

ROAD

DESIGN

STANDARDS



JANUARY 1981

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A AASHO AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS
AASHTO AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
ABC ASPHALT BASE COURSE
ABD ABANDONED
AC ACRE
ACT ACTUATED
ADJ ADJUST
ADT ANNUAL AVERAGE DAILY TRAFFIC
AGG AGGREGATE
AH AHEAD
ALT ALTERNATE
ALUM ALUMINUM
APPR APPROACH
APPROX APPROXIMATE
ARTF ARTIFICIAL
ASPH ASPHALT
ASPH CONC ASPHALTIC CONCRETE
OR AC ASPHALTIC CONCRETE
ASSEM ASSEMBLY
ASTM AMERICAN SOCIETY FOR TESTING MATERIALS
ATTNUATR ATTENUATOR
AVE AVENUE

B TO B BACK TO BACK
BASC BASCULE
BBL BARREL
BC BOTTLE CAP
BCOMP BITUMINOUS COATED CORRUGATED METAL PIPE CULVERT
BCPA BITUMINOUS COATED PIPE ARCH CULVERT
BCPCMP BITUMINOUS COATED AND PAVED CORRUGATED METAL PIPE CULVERT
BCPPA BITUMINOUS COATED AND PAVED PIPE ARCH CULVERT
BEG BEGIN
BIT BITUMINOUS
BK BACK
BL BASE LINE
BLDG BUILDING
BLKHD BULKHEAD
BLVD BOULEVARD
BM BENCH MARK
BOT BOTTOM
BP BORROW PIT
BRG BEARING
BRKWY BREAKAWAY
BTFLY BUTTERFLY
BW BARBED WIRE

C CANTILEVER LENGTH
C & G CURB AND GUTTER
CAP CORRUGATED ALUMINUM PIPE
CB CATCH BASIN
CBC CONCRETE BOX CULVERT
CBS CONCRETE BOX STRUCTURE
CC CENTER TO CENTER
CD CROSS DRAIN
CEM CEMENT
CEM'D CEMENTED
CH CHANNEL
CH CH CHANNEL CHANGE
CHGABLE CHANGABLE
CI CAST IRON
CIP CAST IRON PIPE
CIPL CAST IN PLACE
CL CLEARANCE OR CENTER LINE
CM CONCRETE MONUMENT
CMP CORRUGATED METAL PIPE
CO COUNTY
COM COMMERCIAL
COMP COMPOSITE
CONC CONCRETE
CONST CONSTRUCT
CONTRL CONTROLLER
CONT CONTINUATION
CONTR CONTRACTOR
COORD COORDINATE
COR CORNER
CORR CORRUGATED
CP CONCRETE PIPE
CRS COURSE
CS CURVE TO SPIRAL
CSE COURSE
CTLVR CANTILEVER
CTR CENTER
CULV CULVERT
CY CUBIC YARD
CYL CYLINDRICAL

D DEGREE OF CURVATURE
DA DRAINAGE AREA
DBL DOUBLE
D-CSE DOUBLE COURSE
D=POST DOUBLE POST
DCS DEGREE OF CURVATURE (SPIRAL)
DELIN DELINEATORS
DEMOB DEMOBILIZATION
DEPT DEPARTMENT
DET DETOUR
DHV DESIGN HOURLY VOLUME
DT DITCH
DI DROP INLET
DIA DIAMETER
DIM DIMENSION
DISP DISPOSAL
DOT DEPARTMENT OF TRANSPORTATION
DPI DITCH POINT INTERSECTION
DR DRAIN
DRIV DRIVEN
DRWY DRIVENWAY
DS DESIGN SPEED
DWG DRAWING

E EAST
E RATE OF SUPERELEVATION
E TO E END TO END
E= EXTERNAL DISTANCE
EA EACH
EB EASTBOUND
EL OR ELEV ELEVATION
ELAST ELASTOMERIC
ELEC ELECTRIC
ELLIP ELLIPTICAL
EMBK EMBANKMENT
EMUL EMULSIFIED
ENCL ENCLOSURE
ENGR ENGINEER
EOS END OF SURVEY
EQ EQUATION OR EQUAL
EQUIP EQUIPMENT
ESMT EASEMENT
EST ESTIMATE
ESTBLMNT ESTABLISHMENT
EW ENDWALL
EXCAV EXCAVATION
OR EXC EXCAVATION
EXIST EXISTING
EXP EXPANSION
EXT EXTENSION

F FILL
F & I FURNISH & INSTALL
F TO F FACE TO FACE
FA FEDERAL AID
FAP FEDERAL AID PROJECT
FE FLOOR ELEVATION
FED FEDERAL
FERT FERTILIZER
FETS FLARED END TERMINAL SECTION
FH FIRE HYDRANT
FHWA FEDERAL HIGHWAY ADMINISTRATION
FIN FINISH
FL FLOW LINE
FLEX FLEXIBLE
FOUND FOUNDATION
FR FRAME
FRANG FRANGIBLE
FT FEET
FURN FURNISH
FUT FUTURE

GA GAUGE, GAGE
GAL GALLON
GALV GALVANIZED
GAR GARAGE
GUTTER DRAIN
GIP GALVANIZED IRON PIPE
GR GRADE OR GUARDRAIL
GRD GROUND
GTR GUTTER

HDWL HEADWALL
HNDRL HANDRAIL
HORIZ HORIZONTAL
HR HOUR
HSE HOUSE
HW HIGH WATER
HWY HIGHWAY
HYD HYDRANT

I EXTERNAL ANGLE(DELTA)
ID INSIDE DIAMETER
IN INCH
INC INCORPORATED
INCL INCLUDED
IP IRON PIPE
INSTL INSTALL
INTCH INTERCHANGE

JB JUNCTION BOX
JCT JUNCTION

L LENGTH OF CURVE
LA LIMITED ACCESS
LB POUND
LBR LONGER BEARING RATIO
LC LONG CHORD
LF LINEAR FEET
LGTH LENGTH
LIN LINEAR
LMRK LIMEROCK
LS LENGTH OF SPIRAL
LT LEFT
LT'D LIGHTED
L/W LIGHTWEIGHT

M MIDDLE ORDNATE DISTANCE
MAINT MAINTENANCE
MATL MATERIAL
MAX MAXIMUM
MED MEDIAN
MESS MESSAGE
MH MANHOLE
MHW MEAN HIGH WATER
MI MILE
MIN MINIMUM
MISC MISCELLANEOUS
MLW MEAN LOW WATER
MOBL MOBILIZATION
MOD MODIFY
MON MONUMENT
MP MILE POST
MPH MILES PER HOUR
MSL MEAN SEA LEVEL
MT'D MOUNTED
MB MEDIAN BARRIER

N NORTH
N & C NAIL & (BOTTLE) CAP
NB NORTHBOUND
NE NORTHEAST
NIC NOT IN CONTRACT
NO NUMBER
NW NORTHWEST

O PASS OVERPASS
O TO O OUTSIDE TO OUTSIDE
OD OUTSIDE DIAMETER
OPT OPTICALLY
OVHD OVERHEAD

PAVT PAVEMENT
PC POINT OF CURVATURE
PCC POINT OF COMPOUND CURVATURE OR PLAIN CEMENT CONCRETE
PEDES PEDESTRIAN
PEN PENETRATION
PG PROFILE GRADE
PH PHASE
PI POINT OF INTERSECITON
PK PER CAP
PL PROPERTY LINE
POC POINT ON CURVE
POST POINT ON SEMI TANGENT
POT POINT ON TANGENT
PP POWER POLE
PRC POINT OF REVERSE CURVATURE
PRCST PRECAST
PREST PRESTRESSED
PROG PROGRAMMED
PROJ PROJECT
PRM PERMANENT REFERENCE MONUMENT
PROV PROVISIONS
PRSE PRESSURE
PS&E PLANS, SPECIFICATIONS AND ESTIMATES
PT POINT OF TANGENCY
P-TIME PRE-TIME
Q PEAK DISCHARGE

R RADIUS
R- RANGE
RBAC ROCK BASE ASPHALTIC CONCRETE
RBST ROCK BASE SURFACE TREATMENT
RCP REINFORCED CONCRETE PIPE
RCPA REINFORCED CONCRETE PIPE ARCH
RD ROAD
RD-SD ROADSIDE
RDMY ROADWAY
REF REFERENCE
REFL REFLECTIVE
REINF REINFORCED
REJUV REJUVENATION
RELOC RELOCATED
REM REMOVAL
REPL REPLACE
RES RESIDENCE
RM REFERENCE MONUMENT
RP REFERENCE POINT
RR RAILROAD
RSF RESURFACE
RT RIGHT
R/W RIGHT OF WAY

S SOUTH
SAHM SAND-ASPHALT HOT MIX
SAN SANITARY
SB SOUTHBOUND
SBAC SHELL BASE ASPHALTIC CONCRETE
SBRM SAND BITUMINOUS ROAD MIX
SBST SHELL BASE SURFACE TREATMENT
SC SEAL COAT
SCST SAND-CLAY SURFACE TREATMENT
SD SIDE DRAIN
SE SOUTHEAST
SECT SECTION
SED SEDIMENT
SEP SEPARATOR
SEQ SEQUENTIAL
SF SHRINKAGE FACTOR
SG SUBGRADE
SHLDR SHOULDER
SPEC SPECIFICATION
SQ FT SQUARE FOOT
SQ IN SQUARE INCH
SQ YD OR YD SQUARE YARD
SR STATE ROAD
SS STORM SEWER
SSMD SOLID STATE MODULAR DESIGN
ST SURFACE TREATMENT OR STREET
STA STATION
STAB STABILITY
STD STANDARD
STL STEEL
STR STRUCTURE
SUBGR SUBGRADE
SUPPTS SUPPORTS
SURF SURFACE
SW SOUTHWEST OR SIDEWALK
SYST SYSTEM
S-POST SINGLE POST

T TANGENT LENGTH OF CURVE
TBM TEMPORARY BENCH MARK
TC TANGENT TO CURVE
TCP TERRA COTTA PIPE
TEL TELEPHONE
TEMP TEMPERATURE
THRMPLSTC THERMPLASTIC
TN TON
TRAF TRAFFIC
TREAT TREATMENT
TS TANGENT TO SPIRAL
TSC LENGTH OF TANGENT (SPIRAL CURVE)
TWP TOWNSHIP
TYP TYPICAL
T-CSE TRIPLE COURSE
U PASS UNDERPASS
UNDGRD UNDERGROUND
UNDRD UNDERDRAINS
UNDRDWN UNDERROADWAY
UNL UNLOADED
UNTR UNTREATED
USC&GS US COAST AND GEODETIC SURVEY (NOW NATIONAL GEODETIC SURVEY)
USGS US GEOLOGICAL SURVEY

VAR VARIABLE
VC VERTICAL CURVE
VF VERTICAL FOOT
VCP VERTIFIED CLAY PIPE
VEH VEHICLE
VERT VERTICAL
VOL VOLUME
VN VARIABLE WIDTH

W WEST
WB WESTBOUND
WM WATER MAIN
WT WATER TABLE OR WEIGHT

X COORDINATE DISTANCE (EAST-WEST)
X RD CROSS ROAD
XING CROSSING
X-SEC CROSS SECTION
Y COORDINATE DISTANCE(NORTH-SOUTH)
ZL TWO LANE

UNITS OF MEASURE

| | | | |
|----|------------------|----|------------------|
| AC | ACRE | LU | PER LUMINAIRE |
| AS | ASSEMBLY | MG | THOUSAND GALLONS |
| BA | BARREL | NM | NET MILE |
| BU | BUSHEL | PB | PER BUILDING |
| CF | CUBIC FT. | PC | PER CLUSTER |
| CO | PER CLEANOUT | PE | PILE |
| CY | CUBIC YARD | PI | PER INTERSECTION |
| CW | CWT | PJ | PER JOINT |
| DA | DAYS | PL | PLANT |
| EA | EACH | PO | POST |
| FB | MFBM | PP | PER POLE |
| FT | FOOT | PW | PER WELL |
| GA | GALLON | RM | ROAD MILE |
| GM | GROSS MILE | SF | SQUARE FOOT |
| LB | POUND | SP | SPAN |
| LF | LIN. FT. | SY | SQUARE YARD |
| LS | LUMP SUM | TM | TON |
| ED | PER EACH PER DAY | VF | VERTICAL FOOT |

| | | | |
|--|-------|-------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| STANDARD ABBREVIATIONS | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | | | <i>E. C. Smith</i> Deputy Design Engineer, Roadways |
| Checked by | | | Revision No. Sheet No. Index No. |
| F.H.W.A. Approved: 12/13/74 | | | 81 1 of 1 001 |

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 | Names | Dates | Approved By |
| Drawn by | CDP | 8/72 | <i>De C. Smith</i> Deputy Design Engineer, Roadways |
| Checked by | COR | 8/72 | Revision No. Sheet No. Index No. |
| F.H.W.A. Approved: 7/7/75 | | | 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 ROAD DESIGN | | | | |
| STANDARD SYMBOLS | | | | |
| Designed by | Names | Dates | Approved By | |
| Drawn by | CDP | 8/72 | Dc Bullard Deputy Design Engineer, Roadways | |
| Checked by | COR | 8/72 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 7/7/75 | | | 80 | 2 of 3 |
| | | | | 002 |

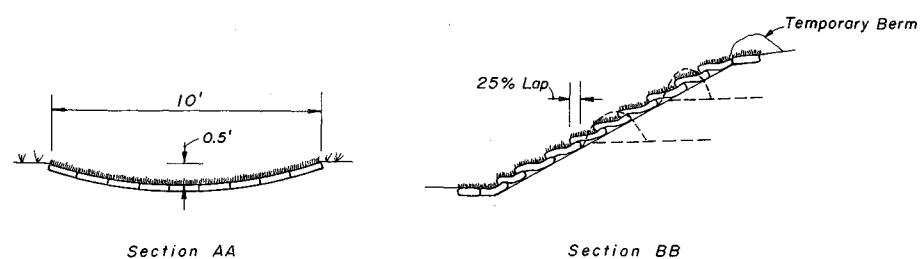
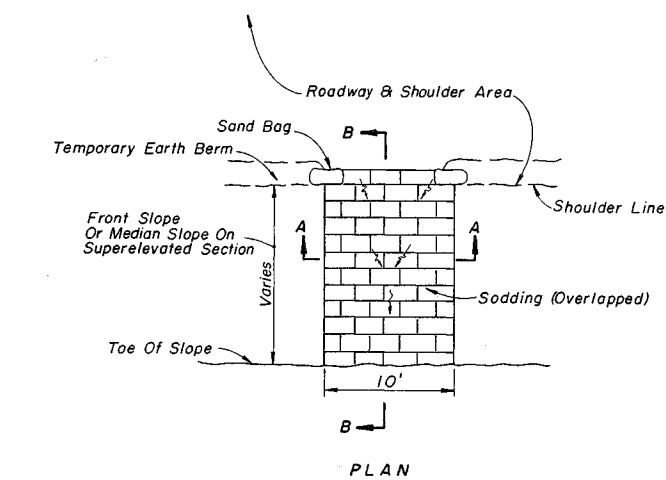
STANDARD SYMBOLS FOR PLAN SHEETS

| 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 | | |
| SIGNAL FACE NUMBER | W - DW FL. | |
| ITEM NUMBER | 630-113 | |
| SIGNAL LENS | | |
| PROGRAMED SIGNAL HEAD | | |
| MESSENGER WIRE | | |
| POLE TABULATION CROSS REFERENCE | | |
| POLE TABULATION CROSS REFERENCE (JOINT USE POLE) | | |
| SIGNAL PHASE | | |

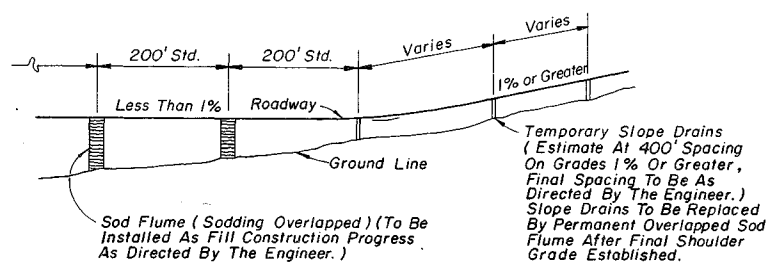
| LIGHTING SYMBOLS | |
|------------------|--|
| | NEW POLE & LUMINAIRE |
| | EXISTING POLE & LUMINAIRE |
| | EXISTING POLE & LUMINAIRE TO BE REMOVED |
| | FINAL POSITION OF RELOCATED OR ADJUSTED POLE & LUMINAIRE |
| | NEW HIGH MAST LIGHTING TOWER |
| | CITY OR UTILITY OWNED LUMINAIRE & POLE |
| | PVC (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 | |

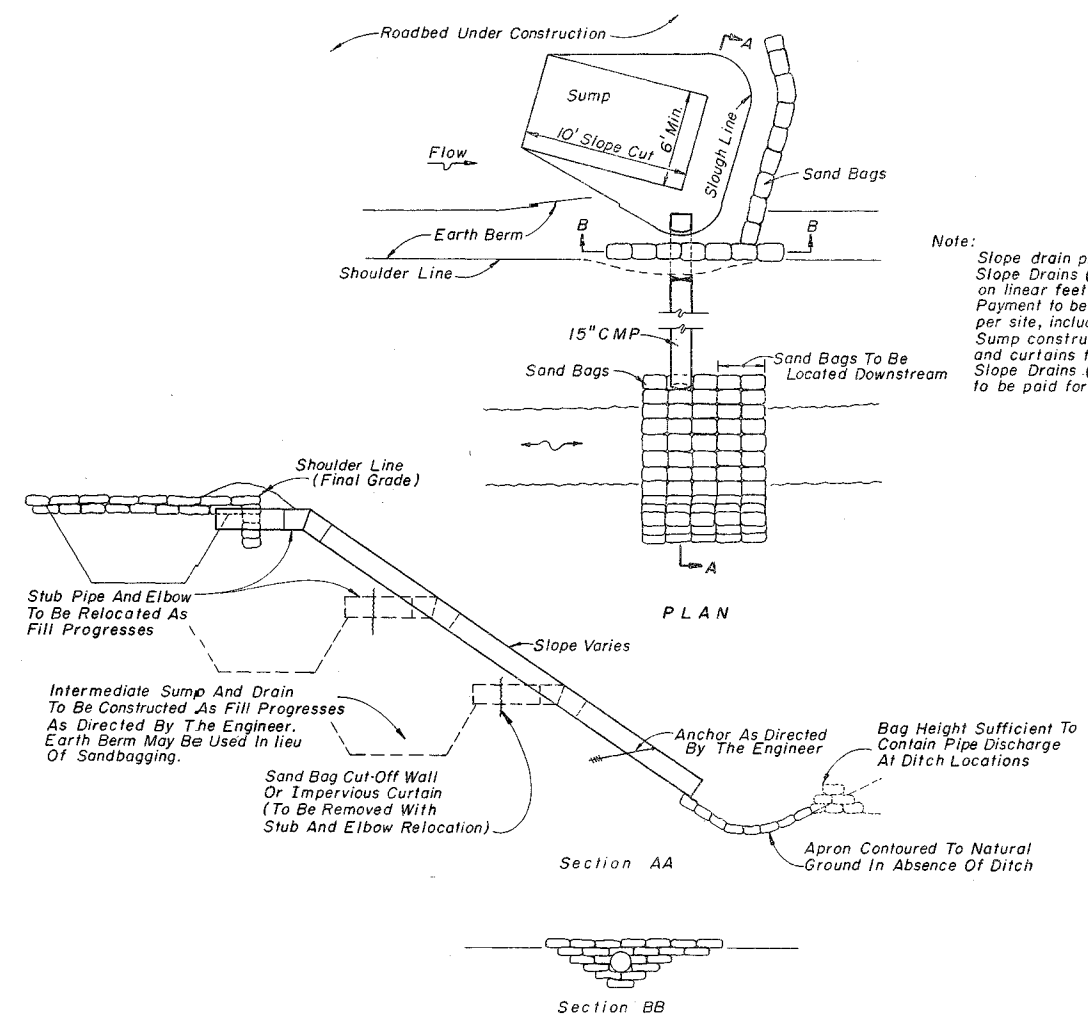
| | | | | | |
|--|-------|-------|--------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| STANDARD SYMBOLS | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | CDP | 8/72 | | | |
| Checked by | COR | 8/72 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 7/7/75 | | | 80 | 3 of 3 | 002 |



SOD FLUME (SODDING OVERLAPPED)



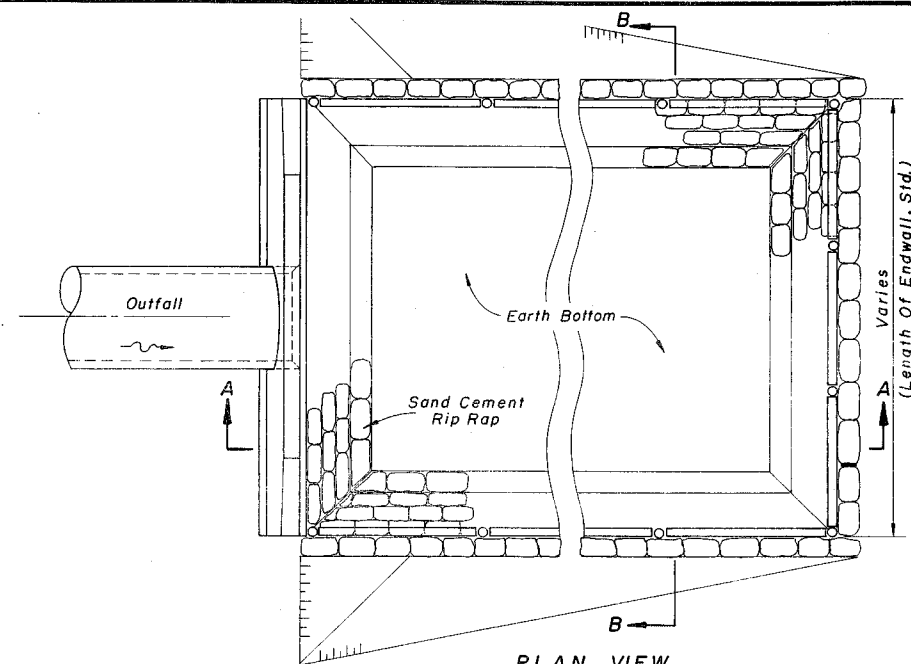
SLOPE DRAIN APPLICATION



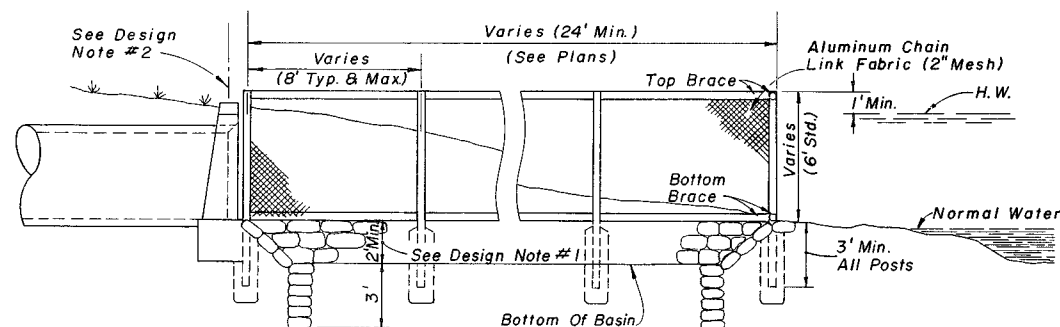
TEMPORARY SLOPE DRAIN

Note: Slope drain pipe to be paid for as Slope Drains (Temporary) LF, 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 CY.

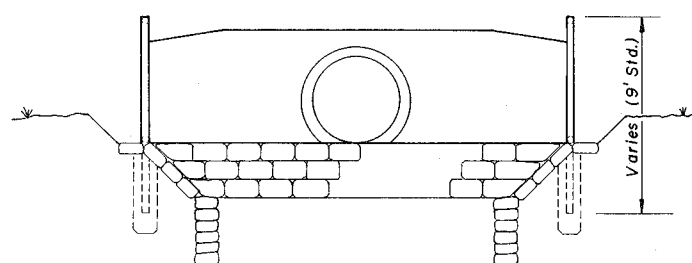
| | | | | | |
|--|-------|-------|----------------------------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| TEMPORARY SLOPE DRAIN AND SOD FLUME | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | | | Deputy Design Engineer,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



PLAN VIEW



SECTION AA



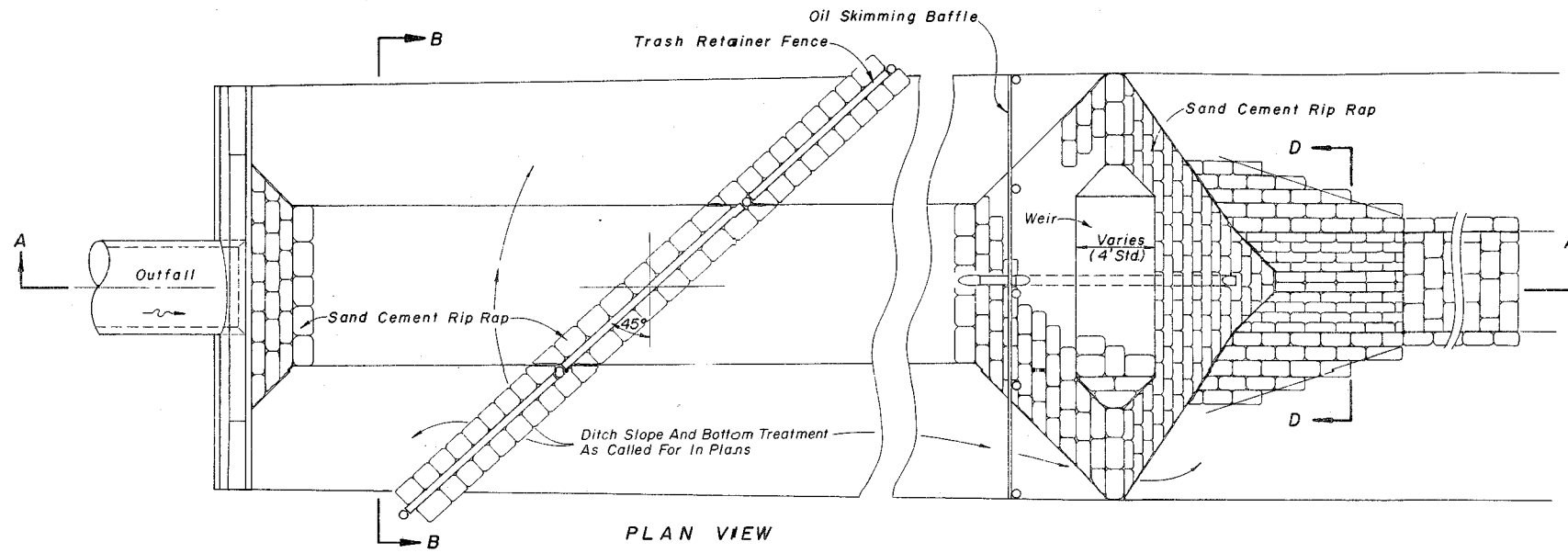
SECTION BB

TYPE A

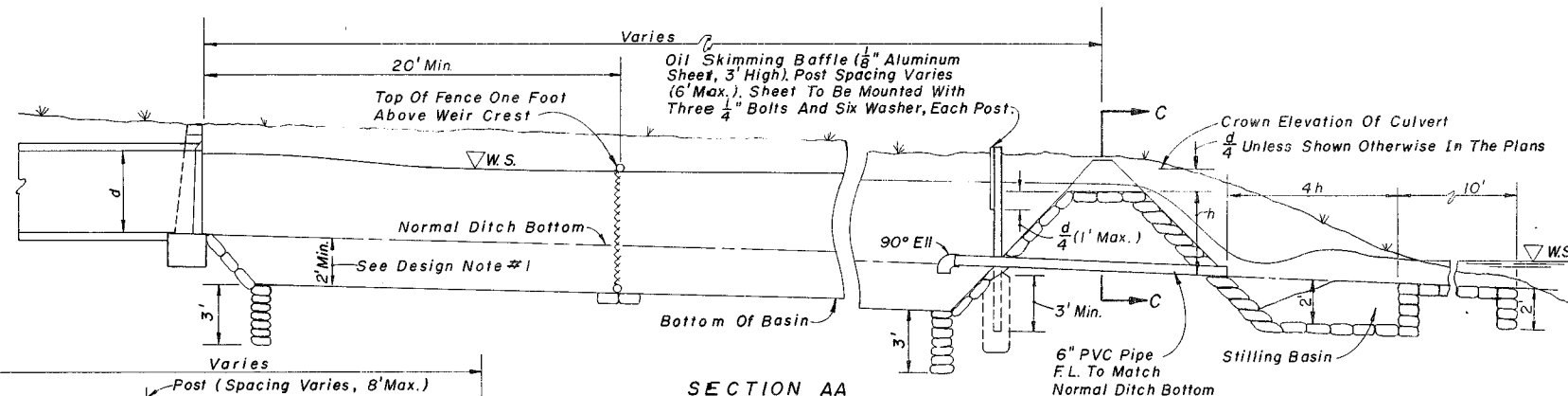
INTENDED FOR USE WHEN THE STORM SEWER OUTFALLS ADJACENT TO A SHORE LINE.

GENERAL DESIGN NOTES

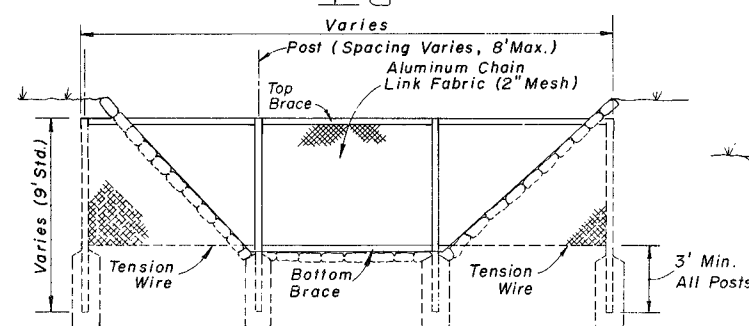
1. Basins should be as deep as practical with a minimum depth of 2.0 feet.
2. In Type A, when the top of endwall is below high water, fence also will be required along the top of the endwall.
3. In Type B, the weir shall be located as far from the endwall as practical. On steep ditch grades two or more 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.



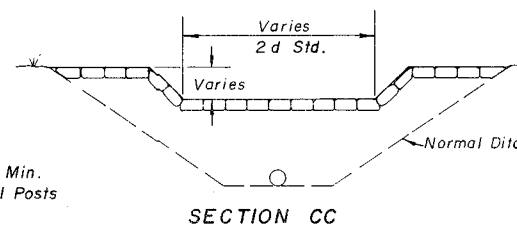
PLAN VIEW



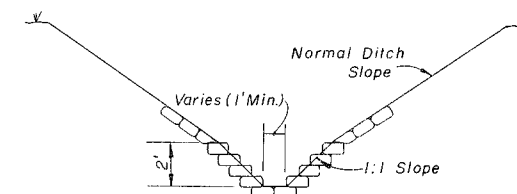
SECTION AA



SECTION BB



SECTION CC



SECTION DD

TYPE B

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

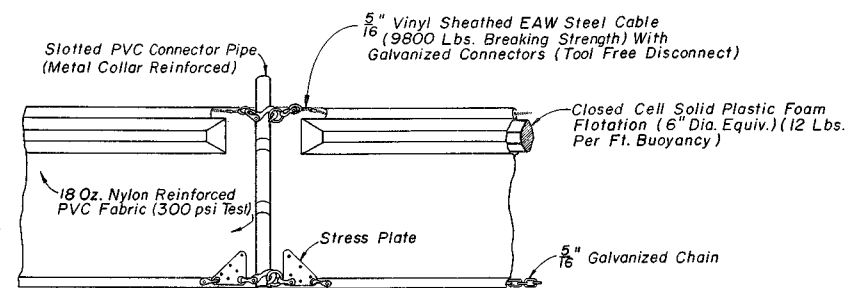
GENERAL CONSTRUCTION NOTES

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.

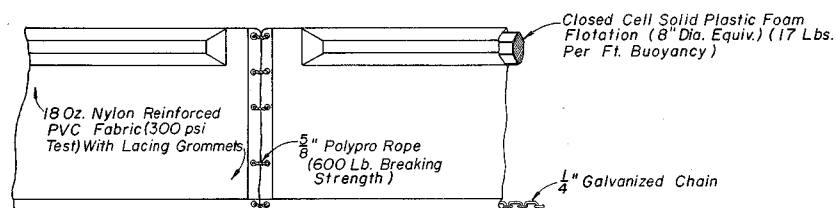
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TRASH RETAINER AND SEDIMENT BASIN

| Names | Dates | Approved By |
|---------------------------|-----------------|---|
| Designed by WJR | 5/74 | <i>D. C. Pugh</i> Deputy Design Engineer, Roadways |
| Drawn by | | |
| Checked by HLB | 6/74 | |
| F.H.W.A. Approved 10/7/80 | Revision No. 80 | Sheet No. 1 of 1 |
| | | Index No. 101 |

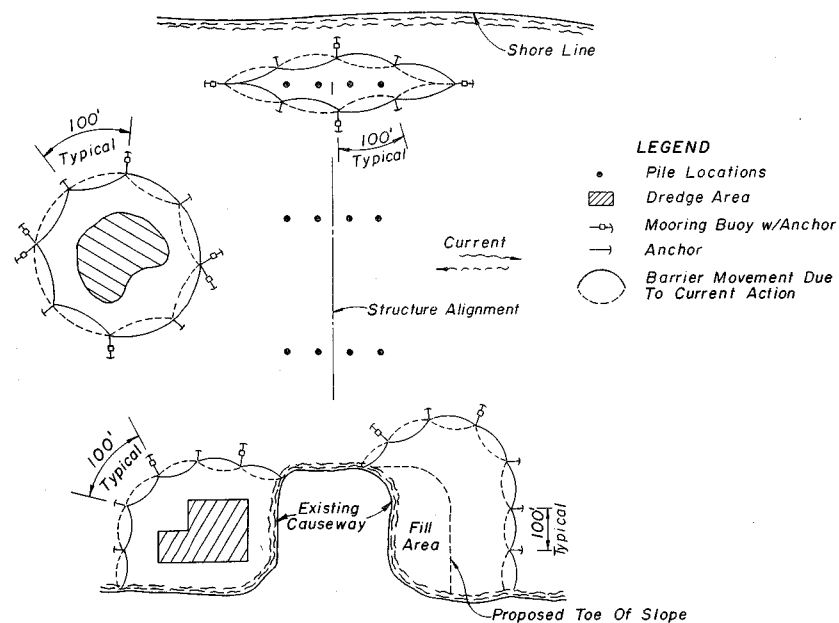


TYPE I



TYPE II

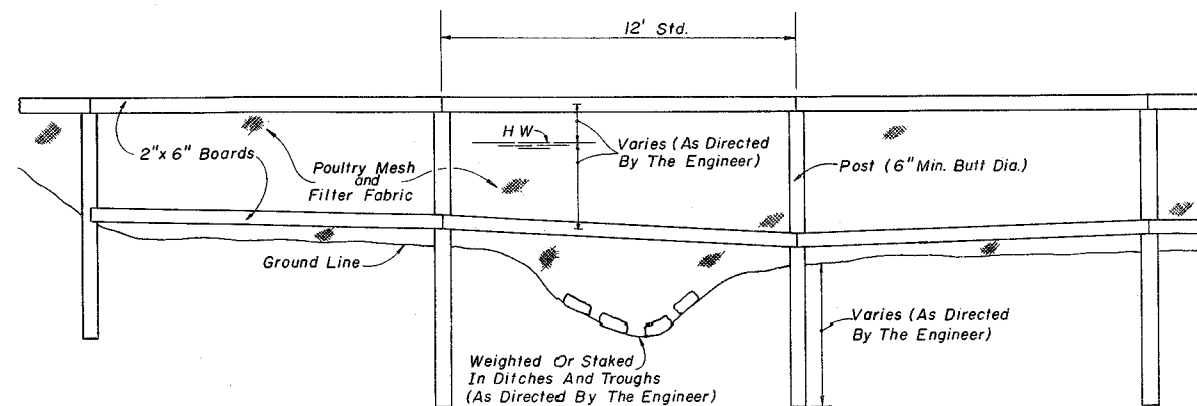
FLOATING SILT BARRIERS



NOTES:

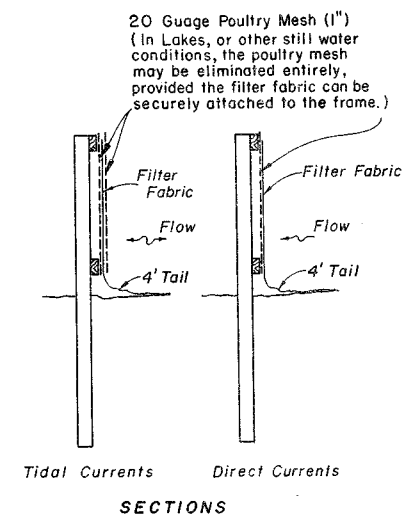
1. Number and spacing of anchors dependent on current velocities.
2. Deployment of barrier around pile locations may vary to accommodate construction operations.
3. Navigation may require segmenting barrier during construction operations.
4. The above applications indicate Type I Floating Silt Barrier 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



ELEVATION

STAKED SILT BARRIER

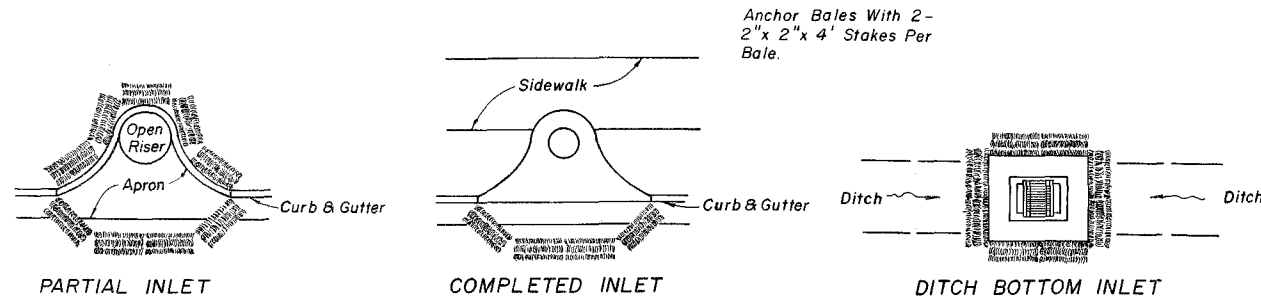


SECTIONS

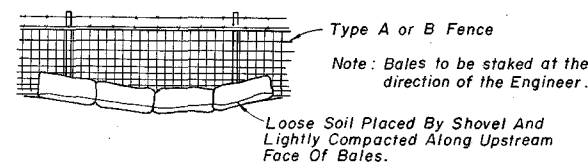
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FLOATING AND STAKED SILT BARRIERS

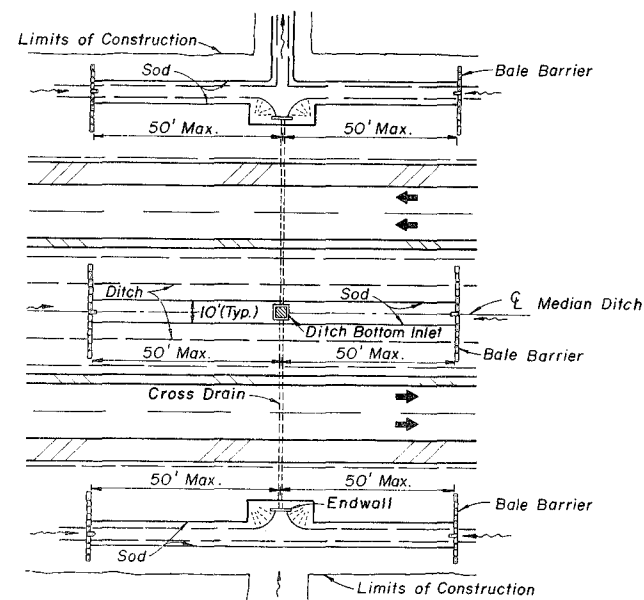
| Designed by | Names | Dates | Approved By | Revision No. | Sheet No. | Index No. |
|----------------------------|-------|-------|--|--------------|-----------|-----------|
| Drawn by | | | <i>J. C. Smith</i> Deputy Design Engineer, Roadways | | | |
| Checked by | | | | | | |
| F.H.W.A. Approved: 10/7/80 | | | | 81 | 1 of 1 | 102 |



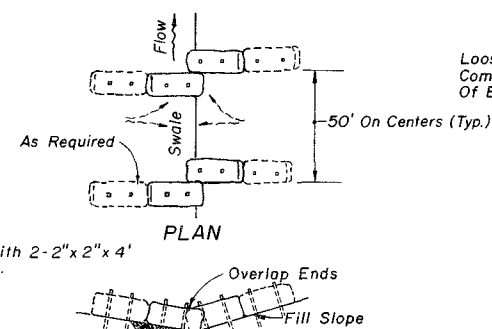
PROTECTION AROUND INLETS OR SIMILAR STRUCTURES



BALES BACKED BY FENCE

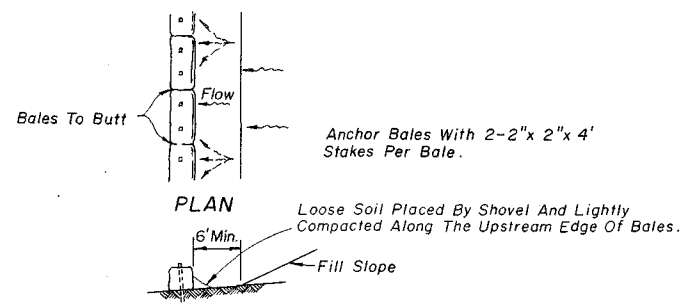


DITCH INSTALLATIONS AT DRAINAGE STRUCTURES



ELEVATION

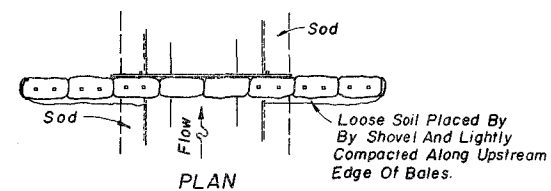
TO BE USED AT SELECTED SITES WHERE THE NATURAL GROUND SLOPES TOWARD THE TOE OF SLOPE



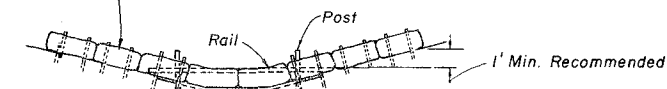
ELEVATION

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

BARRIERS FOR FILL SLOPES



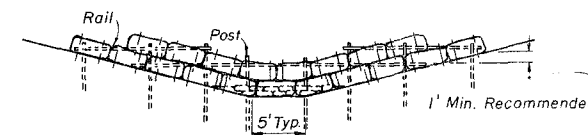
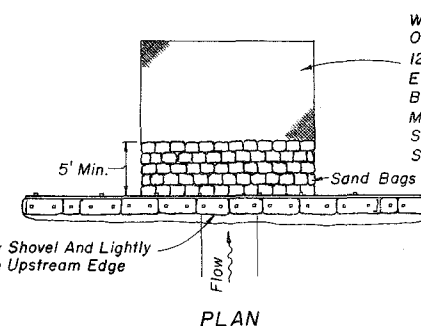
Anchor Bales With 2-2"x2"x4' Stakes Per Bale.



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



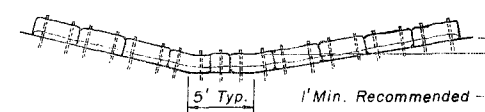
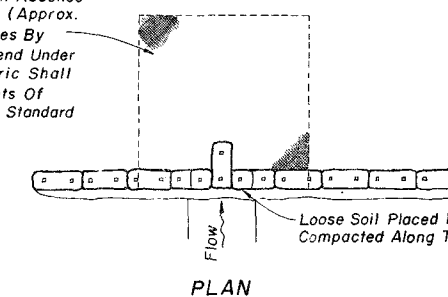
Anchor Lower Bales With 2-2"x2"x4' Stakes Per Bale.
Anchor Top Bales To Lower Bales With 2-2"x2"x4' Stakes Per Bale.

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"x2"x4' Stakes Per Bale

ELEVATION

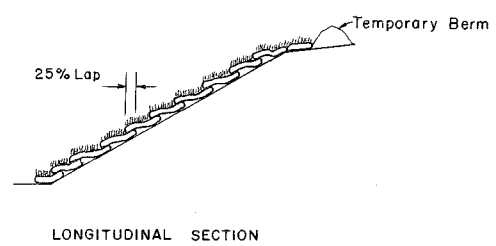
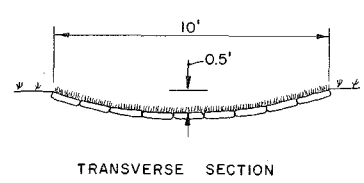
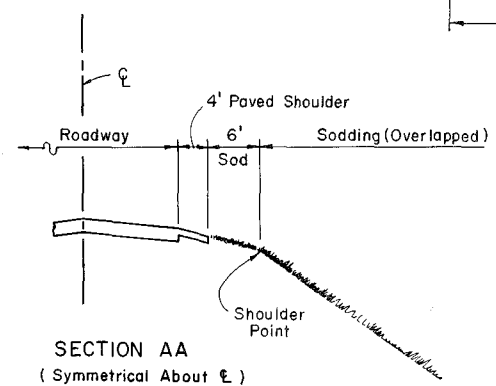
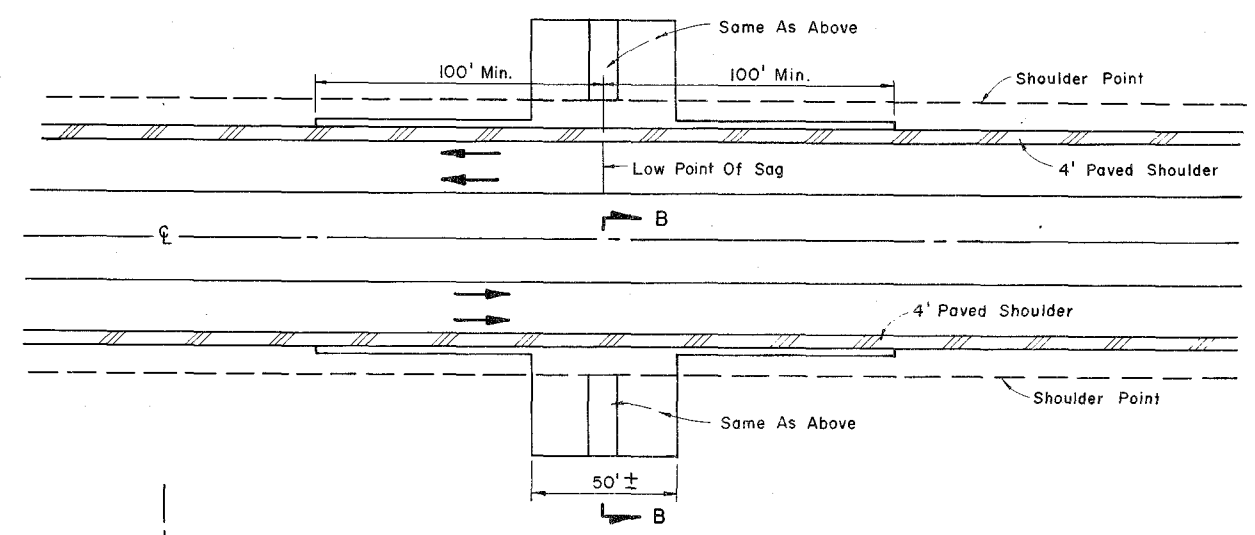
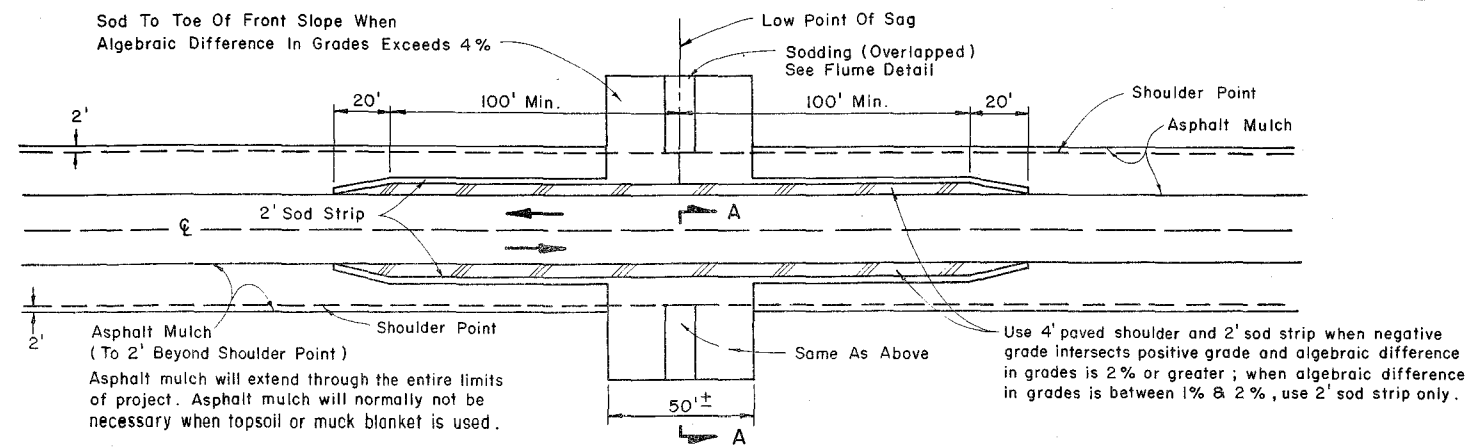
TYPE I

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

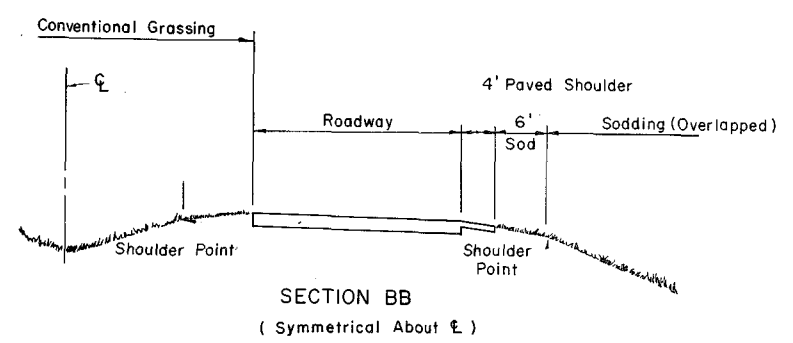
BALED HAY OR STRAW BARRIERS

| Names | Dates | Approved By |
|-----------------|-----------|--------------------------------------|
| Designed by WJR | 5/74 | Deputy Design Engineer, Roadways |
| Drawn by | | |
| Checked by HLB | 6/74 | |
| Revision No. | Sheet No. | Index No. |
| 81 | 1 of 1 | 103 |

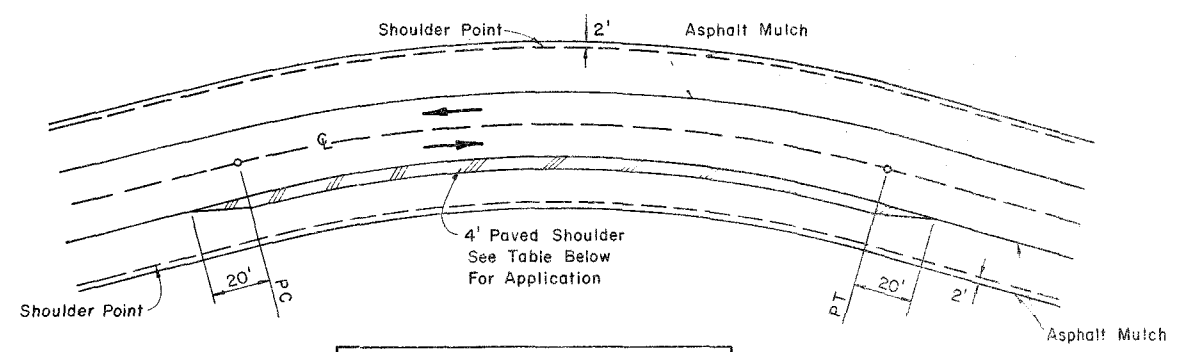
F.H.W.A. Approved: 10/7/80



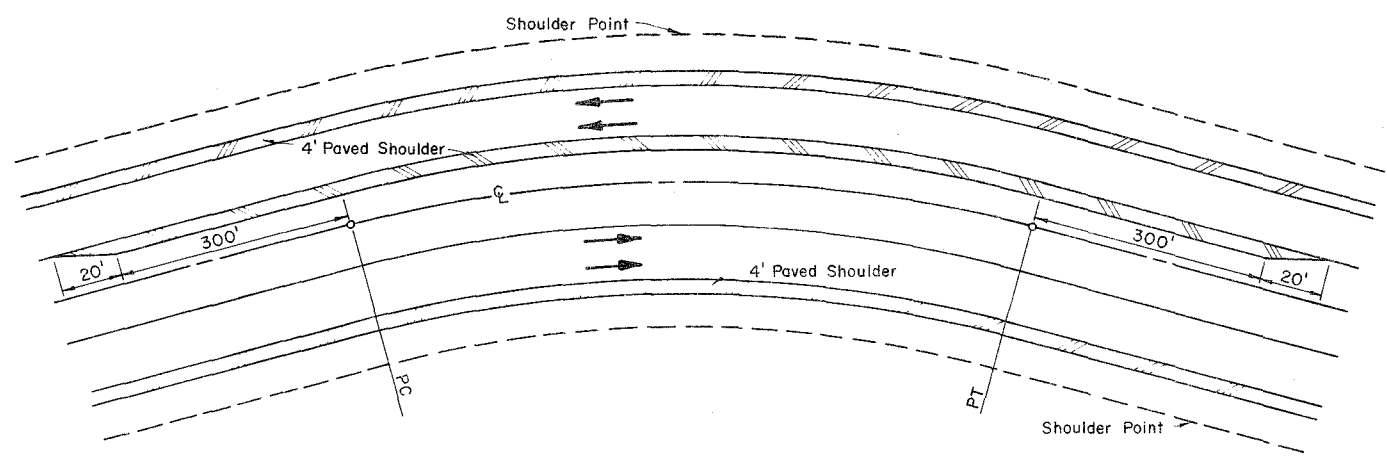
OVERLAPPED SOD FLUME



SHOULDER AND SLOPE TREATMENT IN SAG VERTICAL CURVES



| CRITERIA FOR PAVING SHOULDER | |
|------------------------------|-----------------|
| Design Speed | Degree Of Curve |
| 30 | 7° or greater |
| 40 | 5° or greater |
| 50 | 4° or greater |
| 60 | 3° or greater |
| 65 | 3° or greater |
| 70 | 2° or greater |



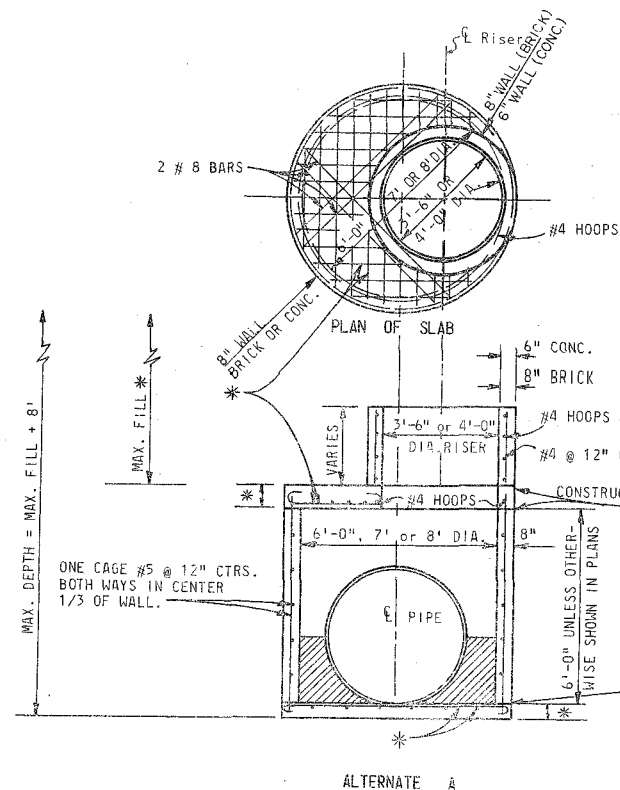
SHOULDER AND SLOPE TREATMENT FOR SUPERELEVATED ROADWAYS

GENERAL NOTES

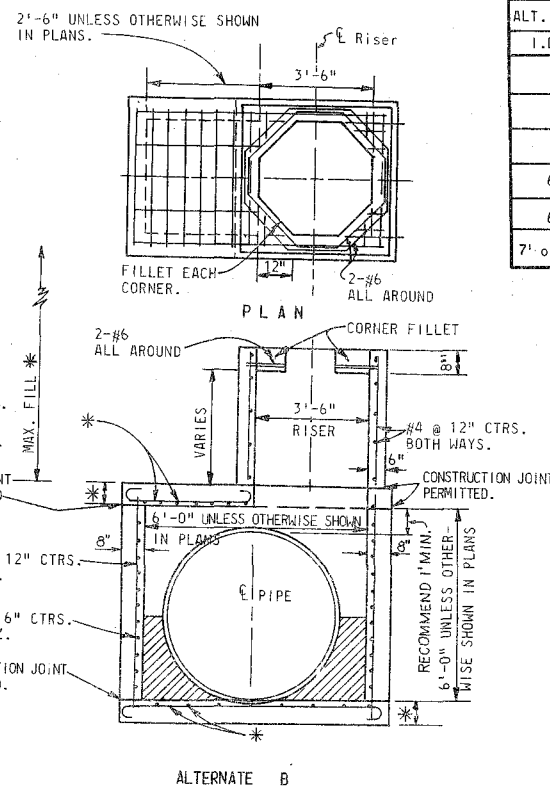
1. For sodding adjacent to ditches and at headwalls, see Index No. 281.
2. All front slopes steeper than 4:1 are to be sodded.

| | | | |
|--|---------------|--|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| EROSION CONTROL DETAILS FOR PERMANENT CONSTRUCTION | | | |
| Designed by HLG | Dates 4/75 | Approved By <i>J. C. Leland</i> Deputy Design Engineer, Roadways | |
| Drawn by | | Revision No. | Sheet No. |
| Checked by DCB | 4/75 | 81 | 1 of 1 |
| F.H.W.A. Approved: 10/7/80 | | Index No. 104 | |

POLYLINE 003

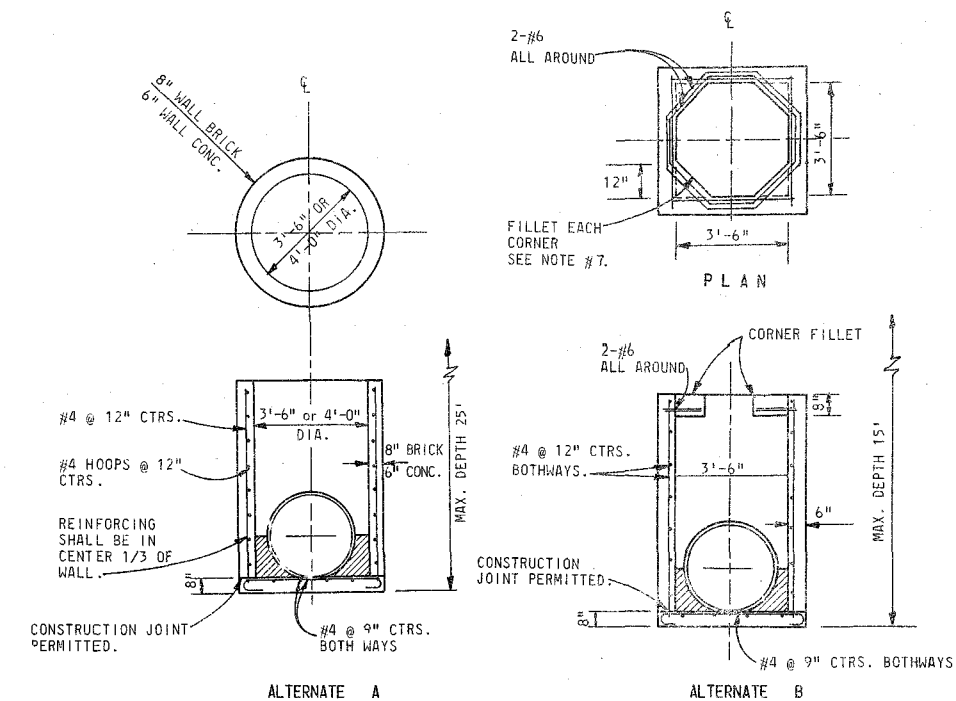


INLET, MANHOLE, JUNCTION BOX TYPE J



ALTERNATE B
* SEE SLAB TABLE.

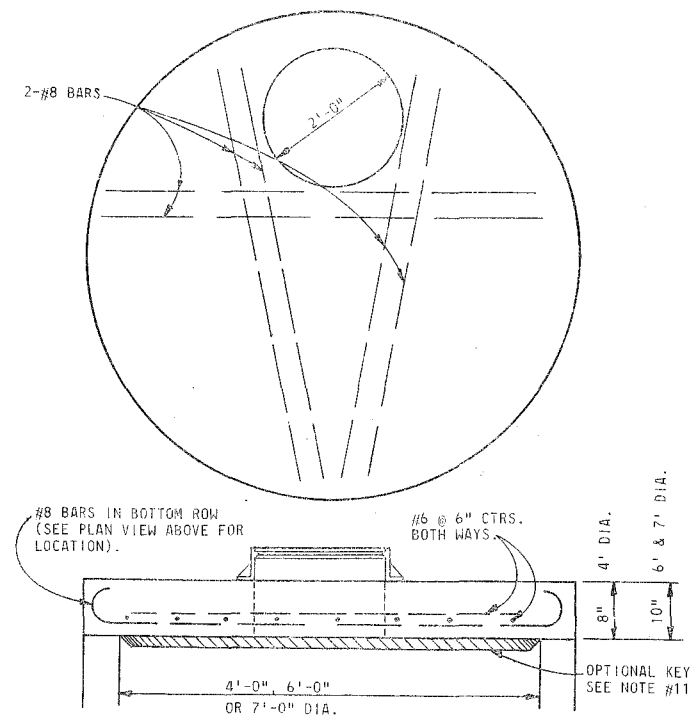
| TOP AND FLOOR SLAB TABLE TYPE J | | | | | |
|------------------------------------|-----------|----------------|------------------------------|------|-------------------------------|
| ALT. A | ALT. B | SLAB THICKNESS | ALLOWABLE FILL OVER TOP SLAB | | REINFORCING TOP & FLOOR SLABS |
| I.D. | BOX WIDTH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



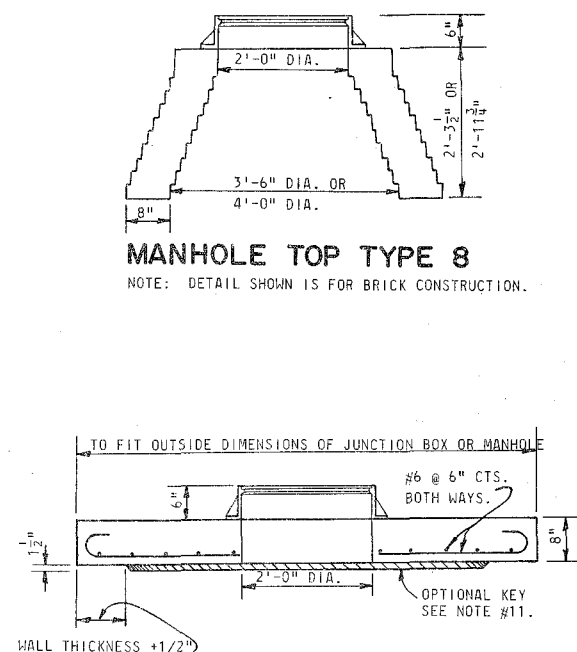
INLET, MANHOLE, JUNCTION BOX TYPE P

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 1" 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 1/4" 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 DOWEL BARS (A MINIMUM OF 6 DOWELS) 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 DOWELS. 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 8 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

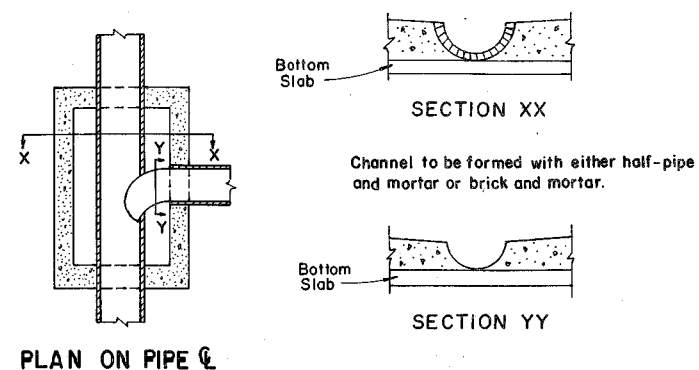


JUNCTION BOX OR MANHOLE TOP TYPE 7-T
FOR USE WHEN TOP SLAB IS SUBJECTED TO WHEEL LOADS (H-20)
(TRAFFIC)



JUNCTION BOX OR MANHOLE TOP TYPE 7-NT
FOR USE WHEN TOP SLAB IS NOT SUBJECTED TO WHEEL LOADS
(NON-TRAFFIC)

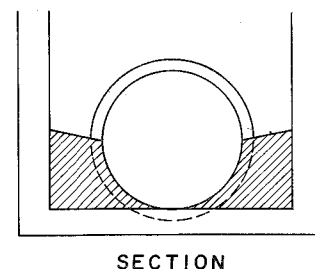
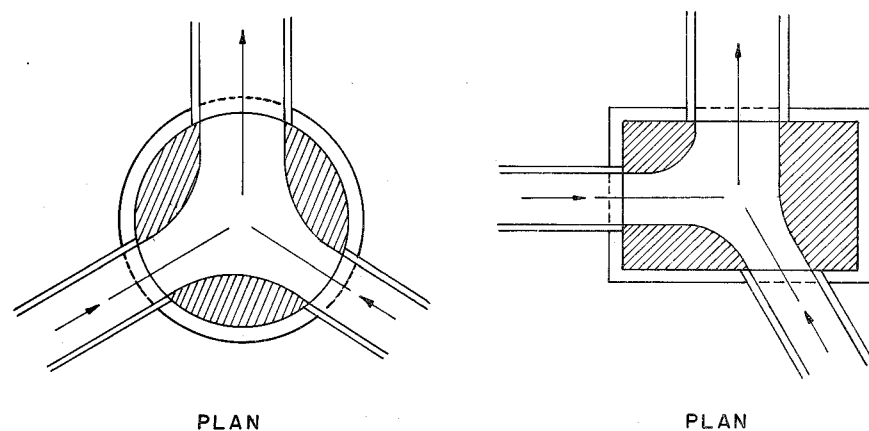
| | | | |
|--|-------|-------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| STRUCTURE BOTTOMS TYPES J AND P | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | | | <i>J. C. Smith</i> Deputy Design Engineer, Roadways |
| Checked by | | | Revision No. 81 Sheet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



BOTTOM CONSTRUCTION WHEN INLET SERVES AS MANHOLE

GENERAL NOTE:

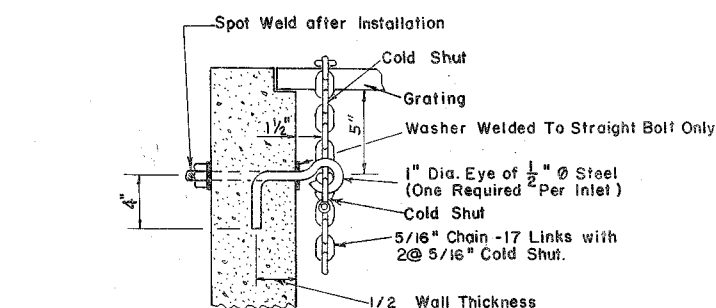
Mortar used to seal the pipe into the walls of precast units will be of such a mix that shrinkage will not cause leakage into or out of the units. Maximum opening for pipe shall be the O.D. of the pipe required plus 6".



CHANNELIZATION

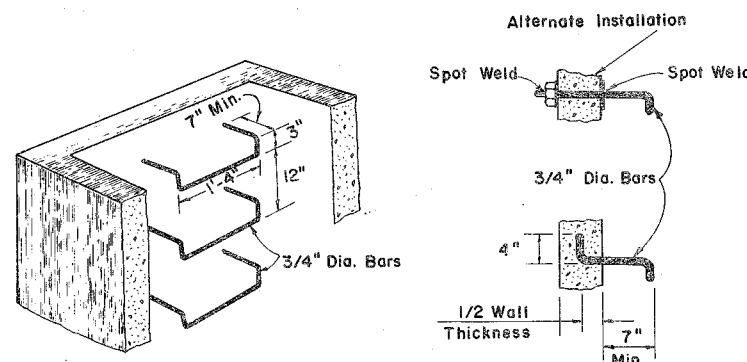
Channelization required at all drainage structures with two or more pipes.

Smooth flow channels composed of concrete, or brick and mortar shall be constructed in the bottoms of all structures to a depth equal to half the diameter of the largest pipe.



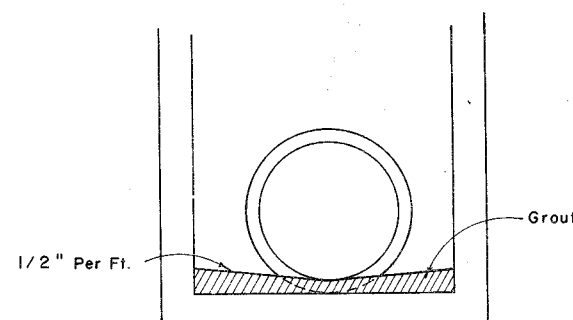
EYE BOLT AND CHAIN FOR LOCKING GRATES TO INLETS

Note: Multiple grates to be chained together.



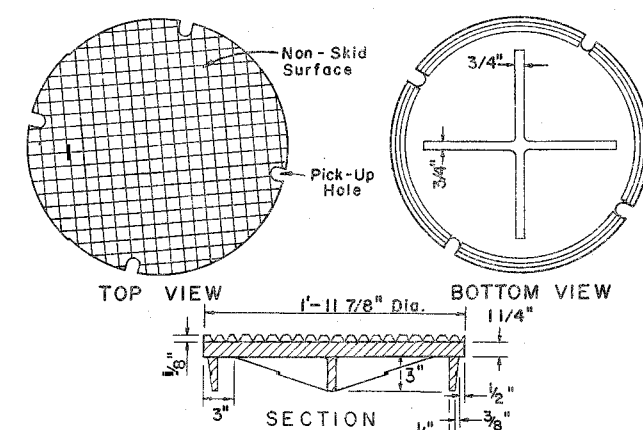
LADDER BARS

Use for box heights over 10'-0"

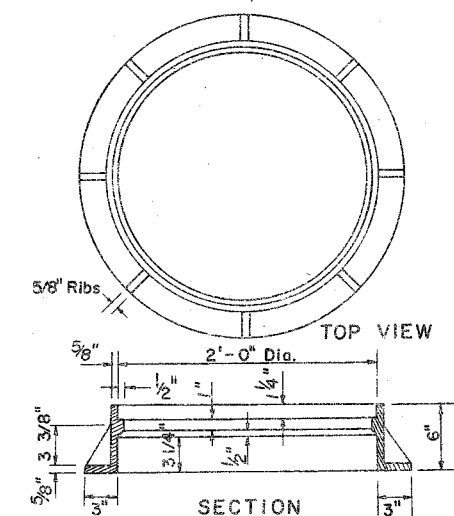


ALTERNATE LOCATION OF PIPE IN STRUCTURE WHEN PREFABRICATED FLOOR SLAB IS USED

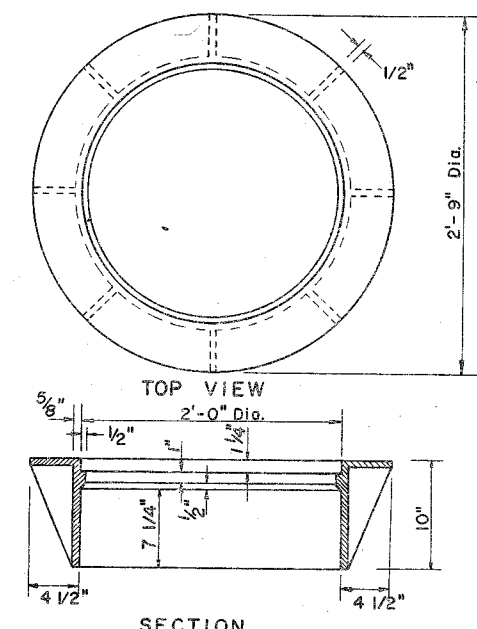
COMPLETE FLOW CHANNEL IS REQUIRED WHEN THERE IS
FLOW THROUGH THE STRUCTURE



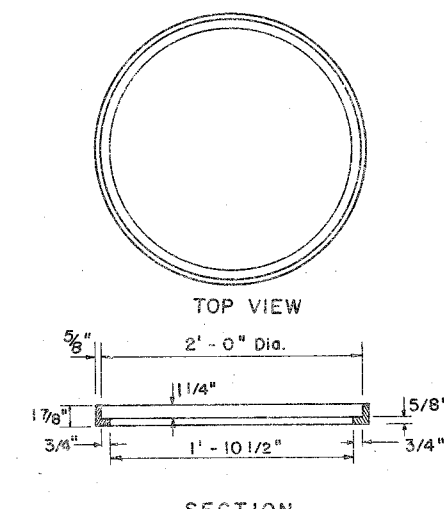
COVER FOR ALL FRAME



For Manholes
As Shown On Index 200



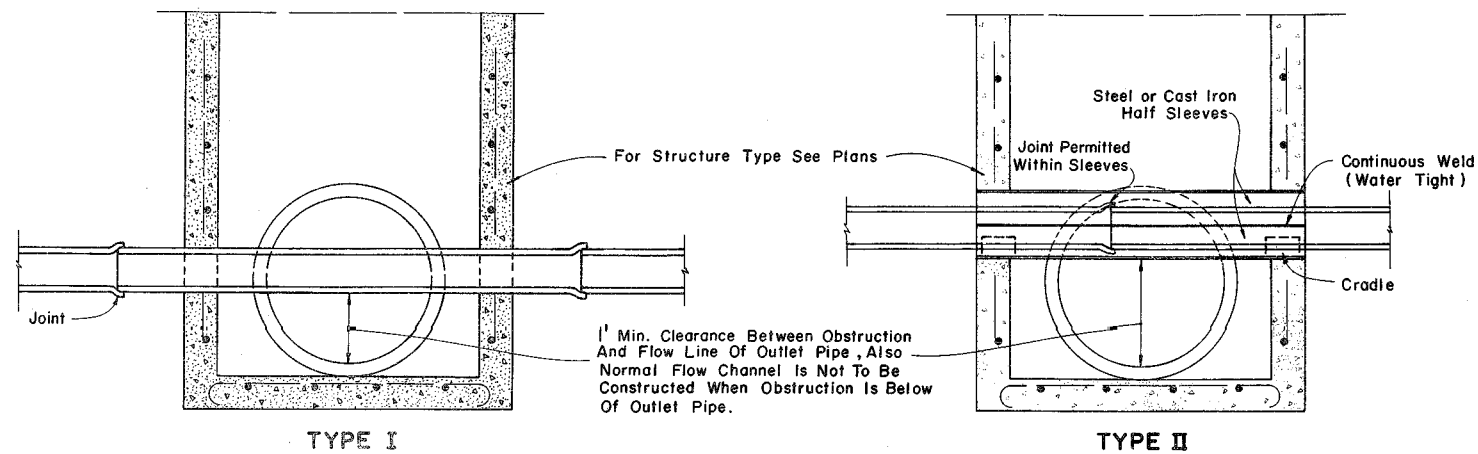
TYPE II For Type 1, 2, 3 & 4 Inlets



TYPE III For Type 7 & 8 Inlets

CAST IRON FRAMES AND COVER

| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
|--|-------|-------|--|-----------|-----------|
| SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | HLB | 4/75 | <i>De B. Smith</i> Deputy Design Engineer, Roadways | | |
| Checked by | LMF | 4/75 | | | |
| F.H.W.A. Approved: 10/7/80 | | | Revision No. | Sheet No. | Index No. |
| | | | 81 | 1 of 2 | 201 |

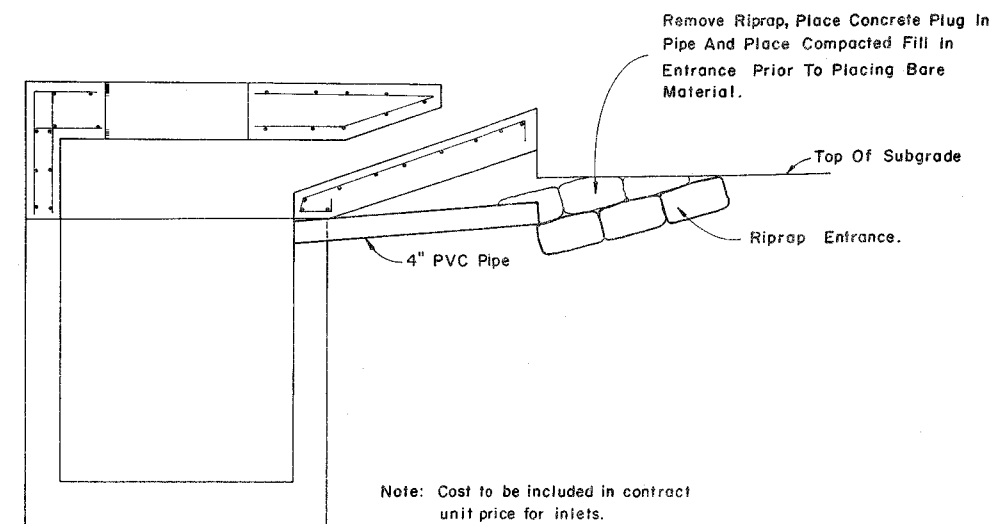


- NOTE:
1. No joints allowed inside Type I structure.
 2. Only cast iron or steel water mains will be allowed to pass directly through structure.
 3. Only cast iron sanitary sewer will be allowed to pass directly through structure.

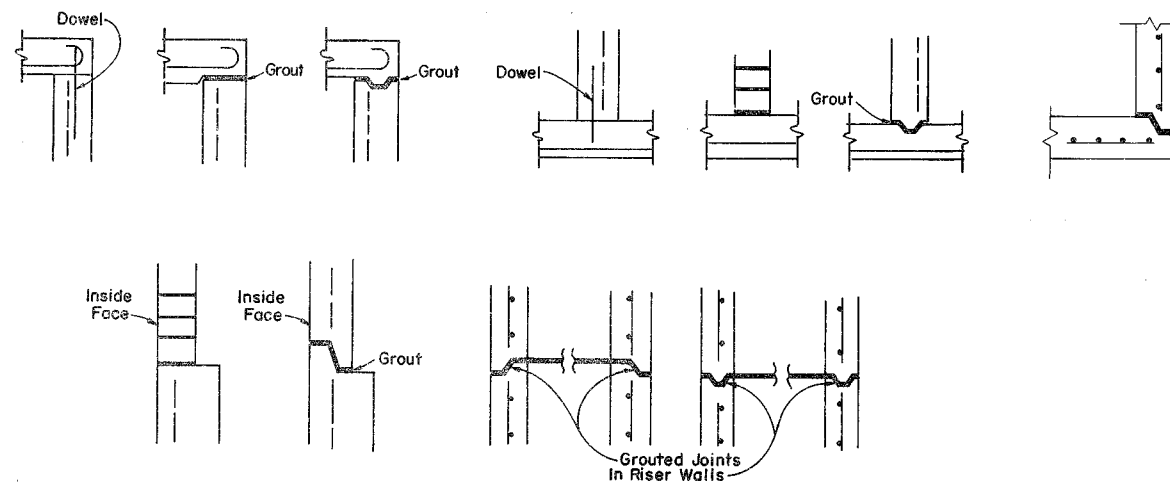
- NOTE:
1. Only water mains will be allowed to pass through a Type II structure.

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.

UTILITY PIPES THRU STORM SEWER STRUCTURES



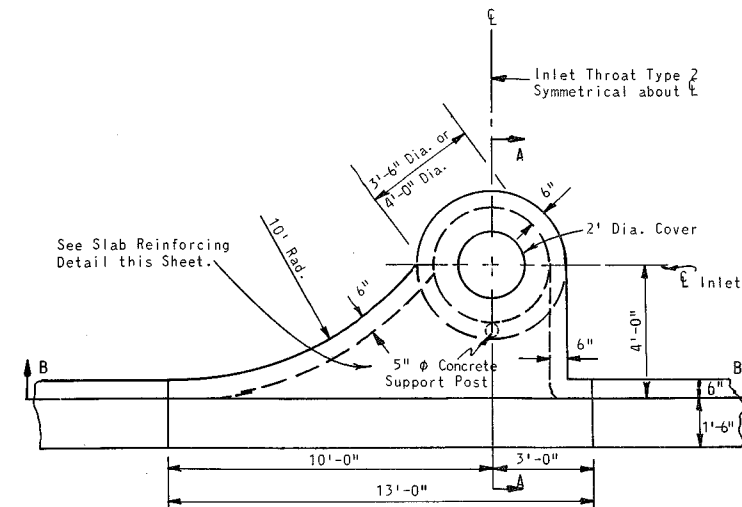
TEMPORARY SUBGRADE DRAINS



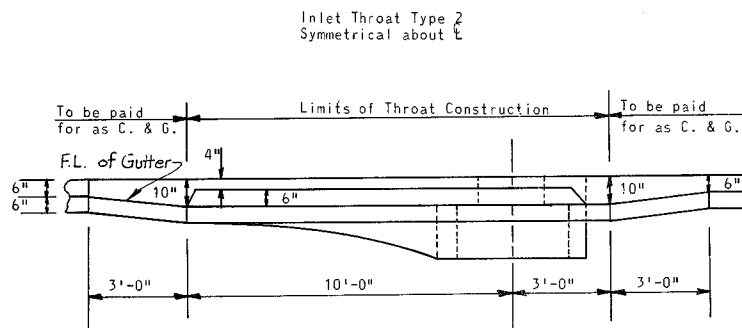
1. Any type joint may be used in conjunction with any other type joint. Brick wall and joint construction is permitted on circular units only.
2. All grouted joints are to have a maximum thickness of 1".
3. Keyways are to be a minimum of 1 1/2" deep.
4. Joint dowels are to be #4 bars, 12" long with a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

OPTIONAL CONSTRUCTION JOINTS

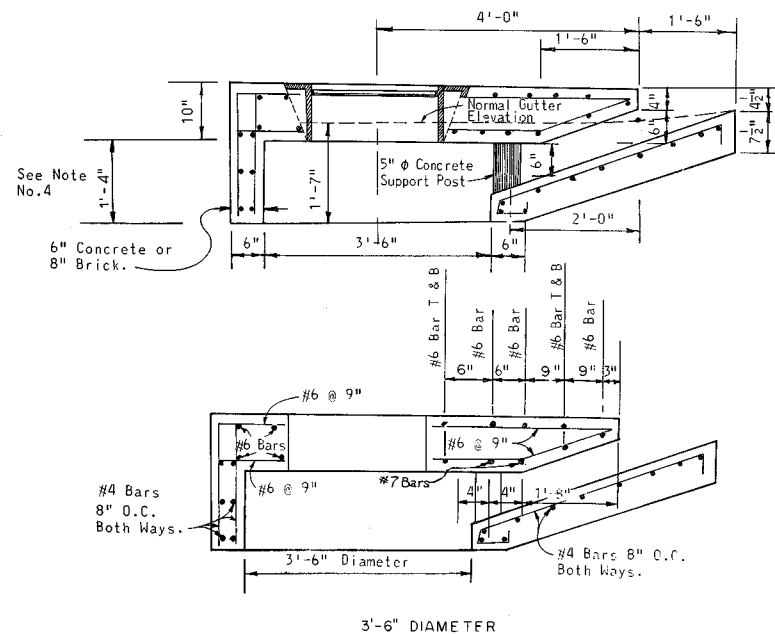
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|--|-------|-------|----------------------------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | HLB | 4/75 | Deputy Design Engineer, Roadways | | |
| Checked by | LMF | 4/75 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 10/7/80 | | | 81 | 2 of 2 | 201 |



INLET THROAT TYPE 1

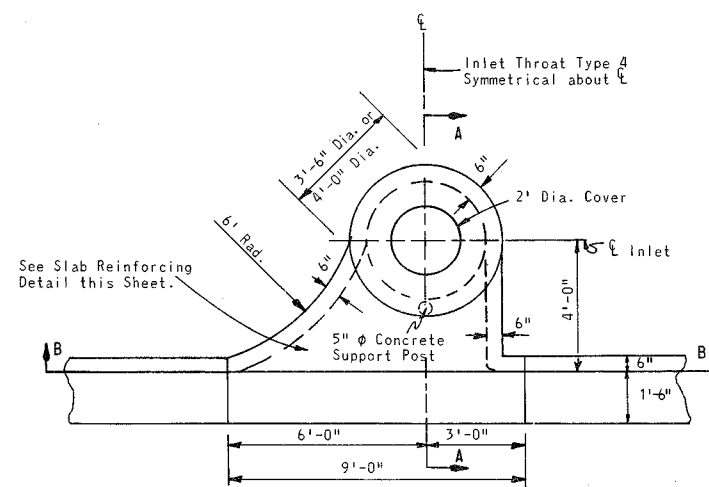


SECTION B-B

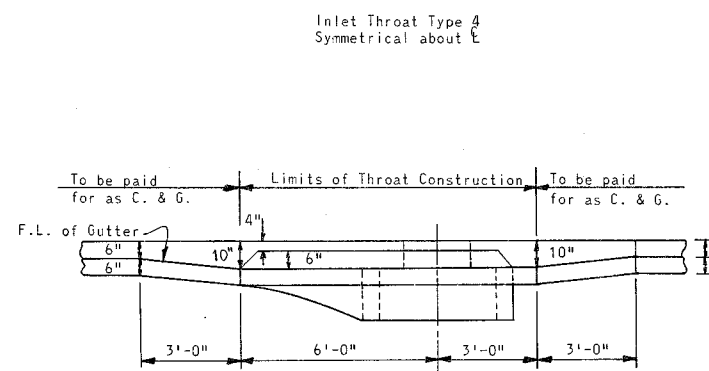


3'-6" DIAMETER

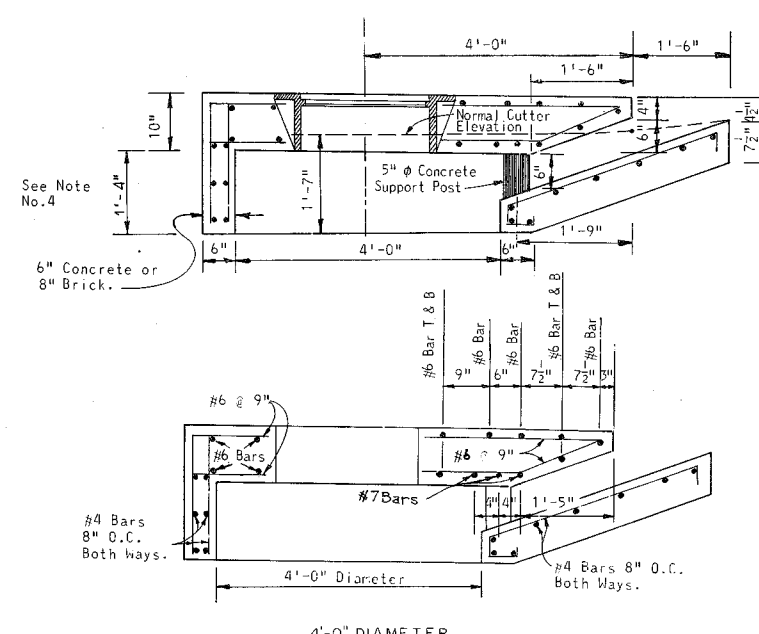
SECTION A-A FOR INLETS TYPE 1, 2, 3 & 4



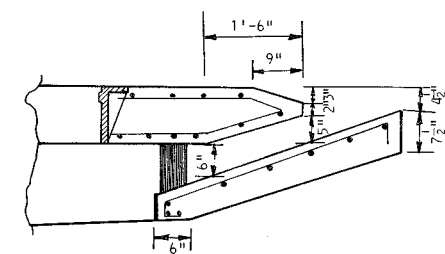
INLET THROAT TYPE 3



SECTION B-B



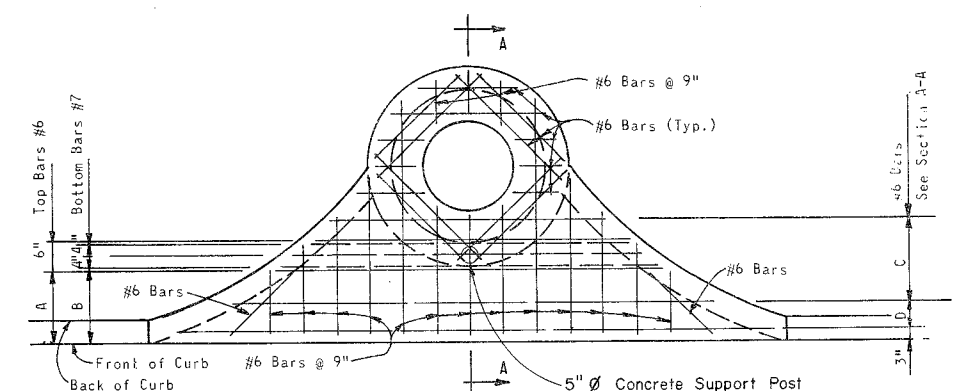
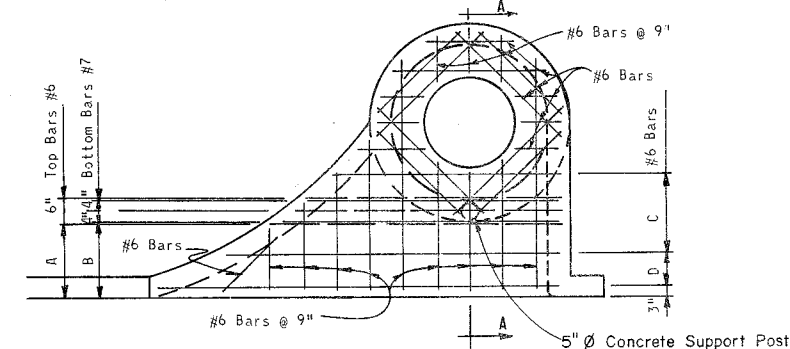
4'-0" DIAMETER



INLET TOP MODIFICATION FOR TYPE "E" CURB

GENERAL NOTES

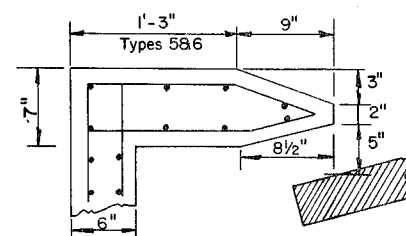
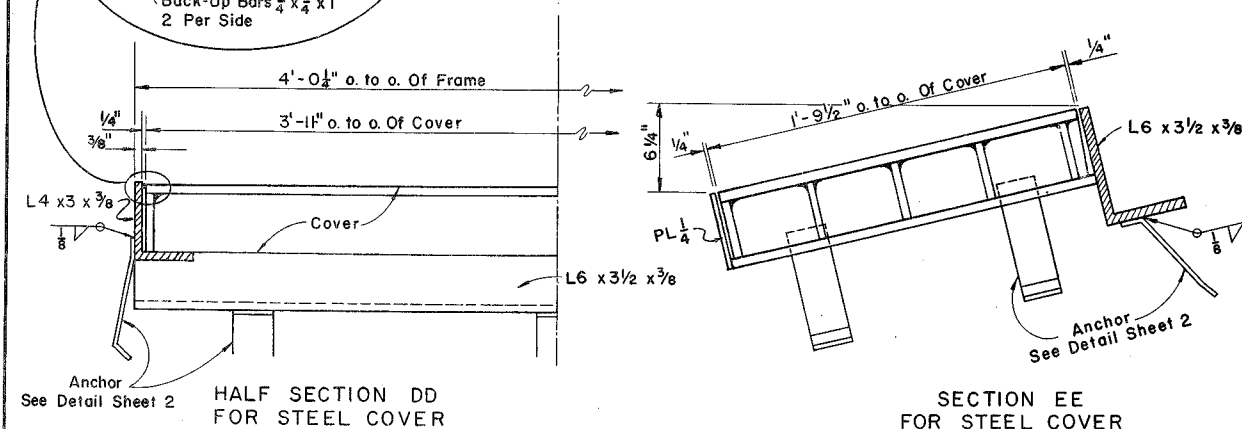
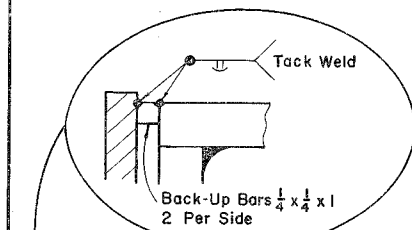
1. The finished grade and slope of the inlet tops are to conform with the finished cross slope and grade of the proposed sidewalk and/or parkway.
2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
3. All steel in throats shall have 1 1/2" minimum cover unless otherwise shown. Inlet throats shall be either cast-in-place or precast concrete.
4. The rear wall portion of throat 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 inlet throats were designed for use with std. curb & gutter and Type E curb. Locate outside of pedestrian cross traffic if possible.
8. For inlet bottoms see index no. 200.



| TABLE OF VARIABLE DIMENSIONS | | |
|------------------------------|-------|------------|
| 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 DETAILS
INLETS 1, 2, 3 & 4

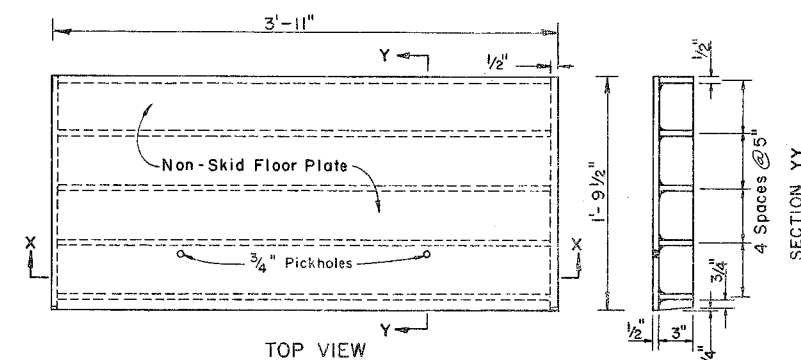
| | | | |
|--|-------|--------|---|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| CURB INLET TOPS TYPES 1, 2, 3, & 4 | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | | | <i>J. C. Hubert</i> Deputy Design Engineer, Roadways |
| Checked by | | | Revision No. |
| F.H.W.A. Approved: 5/1/75 | 81 | 1 of 1 | Index No. 210 |



INLET TOP MODIFICATION
FOR TYPE E CURB



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 $\frac{1}{4}$ " 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-48.
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.

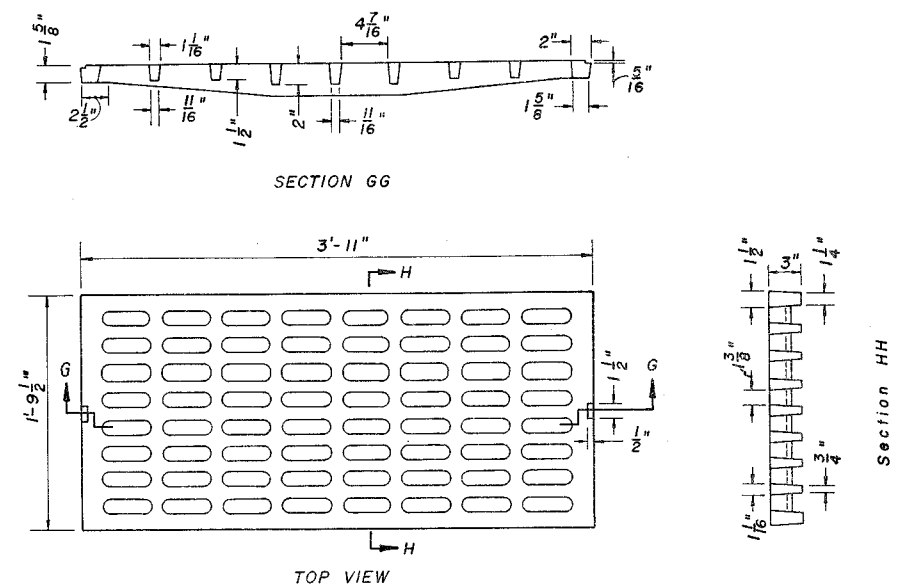
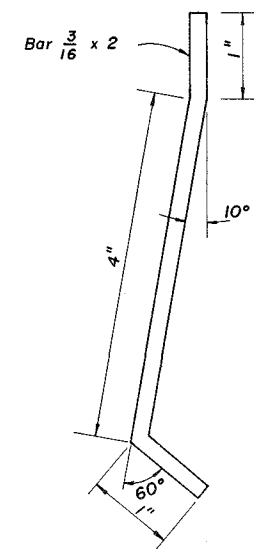
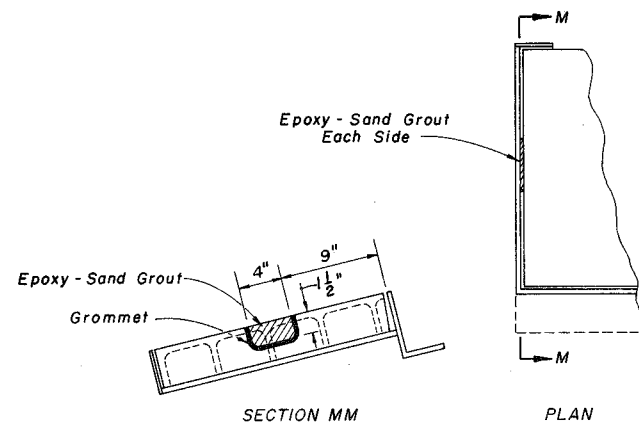
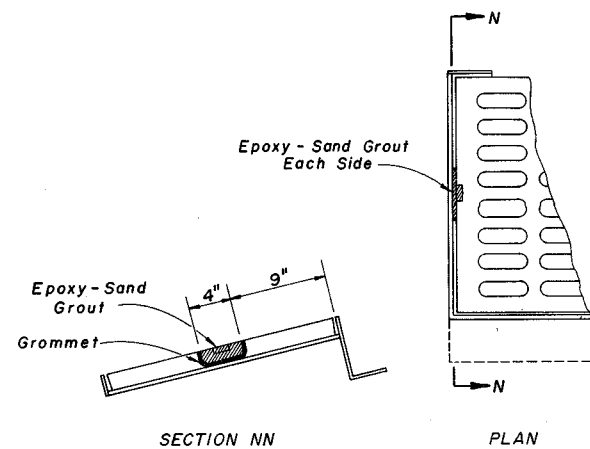


SECTION XX

STEEL COVER

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

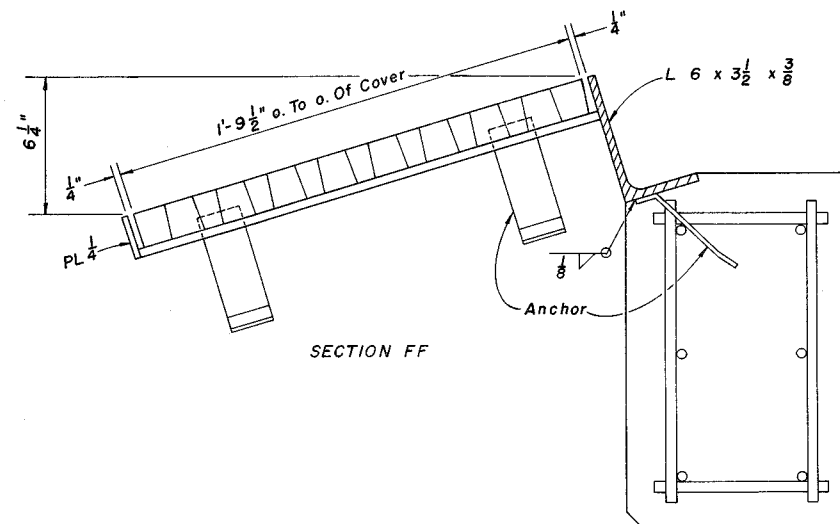
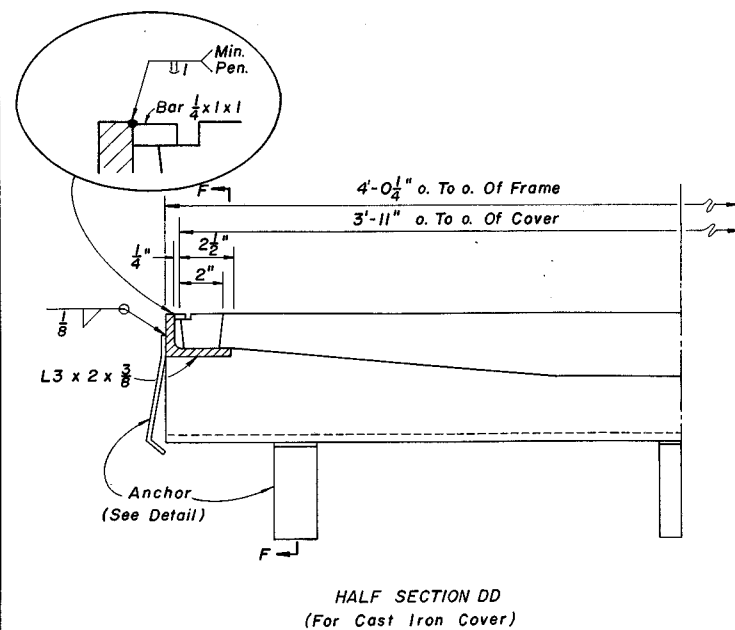
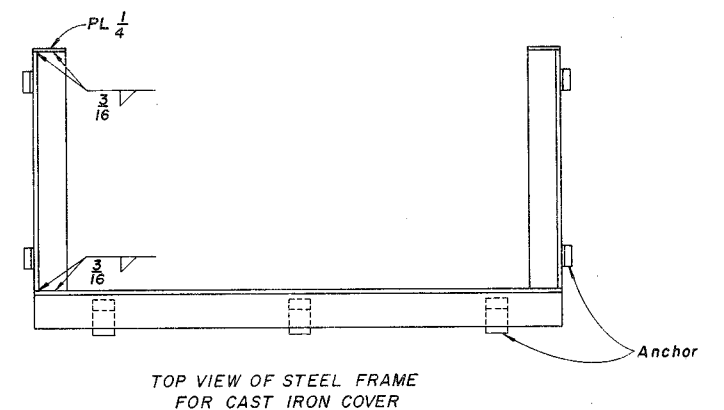
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|---|--|--------------|-------|---|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION | | | | |
| ROAD DESIGN | | | | |
| CURB INLET TOPS | | | | |
| TYPES 5 & 6 | | | | |
| Designed by | | Names | Dates | Approved By <i>Jc Bullard</i> Deputy Design Engineer, Roadway |
| Drawn by | | | | |
| Checked by | | | | |
| F.H.W.A. Approved: | | Revision No. | | Sheet No. |
| | | 80 | | 1 of 2 |
| | | | | 211 |



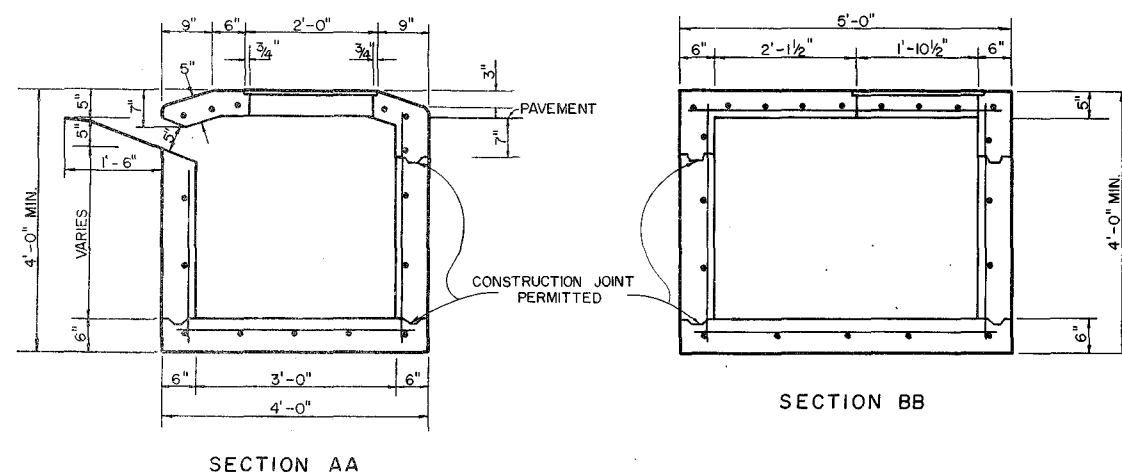
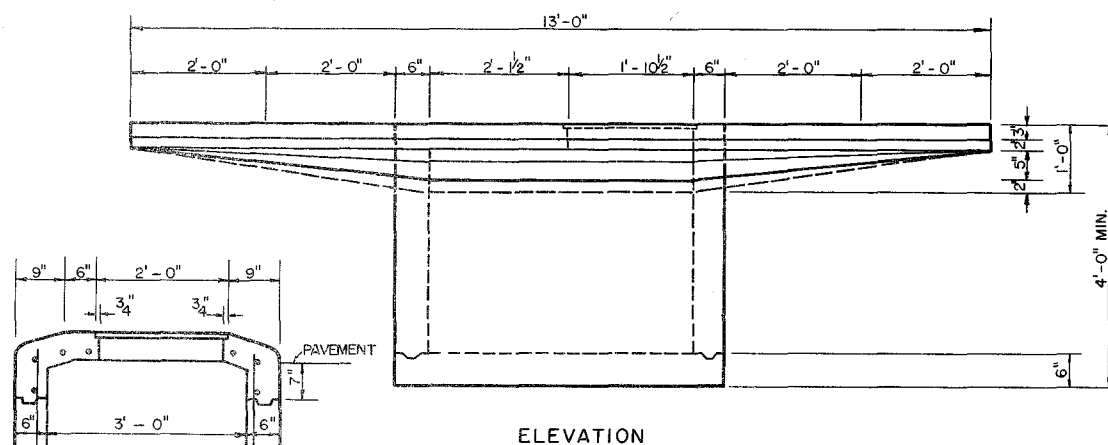
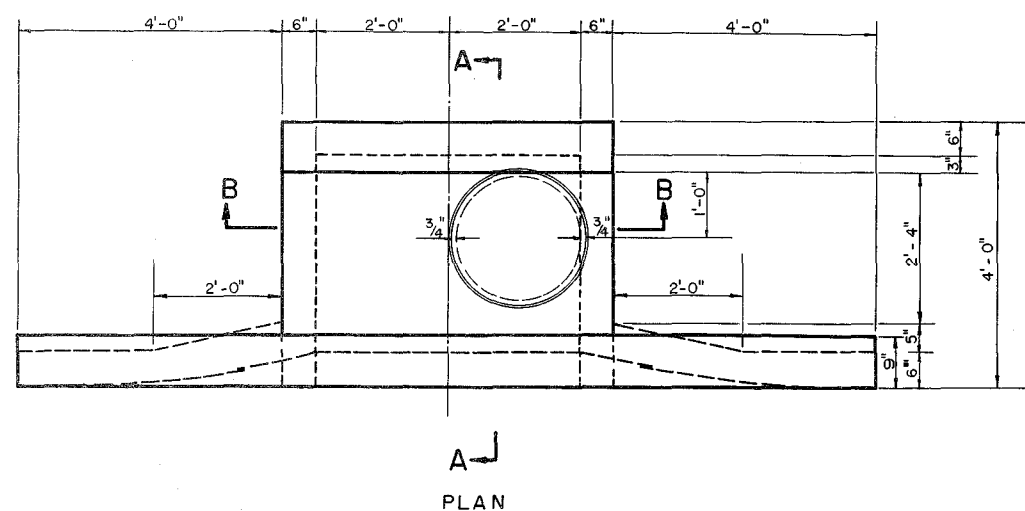
CAST IRON COVER AND GALVANIZED STEEL FRAME

GALVANIZED STEEL COVER AND FRAME

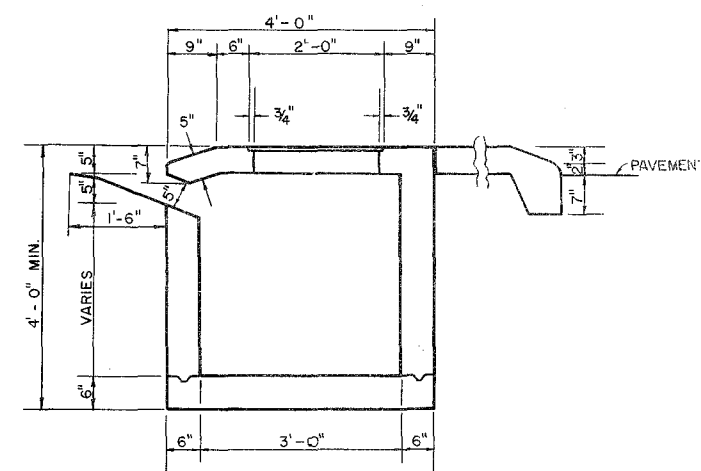
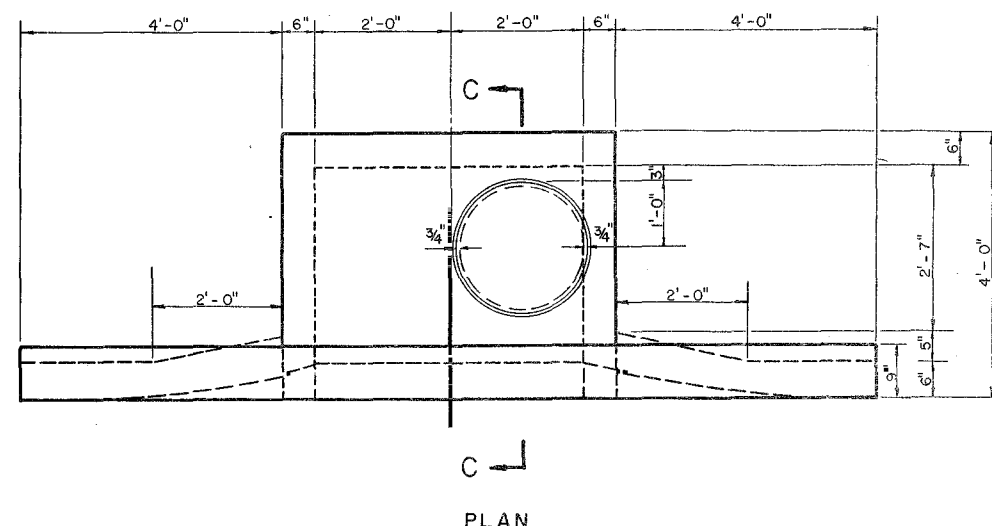
ALTERNATE G DETAIL



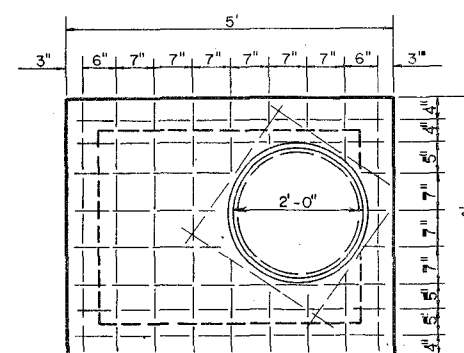
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
|--|-------|-------|--------------|-----------|-----------|
| CURB INLET TOPS TYPES 5 & 6 | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | | | Jc. Bullard | | |
| Checked by | | | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: | | | 80 | 2 of 2 | 211 |



