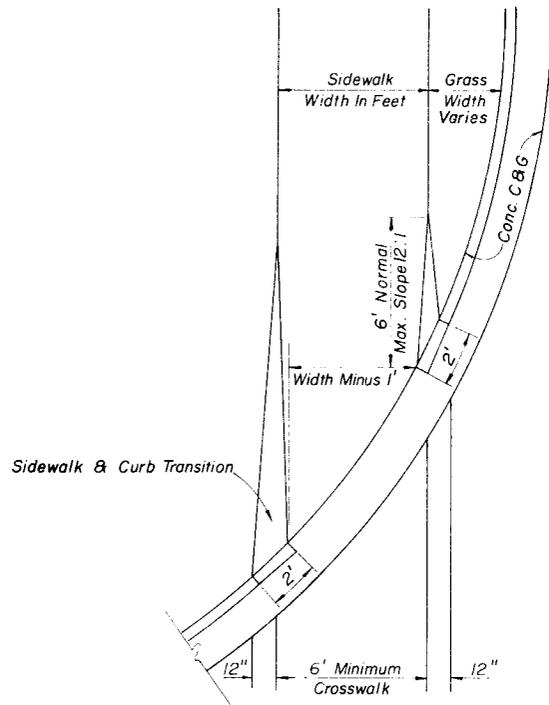
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB CUT RAMPS PHYSICALLY HANDICAPPED

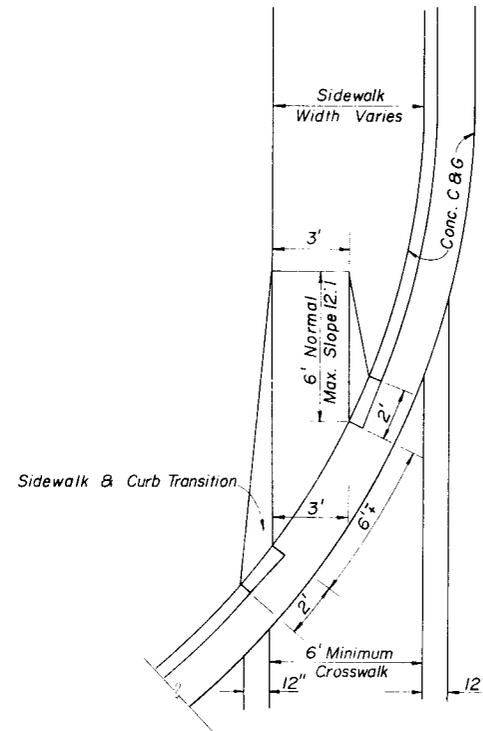
Designed by	H L G	2/74	Approved By	<i>De Bull</i>
Drawn by			Revision No.	
Checked by	D C B	2/74	Sheet No.	1 of 2
F.M.W.A. Approved:	8/20/75	82	Index No.	304



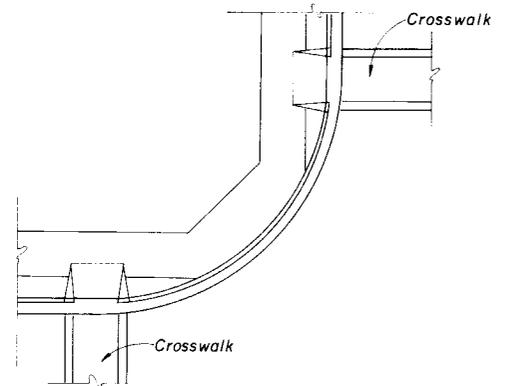
PLAN VIEW



PLAN VIEW

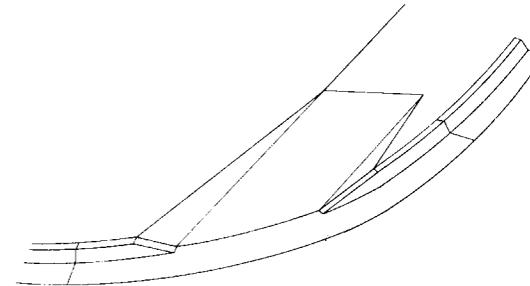
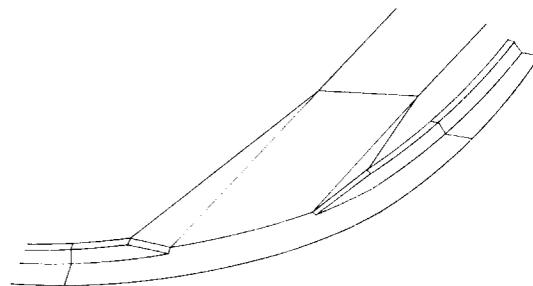
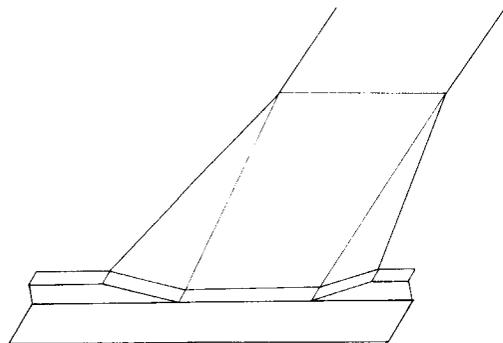


PLAN VIEW



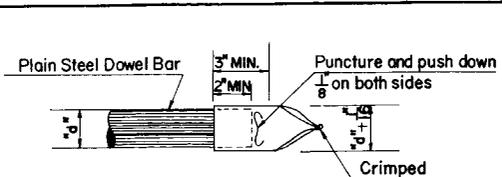
GENERAL NOTES

1. Ramps to be located in accordance with crosswalk marking details as shown in the plans.
2. Ramps shall not exceed a maximum slope of 12:1.
3. Ramp surface to be fine finish in accordance with subarticle 400-15-2.5 as modified. Approved hand methods may be used.
4. Ramps to be constructed at all locations shown in the plans even when sidewalk is not constructed concurrently.
5. Ramps, including curb and gutter to be reconstructed on existing facilities, are to be paid for under the contract unit price for Concrete Sidewalk, SY.

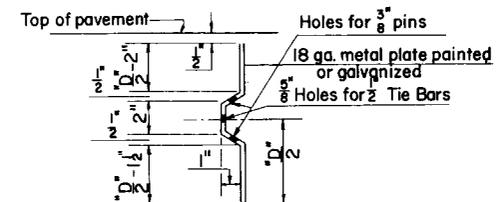


RAMPS ON THIS SHEET TO BE USED WHERE SIDEWALK IS SHARED BY PEDESTRIAN AND BICYCLIST

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			
ROAD DESIGN			
CURB CUT RAMPS			
PHYSICALLY HANDICAPPED			
Designed by	Name	Date	Approved By
Drawn by			<i>J. C. Hall</i> Deputy Design Engineer, Roadways
Checked by			
Revision No.		Sheet No.	Inset No.
F.H.W.A. Approved	2/8/79	82	2 of 2
			304

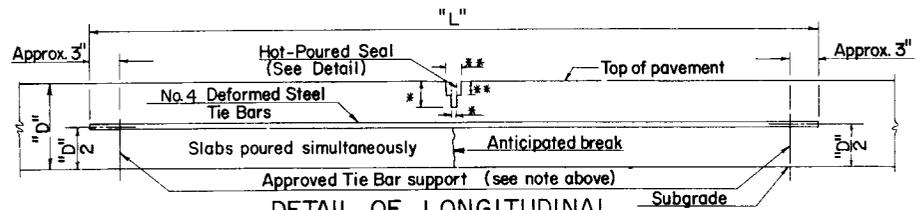


DETAIL OF METAL CAPS FOR DOWEL BARS



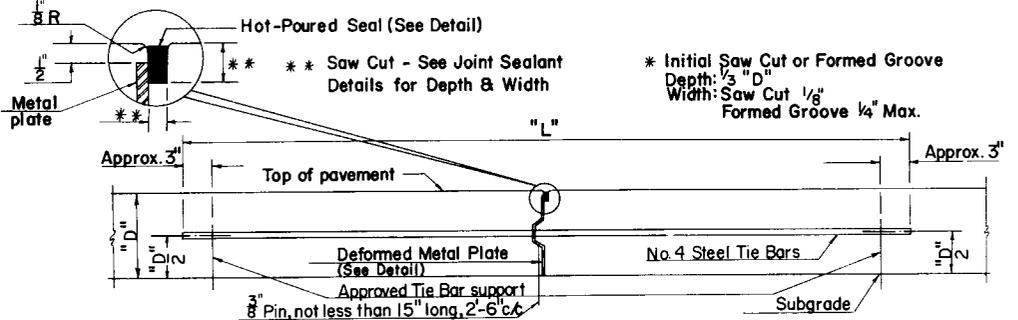
DETAIL OF DEFORMED METAL PLATE

SILICONE SEALANT JOINT (Inches)				
Joint Width	Sealant Bead Thickness	Backer Rod Diameter	Minimum Joint Depth	Backer Rod Placement Depth
1/4	1/4	3/8	1	1/2
3/8	1/4	1/2	1 1/4	1/2
1/2	1/4	5/8	1 1/4	1/2
5/8	5/16	3/4	1 1/2	3/16
3/4	3/8	7/8	1 3/4	5/8
7/8	7/16	1	1 3/4	1 1/16
1	1/2	1 1/8	2	3/4
>1	1/2	1 1/4 +	2 +	3/4



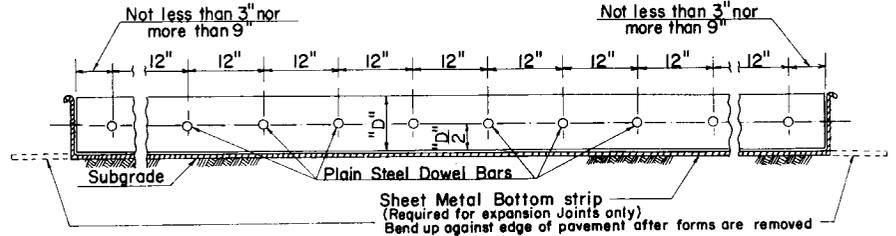
DETAIL OF LONGITUDINAL LANE-TIE JOINT

Note: Tie bars may be inserted in the plastic concrete by means approved by the Engineer.

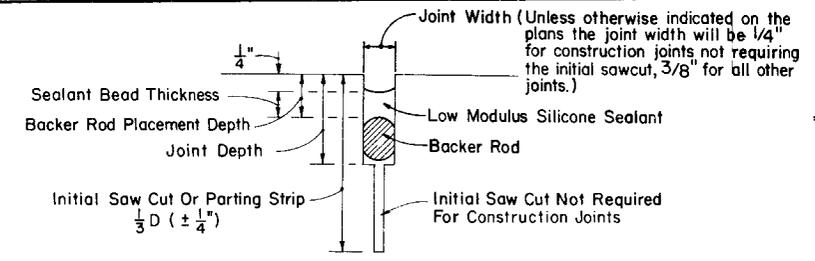


DETAIL OF LONGITUDINAL CONSTRUCTION JOINT

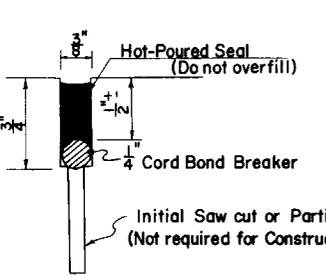
Note: Metal plate optional. Keyway may be formed by bolting shaped timber to the side form or by extrusion from slip-form paver. Alternate keyway shape and tie bar details may be approved by the Engineer. Keyway not required when the concrete pavement is placed on an Econcrete Base.



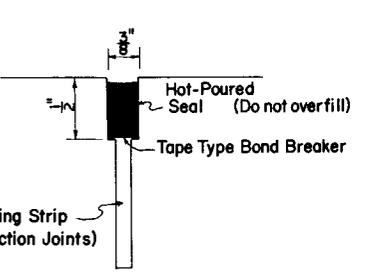
DOWEL BAR LAYOUT



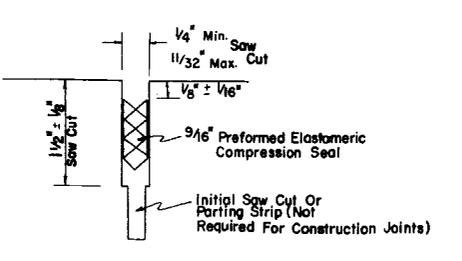
SILICONE SEALANT



HOT-POURED SEAL CORD TYPE BOND BREAKER

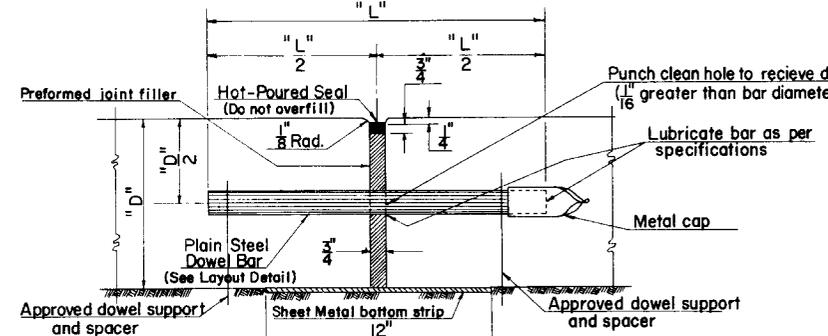


HOT-POURED SEAL TAPE TYPE BOND BREAKER



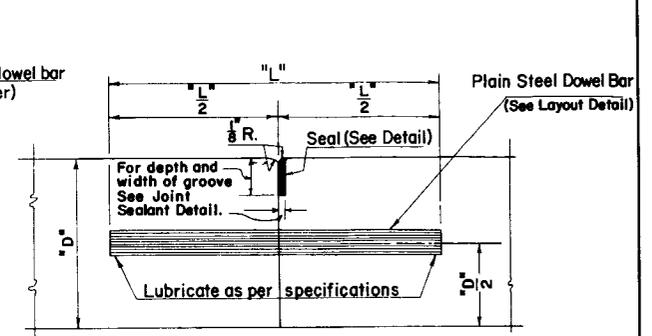
PREFORMED ELASTOMERIC COMPRESSION SEAL

Joint Sealant Details

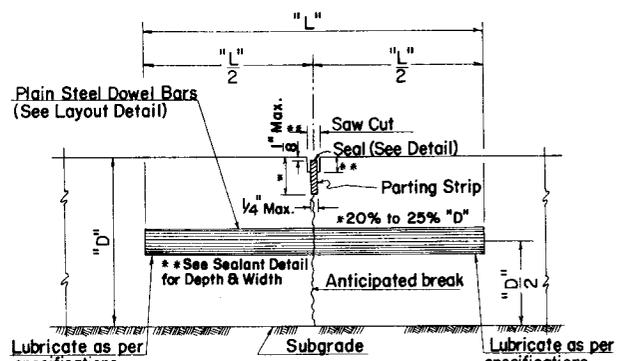


DETAIL OF TRANSVERSE EXPANSION JOINT

EXPANSION JOINTS TO BE PLACED AT JUNCTIONS WITH APPROACH SLAB, AT STREET INTERSECTIONS AND OTHER LOCATIONS INDICATED IN DETAIL PLANS.

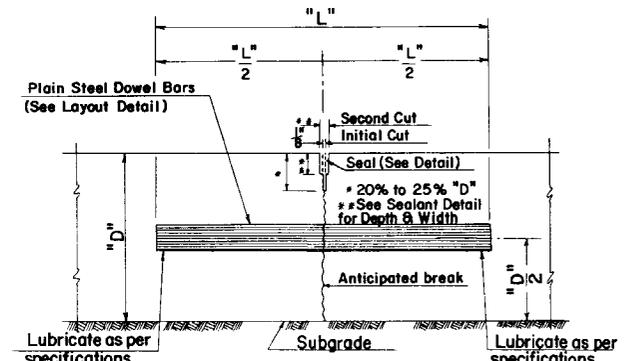


DETAIL OF BUTT CONSTRUCTION JOINT TO BE USED AT DISCONTINUANCES OF WORK



DETAIL OF TRANSVERSE CONTRACTION JOINT, VIBRO CAST METHOD

CONTRACTION JOINTS TO BE SPACED AT 20' INTERVALS. DOWELS REQUIRED ONLY AT FIRST FIVE JOINTS ADJACENT TO EXPANSION JOINTS OR END OF PAVEMENT EXCEPT AS OTHERWISE INDICATED IN DETAIL PLANS.



DETAIL OF TRANSVERSE CONTRACTION JOINT, SAWED METHOD

MAX. SPACING FOR TIE BARS		
PAVEMENT THICKNESS ("D")	LENGTH OF BARS (inches)	SPACING OF BARS (inches)
6"	24"	47"
7"	24"	40"
8"	24"	35"
9"	24"	31"

DOWEL REQUIREMENTS		
PAVEMENT THICKNESS ("D")	DOWEL dia. (inches)	DOWEL LENGTH "L" (inches)
6"	3/4"	18"
7"	1"	18"
8"	1"	18"
9"	1"	18"

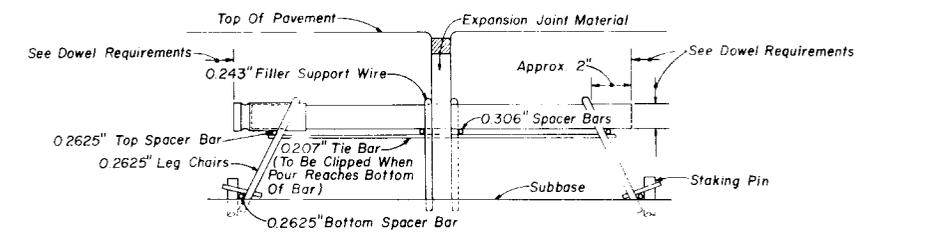
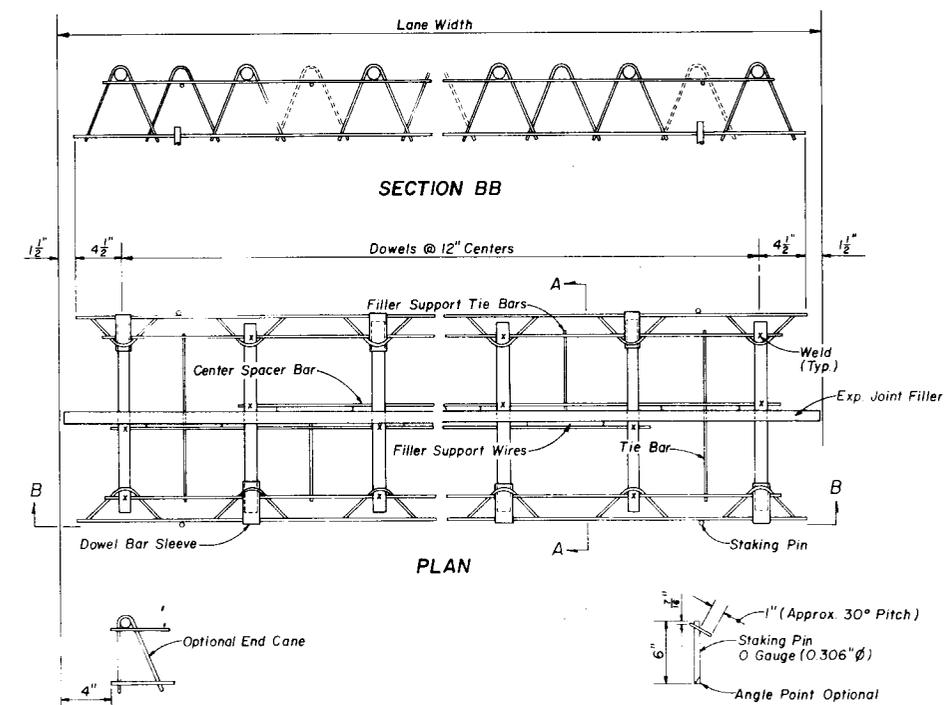
* Provide 1 1/8" diam. dowels at Expansion joints and Butt Construction joints.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE PAVEMENT JOINTS

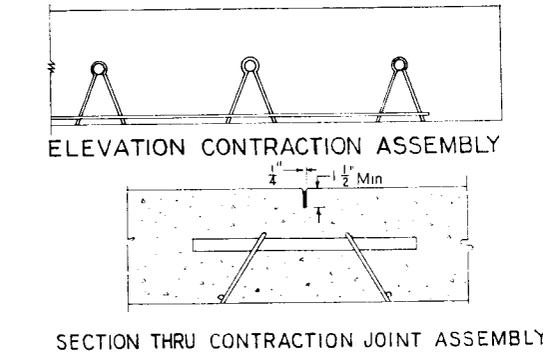
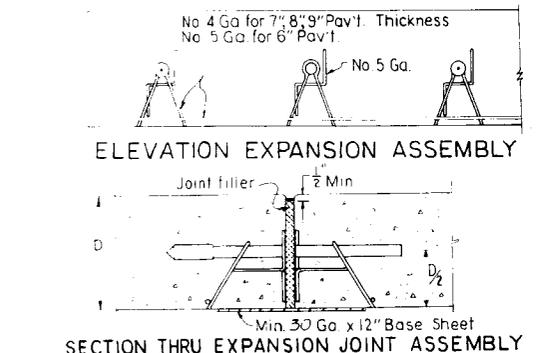
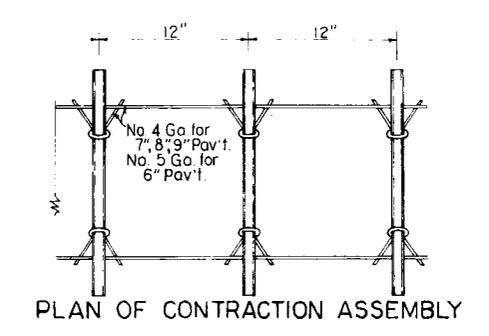
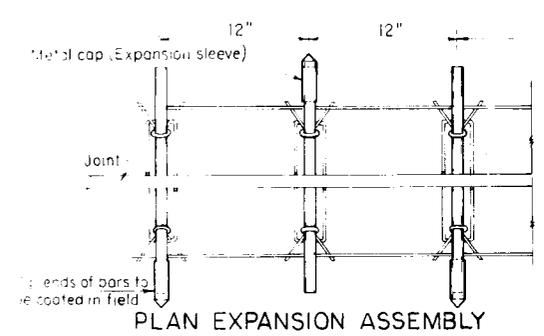
Designed by	Names	Date	Approved by
Drawn by	HW	8/57	<i>J.C. Bell</i>
Checked by	HEC	8/57	City, Design Engineer, Roadways
F.H.W.A. Approved	10/7/80	82	1 of 3

305



SECTION AA

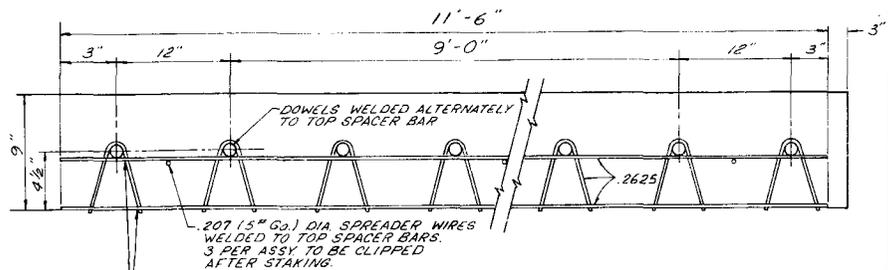
Note: Expansion assembly is illustrated. For contraction assembly omit expansion joint material, center spacer bars, filler support wires, support tie bars and dowel bar sleeves.



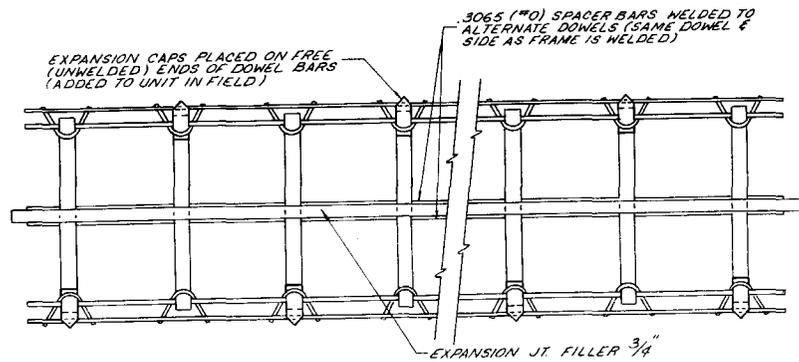
EXPANSION AND CONTRACTION JOINT DOWEL ASSEMBLY ALTERNATE
FLORIDA STEEL CORPORATION

EXPANSION AND CONTRACTION JOINTS DOWEL ASSEMBLY
THE DAYTON SURE GRIP AND SHORE COMPANY

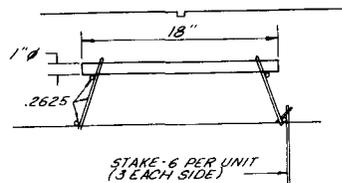
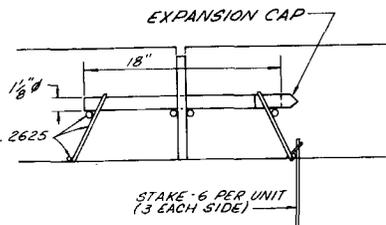
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
CONCRETE PAVEMENT JOINTS				
Designed by	Names	Dates	Approved By	
Drawn by	JAD	9/81	Dputy Design Engineer, Roadways	
Checked by	JVG	9/81		
F.H.W.A. Approved	10/7/80	82	2 of 3	305



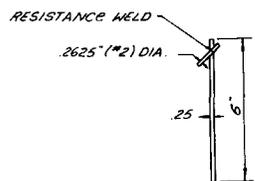
ELEVATION OF CONTRACTION & EXPANSION JOINT TYPE "B" UNIT



PLAN TYPE "B" UNIT



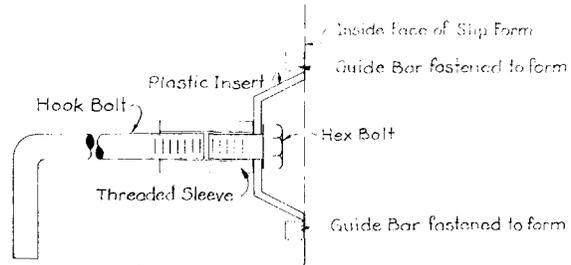
SECTION THROUGH EXPANSION JOINT UNIT SECTION THROUGH CONTRACTION JOINT UNIT



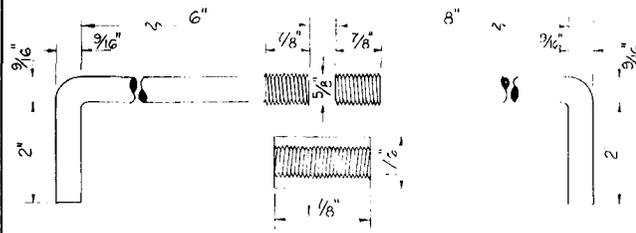
STAKE DETAIL

EXPANSION AND CONTRACTION JOINT DOWEL ASSEMBLY ALTERNATE

Hugensmith Materials, Inc.
Pelham, Ala.

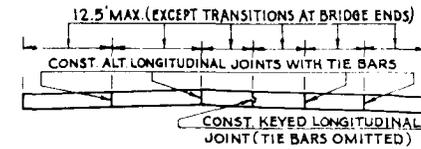


ALTERNATE KEYWAY AND TIE BAR

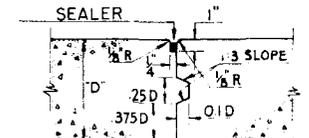


DETAIL FOR STEEL HOOK BOLT ASSEMBLY

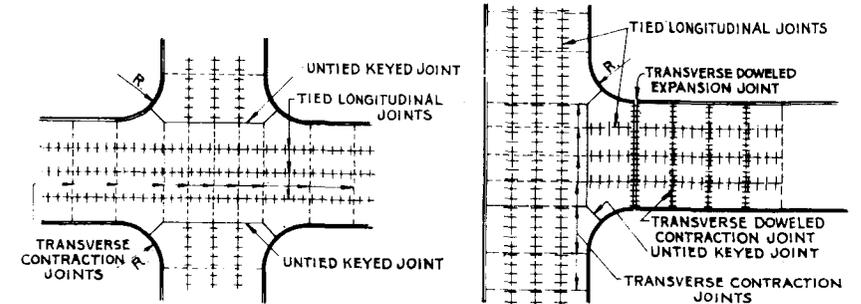
NOTE: After the concrete has set to the extent that the keyway will retain its shape, the hex bolt and plastic insert shall be removed. The remaining portion of the hook bolt assembly shall be installed immediately prior to placing of concrete in the adjacent lane.



TYPICAL SECTION FOR MULTI-LANE CONSTRUCTION



DETAIL OF KEYED JOINT



JOINT LAYOUT AT THRU INTERSECTION

JOINT LAYOUT AT "T" OR OFFSET INTERSECTION

GENERAL NOTES

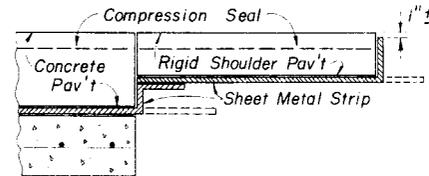
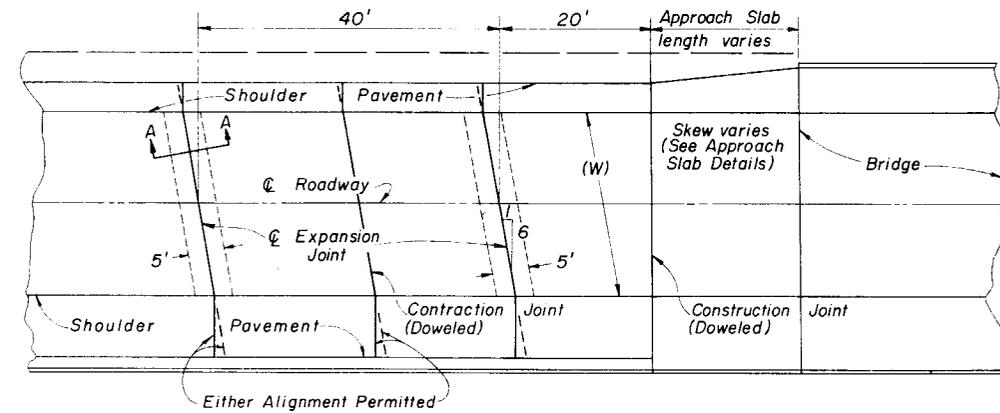
- 1 LONGITUDINAL JOINTS WILL NOT BE REQUIRED FOR SINGLE LANE PAVEMENT 16' OR LESS IN WIDTH.
- 2 WHEN PAVEMENT WIDTH NECESSITATES FIVE OR MORE LONGITUDINAL JOINTS PROVIDE ONE OR MORE UNTIED BUT KEYED JOINTS (NO JOINT SHALL BE TIED THAT IS MORE THAN TWO LANES FROM A FREE EDGE OR FREE JOINT).
- 3 ARRANGEMENT OF LONGITUDINAL JOINTS NOT SHOWN ON TYPICAL SECTION TO BE AS DIRECTED BY THE ENGINEER.
- 4 ALL MANHOLES, METER BOXES AND OTHER PROJECTIONS INTO THE PAVEMENT SHALL BE BOXED-IN WITH 1/2" PREFORMED EXPANSION JOINT MATERIAL.

DETAIL OF JOINT ARRANGEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

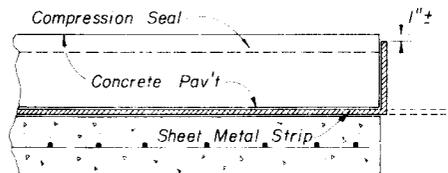
CONCRETE PAVEMENT JOINTS

Designed by	Checked	Approved By	Revision No.	Sheet No.	Index No.
LMF	6/75	<i>S.C. Ball</i>		3 of 3	305
Reviewed by	SFA	6/75			
Approved	10/7/80	81			



DETAIL SHOWING RIGID SHOULDER PAVEMENT

NOTE: Rigid shoulder pavement shall be concrete or econocrete as called for in the plans.



DETAIL SHOWING SHEET METAL STRIP

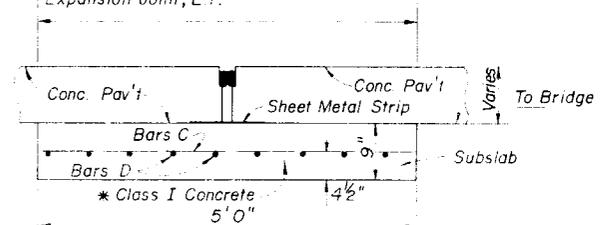
NOTE: Immediately prior to placing the seal, the joint shall be thoroughly cleaned of all foreign material. Immediately after the seal is placed, sheet metal strip shall be bent up against the pavement edge.

The sheet metal strip shall be a minimum 16 gage steel, 12" wide and shall be galvanized in accordance with ASTM A-526, Coating Designation G90.

GENERAL NOTES

1. Pay quantity of expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement. Shoulder pavement joints included.
2. For additional details see Index No. 305.
3. The C of roadway and the C of bridge do not necessarily coincide. Prior to the placement of the expansion joint, the C of the roadway pavement shall be determined.

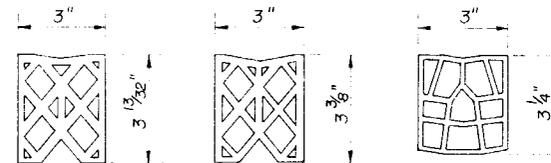
Concrete pavement not deducted from roadway or shoulder pavement quantities. Compression seal, sheet metal strip and reinforced subslab to be paid for under the contract unit price for Bridge Approach Expansion Joint, L.F.



REINFORCING STEEL				
Mark	Size	Spac.	No Req	Lgth
C	5	6"	Varies	4'6"
D	5	6"	9	W-4"

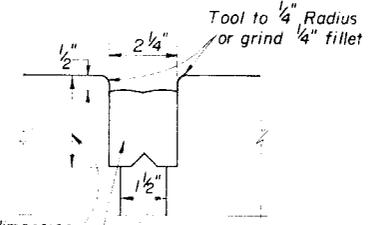
* Finish surface smooth. Cure with heavy coating of wax base white pigmented curing compound. Apply second application immediately prior to placing pavement.

SECTION A A THROUGH EXPANSION JOINT



SECTION THRU SEALS

Either of the three Seals shown may be used.

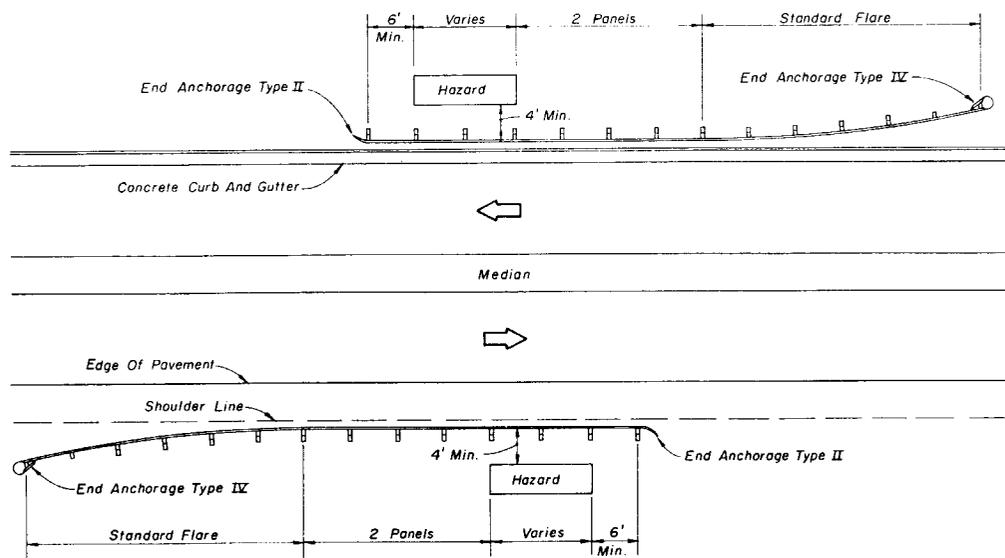


Polychloroprene Compression Seal installed as per Manufacturers Specifications.

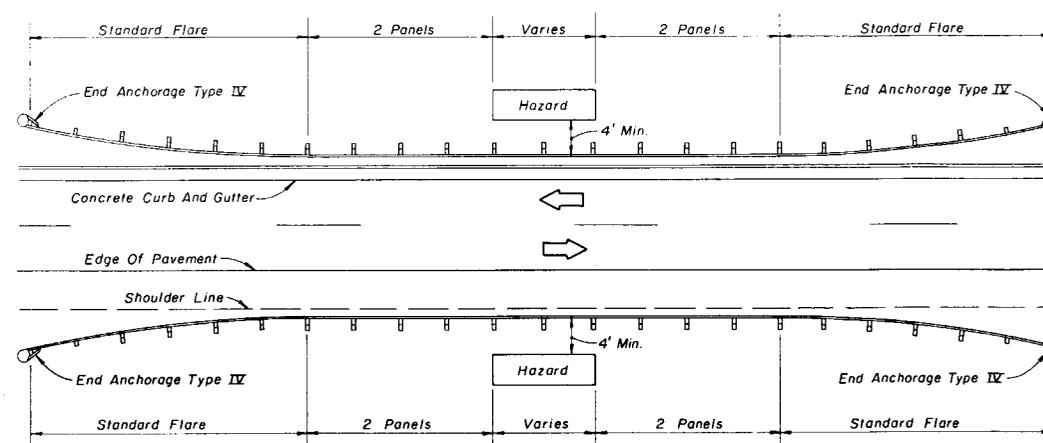
COMPRESSION SEAL DETAIL

NOTE: All contacting surfaces between the compression seal and Concrete shall be thoroughly coated with a lubricating adhesive.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
BRIDGE APPROACH EXPANSION JOINT CONCRETE PAVEMENT			
Designed by	Names	Dates	Approved By
Drawn by	LMF	6/75	<i>De R...</i> Deputy Design Engineer, Roadways
Checked by	SFA	6/75	Revision No.
F. H. W. A. Approved: 8/16/77		82	Sheet No. 1 of 1
			306



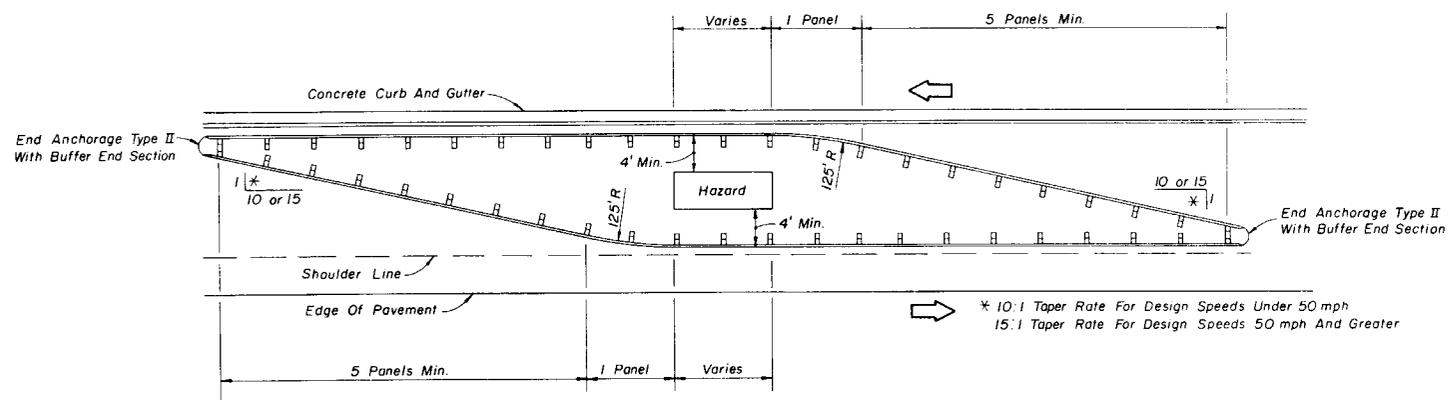
DIVIDED ROADWAY - DETAIL B



UNDIVIDED ROADWAY - DETAIL C

Note: See General Notes Nos. 1, 2, 3, and 4.
See Details K and L for guardrail offsets.
See Detail P for standard flare.

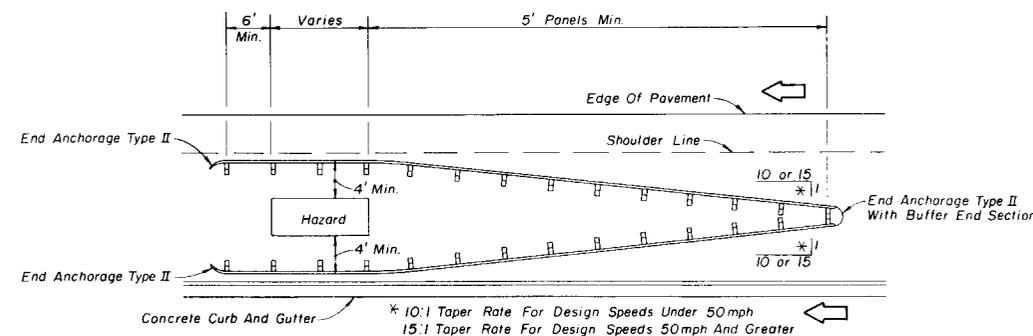
GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS



Note: See General Notes Nos. 1, 2, and 3.
See Details K and L for guardrail offsets.

OPPOSING TRAFFIC - DETAIL D

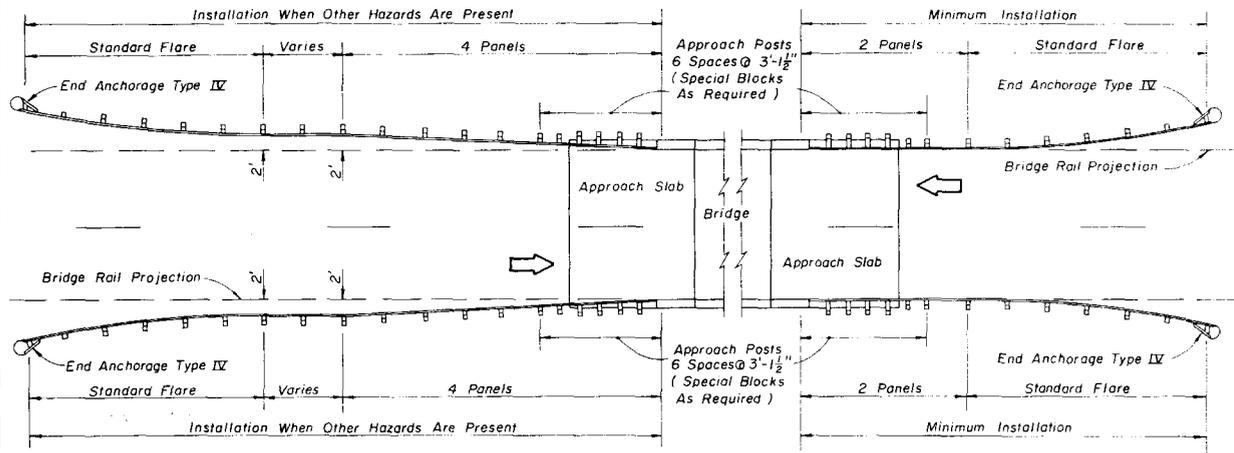
GUARDRAIL APPLICATION FOR MEDIAN AND GORE HAZARDS



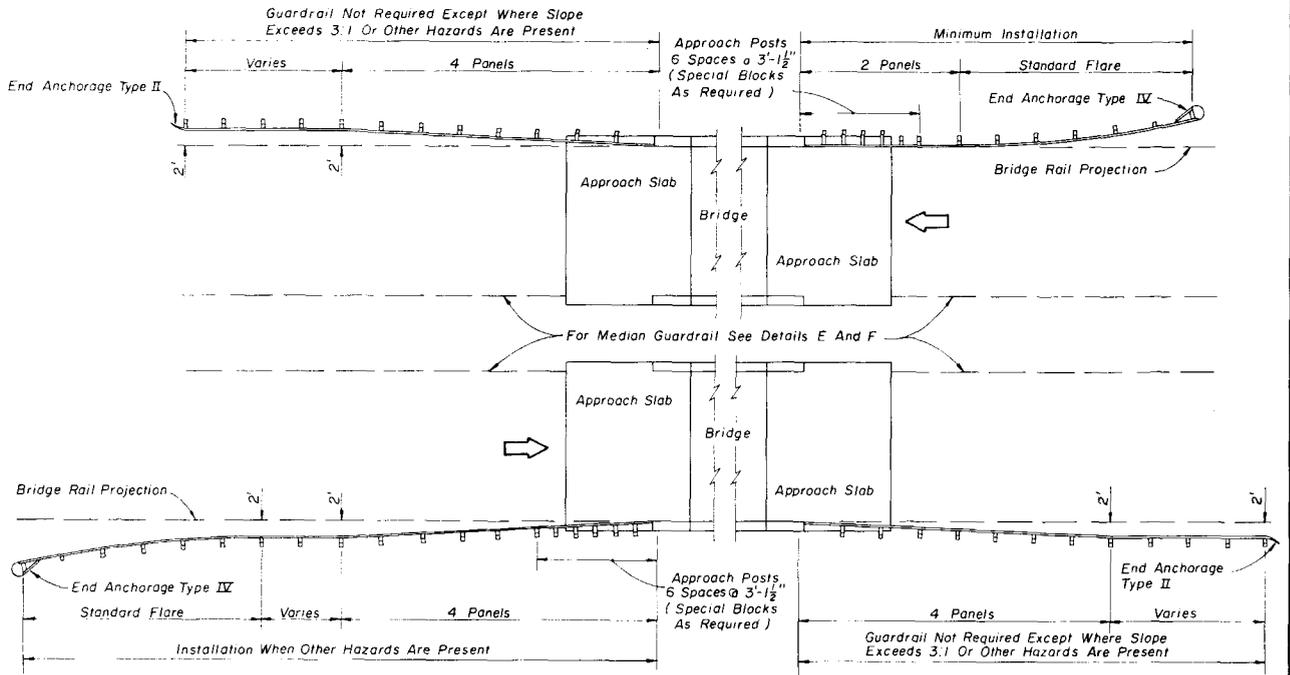
Note: See General Notes Nos. 1, 2 and 3.
See Details K and L for guardrail offsets.

