299 (9-70)
COMMONWEALTH OF PENNSYLVANIA
Department of Transportation
Bureau of Office Services

TRANSMITTAL LETTER

PDT. Pub. 72

DATE
December 1, 1971

SUBJECT: STANDARDS FOR ROADWAY CONSTRUCTION
SERIES RC 0-100

INFORMATION AND SPECIAL INSTRUCTIONS:

The Standards for Roadway Construction are a completely revised publication. The following is a list of the new Std. Dwg. numbers and the equivalent old Std. Dwg. numbers together with a brief description of the major changes.

New No. RC-10, Old No. E-5, 1 of 2 - (1) Rounding of Slopes was changed. (2) Excav. for Endwalls was changed to include End Sections. (3) Revision of Inlet, Outlet and Parallel Ditches to reflect rounding and elimination of unnecessary sections. (4) Changed Extra Depth Pipe U'drain dwg. to make applicable to both Pipe U'drain and Pipe Fd'n drain.

New No. RC-11, Old No. E-5, 2 of 2 - (1) The Retaining Walls and Cribbing section was completely changed to more clearly designate the excav. limits for the case where there is a proposed new roadway construction and where there is no proposed roadway work. (2) The dwg. showing limits of channel Excav. and Structure Excav. was changed to eliminate the need for designating Cl. 1 Excav. under the structure quantities. The symbols for class of excav. at the lower left of the sheet were changed to clarify that Cl. 1 Excav. will be strictly a roadway item.

New No. 12, Old No. E-6 - (1) Added a clarifying statement to the 2nd note. (2) Changed the 2nd note as an addition to the second last note. (3) Added the last note.

New No. RC-13, Old No.----- - (1) New sheet showing subbase and subgrade limits.

New No. RC-20, 1 of 2, Old No. B-1 - Eliminated some unnecessary notes. (2) Minor drafting changes to clarify the three types of joints (Transverse Exp. Jts., Transverse Constr. and Contraction Jts. and Dowelled Long. Constr. Jts.) (3) Eliminated deformed steel plate from Transverse Constr. Jts. (4) Added plastic coated dowel bars.

New No. RC-20, 2 of 2, Old No.----- - (1) New sheet showing Joining of Pavements which was on B-1 of the old sheets. (2) Added patching information. (3) Changed dowelling information to conform to pavement dowelling.

New No. RC-21, 1 of 2, 2 of 2; Old No. B-2, 1 of 5, 2 of 5, 3 of 5, 4 of 5, 5 of 5, B-2 Special These sheets were completely changed to eliminate all types of reinforcement except types F and J.

New No. RC-22, 1 of 5, 2 of 5, 3 of 5, 4 of 5, 5 of 5; Old No.----- - CRC sheets added to the Std. Dwgs.

New No. RC-23, 1 of 2, Old No. B-3, 1 of 2 - Changed complete dwg.

New No. RC-23, 2 of 2; Old No. B-3, 2 of 2 - Changed jt. reference from "as req'd. on Stds." to "See RC-23 sheet 1 of 2."

New No. RC-24, Old No. B-4 - (1) Added alternate brass data plate. (2) Tried to clarify Pay Items and indicated where the station should be shown on the constr. dwgs. (3) Changed bit. mat'l. from AC 4000 to AC 2000.

New No.------, Old No. Type C - E, G, H, I, & J - Deleted these Load Transfer Unit dwgs. from the Std. Dwgs. and will handle them as shop dwgs.

New No. RC-30, Old No. SD-14 - (1) Deleted the outdated and unused sections shown under the subgrade drains. (2) Change the U'drain dwgs. to enlarge the Pipe Fdn. U'drain portion since this is used more often in construction. (3) Deleted the comb. S.S. dwg. for Construction whe subbase is not used since this is a very unusual case. (4) Deleted Stone U'drain. (5)Correct Extra Depth U'drain dwg. so that it will be applicable for both Fdn. Pipe U'drain and Pipe U'drain. (6) Added note 7 to the exceptions for use of Crse. Aggr. for pipe backfill.

New No. RC-31, Old No. SD-1 - (1) Deleted tree walls from this sheet and included them on RC-90. (2) Changed Pipe U'drain Outlet Endwall. (3) Changed Type DW Endwall to allow for skewed pipes. (4) Deleted old D-E Endwall and changed the old D Endwall to Type D-E. (5) Changed min. lengths of the Type D, D-E and E-S end walls.

New No.-----, Old No. SD-2 - Deleted this sheet.

New No. RC-32, Old No. SD-14 - Deleted Slope Pipe Fitting - Type B.

New No. RC-33, Old No. SD-15 - Clarified Type 3 connection.

New No. RC-34, Old No. S.I. 4 and 6 - (1) Indicated direction of flow. (2) Eliminated riveted grates. (3) Added max. inlet depths. (4) Eliminated wrought iron.

New No. RC-35, Old No. Misc. Inlets - (1) Changed the backwall of the Type H Inlet. (2) Eliminated Wrought Iron designation. (3) Eliminated riveted grate. (4) Indicated direction of flow. (5) Added partial perspective view of Type H Inlet.

New No. RC-36, Old No.----- - Added sheet showing precast units for the top of Type 4' and 6',and H Inlets.

New No. ----, Old No. - City Inlets - Deleted this sheet.

New No. RC-38, Old No. - Std. Inlets - No change.

New No. RC-39, 1 of 2; Old No. SD-6, 2 of 2 - (1) Moved Type A Manhole to sheet 2. (2) Removed sketch showing a general picture for Type B, C and D M.H.'s. (3) Removed one type of M.H. cover. (4) Added precast M.H.

New No. RC-39, 2 of 2; Old No. SD-6, 1 of 2 - Changed sheet to delete Type B & C Manholes.

New No. RC-40, Old No. SD-11 - (1) Added half round pipe details. (2) Deleted Type F-1 or F-2 Inlets from spillway dwgs. (3) Changed depth designation for Rock Emb. for Slope Protection. (4) Added mesh to conc. for spillways and streambeds.

New No. RC-41, Old No. SD-7 - Added notes concerning reinf. and cl. of conc.

New No. RC-42, Old No. SD-8 - (1) Added reinf. details since we eliminated the Type E reinf. from B-2. (2) Added weep holes.

New No. RC-50, Old No. GR-1 and SD-30 - Eliminated GR-1 and SD-30 and added new sheet showing guard rail connector at end of structures.

New No. RC-51, 1 of 2; Old No.---- - New weak post cable guard rail sheet.

New No. RC-51, 2 of 2 - New sheet.

New No. RC-52, 1 of 2; Old No. GR-2, 1 of 4 - (1) Added rubbing rail and rubbing rail splice. (2) Change mounting height and post length. (3) Deleted 10 ga. designation.

New No. RC-52, 2 of 2; Old No. GR-2, 2 of 4 - (1) Added rubbing rail. (2) Changed mounting height. (3) Added guard rail over underground structures detail.

New No. RC-53, Old No. ---- - New weak post W guard rail sheet.

New No. RC-54, 1 of 2; Old No. GR-2, 3 of 4 - Rearranged entire sheet to include weak post guard rail where applicable.

New No. RC-54, 2 of 2; Old No. GR-2, 4 of 4 - Rearranged entire sheet to include weak post guard rail where applicable.

New No. RC-55, Old No. ---- - New sheet showing weak post median barrier.

New No. RC-56, 1 of 2; Old No. MB-1 - (1) Changed external splices to internal splices. (2) Added Typ. End Treatment (Wide Medians). (3) Added slot spacing for 24' long box beam. (4) Added alternate Rail Support Plate detail.

New No. RC-56, 2 of 2; Old No. MB-1, 2 of 2 - Change mounting height to 2'-6".

New No. RC-57, 1 of 2; Old No. MB-3, 1 of 2 - (1) Changed section for new construction to permit construction joint at level of surface of pavement. (2) Added slip form construction note.

New No. RC-57, 2 of 2; Old No. MB-3, 2 of 2 - No change.

New No. RC-60, Old No. SD-16 - (1) Change post hole dimensions. (2) Showed fasteners. (3) Added alternate post detail.

New No. RC-61, Old No.----- - New sheet showing gates and removable fence sections.

New No. RC-62, Old No. LD-2 - (1) Added post size chart. (2) Eliminated both sizes and other designations that are covered in the specifications. (3) Restricted line post to H 2.25"x1.95"x4.1# for Type A, B, and C fence.

New No. RC-63, Old No. SD-12 - Eliminated wooden Guard Posts.

New No. RC-64, Old No. SD-10 - (1) Deleted seldom used Pl. Cem. Conc. Gutters Type A and B. (2) Deleted Pl. or Mortared Rubble Gutter-Type A. (3) Deleted Vitrified Brick Gutter. (4) Deleted Cem. Conc. Header Curb. (5) Changed curb exp. jt. intervals from 123' to 93' and intermediate jt. spacing to 23'-3" max. (6) Changed the width designation for Type A Pl. Cem. Conc. curb gutters - Type A. (7) Added Depressed Curb Detail. (8) Added "or sawed jt." to the note concerning jt. spacing for Pl. Cem. Conc. Curb. This will permit sawing of this jt. (9) Reduced curb height to 18" and clarified that the joint between the rdwy. pavement and curb need not be treated other than the top corner seal. Added a note to show that expansion material need only be used behind the curb if the curb is backed up by the concrete. (10) Showed joint detail for curb gutter.

New No. RC-65, Old No. SD-13, 1 of 2 - (1) Corrected dwg. to reflect elimination of scoring and white cement. (2) Added alternate anchor for anchoring to exist. pav't.

New No. RC-66, Old No. SD-13, 2 of 2 - (1) Eliminated White Cem. (2) Eliminated expansion filler for a Traffic Separator between a ramp and mainline. (3) Made depth of separator a constant 9".

New No. RC-80, Old No. SD-20 - Added notes and made minor changes to help to clarify anchor bolt location and lengths.

New No. RC-81, Old No. SD-21 - No change.

New No. RC-82, Old No. SD-22 - No change.

New No. RC-83, Old No. SD-23 - (1) Eliminated Rustic Wood Pole detail and added Guard Rail Clearance detail. (2) Deleted 35' and 40' bracket arm lengths from Round Al. and Steel Poles and Octagonal Steel Poles. (3) Change Note 9. (4) Deleted 35' and 40' bracket arm lengths from Sectional Steel Poles. (5) Deleted 25' and 55' mounting height from Sectional Steel Poles. (6) Added Identification Tag Detail.

New No. RC-84, Old No. SD-24 - Changed Direct - Burial Cable and Conduit dwg. to show different cable or conduit arrangement in the trench.

City Inlets - Deleted this sheet from Std. Dwgs.

Misc. Inlets Supplemental Sheet A - Deleted this sheet from Std. Dwgs. This will be handled as a shop dwg.

Old No. MC-1 - Deleted.

Old No. MC-2 - Deleted.

Old No. CC-1, 1 of 2 - Deleted.

Old No. CC-1, 2 of 2 - Deleted.

New No. RC-90 - New sheet showing tree walls and misc. details for roadside rest areas.

New No. RC-91, Old No. LD-1 - This sheet was completely revised to show latest planting methods.

Many of the revisions in these standards do not represent new standards, however, the title block format has been changed and minor drafting changes may have been made. It is desirable that the new features of these standards be incorporated immediately in the preparation of plans. Complete compliance will be required on plans submitted to the Central Office after September 1, 1972.

No additional compensation will be allowed for work involved to conform to the new Standards for Roadway Construction.

Consultants and other interested parties may obtain additional copies of Standards by writing to:

Pennsylvania Department of Transportation

Publication Sales Section

117A Transportation and Safety Building

Harrisburg, Pennsylvania 17120

These Standards are priced at $2.20 plus 6% sales tax. All requests must be accompanied by check or money order payable to Pennsylvania Department of Transportation

CANCEL AND DESTROY THE FOLLOWING: when no longer required:

Yellow Book of Roadway Stds. dated 6/1966 and all later revisions up to the date of this new issue.

C-2639
C-2638
C-2555
C-2553
C-2530
C-2525
C-2470
C-2465

PENNDOT AGENCIES MAY REQUEST ADDITIONAL COPIES FRO

BUREAU OF OFFICE SERVICES USING FORM OS-513, PUBLICATION REQUISITION.

APPROVED FOR ISSUANCE BY:

David C. Sims

DAVID C. SIMS, P.E.
DEPUTY SECRETARY FOR
HIGHWAY ADMINISTRATION

FS-299 (9-70) COMMONWEALTH OF PENNSYLVANIA Department of Transportation Bureau of Office Services	TRANSMITTAL LETTER	PDT Pub. 72, Change #1 DATE September 10, 1973

SUBJECT: Revisions & Additions to Standards for Roadway Construction Series RC 0-100.

INFORMATION AND SPECIAL INSTRUCTIONS:

The attached revisions and additions should be inserted into your RC Standards.

SHEET	CHANGE DESCRIPTION
INDEX SHEET	Changed dates of revised drawings and added new standard drawings.
RC-10	Deleted class 4 excavation for end sections.
RC-11	Corrected symbol for Cl. 3 Excav. on "Grade Separation Structures" sketch. Note for Section B-B for Metal Pl. Pipe and Metal Pl. Pipe - Arch Culverts with Endwall was changed to designate Section 603 instead of Section 603.3.
RC-13	Corrected drawing to eliminate Stablized Shoulder designation and show subbase extending for the full width of the shoulder. A sketch showing the pay limit for mod. subbase was also added.
RC-25	New sheet showing shoulder details.
RC-30	Changed note for use of coarse aggregate to include full length in cut sections.
RC-33	Deleted Bituminous Coating requirement in note #1 of the General Notes
RC-35	Added note #7 for Type H and note #8 for Type J Inlets.
RC-39 1 of 2	Included Precast Manholes as an alternate for Type B Manholes, as well as Type A. Corrected manhole types in chart. Added a note to Manhole step detail to permit alternate shapes.
RC-40	Changed Class 4 Excavation for half circle pipe to Class 2 Excavation to agree with Form 408.
RC-43	New sheet - Gabions.
RC-50	Clarified post spacing at the end of parapets with and without inlets. Added note #2.
RC-51 1 of 2	Clarified pay limits and corrected minor drafting errors. Qualified the ground slope in Detail C. Changed cap details in Details G and F.

SHEET	CHANGE DESCRIPTION
RC-51 2 of 2	Changed alternate Cable Anchor Casting to include wire pin keeper. Changed Cable Anchor to reflect latest changes by manufacturers. Changed weld sizes for Driveway End Post Cap. Added notes 7 and 8. Deleted obsolete cable splices and added a new type splice.
RC-52 1 of 2	Added post spacing for Type 2-SC and corrected titles.
RC-52 2 of 2	Added base plate details and clarified note 5 and added note 6. Showed delineator as post mounted. Clarified post spacing.
RC-53 1 of 2	The sheet was redrawn to show more clearly some of the details shown on the old RC-53. Added detail J showing shop bending details for the Trailing Section. Added supporting angles to the end posts at the ground level of the Trailing and Approach Sections. Qualified ground slope in Detail A. Corrected Table A.
RC-53 2 of 2	This sheet is a redrawn sheet showing more clearly the remaining details that were originally shown on old RC-53.
RC-54 1 of 2	Clarified clearance limits and showed Type 2-Sc guardrail for full length of pier on sketch for Barrier Treatment at Obstructions on all Median greater than 16' when Type 2-WM Median Barrier is used.
RC-54 2 of 2	Added provision for payment of rubbing rail for the short section beyond the limit of Type 2-S guardrail. Clarified sketch for guardrail treatment for cut to fill condition.
RC-55	Added supporting angles to the end posts at the ground level. Changed delineator pay item. Clarified bolt designation for Rail Expansion Joint. Changed base plate and anchor bolt dimensions.
RC-56 1 of 2	Changed hole sizes in box beam splices. Changed delineator pay item.
RC-56 2 of 2	Changed 36" min. depth of post embedment to 33" for Typical Installation on Existing 4' Roadway Median Divisor. Changed note 5 to eliminate grout and use red lead paint instead of paste. Changed base plate and anchor bolt dimensions.
RC-57 1 of 2	Deleted the White Cement Concrete.
RC-61	Added note for payment of Removable Fence Sections.
RC-64	Corrected type designation for gutter types.
RC-66	Deleted old type of scoring and add new detail showing corrugated type of scoring.
RC-70 1 of 4 2 of 4 3 of 4 4 of 4	New sheets - Erosion and Sediment Control.

SHEET	CHANGE DESCRIPTION
RC-80	Revised Type F & C foundations to one type designated as Type FC. Corrected notes accordingly and added Foundation Dimension Chart.
RC-83	Deleted maximum from table for Davit-type poles. Added Type A and Type T for base designations. Eliminated note 5 and renumbered notes.
RC-84	The location of the bottom of the trench is changed to read as 12" minimum below the subgrade.
RC-90	Flag pole Setting Detail - Added minimum to 2'-0" dimension..

Complete compliance will be required on plans submitted to the Central Office after January 1, 1974.

No additional compensation will be allowed for work involved to conform to the new Standards for roadway construction.

PennDOT Agencies May

CANCEL AND DESTROY THE FOLLOWING:

RC-10
RC-11
RC-13
RC-30
RC-35
RC-39 sheet 1 of 2
RC-40
RC-43
RC-50
RC-51 sheet 1 of 2
RC-51 sheet 2 of 2
RC-52 sheet 1 of 2
RC-52 sheet 2 of 2
RC-53 sheet 1 of 1
RC-54 sheet 1 of 2
RC-54 sheet 2 of 2
RC-55
RC-56 sheet 1 of 2
RC-56 sheet 2 of 2
RC-57 sheet 1 of 2
RC-61
RC-64
RC-66
RC-80
RC-83
RC-84
RC-90
RC-33
Index Sheet

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Bureau of Office Services using Form 511, Forms and Publication Requisition

APPROVED FOR ISSUANCE BY:

for David C. Sims, P.E.
Deputy Secretary for
Highway Administration

05-200 (9/70) COMMONWEALTH OF PENNSYLVANIA Department of Transportation Bureau of Office Services	TRANSMITTAL LETTER	PDT Pub. 72, Change #2 DATE: May 1, 1974

SUBJECT: REVISIONS TO STANDARDS FOR ROADWAY CONSTRUCTION, SERIES RC 0-100

RC-91

INFORMATION AND SPECIAL INSTRUCTIONS:

The attached revisions should be inserted into your RC Standards.

RC-91 has been changed to reflect the following changes:

1. Backfill mounds to be constructed around tree plantings, except in Rest Areas and high maintenance areas, have been indicated.

2. Retails for Plant Bed Edging have been added.

3. Dished detail of tree pit has been eliminated to provide for higher tree setting.

4. General Notes have been grouped and clarified.

5. Added rubber hose guard to tree protector.

This change will become effective immediately on all projects.

No additional compensation will be allowed for work involved to conform to this Standard.

CANCEL AND DESTROY THE FOLLOWING:

RC-91 dated December 1, 1971.

APPROVED FOR ISSUANCE BY:

For R K Musser

David C. Sims, P.E.
Deputy Secretary for
Highway Administration

OS-299 (9-70)
COMMONWEALTH OF PENNSYLVANIA
Department of Transportation
Bureau of Office Services

TRANSMITTAL LETTER

PDT Pub. 72, Change #3

DATE 9-1-74
10-1-74

SUBJECT: Standards for Roadway Construction - Series RC 0-100.

INFORMATION AND SPECIAL INSTRUCTIONS.

The attached revisions, changes and additions should be inserted into your RC Standards.

SHEET	CHANGE DESCRIPTION
Index Sheet	Changed dates on revised drawings.
RC-10	(1) Added pay limits to Parallel Inlet and Outlet Ditches. (2) Added Diversion Ditch which will be payed for by the linear foot.
RC-23 1 of 2 2 of 2	(1) The first note which makes reference to Section 666 of Form 408 was changed to Section 505. (2) Section BB was detailed to show transverse construction joint details as shown on RC-20.
RC-24	The first note which makes reference to Section 665 of Form 408 was changed to Section 504.
RC-34	Complete new drawings on inlets. (5 sheets)
RC-35, 36 and 38	Deleted by the new inlet drawings.
RC-39 1 of 2 2 of 2	(1) The details were rearranged and redrawn. The steel in the bottom slab of precast manholes was altered. (2) Manhole step details were changed. (3) Frame casting details were changed. (4) Several notes were deleted.
RC-65	(1) Type M inlet installation for Concrete mountable curb was added. (2) Removed ¾" expansion joint material at longitudinal construction joint.
RC-66	Removed ¾" expansion joint material. Change border width to 3".
RC-67 1 of 2 2 of 2	New drawings added to RC Series.

SHEET	CHANGE DESCRIPTION
RC-70 1 of 4 2 of 4 3 of 4 4 of 4	(1) Removed Erosion Protection Matting and Rock Ditch. (2) Rock Lining depth changed. (3) Removed Sedimentation Trap and added Log Barrier and Brush Barrier. (4) Changed Rock Dam and Baled Hay or Straw Erosion check titles. (5) Rock Lining was removed from Sedimentation Pond - Type 2. (6) Swale Block was changed to Drainage Dike. (7) Minor other changes on all four sheets.

Many of the revisions in these standards do not represent new standards and only minor drafting changes have been made. It is desirable that the new features of these standards be incorporated immediately in the preparation of plans. The only exception will be RC-34. Complete compliance for RC-34 will be required on all plans submitted to the Central Office after May 1, 1975, and not scheduled for letting before July 1, 1975.

No additional compensation will be allowed for work involved to conform to this standard.

CANCEL AND DESTROY THE FOLLOWING:

RC-10
RC-23 sheet 1 of 2, (2 of 2 reissued for date change)
RC-24
RC-34
RC-35
RC-36
RC-38
RC-39
RC-62
RC-65
RC-66
RC-67 sheet 1 of 2 and 2 of 2
RC-70 sheet 1 of 4, 2 of 4, 3 of 4 and 4 of 4

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Bureau of Office Services using Form 511, Forms and Publication Requisition

APPROVED FOR ISSUANCE BY:

for David C. Sims, P.E.
Deputy Secretary for
Highway Administration

TS-299 (8-72)
CC-0830-3500-0030

TRANSMITTAL LETTER

PDT Pub. 72, Change #4

DATE: November 25, 1974

SUBJECT:

STANDARDS FOR ROADWAY CONSTRUCTION - SERIES RC 0-100

INFORMATION AND SPECIAL INSTRUCTIONS:

The attached revisions, changes and additions should be inserted into your RC Standards.