FOR SEPARATOR FOUR FEET WIDE



FOR SEPARATOR WIDER THAN FOUR FEET



GENERAL NOTES

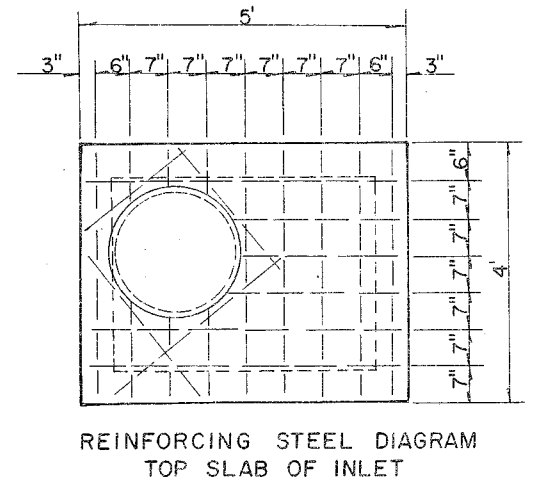
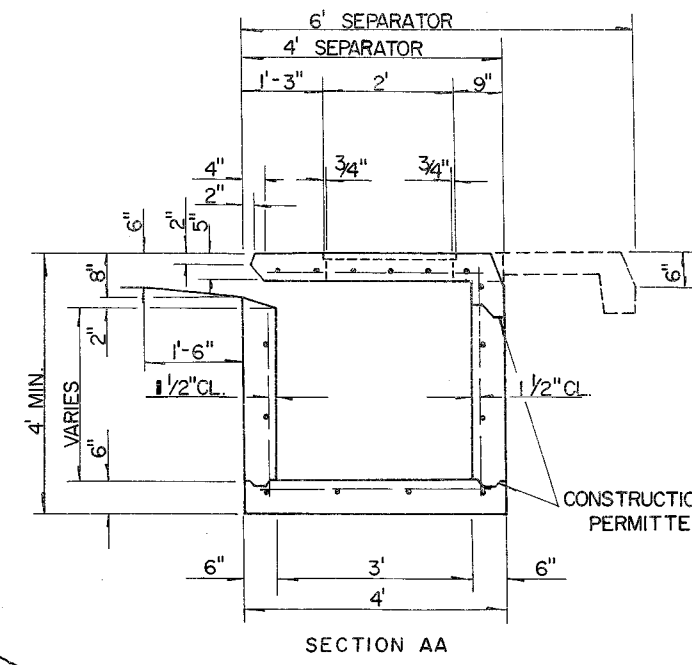
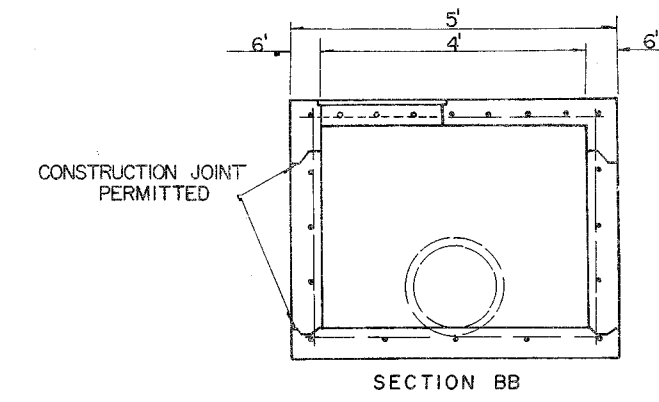
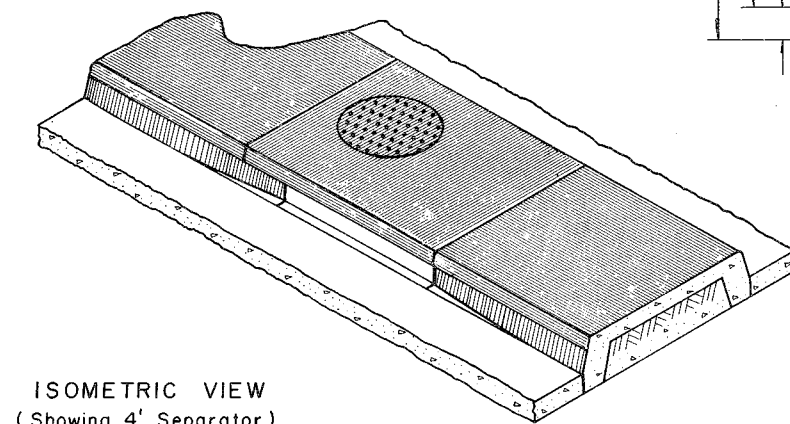
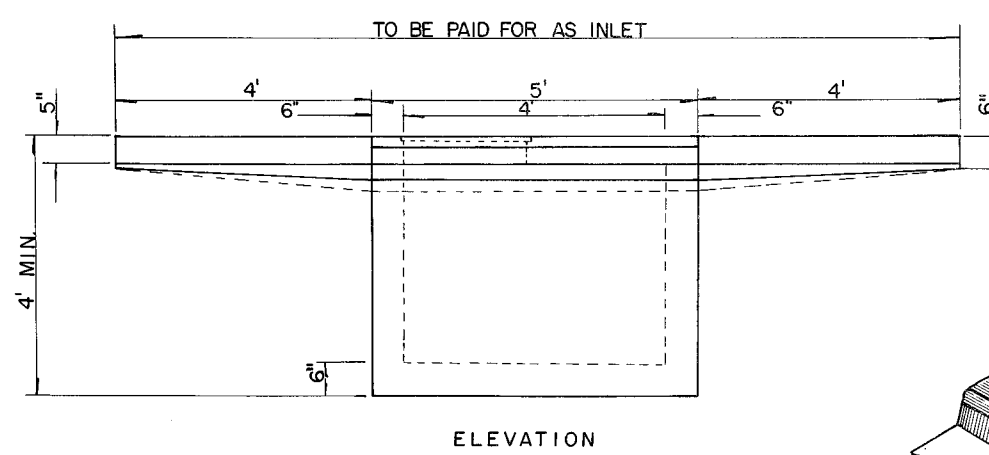
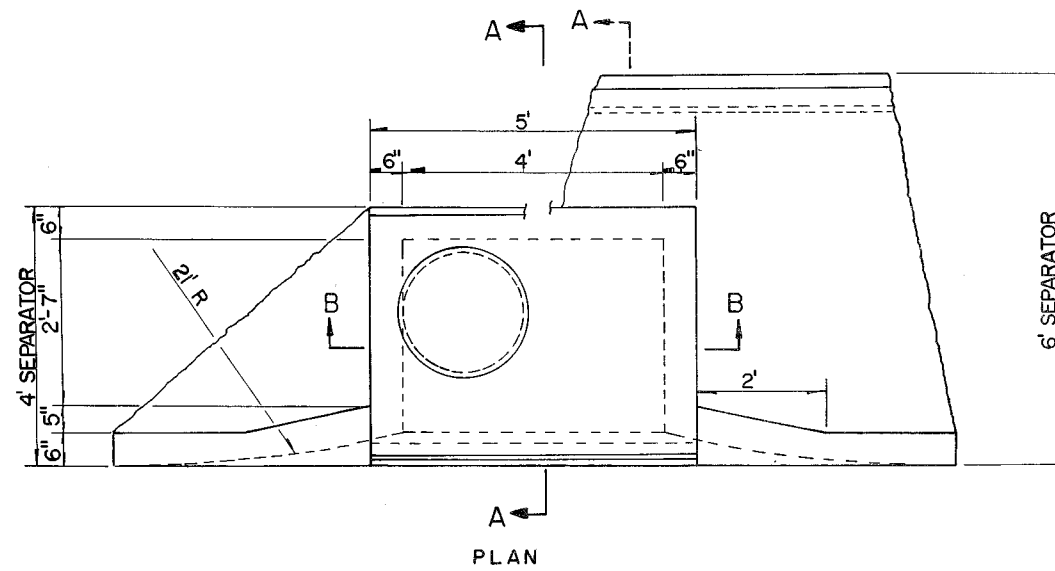
- DESIGN SPECIFICATIONS: A.A.S.H.O.-1973
- CHAMFER: ALL EXPOSED EDGES TO BE CHAMFERED $\frac{3}{4}$ " UNLESS OTHERWISE SHOWN.
- CONCRETE CURB: FOR SHAPE OF CONCRETE CURB SEE INDEX NO. 300.
- STEEL: NO. 4 REINFORCING BARS 12" CENTERS UNLESS OTHERWISE NOTED. $\frac{1}{2}$ " CLEARANCE TO INSIDE FACE.
- FOR SUPPLEMENTARY DETAILS SEE INDEX NO. 201.
- THIS INLET WAS DESIGNED FOR USE WITH TYPE A & B MEDIAN CURB OR TYPE I & II TRAFFIC SEPARATOR. LOCATE OUTSIDE OF PEDESTRIAN CROSS TRAFFIC.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CURB INLET TYPE 7

| Names | Dates | Approved By |
|---------------------------|-----------|-------------|
| Designed by | | |
| Drawn by | | |
| Checked by | | |
| Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 5/1/75 | 81 | 1 of 1 |

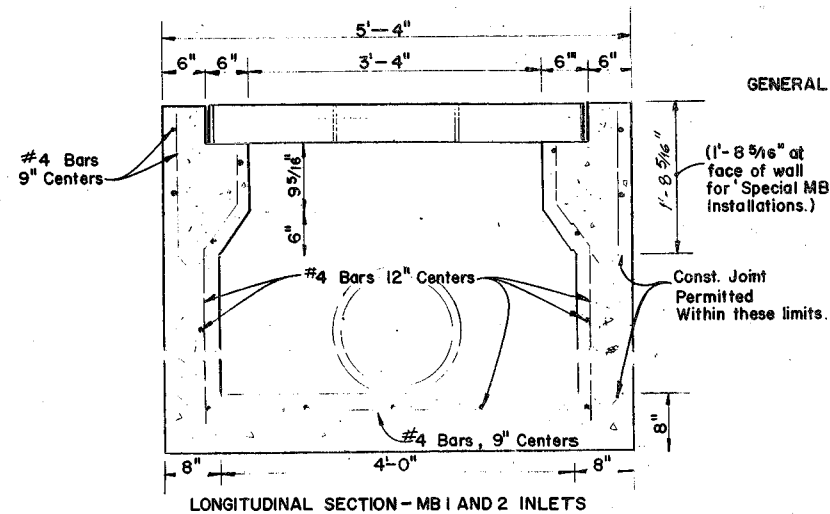
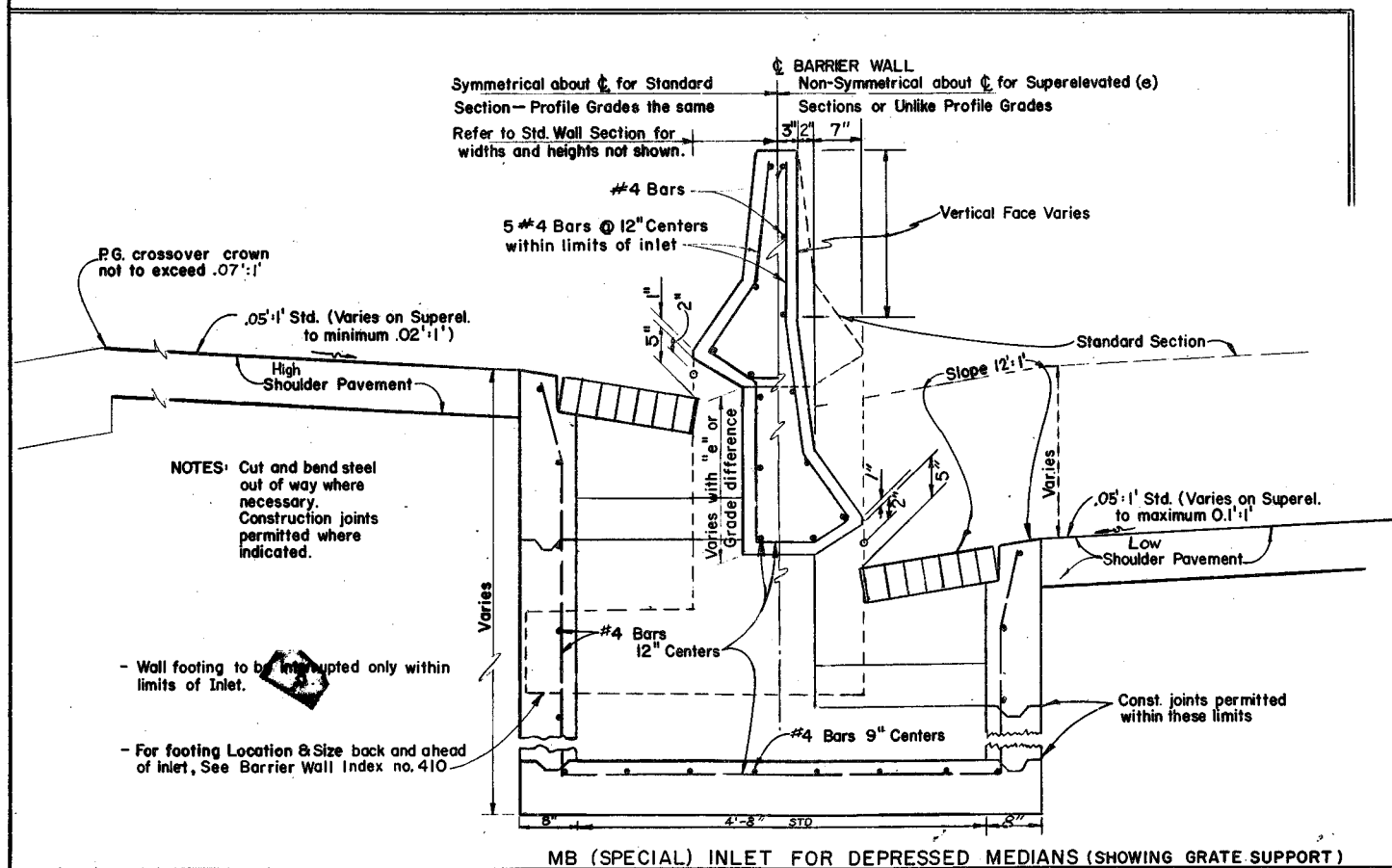
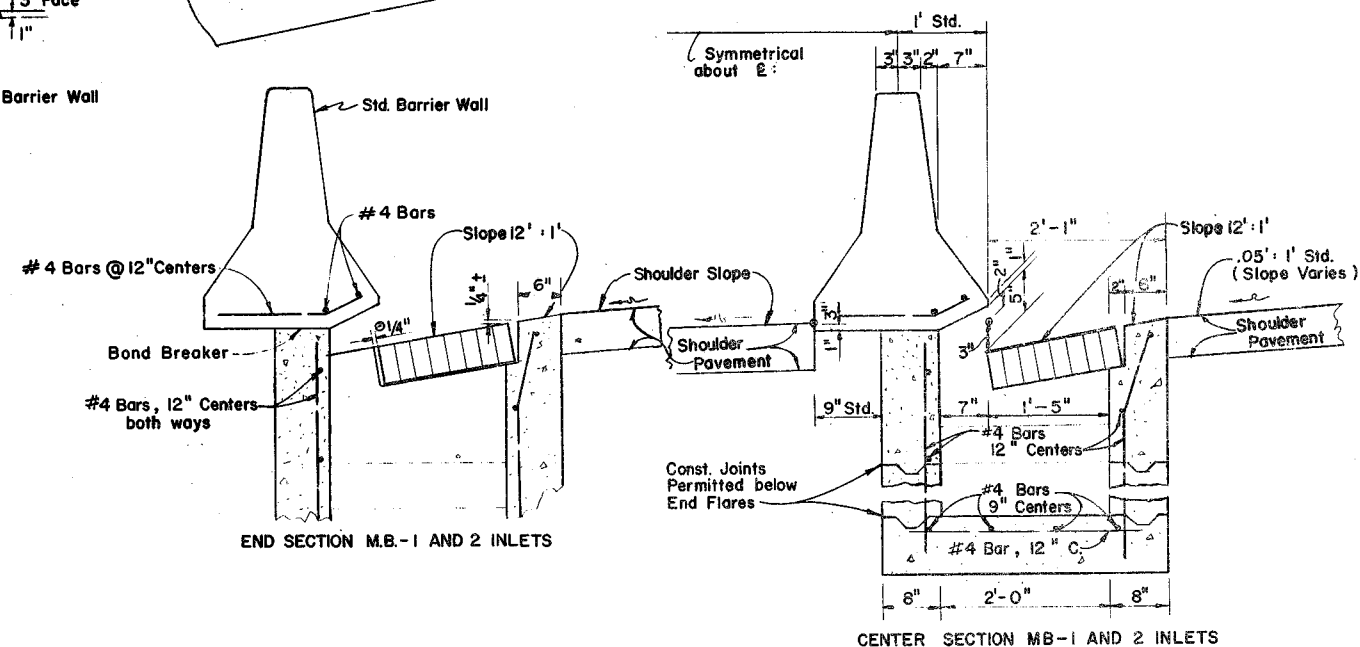
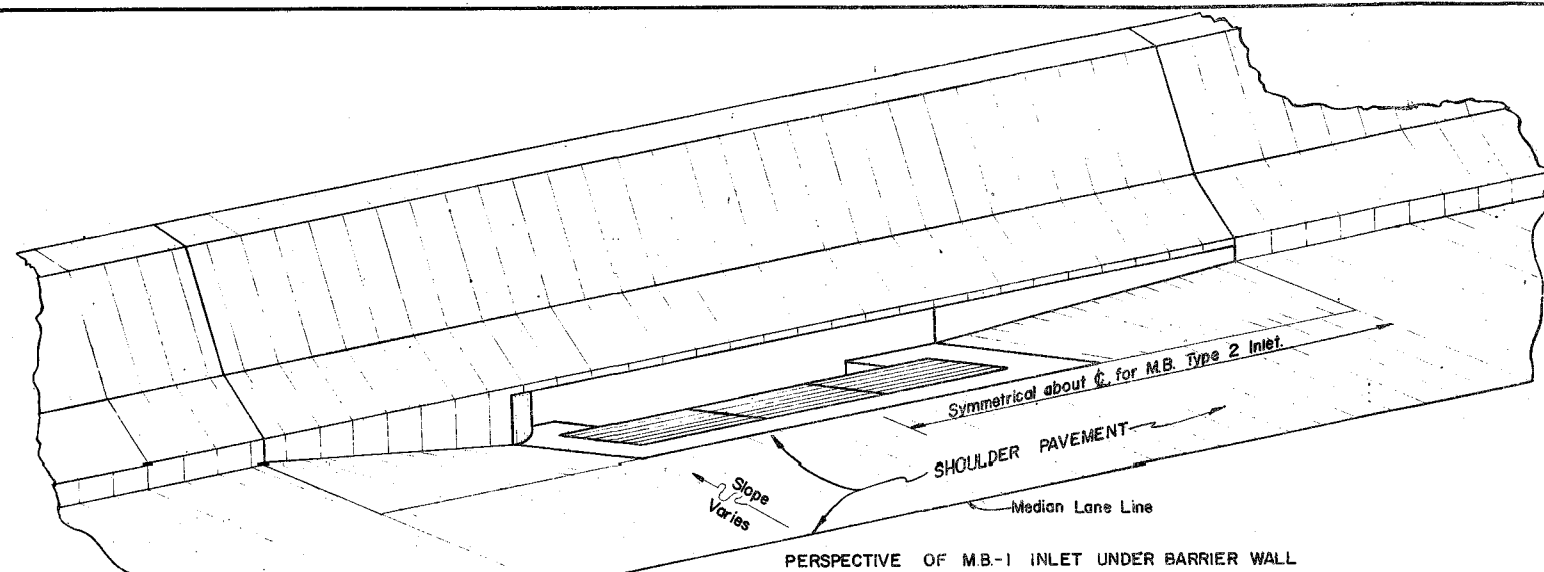
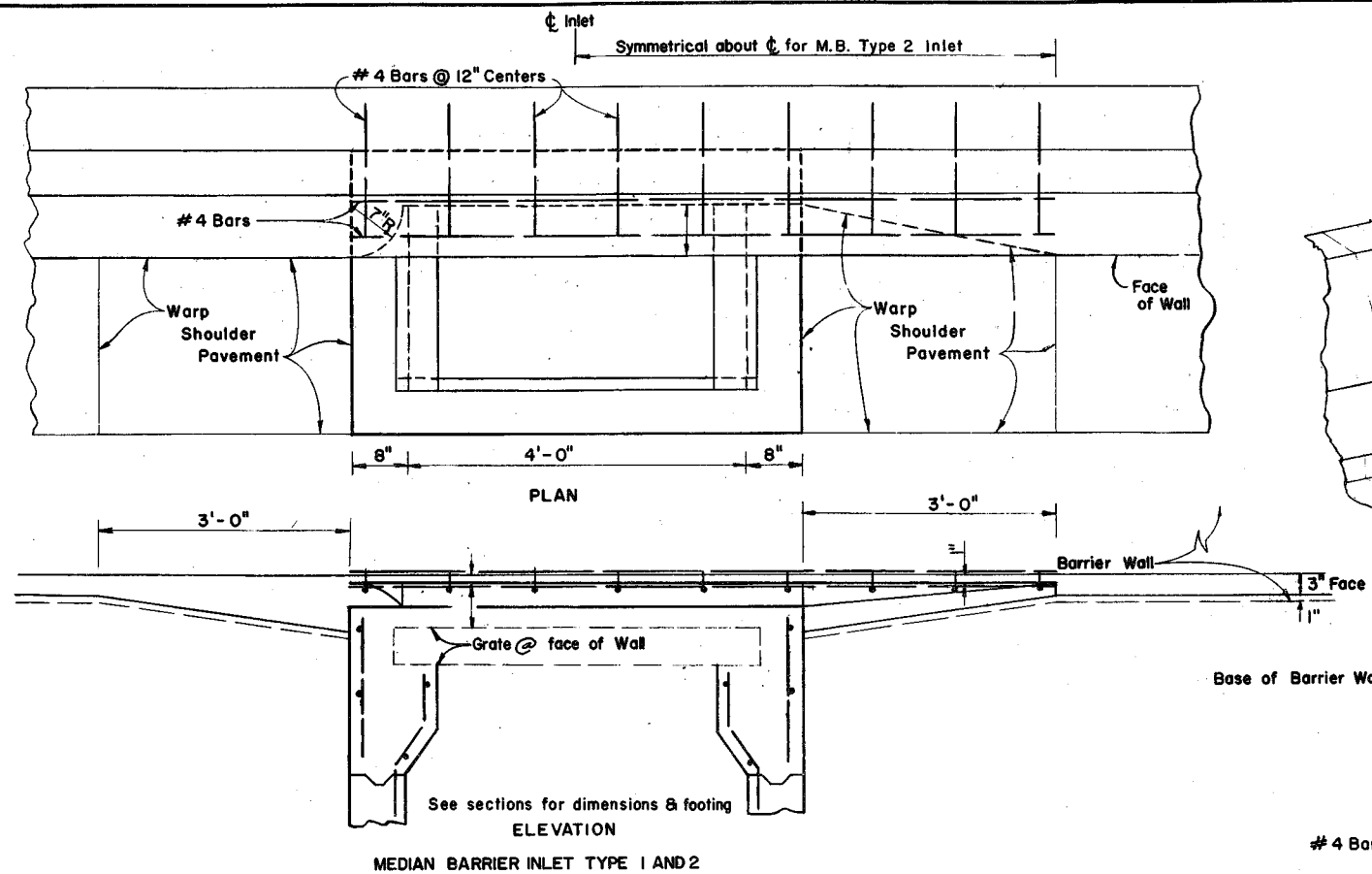
212



- NOTES:
1. NO. 4 REINFORCING BARS 12" CENTERS UNLESS OTHERWISE NOTED.
 2. CUT AND BEND BARS OUT OF WAY OF PIPE WHEN NECESSARY. BARS TO CLEAR PIPE BY 1 1/2".
 3. FOR SUPPLEMENTAL DETAILS SEE INDEX NO. 201.
 4. THIS INLET WAS DESIGNED FOR USE WITH TYPE D MEDIAN CURB OR TYPE IV & V TRAFFIC SEPARATOR. LOCATE OUTSIDE OF PEDESTRIAN CROSS TRAFFIC.

| | | | | | |
|--|----|------|-------|----------------------------------|--------------------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| CURB INLET TYPE 8 | | | | | |
| Designed by | HW | Date | 11/68 | Approved By | <i>[Signature]</i> |
| Drawn by | HW | Date | 11/68 | Deputy Design Engineer, Roadways | |
| Checked by | HW | Date | 11/68 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 5/11/75 | | | | 81 | 1 of 1 |
| | | | | 213 | |

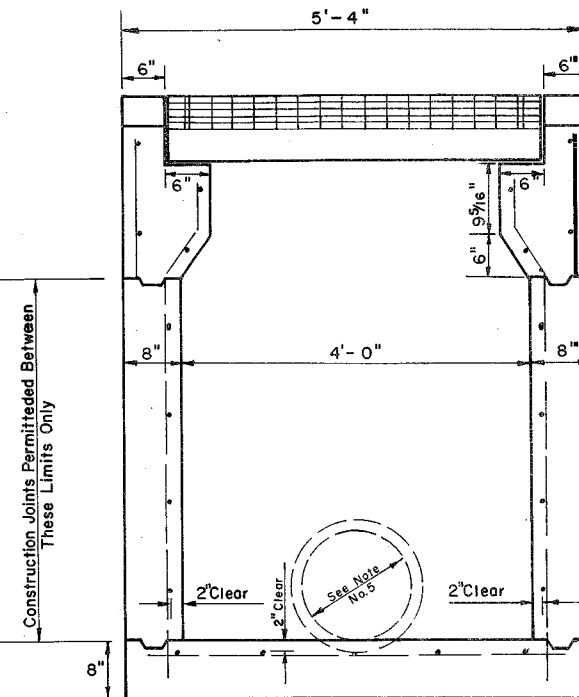
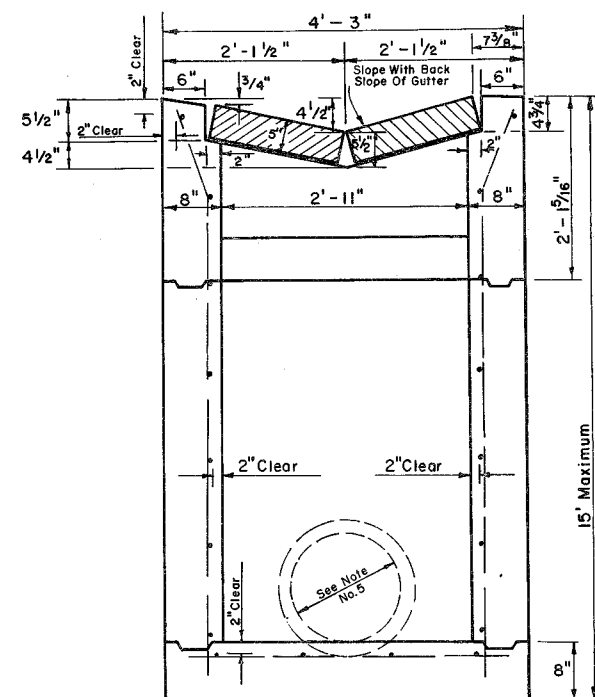
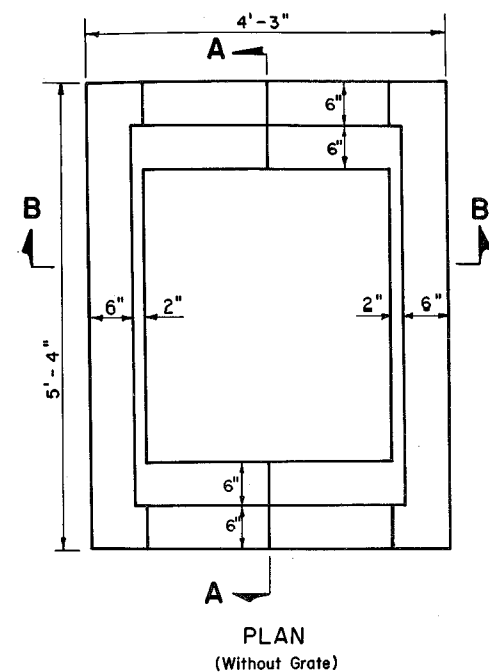
PLEASE RETAIN THIS SHEET FOR
STANDARD MYLAR SHEET
YOUR PERMANENT FILES.



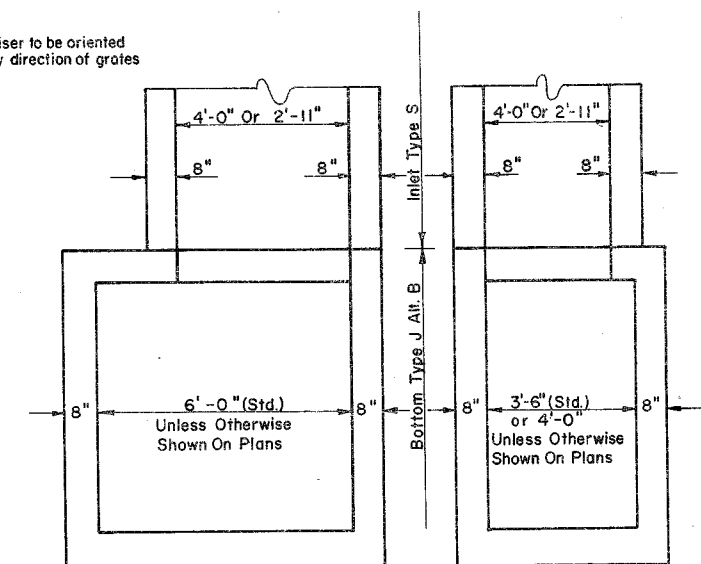
GENERAL NOTES:

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 | 9/73 | Approved By |
| Drawn by | | | Deputy Design Engineer, Roadways |
| Checked by | EGR | 9/73 | Revision No. |
| F.H.W.A. Approved: 10/8/76 | 80 | 1 of 1 | 217 |



NOTE: Riser to be oriented
by direction of grades

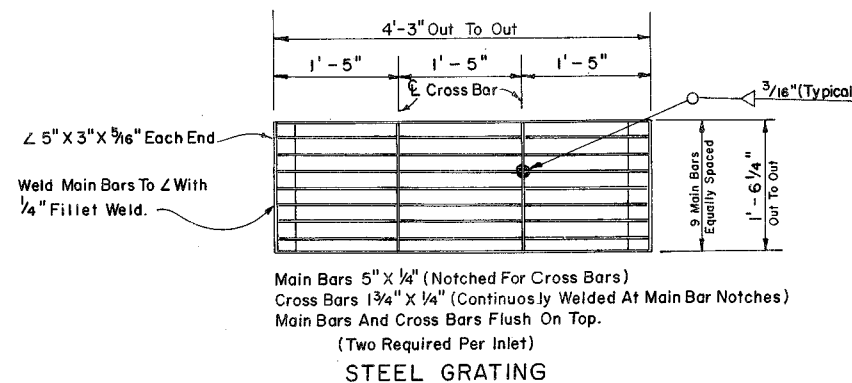
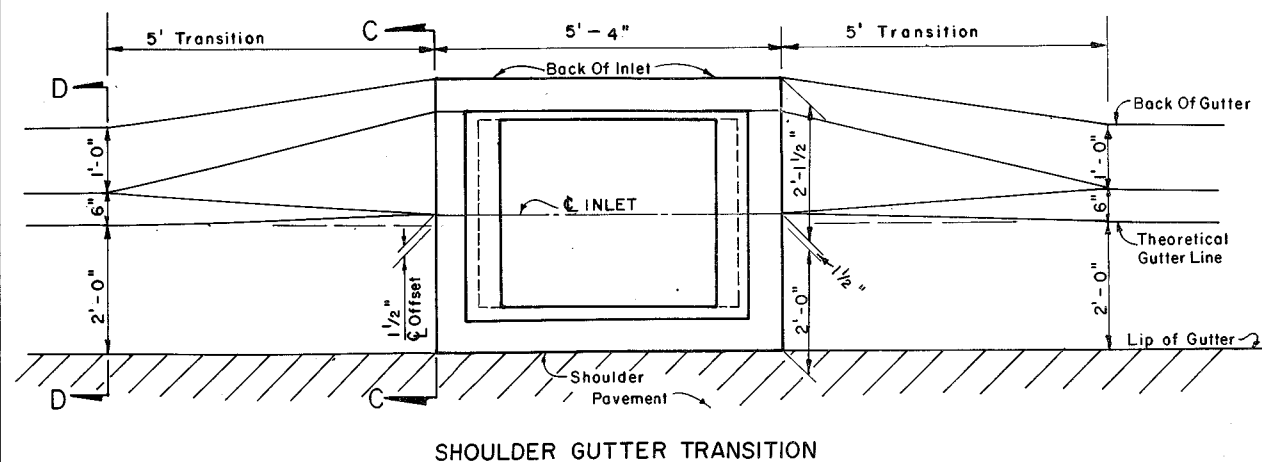
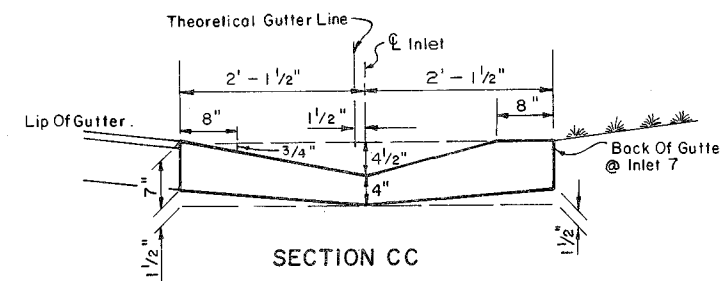
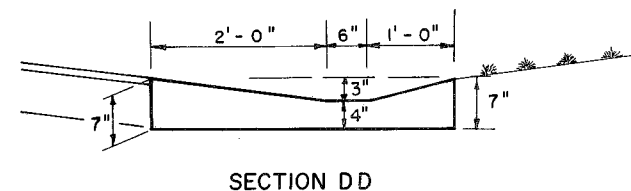


See Index Number 200

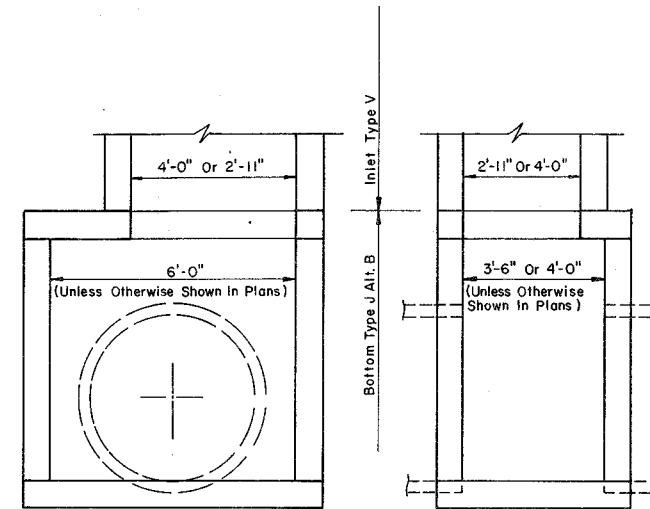
INLET WITH BOTTOM TYPE J

GENERAL NOTES

1. This inlet was designed for shoulder gutters subject to heavy wheel loads on sections where bicycle traffic is not anticipated (ie: limited access, rural sections). Also may be used in locations where the wide opening inlets Types A and B are unacceptable. Where a bicycle safe grate is necessary use the steel grating shown on index no. 221.
2. All reinforcing steel bars are $\frac{1}{2}$ " ϕ @ 12" centers.
3. Cut and bend bars out of way of pipe when necessary. Bars to clear pipe by $\frac{1}{2}$ ".
4. All exposed edges and corners shall be tooled to $\frac{3}{4}$ " radius.
5. Recommended maximum pipe sizes based on concrete pipe: Section A, 36" pipe; Section B, 24" pipe. Larger pipe sizes may be used but should be checked for fit. Bottom Type J is recommended for larger pipe sizes.
6. For supplementary details see index numbers 201 and 200.
7. Grate and top of structure shall be true to grade shown on plans.
8. When Alternate G grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.



| | | | |
|--|-------|--------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| GUTTER INLET TYPE S | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | | | <i>De. [Signature]</i> Deputy Design Engineer, Roadways |
| Checked by | | | Revision No. |
| F.H.W.A. Approved: 5/1/75 | 81 | 1 of 1 | Index No. 220 |

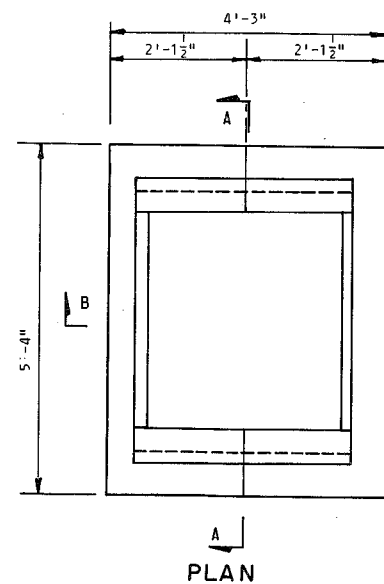


Note: Structure Bottom Type J, Alt. B Only. See Index 200.

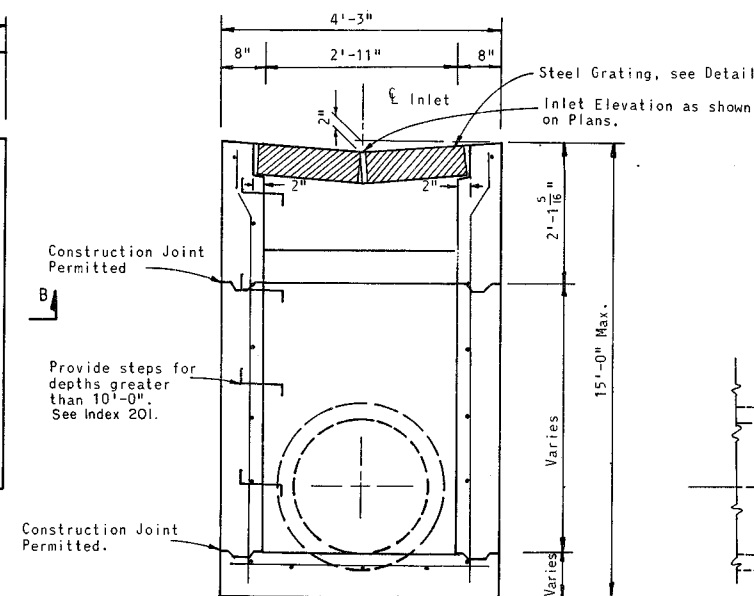
INLET WITH BOTTOM TYPE J
(For Pipes 30" Dia. And Larger)

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.

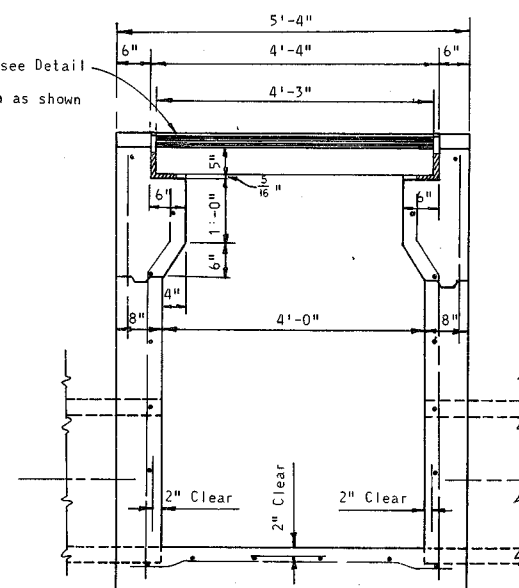


PLAN



SECTION BB

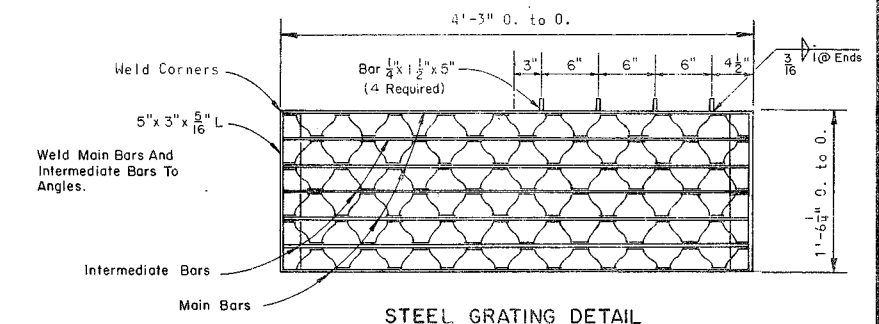
(For Pipes 24" Dia. And Under)



SECTION AA

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

NOTE: All Reinforcing Steel Bars are $\frac{1}{2}$ " ϕ @ 12" Ctrs.

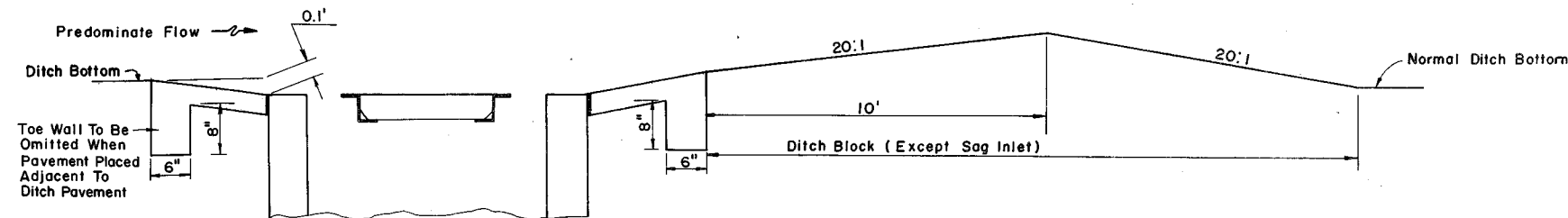


STEEL GRATING DETAIL

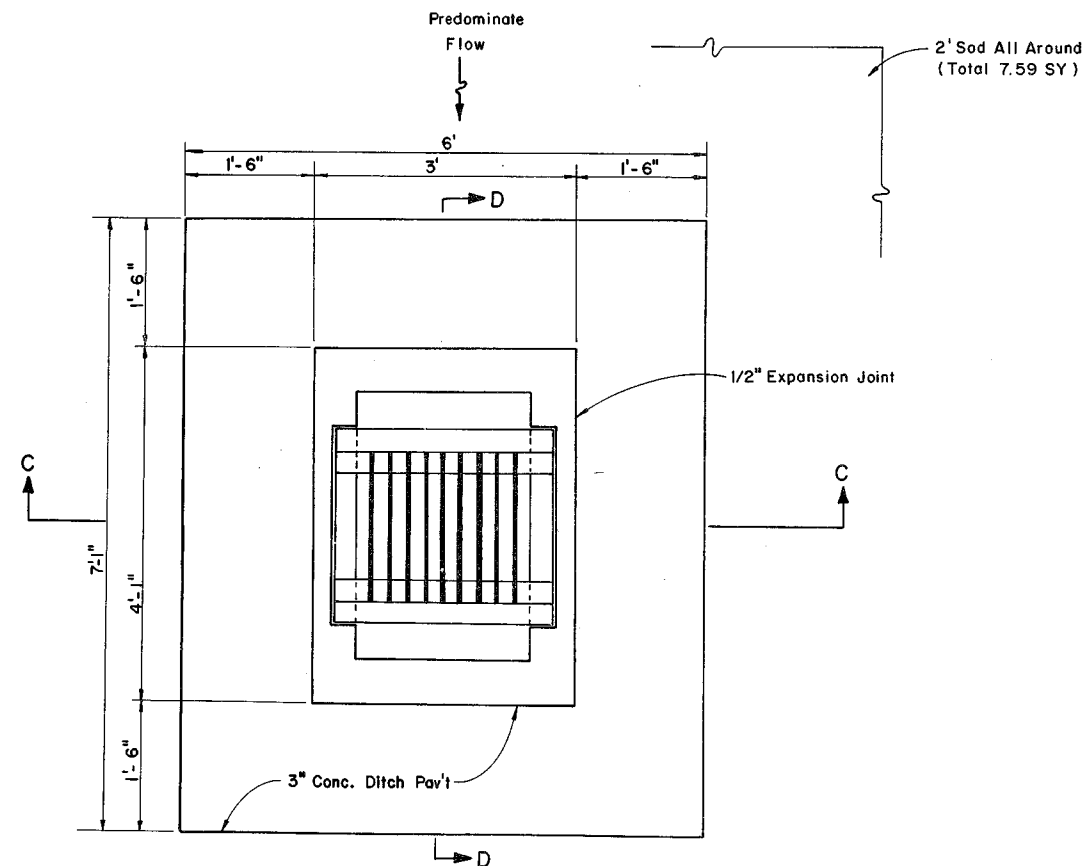
TWO REQUIRED PER INLET
5" Steel Decking Main Bars 5" x $\frac{1}{4}$ "
Intermediate Bars $1\frac{1}{2}$ " x $\frac{1}{4}$ " Reticuline Bars $1\frac{1}{4}$ " x $\frac{3}{16}$ "

STEEL DECKING: MANUFACTURED BY BORDEN, FLORIDA STEEL, U.S. FOUNDRY IRVING, RELIANCE, GREULICH (OR EQUAL).

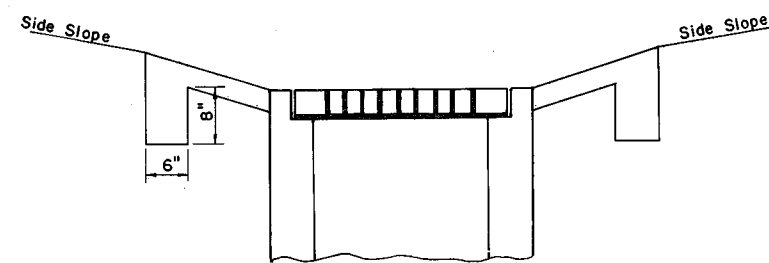
| | | | | | |
|---|-------|-------|----------------------------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION | | | | | |
| ROAD DESIGN | | | | | |
| GUTTER INLET TYPE V | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | WHW | 4/57 | Deputy Design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



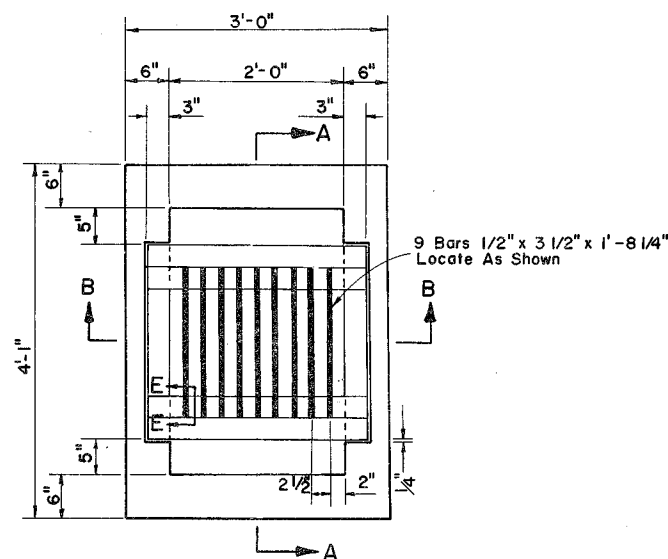
SECTION DD



PAVEMENT DETAIL

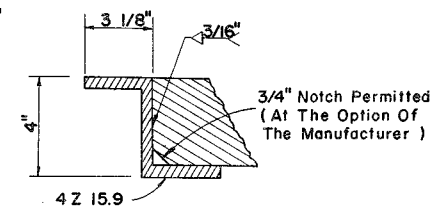


SECTION CC

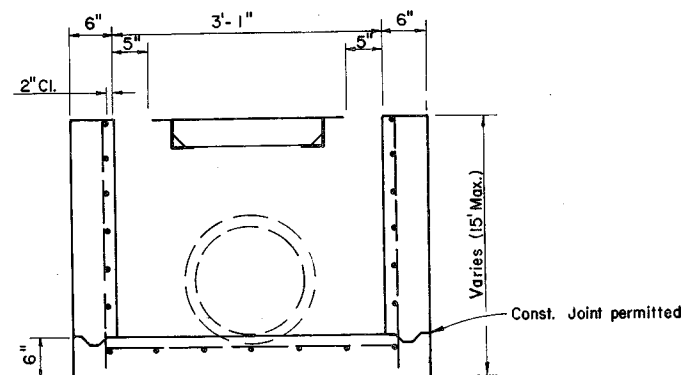


PLAN

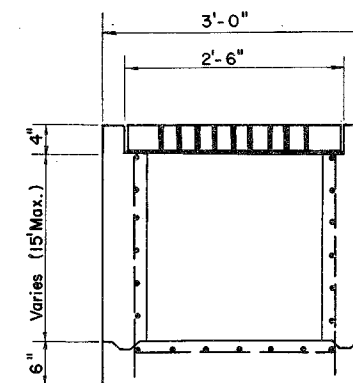
Recommended Maximum Pipe Sizes
 2'-0" Side - 18" Pipe
 3'-1" Side - 24" Pipe
 For Larger Pipe Sizes See Note No. 9



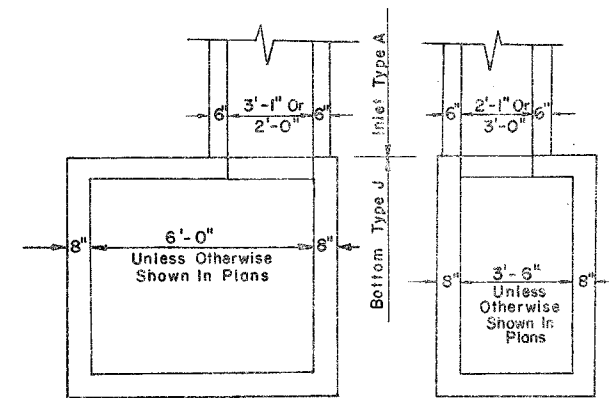
SECTION EE



SECTION AA



SECTION BB



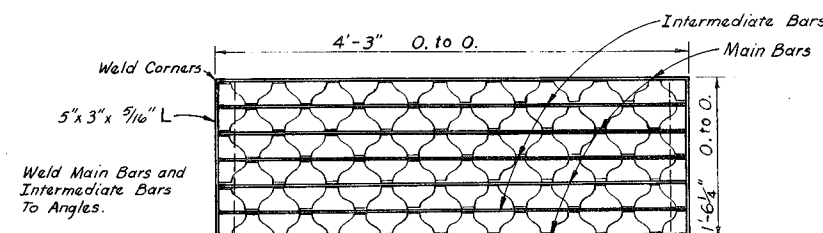
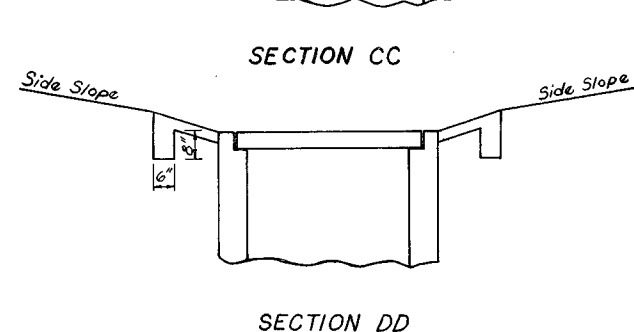
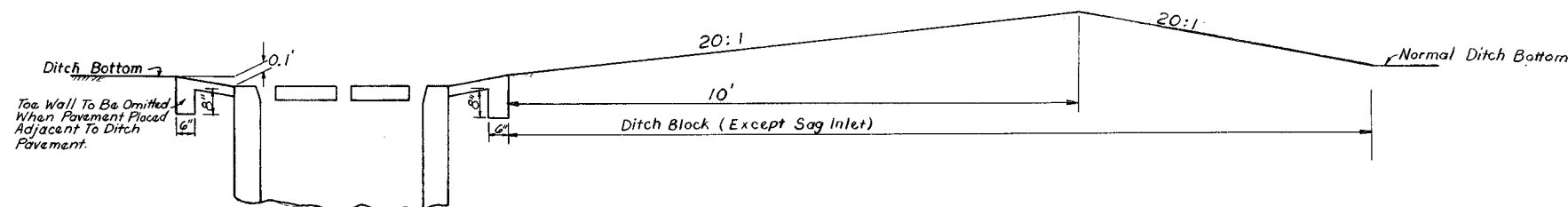
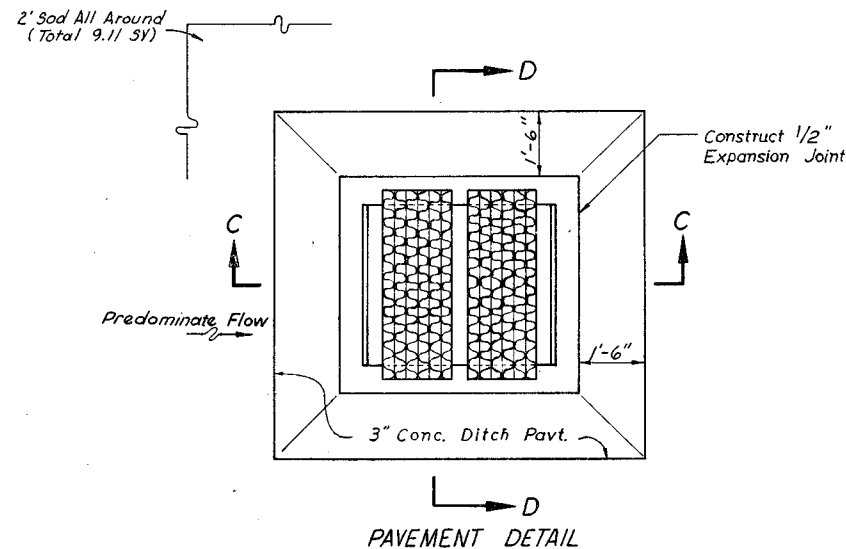
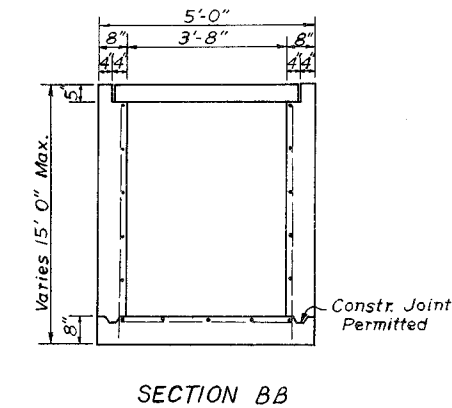
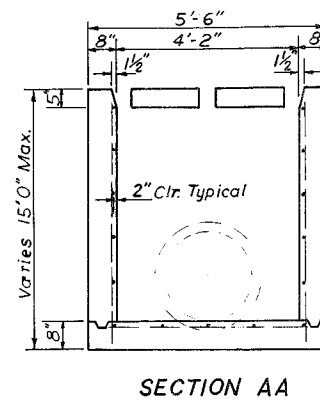
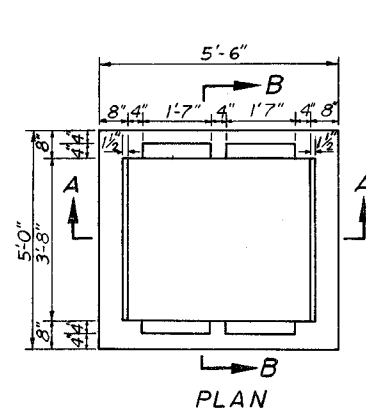
NOTES: Structure Bottom Type J, Alt. B only. See Index 200.
 Inlet to be oriented as required by Note #5.

INLET WITH BOTTOM TYPE J

GENERAL NOTES

- Cost of ditch paving to be included in cost of inlet.
- Reinforcing - No. 4 bars at each 12" center both ways, 2" clearance to inside face.
- Inlet to be used only where flow thru grate is less than 7 c.f.s.
- 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.
- Direction of 1/2" x 3/2" bars to be in same direction as predominant flow.
- Chamfer exposed edges. (3/4" chamfer.)
- Cut and bend bars out of way of pipe when necessary. Bars to clear pipe by 1/2".
- For supplemental detail, see Index 201.
- 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.
- 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.
- When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
- Sodding to be paid for under contract unit price for Sodding, SY.

| | | | | | |
|--|-------|-------|--------------------------------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| DITCH BOTTOM INLET TYPE A | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | | | 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 |

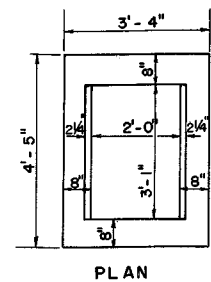


STEEL GRATING
TWO REQUIRED PER INLET
5" Borden, Florida Steel, Irving, Reliance, Greulich, U.S. Foundry, (or equal)
Main Bars 5" x 3/4" Intermediate Bars 1 1/2" x 1/4" Reticuline Bars
1 1/4" x 3/16" (or equal).

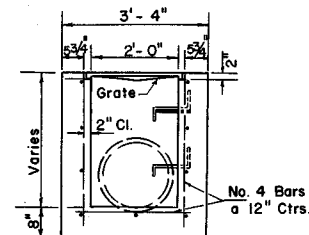
GENERAL NOTES:

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 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 | HAB | Dates | 4/67 | Approved By | <i>De Bell</i> |
| Drawn by | GCB | 4/67 | | Deputy Design Engineer, Roadways | |
| Checked by | | | | Revision No. | Sheet No. |
| F.H.W.A. Approved: 7/18/75 | 81 | 1 of 1 | 231 | | |



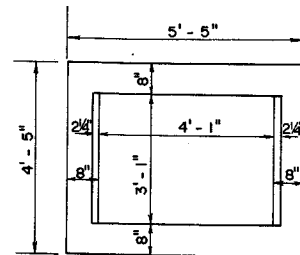
PLAN



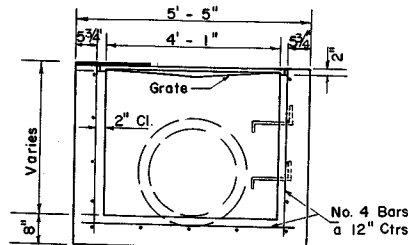
SECTION
TYPE C

Recommended Maximum Pipe Size:

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



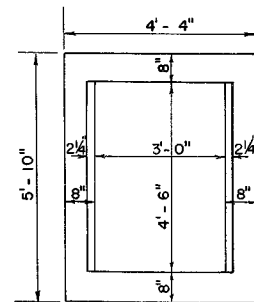
PLAN



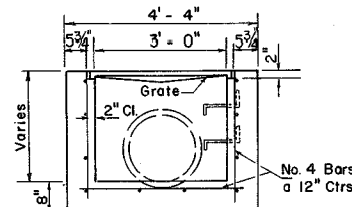
SECTION
TYPE D

Recommended Maximum Pipe Size:

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



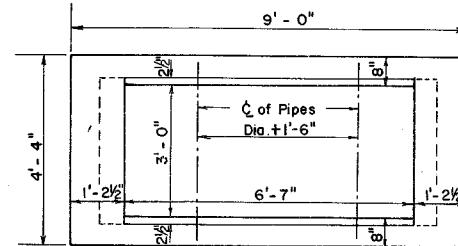
PLAN



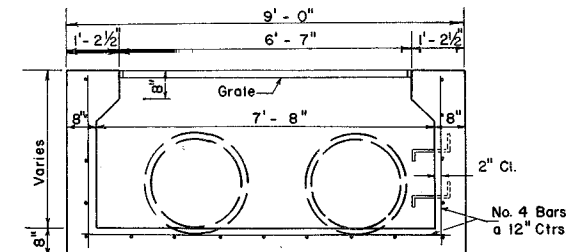
SECTION
TYPE E

Recommended Maximum Pipe Size:

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



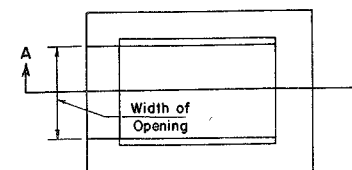
PLAN



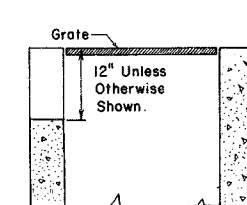
SECTION
TYPE H

Recommended Maximum Pipe Size:

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

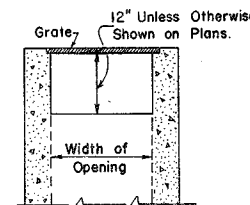


PLAN

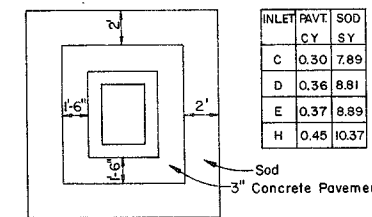


SECTION A A
SLOTS (NON-TRAVERSABLE)

NOTE:
Opening may be constructed
at either end or at both ends
as shown on plans.



END VIEW



PAVT. AND SOD

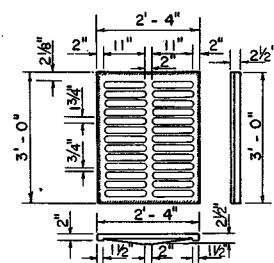
| INLET | PAVT | SOD |
|-------|------|-------|
| CY | SY | SY |
| C | 0.30 | 7.89 |
| D | 0.36 | 8.81 |
| E | 0.37 | 8.89 |
| H | 0.45 | 10.37 |

Note: For inlets with traversable slots see sheet 2 of 2.

PAVEMENT AND SODDING

GENERAL NOTES

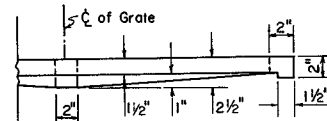
1. BEVELED EDGES: All exposed corners and edges to be chamfered $\frac{3}{4}$ ".
2. FOUNDATION: Where material unsatisfactory for foundation is encountered at FL EL. omit floor and carry walls down to satisfactory foundation. Backfill to FL with clean sand.
3. CAST IRON: In accordance with Florida Department of Transportation Specifications.
4. STEEL GRATING: Manufactured by Borden, Florida Steel, Irving, Reliance, U.S. Foundry, Greulich (or equal).
5. STRUCTURES: These structures are not to be placed in areas subject to heavy wheel loads.
6. DETAILS: For supplementary details see Standard Index 201.
7. PIPE SIZES: Recommended maximum pipe sizes given are for concrete pipe. Larger than recommended sizes must be checked for fit.
8. USES: When used without slots - For ditches, medians and other areas subject to infrequent traffic loads where debris is minimum. Where debris is a problem slots should be used unless controlled by safety criteria.
9. ALTERNATE G GRATE: When specified in plans, the steel grate is to be hot dipped galvanized after fabrication.
10. PAVEMENT: To be used only where shown in the plans. Cost to be included in cost of inlet. Quantities shown are for information only.
11. SODDING: To be used around all inlets. To be paid for under contract unit price for Sodding SY.



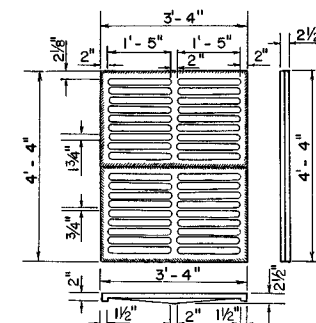
TYPE C

Approx. Weight 235 Lbs.

Note:
Type D Inlet to be used only
when openings are required
in wide side of Inlet. Cast Iron
Grate not permitted.



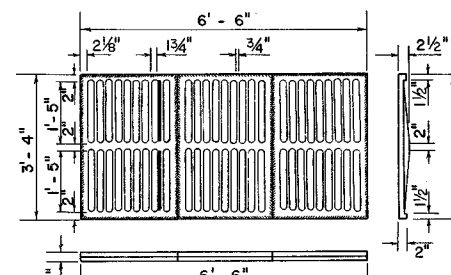
HALF SECTION CAST IRON GRATES



TYPE E

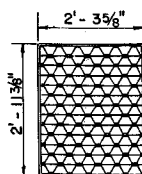
Approx. Weight 465 Lbs.

CAST IRON GRATING



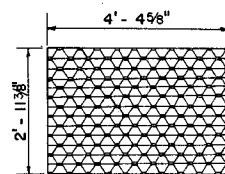
TYPE H

Approx. Weight 725 Lbs.



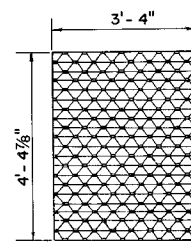
TYPE C

Straight Bars $2" \times \frac{3}{16}"$
Reticuline Bars $1\frac{1}{4}" \times \frac{3}{16}"$
Approx. Weight 100 Lbs.



TYPE D

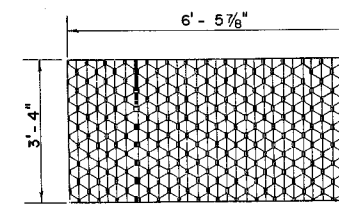
Straight Bars $2" \times \frac{3}{16}"$
Reticuline Bars $1\frac{1}{4}" \times \frac{3}{16}"$
Approx. Weight 180 Lbs.



TYPE E

Straight Bars $2" \times \frac{3}{16}"$
Reticuline Bars $1\frac{1}{4}" \times \frac{3}{16}"$
Approx. Weight 215 Lbs.

STEEL GRATING

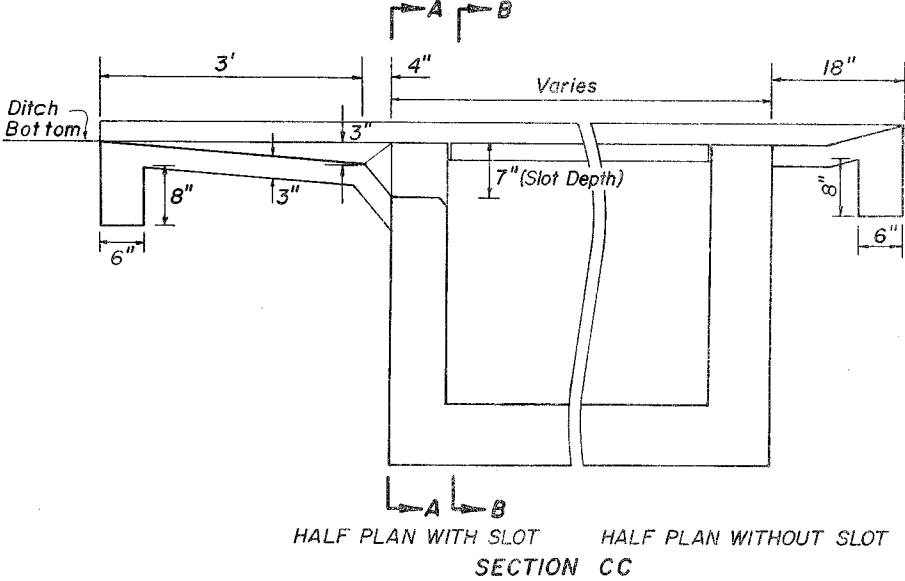
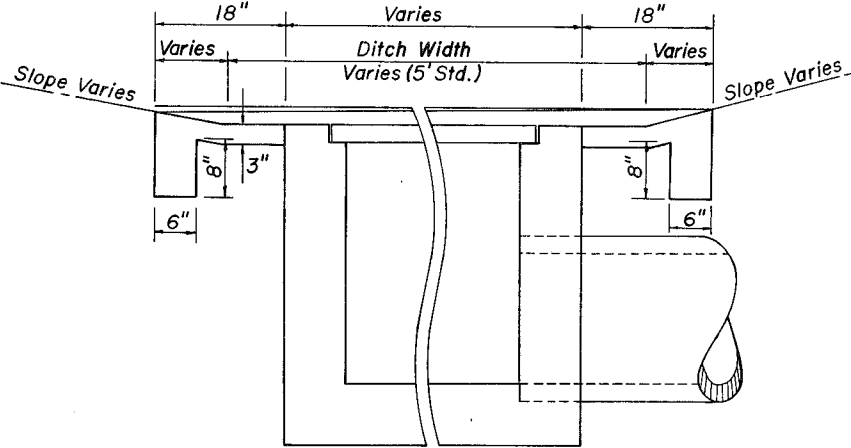
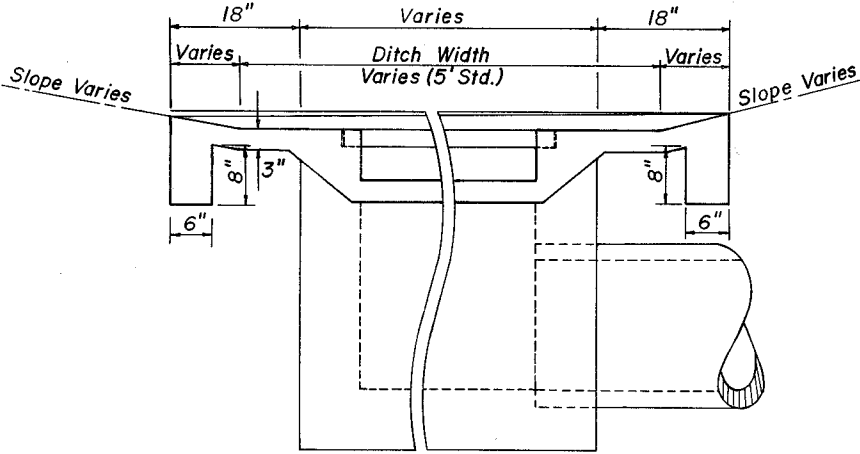
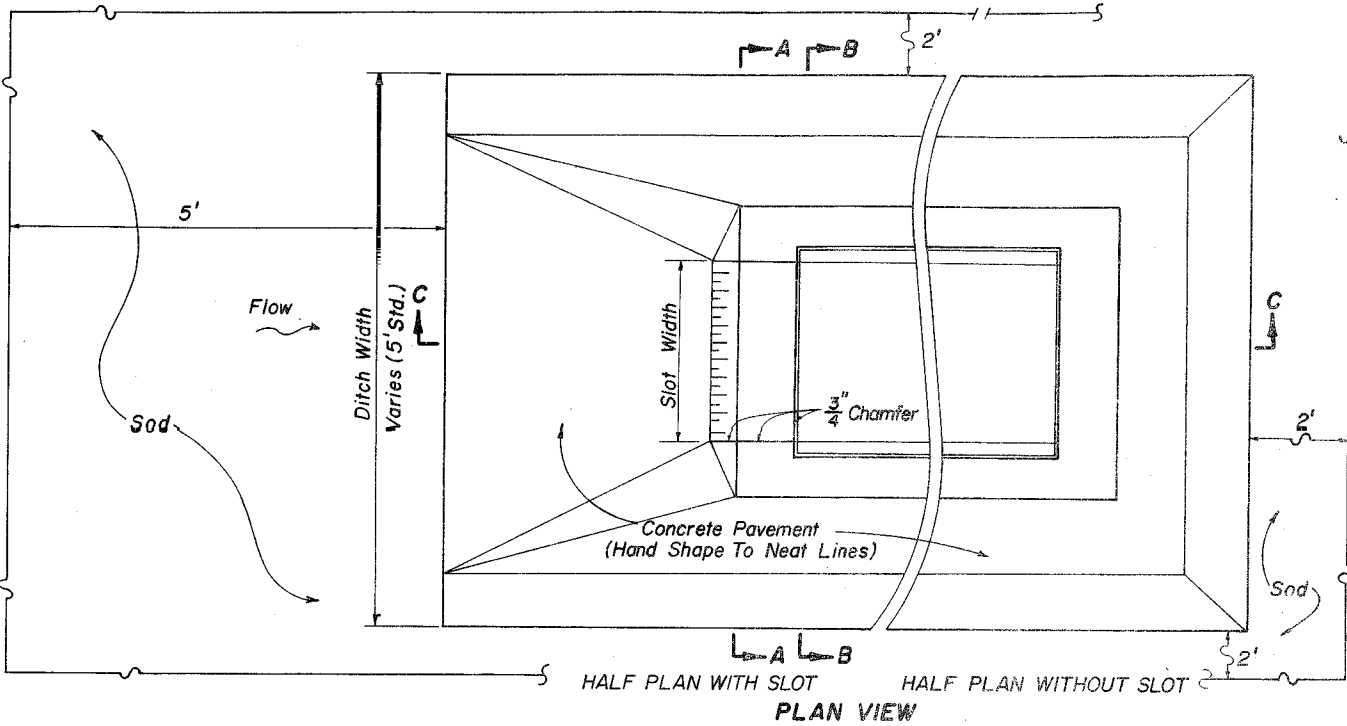


TYPE H

Straight Bars $2" \times \frac{3}{16}"$
Reticuline Bars $1\frac{1}{4}" \times \frac{3}{16}"$
Approx. Weight 315 Lbs.

| | | | | | |
|--|--------|-------|--------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| DITCH BOTTOM INLETS TYPES C, D, E & H | | | | | |
| Designed by | Names | Dates | Approved by | | |
| Drawn by | | | | | |
| Checked by | L.M.F. | 10/74 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 10/7/80 | | | 81 | 1 of 2 | 232 |

| QUANTITIES | | | |
|------------|-------------------|------|-------|
| Inlet | Concrete Pavement | | Sod |
| | SY | CY | SY |
| C | 4.87 | 0.77 | 12.15 |
| D | 5.99 | 0.91 | 13.77 |
| E | 5.88 | 0.91 | 13.56 |

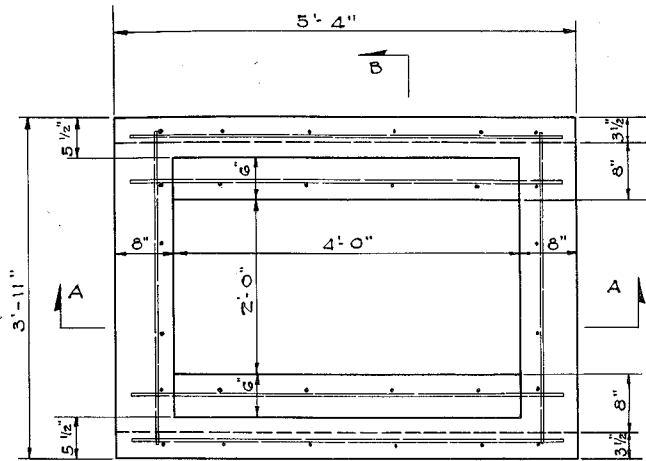


TRAVERSABLE SLOTS

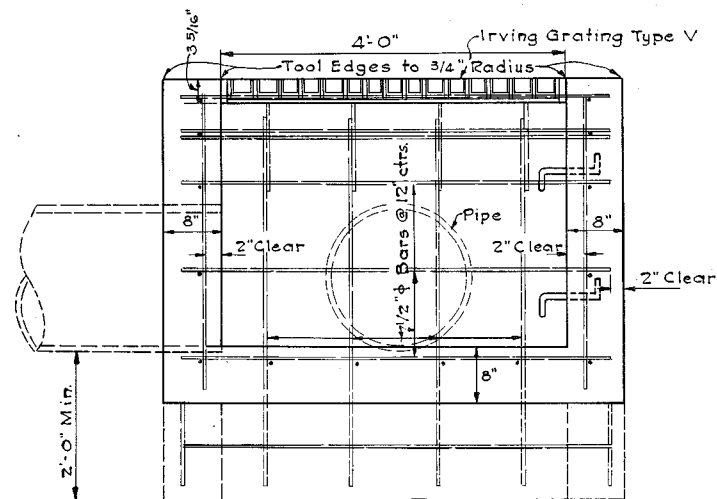
GENERAL NOTES

- For additional details see Index Nos. 201 and 232.
- Cost of pavement to be included in contract unit price for inlet.
- Slot(s) to be provided on one or two ends as called for in plans.
- Sodding to be paid for under contract unit price for Sodding, S.Y.
- Modification not adaptable to DBI Type H.

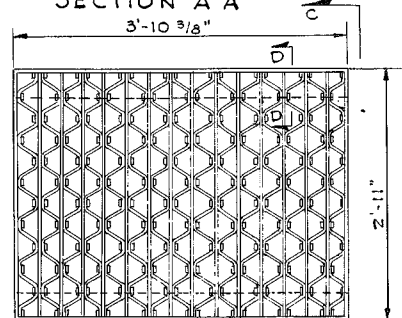
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
|--|--------|--------|------|--------------|----------------------------------|
| DITCH BOTTOM INLETS TYPES C,D,E,&H | | | | | |
| Designed by | E.G.R. | Dates | 2/80 | Approved By | <i>P.C. Bullard</i> |
| Drawn by | J.M. | | 2/80 | | Deputy Design Engineer, Roadways |
| Checked by | J.V.G. | | 2/80 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 10/7/80 | 81 | 2 of 2 | 232 | | |



PLAN B



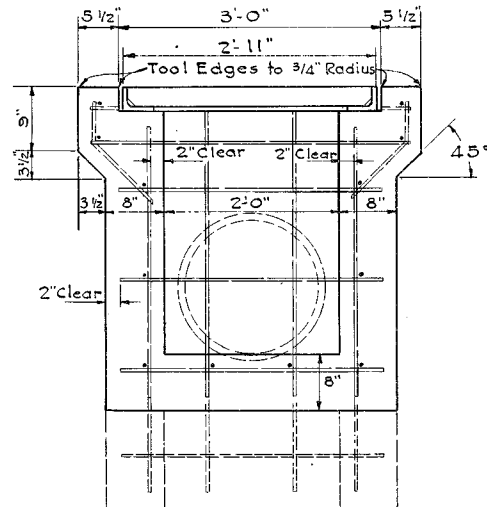
SECTION A A



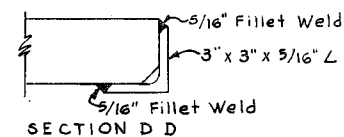
STEEL GRATING
STEEL GRATING, STRAIGHT BARS 3"x 1/4"
RETICULINE BARS 2"x 3/16".
STEEL DECKING: Manufactured by Borden, Florida Steel, Irving, U.S. Foundry,
Reliance, Greulich (or equal).

TYPE F

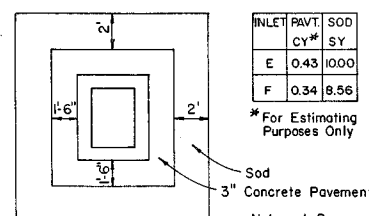
| TYPE F | | |
|-----------------|------------------|-------------------------|
| HEIGHT OF WALLS | CONCRETE CU. YD. | REINFORCING STEEL, LBS. |
| 2'-0" | 0.07 | 81 |
| 3'-0" | 1.15 | 102 |
| 4'-0" | 1.51 | 124 |
| 5'-0" | 1.87 | 145 |
| 6'-0" | 2.23 | 166 |



SECTION B B



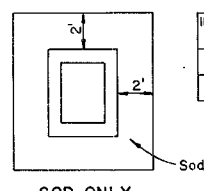
SECTION D D



PAVT. AND SOD

| INLET | PAVT. | SOD |
|-------|-------|------|
| | CY* | SY |
| E | 0.43 | 1000 |
| F | 0.34 | 8.56 |

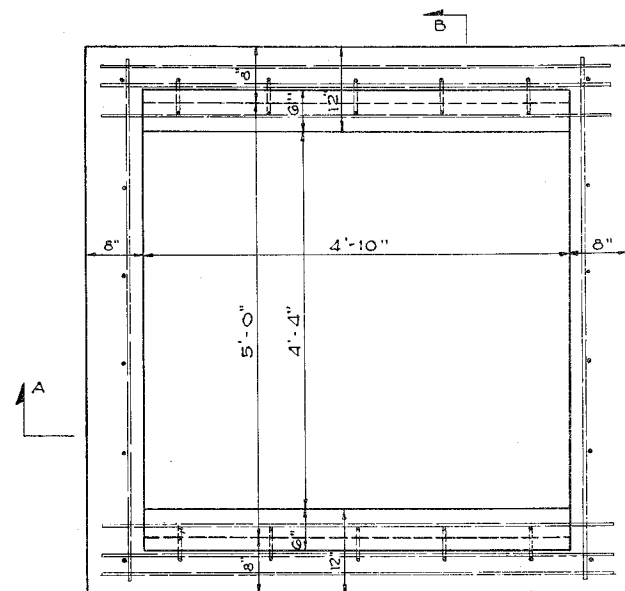
*For Estimating Purposes Only



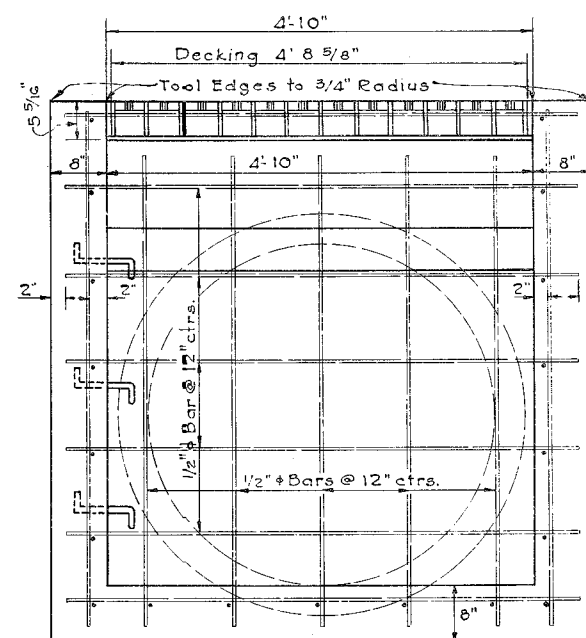
SOD ONLY

Notes: 1. Pavement and/or sod to be used only where called for in the plans.
2. Cost of paving to be included in cost of inlet.

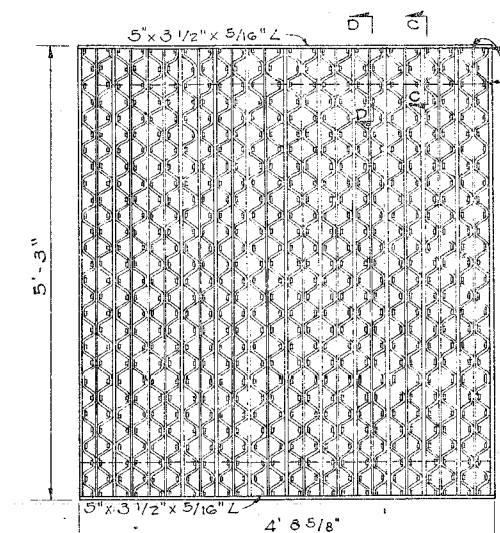
PAVEMENT AND SODDING



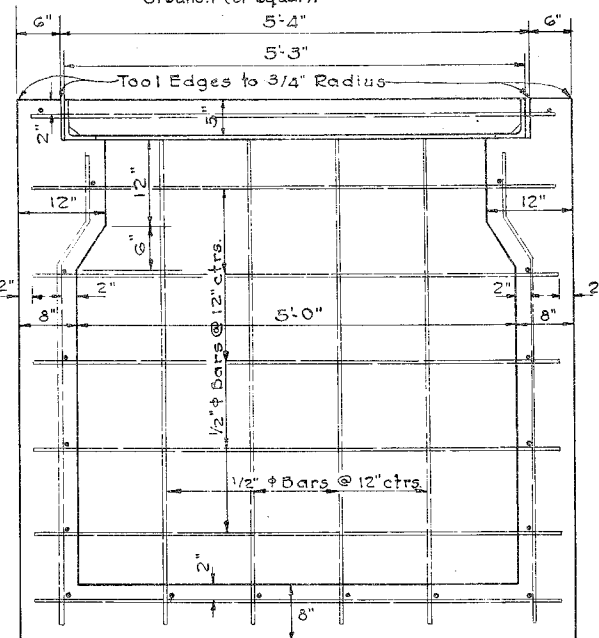
PLAN B



SECTION A A



STEEL GRATING
5" STEEL DECKING, WEIGHT 630 LBS. MAIN BARS 5"x 1/4"
INTERMEDIATE BARS 1 1/2"x 1/4", RETICULINE BARS 1 1/4"x 3/16".
STEEL DECKING: Manufactured by Borden, Florida Steel, Irving, Reliance, U.S. Foundry,
Greulich (or equal).



SECTION B B

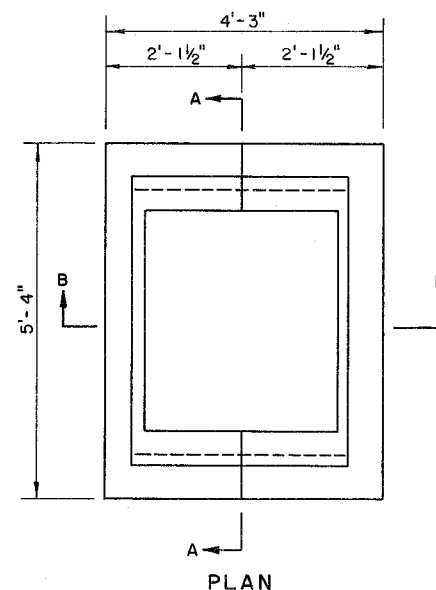
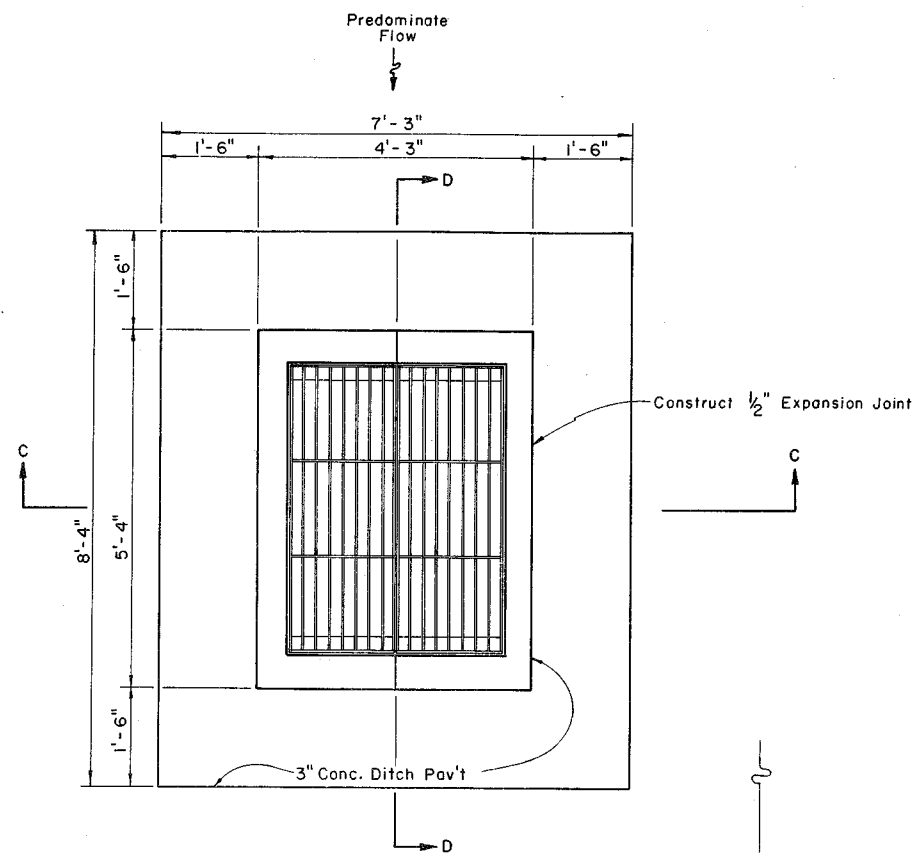
TYPE G

Note: These inlets were designed for use in ditches, medians, pavement areas, or other areas subject to heavy wheel loads where debris is minimum and it is subject to pedestrian and/or bicycle traffic.

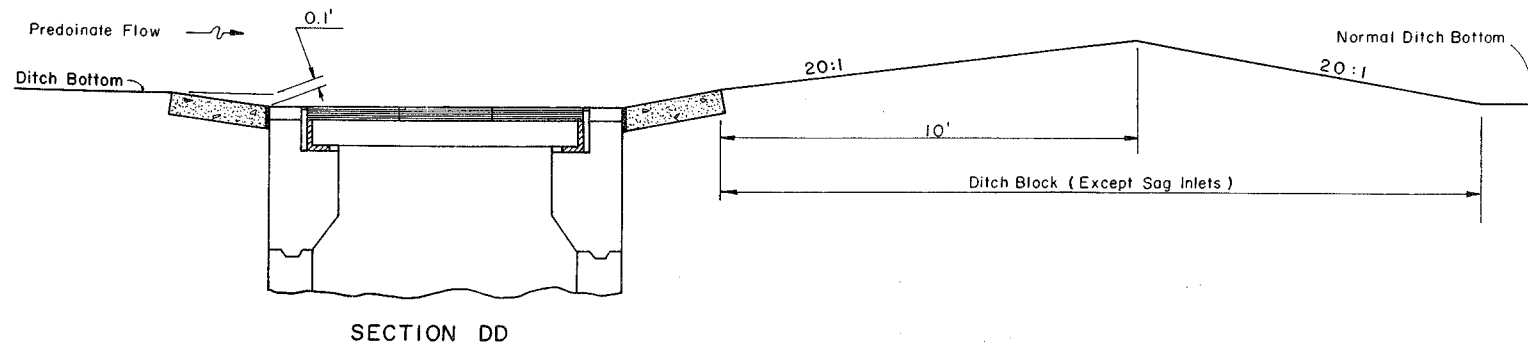
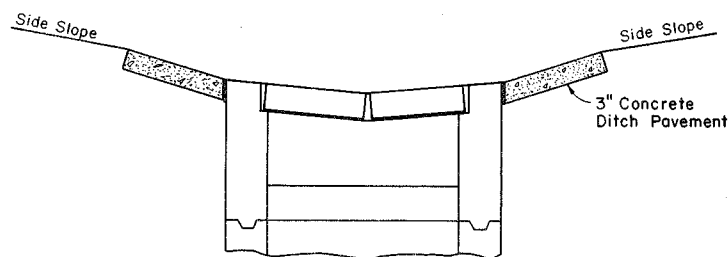
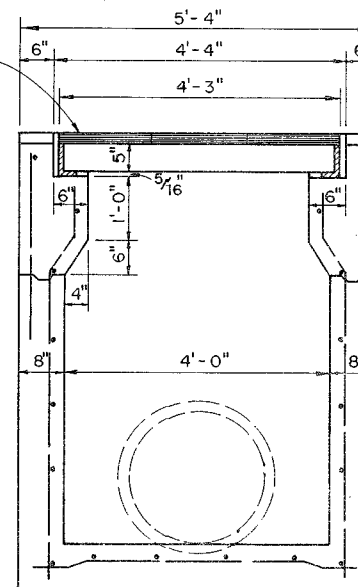
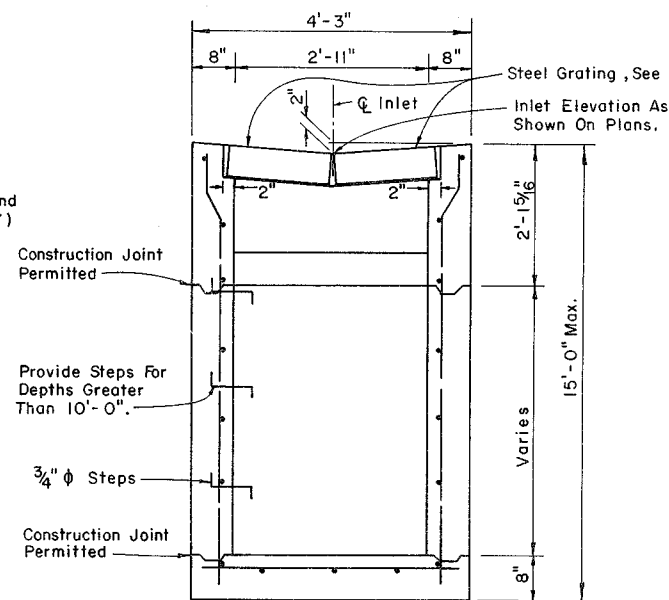
When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.

Where Material unsatisfactory for foundation is encountered at Elev. of FL, omit floor and carry walls down to satisfactory foundation. Backfill inside to level of outlet with clean sand.

| | | | | |
|--|-------|-------|--|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | |
| DITCH BOTTOM INLETS TYPES F & G | | | | |
| Designed by | Names | Dates | Approved By | |
| Drawn by | MEF | 1/50 | De. Amel Deputy Design Engineer, Roadways | |
| Checked by | WHM | 1/50 | | |
| F.H.W.A. Approved: 5/1/75 | | | Revision No. | Sheet No. |
| | | | 81 | 1 of 1 |
| | | | 233 | |

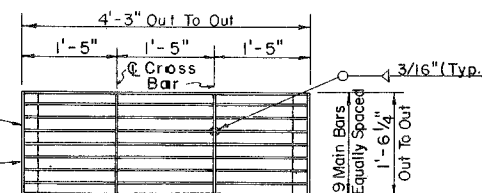


Recommended Maximum Pipe Sizes
2'-11" Wall - 24"
4'-0" Wall - 36"
For Larger Pipe See Note 8

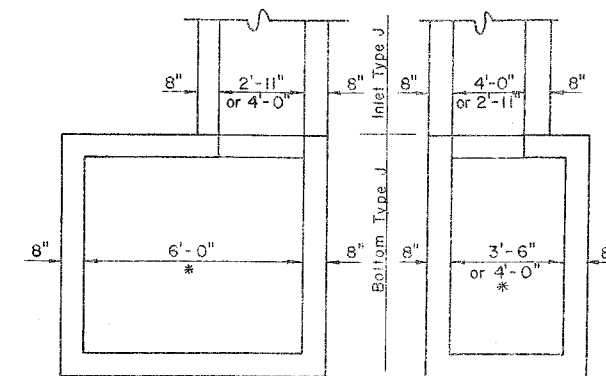


L 5"x3"x5/16"
Each End

Weld Main Bars To L
With 1/4" Fillet Weld



Note: Two Required Per Inlet
Main Bars 5"x1 1/4" (Notched For Cross Bars).
Cross Bars 1 3/4"x1 1/4" (Continuously Welded
At Main Bar Notches).
Main Bars And Cross Bars Flush On Top.



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

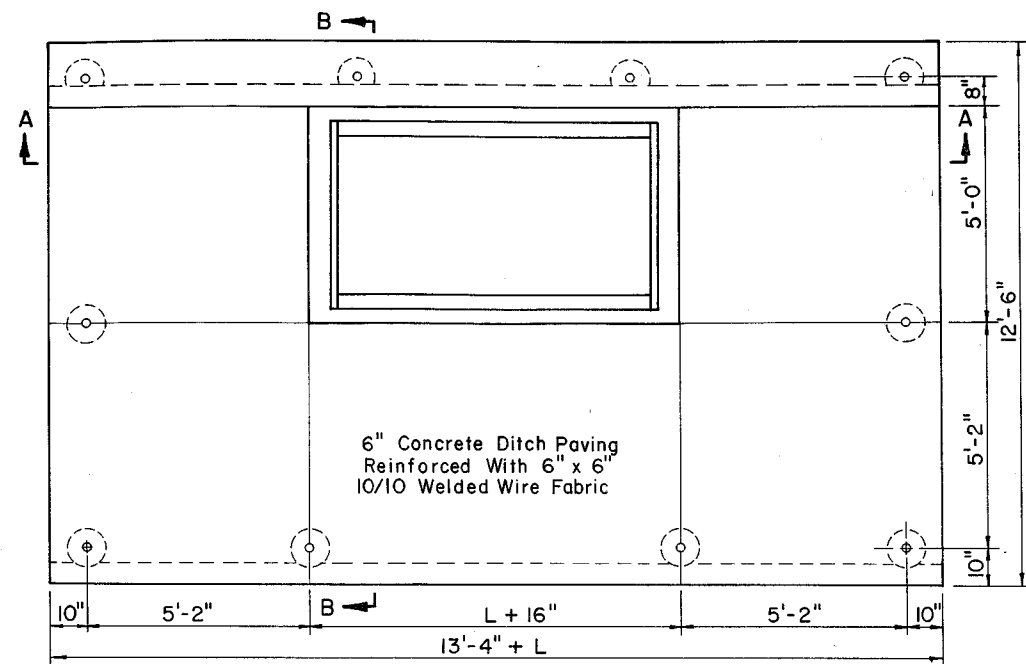
GENERAL NOTES

- Cost of Ditch Paving to be included in cost of inlet.
- Reinforcing - No 4 bars at 12" centers both ways with 2" clearance to inside face.
- Where material unsatisfactory for foundation is encountered at F.L. elevation omit floor and carry walls down to satisfactory foundation. Backfill to F.L. with cleansand.
- Direction of 1/4"x5" Main bars to be in same direction as predominant flow.
- Chamfer exposed edges. (3/4" Chamfer)
- Cut and bend bars out of way of pipe when necessary; Bars to clear pipe by 1 1/2".
- For supplemental details, see Index 201.
- 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).
- 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.
- When alternate G grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
- Sodding to be paid for under contract unit price for Sodding, SY.

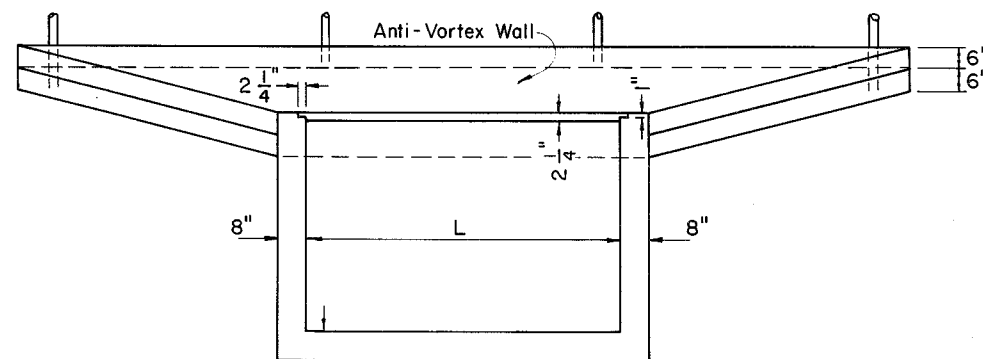
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DITCH BOTTOM INLET TYPE J

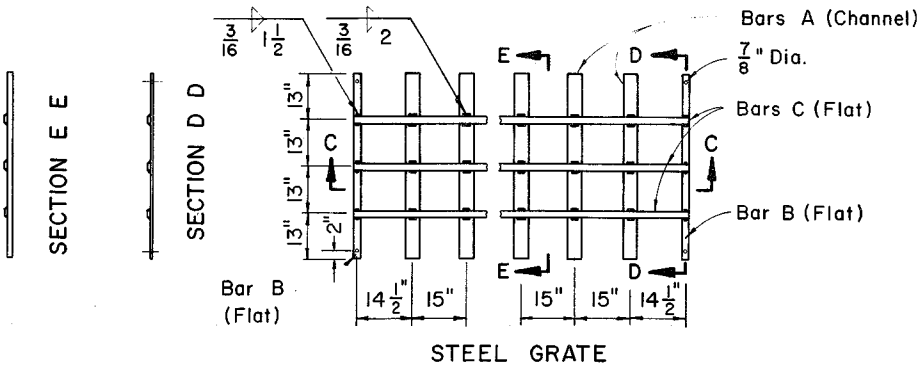
| Designed by | Names | Dates | Approved By | Index No. |
|---------------------------|-------|--------|----------------------------------|-----------|
| LMF | LMF | 8/76 | J.C. Riddick | 234 |
| Drawn by | | | Deputy Design Engineer, Roadways | |
| Checked by | SRL | 8/76 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 9/3/76 | 81 | 1 of 1 | | |



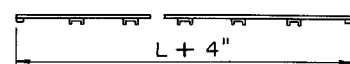
(Grate Not Shown)
PLAN



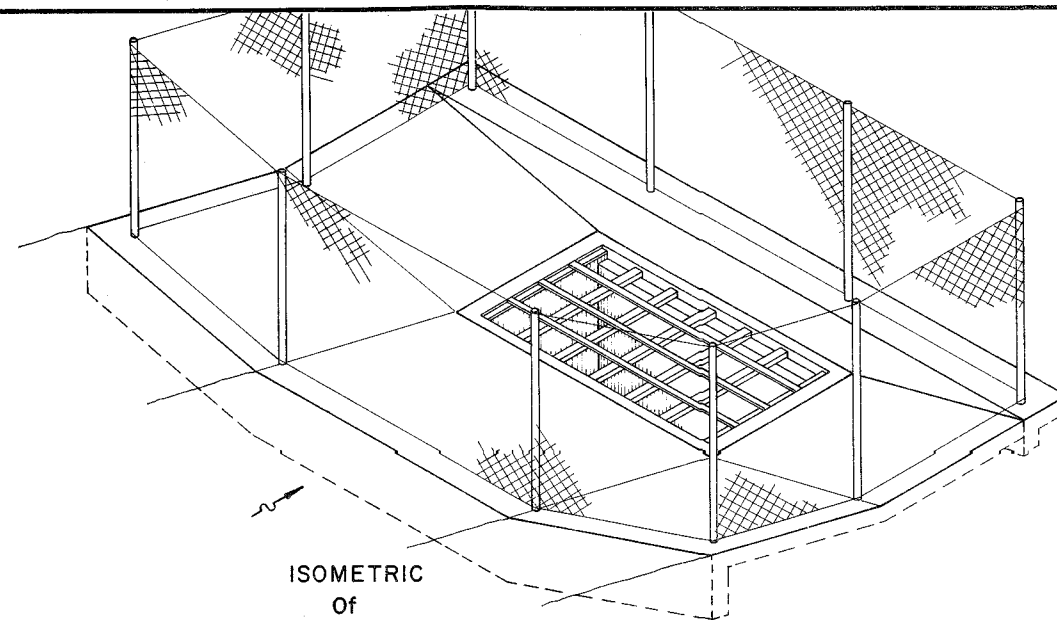
(Grate Not Shown)
SECTION AA



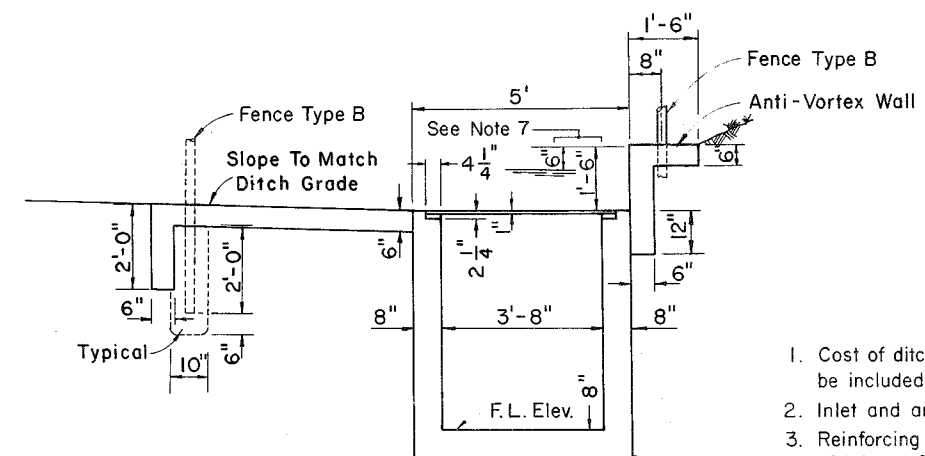
STEEL GRATE



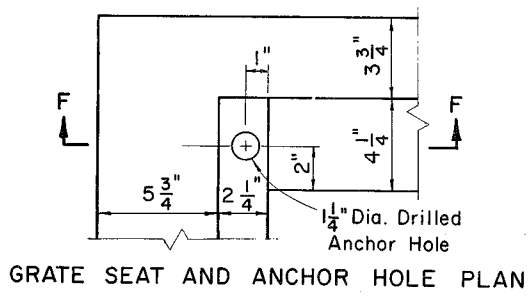
SECTION C C



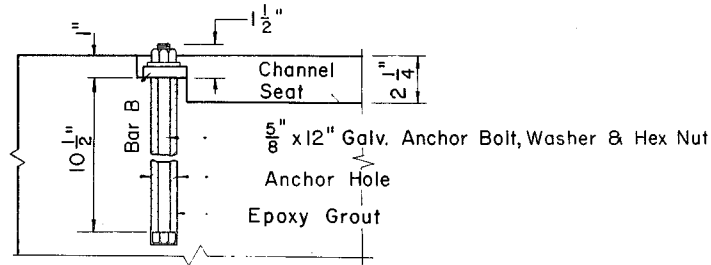
ISOMETRIC
Of
INLET FENCE ENCLOSURE



(Grate Not Shown)
SECTION BB



GRATE SEAT AND ANCHOR HOLE PLAN



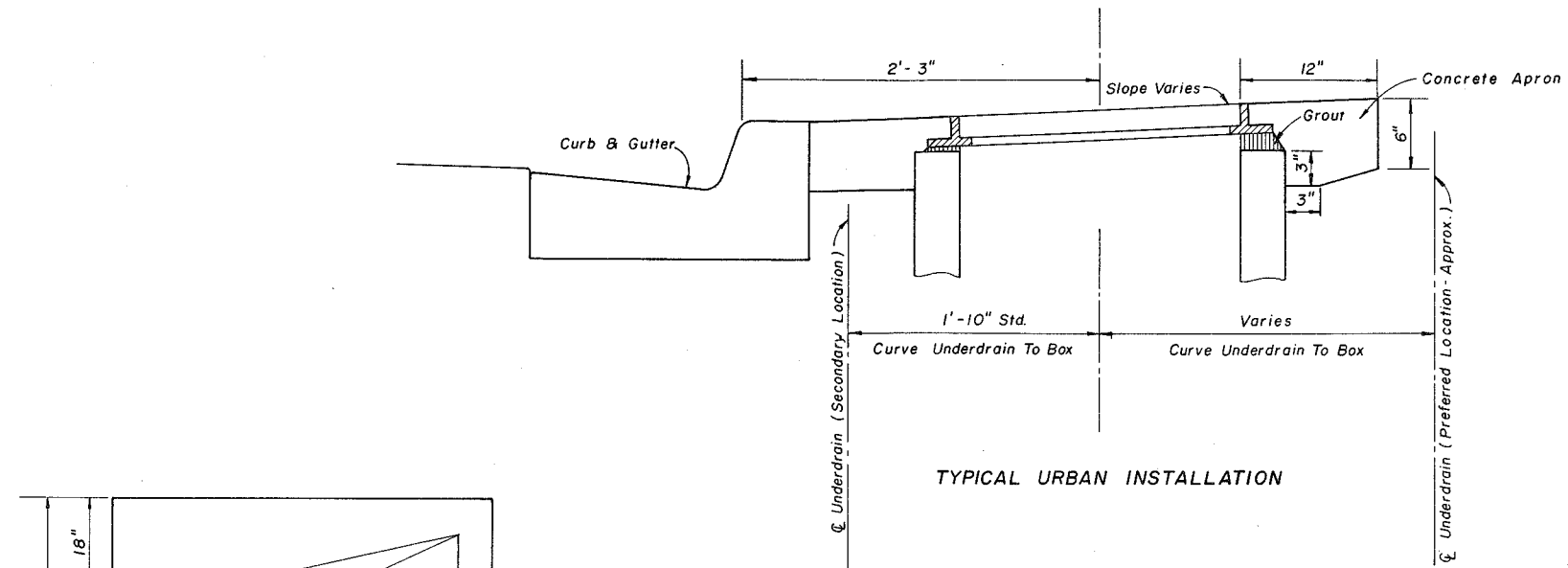
(With Bar B And Anchor Bolt)
SECTION FF

| PIPE SIZE | L | BILL OF STEEL | | | STEEL WEIGHT | |
|----------------|--------|---------------|------------|---------|-----------------|----------------------|
| | | BAR | No. REQ'D. | LENGTH | CHANNEL 4"x5.4" | FLAT 2"x 1/2" (3.4#) |
| 30" & 36" | 4'-9" | A | 3 | 4'-4" | 70 | 30 |
| | | B | 2 | 4'-4" | | 52 |
| | | C | 3 | 5'-1" | | |
| 42" & 48" | 6'-0" | A | 4 | 4'-4" | 94 | 30 |
| | | B | 2 | 4'-4" | | 65 |
| | | C | 3 | 6'-4" | | |
| 54" & 60" | 7'-3" | A | 5 | 4'-4" | 117 | 30 |
| | | B | 2 | 4'-4" | | 77 |
| | | C | 3 | 7'-7" | | |
| 66" & 72" | 8'-6" | A | 6 | 4'-4" | 140 | 30 |
| | | B | 2 | 4'-4" | | 90 |
| | | C | 3 | 8'-10" | | |
| SPECIAL 9'-9" | 9'-9" | A | 7 | 4'-4" | 164 | 30 |
| | | B | 2 | 4'-4" | | 103 |
| | | C | 3 | 10'-1" | | |
| SPECIAL 11'-0" | 11'-0" | A | 8 | 4'-4" | 187 | 30 |
| | | B | 2 | 4'-4" | | 116 |
| | | C | 3 | 11'-4" | | |
| SPECIAL 12'-3" | 12'-3" | A | 9 | 4'-4" | 211 | 30 |
| | | B | 2 | 4'-4" | | 128 |
| | | C | 3 | 12'-7" | | |
| SPECIAL 13'-6" | 13'-6" | A | 10 | 4'-4" | 234 | 30 |
| | | B | 2 | 4'-4" | | 141 |
| | | C | 3 | 13'-10" | | |
| SPECIAL 14'-9" | 14'-9" | A | 11 | 4'-4" | 257 | 30 |
| | | B | 2 | 4'-4" | | 154 |
| | | C | 3 | 15'-1" | | |
| SPECIAL 16'-0" | 16'-0" | A | 12 | 4'-4" | 281 | 30 |
| | | B | 2 | 4'-4" | | 167 |
| | | C | 3 | 16'-4" | | |
| SPECIAL 17'-3" | 17'-3" | A | 13 | 4'-4" | 304 | 30 |
| | | B | 2 | 4'-4" | | 179 |
| | | C | 3 | 17'-7" | | |
| SPECIAL 18'-6" | 18'-6" | A | 14 | 4'-4" | 328 | 30 |
| | | B | 2 | 4'-4" | | 192 |
| | | C | 3 | 18'-10" | | |

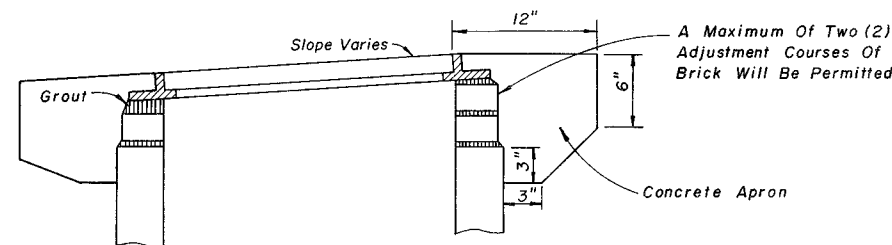
GENERAL NOTES

1. Cost of ditch paving, anti-vortex wall, grate, concrete, reinforcing steel and fence enclosure to be included in the cost of inlet.
2. Inlet and anti-vortex wall to be Class I Concrete.
3. 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.
4. Channel section C 3 x 6 may be used as an alternate for the C 4 x 5.4 channel.
5. 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.
6. 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.
7. Inlet length (L) shall be set by the designer for the greater of either culvert requirement or inlet pool not to exceed 12" depth.
8. This inlet is to be used at locations having high flow rates, usually where an endwall could not be utilized without hazardous intake.