ONE-WAY TRAFFIC - DETAIL G

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed by	HSD	9/81	Deputy Design Engineer, Roadways
Drawn by	JBW/JVG	9/81	
Checked by	JBW/JVG	9/81	Revision No.
F.H.W.A. Approved: 10/8/81	82	1 of 9	Index No. 400



UNDIVIDED ROADWAY - DETAIL H



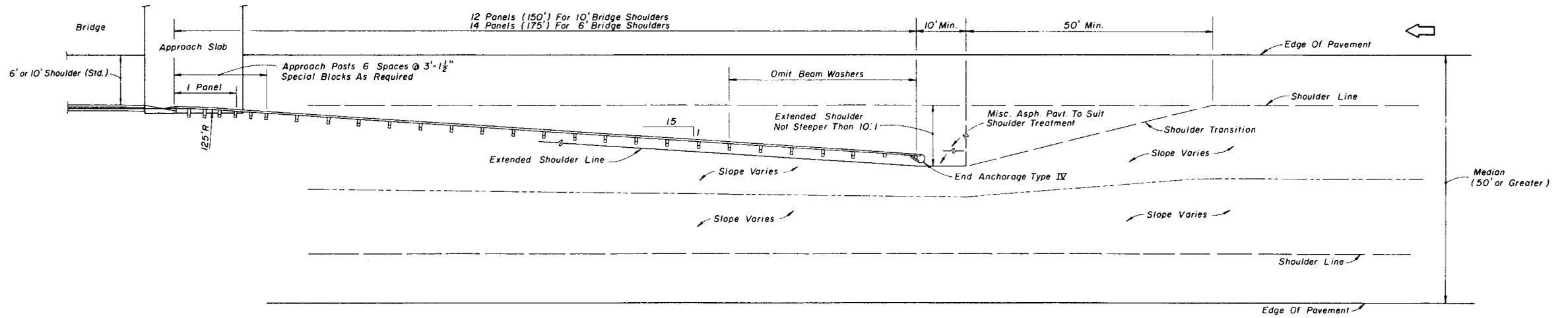
DIVIDED ROADWAY - DETAIL I

Note: See General Notes Nos. 1 and 2.
See Details J and N and existing bridge details for connections to bridges.
GUARDRAIL APPLICATIONS FOR BRIDGE ENDS

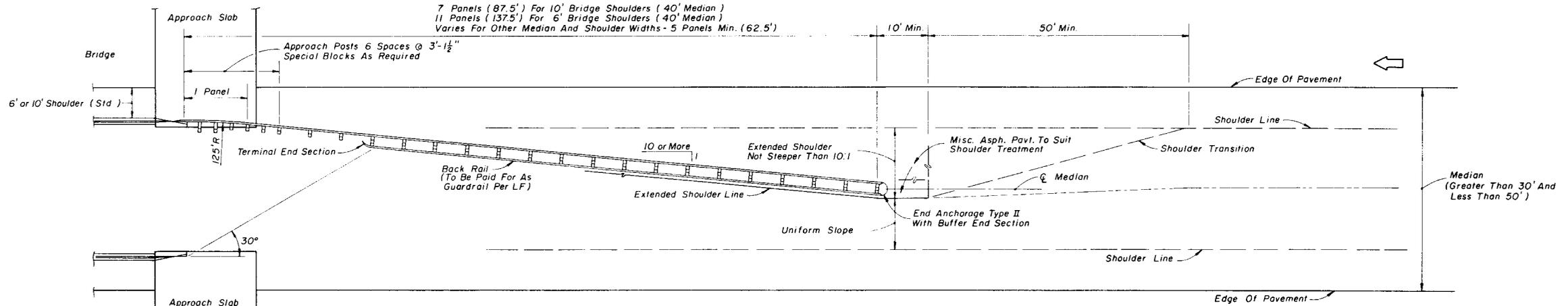
GENERAL NOTES

- The illustrated applications for guardrail are standard requirements. For standard installations a minimum of 62.5 feet of guardrail shall be available approaching a hazard. One panel equals 12.5 feet.
- Post spacing shall be 6'-3" except that a reduced spacing of 3'-1 1/2" shall be used for anchorage to rigid structures such as bridges (See Detail J).
- At hazards where the face of guardrail is offset from the hazard less than the desirable 4 foot minimum, a 2 foot minimum offset may be used with reduced spacing extending over the length of the hazard plus one panel of approach rail. For an offset less than 2 feet, a special detail should be submitted to the Deputy Design Engineer, Roadways for approval.
- In addition to use at conventional roadside hazards, guardrail will be required where fill slopes exceed 3:1, except that where fill heights are less than 8 feet guardrail may be omitted (regardless of fill slope) unless in the opinion of the Engineer its use is deemed necessary due to other roadside features.
- Straight rail sections may be used for all radii of 125 feet or greater.
For radii less than 125 feet the rail must be fabricated to fit.
- For specifications of materials refer to Fla. DOT Standard Specifications.
- Design load of rail equals 80,000 pounds in tension.
- Permissible post and offset block combinations are tabulated on sheet 7 of 9.
- Where guardrail is constructed for street barricade no anchorage, offset blocks or terminal ends will be required.
- Where necessary to enlarge or add additional holes to galvanized guardrail, the work will be done by drilling or reaming. Damaged galvanized guardrail will be metalized in accordance with Sections 562 and 971 of the Standard Specifications. No burning of holes will be permitted.
- Amber reflectors shall be used adjacent to auxiliary lanes and within 200 feet of intersections, at all other locations clear reflectors shall be used.
- Crash cushions may be required in lieu of or in conjunction with guardrail at locations where space does not permit development of sufficient guardrail length, offset or crashworthiness at terminals.

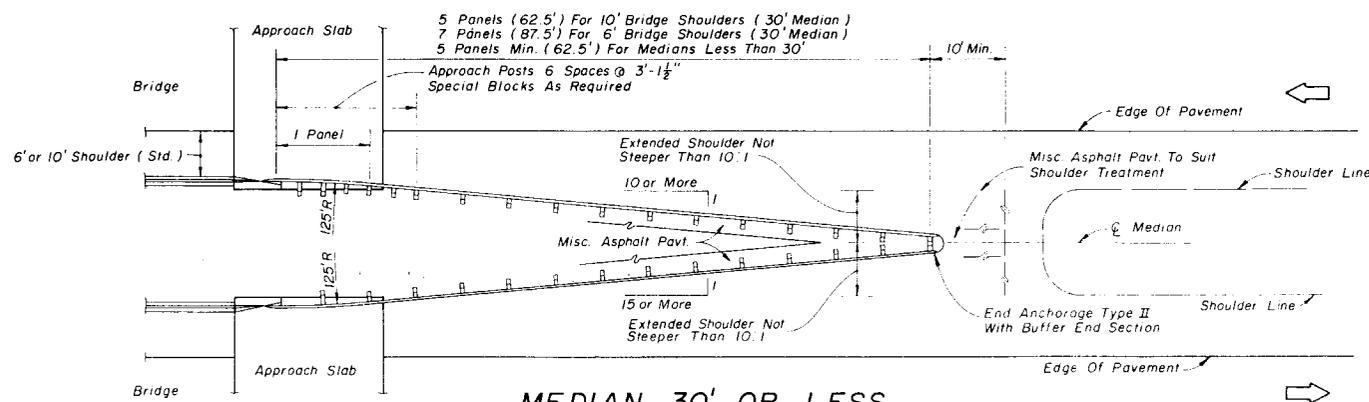
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Names		Dates	
Designed by		Approved By	
Drawn by	HSD 9/81	Deputy Design Engineer, Roadways	
Checked by	JBW/JVG 9/81		
Revision No.		Sheet No.	Index No.
F.H.W.A. Approved: 10/8/81		82	2 of 9 400



MEDIANS 50 FEET OR GREATER

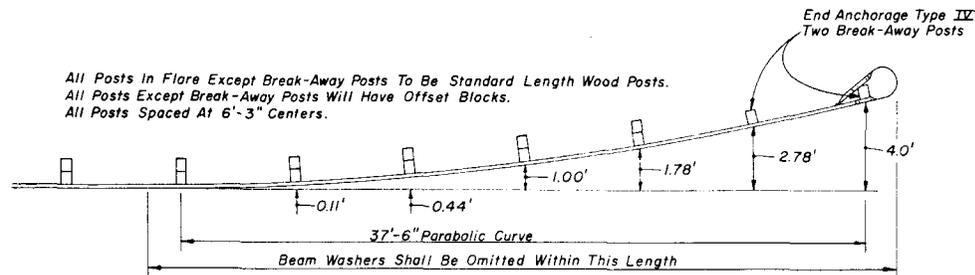


MEDIANS GREATER THAN 30' AND LESS THAN 50'

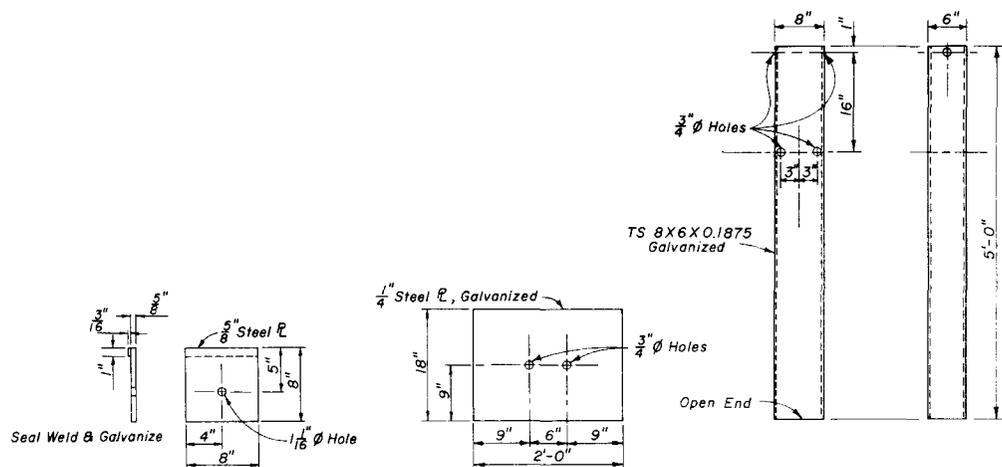


MEDIAN 30' OR LESS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
Designed by	HSD	9/81	Approved By		
Drawn by	JBW/JVG	9/81	Deputy Design Engineer, Roadways		
Checked by	JBW/JVG	9/81	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved	10/8/81	82	3 of 9	400	



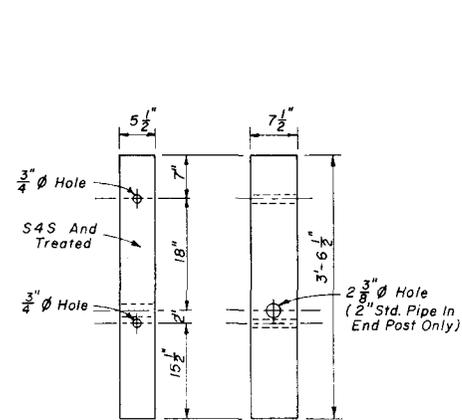
STANDARD FLARE DETAIL P



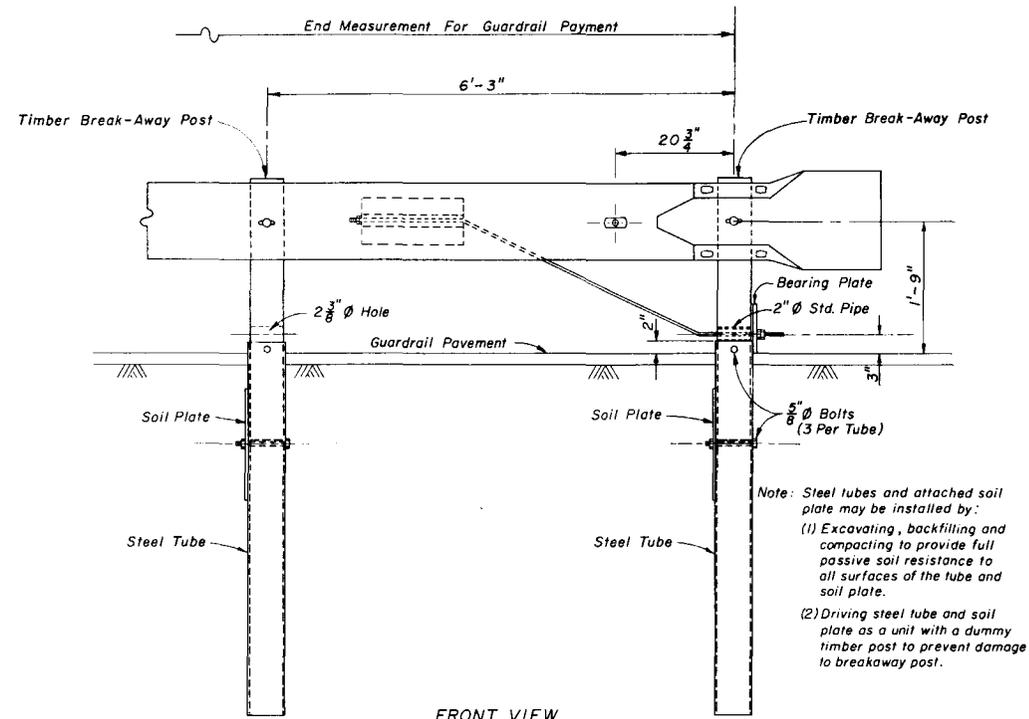
BEARING PLATE

SOIL PLATE

STEEL TUBE

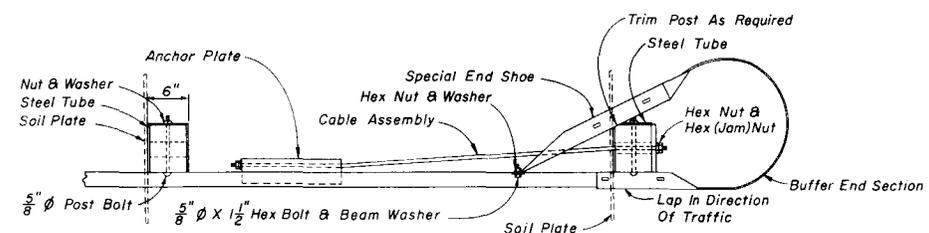


TIMBER BREAK-AWAY POST



FRONT VIEW

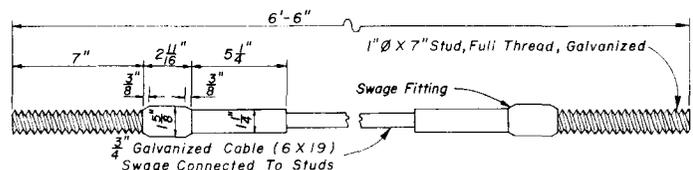
Note: Steel tubes and attached soil plate may be installed by:
(1) Excavating, backfilling and compacting to provide full passive soil resistance to all surfaces of the tube and soil plate.
(2) Driving steel tube and soil plate as a unit with a dummy timber post to prevent damage to breakaway post.



TOP VIEW

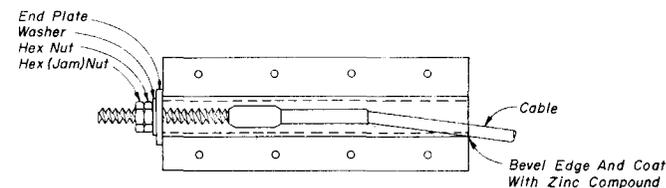
END ANCHORAGE TYPE IV

Note: The payment for the items of End Anchorage Assemblies Type IV shall include furnishing and installing the Buffer End Section, Special End Shoe, One-Piece Anchor Plate, Cable Assembly, Pipe Sleeve, Soil Plates, Steel Tubes, Bearing Plate, two Treated Timber Break-Away Posts, and the necessary hardware.



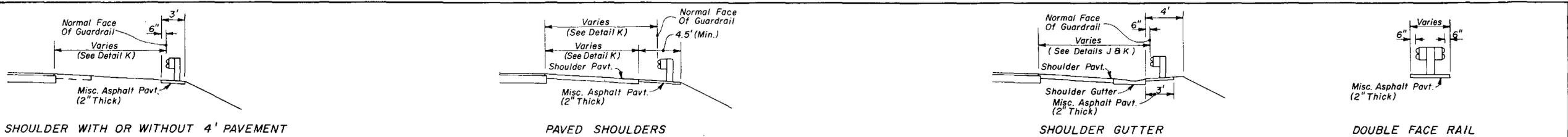
Note: BCT Cable Assembly to be in accordance with the specifications of Standard F-37-76, ARTBA Technical Bulletin No. 268-B, June 1979.

CABLE ASSEMBLY

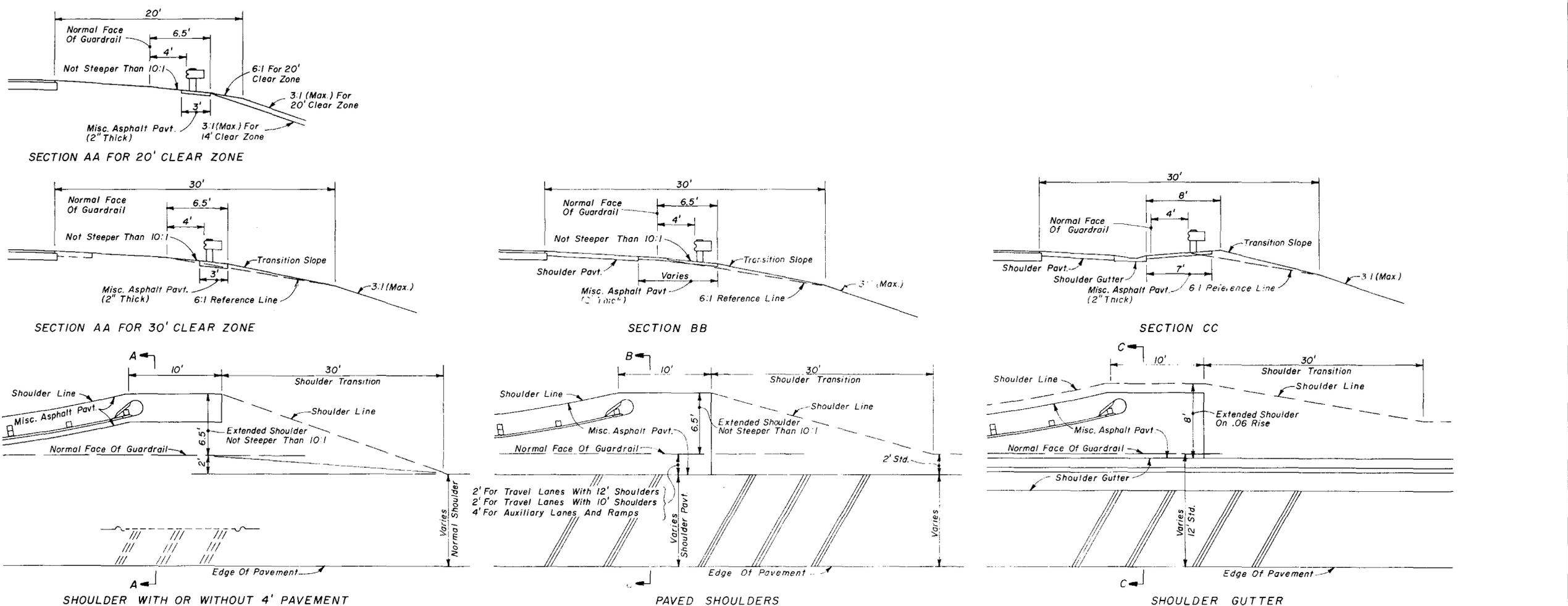


ANCHOR PLATE

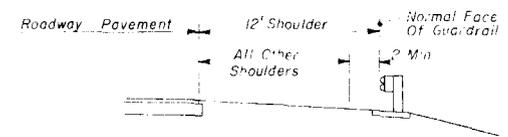
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
Designed By		Dates		Approved By	
Drawn by J.M.		1/81		Deputy Design Engineer, Roadways	
Checked by J.V.G.		1/81		Revision No.	Sheet No.
F.H.W.A. Approved: 10/8/81		82		4 of 9	
				Index No. 400	



MISCELLANEOUS PAVEMENT FOR STANDARD SECTIONS

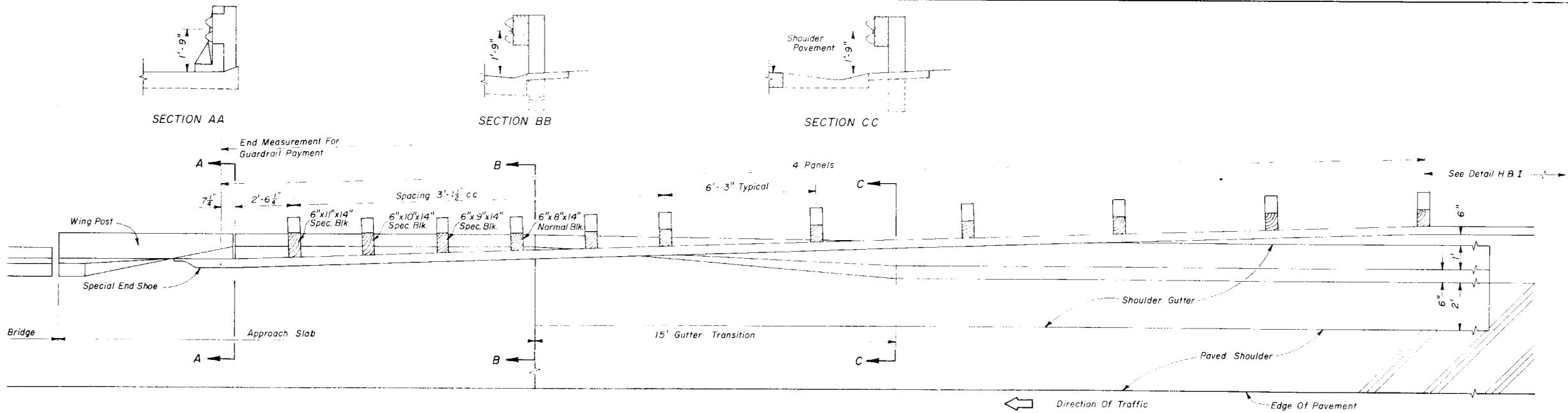


SHOULDERS, SLOPES AND MISCELLANEOUS PAVING FOR THE STANDARD FLARE

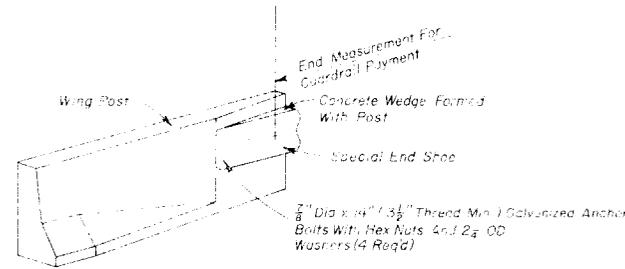


STANDARD GUARDRAIL LOCATION - DETAIL K

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed By		Approved By	
Drawn By	JM	7/81	Deputy Design Engineer, Roadways
Checked By	UBW/JVG	7/81	Revision No. Sheet No. Index No.
F.H.W.A. Approved	10/8/81	dr	5 of 9 400



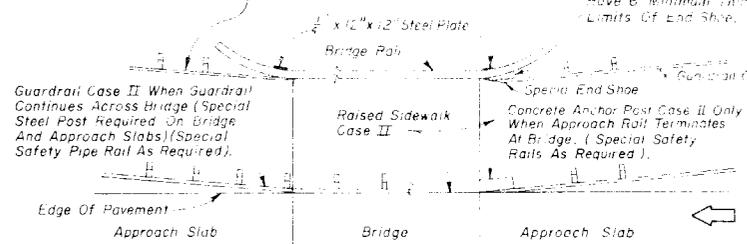
GUARDRAIL AND SHOULDER GUTTER TRANSITIONS AT BRIDGE APPROACHES - DETAIL J



4th Component Parts Shall Be Included In The Contract Unit Price For Guardrail.

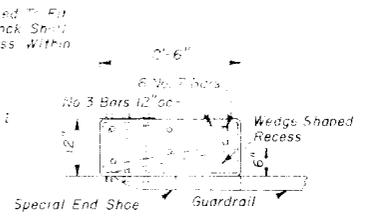
GUARDRAIL ATTACHMENT AT HANDRAIL BARRIER - DETAIL N

Guardrail Case I When Other Hazards Are Present
 Guardrail Case II When Other Hazards Are Present And
 Guardrail Does Not Continue Across Bridge.
 Treated Timber Block Required On Trailing
 Bridge Rails Of Two-Way Bridges

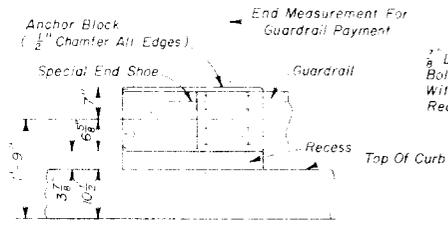


INSTALLATION - CASE I AND CASE II

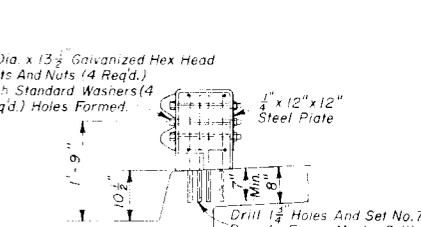
Treated Timber Block Spaced To Fit
 Contour Of Bridge Rail. Block Shall
 Have 6" Minimum Thickness Within
 Limits Of End Shoe.



TOP VIEW



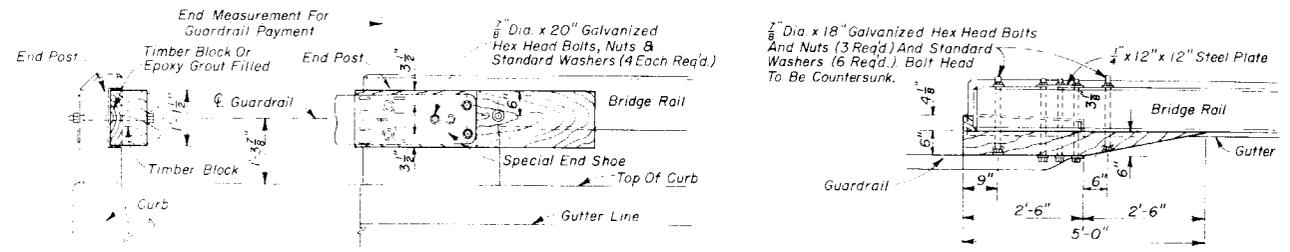
SIDE VIEW



END VIEW

**CASE I: UNDIVIDED ROADWAY WITH OR WITHOUT RAISED SIDEWALK
 DIVIDED ROADWAY WITHOUT RAISED SIDEWALK
 CASE II: DIVIDED ROADWAY WITH RAISED SIDEWALK**

TYPICAL GUARDRAIL INSTALLATION AT EXISTING BRIDGE ENDS



END VIEW

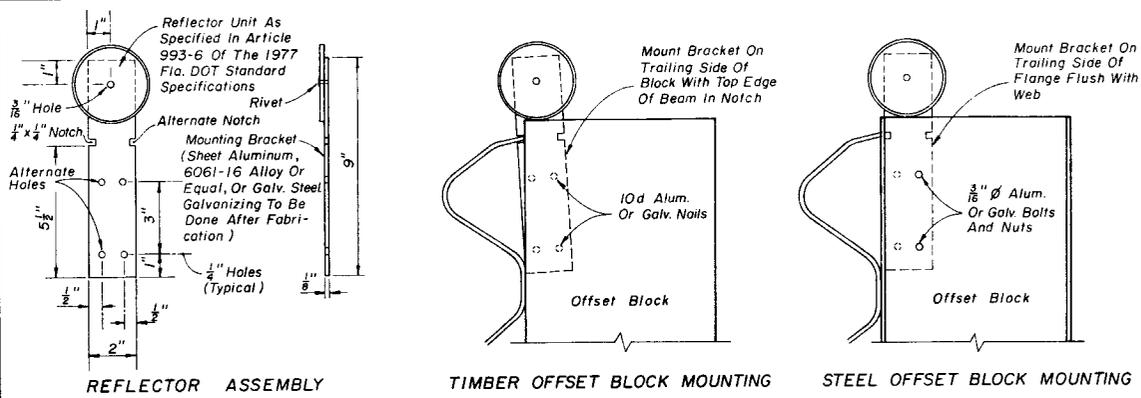
FRONT VIEW

TOP VIEW

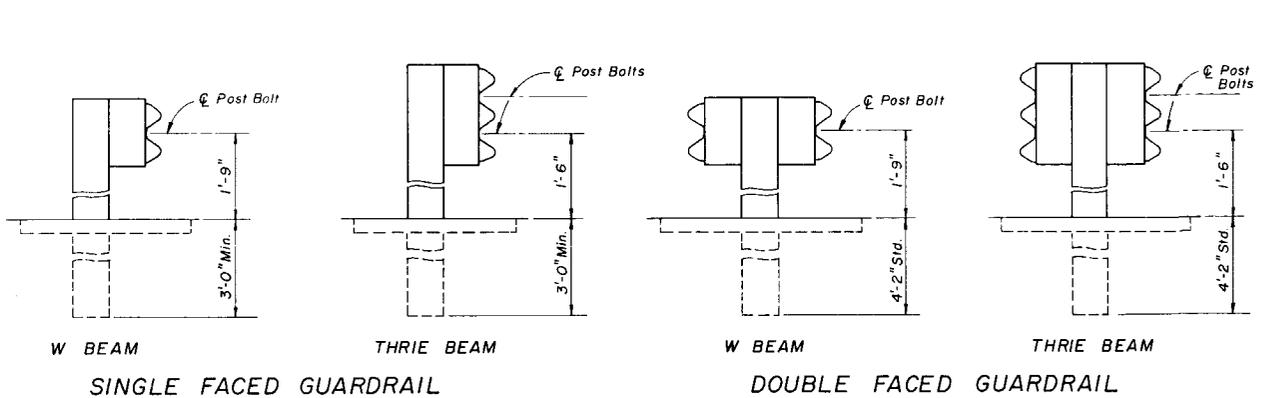
FOR APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES AND APPROACH ENDS OF ONE WAY BRIDGES.
 GUARDRAIL ON TRAILING ENDS OF ONE-WAY BRIDGES CAN BE MOUNDED DIRECTLY IN THE END POST RECESS.

GUARDRAIL ATTACHMENT AT END POST ON EXISTING BRIDGES

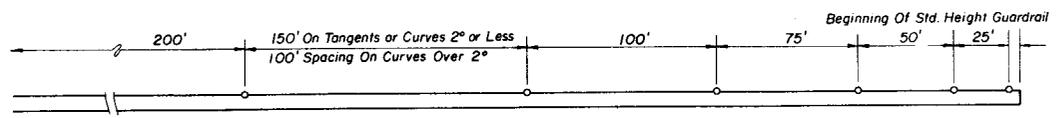
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed by	Name	Date	Approved By
Drawn by	J.M.	8/81	Deputy Design Engineer, Roadways
Checked by	JVG/JBW	9/81	Revision No.
F.H.W.A. Approved: 10/8/81		82	Sheet No. 6 of 9
			Index No. 400



REFLECTOR ASSEMBLY AND MOUNTING



MOUNTING HEIGHTS ON SHOULDERS AND IN MEDIANS

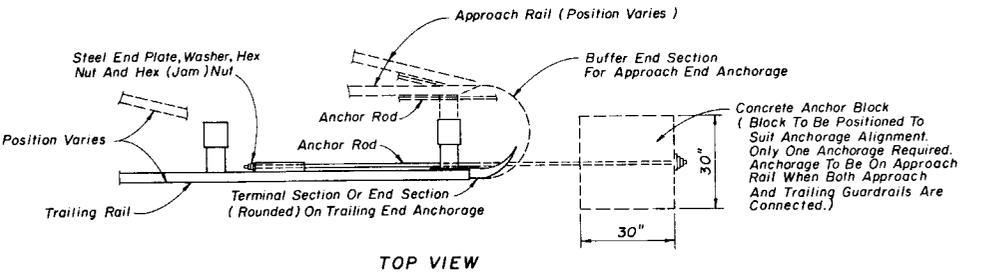


REFLECTOR SPACING
REFLECTORS - DETAIL M

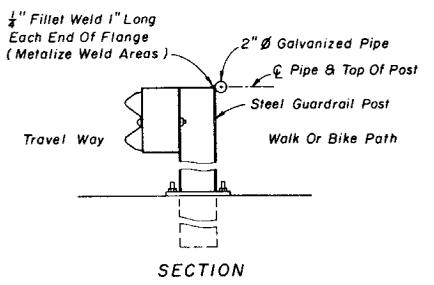
POST	OFFSET BLOCK	Remarks
Timber	6"x 8" & 5"x 8" (Nominal) x 14" Timber	Post bolt hole in timber block to be centered ($\pm \frac{1}{4}$ ").
Concrete	6"x 8" & 5"x 8" (Nominal) x 14" Timber	Same as above.
Steel W6x 8.5 and 6"C	6"x 8" & 5"x 8" (Nominal) x 14" Timber W6x 8.5 x 14" & 6"C x 14" Steel To Match Post	Same as above. $\frac{5}{8}$ " ϕ x $1\frac{1}{2}$ " galv. hex head bolts with full length thread and nuts (2 Req'd.) and washers (4 Req'd.) for mounting steel block to post. Bolts are to be installed in opposite holes.

Note: Thrie Beam blocks are 22" in length.

PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS



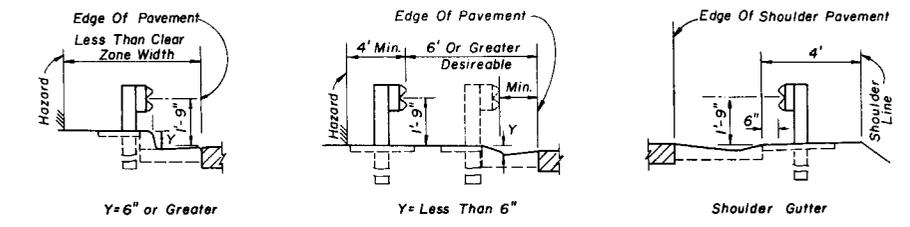
TOP VIEW



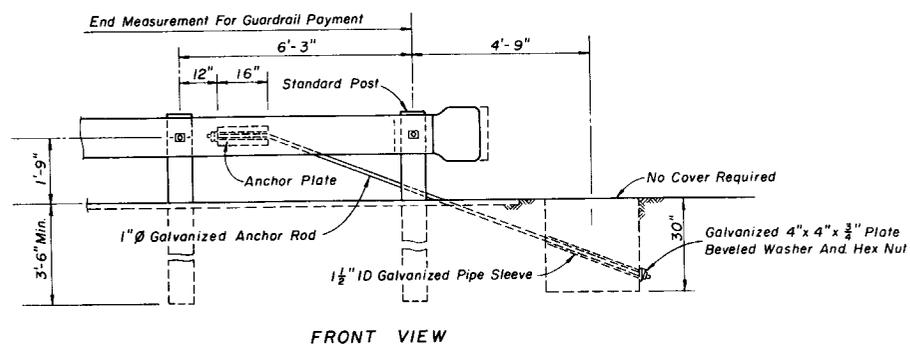
SECTION

Note: Cost of pipe to be included in the contract unit price for guardrail.
FOR LOCATIONS USED BY SUBSTANTIAL NUMBERS OF PEDESTRIANS, CYCLISTS OR FISHERMEN

SPECIAL SAFTY PIPE RAIL



LOCATION AT CURB & GUTTER SECTIONS - DETAIL L

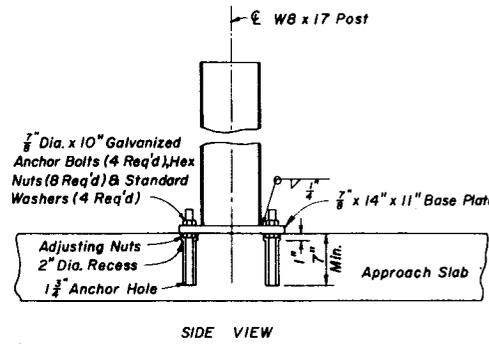
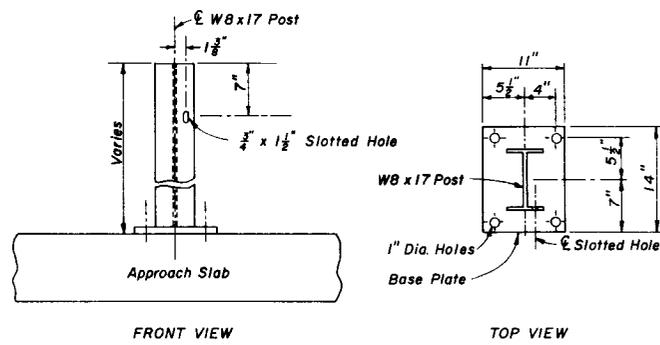


FRONT VIEW

Note: The payment for the items of End Anchorage Assemblies Type II shall include furnishing and installing anchor plate, anchor rod, pipe sleeve, anchor block, either terminal section, end section (rounded) or buffer end section, and, the necessary hardware.

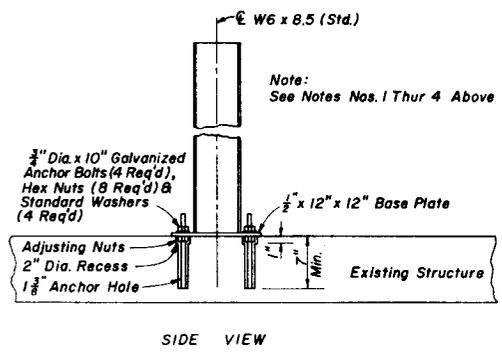
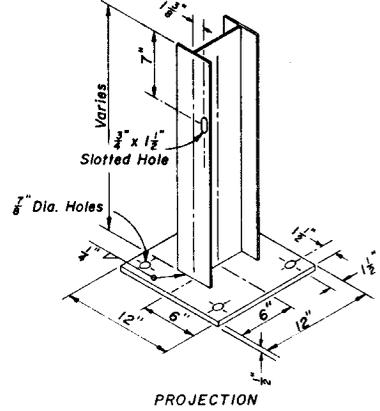
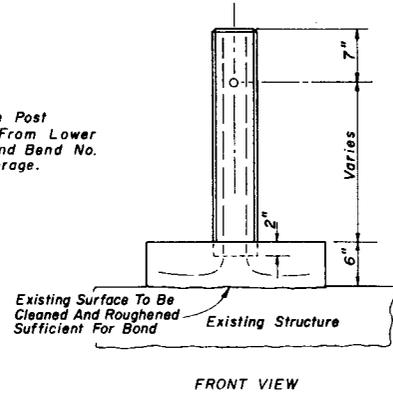
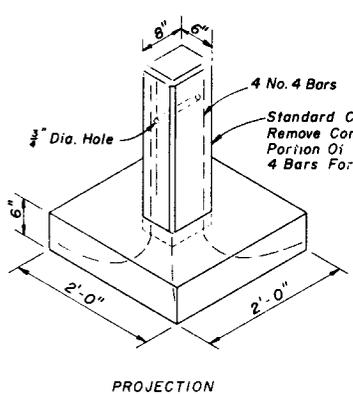
END ANCHORAGE TYPE II - DETAIL R

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
None	Date	Approved By	
Designed by	HSD	9/81	Deputy Design Engineer, Roadways
Drawn by	JBW/JVG	9/81	
Checked by			
F.H.W.A. Approved: 10/8/81	Revision No. 82	Sheet No. 7 of 9	Index No. 400



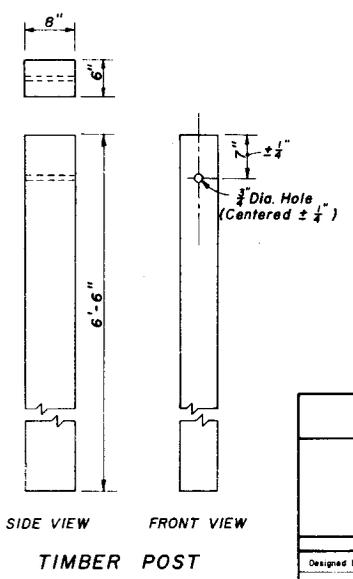
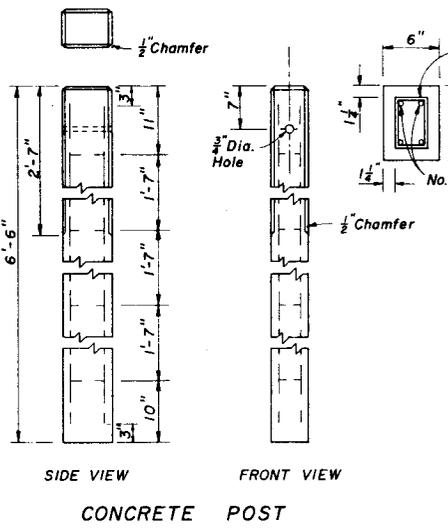
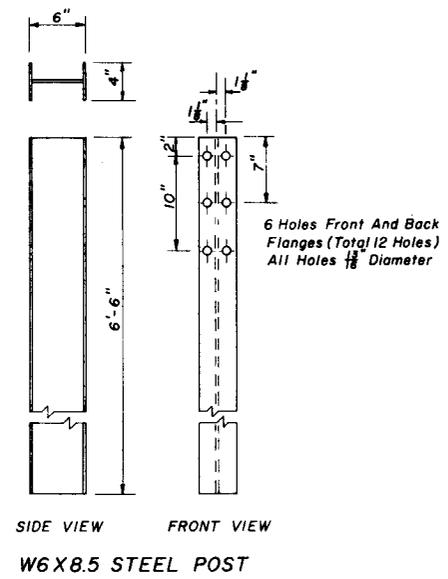
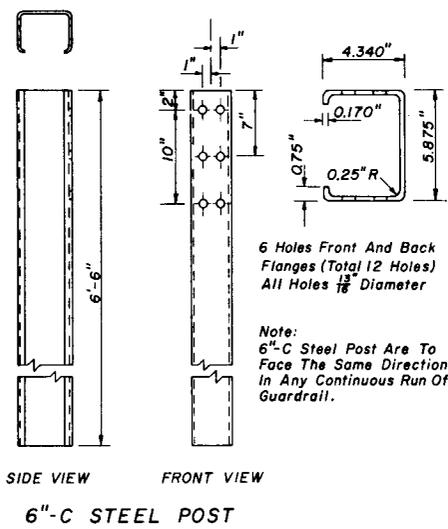
- NOTES: (STEEL POST)**
1. Either anchor bolts or concrete wedge anchors may be used. Anchor bolts are to be installed as detailed. Wedge anchors are to be installed in accordance with the manufacturers recommendations, assuming 3000 psi compressive strength for concrete. Wedge anchors shall also meet the following requirements: (a) tensile strength 125,000 psi (b) tensile load (approach slabs) 14,000 lbs. each; (other structures) 8000 lbs. each (c) shear load (approach slabs) 15,000 lbs. each; (other structures) 7800 lbs. each (d) have an electroplated zinc coating, Type LS, applied in accordance with ASTM A-164. The coated bolts, nuts and washers shall be chromate treated after coating in a water solution containing 0.2% sodium dichromate (3oz. per 10gals.).
 2. Anchor holes and recesses are to be drilled. Encountered reinforcing steel shall be drilled through. Holes shall be thoroughly cleaned before setting bolts or wedge anchors and dry when setting bolts. Bolts shall be set in epoxy mortar.
 3. Posts are to be plumbed with adjusting nuts when bolts are used and plumbed with mortar setting when wedge anchors are used. All base plates to be grouted with neat finish.
 4. Steel post and plate assembly to be galvanized. Any damaged galvanized areas to be metalized in accordance with Section 562 of the Standard Specifications.

STEEL GUARDRAIL POST MOUNTING TO EXISTING APPROACH SLABS



CONCRETE POST **STEEL POST**
 FOR CONSTRUCTION OF GUARDRAIL WHERE CULVERT, PIER FOOTING OR OTHER STRUCTURE PRECLUDES NORMAL POST INSTALLATION. WHEN WOOD POSTS ARE SELECTED AS ALTERNATES THE POST INSTALLATION FOR THE ABOVE CONDITIONS WILL BE STEEL.