SHEET	CHANGE DESCRIPTION
Index Sheet	The Index Sheet was changed to include new dates for RC-21 and RC-24 and include the new May 1, 1974, date for RC-91 which was not included in Change #3.
RC-21	Types F and J Reinforcement have been eliminated. The number of sheets has been reduced to one sheet. One fabric design has been established for all pavement widths with a reduction in longitudinal wire sizes.
RC-24	The brass monitoring pins and data plate have been eliminated. A special provision, deleting Section 504.2(h) and Section 504.3(c), will be required on all projects requiring Pavement Relief Joints.

The following corrections should be made to the Transmittal Letter for hange #3:

Under "Cancel and Destroy"

RC-62 Should not be cancelled and destroyed until the new drawing is issued.

RC-67 There was no old RC-67 and this should not have been listed under Cancel and Destroy.

It is desirable that the new features of these standards be incorporated immediately in the preparation of plans.

No additional compensation will be allowed for work involved to conform to these standards.

CANCEL AND DESTROY THE FOLLOWING:

RC-21 sheets 1 of 2 and 2 of 2
RC-24

APPROVED FOR ISSUANCE BY:

David C. Sims

David C. Sims, P.E.
Deputy Secretary for
Highway Administration

OS-299 (6-72)
CO-0930-3600-0030

TRANSMITTAL
LETTER

Pub. 72, Change #5

DATE
January 6, 1975

SUBJECT:

REVISIONS AND ADDITIONS TO STANDARDS FOR ROADWAY CONSTRUCTION - SERIES RC-0-100

INFORMATION AND SPECIAL INSTRUCTIONS: The attached revisions, changes and additions should be inserted into your Standards.

SHEET	CHANGE DESCRIPTION
Index Sheet	Index Sheet changed to include new dates for RC-22 and RC-62.
RC-22, Sheet 1 of 5	Totally redrawn. Transverse steel has been eliminated. Longitudinal bar sizes and spacings have been revised. Tolerances for placement of longitudinal steel have been revised.
Sheet 2 of 5	Tolerances for placement of longitudinal steel have been revised. A note has been added.
Sheet 3 of 5	Tolerances for placement of longitudinal steel have been revised. The alternate transverse wire size of D5 for deformed welded wire fabric has been eliminated.
Sheet 4 of 5	Detail B has been revised. The term headerboard has been changed to bulkhead.
Sheet 5 of 5	The thickness of the concrete sleeper slab for the Terminal Joint has been revised to 9". An Intermediate Joint has been added for adjacent CRC projects. Detail C has been added. The Table has been relocated and corrected.
RC-62	Dimensions of fabric height removed from details so that various heights could be added without separate details. Type B & D Fence deleted. Type F & G Fence added. Rearrangement of fence fabric details. Various notes removed. Added detail of gate post reinforcing.

It is desirable that the new features of these standards be incorporated immediately in the preparation of plans. No additional compensation will be allowed for work involved to conform to this standard.

CANCEL AND DESTROY THE FOLLOWING:

RC-22, Sheet 1 of 5
Sheet 2 of 5
Sheet 3 of 5
Sheet 4 of 5
Sheet 5 of 5
RC-62

APPROVED FOR ISSUANCE BY:

R R Musser
for David C. Sims, P.E.
Deputy Secretary for
Highway Administration

OS-299 (8-72)
CC-0830-3500-0030

TRANSMITTAL LETTER

Pub. 72 Change #6

DATE
August 21, 1975

SUBJECT:

REVISIONS TO STANDARDS FOR ROADWAY CONSTRUCTION RC 0-100

INFORMATION AND SPECIAL INSTRUCTIONS: The attached revisions and additions should be inserted into your standards.

SHEET	CHANGE DESCRIPTION
Index	Changed to include new dates. Corrected title for RC-91.
RC-13	Defined 2' limits of subbase extension on curbed section.
RC-21	Length of fabric changed to "optional". D wire designation and Note 9 added.
RC-25	Changed corrugation size to 3" x 3/4". Added note for S.E. less than .05 ft/ft.
RC-30	Defined 2' limits of subbase extension on curbed section.
RC-34 (1 of 5)	No change.
RC-34 (2 of 5)	Added detail for Type S Inlet Top unit. Eliminated $7\frac{1}{4}$" dimension and added "min." to 8" dimension for Type S Inlet. Eliminated 10 5/8" dimension and added min. to 18" dimension for Type C Inlet. Added 0.02 ft/ft to normal gutter slope for Type C Inlet.
RC-34 (3 of 5)	Added 45° dimension to grate detail.
RC-34 (4 of 5)	No change.
RC-34 (5 of 5)	Note 5 changed. Changed min. dimension of conc. over pipe opening on inlet boxes from 12" to 4". Eliminated the optional constr. jt. for the top section of the Modified Inlets and added Note 7 for monolithic construction. Both of these changes reduce the overall depth of the inlet boxes.
RC-39 (1 of 2)	Added In place construction to Types A & B Manholes. Added "Max." to vertical dimensions of Type B Manholes.
RC-39 (2 of 2)	Manhole step details changed to conform to safety regulations.
RC-60	Drive anchor added.
RC-66	Changed corrugation to 3" x 3/4".
RC-70 (1 of 4)	Eliminated filter blanket from Rock Lining detail. In the future, if the designer feels that conditions warrant the use of a filter blanket, a special detail will be required.
RC-70 (2 of 4)	No change.
RC-70 (3 of 4)	No change.
RC-70 (4 of 4)	No change.

It is desired that the new features of these standards be incorporated immediately in the preparation of plans. No additional compensation will be allowed for work involved to conform to these standards.

CANCEL AND DESTROY THE FOLLOWING:

Index Sheet
RC-13 dated Mar. 7, 1973
RC-21 dated Dec. 1, 1974
RC-25 dated Mar. 7, 1973
RC-30 dated Mar. 7, 1973
RC-34 (5 sheets) dated Oct. 1, 1974
RC-39 (2 sheets) dated Oct. 1, 1974
RC-60 dated Dec. 1, 1971
RC-66 dated Oct. 1, 1974
RC-70 (4 sheets) dated Oct. 1, 1974

APPROVED FOR ISSUANCE BY:

RR Musser
for David C. Sims, P.E.
Deputy Secretary for
Highway Administration

OS-299 (8-72)
CC-0830-3500-0030

TRANSMITTAL LETTER

Pub. 72 Change #7

DATE: June 8, 1976

SUBJECT:

REVISIONS TO STANDARDS FOR ROADWAY CONSTRUCTION
RC-0-100 CHANGE #7

INFORMATION AND SPECIAL INSTRUCTIONS: The attached revisions and additions should be inserted into your standards:

SHEET	CHANGE DESCRIPTION
RC-12 (1 of 1)	Added a sentence to the second note that steel slag shall not be permitted for use in structure backfill.
RC-22 (1 of 5) through (5 of 5)	Revised Note 9 on sheet 1 of 5 to change the tolerance from $\pm\frac{1}{2}$" to $\pm$3/4". Added #6 bars for 8" thickness in Table 1. Added Note 10 on sheet 1 of 5. Sheets 2, 3 and 4 are changed to agree with notes on sheet 1 of 5. Revised Notes 5, 6 and 7 on sheet 5 of 5. Added W designations to Table 2 on sheet 3.
RC-24 (1 of 1)	Revised the two 4" Keys on Section A-A to one 10" Key to be formed using nominal size lumber. Clarified note describing the use of underdrain at relief joints. Changed pavement relief joint spacing.
RC-34 (2 of 5)	Revised Note 3.
(3 of 5)	Revised Note 3.
(4 of 5)	Revised Note 3.
RC-34 (5 of 5)	Added Base Preparation Detail for installation of precast inlet boxes. Changed Note 3 and deleted +18" from box height.
RC-40 (1 of 1)	The joint spacing for Cement Concrete Paving for Stream Bed was changed from 10' min. to 15'-6" max. Removed detail showing the installation of half circle pipe where the pipe edge is installed level with the ground and eliminate Class B from the concrete notes.
RC-50 (1 of 1)	The sheet was redrawn to clarify the guard rail transitions at structures. Added the use of Type 2-WCC guard rail in the transition. Included new inlet designation and min. guard rail treatment at bridge parapets.
RC-51 (1 of 3)	Redrawn to show alternate Type 1-W Guard Rail Posts and Typical installation sketch.
RC-51 (2 of 3)	Revised End Cap Detail to accommodate alternate posts. Clarified Pay Limit for Type 1-W Intermediate Anchorage Treatment.
RC-51 (3 of 3)	Added Notes 10 and 11.
RC-52 (1 of 4)	Redrawn to show details of the Strong Post Guard Rail Systems and the alternate posts. Added Type 2-S Special, Type 2-SC Special, Type 2-S Modified and Type 2-SC Modified guard rail.
RC-52 (2 of 4)	Redrawn to eliminate the hot rolled C6 x 8.2 Rubbing Rail and add the Cold Formed Channel Rubbing Rail. Added a detail for wood posts over undergound structures.
RC-52 (3 of 4)	Revised the end treatment for Type 2-S guard rail. The length

SHEET	CHANGE DESCRIPTION
RC-52 (3 of 4) (Contd.)	of the parabolic flare was shortened from 75' to 37.5'. All post offsets and heights are now shown. The parabolic layout sketch has been removed. The end treatment title is changed to Type 2 Strong Post End Treatment. Included new rotating bracket sketches.
RC-52 (4 of 4)	Redrawn to show hardware and terminal sections on one sheet.
RC 53 (1 of 2)	Redrawn to show alternate guard rail posts for Type 2-W guard rail. Typical installation detail was redrawn.
RC-53 (2 of 2)	Changed the title of the Typical Approach Section to Type 2-W End Treatment which will be used for approaching and trailing ends with Type 2-W guard rail. The Typical Trailing Section was changed to Type 2-W End Treatment, Driveways and Openings and will be used only at driveways and median openings.
RC-54 (1 of 3)	Redrawn to show guard rail placement at obstructions on shoulders where continuous and non-continuous guard rail is used. Tables were formulated to use the distance from the edge of shoulder to the obstruction as the determining factor for the selection of the type and placement of the guard rail.
RC-54 (2 of 3) and (3 of 3)	Redrawn to show median barrier placement at obstructions in median areas where continuous and non-continuous barrier is used. Added the parabolic flare layout for guard rail placement.
RC-55 (1 of 1)	Added a note to show that alternate weak posts, as shown on RC-53 sheet 1 of 2, shall also be used for Type 2-WM Median Barrier. Holes for mounting bolt and support bolt are shown to be located on both flanges. (front and rear)
RC-56 (1 of 1)	Added alternate weak posts for Type 3-WM median barrier and sketches for controlling median drainage.
RC-56 (2 of 2)	This sheet is deleted.
RC-57 (1 of 2) and (2 of 2)	Redrawn to show major concrete median barrier and end transition revisions.
RC-63 (1 of 1)	Removed RC-63 from the standards and included the Permanent Barricades Type A and B on RC-64.
RC-64 (1 of 1)	Rearranged this sheet to include the barricades. Changed joint spacing to uniform lengths or sections of 15.5' max. Removed the use of dowel bars at curved sections. Removed the use of premolded joint material at intervals of 93 feet in lieu of 3/4" expansion joint material required at structures.
RC-65 (1 of 1)	Revised the face of curb height on Type A and B Concrete Mountable Curbs from 1" to 2" to allow for future resurfacing.
RC-66 (1 of 1)	Redrawn to clarify and show the use of contraction joints in the Concrete Traffic Separator.
RC-70 (1 of 4)	Removed reference to Class B Concrete and changed Rock Dissipator to Rock Energy Dissipator.

SHEET	CHANGE DESCRIPTION
RC-70 (3 of 4)	Removed the 6" Filter Blanket for Rock Lining from Sedimentation Pond-Type 2. Removed reference to Class B Conc.
RC-70 (4 of 4)	Added dimension of 24" Riser Pipe to detail for Inlet Riser Pipe.
RC-80 (1 of 2)	Added 2:1 max. note for ground line slope for Type FC Foundations and removed reference to Class B Concrete.
RC-80 (2 of 2)	These sheets were added to show details for High Mast Lighting Foundations.
RC-90 (1 of 1)	This sheet was redrawn to clarify details regarding root aeration pipes and tree pit drains. The Type B Tree Wall was deleted and the Type D Tree Wall was relabeled as Type C Tree Wall. Detail B for 4" pipe underdrain outlet endwall and aggregate depth layer chart was added.
RC-91 (1 of 1)	This sheet was redrawn to clarify and add a few minor details. Added wood stakes for bracing instead of channel bar posts. Added rubber hose guard around top of street tree protector. Added fertilizer packet and Notes 5, 6, 7 and 8.
Index Sheet	Redrawn to include new dates and titles.

All references to Class B Cement Concrete shall be eliminated and the drawing date changed to June 1, 1976, on the following drawings as a pen and ink change. A general reference to Cement Concrete will remain on the drawings since the specifications designate the type of concrete to be used. The corrections should be made on your drawings since no new drawings will be issued. Any future distribution of these drawings will contain the correct information:

RC-30 (1 of 1)
RC-41 (1 of 1)
RC-42 (1 of 1)
RC-60 (1 of 1)
RC-61 (1 of 1)
RC-70 (2 of 4)
RC-84 (1 of 1)

The following corrections should be made to your drawing since no new drawing will be issued:

RC-34 Sheet 1 of 5 - Change the word "configuration" to "type" in Note #4. Change the drawing date to June 1 , 1976.

It is desired that the new features of these standards be incorporated immediately in the preparation of plans. However, no additional compensation will be allowed for work involved to conform to these standards and coordination with the issuance of the new 408/76 must be checked.

All projects let after October 1, 1976, shall contain these corrected drawings.

CANCEL AND DESTROY THE FOLLOWING:

	Date		Date	
RC-12 (1 of 1)	12-01-71	RC-53 (2 of 2)	3-07-73	C-2770
RC-22 (1 of 5)	1-06-75	RC-54 (1 of 2)	3-07-73	Index Sheet
(2 of 5)	1-06-75	(2 of 2)	3-07-73	
(3 of 5)	1-06-75	RC-55 (1 of 1)	3-07-73	
(4 of 5)	1-06-75	RC-56 (1 of 2)	3-07-73	
(5 of 5)	1-06-75	(2 of 2)	3-07-73	
RC-24 (1 of 1)	12-01-74	RC-57 (1 of 2)	3-07-73	
RC-34 (2 of 5)	8-20-75	(2 of 2)	12-01-71	
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(2 of 2)	3-07-73	RC-90 (1 of 1)	3-07-73	
RC-53 (1 of 2)	3-07-73	RC-91 (1 of 1)	4-01-74	

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APPROVED FOR ISSUANCE BY:

for David C. Sims, P.E.
Deputy Secretary for
Highway Administration

Commonwealth of Pennsylvania

DEPARTMENT OF TRANSPORTATION

BUREAU OF DESIGN

STANDARDS

FOR

ROADWAY CONSTRUCTION

SERIES RC- 0 TO 100

PDT Pub. 72

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RC-13	Aug. 20, 1975	PAY LIMIT OF SUBBASE & SUBGRADE
PAVEMENTS		
RC-20 (2 Sheets)	Dec. 1, 1971	PAVEMENT JOINTS
RC-21	Aug. 20, 1975	REINF. FOR R.C.C. PAV'T.
RC-22 (5 Sheets)	June 1, 1976	CONTINUOUSLY REINF. CONC. PAV'T.
RC-23 (2 Sheets)	Oct. 1, 1974	BRIDGE APPROACH SLAB
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RC-54 (2 Sheets)	Mar. 7, 1973	GUARD RAIL & MED. BARRIER PLACEMENT
RC-55	Mar. 7, 1973	TYPE 2-WM MEDIAN BARRIER
RC-56 (2 Sheets)	Mar. 7, 1973	TYPE 3-WM & 3-WMC MEDIAN BARRIER
RC-57 (2 Sheets)	Sh.1 Mar. 7, 1973 Sh. 2 Dec. 1, 1971	CONCRETE MEDIAN BARRIER

STANDARD DRAWING NO.	DATE	DESCRIPTION
FENCES & CURBS		
RC-60	Dec. 1, 1971	TYPES 1, 2, & 3 R/W FENCE
RC-61	Mar. 7, 1973	R/W GATE & REMOVABLE FENCE SECTIONS
RC-62	Dec. 1, 1971	ROADSIDE FENCE
RC-63	Dec. 1, 1971	BARRICADES
RC-64	Mar. 7, 1973	CURBS & GUTTERS
RC-65	Oct. 1, 1974	CONCRETE MOUNTABLE CURBS
RC-66	Oct. 1, 1974	CONCRETE TRAFFIC SEPARATOR
RC-67 (2 Sheets)	Oct. 1, 1974	ANTI-GLARE SCREEN
POLLUTION CONTROL		
RC-70 (4 Sheets)	Oct. 1, 1974	EROSION & SEDIMENT CONTROL
HIGHWAY LIGHTING		
RC-80	Mar. 7, 1973	HIGHWAY LIGHTING - FOUNDATIONS
RC-81	Dec. 1, 1971	HIGHWAY LIGHTING - JCT. BOXES - LT. DUTY
RC-82	Dec. 1, 1971	HIGHWAY LIGHTING - JCT. BOXES - HVY. DUTY
RC-83	Mar. 7, 1973	HIGHWAY LIGHTING - LIGHTING POLE DETAILS
RC-84	Mar. 7, 1973	HIGHWAY LIGHTING - LIGHTING & ELECTRIC DETAILS
ROADSIDE DEVELOPMENT & PLANTING		
RC-90	Mar. 7, 1973	TREE WALLS & MISC. DETAILS FOR ROADSIDE REST AREAS
RC-91	Dec. 1, 1971 May 1, 1974	TREE & SHRUB PLANTING DETAILS

VOID

INDEX OF STANDARDS FOR ROADWAY CONSTRUCTION

THE INDEX WILL NOT BE REVISED (OR ISSUED) FOR EVERY REVISION TO THE DRAWINGS. IT MAY BE KEPT UP TO DATE BY THE INDIVIDUAL AS REVISED DRAWINGS ARE RELEASED

STANDARD DRAWING NO.	DATE	DESCRIPTION
EARTHWORK		
RC-10	Mar. 7, 1973	CLASSIFICATION OF EARTHWORK
RC-11	Mar. 7, 1973	CLASSIFICATION OF EARTHWORK FOR STRUCTURES
RC-12	Dec. 1, 1971	BACKFILL AT STRUCTURES
RC-13	Mar. 7, 1973	PAY LIMIT OF SUBBASE & SUBGRADE
PAVEMENT DETAILS		
RC-20 (2 Sheets)	Dec. 1, 1971	PAVEMENT JOINTS
RC-21 (2 Sheets)	Dec. 1, 1971	STANDARD TYPES OF REINFORCEMENT
RC-22 (5 Sheets)	Dec. 1, 1971	CONTINUOUSLY REINF. CONC. PAV'T.
RC-23 (2 Sheets)	Dec. 1, 1971	BRIDGE APPROACH SLAB
RC-24	Dec. 1, 1971	PAVEMENT RELIEF JOINT
RC-25	Mar. 7, 1973	TYPE 1, TYPE 3 & CONC. SHOULDERS
DRAINAGE		
RC-30	Mar. 7, 1973	SUB SURFACE DRAINS
RC-31	Dec. 1, 1971	ENDWALLS
RC-32	Dec. 1, 1971	SLOPE PIPE FITTINGS & CONNECTORS
RC-33	Mar. 7, 1973	END SECTIONS FOR PIPE CULVERTS
RC-34	Dec. 1, 1971	4 FOOT & 6 FOOT INLETS
RC-35	Mar. 7, 1973	TYPE H & J INLETS
RC-36	Dec. 1, 1971	PRECAST UNITS
RC-38	Dec. 1, 1971	MISCELLANEOUS INLETS
RC-39 (2 Sheets)	Sh.2 - Dec. 1, 1971 Sh.1 - Mar. 7, 1973	STANDARD MANHOLES
RC-40	Mar. 7, 1973	SLOPE PROTECTION
RC-41	Dec. 1, 1971	SPECIAL MORTARED STONE SLOPE WALL
RC-42	Dec. 1, 1971	REINF. CEM. CONC. SLOPE WALLS
RC-43	Mar. 7, 1973	GABION
GUARD RAIL & MEDIAN BARRIERS		
RC-50	Mar. 7, 1973	GUARD RAIL CONNECTIONS AT END OF STRUCTURES
RC-51 (2 Sheets)	Mar. 7, 1973	TYPE 1-W GUARD RAIL
RC-52 (2 Sheets)	Mar. 7, 1973	TYPE 2-S & 2-SC GUARD RAIL
RC-53 (2 Sheets)	Mar. 7, 1973	TYPE 2-W & 2-WC GUARD RAIL
C-54 (2 Sheets)	Mar. 7, 1973	GUARD RAIL & MED. BARRIER PLACEMENT
RC-55	Mar. 7, 1973	TYPE 2-WM MEDIAN BARRIER
RC-56 (2 Sheets)	Mar. 7, 1973	TYPE 3-WM & 3-WMC MEDIAN BARRIER
RC-57 (2 Sheets)	Sh.1 - Mar. 7, 1973 Sh.2 - Dec. 1, 1971	CONCRETE MEDIAN BARRIER

STANDARD DRAWING NO.	DATE	DESCRIPTION
FENCES & CURBS		
RC-60	Dec. 1, 1971	TYPES 1, 2, & 3 R/W FENCE
RC-61	Mar. 7, 1973	R/W GATE & REMOVABLE FENCE SECTIONS
RC-62	Dec. 1, 1971	ROADSIDE FENCE
RC-63	Dec. 1, 1971	BARRICADES
RC-64	Mar. 7, 1973	CURBS & GUTTERS
RC-65	Dec. 1, 1971	CONCRETE MOUNTABLE CURBS
RC-66	Mar. 7, 1973	CONCRETE TRAFFIC SEPARATOR
POLLUTION CONTROL		
RC-70 (4 Sheets)	July 2, 1973	EROSION & SEDIMENT CONTROL
HIGHWAY LIGHTING		
RC-80	Mar. 7, 1973	HIGHWAY LIGHTING - FOUNDATIONS
RC-81	Dec. 1, 1971	HIGHWAY LIGHTING - JCT. BOXES - LT. DUTY
RC-82	Dec. 1, 1971	HIGHWAY LIGHTING - JCT. BOXES - HVY. DUTY
RC-83	Mar. 7, 1973	HIGHWAY LIGHTING - LIGHTING POLE DETAILS
RC-84	Mar. 7, 1973	HIGHWAY LIGHTING - LIGHTING & ELECTRIC DETAILS
ROADSIDE DEVELOPMENT & PLANTING		
RC-90	Mar. 7, 1973	TREE WALLS & MISC. DETAILS FOR ROADSIDE REST AREAS
RC-91	Dec. 1, 1971	TREE & SHRUB PLANTING DETAILS