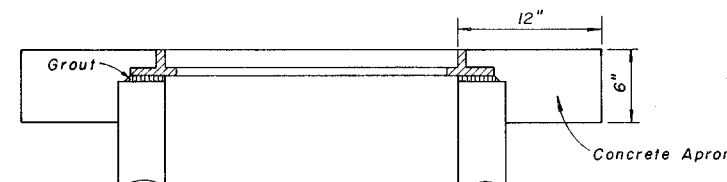
| | | | | | |
|--|-------|-------|--|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| DITCH BOTTOM INLET TYPE K | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | SM | 6/79 | <i>J. C. Smith</i> Deputy Design Engineer, Roadways | | |
| Checked by | JG | 6/79 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: | | | 81 | 1 of 1 | 235 |



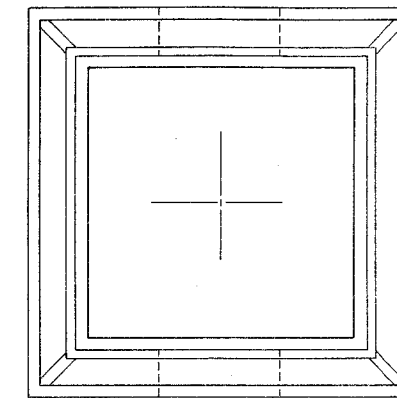
TYPICAL URBAN INSTALLATION



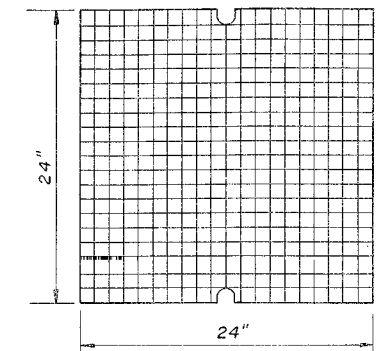
PERMISSIBLE TOP ADJUSTMENT



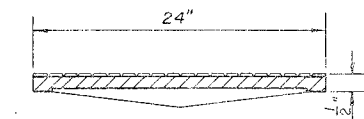
TYPICAL TOP AND APRON



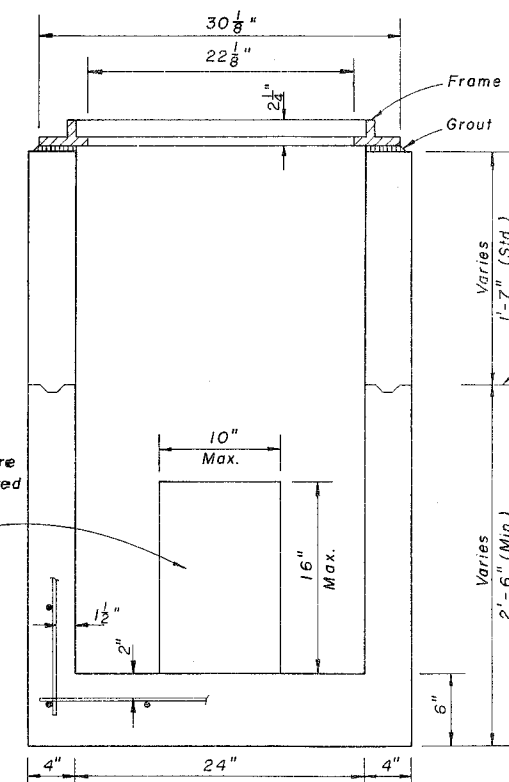
TOP VIEW



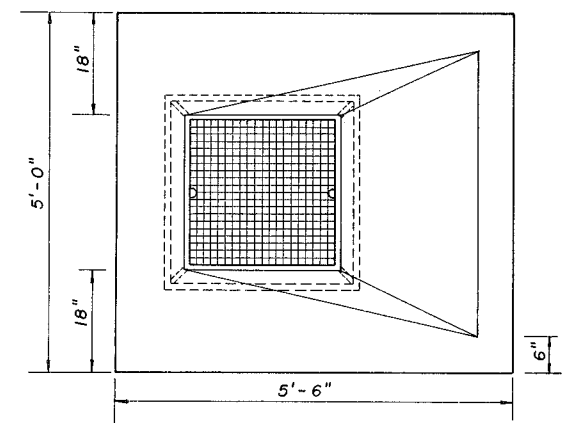
TOP VIEW



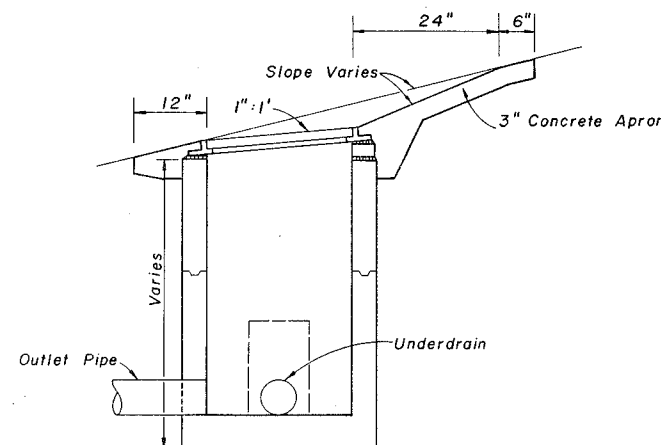
SECTION
CAST IRON COVER



SECTION
BOX AND FRAME



TOP VIEW



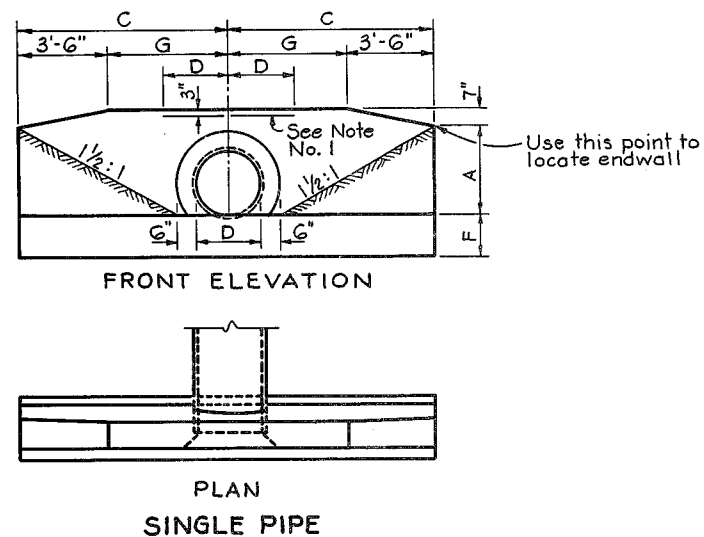
SECTION

TYPICAL INSTALLATION ON SLOPES
(Half Scale)

GENERAL NOTES

1. Cast iron cover and frame to be U.S. Foundry and Manufacturing Corporation No. 1610, Neenah Foundry Company R-6683-2 or equal. U.S. Foundry No. 1610 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 cost of inspection box.

| | | | | | |
|--|-----|------|--|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| UNDERDRAIN INSPECTION BOX | | | | | |
| Designed by | EGR | 8/79 | Approved By | | |
| Drawn by | HSD | 8/79 | <i>De. Bullard</i> Deputy Design Engineer, Roadways | | |
| Checked by | JVG | 8/79 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: | | | 81 | 1 of 1 | 245 |



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

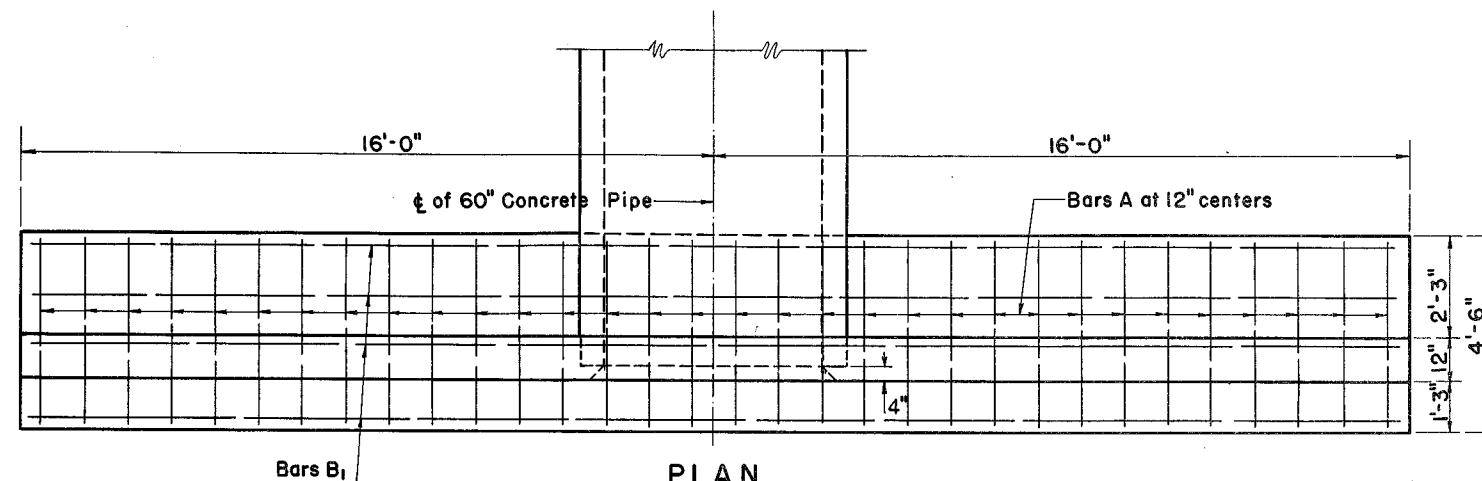
| TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR ROUND PIPE CULVERT ENDWALLS | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--------------------------------|---------|---------|---------|------------|--------|--------|--------|-------|-------|--------|---|---------------------|------|-------|---------------------|-------|-------|-----------------------|-------|-------|----------------------|-------|-----|---|
| 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 | 1.55 | 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 | 2.40 | 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 | 3.55 | 3.62 | 3.60 | 4.37 | 4.44 | 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 | 10.36 | 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" | |

| TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR METAL PIPE ARCH CULVERT ENDWALLS | | | | | | | | | | | | | | | | | | | | |
|---|------|--------------------------------|---------|---------|---------|------------|--------|---------|--------|-------|--------|--------|------|--|---------|---------|---------|------|------|-------------------------|
| CONSTRUCTION DATA | | | | | | | | | | | | | | | | | | | | |
| SPAN | RISE | AREA OF OPENING SQUARE FEET | | | | DIMENSIONS | | | | | | | | QUANTITIES IN ONE ENDWALL CU.YDS. OF CLASS I CONCRETE | | | | SPAN | RISE | EQUIV. ROUND PIPE |
| | | 1 PIPE | 2 PIPES | 3 PIPES | 4 PIPES | A | B | C | D | E | F | G | H | 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" | 1.75 | 2.91 | 2.93 | 3.36 | 28" | 20" | 24" | |
| 35" | 24" | 4.3 | 8.6 | 12.9 | 17.2 | 2'-8" | 1'-4" | 5'-11½" | 2'-0" | 1'-4" | 2'-5½" | 4'-0" | 2.54 | 3.03 | 3.72 | 4.40 | 35" | 24" | 30" | |
| 42" | 29" | 5.9 | 11.8 | 17.7 | 23.6 | 3'-1" | 1'-5" | 6'-10½" | 2'-1" | 1'-3" | 3'-4½" | 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 | 6.18 | 7.32 | 49" | 33" | 42" | |
| 57" | 38" | 10.6 | 21.2 | 31.8 | 42.4 | 3'-10" | 1'-7" | 8'-7½" | 2'-3" | 1'-7" | 5'-1½" | 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'-6½" | 2'-4" | 1'-8" | 6'-0½" | 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 | 12.45 | 14.85 | 71" | 47" | 60" | |

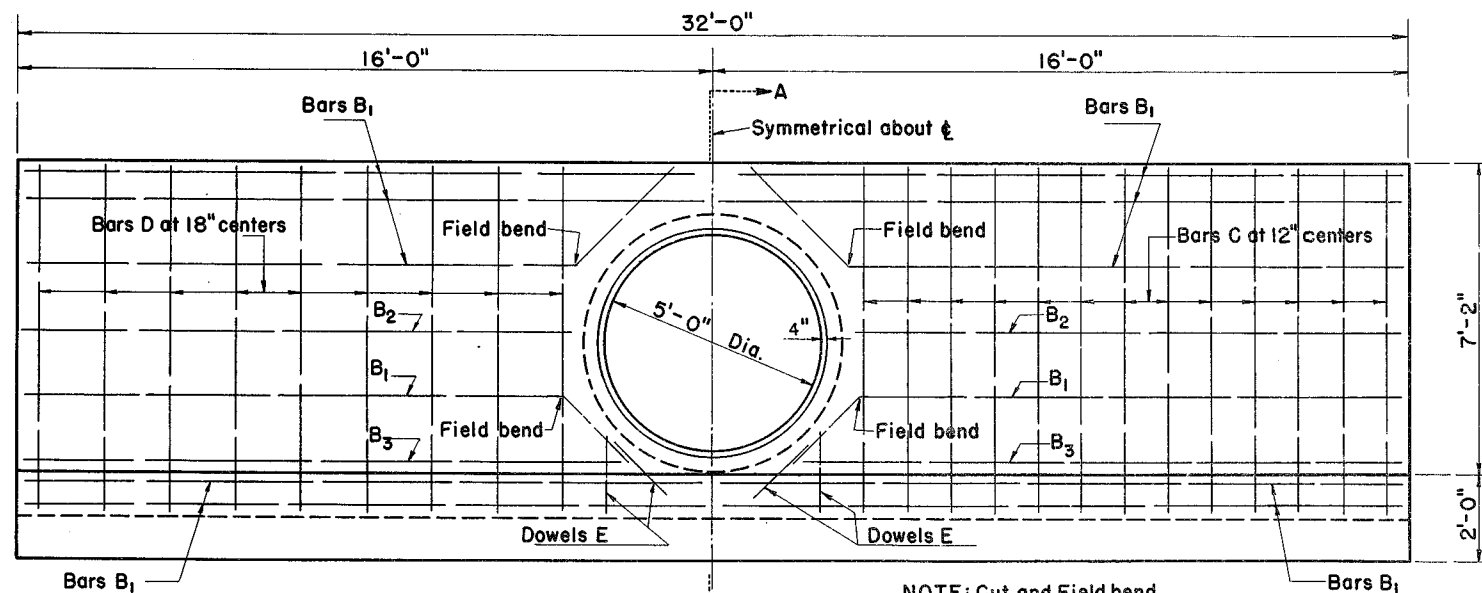
| TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR CONCRETE ELLIPTICAL PIPE CULVERT ENDWALLS | | | | | | | | | | | | | | | | | | | | |
|--|------|--------------------------------|---------|---------|---------|------------|--------|---------|-------|--------|--------|--------|--------|--|---------|---------|-----|------|------|-------------------------|
| CONSTRUCTION DATA | | | | | | | | | | | | | | | | | | | | |
| RISE | SPAN | AREA OF OPENING SQUARE FEET | | | | DIMENSIONS | | | | | | | | QUANTITIES IN ONE ENDWALL CYLINDS OF CLASS 1 CONCRETE | | | | 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'-1½" | 2'-0" | 1'-4" | 1'-7½" | 4'-2" | 1.83 | 2.53 | 3.22 | 3.88 | 19" | 30" | 24" | |
| 24" | 38" | 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" | 38" | 30" | |
| 29" | 45" | 7.13 | 14.26 | 21.39 | 28.52 | 3'-1" | 1'-6" | 7'-0" | 2'-2" | 1'-6" | 3'-6" | 6'-0" | 3.82 | 4.88 | 5.84 | 6.80 | 29" | 45" | 36" | |
| 34" | 53" | 9.82 | 19.64 | 29.46 | 39.28 | 3'-6" | 1'-7" | 7'-11½" | 2'-3" | 1'-7" | 4'-5½" | 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'-8½" | 2'-6" | 1'-10" | 6'-3½" | 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 | 16.89 | 21.47 | 25.97 | 53" | 83" | 66" | |
| 58" | 91" | 28.76 | 57.52 | 86.28 | 115.04 | 5'-6" | 2'-10" | 12'-6½" | 3'-6" | 2'-10" | 9'-0½" | 11'-4" | 16.46 | 22.26 | 28.06 | 33.85 | 58" | 91" | 72" | |

- ### GENERAL NOTES
1. Reinforcing Steel grade 40 or 60. Cost of bars shall be included in the contract unit price for concrete.
 2. For sodding around endwall see detail on Index N^o 281.
 3. Provide 20' transition from endwall to ditch slopes where sideslopes on outfall ditches are flatter than 1½:1.

| | | | |
|--|-----------|-----------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION | | | |
| ROAD DESIGN | | | |
| STRAIGHT CONCRETE ENDWALLS SINGLE AND MULTIPLE PIPE | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | HAB | 5/73 | <i>De Bosh</i> Deputy Design Engineer, Roadways |
| Checked by | LMF | 5/73 | |
| F.H.W.A. Approved: 8/30/77 | | | |
| Revision No. | Sheet No. | Index No. | |
| 81 | 1 of 1 | 250 | |



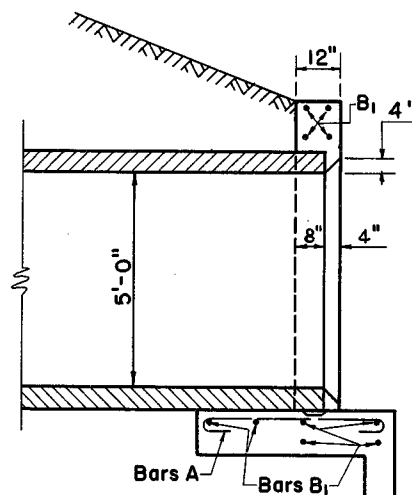
PLAN
(Showing Bar In Footing)



HALF ELEVATION
(Showing Bars In Front Face Of Wall)

NOTE: Cut and field bend
Bars B₁ as shown

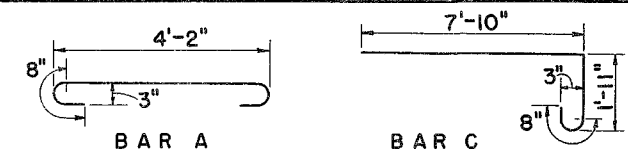
HALF ELEVATION
(Showing Bars In Back Face Of Wall)



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 |

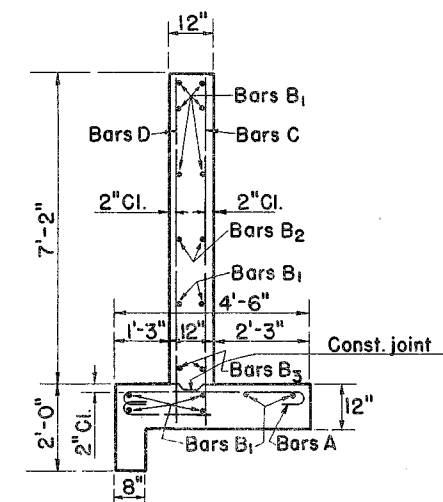
BENDING DIAGRAMS



NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES

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

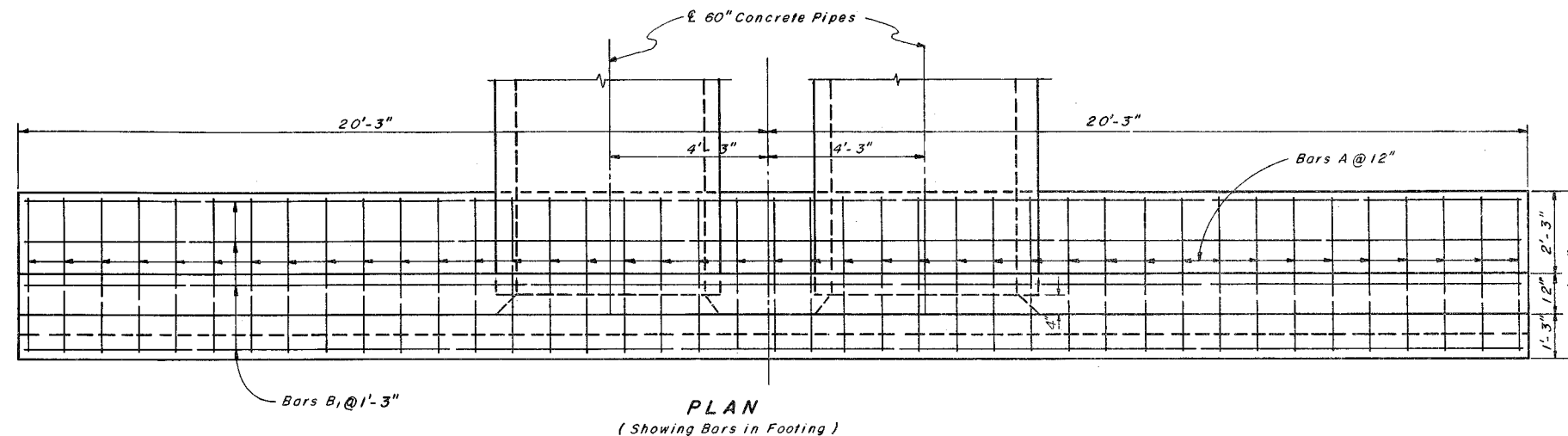


TYPICAL SECTION
THRU ENDWALL

GENERAL NOTES

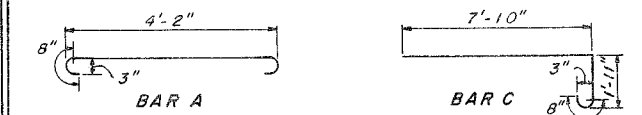
DESIGN SPECIFICATIONS: A.A.S.H.O., 1973
CHAMFER: All exposed edges and corners to be
chamfered $\frac{3}{4}$ " unless otherwise shown
REINFORCING STEEL: Grade 40 or 60
SODDING: See Index 281

| 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 | <i>Jc Bullard</i> Deputy Design Engineer, Roadways | | |
| Checked by | WHM | 11/49 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 3/20/75 | | | 81 | 1 of 2 | 251 |



| BILL OF REINFORCING STEEL | | | | | |
|---------------------------|------|------------|--------|-----------------|------------|
| MARK | SIZE | No. REQ'D. | LENGTH | LOCATION | BENDING |
| A | 4 | 41 | 5'-3" | Footings | Bend |
| B1 | 4 | 10 | 40'-2" | Footings & Wall | Straight |
| B2 | 4 | 4 | 12'-6" | Wall | Straight |
| B3 | 4 | 4 | 13'-9" | Wall | Straight |
| B4 | 4 | 4 | 6'-0" | Wall | Field Bend |
| B5 | 4 | 2 | 2'-2" | Wall | Straight |
| B6 | 4 | 8 | 15'-0" | Wall | Field Bend |
| C | 4 | 29 | 10'-3" | Footings & Wall | Bend |
| D | 4 | 20 | 7'-10" | Footings & Wall | Straight |
| E | 4 | 16 | 1'-8" | Footings & Wall | Straight |

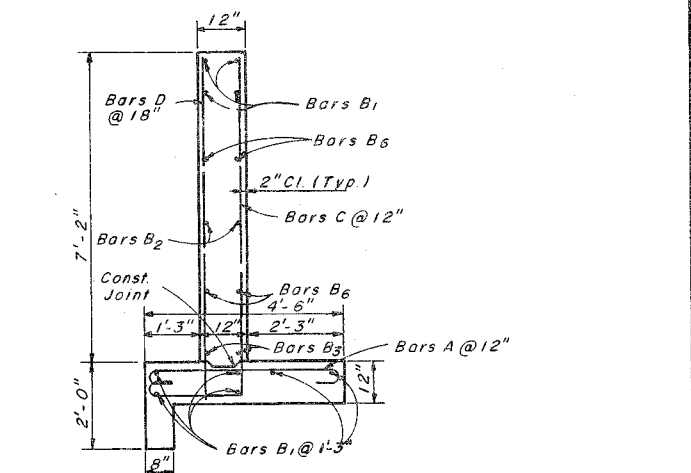
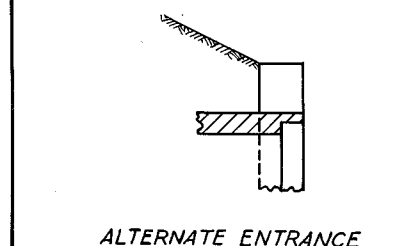
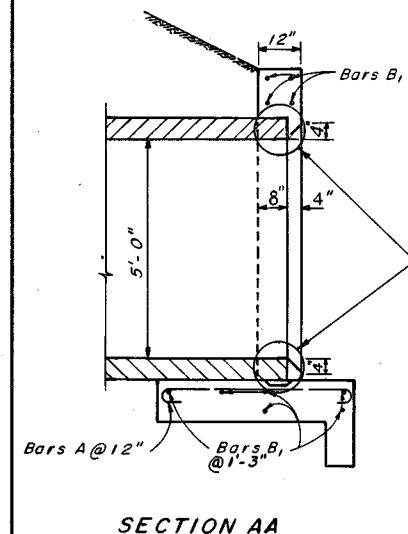
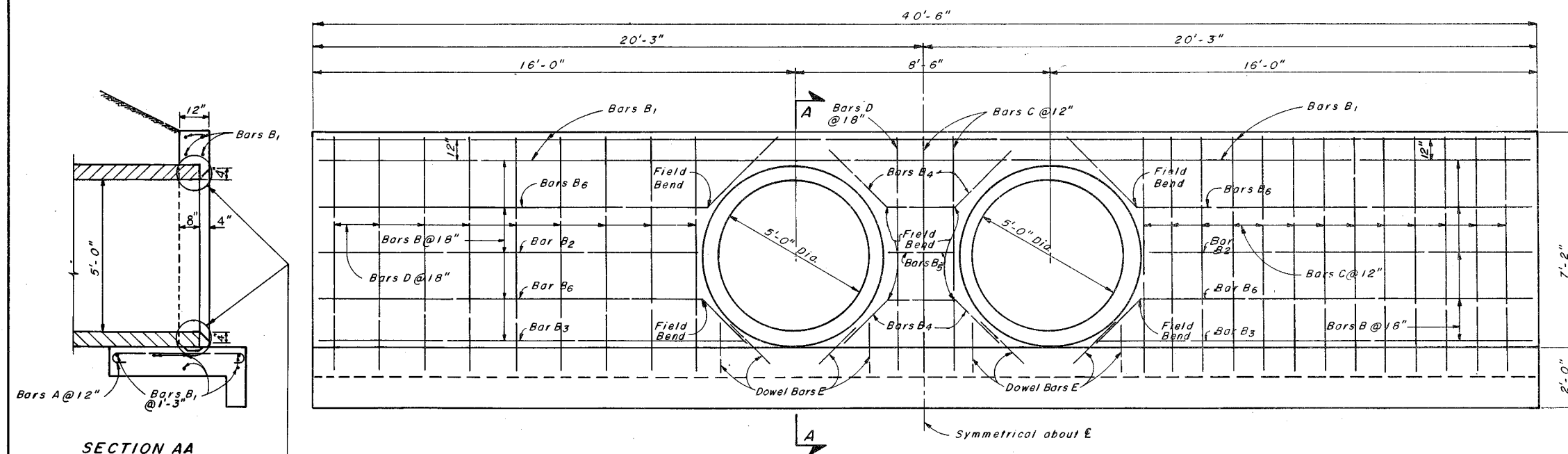
BENDING DIAGRAMS



NOTE: All Bar dimensions are out to out.

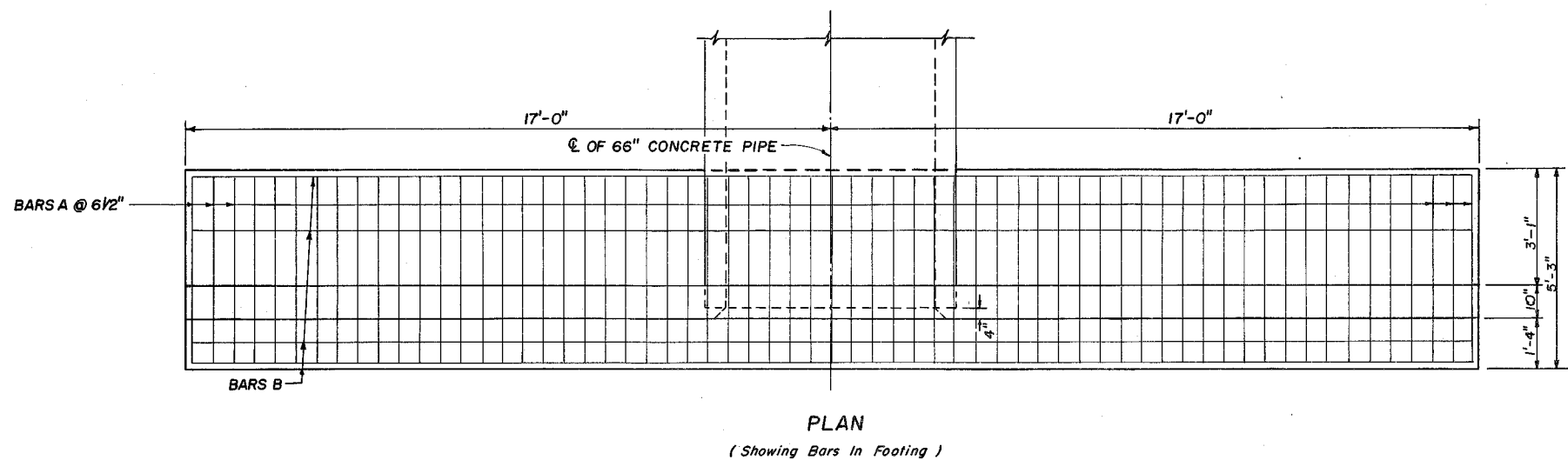
ESTIMATED QUANTITIES

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



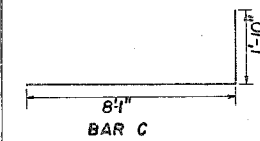
GENERAL NOTES
 DESIGN SPECIFICATIONS: A.A.S.H.O. 1973
 CHAMFER: All Exposed Edges and Corners to be Chamfered 3/4" unless otherwise shown.
 MAXIMUM WORKING STRESSES:
 Class II Concrete 1360 PSI
 Reinforcing Steel 20,000 PSI
 REINFORCING STEEL: Grade 40 or 60
 SODDING: See Index 281

| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
|---|-------|-------|-----------------|-----------|-----------|
| STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 60" CONCRETE PIPE | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | TWJ | 11/49 | Jc. [Signature] | | |
| Checked by | WHM | 11/49 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 3/20/75 | | | 81 | 2 of 2 | 251 |



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

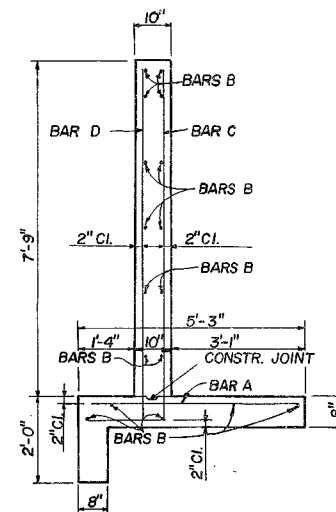
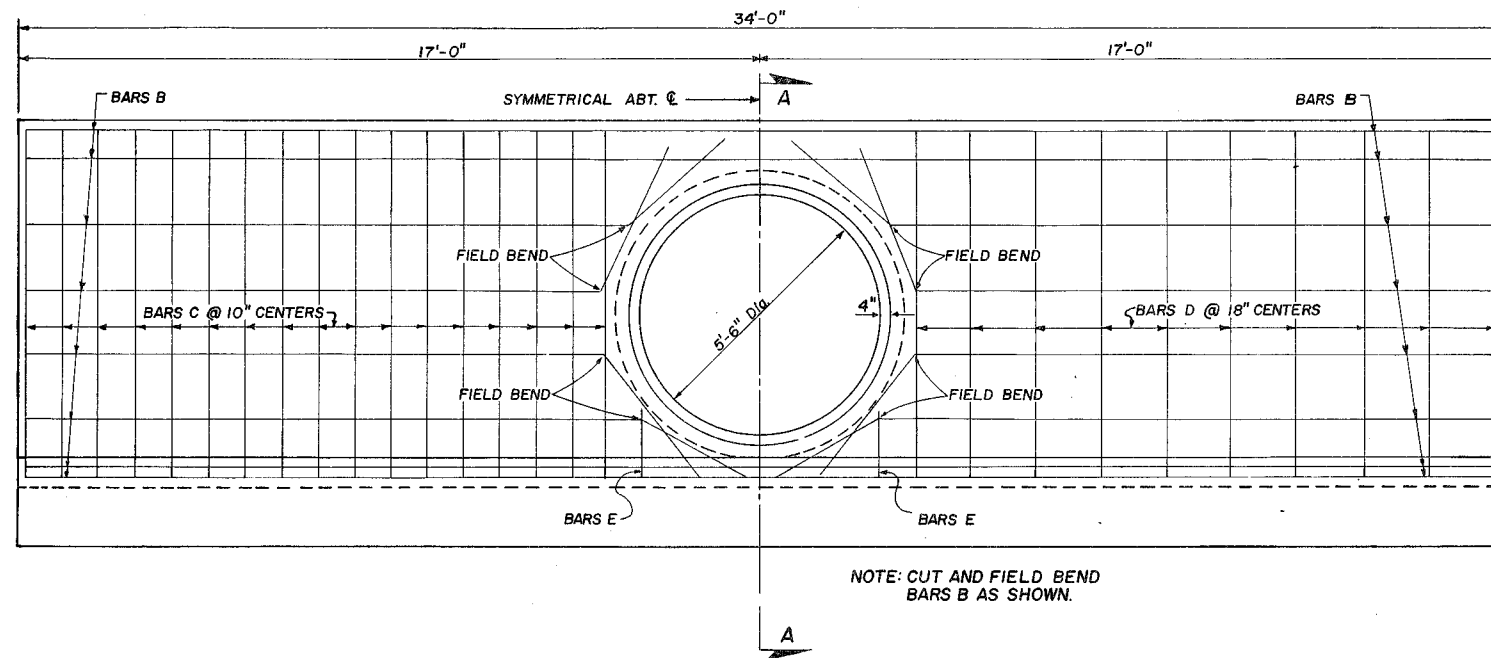
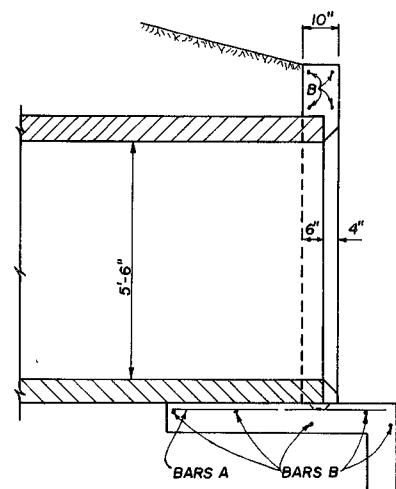
BENDING DIAGRAMS



NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT

ESTIMATED QUANTITIES

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



HALF ELEVATION
(Showing Bars In Back Face Of Wall)

HALF ELEVATION
(Showing Bars In Front Face Of Wall)

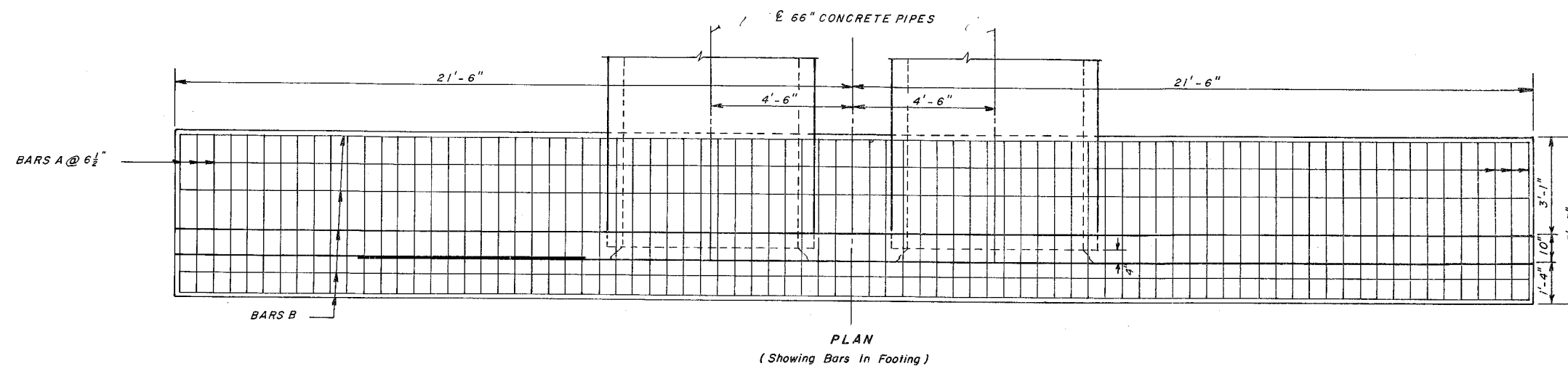
GENERAL NOTES

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

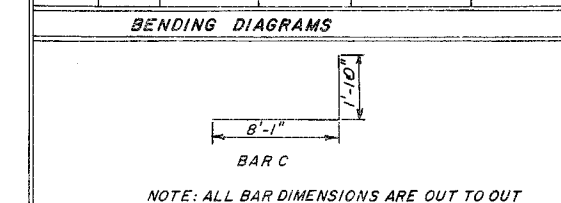
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 66" CONCRETE PIPE

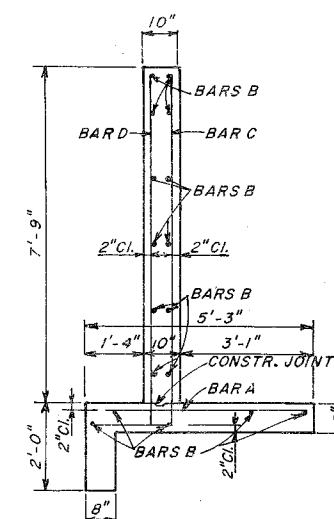
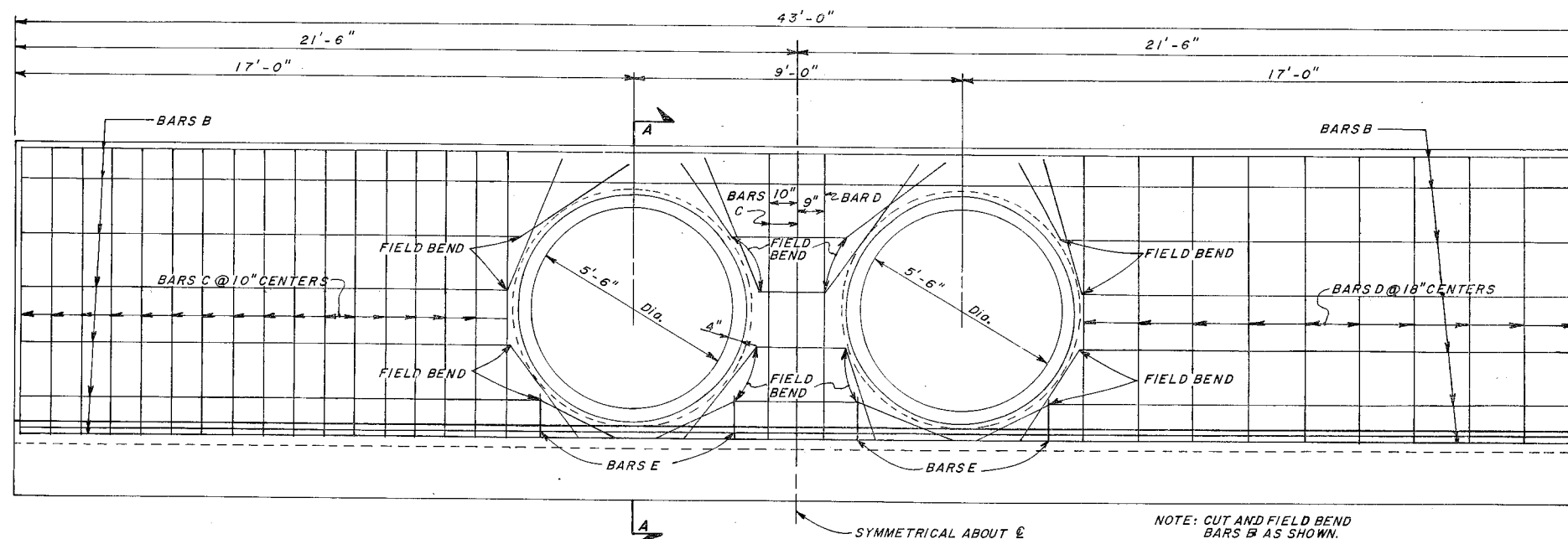
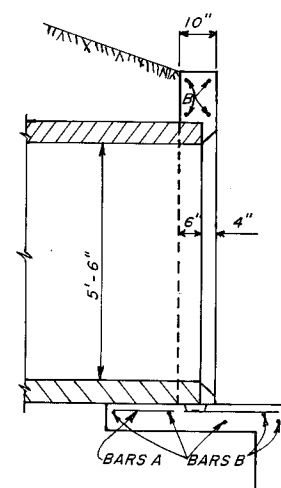
| Names | Dates | Approved By | Index No. |
|----------------------------|-------|--|-----------|
| Designed by JLW | 3/54 | <i>De Puel</i> Deputy Design Engineer, Roadways | |
| Drawn by | | | |
| Checked by RCB | 3/54 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 10/7/80 | 81 | 1 of 2 | 252 |



| 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 |

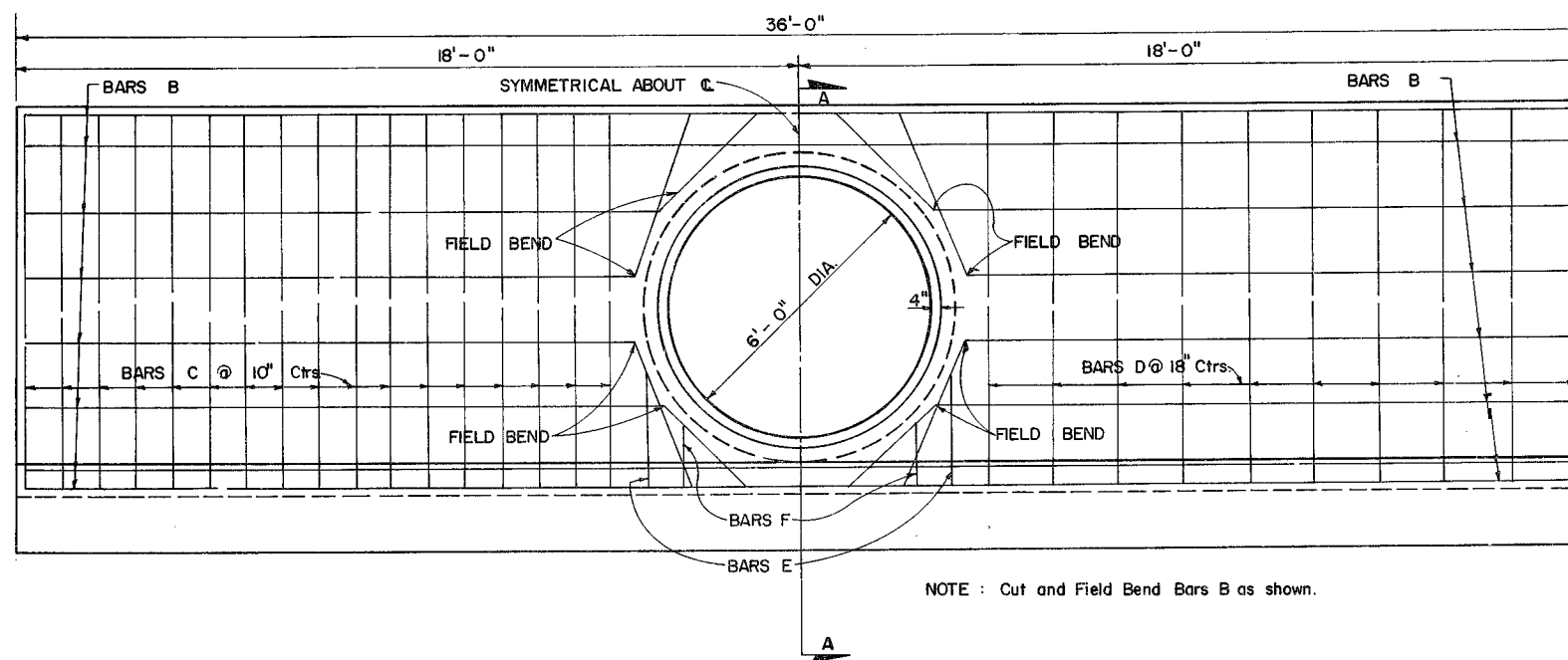
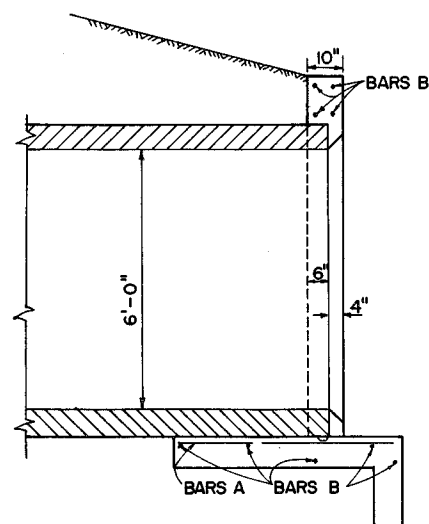
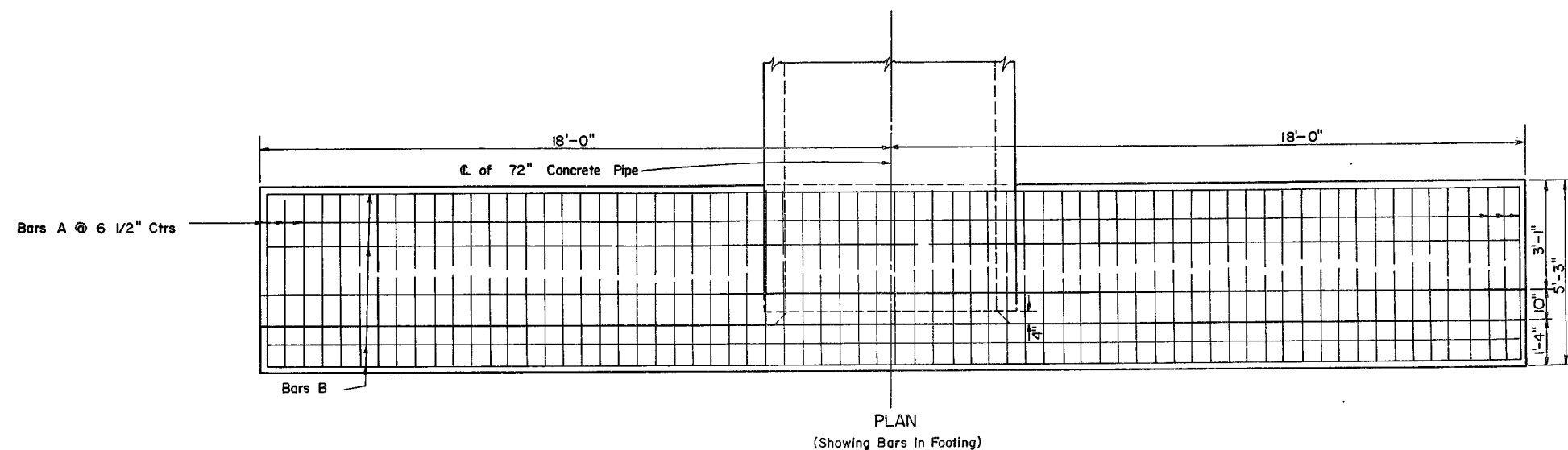


| ESTIMATED QUANTITIES | | |
|----------------------|-------|----------|
| ITEM | UNIT | QUANTITY |
| CONCRETE, CLASS II | C. Y. | 15.35 |
| REINFORCING STEEL | L. B. | 1,406 |



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 $\frac{3}{4}$ " 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 | Names | Dates | Approved By | | |
| Drawn by | JSP | 11/79 | <i>Dr. Bill</i> Deputy Design Engineer, Roadways | | |
| Checked by | FWT | 11/79 | | | |
| Revision No. | | | Sheet No. | Index No. | |
| FHWA Approved: 10/7/80 | | | 81 | 2 of 2 | 252 |



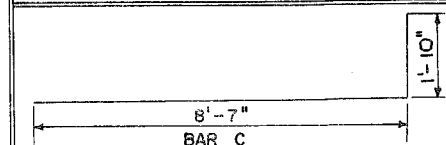
HALF ELEVATION
(Showing Bars In Back Face Of Wall)

HALF ELEVATION
(Showing Bars In Front Face Of Wall)

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

| BILL OF REINFORCING STEEL | | | | | |
|---------------------------|------|-----------|----------|----------------|----------|
| MARK | SIZE | No. Req'd | LENGTH | LOCATION | BENDING |
| A | 5 | 68 | 4' - 11" | FOOTING | 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 | " |

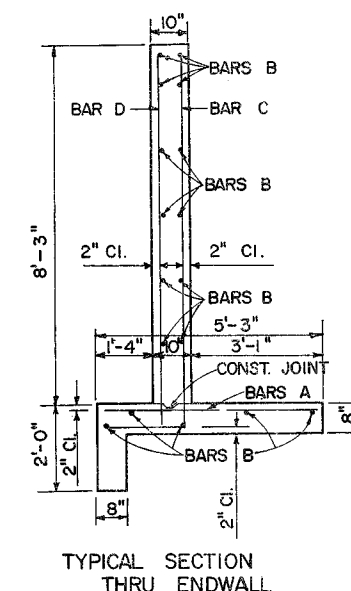
BENDING DIAGRAMS



NOTE: All bar dimensions are out to out.

ESTIMATED QUANTITIES

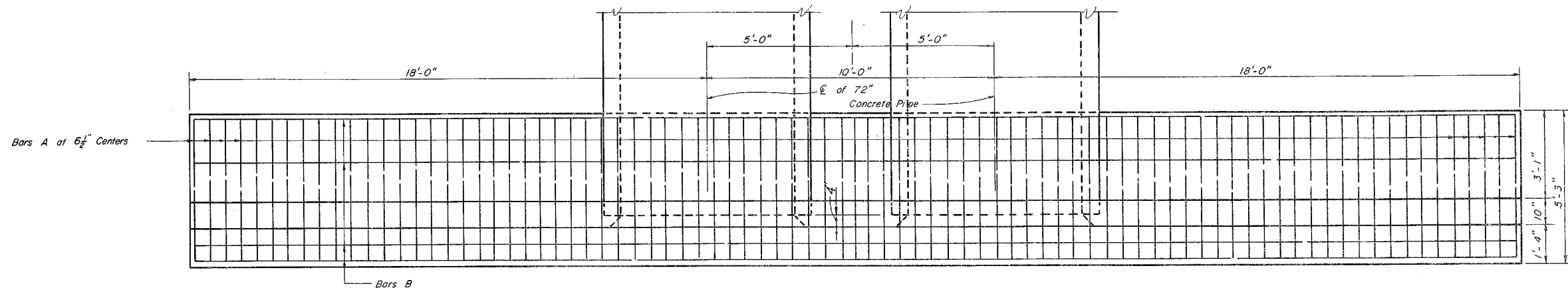
| ITEMS | UNIT | QUANTITY |
|-------------------|---------|----------|
| CONCRETE CLASS II | CU. YD. | 13.76 |
| REINFORCING STEEL | LB. | 1249 |



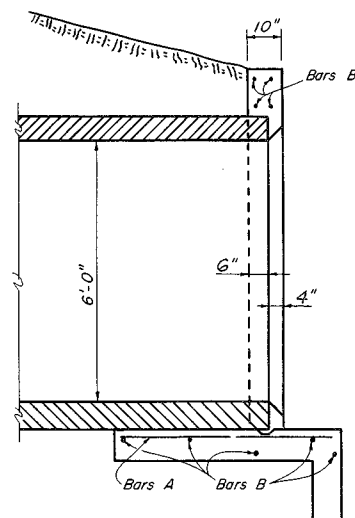
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 72" CONCRETE PIPE

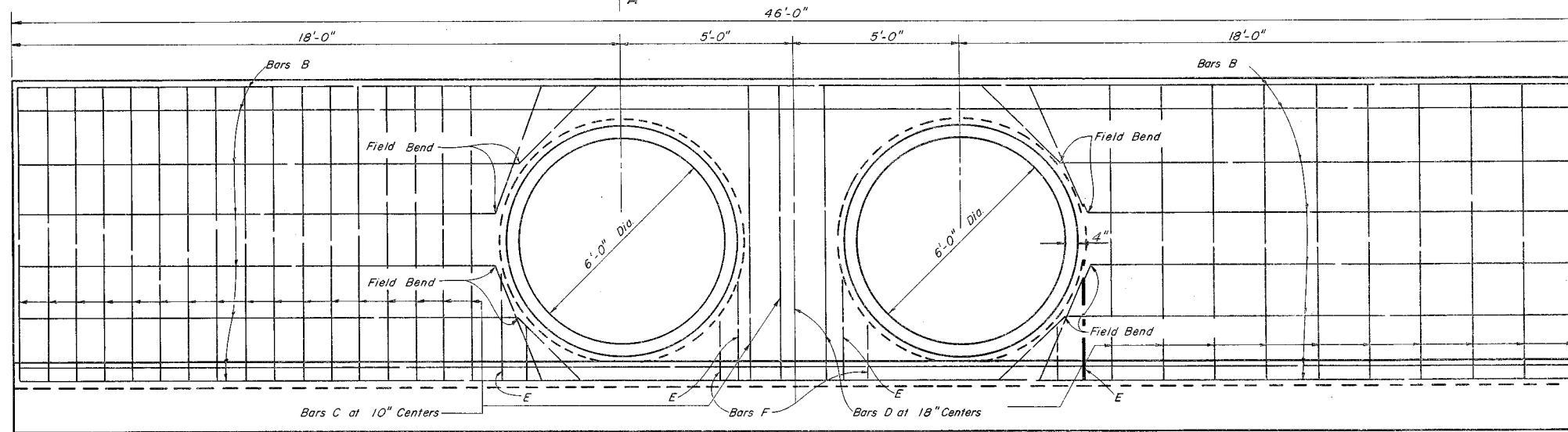
| Names | Dates | Approved By | Index No. |
|----------------------------|-------|--|------------------|
| Designed by EVC | 10/55 | <i>J. C. Smith</i> Deputy Design Engineer, Roadways | 253 |
| Drawn by | | | |
| Checked by WHW | 10/55 | Revision No. 81 | Sheet No. 1 of 2 |
| F.H.W.A. Approved: 3/20/75 | | | |



PLAN
(Showing Bars In Footing)



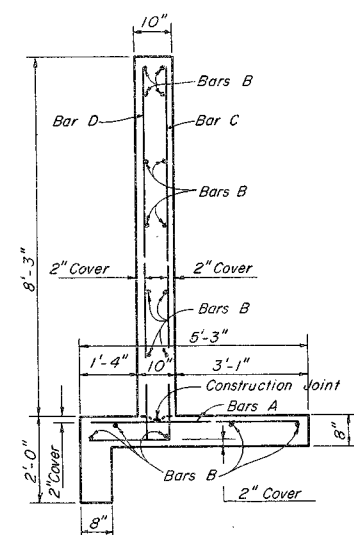
SECTION A A



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)

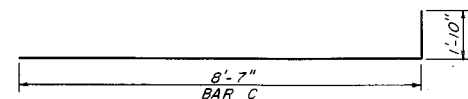


TYPICAL SECTION
THRU ENDWALL

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 |

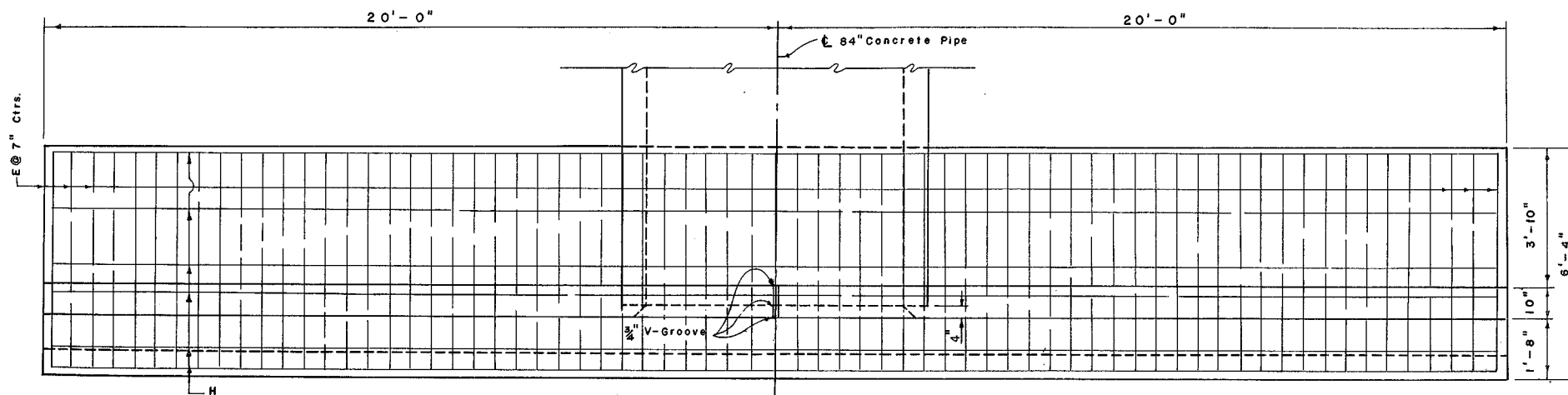
GENERAL NOTES

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

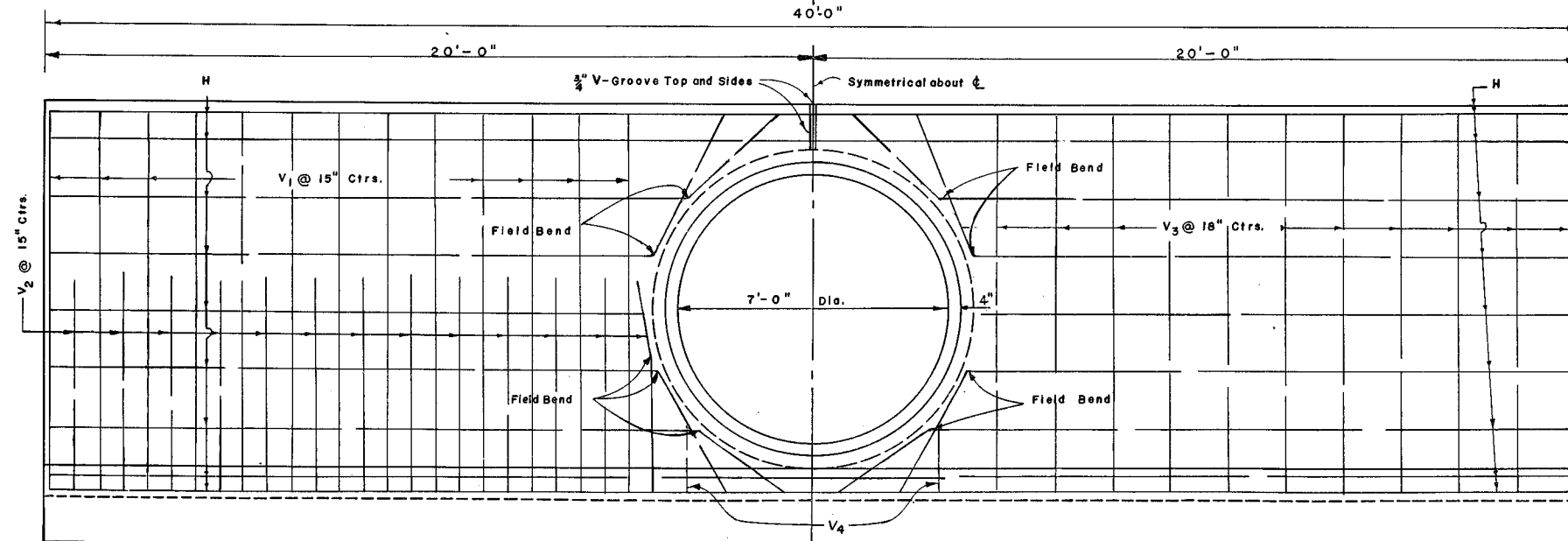
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 72" CONCRETE PIPE

| Names | Dates | Approved By |
|---------------------------|-------|---|
| Designed by EVC | 10/55 | <i>J. C. Arnold</i> Deputy Design Engineer, Roadways |
| Drawn by | | |
| Checked by WHW | 10/55 | |
| F.H.W.A. Approved: 7/7/75 | 81 | 2 of 2 |
| | | 253 |



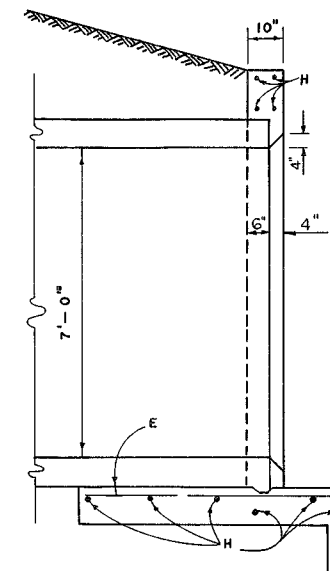
PLAN
Showing Bars in Footing



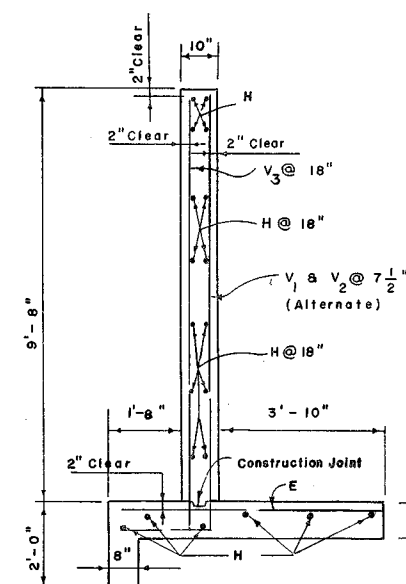
HALF ELEVATION
Showing Bars in Back Face of Wall

HALF ELEVATION
Showing Bars in Front Face of Wall

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



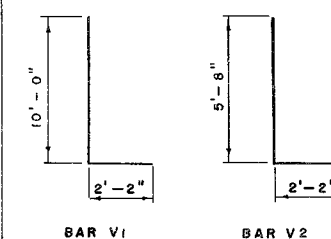
SECTION A A



TYPICAL SECTION THRU
ENDWALL

| 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.

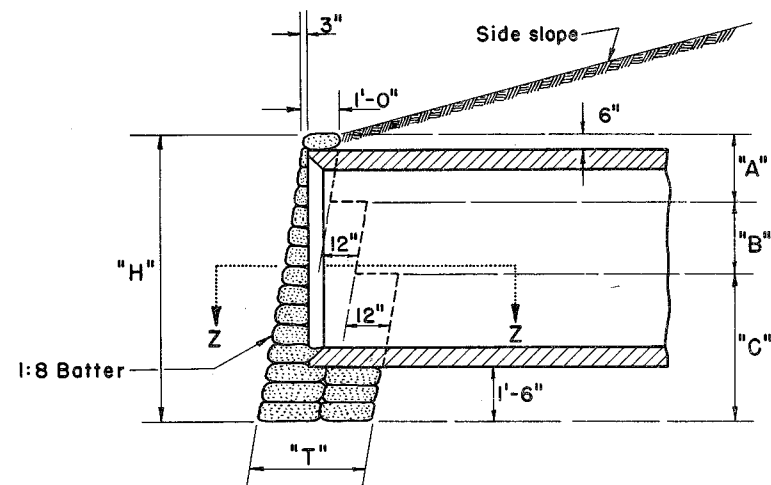
ESTIMATED QUANTITIES

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

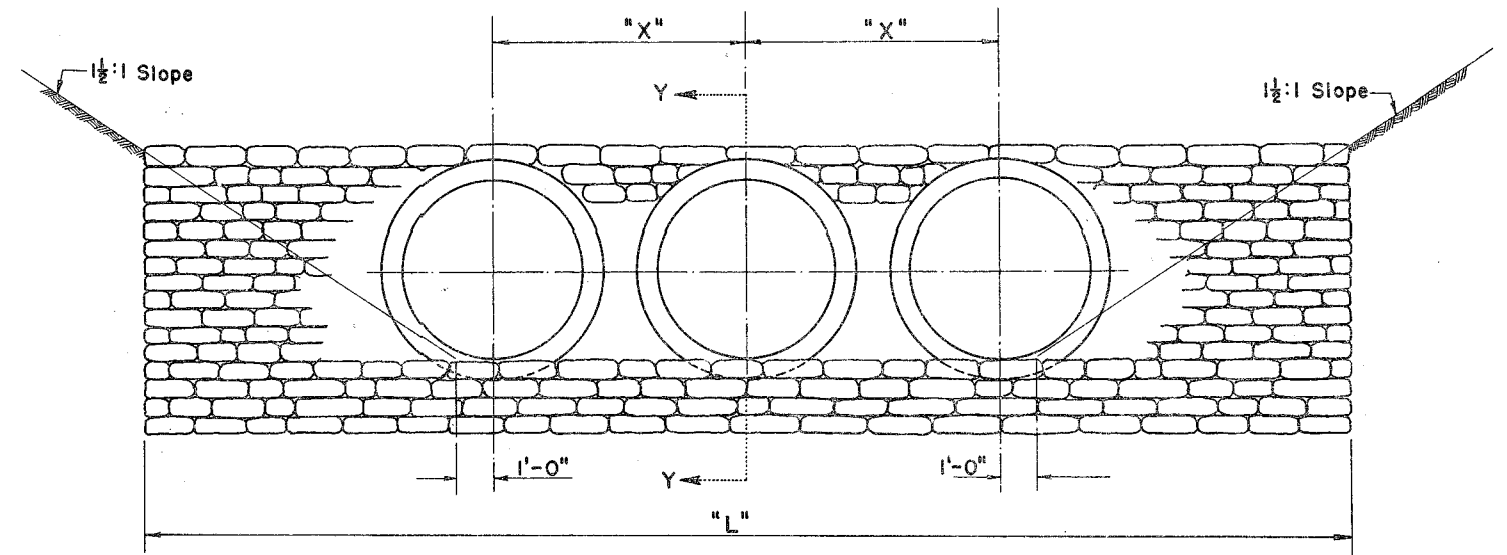
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN
**STRAIGHT CONCRETE ENDWALL
SINGLE 84" CONCRETE PIPE**

| Names | Dates | Approved By |
|----------------------------|----------|-------------|
| Designed by | | |
| Drawn by | WHW 7/58 | |
| Checked by | HCG 7/58 | |
| F.H.W.A. Approved: 3/20/75 | 81 | 1 of 1 |

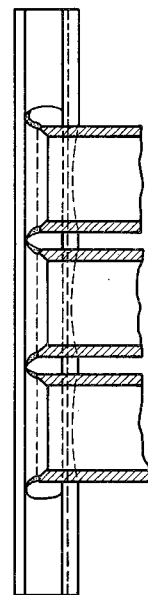
255



SECTION Y-Y



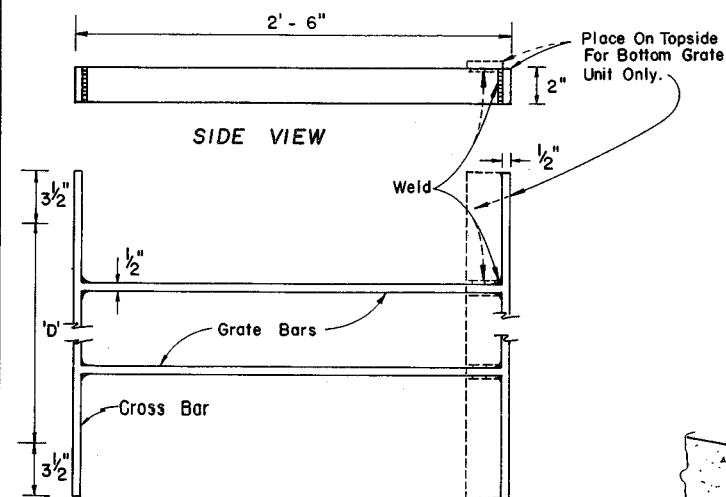
FRONT ELEVATION



SECTION Z-Z

| TABLE OF DIMENSIONS | | | | | | | QUANTITIES FOR ONE ENDWALL | | | | | | | |
|---------------------|--------|-------|--------|-------|--------|--------|----------------------------|-----------------|-------------------|-----------------|---------------------|-----------------|--------------------|-----------------|
| SIZE OF PIPE | 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 | | | | | | |

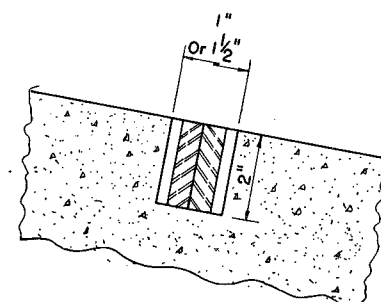
| | | | | | |
|--|-------|-------|----------------------------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| STRAIGHT SAND-CEMENT ENDWALLS | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | EH | 5/48 | Deputy Design Engineer, Roadways | | |
| Checked by | HB | 5/48 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 12/6/76 | | | 80 | 1 of 1 | 258 |



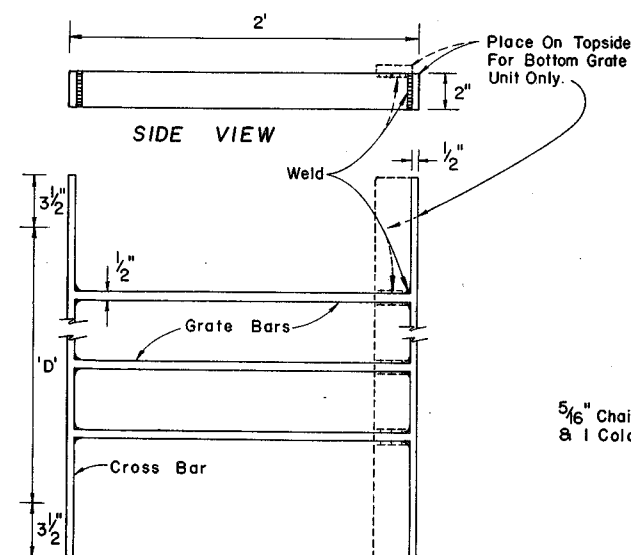
TOP VIEW
GRATE TYPE NO. 1

| Pipe Size | Grate Bars Req'd. | Grate Wt. |
|-----------|-------------------|-----------|
| 15" | 2 | 26.93 |
| 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".



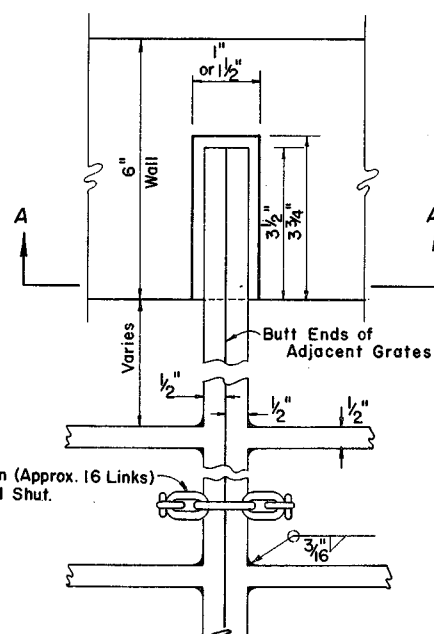
SECTION AA



TOP VIEW
GRATE TYPE NO. 2

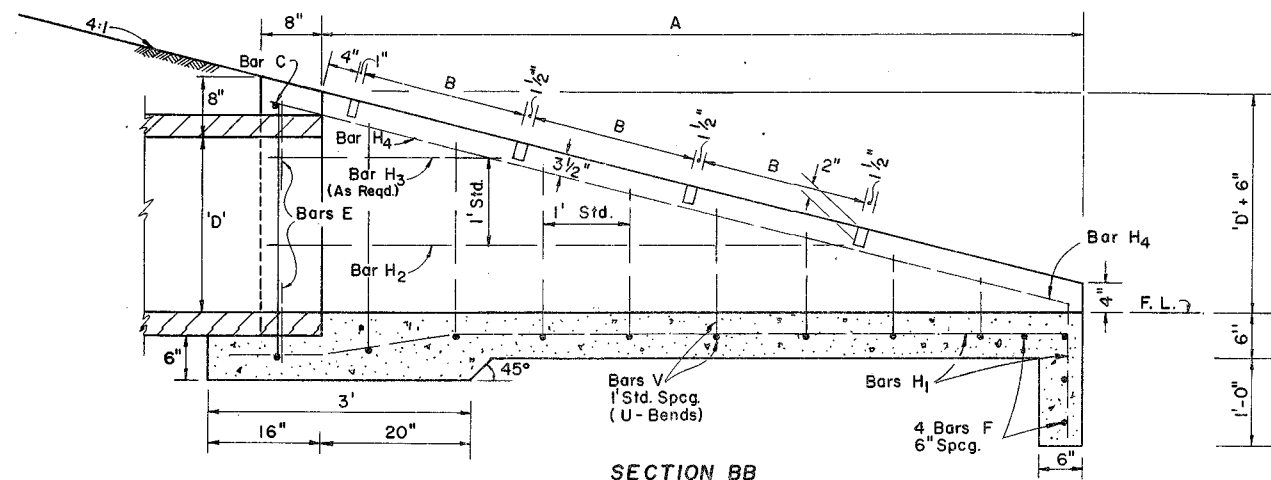
| Pipe Size | Grate Bars Req'd. | Grate Wt. |
|-----------|-------------------|-----------|
| 18" | 3 | 33.69 |
| 24" | 4 | 43.63 |
| 30" | 5 | 53.55 |

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

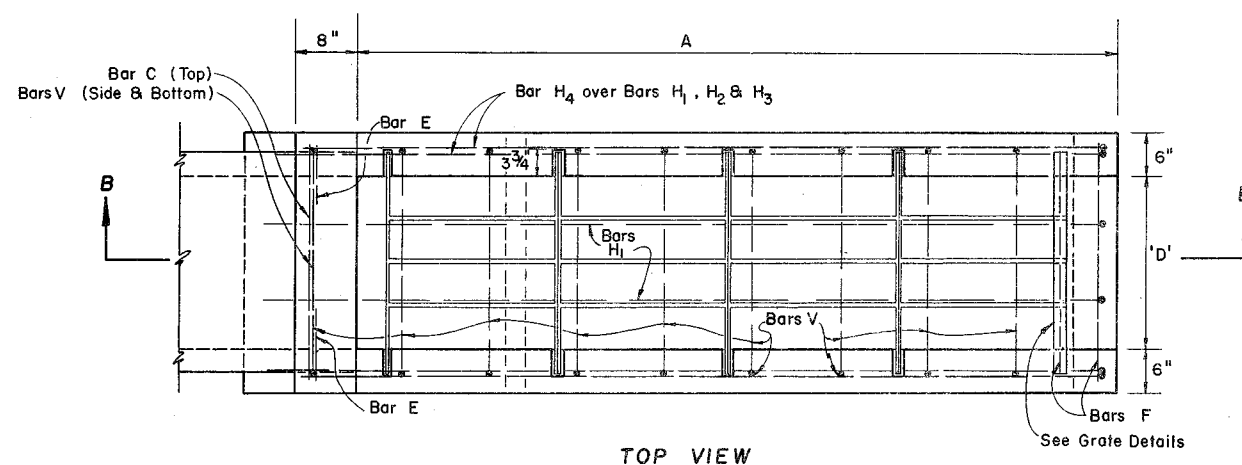


TOP VIEW

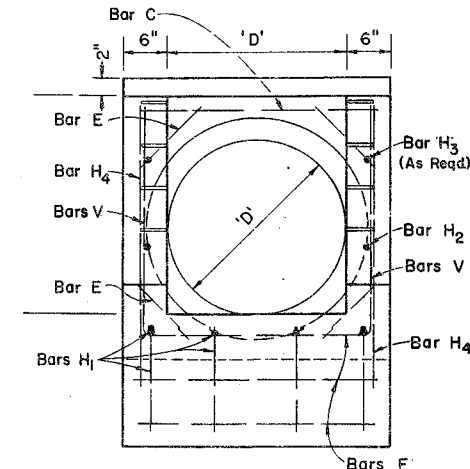
GRATE, SEAT, WELD & CHAIN DETAIL



SECTION BB



TOP VIEW



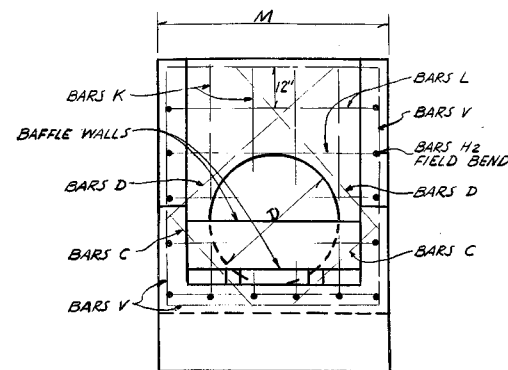
END VIEW

| TABLE OF DIMENSIONS AND QUANTITIES | | | | | | | | | |
|------------------------------------|---------------|--------|--------|--------------------|---------------------|-------------------------|------------------|------------------------|--------------|
| RATE OF SLOPE | PIPE SIZE 'D' | A | B | CONC. CLASS I (CY) | REINF. STEEL (Lbs.) | NUMBER OF GRATES REQ'D. | | TOTAL GRATE WT. (Lbs.) | SODDING (SY) |
| | | | | | | GRATE TYPE NO. 1 | GRATE TYPE NO. 2 | | |
| 4:1 | 15" | 5.67' | 2.38' | 0.35 | 56 | 0 | 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

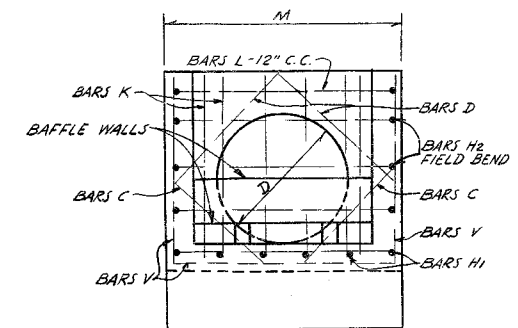
- This endwall is to be used only in the clear recovery area for the drainage of medians and other areas having low design velocities and negligible debris.
- Reinforcing Steel: All bars are size #4. Spacings shown are center to center. Laps to be 12" minimum. Clearance is 2" except as noted.
Square 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 A.S.T.M. C 478 (4,000 P.S.I.) 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 | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | EGR | 6/77 | <i>De. [Signature]</i> |
| Checked by | HKH | 6/77 | Deputy Design Engineer, Roadways |
| F.H.W.A. Approved: 7/15/77 | Revision No. | Sheet No. | Index No. |
| 81 | 1 of 1 | 260 | |

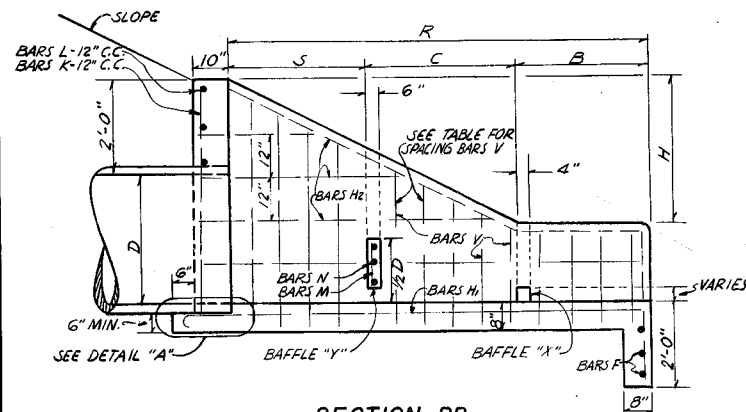


END VIEW

| 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 |
| | 30" | 4.91 | 5'-9" | 2'-10 1/2" | 4'-10" | | | | 1.88 | 146 |
| 4:1 | 15" | 1.23 | 7'-4" | 1'-10" | 3'-7" | 2'-6" | 2'-6" | 2'-4" | 1.54 | 95 |
| | 18" | 1.77 | 8'-4" | 2'-1" | 3'-10" | 2'-10" | 2'-10" | 2'-8" | 1.84 | 109 |
| | 24" | 3.14 | 10'-4" | 2'-7" | 4'-4" | 3'-6" | 3'-6" | 3'-4" | 2.53 | 139 |
| | 30" | 4.91 | 12'-4" | 3'-1" | 4'-10" | 4'-2" | 4'-2" | 4'-0" | 3.34 | 236 |
| 6:1 | 15" | 1.23 | 11'-6" | 1'-11" | 3'-7" | 3'-10" | 3'-10" | 3'-10" | 2.19 | 138 |
| | 18" | 1.77 | 13'-0" | 2'-2" | 3'-10" | 4'-4" | 4'-4" | 4'-4" | 2.63 | 145 |
| | 24" | 3.14 | 16'-0" | 2'-8" | 4'-4" | 5'-4" | 5'-4" | 5'-4" | 3.59 | 227 |
| | 30" | 4.91 | 19'-0" | 3'-2" | 4'-10" | 6'-4" | 6'-4" | 6'-4" | 4.81 | 333 |

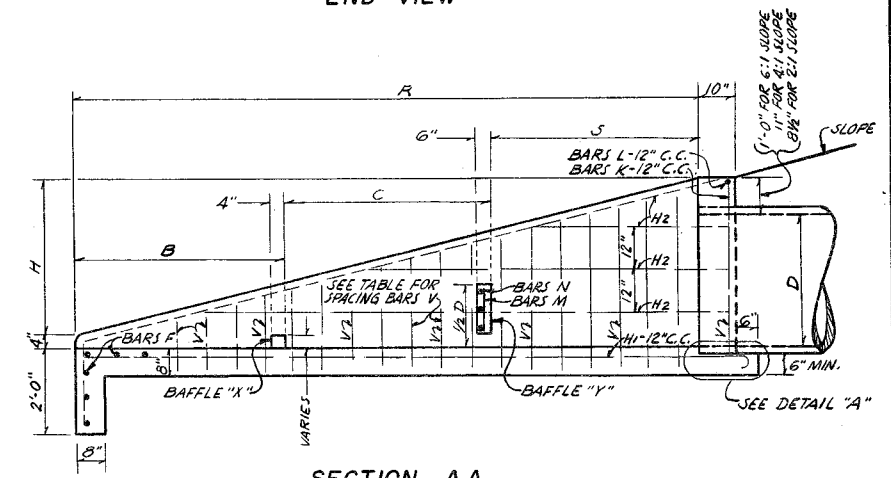


END VIEW

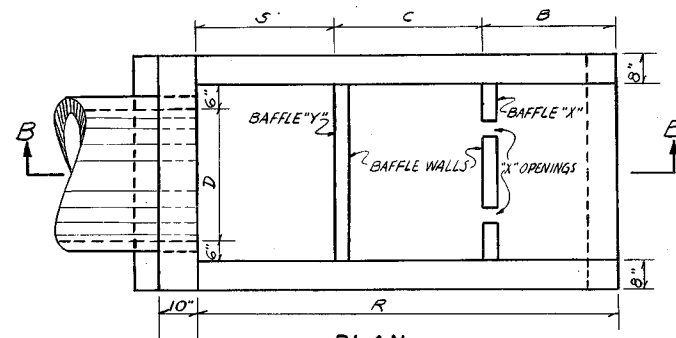


SECTION BB

| 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 | | BAR M | BAR N | | |
| 15" | 4" | 4" | 4" | 4" | 3-#4 | 1-#4 | 0.03 | 4 |
| 18" | 4" | 4" | 4" | 4" | 4-#4 | 2-#4 | 0.04 | 8 |
| 24" | 5" | 5" | 4" | 4" | 5-#4 | 3-#4 | 0.05 | 12 |
| 30" | 5" | 5" | 4" | 4" | 6-#4 | 4-#4 | 0.07 | 18 |



SECTION AA



PLAN

ENDWALL WITH BAFFLES FOR 2:1 SLOPE

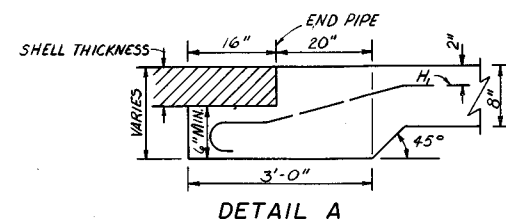
| PIPE SIZE "D" | AREA OF OPENING SQ. FT. | R | H | M | S | B | C | X BAFFLE OPENINGS | | | Y BAFFLE OPENING VERTICAL CLEAR. | Y BAFFLE REINFORCING STEEL | | CONCRETE CLASS I CU. YD. | REINFORCING STEEL LBS. |
|---------------|-------------------------|-------|-----------|--------|-------|-------|-------|-------------------|--------|--------|----------------------------------|----------------------------|-------|--------------------------|------------------------|
| | | | | | | | | WIDTH | HEIGHT | LENGTH | | BAR M | BAR 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 | 99 |
| 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 | 142 |
| 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" | 4.91 | 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

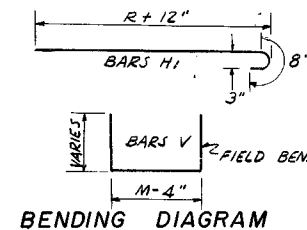
1. BAFFLES TO BE CONSTRUCTED ONLY AT LOCATIONS SPECIFIED IN THE PLANS.
2. WHEN STEEL GRATING IS REQUIRED ON ENDWALL SEE SHEET NO. 2 FOR MOUNTING DETAILS.
3. FOR SODDING AROUND ENDWALL SEE INDEX NO. 281.
4. REINFORCING - NO. 4 BARS 2" CLEARANCE EXCEPT AS NOTED.

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



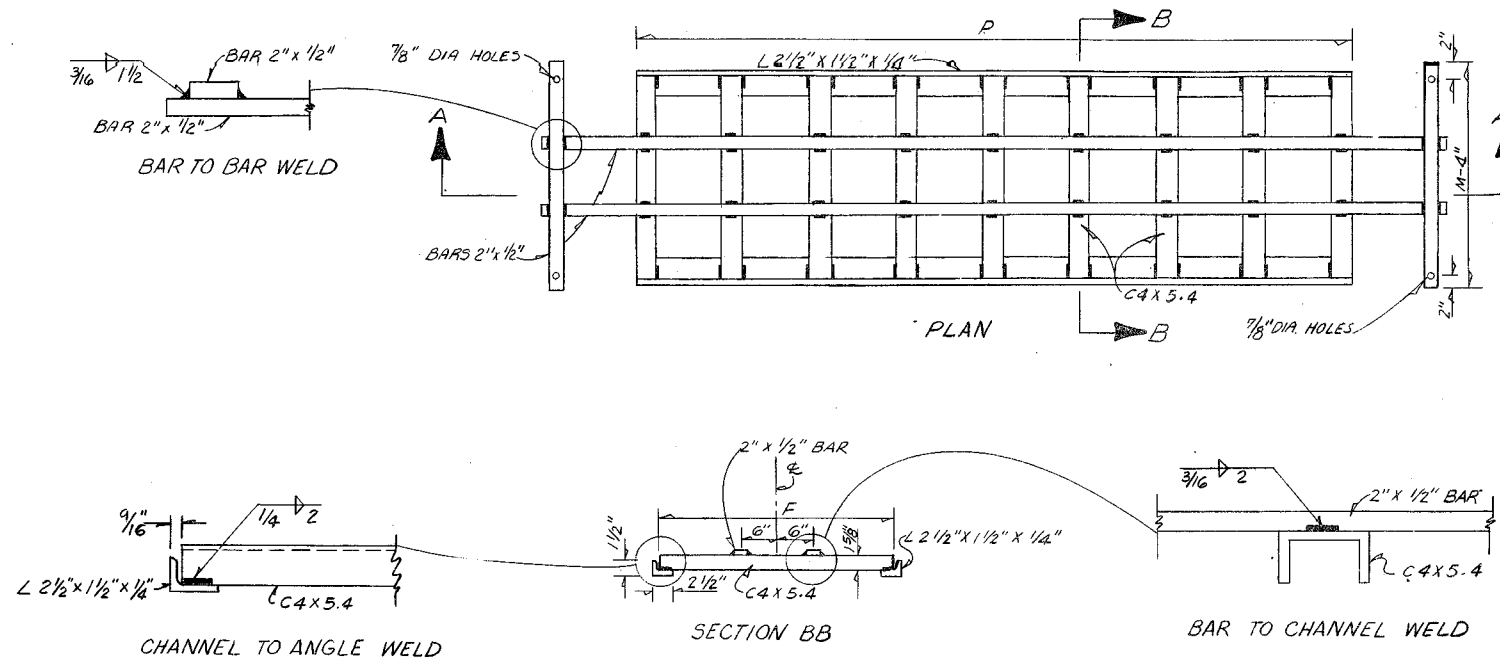
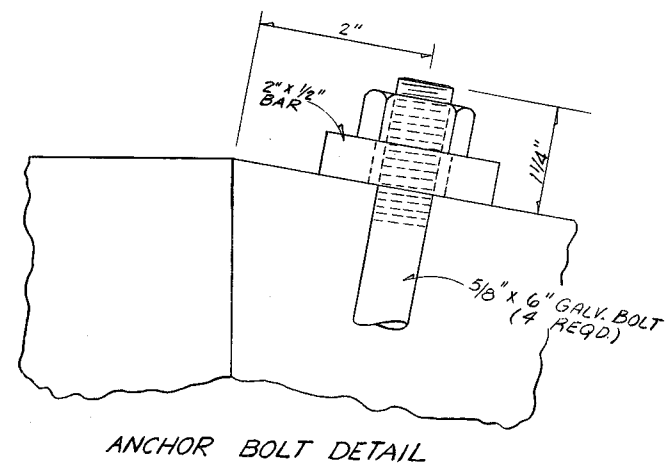
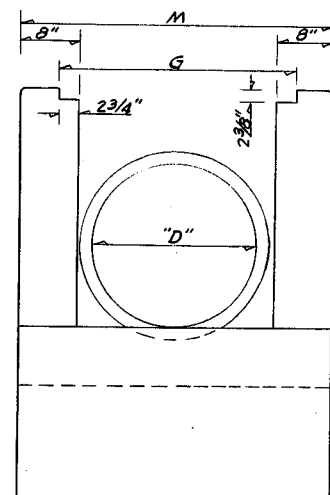
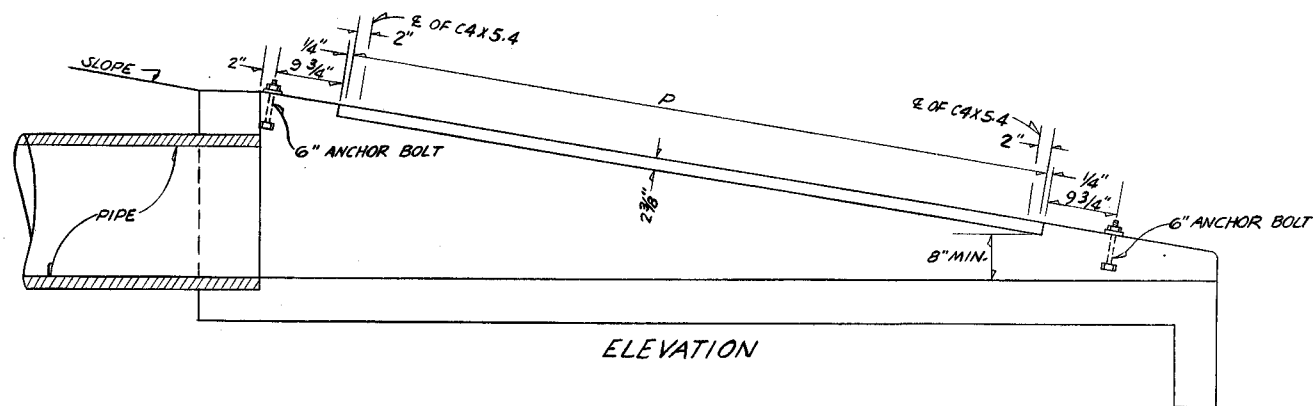
DETAIL A

| PIPE DIAMETER | G. 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 | De Ball Deputy Design Engineer, Roadways | | |
| Checked by | | | Revision No. | Sheet No. | Index No. |
| F.H.W.A. | Approved: 3/20/75 | 81 | 1 of 2 | 261 | |



MOUNTING FOR STEEL GRATE

STEEL GRATING USE CRITERIA

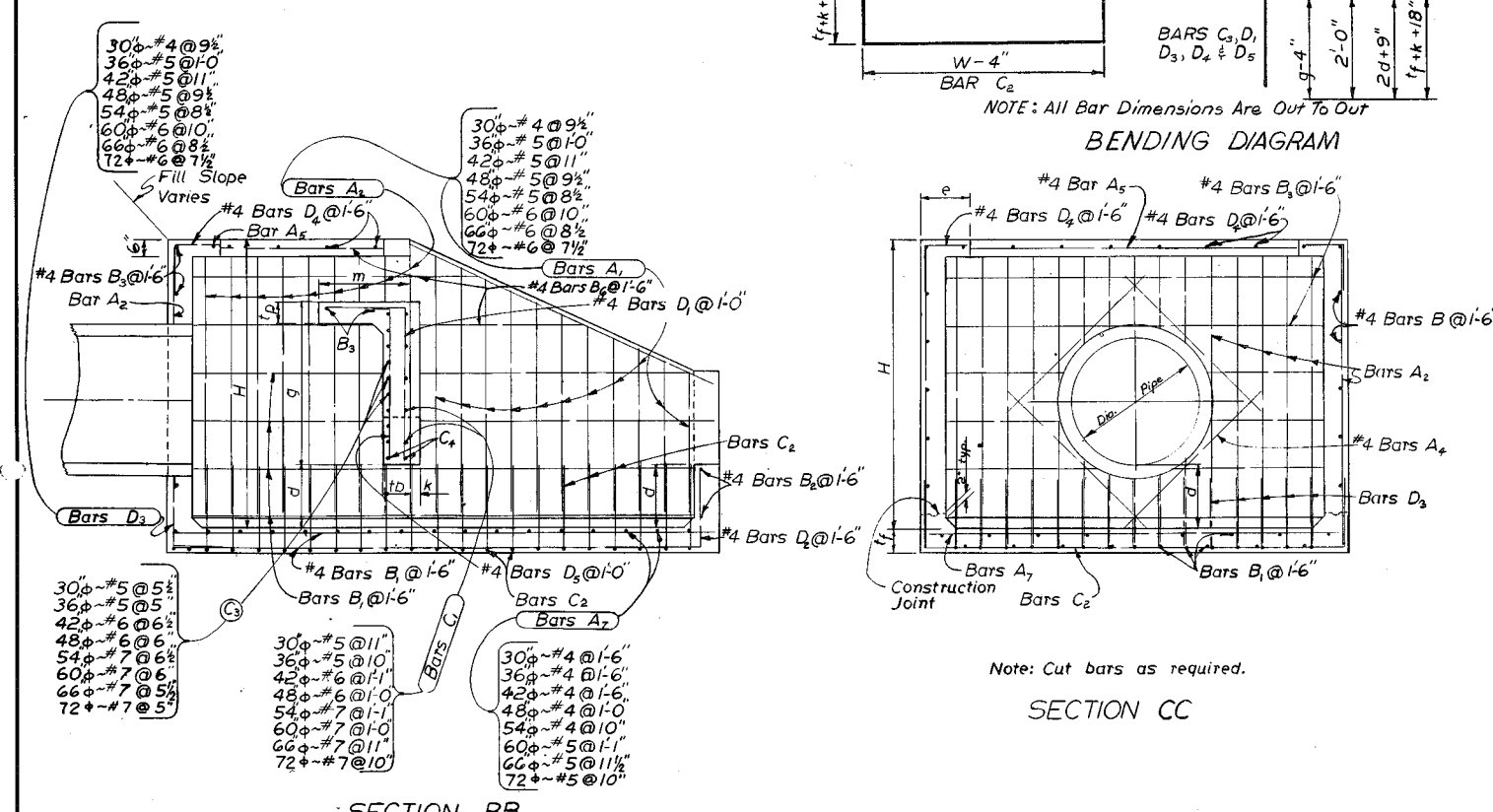
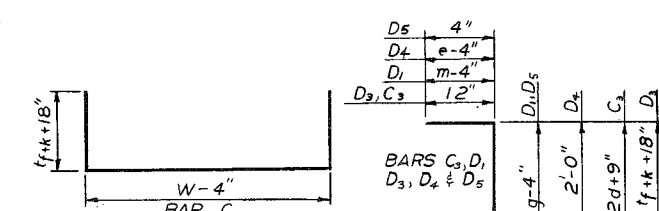
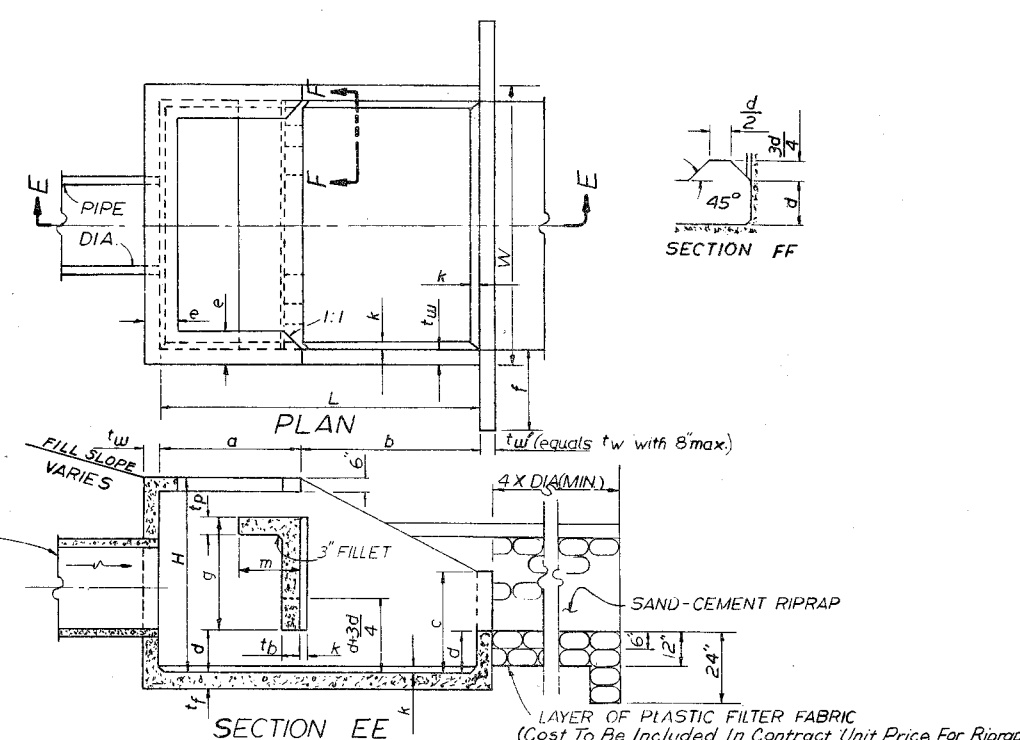
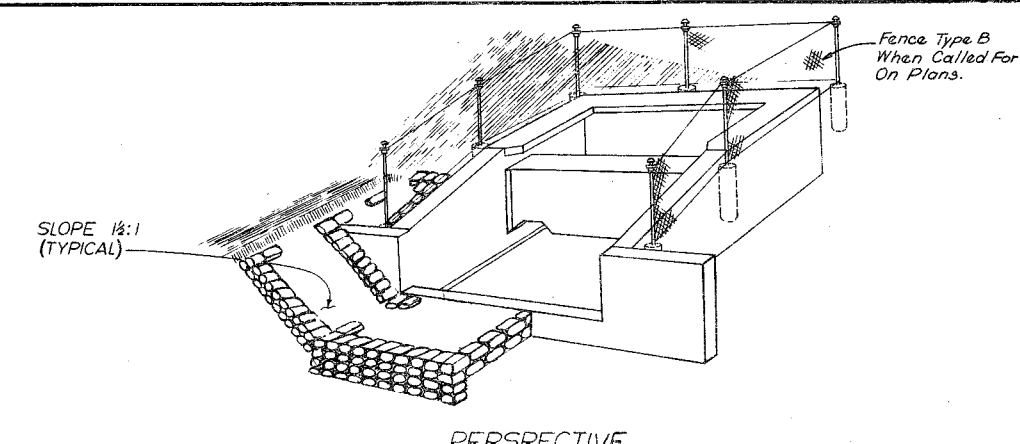
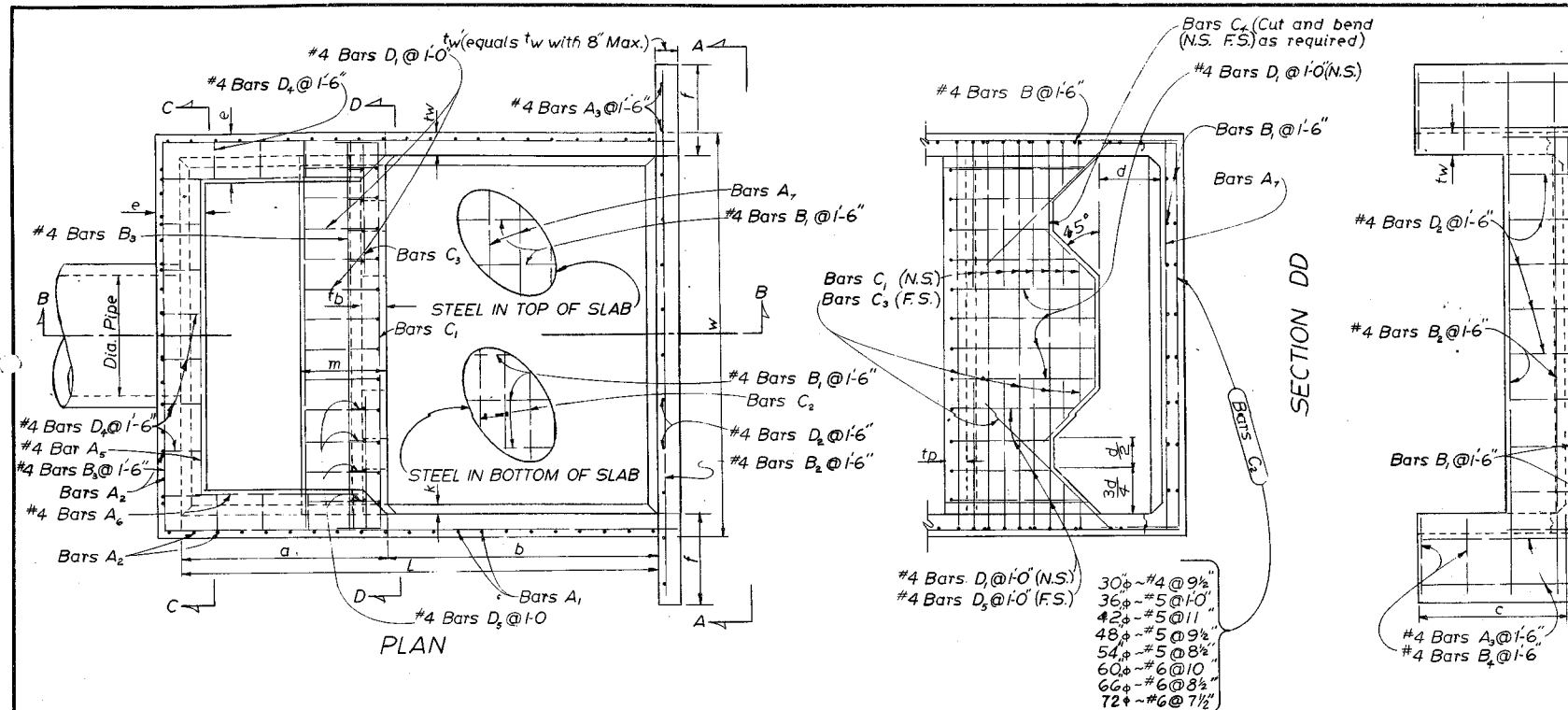
- GRATED HEADWALL AND/OR ENDWALL TO BE USED ON PIPE CULVERTS WHEN IN THE DESIGNATED CLEAR RECOVERY AREA AND WHEN ANY OF THE FOLLOWING CONDITIONS EXIST:
 - DRAINAGE AREA TO CULVERT CONSISTS OF MEDIAN OR INFELD AREAS OR AREAS WHERE DEBRIS AND/OR DRIFT IS NEGLIGIBLE.
 - RUNOFF TO CULVERT IS BY SHEET FLOW 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. | | | (X)CHANNELS @ 5.4LBS./L.F. | | | 2 ANGLES@3.2LBS./L.F. | | TOTAL WEIGHT/GH 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 | 285 |
| | 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 C4X5.4 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 Paul</i> Deputy Design Engineer, Roadways |
| Checked by | | | Revision No. |
| F.H.W.A. Approved: | 81 | 2 of 2 | Index No. 261 |



| SIZE | PIPE | MAX. DISCHARGE | FEET AND INCHES | | | | | | | | | | | | INCHES | | | | CONCRETE CLASS I | REINF. STEEL | SAND CEMENT RIPRAP |
|-------------|--------------|----------------|-----------------|------|------|-----|-------|------|-----|------|-----|------|------|----------------|----------------|----------------|----------------|---|------------------|--------------|--------------------|
| DIA. INCHES | AREA SQ. FT. | Q | W | H | L | a | b | c | d | e | f | g | m | t _w | t _f | t _b | t _p | k | CU. YD. | LBS. | CV |
| 30 | 4.91 | 59 | 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 | 1,072 | 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 | 1,429 | 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 | 2,000 | 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 | 2,659 | 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 | 3,552 | 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 | 4,472 | 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 | 5,426 | 44.5 |

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

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

| | | | | | |
|----------------------------|-----|--------|-------|----------------------------------|------------|
| Designed by | HAB | Dates | 10/69 | Approved By | De Angelis |
| Drawn by | HW | 10/69 | | Deputy Design Engineer, Roadways | |
| Checked by | DEK | 11/69 | | Revision No. | Sheet No. |
| F.H.W.A. Approved: 3/20/75 | 81 | 1 of 1 | | Index No. | 264 |

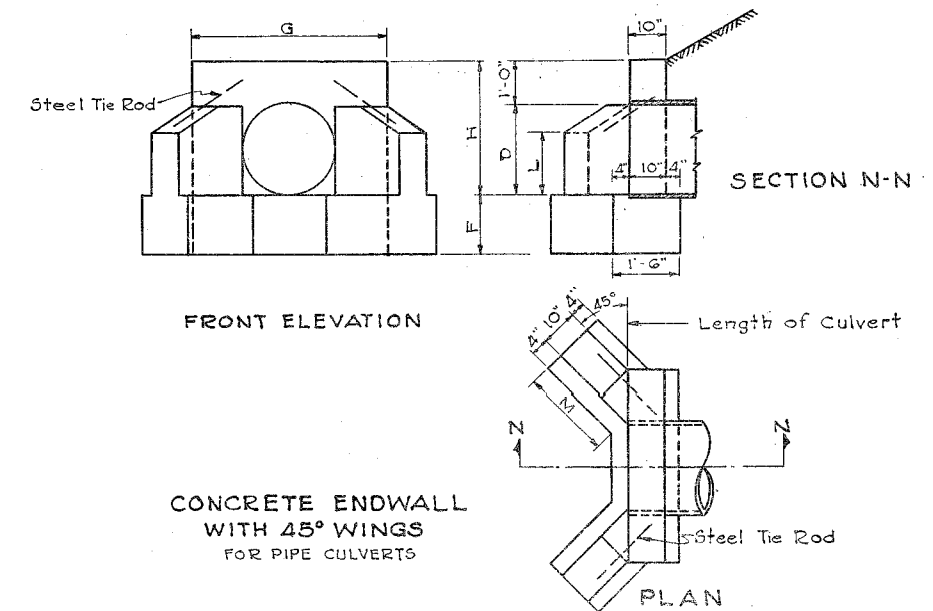
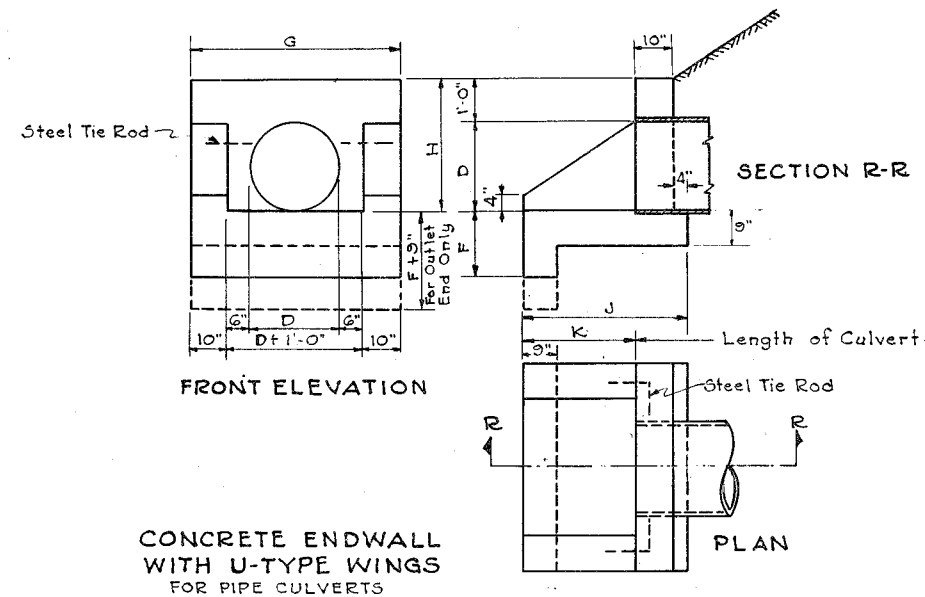


TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH U-TYPE WINGS

| THE CONCRETE ENDWALLS WITH THE WALLS | | | | | | | | | | | | | | |
|--------------------------------------|--------------|--------|-------|-------|---------|--------|---------------------------------|--------|-----------|--------|-----------|--------|----------------|--|
| DIMENSIONS | | | | | | | QUANTITIES IN ONE ENDWALL | | | | | | | |
| Opening | | Wall | | | Footing | | Total Cu.Yds. Concrete, Class I | | | | | | Steel Tie Rods | |
| D | Area Sq. Ft. | G | H | K | F | J | Conc. Pipe | | C.M. Pipe | | C.I. Pipe | | | |
| | | | | | | | Inlet | Outlet | Inlet | Outlet | Inlet | 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'-3" | 2'-7" | 0.61 | 0.69 | 0.64 | 0.72 | 0.63 | 0.72 | none | |
| 18" | 1.8 | 4'-2" | 2'-6" | 1'-8" | 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" | |

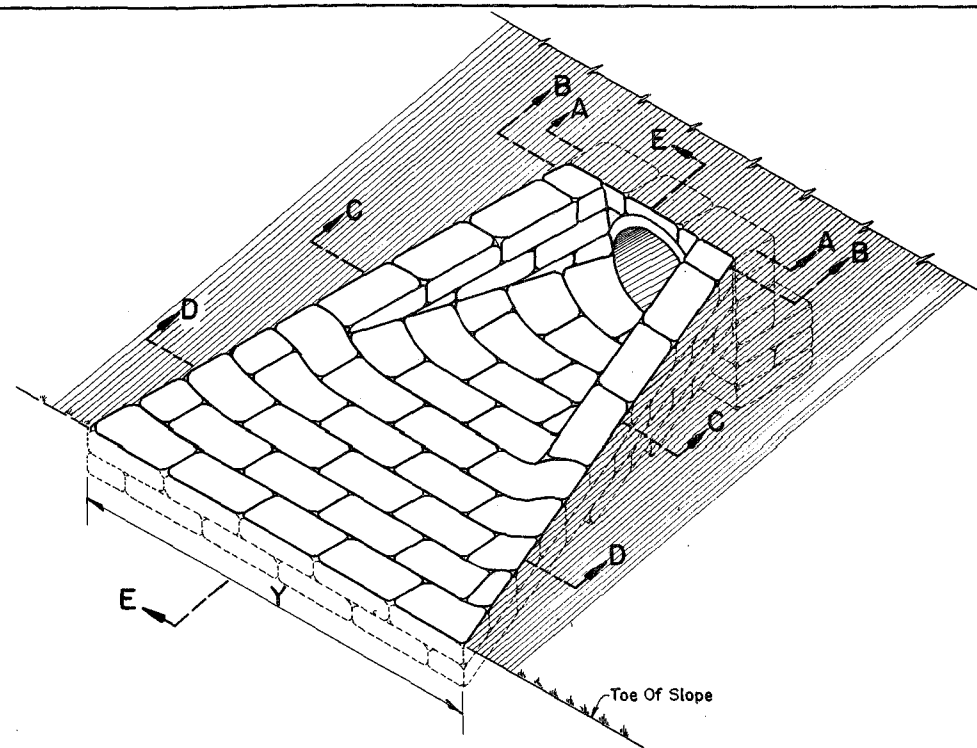
TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH 45° WINGS

| DIMENSIONS | | | | | | | QUANTITIES IN ONE ENDWALL | | | | |
|------------|-------------|-------|--------|-------|--------|---------|---------------------------|-----------|-----------|------------------|--|
| Opening | | Wall | | | | Footing | Concrete, Class I | | | Steel Tie Rods | |
| D | Area Sq.Ft. | H | G | L | M | F | Total Cu Yds. | | | | |
| | | | | | | | 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 | none | |
| 24" | 3.1 | 3'-0" | 4'-4" | 1'-5" | 2'-1" | 1'-4" | 1.03 | 1.08 | 1.08 | 2-3/4" φ x 2'-0" | |
| 30" | 4.9 | 3'-6" | 4'-10" | 1'-9" | 2'-5" | 1'-6" | 1.34 | 1.42 | 1.41 | 2-3/4" φ x 2'-0" | |
| 36" | 7.1 | 4'-0" | 5'-4" | 2'-0" | 2'-11" | 1'-8" | 1.74 | 1.85 | 1.84 | 2-3/4" φ x 3'-0" | |
| 42" | 9.6 | 4'-6" | 5'-10" | 2'-3" | 3'-6" | 2'-0" | 2.36 | 2.49 | | 2-3/4" φ x 3'-0" | |
| 48" | 12.6 | 5'-0" | 6'-4" | 2'-6" | 4'-0" | 2'-0" | 2.76 | 2.92 | | 2-3/4" φ x 3'-0" | |
| 15" | 1.2 | 2'-3" | 3'-7" | 1'-0" | 1'-3" | 1'-3" | 0.58 | 0.61 | 0.61 | none | |

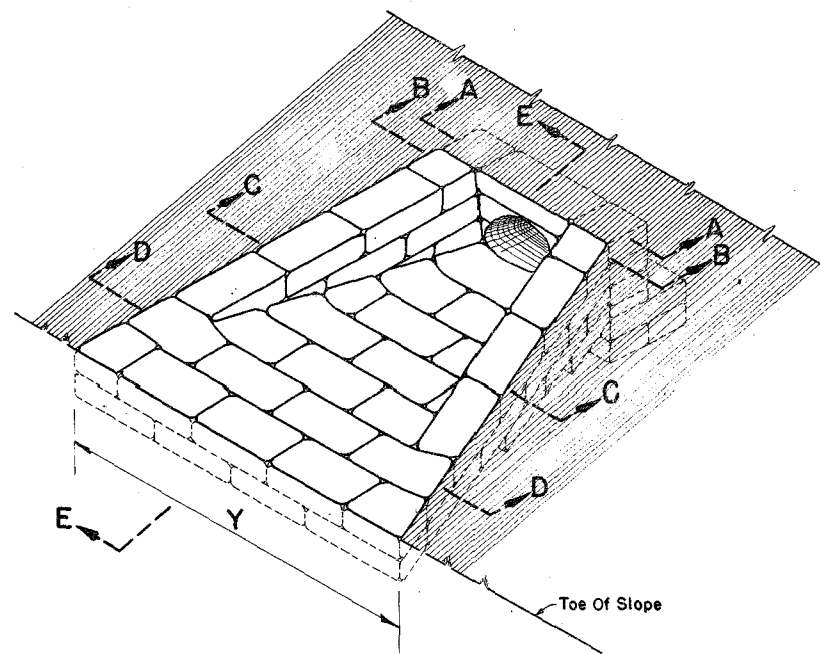
Note:
Chamfer all exposed edges 3/4".
Provide good foundation under pipes using concrete, if natural conditions are very bad.
Where tie rods are required the cost of same shall be included in the unit price bid for Concrete.
For sodding around endwalls see Index No. 281.