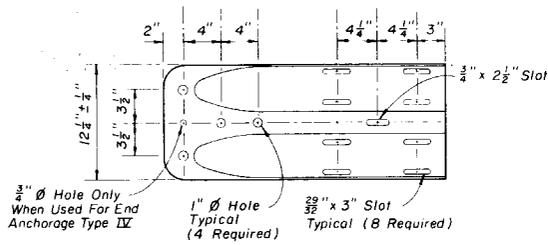
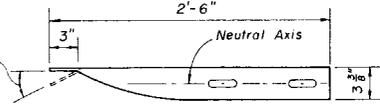
SPECIAL CONCRETE AND STEEL GUARDRAIL POSTS



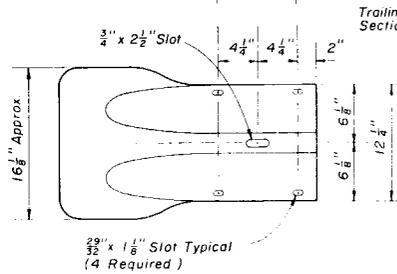
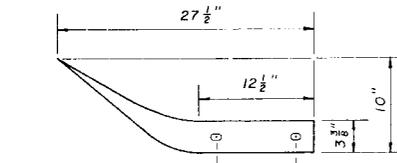
STANDARD TIMBER, CONCRETE AND STEEL GUARDRAIL POST

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed by	Names	Dates	Approved By
Drawn by	J M	8/81	Deputy Design Engineer, Roadways
Checked by	JVG/JBW	8/81	Revision No.
F.H.W.A. Approved: 10/8/81	82	8 of 9	400

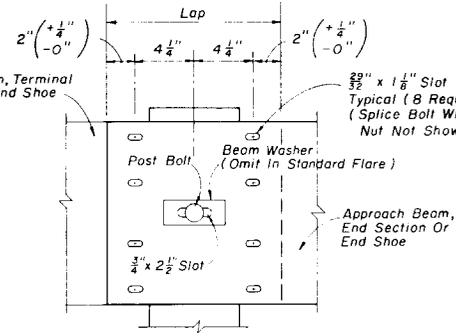
25 1/2 ± For End Anchorage Type IV Only. Field Bend With Metalizing Permitted



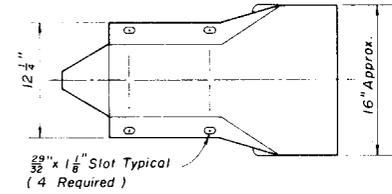
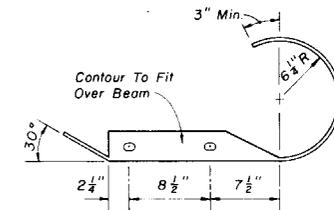
SPECIAL END SHOE



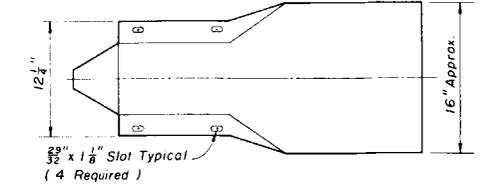
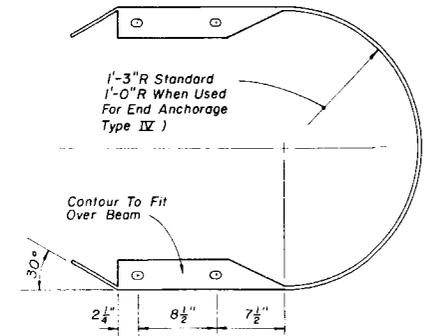
TERMINAL SECTION



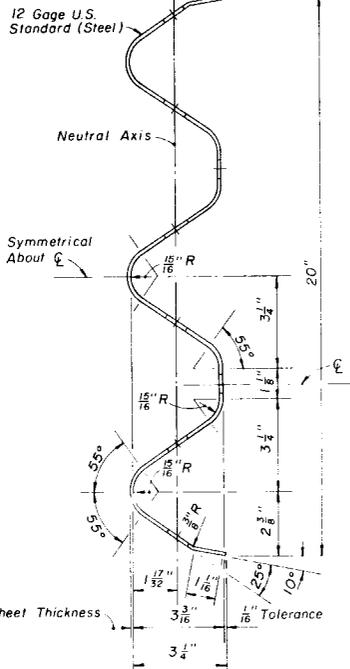
RAIL SPLICE



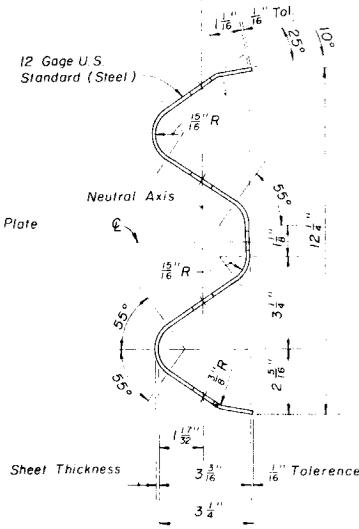
END SECTION (ROUNDED)



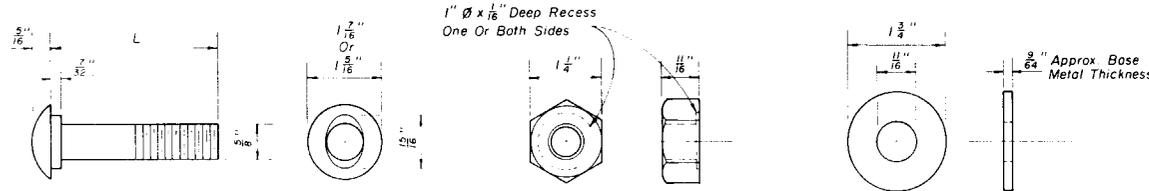
BUFFER END SECTION



THRIE BEAM



W BEAM



Note: Specifications same as for hex nuts

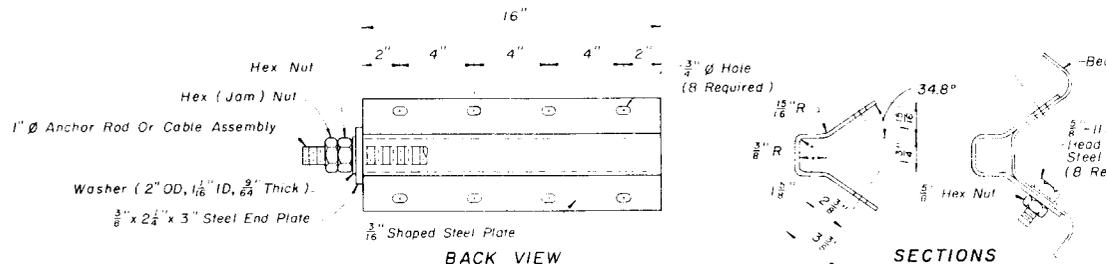
L	Thread Length	Application
1 1/4"	Full Length	Rail Splice Bolt
2"	1 1/2" Min	Rail To Steel Offset Block Bolt
9 1/2"	1 3/4" Min	Post Bolt - Single Faced Guardrail Timber Block On Steel Post
18"	2 1/2" Min	Post Bolt - Single Faced Guardrail Timber Or Concrete Posts
25"	2" Min	Post Bolt - Double Faced Guardrail Timber Or Concrete Posts

Note: Specifications same as for hex bolts.

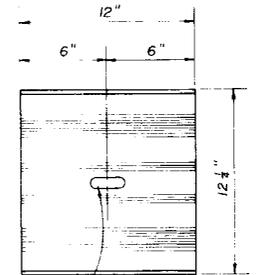
5/8" BUTTON HEAD BOLT

Hex bolts shall conform to the requirements of A.S.T.M. A307 and hex nuts to the requirements of A.S.T.M. A563, Grade A or better. Heavy hex nuts may be used in lieu of hex nuts and hex nuts used for jam nuts.

HEX BOLTS AND NUTS



ANCHOR PLATE

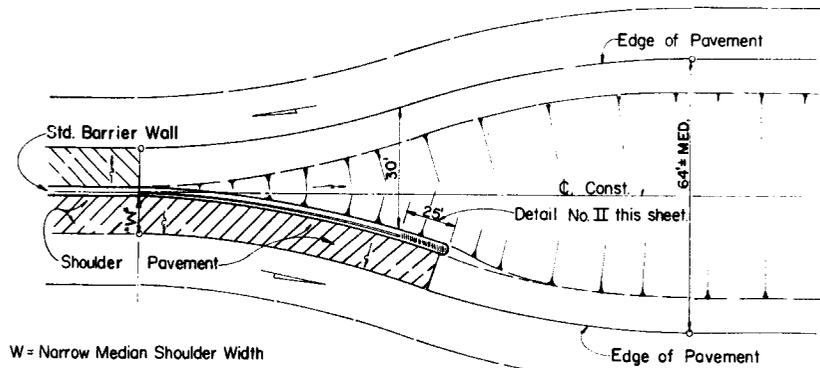


Note: Back up plate is placed behind rail elements at intermediate (non splice) post with steel offset blocks only.

BACK-UP PLATE

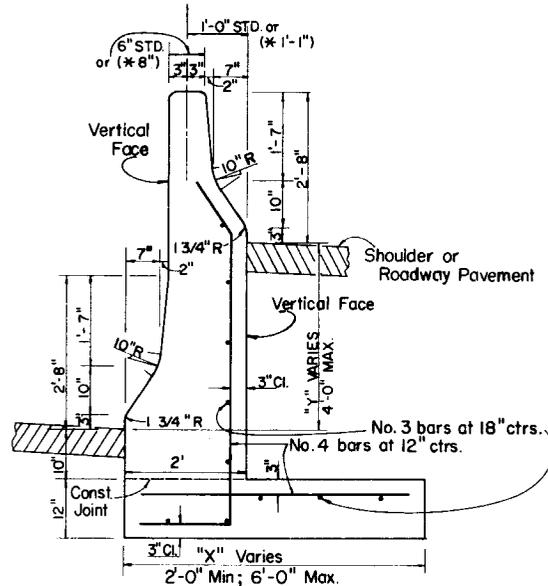
PRIMARILY USED FOR MEDIAN INSTALLATIONS. A SPECIAL DETAIL SHALL BE SUBMITTED TO THE DEPUTY DESIGN ENGINEER, ROADWAYS FOR APPROVAL PRIOR TO INCLUSION IN THE PLANS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed By	Names	Dates	Approved By
Drawn by	HSD	8/81	Deputy Design Engineer, Roadways
Checked by	JBW/JVG	8/81	Revision No.
F.H.W.A. Approved: 10/8/81	82	9 of 9	400



W = Narrow Median Shoulder Width

TERMINATION OF BARRIER WALL AT APPROACH TO WIDE MEDIAN SECTION
DETAIL A

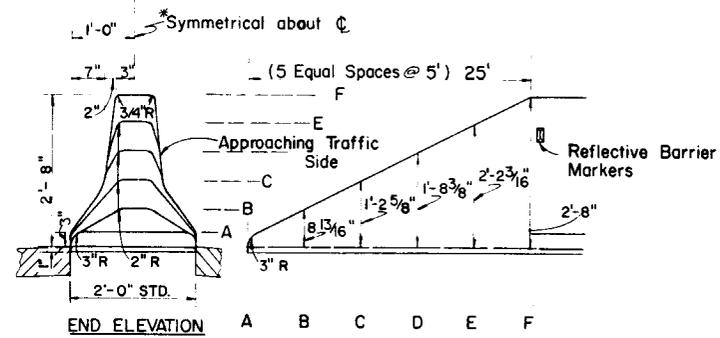


MEDIAN BARRIER WALL FOR SUPERELEVATED SECTION OR VARIABLE ROADWAY PROFILE GRADES

Note: Steel not required until height "Y" is 1'-0" or more and footing width "X" is 3'-0" or more. Cost of the steel and concrete footing to be included in the Contract unit price for Concrete Barrier Wall.

Height "Y"	0'-0"	0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
Width "X"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"

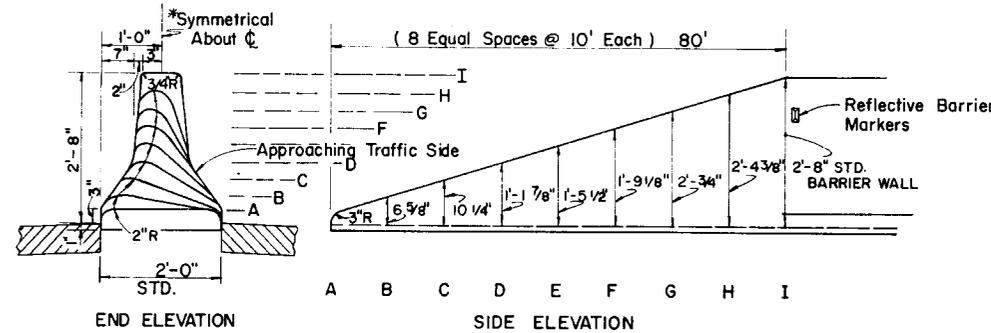
TABLE OF DIMENSIONS FOR DIFFERENCE - HEIGHT "Y" AND BARRIER WALL FOOTING - WIDTH "X"



CONCRETE MEDIAN BARRIER TERMINAL
(To be used only as a Temporary Barrier Terminal or where located 30' from edge of approach lane. See Detail A Lt.)
DETAIL II

Distance - Edge of travel lane to barrier wall.	Spacing	Number per side
1' to < 4'	40'	1
4' to < 8'	80'	1
> than 8'	none required	

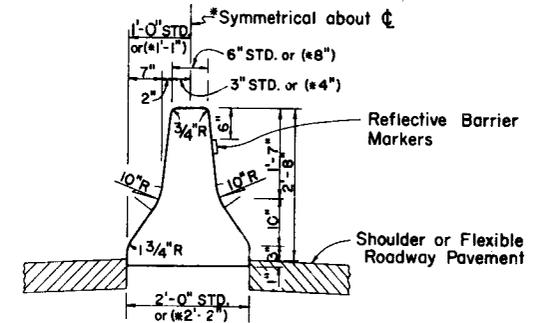
Use Amber Markers only.
Use 10' spacing on Terminal ends.
Hold or clamp reflective barrier markers to wall until dry or set.



CONCRETE MEDIAN BARRIER TERMINAL FOR NARROW MEDIAN
Design Speed 45 M.P.H. or Less
DETAIL III

GENERAL NOTES:

- Cost of installation of all conduits and utility accessories, reinforcing steel and reflective barrier markers shall be included in the contract unit price for Concrete Barrier Wall.
- Terminal Barrier Notes for Design Speeds greater than 45 m.p.h.:
 - Terminated in a wide median section outside recovery area of the approach traffic - See Detail A Lt.
 - Terminated from a shielded location.
 - Terminal protection by the use of an impact attenuator system.
 - Terminated in conjunction with a suitably designed transition to another type median barrier that can be introduced more safely.
- Expansion joints in wall required only at bridge ends and/or at locations where wall is an integral part of existing or proposed concrete slab to match an existing or proposed expansion joint.
- Expansion joints in conduits shall be required only at the expansion joints in the wall.
- When the barrier is installed adjacent to the pavement the top 12" of the subgrade shall be compacted to at least 100% of the density as defined in the AASHTO T-99 specifications.
- Cast-in-place barrier wall normally will be a continuous pour without transverse contraction joints.
- Cast-in-place sections with a length < 40' shall be joined to adjacent sections by doweling. See Detail 'B' on sheet 2.
- Precast construction is allowed as an alternate to cast-in-place construction.
 - Section lengths will not be < 20' in length.
 - Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing.
 - Reinforcement may be required for handling stresses.
 - See detail 'C' on sheet 2 for transverse joint details.



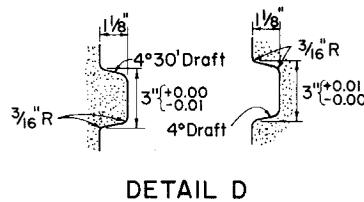
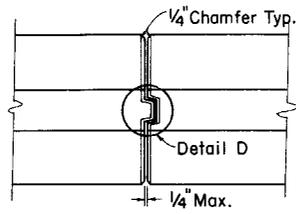
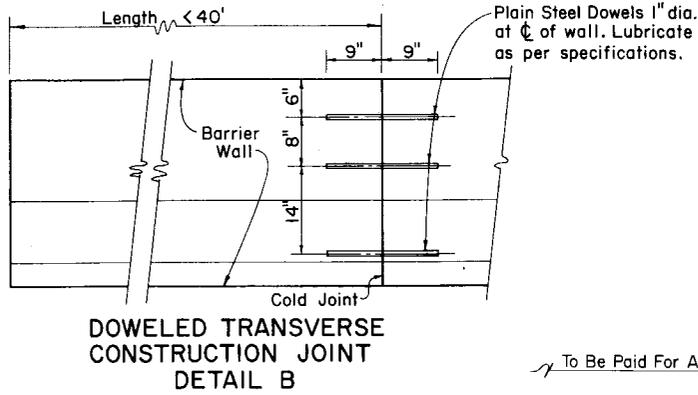
STANDARD BARRIER WALL SECTION NARROW MEDIAN INSTALLATION ADJACENT TO PAVEMENT

*Use 8" top, 2'-2" base when 10" light poles are installed within barrier wall line.

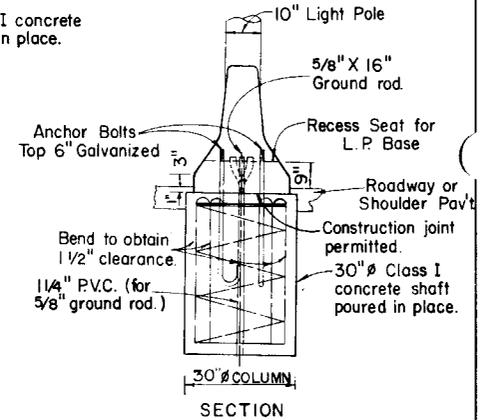
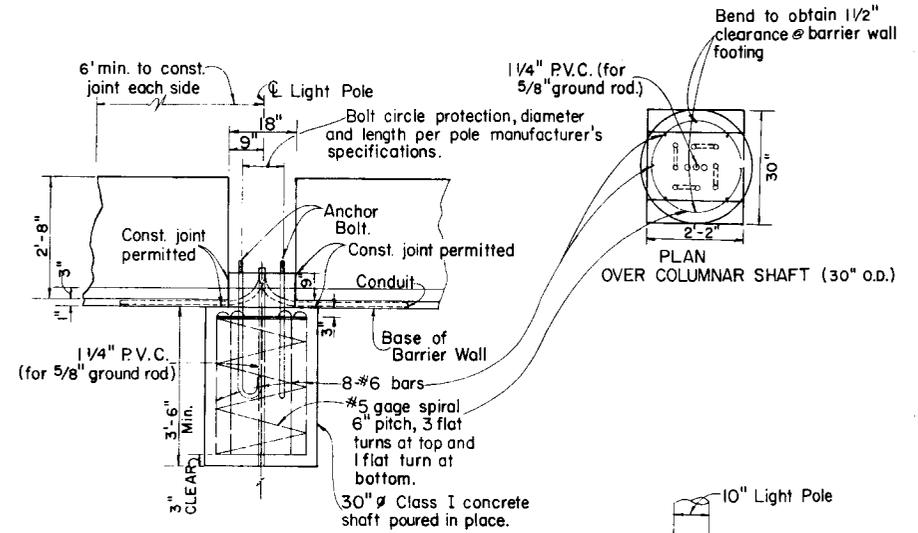
For Concrete Median Barrier Wall details at Piers, Highway Lighting and Guardrail Connections, See Sheet 2.

For Median Barrier and 'Special' Barrier Wall Inlet details see Index No. 217.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE BARRIER WALL			
Designed by	Name	Date	Approved By
Drawn by	A.F.	6/73	<i>D.C. [Signature]</i> Deputy Design Engineer, Roadways
Checked by	L.M.F.	7/73	Revision No.
F. H. W. A. Approved: 5/20/77		81	Sheet No. 1 of 2 Index No. 410



TOP VIEW
DETAIL C
PRECAST BARRIER TRANSVERSE JOINTS



SECTION
10" LIGHT POLE MOUNTING IN MEDIAN BARRIER WALL WITH 8" TOP, 2'-2" BASE

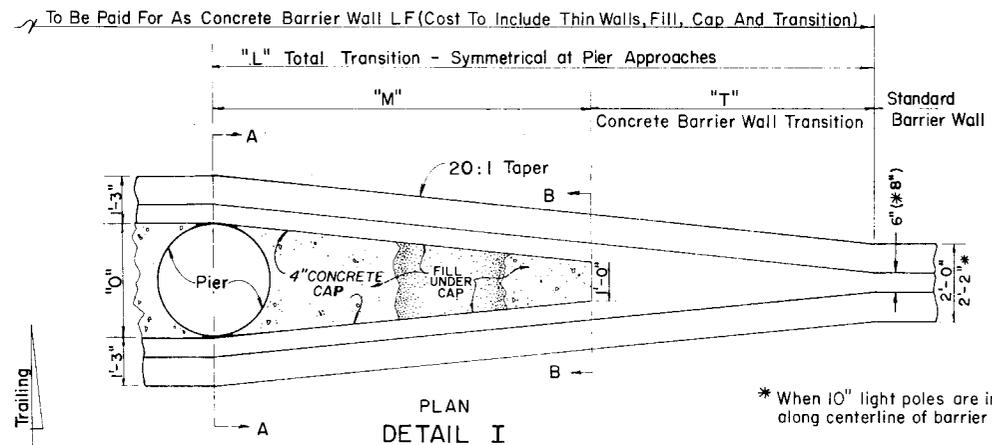
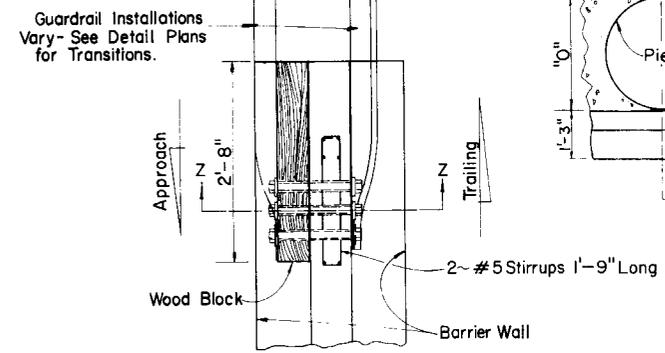


Table with 5 columns: 'L', 'M', 'T', 'Std. to M. Trans.', and 'WALL TYPE'. It provides dimensions for different wall types and transition lengths.

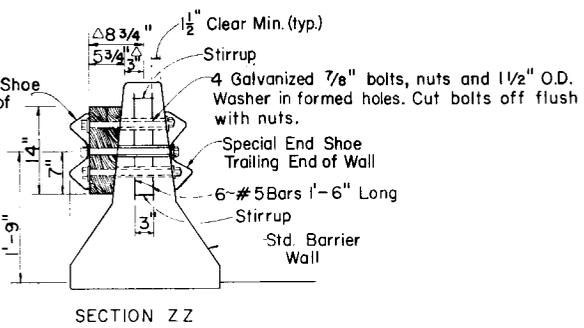
"L"	"M"	"T"	Std. to M. Trans.	WALL TYPE
Varies 3' Shown	Total Trans.	Barrier Wall		
3'	35.8'	20.8'	15.0'	STD., (6" Top, 2'-0" Base)
3'	34.2'	20.8'	13.4'	* (8" Top, 2'-2" Base)

* When 10" light poles are installed along centerline of barrier wall.

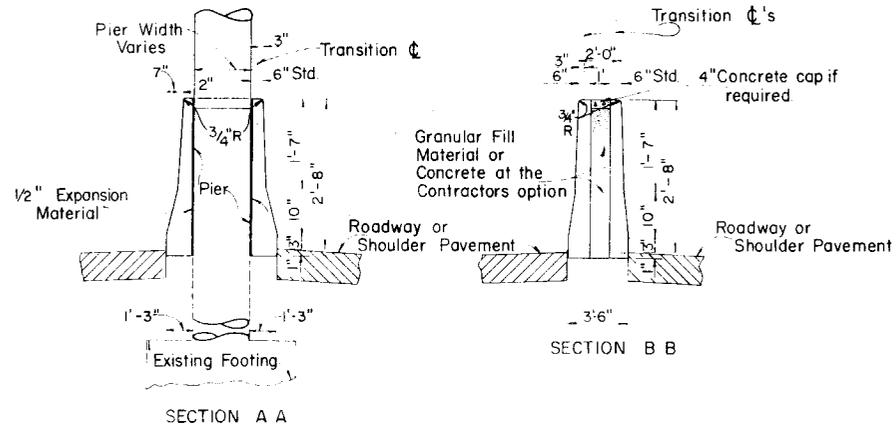


Symmetrical about C for uni-directional flow - Approach End of Wall
Symmetrical about C for uni-directional flow - Trailing End of Wall

For Barrier Wall Dimensions - see sheet 1.
For additional guardrail, blocking and fastening details - see Index No. 400.
Add 1" to horizontal dimensions shown for Light Mounted Barrier Wall Section.



SECTION ZZ
GUARDRAIL CONNECTION TO STD. CONCRETE BARRIER WALL



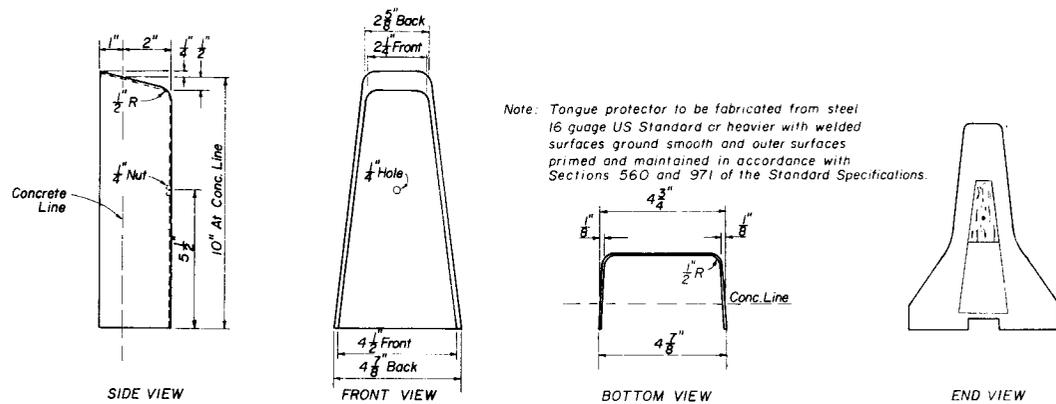
SECTION A A
SECTION B B
CONCRETE MEDIAN BARRIER WALL (THIN WALLS, FILL, CAP AND TRANSITION)

NOTES:
Bolt circle: 8" pole - 11 1/2", 10" pole - 15"
Refer to Highway Lighting Plans for size of Conduit
Payment for the 30" concrete column including reinforcing steel, anchor bolts and accessories shall be included in the contract unit price for Lighting Pole complete, Highway Lighting.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

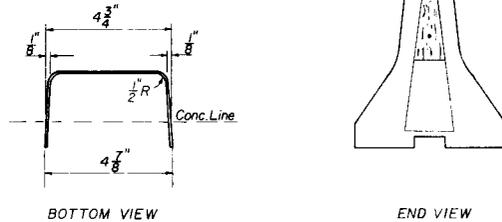
CONCRETE BARRIER WALL

Designed by	Names	Dates	Approved By
Drawn by	AF	6/73	<i>De Kral</i>
Checked by	LMF	7/73	Chief Designer, Highway
Approved	10/8/78	81	Sheet No. 2 of 2
			Index No. 410

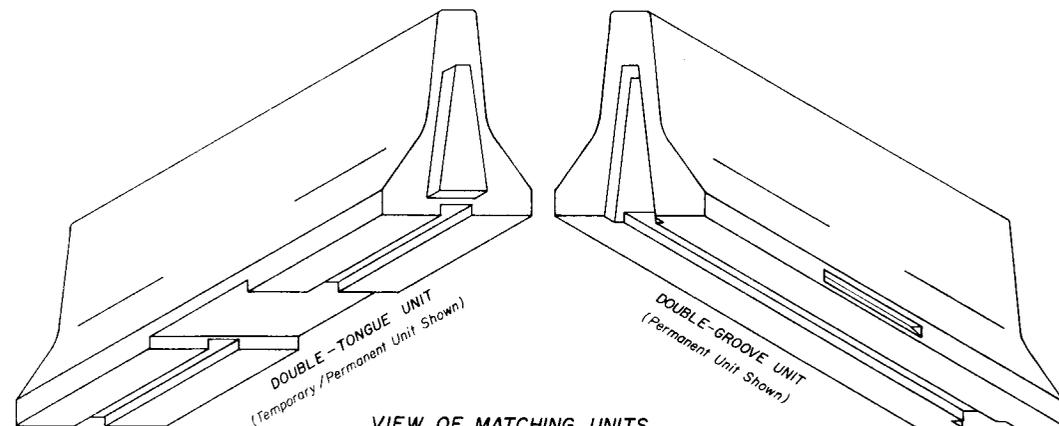


TONGUE PROTECTOR DETAIL

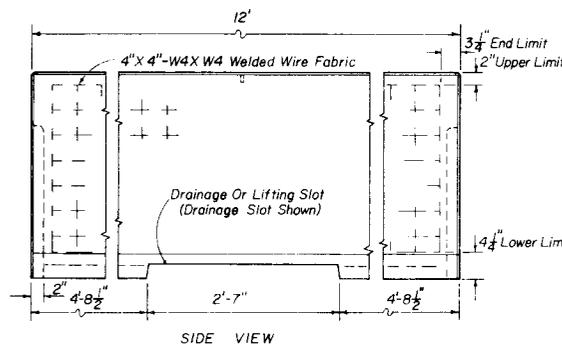
Note: Tongue protector to be fabricated from steel 16 gauge US Standard or heavier with welded surfaces ground smooth and outer surfaces primed and maintained in accordance with Sections 560 and 971 of the Standard Specifications.



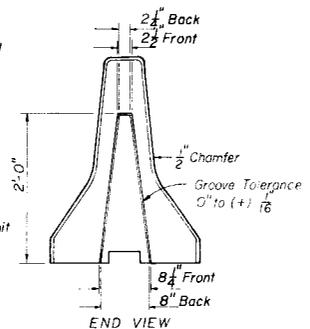
TONGUE PROTECTOR IN PLACE



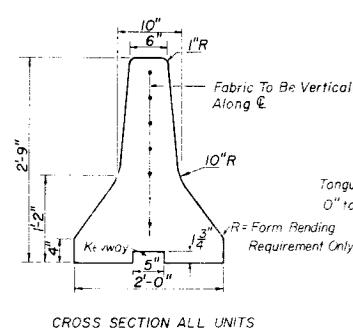
VIEW OF MATCHING UNITS



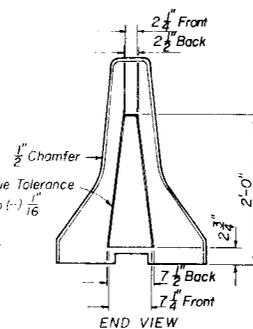
DOUBLE-GROOVE UNIT



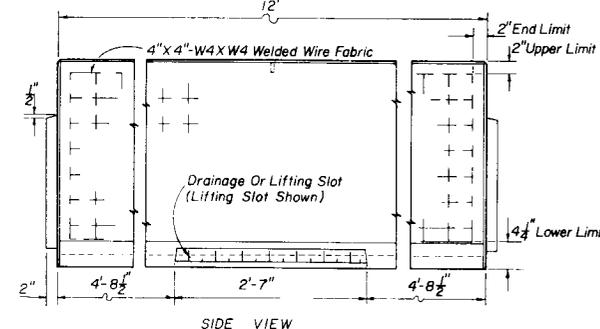
END VIEW



CROSS SECTION ALL UNITS



END VIEW

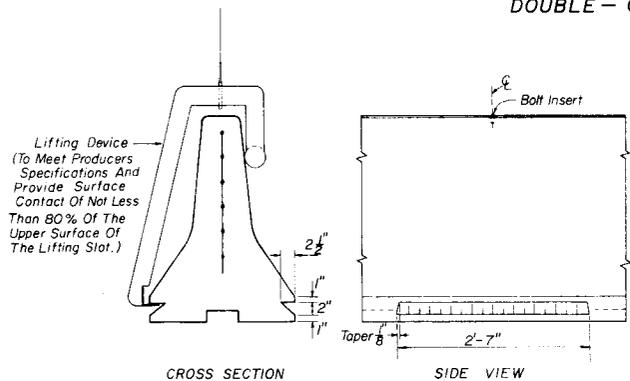


DOUBLE-TONGUE UNIT

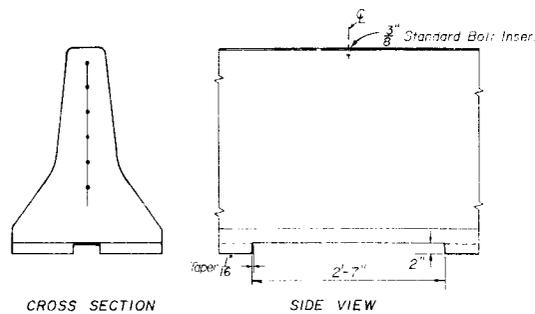
* Federal Aid Projects:
Wall Lift Pipe & Anchors Shall Be Cast Into Each Wall Unit, 6" From The Joint And 2" From The Bottom, As Shown In Figure 7.3 Of The MTCSP Wall Units. Shall Be Secured To The Bridge Deck By Wall Ties, Wall Ties & Anchors And Wall Tie Bolts As Detailed In Fig. 7.3 Of The MTCSP.

** Non Federal Aid Projects:
Channel Shall Have A Minimum Length Of 2'-0" Positioned Symmetrically Under Each Wall Joint And Secured With Two 3/4" Diameter Anchor Bolts, Each Anchor Bolt Shall Develop Minimum Pullout Strength Of 9,500 Lbs. And Minimum Shear Strength Of 16,200 Lbs. In 3,500 psi Concrete. Bolts Shall Be Located 6" From Ends Of Channel. (Continuous Channel With Equivalent Anchors Per Wall Unit May Be Used At Contractors Option.)

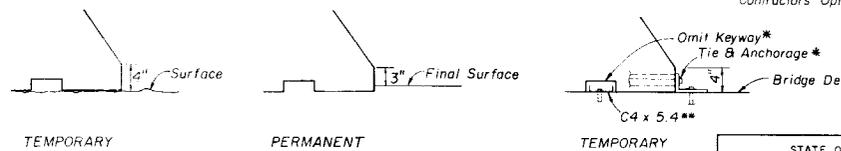
MTCSP Manual On Traffic Control And Safe Practices For Street And Highway Construction, Maintenance And Utility Operations On The Maintained Systems.



LIFTING SLOT DETAIL



DRAINAGE SLOT DETAIL



INSTALLATIONS

GENERAL NOTES

1. Material and workmanship for precast double-tongue and double-groove units shall meet the requirements of Section 521 of the Standard Specifications except for tolerance and wire reinforcement shown in this drawing. The contractor will not be required to submit shop drawings for approval as described in Section 521. Units shall meet the strength requirements of Class I concrete.

2. Units for permanent installation shall be cast with lifting slots only, unless otherwise called for in the plans. Permanent units do not require tongue protectors.

3. Units for temporary installation shall be cast with drainage slots only, unless otherwise called for in the plans. Double-tongue temporary units shall have tongue protectors.

4. Units used for temporary installation may be reused for permanent installations on the same project provided the units have the structural integrity and surface qualities of new units. Drainage slot of temporary units installed as permanent units shall be filled with asphaltic or cement concrete as directed by the Engineer, except when slots in permanent installations are called for in the plans. Units used only for temporary installation may be cast with a 3" toe, but the keyway and drainage slot dimensions must remain

as shown above. Units with the 3" toe shall not be used in a permanent installation. Units with the 3" toe and units with the 4" toe shall not be installed in the same barrier wall.

5. Precast double-tongue double-groove units may be used as Class E warning devices.

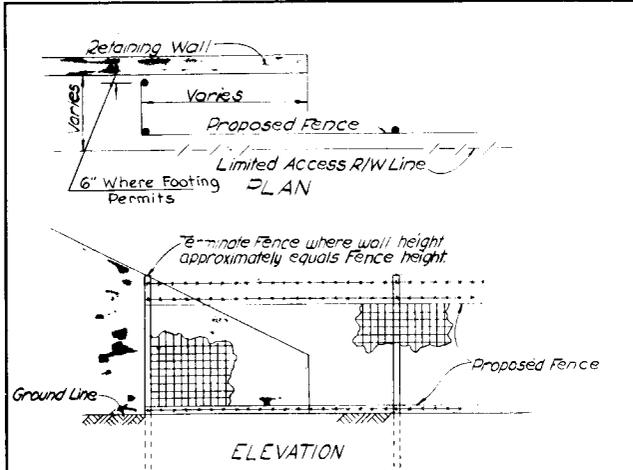
6. Precast double-tongue double-groove units installed as temporary barrier shall be paid for under the contract unit price for Conc Barrier (Temp-Type E) (Form B install) L.F. or Conc Barrier (Temp-Type E) (install) L.F. as called for in the plans.

7. Precast double-tongue double-groove units installed as permanent concrete barrier wall shall be paid for under the contract unit price for Conc Barrier Wall L.F. as called for in the plans.

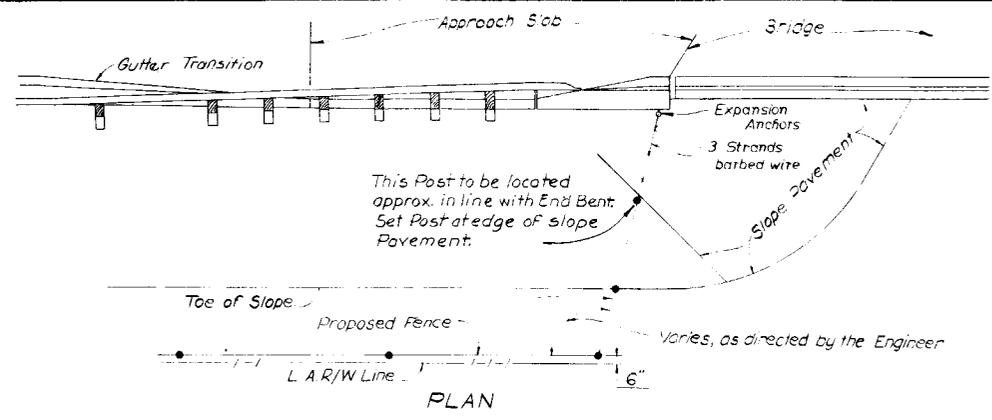
8. Unit Weight: Approximately 4950 lbs (412 lbs/L.F.)

9. The requirements for precast barrier wall shown on Standard Drawing Index 410 do not apply to the use of double-tongue double-groove barrier wall.

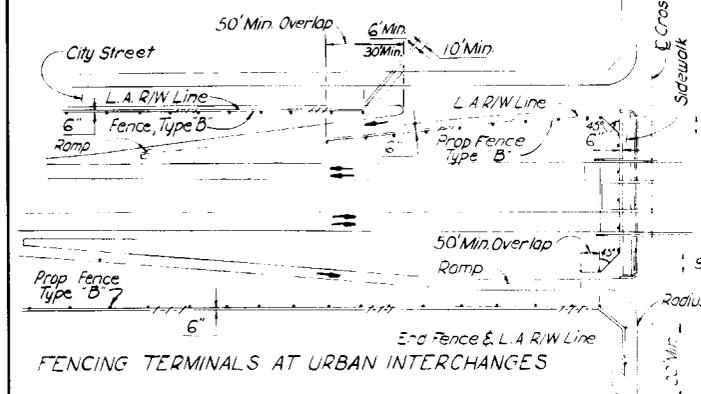
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DOUBLE-TONGUE DOUBLE-GROOVE PRECAST CONCRETE BARRIER WALL			
DESIGNED BY	DATE	APPROVED BY	
DRAWN BY	3/80	<i>[Signature]</i> DEPUTY DESIGN ENGINEER, ROADWAYS	
CHECKED BY	JVG	REVISION NO.	SHEET NO.
F.H.W.A. Approved: 10/7/80		82	1 of 1
			INDEX NO. 415



FENCING TERMINALS AT RETAINING WALLS

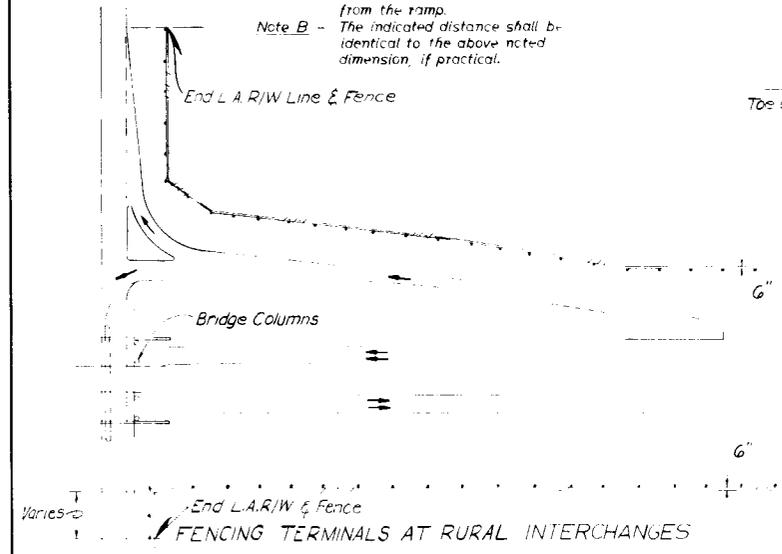


FENCING TERMINALS AT BRIDGE ENDS (ROADWAY)

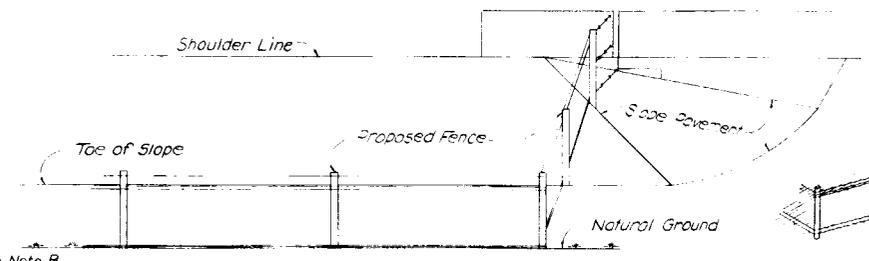


FENCING TERMINALS AT URBAN INTERCHANGES

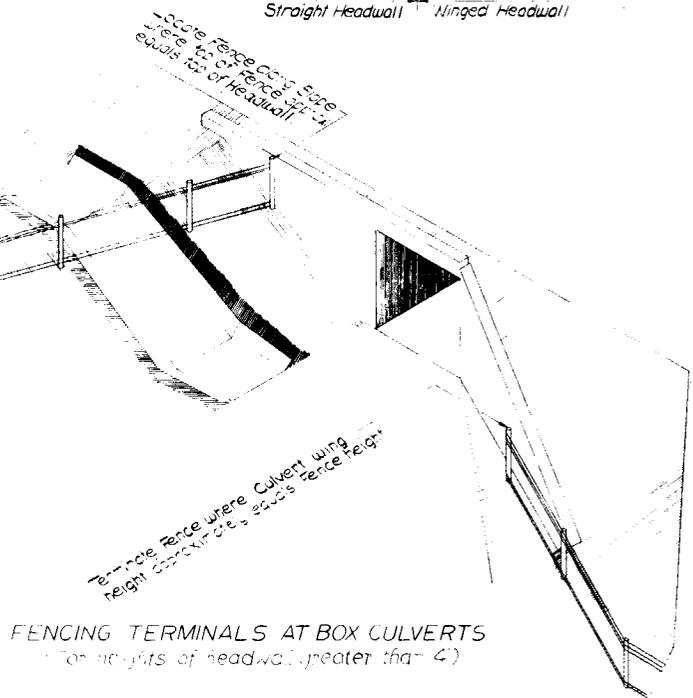
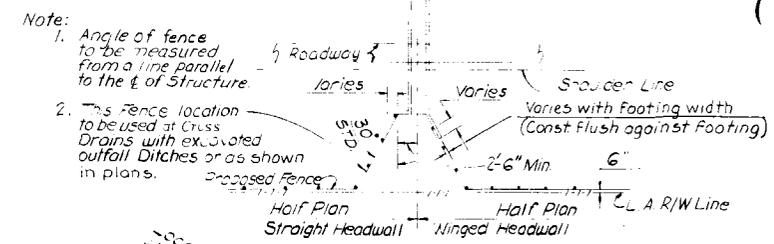
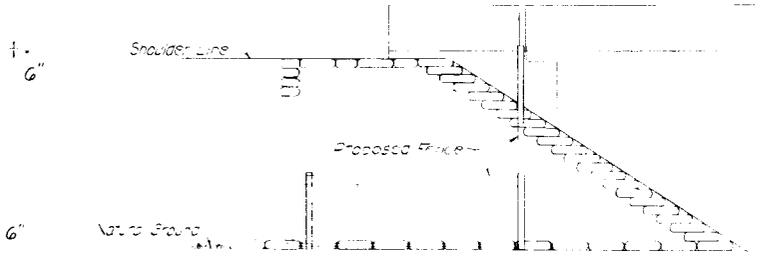
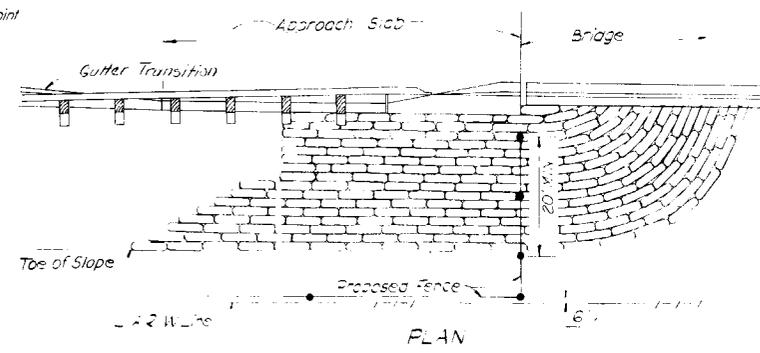
- Note A - The indicated distance shall be sufficient to provide satisfactory sight distance for the traffic from the ramp.
- Note B - The indicated distance shall be identical to the above noted dimension, if practical.