VOID

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RC-21 (2 Sheets)	Dec. 1, 1971	STANDARD TYPES OF REINFORCEMENT
RC-22 (5 Sheets)	Dec. 1, 1971	CONTINUOUSLY REINF. CONC. PAV'T.
RC-23 (2 Sheets)	Dec. 1, 1971	BRIDGE APPROACH SLAB
RC-24	Dec. 1, 1971	PAVEMENT RELIEF JOINT
DRAINAGE		
RC-30	Dec. 1, 1971	SUB SURFACE DRAINS
RC-31	Dec. 1, 1971	ENDWALLS
RC-32	Dec. 1, 1971	SLOPE PIPE FITTINGS & CONNECTORS
RC-33	Dec. 1, 1971	END SECTIONS FOR PIPE CULVERTS
RC-34	Dec. 1, 1971	4 FOOT & 6 FOOT INLETS
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RC-36	Dec. 1, 1971	PRECAST UNITS
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RC-50	Dec. 1, 1971	GUARD RAIL CONNECTIONS AT END OF STRUCTURES
RC-51 (2 Sheets)	Dec. 1, 1971	TYPE 1-W GUARD RAIL
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RC-53	Dec. 1, 1971	TYPE 2-W GUARD RAIL
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STANDARD DRAWING NO.	DATE	DESCRIPTION
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RC-80	Dec. 1, 1971	HIGHWAY LIGHTING - FOUNDATIONS
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RC-82	Dec. 1, 1971	HIGHWAY LIGHTING - JCT. BOXES - HVY. DUTY
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RC-84	Dec. 1, 1971	HIGHWAY LIGHTING - LIGHTING & ELECTRIC DETAILS
ROADSIDE DEVELOPMENT & PLANTING		
RC-90	Dec. 1, 1971	TREE WALLS & MISC. DETAILS FOR ROADSIDE REST AREAS
RC-91	Dec. 1, 1971	TREE & SHRUB PLANTING DETAILS

BY

VOIDED CHANGE #1

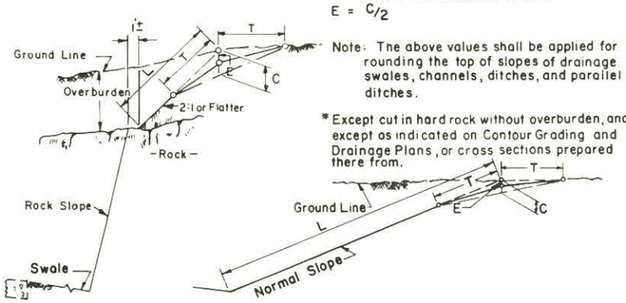
VOID

FORM 4237 REV 3-61

L = Length of slope.
* T = 10 feet where L is 10 feet or more.
* T = L when L is less than 10 feet.
E = C/2

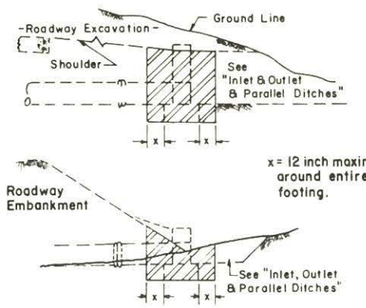
Note: The above values shall be applied for rounding the top of slopes of drainage swales, channels, ditches, and parallel ditches.

* Except cut in hard rock without overburden, and except as indicated on Contour Grading and Drainage Plans, or cross sections prepared there from.



-ROCK CUTS- -NORMAL CUTS-

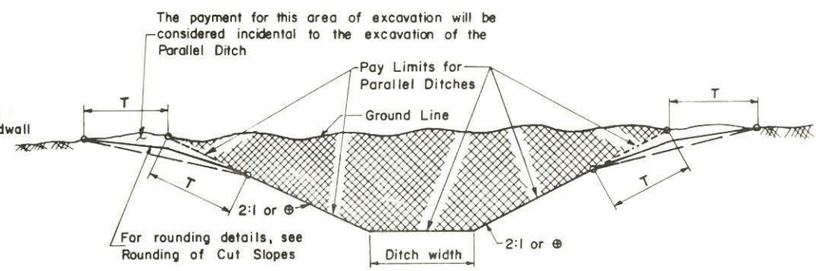
ROUNDING OF CUT SLOPES



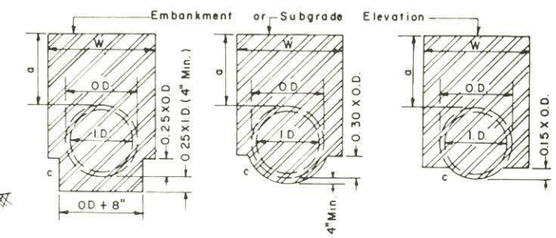
x = 12 inch maximum around entire endwall footing.

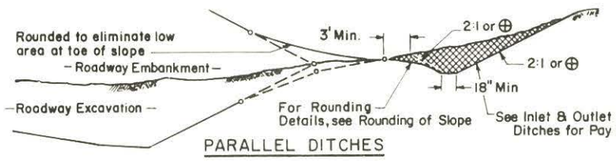
EXCAVATION FOR ENDWALLS

Slope ⊕ As indicated on the construction cross-sections.
Classification is shown for ditch bottom widths of less than 8 feet.
When ditch width is 8 feet or more, all excavation is Class I.

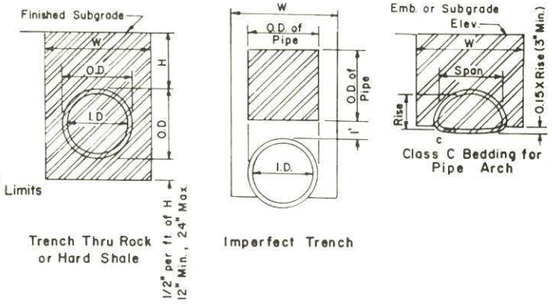


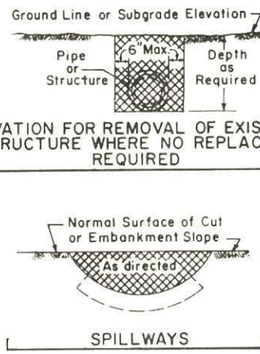
INLET AND OUTLET DITCHES





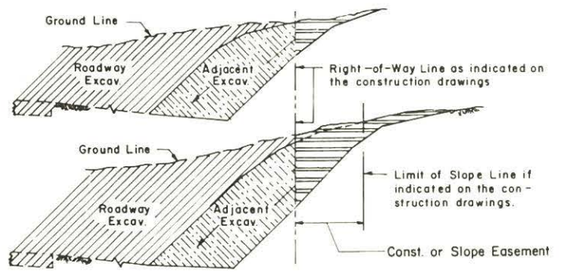
PARALLEL DITCHES



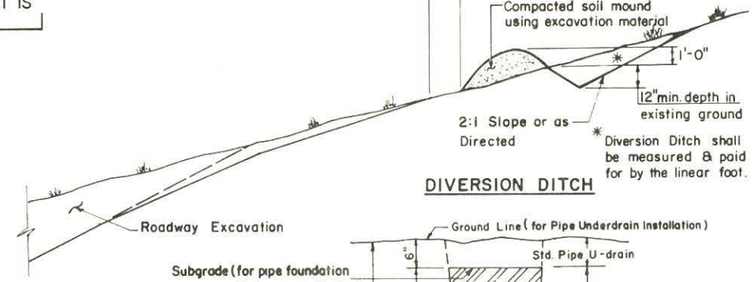


SPILLWAYS

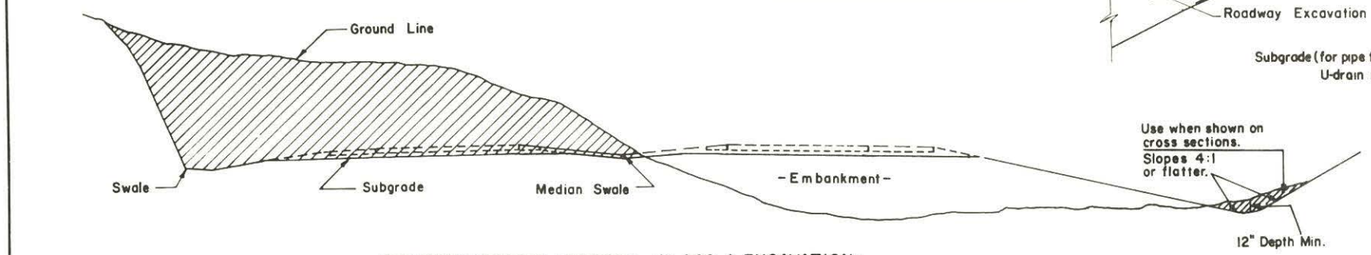
EXCAVATION FOR REMOVAL OF EXISTING PIPE OR STRUCTURE WHERE NO REPLACEMENT IS REQUIRED



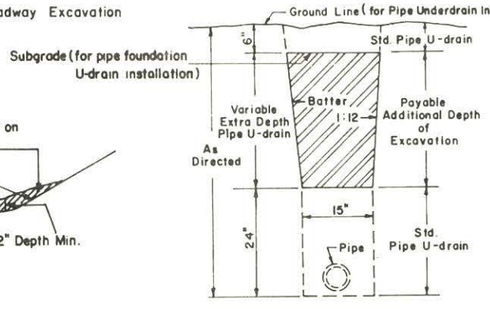
EXCAVATION ADJACENT TO ROADWAY IN LIEU OF COMMON BORROW EXCAVATION



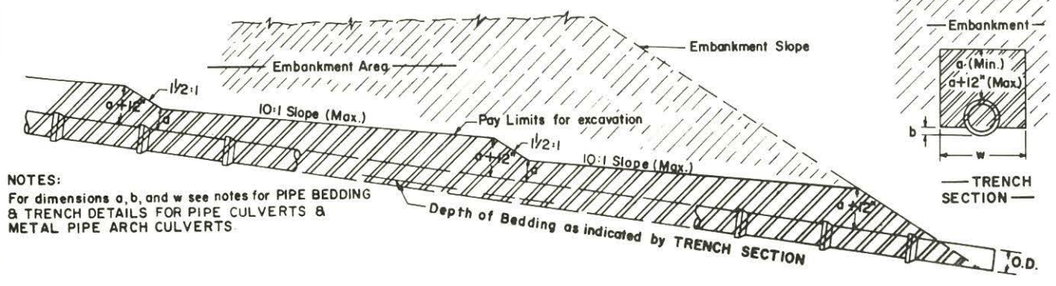
DIVERSION DITCH



ROADWAY SECTION SHOWING CLASS 1 EXCAVATION



EXTRA DEPTH UNDERDRAIN



NOTES:
For dimensions a, b, and w see notes for PIPE BEDDING & TRENCH DETAILS FOR PIPE CULVERTS & METAL PIPE ARCH CULVERTS

MAXIMUM PAYABLE EXCAVATION FOR TRENCHES IN EMBANKMENT AREAS FOR PIPE CULVERTS, CORRUGATED METAL PIPE ARCH CULVERTS, METAL PLATE PIPE CULVERTS & METAL PLATE PIPE ARCH CULVERTS
(For pipes with an inside diameter of less than 8 feet)

I. D. – Nominal inside diameter of pipe.
O.D. – Outside diameter of pipe barrel or shell.
H.D. (Hub Diameter) – Outside diameter of pipe at bell or band.
* W – 2.0 ft. + H.D. for pipes or pipe arches not exceeding 48" I.D. or Span, resp.
2.5 ft. + H.D. for pipes or pipe arches exceeding 48" I.D. or Span, resp.

A tolerance of one foot on each side of the trench will be allowed in excess of the specified trench width. All excavation in excess of the specified trench widths and the additional backfill material required shall be at the contractors expense.

a. 4 ft. minimum, where practicable, in embankment areas
b. Varies in conformance with class of bedding applicable to pipe installation. (See RC-30 for bedding treatment)
c. When the material encountered is unstable, it shall be entirely removed under the pipe for the full width of the trench or as otherwise required for the particular condition.
H. Height of fill over top of pipe.
* The trench width for Combination Storm Sewer and Underdrain shall have a specified width of 1.0 ft. plus H.D. as shown on RC-30

EXCAVATION FOR PIPE BEDDING & TRENCH DETAILS FOR PIPE CULVERTS & METAL PIPE ARCH CULVERTS

CLASS 1 EXCAV.
CLASS 2 EXCAV.
CLASS 4 EXCAV.
COMMON BORROW EXCAV.
EITHER CLASS 1 or COMMON BORROW EXCAV.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CLASSIFICATION OF EARTHWORK

Recommended Oct 1, 1974
P.D. Crunkie
Director, Bureau of Design

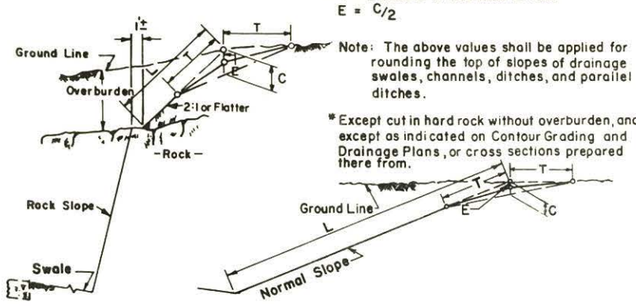
Approved Oct 1, 1974
R.R. Master
Deputy Chief Hwy. Engr.

Sht. 1 of 1
RC-10

L = Length of slope.
* T = 10 feet where L is 10 feet or more.
* T = L when L is less than 10 feet.
E = C/2

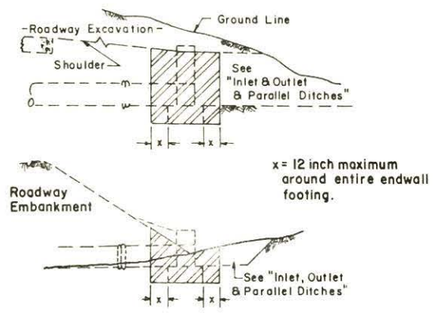
Note: The above values shall be applied for rounding the top of slopes of drainage swales, channels, ditches, and parallel ditches.

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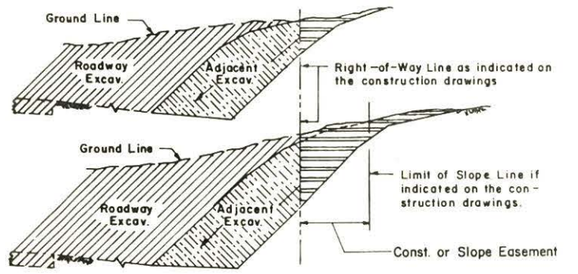
-ROCK CUTS- -NORMAL CUTS-

ROUNDING OF CUT SLOPES

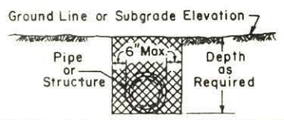


x = 12 inch maximum around entire endwall footing.

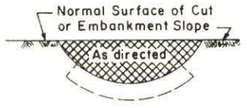
EXCAVATION FOR ENDWALLS



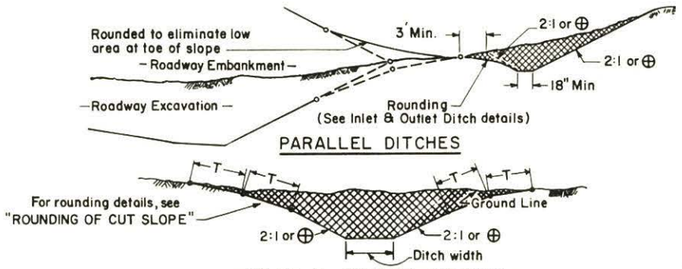
EXCAVATION ADJACENT TO ROADWAY IN LIEU OF COMMON BORROW EXCAVATION



EXCAVATION FOR REMOVAL OF EXISTING PIPE OR STRUCTURE WHERE NO REPLACEMENT IS REQUIRED



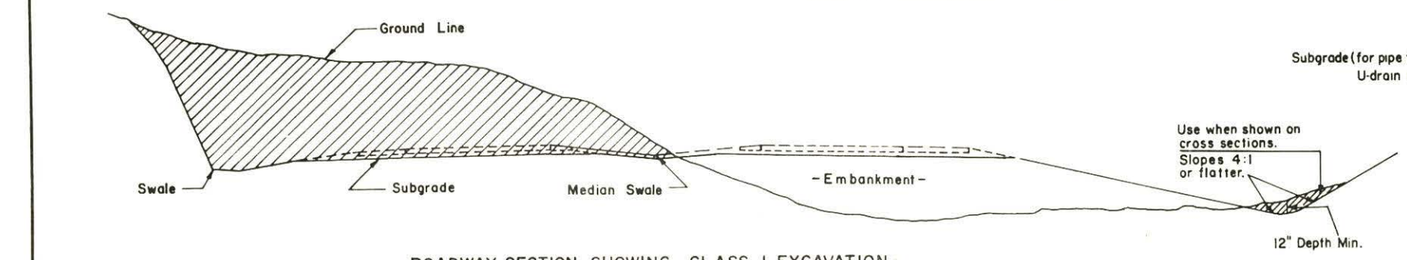
SPILLWAYS



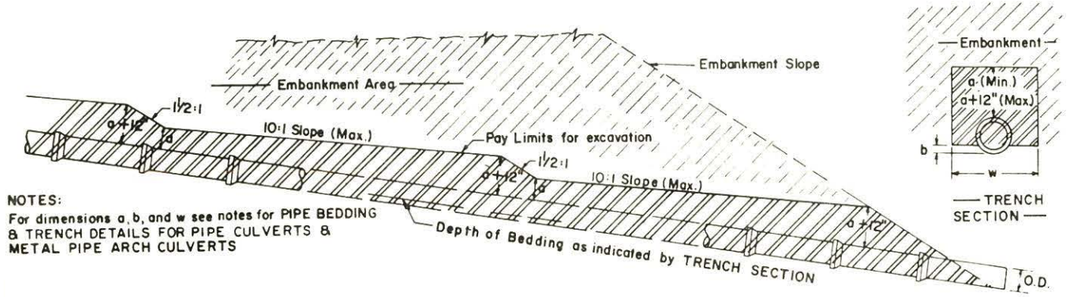
-INLET & OUTLET DITCHES-

Slope ⊕ As indicated on the construction cross-sections. Classification is shown for ditch bottom widths of less than 8 feet. When Ditch width is 8 feet or more, all excavation is Class I.

INLET, OUTLET AND PARALLEL DITCHES

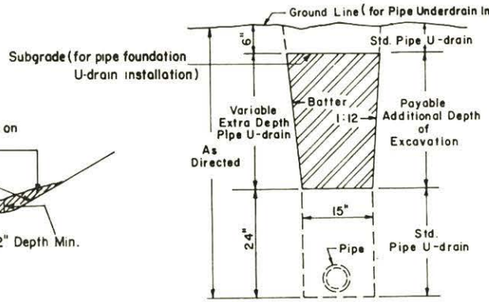


ROADWAY SECTION SHOWING CLASS I EXCAVATION



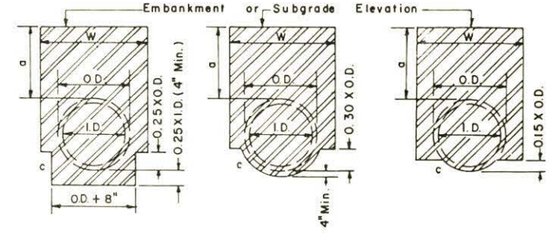
NOTES:
For dimensions a, b, and w see notes for PIPE BEDDING & TRENCH DETAILS FOR PIPE CULVERTS & METAL PIPE ARCH CULVERTS

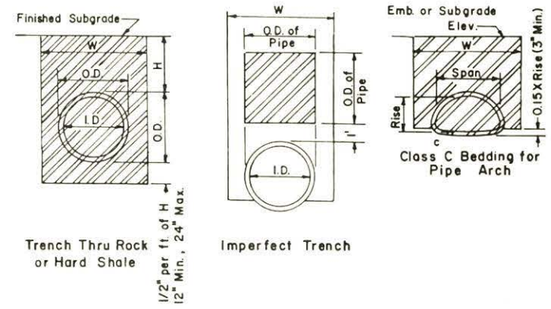
MAXIMUM PAYABLE EXCAVATION FOR TRENCHES IN EMBANKMENT AREAS FOR PIPE CULVERTS, CORRUGATED METAL PIPE ARCH CULVERTS, METAL PLATE PIPE CULVERTS & METAL PLATE PIPE ARCH CULVERTS
(For pipes with an inside diameter of less than 8 feet)



EXTRA DEPTH UNDERDRAIN

CLASS 1 EXCAV.
CLASS 2 EXCAV.
CLASS 4 EXCAV.
COMMON BORROW EXCAV.
EITHER CLASS I or COMMON BORROW EXCAV.





I. D. – Nominal inside diameter of pipe.
O.D. – Outside diameter of pipe barrel or shell.
H.D. (Hub Diameter) – Outside diameter of pipe at bell or band.

* W – 2.0 ft. + H.D. for pipes or pipe arches not exceeding 48" I.D. or Span, resp.
2.5 ft. + H.D. for pipes or pipe arches exceeding 48" I.D. or Span, resp.