Rev. 6-14-46

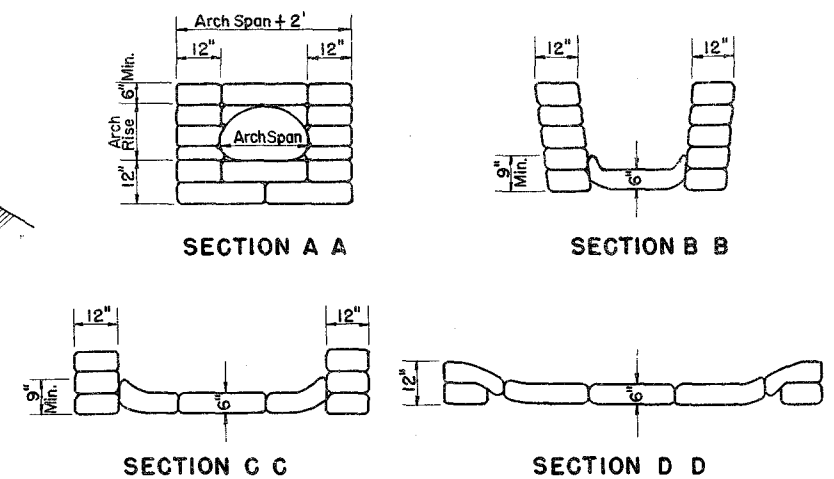
| | | | | | |
|--|-------|-------|---|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| WINGED CONCRETE ENDWALLS SINGLE ROUND PIPE | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | TJK | 12/31 | <i>De Breda</i> Deputy Design Engineer, Roadways | | |
| Checked by | GEF | 3/32 | | | |
| F.H.W.A. Approved: 3/20/75 | | | Revision No. | Sheet No. | Index No. |
| | | | 80 | 1 of 1 | 266 |



ISOMETRIC



ISOMETRIC

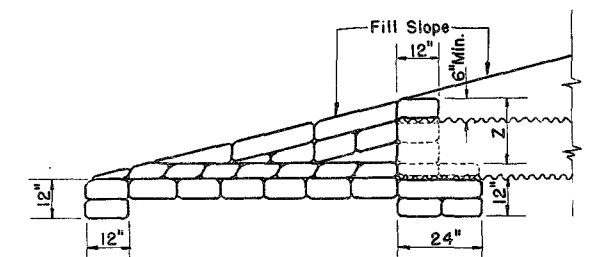


SECTION A A

SECTION B B

SECTION C C

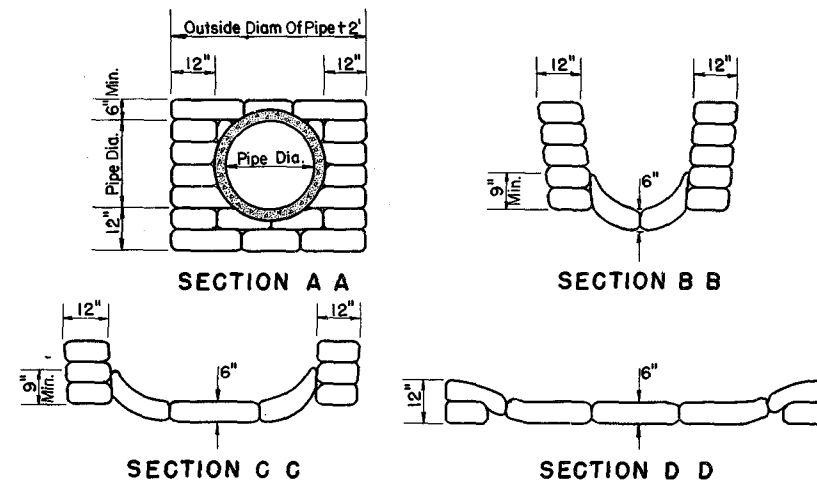
SECTION D D



SECTION E E

DETAILS FOR SINGLE METAL PIPE ARCH CULVERTS

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

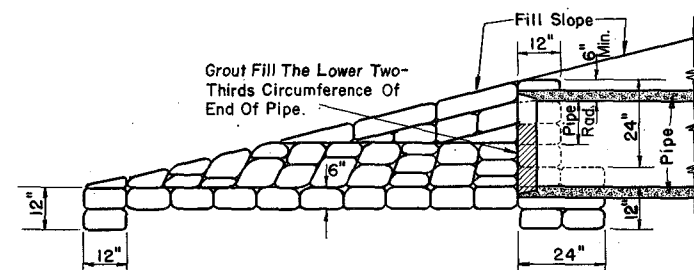


SECTION A A

SECTION B B

SECTION C C

SECTION D D



SECTION E E

DETAIL FOR SINGLE PIPE CULVERT

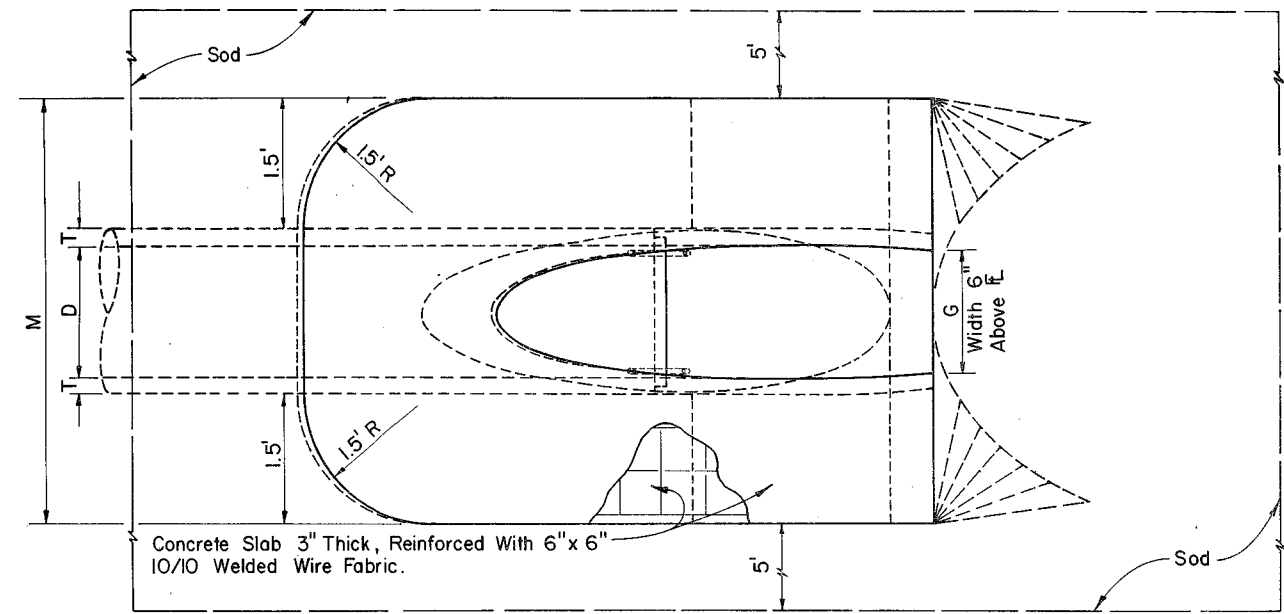
NOTE: For Multiple Pipe Culvert spacing between pipe centers = X

| DIMENSIONS and QUANTITIES for METAL PIPE ARCH CULVERTS | | | | | | | | | | | | | | | | | | | |
|--|------|------------|--------|---------|--------|--------|-------|---|--------|--------|--------|----------------|--------|--------|--------|----------------|--------|--------|--------|
| 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" | 1'-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" | 1'-9" | 1.2 | 1.8 | 2.4 | 3.0 | 1.9 | 2.7 | 3.5 | 4.3 | | | | |
| 25" | 17" | 3'-5" | 9'-3" | 12'-8" | 16'-1" | 19'-6" | 2'-0" | 1.7 | 2.5 | 3.3 | 4.1 | 2.6 | 3.7 | 4.8 | 5.9 | | | | |
| 29" | 19" | 4'-0" | 11'-0" | 15'-0" | 19'-0" | 23'-0" | 2'-0" | 2.2 | 3.1 | 4.0 | 4.9 | 3.4 | 4.7 | 6.0 | 7.3 | | | | |
| 33" | 21" | 4'-9" | 12'-9" | 17'-6" | 22'-3" | 27'-0" | 2'-0" | 2.9 | 4.1 | 5.3 | 6.5 | 4.5 | 6.1 | 7.7 | 9.3 | | | | |
| 37" | 23" | 5'-6" | 14'-6" | 20'-0" | 25'-6" | 31'-0" | 2'-0" | 3.5 | 4.9 | 6.3 | 7.7 | 5.5 | 7.4 | 9.3 | 11.2 | | | | |
| 41" | 25" | 6'-4" | 16'-6" | 22'-10" | 29'-2" | 35'-6" | 2'-0" | 4.4 | 6.1 | 7.8 | 9.5 | 6.9 | 9.2 | 11.5 | 13.8 | | | | |
| 45" | 27" | 7'-1" | 18'-3" | 25'-4" | 32'-6" | 39'-6" | 2'-0" | 5.1 | 7.0 | 8.9 | 10.8 | 8.1 | 10.7 | 13.3 | 15.9 | | | | |
| 49" | 29" | 7'-10" | 20'-0" | 27'-10" | 35'-8" | 43'-6" | 2'-0" | 5.9 | 8.1 | 10.3 | 12.5 | 9.5 | 12.4 | 15.3 | 18.2 | | | | |

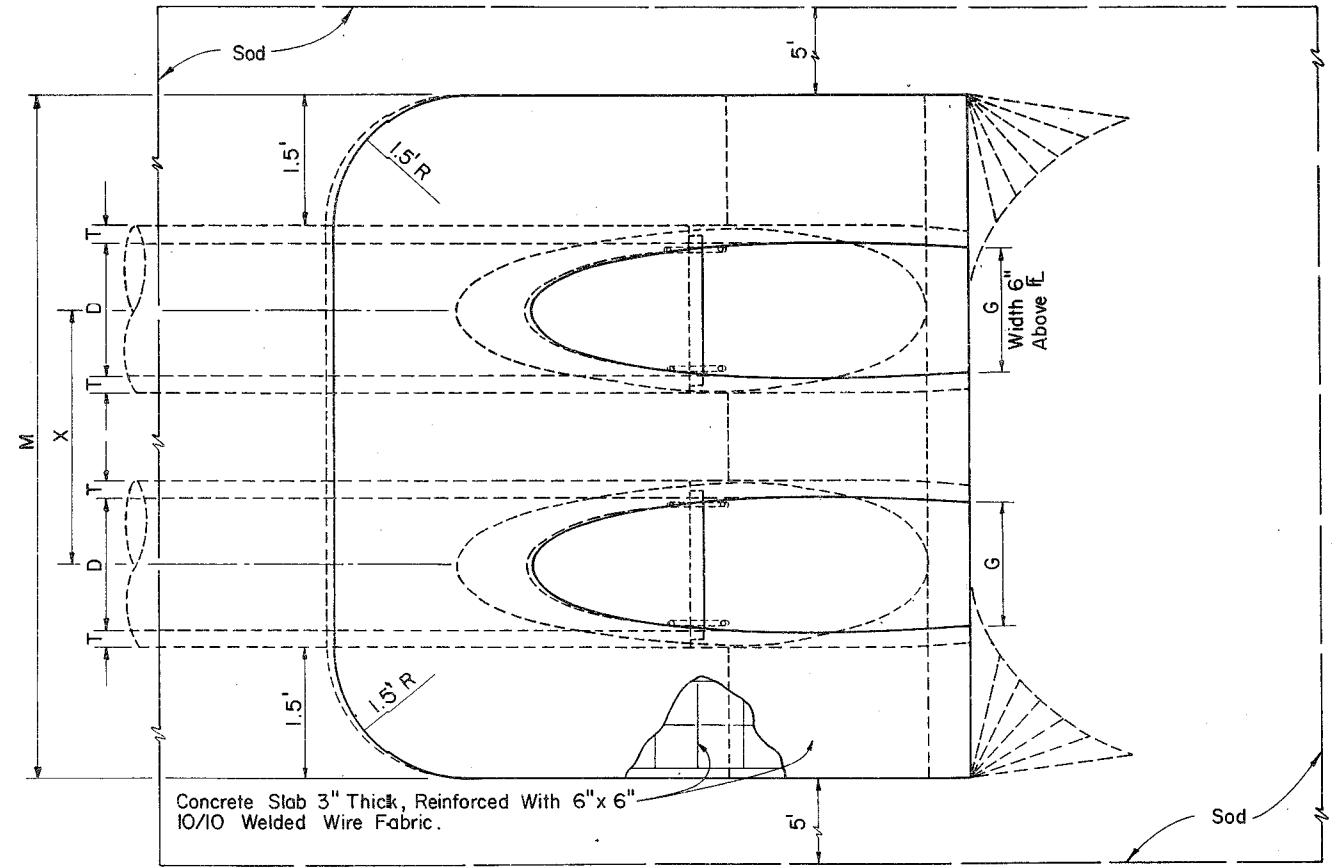
| DIMENSIONS and QUANTITIES for ROUND PIPE CULVERTS | | | | | | | | | | | | | | | | | |
|---|------------|--------|---------|---------|---|----------------|---------|---------|---------|----------------|---------|---------|---------|----------------|---------|---------|---------|
| Pipe Diam | Dimensions | | | | 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 | 1-Pipe | 2-Pipes | 3-Pipes | 4-Pipes |
| 15" | 2'-7" | 7'-0" | 9'-7" | 12'-2" | 14'-9" | 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" | 16'-6" | 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" | 20'-3" | 1.9 | 2.7 | 3.5 | 4.3 | 2.9 | 4.0 | 5.1 | 6.3 | | | | |
| 30" | 4'-3" | 12'-0" | 16'-3" | 20'-6" | 24'-9" | 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" | 29'-3" | 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" | 34'-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" | 38'-3" | 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" | 43'-0" | 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" | 47'-6" | 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 | Dates | 12/48 |
| Drawn by | HW | 3/54 | |
| Checked by | CDD | 3/54 | |
| F.H.W.A. Approved: 8/30/77 | | Revision No. | 81 |
| | | Sheet No. | 1 of 1 |
| | | Index No. | 268 |

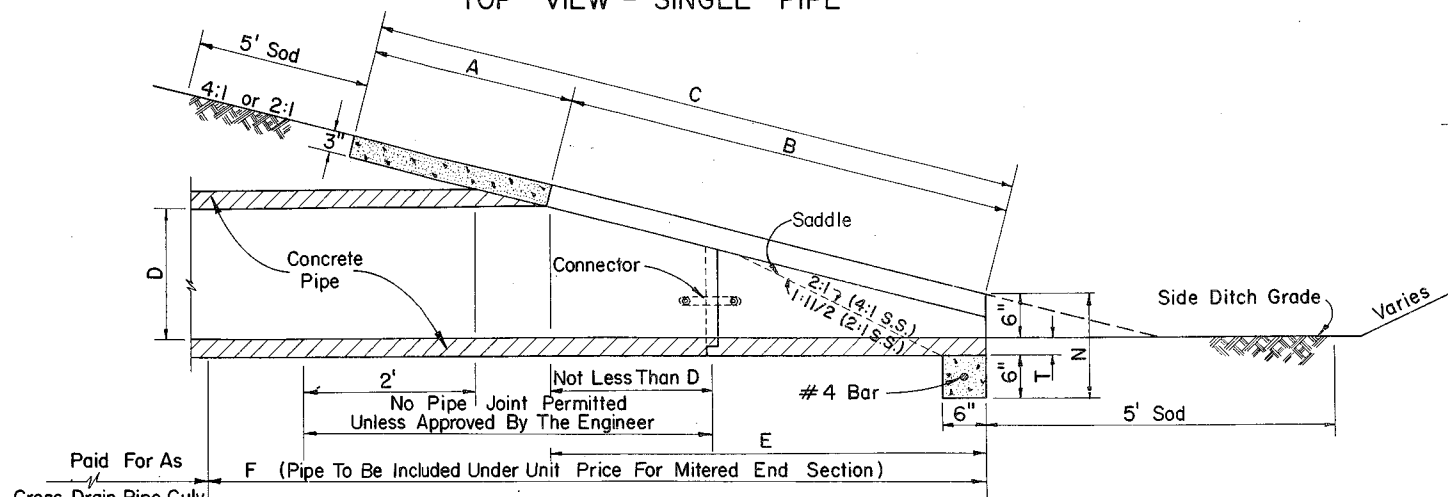
| DIMENSIONS AND QUANTITIES | | | | | | | | | | | | | | | | | | | | | |
|---------------------------|--------|--------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|-------|--------------------|--------|--------|-------|-------------------|--------|--------|-------|
| | D | X | A | B | C | E | F | G | M | | | | N | CONCRETE (CU YDS.) | | | | SODDING (SQ YDS.) | | | |
| | | | | | | | | | Single | Double | Triple | Quad. | | Single | Double | Triple | Quad. | Single | Double | Triple | Quad. |
| | | | | | | | | | 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' | 3.56' | 7' | 1.73' | 5.50' | 8.92' | 12.33' | 15.75' | 1.25' | 0.39 | 0.59 | 0.79 | 1.00 | 23.82 | 27.62 | 31.78 | 35.21 |
| | 30" | 4'-3" | 2.15' | 4.95' | 7.10' | 4.56' | 8' | 2.00' | 6.08' | 10.33' | 14.58' | 18.83' | 1.29' | 0.46 | 0.76 | 1.04 | 1.32 | 25.81 | 30.53 | 35.26 | 39.98 |
| | 36" | 5'-1" | 2.25' | 6.08' | 8.33' | 5.56' | 9' | 2.24' | 6.67' | 11.75' | 16.83' | 21.92' | 1.33' | 0.55 | 0.94 | 1.33 | 1.71 | 27.76 | 33.46 | 39.10 | 44.76 |
| | 42" | 6'-0" | 2.34' | 7.21' | 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" | 6'-9" | 2.43' | 8.33' | 10.76' | 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" | 7'-8" | 2.52' | 9.44' | 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" | 8'-6" | 2.62' | 10.56' | 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" | 9'-2" | 2.71' | 11.68' | 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" | 10'-0" | 2.80' | 12.80' | 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" | 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 | 24.90 | 28.04 | 31.19 | 34.34 |
| | 24" | 3'-5" | 2.53' | 7.18' | 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 | 28.02 | 31.82 | 35.61 | 39.41 |
| | 30" | 4'-3" | 2.70' | 9.25' | 11.95' | 9.03' | 13' | 2.00' | 6.08' | 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" | 5'-1" | 2.87' | 11.31' | 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" | 6'-0" | 3.05' | 13.37' | 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" | 6'-9" | 3.22' | 15.43' | 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" | 7'-8" | 3.39' | 17.49' | 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" | 8'-6" | 3.56' | 19.55' | 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" | 9'-2" | 3.73' | 21.62' | 24.35' | 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" | 10'-0" | 3.91' | 22.68' | 26.59' | 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

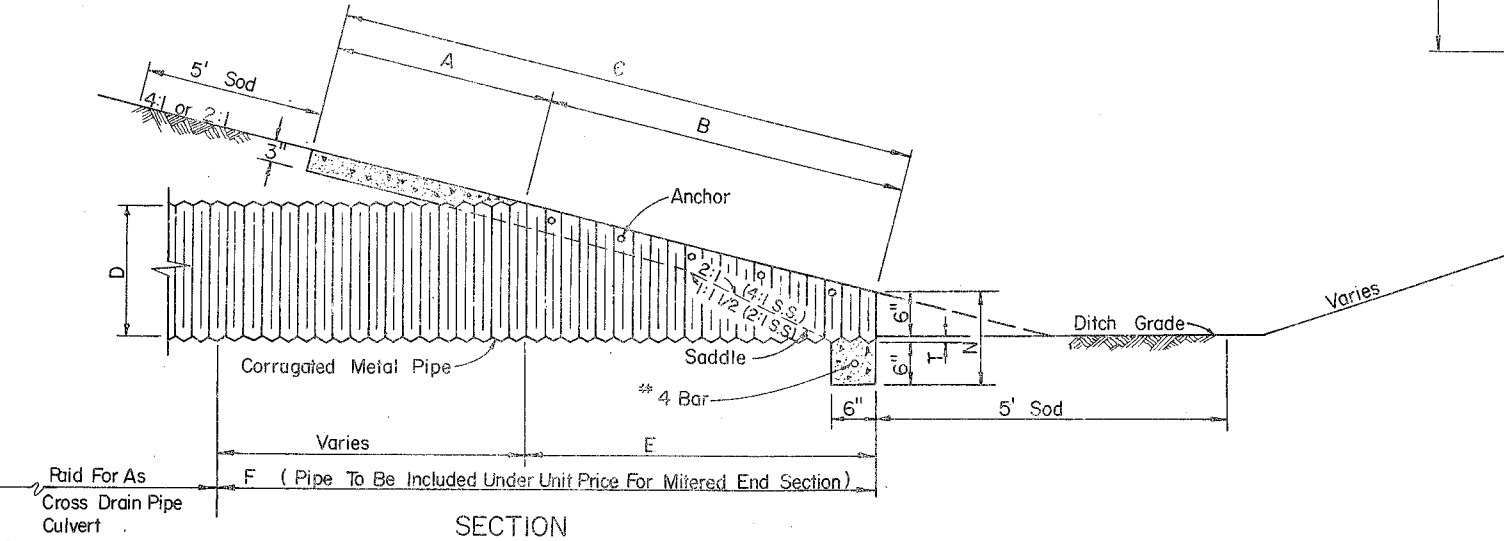
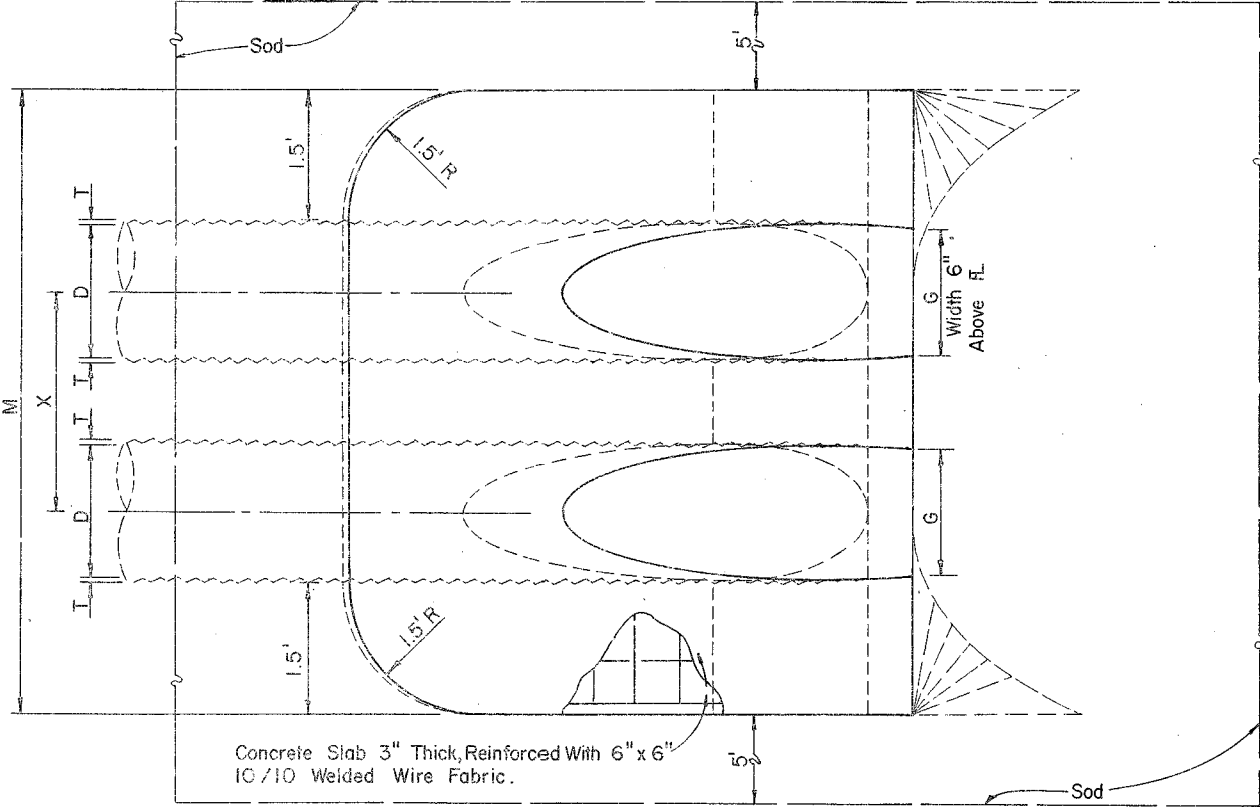
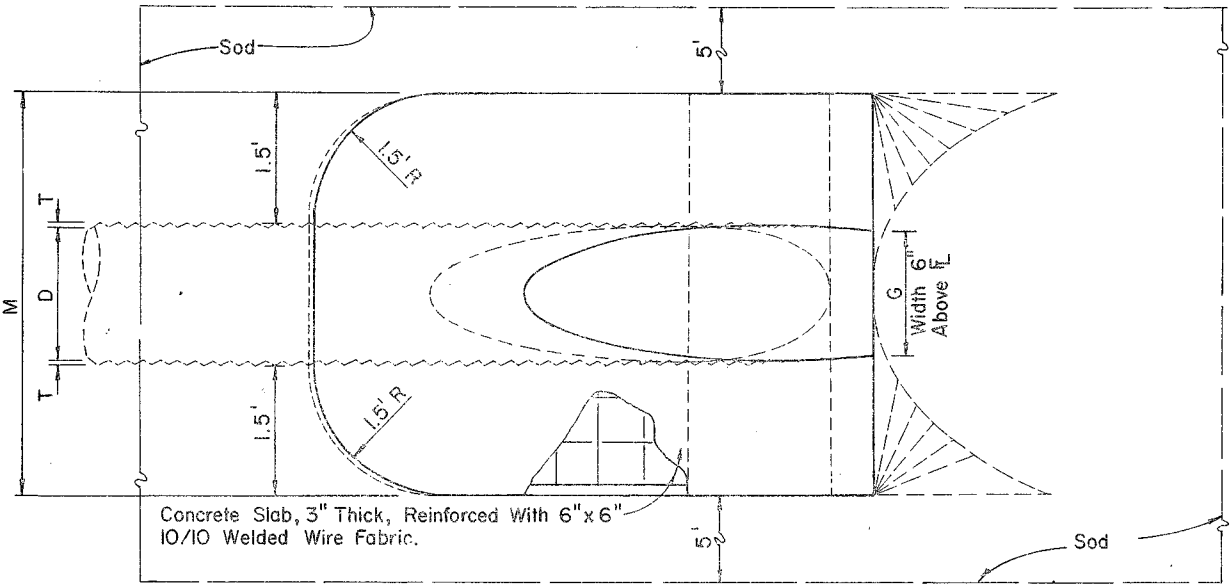


SECTION

NOTE: See Sheet 4 for Details and Notes

| | | | |
|---|-----|------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| CROSS DRAIN MITERED END SECTION SINGLE AND MULTIPLE ROUND CONCRETE PIPE | | | |
| Designed by | DCB | 6/78 | Approved By |
| Drawn by | | | <i>J. C. Smith</i> Deputy Design Engineer, Roadways |
| Checked by | KNM | 6/78 | Revision No. |
| F.H.W.A. Approved: 7/21/78 | | 81 | Sheet No. 1 of 4 |
| | | | Index No. 272 |

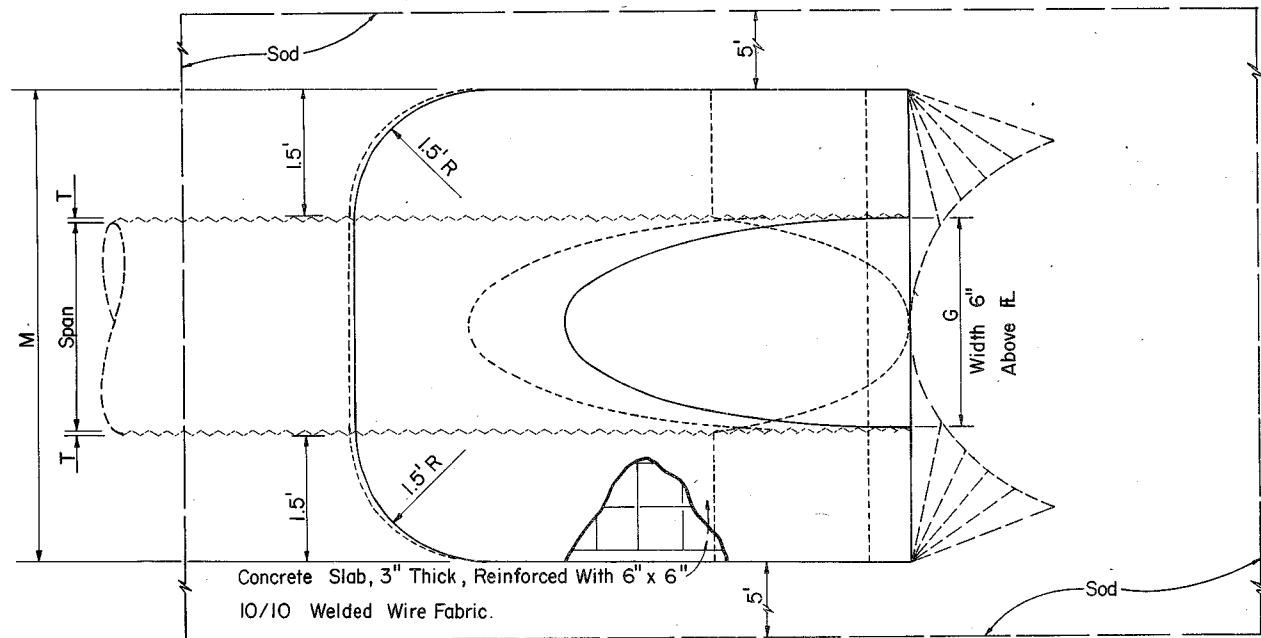
| DIMENSIONS AND QUANTITIES | | | | | | | | | | | | | | | | | | | | | |
|---------------------------|-----|--------|------|--------|--------|-------|-------|-------|----------------|----------------|----------------|---------------|-------|--------------------|----------------|----------------|---------------|-------------------|----------------|----------------|---------------|
| | D | 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 | 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 | 23.46 | 26.32 | 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' | 8.50' | 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' | 9.83' | 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 | 38.17 | 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" | 6'-9" | 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 |
| | 54" | 7'-8" | 2.5' | 8.94' | 11.44' | 8.00' | 12' | 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 |
| | 60" | 8'-6" | 2.5' | 10.06' | 12.56' | 9.00' | 13' | 3.00' | 8.08' | 16.58' | 25.08' | 33.58' | 1.04' | 0.71 | 1.49 | 2.28 | 3.07 | 34.06 | 43.50 | 52.94 | 62.39 |
| 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' | 5.18' | 8.68' | 5.0' | 10.0' | 1.73' | 5.08' | 8.50' | 11.92' | 15.33' | 1.04' | 0.44 | 0.69 | 0.92 | 1.18 | 25.41 | 30.21 | 34.01 | 37.80 |
| | 30" | 4'-3" | 2.5' | 6.25' | 10.75' | 6.0' | 12.0' | 2.00' | 5.58' | 9.83' | 14.08' | 18.33' | 1.04' | 0.53 | 0.88 | 1.25 | 1.60 | 27.27 | 33.99 | 38.71 | 43.43 |
| | 36" | 5'-1" | 2.5' | 7.31' | 12.81' | 7.0' | 14.0' | 2.24' | 6.08' | 11.17' | 16.25' | 21.33' | 1.04' | 0.62 | 1.07 | 1.53 | 2.00 | 29.11 | 37.77 | 43.41 | 49.06 |
| | 42" | 6'-0" | 2.5' | 8.37' | 14.87' | 8.0' | 16.0' | 2.45' | 6.58' | 12.58' | 18.58' | 24.58' | 1.04' | 0.71 | 1.30 | 1.92 | 2.52 | 30.96 | 41.62 | 48.29 | 54.96 |
| | 48" | 6'-9" | 2.5' | 9.43' | 16.93' | 9.0' | 18.0' | 2.65' | 7.08' | 13.83' | 20.58' | 27.33' | 1.04' | 0.80 | 1.54 | 2.29 | 3.02 | 32.80 | 45.30 | 52.80 | 60.30 |
| | 54" | 7'-8" | 2.5' | 10.49' | 18.99' | 10.0' | 20.0' | 2.83' | 7.58' | 15.25' | 22.92' | 30.58' | 1.04' | 0.91 | 1.83 | 2.74 | 3.67 | 34.64 | 49.17 | 57.69 | 66.20 |
| | 60" | 8'-6" | 2.5' | 11.55' | 21.05' | 11.0' | 22.0' | 3.00' | 8.08' | 16.58' | 25.08' | 33.58' | 1.04' | 1.02 | 2.15 | 3.27 | 4.39 | 36.49 | 52.93 | 62.38 | 71.82 |



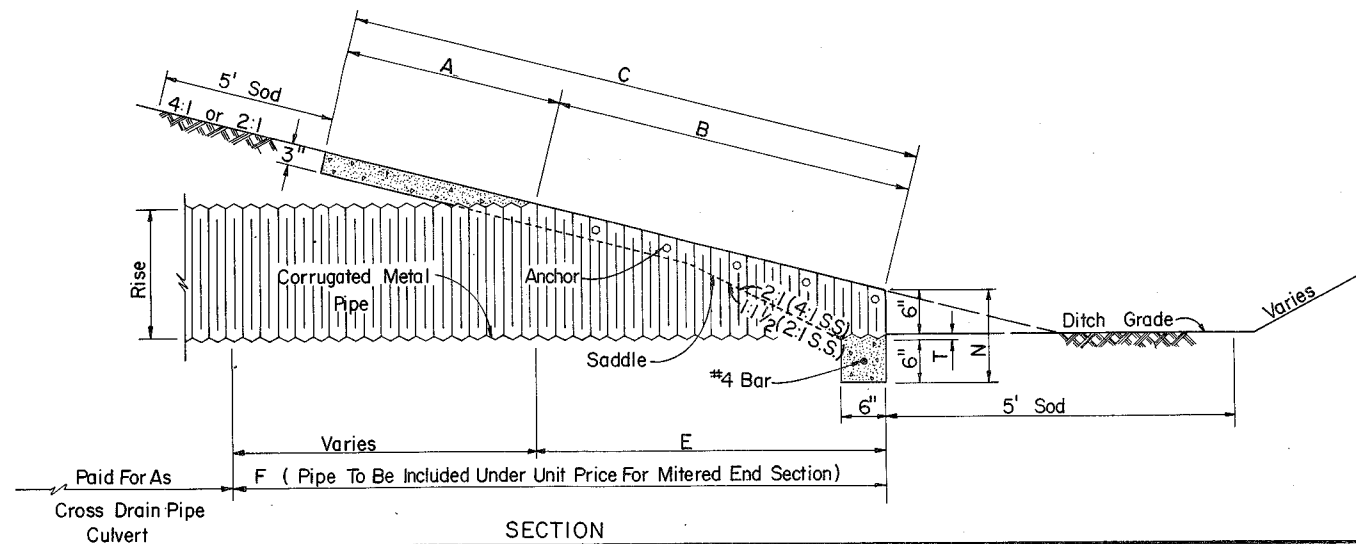
NOTE: See Sheet 4 for Details and Notes.

| | | | |
|---|-------|--------------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION | | | |
| ROAD DESIGN | | | |
| CROSS DRAIN | | | |
| MITERED END SECTION | | | |
| SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE | | | |
| Names | Dates | Approved By | |
| Designed by | DCB | 6/78 | |
| Drawn by | | Jc. Buel | |
| Checked by | KNM | 6/78 | |
| F.H.W.A. Approved: 7/21/78 | | Revision No. | Sheet No. |
| | | 81 | 2 of 4 |
| | | Index No. | |
| | | 272 | |

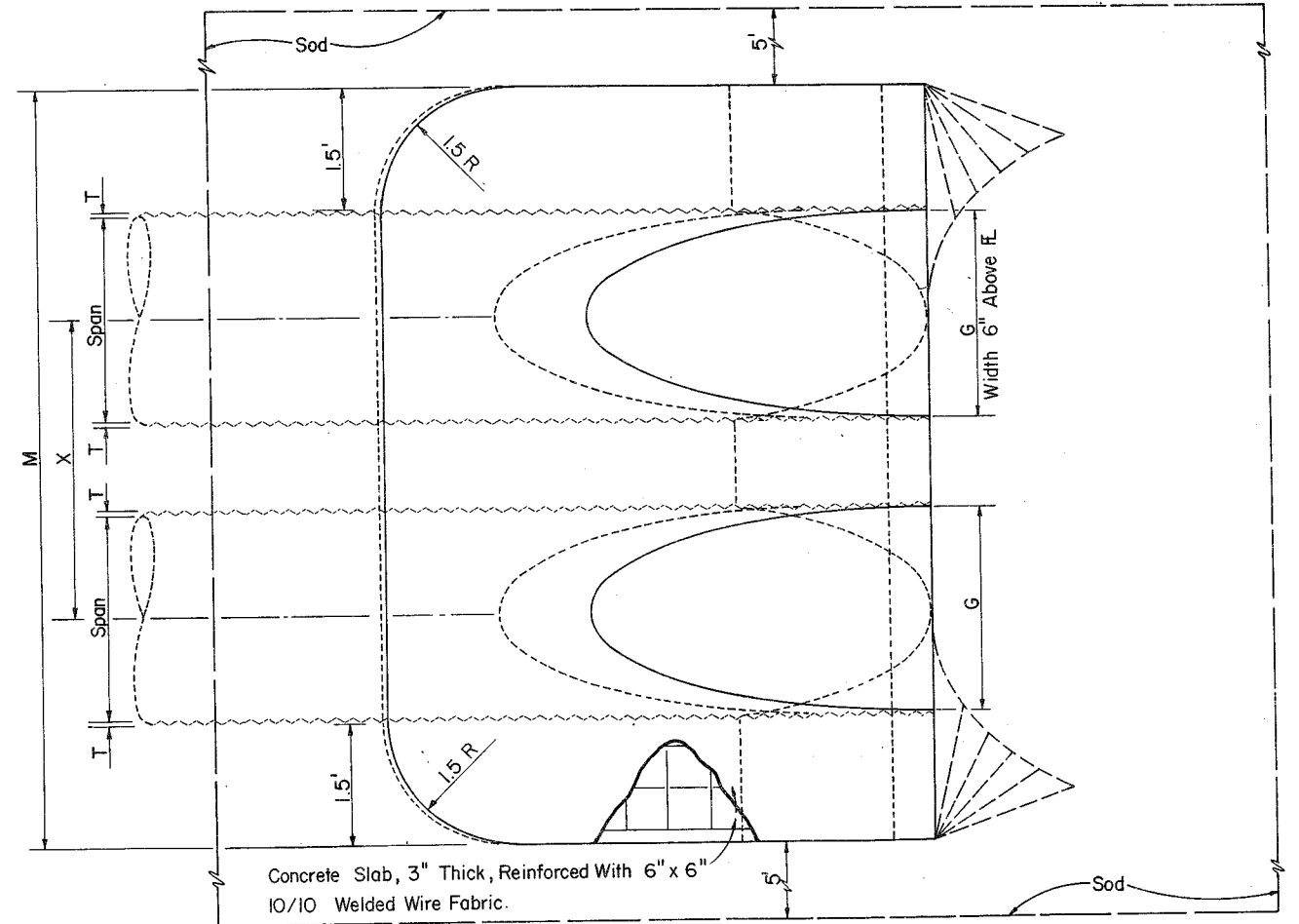
| 1974 AASHTO | | | DIMENSIONS AND QUANTITIES | | | | | | | | | | | | | | | | | | | |
|--------------|------|--------|---------------------------|--------|--------|--------|--------|-------|-------|----------------|----------------|----------------|---------------|-------|--------------------|----------------|----------------|---------------|--------------------|----------------|----------------|---------------|
| | SPAN | RISE | X | A | B | C | E | F | G | M | | | | N | CONCRETE (CU.YDS.) | | | | SODDING (S.Q.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" | 13" | 2'-6" | 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" | 15" | 2'-10" | 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" | 20" | 3'-5" | 2.5' | 2.06' | 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 |
| | 35" | 24" | 4'-10" | 2.5' | 3.35' | 5.85' | 3.00' | 7' | 2.55' | 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 |
| | 45" | 28" | 4'-10" | 2.5' | 4.29' | 6.79' | 3.83' | 8' | 2.97' | 6.58' | 11.33' | 16.08' | 20.83' | 1.04' | 0.42 | 0.69 | 0.96 | 1.22 | 25.98 | 31.26 | 36.53 | 41.81 |
| | 49" | 31" | 5'-6" | 2.5' | 5.03' | 7.53' | 4.50' | 9' | 3.34' | 7.17' | 12.67' | 18.17' | 23.67' | 1.04' | 0.49 | 0.82 | 1.15 | 1.48 | 27.46 | 33.57 | 39.68 | 45.78 |
| | 57" | 38" | 6'-4" | 2.5' | 5.96' | 8.46' | 5.33' | 10' | 3.65' | 7.83' | 14.17' | 20.50' | 26.83' | 1.04' | 0.55 | 0.95 | 1.35 | 1.75 | 29.23 | 36.28 | 43.31 | 50.34 |
| | 64" | 43" | 7'-11" | 2.5' | 6.89' | 9.39' | 6.17' | 11' | 3.89' | 8.42' | 15.50' | 22.58' | 29.67' | 1.04' | 0.62 | 1.10 | 1.57 | 2.05 | 30.91 | 38.78 | 46.64 | 54.52 |
| 71" | 47" | 7'-10" | 2.5' | 7.64' | 10.14' | 6.83' | 12' | 4.14' | 9.00' | 16.83' | 24.67' | 32.50' | 1.04' | 0.69 | 1.24 | 1.80 | 2.35 | 32.40 | 41.10 | 49.81 | 58.51 | |
| 4:1 Slope | 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' | 0.28 | 0.42 | 0.56 | 0.70 | 21.58 | 24.36 | 27.13 | 29.91 |
| | 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' | 0.32 | 0.49 | 0.66 | 0.78 | 22.70 | 25.85 | 29.00 | 32.14 |
| | 25" | 20" | 3'-5" | 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 |
| | 35" | 24" | 4'-10" | 2.5' | 6.18' | 8.68' | 6.00' | 11' | 2.55' | 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 |
| | 42" | 29" | 4'-0" | 2.5' | 7.90' | 10.40' | 7.67' | 12' | 2.97' | 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 |
| | 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' | 0.65 | 1.08 | 1.50 | 1.93 | 32.18 | 38.29 | 44.40 | 50.51 |
| | 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' | 0.76 | 1.30 | 1.83 | 2.37 | 34.82 | 41.87 | 48.90 | 55.93 |
| | 64" | 43" | 7'-11" | 2.5' | 12.71' | 15.21' | 12.33' | 17' | 3.89' | 8.42' | 15.50' | 22.58' | 29.67' | 1.04' | 0.87 | 1.55 | 2.18 | 2.83 | 37.38 | 45.24 | 53.11 | 60.99 |
| 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' | 0.95 | 1.68 | 2.43 | 3.17 | 39.56 | 48.26 | 56.97 | 65.67 | |



TOP VIEW - SINGLE PIPE



SECTION



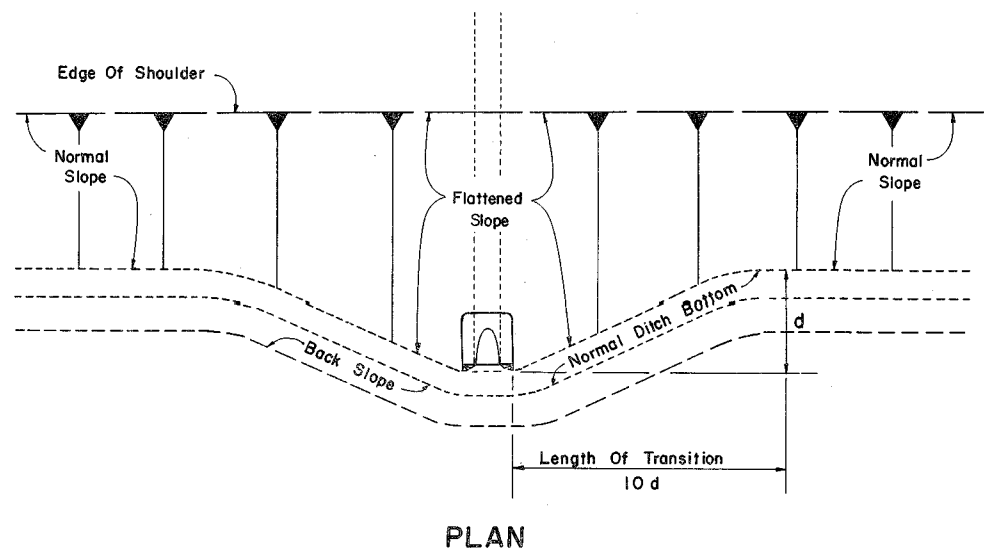
TOP VIEW - MULTIPLE PIPE

NOTE: See Sheet 4 for Details and Notes.

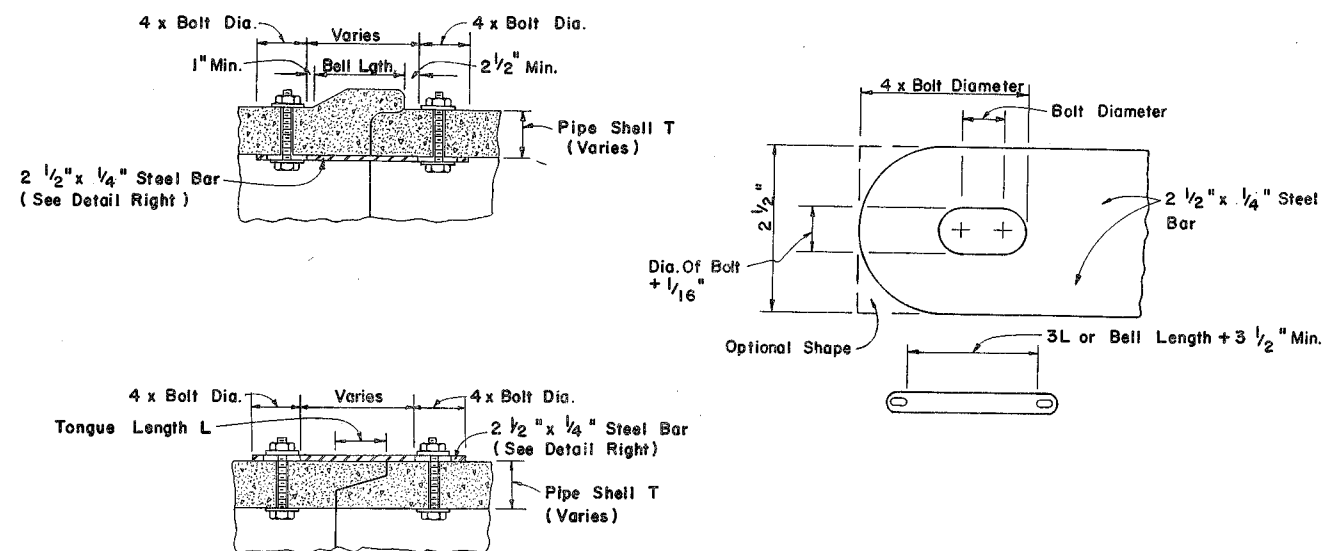
| | | | |
|--|-------|-----------|----------------------------------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| CROSS DRAIN MITERED END SECTION | | | |
| SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | D C B | 6/78 | <i>J. C. B.</i> |
| Checked by | K N M | 6/78 | Deputy Design Engineer, Roadways |
| Revision No. | | Sheet No. | Index No. |
| 81 | | 3 of 4 | 272 |
| F.H.W.A. Approved: 7/21/78 | | | |

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.



SLOPE AND DITCH TRANSITIONS



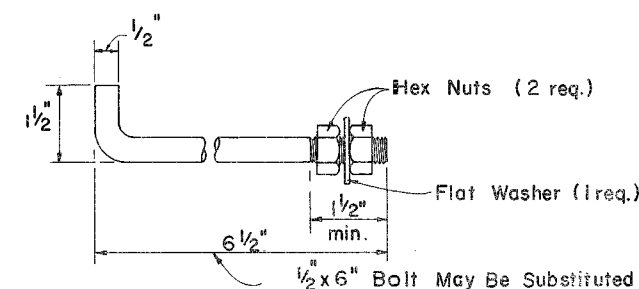
All bars, bolts, nuts and washers are to be galvanized steel.

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.

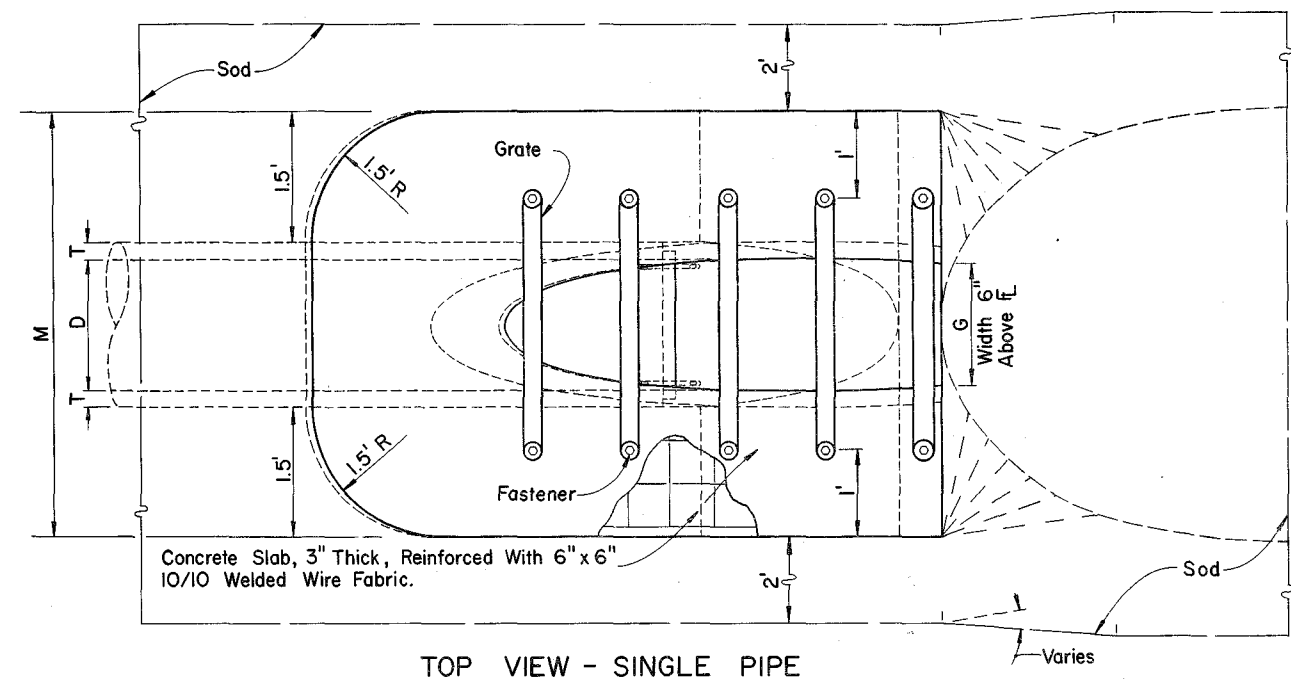
Bend anchor where required to center in concrete slab. Damaged surfaces to be repaired after bending. Anchors are to be spaced a distance equal to four (4) corrugations. Place the anchors in the outside crest of corrugation.

Flat washers to be placed on inside wall of pipe.

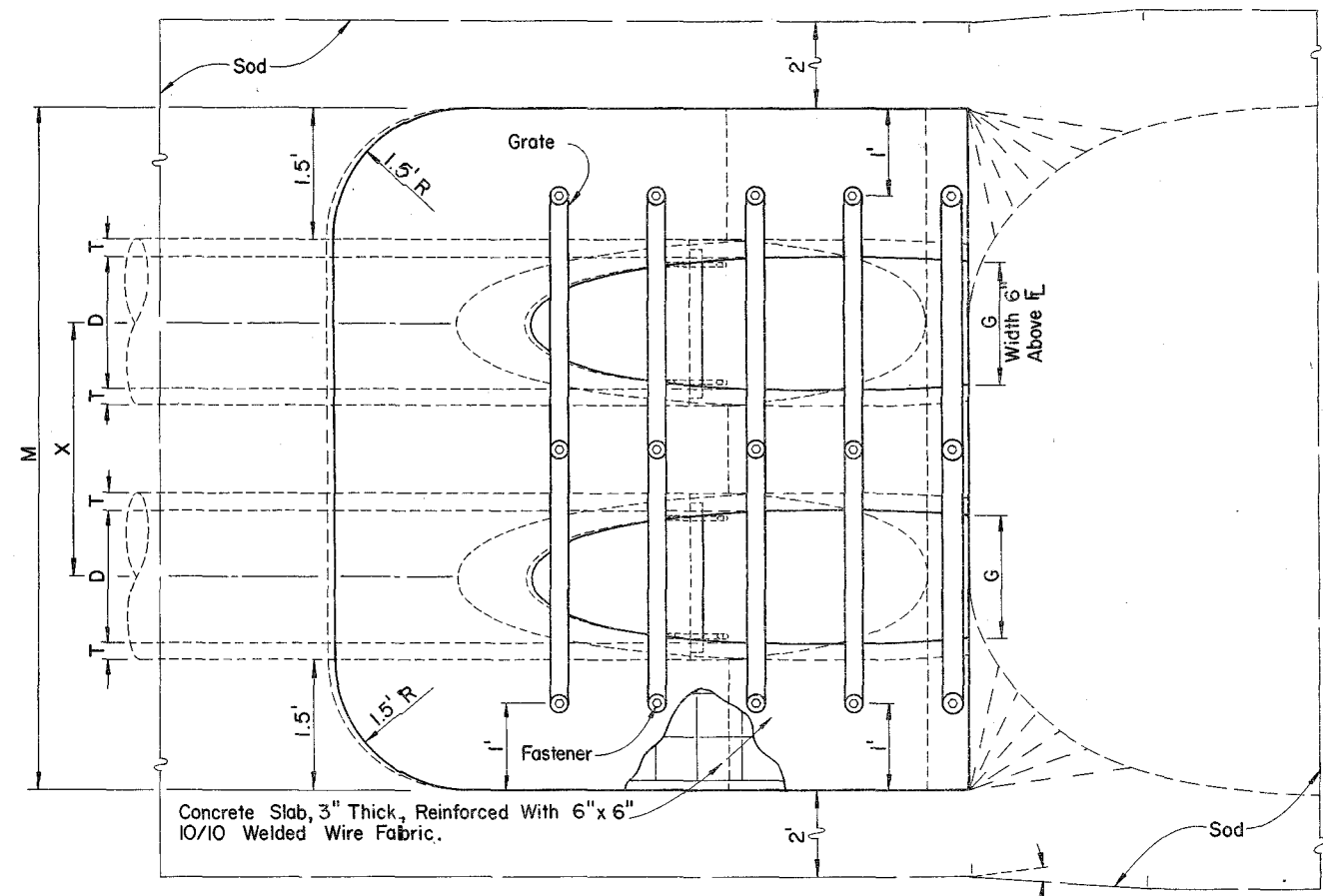
ANCHOR DETAIL

| | | | |
|---|------|-----------|----------------------------------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| CROSS DRAIN MITERED END SECTION SPECIAL DETAILS AND NOTES | | | |
| Designed by | Nums | Dates | Approved By |
| Drawn by | DCB | 6/78 | <i>DCB</i> |
| Checked by | K/M | 6/78 | Deputy Design Engineer, Roadways |
| Revision No. | | Sheet No. | Index No. |
| 81 | | 4 of 4 | 272 |
| F.H.W.A. Approved: 7/21/78 | | | |

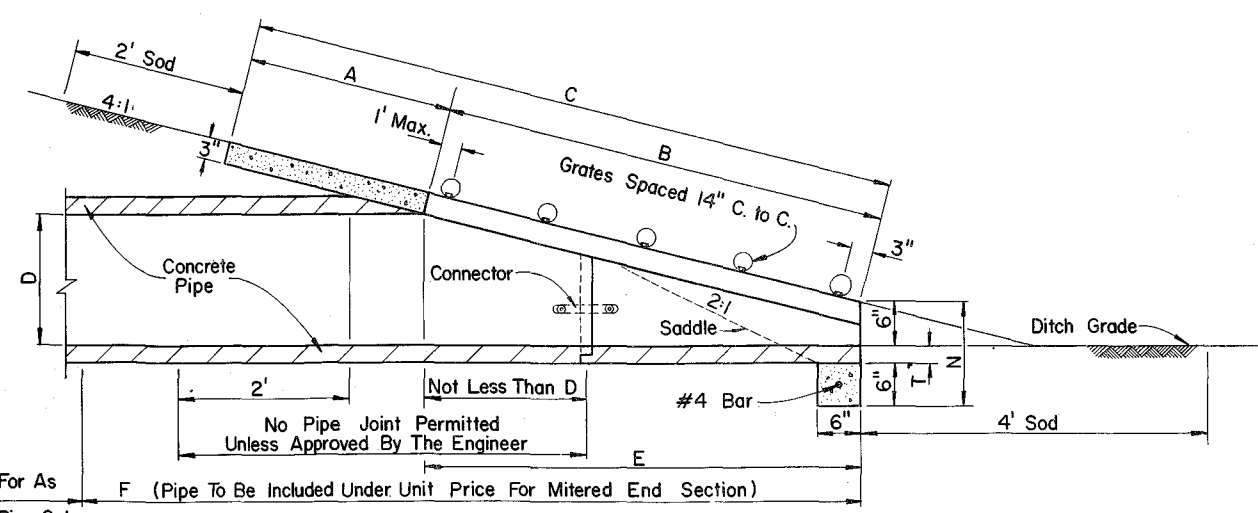
| DIMENSIONS & QUANTITIES | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|--------|-------|--------|--------|--------|-----|-------|-------------|-------------|-------------|------------|-------|----------------------|-------------------|---------------------|-------------|-------------|------------|--------------------|-------------|-------------|------------|
| 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" | 2.27' | 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' | 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 | 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 |



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



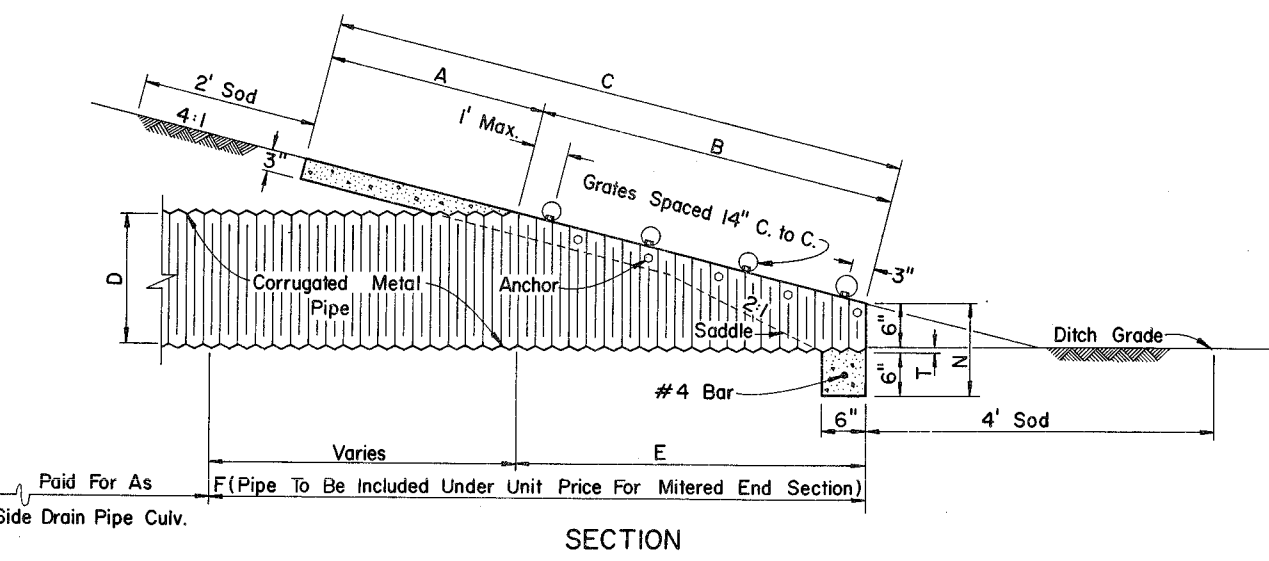
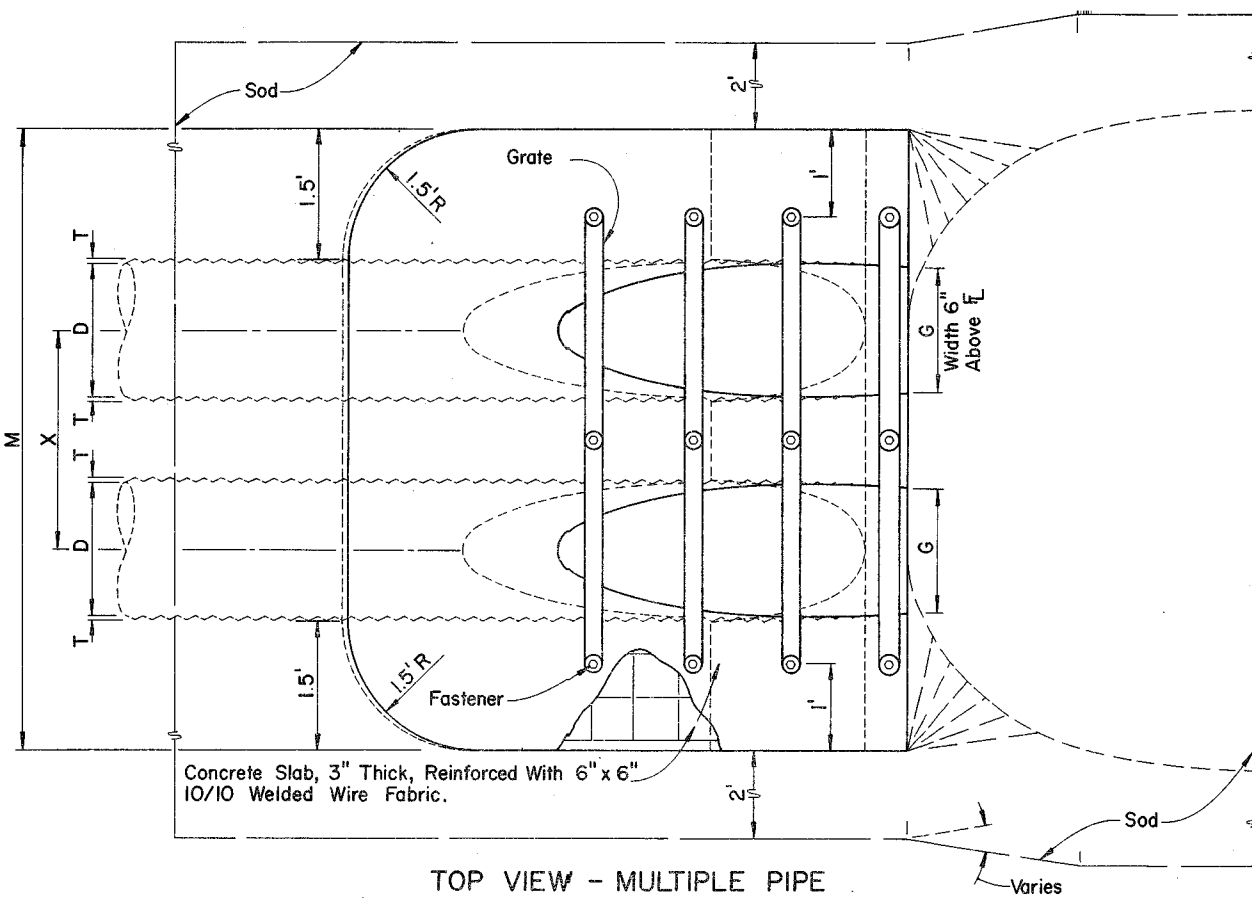
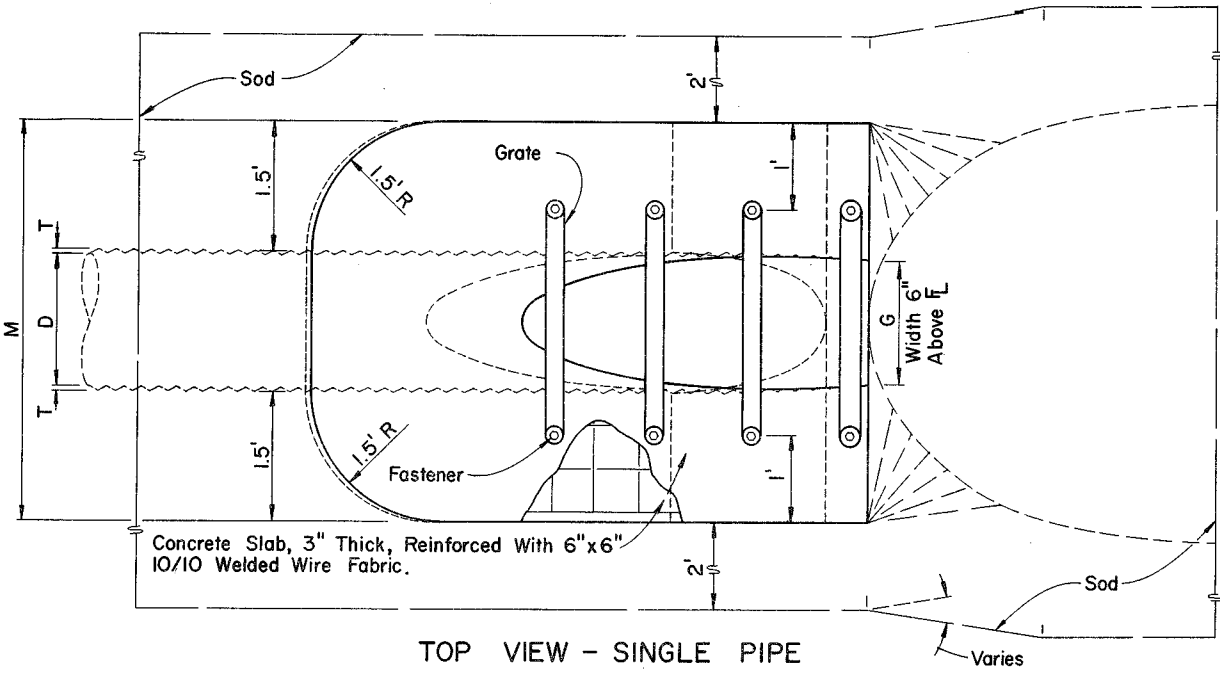
SECTION

Note:
See Sheet 4 for Details and Sheet 5 for Notes.

| | | | |
|--|-----|------|----------------------------------|
| 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 |
| Drawn by | HKH | 6/78 | Deputy Design Engineer, Roadways |
| Checked by | JVG | 6/78 | Revision No. |
| F.H.W.A. Approved: 10/21/77 | | 81 | Sheet No. 1 of 5 |
| | | | Index No. 273 |

DIMENSIONS & QUANTITIES

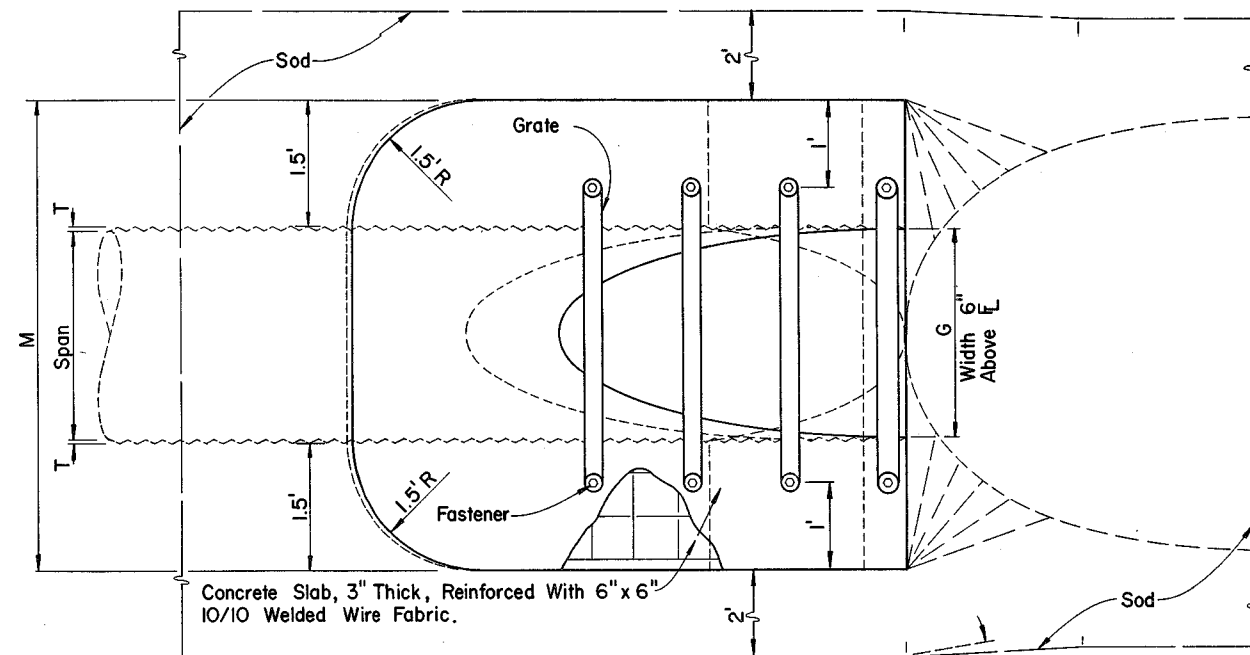
| D | X | A | B | C | E | F | G | M | | | | N | GRATE SIZES | | CONCRETE (Cu. Yds.) | | | | SODDING (Sq. Yds.) | | | |
|-----|--------|------|--------|--------|-------|-------|-------|-------------|-------------|-------------|------------|-------|----------------------|-------------------|---------------------|-------------|-------------|------------|--------------------|-------------|-------------|------------|
| | | | | | | | | 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' | 2 1/2" | 3" | 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 |



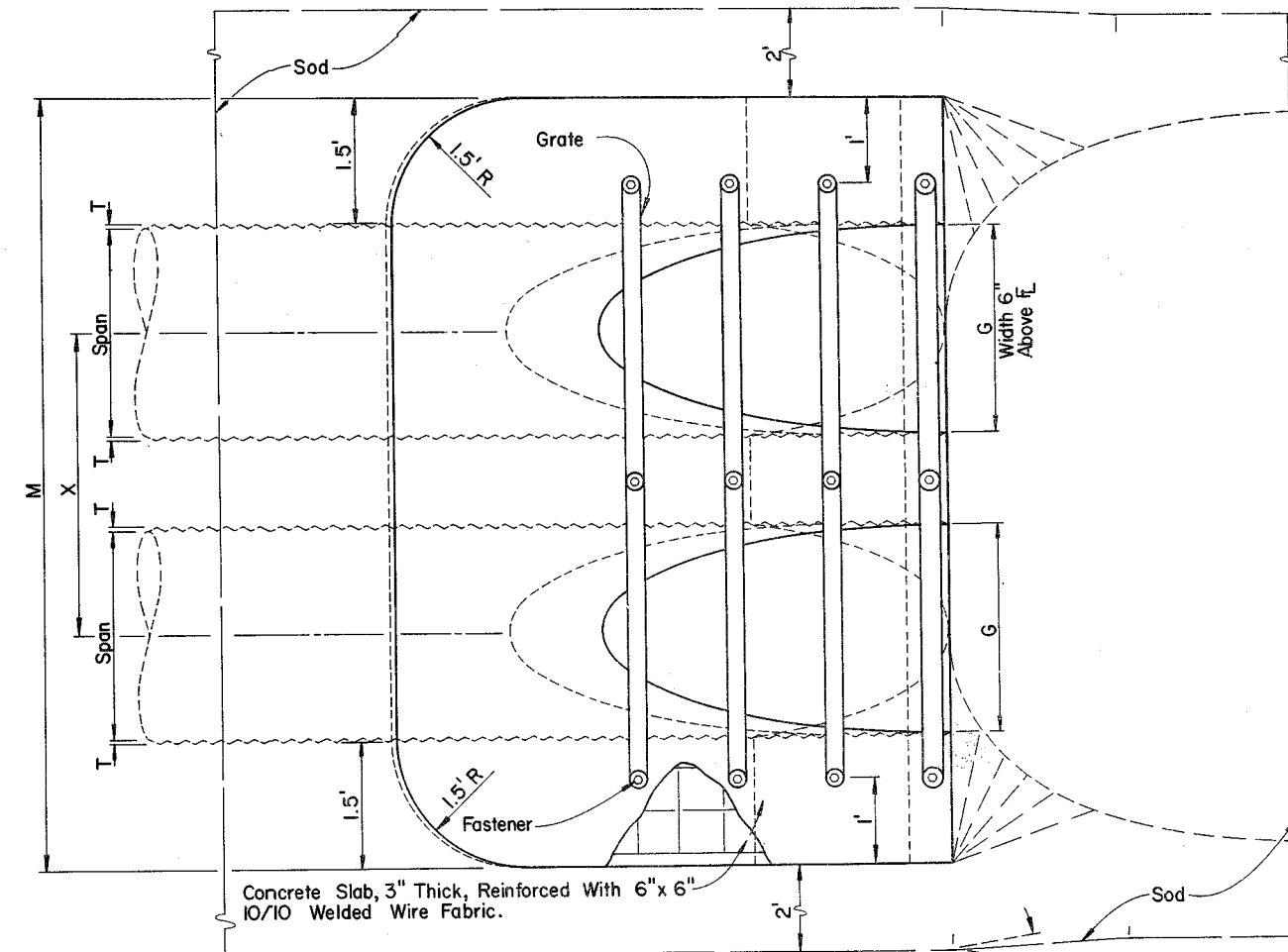
Note:
See Sheet 4 for Details and Sheet 5 for Notes.

| | | | |
|--|-----|--------------|--------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| SIDE DRAIN MITERED END SECTION SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE | | | |
| Designed by | EGR | Dates | 8/77 |
| Drawn by | HKH | Dates | 8/77 |
| Checked by | JVG | Dates | 8/77 |
| F.H.W.A. Approved: 10/21/77 | | Revision No. | 81 |
| | | Sheet No. | 2 of 5 |
| | | Index No. | 273 |

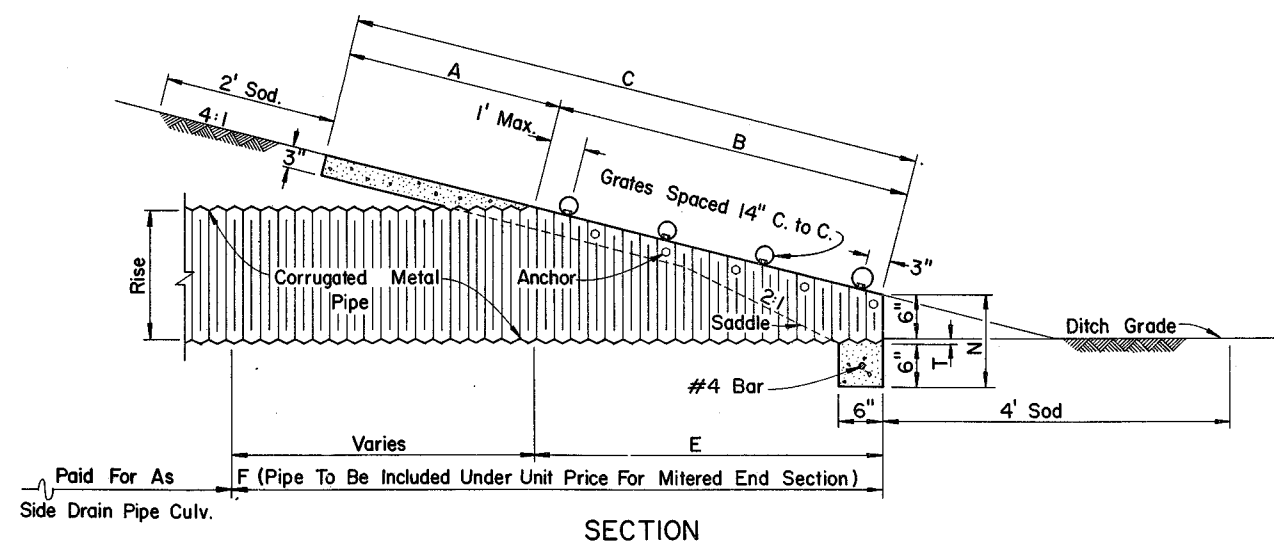
| DIMENSIONS & QUANTITIES | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|------|--------|------|--------|--------|--------|-----|-------|-------------|-------------|-------------|------------|-------|----------------------|-------------------|---------------------|-------------|-------------|------------|--------------------|-------------|-------------|------------|
| 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



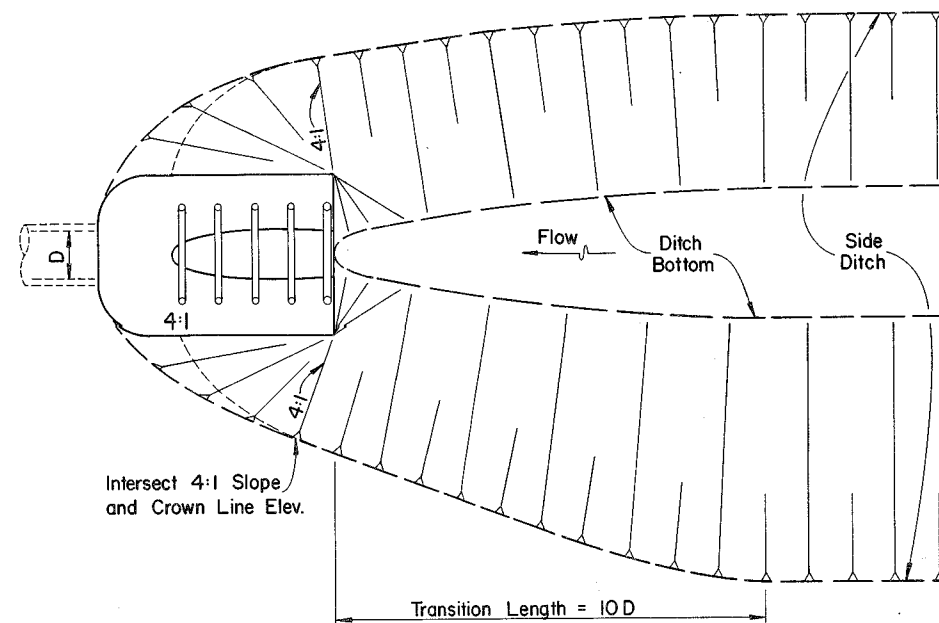
TOP VIEW - MULTIPLE PIPE



SECTION

Note:
See Sheet 4 for Details and Sheet 5 for Notes.

| | | | |
|---|-----|------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| SIDE DRAIN MITERED END SECTION SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH | | | |
| Designed by | EGR | 8/77 | Approved By <i>De. Bull</i> Deputy Design Engineer, Roadways |
| Drawn by | HKH | 8/77 | |
| Checked by | JVB | 8/77 | |
| F.H.W.A. Approved: 10/21/77 | | 81 | 3 of 5 |
| | | | 273 |



PLAN

DITCH TRANSITION

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 and pipe-arch size 35" x 24" or greater shall be grouted unless excepted in the plans. Smaller sizes of pipe shall be grouted only when called for in the 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.
12. Elliptical concrete pipe mitered end sections shall be constructed using appropriate mitered end section details for round concrete pipe and corrugated metal pipe arch, sheets 1, 3, 4 and 5.

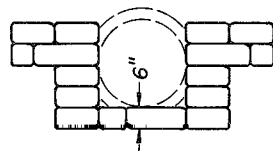
DESIGN NOTES

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.

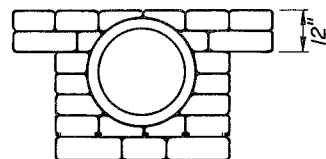
| | | | | | |
|---|--|--------------|--|-----------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| SIDE DRAIN MITERED END SECTION NOTES & INFORMATION | | | | | |
| Designed by | | Names | | Dates | |
| EGR | | HKG | | 8/77 | |
| Drawn by | | Names | | Dates | |
| HKG | | JVG | | 8/77 | |
| Checked by | | Names | | Dates | |
| JVG | | JVG | | 8/77 | |
| F.H.W.A. Approved: 10/21/77 | | Revision No. | | Sheet No. | |
| | | 81 | | 5 of 5 | |
| | | | | 273 | |



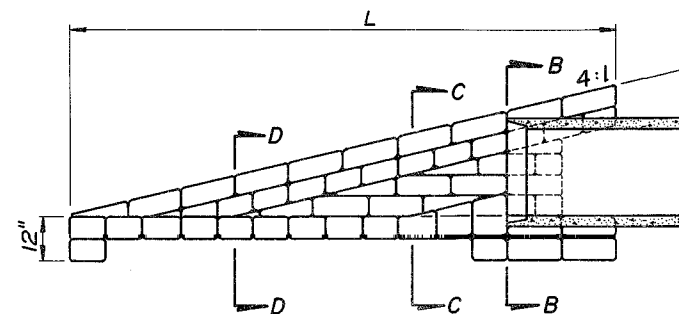
SECTION DD



SECTION CC



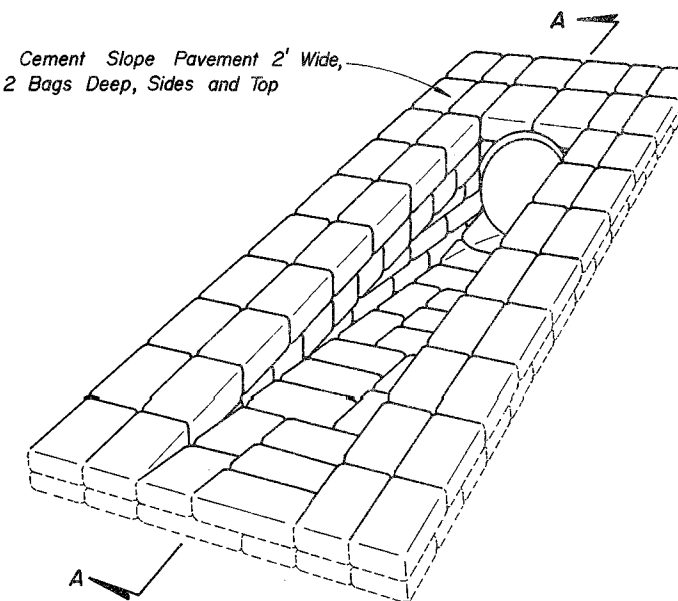
SECTION BB



SECTION AA

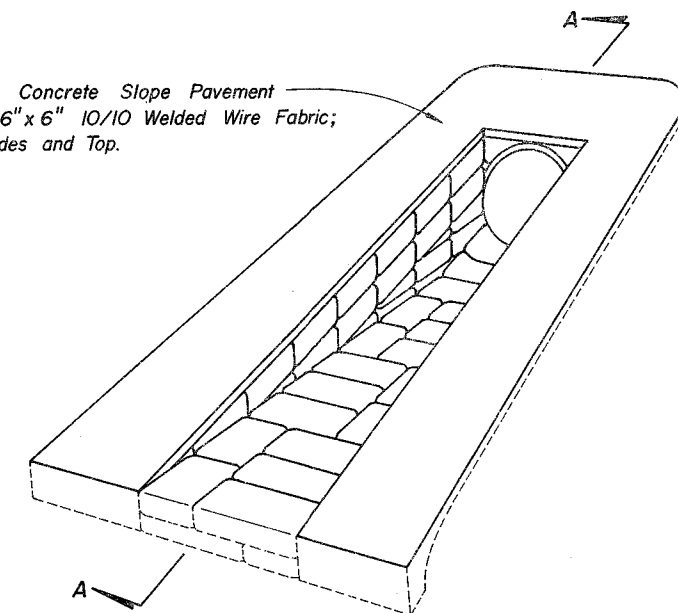
| ESTIMATED QUANTITIES & DIMENSIONS | | | | | |
|-----------------------------------|--------|--------------|------------------------------|---------------|-------|
| PIPE SIZE | L CMP | L Conc. Pipe | SAND-CEMENT RIPRAP (Cu. Yd.) | SOD (Sq. Yd.) | |
| 15" | 8'-2" | 8'-9" | 2.2 | 90 | 8.40 |
| 18" |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

Sand Cement Slope Pavement 2' Wide, 2 Bags Deep, Sides and Top

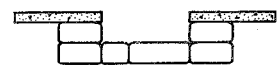


ISOMETRIC

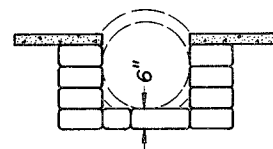
Reinforced Concrete Slope Pavement 3" Thick; 6"x6" 10/10 Welded Wire Fabric; 2' Wide Sides and Top.



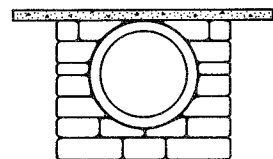
ISOMETRIC



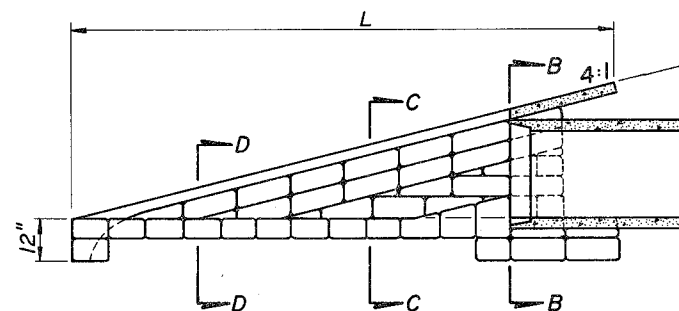
SECTION DD



SECTION CC



SECTION BB



SECTION AA

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

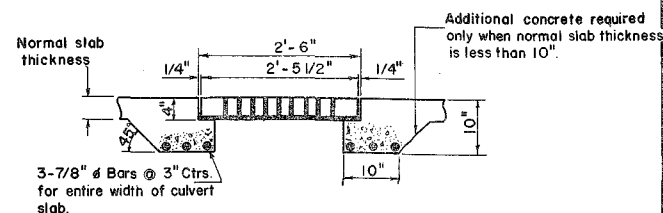
GENERAL NOTE

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

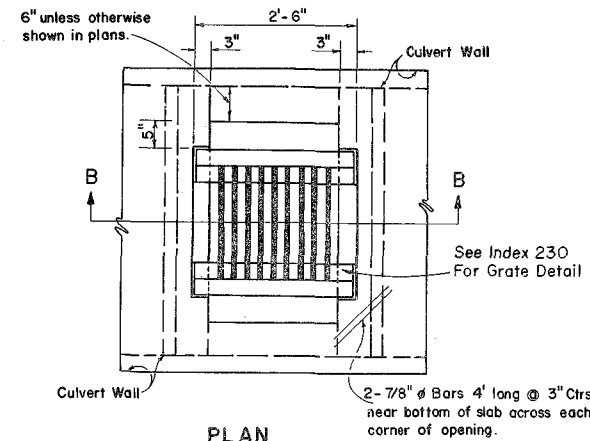
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

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

| Names | Dates | Approved By |
|-----------------------------|-------|---|
| Designed by EGR | 10/77 | <i>De Bullard</i> Deputy Design Engineer, Roadways |
| Drawn by HKH | 10/77 | |
| Checked by JVG | 10/77 | |
| F.H.W.A. Approved: 10/23/78 | | Revision No. 80 |
| | | Sheet No. 1 of 1 |
| | | Index No. 274 |

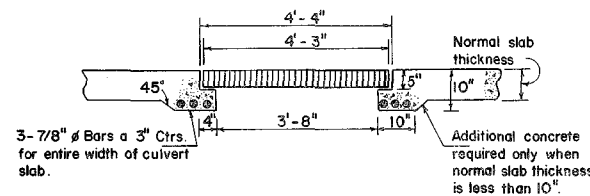


SECTION BB

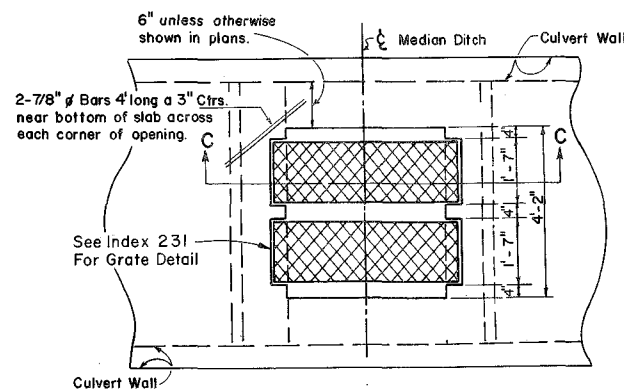


PLAN

INLET TYPE A GRATE



SECTION CC

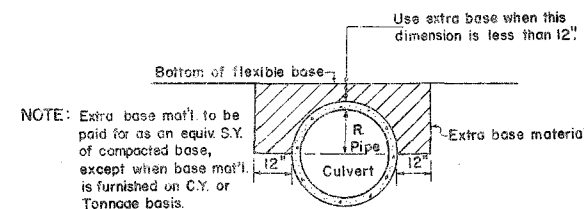
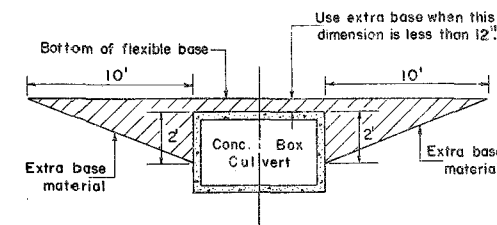


PLAN

INLET TYPE B GRATE

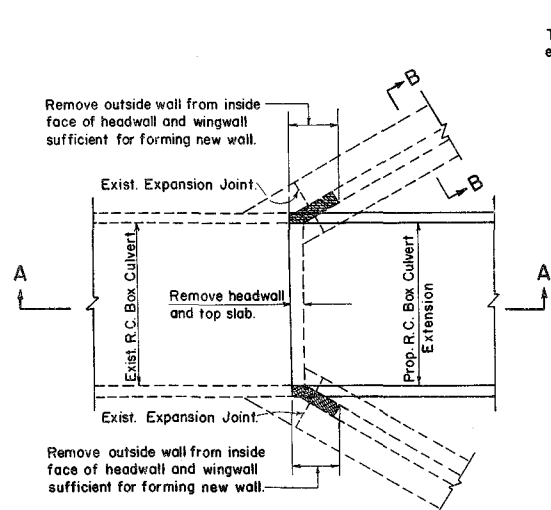
INLET IN TOP OF BOX CULVERT

NOTE:
1. Cost of Steel Grating to be included in cost of Box Culvert.
2. All steel shall be 11/4" clear.



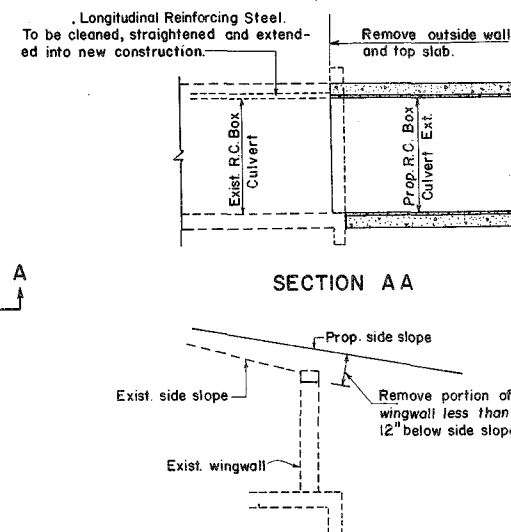
NOTE: Extra base mat'l. to be paid for as an equiv. S.Y. of compacted base, except when base mat'l. is furnished on C.Y. or Tonnage basis.

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



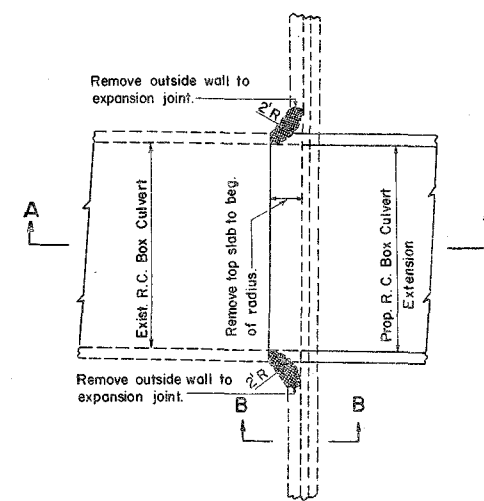
PLAN

FLARED ENDWALL



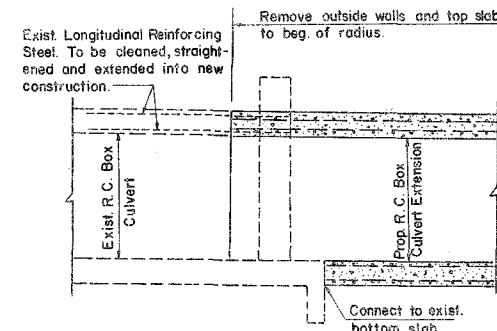
SECTION AA

SECTION BB

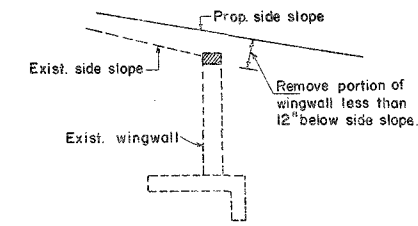


PLAN

STRAIGHT ENDWALL



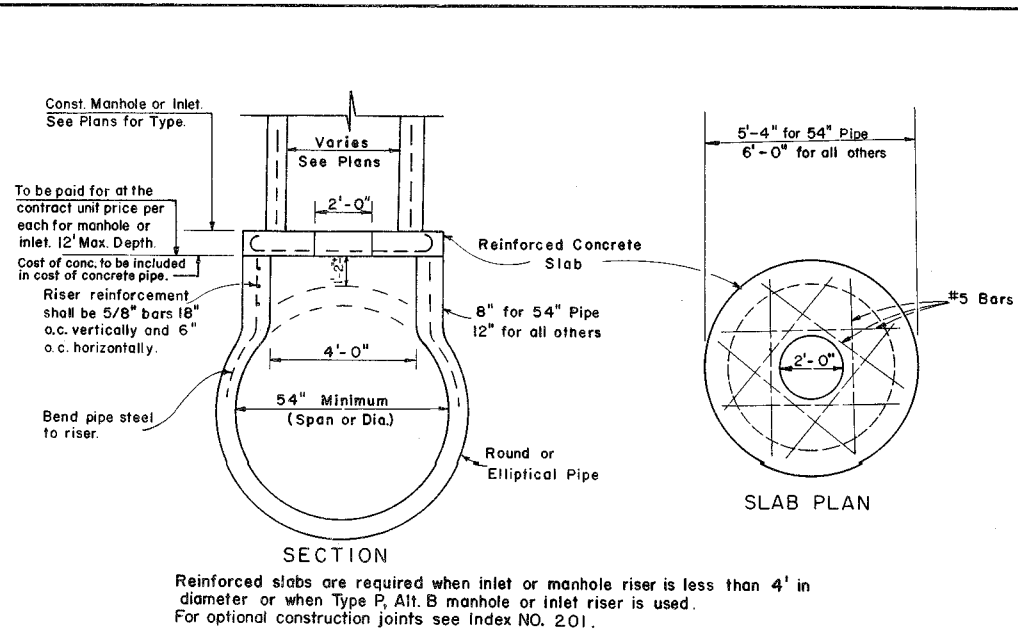
SECTION AA



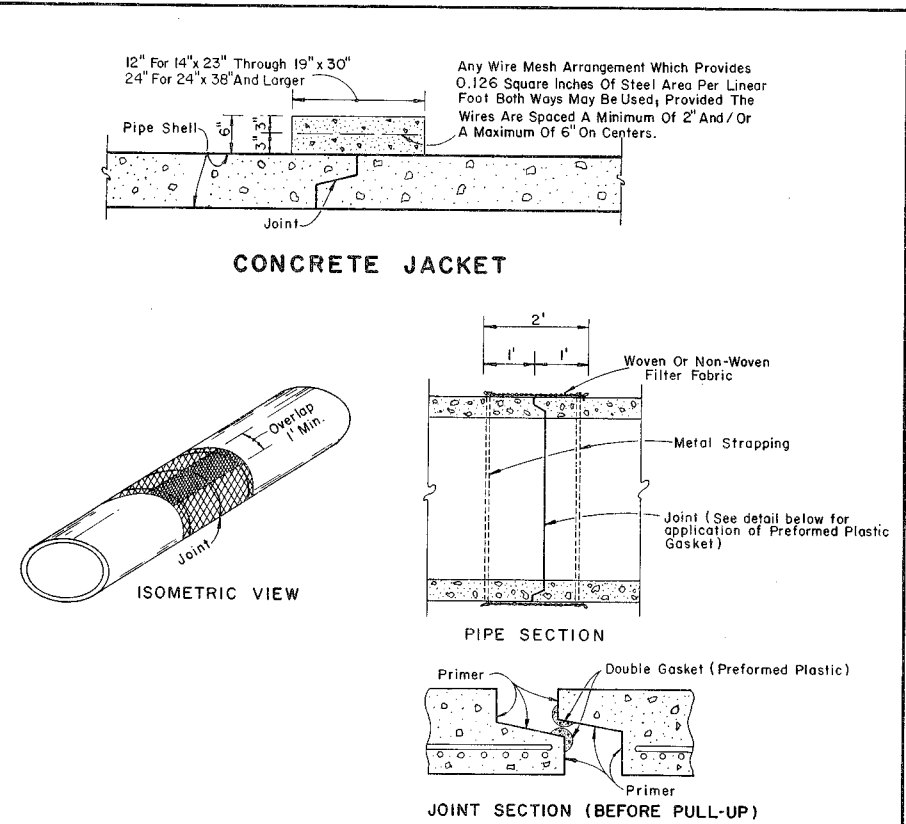
SECTION BB

CONNECTION DETAILS FOR BOX CULVERT EXTENSIONS

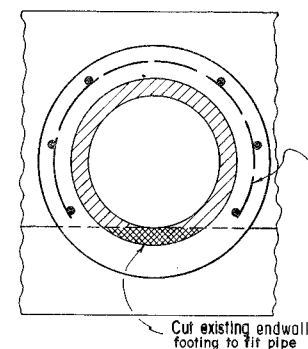
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | |
|--|-------|--------|--------------|-----------|
| MISCELLANEOUS DRAINAGE DETAILS | | | | |
| Designed by | Names | Dates | Approved By | |
| Drawn by | | | J. C. Bull | |
| Checked by | | | Revision No. | Sheet No. |
| F.H.W.A. Approved: 11/16/78 | 81 | 1 of 3 | 280 | |



INLETS OR MANHOLES ON INTEGRAL PRECAST CONCRETE RISER FOR CONCRETE PIPE

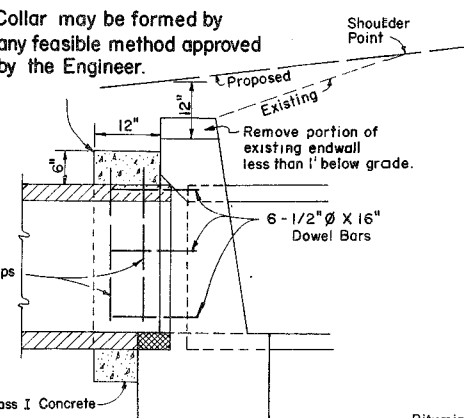


Cost of Concrete and Reinforcing Steel to be included in Contract Unit Price for Pipe Culvert.

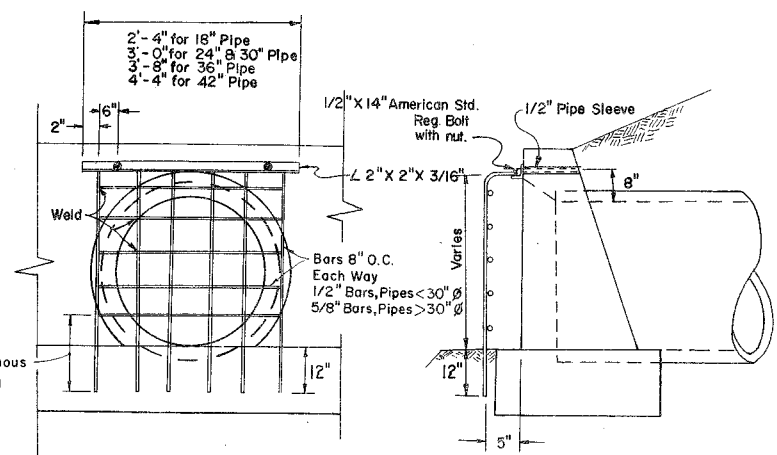


CONCRETE COLLAR FOR EXTENSION OF EXISTING PIPE CULVERTS

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

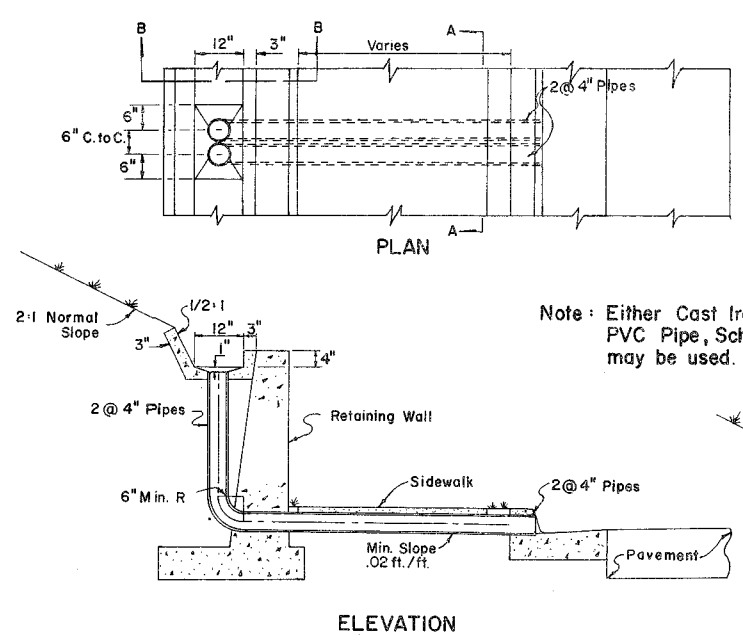
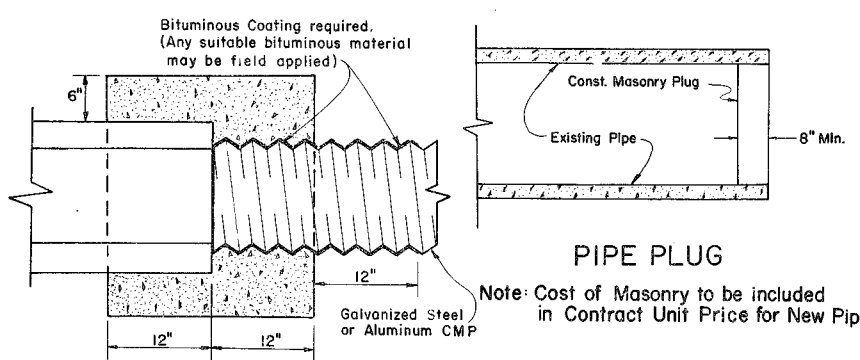
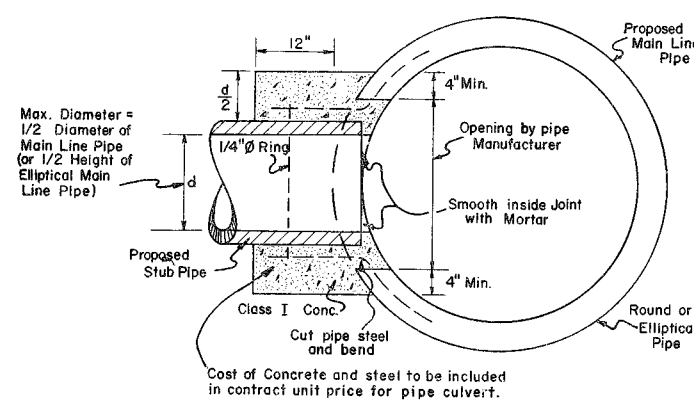


Note: Spigot end to be placed in existing Endwall regardless of direction of flow.



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 GUTTER AND DRAINS AT RETAINING WALLS

Note: Either Cast Iron Pipe or PVC Pipe, Schedule 40, may be used.

| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | |
|--|-------|-------|--------------|-----------|
| MISCELLANEOUS DRAINAGE DETAILS | | | | |
| Designed by | Names | Dates | Approved By | |
| Drawn by | | | De Muel | |
| Checked by | | | Revision No. | Sheet No. |
| F.H.W.A. Approved: | | | 81 | 2 of 3 |
| | | | | 280 |

PLEASE RETAIN THIS SHEET FOR
STANDARD MYLAR SHEET
YOUR PERMANENT FILES.

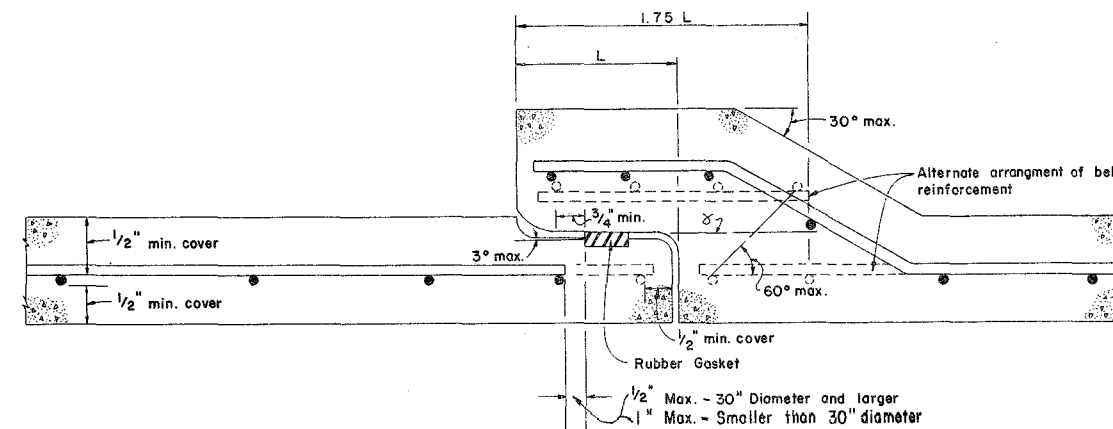
GENERAL NOTES

- 1) 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

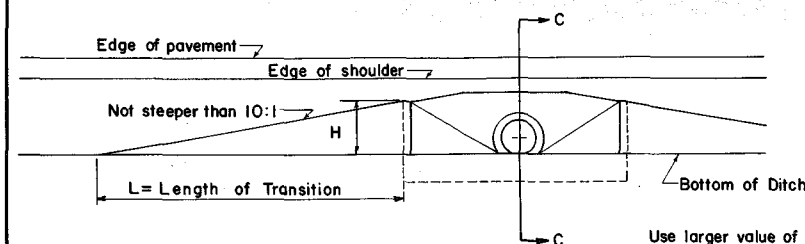
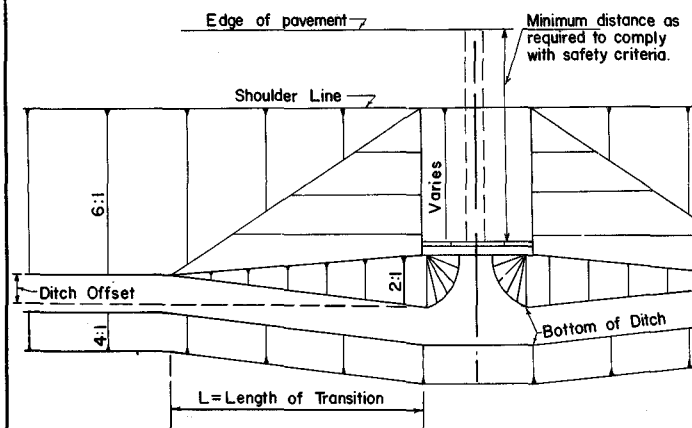
Classes - III, IV, V; Wall- A,B,C

| 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 |



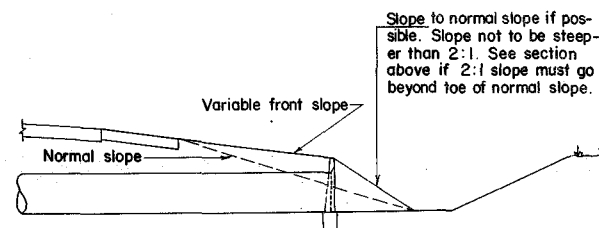
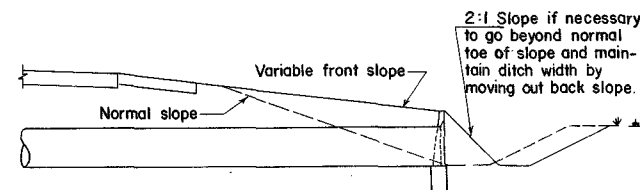
Ø All circumferential steel located above this line within 1.75 L is defined as bell reinforcement.

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



- 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



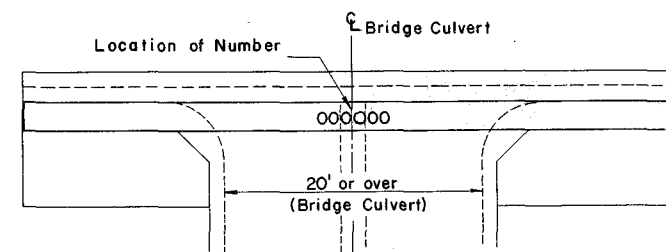
NOTE: Filling or excavation of variable slopes to be done during normal grading operations.

SECTION CC

Paint Recessed
Surfaces Black

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 $\frac{3}{8}$ " "V" Grooves.
"V" Grooves shall be formed by preformed Figures.

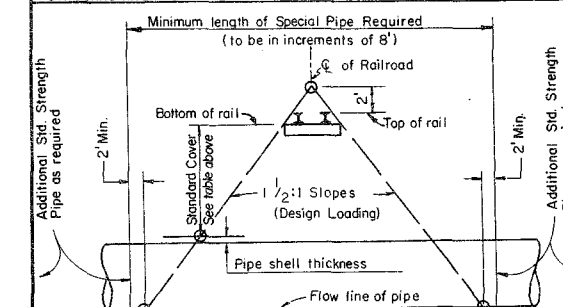


TOP VIEW OF HEADWALL

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 |



METHOD FOR DETERMINING THE LENGTH OF SPECIAL PIPE REQUIRED UNDER RAILROADS

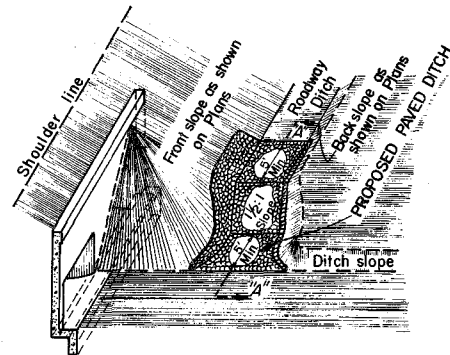
* Clearance is for casing pipe. All subgrade carrier pipelines and wirelines will be installed within a casing pipe which will extend from Right-of-Way line to Right-of-Way line.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MISCELLANEOUS DRAINAGE DETAILS

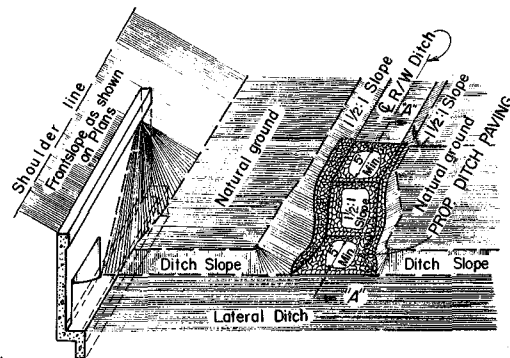
| Names | Dates | Approved By |
|-----------------------------|-----------|-------------|
| Designed by | | |
| Drawn by | | |
| Checked by | | |
| Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 11/16/78 | 81 | 3 of 3 |

280

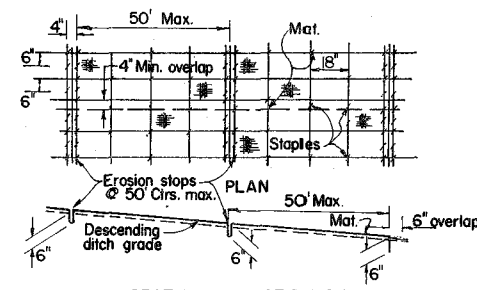


JUNCTION OF ROADWAY DITCH AND LATERAL DITCH

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



JUNCTION OF R/W DITCH AND LATERAL DITCH

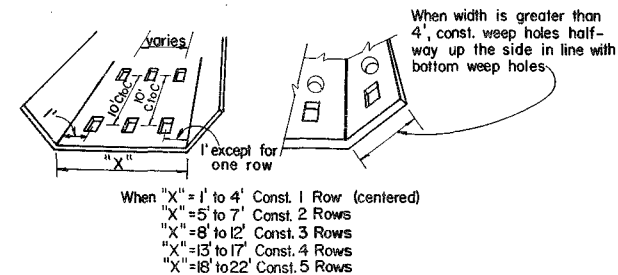


SECTION AT E OF DITCH



CROSS SECTION OF DITCH

MATting FOR EROSION CONTROL

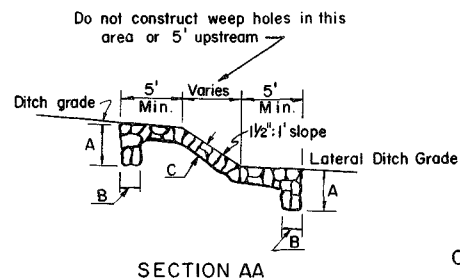


Notes: All weep holes to be 3" X 4" rectangle or 4" or 5" Dia. circular hole. 1/2 Cu. ft. (12" x 12" x 6") of No. 6 aggregate to be placed under each hole. 1 Sq. ft. of galvanized wire mesh (1/4" openings) shall be placed between the aggregate and the concrete. Cost of holes, aggregate and wire mesh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

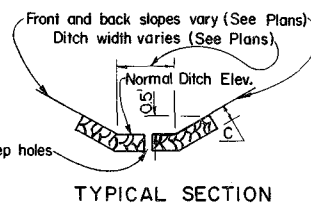
WEEP HOLE ARRANGEMENT

GENERAL NOTES

1. Type of ditch pavement shall be as shown on plans.
2. 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.
1/2" expansion joints with preformed joint filler shall be constructed at all inlets, endwalls, and at intervals of not more than 200'.
3. Salvaged concrete ditch pavement shall consist of concrete pav't., sidewalk, curb and gutter with a 3 sq. ft. minimum surface area.
4. All joints shall be grouted when rubble, sand cement or salvaged concrete paving is used for ditch paving.
5. Toewalls are to be used with all ditch paving. A toewall is not required adjacent to drainage structures.
6. When directed by the Engineer, weep hole spacing may be reduced to 5' minimum.
7. For junction of R/W ditch spillway and lateral ditch, sides of paving to be 1' high minimum.
8. 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.