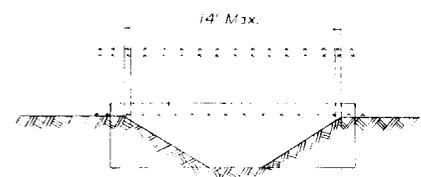
FENCING TERMINALS AT RURAL INTERCHANGES



FENCING TERMINALS AT BRIDGE ENDS (STREAM CROSSING)



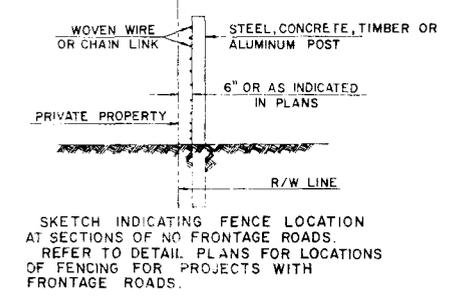
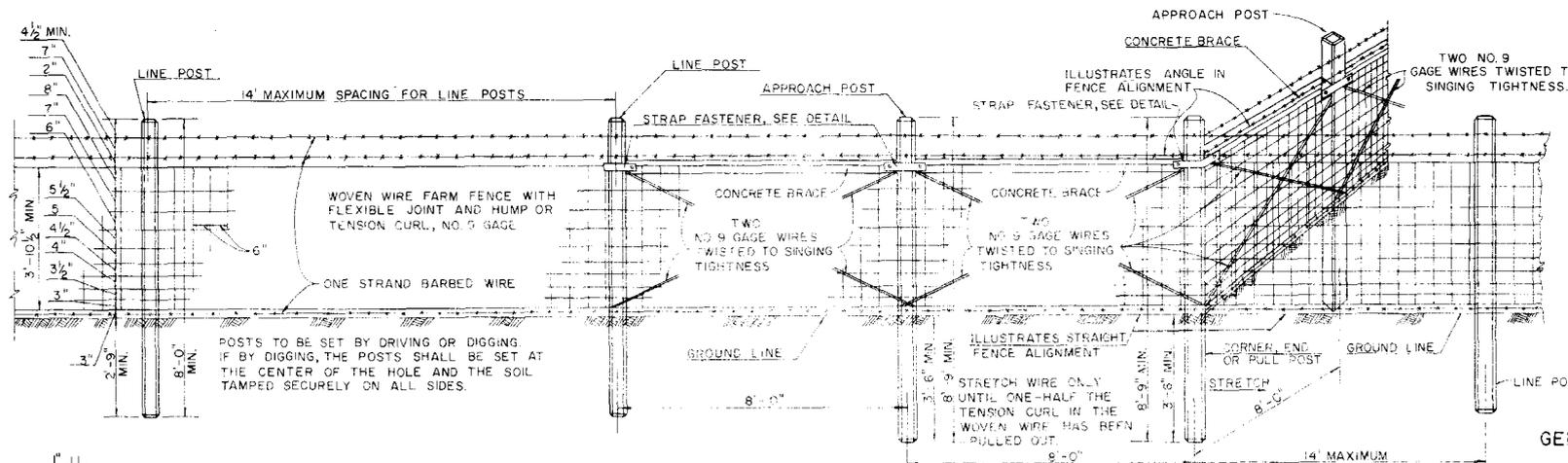
FENCING TERMINALS AT BOX CULVERTS (For heights of headwall greater than 4')



FENCING DETAIL AT CULVERT (For heights of headwalls 4' or less)

- Note: When height of headwall is 4' or less (pipe culverts 3' or less) the fence shall not be tied to the headwall, but shall span the lateral ditch.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
FENCE LOCATION				
Designed by	HFW	2/65	Approved By	
Drawn by	HFW	2/65	<i>DePelle</i> Deputy Design Engineer, Roadways	
Checked by	RLO	2/65	Revision No.	Sheet No.
H.W.A. Approved 6/18/74			80	1 of 1
				450

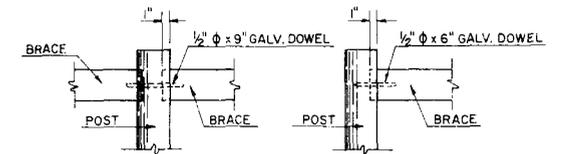


SKETCH INDICATING FENCE LOCATION AT SECTIONS OF NO FRONTAGE ROADS. REFER TO DETAIL PLANS FOR LOCATIONS OF FENCING FOR PROJECTS WITH FRONTAGE ROADS.

GENERAL NOTES (TYPE "A" FENCE)

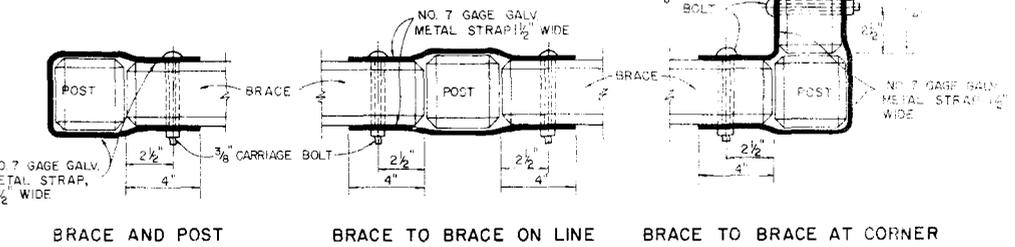
- THIS FENCE TO BE PROVIDED GENERALLY IN RURAL AREAS.
- POSTS AND BRACES MAY BE EITHER STEEL, ALUMINUM, TIMBER OR CONCRETE.
- STEEL POSTS AND BRACES SHALL BE STANDARD STEEL POSTS, GALVANIZED AT THE RATE OF 2 OZ. PER SQ. FT., TOGETHER WITH NECESSARY HARDWARE AND WIRE CLAMPS AND MEETING THE FOLLOWING REQUIREMENTS:
 - LINE POSTS: 6' LONG, 1.33 LBS. PER LIN. FT.; STUDDED, ANCHOR PLATE ATTACHED, WITH NECESSARY CLAMPS, ETC.
 - APPROACH POSTS: 2 1/2" x 2 1/2" x 1/4" ANGLES, 8' LONG; FABRICATED FOR ATTACHING BRACE; WITH NECESSARY HARDWARE, CLAMPS, ETC.
 - PULL END AND CORNER POSTS: 2 1/2" x 2 1/2" x 1/4" ANGLES, 8' LONG; FABRICATED FOR ATTACHING BRACE; WITH NECESSARY HARDWARE, CLAMPS, ETC.
 - BRACES: 2" x 2" x 1/4" ANGLES WITH NECESSARY HARDWARE AND FABRICATED FOR ATTACHING TO POST
 - THE PULL, CORNER, APPROACH AND END POSTS ARE TO BE SET IN CONCRETE AS PER DETAIL. (ALSO SEE NOTE NO. 6)
- ALL TIMBER POSTS, EXCEPT CORNER AND PULL POSTS ARE TO BE MINIMUM 4" DIAMETER. TIMBER CORNER AND PULL POSTS ARE TO BE MINIMUM 5" DIAMETER. BRACES ARE TO BE 4" MINIMUM DIAMETER. LENGTHS OF TIMBER POSTS TO BE AS INDICATED ABOVE FOR CONCRETE POSTS.
 - STAPLES FOR LINE POSTS TO BE 1 1/2" MINIMUM LENGTH, FOR APPROACH, CORNER AND PULL POSTS 1 1/2" MINIMUM LENGTH. AT APPROACH, CORNER AND PULL POSTS, STAPLE EVERY LINE WIRE. AT LINE POSTS, STAPLE EVERY LINE WIRE IN TOP HALF AND ALTERNATE LINE WIRES IN BOTTOM HALF.
 - ADEQUATE CONNECTIONS BETWEEN TIMBER POSTS AND BRACES TO BE PROVIDED.
 - WIRE TO BE WRAPPED AROUND END POSTS AND CORNER POSTS (INSTALLED AS LINE POSTS) AT VERTICAL BREAKS OF 15° OR MORE.
- LONGER POSTS THAN THOSE INDICATED ABOVE MAY BE REQUIRED BY THE PLANS OR FOR DEEPER INSTALLATIONS.
- CONCRETE FOR BASES SHALL BE CLASS I AS SPECIFIED IN SECTION 345 EXCEPT THAT THE REQUIREMENTS CONTAINED IN 345-5.1, 345-10 AND 345-11 SHALL NOT APPLY. MATERIALS FOR CLASS I CONCRETE MAY BE PROPORTIONED BY VOLUME AND/OR BY WEIGHT.
- THE CONTRACTOR, AT HIS OPTION, MAY USE ANY SUITABLE PRESTRESSED CONCRETE POST; HOWEVER, APPROVAL BY THE ENGINEER, OF POSTS NOT SHOWN ON THIS DRAWING, WILL BE REQUIRED PRIOR TO CONSTRUCTION OF THE FENCE.
- FENCE SHALL BE INSTALLED WITH WIRE SIDE TO PRIVATE PROPERTY EXCEPT ON HORIZONTAL CURVES GREATER THAN 3° THE FENCE SHALL BE INSTALLED SO AS TO PULL AGAINST ALL POSTS.

(CONTINUED)

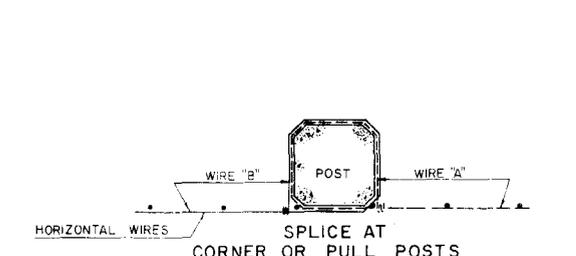


FASTENER FOR TIMBER POST AND BRACE

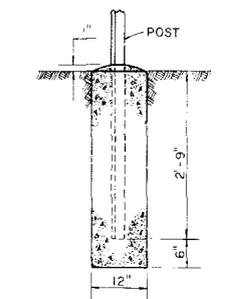
DETAILS OF TYPE "A" FENCE
(ILLUSTRATED FOR CONC. POSTS AND BRACES)



FASTENER FOR CONCRETE POSTS AND BRACES



SPLICE AT CORNER OR PULL POSTS
EACH HORIZONTAL WIRE TO BE WRAPPED COMPLETELY AROUND PULL POST AND TIED TO SAME WIRE. CONC. POST ILLUSTRATED. THIS METHOD ALSO APPLIES TO STEEL POST INSTALLATIONS AND TIMBER POST INSTALLATIONS.



CONCRETE BASE FOR ANGULAR STEEL POST
(PULL, CORNER, END AND APPROACH POSTS)



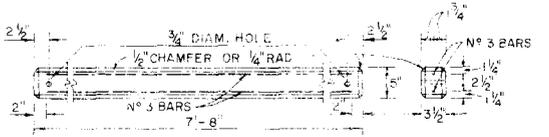
PRESTRESSED POST



PRESTRESSED BRACE



PRECAST POST



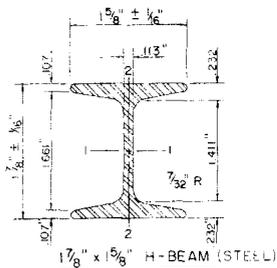
PRECAST BRACE

ALTERNATE CONCRETE POSTS AND BRACES

GENERAL NOTES (TYPE "A" FENCE) CONTINUED

- FOR PAY PURPOSES ASSEMBLIES ARE DEFINED AS FOLLOWS: PULL OR END POST ASSEMBLIES SHALL CONSIST OF: ONE END OR PULL POST, ONE APPROACH POST, TWO BRACES AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE. CORNER POST ASSEMBLIES SHALL CONSIST OF: ONE CORNER POST, TWO APPROACH POSTS, FOUR BRACES AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE.
- THE TYPE OF FENCE TO BE INSTALLED SHALL BE SHOWN ON PLANS. PULL POSTS SHALL BE INSTALLED AT APPROXIMATELY 330' CENTERS EXCEPT THAT THIS MAXIMUM INTERVAL MAY BE REDUCED BY THE ENGINEER ON CURVES WHERE THE DEGREE OF CURVATURE IS GREATER THAN 3 DEGREES.
- CORNER POSTS ARE TO BE INSTALLED AT ALL HORIZONTAL AND VERTICAL BREAKS IN FENCE OF 15° OR MORE.
- A MAXIMUM LENGTH OF 1320' OF WIRE MAY BE INSTALLED AS A UNIT.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
FENCE TYPE A		Approved By: <i>Dr. Bull</i> District Design Engineer, Roadways	
Designed By	Checked By	Revision No.	Sheet No.
Drawn By	Checked By	Revision No.	Sheet No.
Checked By	Checked By	Revision No.	Sheet No.
F. R. A. Approved 9/3/76		81	1 of 1
			451



1 7/8" x 1 5/8" H-BEAM (STEEL)

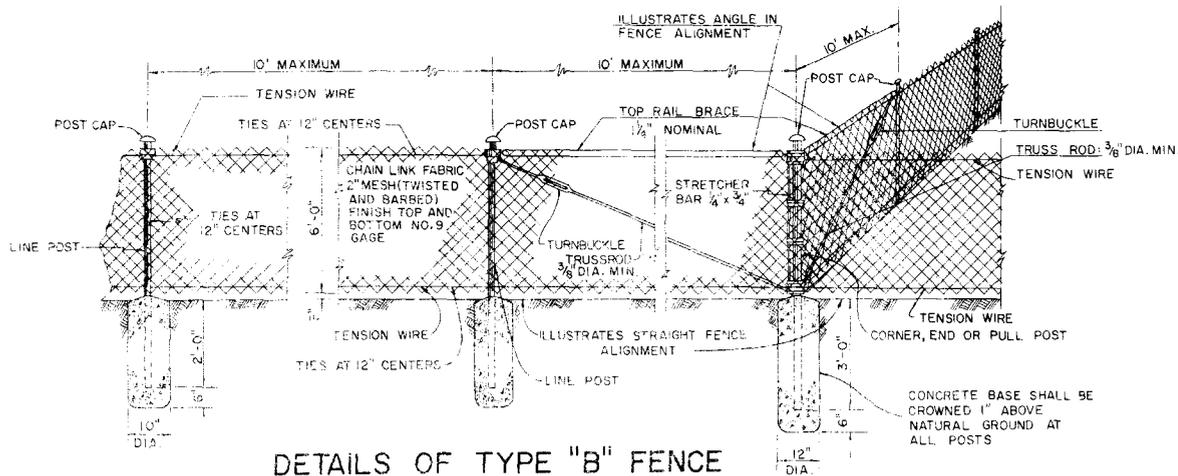
AREA = 7.24 ^{sq} IN.	
GALV. WT. PER FT. = 2.72 ± 5%	
AXES	
1-1	2-2
MOMENT OF INERTIA	.428 101
SECTION MODULUS	4.85 12.4
RAD. OF GYRATION	.775 37.5
SURFACE AREA = 7.75 ^{sq} PER FT.	
TENSILE STRENGTH PSI (MIN.) 80,000	
YIELDING POINT PSI (MIN.) 48,000	

ALTERNATE H-BEAM LINE POST FOR TYPE "B" FENCE

[ALUM.]

0.91 # ± 5%	
AXES	
1-1	2-2
MOMENT OF INERTIA	.428 101
SECTION MODULUS	4.85 12.4
RAD. OF GYRATION	.775 37.5
SURFACE AREA = 7.75 ^{sq} PER FT.	
TENSILE STRENGTH PSI (MIN.) 80,000	
YIELDING POINT PSI (MIN.) 48,000	

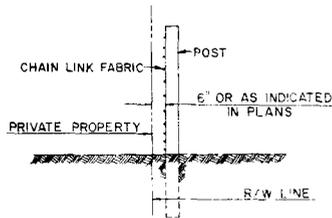
ALTERNATE H-BEAM LINE POST FOR TYPE "B" FENCE



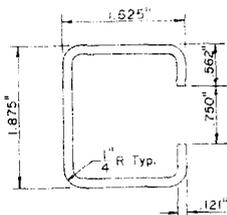
DETAILS OF TYPE "B" FENCE
(ILLUSTRATED FOR STEEL TUBULAR POSTS)

GENERAL NOTES (TYPE "B" FENCE)

- THIS FENCE TO BE PROVIDED GENERALLY IN URBAN AREAS.
- LINE POSTS MAY BE ANY OF THE FOLLOWING:
(A) GALVANIZED STEEL PIPE - 1 1/2" NOMINAL; (B) ALUMINUM COATED STEEL PIPE - 1 1/2" NOMINAL; (C) ALUMINUM ALLOY PIPE - 2" NOMINAL; (D) GALVANIZED STEEL H-BEAM - 1 7/8" x 1 5/8"; (E) ALUMINUM ALLOY H-BEAM - 1 7/8" x 1 5/8"; (F) GALV. STEEL "C" - 1 7/8" x 1 5/8".
- CORNER, END OR PULL POSTS MAY BE ANY OF THE FOLLOWING:
(A) GALVANIZED STEEL PIPE - 2" NOMINAL; (B) ALUMINUM COATED STEEL PIPE - 2" NOMINAL; (C) ALUMINUM ALLOY PIPE - 2 1/2" NOMINAL.
NOTE: OTHER STEEL OR ALUMINUM SHAPES FOR CORNER, END OR PULL POST ASSEMBLIES MAY BE USED IF APPROVED BY THE ENGINEER.
- CHAIN LINK FABRIC, POSTS, RAILS, GATE FRAMES, EXPANSION SLEEVES, TIE WIRES, TENSION WIRES, AND ALL MISCELLANEOUS FITTINGS AND HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M 181-74 AND M-111 UNLESS OTHERWISE NOTED:
(A) UNLESS OTHERWISE CALLED FOR IN THE PLANS OR SPECIAL PROVISIONS;
(1) THE CHAIN LINK FABRIC WIRE SHALL BE NO. 9 GAGE AND GALVANIZED AT RATE OF 2 OZ. PER SQ. FT.
(2) THE TENSION WIRE SHALL BE EITHER NO. 7 GAGE STEEL WIRE GALVANIZED AT THE RATE OF 2 OZ. PER SQ. FT. MIN. OR ALUMINUM WIRE OF ALLOY ALCLAD 5056-H38 OR EQUAL WITH A WIRE DIAMETER OF 0.1875 INCH OR LARGER, OR NO. 7 GAGE ALUMINUM COATED STEEL WIRE COATED AT THE RATE OF 0.4 OZ. PER SQ. FT. MIN.
(3) TIE WIRE AND HOG RINGS SHALL BE NO. 9 GAGE (0.148 INCH) GALVANIZED OR ALUMINUM ALLOY.
(B) THE CONTRACTOR MAY ELECT TO USE A COMBINATION OF ZINC-COATED STEEL FENCE MEMBERS, ALUMINUM COATED STEEL FENCE MEMBERS, AND ALUMINUM ALLOY FENCE MEMBERS; BUT IN GENERAL ONLY ONE COMBINATION OF MATERIALS WILL BE ALLOWED IN FENCE CONSTRUCTION.
- SEE SECTION 966 OF D.O.T. STANDARD SPECIFICATIONS FOR OPTIONAL MATERIALS.
- CONCRETE FOR BASES SHALL BE CLASS I AS SPECIFIED IN SECTION 345 OF THE STANDARD SPECIFICATIONS EXCEPT THAT THE REQUIREMENTS CONTAINED IN 345-5.1, 345-10 AND 345-11 SHALL NOT APPLY. MATERIALS FOR CLASS I CONCRETE MAY BE PROPORTIONED BY VOLUME AND/OR BY WEIGHT.
- IN LOCATIONS OF FIRM WELL DRAINED SOIL, THE CONTRACTOR MAY ELECT TO INSTALL C LINE POSTS (ONLY) BY DRIVING THE POSTS TO A MINIMUM DEPTH OF THREE FEET IN LIEU OF USING CONCRETE FOOTINGS.

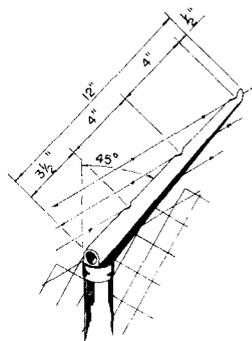


SKETCH INDICATING FENCE LOCATION AT SECTIONS OF NO FRONTAGE ROADS. REFER TO DETAIL PLANS FOR LOCATIONS OF FENCING FOR PROJECTS WITH FRONTAGE ROADS.



ALTERNATE "C" LINE POST FOR TYPE "B" FENCE

GALV. WT. PER FT. = 2.34 ± 5%	
YIELDING POINT PSI (MIN.) 45,000	

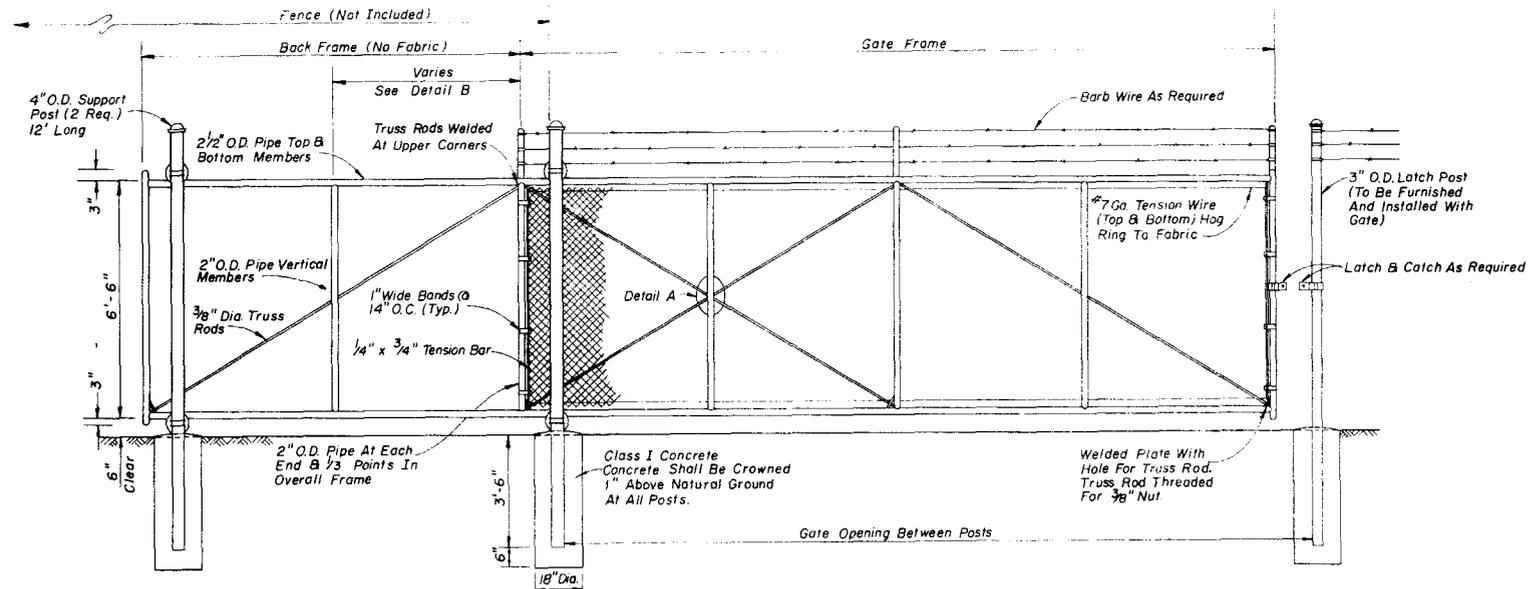


MODIFICATION OF TYPE "B" FENCING SHOWING BARB WIRE AT ATTACHMENT.

GENERAL NOTES (CONT.)

- FOR PAY PURPOSES ASSEMBLIES ARE DEFINED AS FOLLOWS: PULL OR END POST ASSEMBLIES SHALL CONSIST OF ONE PULL OR END POST, ONE BRACE AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE. CORNER POST ASSEMBLIES SHALL CONSIST OF ONE CORNER POST, TWO BRACES AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE.
- THE TYPE OF FENCE TO BE INSTALLED SHALL BE SHOWN ON PLANS. PULL POSTS SHALL BE USED AT BREAKS IN VERTICAL GRADES OF 15° OR MORE, OR AT APPROXIMATELY 330' CENTERS EXCEPT THAT THIS MAXIMUM INTERVAL MAY BE REDUCED BY THE ENGINEER ON CURVES WHERE THE DEGREE OF CURVATURE IS GREATER THAN 3 DEGREES.
- CORNER POSTS ARE TO BE INSTALLED AT ALL HORIZONTAL BREAKS IN FENCE OF 15° OR MORE AND AS REQUIRED AT VERTICAL BREAKS OVER 15° AS DETERMINED BY THE ENGINEER.

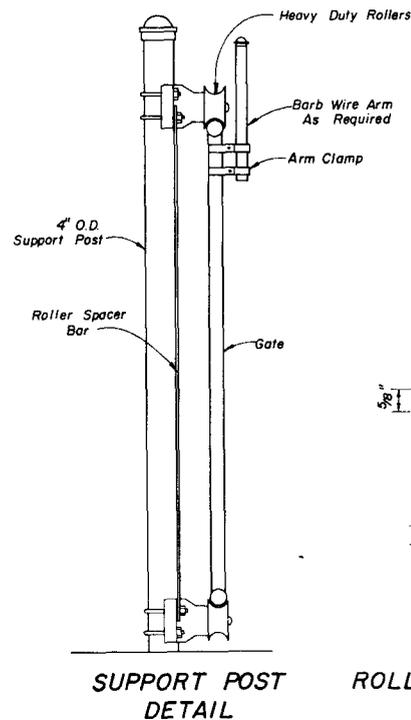
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			
ROAD DESIGN			
FENCE TYPE B			
Designed By	Checked By	Approved By	<i>De Balle</i> Senior Design Engineer, Roadways
Drawn By	Reviewed By		
Project No.	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved 9/3/76	81	1 of 1	452



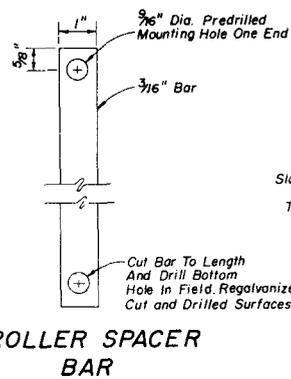
FRONT ELEVATION

GENERAL NOTES

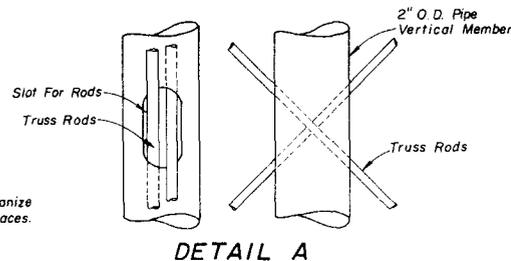
1. Gate components shall meet the material requirement specified on Index No. 452.
2. Steel gate frame shall be fabricated prior to galvanizing, except that truss rods and truss rod plates may be fabricated following frame galvanizing provided surfaces damaged during welding are galvanized in accordance with Section 24 of AASHTO M36.
3. All fabric shall be knuckled top & bottom selvages.
4. Cost of all gate components shall be included in the contract unit price for Sliding Fence Gate (Cantilever), Each.
5. The Contractor may substitute any equivalent cantilever slide gate approved by the Engineer.



SUPPORT POST
DETAIL

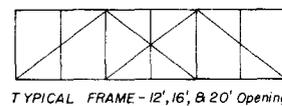


ROLLER SPACER
BAR



DETAIL A

GATE OPENING	GATE FRAME	BACK FRAME
12'	12'-3"	6'
16'	16'-3"	8'
20'	20'-3"	10'
24'	24'-3"	12'



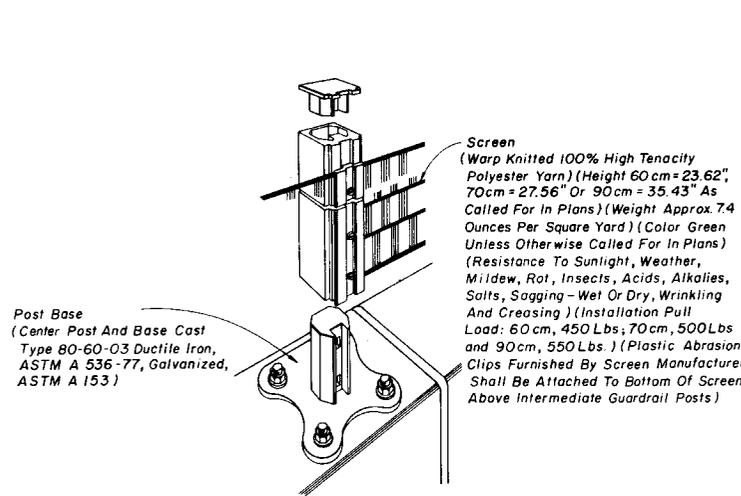
TYPICAL FRAME - 12', 16', & 20' Opening



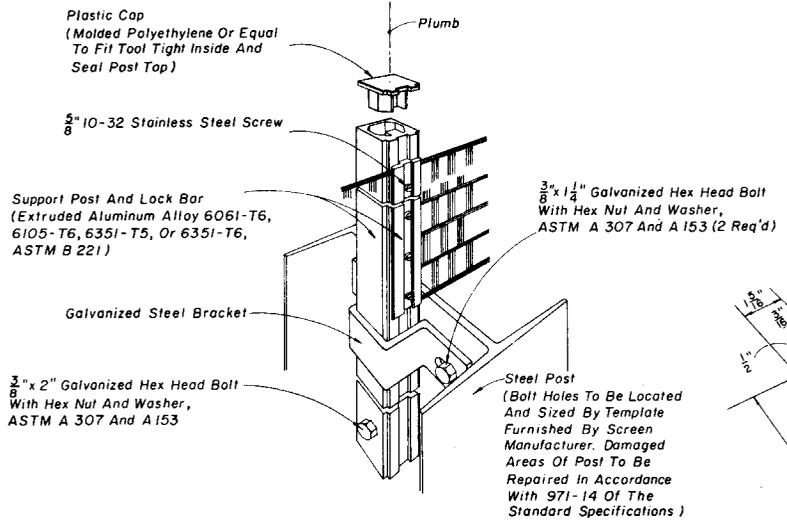
TYPICAL FRAME - 24' Opening

DETAIL B

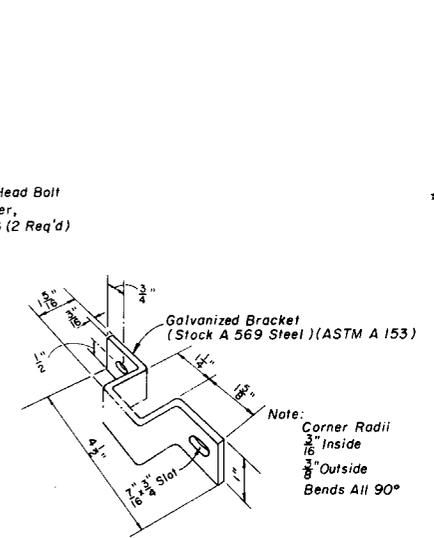
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CANTILEVER SLIDE GATE TYPE B FENCE					
Designed by	Names	Dates	Approved By		
Drawn by	HDD	9/78	<i>D. A. Hill</i> Deputy Design Engineer, Roadways		
Checked by	LMF	9/78	Revisior No.	Sheet No.	Index No.
F.W.A. Approved	10/26/78	82	1 of 1	453	



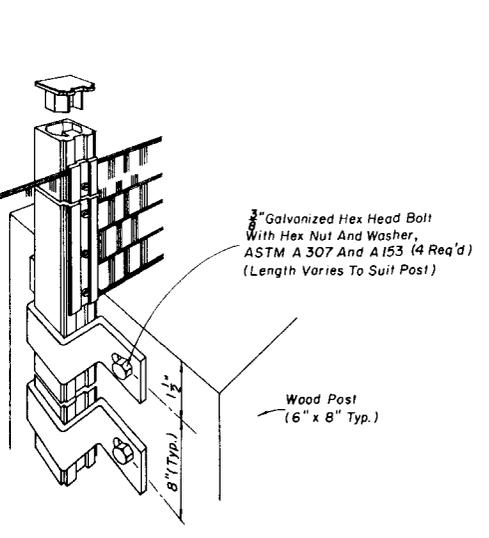
CONCRETE BARRIER WALL MOUNT



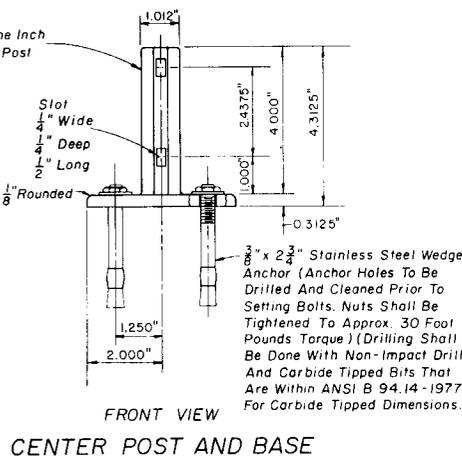
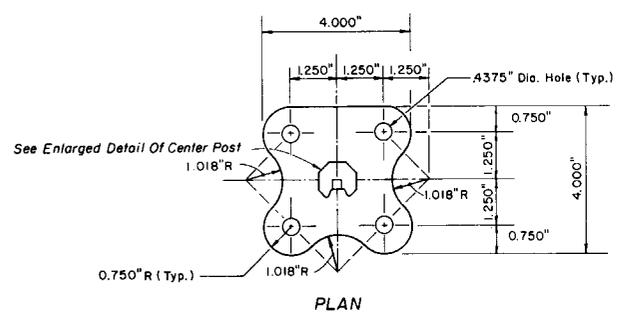
STEEL POST MOUNT



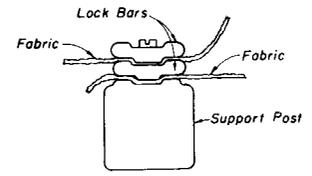
MOUNTING BRACKET



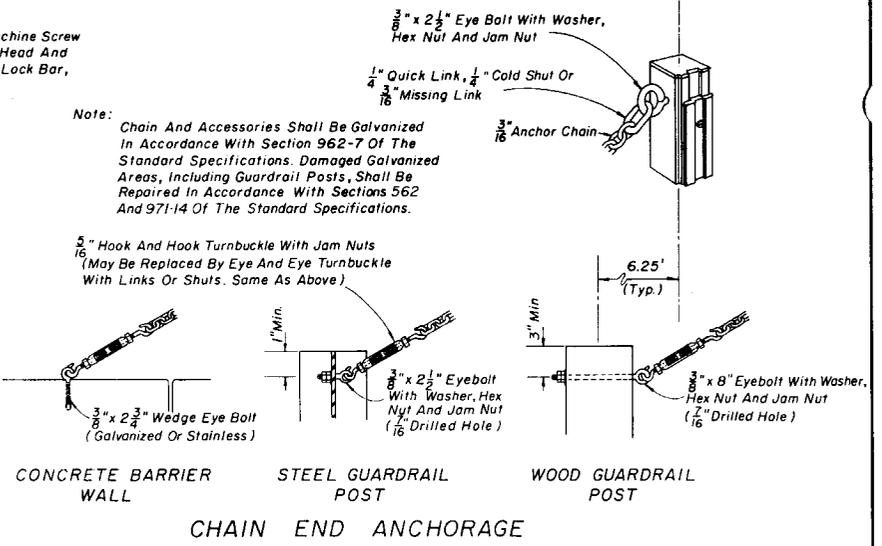
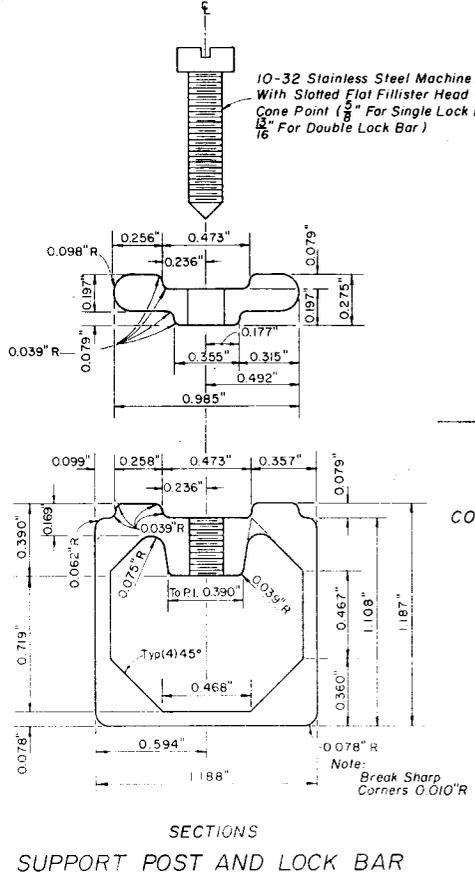
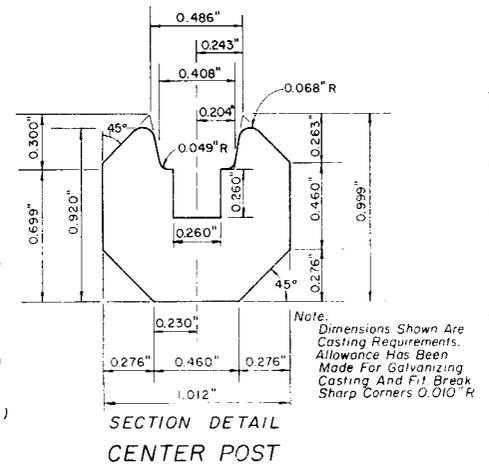
GUARDRAIL WOOD POST MOUNT



CENTER POST AND BASE



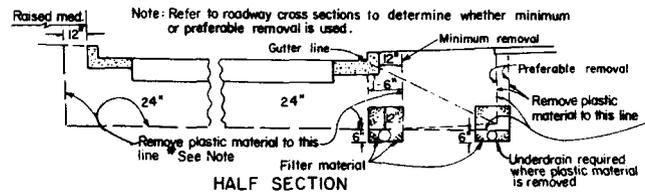
TOP VIEW
GLARE SCREEN SPLICE



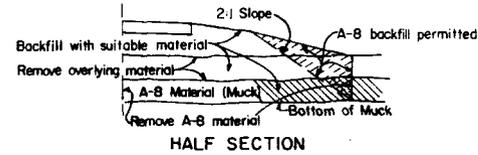
GENERAL NOTES

1. Cost of installation of screen, support posts, lock bars, leading and trailing end anchorages and all accessories shall be included in the contract unit price for Glare Screen (Knitted Polyester) L.F.

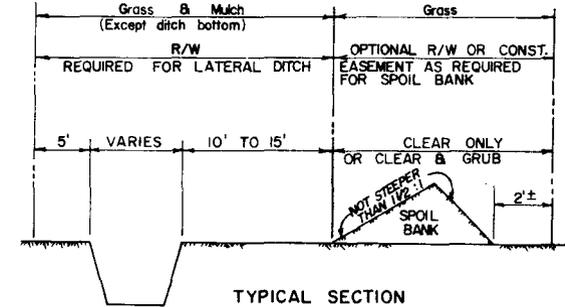
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
GLARE SCREEN KNITTED POLYESTER				
Drawn by	Date	Approved By		
HSD	2-80	<i>[Signature]</i> Road Design Engineer, Roadways		
Checked by	JVG			
Sheet No.		Index No.		
82		1 of 1		460
F.H.W.A. Approved: 10/7/80				



Where preferable method of removal governs and it is impossible to place the underdrain at the outer cut limit due to conflict with storm sewer mains, remove to these limits and place underdrain at location shown for minimum removal.



REMOVAL AND DISPOSAL OF A-8 MATERIAL IN RURAL CONSTRUCTION

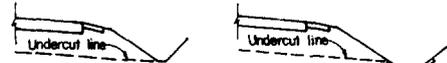


- NOTE.
1. Where no spoil is anticipated or when a large ditch or Canal is involved and spoil is anticipated on both sides, R/W should be adjusted accordingly.
 2. Clearing and Grubbing is to extend 200' beyond the end of the ditch if necessary.
 3. The bottom width of Lateral Ditches is to be 2' wider than the span of the Structure they drain or as shown on Plans.
 4. No Spoil Bank will be permitted within 300' of the C. of the Project, measured at right angles thereto. Waste materials in this section shall be either hauled and deposited in areas approved by the Engineer, or spread on adjacent areas to the depth designated by the Engineer.
 5. All excavation from Lateral Ditches shall be wasted unless otherwise shown on Lateral Ditch Sheets.

LATERAL DITCH SHOWING SPOIL BANK

* NOTE: Where frequency of median breaks indicates that it is impractical to leave plastic material in the median, the designer may elect to indicate total removal of this material. If during construction it becomes apparent, due to normal required construction procedures, that it is impractical to leave the plastic material in the median, the project engineer may authorize total removal of this material after clearing this change thru the Asst. Dist. Engr.-Const.

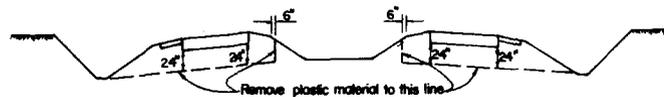
REMOVAL OF PLASTIC MATERIAL AND LOCATION OF UNDERDRAIN IN MUNICIPAL CONSTRUCTION



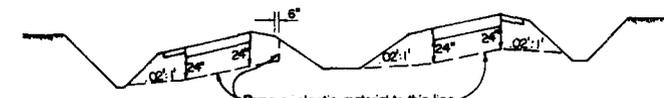
At locations where plastic material is being removed, the side ditches must be at least as deep as the undercut plane.

Where paved side ditches are used in areas of removal of plastic material, the top of the ditch pavement must be no higher than the undercut plane.

MISCELLANEOUS DETAILS

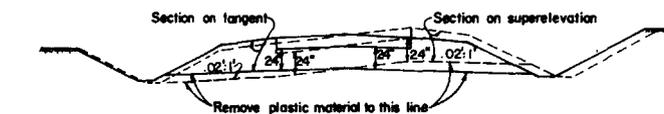


TYPICAL CUT SECTION ON TANGENT

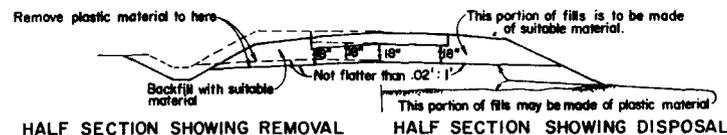


TYPICAL CUT SECTION ON SUPERELEVATION

REMOVAL OF PLASTIC MATERIAL ON INTERSTATE AND PRIMARY SYSTEM HAVING DEPRESSED MEDIAN

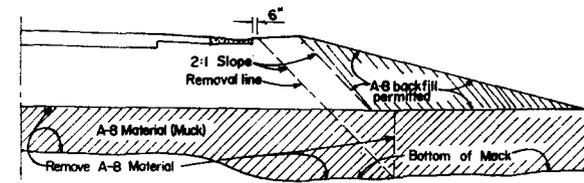


REMOVAL OF PLASTIC MATERIAL ON MAJOR PRIMARY SYSTEM ROADS

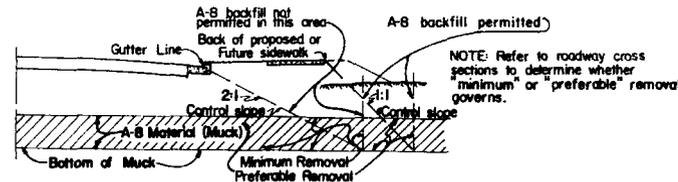


HALF SECTION SHOWING REMOVAL HALF SECTION SHOWING DISPOSAL

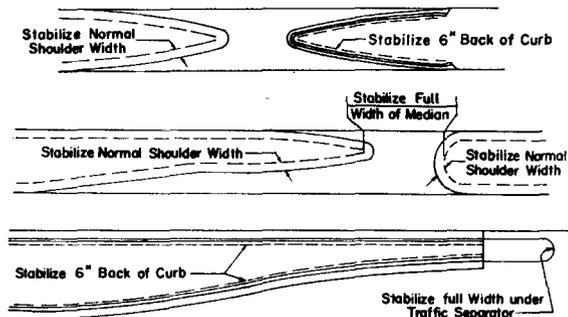
REMOVAL AND DISPOSAL OF PLASTIC MATERIAL FOR SECONDARY AND MINOR PRIMARY SYSTEM ROADS



HALF SECTION MUCK REMOVAL WHERE SHOULDER GUTTER IS CONSTRUCTED



HALF SECTION REMOVAL AND DISPOSAL OF A-8 MATERIAL IN MUNICIPAL CONSTRUCTION



MEDIAN STABILIZING DETAILS

GENERAL STABILIZING NOTES:

- (1) When typical section has curb or curb and gutter in median stabilize 6" back of curb.
- (2) When typical section has shoulder with no curb or curb and gutter in median stabilize to normal shoulder width.
- (3) Stabilize entire area under all paved traffic islands.
- (4) Stabilize full width under all traffic separators.

NOTES:

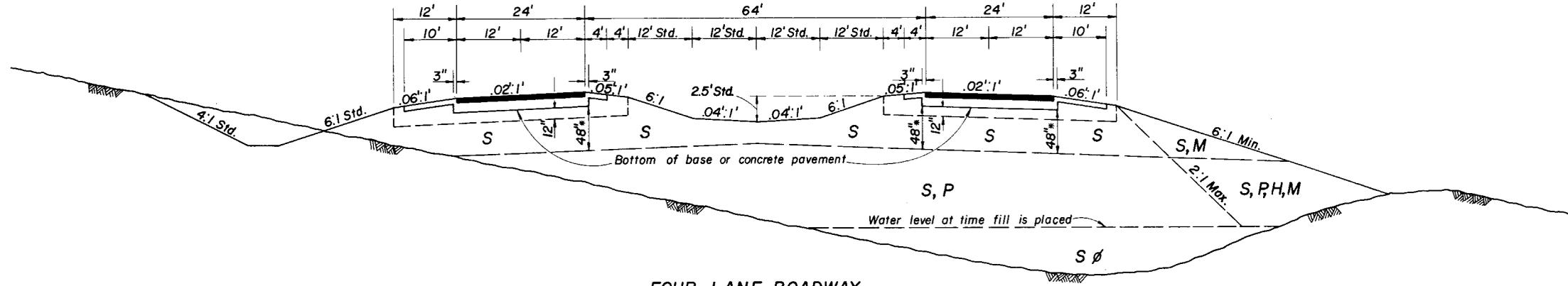
1. All surplus material in shaded area to be removed.
2. Payment for removal is included in the Base item.
3. * Area of base for payment will be calculated using the nominal width (3" Overhang).