A tolerance of one foot on each side of the trench will be allowed in excess of the specified trench width. All excavation in excess of the specified trench widths and the additional backfill material required shall be at the contractors expense.

a. 4 ft. minimum, where practicable, in embankment areas
b. Varies in conformance with class of bedding applicable to pipe installation. (See RC-30 for bedding treatment)
c. When the material encountered is unstable, it shall be entirely removed under the pipe for the full width of the trench or as otherwise required for the particular condition.
H. Height of fill over top of pipe.
* The trench width for Combination Storm Sewer and Underdrain shall have a specified width of 1.0 ft. plus H.D. as shown on RC-30

EXCAVATION FOR PIPE BEDDING & TRENCH DETAILS FOR PIPE CULVERTS & METAL PIPE ARCH CULVERTS

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CLASSIFICATION OF EARTHWORK

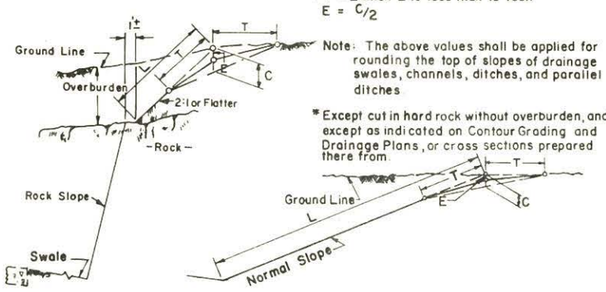
Recommended Mar. 7, 1973
Director, Bureau of Design

Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

Sht. 1 Of 1
RC-10

VOID

FORM 4237 REV 3-61



-ROCK CUTS-

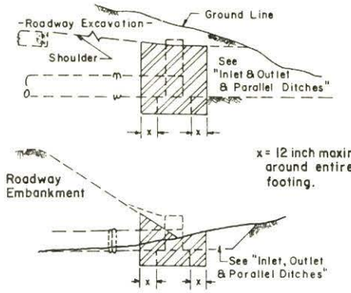
L = Length of slope.
* T = 10 feet where L is 10 feet or more.
* T = L when L is less than 10 feet.
E = C/2

Note: The above values shall be applied for rounding the top of slopes of drainage swales, channels, ditches, and parallel ditches

* Except cut in hard rock without overburden, and except as indicated on Contour Grading and Drainage Plans, or cross sections prepared there from.

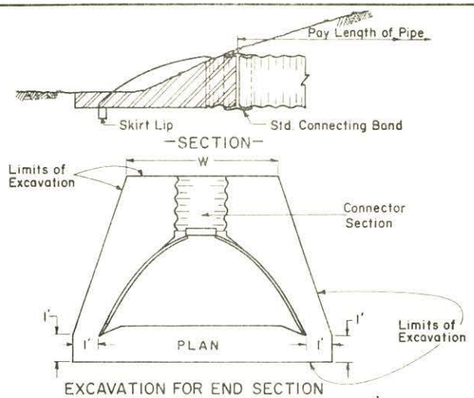
-NORMAL CUTS-

ROUNDING OF CUT SLOPES

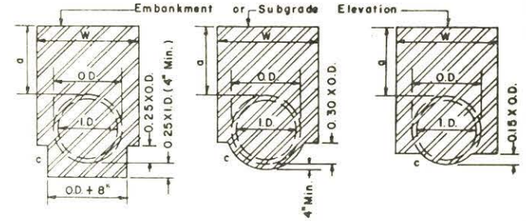


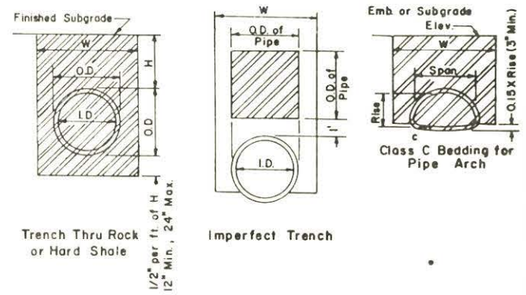
x = 12 inch maximum around entire endwall footing.

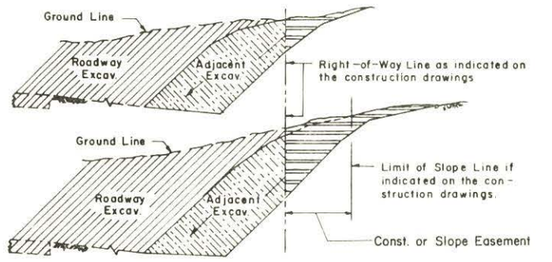
EXCAVATION FOR ENDWALLS



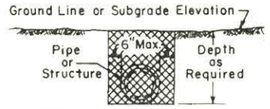
EXCAVATION FOR END SECTION



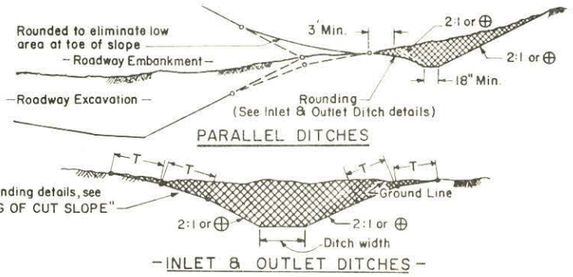




EXCAVATION ADJACENT TO ROADWAY IN LIEU OF COMMON BORROW EXCAVATION



EXCAVATION FOR REMOVAL OF EXISTING PIPE OR STRUCTURE WHERE NO REPLACEMENT IS REQUIRED



Slope ⊕ As indicated on the construction cross-sections
Classification is shown for ditch bottom widths of less than 8 feet.
When Ditch width is 8 feet or more, all excavation is Class I.

INLET, OUTLET AND PARALLEL DITCHES



SPILLWAYS

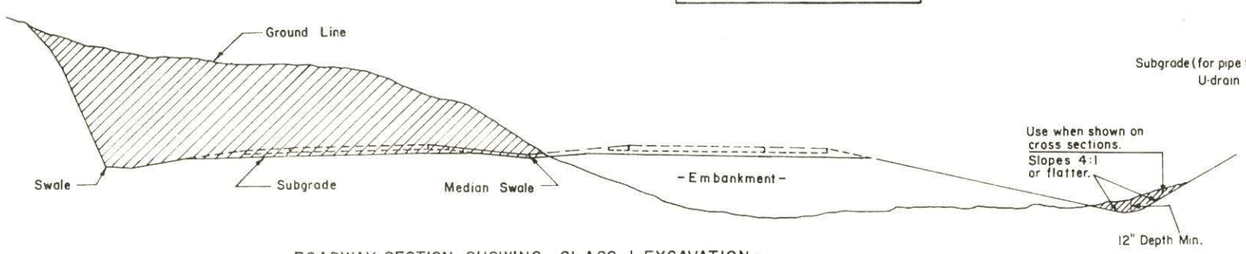
I.D. – Nominal inside diameter of pipe.
O.D. – Outside diameter of pipe barrel or shell.
H.D. (Hub Diameter) – Outside diameter of pipe at bell or band.

* W — 2.0 ft. + H.D. for pipes or pipe arches not exceeding 48" I.D. or Span, resp.
2.5 ft. + H.D. for pipes or pipe arches exceeding 48" I.D. or Span, resp.

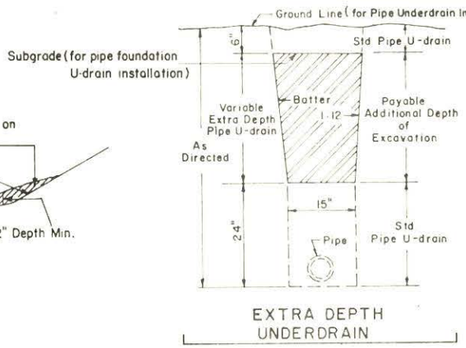
A tolerance of one foot on each side of the trench will be allowed in excess of the specified trench width. All excavation in excess of the specified trench widths and the additional backfill material required shall be at the contractors expense.

a. 4 ft. minimum, where practicable, in embankment areas
b. Varies in conformance with class of bedding applicable to pipe installation (See RC-30 for bedding treatment)
c. When the material encountered is unstable, it shall be entirely removed under the pipe for the full width of the trench or as otherwise required for the particular condition.
H. Height of fill over top of pipe.
* The trench width for Combination Storm Sewer and Underdrain shall have a specified width of 1.0 ft. plus H.D. as shown on RC-30

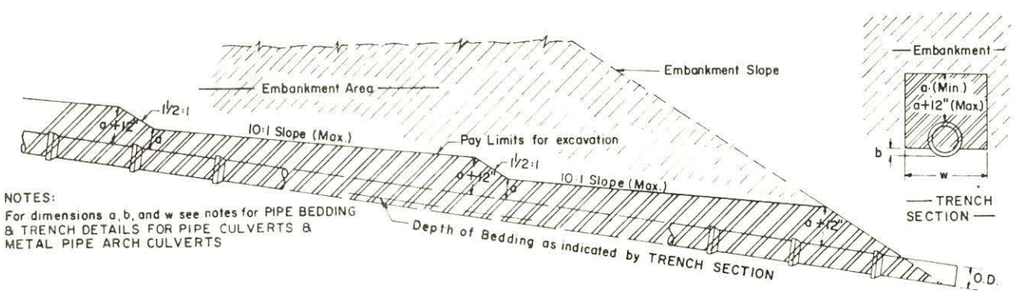
EXCAVATION FOR PIPE BEDDING & TRENCH DETAILS FOR PIPE CULVERTS & METAL PIPE ARCH CULVERTS



ROADWAY SECTION SHOWING CLASS I EXCAVATION



EXTRA DEPTH UNDERDRAIN



NOTES:
For dimensions a, b, and w see notes for PIPE BEDDING & TRENCH DETAILS FOR PIPE CULVERTS & METAL PIPE ARCH CULVERTS

MAXIMUM PAYABLE EXCAVATION FOR TRENCHES IN EMBANKMENT AREAS FOR PIPE CULVERTS, CORRUGATED METAL PIPE ARCH CULVERTS, METAL PLATE PIPE CULVERTS & METAL PLATE PIPE ARCH CULVERTS
(For pipes with an inside diameter of less than 8 feet)

CLASS I EXCAV.
CLASS 2 EXCAV.
CLASS 4 EXCAV
COMMON BORROW EXCAV.
EITHER CLASS I or COMMON BORROW EXCAV.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

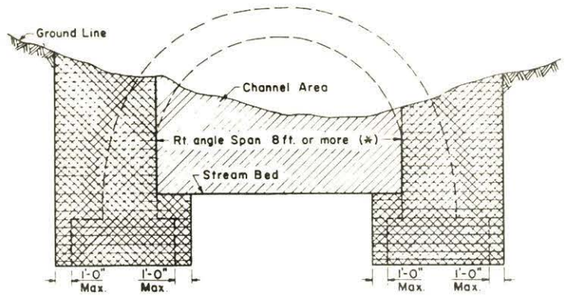
CLASSIFICATION OF EARTHWORK

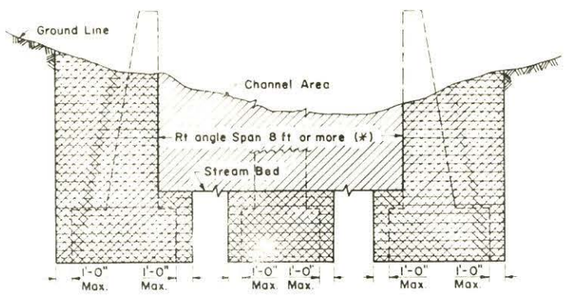
Recommended Dec. 1, 1971
R R Musser
Location & Design Engineer

Approved Dec. 1, 1971
W. J. Reves
Deputy Chief Hwy. Engr.

Sht. 1 Of 1
RC-10

VOID

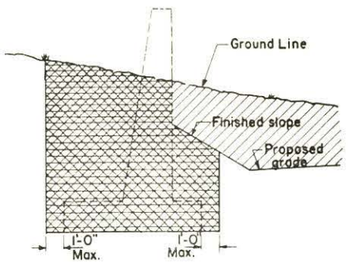


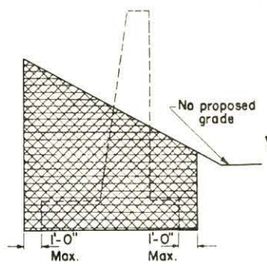


STRUCTURES OVER STREAMS

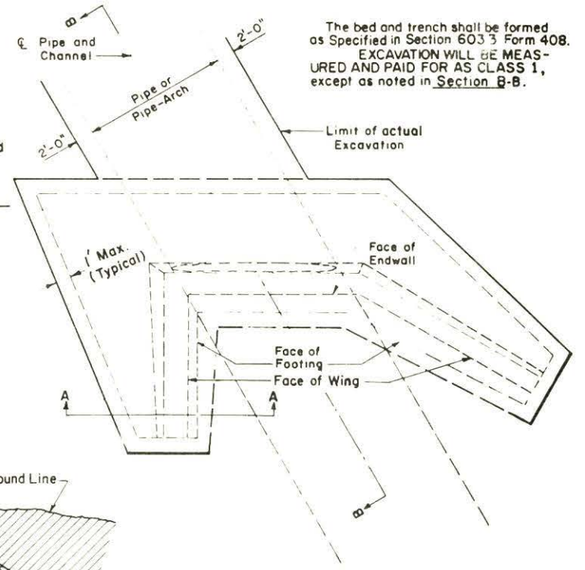
INCLUDING METAL PLATE ARCH

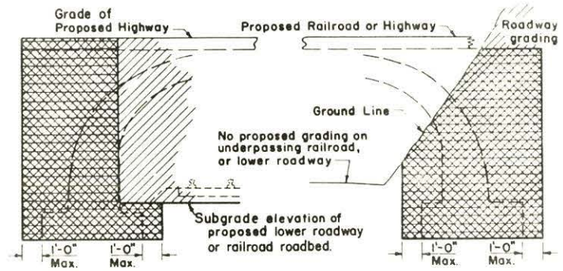
* When right angle span is less than 8' all excavation is Class 3.

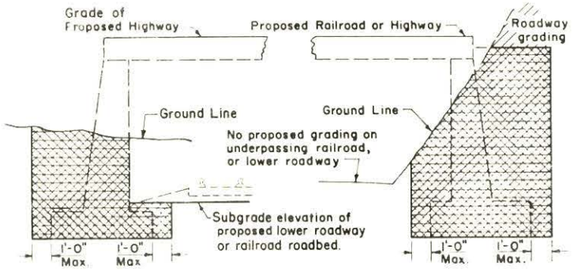




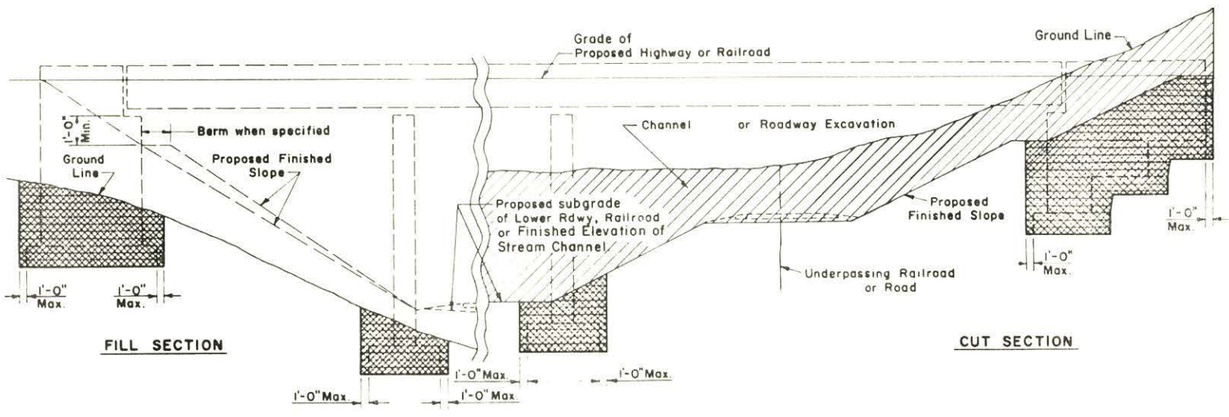
WING WALLS & RETAINING WALLS



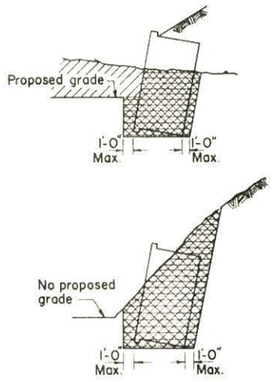




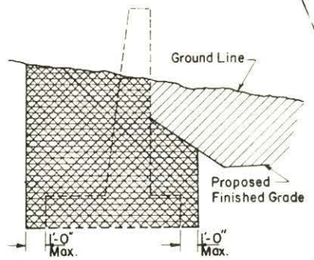
GRADE SEPARATION STRUCTURES



TYPICAL STRUCTURE ELEVATION

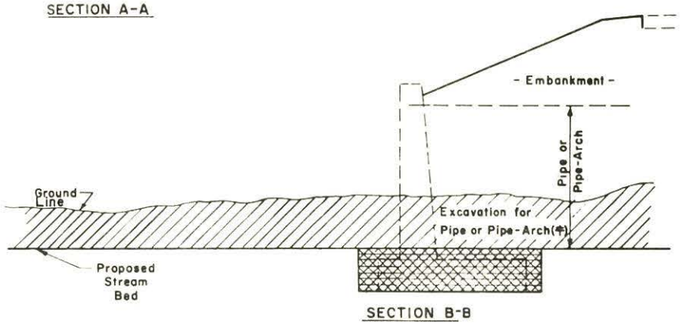


CRIBBING



SECTION A-A

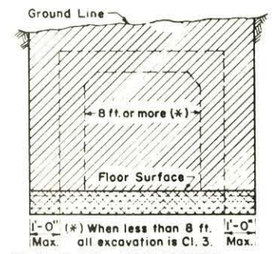
METAL PLATE PIPE and METAL PLATE PIPE-ARCH CULVERTS with ENDWALL



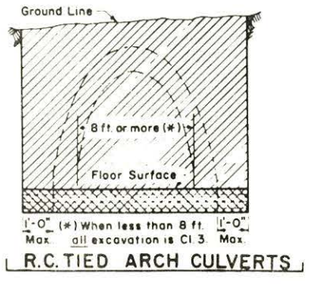
SECTION B-B

(*) Class 4 Excavation from stream bed to a maximum of 4 ft. above top of Pipe or Pipe-Arch for span or diameter less than 8 ft., in accordance with Section 603, Form 408.

NOTE: Special situations involving excavation not entirely covered by this drawing must be defined on the design drawing by sketches and/or described in the Special Provisions.



R.C. BOX CULVERTS



R.C. TIED ARCH CULVERTS

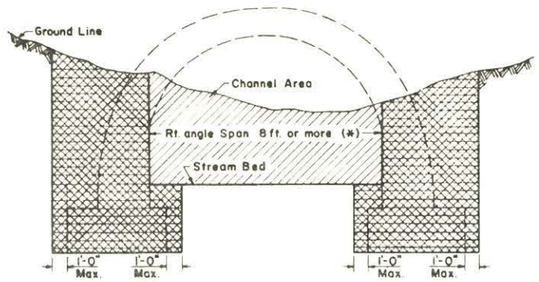
CLASS 1 EXCAV. — ROADWAY ITEM (To be included in Roadway quantities)

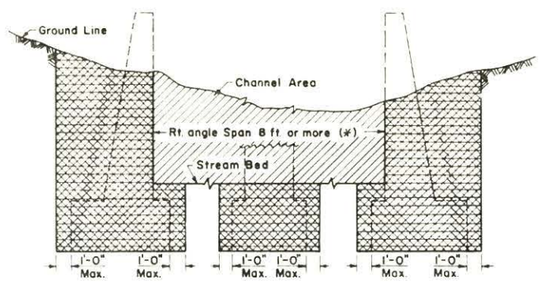
CLASS 3 EXCAV. — STRUCTURE ITEM (To be included in Structure quantities)

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CLASSIFICATION OF EARTHWORK FOR STRUCTURES

Recommended Mar 7, 1973	Approved Mar 7, 1973	Sht. 1 Of 1
Director, Bureau of Design	Deputy Chief Hwy Engr.	RC-11

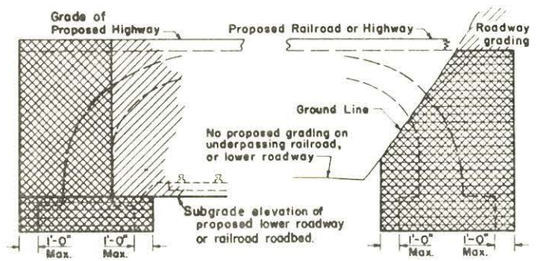


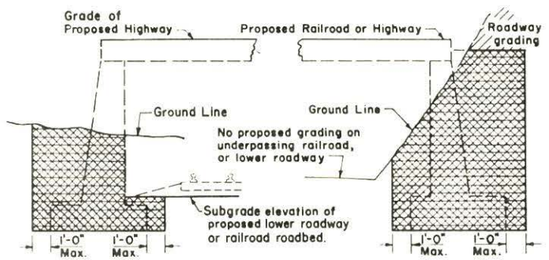


STRUCTURES OVER STREAMS

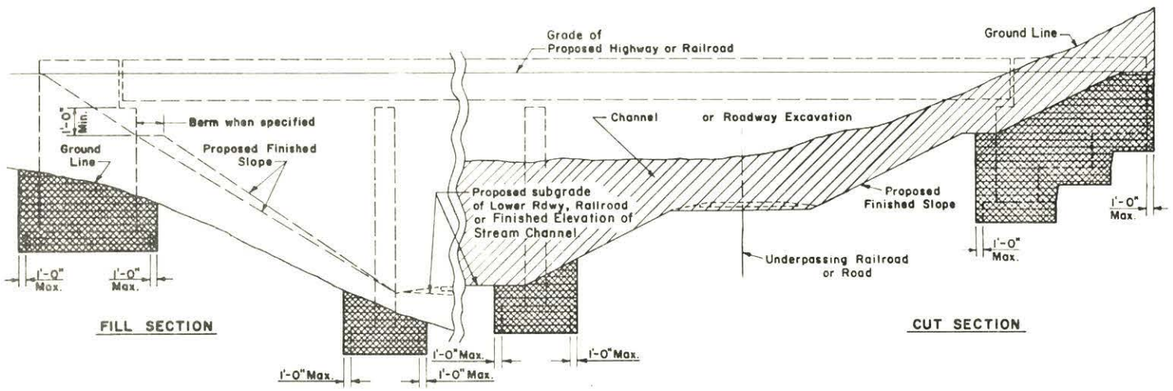
INCLUDING METAL PLATE ARCH

* When right angle span is less than 8' all excavation is Class 3.