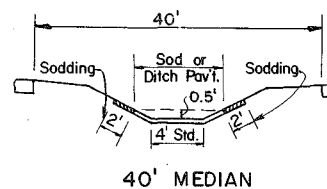


PROFILE OF DITCH PAVT. AT LOCATIONS OTHER THAN JUNCTION WITH LATERAL DITCH

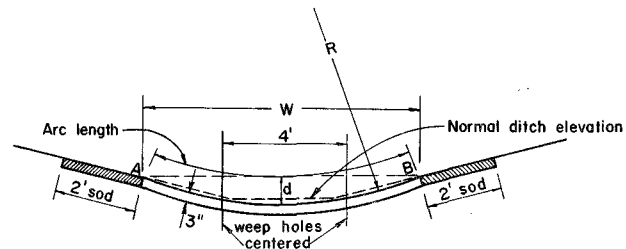


TYPICAL SECTION

| 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" |
| S.B.R.M. | 24" | 12" | 4" |
| Salvaged Concrete | 24" | 12" | 3" |



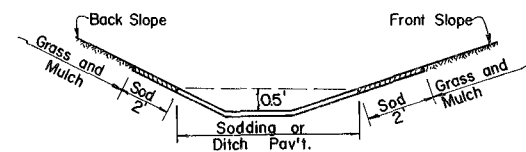
40' MEDIAN



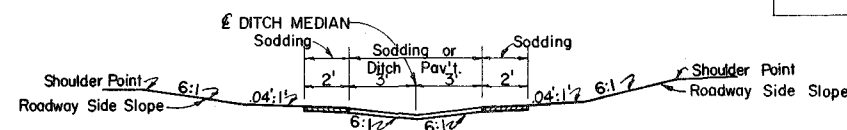
| TO REPLACE: | W | d | R | No. of rows of weep holes | Arc Length |
|----------------------------------|-----|------|-----|---------------------------|------------|
| 6' Median Swale | 6' | .24' | 19' | 0 | 6.0 |
| 6:1 Front Slopes; 4:1 Back Slope | | | | | |
| 5' B.W. Ditch | 10' | .67' | 19' | 2 | 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 in center | 8.1 |

ALTERNATE DITCH PAVEMENT

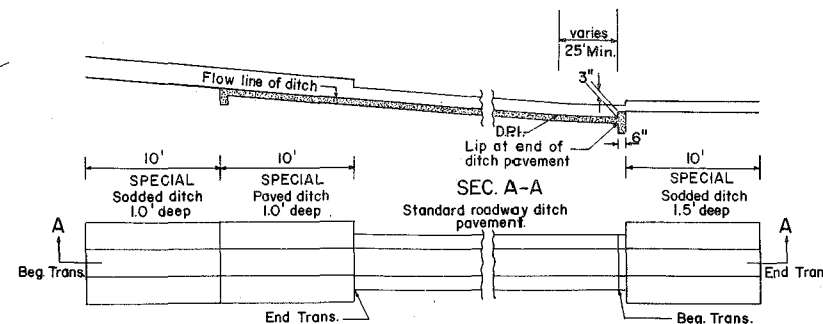
For use only where side slopes are 4:1 or flatter. Point "A" and "B" are to be the same elevation and should be used to locate the paved section.



ROADWAY SIDE DITCH



SWALED MEDIAN (No Weep Holes)



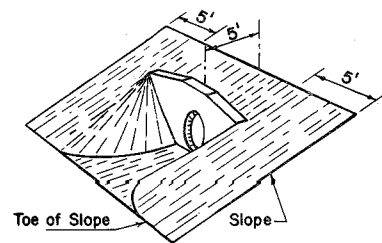
TRANSITIONS FROM PAVED TO UNPAVED SECTION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

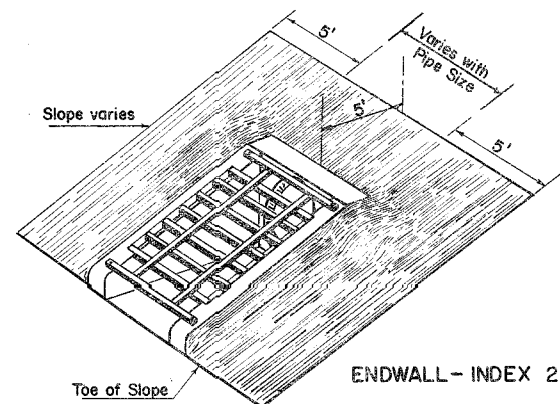
DITCH PAVEMENT & SODDING

| Names | Dates | Approved By |
|---------------------------|-------|-------------|
| Designed by | | |
| Drawn by | | |
| Checked by | | |
| F.H.W.A. Approved: 5/1/75 | 81 | 1 of 2 |

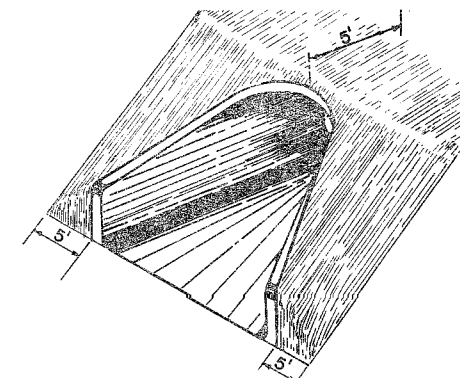
281



ENDWALL - INDEX 250



ENDWALL - INDEX 261



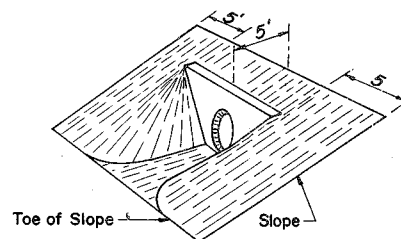
ENDWALL - INDEX 270

| 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 | 145 | 172 | 46.74 | 74.01 | 102.30 |
| 54" | 64 | 79 | 94 | 100 | 124 | 143 | 137 | 170 | 203 | | | |
| 60" | | | | | | | 157 | | | | | |
| Note: These quantities are for one pipe. | | | | | | | | | | | | |

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 |

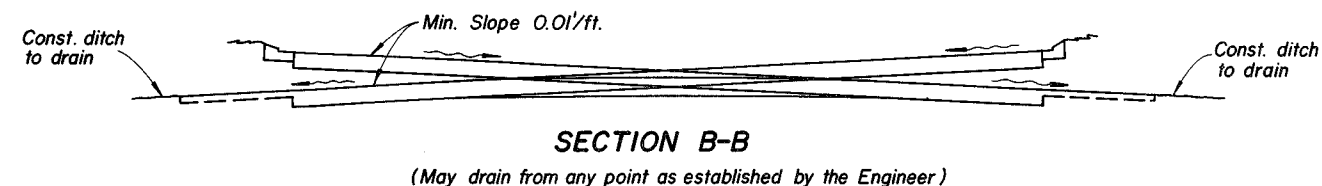
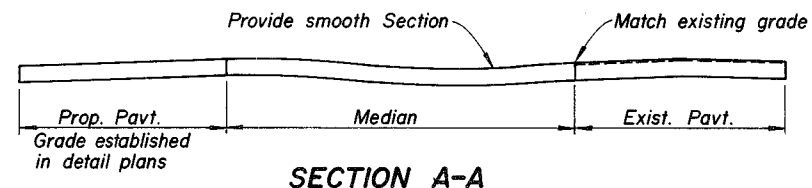
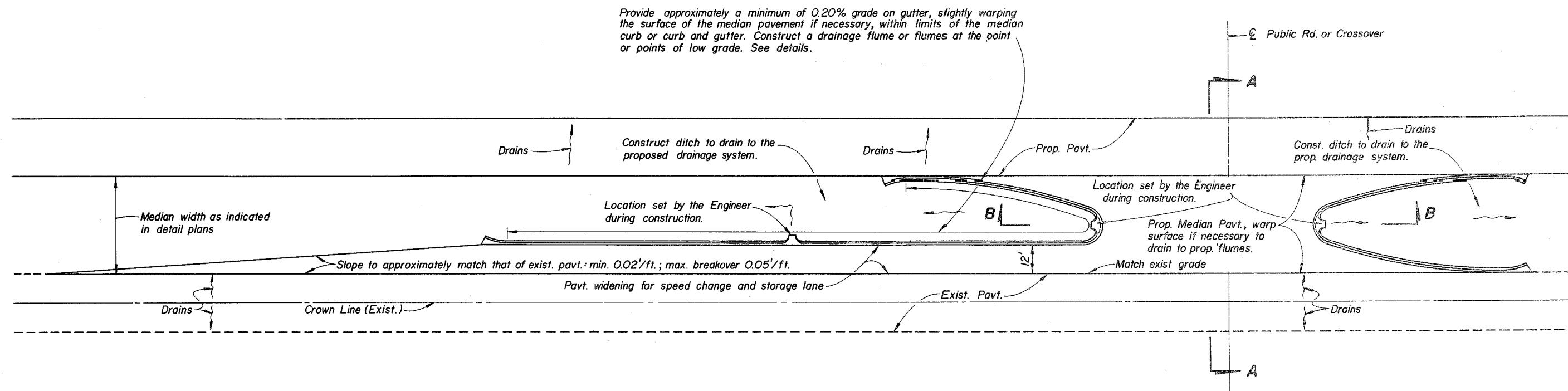
Note: Quantity for 2:1 is for endwall with baffles.



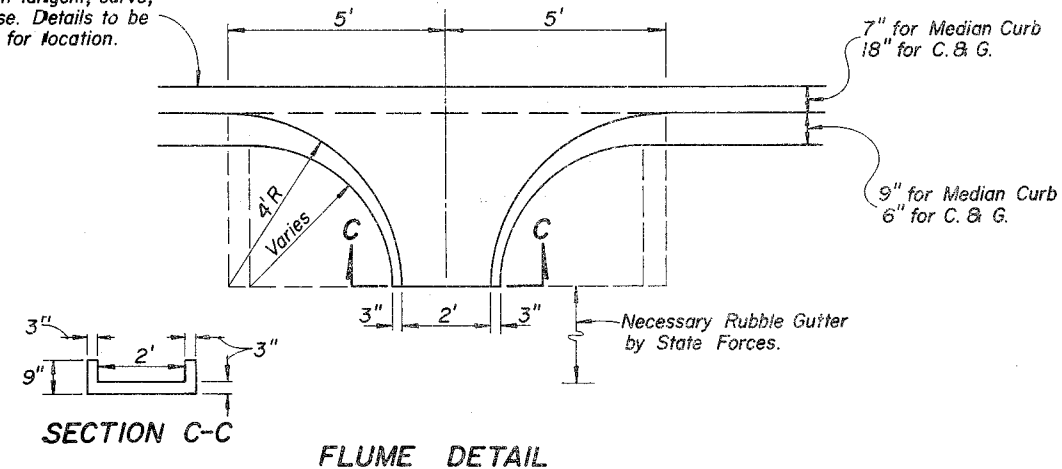
STRAIGHT ENDWALLS

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 | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | | | Deputy Design Engineer, Roadways | | |
| Checked by | | | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 7/7/75 | | | 81 | 2 of 2 | 281 |



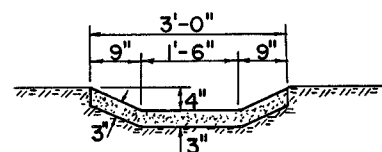
May be on tangent, curve, or at nose. Details to be modified for location.



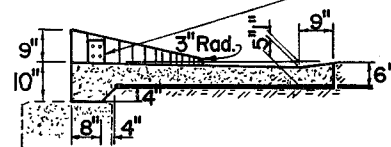
GENERAL NOTES: These details are to apply to projects which provide for the conversion of 2-lane sections to 4-lane divided highway sections and for superelevated sections of new 4-lane divided highways. Location of low point or points in gutters is to be set by the Engineer during construction and will 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 | Names | Dates | Approved By | | |
| Drawn by | CHR | 3/59 | De. Bull | | |
| Checked by | CDD | 3/59 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 3/20/75 | | | 80 | 1 of 1 | 283 |

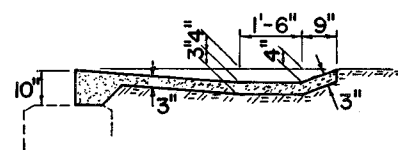
Note: Set reflector plates on right hand curb at bridge ends as shown. Plates to be furnished by D.O.T. and installed by the contractor. Cost of installing plates to be included in the contract unit price for concrete ditch pavement (3" thick).



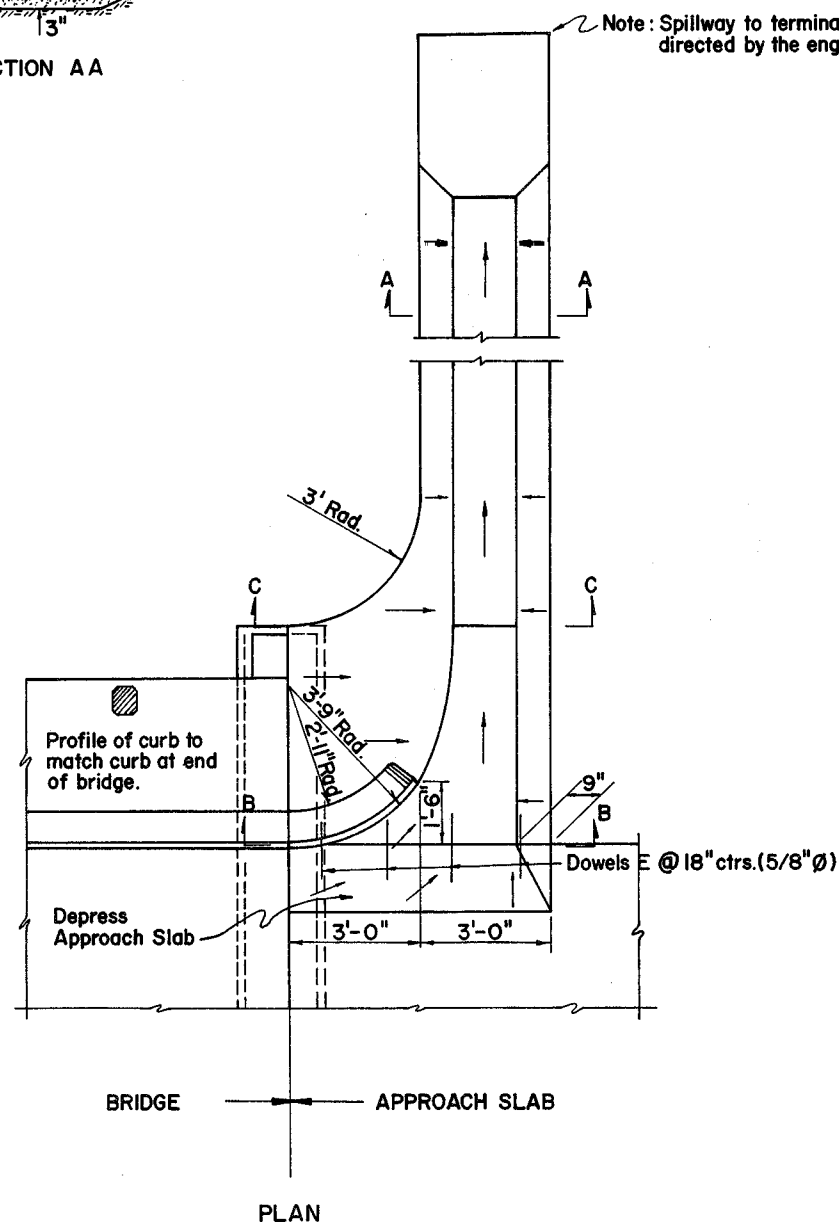
SECTION AA



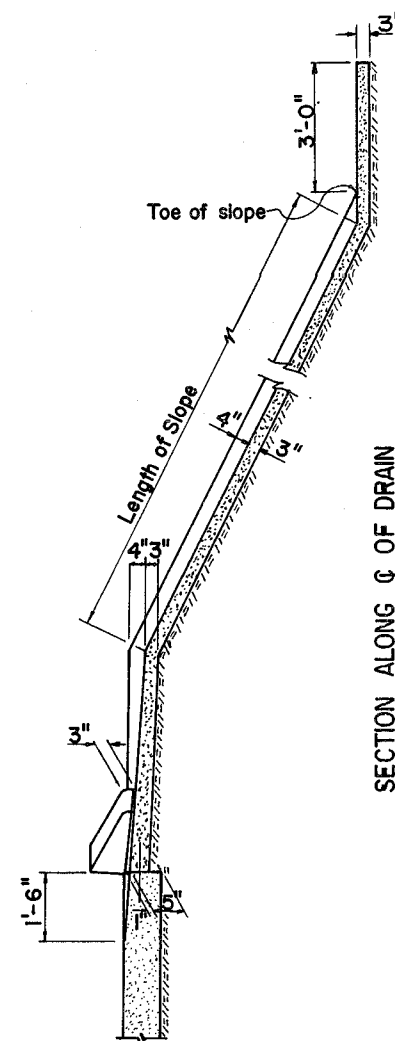
SECTION BB



SECTION CC



Note: Spillway to terminate as directed by the engineer.

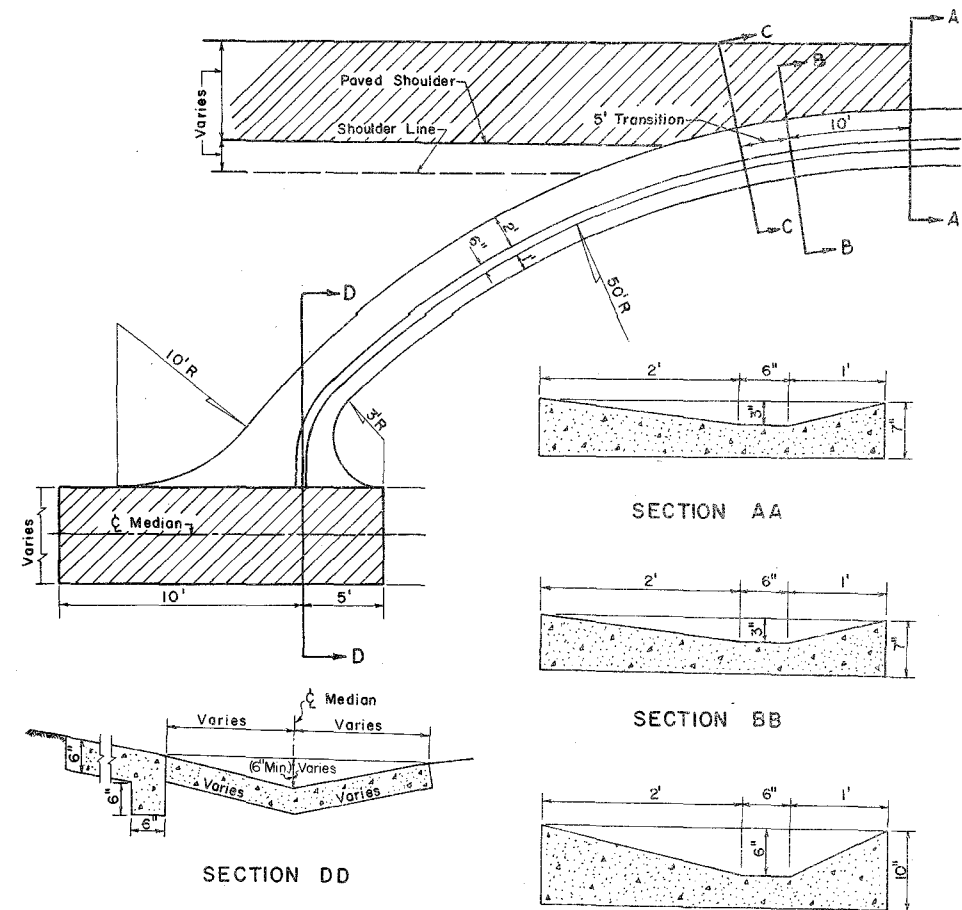


Dowels to be included in the contract unit price for concrete ditch pavement (3" thick).

| 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.

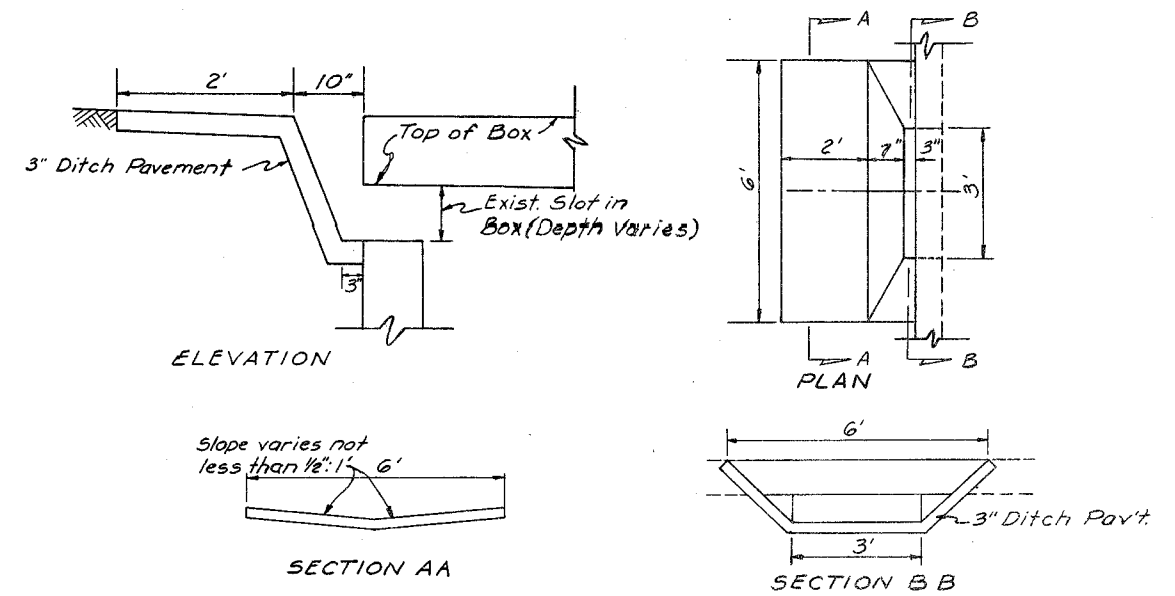
| | | | |
|--|----------------|---|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| CONCRETE SPILLWAYS BRIDGE END SPILLWAY | | | |
| Designed by C E S | Dates 12/51 | Approved By <i>De. [Signature]</i> Deputy Design Engineer, Roadways | |
| Drawn by H L F | 12/51 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 3/20/75 | | 81 | 1 of 2 |
| | | | 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.

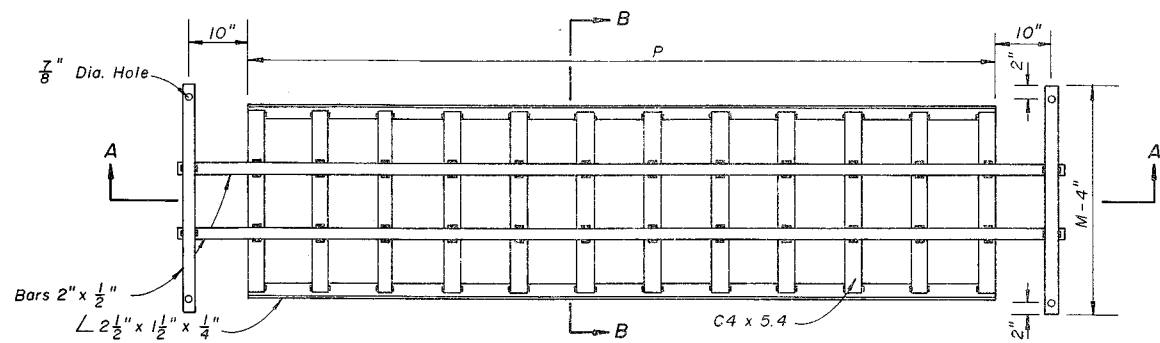
DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER
(TO BE USED WHERE INLETS, PIPES & ENDWALLS ARE IMPRACTICAL)

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

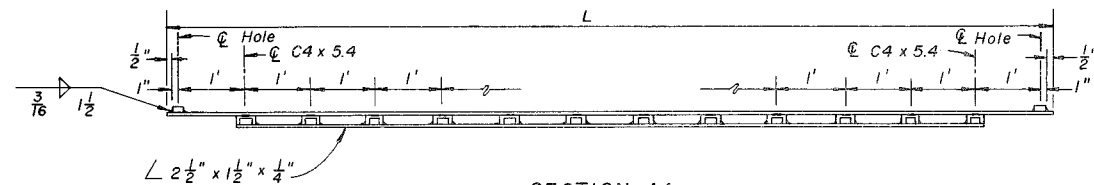


SAFETY MODIFICATION FOR
INLETS IN BOX CULVERTS

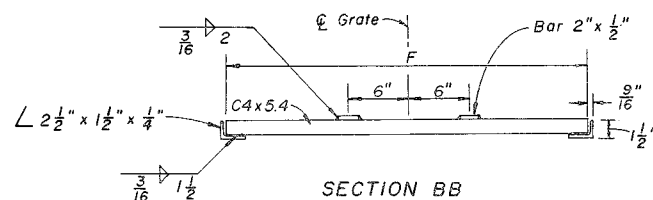
| | | | | |
|--|-----|-------|--------------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | |
| SAFETY MODIFICATIONS FOR INLETS IN BOX CULVERTS | | | | |
| Designed by | HAB | Dates | 7/67 | Approved By |
| Drawn by | MJT | 7/67 | | <i>De. [Signature]</i> Deputy Design Engineer,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



PLAN

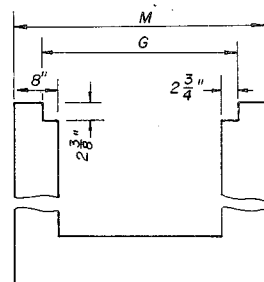


SECTION AA

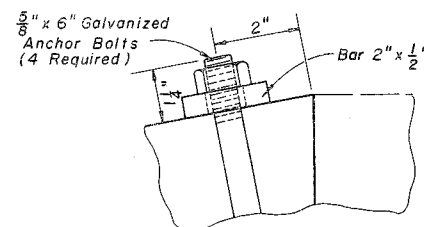


SECTION BB

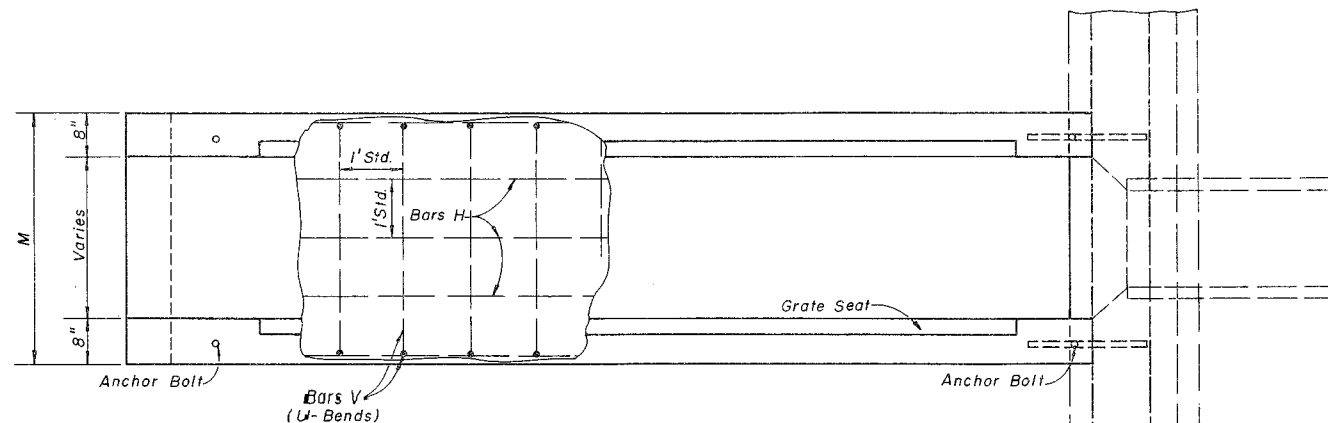
GRATE DETAIL



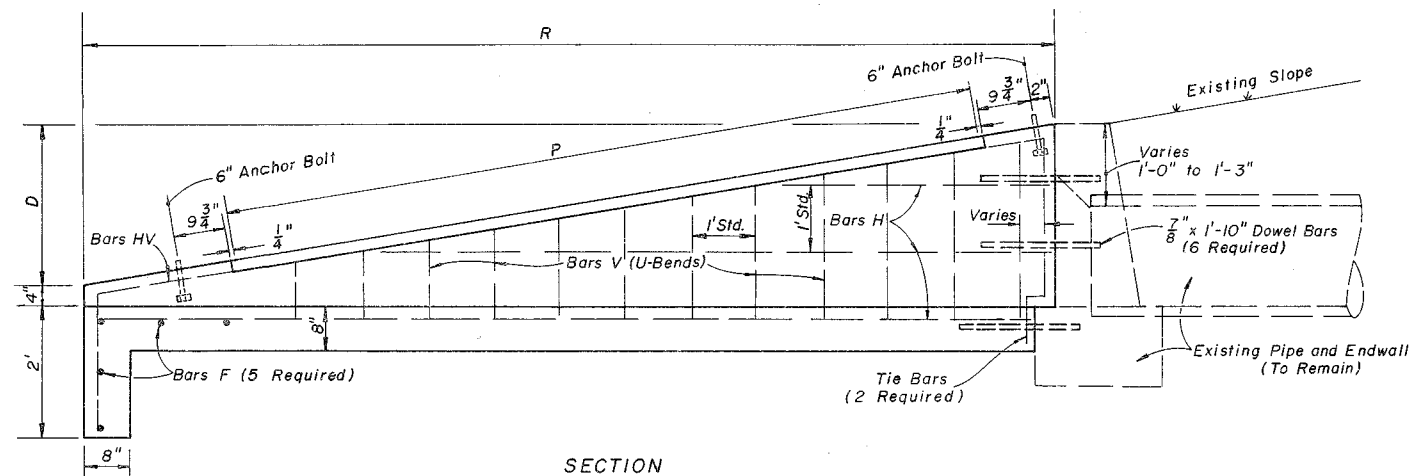
GRATE SEAT DETAIL



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 (0.20 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 | L | M-4" | P | Lbs. | |
| 6:1 | 15" | 10 | 2'-6 7/8" | 11'-3" | 3'-3" | 9'-4" | 99 | 298 |
| | 18" | 12 | 2'-9 1/8" | 13'-3" | 3'-6" | 11'-4" | 114 | 370 |
| | 24" | 15 | 3'-3 3/8" | 16'-3" | 4'-0" | 14'-4" | 138 | 499 |
| | 30" | 18 | 3'-9 3/8" | 19'-3" | 4'-6" | 17'-4" | 162 | 645 |
| 4:1 | 15" | 6 | 2'-6 7/8" | 7'-3" | 3'-3" | 5'-4" | 71 | 188 |
| | 18" | 7 | 2'-9 1/8" | 8'-3" | 3'-6" | 6'-4" | 80 | 228 |
| | 24" | 9 | 3'-3 3/8" | 10'-3" | 4'-0" | 8'-4" | 97 | 311 |
| | 30" | 11 | 3'-9 3/8" | 12'-3" | 4'-6" | 10'-4" | 114 | 407 |

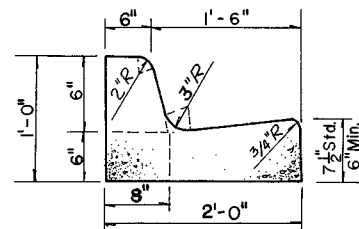
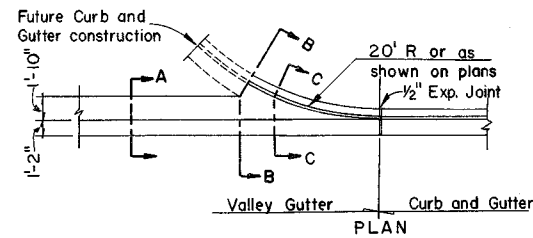
DIMENSIONS AND QUANTITIES PER U-ENDWALL

| Pipe Size | G | M | D | R | P | Class I Concrete - C.Y. | 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

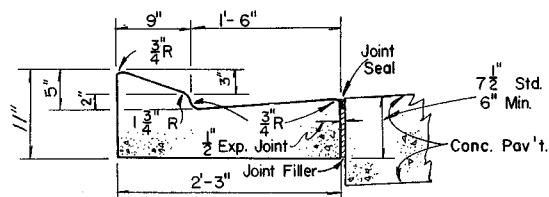
SAFETY MODIFICATIONS FOR ENDWALLS

| Names | Dates | Approved By |
|--------------------|-------|--|
| Designed by | | <i>De Kull</i> Deputy Design Engineer, Roadways |
| Drawn by | | |
| Checked by | | Revision No. |
| F.H.W.A. Approved: | 80 | Sheet No. 1 of 1 |
| | | Index No. 295 |

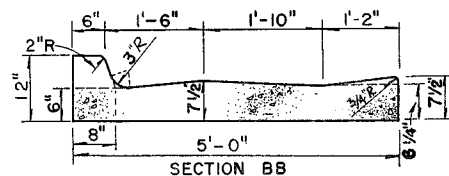


* Note (1) : When used on high side of roadways, the cross slope of the gutter shall match the cross slope of the adjacent pavement and the thickness of the lip shall be 6", unless otherwise shown on plans.

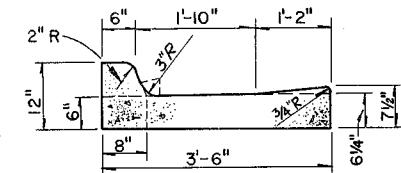
TYPE F



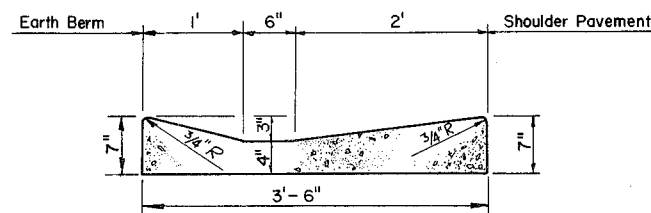
TYPE E
* See Note (1) Above.



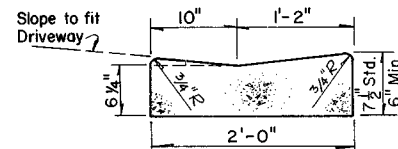
SECTION BB



SECTION CC
VALLEY GUTTER

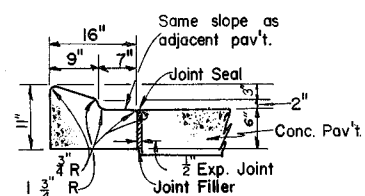


SHOULDER GUTTER

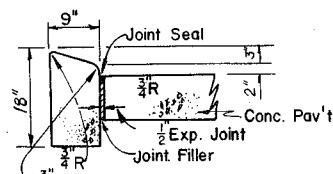


DROP CURB
* See Note (1) Above

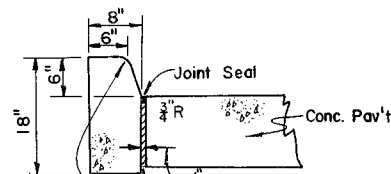
CONCRETE CURB AND GUTTER



TYPE A



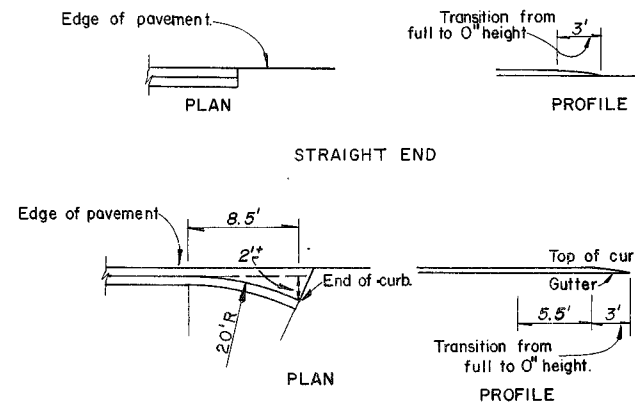
TYPE B



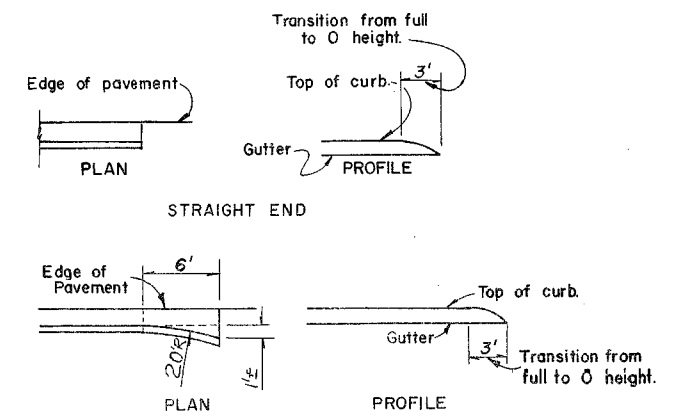
TYPE D

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.

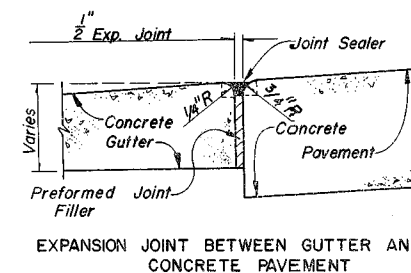


FLARED END
CURB TYPE A

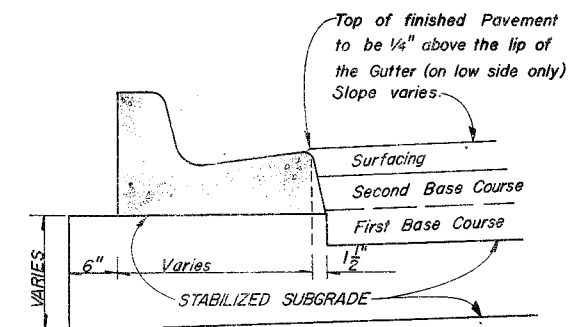


FLARED END
CURB AND GUTTER TYPES E & F

MEDIAN CURB AND GUTTER ENDINGS

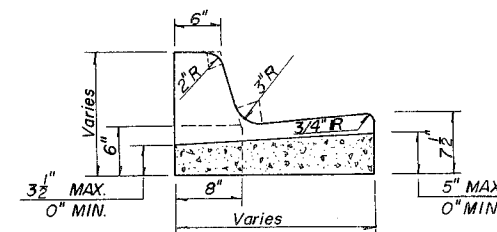


EXPANSION JOINT BETWEEN GUTTER AND CONCRETE PAVEMENT



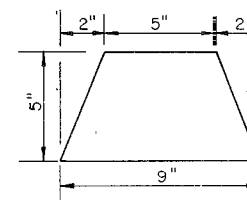
CURB AND GUTTER ADJACENT TO FLEXIBLE PAVEMENT

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.

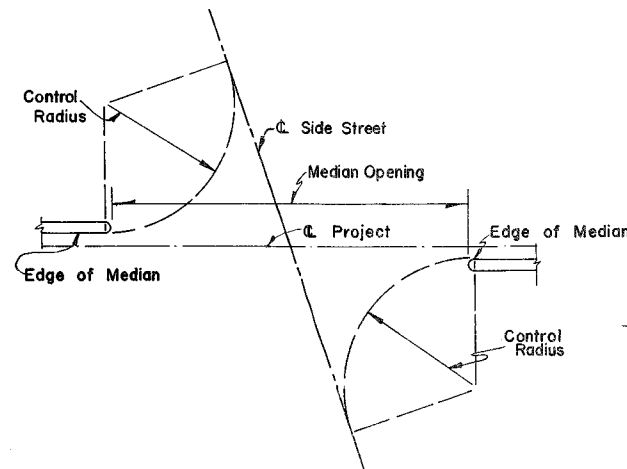


ASPHALTIC CONCRETE CURB

GENERAL NOTES

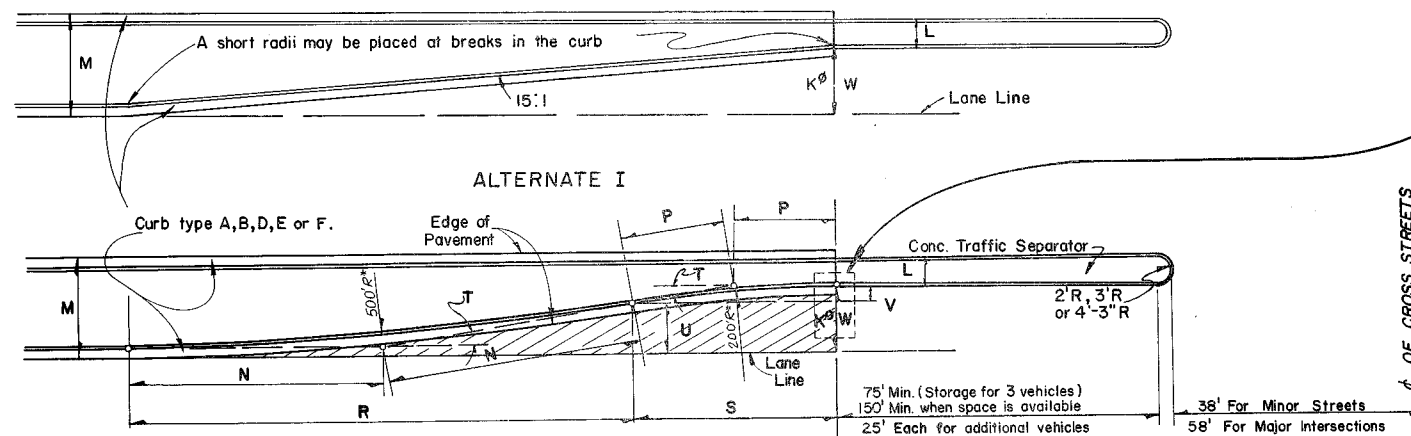
1. For Curb and Gutter and Traffic Separator provide 1/8" - 1/4" contraction joints at 10' centers.
2. All Curb and Gutter Details are shown for construction adjacent to Concrete Pavement, unless otherwise noted.
3. End of Curbs Types B and D shall transition from full to zero height in 3 feet.

| | | | |
|--|-------|-------|--|
| 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 | | 81 | Sheet No. 1 of 1 |
| | | | Index No. 300 |



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

METHOD OF DETERMINING MEDIAN OPENINGS AT SKEWED SIDE STREETS



* 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.

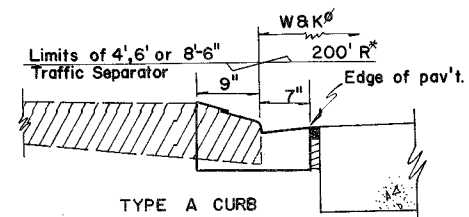
Ø Dimensions K and W are identical except when median curb is type D or curb and gutter, type F. Dimension K is from lane line to the face of curb. Dimension W is from lane line to traffic separator.

ALTERNATE II

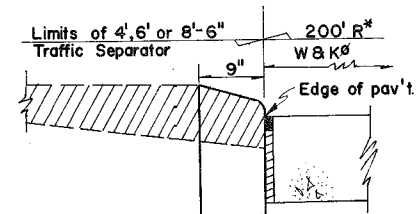
NOTE: HATCHED PORTION INDICATES AREA GIVEN IN TABLE BELOW

| TABLE OF DIMENSIONS AND QUANTITIES FOR MEDIAN STORAGE LANES | | | | | | | | | | | | |
|---|--------|-----------|--------|--------|--------|--------|---------------|-------|-------|----------------|---------|--------------|
| L | M | CURB TYPE | N | P | R | S | T | U | V | K ^Ø | 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" | 529.8 |
| | | 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" | 395.2 |
| | | F | 39.84' | 15.94' | 79.18' | 31.67' | 09° 06' 42.8" | 7.81' | 2.36' | 10'-4" | 10'-2" | 418.6 |
| 4' | 17'-6" | A | 47.14' | 18.86' | 93.44' | 37.38' | 10° 46' 16.8" | 9.39' | 3.52' | 12'-11" | 12'-11" | 690.2 |
| | | B | 49.34' | 19.73' | 97.72' | 39.09' | 11° 16' 15.0" | 9.81' | 3.69' | 13'-8" | 13'-6" | 790.4 |
| | | D | 49.34' | 19.73' | 97.72' | 39.09' | 11° 16' 15.0" | 9.81' | 3.69' | 13'-8" | 13'-6" | 790.4 |
| | | E | 43.46' | 17.39' | 86.28' | 34.51' | 09° 56' 10.9" | 9.00' | 3.00' | 12'-0" | 12'-0" | 542.1 |
| | | F | 44.15' | 17.66' | 87.63' | 35.05' | 10° 05' 35.7" | 9.24' | 2.93' | 12'-4" | 12'-2" | 568.0 |
| 6' | 17'-6" | A | 43.12' | 17.25' | 85.60' | 34.24' | 09° 51' 25.3" | 7.96' | 2.95' | 10'-11" | 10'-11" | 529.8 |
| | | 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" | 395.2 |
| | | F | 39.84' | 15.94' | 79.18' | 31.67' | 09° 06' 42.8" | 7.81' | 2.36' | 10'-4" | 10'-2" | 418.6 |
| 6' | 19'-6" | A | 47.14' | 18.86' | 93.44' | 37.38' | 10° 46' 16.8" | 9.39' | 3.52' | 12'-11" | 12'-11" | 690.2 |
| | | B | 49.34' | 19.73' | 97.72' | 39.09' | 11° 16' 15.0" | 9.81' | 3.69' | 13'-8" | 13'-6" | 790.5 |
| | | D | 49.34' | 19.73' | 97.72' | 39.09' | 11° 16' 15.0" | 9.81' | 3.69' | 13'-8" | 13'-6" | 790.4 |
| | | E | 43.46' | 17.39' | 86.28' | 34.51' | 09° 56' 10.9" | 9.00' | 3.00' | 12'-0" | 12'-0" | 542.1 |
| | | F | 44.15' | 17.66' | 87.63' | 35.05' | 10° 05' 35.7" | 9.24' | 2.93' | 12'-4" | 12'-2" | 568.0 |
| 8'-6" | 22'-0" | A | 47.14' | 18.86' | 93.44' | 37.38' | 10° 46' 16.8" | 9.39' | 3.52' | 12'-11" | 12'-11" | 690.2 |
| | | B | 49.34' | 19.73' | 97.72' | 39.09' | 11° 16' 15.0" | 9.81' | 3.69' | 13'-8" | 13'-6" | 790.5 |
| | | D | 49.34' | 19.73' | 97.72' | 39.09' | 11° 16' 15.0" | 9.81' | 3.69' | 13'-8" | 13'-6" | 790.4 |
| | | E | 43.46' | 17.39' | 86.28' | 34.51' | 09° 56' 10.9" | 9.00' | 3.00' | 12'-0" | 12'-0" | 542.1 |
| | | F | 44.15' | 17.66' | 87.63' | 35.05' | 10° 05' 35.7" | 9.24' | 2.93' | 12'-4" | 12'-2" | 568.0 |

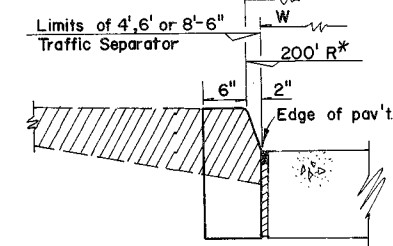
Note: The table above is applicable only where median storage lanes occur on tangent construction.



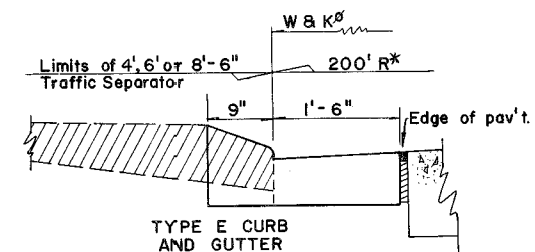
TYPE A CURB



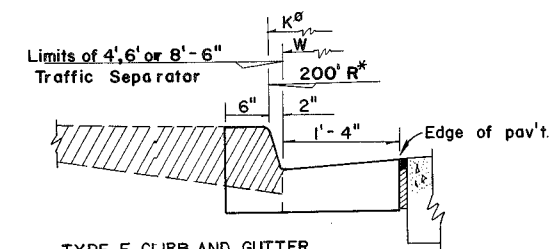
TYPE B CURB



TYPE D CURB



TYPE E CURB AND GUTTER



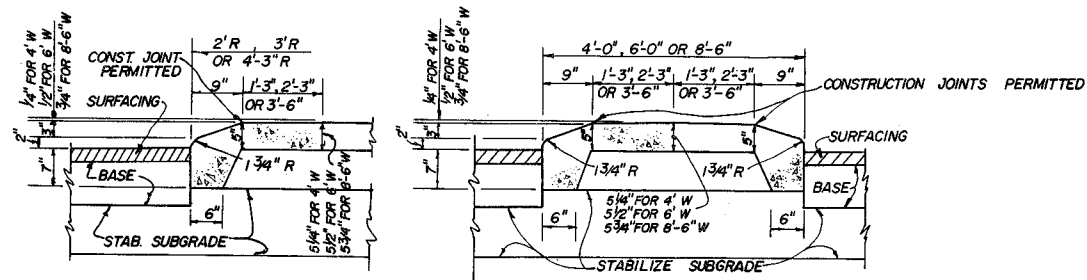
TYPE F CURB AND GUTTER

JUNCTURE DETAILS
MEDIAN CURBS AND
TRAFFIC SEPARATORS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MEDIAN STORAGE LANES

| Designed by | Names | Dates | Approved By | Index No. |
|---------------------------|-------|--------|---|-----------|
| Drawn by | SHG | 6/73 | <i>De Balle</i> Deputy Design Engineer, Roadways | |
| Checked by | AF | 6/73 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 7/7/75 | 81 | 1 of 1 | | 301 |

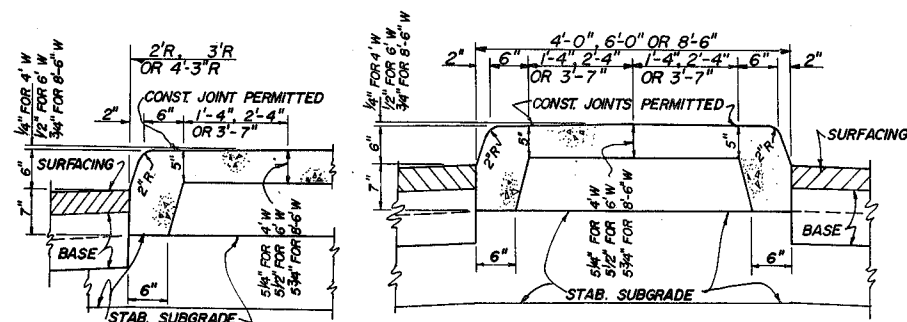


LONGITUDINAL SECTION

TRANSVERSE SECTION

DETAILS OF TYPE I CONCRETE TRAFFIC SEPARATOR

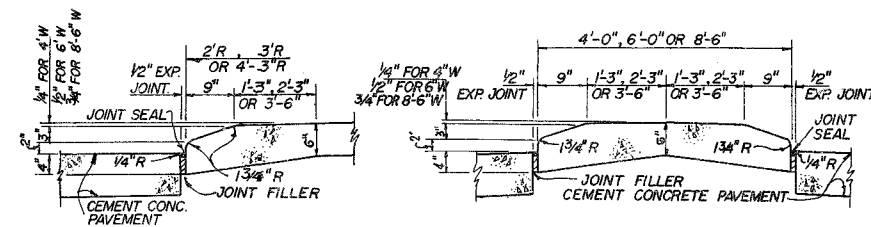
NOTE: STABILIZE FULL WIDTH OF TRAFFIC SEPARATOR.



LONGITUDINAL SECTION

TRANSVERSE SECTION

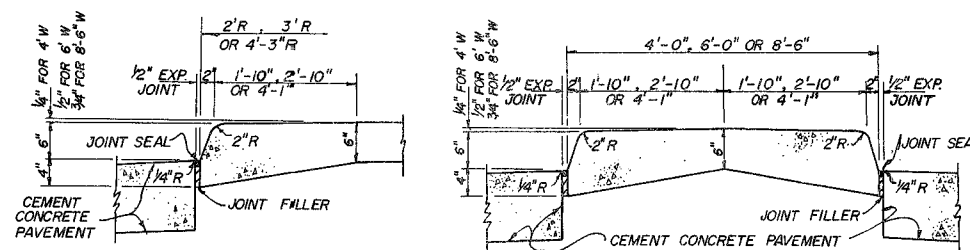
DETAILS OF TYPE III CONCRETE TRAFFIC SEPARATOR



LONGITUDINAL SECTION

TRANSVERSE SECTION

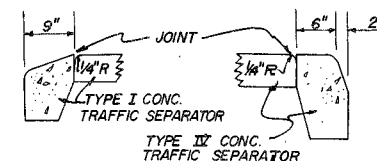
DETAILS OF TYPE II CONCRETE TRAFFIC SEPARATOR



LONGITUDINAL SECTION

TRANSVERSE SECTION

DETAILS OF TYPE VI CONCRETE TRAFFIC SEPARATOR



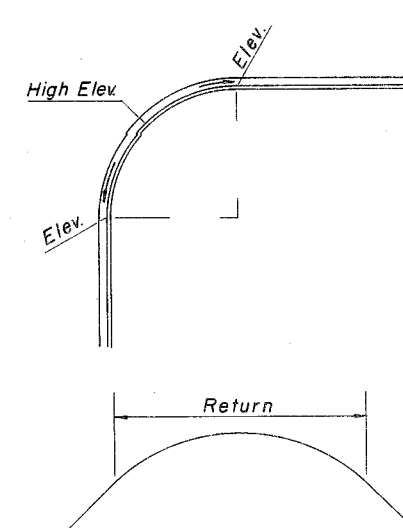
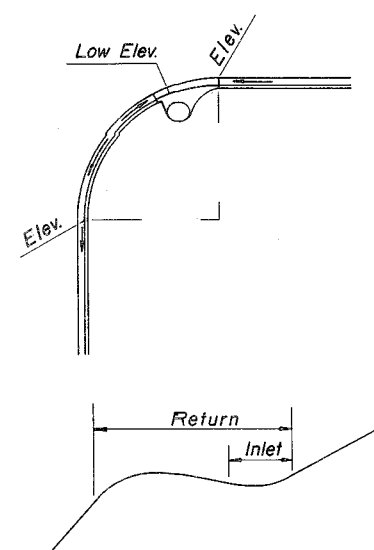
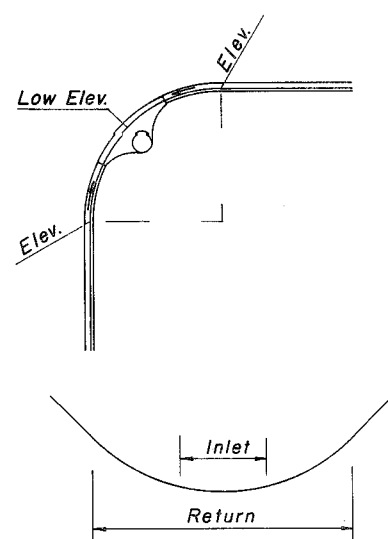
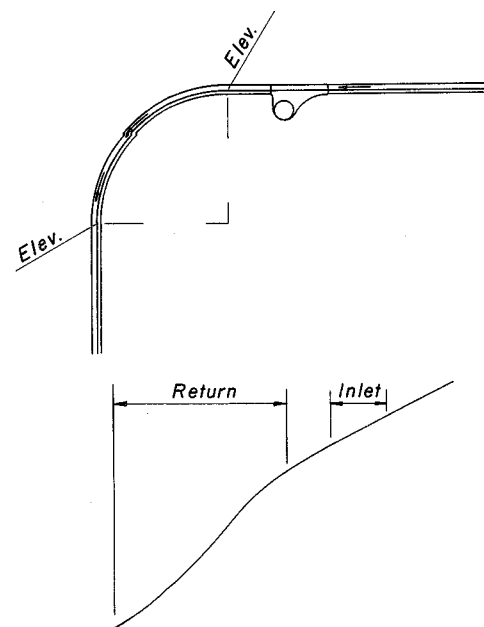
CONSTRUCTION JOINT DETAILS

NOTE: CONCRETE TRAFFIC SEPARATORS TYPE I AND TYPE III ARE TO BE USED WHEN ADJACENT PAVEMENT IS FLEXIBLE. CONCRETE TRAFFIC SEPARATORS TYPE II AND TYPE IV ARE TO BE USED WHEN ADJACENT PAVEMENT IS CEMENT CONCRETE.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TRAFFIC SEPARATORS

| Names | Dates | Approved By |
|---------------------------|-------|-------------|
| Designed by | | |
| Drawn by | SHG | 6/73 |
| Checked by | AF | 6/73 |
| Revision No. | 81 | 1 of 1 |
| Sheet No. | | 302 |
| F.H.W.A. Approved: 7/7/75 | | |

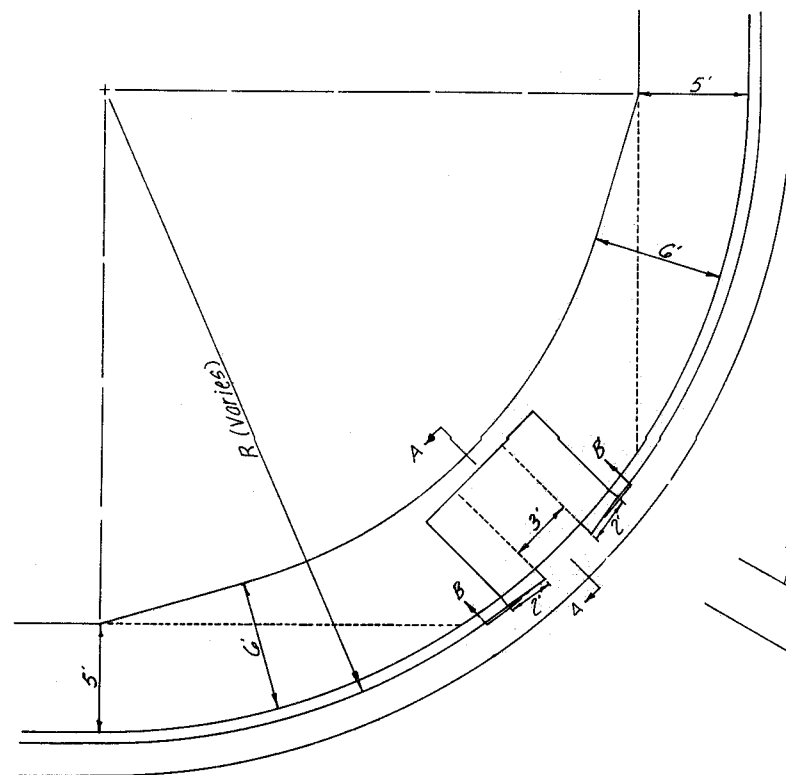


TYPICAL RETURN PROFILES INCLUDING DETAIL SHOWING LOCATION OF INLETS ON RETURN

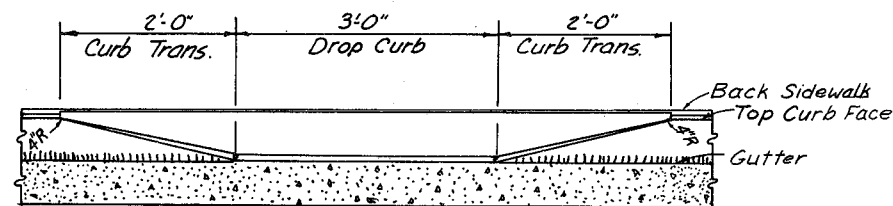
NOTE :

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 | | | De. [Signature] Deputy Design Engineer, Roadways | |
| Checked by | | | Revision No. | Sheet No. |
| F.H.W.A. Approved: 7/7/75 | | | 80 | 1 of 1 |
| | | | 303 | |



PLAN
SHOWING LOCATION TO
MATCH CROSS WALK

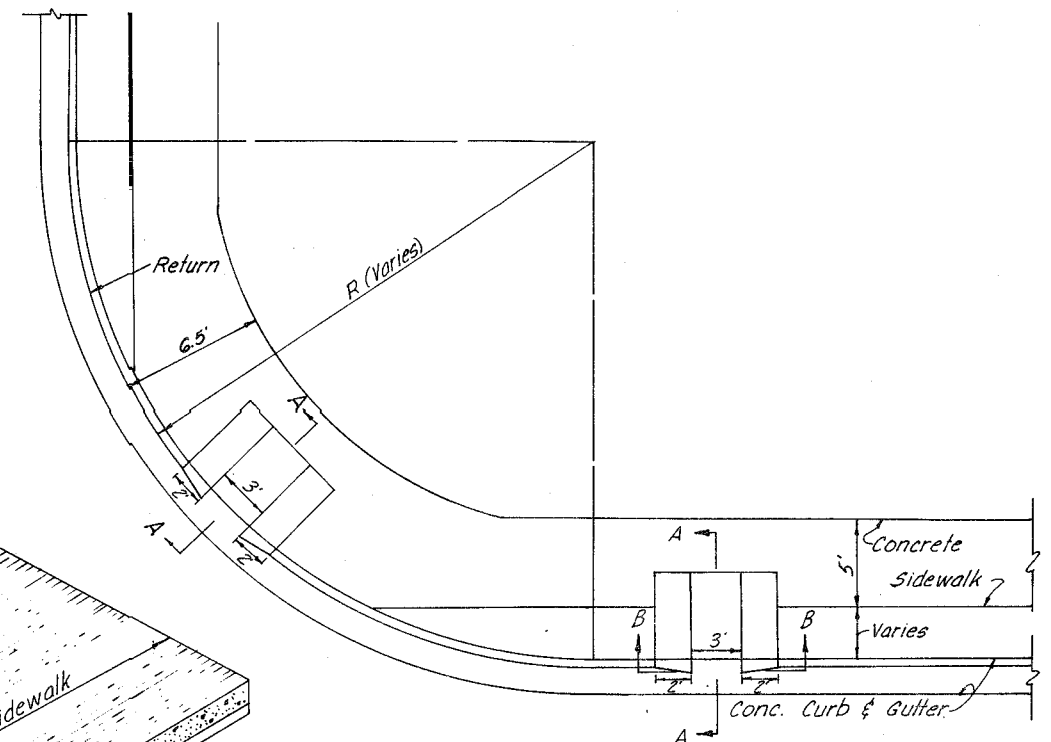


Section B B

NOTES:

1. The ramp surface shall be tined finished in accordance with sub article 400-15-2.5 as modified. Approved hand methods may be used. Ramp shall not exceed a maximum slope of 12:1.
2. Curb cut ramps are to be located as shown on the plans.
3. Basis of payment: contract unit price per Sq. Yd. of Concrete sidewalk.
4. Complete curb cut ramps are to be constructed at all locations shown on plans even when sidewalk is not constructed concurrently.

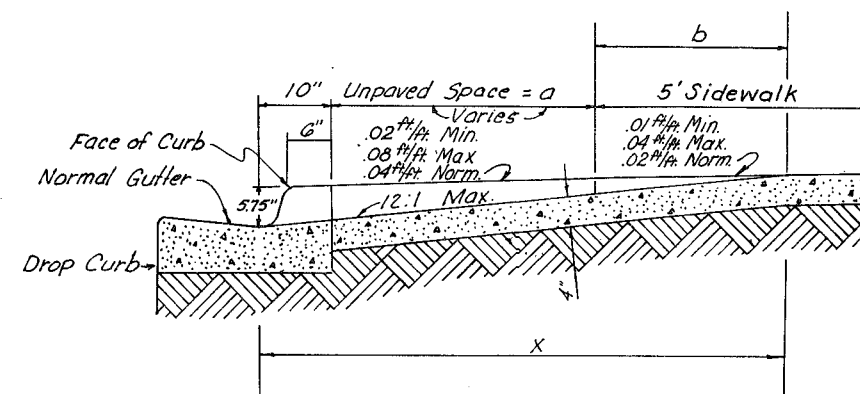
CURB CUT RAMP
FACILITY FOR PHYSICALLY HANDICAPPED



PLAN
SHOWING VARIOUS LOCATIONS
TO MATCH CROSS WALKS

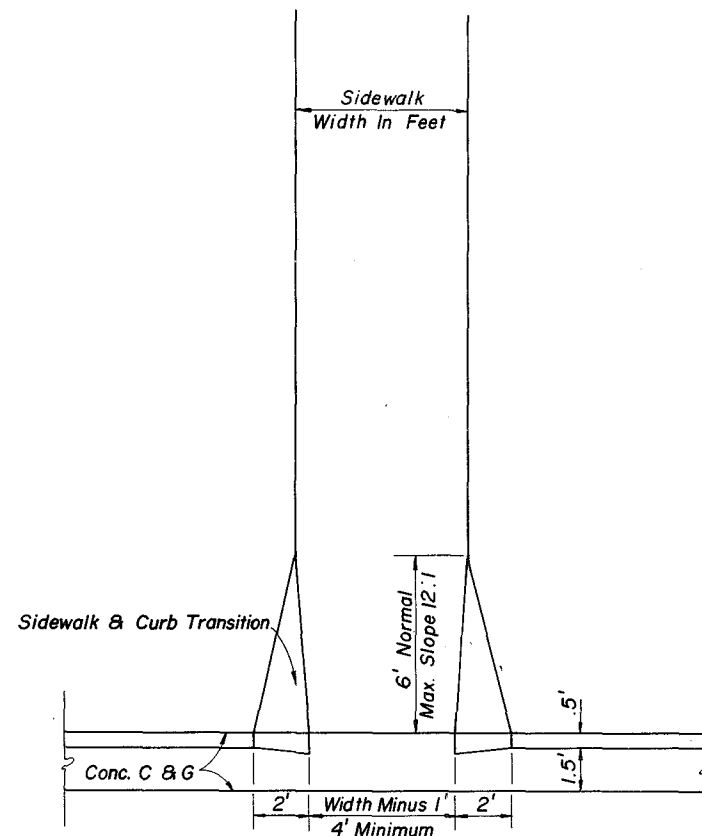
| S.W. | a | S.W. + a + 10" | X | b |
|------|-----|----------------|-----|-----|
| 5' | 0 | 5.8 | 6.8 | 6.0 |
| 6' | 0 | 6.8 | 6.8 | 6.0 |
| 7' | 0 | 7.8 | 7.3 | 6.5 |
| 8' | 0 | 8.8 | 7.3 | 6.5 |
| 5' | 2.0 | 7.8 | 7.8 | 5.0 |
| 5' | 2.5 | 8.3 | 8.1 | 4.8 |
| 5' | 3.0 | 8.8 | 8.3 | 4.4 |
| 5' | 3.5 | 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 = distance from front edge of
sidewalk to back point of 12:1 slope.
 $b = x - (a + 10")$

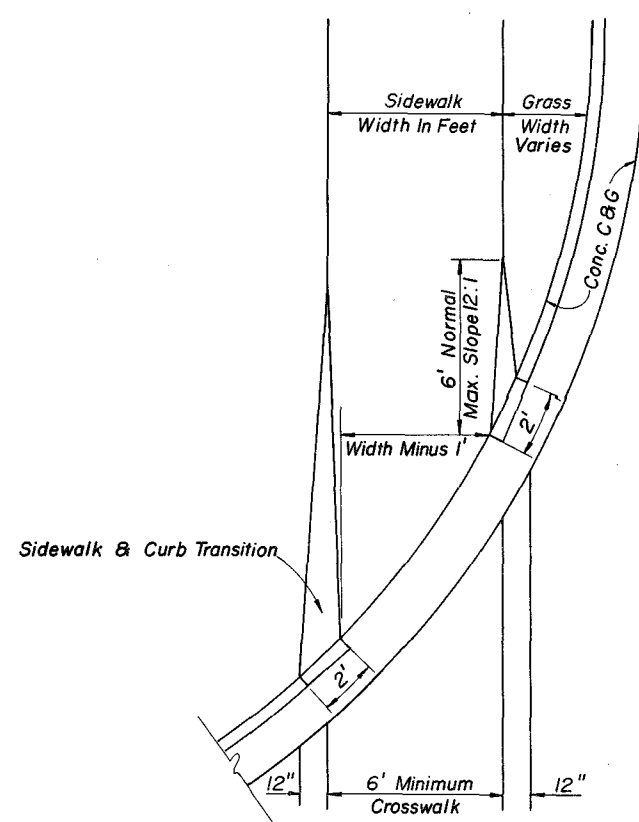
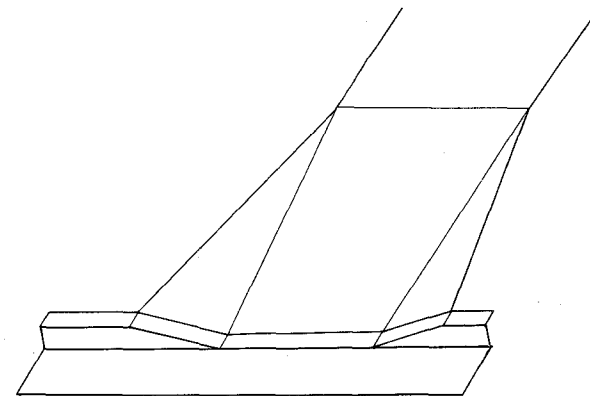


Section A A

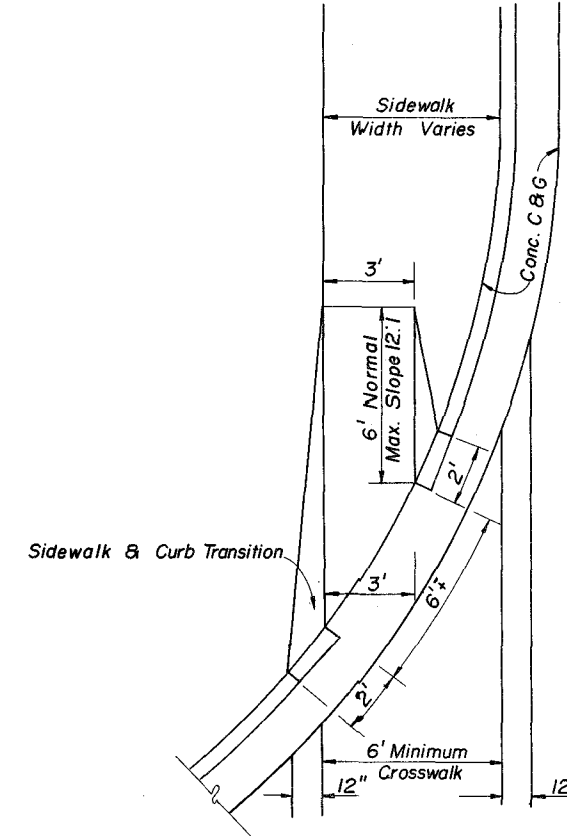
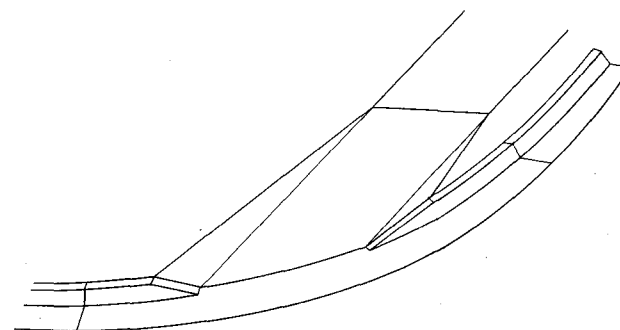
| | | | |
|--|---------------|---|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| CURB CUT RAMPS PHYSICALLY HANDICAPPED | | | |
| Designed by HLG | Dates 2/74 | Approved By <i>Jc. Bullard</i> Deputy Design Engineer, Roadways | |
| Drawn by | | Revision No. | Sheet No. |
| Checked by DCB | 2/74 | 81 | 1 of 2 |
| F.H.W.A. Approved: 8/20/75 | | Index No. 304 | |



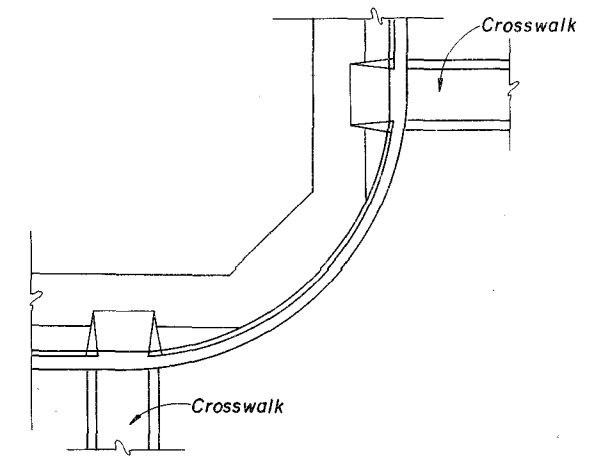
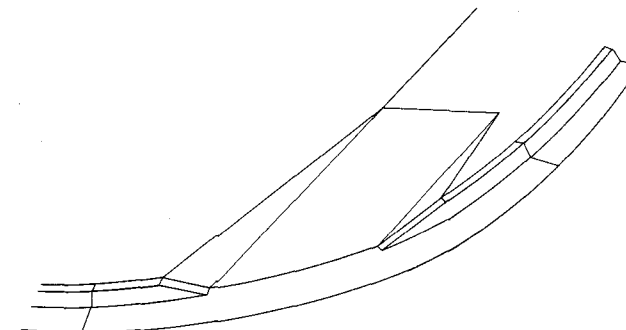
PLAN VIEW



PLAN VIEW



PLAN VIEW

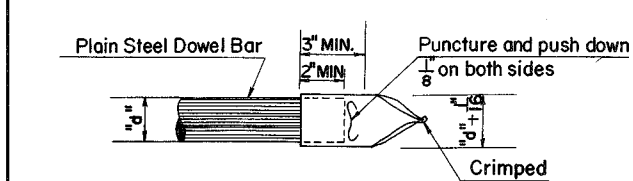


GENERAL NOTES

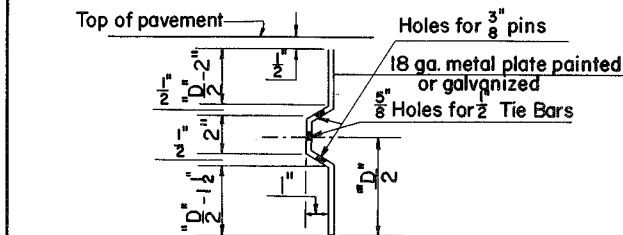
1. The ramp surface shall be tined finished in accordance with sub article 400-15-2.5 as modified. Approved hand methods may be used.
2. Curb cut ramps are to be located as shown on the plans.
3. Basis of payment to be the contract unit price per sq. yd. of Concrete Sidewalk.

THESE RAMPS TO BE USED ONLY WHERE
SIDEWALK IS SIGNED AS A BIKE ROUTE

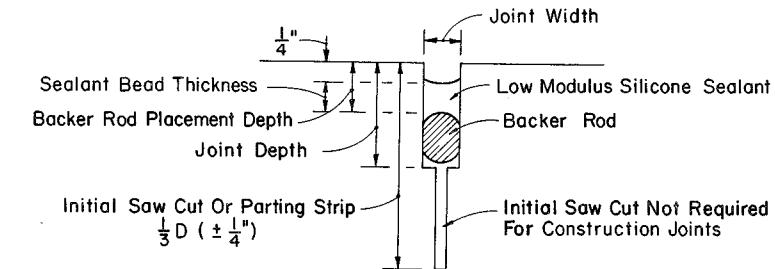
| | | | | | |
|--|-------|-------|---|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| CURB CUT RAMPS BIKEWAYS & PHYSICALLY HANDICAPPED | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | | | <i>De A. Hall</i> Deputy Design Engineer, Roadways | | |
| Checked by | | | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 2/8/79 | | | 81 | 2 of 2 | 304 |



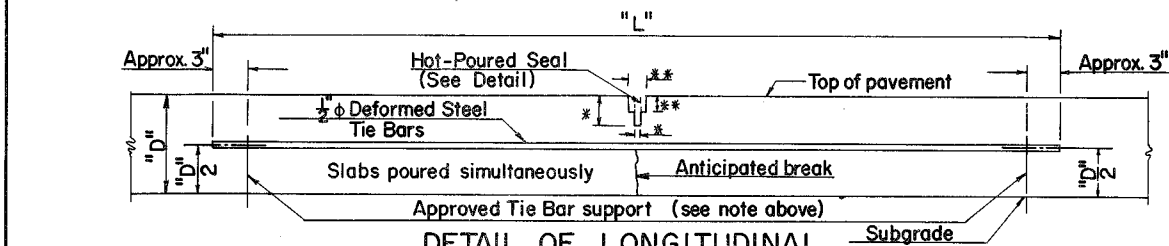
DETAIL OF METAL CAPS FOR DOWEL BARS



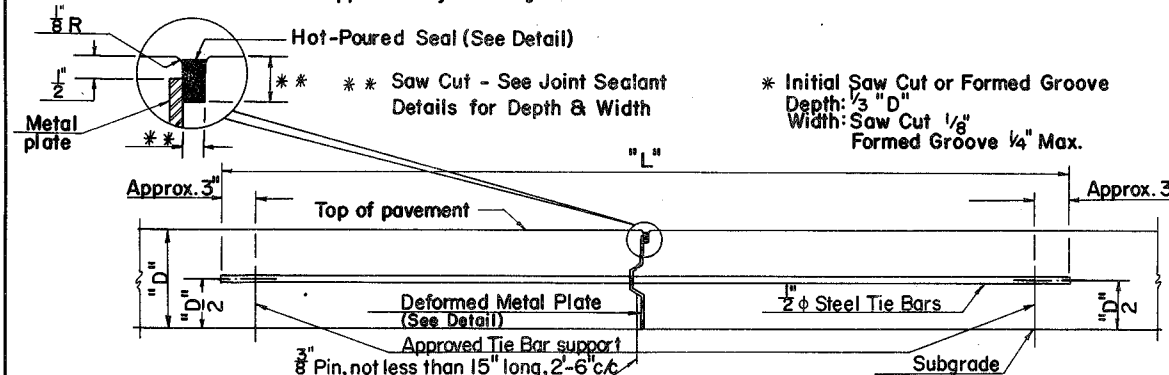
DETAIL OF DEFORMED METAL PLATE



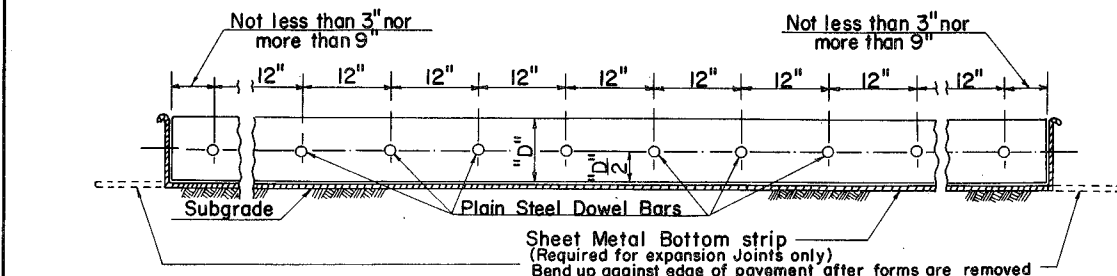
| SILICONE SEALANT JOINT (Inches) | | | | |
|---------------------------------|------------------------|---------------------|---------------------|----------------------------|
| Joint Width | Sealant Bead Thickness | Backer Rod Diameter | Minimum Joint Depth | Backer Rod Placement Depth |
| 1/4 | 1/4 | 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 | 9/16 |
| 3/4 | 3/8 | 7/8 | 1 3/4 | 5/8 |
| 7/8 | 7/16 | 1 | 1 3/4 | 11/16 |
| 1 | 1/2 | 1 1/8 | 2 | 3/4 |
| >1 | 1/2 | 1 1/4 + | 2 + | 3/4 |



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



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

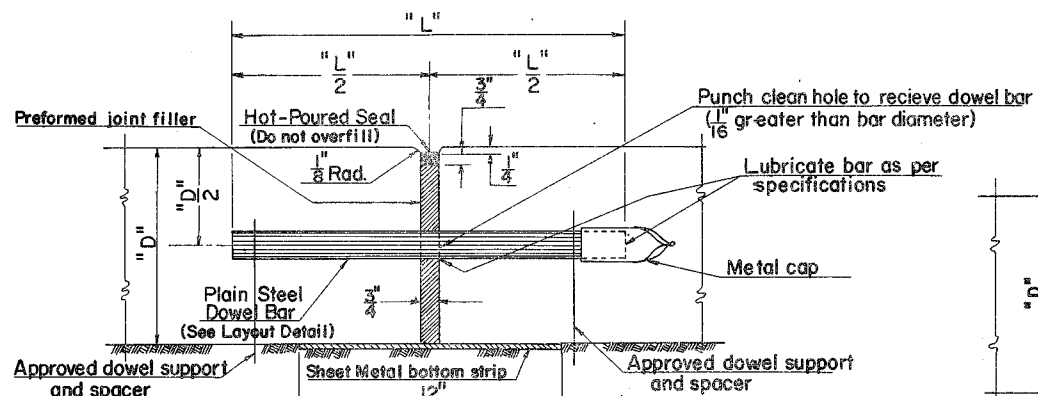
SILICONE SEALANT

HOT-POURED SEAL
CORD TYPE BOND BREAKER

HOT-POURED SEAL
TAPE TYPE BOND BREAKER

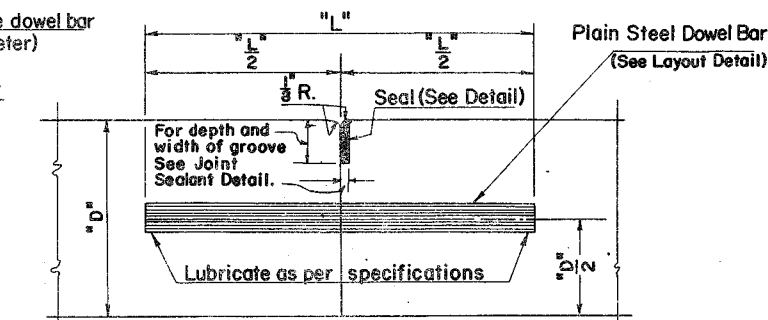
PREFORMED ELASTOMERIC COMPRESSION SEAL

JOINT SEALANT DETAILS

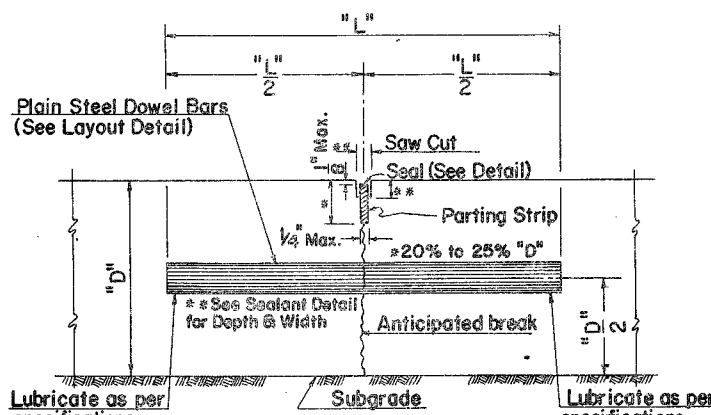


DETAIL OF TRANSVERSE EXPANSION JOINT

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

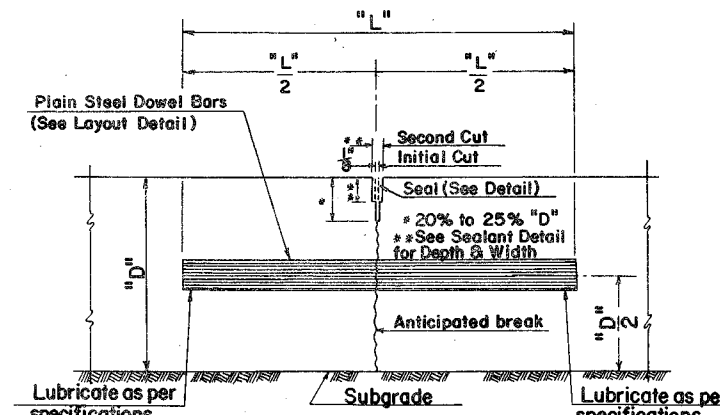


DETAIL OF BUTT CONSTRUCTION JOINT TO BE USED AT DISCONTINUANCES OF WORK



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.



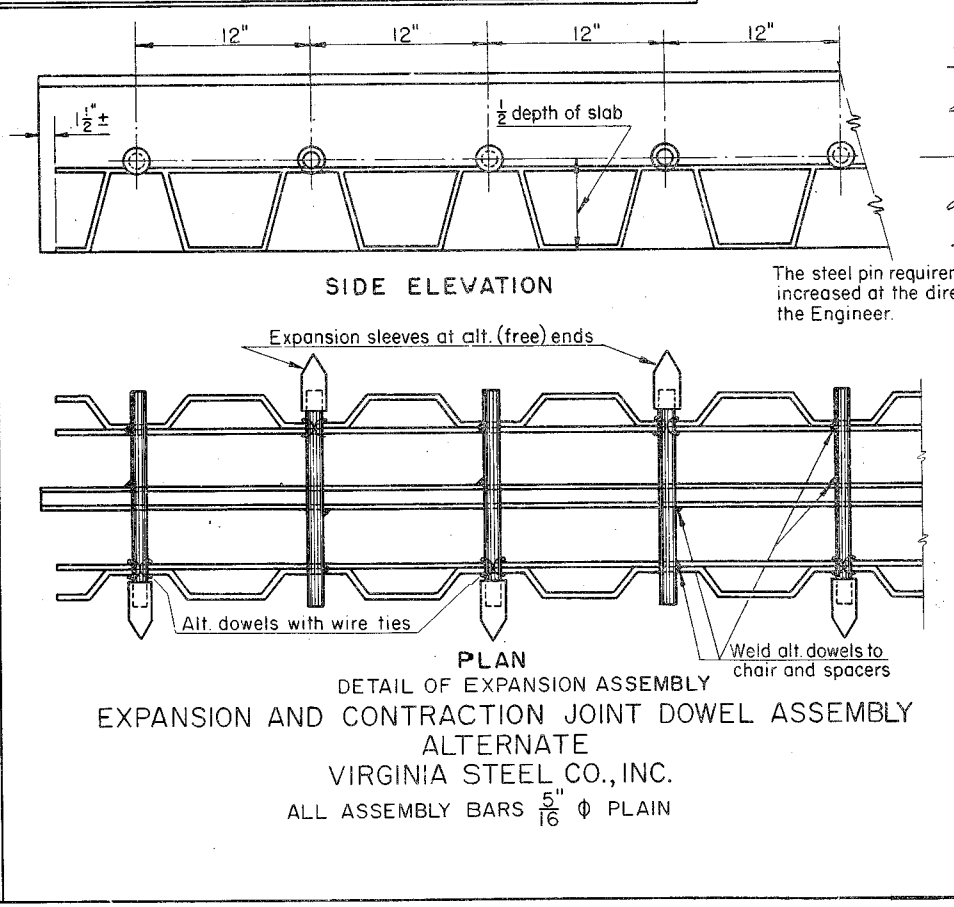
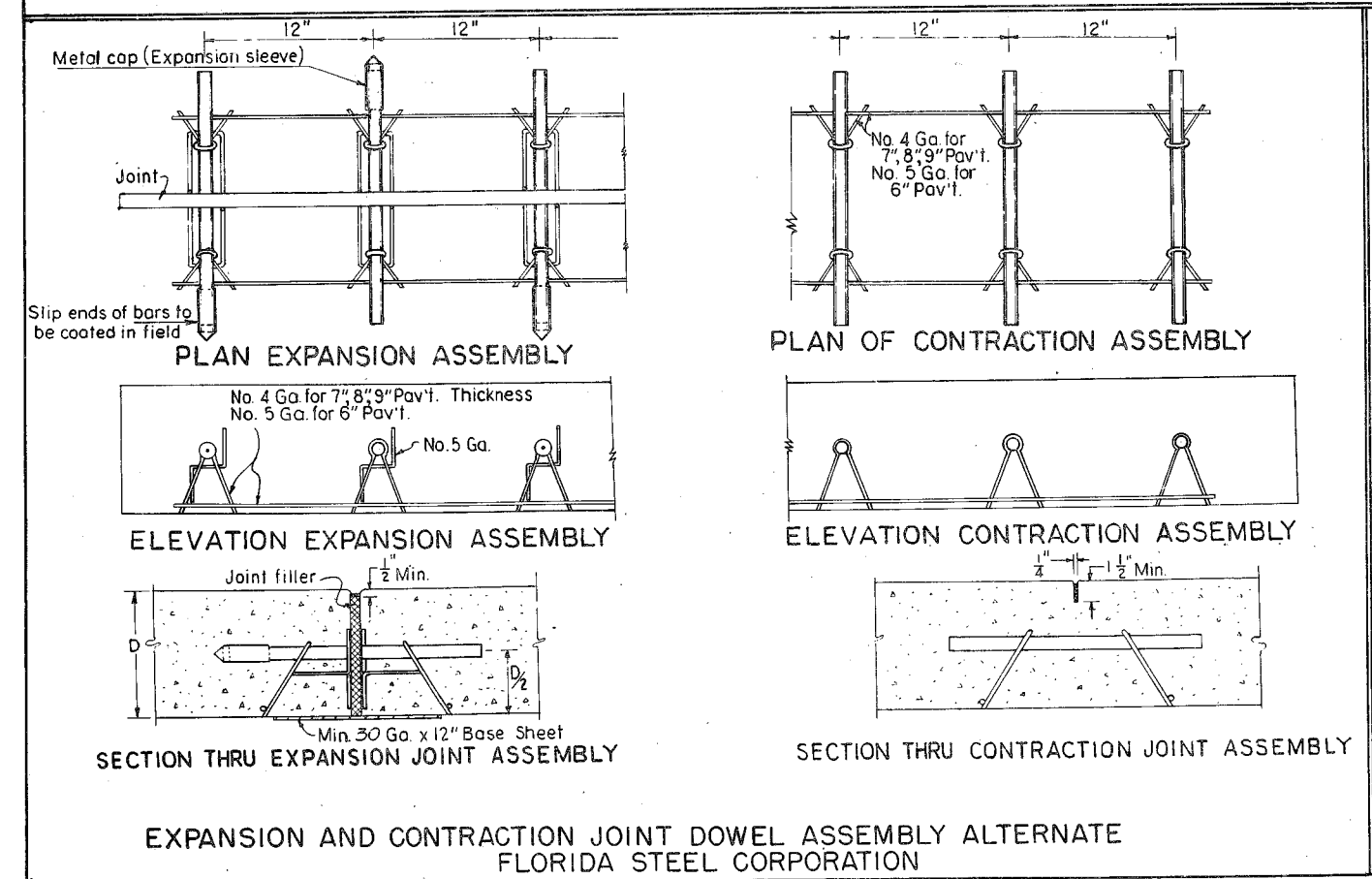
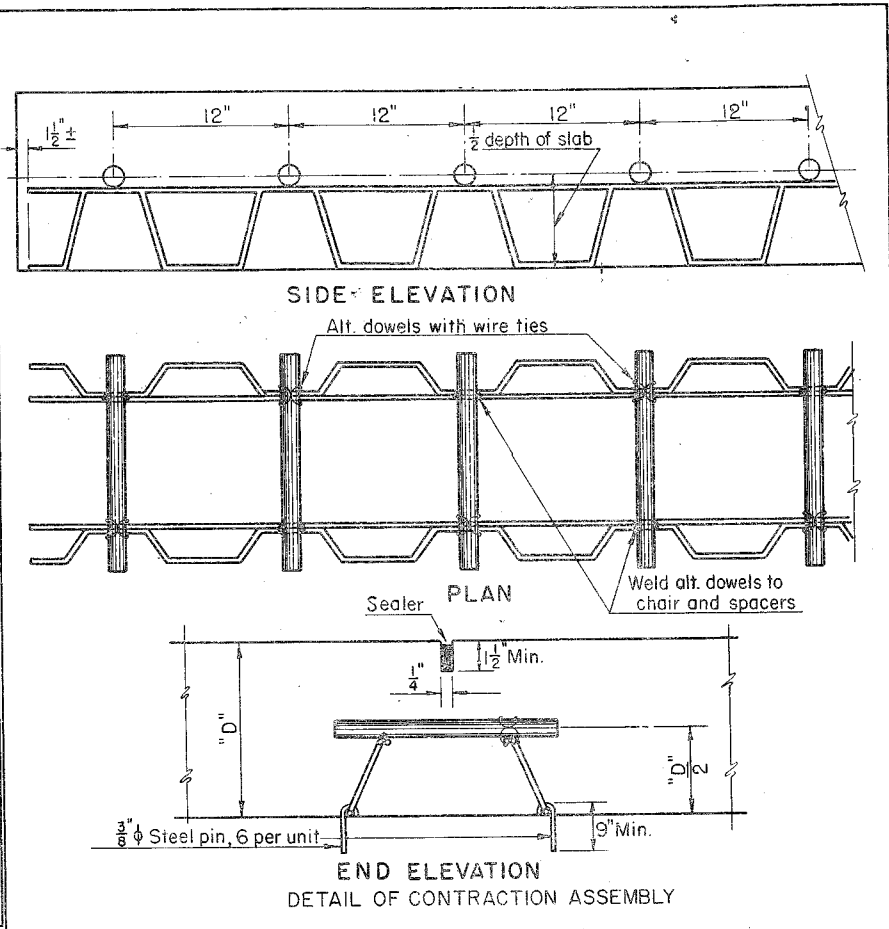
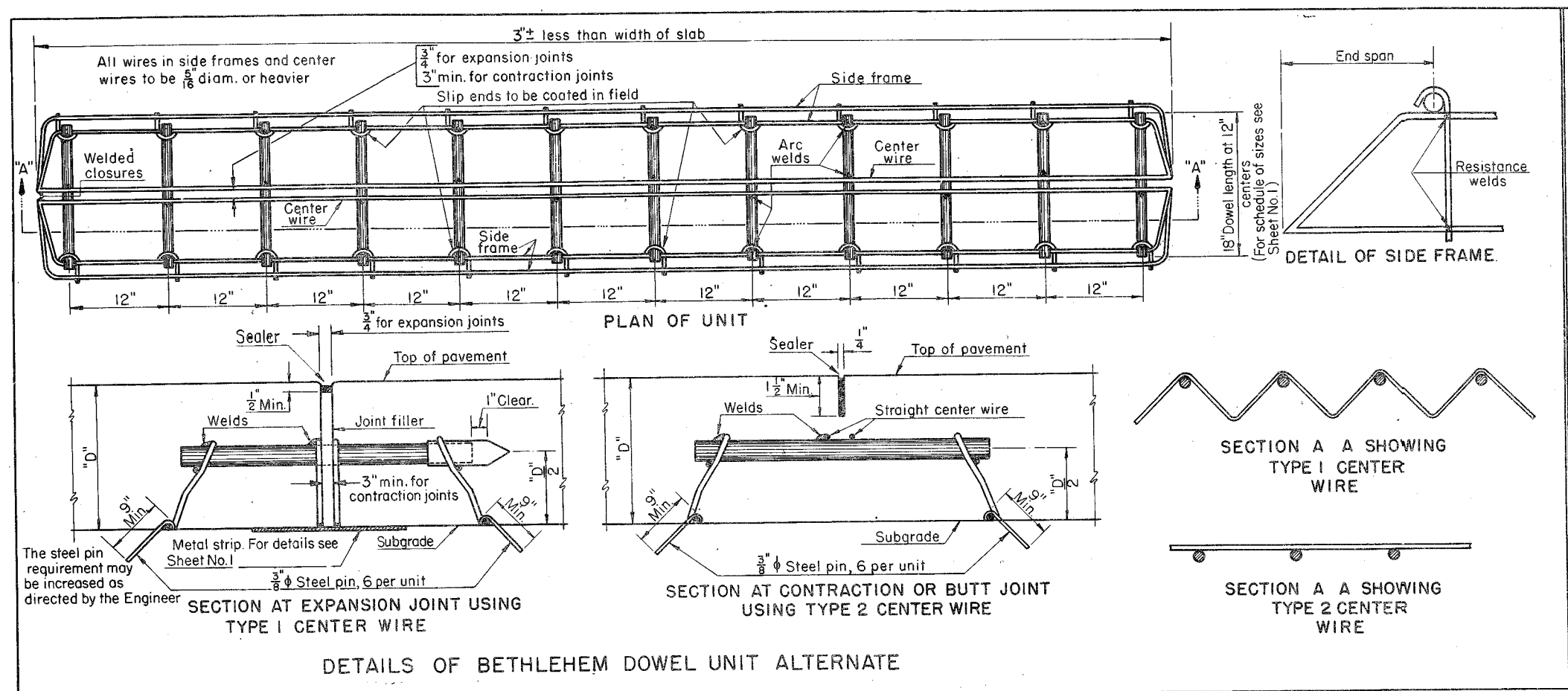
DETAIL OF TRANSVERSE CONTRACTION JOINT, SAWED METHOD

| MAX. SPACING FOR 1" / 2" TIE BARS | | |
|-----------------------------------|-------------------------|--------------------------|
| PAVE MENT 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\"/>

| | | | |
|--|------|-----------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| CONCRETE PAVEMENT JOINTS | | | |
| Designed by | None | Dates | Approved By |
| Drawn by | HW | 8/57 | <i>De Muel</i> Deputy Design Engineer, Roadways |
| Checked by | HEC | 8/57 | Revision No. |
| F.H.W.A. Approved: 10/7/80 | 81 | Sheet No. | Index No. |
| | | 1 of 3 | 305 |

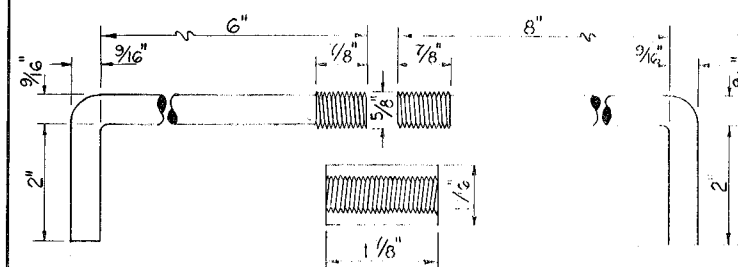
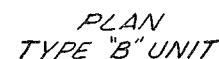
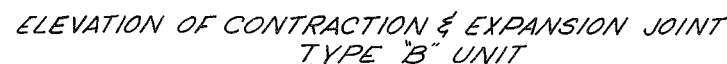


GENERAL NOTES

Any other dowel bar support or assembly (except a cantilever design) which meets the approval of the Engineer, may be used at the option of the Contractor.

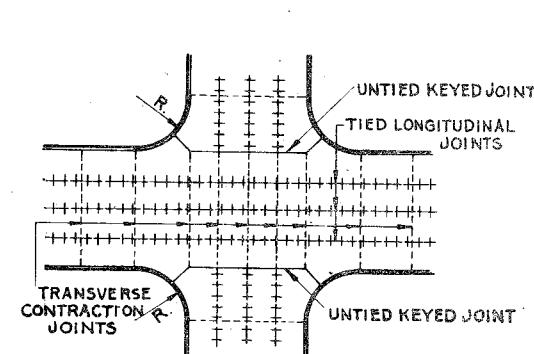
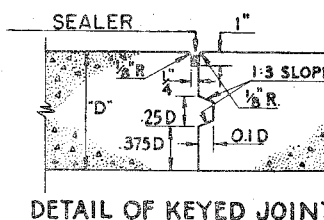
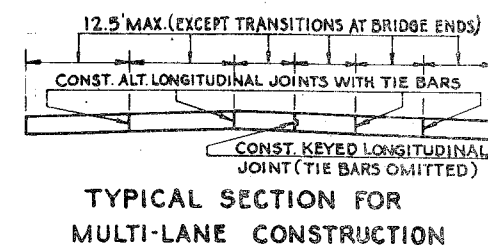
For details not shown on this sheet refer to Sheet Nos. 1 & 3.

| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | |
|--|-------|-------|--------------------------------------|-----------|
| CONCRETE PAVEMENT JOINTS | | | | |
| Designed by | Names | Dates | Approved By | |
| Drawn by | HW | 8/57 | Deputy Design Engineer, Roadways | |
| Checked by | HEC | 8/57 | | |
| F.H.W.A. Approved: 10/7/80 | | | Revision No. | Sheet No. |
| | | | 81 | 2 of 3 |
| | | | 305 | |

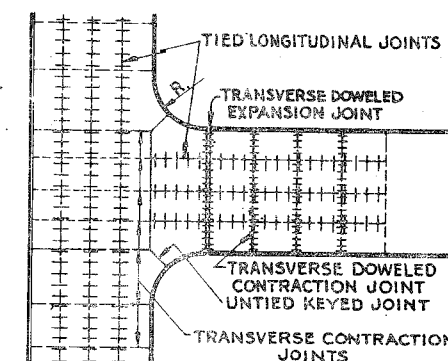


DETAIL FOR STEEL HOOK BOLT ASSEMBLY

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.



JOINT LAYOUT AT THRU
INTERSECTION

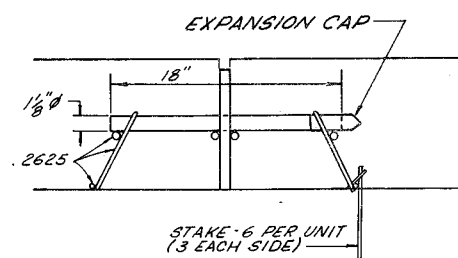


JOINT LAYOUT AT "T" OR
OFFSET INTERSECTION

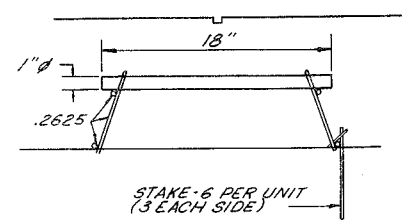
GENERAL NOTES

- 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 KEED 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.

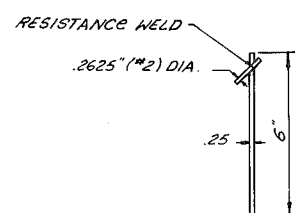
DETAIL OF JOINT ARRANGEMENT



SECTION THROUGH EXPANSION JOINT UNIT




SECTION THROUGH CONTRACTION JOINT UNIT

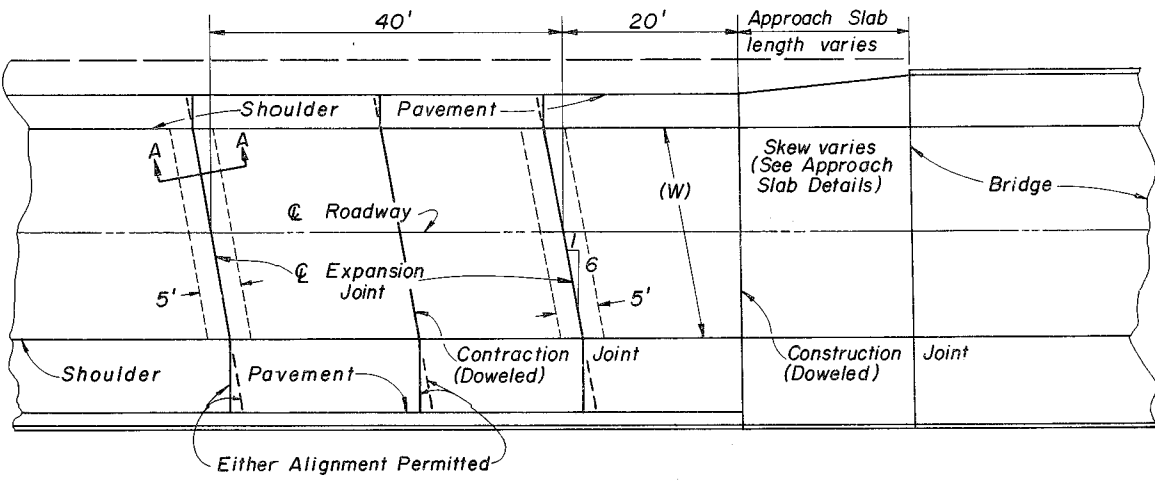


STAKE DETAIL

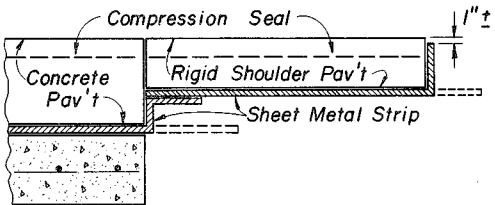
EXPANSION AND CONTRACTION JOINT DOWEL ASSEMBLY
ALTERNATE:

Hugensmith Materials, Inc.
Pelham, Ala.

| | | | | |
|---|--|-----------|--|---|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION | | | | |
| ROAD DESIGN | | | | |
| CONCRETE PAVEMENT JOINTS | | | | |
| Names | | Dates | | Approved By |
| Designed by | | | |  Deputy Design Engineer, Roadways |
| Drawn by LMF | | 6/75 | | |
| Checked by SFA | | 6/75 | | |
| Revision No. | | Sheet No. | | Index No. |
| F.H.W.A. Approved: 10/7/80 | | 81 | | 3 of 3 |
| | | | | 305 |

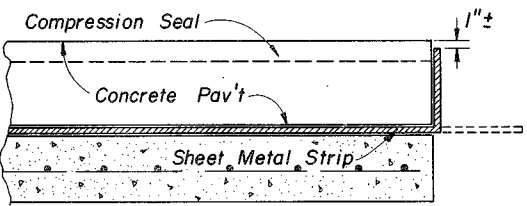


PLAN



DETAIL SHOWING RIGID SHOULDER PAVEMENT

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



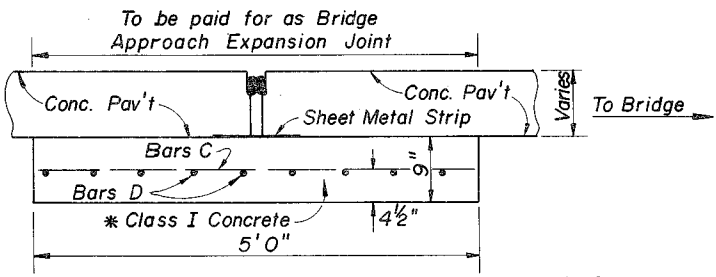
DETAIL SHOWING SHEET METAL STRIP

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

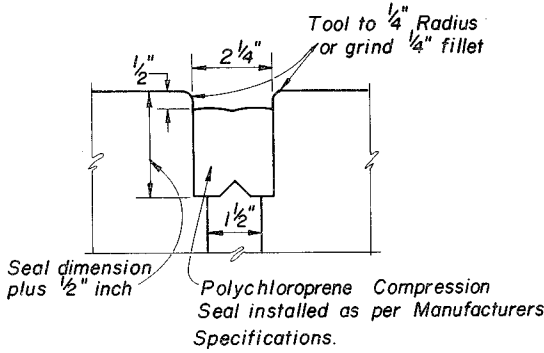
1. Pay quantity of expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement. Shoulder pavement joints included.
2. For additional details see Index No. 305.
3. The ϕ of roadway and the ϕ of bridge do not necessarily coincide. Prior to the placement of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



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

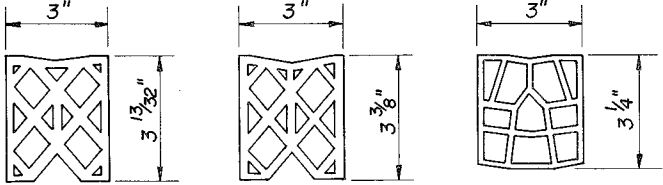
* Finish surface smooth. Cure with heavy coating of wax base white pigmented curing compound. Apply second application immediately prior to placing pavement.

SECTION A A
THROUGH EXPANSION JOINT



COMPRESSION SEAL DETAIL

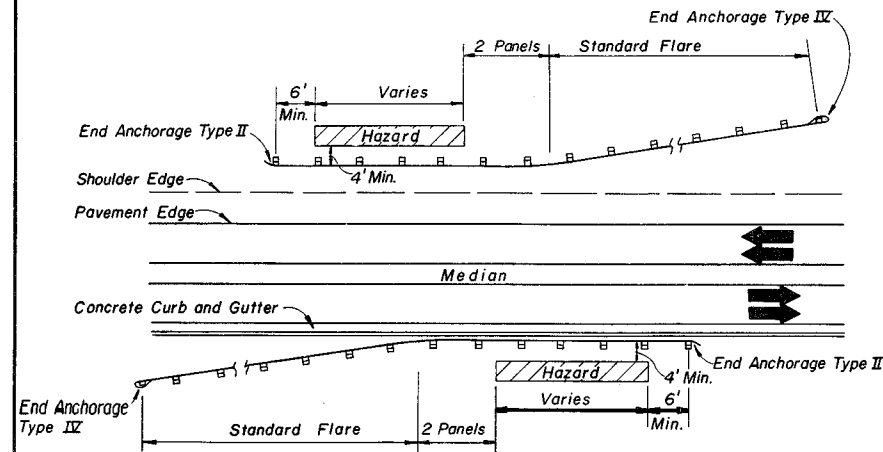
NOTE: All contacting surfaces between the compression seal and Concrete shall be thoroughly coated with a lubricating adhesive.



SECTION THRU SEALS

Either of the three Seals shown may be used.

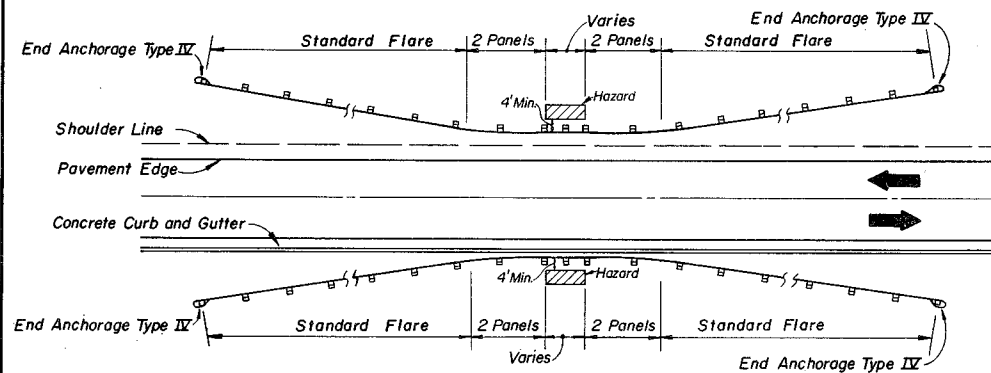
| | | | | | |
|--|-------|-------|--------------------------------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| BRIDGE APPROACH EXPANSION JOINT CONCRETE PAVEMENT | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | LMF | 6/75 | Deputy Design Engineer, Roadways | | |
| Checked by | SFA | 6/75 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 8/16/77 | | | 81 | 1 of 1 | 306 |



DETAIL B

GUARDRAIL INSTALLATION FOR ROADSIDE HAZARD (4-LANE)

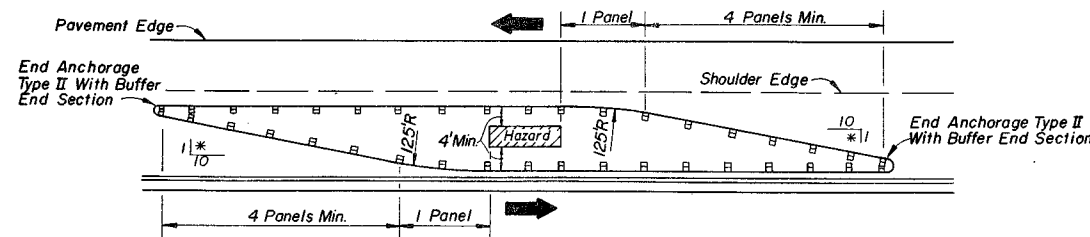
Note: See general notes Nos. 1, 2, 3, 4, 7, 11 and 12 on sheet No. 2.
See details J, K and L for guardrail offsets.
See detail P for standard flare.



DETAIL C

GUARDRAIL INSTALLATION FOR ROADSIDE HAZARD (2-LANE)

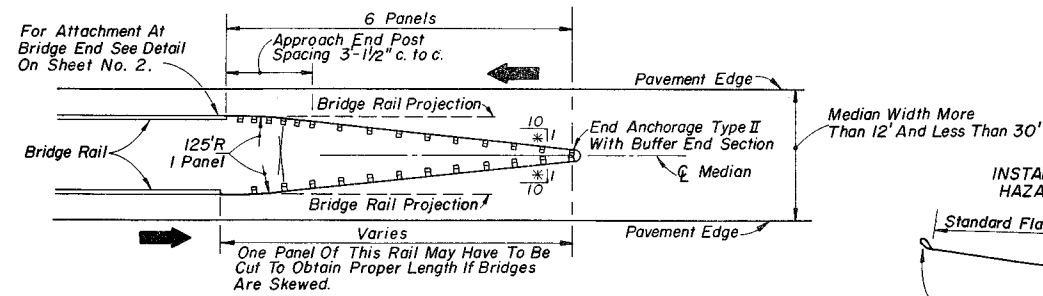
Note: See general notes Nos. 1, 2, 3, 4, 7, 11 and 12 on sheet No. 2.
See details J, K and L for guardrail offsets.
See detail P for standard flare.