REMOVAL OF EXCESS BASE MATERIAL

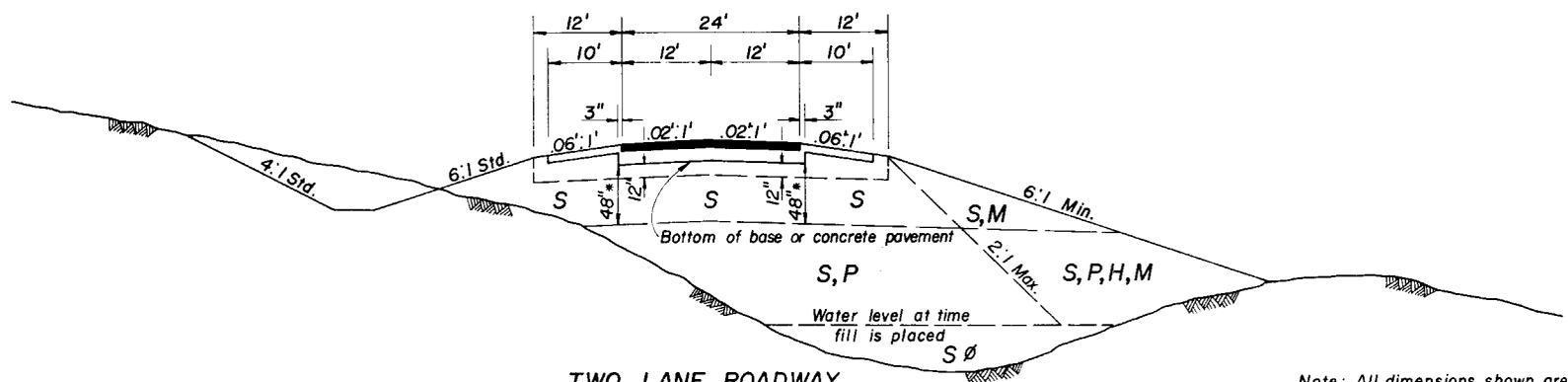
GENERAL NOTES

1. Minimum grade on underdrain pipe shall be 0.2%.
2. Gradation of the filter material shall conform to standard specifications.
3. In rural projects, where underdrain is to be constructed beneath the proposed pavement, the grade of the underdrain is to be such that the underdrain filter material will not extend above the bottom of the stabilized section of the subgrade.
4. All details shown on this sheet for the removal and disposal of unsuitable materials apply unless otherwise shown on the plans.
5. Where plastic material is undercut, backfill shall be made of suitable material.
6. The term "plastic material" used in this drawing in conjunction with removal of plastic material is as defined under soil classification on Index No. 505.
7. The normal depth of side ditches for Interstate and major Primary System roads shall be 3.5' below the shoulder point except in special cases.
8. On Primary and Interstate highways where plastic material is permitted for use in roadway fill, the material may be placed above the existing water level (at the time of Construction) to within 4' of the proposed base. It should be placed uniformly in the lower portion of the embankment for some distance along the Project rather than full depth for short distances.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
EXCAVATION, EMBANKMENT & GRADING			
Designed by	Name	Date	Approved By
Drawn by			<i>D. J. ...</i> Deputy Design Engineer, Roadways
Checked by			Revision No.
E.H.W.A. Approved: 7/7/75		82	1 of 1
			500



FOUR LANE ROADWAY



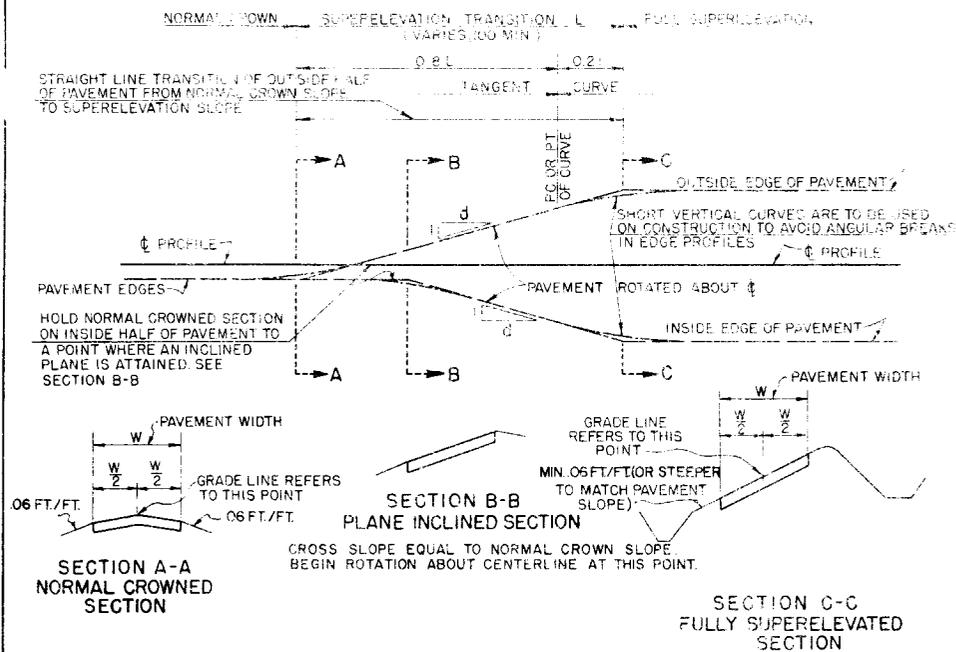
TWO LANE ROADWAY

Note: All dimensions shown are standard.
 The details shown on this Index drawing do not supersede the details shown on Index 500.
 * When otherwise shown on plans this dimension may be reduced to 24".

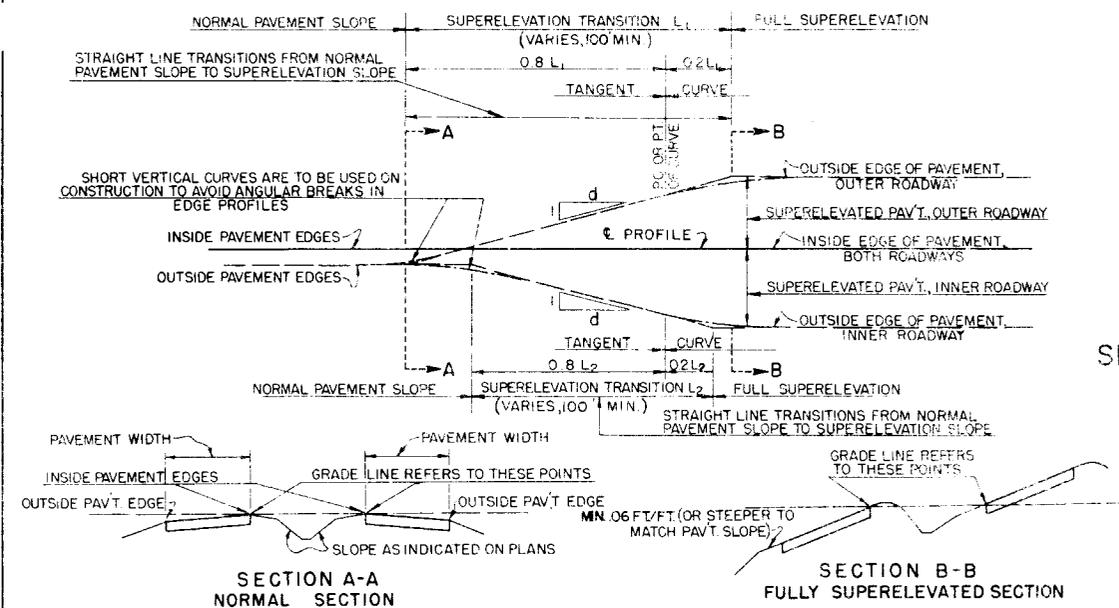
SYMBOL	SOIL	CLASSIFICATION (AASHTO M-145)
S	Select	A-1, A-3, A-2-4
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (All with LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 or A-7 (All with LL > 50)
M	Muck	A-8

Symbols listed Left to Right in order of preference.
 ∅ Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and therefor should be used in the embankment above water level existing at time of construction.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
EMBANKMENT UTILIZATION			
Drawn by	Checked	Approved By	
Design No.	Revision No.	<i>D. J. Baker</i>	
Checked By	Sheet No.	Speed No.	Draw No.
10/11/74 Approved: 4/23/74	82	1 of 1	505

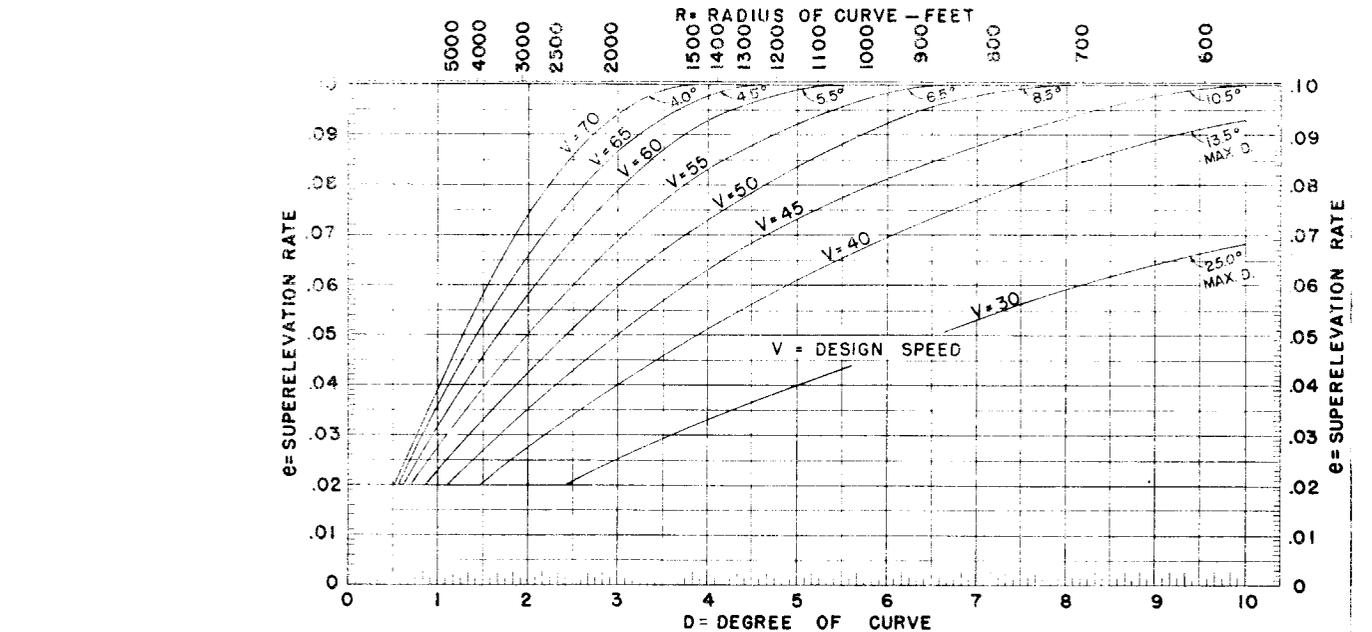


2-LANE OR 4-LANE PAVEMENT, NO MEDIAN

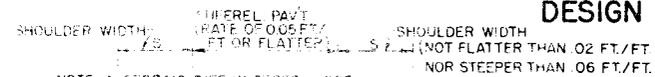


4-LANE PAVEMENT WITH MEDIAN

THESE TRANSITION DETAILS ARE TO APPLY IN ALL CASES, EXCEPT AT CURVES OF INSUFFICIENT LENGTH, INSUFFICIENT TANGENT LENGTH BETWEEN CURVES, P.C.C.'S OR P.R.C.'S, IN WHICH CASE THE DETAILS OF THE TRANSITIONS ARE TO BE INCLUDED IN THE DETAIL PLANS.



DESIGN SUPERELEVATION RATES $e_{max} = 0.10$



SHOULDER CONSTRUCTION WITH SUPERELEVATION

GENERAL NOTES FOR SUPERELEVATION

1. USE NORMAL SECTION WITH NO SUPERELEVATION FOR CURVES UP TO 0°-20' (0°-14' FOR DESIGN SPEEDS OF 70 MPH).
2. WHEN THE DEGREE OF CURVE IS 0°-21' OR GREATER (0°-15' FOR DESIGN SPEEDS OF 70 MPH) AND IS IN THE RANGE OF THE HORIZONTAL PORTION OF THE CURVE, SUPERELEVATE AT THE NORMAL CROSS SLOPE RATE OF .02 FT./FT. OR AS INDICATED BY THE CURVE FOR THE APPROVED DESIGN SPEED.
3. THE LENGTH OF SUPERELEVATION TRANSITION IS TO BE DETERMINED BY USING A RELATIVE SLOPE OF PAVEMENT EDGE TO PROFILE GRADE GIVEN IN THE TABLE BELOW, EXCEPT THAT THE MINIMUM LENGTH OF TRANSITION SHALL BE 100 FT.
4. FOR CURVES IN MUNICIPAL AREAS, SEE INDEX NO. 511.

SHOULDER ON HIGH SIDE A SHOULDER SLOPE OF .06 FT./FT. DOWNWARD FROM THE EDGE OF PAVEMENT WILL BE MAINTAINED UNTIL A .07 FT./FT. BREAK IN SLOPE AT THE PAVEMENT EDGE IS REACHED DUE TO SUPERELEVATION OF THE PAVEMENT AS THE PAVEMENT SUPERELEVATION INCREASES, THE .07 FT./FT. BREAK IN SLOPE WILL BE MAINTAINED AND THE SHOULDER FLATTENED UNTIL THE SHOULDER SLOPE REACHES THE MINIMUM OF .02 FT./FT. DOWNWARD FROM THE EDGE OF PAVEMENT. ANY FURTHER INCREASE IN PAVEMENT SUPERELEVATION WILL NECESSITATE SLOPING THE INSIDE HALF OF THE SHOULDER TOWARD THE PAVEMENT AND THE OUTER HALF OUTWARD, BOTH AT .02 FT./FT. THESE SLOPES WILL BE HELD WITH FURTHER INCREASE IN PAVEMENT SUPERELEVATION UNTIL THE MAXIMUM BREAK OF 0.07 FT./FT. AT THE PAVEMENT EDGE IS AGAIN REACHED. THIS MAXIMUM BREAK WILL THEN BE HELD AND SHOULDER SLOPES STEEPENED WITH ADDITIONAL SUPERELEVATION.

SHOULDER ON LOW SIDE MAINTAIN .06 FT./FT. DROP ACROSS INSIDE SHOULDER UNTIL PAVEMENT CROSS SLOPE REACHES .06 FT./FT. FOR PAVEMENT CROSS SLOPES GREATER THAN .06 FT./FT., SHOULDER TO HAVE SAME SLOPE AS PAVEMENT.

THESE DETAILS APPLY TO BOTH PAVED AND GRASSED SHOULDER.

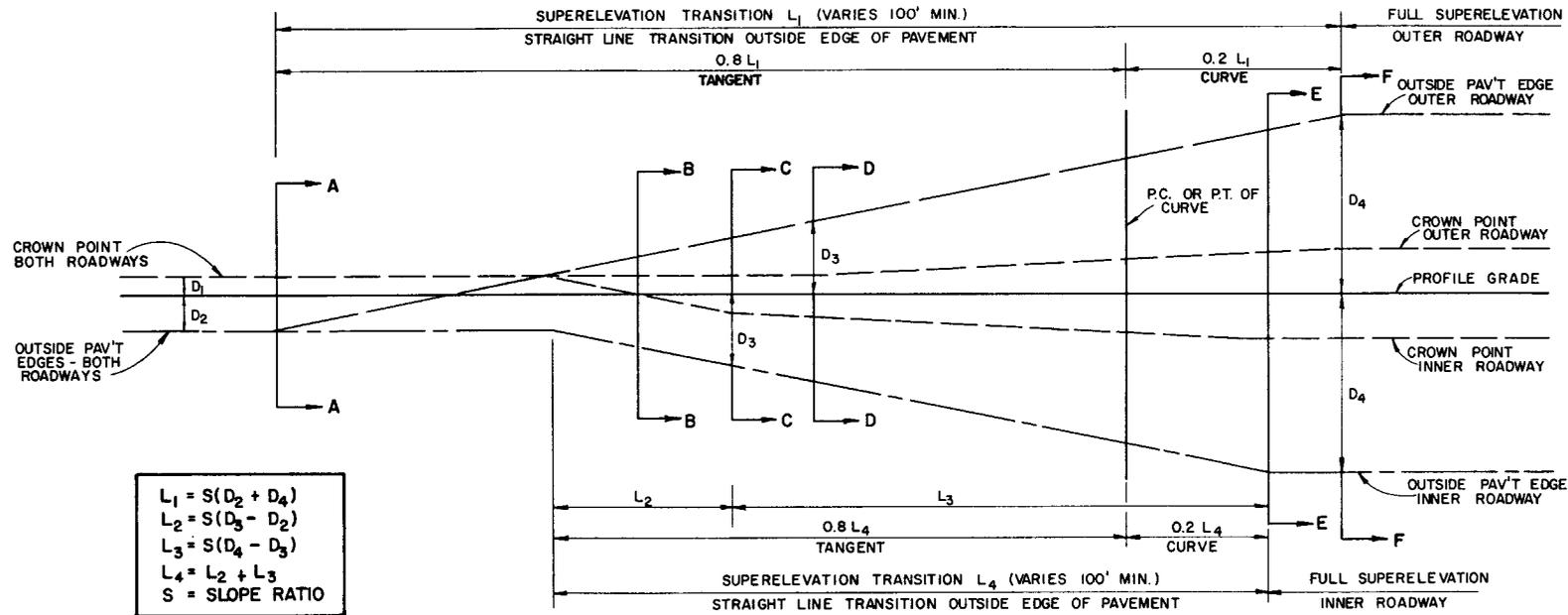
SLOPE RATIOS FOR SUPERELEVATION TRANSITIONS				
DESIGN SPEED, M.P.H.	45-50	55-60	65-70	
L _d	1:200	1:225	1:250	2 Lane B
	1:160	1:180	1:200	4 Lane
	1:150	1:170	1:190	6 Lane

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SUPERELEVATION

Designed by	Name	Date	Approved By
Drawn by	H.F.W.	5/65	<i>De Hall</i> Deputy Design Engineer, Roadways
Checked by	L.M.F.	10/74	
F.H.W.A. Approved	7/27/75	31	1 of 2

Index No. 510



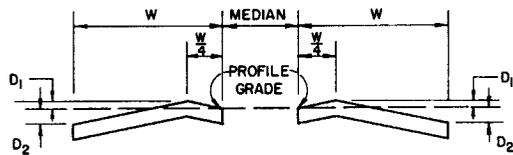
$$L_1 = S(D_2 + D_4)$$

$$L_2 = S(D_3 - D_2)$$

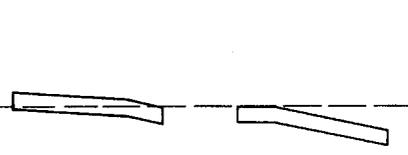
$$L_3 = S(D_4 - D_3)$$

$$L_4 = L_2 + L_3$$

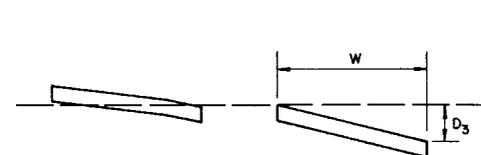
$$S = \text{SLOPE RATIO}$$



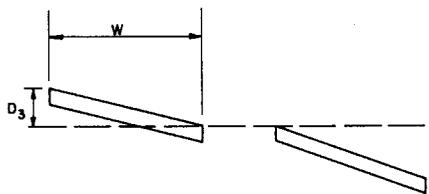
SECTION A-A
NORMAL CROWNED SECTION



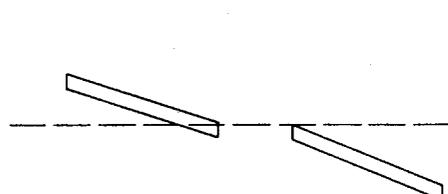
SECTION B-B
SUPERELEVATION SECTION LT. & RT.



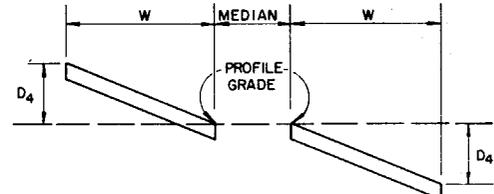
SECTION C-C
SUPERELEVATION SECTION LT.
PLANE INCLINED SECTION RT.



SECTION D-D
PLANE INCLINED SECTION LT.
SUPERELEVATION TRANSITION RT.



SECTION E-E
SUPERELEVATION TRANSITION LT.
FULL SUPERELEVATION RT.



SECTION F-F
FULL SUPERELEVATION LT. & RT.

8-LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SUPERELEVATION					
Designed by	WAL	8/77	Approved By		
Drawn by	LMF	8/77	<i>De. [Signature]</i> Deputy Design Engineer, Roadways		
Checked by	WAL	8/77	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved	11/2/77	81	2 of 2	510	

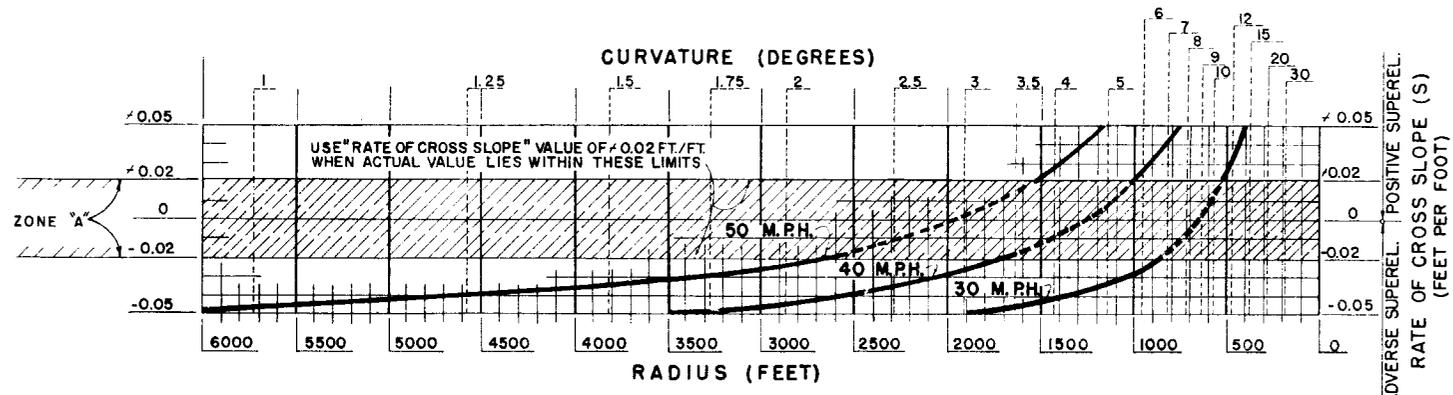
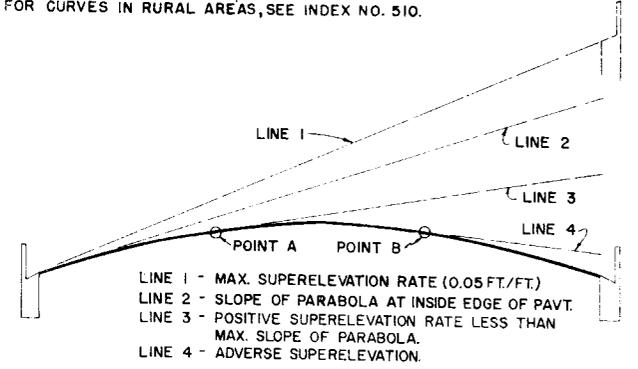
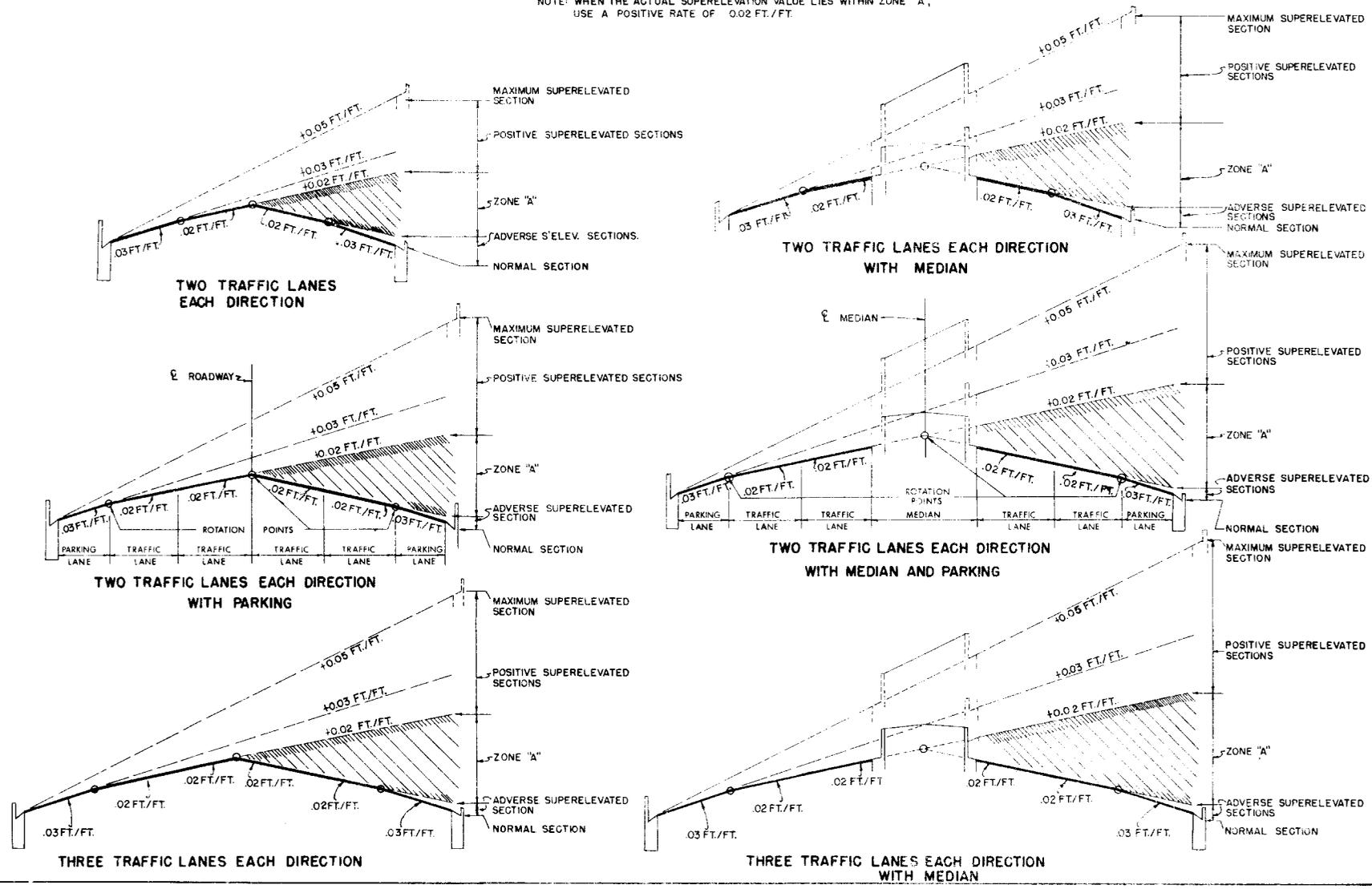


CHART SHOWING REMOVAL OF CROWN AND OR SUPERELEVATION NECESSARY FOR CURVATURE AT VARIOUS DESIGN SPEEDS

NOTE: WHEN THE ACTUAL SUPERELEVATION VALUE LIES WITHIN ZONE "A", USE A POSITIVE RATE OF .02 FT./FT.

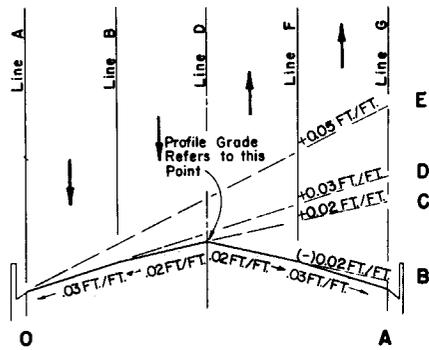
GENERAL NOTES FOR SUPERELEVATION

1. MAXIMUM RATE OF SUPERELEVATION (IN MUNICIPAL CONSTRUCTION) SHALL BE 0.05 FT./FT.
2. SUPERELEVATION SHALL BE OBTAINED BY ROTATING THE PLANE SUCCESSIVELY ABOUT THE BREAK POINTS OF THE SECTION UNTIL THE PLANE HAS ATTAINED A SLOPE EQUAL TO THAT REQUIRED BY THE CHART. SHOULD THE ROTATION TRAVERSE THE ENTIRE SECTION AND FURTHER SUPERELEVATION BE REQUIRED, THE REMAINING ROTATION OF THE PLANE SHALL BE ABOUT THE LOW EDGE OF THE INSIDE TRAVEL LANE. ADVERSE SUPERELEVATION OF SECTIONS WITH PARKING LANES. NO SUPERELEVATION WILL BE REQUIRED WHEN THE MAXIMUM ADVERSE SUPERELEVATION RATE IS GREATER THAN THE NORMAL SLOPE OF THE TRAFFIC LANE ADJACENT TO THE PARKING LANE.
3. WHEN POSITIVE SUPERELEVATION IS REQUIRED, THE SLOPE OF THE GUTTER ON THE HIGH SIDE SHALL BE A CONTINUATION OF THE SLOPE OF THE SUPERELEVATED PAVEMENT.
4. IN CONSTRUCTION, SHORT VERTICAL CURVES SHALL BE PLACED AT ALL ANGULAR PROFILE BREAKS WITHIN THE LIMITS OF THE SUPERELEVATION TRANSITION.
5. MINIMUM GUTTER GRADES WITHIN THE LIMITS OF THE SUPERELEVATION TRANSITION SHALL BE 0.2%.
6. THE VARIABLE SUPERELEVATION TRANSITION LENGTH "L" SHALL HAVE A MINIMUM VALUE OF 50 FEET FOR DESIGN SPEEDS UNDER 40 M.P.H. AND 75 FEET FOR DESIGN SPEEDS OF 40 M.P.H. OR GREATER.
7. MUNICIPAL SECTIONS HAVING LANE ARRANGEMENTS DIFFERENT FROM THOSE SHOWN, BUT COMPOSED OF A SERIES OF PLANES, SHALL BE SUPERELEVATED IN A SIMILAR MANNER.
8. FOR CURVES IN RURAL AREAS, SEE INDEX NO. 510.



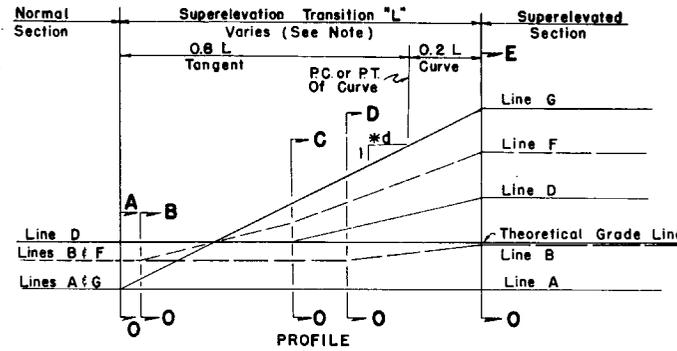
VALUES OBTAINED FROM THE CHART ARE ALSO APPLICABLE TO A PARABOLIC CROWN SECTION. WHEN THIS TYPE SECTION IS USED, SUPERELEVATION IS ESTABLISHED BY ROTATING A TANGENT ABOUT THE ARC OF THE PARABOLIC CROWN UNTIL THE DESIRED SLOPE IS ATTAINED (POINTS A & B ON SKETCH). THE NORMAL PARABOLIC CROWN WILL BE MAINTAINED OUTSIDE THE LIMITS OF THE PLANE THUS FORMED.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
SUPERELEVATION MUNICIPAL CONSTRUCTION				
Designed by	WLB	Date	2/66	Approved By
Drawn by	CDR	1/67		<i>J. P. Hall</i> District Design Engineer, Roadways
Checked by	RLD	1/67	Revision No.	Sheet No.
F.H.W.A. Approved: 5/20/77	81	1 of 2	511	



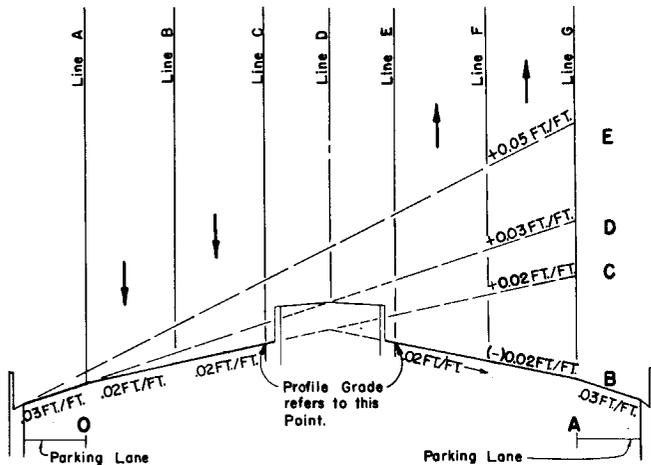
SECTION O-A TO O-E

TWO LANES EACH DIRECTION



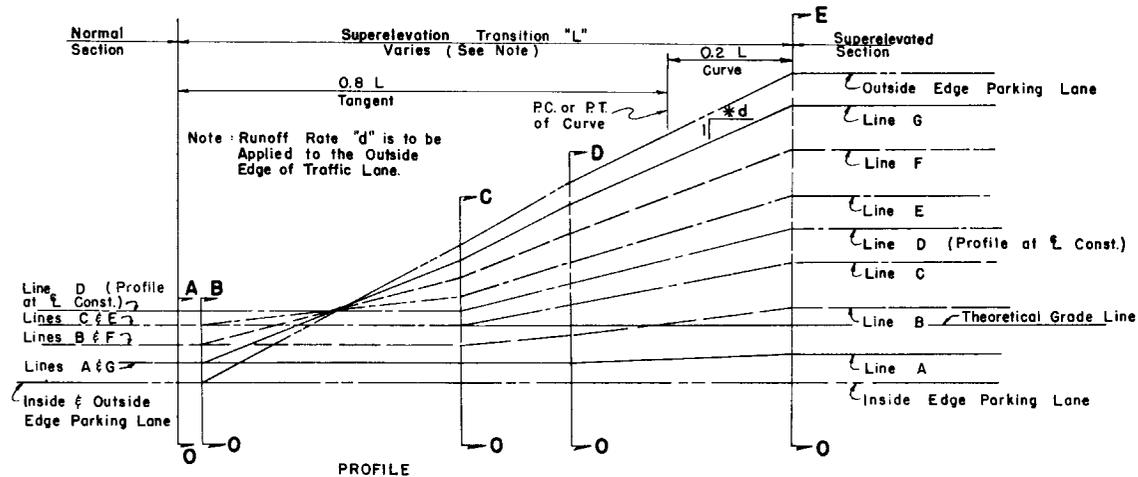
PROFILE

LINE	DESCRIPTION
A	INSIDE TRAFFIC LANE
B	INSIDE LANE LINE
C	INSIDE MEDIAN EDGE PAVEMENT
D	ℓ CONSTRUCTION
E	OUTSIDE MEDIAN EDGE PAVEMENT
F	OUTSIDE LANE LINE
G	OUTSIDE TRAFFIC LANE



SECTION O-A TO O-E

TWO LANES EACH DIRECTION WITH MEDIAN AND REFUGE LANE



PROFILE

*d (SLOPE RATIO)	
30 MPH	1 : 100
40 MPH	1 : 125
50 MPH	1 : 150

D	R	V=30mph			V=40mph			V=50mph		
		e	e	e	e	e	e	e	e	
0° 15'	22918'	NC	NC	NC	NC	NC	NC	NC	NC	
0° 30'	11459'	NC	NC	NC	NC	NC	NC	NC	NC	
0° 45'	7639'	NC	NC	NC	NC	NC	NC	NC	NC	
1° 00'	5730'	NC	NC	NC	NC	NC	NC	NC	NC	
1° 30'	3820'	RC	RC	RC	RC	RC	RC	RC	RC	
2° 00'	2865'	RC	RC	RC	.022	.026	.028	.028	.028	
2° 30'	2292'	RC	RC	RC	.026	.029	.031	.031	.031	
3° 00'	1910'	.020	.020	.020	.029	.032	.033	.033	.033	
3° 30'	1637'	.023	.023	.023	.032	.035	.036	.036	.036	
4° 00'	1432'	.025	.025	.025	.033	.036	.038	.038	.038	
5° 00'	1146'	.028	.028	.028	.036	.040	.043	.043	.043	
6° 00'	955'	.031	.031	.031	.039	.044	.047	.047	.047	
7° 00'	819'	.032	.032	.032	.041	.046				
8° 00'	716'	.034	.034	.034	.044					
9° 00'	637'	.035	.035	.035	.046					
10° 00'	573'	.037	.037	.037	.048					
11° 00'	521'	.038								
12° 00'	477'	.039								
13° 00'	441'	.040								
14° 00'	409'	.043								
16° 00'	358'	.045								
18° 00'	318'	.047								
20° 00'	286'	.050								

e Max.=0.05

The super-elevation rates shown above are to be used for urban (curb & gutter) arterials in suburban areas where sufficient R/W may be acquired to make suitable connections.

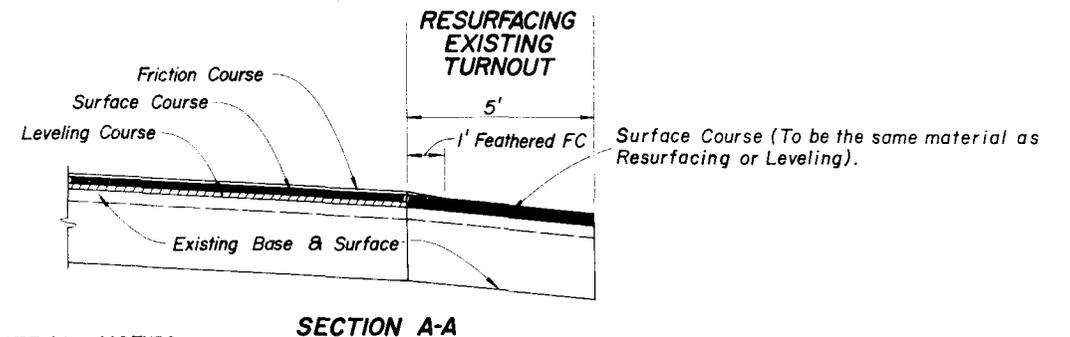
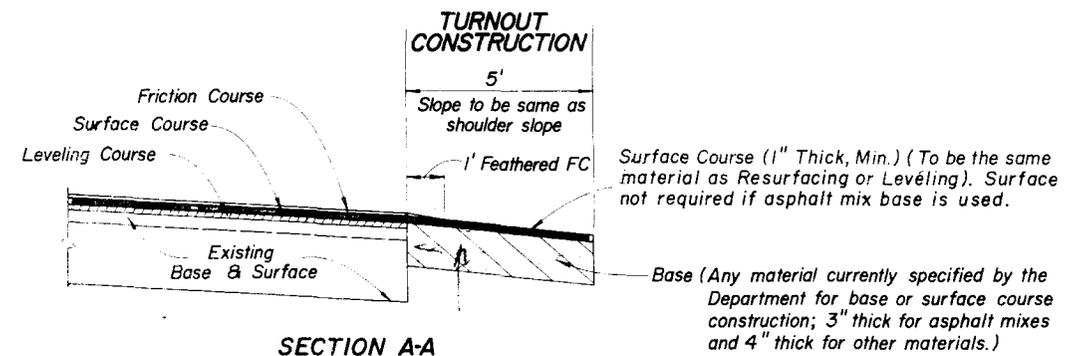
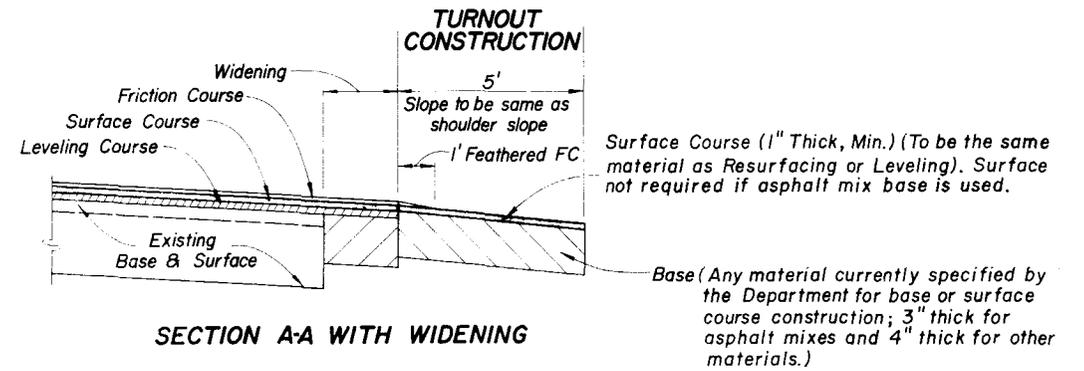
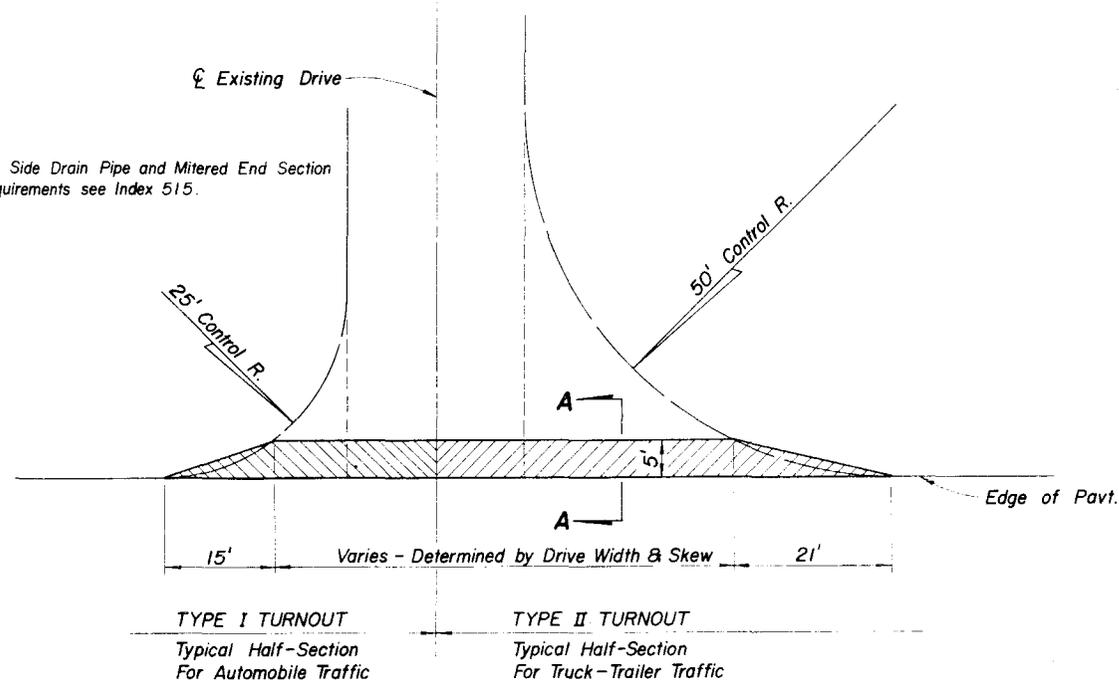
NOTE: THE SECTIONS AND PROFILES SHOWN ON THIS SHEET ARE EXAMPLES OF THE SUPERELEVATION TRANSITIONS. SIMILAR SCHEMES SHOULD BE USED FOR ROADWAYS HAVING DIFFERENT SECTION DESIGNS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SUPERELEVATION MUNICIPAL CONSTRUCTION			
Designed by	WLB	Date	2/66
Drawn by	CDR	Date	1/67
Checked by	RLD	Date	1/67
Approved By		<i>De. Bell</i> Mobility Design Engineer, Roadwork	
F.H.W.A. Approved		5/20/77	81
Sheet No.		2 of 2	Index No.
			511

LAYER THICKNESS FOR ASPHALTIC CONCRETE STRUCTURAL COURSES																					
COURSE THICKNESS (Inches)	LAYER THICKNESS (Inches)																				
	Type S-I					Type S-II				Type II				Type III				SAHM			
	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
1	1									1				1					1		
1½	1½					1½				1½				1½					1½		
2	2					2				1	1			1	1				1	1	
2½	1½	1				2½				1¼	1¼			1¼	1¼				1¼	1¼	
3	2	1				3				1	1	1		1	1	1			1	1	1
3½	2	1½				2	1½			1¼	1¼	1		1¼	1¼	1			1¼	1¼	1
4	2	2				2½	1½			1½	1¼	1¼		1½	1¼	1¼			1½	1¼	1¼
4½	2	1½	1			3	1½			1¼	1¼	1	1	1¼	1¼	1	1		1½	1¼	1
5	2	2	1			3	2			1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼		1¼	1¼	1¼
5½	2	2	1½			3	2½														
6	2	2	2			2	2	2													
6½	2	2	1½	1		2½	2	2													
7	2	2	2	1		3	2	2													
7½	2	2	2	1½		3	2½	2													
8	2	2	2	2		3	3	2													
8½	2	2	2	1½	1	3	3	2½													
9	2	2	2	2	1	3	2	2	2												

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
FLEXIBLE PAVEMENT LAYER THICKNESS FOR STRUCTURAL COURSES					
Designed by	None	Date	Approved By		
Drawn by	JAD	9/81	Deputy Design Engineer, Roadways		
Checked by	JVG	9/81	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved:	2/81		82	1 of 1	513

For Side Drain Pipe and Mitered End Section Requirements see Index 515.