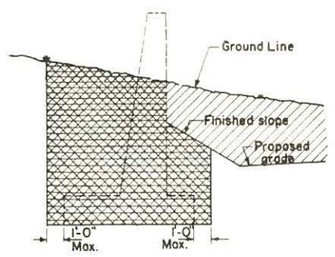
GRADE SEPARATION STRUCTURES

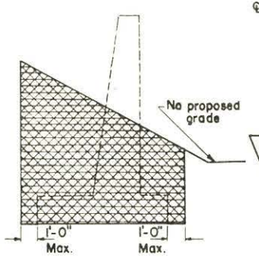


TYPICAL STRUCTURE ELEVATION

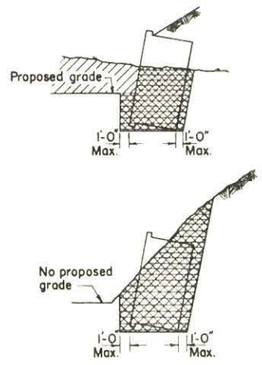
CLASS 1 EXCAV. — **ROADWAY ITEM** (To be included in Roadway quantities)

CLASS 3 EXCAV. — **STRUCTURE ITEM** (To be included in Structure quantities)

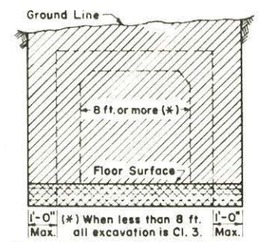




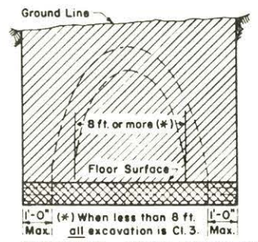
WING WALLS & RETAINING WALLS



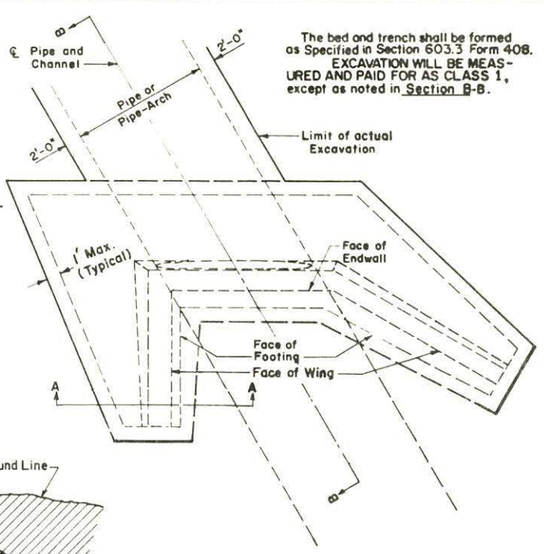
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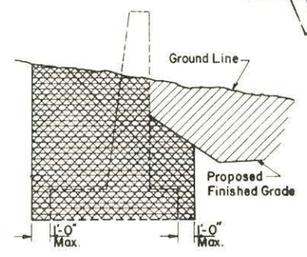


R.C. BOX CULVERTS



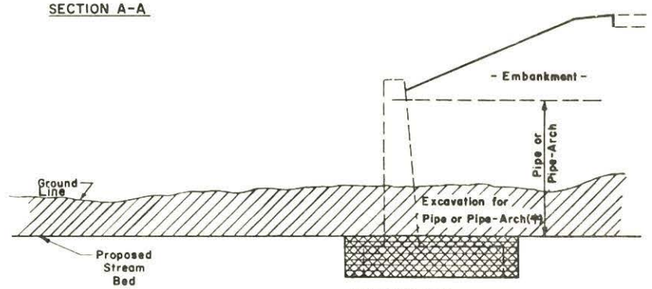
R.C. TIED ARCH CULVERTS





SECTION A-A

METAL PLATE PIPE and METAL PLATE PIPE-ARCH CULVERTS with ENDWALL



SECTION B-B

(*) Class 4 Excavation from stream bed to a maximum of 4 ft. above top of Pipe or Pipe-Arch for span or diameter less than 8 ft., in accordance with Section 603.3, Form 408.

NOTE: Special situations involving excavation not entirely covered by this drawing must be defined on the design drawing by sketches and/or described in the Special Provisions.

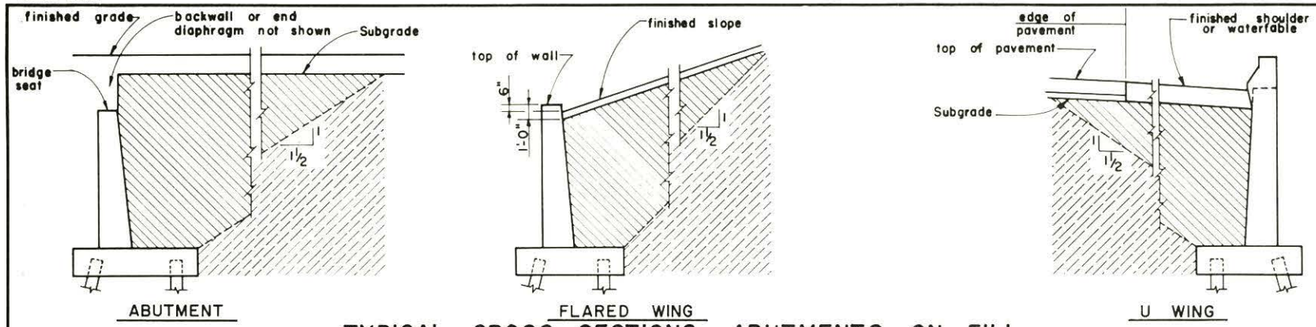
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CLASSIFICATION OF EARTHWORK FOR STRUCTURES

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
R R Musser	W. J. Reese	RC-11
Location & Design Engineer	Deputy Chief Hwy Engr.	

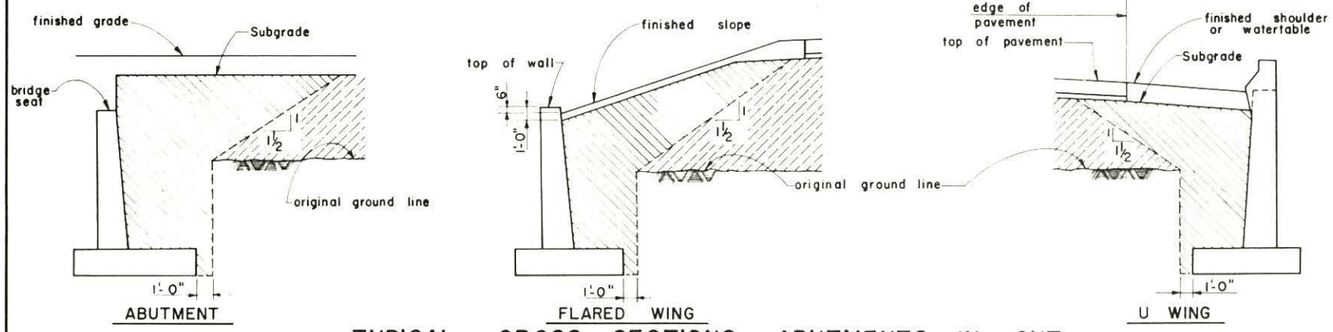
VOID

FORM 4237 REV 3-61



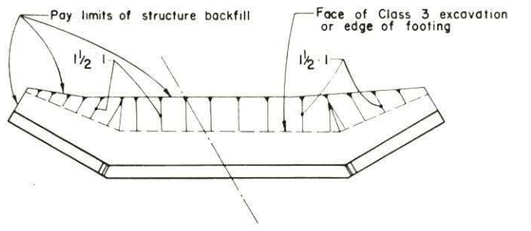
ABUTMENT | FLARED WING | U WING

TYPICAL CROSS SECTIONS - ABUTMENTS ON FILL

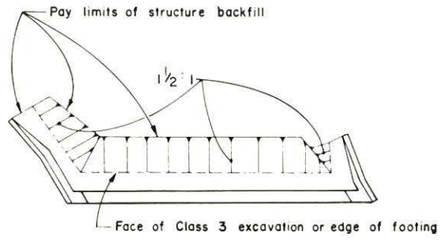


ABUTMENT | FLARED WING | U WING

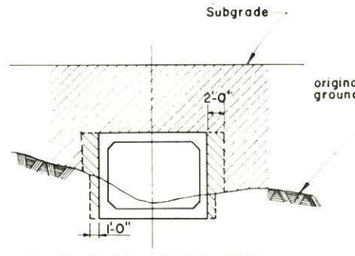
TYPICAL CROSS SECTIONS - ABUTMENTS IN CUT



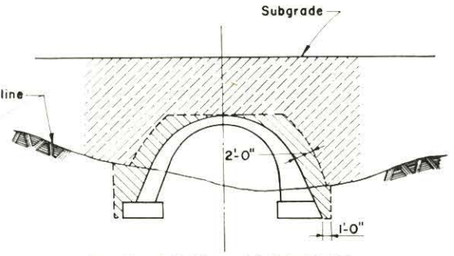
PLAN - ABUTMENT WITH FLARED WINGS



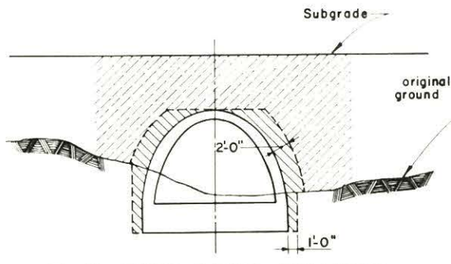
PLAN - ABUTMENT WITH U WINGS



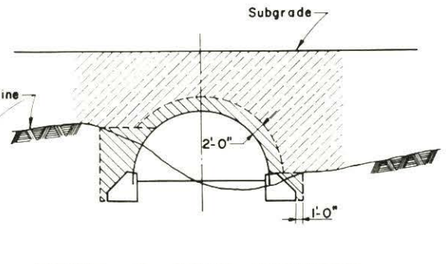
R. C. BOX CULVERT



R. C. ARCH CULVERT



R. C. TIED ARCH CULVERT



METAL PL. ARCH CULVERT

LEGEND
- Structure Backfill
- Embankment Material

BACKFILL & EMBANKMENT CONSTRUCTION AT STRUCTURES

NOTES

- Backfill and embankment shall be placed in accordance with this Standard Drawing unless otherwise shown on the structure drawings.
- Structure backfill shall consist of material meeting the requirements of Section 350.2 of Form 408. Rock which can be placed and compacted in layers of 12 inches or less, may be used. However, rock shall not be permitted for structure backfill at metal plate arches. Any shale, regardless of whether it is classified as rock or not, shall not be permitted in structure backfill. Steel Slag, such as that resulting from the production of steel in basic oxygen or electric arc furnace or by open hearth, shall not be permitted as structure backfill.
- Structure backfill will be measured and paid for as Selected Borrow Excavation - Structure Backfill
- Backfill limits at retaining walls and wingwalls for culverts shall be treated the same as flared abutment wingwalls.
- Backfill construction at R.C. Box Culverts with the top slab at roadway grade shall be treated the same as abutments.
- Backfill construction at culverts where the top of the culvert is near subgrade shall be considered as a special case and shall be treated as shown on the structure drawings or as directed by the engineer.
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- Drainage details are not shown, see structural drawings for drainage, weep holes, etc.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

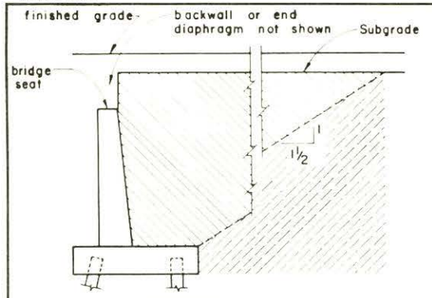
BACKFILL AT STRUCTURES

Recommended June 1, 1976
Chief Bridge Engineer

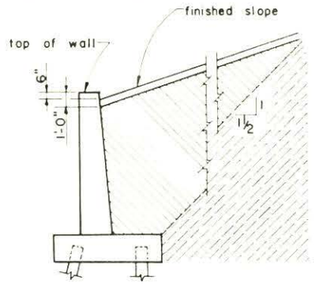
Approved June 1, 1976
Deputy Chief Hwy. Engr.

Sht. 1 of 1
RC-12

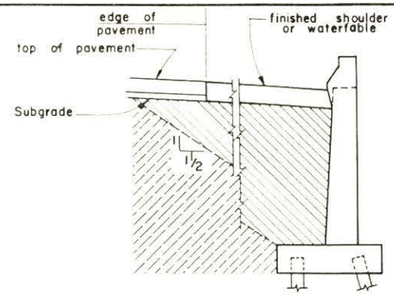
FORM 4237 REV 3-61



ABUTMENT

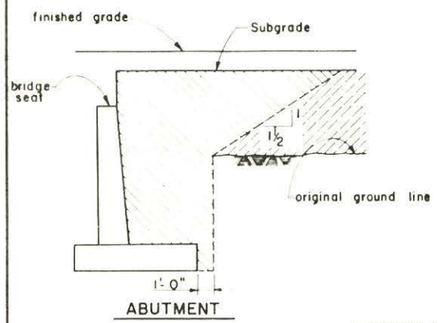


FLARED WING

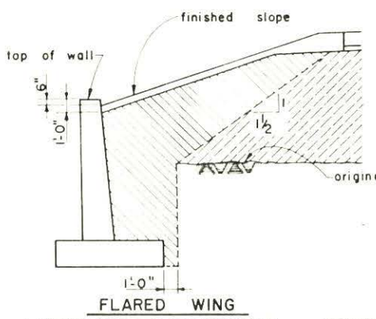


U WING

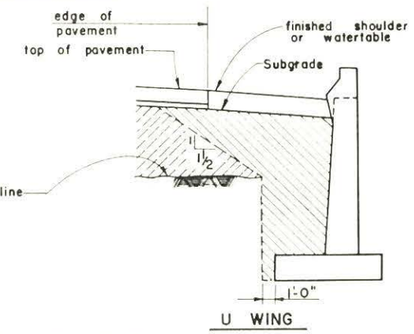
TYPICAL CROSS SECTIONS - ABUTMENTS ON FILL



ABUTMENT

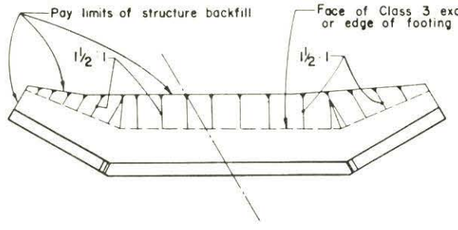


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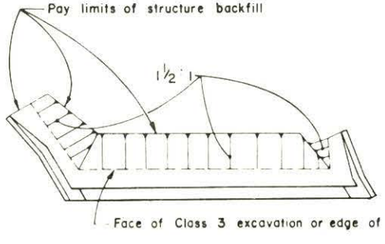


U WING

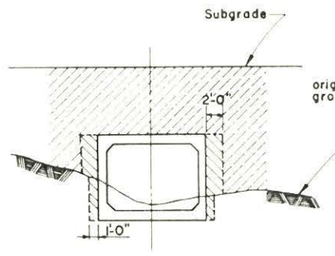
TYPICAL CROSS SECTIONS - ABUTMENTS IN CUT



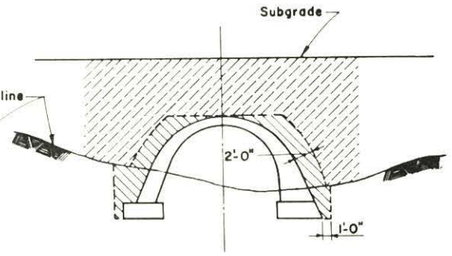
PLAN - ABUTMENT WITH FLARED WINGS



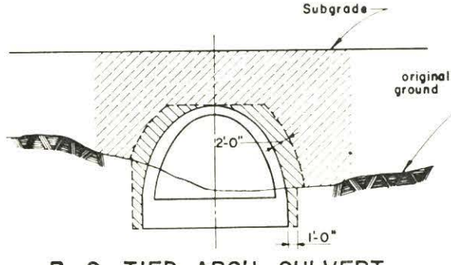
PLAN - ABUTMENT WITH U WINGS



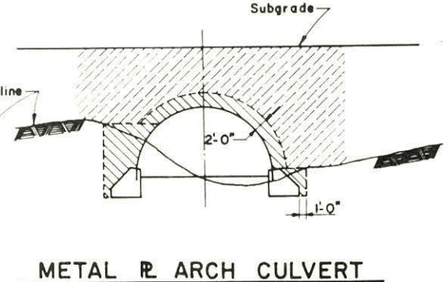
R. C. BOX CULVERT



R. C. ARCH CULVERT



R. C. TIED ARCH CULVERT



METAL PL. ARCH CULVERT

BACKFILL & EMBANKMENT CONSTRUCTION AT STRUCTURES

NOTES

- Backfill and embankment shall be placed in accordance with this Standard Drawing unless otherwise shown on the structure drawings.
- Structure backfill shall consist of material meeting the requirements of Section 350.2 of Form 408. Rock which can be placed and compacted in layers of 12 inches or less, may be used. However, rock shall not be permitted for structure backfill at metal plate arches. Any shale, regardless of whether it is classified as rock or not, shall not be permitted in structure backfill.
- Structure backfill will be measured and paid for as Selected Borrow Excavation - Structure Backfill
- Backfill limits at retaining walls and wingwalls for culverts shall be treated the same as flared abutment wingwalls.
- Backfill construction at R.C. Box Culverts with the top slab at roadway grade shall be treated the same as abutments.
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- Drainage details are not shown, see structural drawings for drainage, weep holes, etc.

LEGEND

Structure Backfill

Embankment Material

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BACKFILL AT STRUCTURES

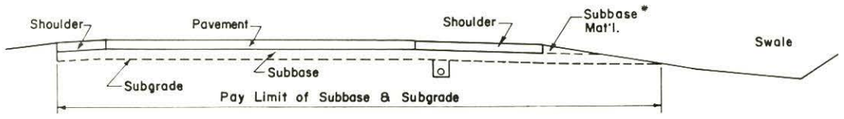
Recommended Dec. 1, 1971
B. F. Stahl
Chief Bridge Engineer

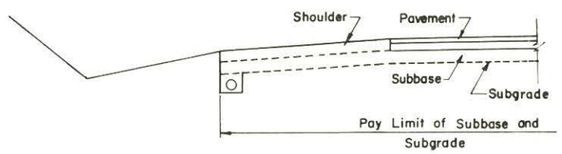
Approved Dec. 1, 1971
W. J. Reves
Deputy Chief Hwy. Engr.

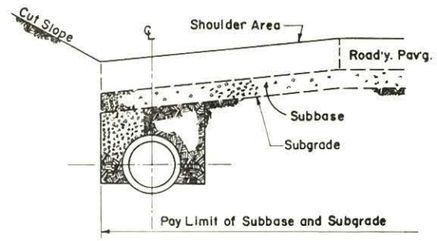
Sht. 1 Of 1

RC-12

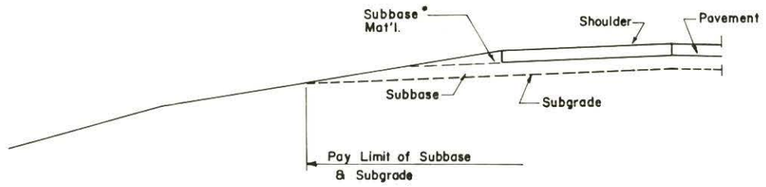
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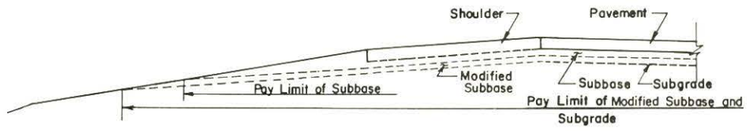


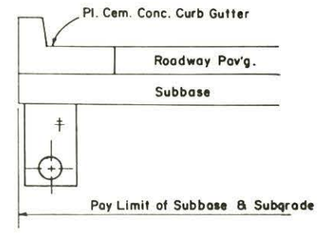




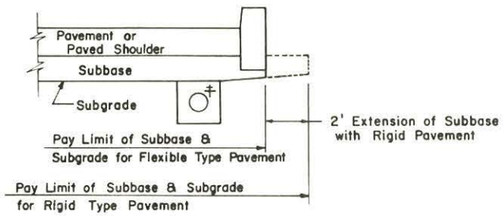
COMBINATION STORM SEWER & U' DRAIN

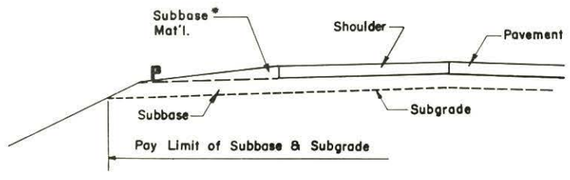






† For position of underdrain see RC-30.





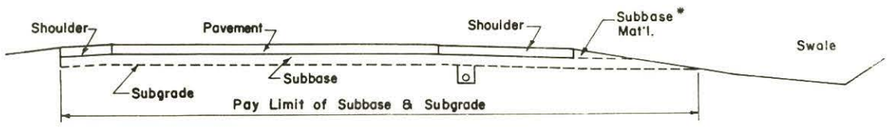
* The payment for this area of subbase will be considered incidental to the shoulder.