DETAIL D

GUARDRAIL - MEDIAN INSTALLATION

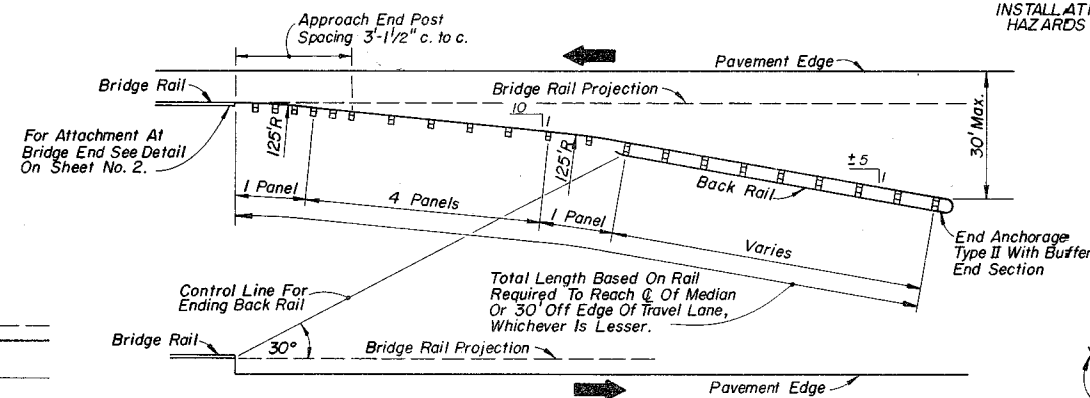
Note: See general notes Nos. 1, 2, 3, 4, 11 and 12 on sheet No. 2.
See details J, K and L for guardrail offsets.



DETAIL E

MINIMUM BRIDGE END GUARDRAIL INSTALLATION - NARROW MEDIAN (LESS THAN 30')

Note: See general notes Nos. 1, 2, and 3 on sheet No. 2.

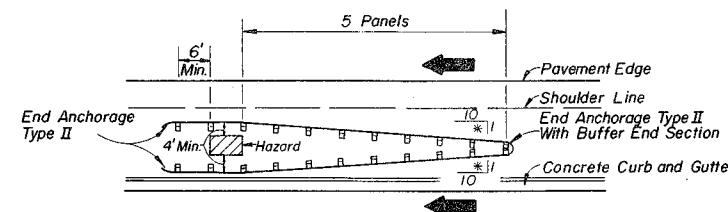


DETAIL F

MINIMUM BRIDGE END GUARDRAIL INSTALLATION - WIDE MEDIAN (30' OR GREATER)

Note: See general notes Nos. 1, 3, and 4 on sheet No. 2.

Backrail is required for protection of off-bridge traffic where median edge of pav't for off-bridge traffic passes less than 30' from end anchorage. Backrail is not required where median width is 64' or greater. Payment for backrail is to be included in the total length of guardrail required, measured along both the front rail and along the backrail.



DETAIL G

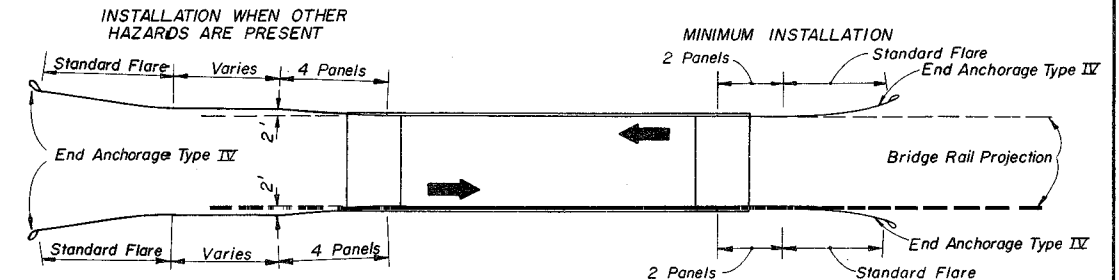
GUARDRAIL - HAZARD INSTALLATION

Note: See general notes Nos. 1, 2 and 3 on sheet No. 2.
See details J, K and L for guardrail offsets.

NOTES: For details D, E, F, and G only one end anchor is required on each double rail end of the installation and should be attached to and in line with the traffic approach side.

*10:1 Maximum desirable, may be flatter or slightly steeper where other factors control length of installation.

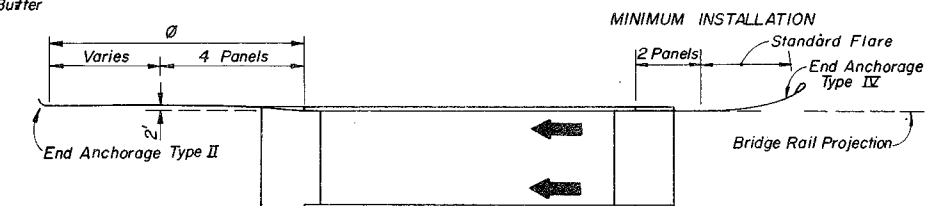
For details B and C the depth of hazard must be considered when determining the length of guardrail needed.



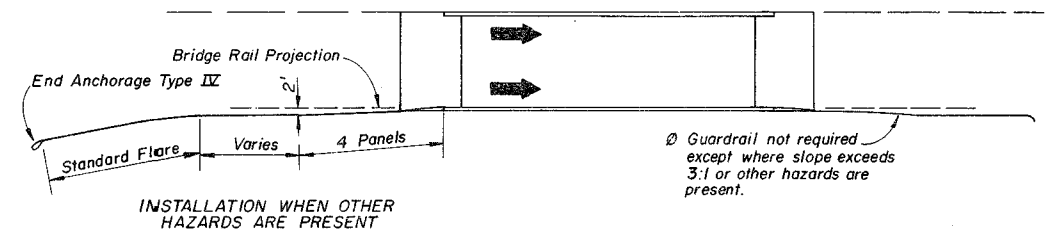
DETAIL H

GUARDRAIL INSTALLATION FOR BRIDGE ENDS (2-LANE)

Note: See general notes Nos. 1, 2, 3, 4 and 7 on sheet No. 2.
See sheet No. 2, detail N for attachment to bridge ends.
See detail P for standard flare.



FOR MEDIAN TREATMENT SEE DETAILS E & F

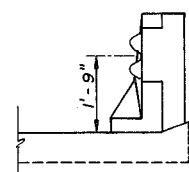
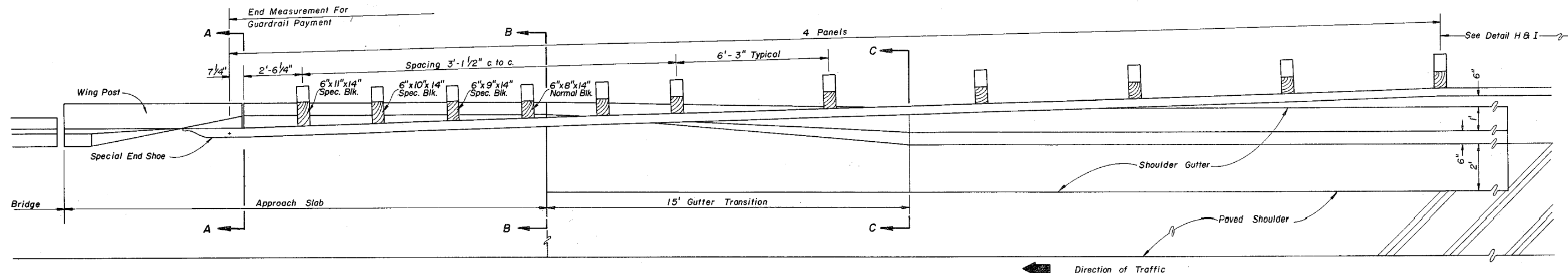


DETAIL I

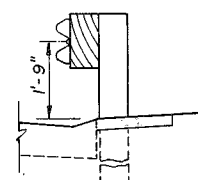
GUARDRAIL INSTALLATION FOR BRIDGE ENDS (4-LANE)

Note: See general notes Nos. 1, 2, 3, 4 and 7 on sheet No. 2.
See sheet No. 2, detail N for attachment to bridge ends.
See detail P for standard flare.

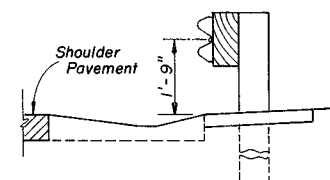
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION | | | |
|---|-------|--------------|-------------------------------|
| ROAD DESIGN | | | |
| GUARDRAIL | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | HW | 7/69 | Design Engineer, Roadways |
| Checked by | LMF | 3/76 | |
| F.H.W.A. Approved: 10/7/80 | | Revision No. | Sheet No. |
| | | 81 | 1 of 6 |
| | | 400 | |



Section AA

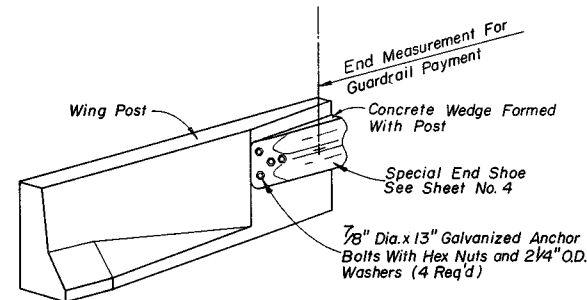


Section BB



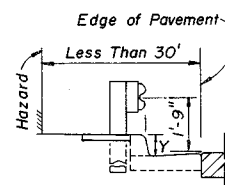
Section CC

GUARDRAIL AND SHOULDER GUTTER TRANSITIONS AT BRIDGE APPROACHES (TRAILING END OPPOSITE HAND)
DETAIL J

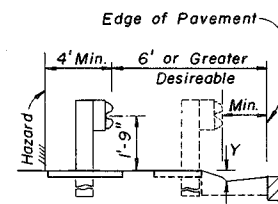


All component parts shall be included in the contract unit price for guardrail

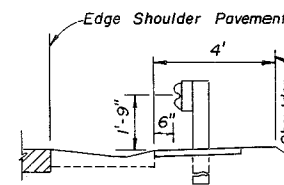
GUARDRAIL ATTACHMENT AT BRIDGE ENDS
DETAIL N



Y=6" or Greater

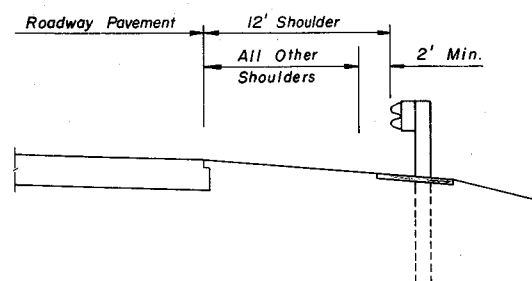


Y= Less Than 6"

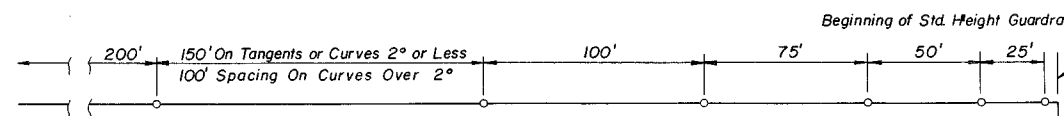


Shoulder Gutter

GUARDRAIL LOCATION AT CURB & GUTTER SECTIONS
DETAIL L



STANDARD GUARDRAIL LOCATION
DETAIL K



Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer.
For minimum installations (length 62.5') provide one reflector at each end and at approximate center.

REFLECTOR SPACING
DETAIL M

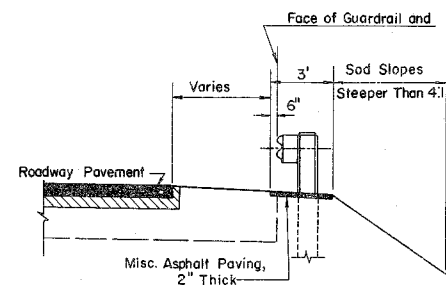
GENERAL NOTES

- The illustrated limits for guardrail installation are standard requirements, one panel equals 12.5ft.
- Installations shown are typical. The intent is that 62.5 ft. of rail be available approaching earliest hazard.
- Post spacing shall be 6.25ft except that a reduced spacing of 3'-1 1/2" shall be used at bridge anchorages (See detail J). At hazards, where the face of guardrail offset from hazard is less than 4ft., a reduced spacing shall also be provided for the length of the hazard plus one panel of approach rail.
- Straight rail sections may be used for all radii of 125 ft. or greater. For radii less than 125ft. the rail must be fabricated to fit.
- For specifications of materials refer to standard specifications.
- Design load of rail equals 80,000 pounds in tension.
- 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 8ft. 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.
- Undressed timber will be permitted for 6"x8"x14" nominal treated timber block. A 5"x8"x14" nominal treated timber block or a 14" section of the steel post will be permitted as an alternate. The 14" alternate steel section shall be bolted to the alternate post with one 3/8"x1 1/2" bolt on each side of block. Blocks used with Thrie Beam rail shall be 22" long. The bolt hole in timber blocks shall be located 7" (± 1/4") from the end and centered (± 1/4") in the block.
- Where guardrail is constructed for street barricade no anchorage, offset blocks or terminal end panels 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 coated with a zinc compound. No burning of holes will be permitted.
- Guardrail to be installed at maximum practical distance from travel lane except at locations control by installation of non-mountable curb.
- If desirable 4ft. minimum offset between face of rail and hazard can not be provided, a 2ft. offset may be used. A special detail should be prepared by the designer and forwarded to the Deputy Design Engineer, Roadway office for review and approval if minimum 2' offset can not be provided.
- Amber reflectors shall be used adjacent to auxiliary lanes and within 250 ft. of intersections; at all other locations clear reflectors shall be used.

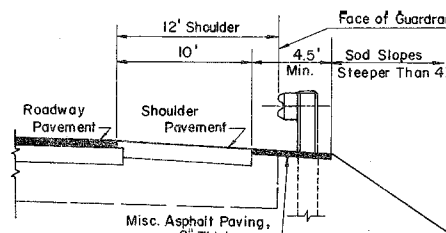
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

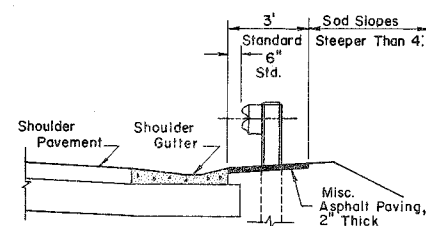
| Names | Dates | Approved By |
|----------------------------|------------------------|--|
| Designed by <i>HW</i> | 7/69 | <i>De Kallal</i> Deputy Design Engineer, Roadways |
| Drawn by | | |
| Checked by <i>LMF</i> | 3/76 | |
| F.H.W.A. Approved: 10/7/80 | Revision No. <i>81</i> | Sheet No. <i>2 of 6</i> |
| | | Index No. <i>400</i> |



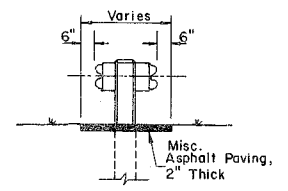
ADJACENT TO UNPAVED SHOULDER



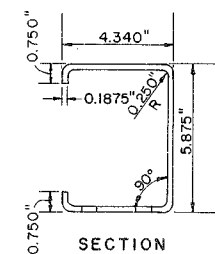
ADJACENT TO SHOULDER PAVEMENT



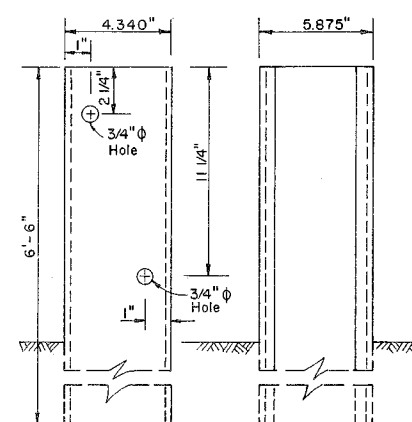
ADJACENT TO SHOULDER GUTTER



UNDER DOUBLE FACE RAIL



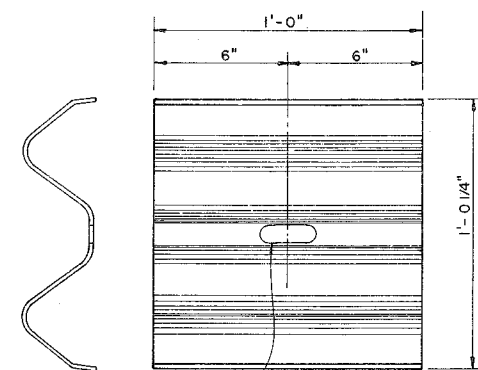
SECTION



FRONT SIDE

Note: See note 8, sheet 2

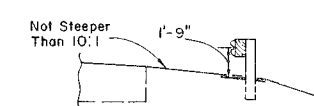
6"- "C" STEEL POST



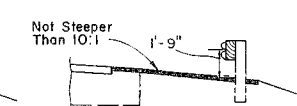
Slot 3/4" x 2 1/2"

BACK-UP PLATE

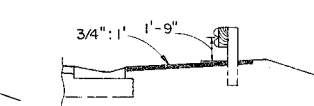
NOTE: This back-up plate is placed behind rail elements of intermediate (non-splice) post with steel offset blocks only.



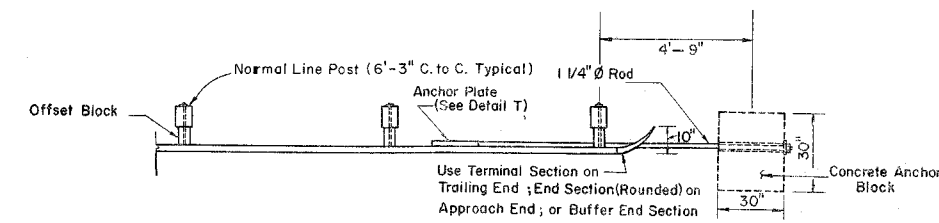
SECTION AA



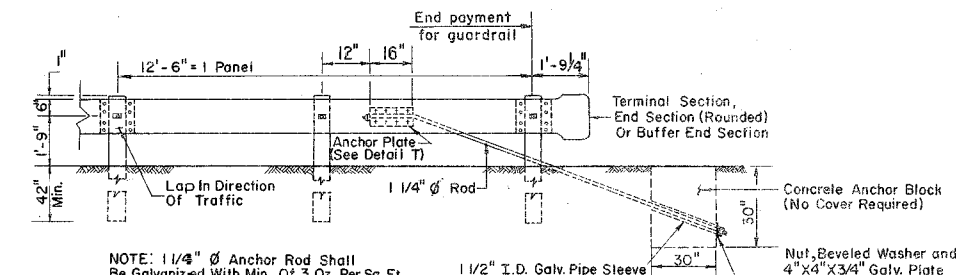
SECTION BB



SECTION CC



PLAN



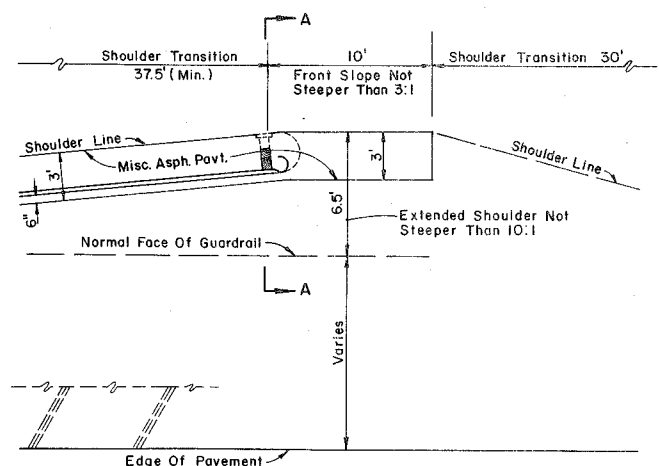
ELEVATION

END ANCHORAGE TYPE II
DETAIL R

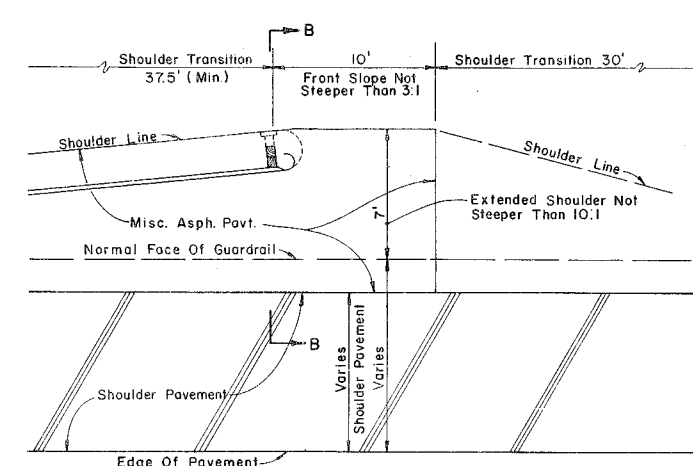
NOTE: 1 1/4" Ø Anchor Rod Shall Be Galvanized With Min. Of 3 Oz. Per Sq. Ft.

1 1/2" I.D. Galv. Pipe Sleeve

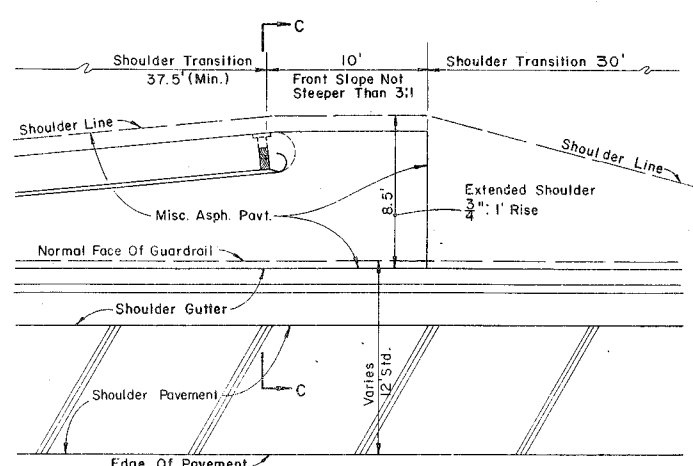
NOTE: The payment for the items of End Anchorage Assemblies Type II shall include furnishing and installing the Terminal and End Sections, Anchor Plates, Rods, Pipe Sleeves, Anchor Blocks, Plates and the necessary hardware.



UNPAVED SHOULDER OR 4' PAVED SHOULDER



PAVED SHOULDER

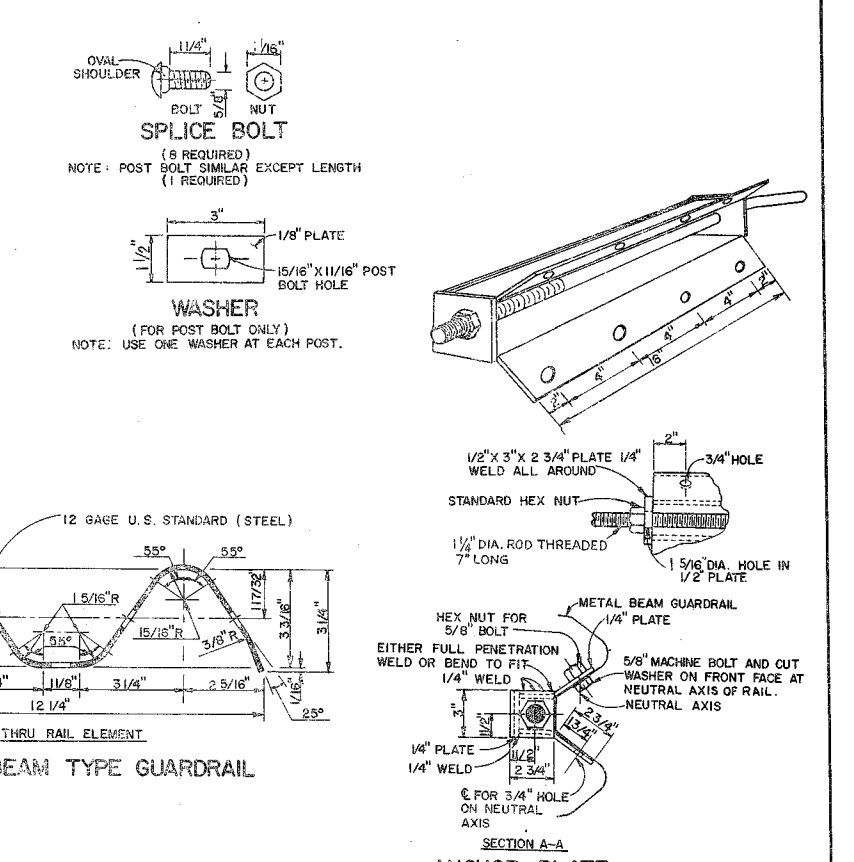
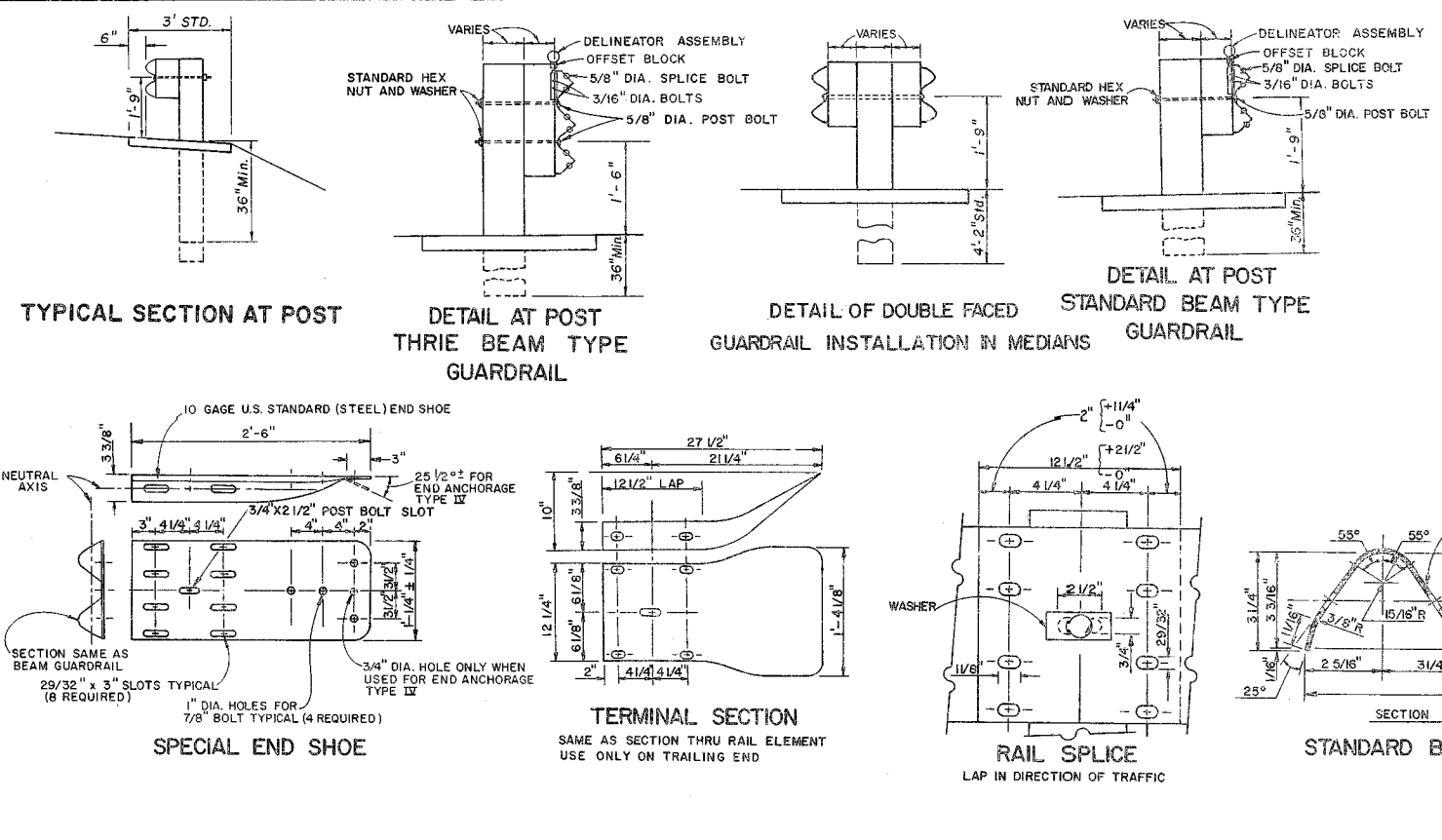
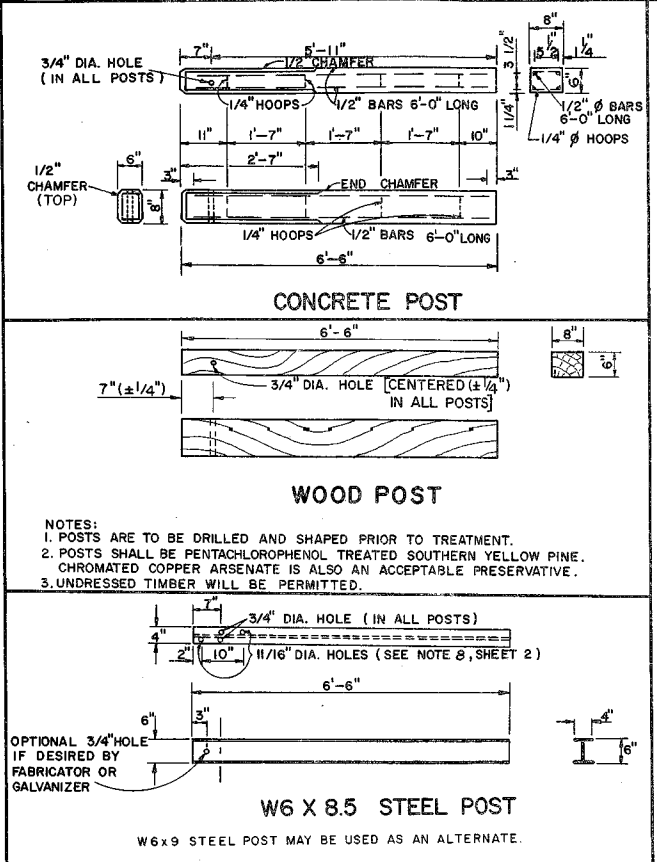


SHOULDER GUTTER

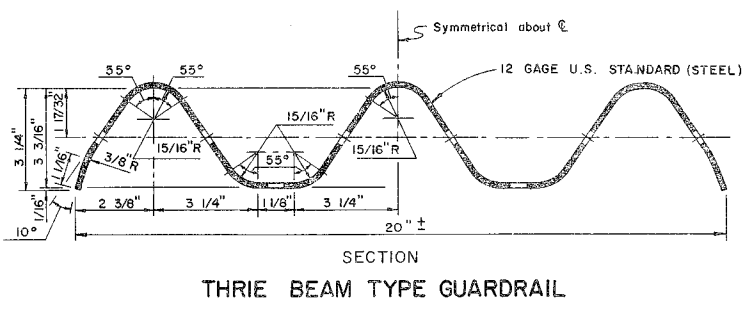
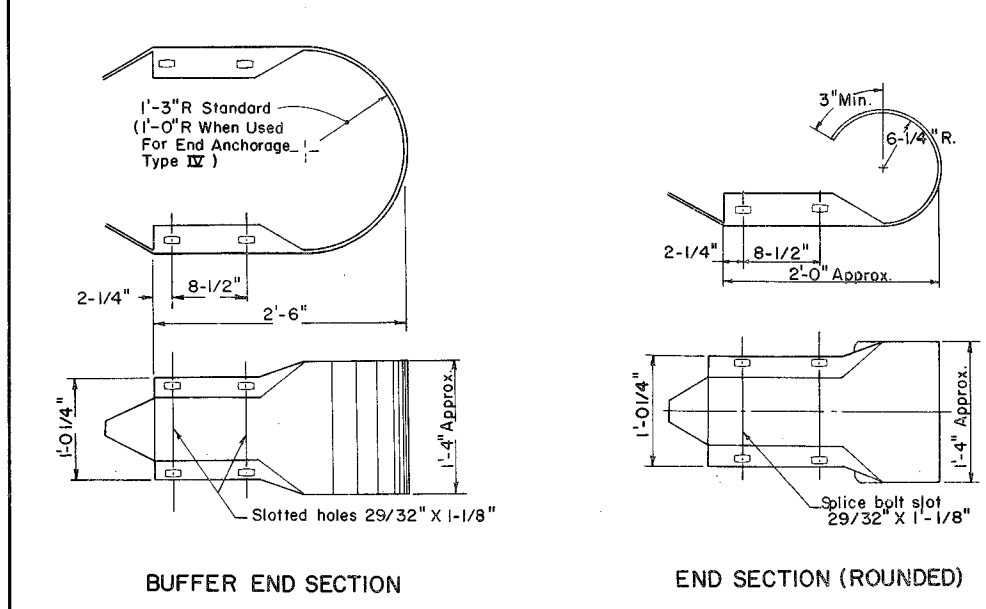
GUARDRAIL PAVEMENT

NOTE: The soil under all miscellaneous asphalt pavement shall be sterilized in accordance with Section 339 of the Standard Specifications.

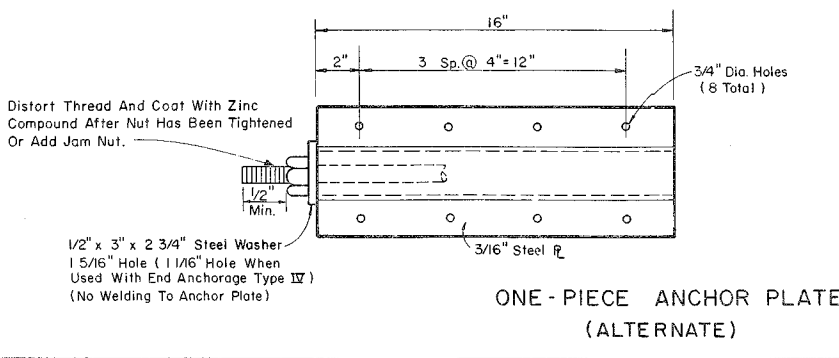
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | |
|--|-----|--------|--------------|---|
| GUARDRAIL | | | | |
| Designed by | HW | Dates | 7/69 | Approved By |
| Drawn by | | | | <i>De Pabst</i> Deputy Design Engineer, Roadways |
| Checked by | LMF | 3/76 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 10/7/80 | 81 | 3 of 6 | Index No. | 400 |



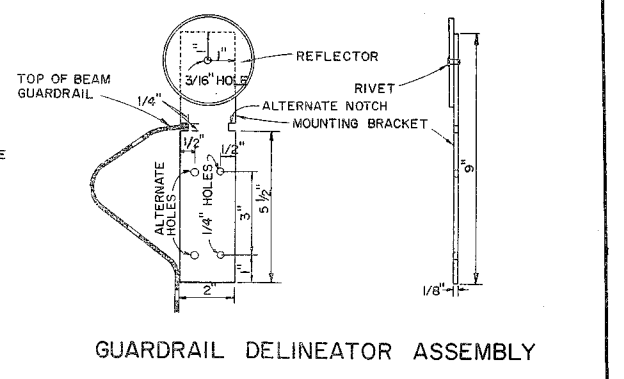
NOTE:
All end sections to be lapped in direction of traffic.



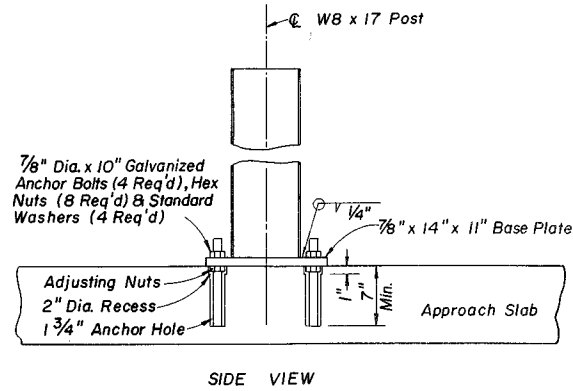
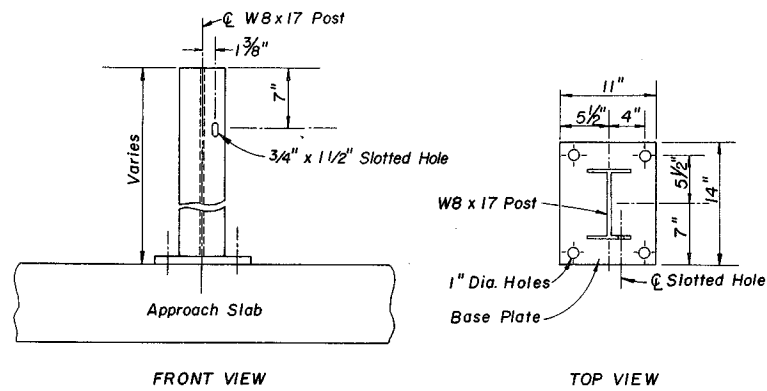
NOTES:
1. THRIE BEAM GUARDRAIL SHALL BE PRIMARILY USED FOR MEDIAN INSTALLATIONS. IF DESIRED OR RECOMMENDED AT OTHER LOCATIONS, A SPECIAL DETAIL SHOULD BE PREPARED BY THE DESIGNER AND FORWARDED TO THE DEPUTY DESIGN ENGINEER, ROADWAY OFFICE FOR REVIEW AND APPROVAL PRIOR TO INCLUSION IN THE PLANS.
2. THE ANCHOR PLATE SHALL BE FASTENED TO THE LOWER PORTION OF THE THRIE BEAM (REFER TO DETAIL R, SHEET 3, FOR ADDITIONAL DETAILS).



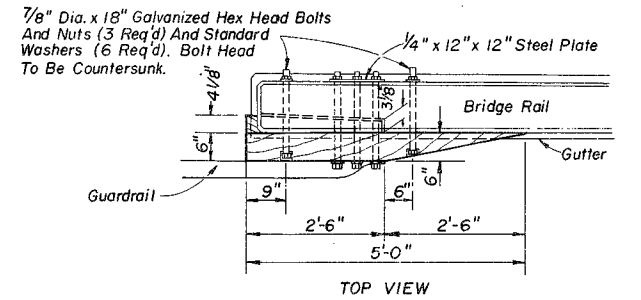
NOTES:
1. GUARDRAIL DELINEATOR ASSEMBLY IS TO BE FASTENED TO THE TRAILING SIDE OF WOOD OFFSET BLOCKS WITH TWO 10 PENNY ALUMINUM OR GALVANIZED NAILS SO AS TO FIRMLY PLACE THE TOP EDGE OF GUARDRAIL INTO THE 1/4" NOTCH ON THE MOUNTING BRACKET. THE LOWER SIDE OF THE BRACKET SHALL CONTACT THE GUARDRAIL. WHEN METAL OFFSET BLOCKS ARE USED, FASTEN THE ASSEMBLY TO THE TRAILING SIDE OF THE WEB WITH TWO 3/16" DIAMETER ALUMINUM OR GALVANIZED NUTS AND BOLTS SO THAT THE BOTTOM OF THE REFLECTOR IS RESTING ON THE WEB AND THE SIDE OF THE MOUNTING BRACKET IS FLUSH WITH THE FLANGE NEXT TO THE RAIL.
2. REFLECTOR UNITS ARE AS SPECIFIED IN ARTICLE 993-6 OF THE 1977 FLORIDA D.O.T. STANDARD SPECIFICATIONS.
3. MOUNTING BRACKET SHALL BE MANUFACTURED FROM SHEET ALUMINUM, 6061-T6 ALLOY OR EQUAL, OR GALVANIZED STEEL AND MAY BE MANUFACTURED WITH THE ALTERNATE NOTCH AND ALTERNATE HOLES AS SHOWN IN THE DETAIL. ALL GALVANIZING TO BE DONE AFTER FABRICATION.
4. FOR DELINEATOR SPACING SEE, SHEET 2, DETAIL M.



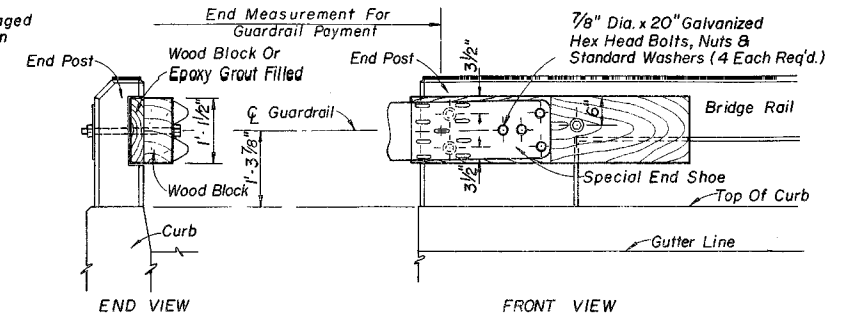
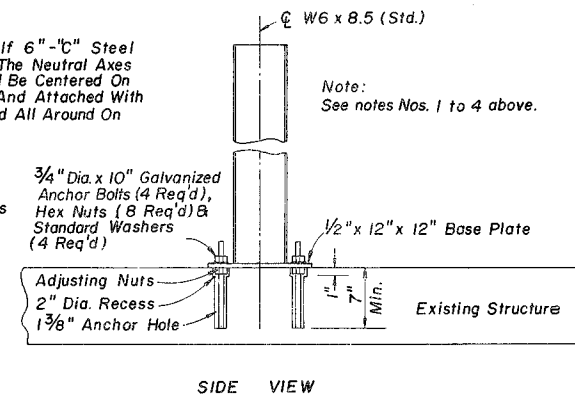
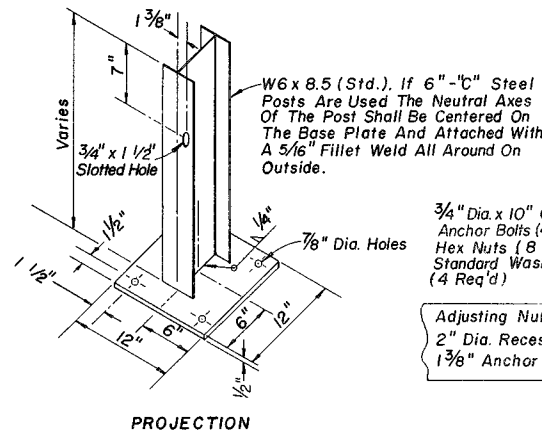
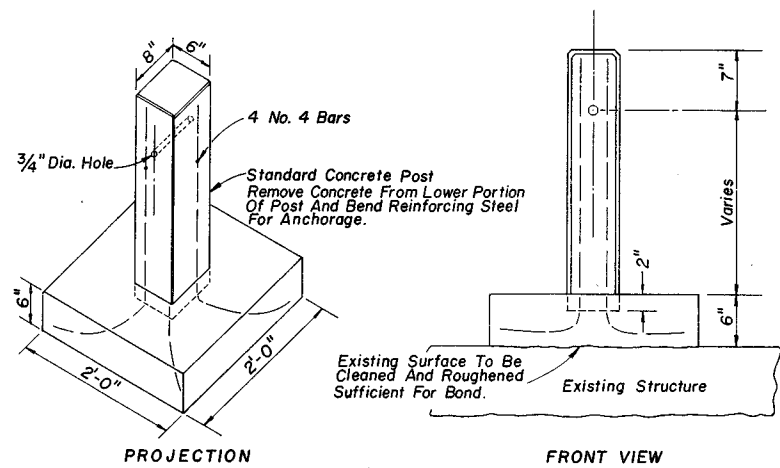
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | |
|--|-------|--------|----------------|-----------|
| GUARDRAIL | | | | |
| Designed by | Names | Dates | Approved By | |
| Drawn by | HW | 7/69 | <i>De Bell</i> | |
| Checked by | LMF | 3/76 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 10/7/80 | 81 | 4 of 6 | 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) 78,000 lbs. each (d) have an electroplated zinc coating, Type L5, applied in accordance with ASTM A-164. The coated bolts, nuts and washers shall be chrome treated after coating in a water solution containing 0.2% sodium dichromate (3 oz. per 10 gals.)
 2. Anchor holes and recesses are to be drilled. Encountered reinforcing steel shall be drilled through. Holes shall be thoroughly clean 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 seating 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.

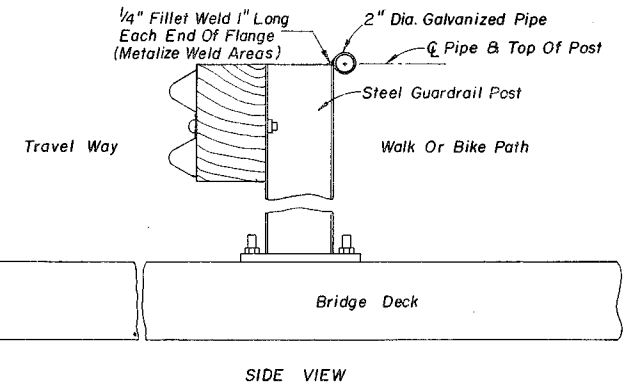


STEEL GUARDRAIL POST MOUNTING TO EXISTING APPROACH SLAB



GUARDRAIL ATTACHMENT AT END POST ON EXISTING BRIDGES

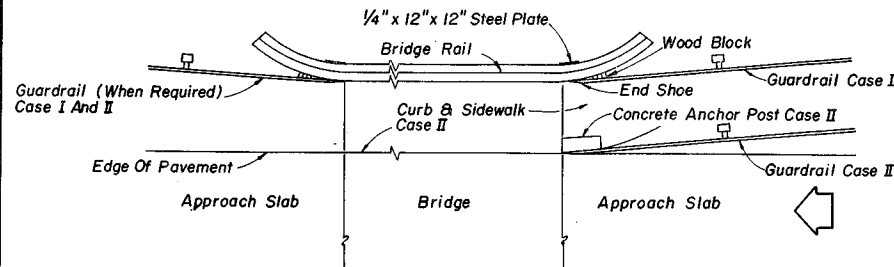
FOR APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES AND APPROACH ENDS OF ONE-WAY BRIDGES. GUARDRAIL ON TRAILING ENDS OF ONE-WAY BRIDGES CAN BE MOUNTED DIRECTLY IN THE END POST RECESS.



CONCRETE POST

SPECIAL CONCRETE AND STEEL GUARDRAIL POSTS

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.

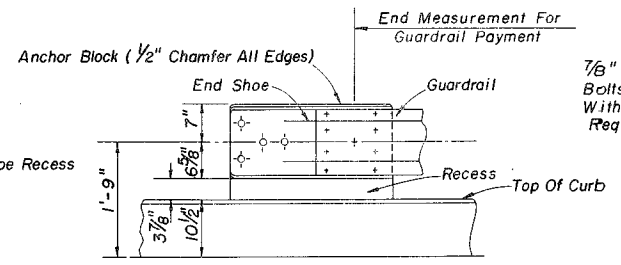
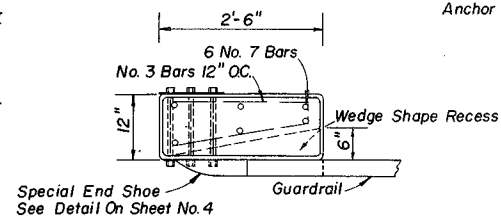


Note: The pentachlorophenol treated wood block and end shoe shall be mounted to the existing bridge rail and located to provide a 6" clearance from back of guardrail to the face of bridge rail.

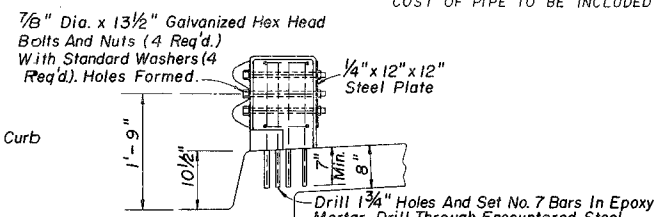
TYPICAL GUARDRAIL INSTALLATION AT EXISTING BRIDGE ENDS

TYPICAL GUARDRAIL INSTALLATION AT EXISTING BRIDGE ENDS

CASE I - BRIDGE RAIL WITHOUT SIDEWALK
CASE II - BRIDGE RAIL WITH SIDEWALK & CURB



ANCHOR POST - CASE II



END VIEW

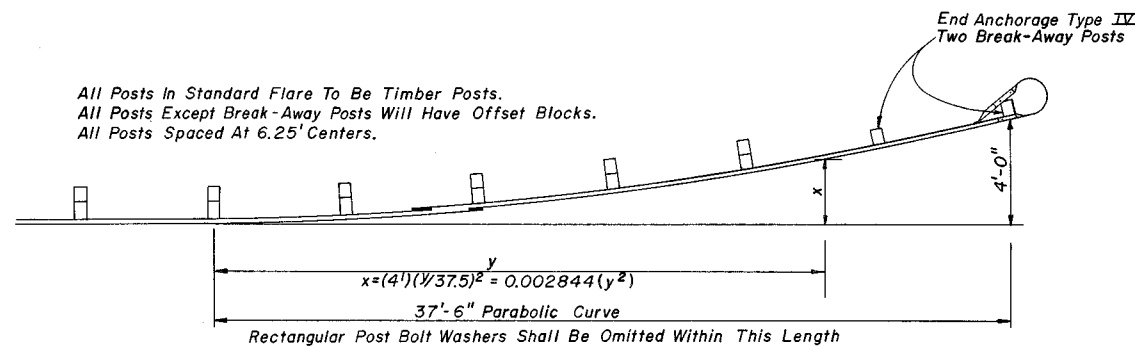
SPECIAL SAFETY PIPE RAIL

FOR LOCATIONS USED BY SUBSTANTIAL NUMBERS OF PEDESTRIANS, CYCLISTS OR FISHERMEN. COST OF PIPE TO BE INCLUDED IN COST OF GUARDRAIL.

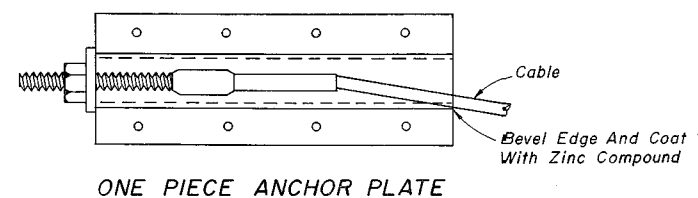
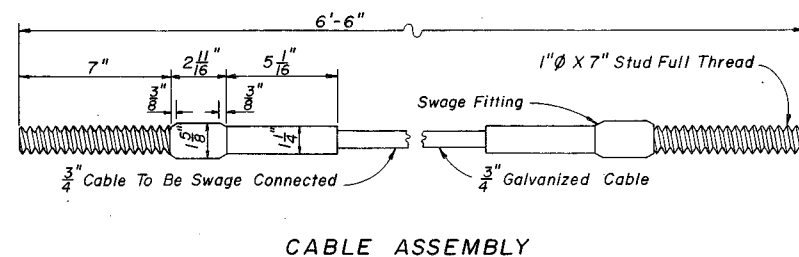
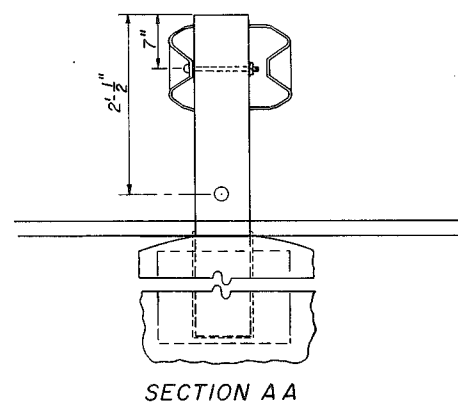
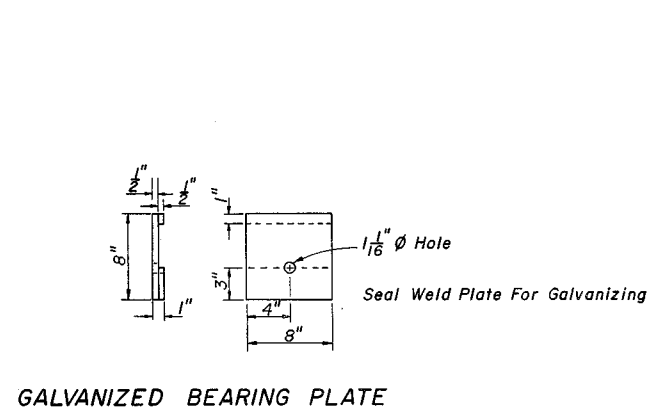
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

| Design by | Names | Dates | Approved By |
|----------------------------|-----------|-----------|-------------|
| Drawn by | HW | 7/69 | |
| Checked by | LMF | 3/76 | |
| F.H.W.A. Approved: 10/7/80 | | | |
| Revision No. | Sheet No. | Index No. | |
| 81 | 5 of 6 | 400 | |

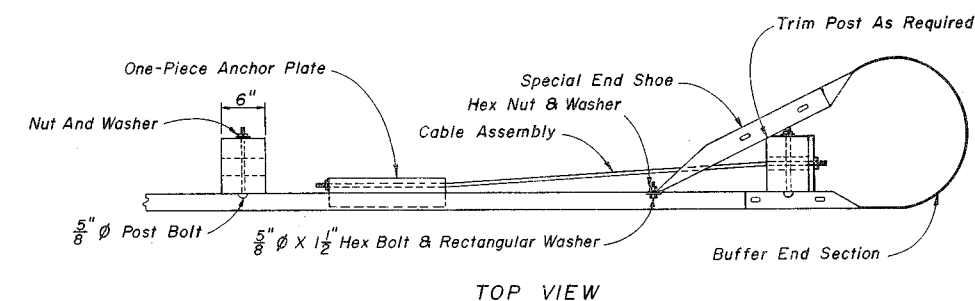
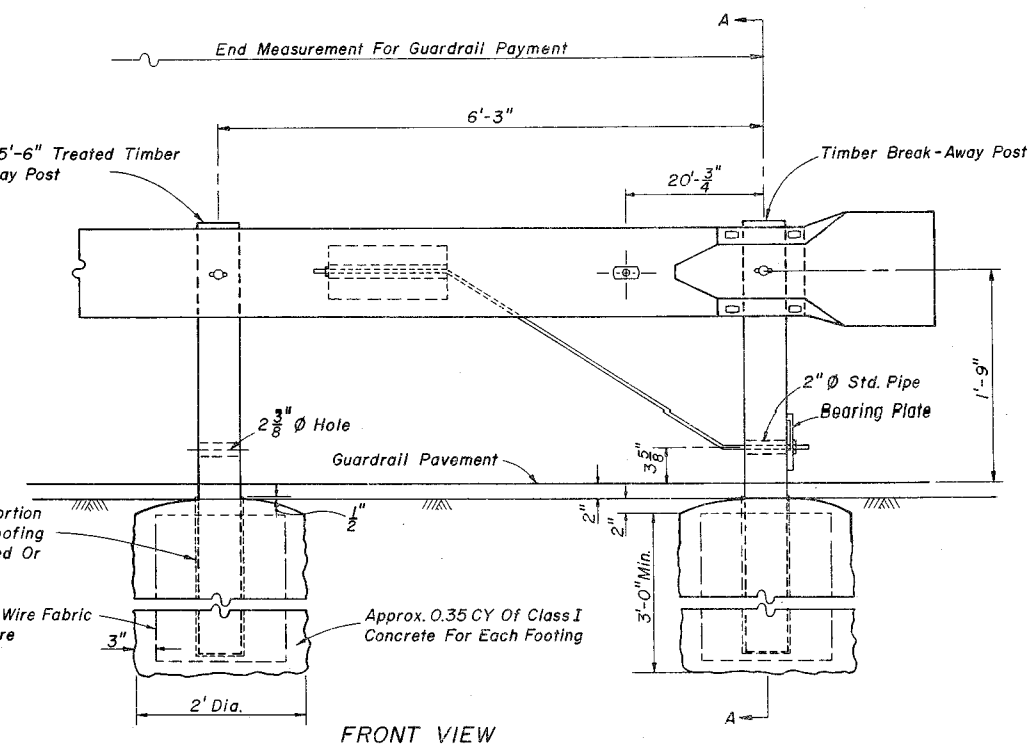


STANDARD FLARE
DETAIL P



To Facilitate Post Replacement Wrap Portion Of Post In Concrete With 3 Turns Of Roofing Paper. Paper Will Not Be Tacked, Stapled Or Otherwise Secured To Post.

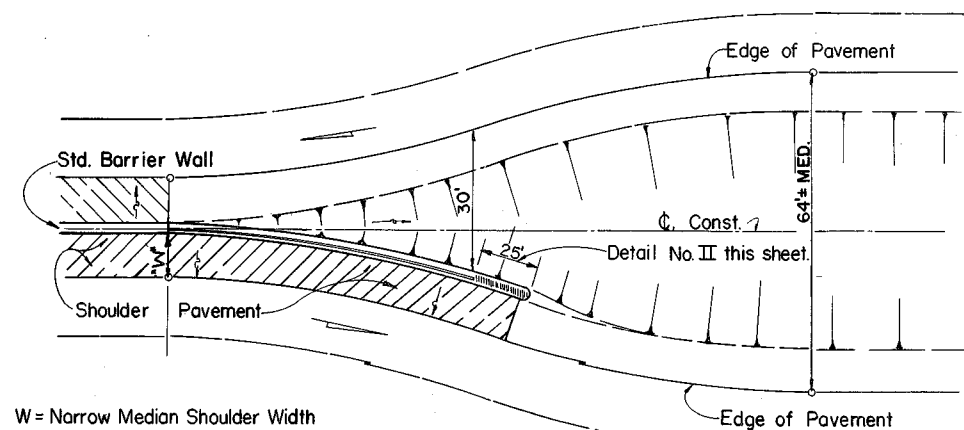
6 X 6 - W6 X W6 Welded Wire Fabric (Cylinder). Lap One Square



END ANCHORAGE TYPE IV

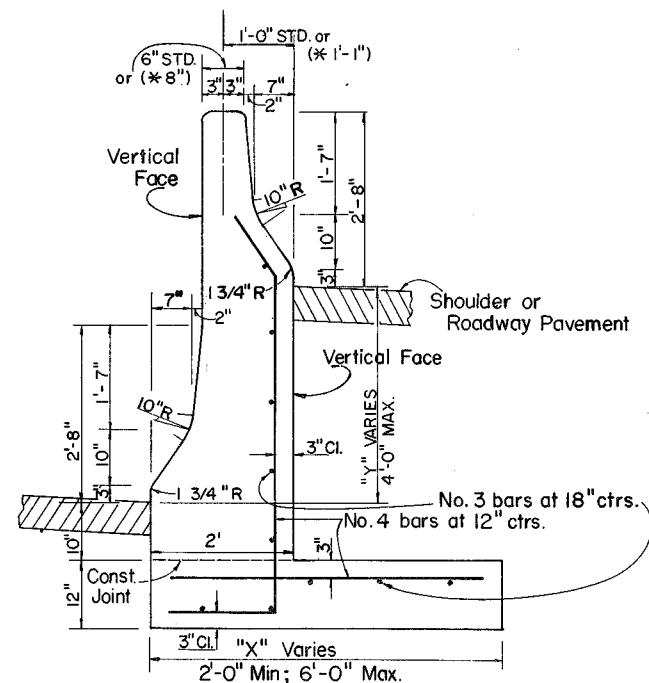
Note: The payment for the items of End Anchorage Assemblies Type IV shall include furnishing and installing the Buffer End Section, Special End Shoe, One Piece Anchor Plate, Cable Assembly, Pipe Sleeve Bearing Plate, two Treated Timber Break-Away Posts, two Concrete Footings including Wire Fabric and Roofing Paper and the necessary hardware.

| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
|--|-------|-------|--------------------------------------|-----------|-----------|
| GUARDRAIL | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | J M | 9/80 | Deputy Design Engineer, Roadways | | |
| Checked by | J V G | 9/80 | | | |
| F.H.W.A. Approved: 10/7/80 | | | Revision No. | Sheet No. | Index No. |
| | | | 81 | 6 of 6 | 400 |



W = Narrow Median Shoulder Width

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

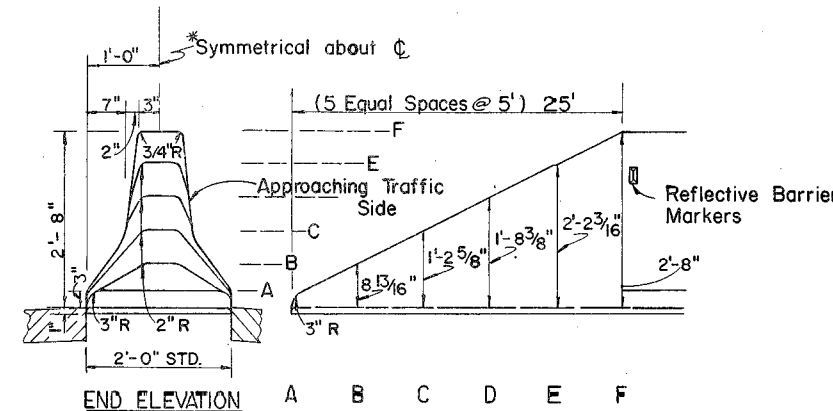


**MEDIAN BARRIER WALL FOR SUPERELEVATED SECTION
OR VARIABLE ROADWAY PROFILE GRADES**

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" |

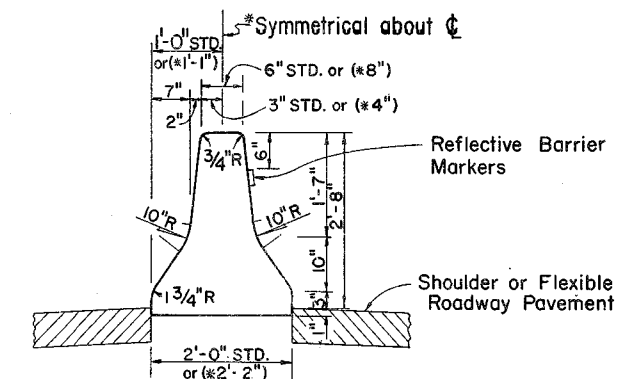
TABLE OF DIMENSIONS FOR DIFFERENCE HEIGHT "Y" AND BARRIER WALL FOOTING - WIDTH "X"



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.

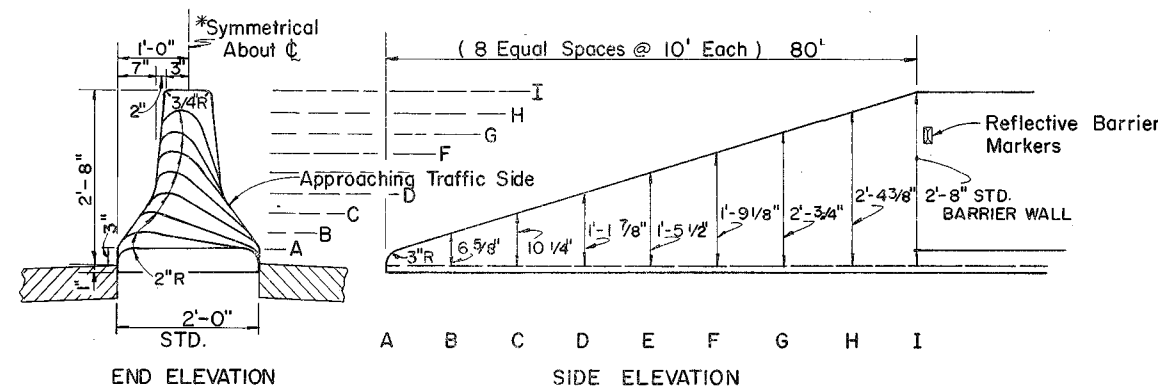


**STANDARD BARRIER WALL SECTION
NARROW MEDIAN INSTALLATION
ADJACENT TO PAVEMENT**

*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.

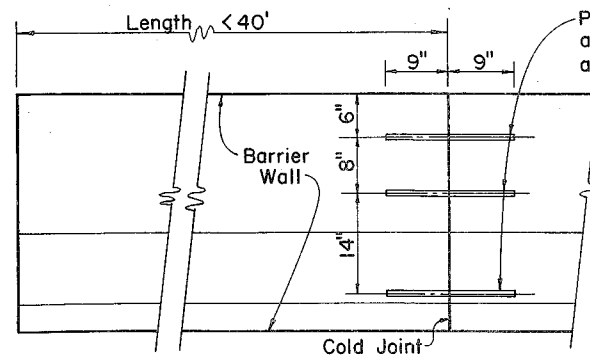


CONCRETE MEDIAN BARRIER TERMINAL FOR NARROW MEDIAN
Design Speed 45 M.P.H. or Less
DETAIL III

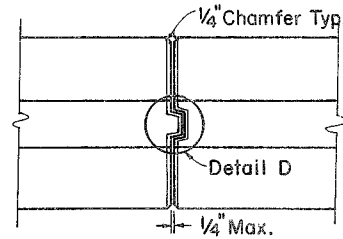
GENERAL NOTES:

- 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.

| | | | | |
|--|-------|-------|-------------------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | |
| CONCRETE BARRIER WALL | | | | |
| Designed by | Names | Dates | Approved By | |
| Drawn by | A F | 6/73 | D. C. [Signature] | |
| Checked by | L M F | 7/73 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 5/20/77 | | | 81 | 1 of 2 |
| | | | | 410 |

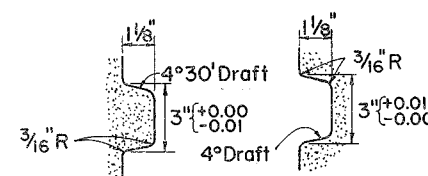


DOWELED TRANSVERSE CONSTRUCTION JOINT
DETAIL B



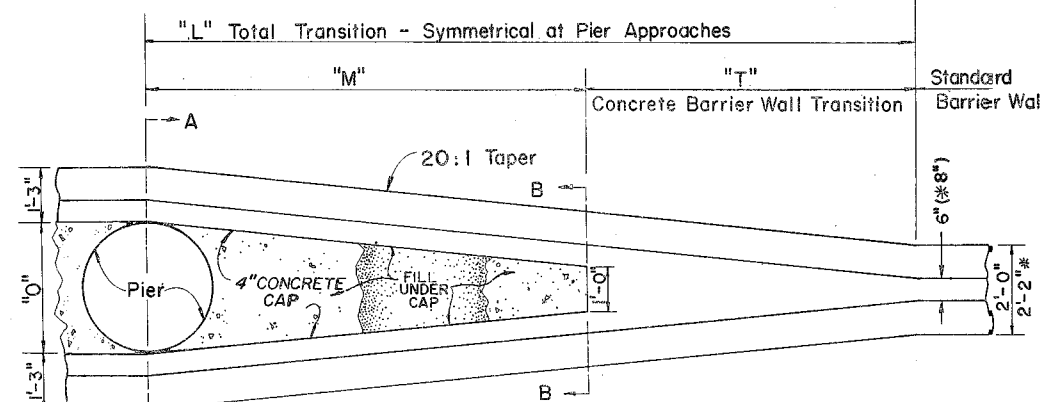
TOP VIEW
DETAIL C

PRECAST BARRIER TRANSVERSE JOINTS



DETAIL D

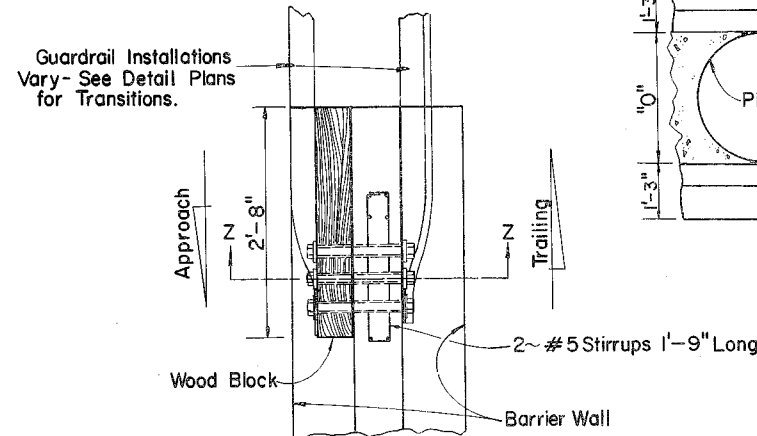
To Be Paid For As Concrete Barrier Wall LF (Cost To Include Thin Walls, Fill, Cap And Transition)



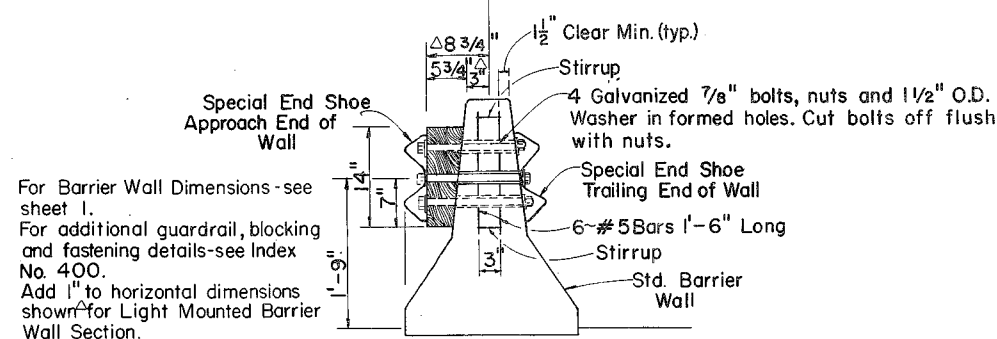
PLAN
DETAIL I

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

| DIMENSIONS - DETAIL I | | | | |
|-----------------------|------------------|------------------|-----------------------|----------------------------|
| "O" Varies 3' Shown | "L" Total Trans. | "M" Barrier Wall | "T" Std. to M. Trans. | WALL TYPE |
| 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) |

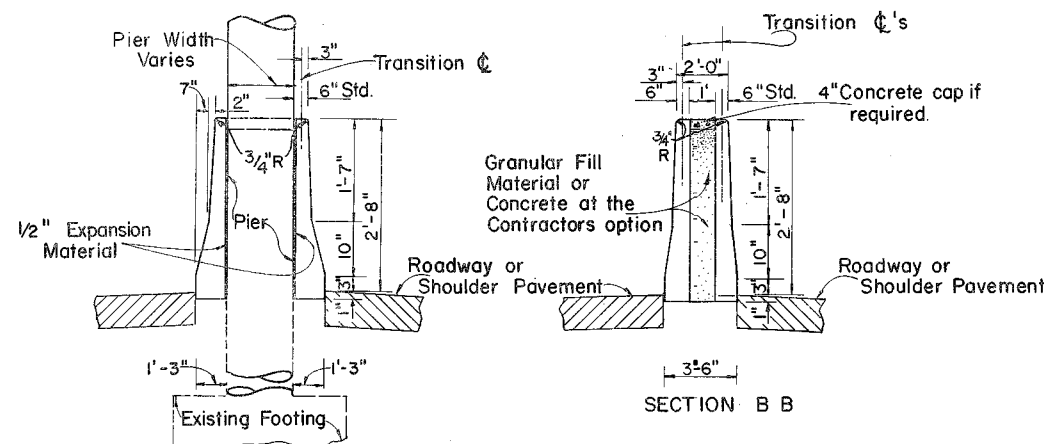


Symmetrical about C for uni-directional flow - Approach End of Wall
Symmetrical about C for uni-directional flow - Trailing End of Wall



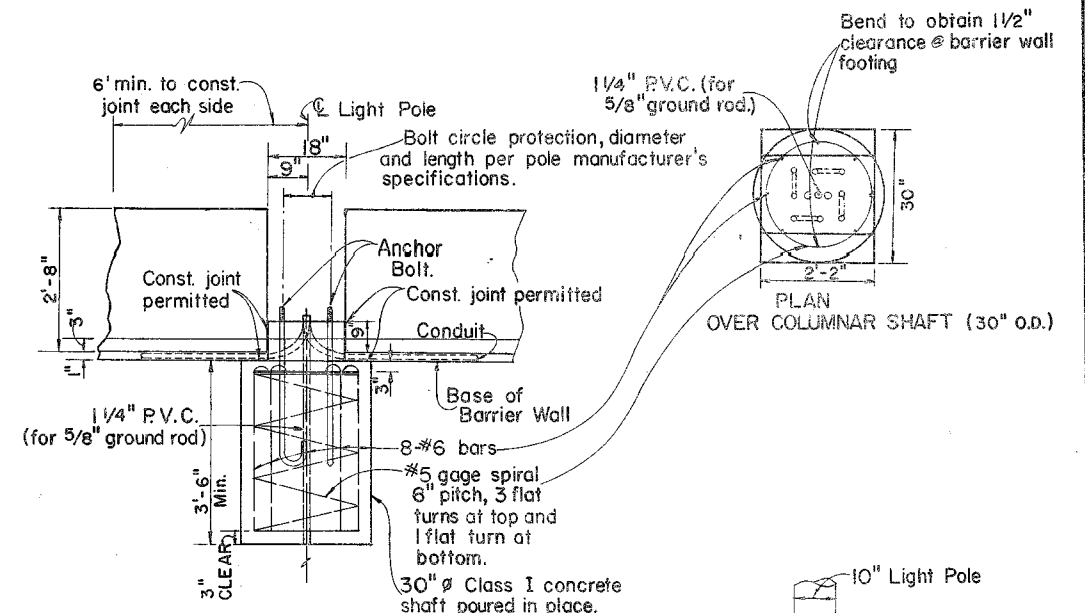
SECTION Z Z

GUARDRAIL CONNECTION TO STD. CONCRETE BARRIER WALL

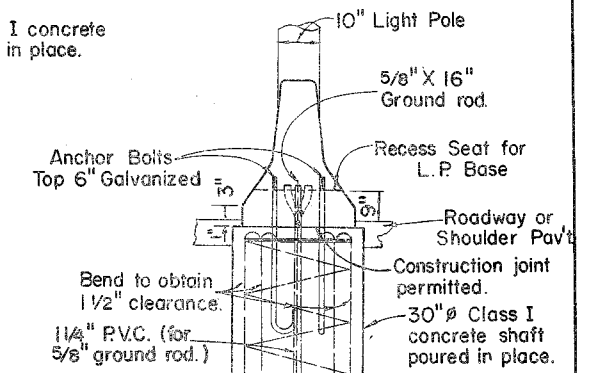


SECTION A A

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



SECTION



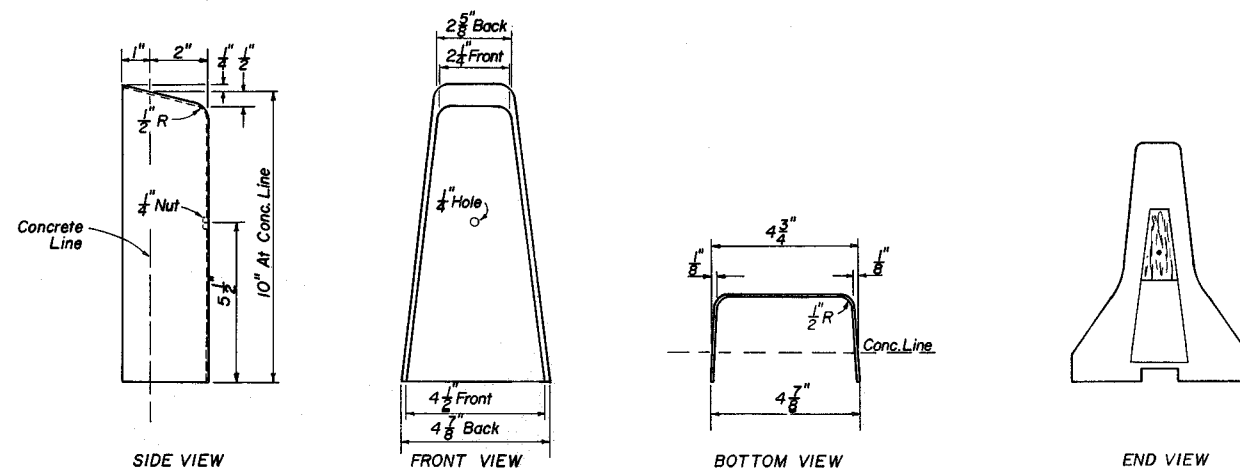
10" LIGHT POLE MOUNTING IN MEDIAN BARRIER WALL WITH 8" TOP, 2'-2" BASE

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

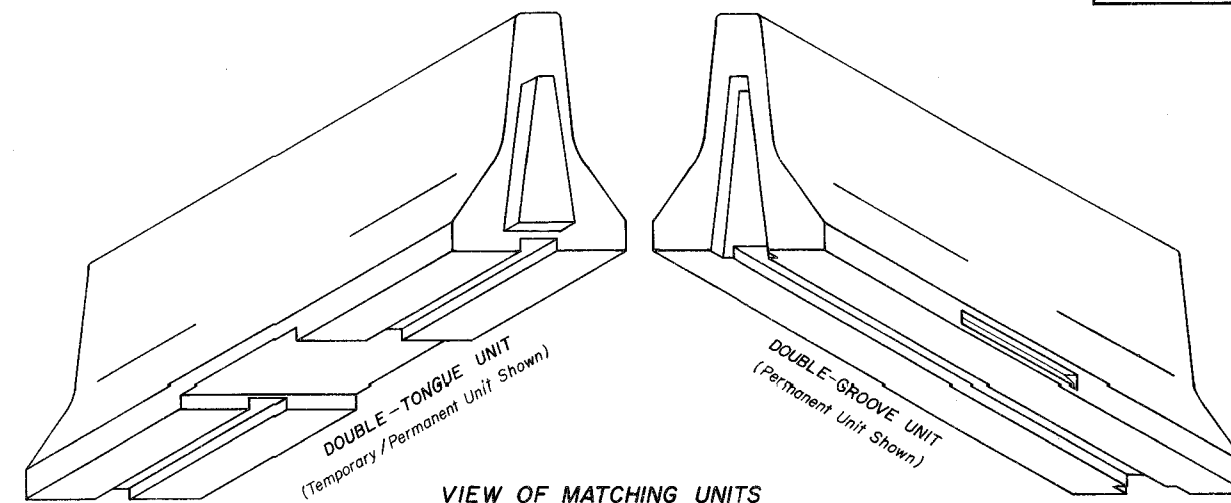
CONCRETE BARRIER WALL

| Designed by | Names | Dates | Approved By | Index No. |
|--------------------|---------|-------|-------------------|-----------|
| Drawn by | AF | 6/73 | <i>De. Bittel</i> | |
| Checked by | LMF | 7/73 | | |
| F.H.W.A. Approved: | 10/8/78 | 81 | 2 of 2 | 410 |

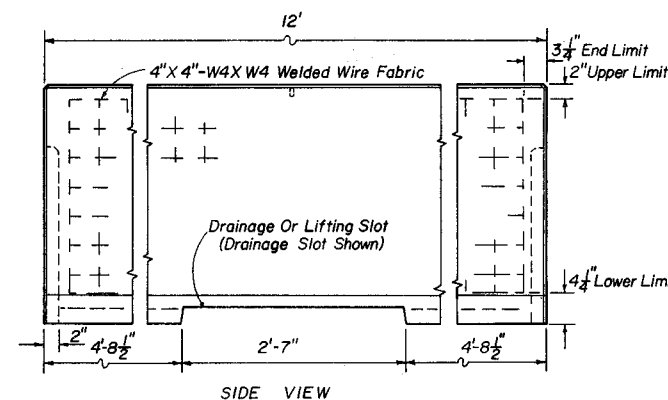


TONGUE PROTECTOR DETAIL

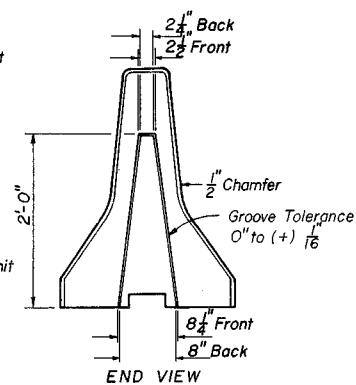
TONGUE PROTECTOR IN PLACE



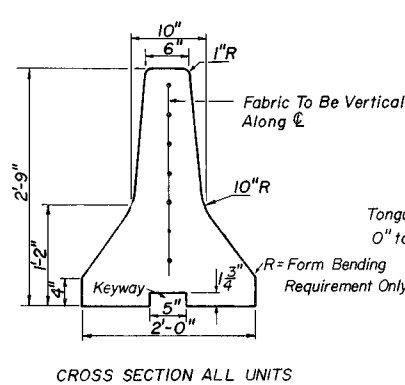
VIEW OF MATCHING UNITS



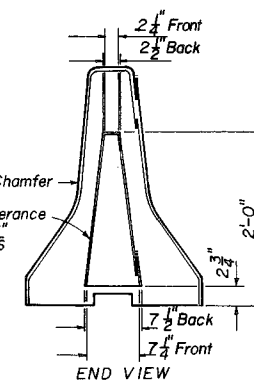
DOUBLE-GROOVE UNIT



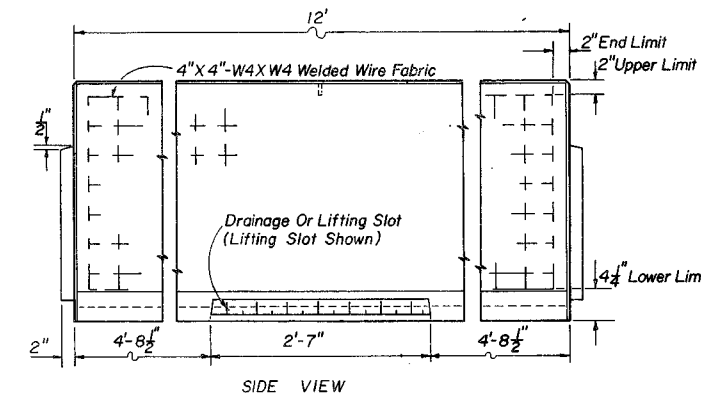
END VIEW



CROSS SECTION ALL UNITS

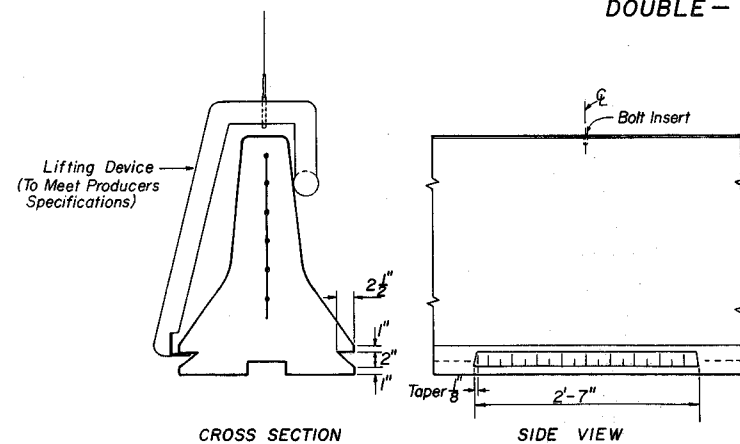


END VIEW

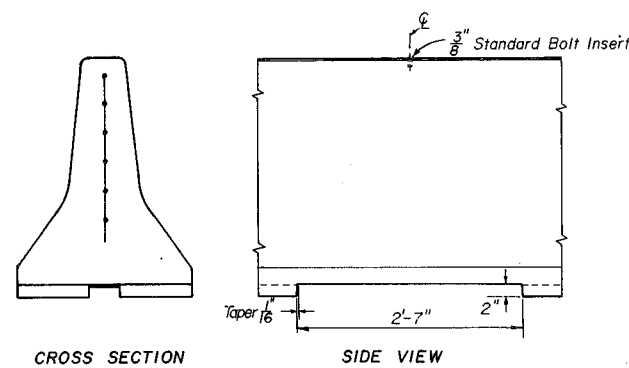


SIDE VIEW

DOUBLE-TONGUE UNIT



LIFTING SLOT DETAIL



DRAINAGE SLOT DETAIL

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.

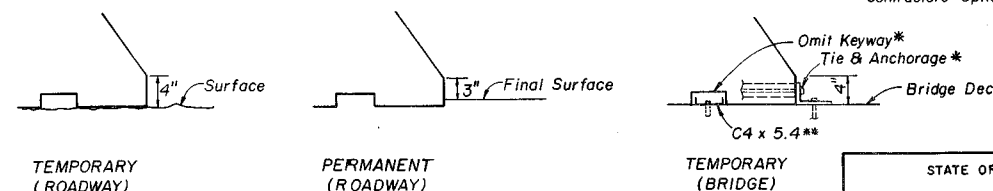
5. Precast double-tongue double-groove units may be used as Class E warning devices.

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) (Furn & 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.



* 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.

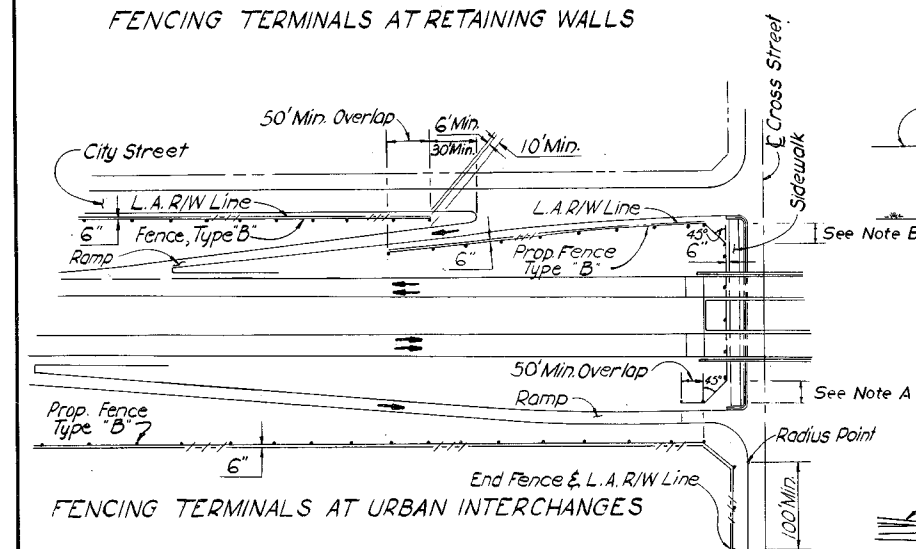
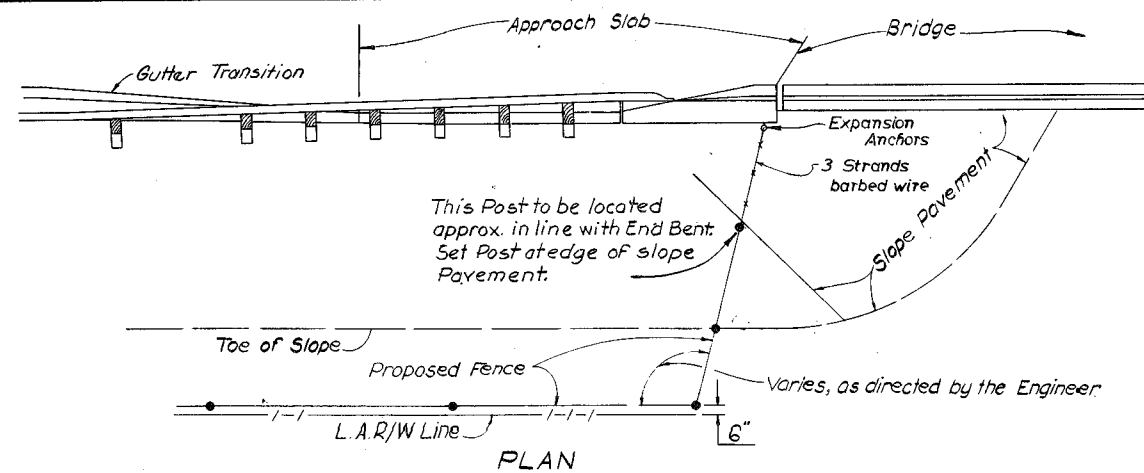
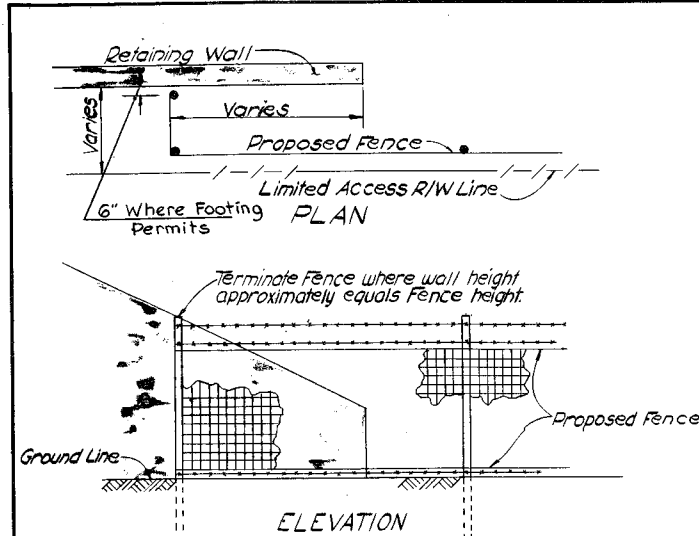
** Non Federal Aid Projects:
Channel Shall Have A Minimum Length Of 2'-0" Positioned Symmetrically Under Each Wall Joint And Secured With Two 3/4" Diameter Anchor Bolts. Each Anchor Bolt Shall Develop Minimum Pullout Strength Of 9,500 Lbs. And Minimum Shear Strength Of 16,200 Lbs. In 3,500 p.s.i. Concrete. 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.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

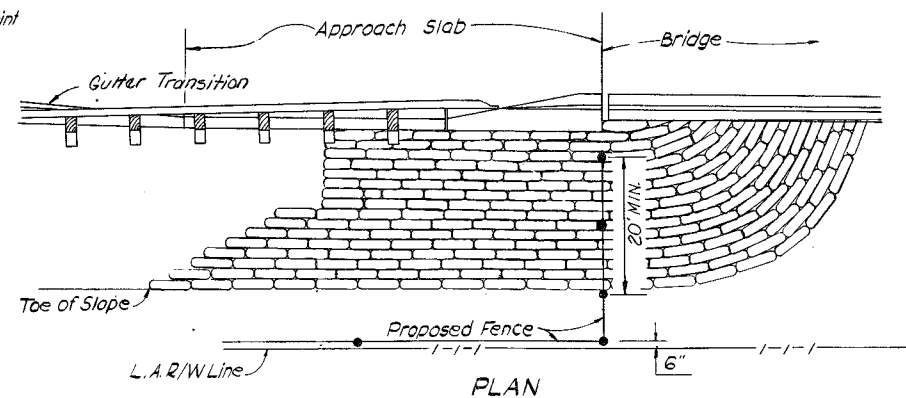
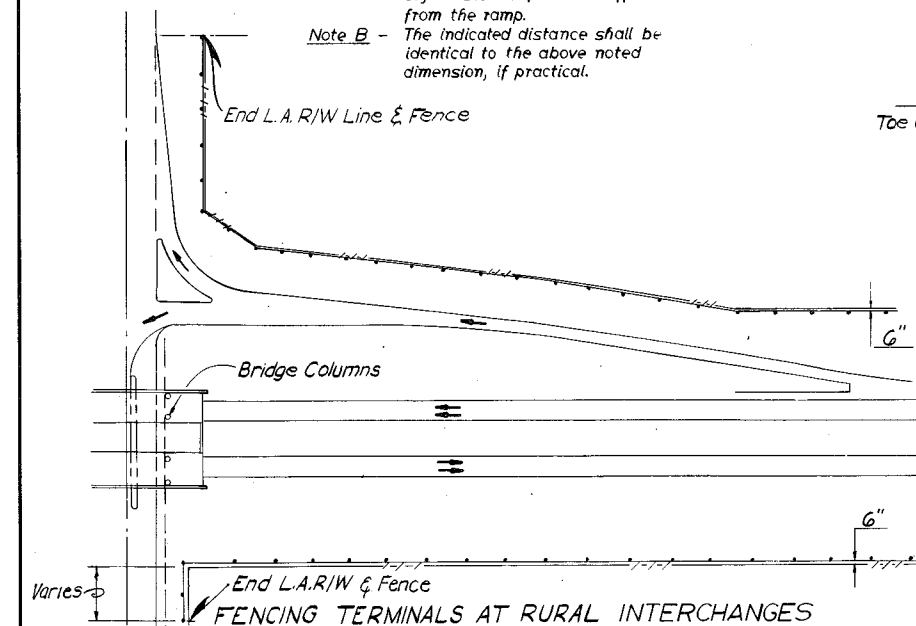
DOUBLE-TONGUE DOUBLE-GROOVE
PRECAST CONCRETE BARRIER WALL

| Names | Dates | Approved By | Revision No. | Sheet No. | Index No. |
|----------------------------|-------|-------------|--------------|-----------|-----------|
| Designed by | | | | | |
| Drawn by | J/M | 3/80 | | | |
| Checked by | JVG | 3/80 | | | |
| F.H.W.A. Approved: 10/7/80 | 81 | 1 of 1 | | | 415 |



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.



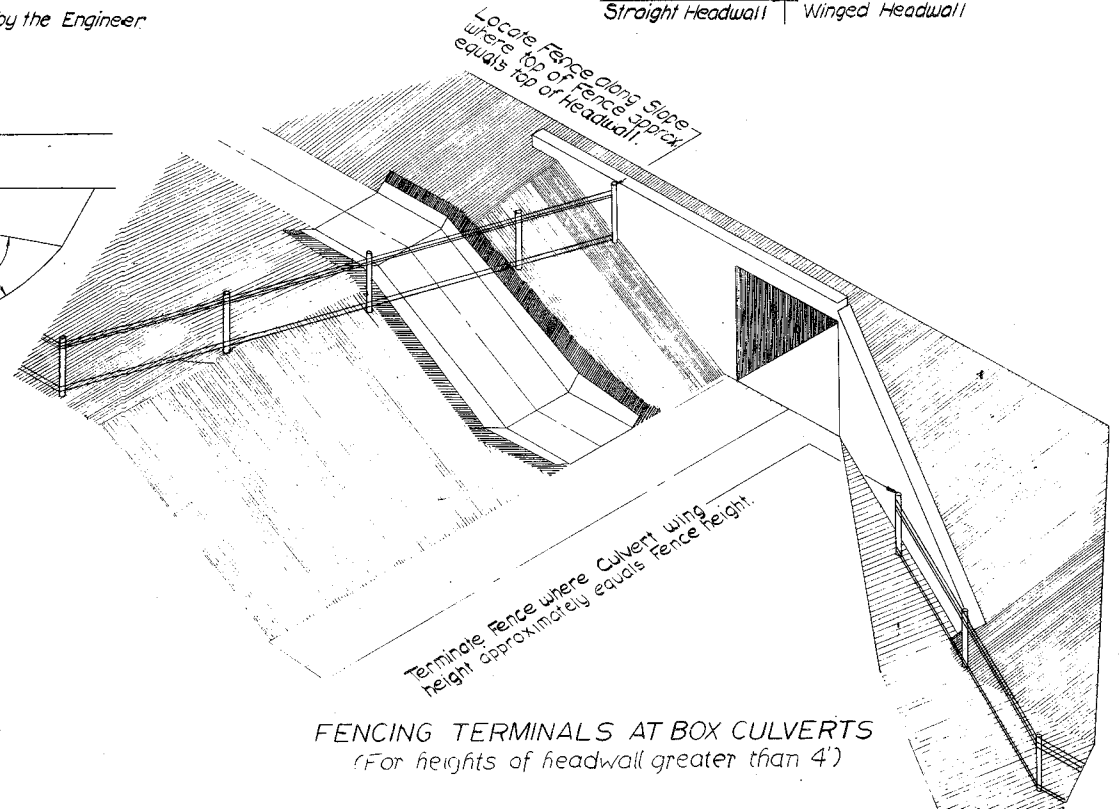
Note:

1. Angle of fence to be measured from a line parallel to the $\frac{1}{2}$ of Structure.
2. This Fence location to be used at Cross Drains with excavated outfall Ditches or as shown in plans.

Locate Fence along Slope where top of fence approx. equals top of headwall.

Terminate Fence where Culvert wing height approximately equals fence height.

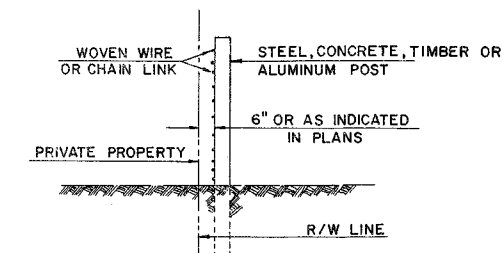
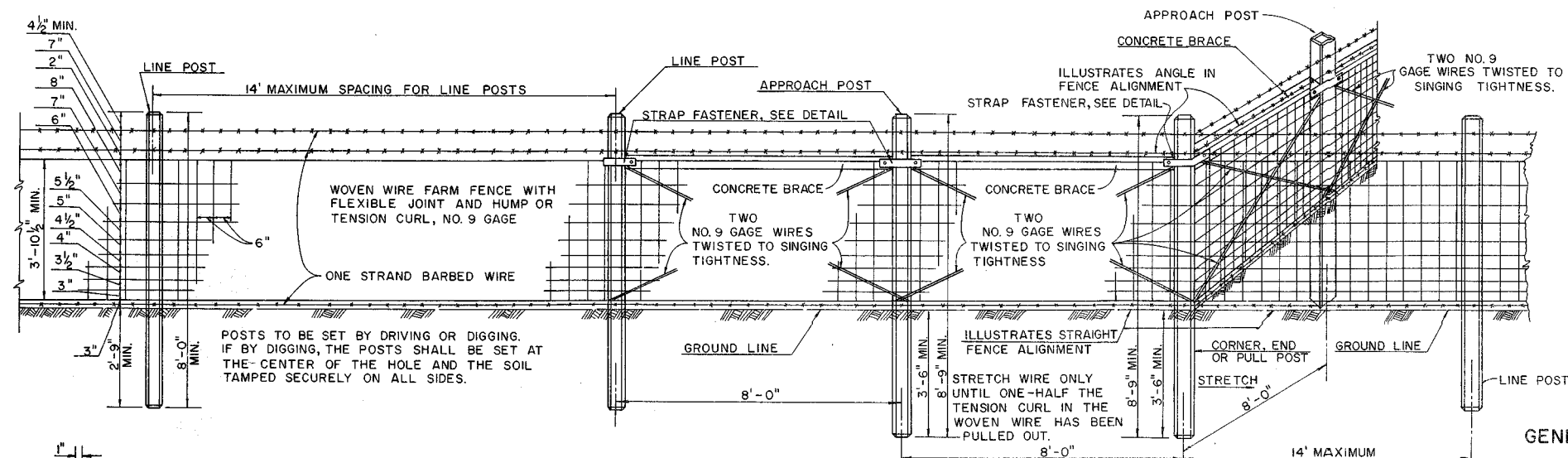
Half Plan Straight Headwall, Half Plan Winged Headwall, CL. A. R/W Line, 6", 2'-6" Min., Varies with Footing width (Const. Flush against Footing), Varies, Roadway, Roadway, Shoulder Line.



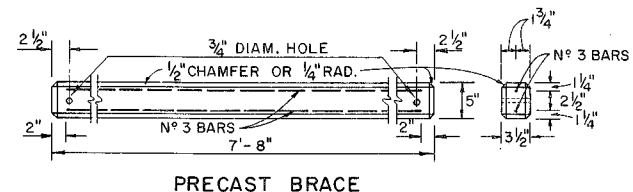
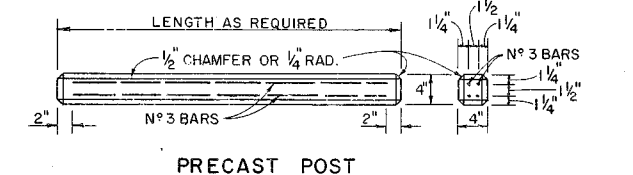
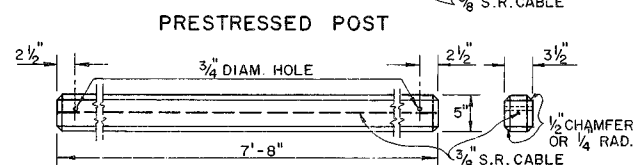
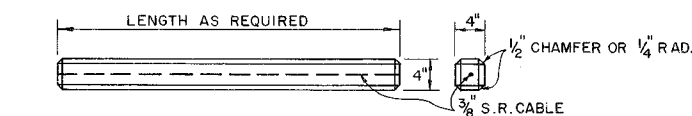
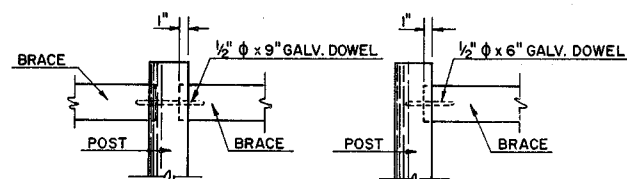
FENCING DETAIL AT CULVERT
(For heights of headwalls 4' or less.)

Note: When height of headwall is 4' or less (pipe culverts 36" 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 | De Puhl Deputy Design Engineer, Roadways | | |
| Checked by | RLO | 2/65 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: | 6/18/74 | 80 | 1 of 1 | 450 | |



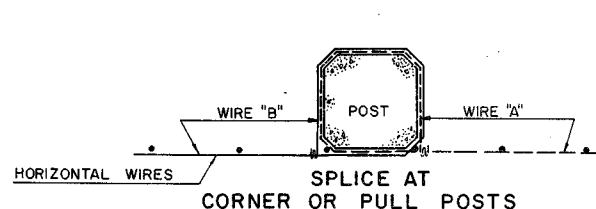
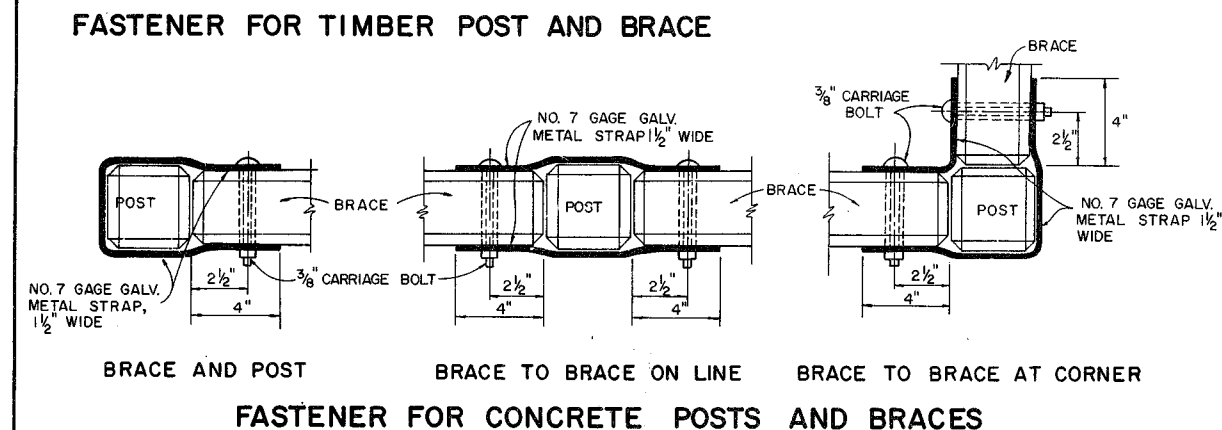
DETAILS OF TYPE "A" FENCE (ILLUSTRATED FOR CONC. POSTS AND BRACES)



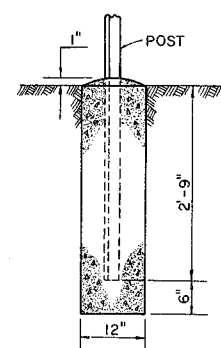
ALTERNATE CONCRETE POSTS AND BRACES

GENERAL NOTES (TYPE "A" FENCE) CONTINUED

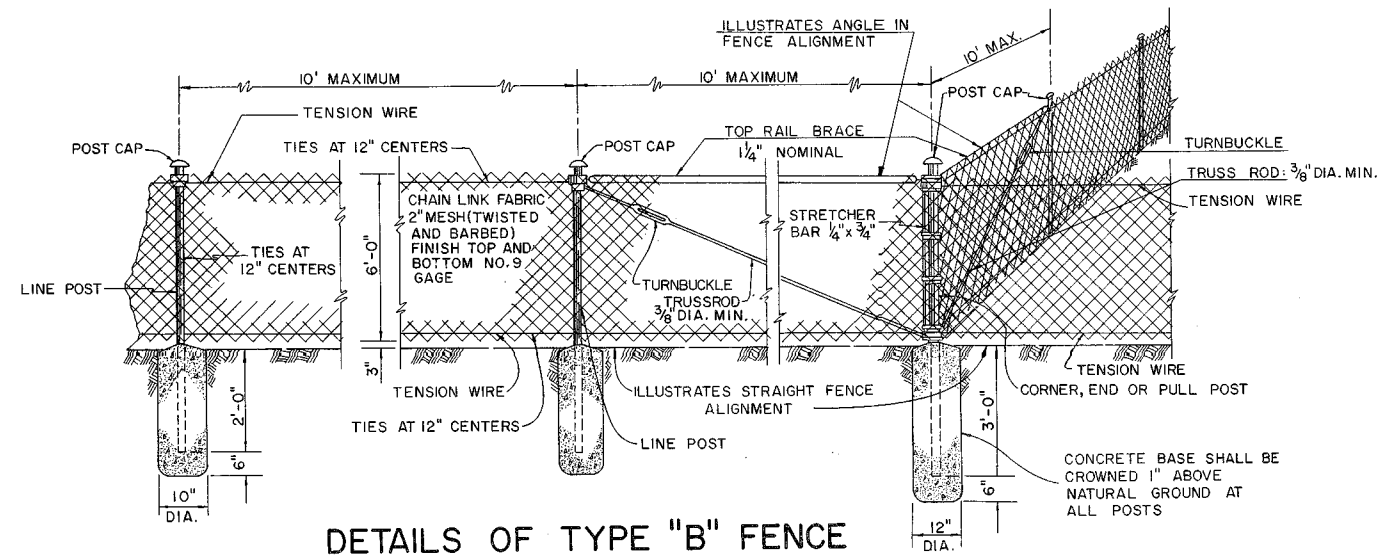
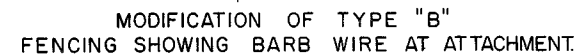
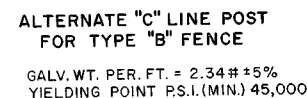
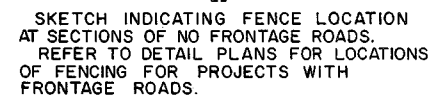
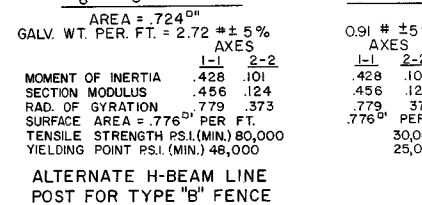
9. FOR PAY PURPOSES ASSEMBLIES ARE DEFINED AS FOLLOWS: PULL OR END POST ASSEMBLIES SHALL CONSIST OF: ONE END OR PULL POST, ONE APPROACH POST, TWO BRACES AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE. CORNER POST ASSEMBLIES SHALL CONSIST OF: ONE CORNER POST, TWO APPROACH POSTS, FOUR BRACES AND ALL NECESSARY FITTINGS AND HARDWARE AS DETAILED ABOVE.
10. 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.
11. CORNER POSTS ARE TO BE INSTALLED AT ALL HORIZONTAL AND VERTICAL BREAKS IN FENCE OF 15° OR MORE.
12. A MAXIMUM LENGTH OF 1320' OF WIRE MAY BE INSTALLED AS A UNIT.



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.



| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | | | | | | | |
|--|--------------|-----------|-------------|--|----------|--|------------|--|---|--|--|
| <h1 style="margin: 0;">FENCE TYPE A</h1> | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">Names</th> <th style="width: 15%;">Dates</th> </tr> <tr> <td style="height: 30px;">Designed by</td> <td></td> </tr> <tr> <td style="height: 30px;">Drawn by</td> <td></td> </tr> <tr> <td style="height: 30px;">Checked by</td> <td></td> </tr> </table> | Names | Dates | Designed by | | Drawn by | | Checked by | | Approved By Jc. Butler | | |
| Names | Dates | | | | | | | | | | |
| Designed by | | | | | | | | | | | |
| Drawn by | | | | | | | | | | | |
| Checked by | | | | | | | | | | | |
| F.H.W.A. Approved: 9/3/76 | Revision No. | Sheet No. | Index No. | | | | | | | | |
| | 81 | 1 of 1 | 451 | | | | | | | | |




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

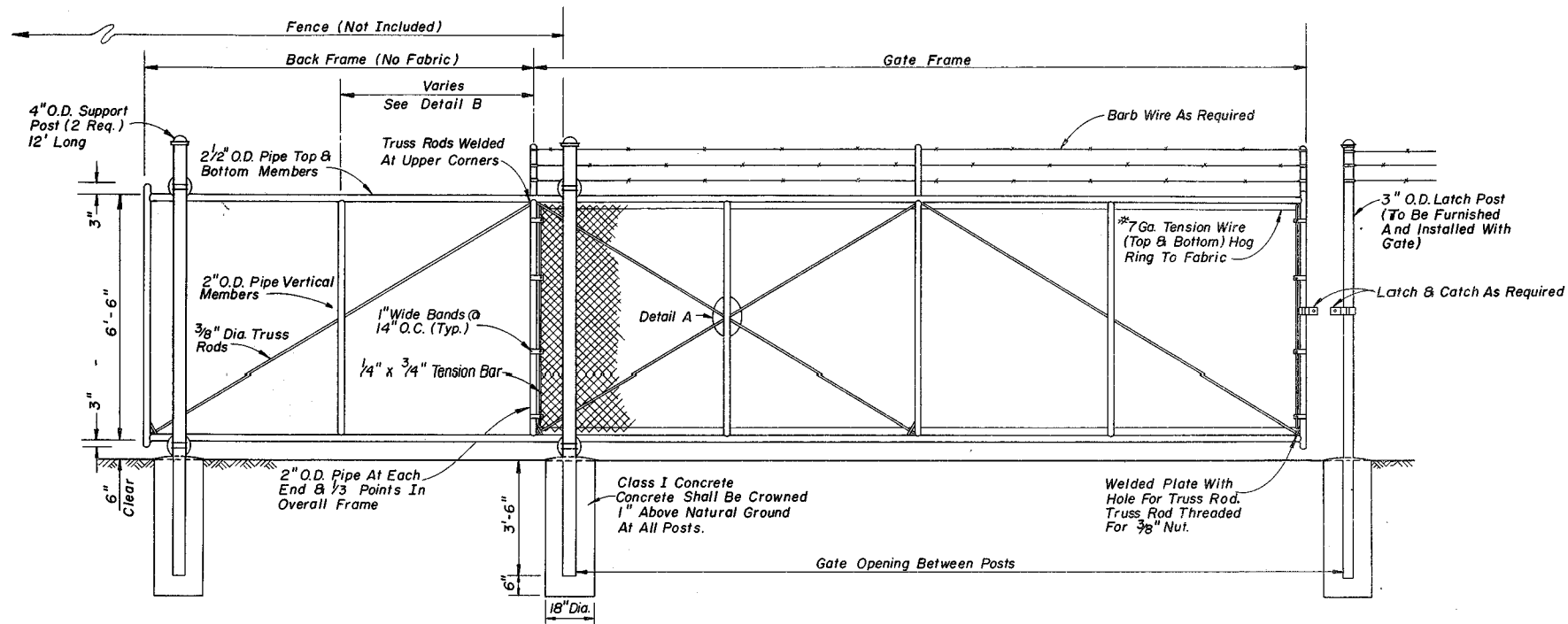
GENERAL NOTES (TYPE "B" FENCE)

1. THIS FENCE TO BE PROVIDED GENERALLY IN URBAN AREAS.
2. LINE POSTS MAY BE ANY OF THE FOLLOWING:
(A) GALVANIZED STEEL PIPE - $1\frac{1}{2}$ " NOMINAL; (B) ALUMINUM COATED STEEL PIPE - $1\frac{1}{2}$ " NOMINAL; (C) ALUMINUM ALLOY PIPE - 2" NOMINAL; (D) GALVANIZED STEEL H-BEAM - $1\frac{1}{8}$ " x $1\frac{1}{8}$ " x $1\frac{1}{8}$ "; (E) ALUMINUM ALLOY H-BEAM - $1\frac{1}{8}$ " x $1\frac{1}{8}$ " x $1\frac{1}{8}$ "; (F) GALV. STEEL "C" - $1\frac{1}{8}$ " x $1\frac{1}{8}$ ".
3. 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" NOMINAL.
NOTE: OTHER STEEL OR ALUMINUM SHAPES FOR CORNER, END OR PULL POST ASSEMBLIES MAY BE USED IF APPROVED BY THE ENGINEER.
4. 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.
5. SEE SECTION 966 OF D.O.T. STANDARD SPECIFICATIONS FOR OPTIONAL MATERIALS.
6. 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.
7. 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.

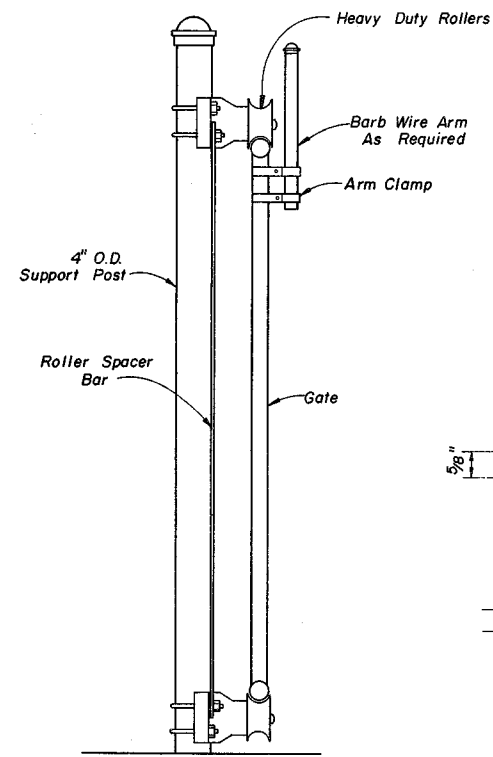
GENERAL NOTES (CONT.)

8. 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.
9. 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.
10. 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.