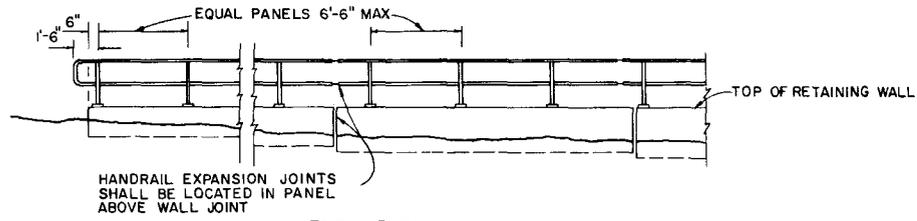
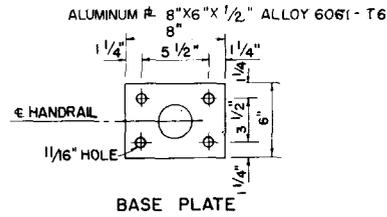


Drive Width (Ft.)	Intersection			
	Normal		Skewed	
	Type I	Type II	Type I	Type II
12	26	51	31	60
14	27	52	33	61
16	28	53	34	63
18	29	54	35	64
20	31	55	37	65
22	32	56	38	67
24	33	57	39	68
26	34	58	40	69
28	35	59	42	70
30	36	61	43	72
32	37	62	44	73
34	38	63	46	74
36	39	64	47	76
38	41	65	48	77
40	42	66	49	78
42	43	67	51	79
44	44	68	52	81
46	45	69	53	82
48	46	71	55	83
50	47	72	56	85
52	48	73	57	86
54	49	74	58	87
56	51	75	60	88
58	52	76	61	90
60	53	77	62	91

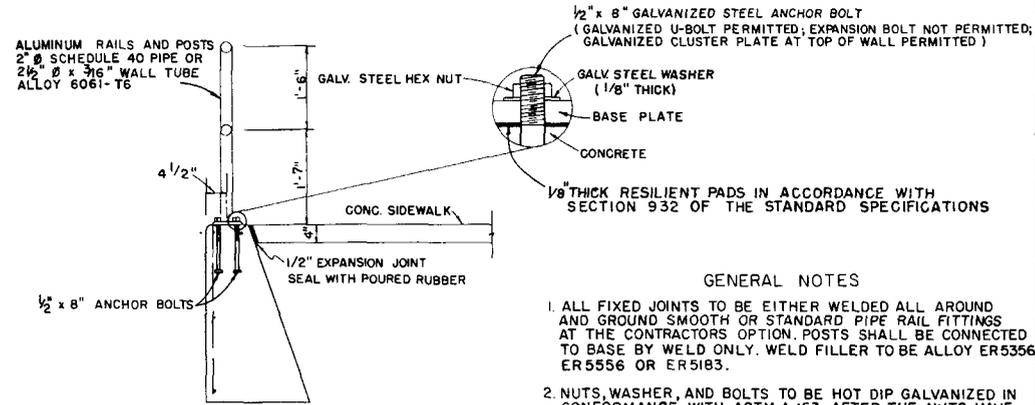
GENERAL NOTES

1. Turnouts are to be constructed or resurfaced at locations as directed by the Engineer.
2. Turnout construction not required with paved shoulders.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. Contract unit price, Turnout Construction, to include excavation and base.
5. Payment for surface course to be included in roadway resurfacing pay item.
6. Payment for feathering friction course to be included in the unit price for Asphaltic Concrete Friction Course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering not required for FC-2 & FC-3 friction courses.

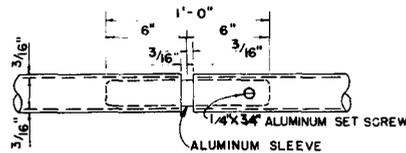
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TURNOUTS RESURFACING PROJECTS			
Designed By	D.C.B.	Date	11/77
Drawn By	H.K.H.	Date	11/77
Checked By	J.V.G.	Date	11/77
Approved By		<i>J.C. Hall</i> Deputy Design Engineer, Roadways	
Revision No.		80	Sheet No.
F.H.W.A. Approved		1 of 1	516



ELEVATION



TYPICAL SECTION AT POST



EXPANSION JOINT

ALUMINUM HANDRAIL ON GRAVITY WALL

1/2" x 8" GALVANIZED STEEL ANCHOR BOLT
(GALVANIZED U-BOLT PERMITTED; EXPANSION BOLT NOT PERMITTED; GALVANIZED CLUSTER PLATE AT TOP OF WALL PERMITTED)

GALV. STEEL HEX NUT

GALV. STEEL WASHER (1/8" THICK)

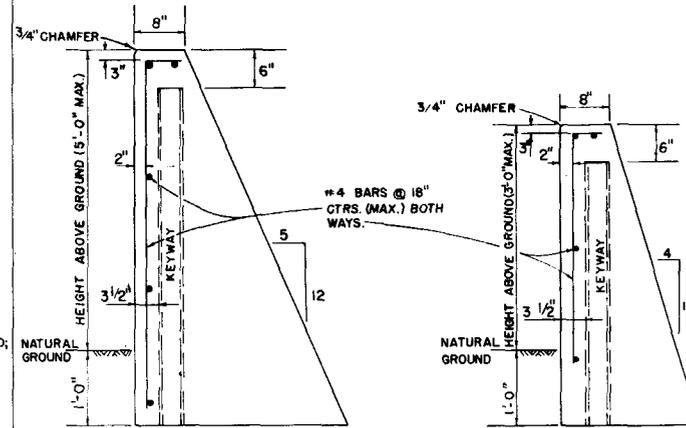
BASE PLATE

CONCRETE

1/8" THICK RESILIENT PADS IN ACCORDANCE WITH SECTION 932 OF THE STANDARD SPECIFICATIONS

GENERAL NOTES

- ALL FIXED JOINTS TO BE EITHER WELDED ALL AROUND AND GROUND SMOOTH OR STANDARD PIPE RAIL FITTINGS AT THE CONTRACTORS OPTION. POSTS SHALL BE CONNECTED TO BASE BY WELD ONLY. WELD FILLER TO BE ALLOY ER5356, ER5556 OR ER5183.
- NUTS, WASHER, AND BOLTS TO BE HOT DIP GALVANIZED IN CONFORMANCE WITH ASTM A-153. AFTER THE NUTS HAVE BEEN TIGHTENED, THE ANCHOR BOLT THREADS SHALL BE DISTORTED OR THE NUTS AND BOLTS SPOT WELDED AND COATED WITH ZINC COMPOUND.

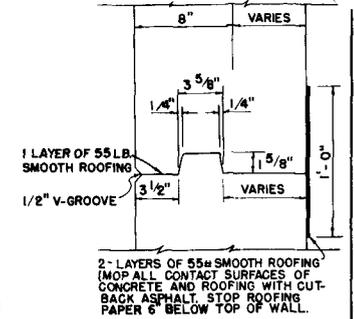


SECTION

SECTION

ESTIMATED QUANTITIES FOR WALL		
HEIGHT ABOVE GROUND	CUBIC YARDS CONCRETE	POUNDS STEEL
2'	.13	4
3'	.20	5
4'	.32	6
5'	.43	7

GRAVITY WALL

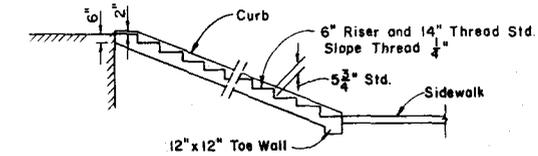


KEY DETAIL

ALL WALL JOINTS TO BE EQUALLY SPACED WITH 30'-0" MAX. CENTERS. KEYWAY TO STOP 6" BELOW TOP OF WALL.

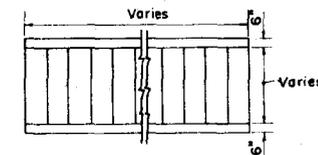
GENERAL NOTES:

- COST OF REINFORCING STEEL TO BE INCLUDED IN THE COST OF CLASS I CONCRETE.
- QUANTITIES SHOWN ARE FOR ONE LINEAR FOOT OF WALL.



SECTION

Note: Riser height and thread depth may vary to fit existing conditions as directed by the Engineer.



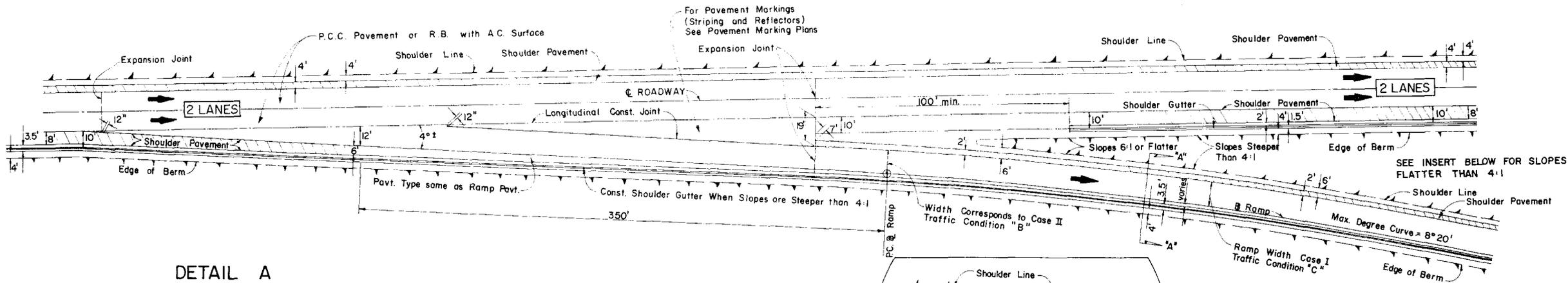
PLAN

CONCRETE STEPS

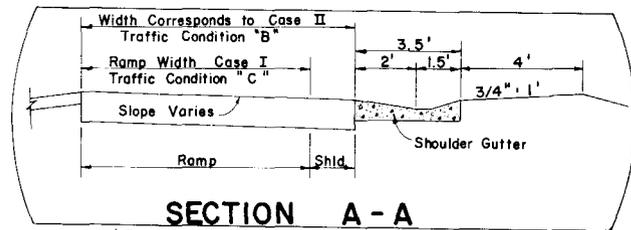
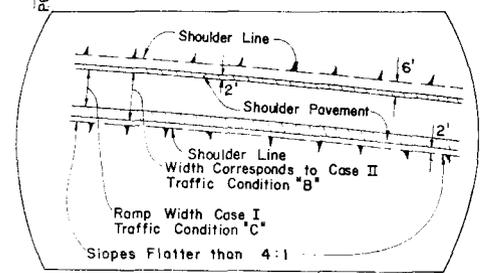
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

WALLS, HANDRAILS & STEPS

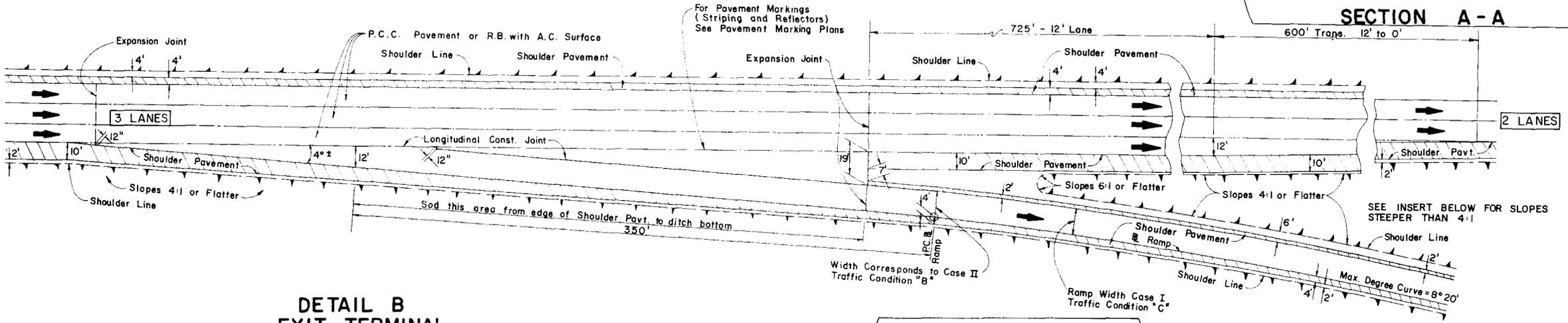
Designed by	Names	Date	Approved By			
Drawn by	CDR	2/68	<i>Dr. Kull</i>	Deputy Design Engineer, Roadways		
Checked by	RHC	2/68	Revision No.	Sheet No.	Index No.	
F.H.W.A. Approved: 3/20/75			81	1 of 1	520	



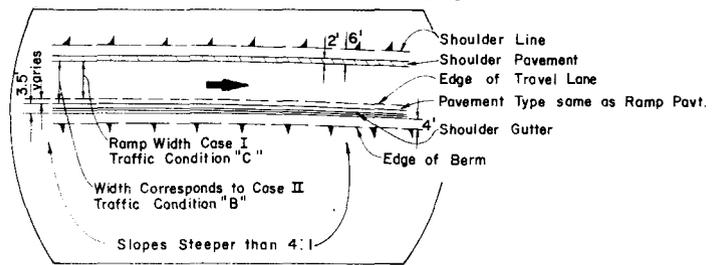
DETAIL A
EXIT TERMINAL
TWO THRU LANES



SECTION A - A

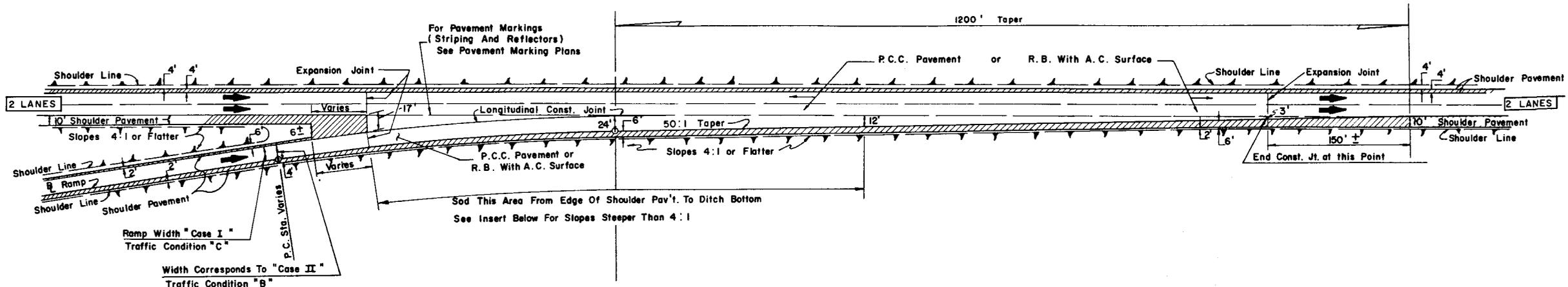


DETAIL B
EXIT TERMINAL
TWO THRU LANES
THREE APPROACH LANES

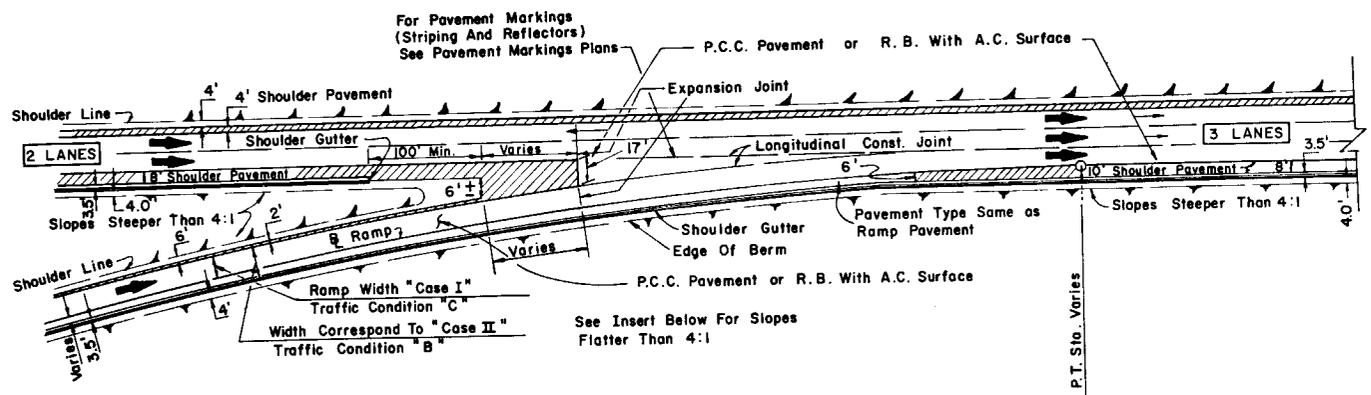
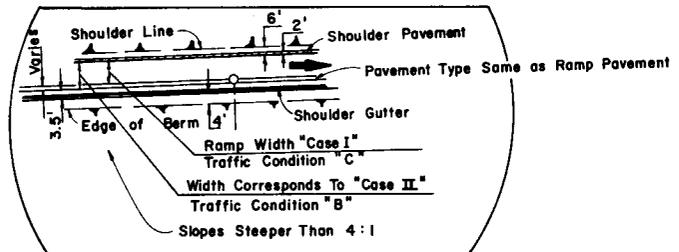


NOTES:
1. FOR GENERAL NOTES SEE SHEET NO. 2

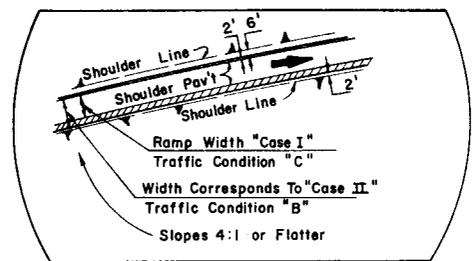
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
RAMP TERMINALS			
Names	Date	Approved By	
Designed by EHH	1/65	<i>J. C. Hill</i> Deputy Design Engineer, Roadways	
Drawn by HFW	1/65		
Checked by RLO	6/67		
Revision No.		Sheet No.	Index No.
P.M.W.A. Approved: 7/18/75		81	1 of 4
			525



**DETAIL C
ENTRANCE TERMINAL
TWO THRU LANES**



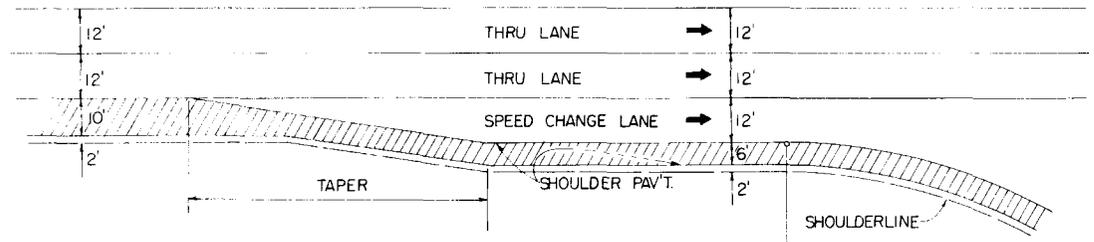
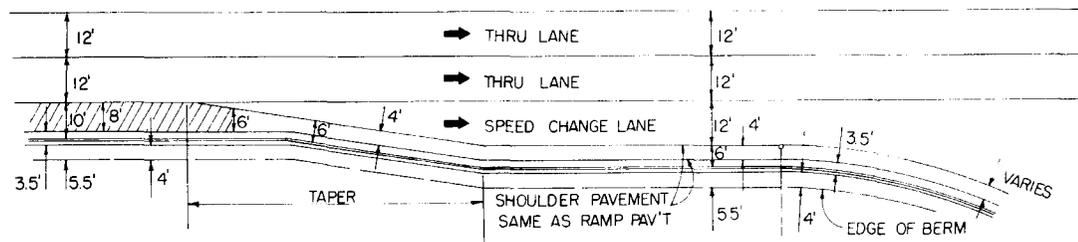
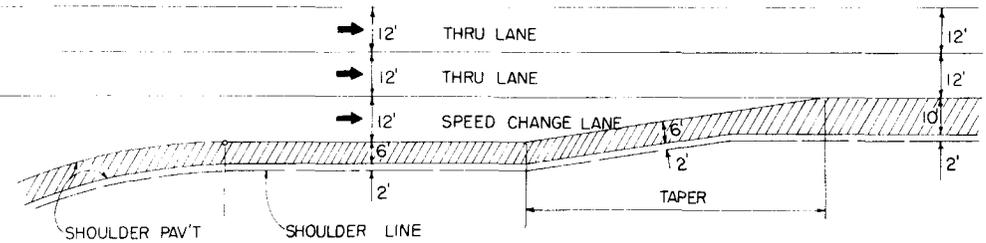
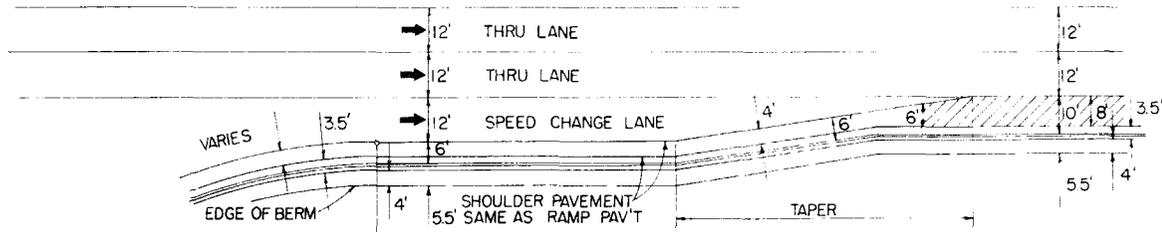
**DETAIL D
ENTRANCE TERMINAL
WITH ADDED LANE**



GENERAL NOTES

1. The notes applying to P.C.C. Pavement are not applicable to R. B. A. C. Pavement.
2. (a.) P.C.C. Pavement Projects :
Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identical to the adjacent roadway pavement beginning with the transverse joint nearest the point of 6' width.
- (b.) Flexible Base Projects :
Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identical to the adjacent roadway pavement.
3. Exit and Entrance terminals as detailed shall not be used on ramps for which a speed of 50 M.P.H. or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of tapers with lengths set according to table J-B & J-10 (1973 A-A-S-H-O.-Red Book).

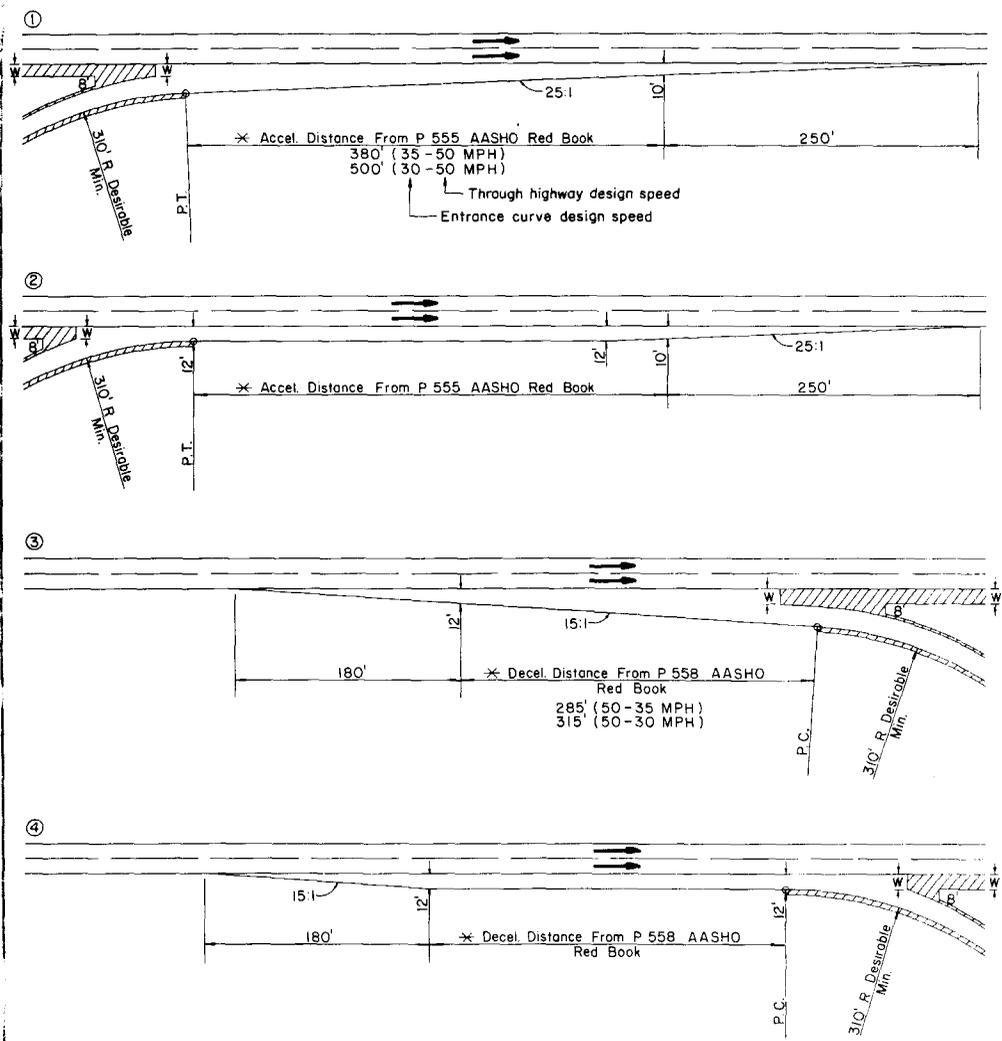
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
RAMP TERMINALS					
Designed by	Names	Dates	Approved By		
Drawn by	EHH	1/65	 <small>Deputy Design Engineer, Roadways</small>		
Checked by	HFW	1/65			
	RLO	6/67	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved: 7/18/75			81	2 of 4	525



SHOULDER TREATMENT
AT SPEED CHANGE LANES WITH SHOULDER GUTTER

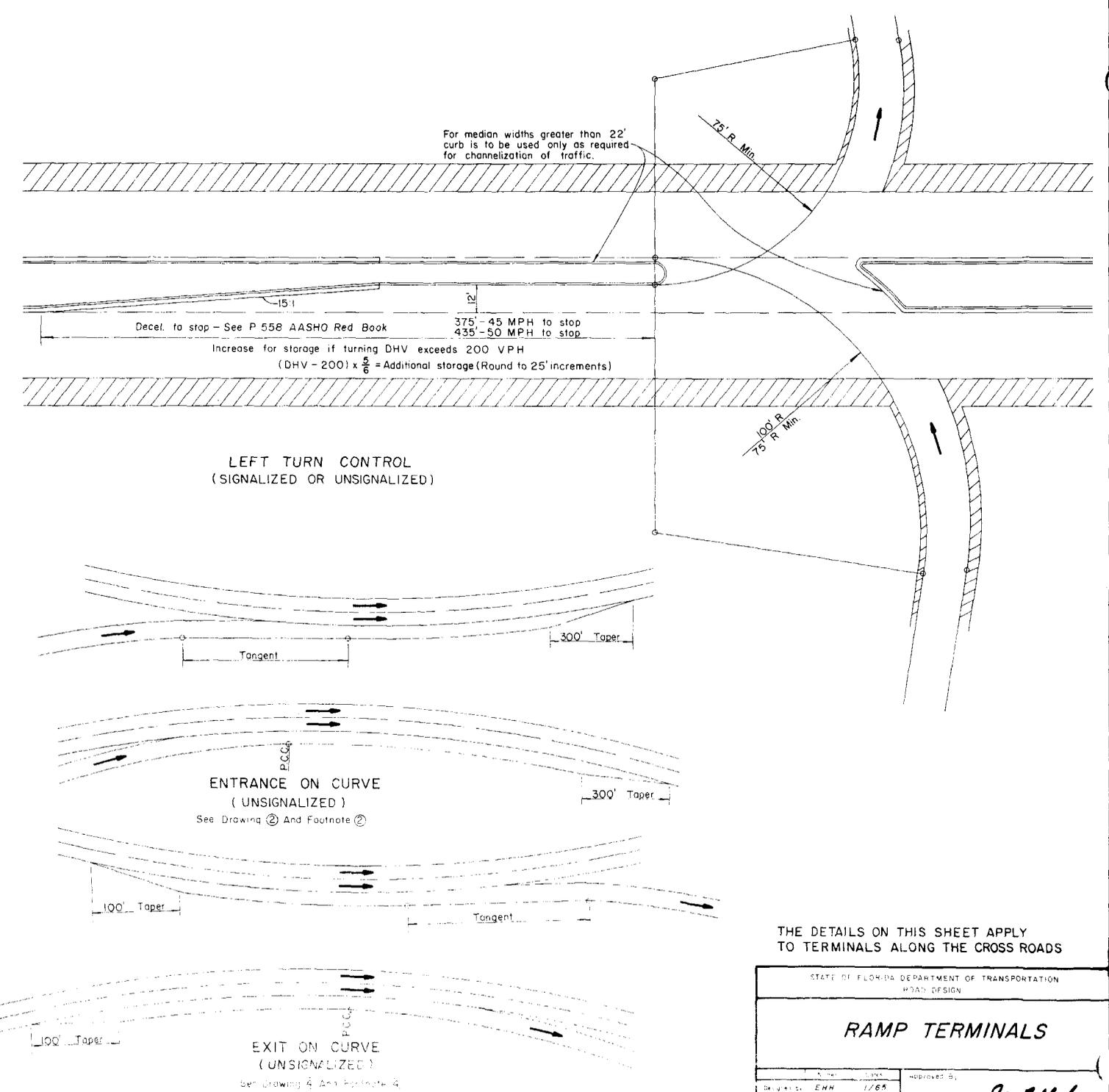
SHOULDER TREATMENT
AT SPEED CHANGE LANES WITHOUT SHOULDER GUTTER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
RAMP TERMINALS					
Designed by	Names	Dates	Approved By		
Drawn by	EHH	1/65	<i>De Kuhl</i> Deputy Design Engineer, Roadways		
Checked by	HFW	1/65			
	RLO	6/67	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved	7/18/75	81	3 of 4	525	



ENTRANCE AND EXIT RAMP TERMINAL
(UNSIGNALIZED)

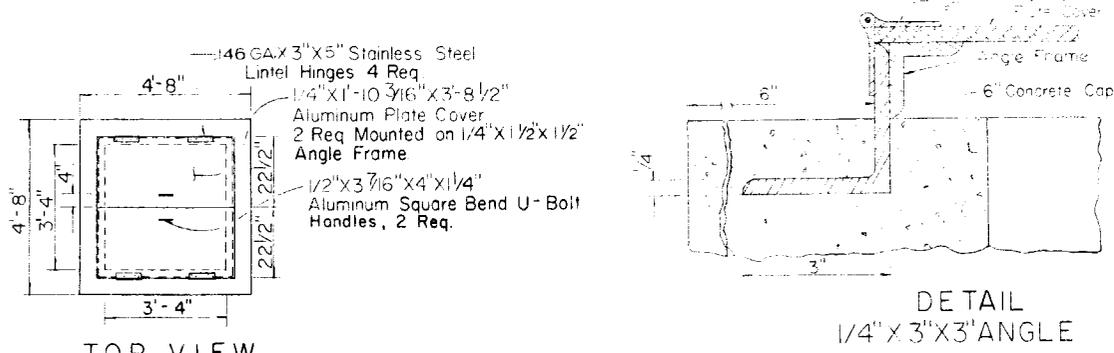
- W Normal shoulder pavement width
- * Adjust for grades if greater than 2% (See P 556 AASHO Red Book).
- ① Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridges are located within the merging lane.
- ② Parallel cross road entrance terminals. Recommended when a bridge is located within the merging lane, turning roadway speed is less than 60% of thru roadway speed or for the combinations of horizontal alignment shown elsewhere on this sheet.
- ③ Standard cross road exit terminal. To be used when roadway alignment is tangent.
- ④ Parallel cross road exit terminals. Recommended when exit is partially hidden over the crest of vertical curve or when turning roadway speed is less than 60% of the thru roadway speed, or for the combinations of horizontal alignment shown elsewhere on this sheet.



NOTE: In all cases, turn exist on curves should be avoided when possible.

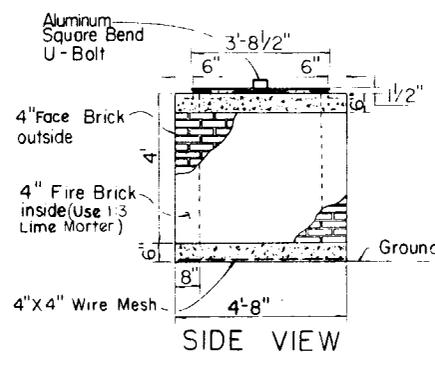
THE DETAILS ON THIS SHEET APPLY TO TERMINALS ALONG THE CROSS ROADS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
RAMP TERMINALS			
DATE	1/69	APPROVED BY	
DESIGNED BY	EHH	CHECKED BY	
DRAWN BY	RFW	DATE	1/65
CHECKED BY	RLC	DATE	6/67
PROJECT NO.		SHEET NO.	4 of 4
DATE	7-25-75	NO. OF SHEETS	525

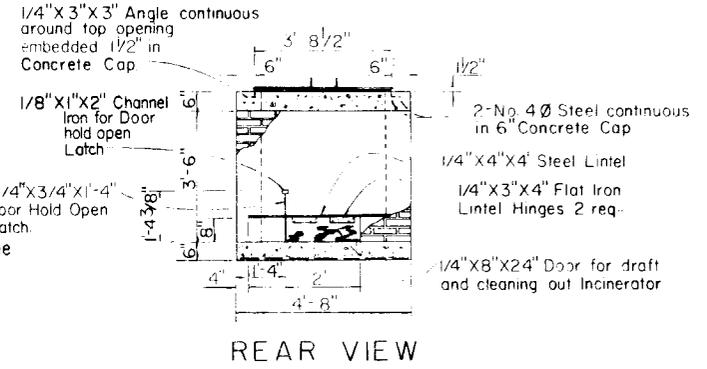


TOP VIEW

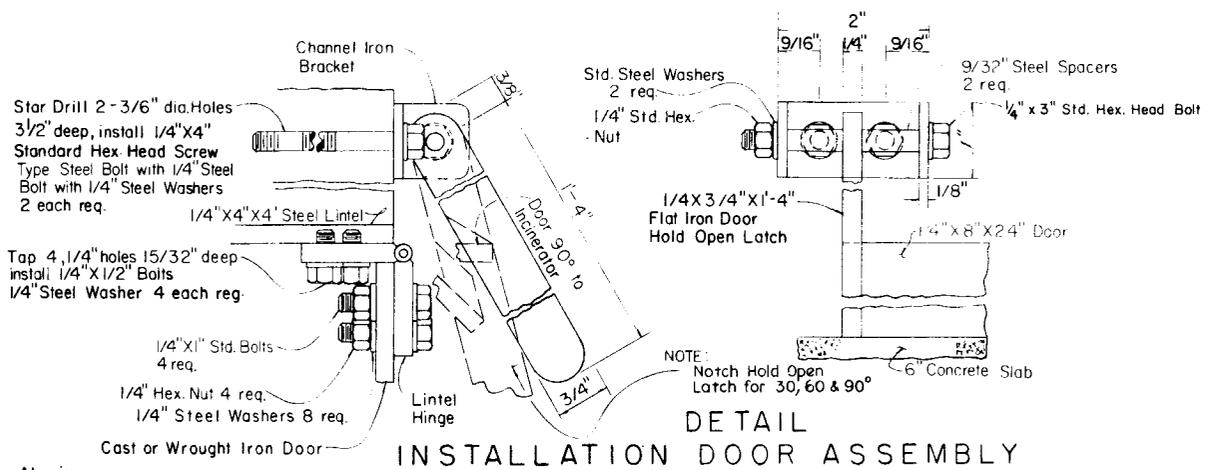
DETAIL
1/4" X 3" X 3" ANGLE



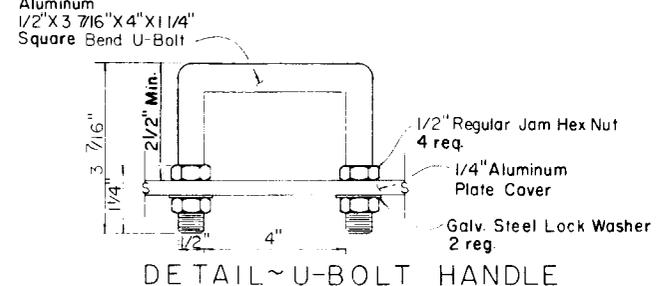
SIDE VIEW



REAR VIEW

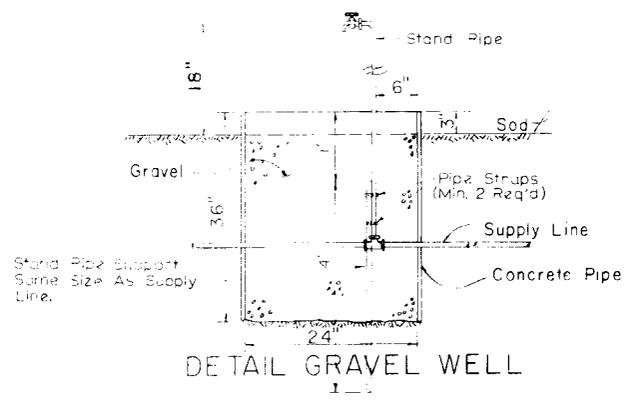


INSTALLATION DOOR ASSEMBLY

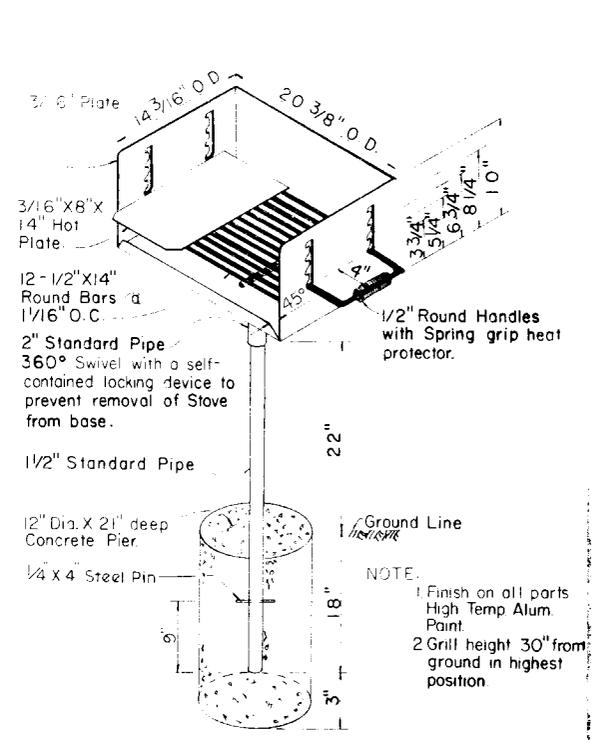


DETAIL ~ U-BOLT HANDLE

INCINERATOR



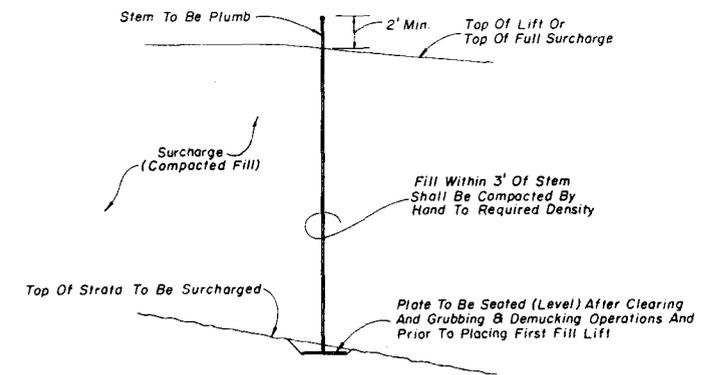
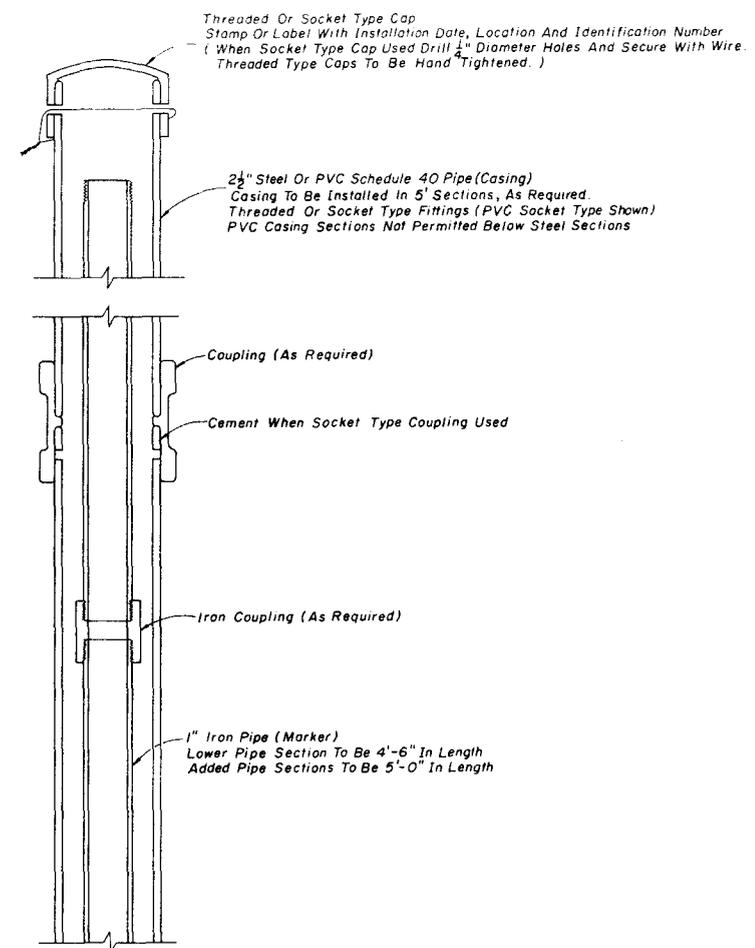
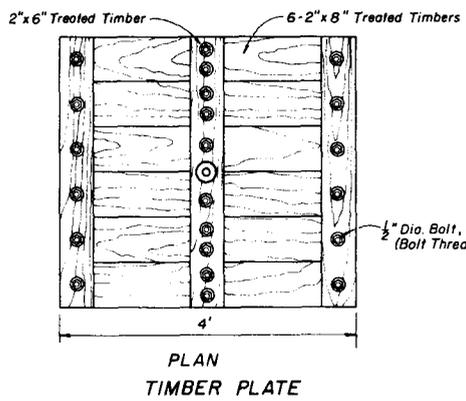
DETAIL GRAVEL WELL



ADJUSTABLE CAMPSTOVE AND GRILL

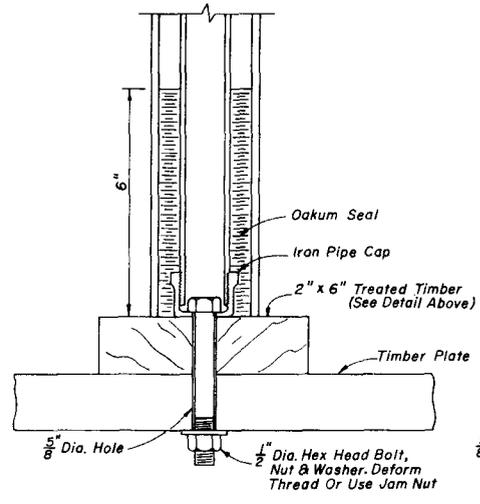
GENERAL NOTES
1. For details of chain link fence at rest area locations see Index No. 452.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
ROAD DESIGN					
REST AREA EQUIPMENT					
Designed by	Names	Dates	Approved By		
Drawn by	HW	3/68	<i>J.C. Hill</i> Deputy Design Engineer, Highways		
Checked by	RHC	6/68	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved: 3/20/75			82	1 of 1	530

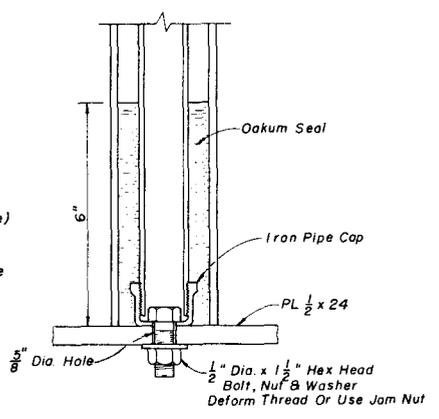


INSTALLATION

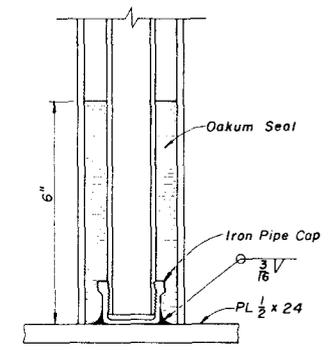
- NOTES
- Elevation of the top of each length of marker pipe shall be determined as soon as it is installed and also immediately before the next length of marker pipe is added.
 - Settlement plate locations shall be flagged and protected from construction vehicles and equipment. If settlement plates are disturbed, they shall be replaced in kind.
 - Oakum used to construct seal should not have a mesh covering (plastic or other synthetic material).