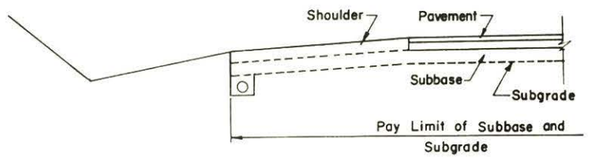
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

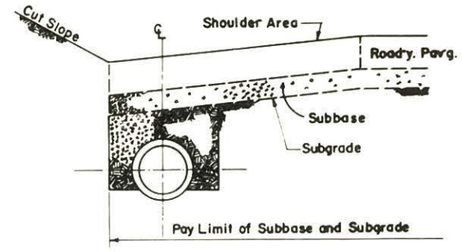
PAY LIMIT OF SUBBASE AND SUBGRADE

Recommended Aug. 20, 1975	Approved Aug. 20, 1975	Sht. 1 Of 1
B.O. Rowdis	R.R. Moser	RC-13
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

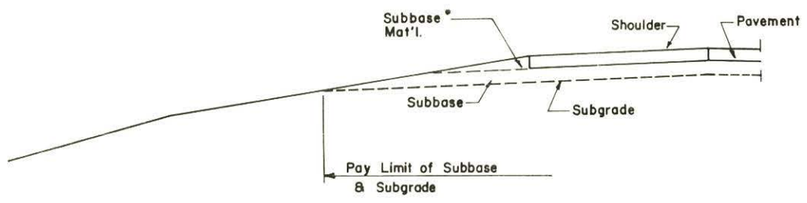
FORM 4237 REV 7-68

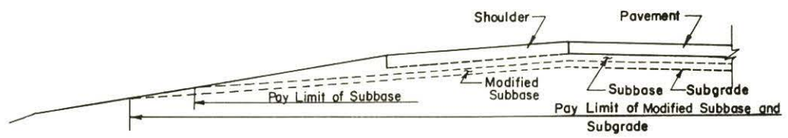


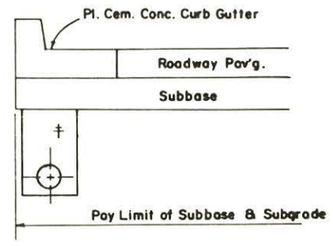




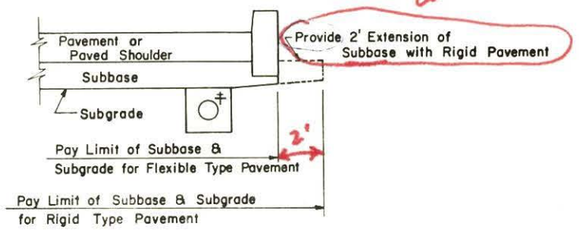
COMBINATION STORM SEWER & U' DRAIN



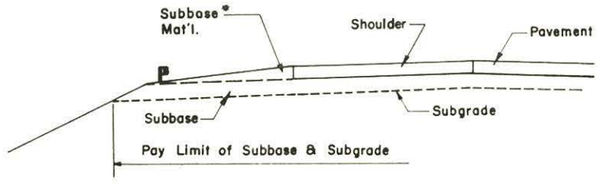




† For position of underdrain see RC-30.



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* The payment for this area of subbase will be considered incidental to the shoulder.

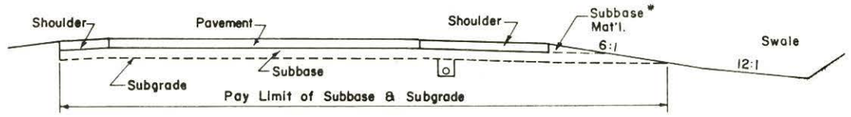
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

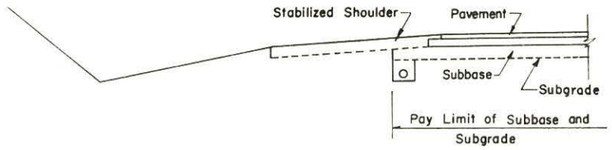
PAY LIMIT OF SUBBASE AND SUBGRADE

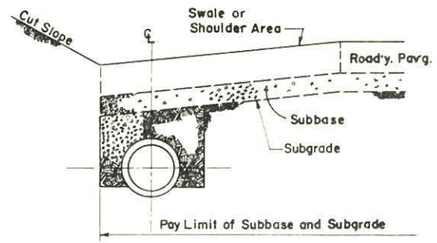
Recommended Mar. 7, 1973	Approved Mar. 7, 1973	Sht. 1 Of 1
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-13

VOID

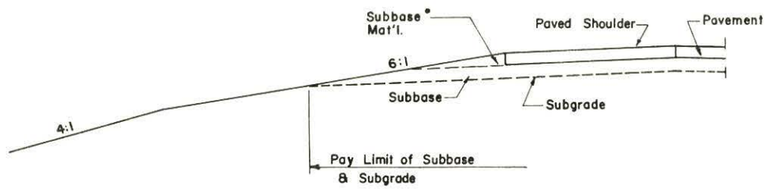
FORM 4837 REV 7-69

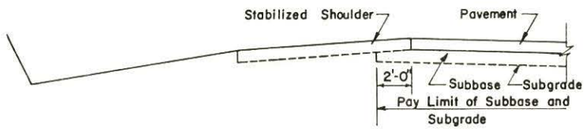


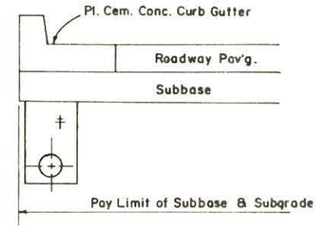




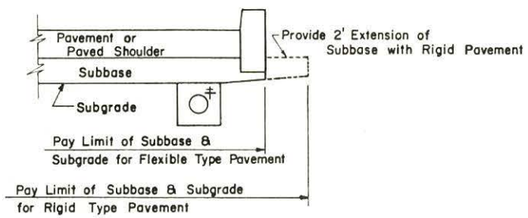
COMBINATION STORM SEWER & U' DRAIN

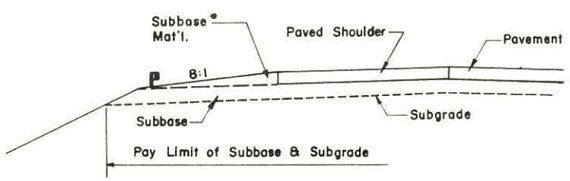






† For position of underdrain see RC-30.





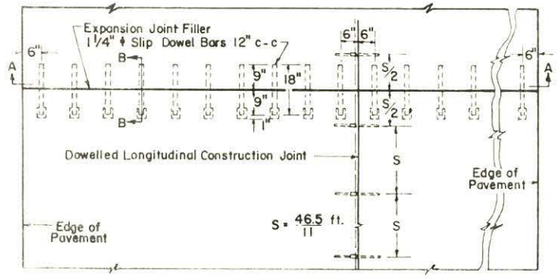
* The payment for this area of subbase will be considered incidental to the shoulder.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

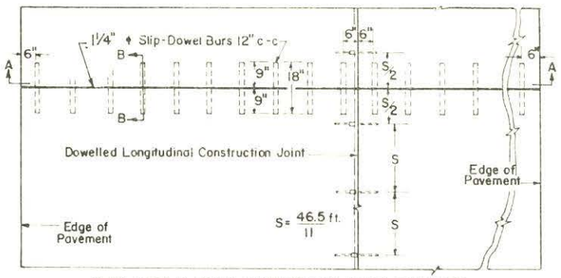
PAY LIMIT OF SUBBASE AND SUBGRADE

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht 1 Of 1
R R Muse	W. J. Rawe	RC-13
Location & Design Engineer	Deputy Chief Hwy. Engr.	

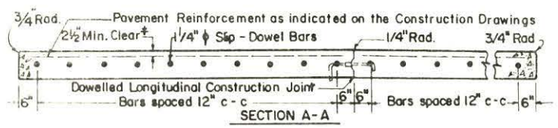
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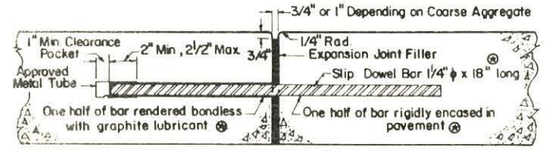
PLAN OF 8, 9, OR 10 INCH UNIFORM DEPTH PAVEMENT



PLAN OF 8, 9, OR 10 INCH UNIFORM DEPTH PAVEMENT



SECTION A-A



SECTION B-B

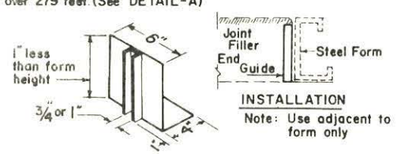
Expansion joint Filler shall have a minimum thickness of 1 inch if slag is used as a coarse aggregate and 3/4 of an inch if stone or gravel is used. It shall be cut to conform to the cross section of the pavement, except that the width shall be 3/4 of an inch less than the depth of the pavement, and shall be furnished in strips equal to the width of the pavement slab. The top surface shall be smooth, and holes punched for the slip-dowel bars (load transfer units) shall provide a snug fit without loss in thickness of the material.

A removable steel joint shield conforming to the crown of the pavement slab shall be used over transverse expansion joints. It shall be not thinner than 12 gauge, U.S. Std., and of sufficient stiffness to retain its shape. It shall be formed to provide a snug fit over the joint material and shall extend downward for a distance sufficient to prevent displacement or bending of the joint material from its vertical position. The ends of the joint shield shall be bevelled as may be necessary to clear mechanical finishing equipment

An approved metal tube shall be placed over the graphited end of all slip-dowel bars. This tube shall provide a snug fit for a distance of 2 inches and shall provide a minimum 1 inch clearance pocket assured by means of a positive spacing device.

Steel end guides shall be not thinner than 16 gauge, U.S. Std., and shall be used at each end of the joint

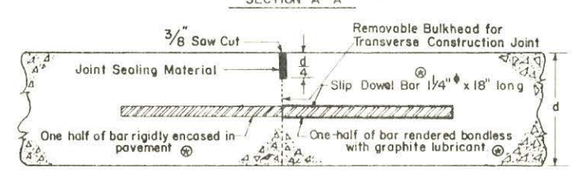
Transverse expansion joints shall be placed in ramp pavements and at other locations where pavement expansions and contractions can not be handled by the pavement relief joint. These locations shall be shown on the construction drawings. Transverse expansion joints in ramp pavements shall be placed at intervals of not over 279 feet. (See DETAIL-A)



END GUIDE FOR TRANSVERSE EXPANSION JOINTS

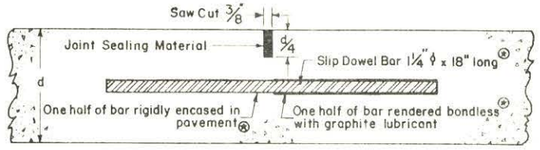
TRANSVERSE EXPANSION JOINTS

⊛ Plastic coated dowel bars supported on approved baskets may be used as an alternate method of load transfer device. The requirements for slip dowel bars in the general notes shall also apply to the plastic coated dowel bars. The requirements for lubricating & bonding the slip dowel bars do not apply to Plastic coated dowel bars.



SECTION B-B

TRANSVERSE CONSTRUCTION JOINT



SECTION B-B

TRANSVERSE CONTRACTION JOINT

Joints shall be placed at intervals of not over 46½ feet and at 46½ feet from expansion joint or pavement relief joints.

‡ Reinforcement Clearance Requirement:

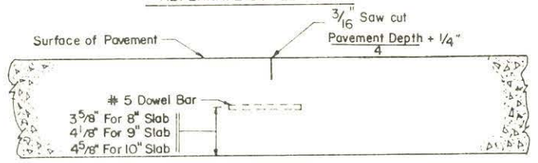
Pav't Depth	Min	Max
8"	2½"	3½"
9"	2½"	4"
10"	2½"	4"

TRANSVERSE CONSTRUCTION & CONTRACTION JOINTS

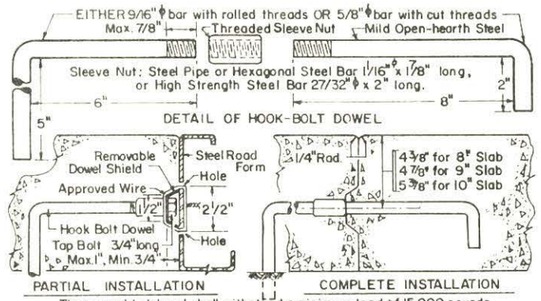


See "Joining of Pavements" for construction required where dowel bars are omitted or are broken off.

ALTERNATE DOWEL BARS



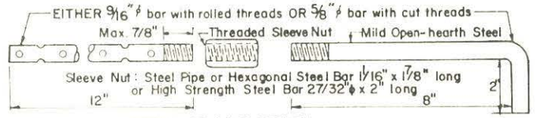
FOR CONSTRUCTION OF TWO LANES AT ONE TIME



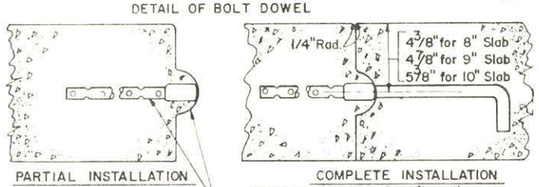
The assembled dowel shall withstand a minimum load of 15,000 pounds.
The 5" leg of the dowel will extend into the subgrade for all pavement depths.
The dowel shield shall stop 6" to 8" each side of all transverse joints.
The removable dowel shield, either steel or iron not thinner than 16 gauge U.S. Std shall be securely wired to the steel forms. Holes in the shield shall be punched so as to permit the placing of the hook bolt dowels in the shield at the required spacings.

Two holes shall be provided in the roadway forms 2½" apart vertically, for wiring the dowel bar shield in the slab, with a maximum horizontal spacing of 3 feet between sets of holes.

HOOK-BOLT DOWEL & REMOVABLE DOWEL SHIELD
FOR CONSTRUCTION OF ADJOINING SUCCESSIVE LANES



DETAIL OF BOLT DOWEL



Keyway and bolt dowel configurations as approved by the Department.

The assembly dowel shall withstand a minimum load of 15,000 lbs.
Manual placing of dowel assemblies will not be permitted.

BOLT DOWEL ASSEMBLY FOR USE WITH
SLIP FORM PAVING EQUIPMENT

DOWELLED LONGITUDINAL CONSTRUCTION JOINTS

GENERAL NOTES

TRANSVERSE CONTRACTION, CONSTRUCTION, & EXPANSION JOINTS

Slip-dowel bars of the size, spacing and position shown on this drawing shall be used as load transfer units in all transverse expansion and construction joints. The center of bars shall be located vertically at least 3½ inches below the finish pavement surface or 3½ inches above the theoretical bottom of pavement or between these limits as desired

The perimeter of the free end of all slip-dowel bars in expansion and construction joints shall be a true circle and free from burrs.

One-half the length of each bar shall be rendered bondless by a coating of graphite lubricant, and this half of the bars in a transverse joint assembly may be placed all on one side of the joint or may be placed alternately on either side of said joint. The uncoated half of the bar shall be rigidly encased in the pavement.

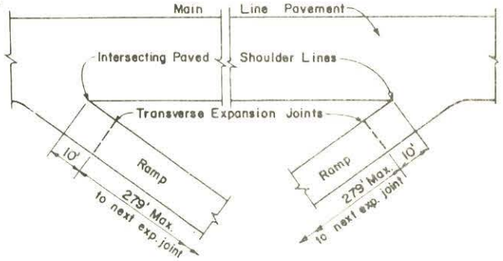
This Standard does not indicate details for the method of supporting the slip dowel bars required as load transfer units in all transverse expansion and transverse construction joints. A drawing (22 inches by 36 inches) showing necessary assembly details for supporting the bars in correct vertical and horizontal position for expansion and for construction joint assemblies shall be prepared by the manufacturer or his representative, and it shall be submitted to and be approved by the Chief Engineer prior to furnishing assemblies on any purchase order or for use on any contract.

The Transverse expansion joints shall not be used in main line pavements unless specifically shown on the drawings, however they shall be used in ramp pavements and will be placed at normal intervals of not over 279 feet.

PAVEMENT WIDENING

Transverse expansion joints shall be placed opposite existing expansion joints except that they shall not be closer than 46½ feet. Transverse contraction and construction joints shall be placed opposite existing construction joints, cleft-type joints or cracks except that they shall not be closer than 24 feet to adjacent transverse expansion or construction joints.

DETAIL-A



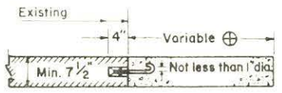
LOCATION OF FIRST TRANSVERSE EXPANSION JOINT IN RAMP PAVEMENT

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PAVEMENT JOINTS

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 of 2
R R Mercer	W. J. Rauser	RC-20
Location & Design Engr.	Deputy Chief Hwy. Engr.	

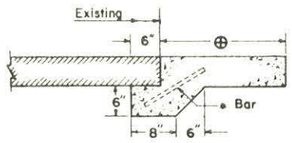
FORM 4237 REV. 7-68



Expansion anchor bolts $\frac{5}{8}$ inch in diameter and 11 inches long with 90° to 180° bends, shall be placed in accordance with Doweled Longitudinal Construction Joint requirements shown on RC-20.

The design and quality of the bolts and the number of lead slugs or swedging units used shall be approved by the Department.

EXPANSION ANCHOR BOLT METHOD



Concrete for underpinning shall be the same mix as, and shall be placed integral with, the new pavement.

Excavation made to greater dimensions than those shown for underpinning shall be replaced with concrete, and backfilling with other material will not be permitted.

Corner breaks shall be repaired by the underpinning method

The underpinning method should not be used if it will interfere with subbase drainage.

UNDERPINNING METHOD

⊕ Payable width of pavement, subgrade, and excavation

Either method shall be used to join new pavement. Only the underpinning method shall be used where the depth of existing pavement or concrete base is less than 7½ inches.

Where dowel bars are broken off or are omitted from doweled longitudinal construction joints, either an expansion anchor bolt or underpinning shall be used.

Premoulded expansion joint filler shall be cut to the cross section of the new pavement. Two sections of filler, if satisfactorily lapped or clipped together, may be used with the underpinning method.

No separate or additional payment will be allowed for materials or labor involved in joining pavement by either method.

Adequate subbase drainage must be provided when the underpinning method is used.

* This bar (#4 x 1'-6" long) is required only in underpinning where dowel bars are broken off or omitted from longitudinal construction joints.

JOINING OF PAVEMENTS

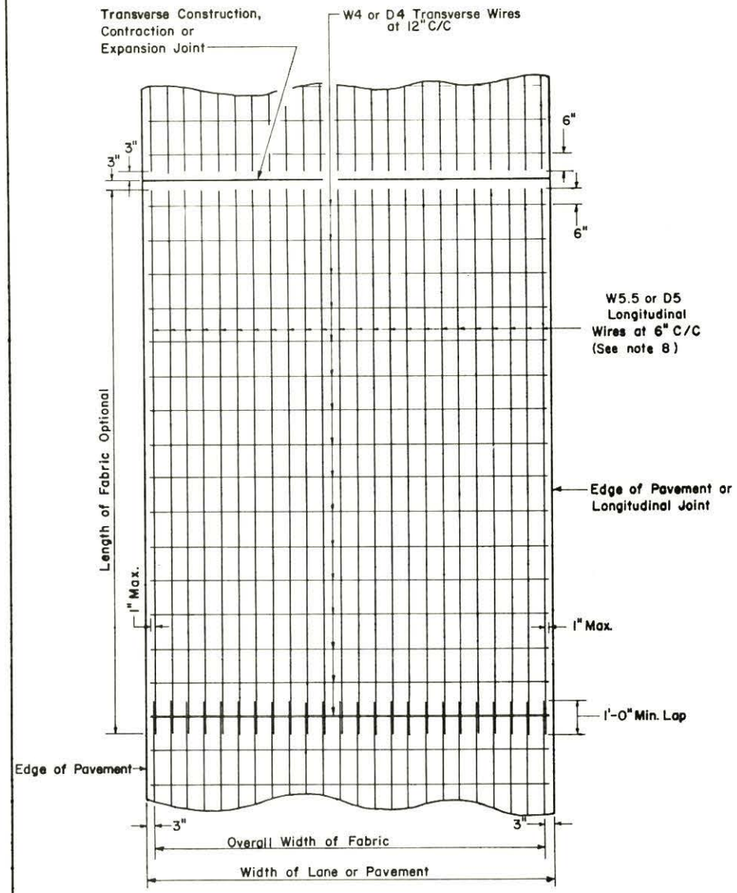
PATCHES

1. The minimum width of patch will be a single lane width.
2. The side of the patch adjacent to a longitudinal joint shall be doweled or underpinned as per widening.
3. The sides of the patch in the transverse direction shall be doweled only
4. A saw cut 2 inches deep will be made along each side of the patch that is not bound by a joint.
5. The depth of the patch will equal that of the existing concrete except the minimum will be 8 inches.
6. Reinforcement will be replaced in kind if not noted otherwise

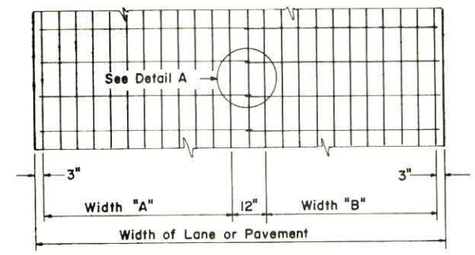
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PAVEMENT JOINTS

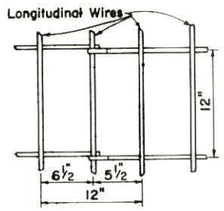
Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 2 Of 2
P R Musser	W J. Rawa	RC-20
Location & Design Engineer	Deputy Chief Hwy. Engr.	



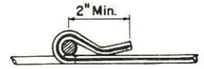
WIRE FABRIC REINFORCEMENT



ALTERNATE HINGED FABRIC

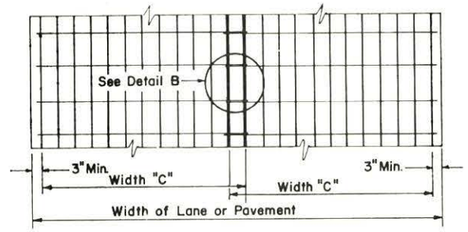


DETAIL A

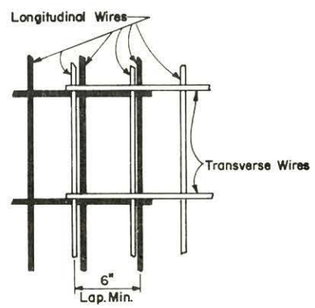


HINGE DETAIL

Other designs may be used as approved by the engineer



ALTERNATE LAPPED FABRIC



DETAIL B

WIDTH OF LANE OR PAVEMENT	NUMBER OF WIRES	WIDTH "A"	WIDTH "B"	WIDTH "C"	OVERALL WIDTH OF FABRIC
11'-0"	22	60"	54"	66"	10'-6"
12'-0"	24	66"	60"	72"	11'-6"
13'-0"	26	72"	66"	78"	12'-6"
14'-0"	28	—	—	84"	13'-6"
15'-0"	30	—	—	90"	14'-6"
16'-0"	32	—	—	96"	15'-6"
17'-0"	34	—	—	102"	16'-6"
18'-0"	36	—	—	108"	17'-6"

GENERAL NOTES

1. Fabric reinforcement shall be constructed in accordance with Specification Form 408.
2. For variable width pavement and for widths not shown, the reinforcement shall be cut as required.
3. Wire fabric reinforcement may be placed with transverse wires above or below longitudinal wires.
4. Depth for placement of wire fabric reinforcement, measured from top of pavement to the top of fabric shall be as follows with a tolerance of ± ½":

Pav't. Depth	Depth of Fabric
8"	3"
9"	3½"
10"	3½"

5. Hinged fabric reinforcement may be used for 11'-0", 12'-0", and 13'-0" widths where longitudinal joints are not permitted.
6. Lapped fabric reinforcement may be used for all widths where longitudinal joints are not permitted.
7. All longitudinal and transverse laps of wire fabric reinforcement shall be securely tied.
8. On projects where additional lanes are being added to existing cement concrete pavements and the existing joint spacing is more than 46.5', the longitudinal wire size shall be W6 or D5.5.
9. Wire fabric reinforcement may be constructed of smooth wire (sizes designated by W) or deformed wire (sizes designated by D) or a combination of both.