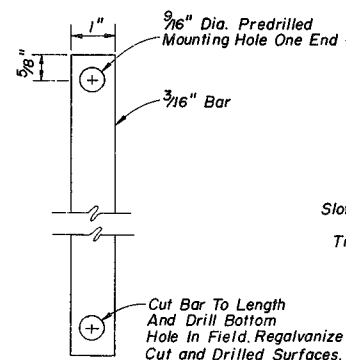
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION | | | | | | | | | | | | |
|--|-------|--------------|-----------|-------------|--|----------|--|------------|--|--|--|--|
| ROAD DESIGN | | | | | | | | | | | | |
| <div style="text-align: center; font-size: 2em; font-weight: bold;">FENCE TYPE B</div> | | | | | | | | | | | | |
| <table border="1"> <tr> <th>Names</th> <th>Dates</th> </tr> <tr> <td>Designed by</td> <td></td> </tr> <tr> <td>Drawn by</td> <td></td> </tr> <tr> <td>Checked by</td> <td></td> </tr> </table> | | Names | Dates | Designed by | | Drawn by | | Checked by | | Approved By  Deputy Design Engineer, Roadways | | |
| Names | Dates | | | | | | | | | | | |
| Designed by | | | | | | | | | | | | |
| Drawn by | | | | | | | | | | | | |
| Checked by | | | | | | | | | | | | |
| F.H.W.A. Approved: 9/3/76 | | Revision No. | Sheet No. | Index No. | | | | | | | | |
| | | 81 | 1 of 1 | 452 | | | | | | | | |



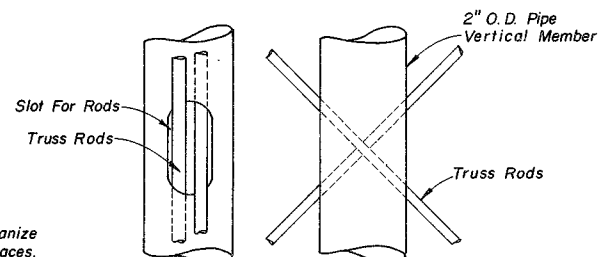
FRONT ELEVATION



SUPPORT POST
DETAIL

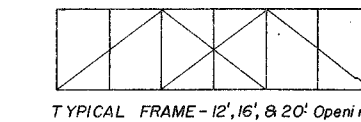


ROLLER SPACER
BAR

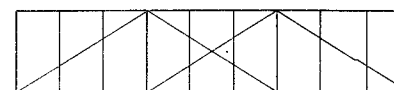


DETAIL A

| 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

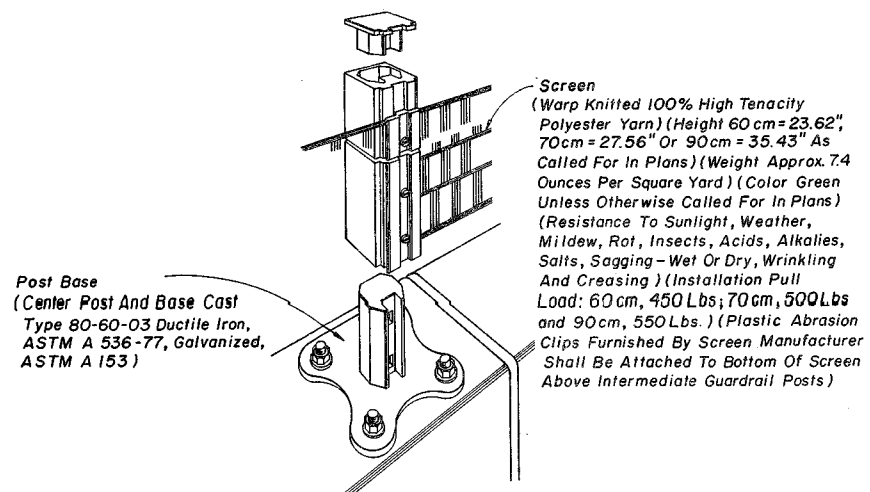
GENERAL NOTES

1. All fabric shall be #9 gage 2" mesh knuckled top & bottom selvages.
2. All gate components shall meet the galvanizing requirements specified in Index No. 452.
3. Cost of all gate components shall be included in the contract unit price for Cantilever Slide Gate.
4. The Contractor may substitute any equivalent cantilever slide gate approved by the Engineer.

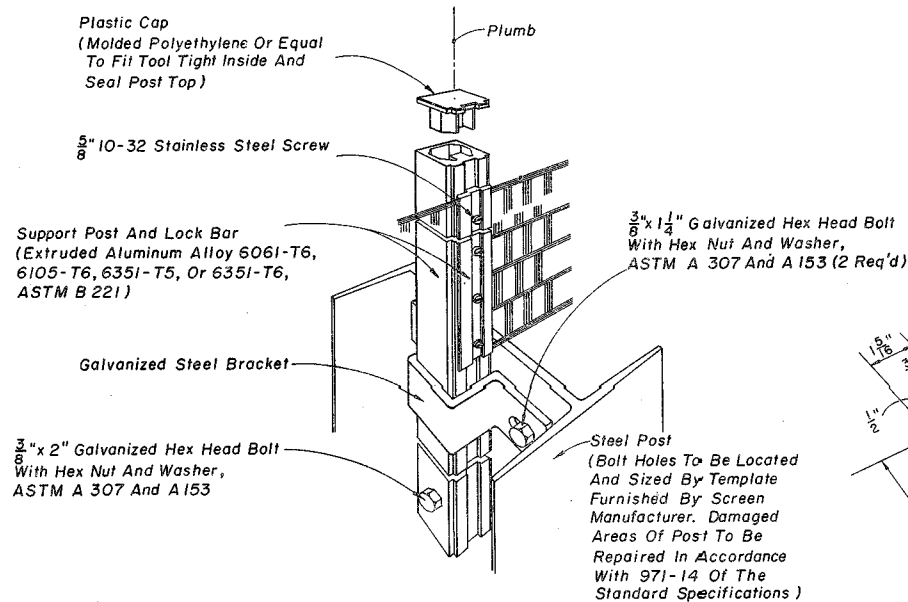
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CANTILEVER SLIDE GATE TYPE B FENCE

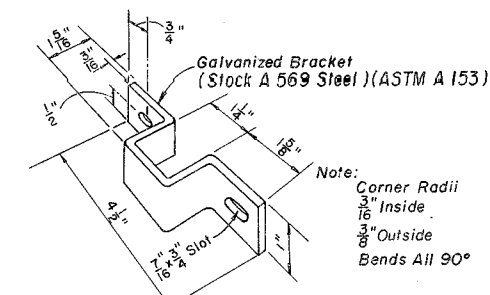
| Names | Dates | Approved By | Revision No. | Sheet No. | Index No. |
|-----------------------------|--------|-------------|--------------|-----------|-----------|
| Designed by | | | | | |
| Drawn by | HDD | 9/78 | | | |
| Checked by | L.M.F. | 9/78 | | | |
| F.H.W.A. Approved: 10/26/78 | 80 | 1 of 1 | | | 453 |



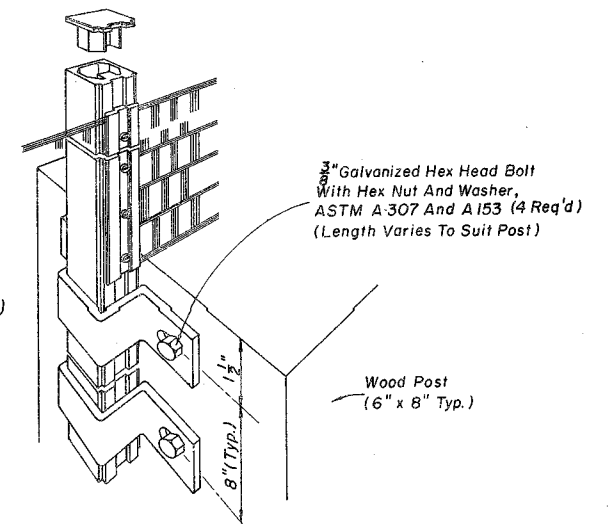
CONCRETE BARRIER WALL MOUNT



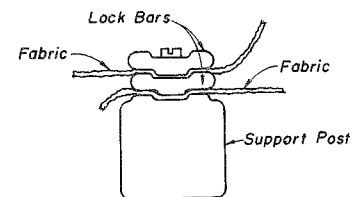
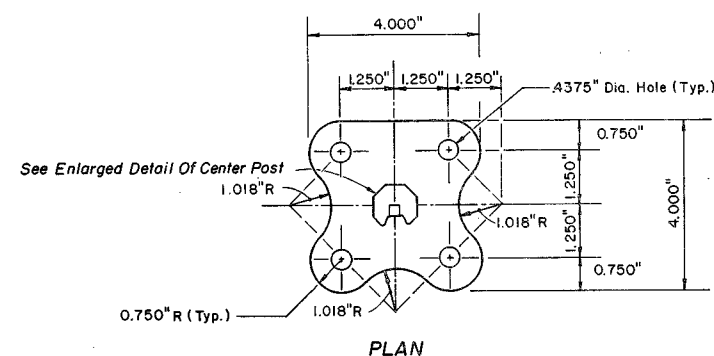
STEEL POST MOUNT



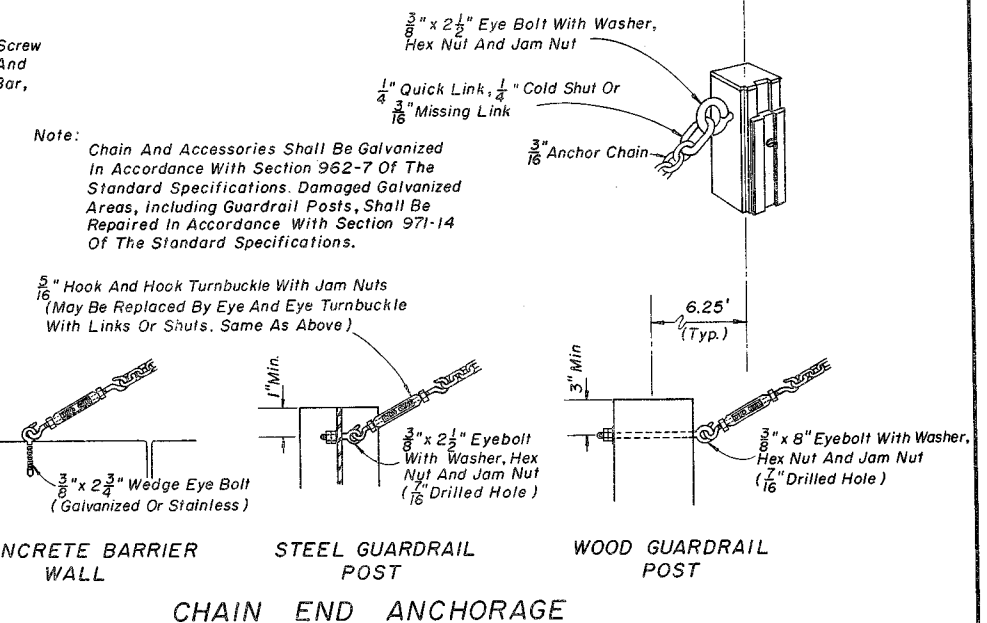
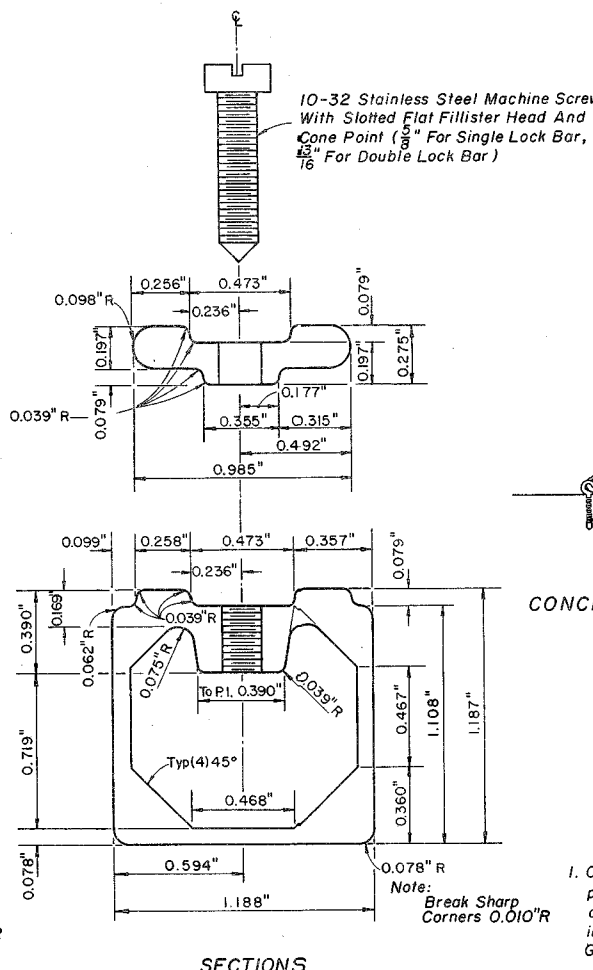
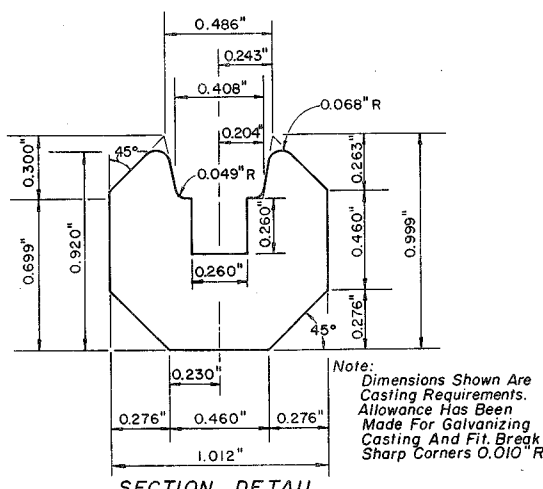
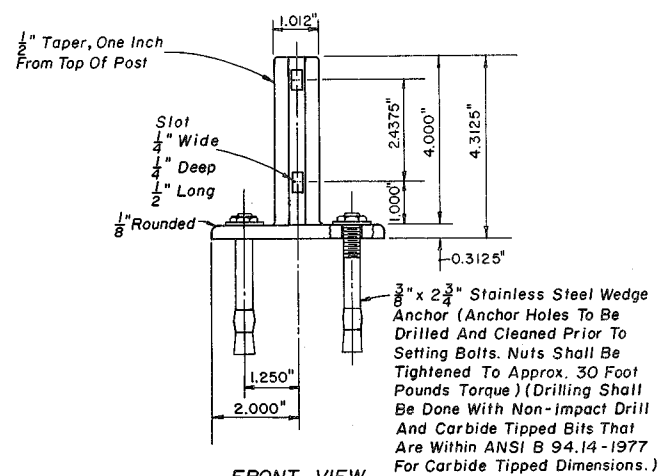
MOUNTING BRACKET



GUARDRAIL WOOD POST MOUNT



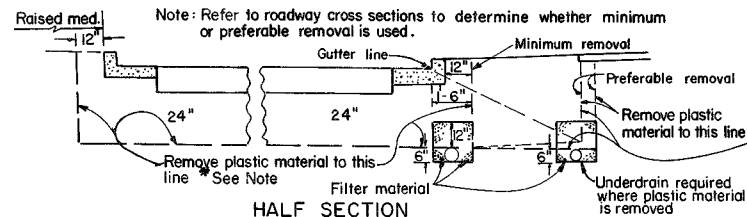
TOP VIEW
GLARE SCREEN SPLICE



GENERAL NOTES

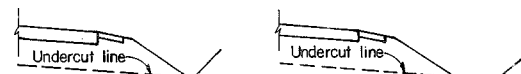
1. Cost of installation of screen, support posts, lock bars, leading and trailing end anchorages and all accessories shall be included in the contract unit price for Glare Screen (Knitted Polyester) L.F.

| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
|--|-------|-------|---|-----------|-----------|
| GLARE SCREEN KNITTED POLYESTER | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | HSD | 2-80 | De. Smith Deputy Design Engineer, Roadways | | |
| Checked by | JVG | 2-80 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 10/7/80 | | | 81 | 1 of 1 | 460 |



* 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.

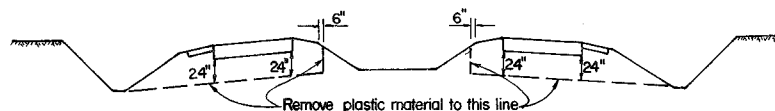
REMOVAL OF PLASTIC MATERIAL AND LOCATION OF UNDERDRAIN IN MUNICIPAL CONSTRUCTION



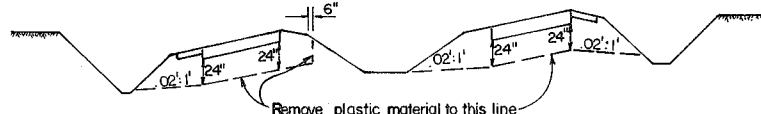
At locations where plastic material is being removed, the side ditches must be at least as deep as the undercut plane.

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

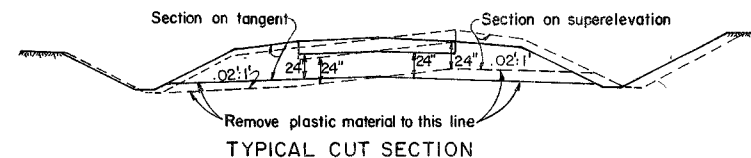


TYPICAL CUT SECTION ON TANGENT

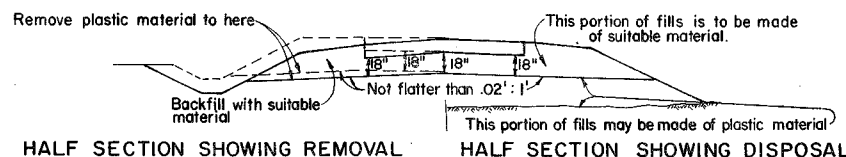


TYPICAL CUT SECTION ON SUPERELEVATION

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



REMOVAL OF PLASTIC MATERIAL ON MAJOR PRIMARY SYSTEM ROADS

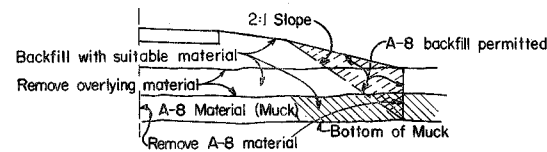


HALF SECTION SHOWING REMOVAL

HALF SECTION SHOWING DISPOSAL

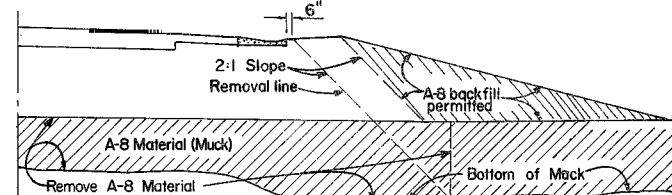
REMOVAL AND DISPOSAL OF PLASTIC MATERIAL FOR SECONDARY AND MINOR PRIMARY SYSTEM ROADS

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.



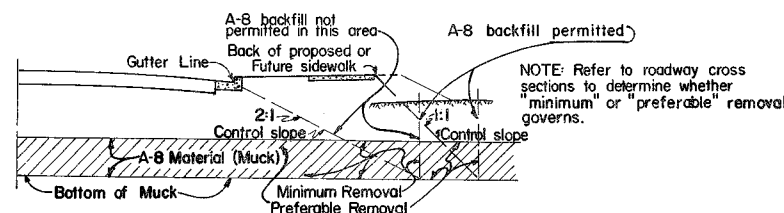
HALF SECTION

REMOVAL AND DISPOSAL OF A-8 MATERIAL IN RURAL CONSTRUCTION



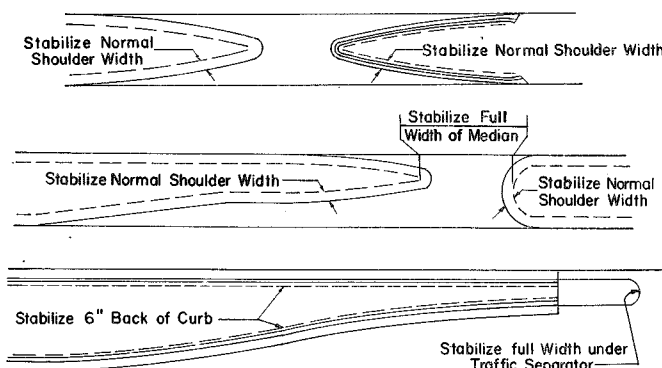
HALF SECTION

MUCK REMOVAL WHERE SHOULDER GUTTER IS CONSTRUCTED



HALF SECTION

REMOVAL AND DISPOSAL OF A-8 MATERIAL IN MUNICIPAL CONSTRUCTION



MEDIAN STABILIZING DETAILS

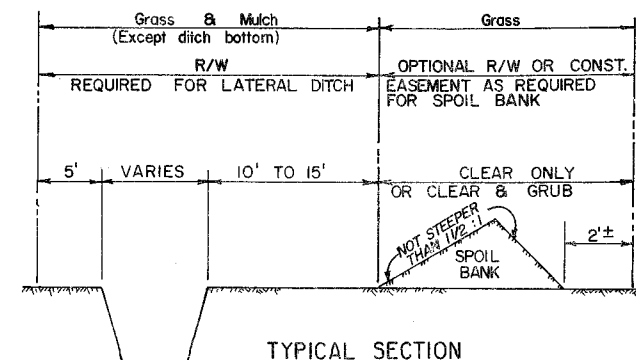
GENERAL STABILIZING NOTES:

- (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



TYPICAL SECTION

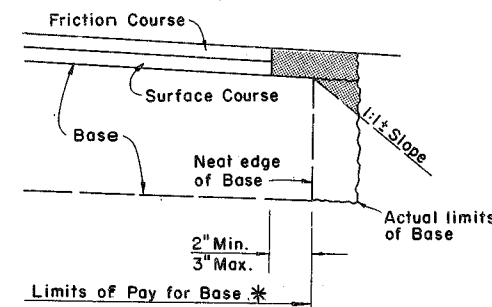
NOTE:

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.

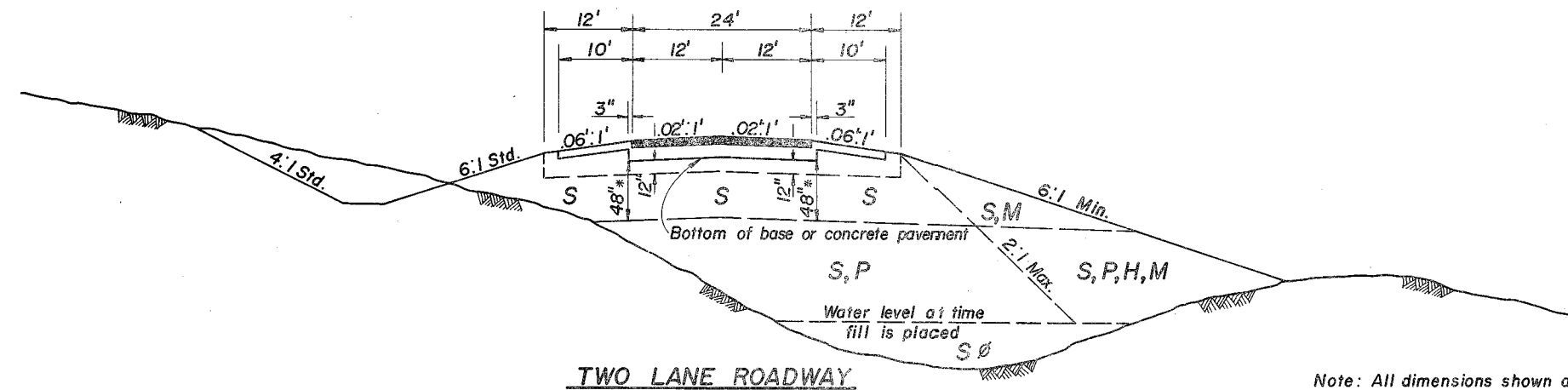
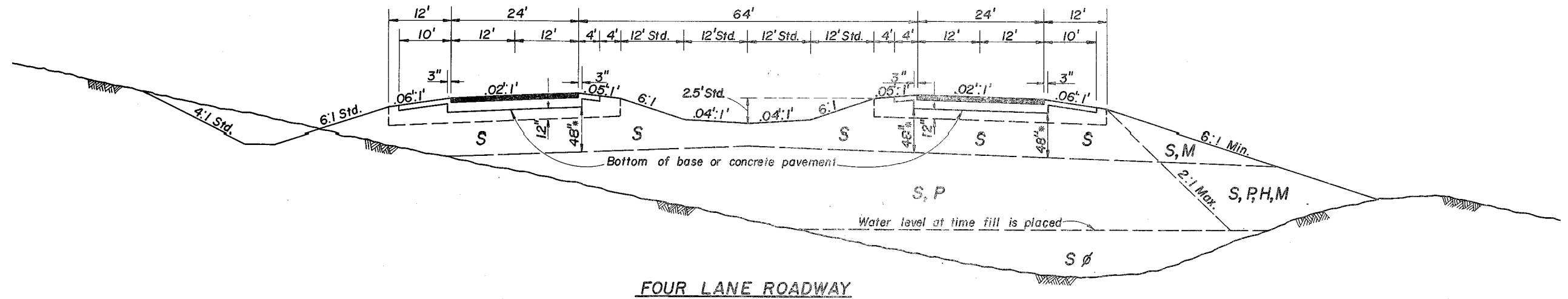
LATERAL DITCH SHOWING SPOIL BANK

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 defined as any material of the soils classifications of A-2-6, A-2-7, A-4, A-5, A-6 and A-7.
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 | Names | Dates | Approved By |
| Drawn by | | | <i>De. [Signature]</i> Deputy Design Engineer, Roadways |
| Checked by | | | Revision No. |
| F.H.W.A. Approved: 7/7/75 | 81 | 1 of 1 | 500 |



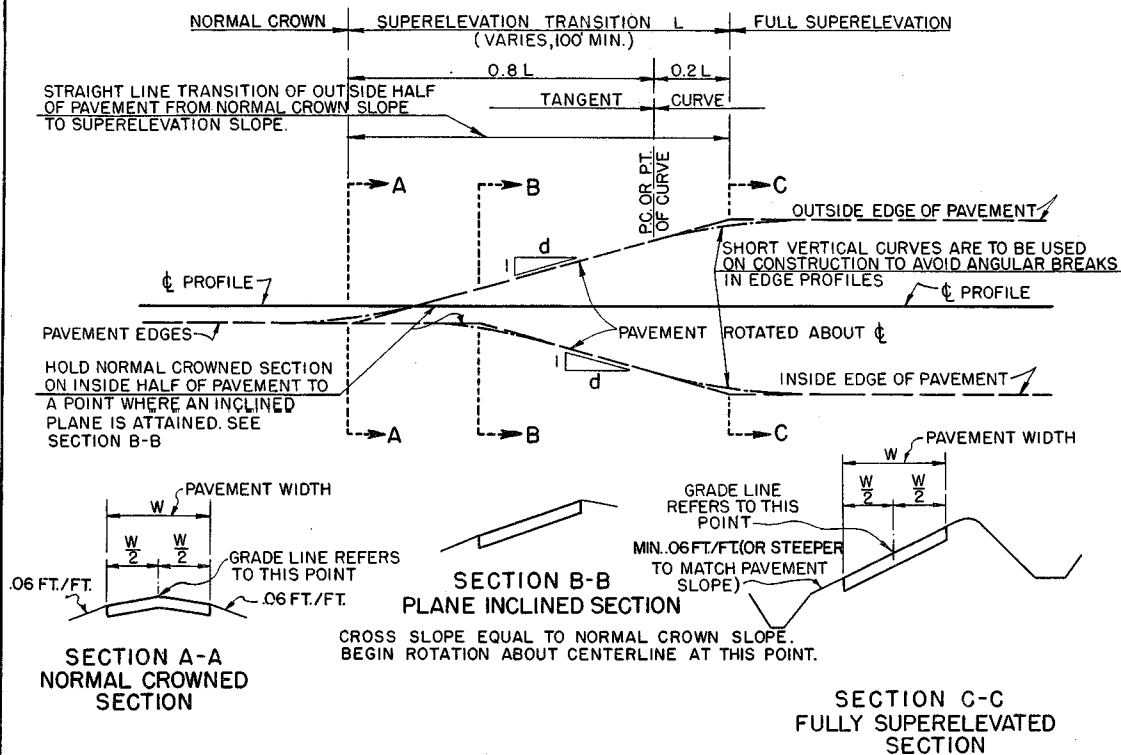
Note: All dimensions shown are standard.
The details shown on this Index drawing
do not supersede the details shown on
Index 500.
* When otherwise shown on plans this
dimension may be reduced to 24".

| 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-5 or A-7 (both with LL > 50) |
| M | Muck | A-8 |

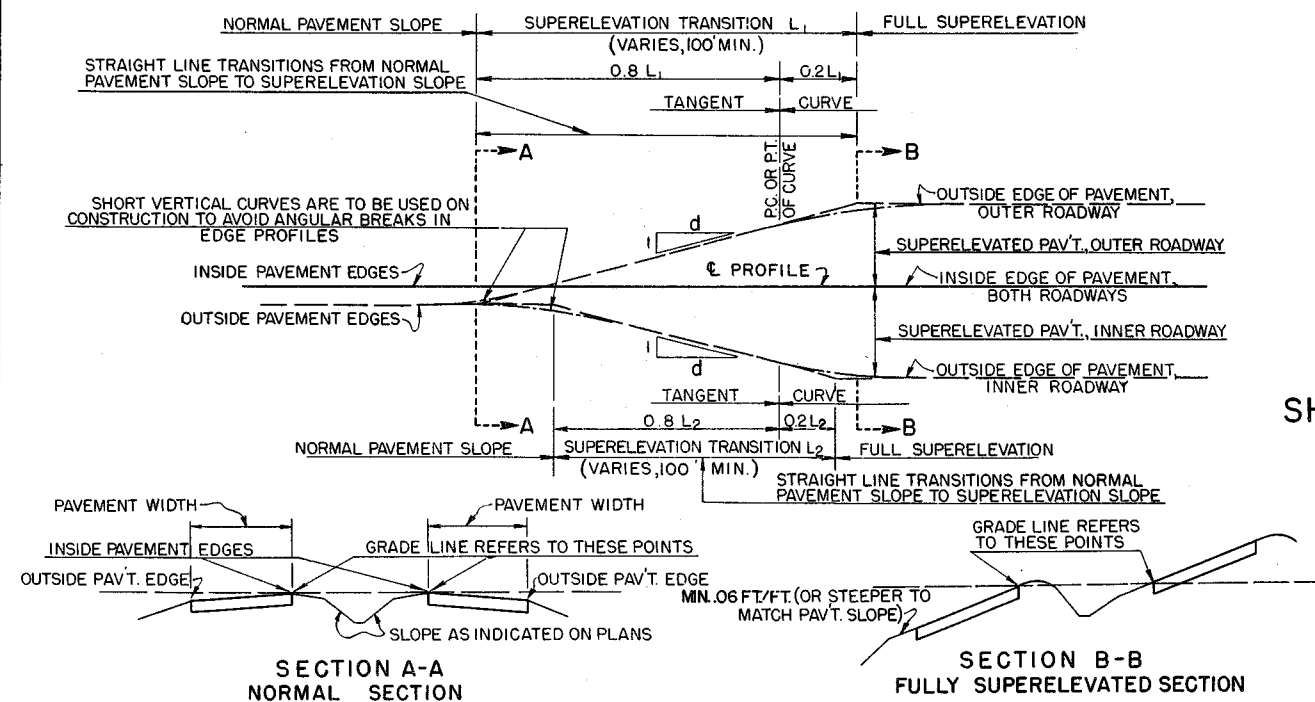
Symbols listed Left to Right in order of preference.

ø Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and therefore should be used in the embankment above water level existing at time of construction.

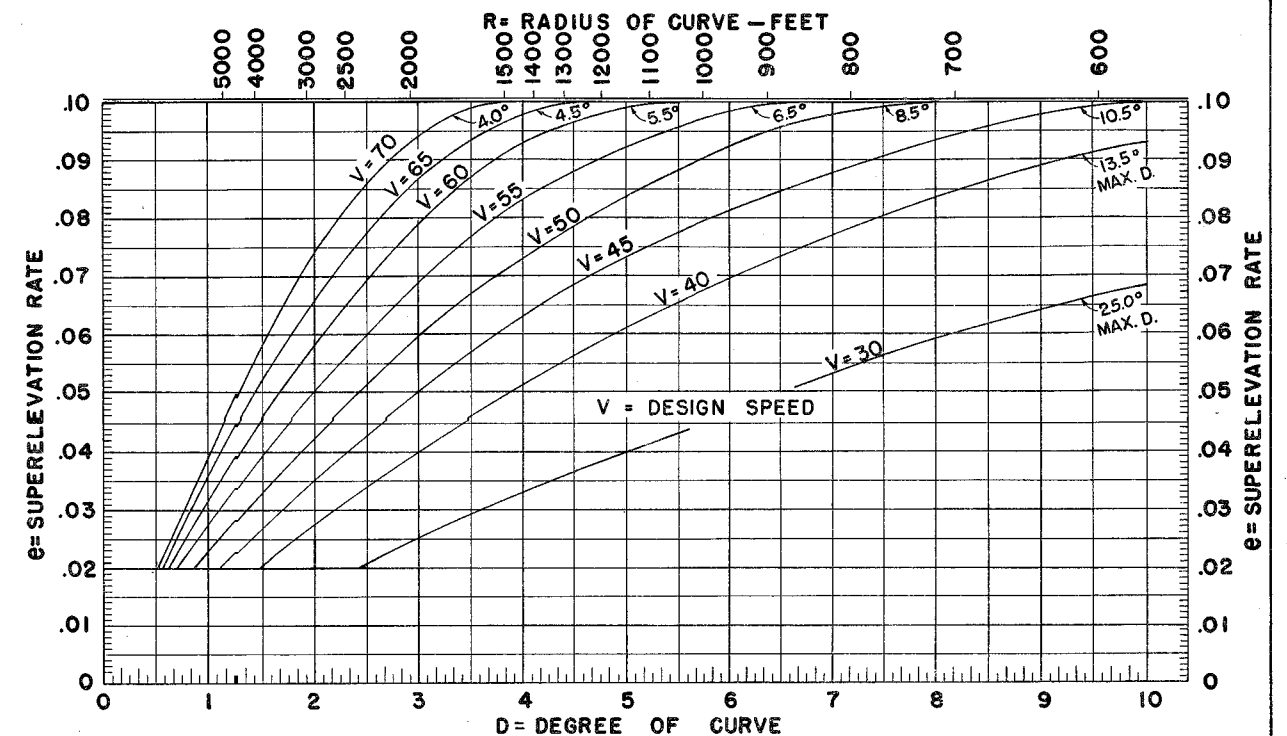
| | | | |
|--|-------|-----------|--|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| EMBANKMENT UTILIZATION | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | | | <i>De Adol</i> Deputy Design Engineer, Roadways |
| Checked by | | | |
| Revision No. | | Sheet No. | Index No. |
| F.H.W.A. Approved: 4/23/74 | | 81 | 1 of 1 |
| | | | 505 |



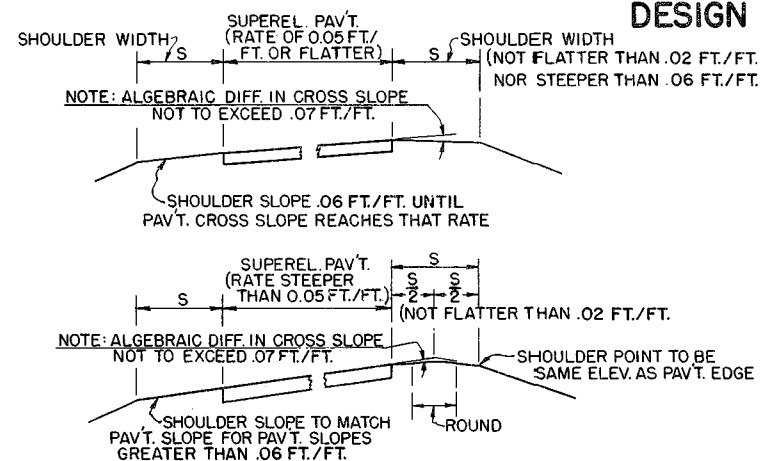
2-LANE OR 4-LANE PAVEMENT, NO MEDIAN



4-LANE PAVEMENT WITH MEDIAN



DESIGN SUPERELEVATION RATES $e_{max} = 0.10$



SHOULDER CONSTRUCTION WITH SUPERELEVATION

SHOULDER ON HIGH SIDE A SHOULDER SLOPE OF .06 FT./FT. DOWNWARD FROM THE EDGE OF PAVEMENT WILL BE MAINTAINED UNTIL A 0.07 FT./FT. BREAK IN SLOPE AT THE PAVEMENT EDGE IS REACHED DUE TO SUPERELEVATION OF THE PAVEMENT. AS THE PAVEMENT SUPERELEVATION INCREASES, THE 0.07 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 SHOULDERS.

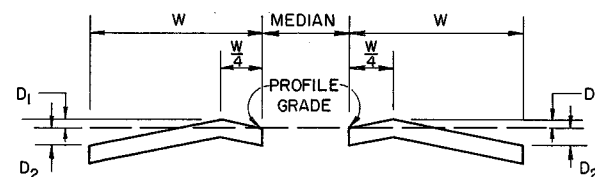
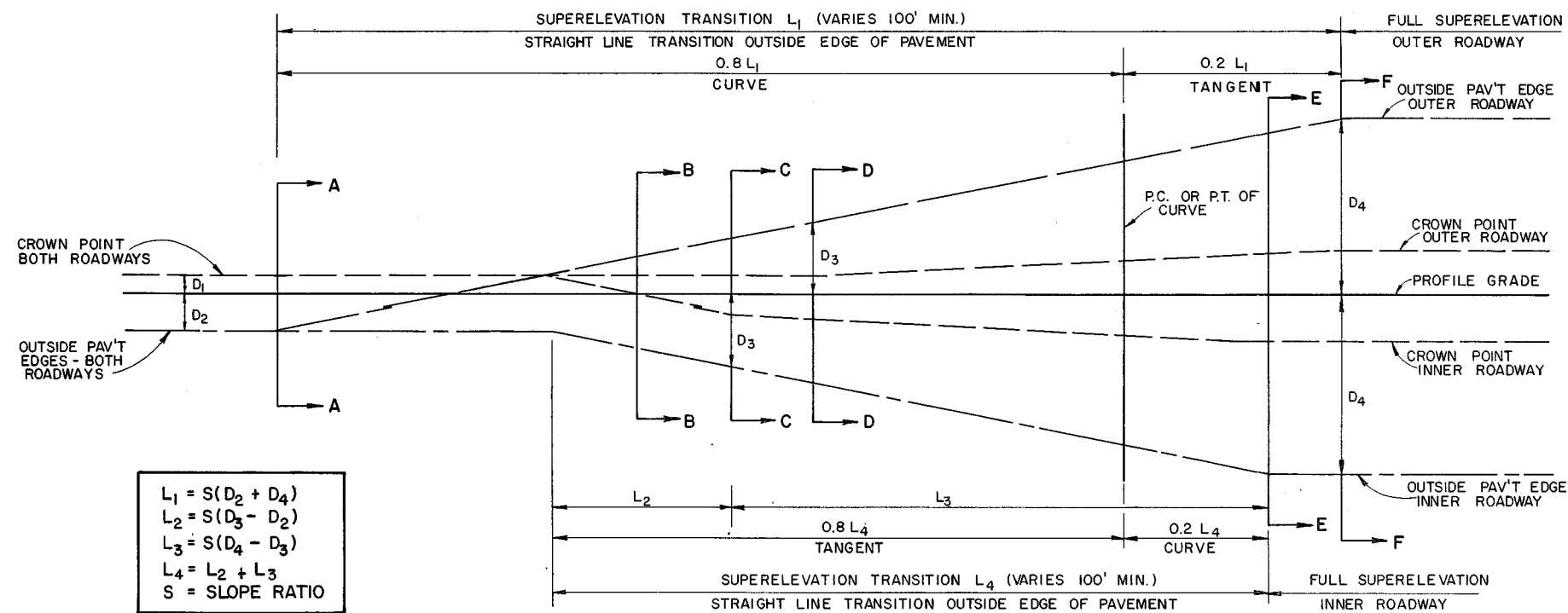
GENERAL NOTES FOR SUPERELEVATION

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.

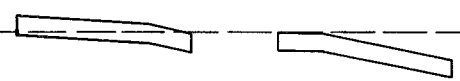
| SLOPE RATIOS FOR SUPERELEVATION TRANSITIONS | | | | |
|---|-------|-------|-------|-----------------|
| DESIGN SPEED, M.P.H. | 45-50 | 55-60 | 65-70 | |
| 1:d | 1:200 | 1:225 | 1:250 | 2 Lane & 4 Lane |
| | 1:160 | 1:180 | 1:200 | 6 Lane |
| | 1:150 | 1:170 | 1:190 | 8 Lane |

| | | | | |
|--|--------|-------|---|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | |
| SUPERELEVATION | | | | |
| Designed by | Names | Dates | Approved By | |
| Drawn by | HFW | 5/65 | <i>De R. Hill</i> Deputy Design Engineer, Roadways | |
| Checked by | LMF | 10/74 | Revision No. | Sheet No. |
| F.H.W.A. Approved: | 7/7/75 | 81 | 1 of 2 | 510 |

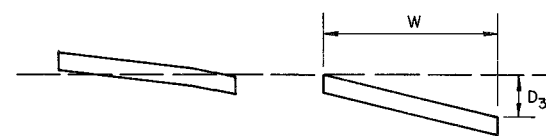
THESE TRANSITION DETAILS ARE TO APPLY IN ALL CASES, EXCEPT AT CURVES OF INSUFFICIENT LENGTH, INSUFFICIENT TANGENT LENGTH BETWEEN CURVES, P.C.C.'S OR P.R.C.'S, IN WHICH CASE THE DETAILS OF THE TRANSITIONS ARE TO BE INCLUDED IN THE DETAIL PLANS.



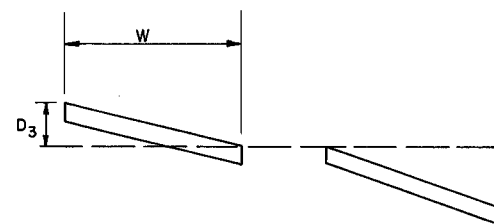
SECTION A-A
NORMAL CROWNED SECTION



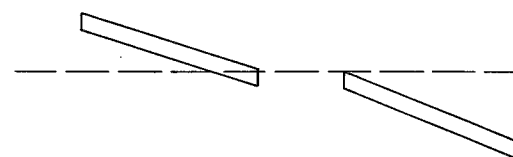
SECTION B-B
SUPERELEVATION SECTION LT. & RT.



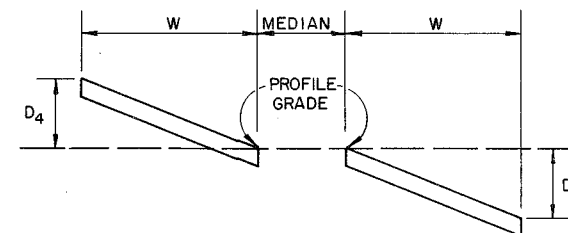
SECTION C-C
SUPERELEVATION SECTION LT.
PLANE INCLINED SECTION RT.



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 | Dates | 8/77 | Approved By | <i>De. Antel</i> |
| Drawn by | LMF | | 8/77 | Deputy Design Engineer, Roadways | |
| Checked by | WAL | | 8/77 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 11/2/77 | | | | 81 | 2 of 2 |
| | | | | | 510 |

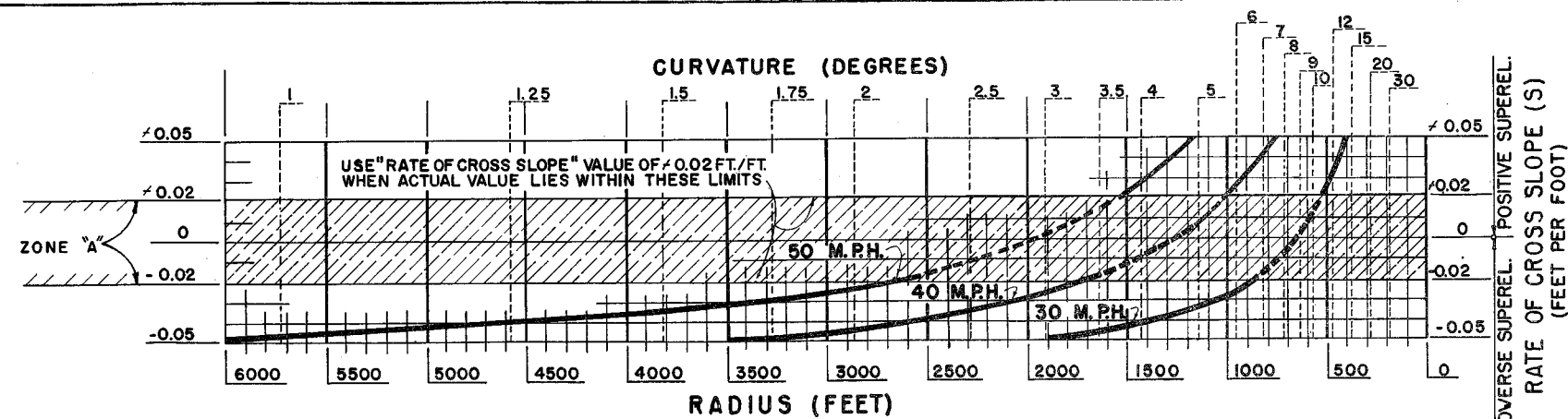
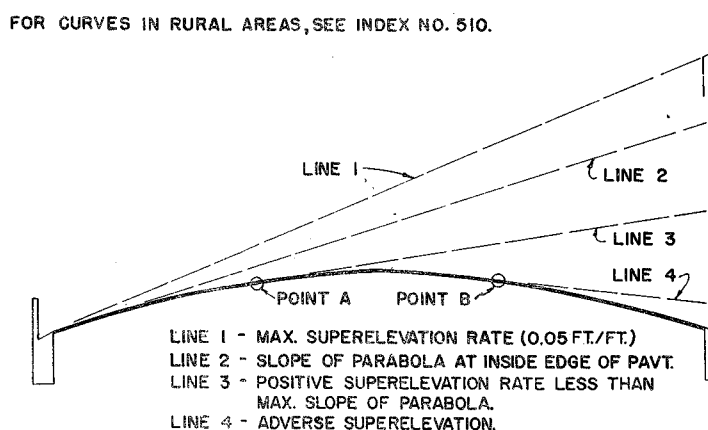
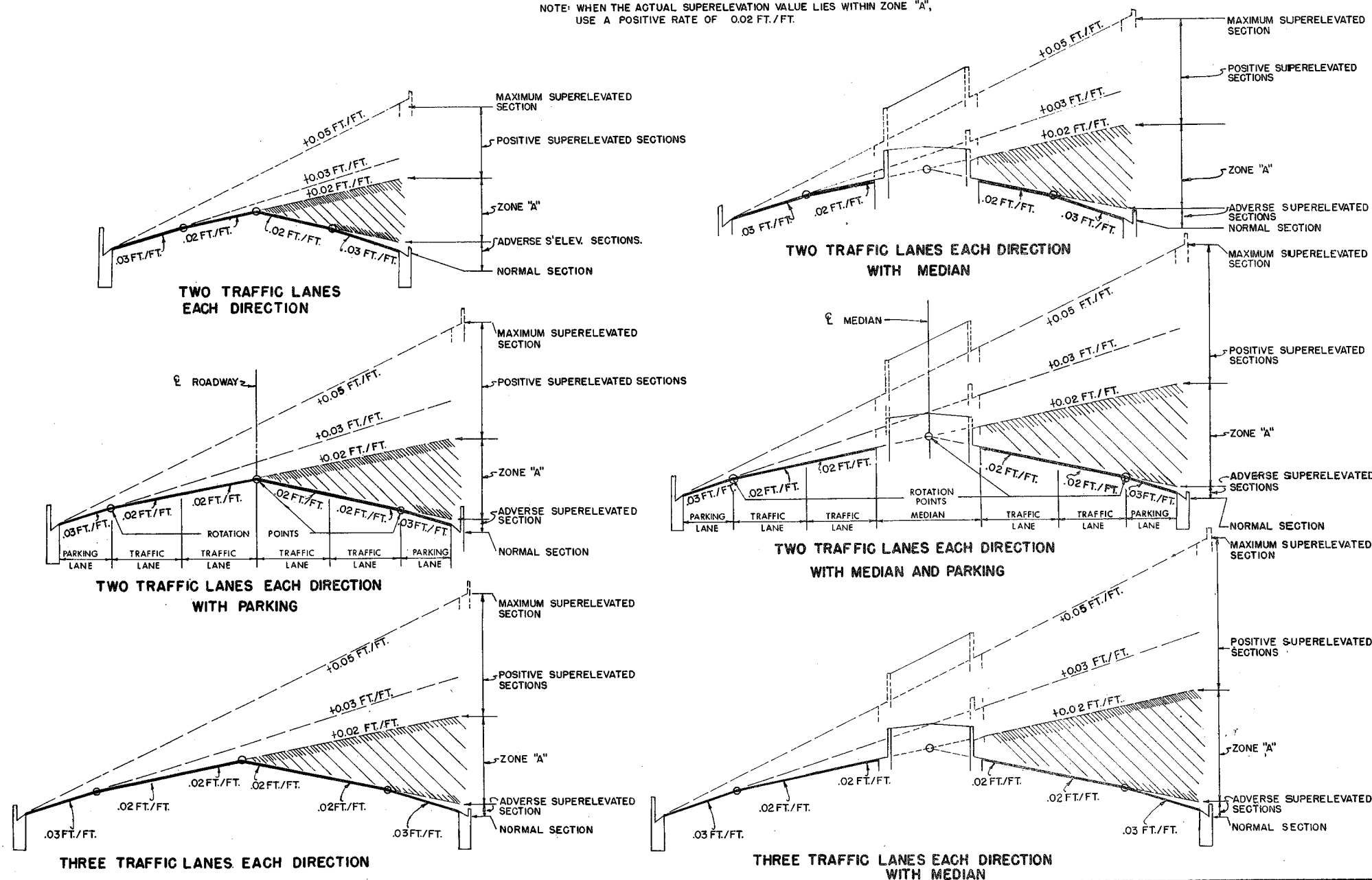


CHART SHOWING REMOVAL OF CROWN AND OR SUPERELEVATION NECESSARY FOR CURVATURE AT VARIOUS DESIGN SPEEDS

NOTE: WHEN THE ACTUAL SUPERELEVATION VALUE LIES WITHIN ZONE "A", USE A POSITIVE RATE OF 0.02 FT./FT.

GENERAL NOTES FOR SUPERELEVATION

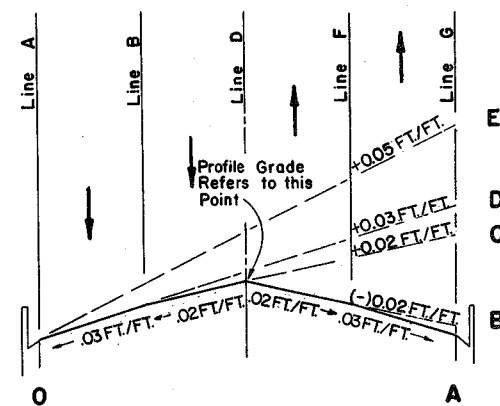
1. MAXIMUM RATE OF SUPERELEVATION (IN MUNICIPAL CONSTRUCTION) SHALL BE 0.05 FT./FT.
2. SUPERELEVATION SHALL BE OBTAINED BY ROTATING THE PLANE SUCCESSIVELY ABOUT THE BREAK POINTS OF THE SECTION UNTIL THE PLANE HAS ATTAINED A SLOPE EQUAL TO THAT REQUIRED BY THE CHART. SHOULD THE ROTATION TRAVERSE THE ENTIRE 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.

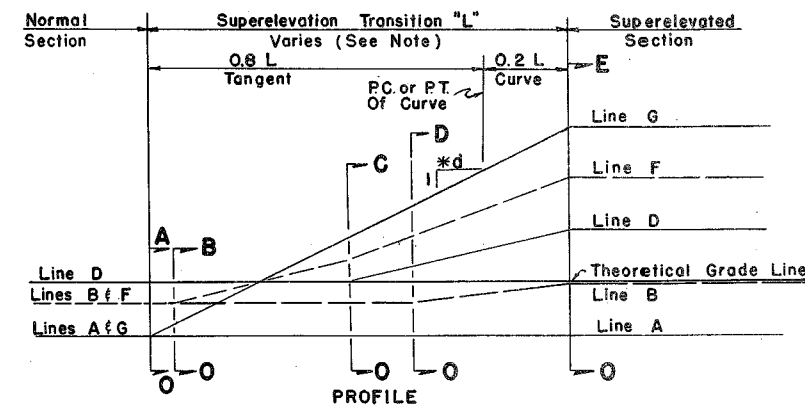
PARABOLIC SECTION

| | | | |
|--|---------------|------------------------------------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| SUPERELEVATION MUNICIPAL CONSTRUCTION | | | |
| Designed by WLB | Dates 2/66 | Approved By <i>De. R. R. R.</i> | |
| Drawn by CDR | 1/67 | Deputy Design Engineer, Roadways | |
| Checked by RLO | 1/67 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 5/20/77 | | 81 | 1 of 2 |
| | | | 511 |



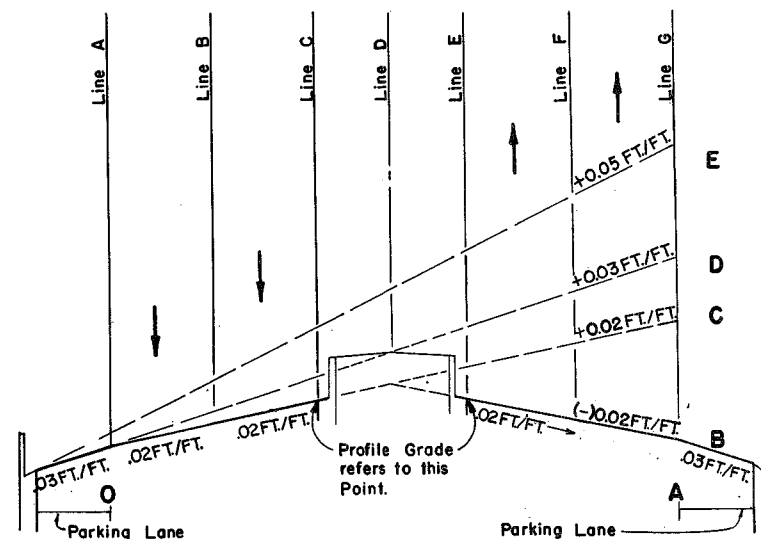
SECTION O-A TO O-E

TWO LANES EACH DIRECTION



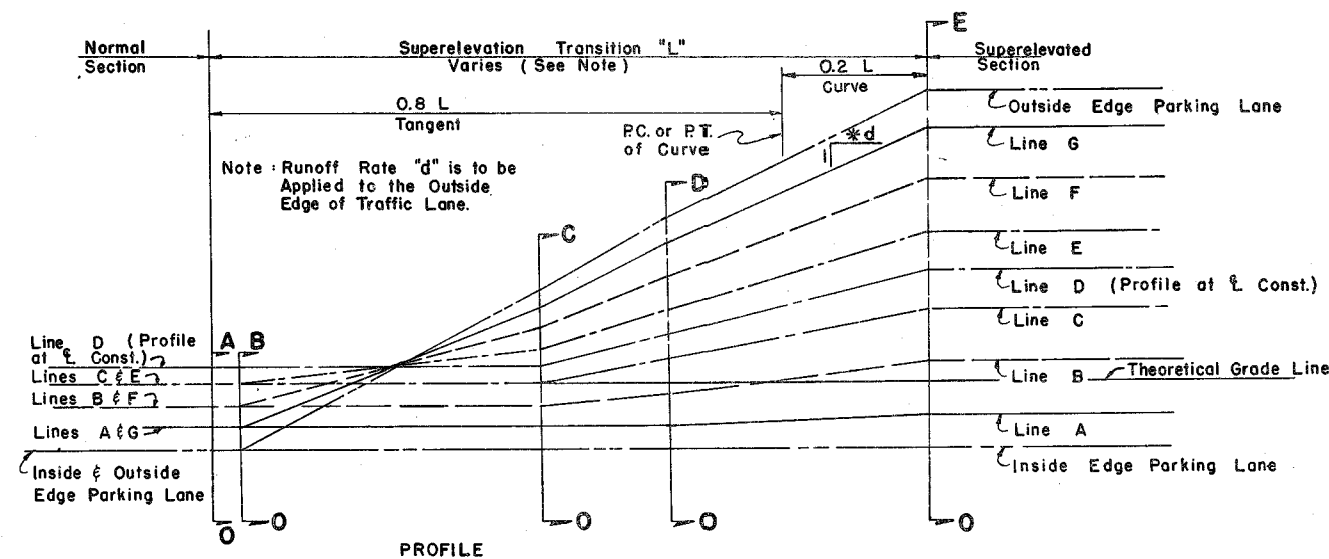
PROFILE

| 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 |

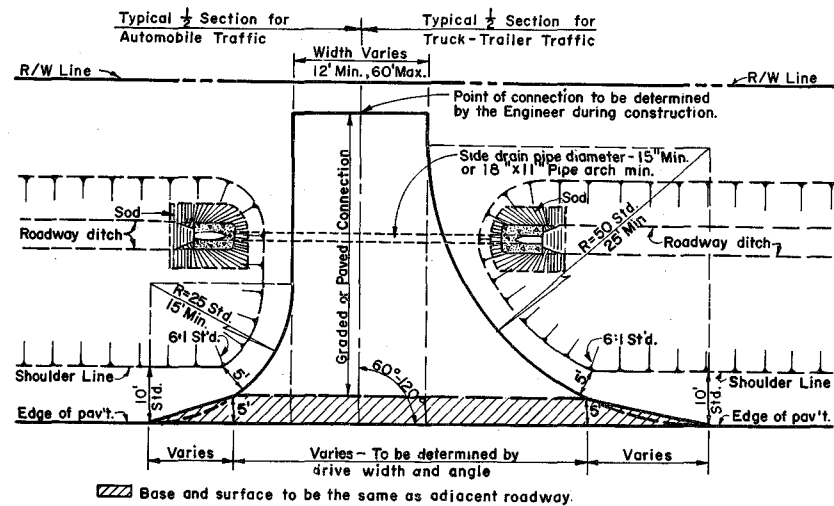
NOTE: THE SECTIONS AND PROFILES SHOWN ON THIS SHEET ARE EXAMPLES OF THE SUPERELEVATION TRANSITIONS. SIMILAR SCHEMES SHOULD BE USED FOR ROADWAYS HAVING DIFFERENT SECTION DESIGNS.

| D | R | V=30mph | V=40mph | V=50mph |
|---------|--------|---------|---------|---------|
| 0° 15' | 22918' | NC | NC | NC |
| 0° 30' | 11459' | NC | NC | NC |
| 0° 45' | 7639' | NC | NC | RC |
| 1° 00' | 5730' | NC | RC | RC |
| 1° 30' | 3820' | RC | RC | .024 |
| 2° 00' | 2865' | RC | .022 | .028 |
| 2° 30' | 2292' | RC | .026 | .031 |
| 3° 00' | 1910' | .020 | .029 | .033 |
| 3° 30' | 1637' | .023 | .032 | .036 |
| 4° 00' | 1432' | .025 | .033 | .038 |
| 5° 00' | 1146' | .028 | .036 | .043 |
| 6° 00' | 955' | .031 | .039 | .047 |
| 7° 00' | 819' | .032 | .041 | |
| 8° 00' | 716' | .034 | .044 | |
| 9° 00' | 637' | .035 | .046 | |
| 10° 00' | 573' | .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 | | |

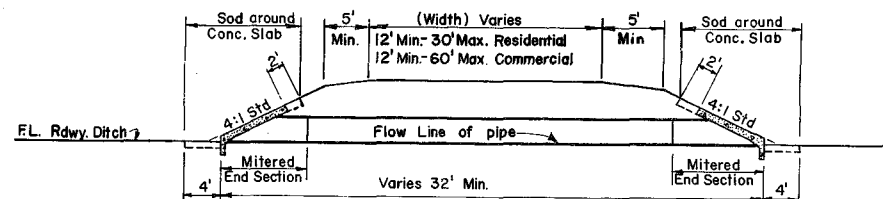
e Max.=0.05

The superelevation 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.

| | | | |
|--|----------------------|----------------------------------|---------------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| SUPERELEVATION MUNICIPAL CONSTRUCTION | | | |
| Designed by <i>WLB</i> | Dates <i>2/66</i> | Approved By <i>De. RLL</i> | |
| Drawn by <i>CDR</i> | <i>1/67</i> | Deputy Design Engineer, Roadways | |
| Checked by <i>RLO</i> | <i>1/67</i> | Revision No. | Sheet No. |
| F.H.W.A. Approved: 5/20/77 | | <i>81</i> | <i>2 of 2</i> |
| | | | <i>511</i> |

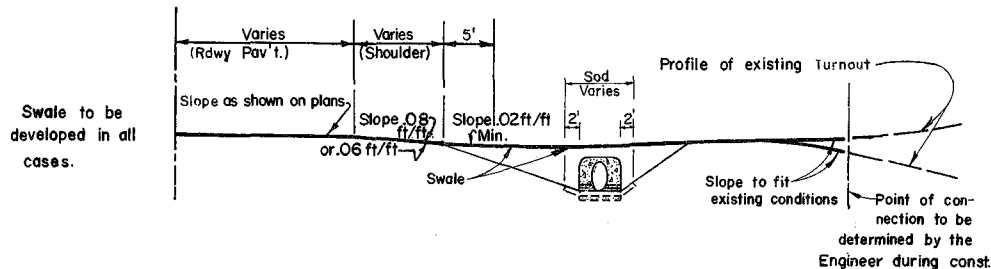


PLAN



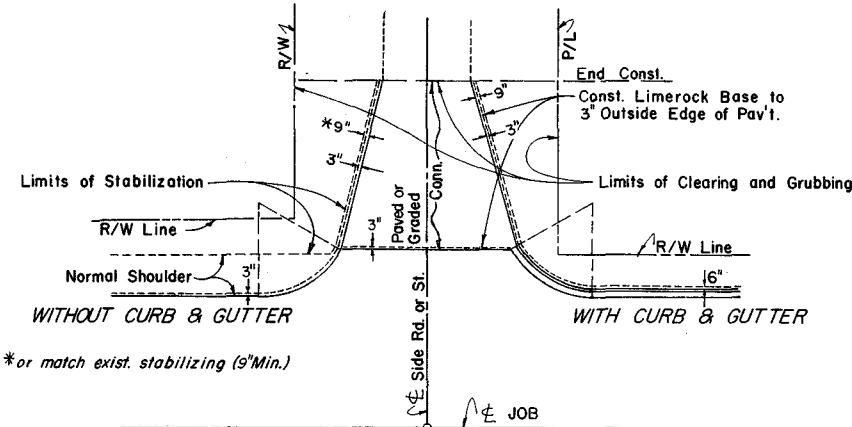
LONGITUDINAL SECTION

NOTE: For details of Mitered End Section see Index No. 273.

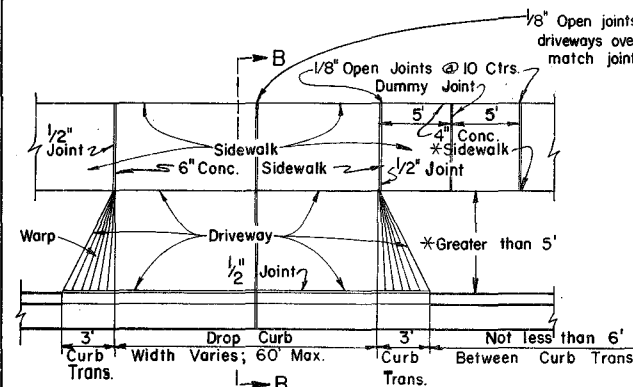


PROFILE AND END VIEW

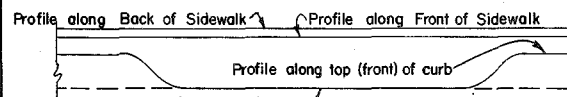
TURNOUT CONSTRUCTION TO PRIVATE PROPERTY AND GRADED ROADS



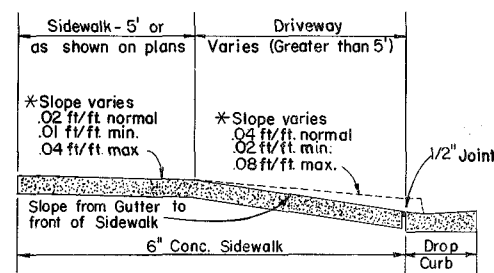
LIMITS OF CLEARING & GRUBBING AND STABILIZING AT INTERSECTIONS



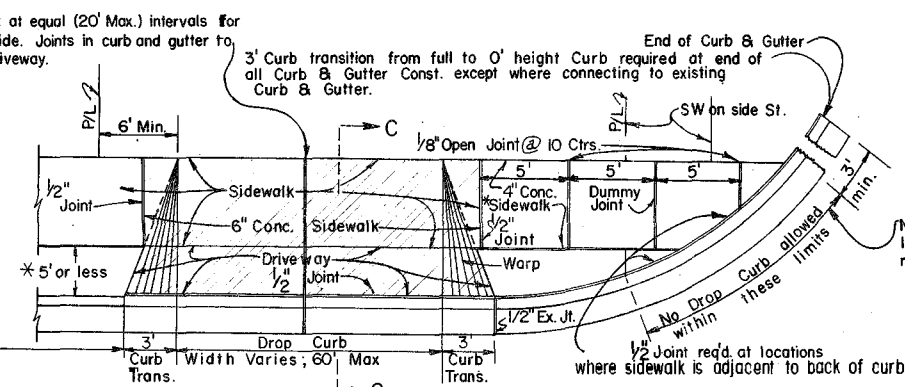
PLAN



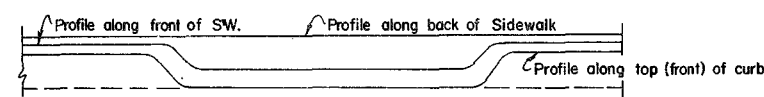
PROFILE



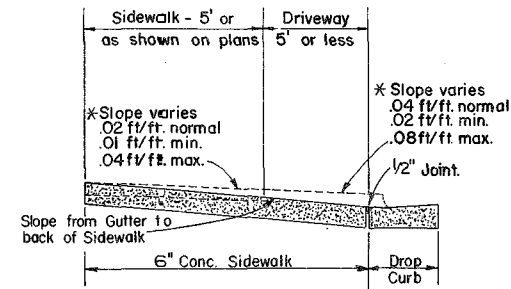
SECTION BB
WHEN DISTANCE BETWEEN CURB & SIDEWALK IS GREATER THAN 5'



PLAN



PROFILE



SECTION CC
WHEN DISTANCE BETWEEN CURB & SIDEWALK IS 5' OR LESS

NOTE: For Detail of Drop Curb See Index No. 300.

* Slopes can be adjusted within the ranges shown to improve ties to adjacent property and are to be transitioned to avoid distortion in sidewalk continuity.

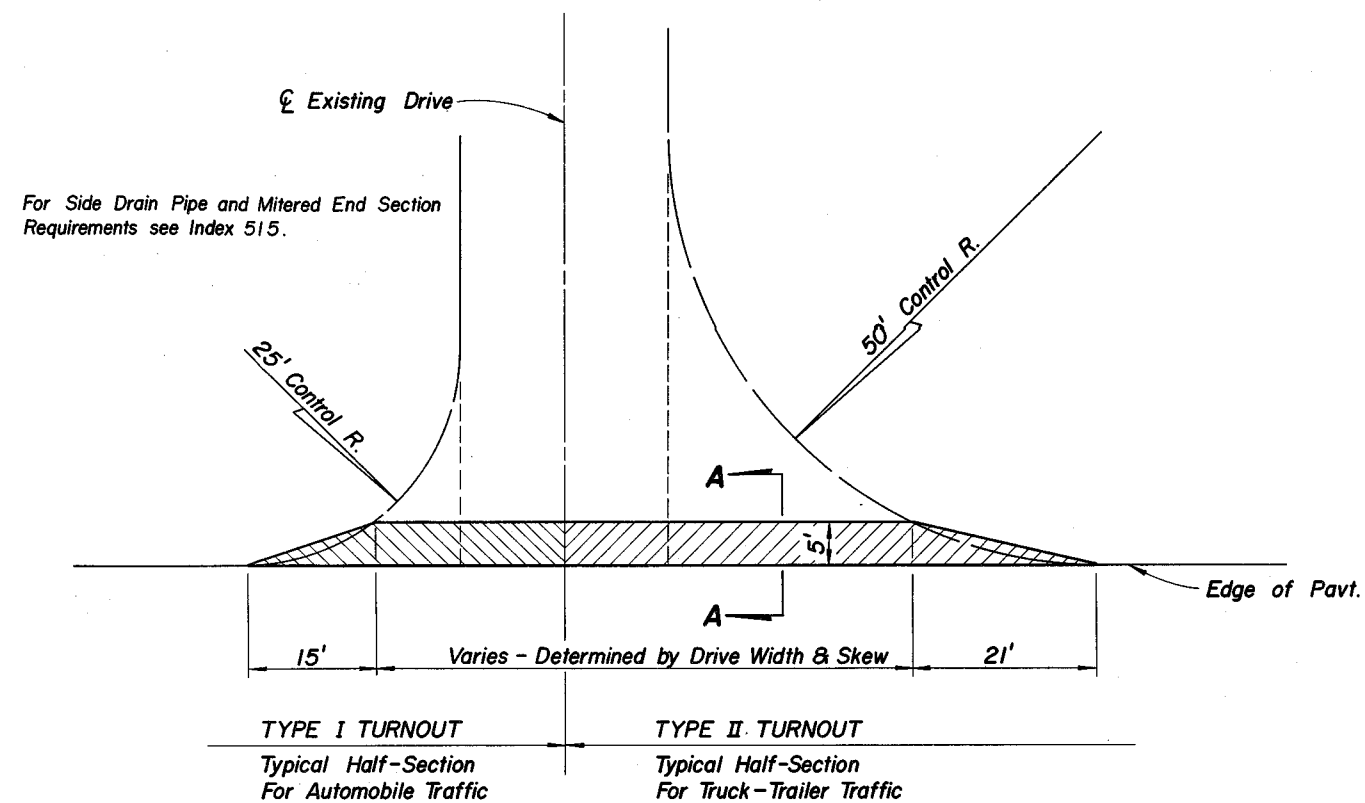
GENERAL NOTES

1. No driveways, turnouts, or side drains are to be constructed without compensation for materials from the owner except for replacement of driveways, turnouts, and/or side drains existing at the time of beginning of const. of the project and if desired by the owner. All new or reconstructed driveways, turnouts, and side drains must conform to the size limits indicated above.
2. In a rural section where the abutting property owner desires installation of turnouts, the Department will construct or will allow the construction of a maximum of two 60' turnouts, to any business establishment or parcel of property, with a minimum of 25' of space between them.
3. In urban areas, at the request of the abutting property owner or his assignee, and to the extent that there is sufficient property, the Department will construct or will allow the construction of up to two entrances (drop curbs) of sixty feet each, maximum, separated by a minimum of six feet of curbing, but curbing shall be required around all corners.
4. In both urban and rural areas, wherever dual driveways are allowed, that portion of the Right-of-Way between the drives and outside the pavement limits of the highway shall be maintained as a "No-Parking-Area" and shall be suitably outlined by such fences, hedges, curbs, or other obstructions as are safe and effective.

GENERAL STABILIZING NOTES

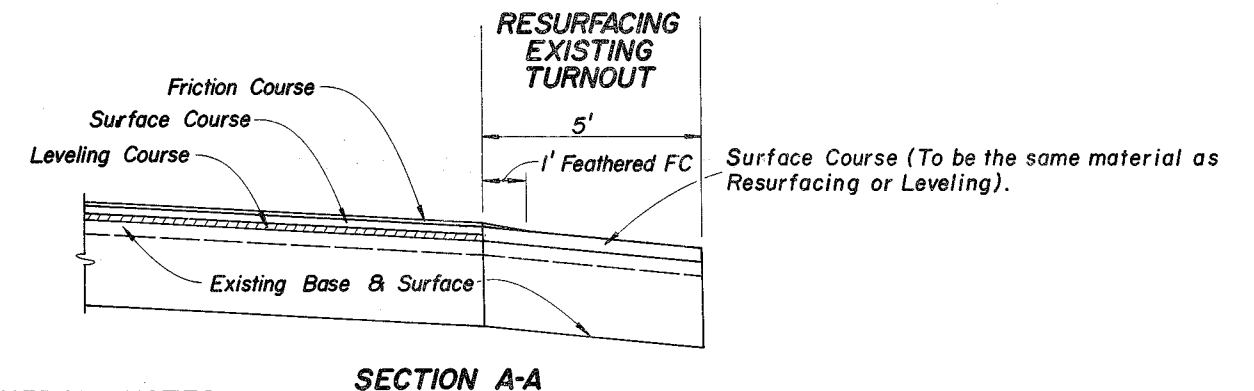
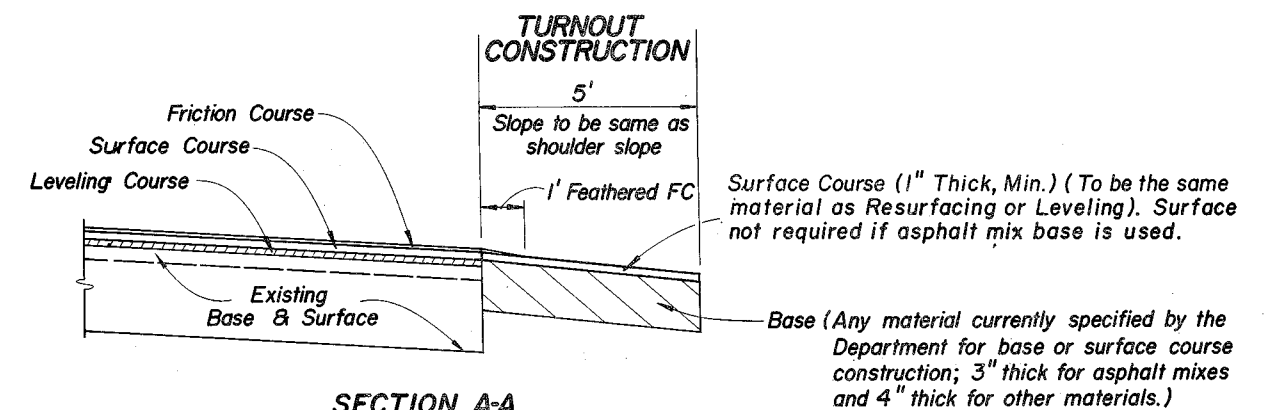
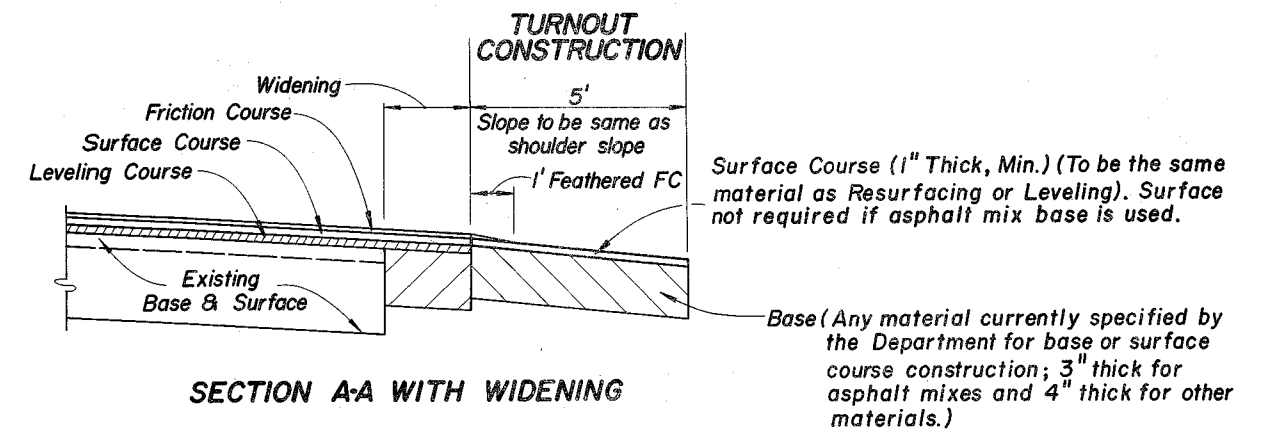
1. No Stabilizing will be required for Paved Turnouts to Private Property.
2. Stable Material may be required for Unpaved Turnouts to Private Property as directed by the Engineer in accordance with Section 102-6 of the Standard Specifications.

| | | | |
|--|-------|--------|---|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| TURNOUTS | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | | | <i>De. B. B. B.</i> Deputy Design Engineer, Roadways |
| Checked by | | | Revision No. |
| F.H.W.A. Approved: 12/6/76 | 81 | 1 of 1 | 515 |



QUANTITIES FOR ONE TURNOUT (Sq. Yd.)

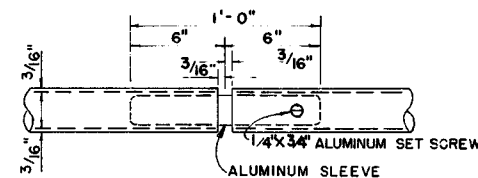
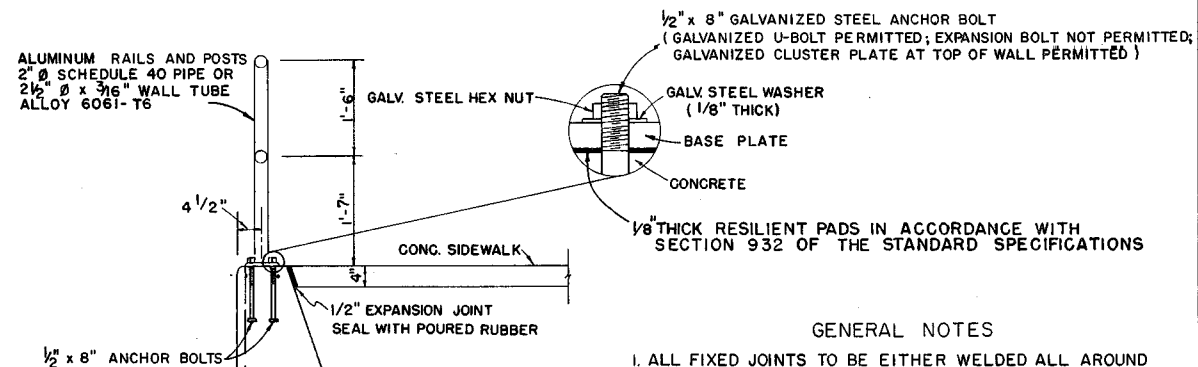
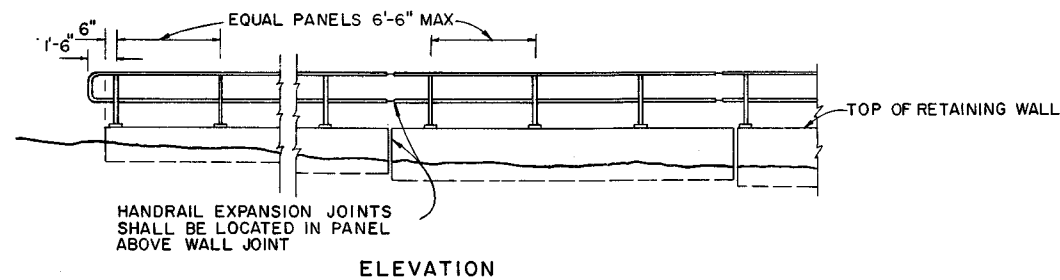
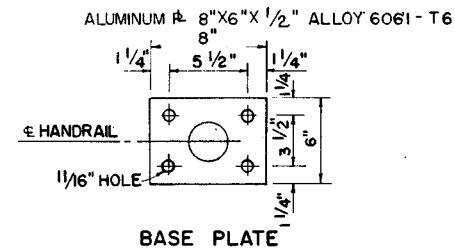
| Drive Width (Ft.) | Intersection | | | |
|-------------------|--------------|---------|--------|---------|
| | Normal | | Skewed | |
| | Type I | Type II | Type I | Type II |
| 12 | 26 | 51 | 31 | 60 |
| 14 | 27 | 52 | 33 | 61 |
| 16 | 28 | 53 | 34 | 63 |
| 18 | 29 | 54 | 35 | 64 |
| 20 | 31 | 55 | 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

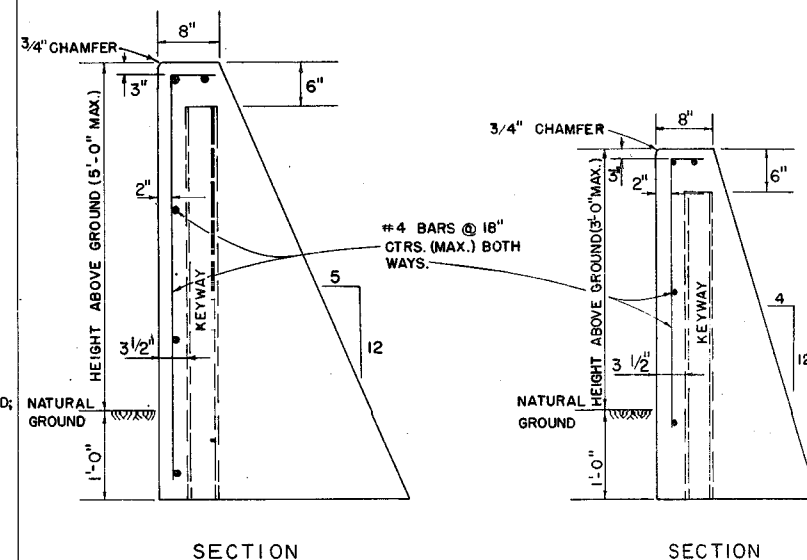
1. Turnouts are to be constructed or resurfaced at locations as directed by the Engineer.
2. Turnout construction not required with paved shoulders.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. Contract unit price, Turnout Construction, to include excavation 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 DCB | Dates 11/77 | Approved By <i>J. C. Hall</i> Deputy Design Engineer, Roadways | |
| Drawn by HKH | 11/77 | Revision No. | Sheet No. |
| Checked by JVG | 11/77 | 80 | 1 of 1 |
| F.H.W.A. Approved: | | Index No. 516 | |



ALUMINUM HANDRAIL ON GRAVITY WALL

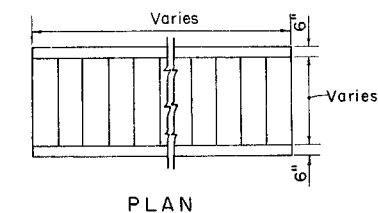
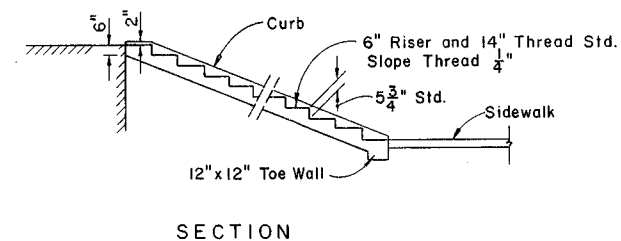
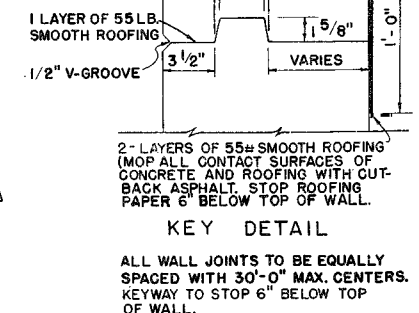
- GENERAL NOTES
- ALL FIXED JOINTS TO BE EITHER WELDED ALL AROUND AND GROUND SMOOTH OR STANDARD PIPE RAIL FITTINGS AT THE CONTRACTOR'S OPTION. POSTS SHALL BE CONNECTED TO BASE BY WELD ONLY. WELD FILLER TO BE ALLOY ER5356, ER5556 OR ER5183.
 - NUTS, WASHER, AND BOLTS TO BE HOT DIP GALVANIZED IN CONFORMANCE 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.



| 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

- 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.



CONCRETE STEPS

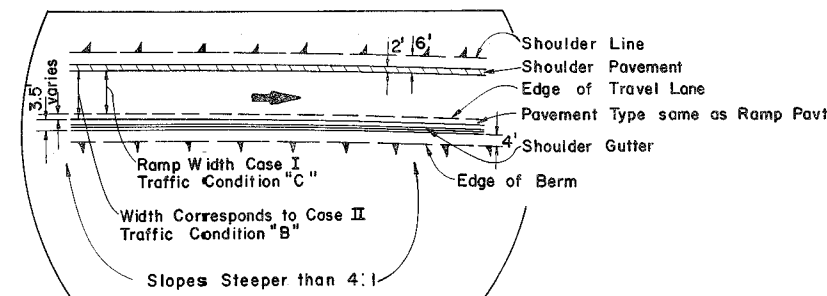
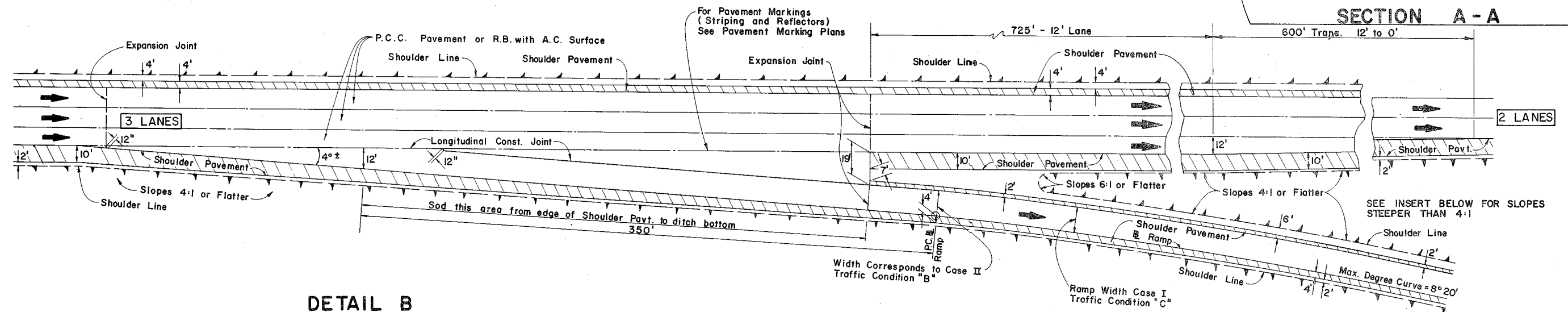
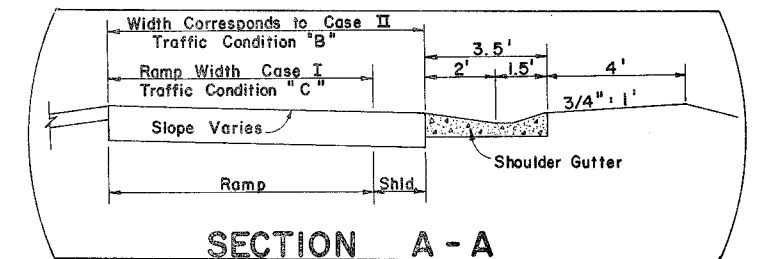
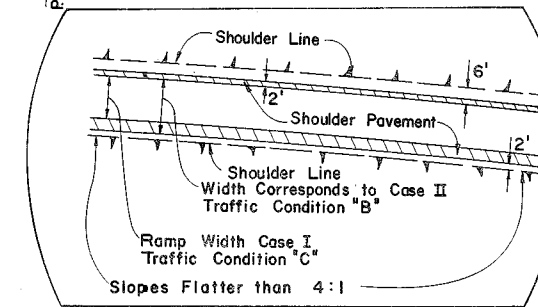
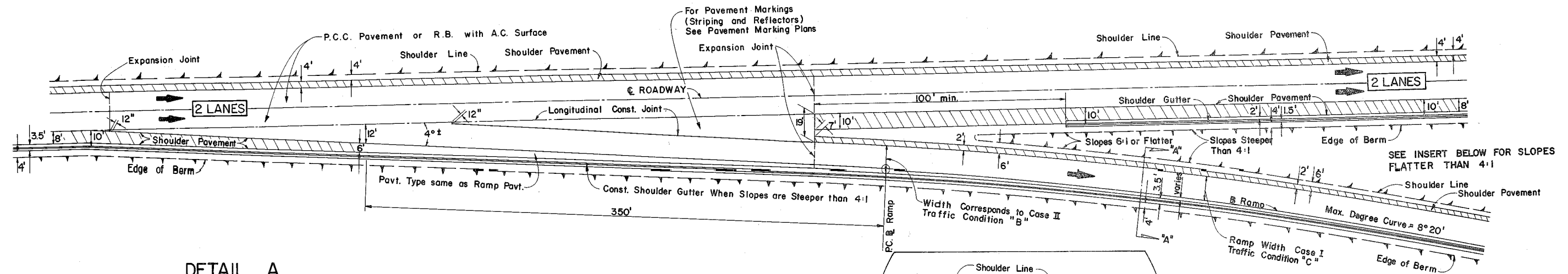
Note: Riser height and thread depth may vary to fit existing conditions as directed by the Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

WALLS, HANDRAILS & STEPS

| Names | Dates | Approved By |
|--------------|-----------|-------------|
| Designed by | | |
| Drawn by | CDR 2/68 | |
| Checked by | RHC 2/68 | |
| Revision No. | Sheet No. | Index No. |
| 81 | 1 of 1 | 520 |

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



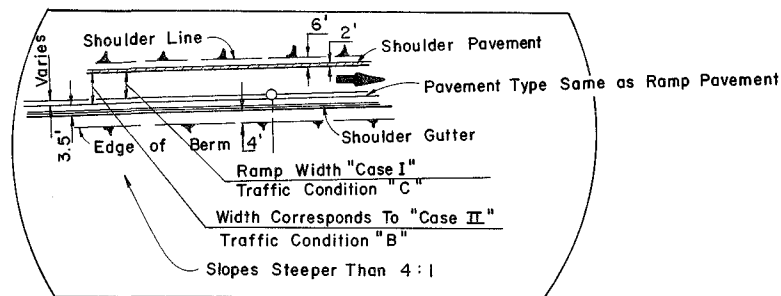
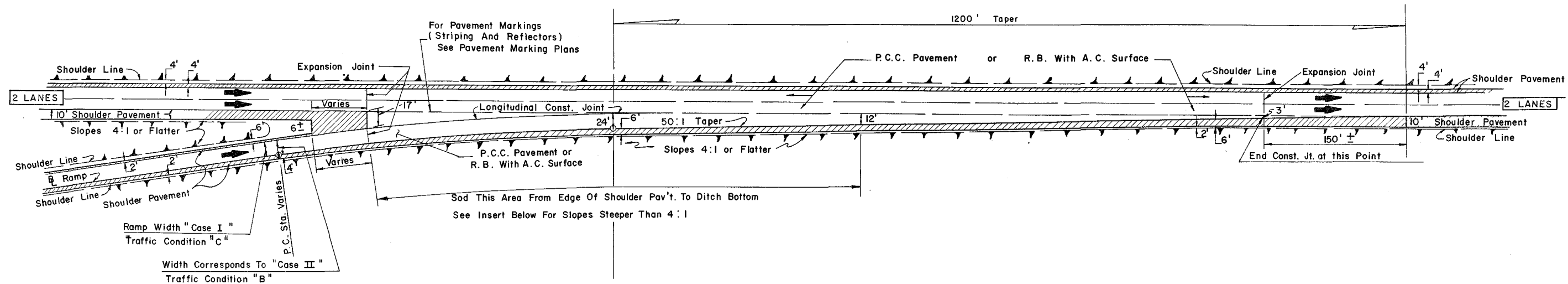
NOTES:
1. FOR GENERAL NOTES SEE SHEET NO. 2

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

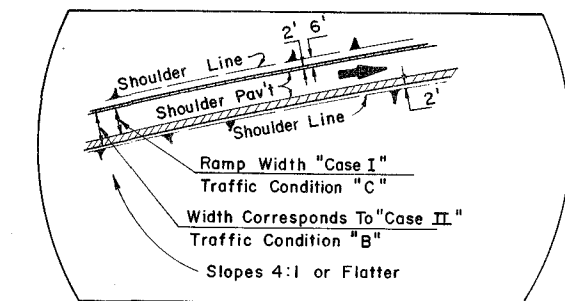
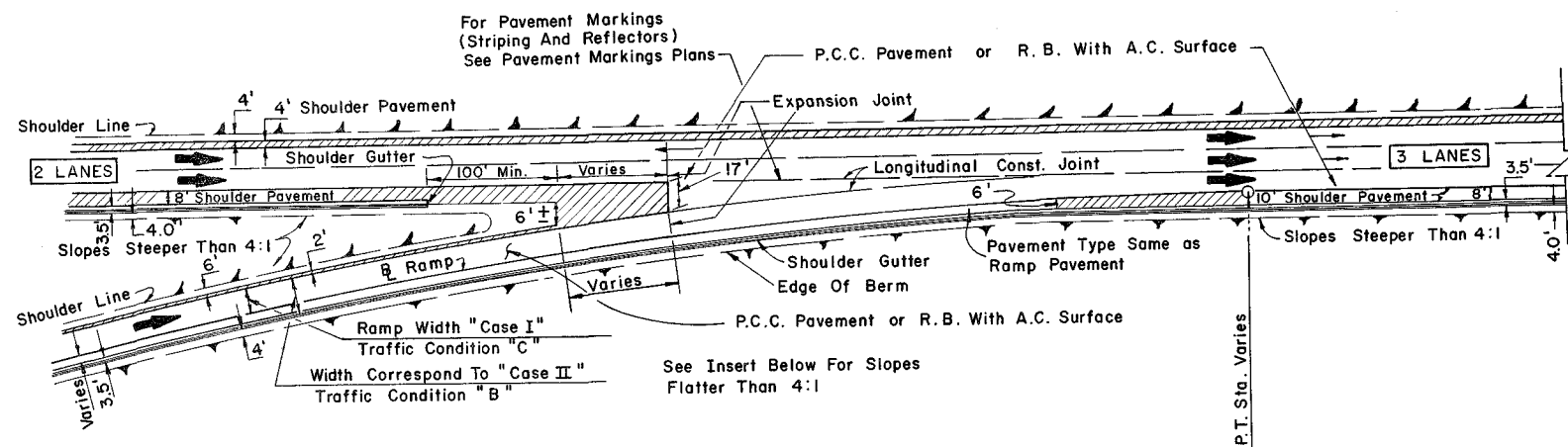
RAMP TERMINALS

| Names | Dates | Approved By |
|----------------------------|-------|--|
| Designed by EHH | 1/65 | <i>De. B. B.</i> Deputy Design Engineer, Roadways |
| Drawn by HFW | 1/65 | |
| Checked by RLO | 6/67 | |
| F.H.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

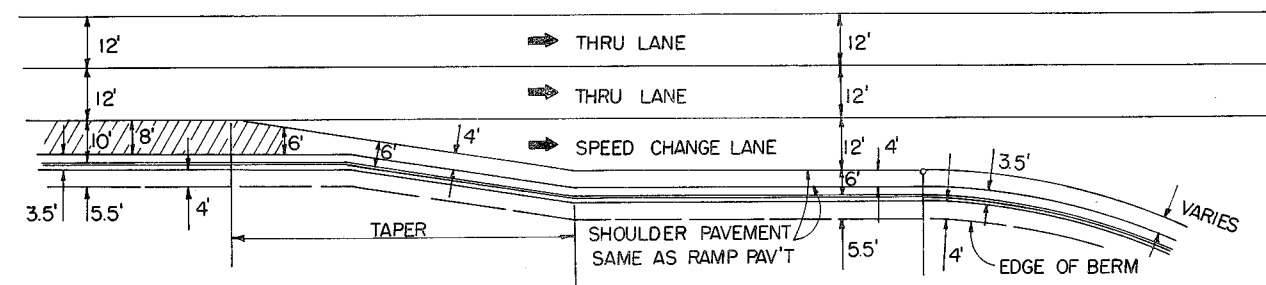
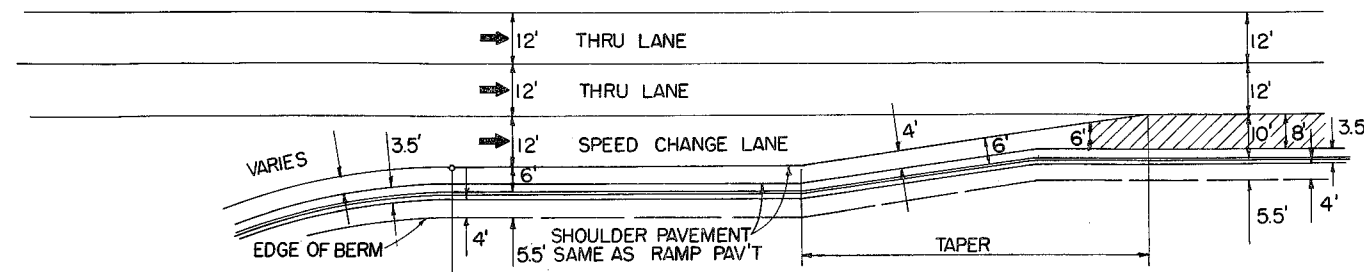
GENERAL NOTES

- The notes applying to P.C.C. Pavement are not applicable to R. B. A. C. Pavement.
- (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.
- 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-8 & J-10 (1973 A.A.S.H.O. - Red Book).

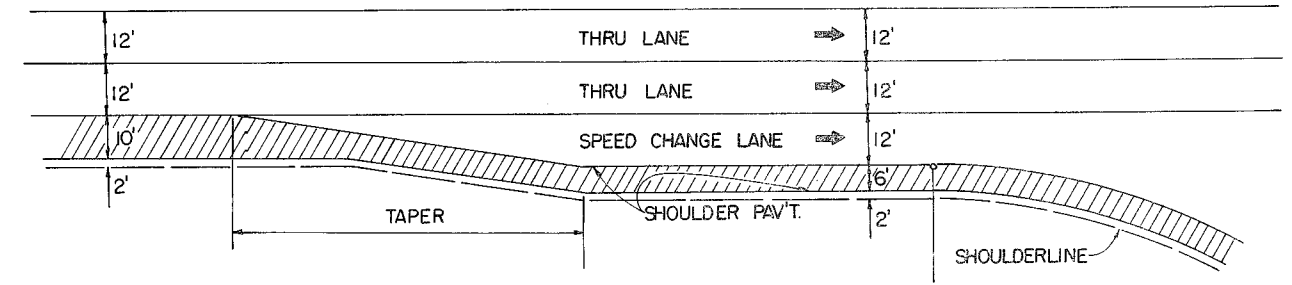
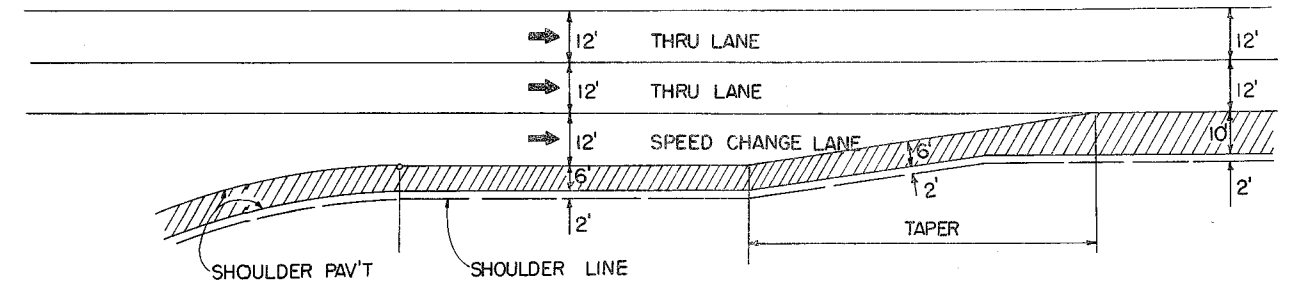
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAMP TERMINALS

| Names | Dates | Approved By | Revision No. | Sheet No. | Index No. |
|----------------------------|-------|--|--------------|-----------|-----------|
| Designed by EHH | 1/65 | <i>De Bell</i> Deputy Design Engineer, Roadways | | | |
| Drawn by HFW | 1/65 | | | | |
| Checked by RLO | 6/67 | | | | |
| F.H.W.A. Approved: 7/18/75 | | | 81 | 2 of 4 | 525 |

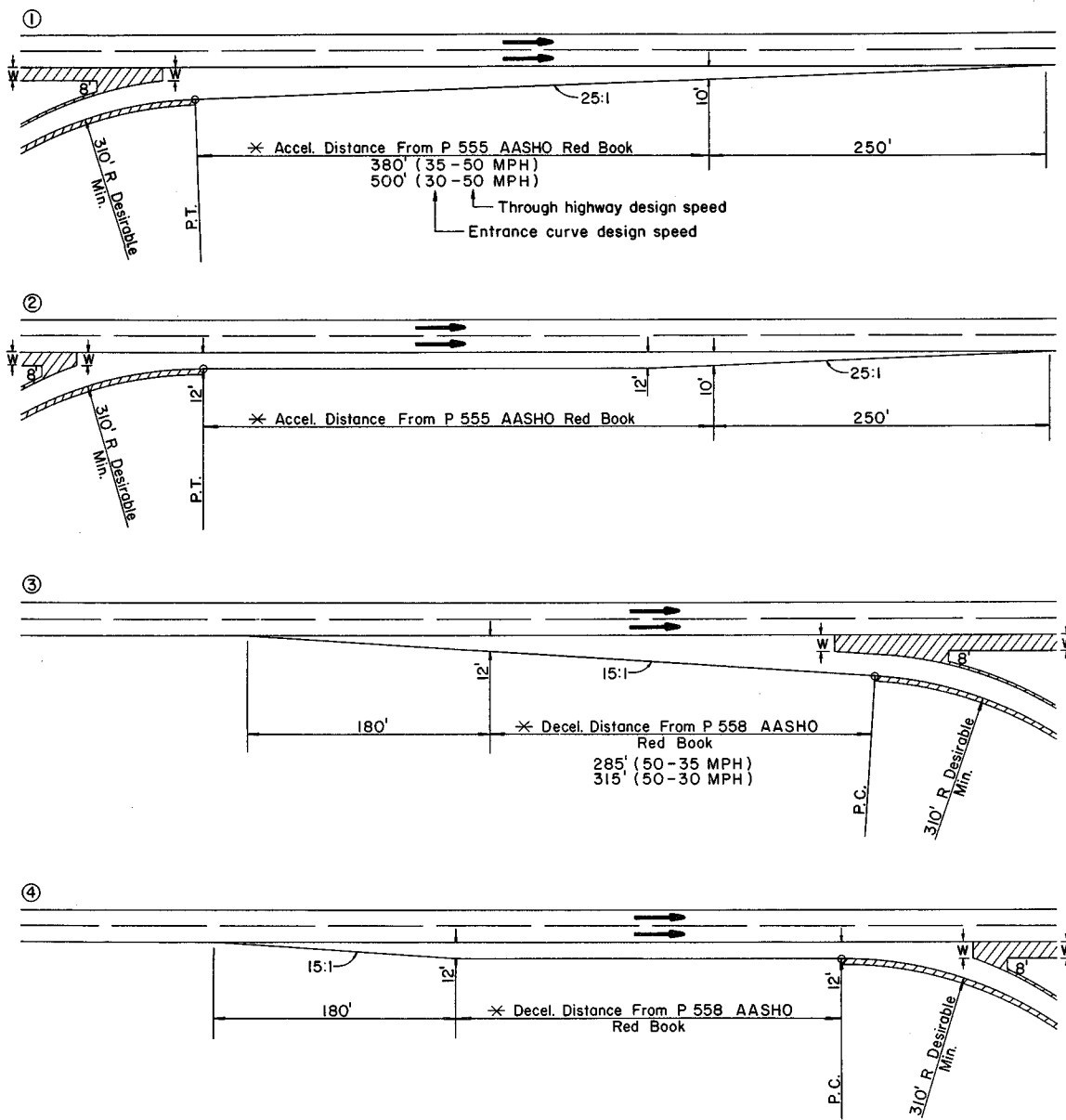


SHOULDER TREATMENT
AT SPEED CHANGE LANES WITH SHOULDER GUTTER



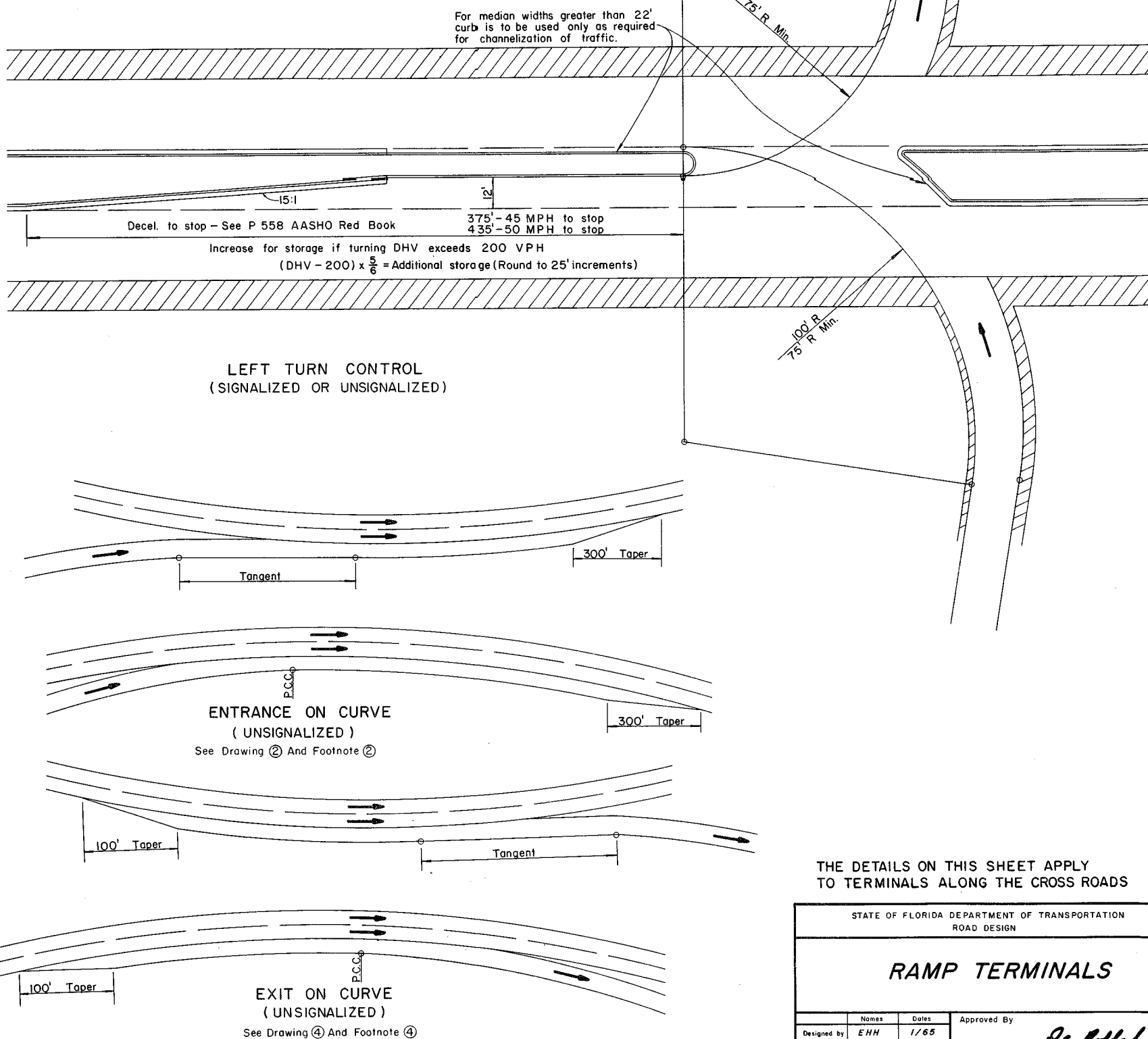
SHOULDER TREATMENT
AT SPEED CHANGE LANES WITHOUT SHOULDER GUTTER

| | | | | | |
|--|-------|-------|--------------------------------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| RAMP TERMINALS | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | EHH | 1/65 | 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)

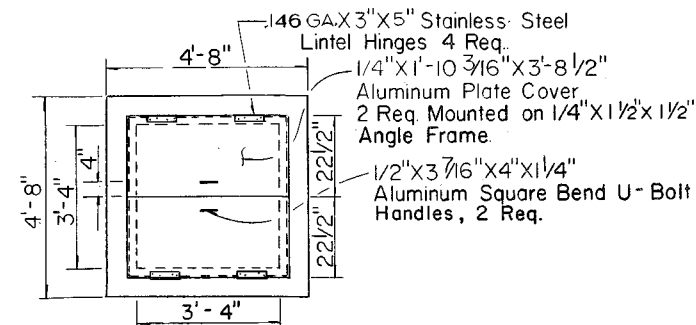
- W Normal shoulder pavement width
- * Adjust for grades if greater than 2% (See P 556 AASHO Red Book).
- ① Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridges are located within the merging lane.
- ② Parallel cross road entrance terminals. Recommended 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.



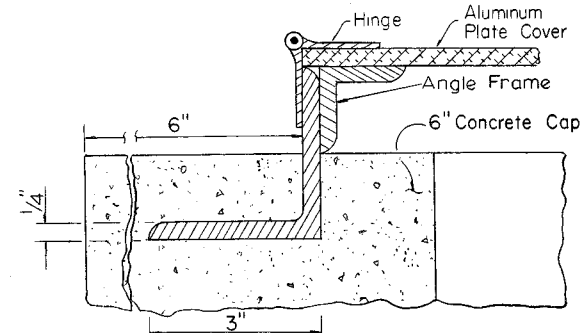
NOTE: Entrances and exits on curves should be avoided when possible.