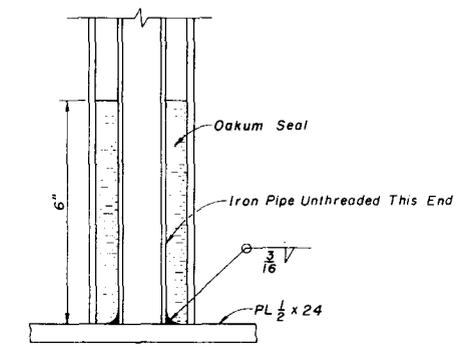
TIMBER PLATE



STEEL PLATE



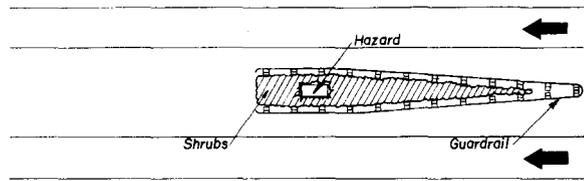
STEEL PLATE



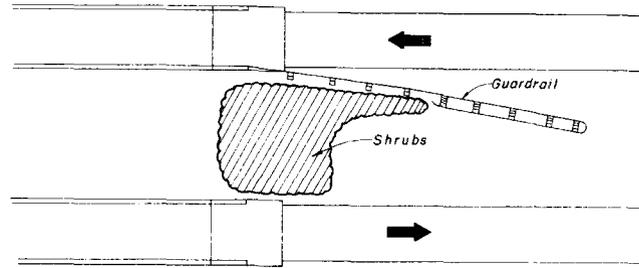
STEEL PLATE

STEM AND PLATE OPTIONS

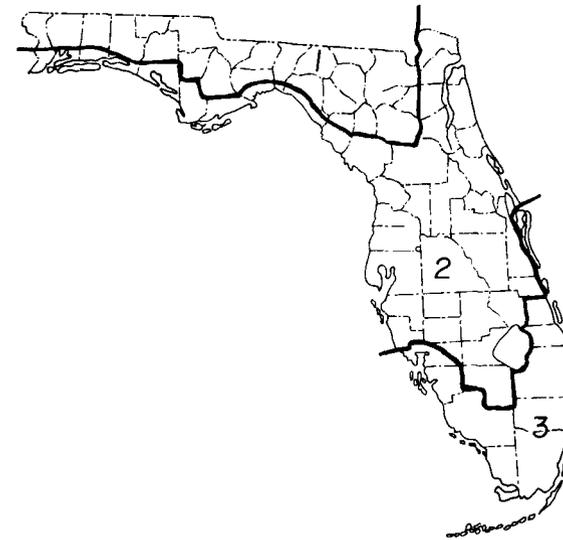
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
SETTLEMENT PLATE				
Designed by	JVG	Date	10/79	
Drawn by	HSD	Date	10/79	
Checked by	JBW	Date	10/79	
F.H.W.A. Approved: 10/77/80		Revision No.	81	Sheet No.
			1 of 1	Index No.
				540



DETAIL A
MEDIAN HAZARD - ONE-WAY TRAFFIC

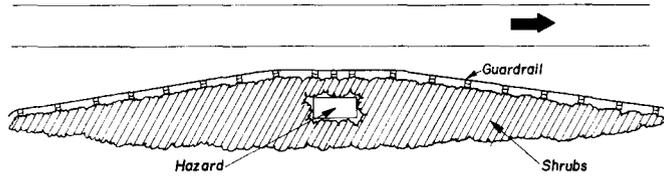


DETAIL C
BRIDGE END - WIDE MEDIAN

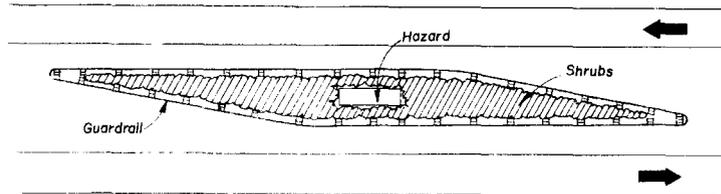


ZONE MAP

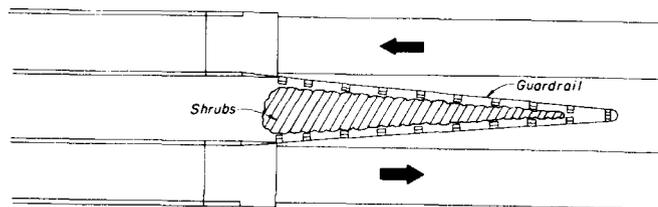
ZONE	SHRUB
1.	Wax Myrtle Pampas Grass Primrose Jasmine Russian Olive
2.	Wax Myrtle Pampas Grass Primrose Jasmine Russian Olive Jasmine Simplic Oleander
3.	Pampas Grass Russian Olive Natal Plum Jasmine Simplic Oleander Dwarf Oleander



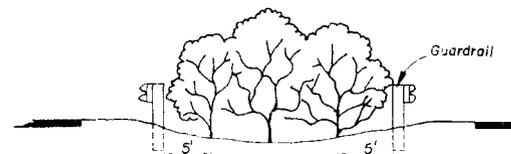
DETAIL B
ROADSIDE HAZARD



DETAIL D
MEDIAN HAZARD - TWO-WAY TRAFFIC



DETAIL E
BRIDGE END - NARROW MEDIAN



CROSS SECTION
BACK TO BACK GUARDRAIL

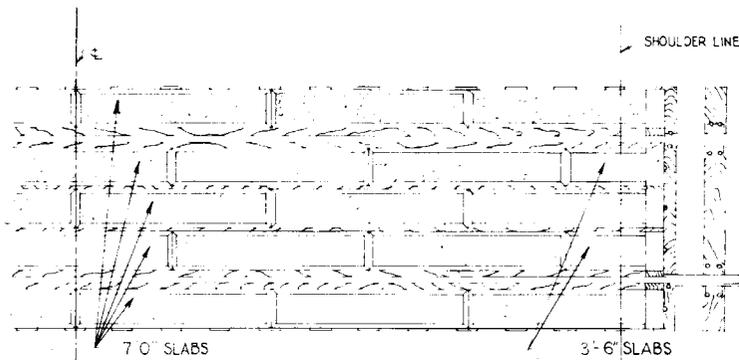
GENERAL NOTES

1. The purpose of shrubs in areas back of guardrail is to eliminate hand maintenance in those areas.
2. Shrubs are to be planted approximately 5' back from guardrail posts and hazards. Narrow plant areas are to have at least one row of shrubs, as directed by the Engineer.
3. Shrubs are to be planted approximately 5' on centers in rows with 5' spacings.
4. Shrubs are to be offset in successive rows to create a zig-zag pattern between any two rows.
5. Shrubs shall be specified in the plans by Landscape Material Master Pay Item List numbers.
6. Only one variety of shrub shall be planted within any given contiguous area and no shrub variety is to be repeated within a distance of one mile.
7. When guardrail paving is constructed in conjunction with shrub planting, soil sterilization shall be in accordance with Section 339 of the Standard Specifications.

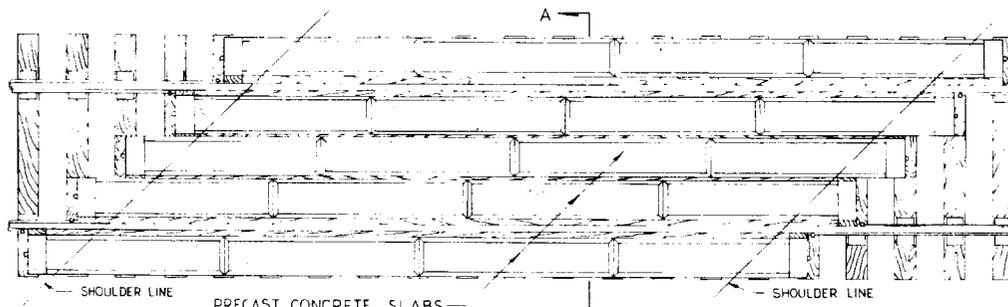
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SHRUBBERY
BACK OF GUARDRAIL APPLICATION

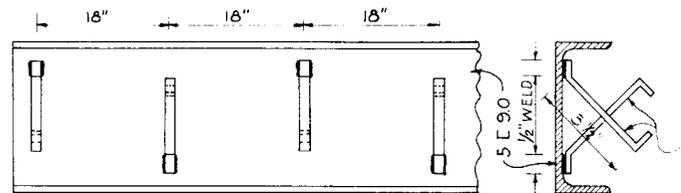
Designed by: G.L.H.	Checked by:	Approved by: <i>[Signature]</i> Deputy Design Engineer, Roadways
Drawn by:	Revision No.:	Sheet No. 1 of 1
Index No.:	F.H.W.A. Approved 80	
		545



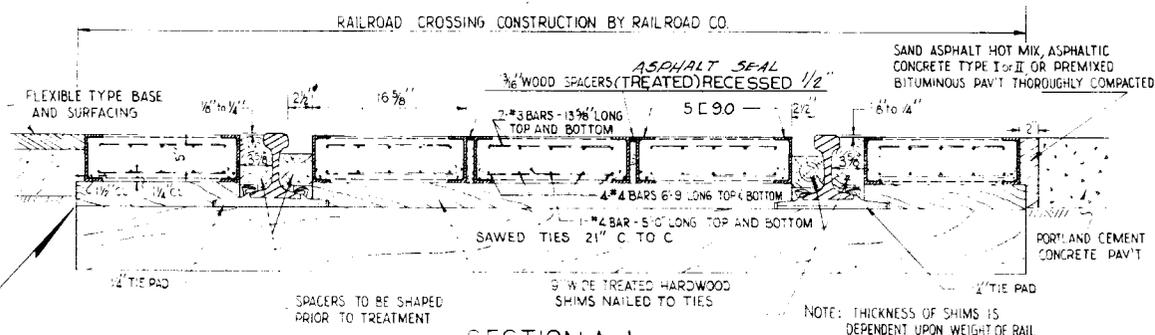
PLAN - 90° CROSSING



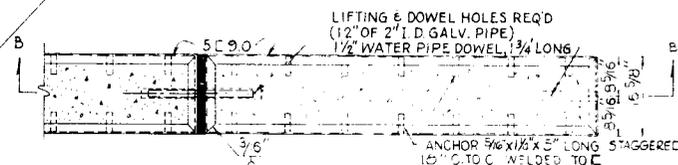
PRECAST CONCRETE SLABS — ALL SLABS 7'-0" LONG AND 16 3/8" WIDE
PLAN - SKEW CROSSING



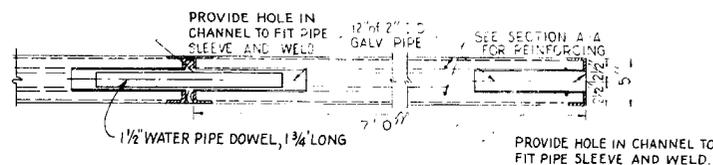
ELEVATION
DETAIL OF 5/16" x 1 1/4" x 5" ANCHORS
ANCHORS STAGGERED 18" C. TO C.
NOTE: 1/2" x 5" STUDS MAY BE USED
IN LIEU OF ANCHORS.



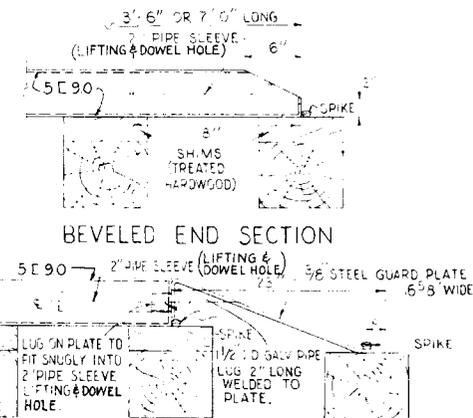
SECTION A-A



PLAN TYPICAL SLAB

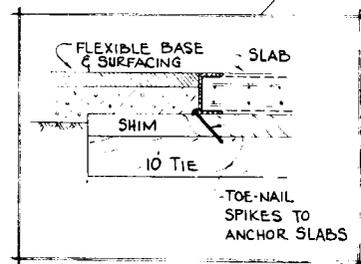


SECTION B-B



BEVELED END SECTION

ALTERNATE END SECTION

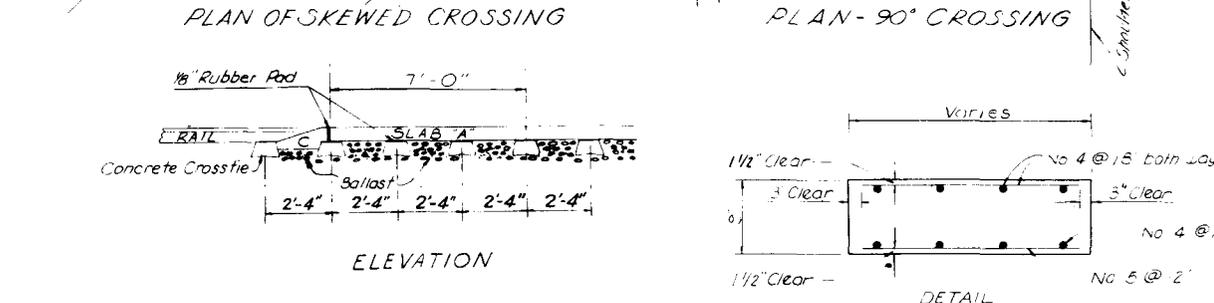
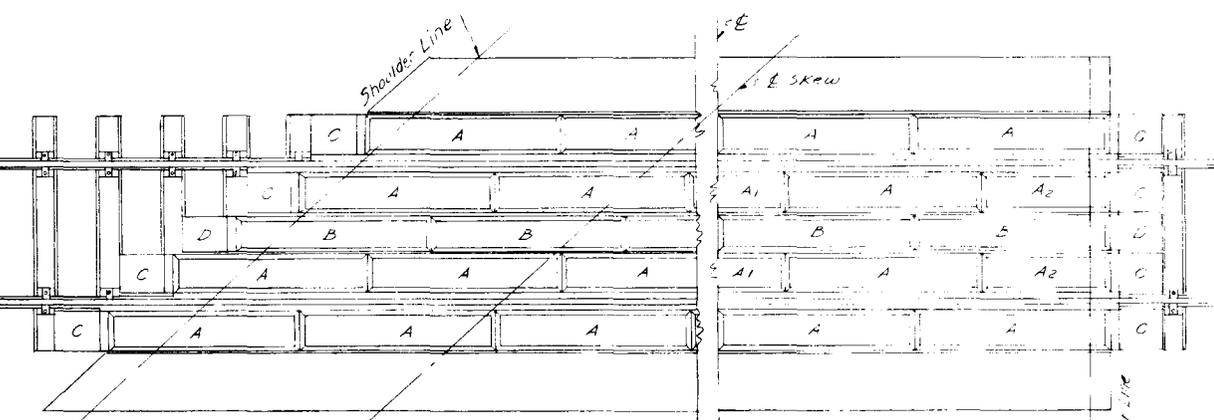
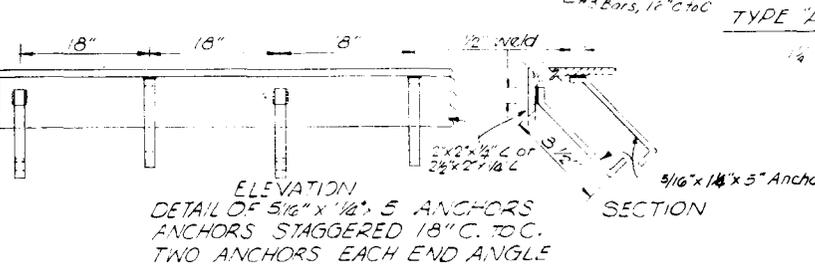
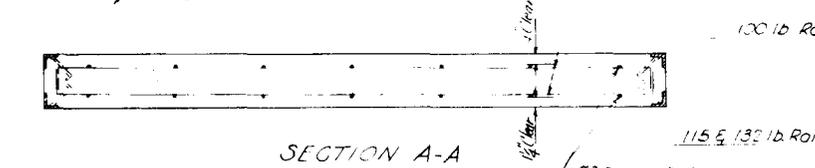
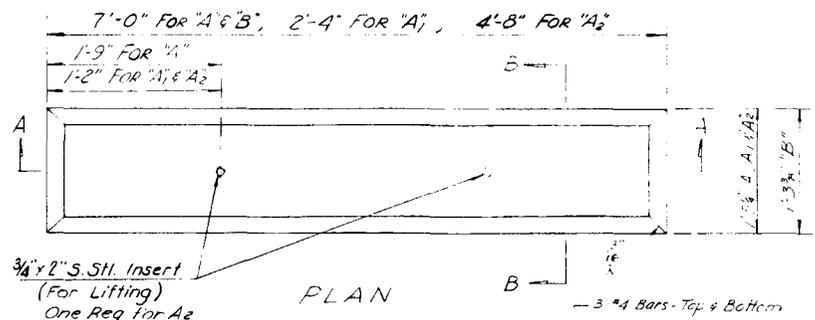


OPTIONAL DETAIL
WHEN 10' TIES ARE USED

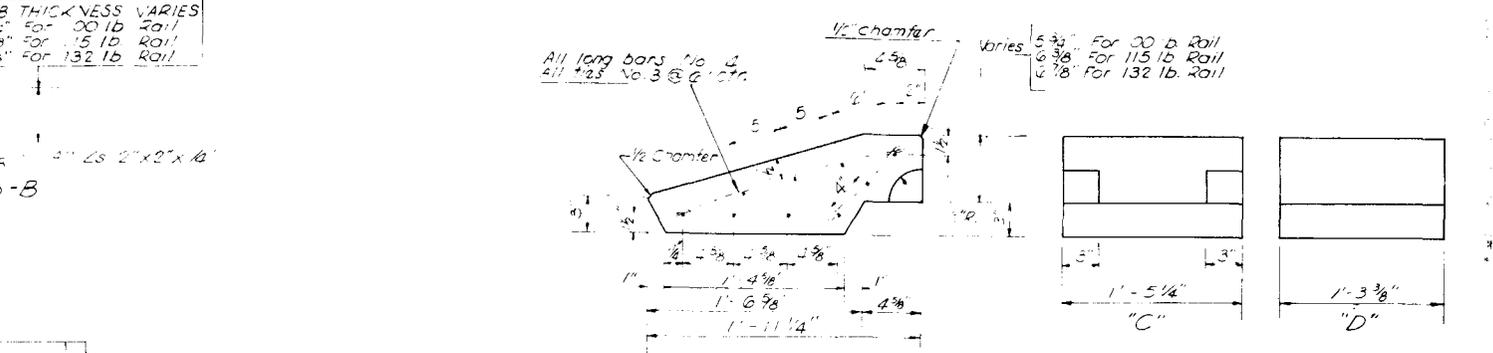
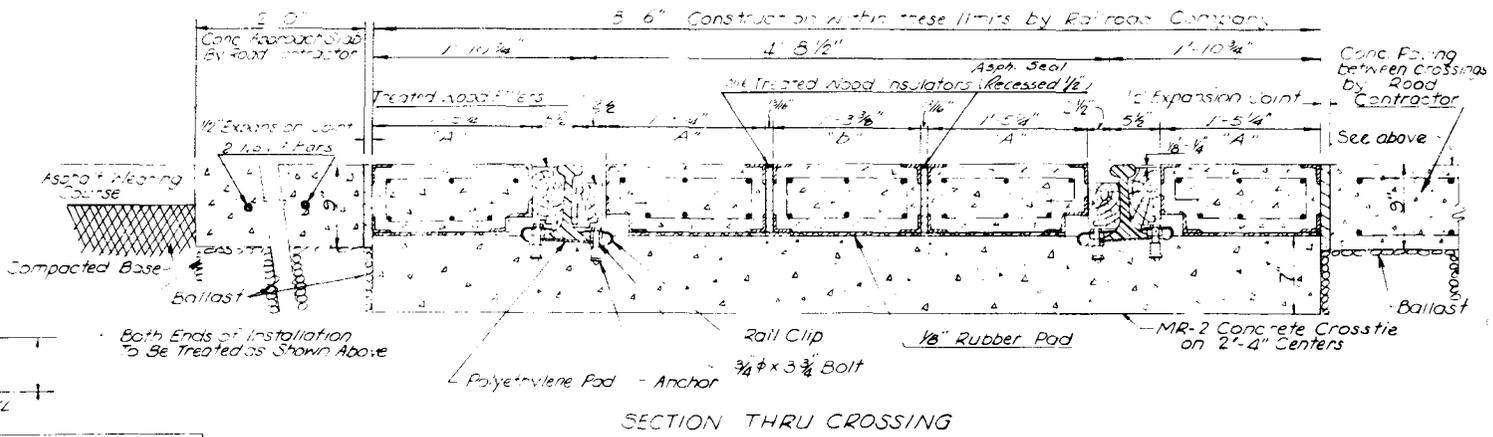
NOTES

1. SPACERS ADJACENT TO RAIL TO BE DENSE STRUCTURAL 65 GRADE.
2. SPACERS BETWEEN SLABS TO BE N#1 COMMON GRADE.
3. ALL TIMBER TO BE SHAPED PRIOR TO TREATMENT.
4. CLASS I CONCRETE TO BE USED IN THE CONSTRUCTION OF THE PRECAST CONCRETE SLABS.
5. ALL TIMBER SHIMS AND SPACERS AND PRECAST CONCRETE SLABS WILL BE FURNISHED AND INSTALLED BY THE RAILROAD CO. THE TRACK SHALL BE CONDITIONED TRUE TO LINE AND GRADE BY THE RAILROAD CO. PRIOR TO INSTALLATION OF THE CROSSING ELEMENTS.
6. CONSTRUCTION OF THIS CROSSING REQUIRES A STABLE SUBGRADE FOR A MINIMUM OF 2' BELOW THE BOTTOM OF THE BALLAST. THE SUBGRADE SHALL BE CONSTRUCTED TO THE SAME REQUIREMENTS AS SPECIFIED FOR THE ADJOINING ROADWAY.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
RAILROAD CROSSINGS TYPE J					
Designed by	Names	Date	Approved By		
Drawn by	HW	8/69	<i>J. K. C.</i> Senior Design Engineer, Roadways		
Checked by	JKC	8/69	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved: 3/20/75			81	2 of 6	560

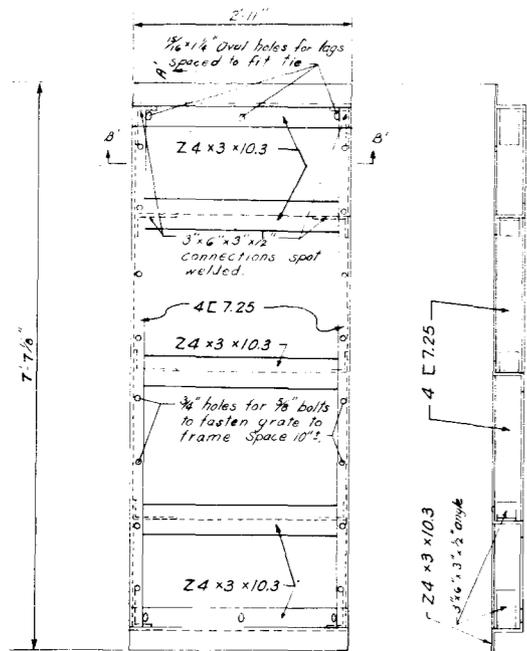


Reinforcing for Concrete Paving between Parallel Track Crossings
(Cost of Reinforcing to be included in Cost of Class I Concrete. See note No 6)

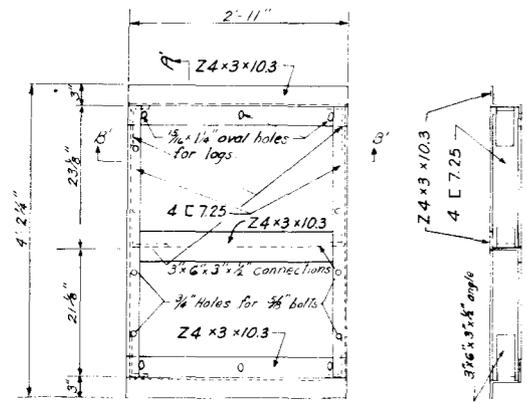


- GENERAL NOTES**
- The furnishing and installing of concrete crossties together with any necessary reballasting, grade adjustment and track alignment shall be done by the Railroad Company without cost to the Contractor or to the Department.
 - All concrete slabs, rubber pads for tops of ties and wood filler blocks shall be furnished and installed by the Railroad Company.
 - Concrete Crossties shall be spaced on 28" centers by the Railroad Company.
 - Rubber pads shall be installed on concrete ties in field using contact cement.
 - Filler blocks shall be pressure treated pine or clear heart redwood and shall be shaped prior to treatment.
 - Class I concrete 9" thick to be used in construction, by road Contractor, of Concrete Approach Slabs and for paving between crossings (Cost of steel to be included in cost of Class I Concrete.)

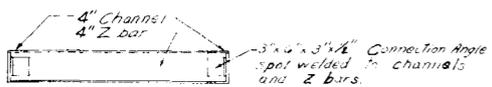
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
RAILROAD CROSSINGS TYPE K			
Designed by	Names	Date	Approved By
Drawn by	HW	8/69	<i>J. K. C.</i> Deputy Design Engineer, Roadways
Checked by	J.K.C.	8/69	
F.H.W.A. Approved: 3/20/75		Revision No.	Sheet No.
		81	3 of 6
		560	



PLAN INTER-TRACK UNIT

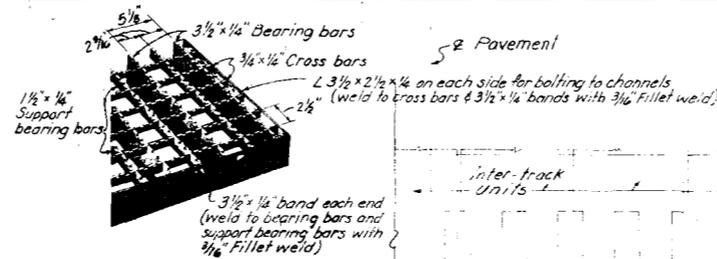


PLAN INTER-RAIL UNIT

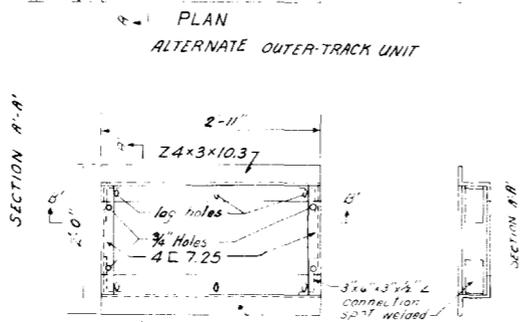
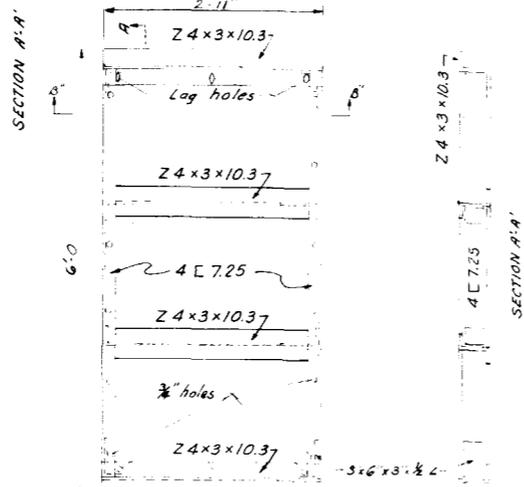


SECTION B-B

FRAME DETAILS
Scale 1/2"

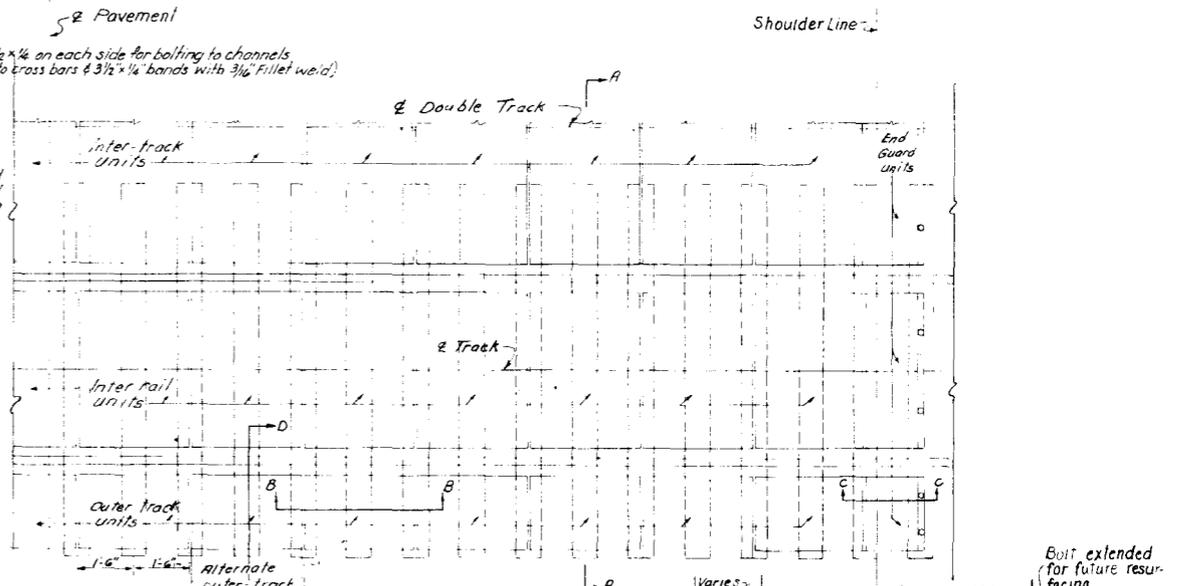


DECKING (14.81 Lbs./S.F.)

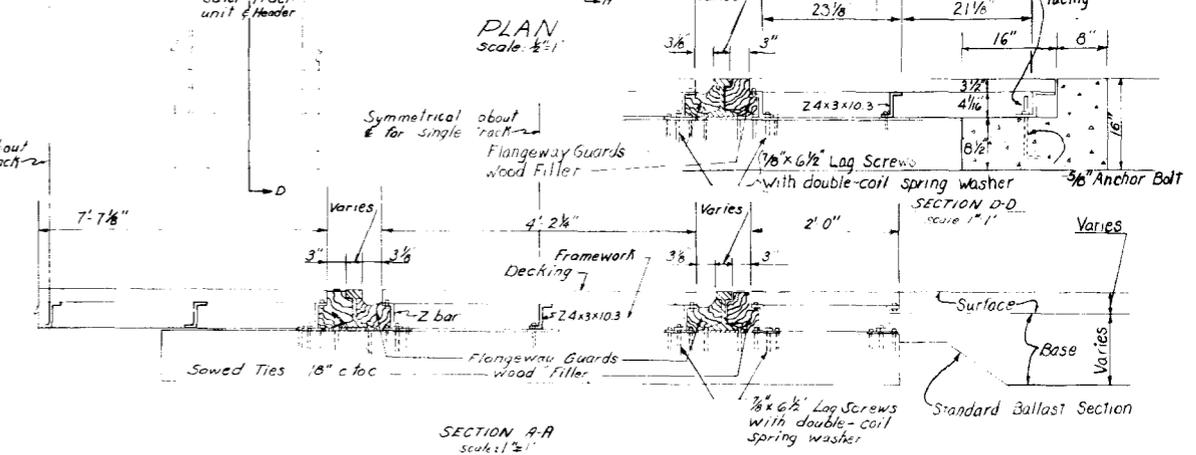


OUTER TRACK UNIT GENERAL NOTES

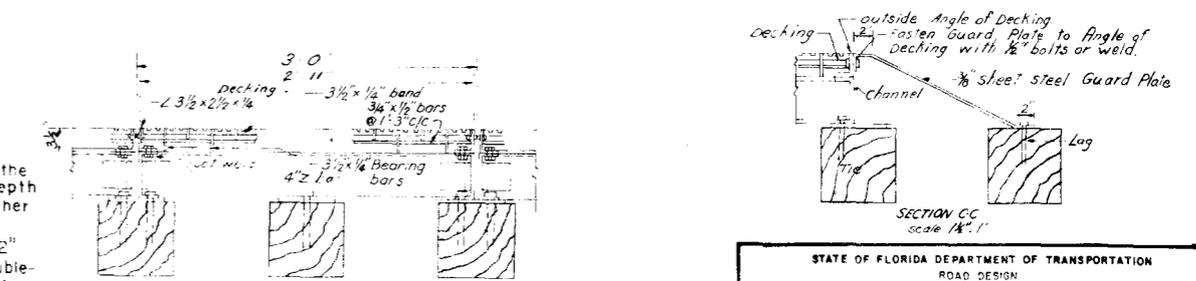
- This drawing is based on using 131st rail on a tangent section and Decking fabricated in sections to fit the corresponding sections of the supporting frame. The depth of the Z bars and channels may be varied to fit other rail sections.
- The framework units are attached to ties by 7/8"x6 1/2" lag screws, and to Headwall by 5/8" anchor bolts. Double-coil spring washers are used with lags to compensate for vertical motion.
- The decking is attached to the framework with 5/8" bolts. The head of the bolt is to be spot welded to the underside of the channel flange.
- Flangeway and outside filler timbers to be rabbetted to assure close fit prior to treatment.
- Ties to be sawed and spaced 18" C to C.
- Crossing of any angle can be equipped with units of either 45°, 67°30' or 90°.
- Decking may be as shown or equal (Submit shop drawings for approval by the Engineer).



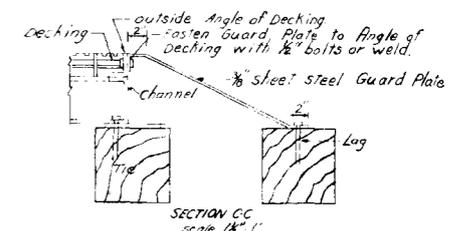
PLAN Scale 1/2"



SECTION A-A Scale 1/2"

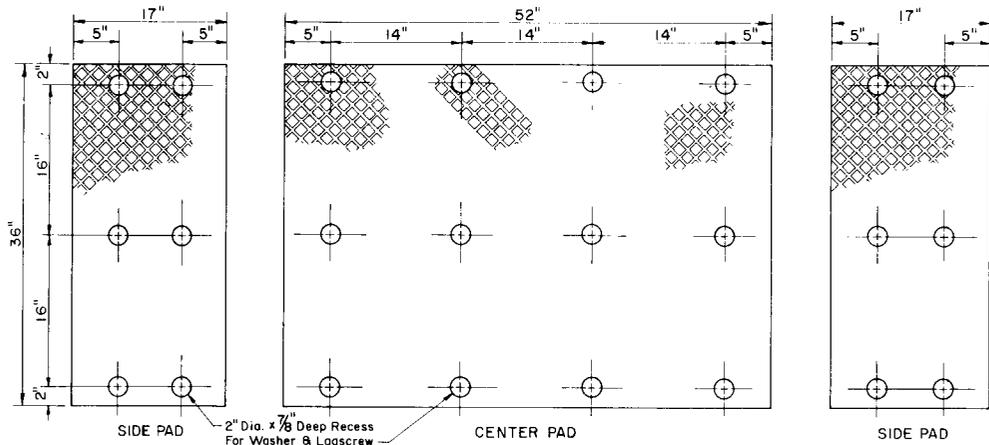


SECTION BB Scale 1/4"

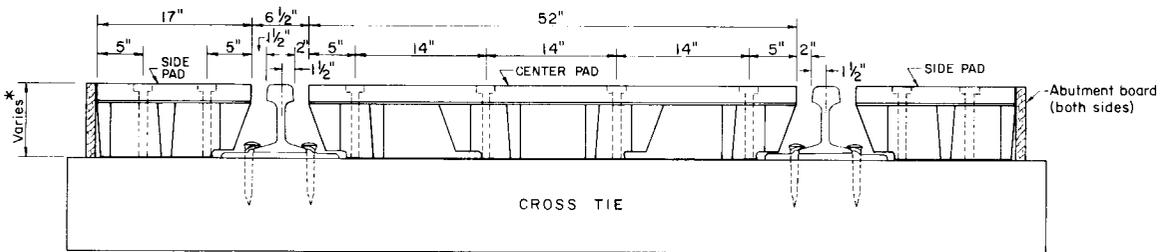


SECTION CC Scale 1/4"

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
RAILROAD CROSSINGS TYPE M					
Designed By	Names	Date	Approved By		
Drawn By	HW	8/69	<i>D. Hill</i>		
Checked by	JKC	8/69	Project No.	Sheet No.	Index No.
F.H.W. 4. Approved	3/20/75	81	4 of 6	560	

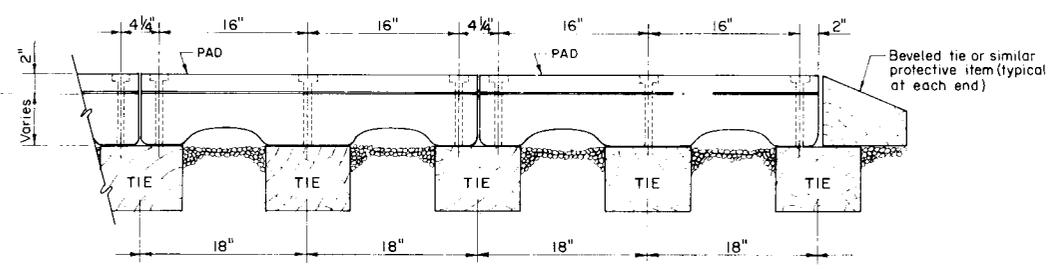


TOP VIEW



SECTION

* O.A. Height 6 1/2" - Pads typical for 90-100 lb rails.
 O.A. Height 7 3/8" - Pads typical for 110-130 lb rails.
 O.A. Height 7 7/8" - Pads typical for 131, 133 or 136 lb rails.



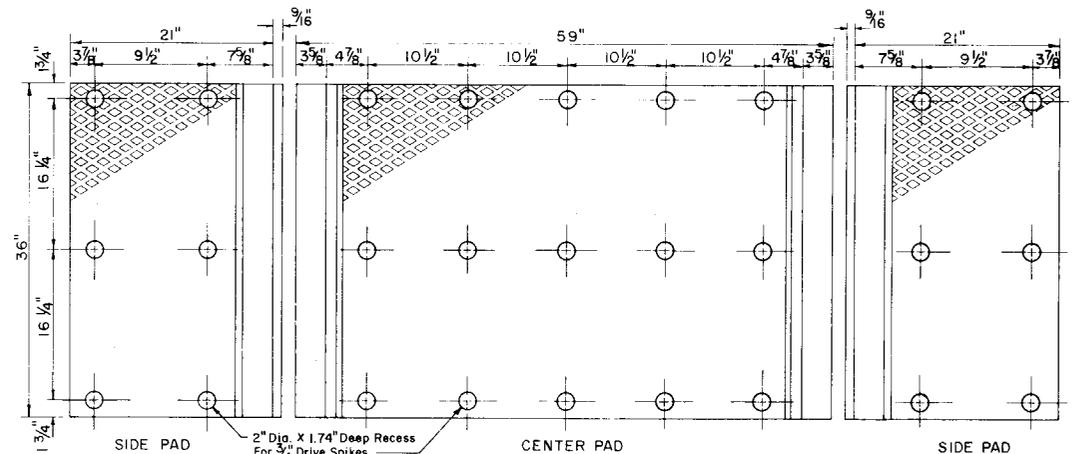
PARTIAL SECTION PARALLEL TO RAIL

CROSSING TYPE "P"
(POLYETHYLENE)

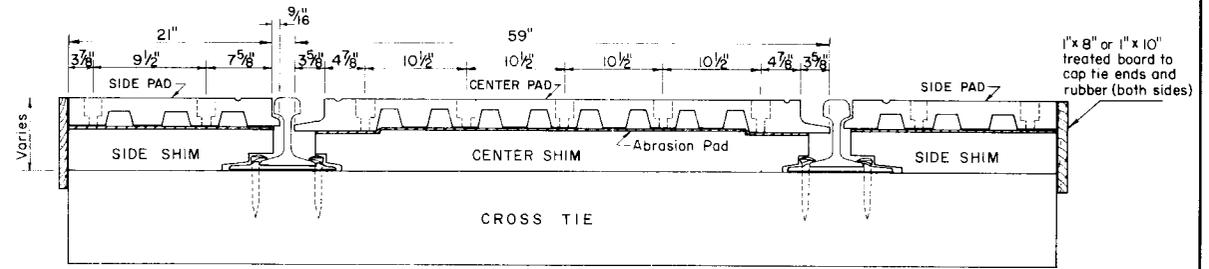
GENERAL NOTES

- The crossings shown on this sheet are NOT to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.
- Crossings on this sheet may be used for single track crossings within the zones in the chart unless engineering or safety considerations dictate otherwise.
- Details shown are for straight track installations. Materials are also available for curved track installations.
- For additional details, materials required and installation procedures refer to the manufacturers specifications.

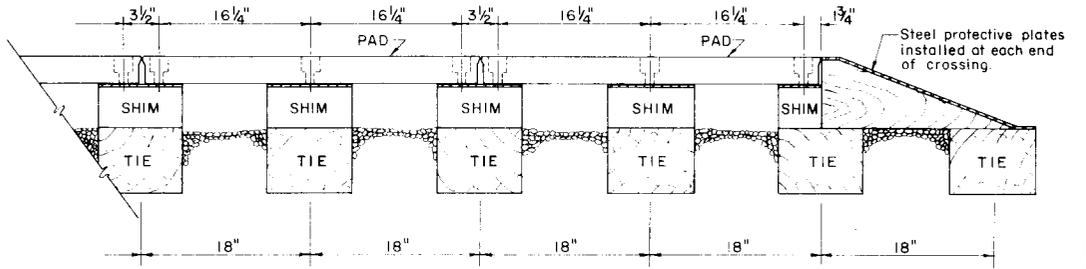
PARTIAL PLAN DEPICTING SUGGESTED PAD PLACEMENT



TOP VIEW

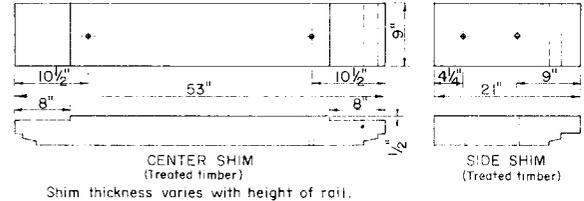


SECTION



PARTIAL SECTION PARALLEL TO RAIL

STOP ZONE	
Design Speed	Zone length - Distance from stop
45 MPH or less	250'
50 - 55	350'
60 - 65	500'
70	600'



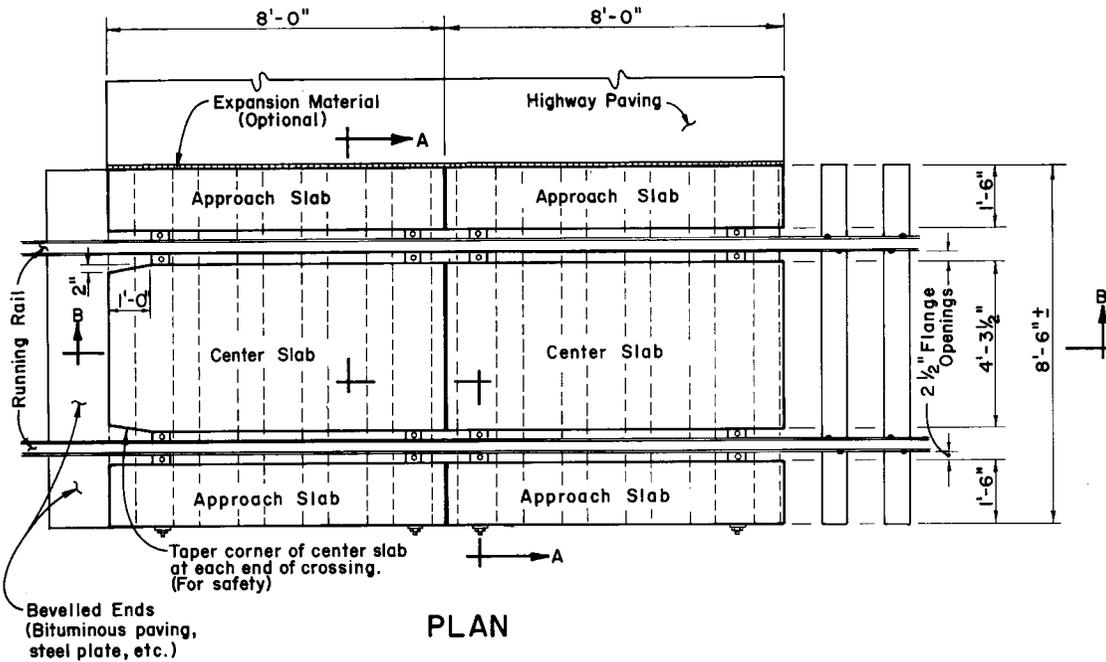
Shim thickness varies with height of rail.