ASTM A-82-72
AASHTO M32-74

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

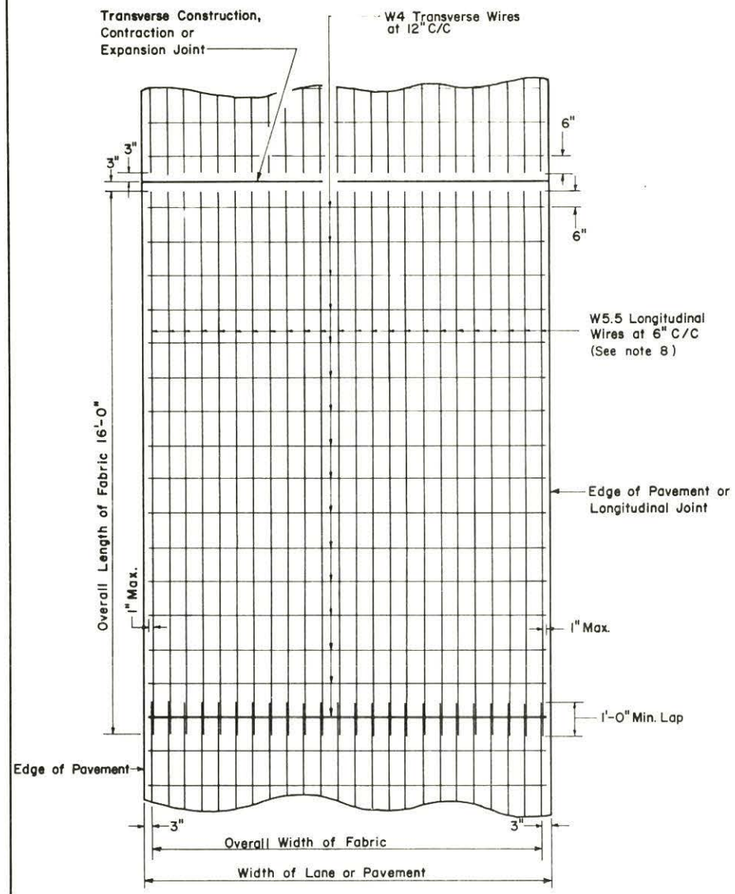
REINFORCEMENT FOR REINFORCED CEMENT CONCRETE PAVEMENT

Recommended Aug. 20, 1975
B.D. Rowbine
Director, Bureau of Design

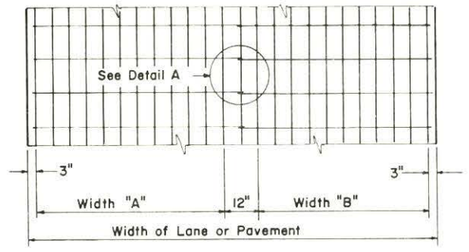
Approved Aug. 20, 1975
Robert R. Musser
Deputy Chief Hwy. Engr.

Sht. 1 Of 1
RC-21

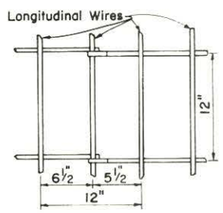
TRACED BY
FINAL BY



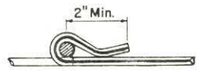
WIRE FABRIC REINFORCEMENT



ALTERNATE HINGED FABRIC

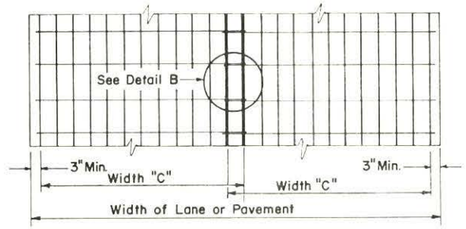


DETAIL A

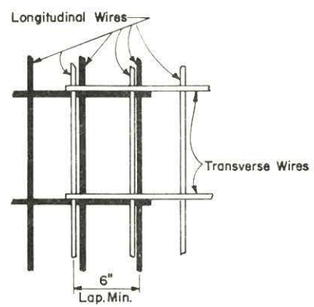


HINGE DETAIL

Other designs may be used as approved by the engineer



ALTERNATE LAPPED FABRIC



DETAIL B

GENERAL NOTES

1. Fabric reinforcement shall be constructed in accordance with Specification Form 408.
2. For variable width pavement and for widths not shown, the reinforcement shall be cut as required.
3. Wire fabric reinforcement may be placed with transverse wires above or below longitudinal wires.
4. Depth for placement of wire fabric reinforcement, measured from top of pavement to the top of fabric shall be as follows with a tolerance of ± ½":

Pav't. Depth	Depth of Fabric
8"	3"
9"	3½"
10"	3½"

5. Hinged fabric reinforcement may be used for 11'-0", 12'-0", and 13'-0" widths where longitudinal joints are not permitted.
6. Lapped fabric reinforcement may be used for all widths where longitudinal joints are not permitted.
7. All longitudinal and transverse laps of wire fabric reinforcement shall be securely tied.
8. On projects where additional lanes are being added to existing cement concrete pavements and the existing joint spacing is more than 46.5', the longitudinal wire size shall be W6.0.

WIDTH OF LANE OR PAVEMENT	NUMBER OF WIRES	WIDTH "A"	WIDTH "B"	WIDTH "C"	OVERALL WIDTH OF FABRIC
11'-0"	22	60"	54"	66"	10'-6"
12'-0"	24	66"	60"	72"	11'-6"
13'-0"	26	72"	66"	78"	12'-6"
14'-0"	28	—	—	84"	13'-6"
15'-0"	30	—	—	90"	14'-6"
16'-0"	32	—	—	96"	15'-6"
17'-0"	34	—	—	102"	16'-6"
18'-0"	36	—	—	108"	17'-6"

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

REINFORCEMENT FOR REINFORCED CEMENT CONCRETE PAVEMENT

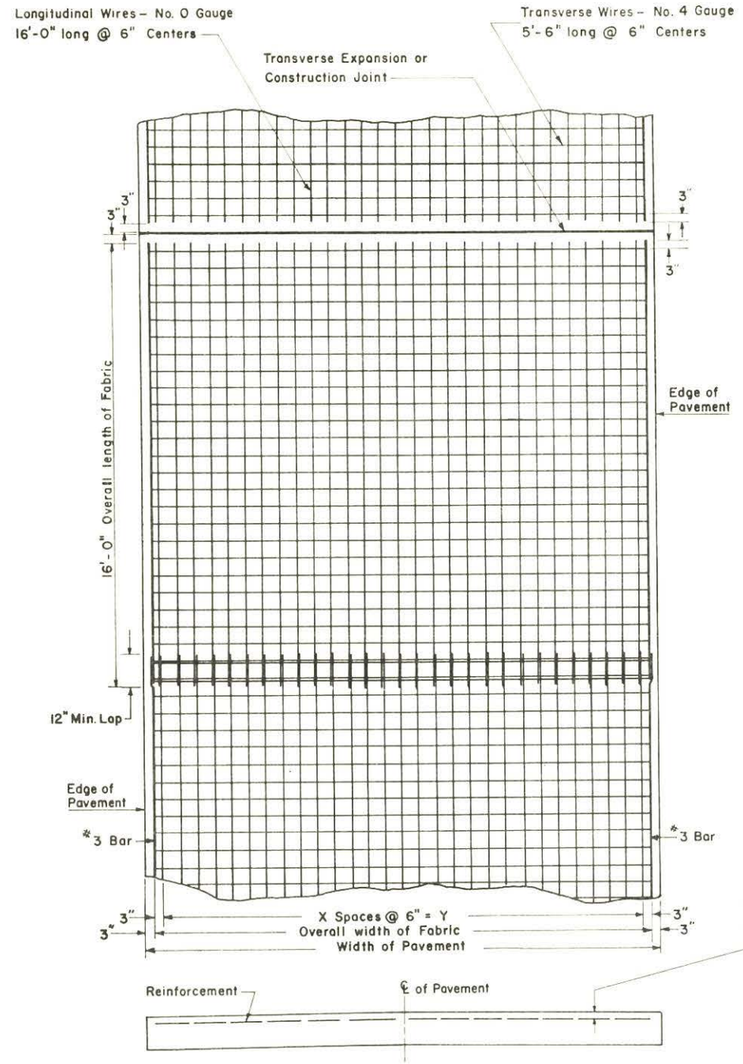
Recommended Dec 1, 1974
B.D. Rossbie
Director, Bureau of Design

Approved Dec 1, 1974
Robert R. Mease
Deputy Chief Hwy. Engr.

Sht. 1 Of 1
RC-21

TRACED BY
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VOID

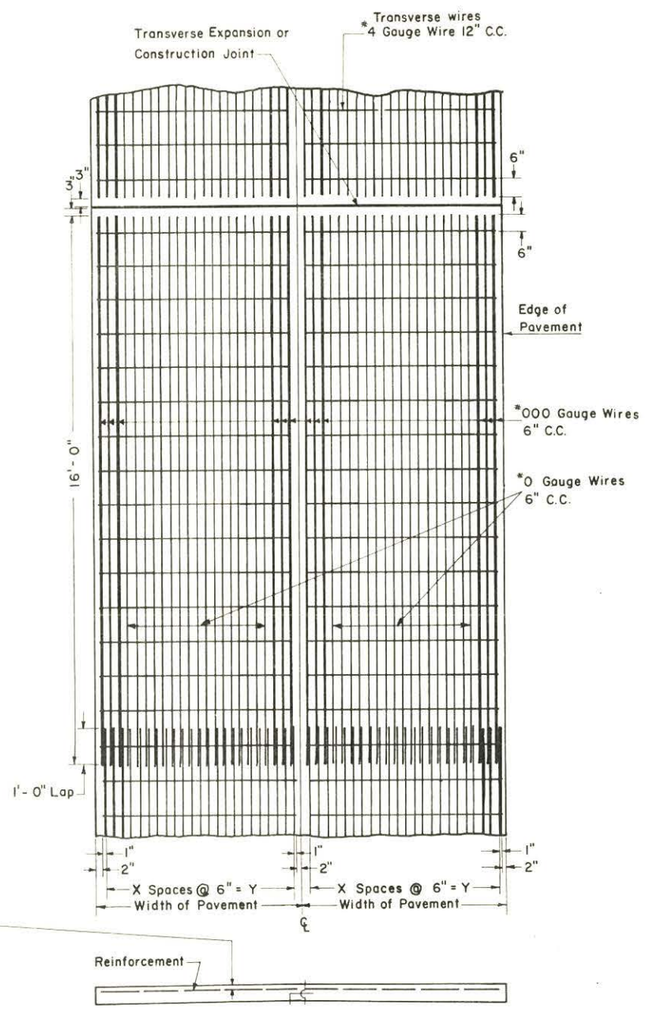


Reinf. Cl. Requirements

Pav't. Depth	Min.	Max.
8"	2½"	3½"
9"	2½"	4"
10"	2½"	4"

WIDTH OF PAVEMENT	X	WIDTH Y	OVERALL WIDTH OF FABRIC
15'-0"	28	14'	14'-6"
16'-0"	30	15'	15'-6"
17'-0"	32	16'	16'-6"
18'-0"	34	17'	17'-6"

TYPE J REINFORCEMENT - FABRIC



WIDTH OF PAVEMENT	X	WIDTH Y
11'-0"	21	10'-6"
12'-0"	23	11'-6"
13'-0"	25	12'-6"
14'-0"	27	13'-6"

TYPE F REINFORCEMENT - FABRIC

GENERAL NOTES

1. Pavement reinforcement shall be placed as shown on the pavement cross section.

2. Fabric reinforcement shall consist of members rigidly attached at all joints or points of intersection in accordance with the Department's Specifications, Form 408.

3. The size and spacing of the wire members shall be as shown on this drawing.

4. The minimum lap of reinforcement shall be twelve (12) inches from end to end of the wires measured along the line of the lap of the wires as shown.

5. All types of reinforcement, if not assembled on the project, shall be delivered in flat sheets of the indicated dimensions at the site of the work.

6. For variable width pavement and for widths not shown, the reinforcement shall be cut as required and placed with the closely spaced or heavy members adjacent to the pavement edges.

7. All types of reinforcement may be furnished with an approved type of hinged joint. The spacing of longitudinal members affected by the hinge shall not vary more than 1 inch from the spacings shown on these drawings. The hinge shall be placed parallel to the ℄ of the pavement. Type F and J reinforcement with approved hinges are shown on Sheet RC-21, Sheet 2 of 2.

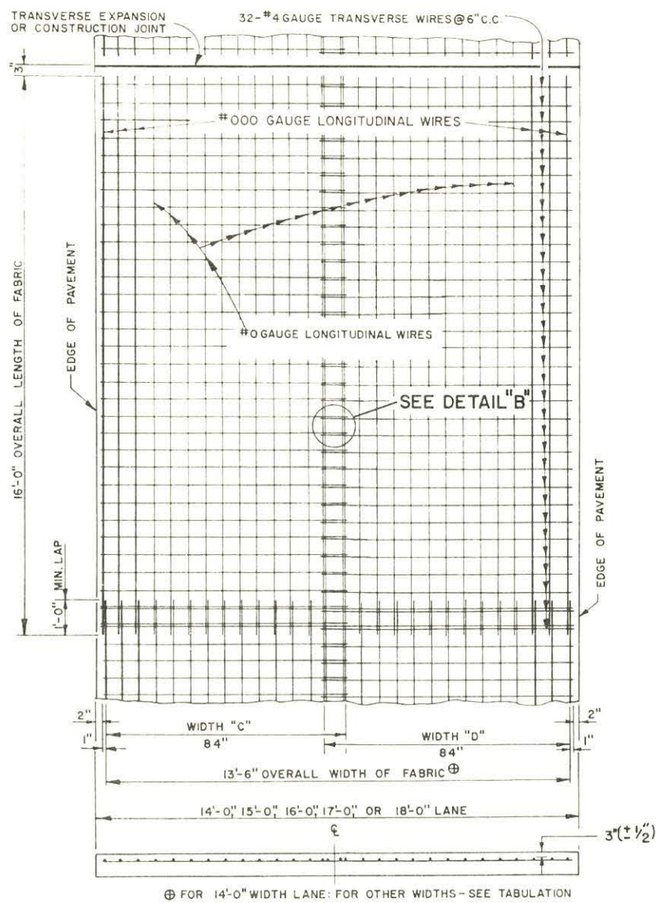
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD TYPES OF REINFORCEMENT

Recommended	Approved	Sht. 1 Of 2
Dec. 1, 1971	Dec. 1, 1971	RC-21
P R Musser	W. J. Rover	
Location & Design Engineer	Deputy Chief Hwy Engr.	

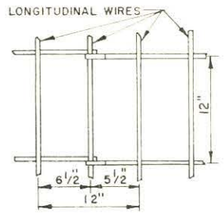
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FORM 4237 REV 3-61



⊕ FOR 14'-0" WIDTH LANE: FOR OTHER WIDTHS - SEE TABULATION

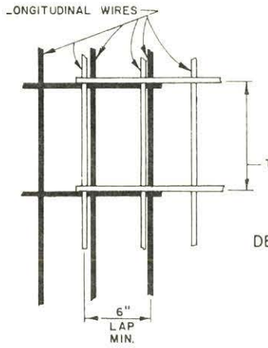
TYPE J REINFORCEMENT - FABRIC



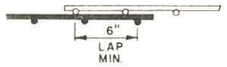
DETAIL "A"
(HINGE JOINT)



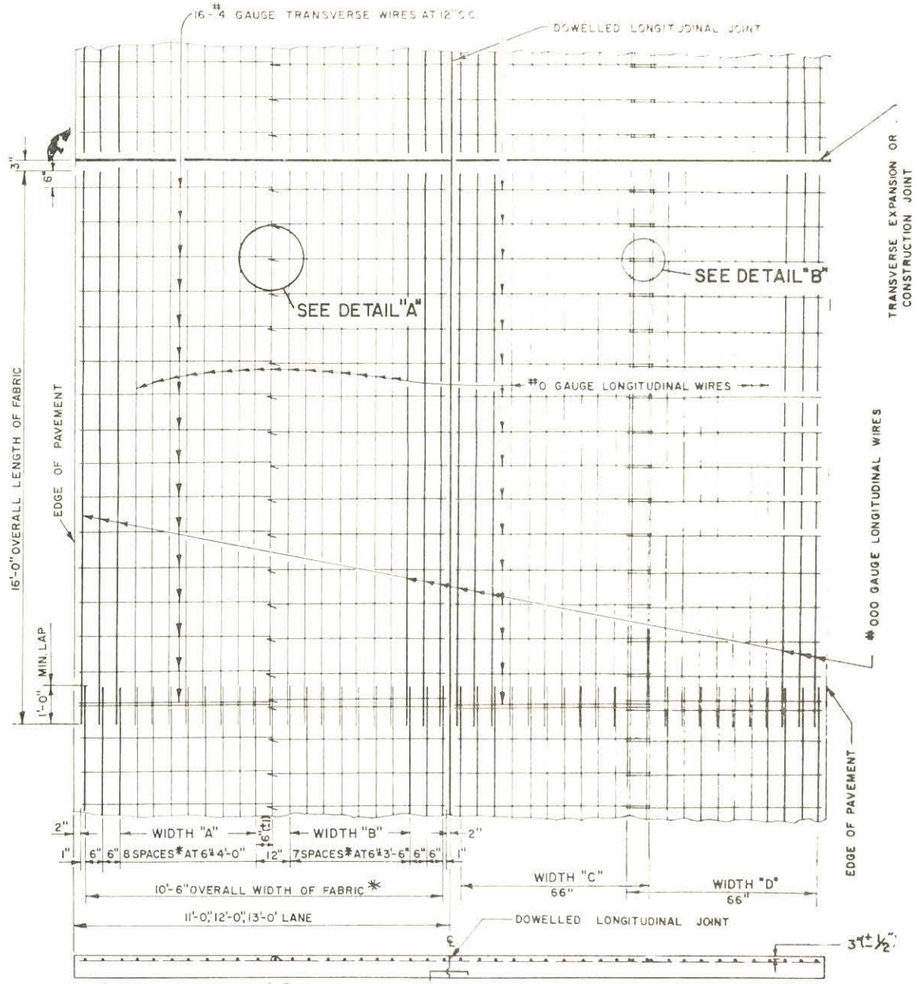
DETAIL OF HINGE JOINT, OTHER DESIGNS MAY BE USED AS APPROVED BY THE ENGINEER.



DETAIL "B"



12" FOR TYPE F REINF.
6" FOR TYPE J REINF.



* Fabric shown is for lane 11'-0" wide. For other widths, see tabulation

TYPE F REINFORCEMENT - FABRIC

WHERE LANES WIDER THAN 14'-0" ARE USED, THE FOLLOWING DIMENSIONS APPLY.

LANE WIDTH	WIDTH "C"	WIDTH "D"	OVERALL WIDTH OF FABRIC
15'-0"	90"	90"	14'-6"
16'-0"	96"	96"	15'-6"
17'-0"	102"	102"	16'-6"
18'-0"	108"	108"	17'-6"

LAPPED TYPE J REINFORCEMENT MAY BE USED, FOR 14'-0", 15'-0", 16'-0", 17'-0", AND 18'-0" WIDTH PAVEMENT LANES WHERE LONGITUDINAL JOINTS ARE NOT PERMITTED.

WHERE LANES WIDER THAN 11'-0" ARE USED, THE FOLLOWING DIMENSIONS APPLY.

LANE WIDTH	WIDTH "A"	WIDTH "B"	OVERALL WIDTH OF FABRIC	WIDTH "C"	WIDTH "D"	LANE WIDTH
12'-0"	9 SPACES AT 6" = 4'-6"	8 SPACES AT 6" = 4'-0"	11'-6"	72"	72"	12'-0"
13'-0"	10 SPACES AT 6" = 5'-0"	9 SPACES AT 6" = 4'-6"	12'-6"	78"	78"	13'-0"
				84"	84"	14'-0"

HINGED TYPE F REINFORCEMENT MAY BE USED FOR 11'-0", 12'-0", AND 13'-0" WIDTH PAVEMENT LANES WHERE DOWELLED LONGITUDINAL JOINTS ARE NOT PERMITTED.
LAPPED TYPE F REINFORCEMENT MAY BE USED FOR 11'-0", 12'-0", 13'-0" AND 14'-0" WIDTH PAVEMENT WHERE DOWELLED LONGITUDINAL JOINTS ARE NOT PERMITTED.

NOTES:
STEEL WIRE FABRIC SHALL CONFORM TO THE DEPARTMENT'S SPECIFICATIONS, FORM 408, AND SHALL CONSIST OF HINGED SHEETS OR LAPPED SHEETS RIGIDLY ATTACHED AT POINTS OF INTERSECTION.
THE GAUGE AND SPACING OF THE LONGITUDINAL AND TRANSVERSE WIRES FOR THE VARIOUS WIDTHS OF PAVING LANES SHALL BE AS SHOWN ABOVE.
THE MINIMUM LAP OF REINFORCEMENT FROM END TO END OF WIRES MEASURED ALONG THE LINE OF LAP OF THE WIRES AS SHOWN SHALL BE 1'-0" FOR LONGITUDINAL WIRES AND 0'-6" FOR TRANSVERSE WIRES.
STEEL WIRE FABRIC MAYBE PLACED WITH TRANSVERSE WIRES OVER OR UNDER LONGITUDINAL WIRES.