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

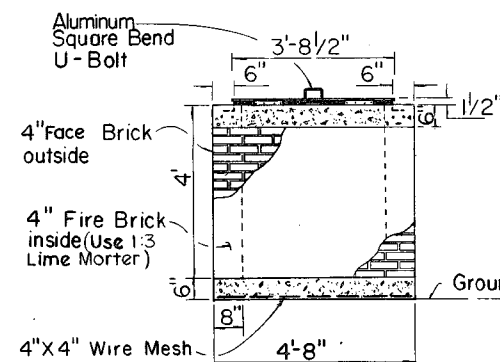
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
|--|---------|--------------|---|
| RAMP TERMINALS | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | EHH | 1/65 | <i>P. C. Rull</i> Deputy Design Engineer, Roadways |
| Checked by | HFW | 1/65 | |
| | RLD | 6/67 | |
| F.H.W.A. Approved: | 7/25/75 | Revision No. | 81 |
| | | Sheet No. | 4 of 4 |
| | | Index No. | 525 |



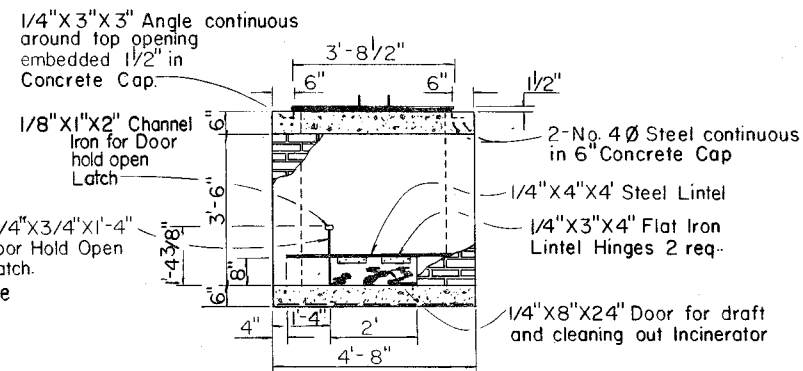
TOP VIEW



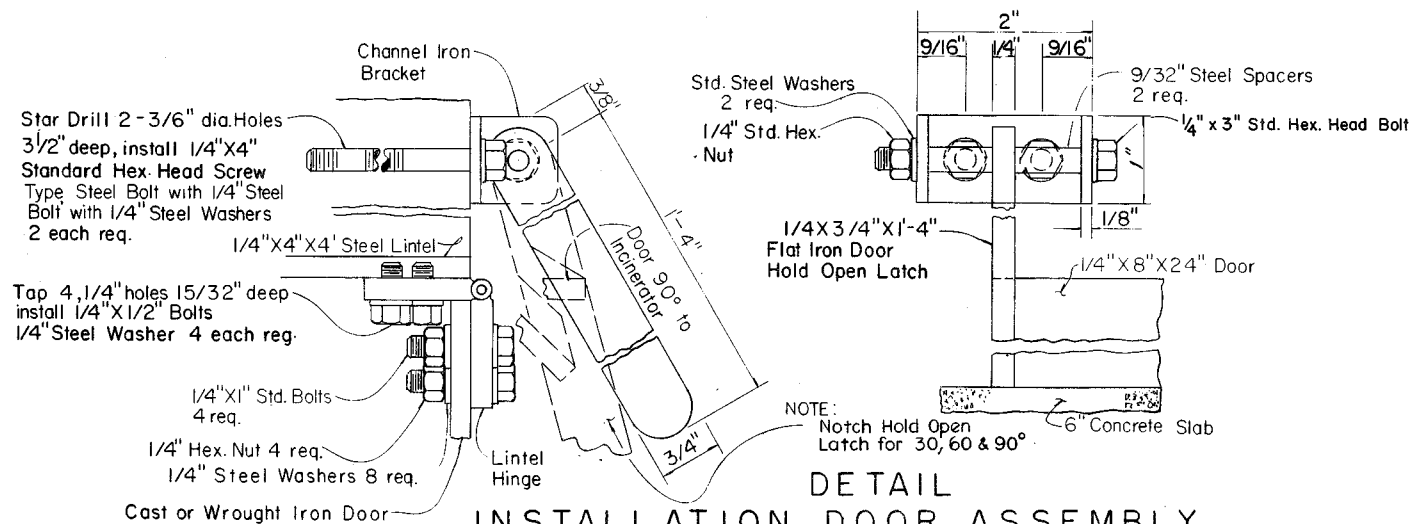
DETAIL
1/4"X3"X3" ANGLE



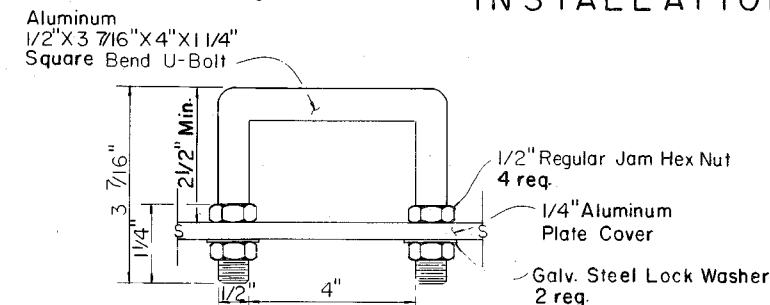
SIDE VIEW



REAR VIEW

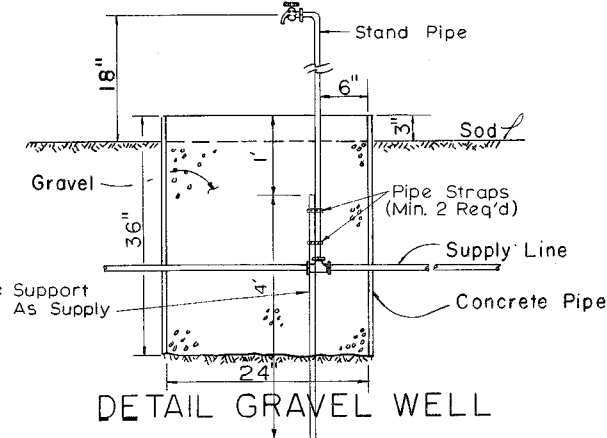


INSTALLATION DOOR ASSEMBLY

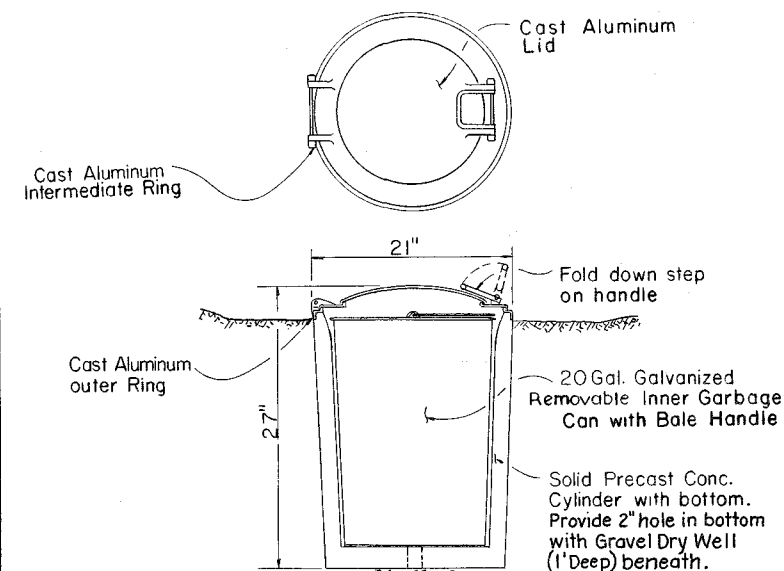


DETAIL ~ U-BOLT HANDLE

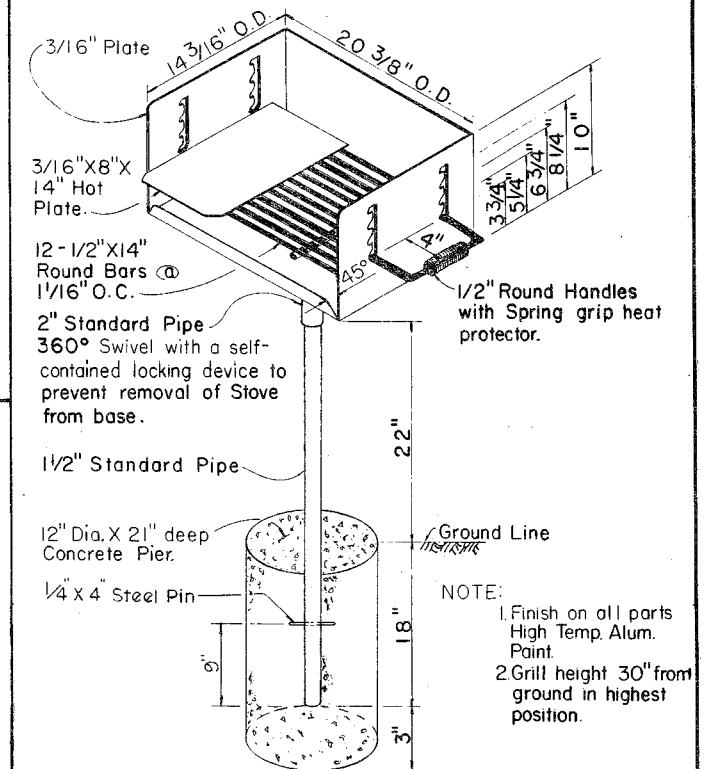
INCINERATOR



DETAIL GRAVEL WELL



DETAIL OF BURIED GARBAGE CANS



ADJUSTABLE CAMPSTOVE AND GRILL

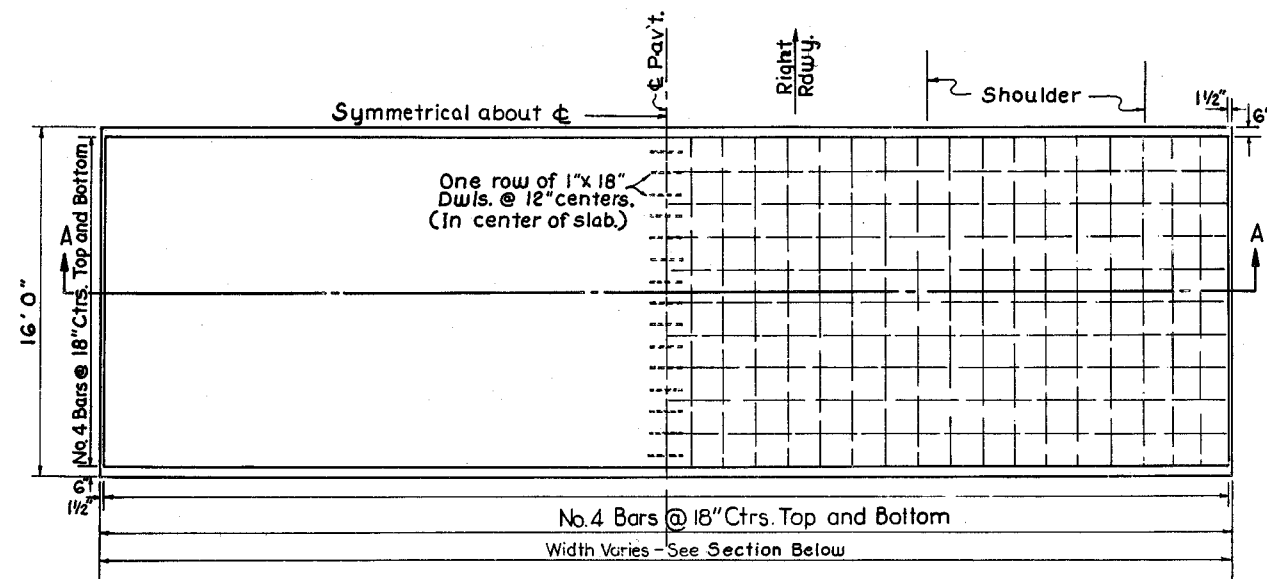
GENERAL NOTES

- For details of chain link fence at rest area locations see Index No. 452.

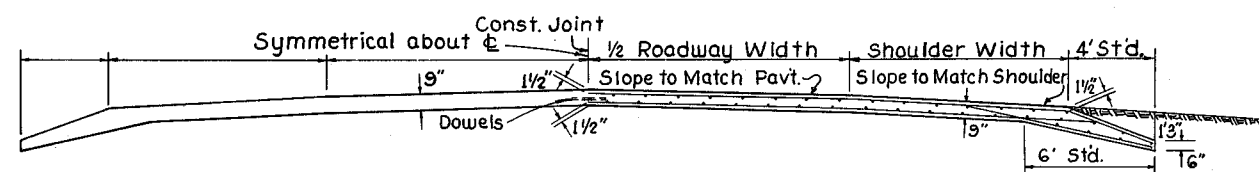
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

REST AREA EQUIPMENT

| Names | Dates | Approved By | Revision No. | Sheet No. | Index No. |
|----------------------------|-------|-------------|--------------|-----------|-----------|
| Designed by | | | | | |
| Drawn by | HW | 3/68 | | | |
| Checked by | RHC | 6/68 | | | |
| F.H.W.A. Approved: 3/20/75 | 81 | 1 of 1 | | | 530 |



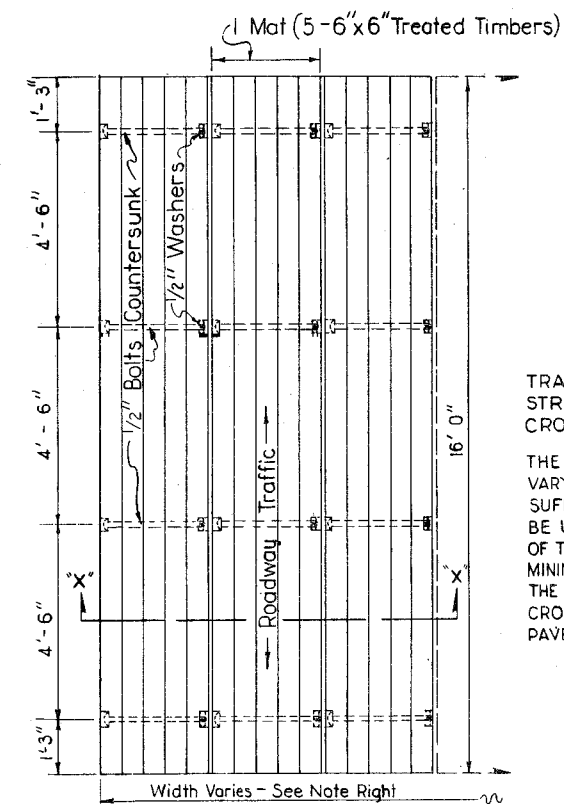
PLAN



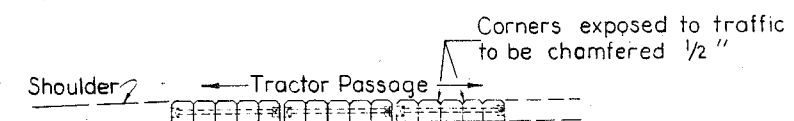
SECTION A-A

TYPE A
REINFORCED CONCRETE

NOTE
CLASS I CONCRETE IS TO BE
USED UNLESS OTHERWISE NOTED
IN PLANS OR SPECIAL PROVISIONS



PLAN



SECTION X-X

TYPE B
TREATED TIMBER

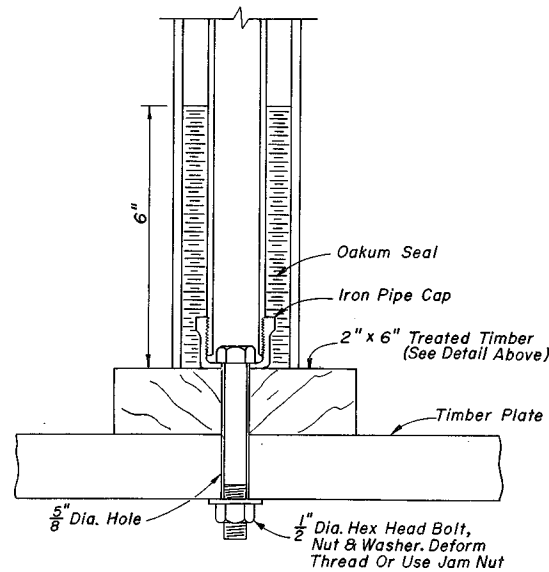
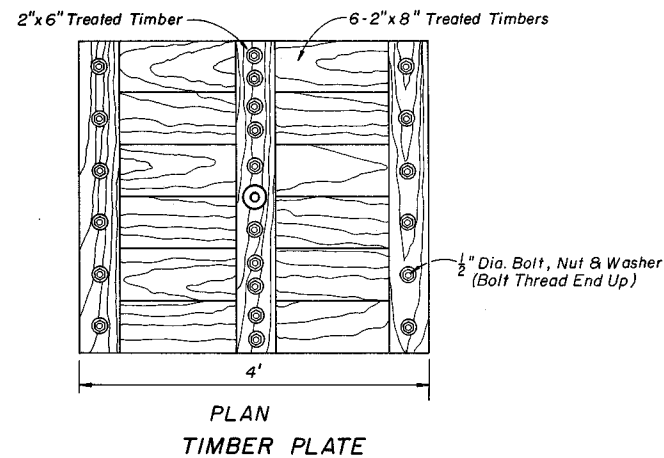
NOTE
TRACTOR CROSSING TO BE CON-
STRUCTED TO MATCH PAVEMENT
CROSS SLOPE.

THE NUMBER OF MATS REQUIRED WILL
VARY WITH THE PAVEMENT WIDTH, A
SUFFICIENT NUMBER OF MATS WILL
BE USED SO THAT THE OVERALL WIDTH
OF THE TRACTOR CROSSING WILL BE A
MINIMUM OF ONE FOOT GREATER THAN
THE PAVEMENT WIDTH. THE TRACTOR
CROSSING WILL BE CENTERED ON THE
PAVEMENT CENTERLINE.

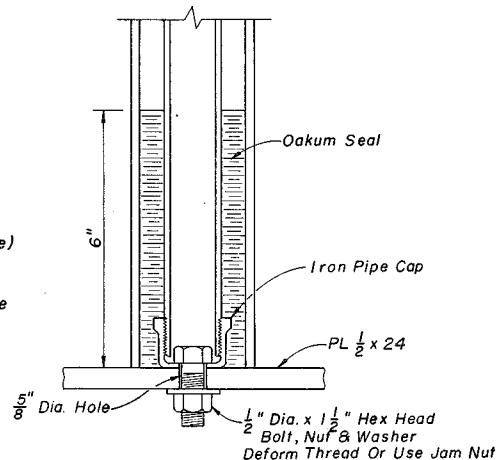
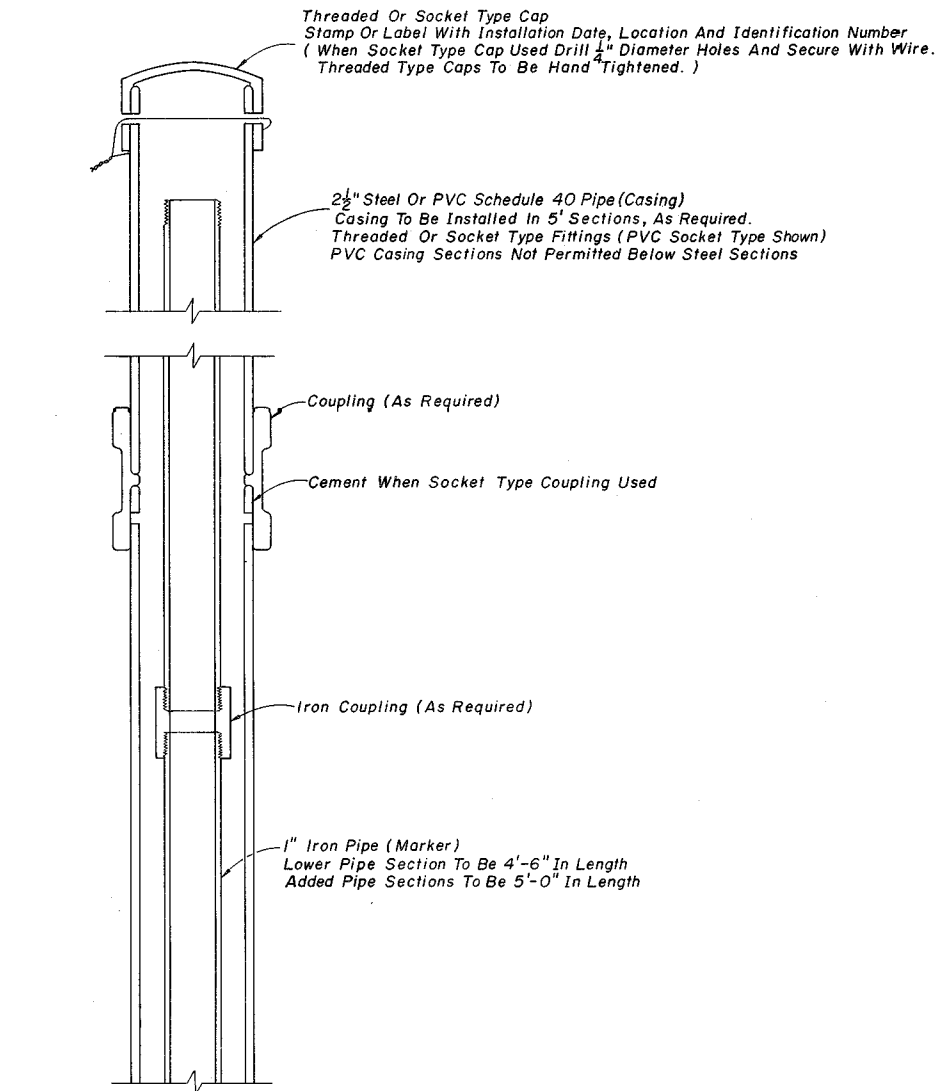
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

TRACTOR CROSSINGS

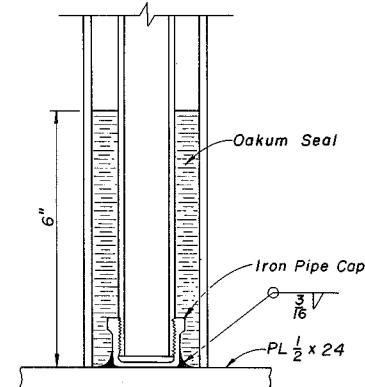
| Designed by | Names | Dates | Approved By | Revision No. | Sheet No. | Index No. |
|--------------------|---------|-------|--|--------------|-----------|-----------|
| Drawn by | LH | 1/61 | <i>De R. L. L.</i> Deputy Design Engineer, Roadways | | | |
| Checked by | CDD | 1/61 | | | | |
| F.H.W.A. Approved: | 3/20/75 | 81 | 1 of 1 | 535 | | |



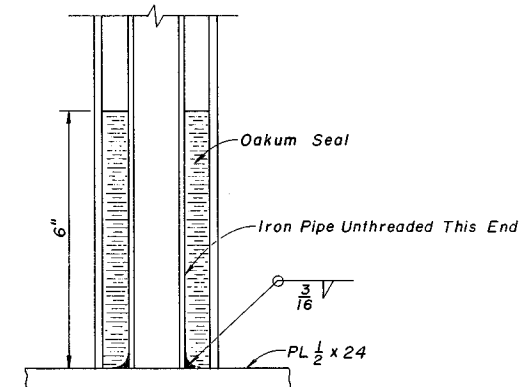
TIMBER PLATE



STEEL PLATE

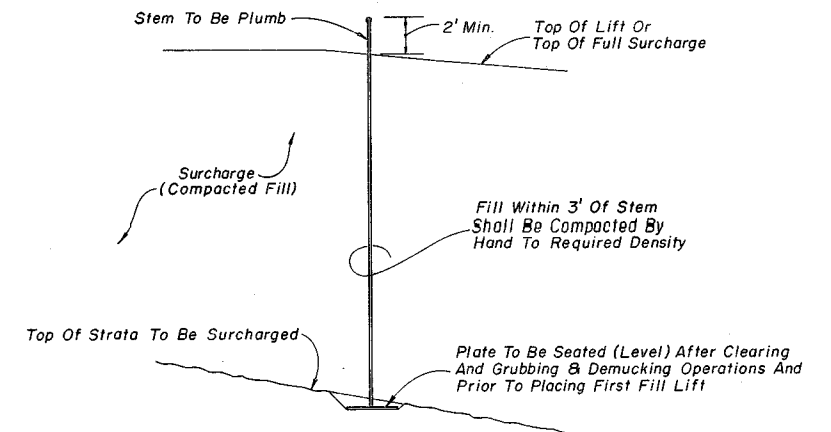


STEEL PLATE



STEEL PLATE

STEM AND PLATE OPTIONS

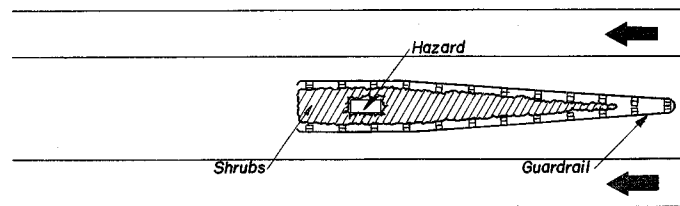


INSTALLATION

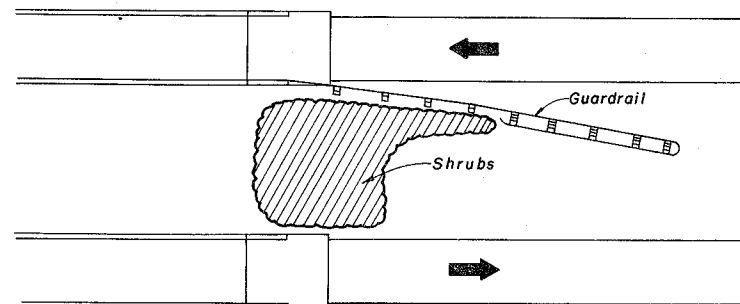
NOTES

1. 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.
2. Settlement plate locations shall be flagged and protected from construction vehicles and equipment. If settlement plates are disturbed, they shall be replaced in kind.
3. Oakum used to construct seal should not have a mesh covering (plastic or other synthetic material).

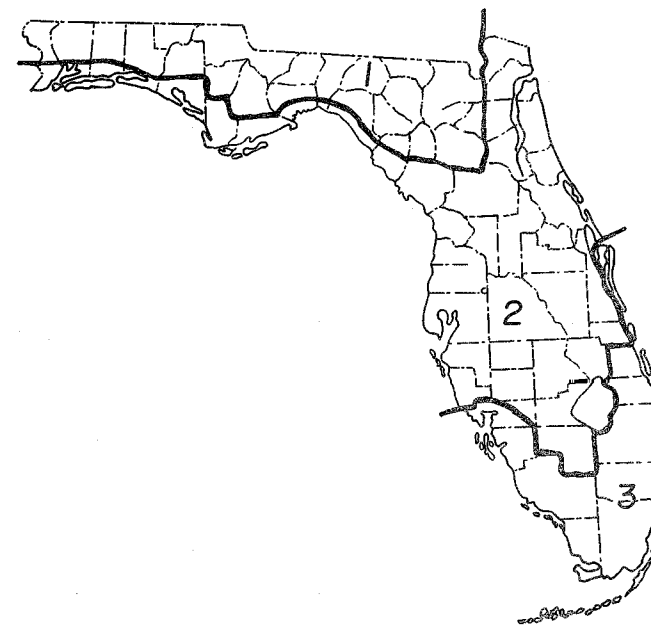
| | | | | | |
|--|-------|-------|--------------------------------------|-----------|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | | | |
| SETTLEMENT PLATE | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | JVG | 10/79 | Deputy Design Engineer, Roadways | | |
| Checked by | HSD | 10/79 | | | |
| Checked by | JBW | 10/79 | Revision No. | Sheet No. | Index No. |
| F.H.W.A. Approved: 10/7/80 | | | 81 | 1 of 1 | 540 |



DETAIL A
MEDIAN HAZARD - ONE-WAY TRAFFIC

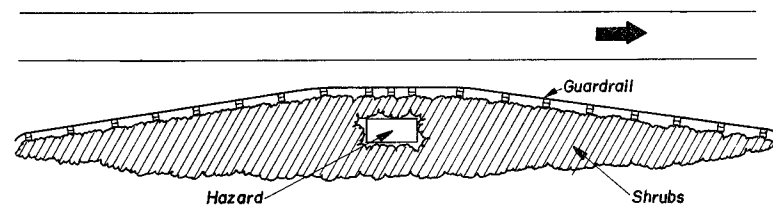


DETAIL C
BRIDGE END - WIDE MEDIAN

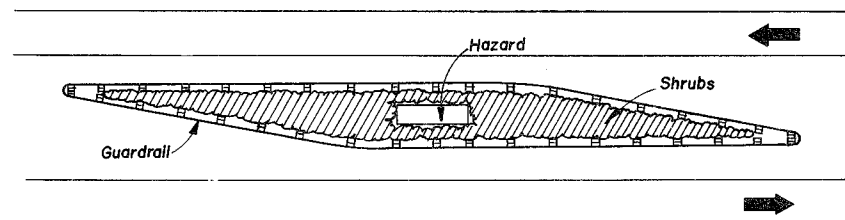


ZONE MAP

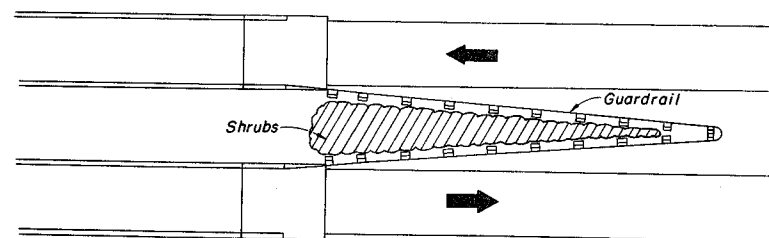
| ZONE | SHRUB |
|------|--|
| 1. | Wax Myrtle Pampas Grass Primrose Jasmine Russian Olive |
| 2. | Wax Myrtle Pampas Grass Primrose Jasmine Russian Olive Jasmine Simplic Oleander |
| 3. | Pampas Grass Russian Olive Natal Plum Jasmine Simplic Oleander Dwarf Oleander |



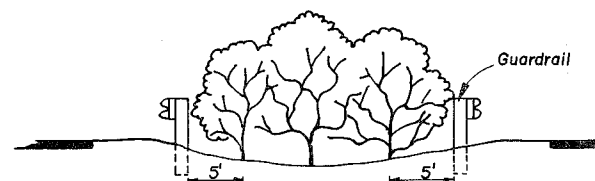
DETAIL B
ROADSIDE HAZARD



DETAIL D
MEDIAN HAZARD - TWO-WAY TRAFFIC



DETAIL E
BRIDGE END - NARROW MEDIAN

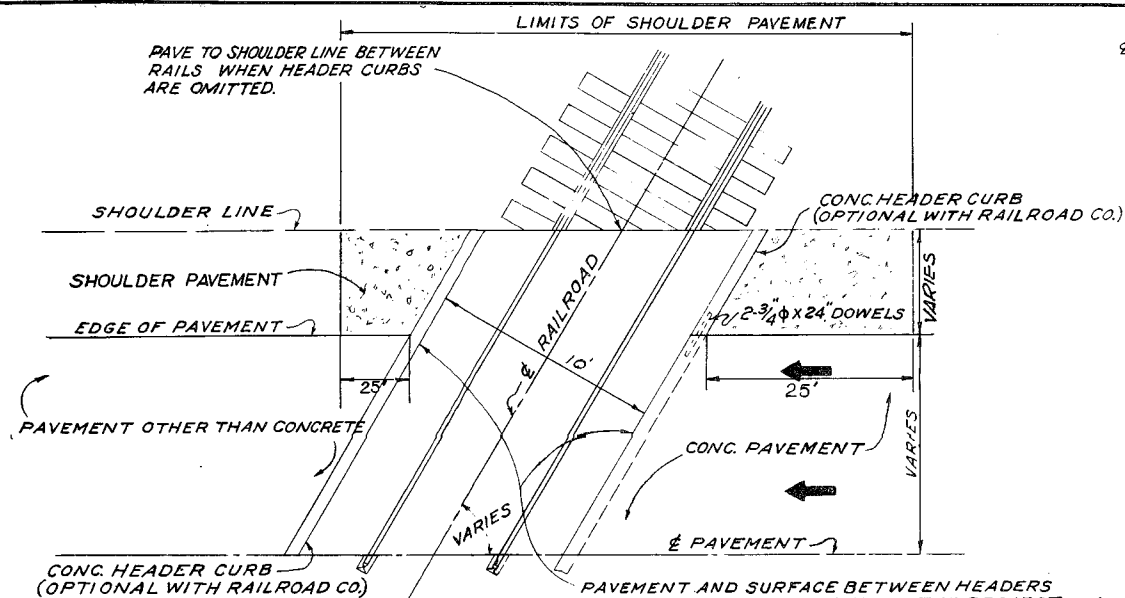


CROSS SECTION
BACK TO BACK GUARDRAIL

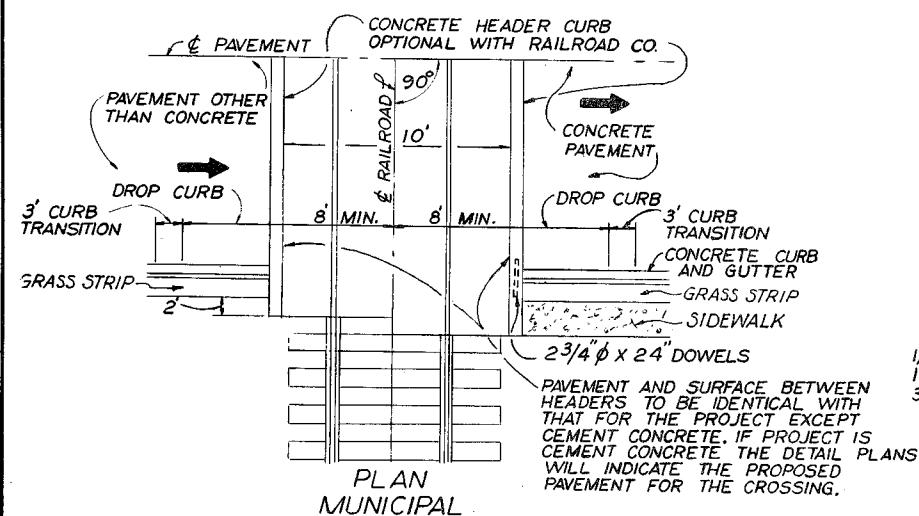
GENERAL NOTES

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.

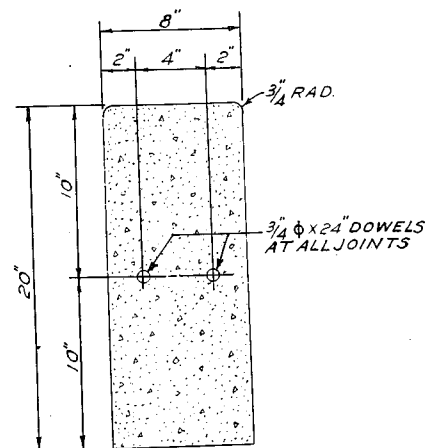
| | | | |
|--|-------|--|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| SHRUBBERY BACK OF GUARDRAIL APPLICATION | | | |
| Designed by G L H | Dates | Approved By <i>De Albel</i> Deputy Design Engineer, Roadways | |
| Drawn by | | Revision No. | Sheet No. |
| Checked by | | 80 | 1 of 1 |
| F.H.W.A. Approved: | | 545 | |



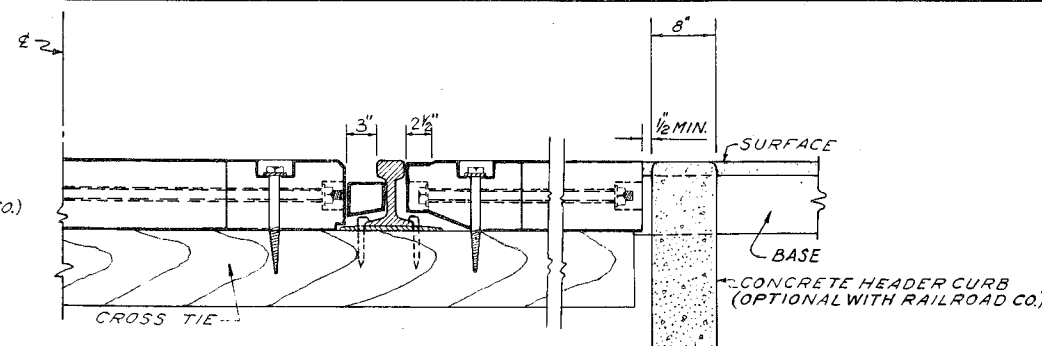
PLAN RURAL



PLAN MUNICIPAL

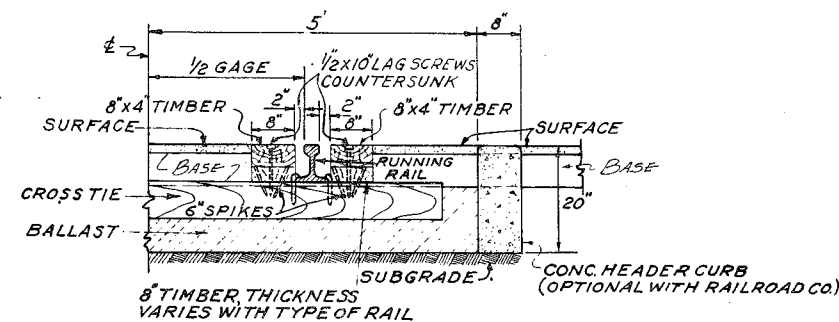


DETAIL OF HEADER CURB
(OPTIONAL WITH RAILROAD CO.)

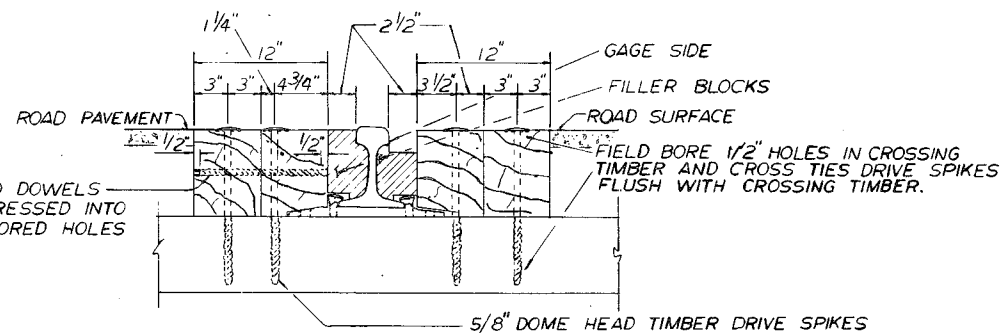


HALF SECTION TYPE D

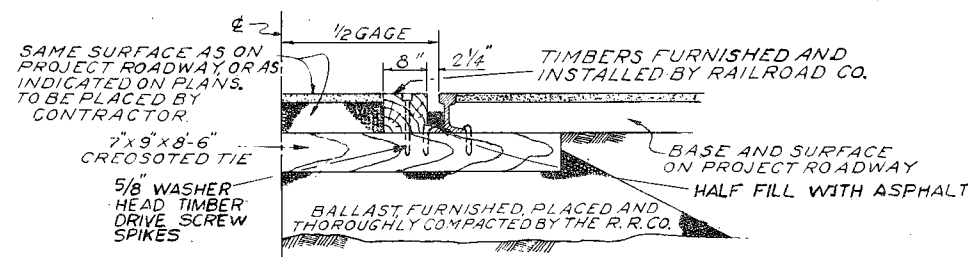
NOTE: THIS TYPE OF CROSSING TO BE CONSTRUCTED ENTIRELY BY THE RAILROAD CO.



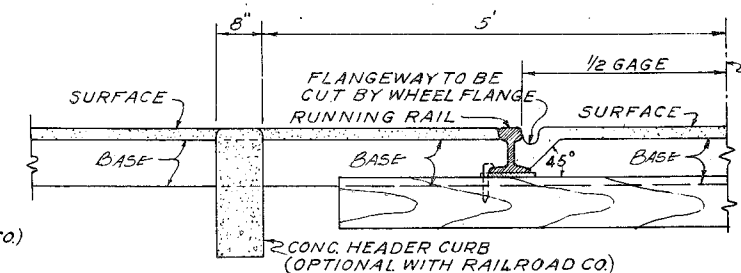
HALF SECTION TYPE G



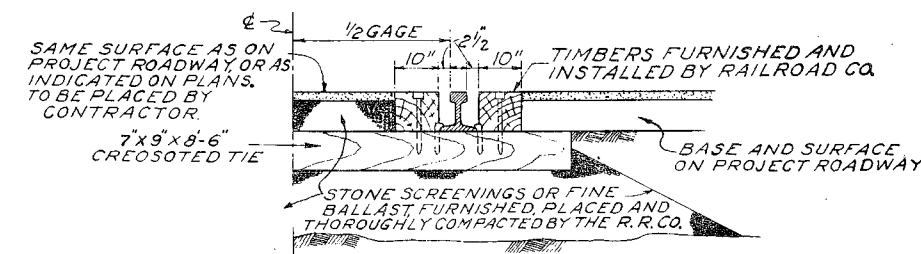
HALF SECTION TYPE L



HALF SECTION TYPE S



HALF SECTION TYPE E



HALF SECTION TYPE H

~ NOTES ~

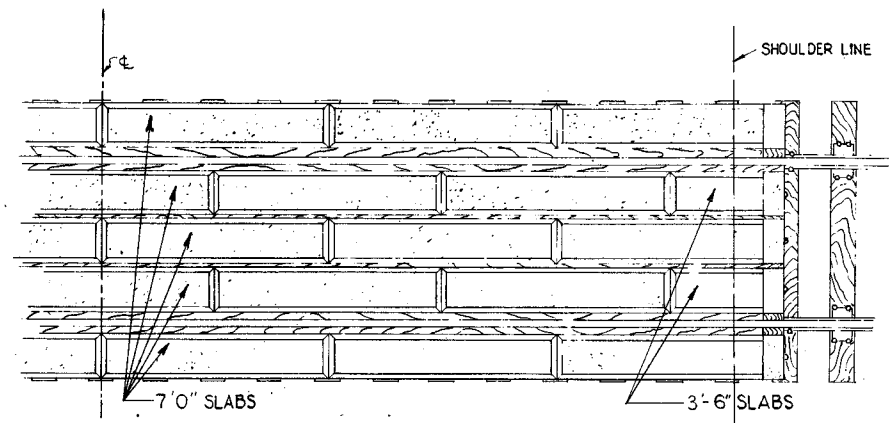
1. THE CONTRACTOR WILL CONSTRUCT HEADER CURBS AT LOCATIONS REQUESTED BY THE RAILROAD COMPANY, AND CONSTRUCT PAVEMENT AS SHOWN FOR ALL CROSSINGS EXCEPT J AND K.
2. THE RAILROAD COMPANY WILL FURNISH AND INSTALL ALL MATERIAL WITHIN 5' OF $\frac{1}{2}$ OF TRACKS, EXCEPT PAVEMENT, FOR ALL CROSSINGS EXCEPT J AND K.
3. ALL RAILS WITHIN CROSSING SHALL BE LINED AND LEVELED TO ELEVATIONS SHOWN ON PLANS.
4. UNLESS OTHERWISE REQUESTED BY THE RAILROAD COMPANY, THE VARIOUS TYPES OF CROSSING WILL BE USED AS FOLLOWS:

| | |
|---|----------|
| APALACHICOLA NORTHERN R. R. CO. | TYPE "L" |
| ATLANTA AND ST. ANDREWS BAY RAILWAY CO. | L |
| FLORIDA EAST COAST RAILWAY CO. | G |
| ST. LOUIS ~ SAN FRANCISCO RAILWAY CO. | H |
| SEABOARD COAST LINE R. R. CO. | L |
| LOUISVILLE AND NASHVILLE R. R. CO. | L |
| SOUTHERN RAILWAY SYSTEM | L |
| (a) GEORGIA SOUTHERN AND FLORIDA RAILWAY CO. | G |
| (b) LIVE OAK, PERRY AND SOUTH GEORGIA RAILWAY CO. | G |
| (c) ST. JOHNS RIVER TERMINAL CO. | G |
| (d) GEORGIA AND FLORIDA RAILWAY CO. | TYPE "G" |

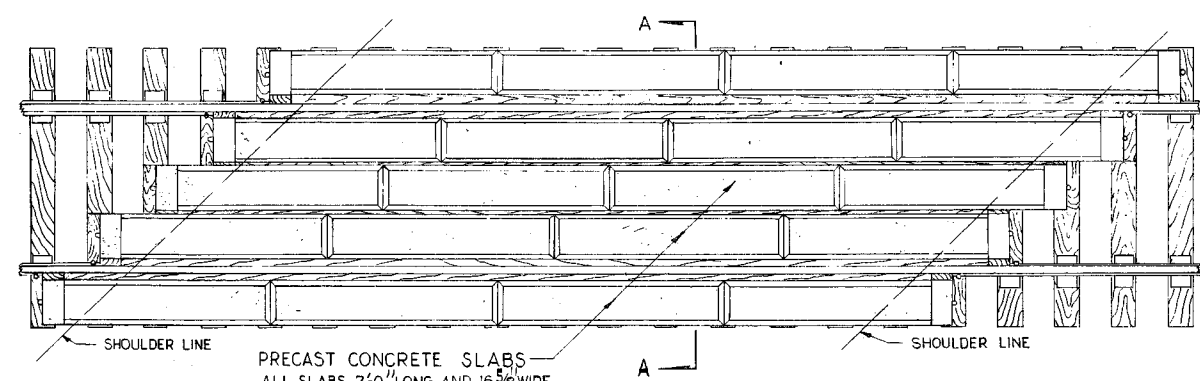
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE D, E, G, H, L & S

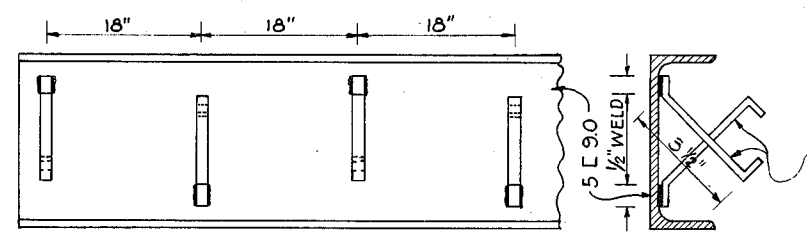
| Names | Dates | Approved By | Index No. |
|----------------------------|-------|-----------------|-----------|
| Designed by | | <i>De. Bull</i> | |
| Drawn by | HW | 8/69 | |
| Checked by | JKC | 8/69 | |
| F.H.W.A. Approved: 3/20/75 | 81 | 1 of 6 | 560 |



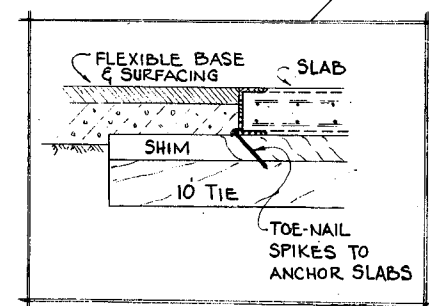
PLAN - 90° CROSSING



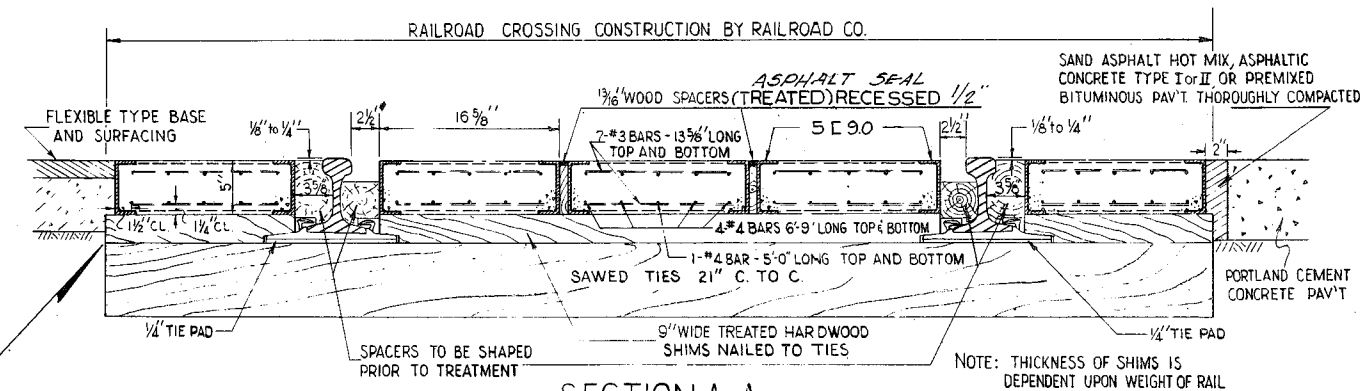
PLAN - SKEW CROSSING



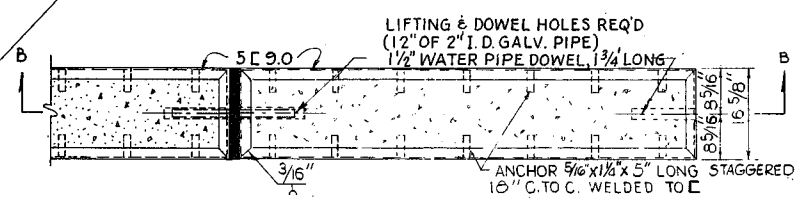
ELEVATION
DETAIL OF 5/16" x 1 1/4" x 5" ANCHORS
ANCHORS STAGGERED 18" C. TO C.
TWO ANCHORS EACH END CHANNEL
NOTE: 1/2" x 5" STUDS MAY BE USED
IN LIEU OF ANCHORS.



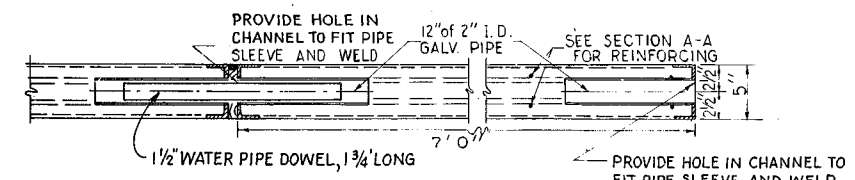
OPTIONAL DETAIL
WHEN 10' TIES ARE USED



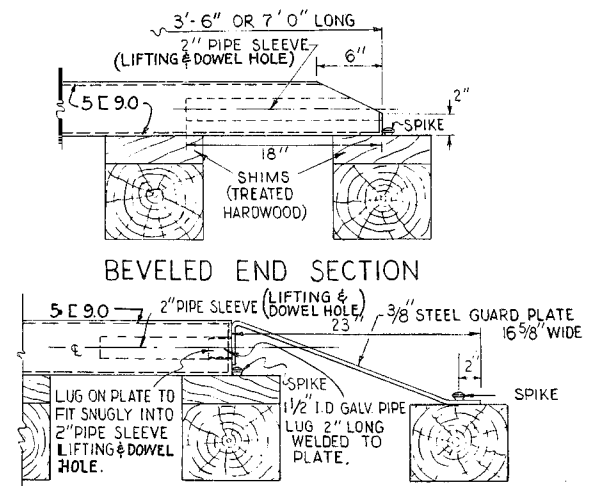
SECTION A-A



PLAN TYPICAL SLAB



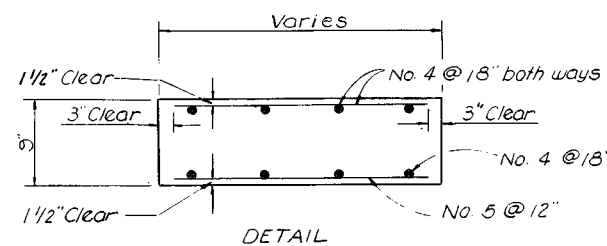
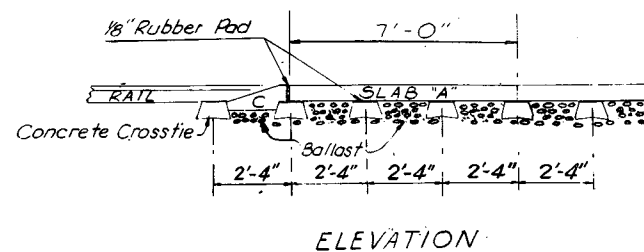
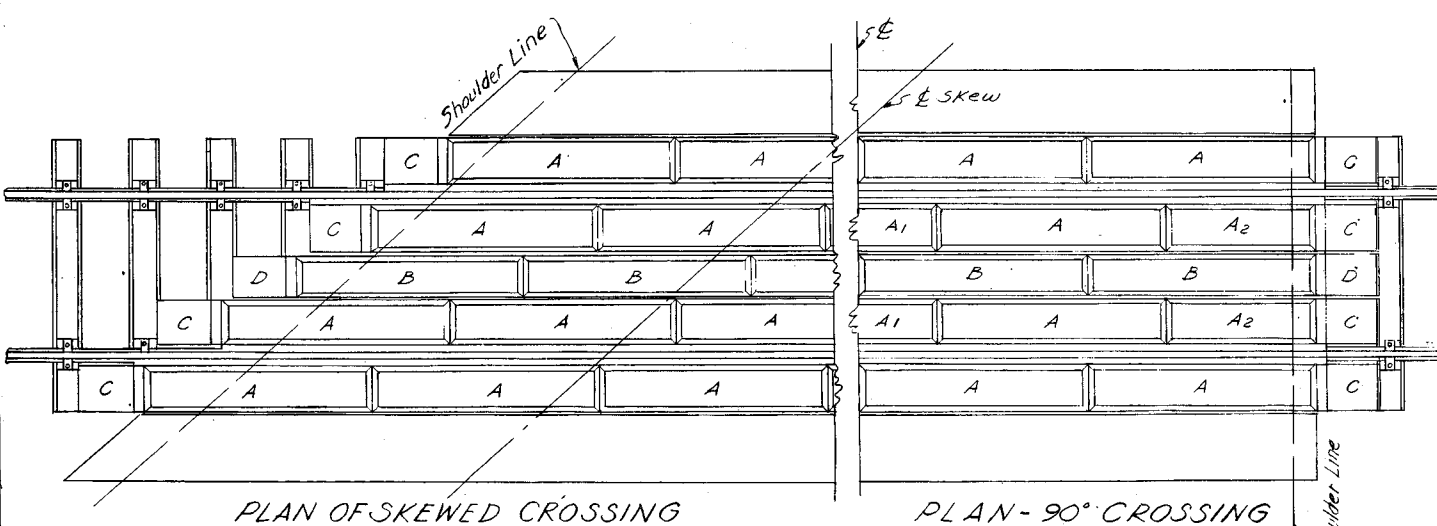
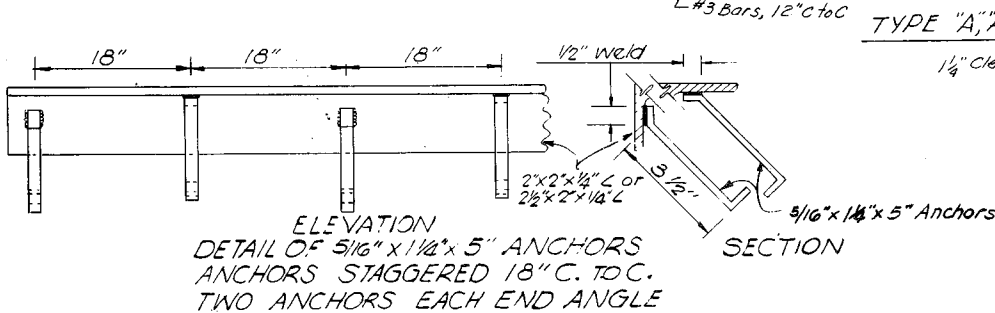
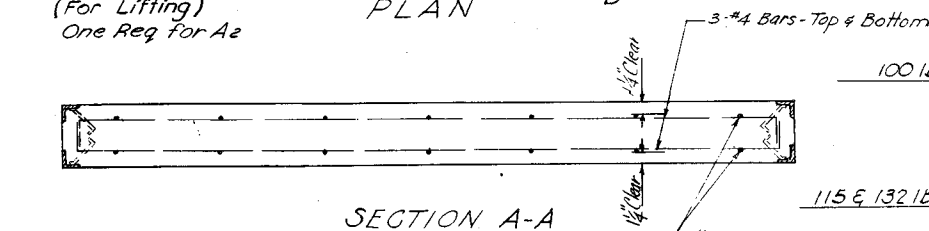
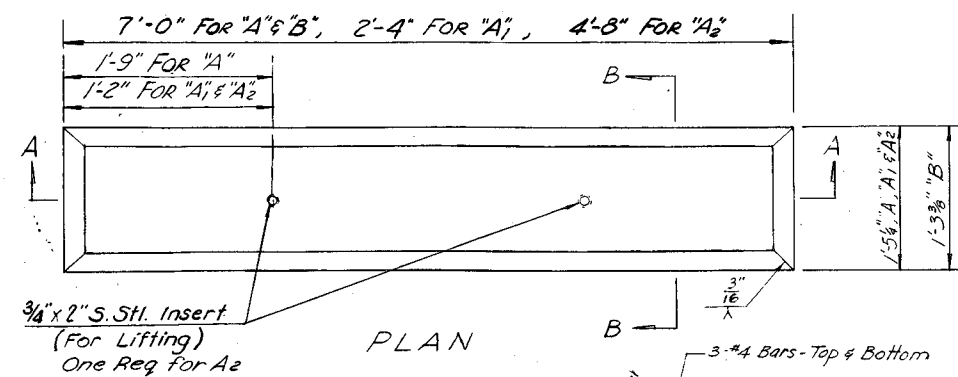
SECTION B-B



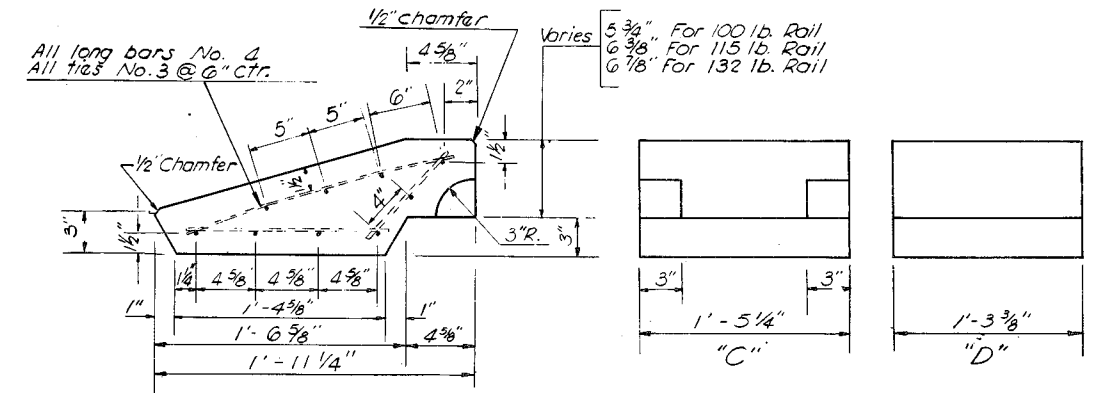
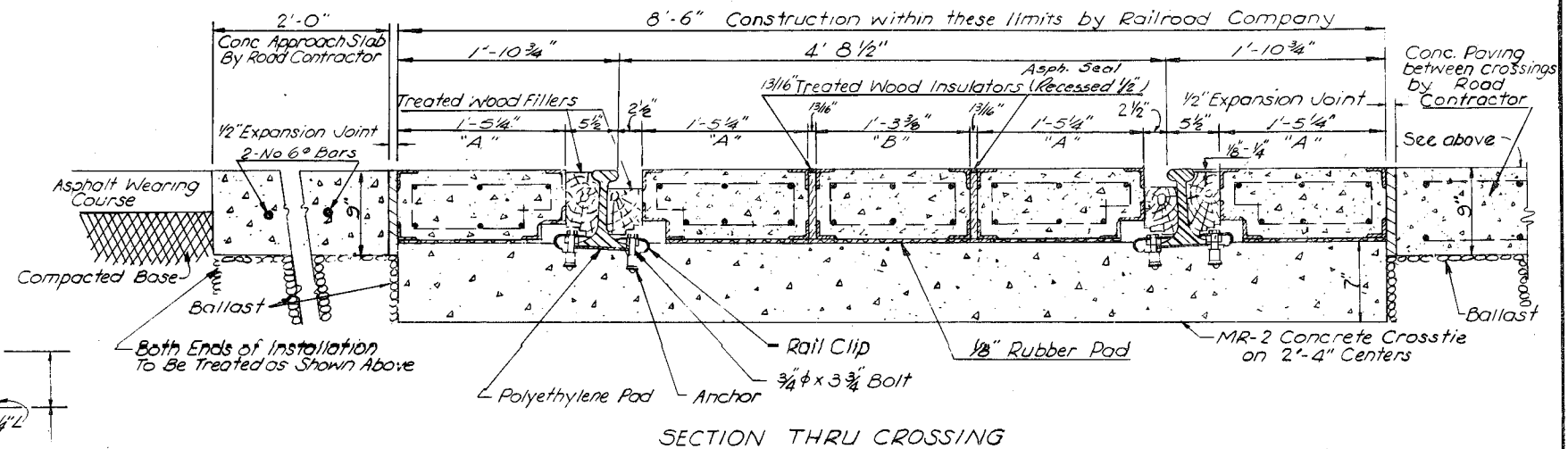
ALTERNATE END SECTION

- NOTES
1. SPACERS ADJACENT TO RAIL TO BE DENSE STRUCTURAL 65 GRADE.
 2. SPACERS BETWEEN SLABS TO BE NO. 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 | Dates | Approved By | | |
| Drawn by | HW | 8/69 | De [Signature] Deputy 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.)



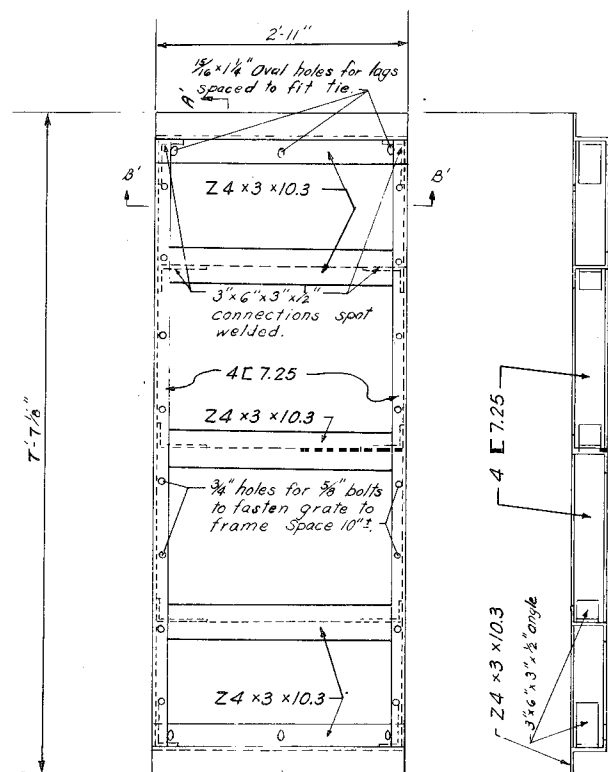
GENERAL NOTES

1. 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.
2. All concrete slabs, rubber pads for tops of ties and wood filler blocks shall be furnished and installed by the Railroad Company.
3. Concrete Crossties shall be spaced on 28" centers by the Railroad Company.
4. Rubber pads shall be installed on concrete ties in field using contact cement.
5. Filler blocks shall be pressure treated pine or clear heart redwood and shall be shaped prior to treatment.
6. 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.)

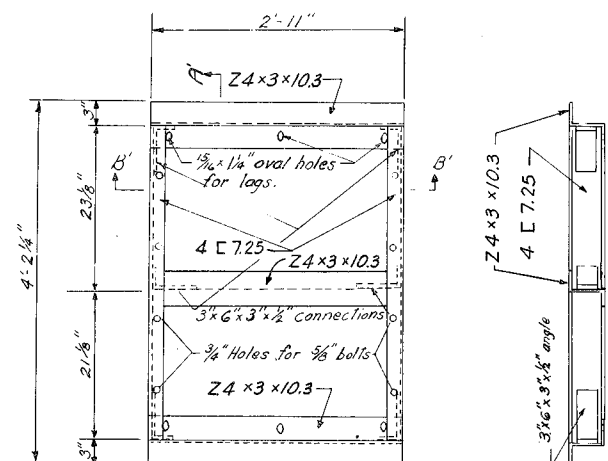
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE K

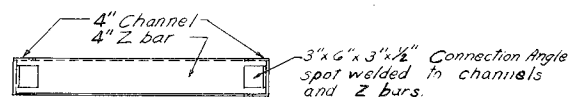
| Designed by | Names | Dates | Approved By | Revision No. | Sheet No. | Index No. |
|--------------------|---------|-------|---|--------------|-----------|-----------|
| Drawn by | HW | 8/69 | <i>De. A. H. H.</i> Deputy Design Engineer, Roadways | | | |
| Checked by | JKC | 8/69 | | | | |
| F.H.W.A. Approved: | 3/20/75 | 81 | 3 of 6 | 560 | | |



PLAN
INTER-TRACK UNIT



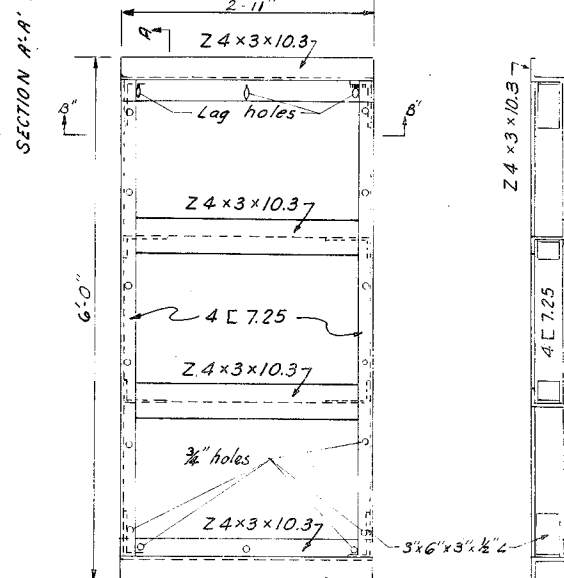
PLAN
INTER-RAIL UNIT



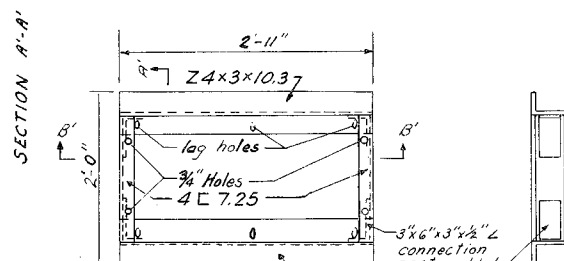
SECTION B-B'

FRAME DETAILS

Scale: 1/2"=1'



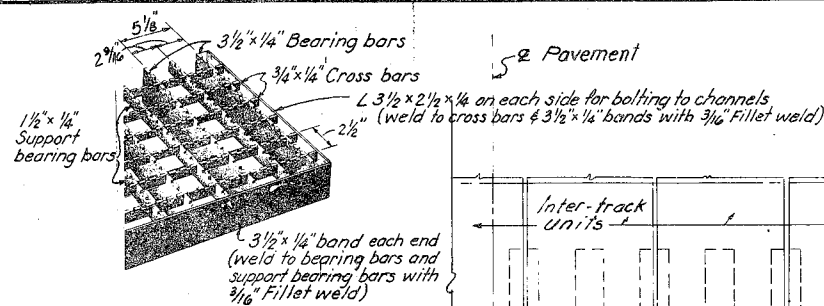
PLAN
ALTERNATE OUTER-TRACK UNIT



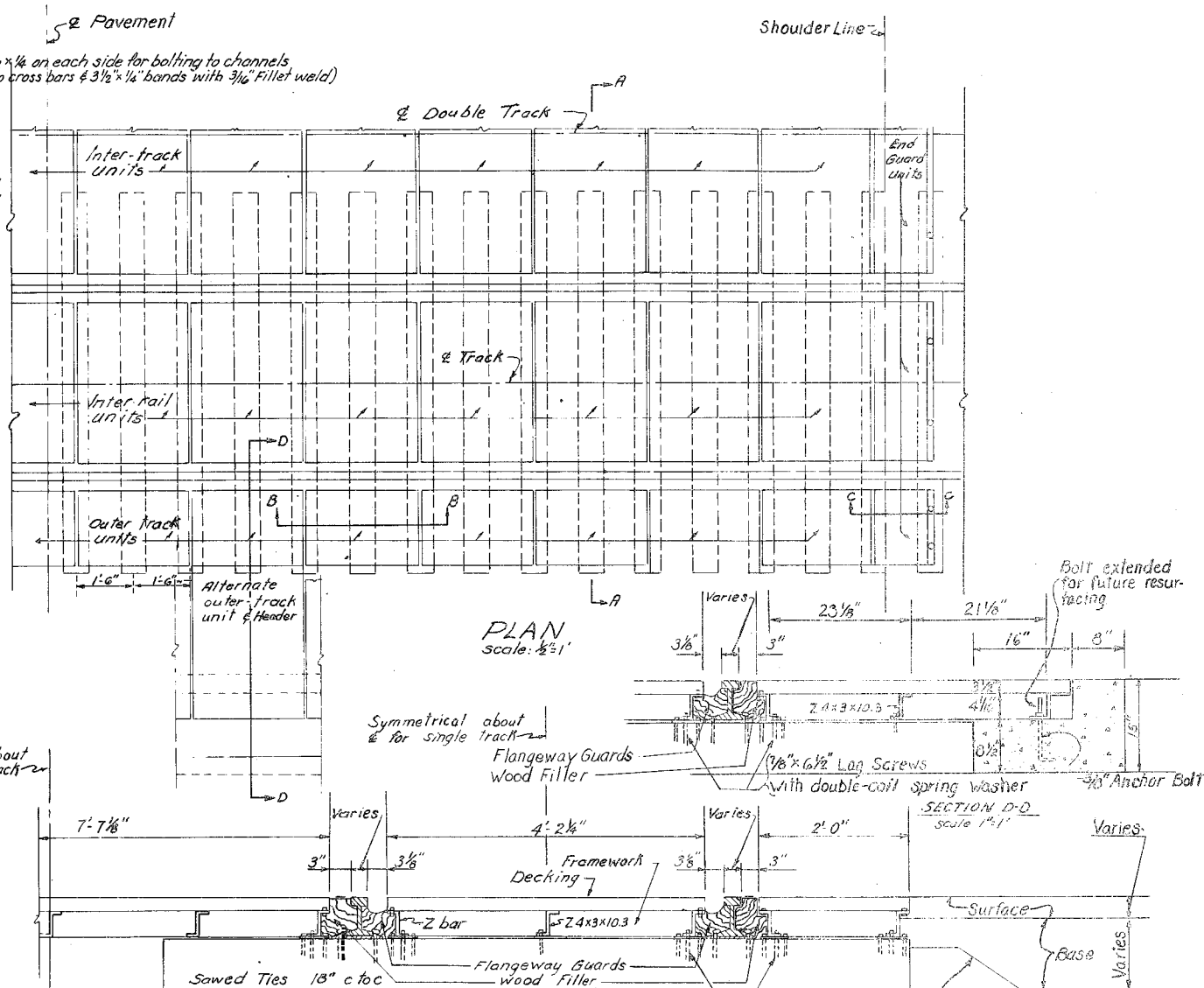
PLAN
OUTER TRACK UNIT

GENERAL NOTES

1. This drawing is based on using 131* 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.
2. 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.
3. 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.
4. Flangeway and outside filler timbers to be rabbetted to assure close fit prior to treatment.
5. Ties to be sawed and spaced 18" C to C.
6. Crossing of any angle can be equipped with units of either 45°, 67°30' or 90°.
7. Decking may be as shown or equal (Submit shop drawings for approval by the Engineer).

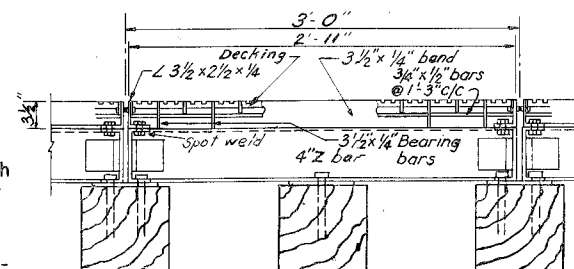


DECKING (14.81 LBS/S.F.)

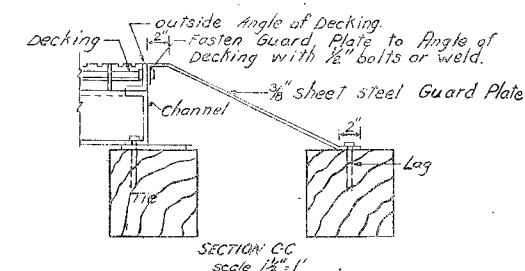


PLAN
Scale: 1/2"=1'

SECTION A-A'
Scale: 1/2"=1'



SECTION B-B'
Scale: 1/2"=1'

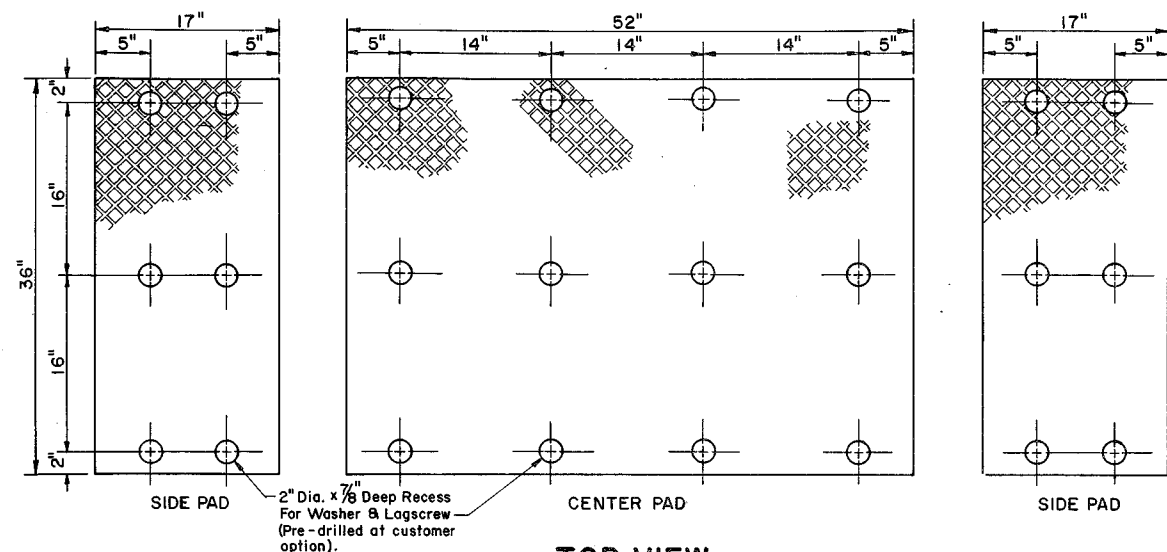


SECTION C-C'
Scale: 1/2"=1'

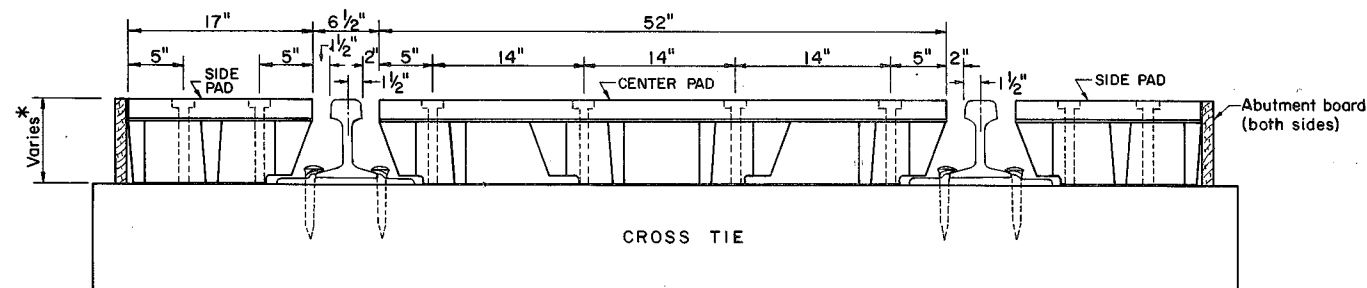
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE M

| Designed by | Names | Date | Approved By |
|--------------------|---------|------|----------------------------------|
| Drawn by | HW | 8/89 | <i>De Adel</i> |
| Checked by | JKC | 8/89 | Deputy Design Engineer, Roadways |
| F.H.W.A. Approved: | 3/20/75 | 81 | 4 of 5 |
| | | | 560 |

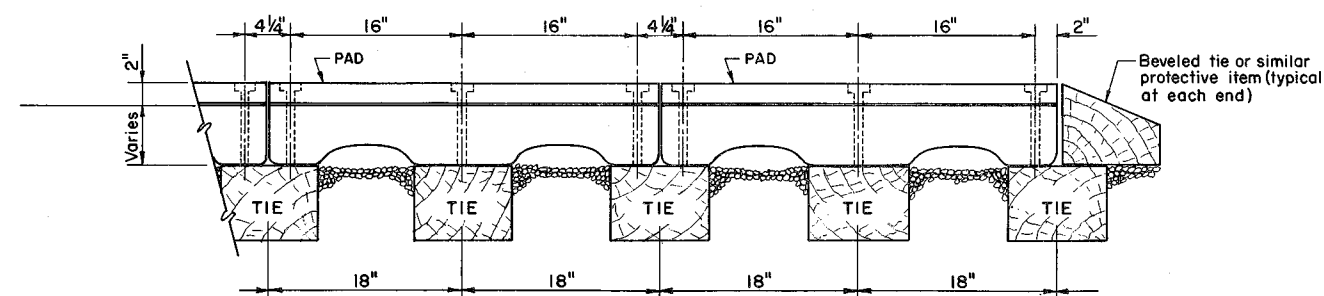


TOP VIEW



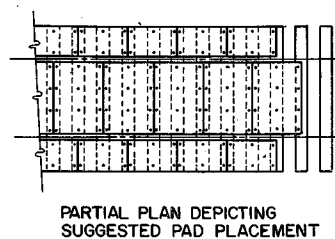
SECTION

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



PARTIAL SECTION PARALLEL TO RAIL

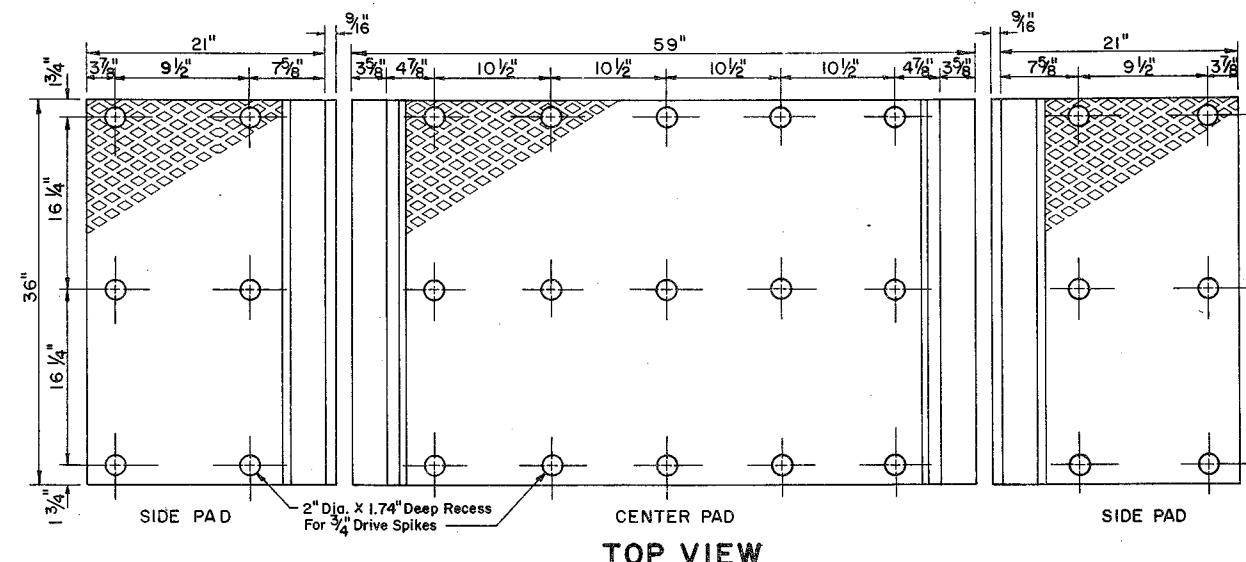
CROSSING TYPE "P"
(POLYETHYLENE)



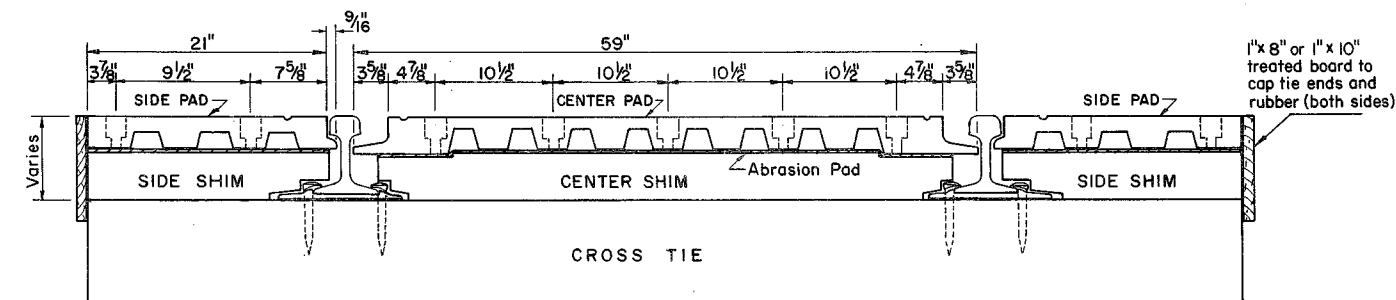
PARTIAL PLAN DEPICTING
SUGGESTED PAD PLACEMENT

GENERAL NOTES

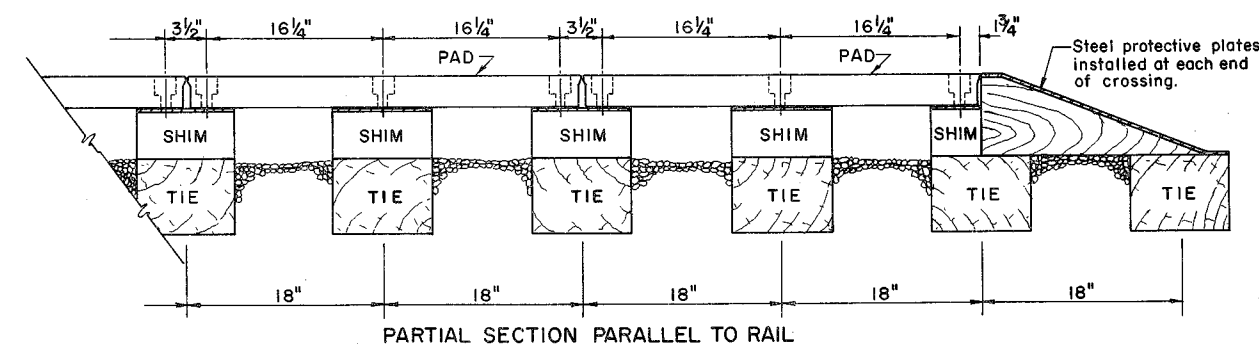
- The crossings shown on this sheet are **NOT** to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.
- Crossings on this sheet may be used for single track crossings within the zones in the chart unless engineering or 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.



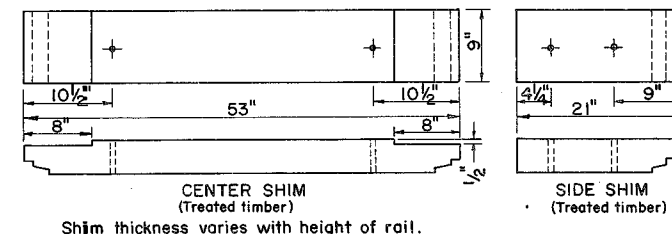
TOP VIEW



SECTION



PARTIAL SECTION PARALLEL TO RAIL



CENTER SHIM
(Treated timber)
Shim thickness varies with height of rail.

SIDE SHIM
(Treated timber)

CROSSING TYPE "R"
(RUBBER)

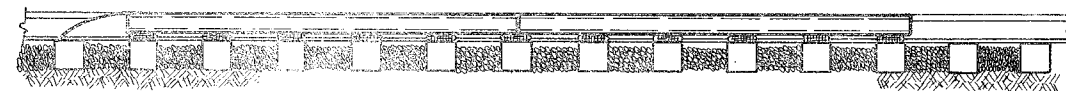
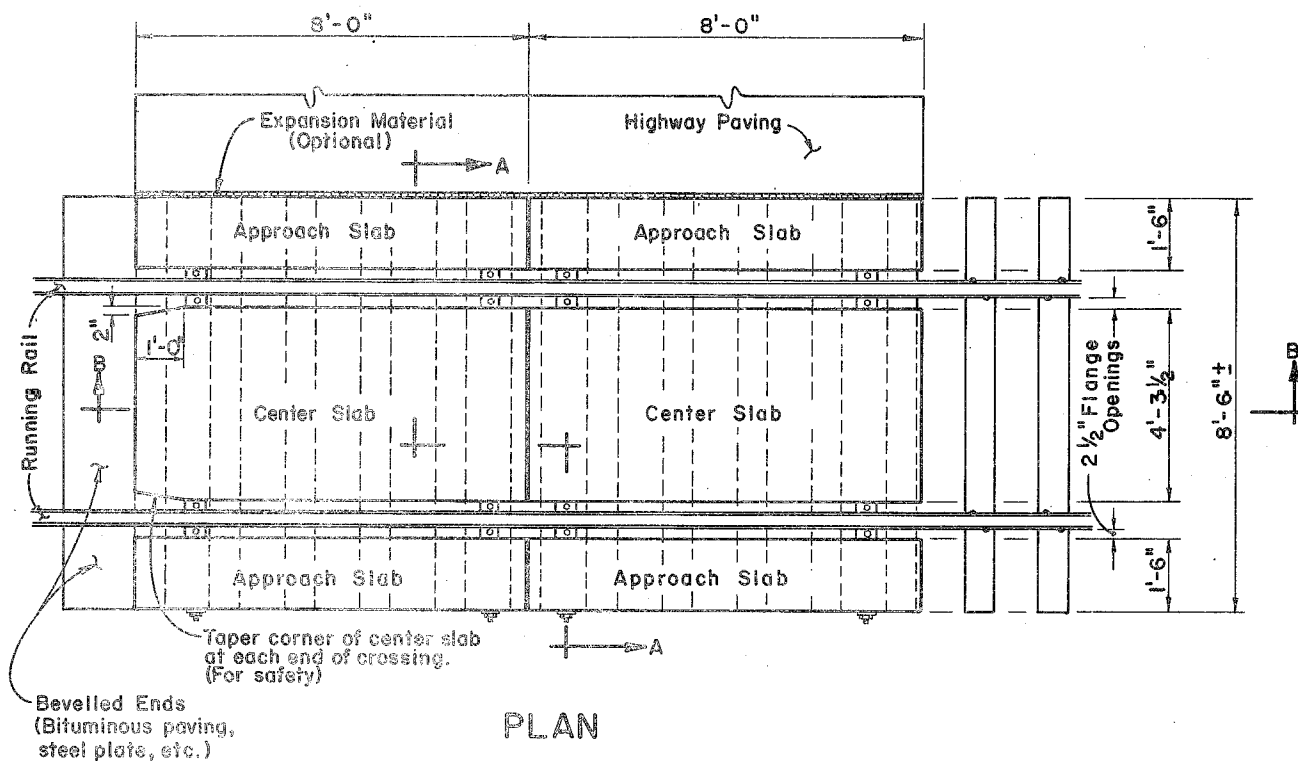
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE P & R

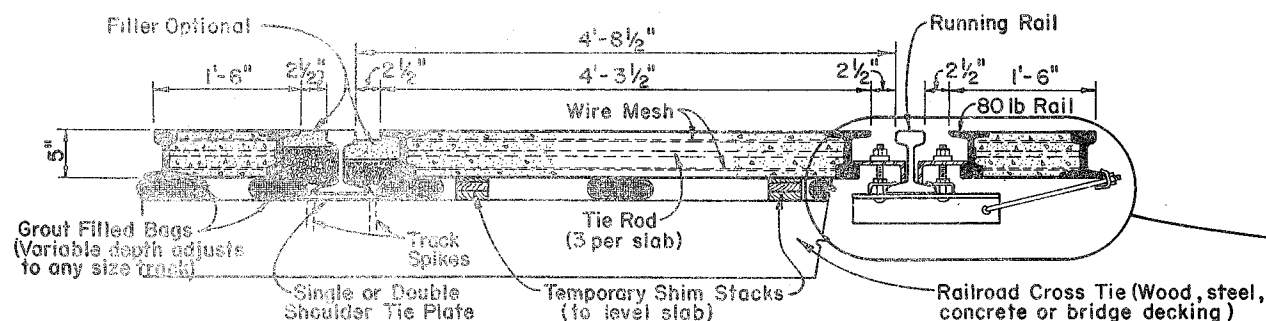
| Names | Dates | Approved By |
|-----------------------------|-------|-------------|
| Designed by | | |
| Drawn by | LMF | 11/75 |
| Checked by | GSB | 11/75 |
| F.H.W.A. Approved: 10/11/78 | 81 | 5 of 6 |

Index No.
560

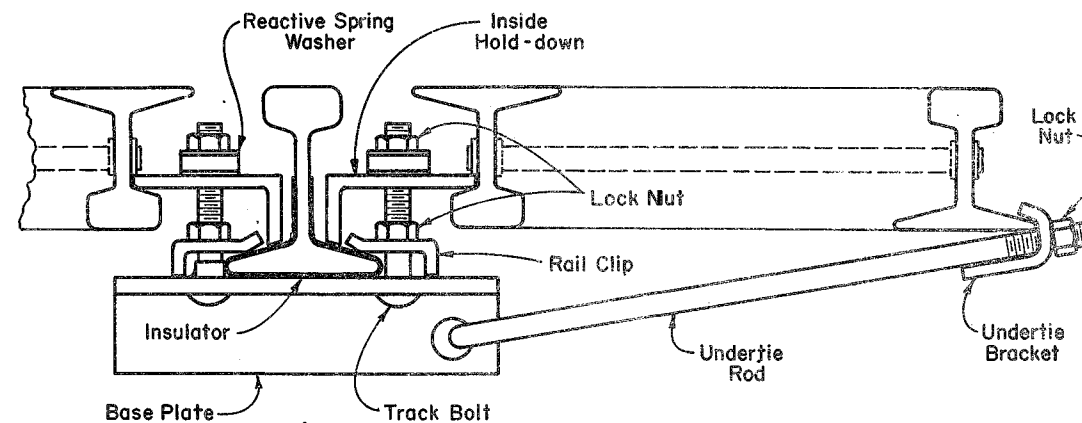
PLEASE RETAIN THIS SHEET FOR
STANDARD MYLAR SHEET
YOUR PERMANENT FILES.



SECTION B-B




SECTION A-A

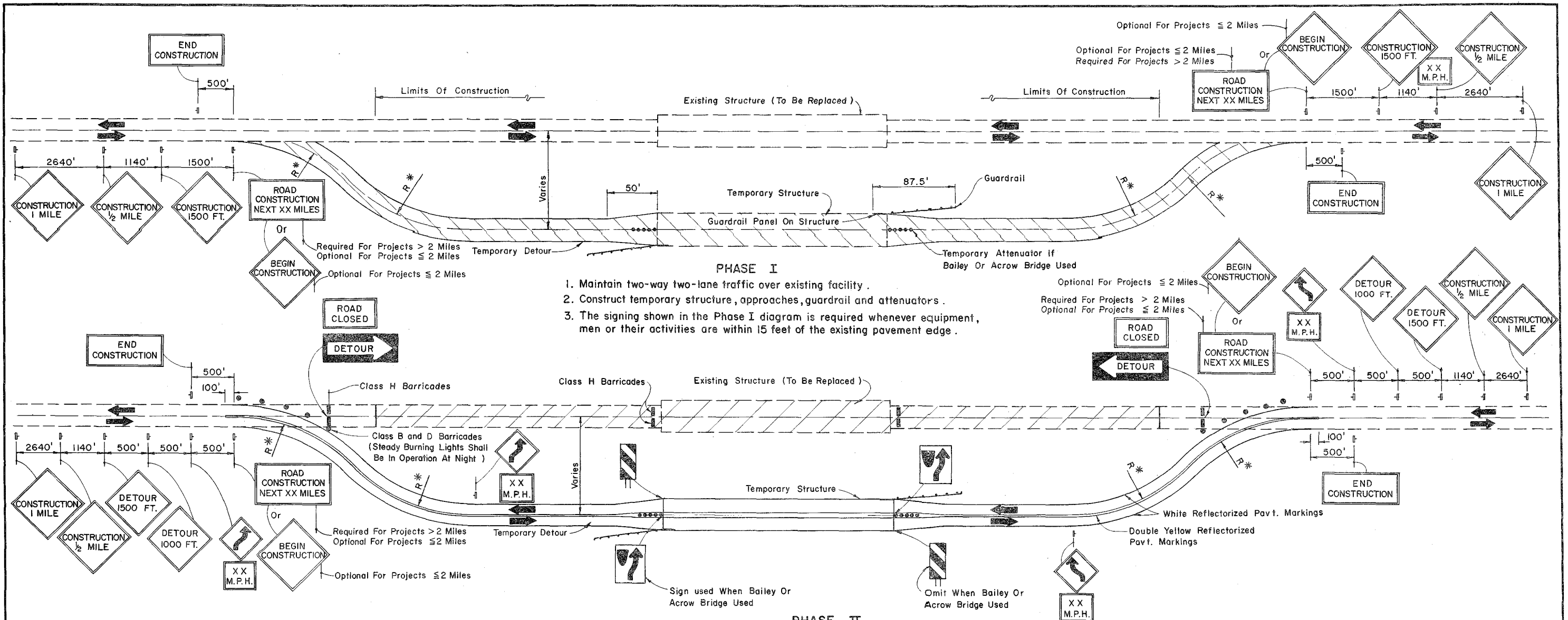


TYPICAL BOTH SIDES

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 | | | | | |
| Designed by | Names | Dates | Approved By | | |
| Drawn by | LMF | 2/77 |  Deputy Design Engineer, Roadways | | |
| Checked by | G S B | 2/77 | | | |
| F.H.W.A. Approved: 5/3/77 | | | Revision No. | Sheet No. | Index No. |
| | | | 81 | 6 of 6 | 560 |



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.

| 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 | | |

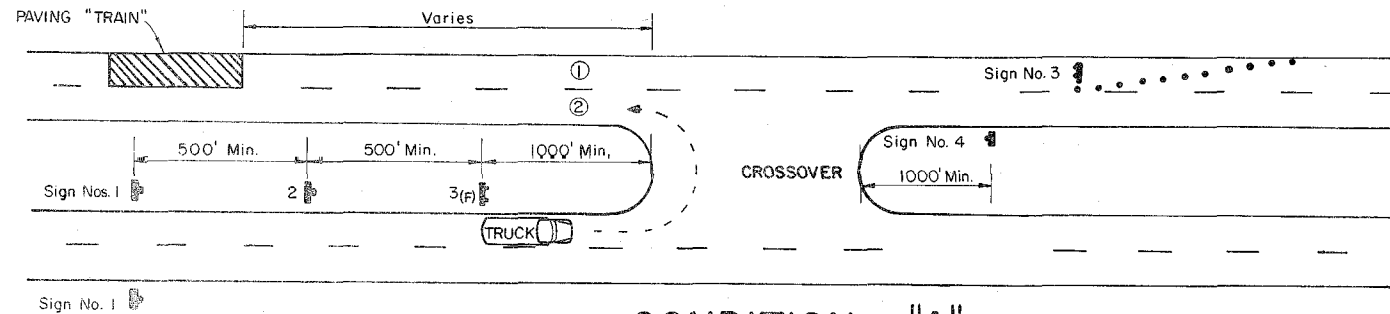
LEGEND

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

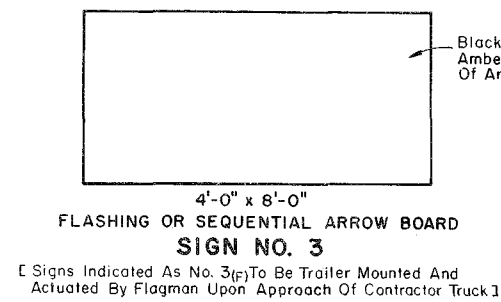
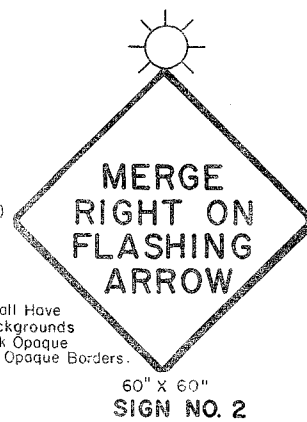
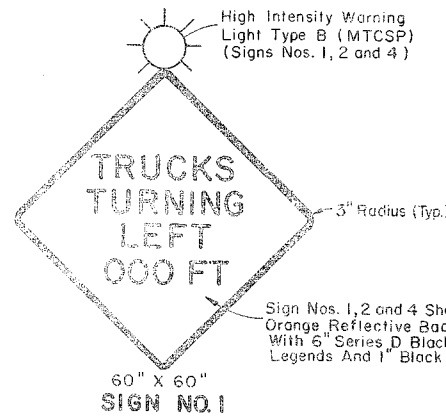
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|--|--------------|---|-----------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| STRUCTURE REPLACEMENT STANDARD TRAFFIC CONTROL PLAN RURAL FACILITY | | | |
| Designed by KNM | Date 8/79 | Approved By <i>J.C. Rull</i> Deputy Design Engineer, Roadways | |
| Drawn by SHM | Date 8/79 | Revision No. | Sheet No. |
| Checked by JVG | Date 8/79 | Revision No. | Sheet No. |
| F.H.W.A. Approved: 9/11/79 | | 81 | 1 of 1 |
| | | | 600 |

CASE I

TRAFFIC TRANSITION AREA UPSTREAM FROM CROSSOVER

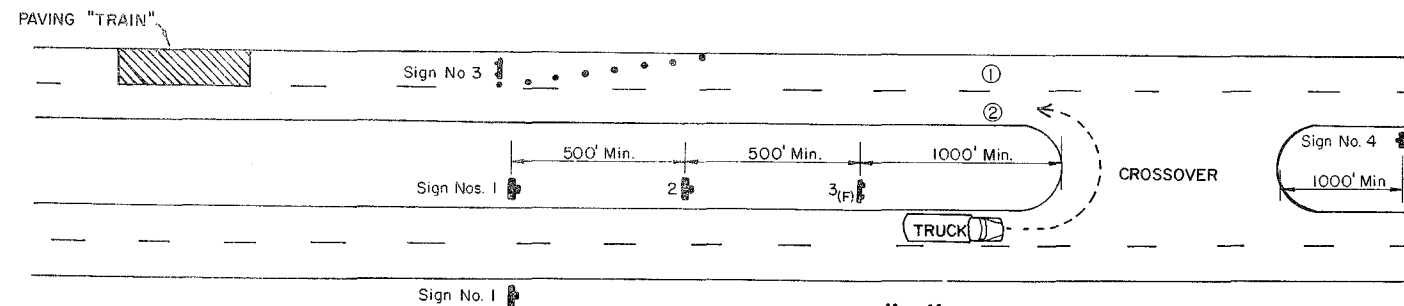


CONDITION "A"

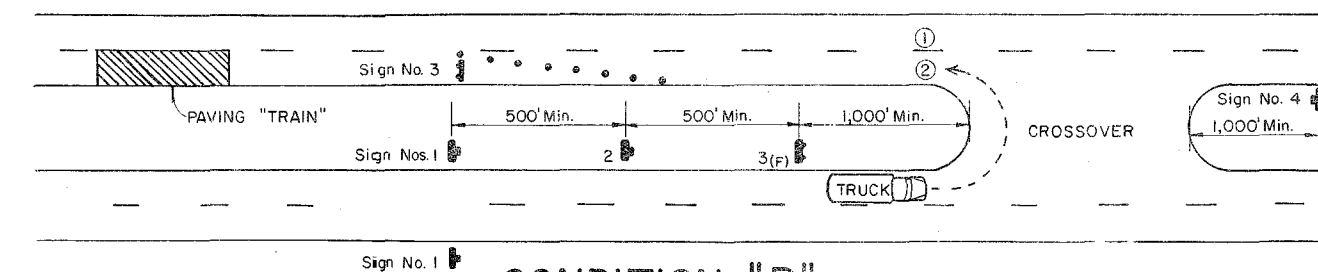


CASE II

TRAFFIC TRANSITION AREA DOWNSTREAM 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".

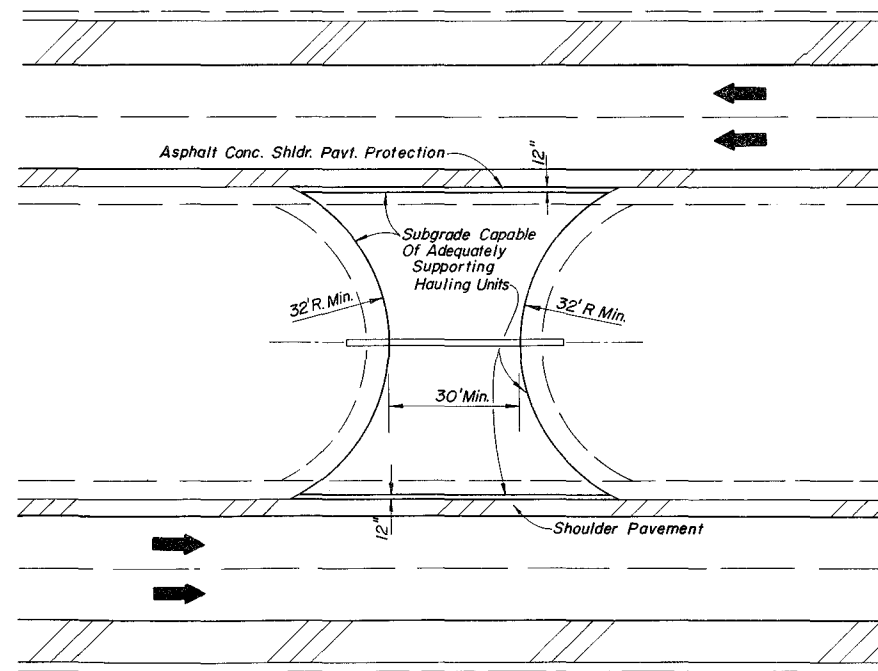
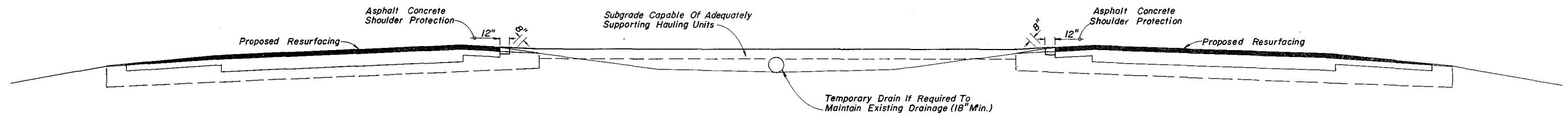
CONDITION "A" & "B"
Lane Closure And Maintenance Of Traffic In The Roadway Being Paved Shall Be In Accordance With Case XII Of The MTCSP. The Flashing Or Sequential Arrow Board Is Required In Addition To Signs Shown In Case XII. Under No Circumstances Will The Traffic Transition Area Be Located Within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

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, 1978.

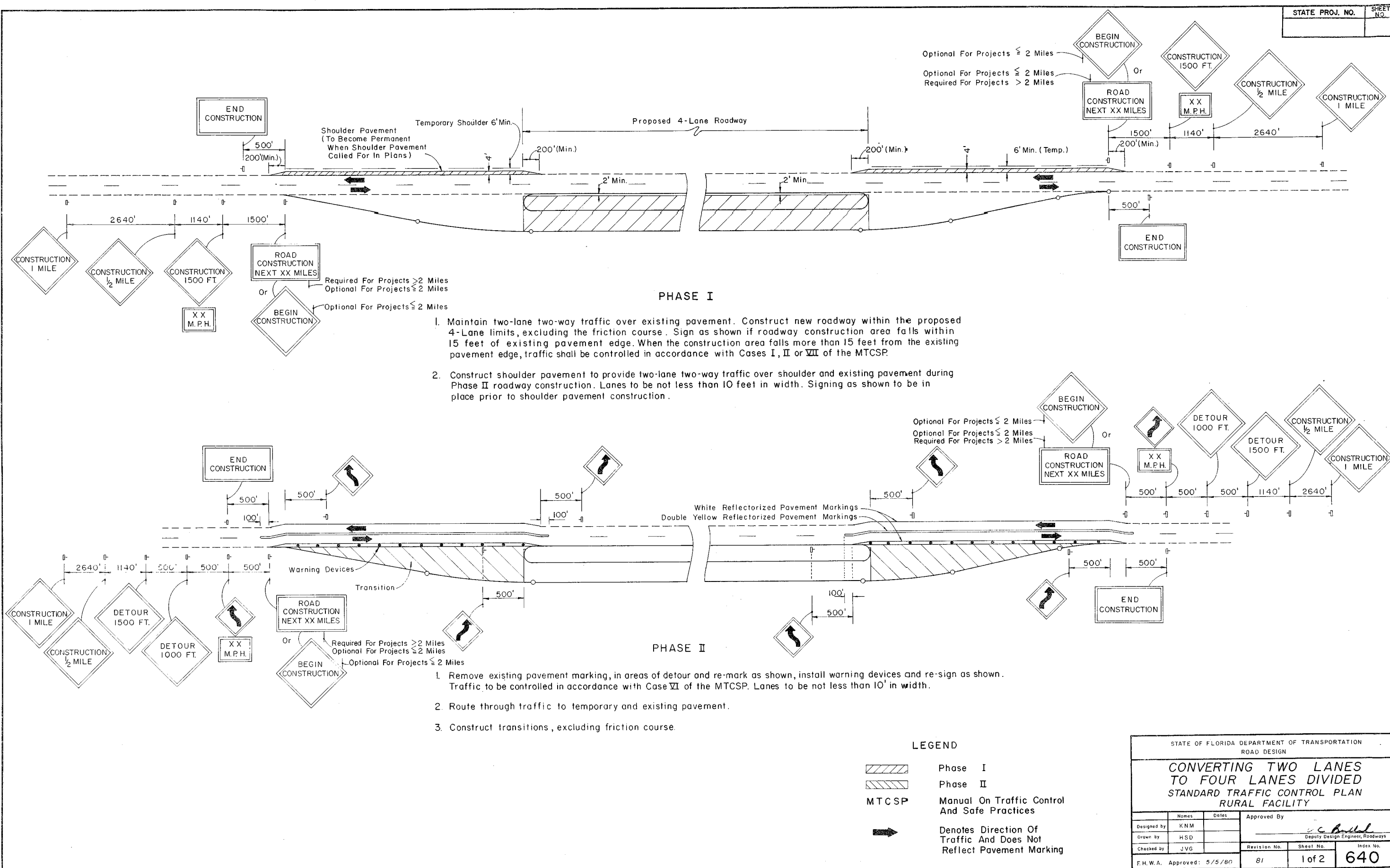
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|--|-----|-----------|-------------------------|
| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| TEMPORARY CROSSOVER TRAFFIC CONTROL PLAN RURAL | | | |
| Designed by | GW | Dates | 12/71 |
| Drawn by | RLF | 9/78 | Approved By |
| Checked by | RLF | 9/78 | Revision No. |
| F.H.W.A. Approved: 10/7/80 | 81 | Sheet No. | 1 of 1 |
| | | | Index No. 630 |

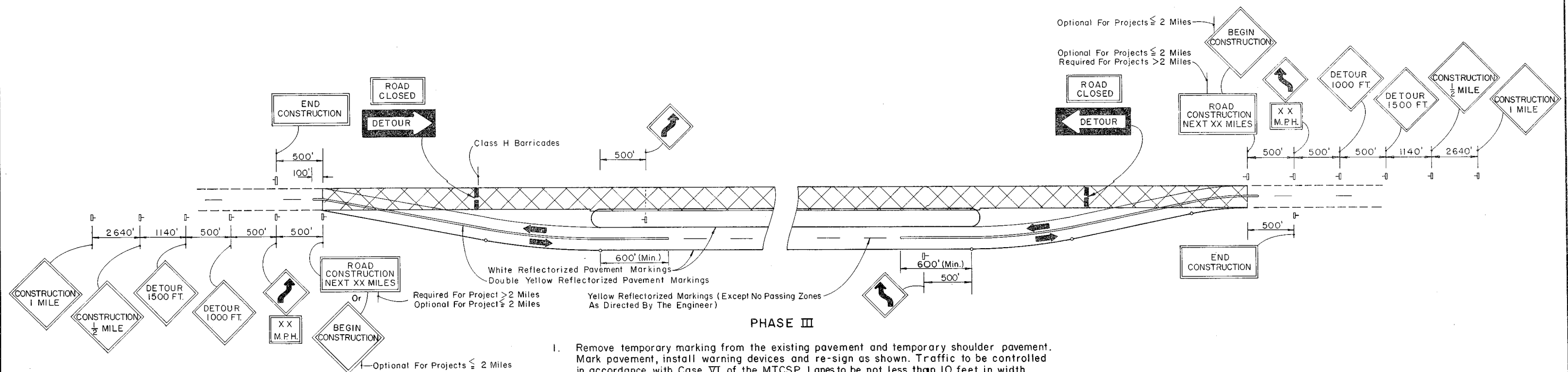


- NOTES:
1. When a crossover is no longer needed, all temporary construction shall be immediately removed and the area restored to its original condition.
 2. Cost of all construction, maintenance, removal and restoration work related to temporary crossovers shall be included in the contract unit price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

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

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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.





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.

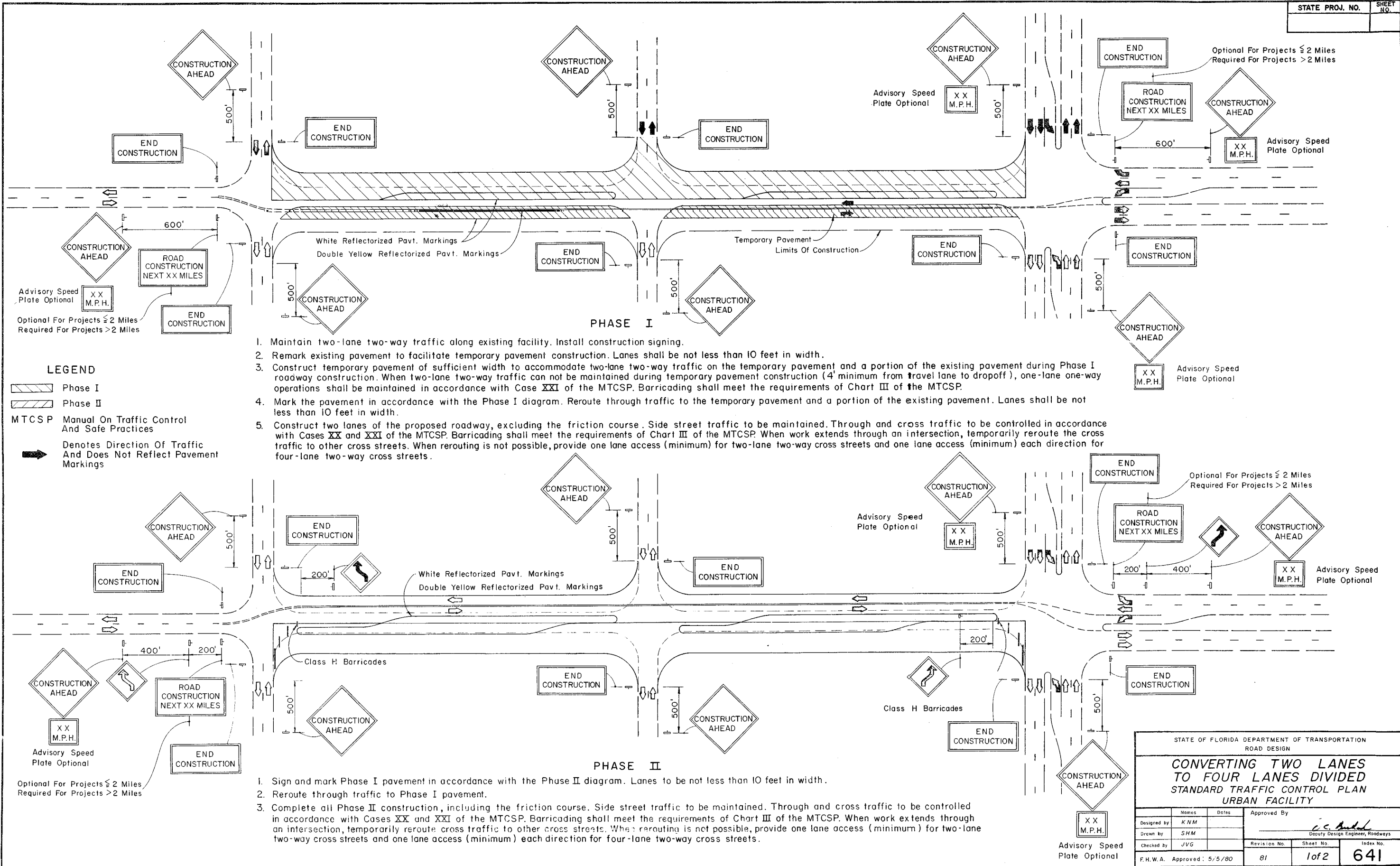
GENERAL MAINTENANCE OF TRAFFIC NOTES

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.

LEGEND

- | | |
|---|--|
|  | Phase I |
|  | Phase II |
|  | Phase III |
| MT CSP | 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 | | | |
| <h1 style="text-align: center;">CONVERTING TWO LANES TO FOUR LANES DIVIDED STANDARD TRAFFIC CONTROL PLAN RURAL FACILITY</h1> | | | |
| Names | Dates | Approved By  Deputy Design Engineer, Roadways | |
| Designed by | KNM | | |
| Drawn by | HSO | | |
| Checked by | JVG | | |
| Revision No. | | Sheet No. | Index No. |
| 81 | | 2 of 2 | 640 |
| F.H.W.A. Approved: 5/5/80 | | | |



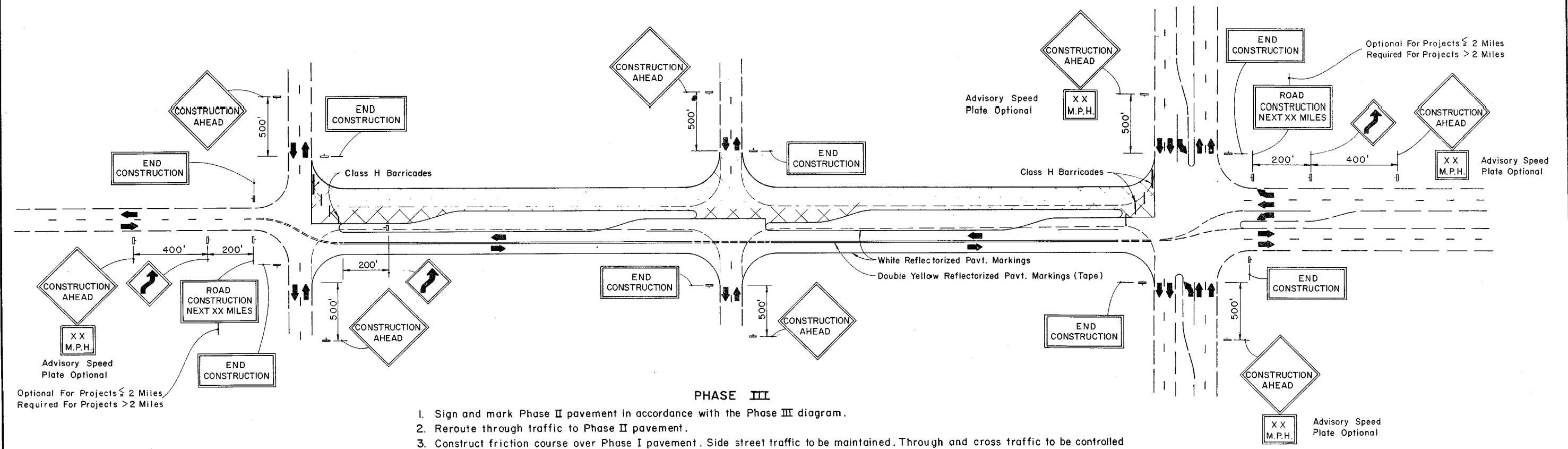
LEGEND

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

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.

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.

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| STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN | | | |
| CONVERTING TWO LANES TO FOUR LANES DIVIDED | | | |
| STANDARD TRAFFIC CONTROL PLAN | | | |
| URBAN FACILITY | | | |
| Designed by | Names | Dates | Approved By |
| Drawn by | K N M | | <i>J. S. [Signature]</i> |
| Checked by | S H M | | Deputy Design Engineer, Roadways |
| | J V G | | |
| F.H.W.A. Approved: 5/5/80 | Revision No. | Sheet No. | Index No. |
| | 81 | 1 of 2 | 641 |



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 | Dates | Approved By |
| Drawn by | SHM | | |
| Checked by | JVG | | Deputy Design Engineer, Roadways |
| Revision No. | | Sheet No. | Index No. |
| F.H.W.A. Approved: 5/5/80 | | 81 | 2 of 2 641 |