CROSSING TYPE "R"
(RUBBER)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

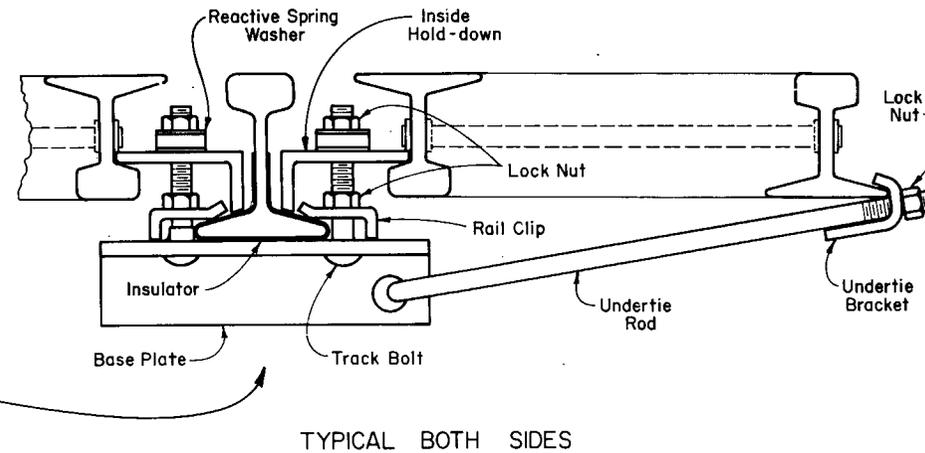
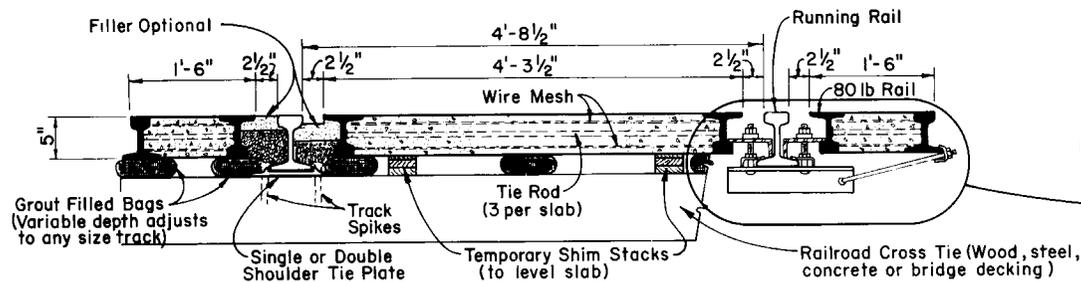
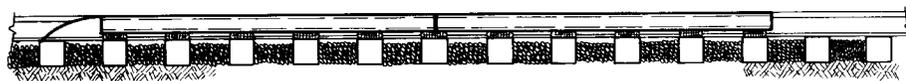
**RAILROAD CROSSINGS
TYPE P & R**

Designed by	Checked by	Approved by
Drawn by	11/75	<i>De Hill</i> Deputy Chief Engineer, Roadways
Checked by	11/75	Revision No.
F.H.A. Approval	10/11/78	Sheet No. 81
		5 of 6
		560

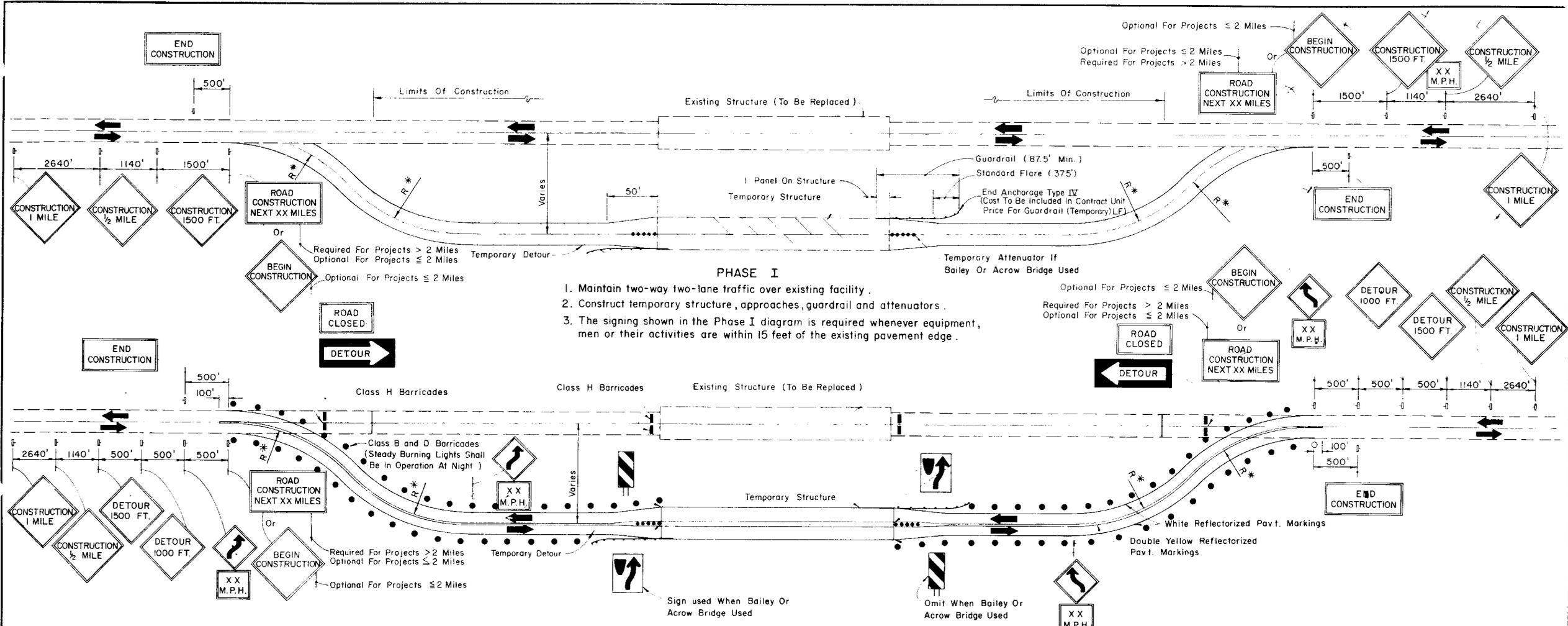


GENERAL NOTES

1. The reinforced concrete slabs are manufactured in 8'-0" sections, 5" in depth to fit all rail sections 5 1/4" in height or heavier. Slabs are interchangeable and relocateable.
2. Center slabs are one piece construction allowing for 2 1/2" flange opening. 80 lb. rail is used to encase, armor and reinforce slabs and is held to gage with 3 tie rods per slab.
3. Slabs are installed by a "flotation" process, supported on non-shrinkable, non-metallic grout positioned on the ties. Slabs can be placed on wood ties, concrete ties, steel ties, bridge decks or any other type of track support. No re-spacing of ties is necessary.
4. Slabs are secured to "running rails" with specially designed hardware. Insulation is to be provided for crossings in signal territory.
5. Curved slabs are fabricated to fit curved track to 22 degrees (262.04' radius). Special slabs are available for Diamond Crossings, Turnouts, Multiple Tracks, Bridge Decks and Rapid Transit Systems.
6. For additional details, materials required and installation procedures refer to the manufacturers specifications.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
RAILROAD CROSSINGS TYPE T					
Design By	LMF	Date	2/77	Approved By	<i>[Signature]</i> Deputy Design Engineer, Roadways
Checked By	GSB	Date	2/77	Revision No.	81
EW & A	Approved	5/3/77		Sheet No.	6 of 6
				Index No.	560



PHASE I

1. Maintain two-way two-lane traffic over existing facility.
2. Construct temporary structure, approaches, guardrail and attenuators.
3. The signing shown in the Phase I diagram is required whenever equipment, men or their activities are within 15 feet of the existing pavement edge.

PHASE II

1. Re-sign and mark as shown in Phase II plan.
2. Reroute traffic to detour and maintain two-way traffic on detour. Traffic control shall be in accordance with the MTCSP. Install class H barricades.
3. Construct proposed structure and reconstruct or resurface existing approaches.

PHASE III

1. Reroute traffic to existing alignment and maintain two-way traffic.
2. Remove all temporary construction items.

GENERAL MAINTENANCE OF TRAFFIC NOTES

1. All signing, pavement markings, barricades and warning lights necessary for maintenance of traffic shall conform to the MTCSP.
2. The detour pavement should be constructed of width equal to the existing pavement, but lanes shall be not less than 10 feet in width. When one-way one-lane operations are necessary, a minimum width of 12 feet shall be maintained and traffic controlled in accordance with the MTCSP. Minimum width for the detour shoulders is 6 feet.
3. Raised pavement markers shall be placed along the center of the detour pavement at 40 foot centers on the tangent roadway, and at 20 foot centers through the curve.
4. Existing signs and pavement markings that conflict with construction signings and markings shall be obliterated or removed.
5. Posted speed on the existing facility shall be decreased at the rate of 10 mph per 500 feet (minimum distance) until detour design speed is reached.
6. Method of attaching temporary guardrail to the detour structure to be approved by the Engineer.
7. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
8. Temporary attenuators shall be the inertial type indicated in Figure 7.3 of the MTCSP.

LEGEND

- Phase I (hatched area)
- Phase II (diagonal lines)
- MTCSP (arrow)
- Denotes Direction Of Traffic And Does Not Reflect Pavement Markings (arrow)

R *		
TABLE FOR MINIMUM RADIUS FOR NORMAL CROSS SLOPES		
POSTED SPEED	DETOUR DESIGN SPEED	MINIMUM RADIUS-R
M. P. H.	M. P. H.	FT.
55	45	1080
50	40	830
45	35	620
40	30	450

Superelevate When Smaller Radii Used

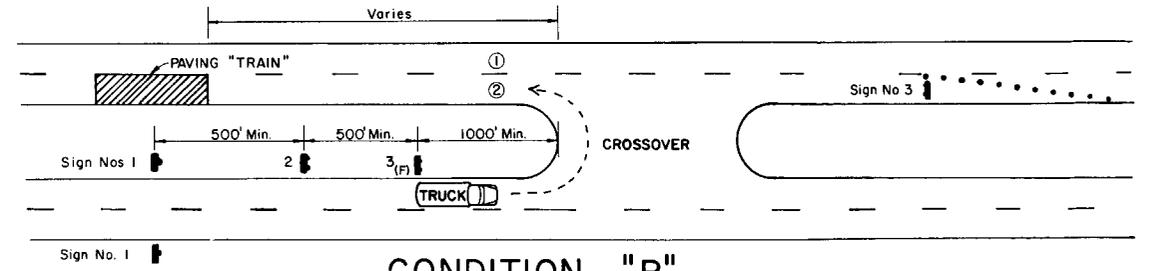
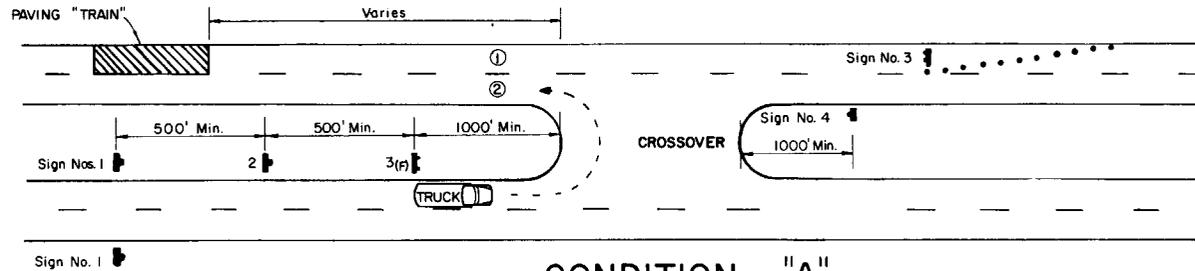
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**STRUCTURE REPLACEMENT
STANDARD TRAFFIC CONTROL PLAN
RURAL FACILITY**

Designed by	KNM	Date	8/79	Approved By	<i>J. C. Smith</i> Deputy Design Engineer, Roadways
Drawn by	SHM	Date	8/79	Revision No.	
Checked by	JVG	Date	8/79	Sheet No.	1 of 1
F.H.W.A. Approved:	9/11/79	82		Index No.	600

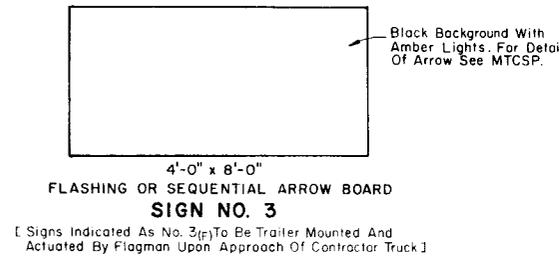
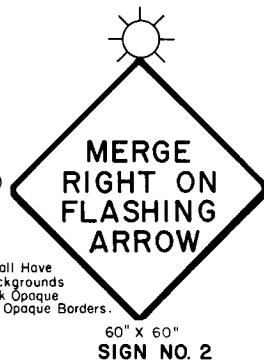
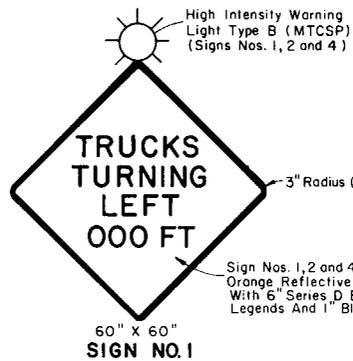
CASE I

TRAFFIC TRANSITION AREA UPSTREAM FROM CROSSOVER



CONDITION "A"

CONDITION "B"



MAINTENANCE OF TRAFFIC

CONDITION "A"

When The Paving "Train" Is In Lane ① The U-Turning Truck Shall Cautiously Turn Into Lane ② And Proceed In Lane ② To The Front Of The "Train".

CONDITION "B"

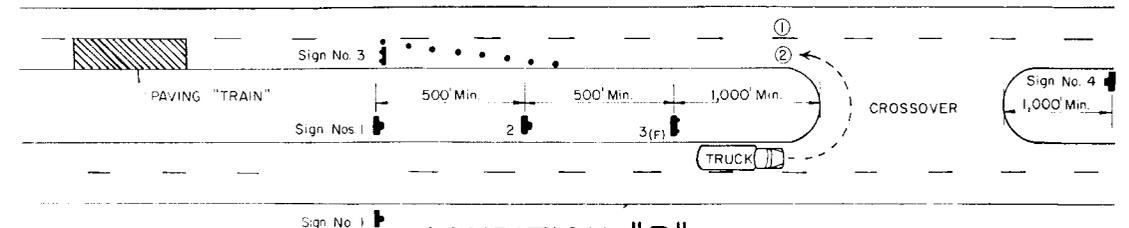
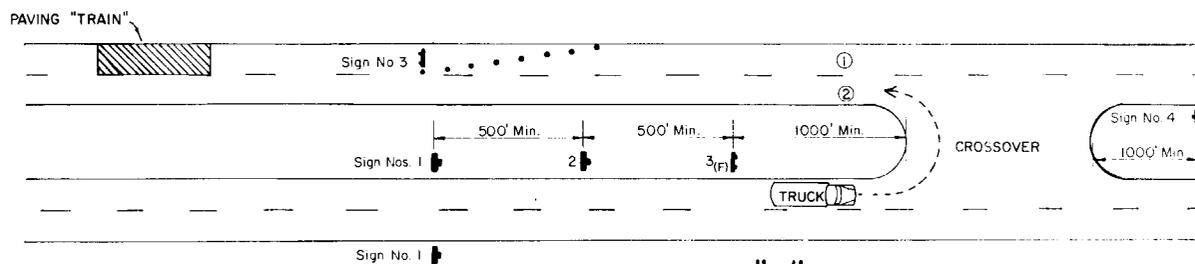
When The Paving "Train" Is In Lane ②, The U-Turning Truck Shall Turn Into Lane ②, Cautiously Merge Into Lane ① And Proceed To The Front Of The Paving "Train".

CONDITION "A" & "B"

Lane Closure And Maintenance Of Traffic In The Roadway Being Paved Shall Be In Accordance With Case XII Of The MTCSP. The Flashing Or Sequential Arrow Board Is Required In Addition To Signs Shown In Case XII. Under No Circumstances Will The Traffic Transition Area Be Located Within The Limits Of The Crossover.

CASE II

TRAFFIC TRANSITION AREA DOWNSTREAM FROM CROSSOVER



CONDITION "A"

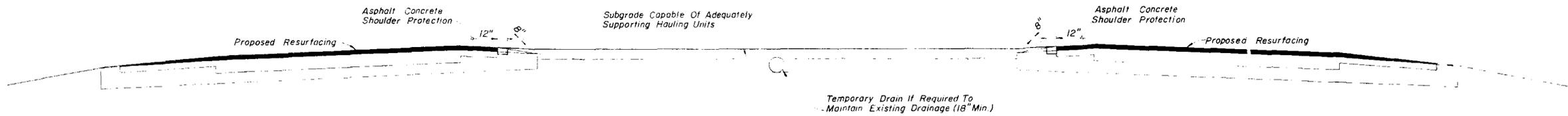
CONDITION "B"

GENERAL NOTES

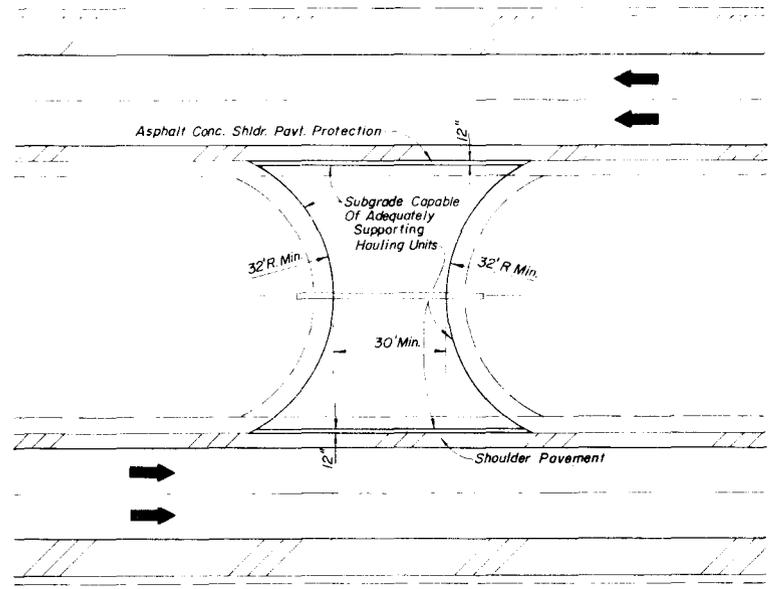
When crossovers do not exist, contractor will construct temporary crossovers in accordance with Index No. 631.

MTCSP MANUAL ON TRAFFIC CONTROL DEVICES AND SAFE PRACTICES FOR STREET AND HIGHWAY CONSTRUCTION MAINTENANCE AND UTILITY OPERATIONS ON THE STATE MAINTAINED SYSTEMS, BY FLORIDA DEPARTMENT OF TRANSPORTATION, 1976

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TEMPORARY CROSSOVER TRAFFIC CONTROL PLAN RURAL			
Designed By: G.W. 12/71	Checked By:	Approved By: <i>De Bull</i>	
Drawn By:	Revised No.:	Sheet No.:	Index No.:
Project By: R.L.P. 5/78	Revision No.:	81	1 of 1
F.H.W.A. Approval: 10/7/80			630



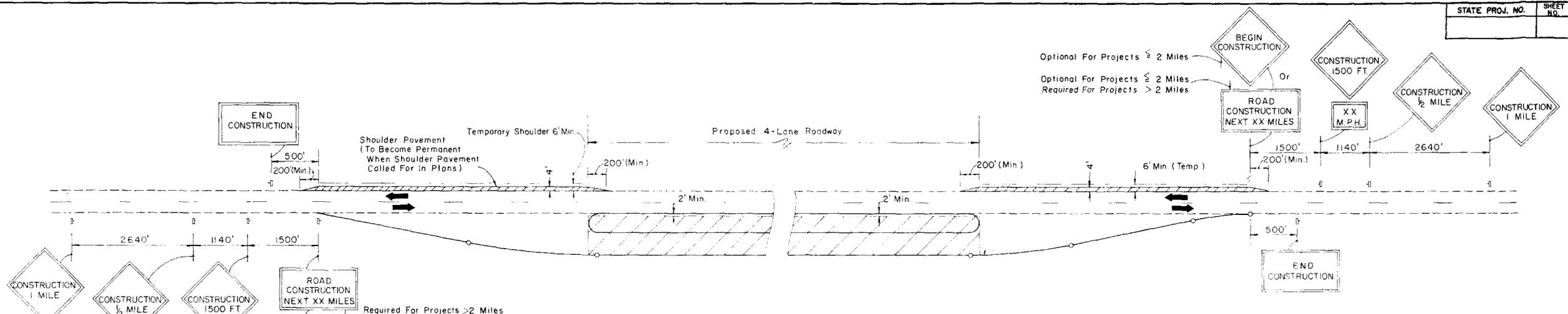
SECTION



PLAN

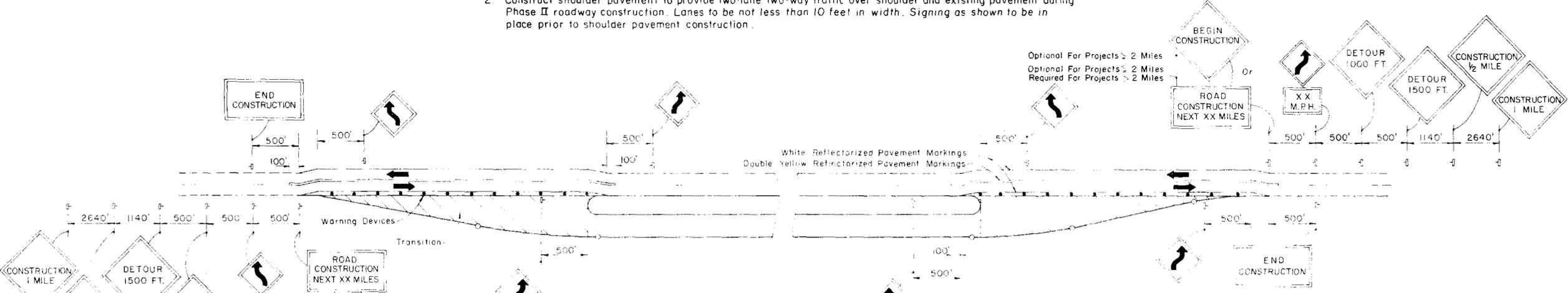
- NOTES:
1. When a crossover is no longer needed, all temporary construction shall be immediately removed and the area returned to its original condition.
 2. Cost of all construction, maintenance, removal and restoration work related to temporary crossovers shall be included in the contract unit price for Maintenance Of Traffic L.S.
 3. Crossovers to be constructed where sight distance is adequate in both directions as directed by the Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TEMPORARY CROSSOVER CONSTRUCTION DETAILS			
RURAL			
Designed by	Name	Date	Approved By
Drawn by			<i>De Bell</i> Deputy Design Engineer, Roadways
Checked by			Revision No.
F.H.W.A. Approved: 10/7/80		Sheet No.	Index No.
		81	1 of 1
		631	



PHASE I

1. Maintain two-lane two-way traffic over existing pavement. Construct new roadway within the proposed 4-Lane limits, excluding the friction course. Sign as shown if roadway construction area falls within 15 feet of existing pavement edge. When the construction area falls more than 15 feet from the existing pavement edge, traffic shall be controlled in accordance with Cases I, II or VII of the MTCSP.
2. Construct shoulder pavement to provide two-lane two-way traffic over shoulder and existing pavement during Phase II roadway construction. Lanes to be not less than 10 feet in width. Signing as shown to be in place prior to shoulder pavement construction.



PHASE II

1. Remove existing pavement marking, in areas of detour and re-mark as shown, install warning devices and re-sign as shown. Traffic to be controlled in accordance with Case VI of the MTCSP. Lanes to be not less than 10' in width.
2. Route through traffic to temporary and existing pavement
3. Construct transitions, excluding friction course

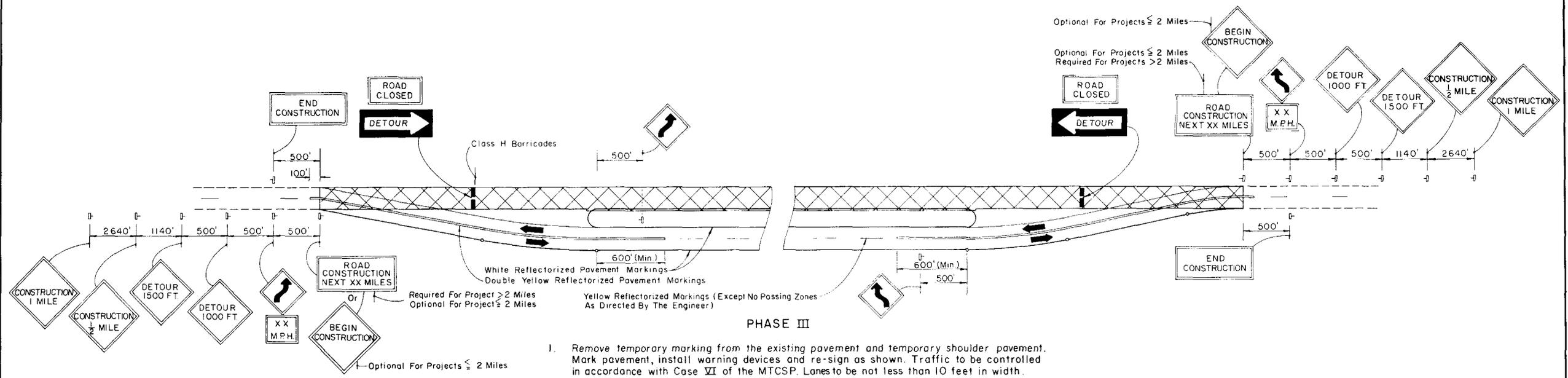
LEGEND

- Phase I
- Phase II
- Manual On Traffic Control And Safe Practices
- Denotes Direction Of Traffic And Does Not Reflect Pavement Marking

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**CONVERTING TWO LANES TO FOUR LANES DIVIDED
STANDARD TRAFFIC CONTROL PLAN
RURAL FACILITY**

Designed By	Names	Dates	Approved By
Drawn By	HSD		<i>J. C. Bull</i> Deputy Design Engineer, Roadways
Checked By	JVG		Revision No.
F.H.W.A. Approved: 5/5/80	81	Sheet No.	Index No.
		1 of 2	640



- PHASE III**
1. Remove temporary marking from the existing pavement and temporary shoulder pavement. Mark pavement, install warning devices and re-sign as shown. Traffic to be controlled in accordance with Case VI of the MTCSP. Lanes to be not less than 10 feet in width.
 2. Route through traffic to newly constructed roadway.
 3. Resurface or reconstruct existing pavement including required shoulder pavement and friction course.

LEGEND

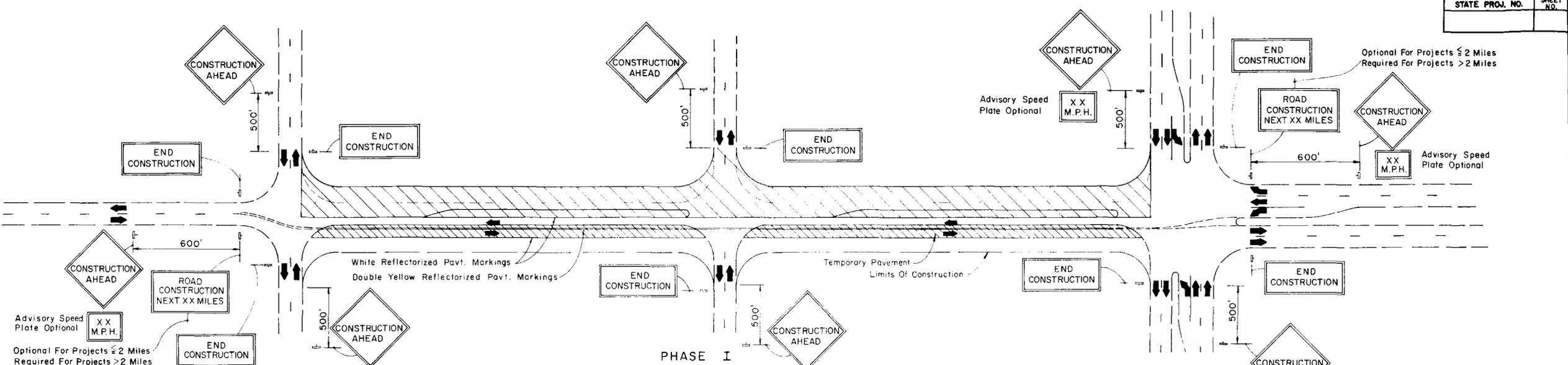
- Phase I
- Phase II
- Phase III
- MTCSP** Manual On Traffic Control And Safe Practices
- Denotes Direction Of Traffic And Does Not Reflect Pavement Marking

- PHASE IV**
1. Reroute through traffic as shown in Phase II. Signing to be as shown in Phase II.
 2. Construct friction course over pavement constructed in Phase I and II.

GENERAL MAINTENANCE OF TRAFFIC NOTES

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to the MTCSP.
2. Lane widths for maintenance of two-way traffic should desirably be equal to lane widths of the existing facility, but lanes shall be not less than 10 feet in width. When one-lane one-way operations are necessary, a minimum width of 12 feet shall be maintained and traffic controlled in accordance with the MTCSP. Minimum width for the temporary shoulders is 6 feet.
3. Raised pavement markers shall be placed along the center of the pavement under traffic; at 40 foot centers on the tangent roadway and 20 foot centers through the curves.
4. Existing signs and pavement markings that conflict with construction signing and marking shall be obliterated or removed.
5. Posted speed on the existing facility shall be decreased at the rate of 10 mph per 500 feet (minimum distance) until detour speed is reached.
6. Additional barricades, signing, lighting or other traffic controls as required by the MTCSP shall be provided as conditions warrant in each phase.
7. Intermediate advisory speed signs shall be erected when the length of construction exceeds one mile, as directed by the Engineer.
8. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
9. Barricading shall meet the requirements of Chart I of the MTCSP.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONVERTING TWO LANES TO FOUR LANES DIVIDED STANDARD TRAFFIC CONTROL PLAN RURAL FACILITY			
Designed By	KNM	Date	Approved By
Drawn By	HSD		<i>Jc. Bull</i> Deputy Design Engineer, Roadways
Checked By	JVG	Revision No.	Sheet No.
F.H.W.A. Approved: 3/3/80	81	2 of 2	640



PHASE I

1. Maintain two-lane two-way traffic along existing facility. Install construction signing.
2. Remark existing pavement to facilitate temporary pavement construction. Lanes shall be not less than 10 feet in width.
3. Construct temporary pavement of sufficient width to accommodate two-lane two-way traffic on the temporary pavement and a portion of the existing pavement during Phase I roadway construction. When two-lane two-way traffic can not be maintained during temporary pavement construction (4' minimum from travel lane to dropoff), one-lane one-way operations shall be maintained in accordance with Case XXI of the MTCSP. Barricading shall meet the requirements of Chart III of the MTCSP.
4. Mark the pavement in accordance with the Phase I diagram. Reroute through traffic to the temporary pavement and a portion of the existing pavement. Lanes shall be not less than 10 feet in width.
5. Construct two lanes of the proposed roadway, excluding the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Cases XX and XXI of the MTCSP. Barricading shall meet the requirements of Chart III of the MTCSP. When work extends through an intersection, temporarily reroute the cross traffic to other cross streets. When rerouting is not possible, provide one lane access (minimum) for two-lane two-way cross streets and one lane access (minimum) each direction for four-lane two-way cross streets.

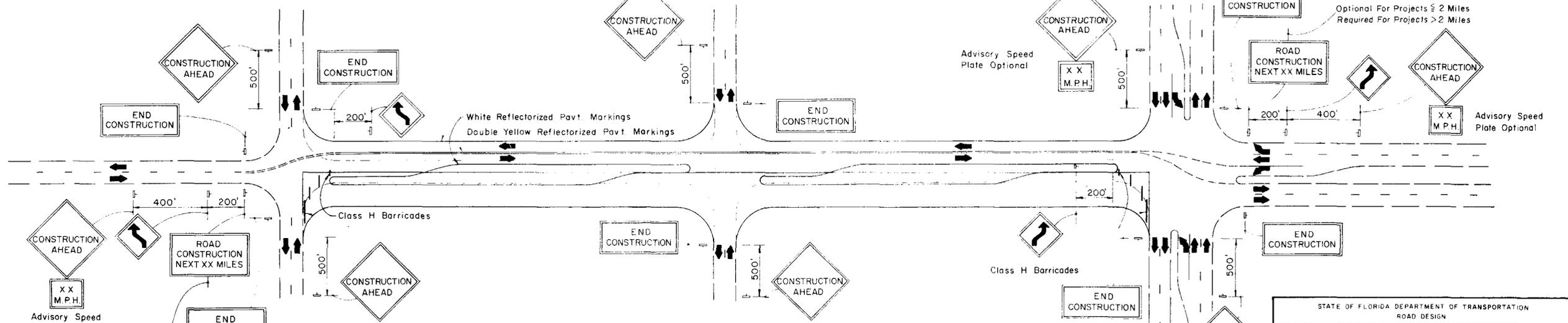
LEGEND

Phase I

Phase II

MTCSP Manual On Traffic Control And Safe Practices

Denotes Direction Of Traffic And Does Not Reflect Pavement Markings



PHASE II

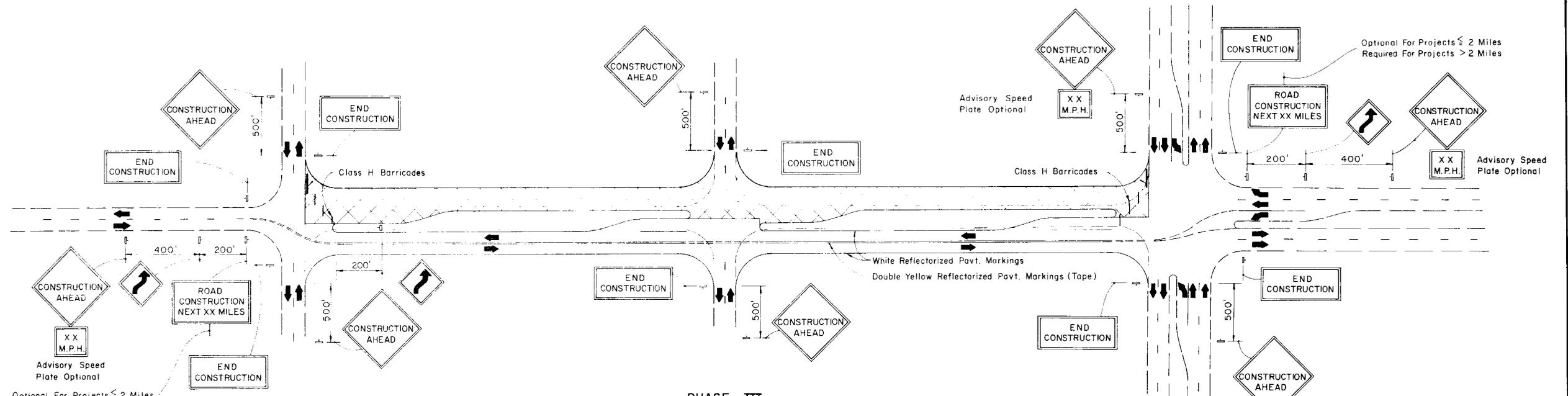
1. Sign and mark Phase I pavement in accordance with the Phase II diagram. Lanes to be not less than 10 feet in width.
2. Reroute through traffic to Phase I pavement.
3. Complete all Phase II construction, including the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Cases XX and XXI of the MTCSP. Barricading shall meet the requirements of Chart III of the MTCSP. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one lane access (minimum) for two-lane two-way cross streets and one lane access (minimum) each direction for four-lane two-way cross streets.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONVERTING TWO LANES TO FOUR LANES DIVIDED STANDARD TRAFFIC CONTROL PLAN URBAN FACILITY

Designed by	K.N.M.	Checked by	J.V.G.
Drawn by	S.H.M.	Revised No.	81
Approved By	<i>[Signature]</i> District Design Engineer, Roadways		
Sheet No.	1 of 2	Index No.	641

F.H.W.A. Approved: 5/5/80



PHASE III

1. Sign and mark Phase II pavement in accordance with the Phase III diagram.
2. Reroute through traffic to Phase II pavement.
3. Construct friction course over Phase I pavement. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Cases XX and XXI of the MTCSP. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one lane access (minimum) for two-lane two-way cross streets and one lane access (minimum) each direction for four-lane two-way cross streets.

GENERAL MAINTENANCE OF TRAFFIC NOTES

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to the MTCSP.
2. Existing raised pavement markers that are properly located shall remain in place. Damaged markers shall be replaced. Markers to be installed shall be placed every 40 feet on tangent roadways and every 20 feet on curves.
3. For divided facility, identical through traffic signing as shown above shall be placed on the outside and median of both roadways for each phase.
4. Existing signs and pavement markings that conflict with construction signings and markings shall be obliterated or removed.
5. At signalized intersections, signals shall be directed or relocated as required to the center of relocated lanes.
6. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
7. Additional barricades, signing, lighting or other traffic controls as required by the MTCSP shall be provided as conditions warrant in each phase.

LEGEND

-  Phase I
-  Phase II
-  Phase III
-  MTCSP Manual On Traffic Control And Safe Practices
-  Denotes Direction Of Traffic And Does Not Reflect Pavement Markings

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CONVERTING TWO LANES TO FOUR LANES DIVIDED STANDARD TRAFFIC CONTROL PLAN URBAN FACILITY					
Designed by	Names	Date	Approved By		
Drawn by	SHM		<i>P. J. ...</i> Deputy Design Engineer, Roadways		
Checked by	JVG		Revision No.	Sheet No.	Index No.
F.H.W.A. Approved: 5/5/80			81	2 of 2	641

FLORIDA DEPARTMENT OF TRANSPORTATION DESIGN CRITERIA RELATED TO HIGHWAY SAFETY

June 5, 1981

TYPE OF FACILITY	INTERSTATE, OTHER LIMITED ACCESS, OR DIVIDED (4 OR MORE LANES) DESIGN SPEED OF 50 MPH OR GREATER	UNDIVIDED - DESIGN SPEED OF 50 MPH OR GREATER AND PROJECTED ADT (20 YR) OF 1,600 OR GREATER	UNDIVIDED - DESIGN SPEED OF 35-45 MPH	DIVIDED OR UNDIVIDED - DESIGN SPEED OF 35-45 MPH	MUNICIPAL - DESIGN SPEED OF 45 MPH OR LESS (CURB AND GUTTER)
EMBANKMENT SLOPE	Fill Ht. 0'-5' 6:1 5'-10' 6:1 to edge of CRA & 4:1 10'-20' 6:1 to edge of CRA & 3:1 > 20' 2:1 R/W cost must be considered in urban areas in using these slopes	Fill Ht. 0'-5' 6:1 5'-10' 6:1 to edge of CRA & 4:1 10'-20' 6:1 to edge of CRA & 3:1 > 20' 2:1	Fill Ht. 0'-5' 6:1 except where R/W is insufficient then 6:1 to edge of CRA & 3:1 will be permitted 5'-20' 6:1 to edge of CRA & 3:1 except where R/W is insufficient then 2:1 with guardrail will be permitted.	Fill Ht. 0'-5' 6:1 except where R/W is insufficient then 6:1 to edge of CRA & 3:1 will be permitted. 5'-20' 6:1 to edge of CRA & 3:1 except where R/W is insufficient then 2:1 with guardrail will be permitted.	2:1 or to suit property owner, not flatter than 6:1. R/W cost must be considered for high fill sections in urban areas.
CLEAR WIDTHS FOR BRIDGES	Travel lanes plus 10' Rt. and 6' Lt. for 6 or more lanes.	Travel lanes plus approach shoulder widths.	Travel lanes plus approach shoulder widths.	Divided - Travel lanes plus approach shoulder width Rt. and 6' Lt. unless full median section is carried across structure. Undivided - Travel lanes plus approach shoulder widths.	Full section (face to face of curb) plus clearance to bridge rail.
BACKSLOPES	4:1 (Normal)	4:1 (Normal)	4:1 where R/W permits or 3:1.	4:1 where R/W permits or 3:1.	2:1 or to suit property owner, not flatter than 6:1.
CLEAR RECOVERY AREA (CRA)	30' min. from edge of travel lane, 18' min. from edge of auxiliary lane. Shoulder width plus 2' to face of guardrail (at shoulder line when shoulder width is 12').	30' min. from edge of travel lane, 18' min. from edge of auxiliary lane. Shoulder width plus 2' to face of guardrail.	20' min. from edge of travel lane, 14' min. from edge of auxiliary lane. Shoulder width plus 2' to face of guardrail (8' min.) For projected ADT (20 yr.) less than 750 14' min. from edge of both travel and auxiliary lanes.	18' where R/W permits or 14' min. from edge of both travel and auxiliary lanes. Shoulder width plus 2' to face of guardrail (8' min.).	4' from face of curb, ϕ Bridge piers normally will be 16' min. from edge of travel lane. *
SIGNS	Not generally in median. Outside clear recovery area or behind barrier that is justified for other reasons. Cantilever signs may be located inside recovery area protected by barrier. Frangible single column signs to be located in accordance with Operations Standards Index No. 17302. All supports are breakaway or frangible except overhead cantilever or truss signs.	Outside clear recovery area or behind barrier that is justified for other reasons. Cantilever signs may be located inside recovery area protected by barrier. Frangible single column signs to be located in accordance with Operations Standards Index No. 17302. All supports are breakaway or frangible except overhead cantilever or truss signs.	Outside clear recovery area or behind barrier that is justified for other reasons. Cantilever signs may be located inside recovery area protected by barrier. Frangible single column signs to be located in accordance with Operations Standards Index No. 17302. All supports are breakaway or frangible except overhead cantilever or truss signs.	Outside clear recovery area or behind barrier that is justified for other reasons. Cantilever signs may be located inside recovery area protected by barrier. Frangible single column signs to be located in accordance with Operations Standards Index No. 17302. All supports are breakaway or frangible except overhead cantilever or truss signs.	2' min. from face of curb to inside edge of sign panel. Sign placement shall not block sidewalk.
LIGHT POLES	Not generally in median. Outside clear recovery area or frangible base 20' from edge of travel lanes and 14' min. from edge of auxiliary lane or behind approved barrier that is justified for other reasons.	Outside clear recovery area or frangible base 20' from edge of travel lanes and 14' min. from edge of auxiliary lane or behind approved barrier that is justified for other reasons.	Outside clear recovery area for both frangible and non-frangible bases. Desirable 20' from edge of travel lanes and 14' min. from edge of auxiliary lane or behind approved barrier that is justified for other reasons.	18' from edge of travel lanes or 14' from edge of auxiliary lane for both frangible and non-frangible bases or behind approved barrier that is justified for other reasons.	4' min. from face of curb, ϕ
UTILITY POLES, FIRE HYDRANTS, ETC.	Not in median. Not within R/W of the main travel way of interstate or other limited access facilities. For other facilities outside the clear recovery area, normally 6.5' inside R/W when beyond clear recovery area otherwise as close as practical to R/W line.	Outside clear recovery area. Normally 6.5' inside R/W when beyond clear recovery area otherwise as close as practical to R/W line.	Outside clear recovery area. Normally 6.5' inside R/W when beyond clear recovery area otherwise as close as practical to R/W line.	Not in median. 18' from travel lane or 14' from auxiliary lane. Normally 6.5' inside R/W when beyond clear recovery area. Otherwise as close as practical to R/W line.	Not in median. 4' min. from face of curb, ϕ
RAILROAD CROSSING DEVICES	Not on interstate or expressway. 10' min. from edge of driving lane to near edge of device. No guardrail.	10' min. from edge of driving lane to near edge of device. No guardrail.	10' min. from edge of driving lane to near edge of device. No guardrail.	10' min. from edge of driving lane to near edge of device. No guardrail.	2.5' min. from face of curb to near edge of device.
MEDIAN WIDTHS	Interstate or limited access facilities. 60' min. - 60 mph and over 40' min. - under 60 mph Other divided highways 40' min. - 55 mph and over 22' min. - under 55 mph	Interstate or limited access facilities. 60' min. - 60 mph and over 40' min. - under 60 mph Other divided highways 40' min. - 55 mph and over 22' min. - under 55 mph	Interstate or limited access facilities. 60' min. - 60 mph and over 40' min. - under 60 mph Other divided highways 40' min. - 55 mph and over 22' min. - under 55 mph	Interstate or limited access facilities. 60' min. - 60 mph and over 40' min. - under 60 mph Other divided highways 40' min. - 55 mph and over 22' min. - under 55 mph	19.5' min. - 45 mph 15.5' min. - 40 mph or less (greater widths desirable) For reconstruction projects the min. painted median width with provision for left turn is 10' (greater widths desirable).
TREES Δ Existing or Expected Dia. \geq 4"	Not generally in median. 40' desirable (30' min.) from edge of travel lane, 18' min. from edge of auxiliary lane. \dagger	30' min. from edge of travel lane, 18' min. from edge of auxiliary lane.	20' min. from edge of travel lane, 14' min. from edge of auxiliary lane. For projected ADT (20 yr.) less than 750 14' min. from edge of both travel and auxiliary lanes.	Not generally in median. 14' min. from face of curb and auxiliary lanes, 8' min. from edge of driving lane for median where median curb is used.	4' min. from face of curb where curb height is 6" or greater. 8' min. from edge of driving lane. <input type="checkbox"/>

Design speed to be established using realistic anticipated operating speed. (Assume 55 mph limits to be non-existent).

Preferred ditch cross sections are shown on pages 25, 26 & 27 of the AASHTO Guide For Selecting, Locating And Designing Traffic Barriers. Consideration should be given to maintaining greater than the above specified clearances and/or flatter slopes where feasible and practical.

ϕ On projects where the 4' min. offset would place the utility or other obstruction in substantial conflict with the sidewalk or when utility poles would create an unreasonable conflict with requirements of the National Safety Codes and other alternatives are deemed impractical the minimum may be reduced to 2.5' from face of curb - each case where this deviation is proposed must be supported on an individual basis.

* At locations where immediately adjacent development such as buildings, etc. provide less clearance, bridge piers can be placed to provide clearance less than 16'.

Values shown above shall be used on all new construction and on reconstruction projects to the extent that economic and environmental considerations and R/W limitations will allow. For definitions of new construction and reconstruction see "Manual Of Uniform Minimum Standards For Design, Construction And Maintenance For Streets And Highways"

Driving lane is any traffic lane, travel or auxiliary.

An auxiliary lane is the portion of the roadway adjoining the traveled way for parking, speed changes, turning, weaving, truck climbing or for other purposes supplementary to through traffic movement.

Traveled way (travel lanes) is the portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

Δ Offsets shown are for existing or newly planted trees. If existing trees are close to but less than the minimum offset indicated, other factors should be considered to determine adequacy of offset, i.e. ADT; operating speed; accident history; size, age and type of tree; protection by a barrier; etc. Newly planted trees may be placed behind barriers that are provided for other reasons. The minimum setback distance from the back of concrete barriers, walls, abutments or other rigid obstructions is 4' for newly planted trees. For W-beam guardrail the minimum setback is 6' from the face of the rail. Offsets shown apply to both outside and median for divided highways unless otherwise noted. When trees are placed in median adequate sight distance at intersections, turnouts and median openings, etc. shall be maintained.

Minimum distance to existing or newly planted trees. To be used on facilities classified as municipal when no curb and gutter exist, when curb height is less than 6" or when curb height has been reduced by resurfacing. May be reduced to 5' from edge of driving lane for speeds of 30 mph or less.

\dagger When 30' min. offset established, care shall be taken to avoid blocking sight distance to roadside signs.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
DESIGN CRITERIA RELATED TO HIGHWAY SAFETY					
Designed by	HSD	Date	6/81	Approved By	
Drawn by	JVG	Revision No.	82	Sheet No.	1 of 1
Checked by	JVG	Revision No.	82	Sheet No.	1 of 1
F H W A Approved					700