NOTES
Pavement reinforcement shall be placed 3"(± ½") clear, below pavement surface.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

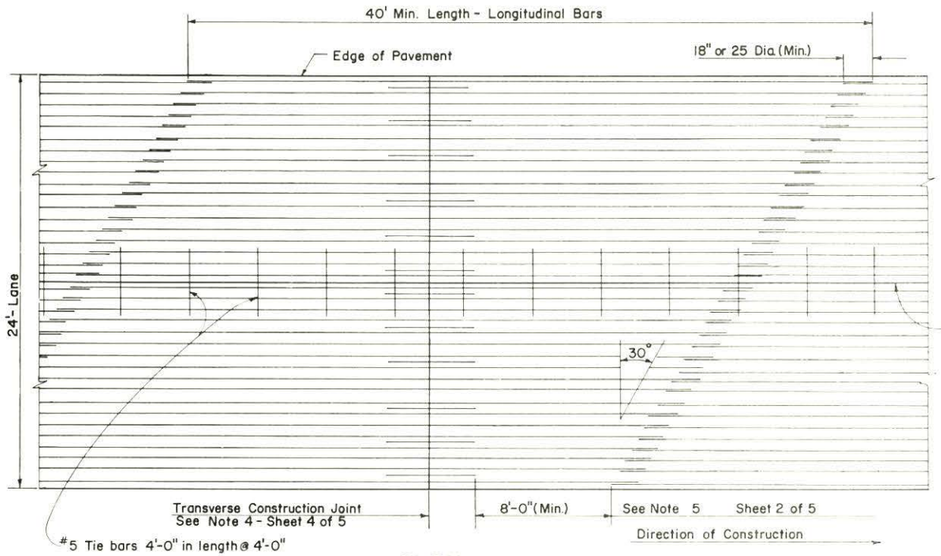
STANDARD TYPES OF REINFORCEMENT

Recommended Dec. 1, 1971
R R Musser
Location & Design Engineer

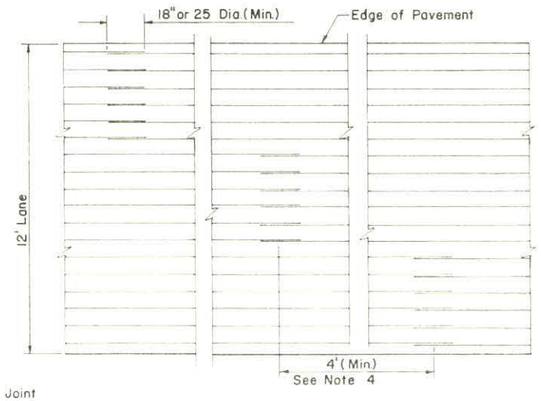
Approved Dec. 1, 1971
W. J. Rover
Deputy Chief Hwy. Engr.

Sht. 2 of 2
RC-21

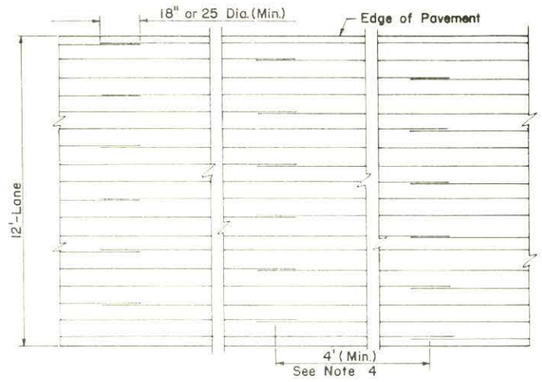
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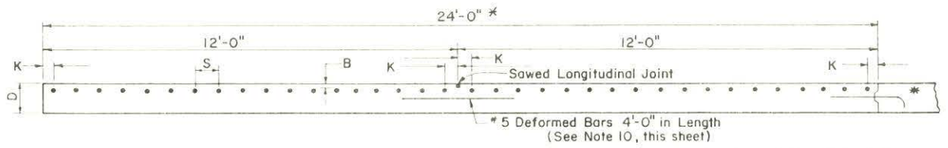
PLAN
LOOSE BARS



ALTERNATE PLAN
LOOSE BARS



ALTERNATE PLAN
LOOSE BARS



TYPICAL CROSS SECTION
LOOSE BARS

TABLE I

Thickness D (inches)	Longitudinal Steel 12' Lane				Transverse Bars (when required) ⊕
	No. of Bars	Bar Size	S (in.)	K (in.)	
8	23	#5	6 1/4	3 1/4	#3 Bars @ 22" or
	16	#6	9	4 1/2	#4 Bars @ 40"
9	25	#5	5 3/4	3	#4 Bars @ 34" or
	18	#6	8	4	#5 Bars @ 48"
10	28	#5	5	4 1/2	#4 Bars @ 30" or
	20	#6	7 1/4	3 1/8	#5 Bars @ 48"

⊕ Transverse bars required by special provision only

NOTES

1. Material and workmanship shall be in accordance with Specification Form 408.
2. All Longitudinal Bars shall have a minimum lap of 18" or 25 diameters whichever is greater.
3. Bars of high yield strength shall not be bent.
4. No more than one-third of the Longitudinal Bars shall be lapped within the same transverse plane. The minimum distance between laps is 4'-0".
5. For 36' pavement width in one operation on a straight slope, both joints at 12' intervals shall be sawed Longitudinal Joints in accordance with Form 408, Section 501.3. For 36' pavement width in two operations, 24' and 12' widths, the center joint for the 24' width shall be a sawed Longitudinal Joint and the remaining joint shall be a keyed and tied construction joint.
6. For 48' pavement width, the outer joints shall be sawed longitudinal joints and the center joint shall be a keyed construction joint with no ties.
7. Longitudinal construction joints are to be constructed in accordance with Standard Drawings RC-20, except ties are eliminated at the center joint of the 48' pavement width.
8. Transverse steel bars, when required by special provision, may be provided in full width lengths for 24' and 36' pavement widths, and tie bars will not be required. When Transverse Bars are provided in one lane widths, the 4' tie bar shall be provided and be positioned between the Transverse Bars. Transverse Bars shall have a 2" min. clearance from end of bar to edge of pavement or lane.
9. The target depth for longitudinal bar placement measured from top of pavement to the top of bar shall be as indicated below with a tolerance of ± 3/4":

D	B
8"	3 1/4"
9"	3 1/2"
10"	3 3/4"

10. The preferred location for the tie bars is at mid-depth. The tie bars shall be placed below the longitudinal steel for any method of steel placement.

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CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

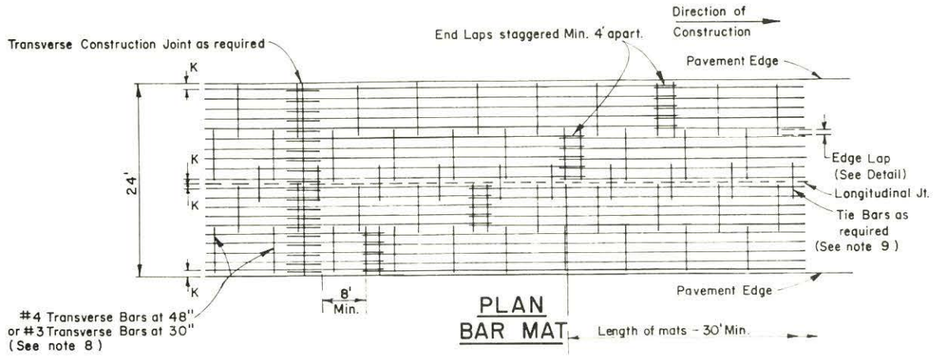
Recommended June 1, 1976
B.D. Rubis
Director, Bureau of Design

Approved June 1, 1976
Deputy Chief Hwy. Engr.

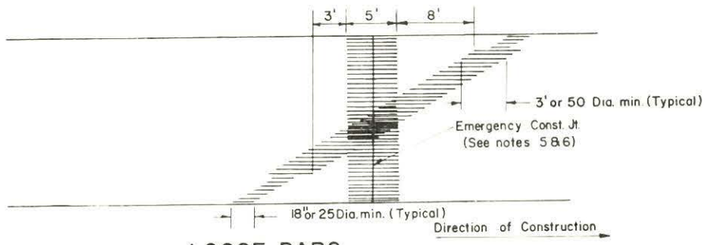
Sht. 1 Of 5

RC-22

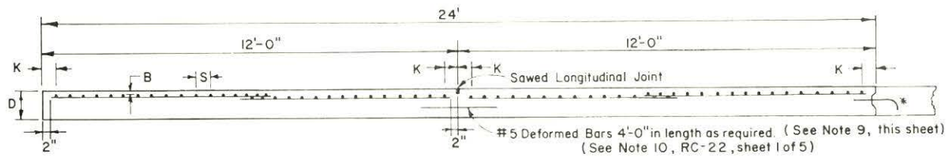
TRACED BY
FINAL BY



PLAN
BAR MAT

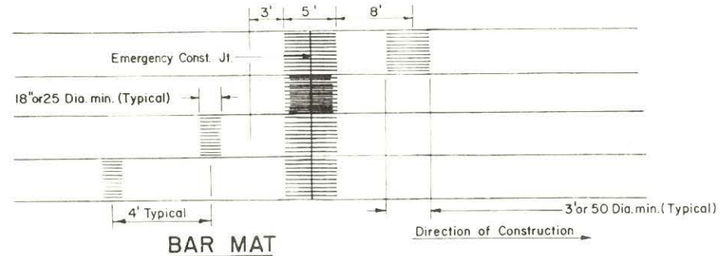


LOOSE BARS
EMERGENCY CONSTRUCTION JOINT

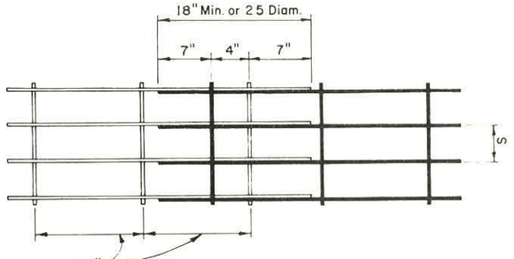


TYPICAL CROSS SECTION
BAR MAT

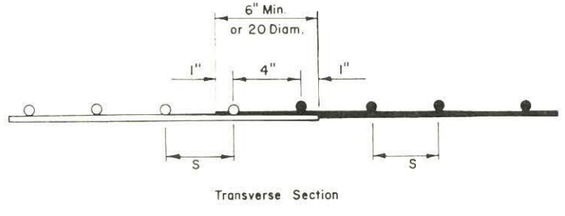
NOTE:
See table I for values of S, K, D
Sheet 1 of 5



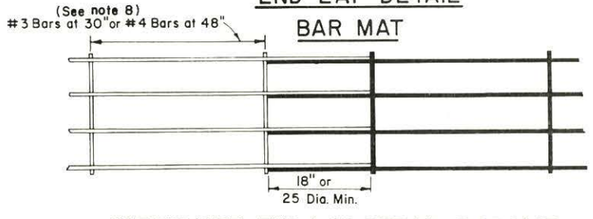
BAR MAT
EMERGENCY CONSTRUCTION JOINT



END LAP DETAIL
BAR MAT



EDGE LAP DETAIL
BAR MAT



ALTERNATE END LAP DETAIL-BAR MAT

NOTES

1. Materials and workmanship shall be in accordance with Specification Form 408.
2. All Longitudinal Bars shall have a minimum lap of 18" or 25 Diameters which ever is greater.
3. Bars of high yield strength shall not be bent.
4. The target depth for longitudinal bar placement measured from top of pavement to the top of bar shall be as indicated below with a tolerance of ± 3/4":

D	B
8"	3 1/4"
9"	3 1/2"
10"	3 3/4"

Transverse steel may be on the top or bottom except as qualified in note 9.

5. At all Lap splices occurring within 8 feet beyond the Joint limits, in the direction of paving and 3 feet back of the Construction Joint limits, the length of lap shall be double that normally specified, (3' or 50 Diameters minimun whichever is greater) or each splice shall be strengthened by splicing in symmetrically with the lap, a 6 foot length of deformed bar of the same nominal size as the longitudinal reinforcement.
6. The Emergency Construction Joint shall be strengthened by the addition of supplementary deformed bars, 5 foot long and of the same nominal size as the longitudinal reinforcement, placed symmetrically with the joint and at a uniform spacing along the joint. The number of supplementary bars shall be as to increase the areas of steel through the joint by at least one third.
7. Bar Mats shall have a nominal width of 4', 6', or 8'.
8. When transverse bars are required by special provision, the transverse bars for bar mats shall be as indicated in Table I on Sheet 1 of 5.
9. When 8' mats are used, the tie bar shall not be used because the bar mat extends through the longitudinal joint and transverse steel must be on the bottom.

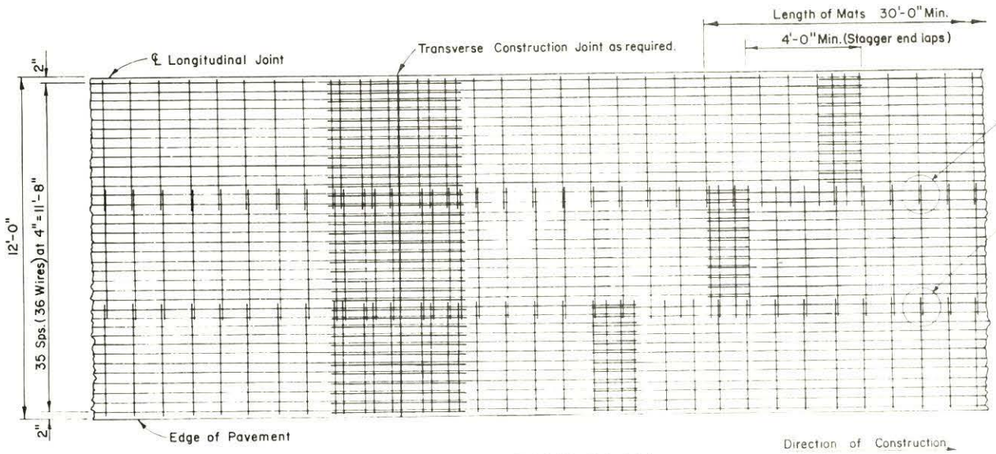
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended June 1, 1976
R.O. Lewis
Director, Bureau of Design

Approved June 1, 1976
Robert R. Mann
Deputy Chief Hwy. Engr.

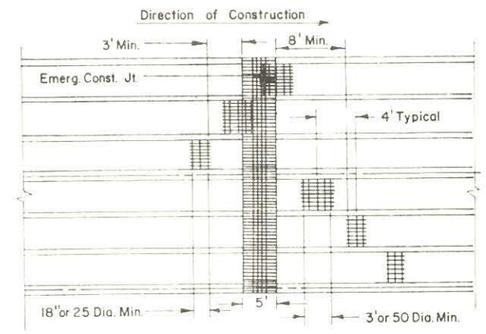
Sht. 2 Of 5
RC-22



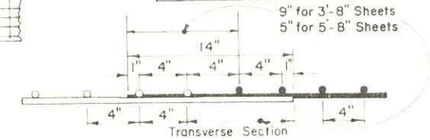
TYPICAL REINFORCING PLAN USING DEFORMED WELDED WIRE FABRIC

TABLE 2

DEFORMED WELDED WIRE FABRIC DETAILS					
12' Slab		Longitudinal Steel 12' Slab			Transverse Steel
Slab Thickness D (Inches)	Cross Sectional Area of 12' Slab Sq. In.	Req'd Cross Sectional Area of Steel Sq. In	36 at 4" Wire Size	36 at 4" Area Sq. In.	Size & Spacing
8	1,152	6.912	D-19.2	6.912	W4 or D4 @ 12"
9	1,296	7.776	D-21.6	7.776	W4 or D4 @ 12"
10	1,440	8.640	D-240	8.640	W4 or D4 @ 12"

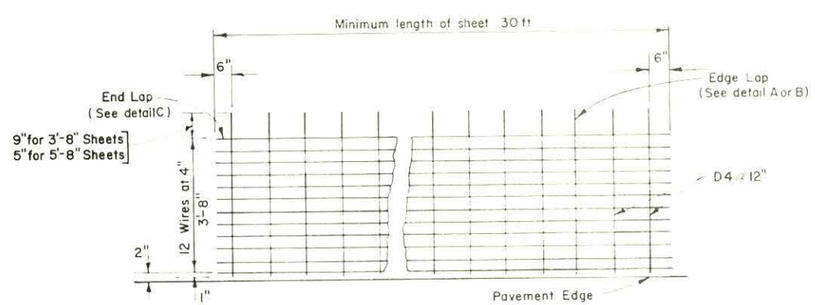


EMERGENCY CONSTRUCTION JOINT DEFORMED WELDED WIRE FABRIC

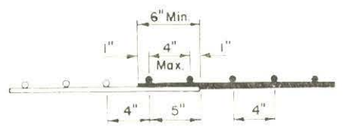


EDGE LAP DETAIL

Detail A

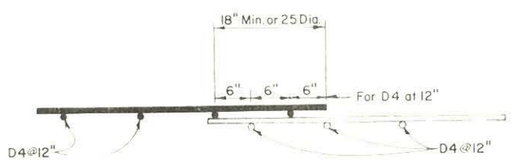


TYPICAL REINFORCING PLAN DEFORMED WELDED WIRE FABRIC



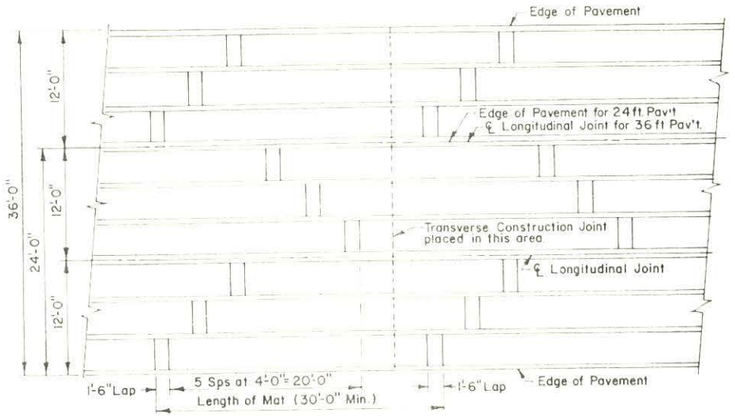
EDGE LAP DETAIL

Detail B

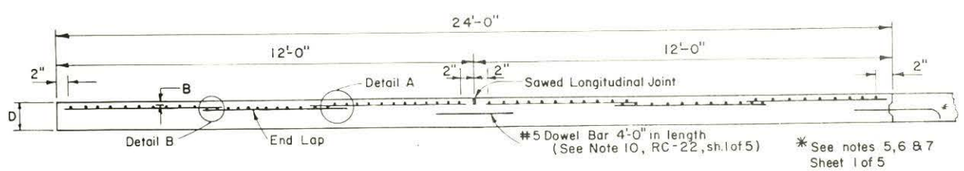


END LAP DETAIL

Detail C



TYPICAL MAT PLACEMENT PATTERN DEFORMED WELDED WIRE FABRIC



TYPICAL CROSS SECTION

NOTES

1. All Materials and Workmanship shall be in accordance with Specifications Form 408.
2. Deformed Tie Bars in the Longitudinal Joint shall be placed at Mid Point of the Slab and shall conform to the spacing indicated in Table I.
3. All Longitudinal Wires in the Fabric shall have a minimum Lap of 18" or 25 Dia., whichever is greater.
4. Transverse Wire in the consecutive Fabric sheets shall have a minimum edge lap of 6".
5. The Emergency Construction Joint shall be strengthened by the addition of supplementary Deformed Bars, 5 feet long and of the same nominal size as the Longitudinal Reinforcement, (or #5 Deformed Bars) placed symmetrically with the joint and at a uniform spacing along the joint. The number of supplementary bars shall be such as to increase the area of steel through the joint by at least one third.
6. At all Lap splices occuring within 8 feet beyond the Const. Joint limits, in the direction of paving and 3 feet back of the Const. Joint limits, the length of lap shall be double that normally specified, (3' or 50 Diameters minimum whichever is greater) or each splice shall be strengthened by splicing in symmetrically with the lap, a 6 foot length of deformed bar of the same nominal size as the longitudinal reinforcement.
7. Deformed Welded Wire Fabric may have a nominal width of either 4', 6' or 8'. The sawed long. jt is required at center line of 24' pavement width (See Note 9 on RC-22, Sheet 2 of 5)
8. The target depth for longitudinal wire placement measured from top of pavement to the top of wire shall be as indicated below with a tolerance of ± 3/4":

D	B
8"	3 1/4"
9"	3 1/2"
10"	3 3/4"

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CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

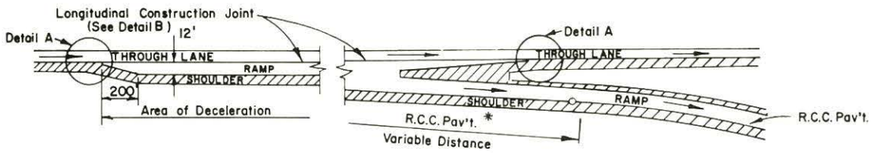
Recommended June 1, 1976
B.A. Crumbie
Director, Bureau of Design

Approved June 1, 1976
Charles R. Moses
Deputy Chief Hwy. Engr.

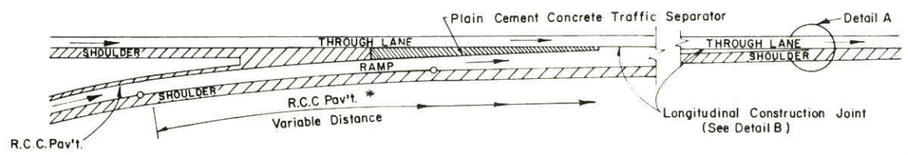
Sht. 3 Of 5

RC-22

RAMP CONNECTION DETAILS

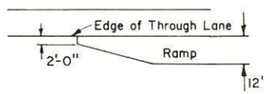


EXIT TERMINAL

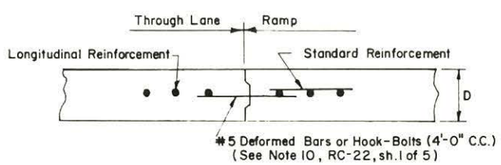


ENTRANCE TERMINAL

* When the ramp connection is located 500' or less from the terminus of the main line C.R.C. pavement, this portion of the ramp pavement shall be C.R.C. and a terminal joint shall be used on the ramp.

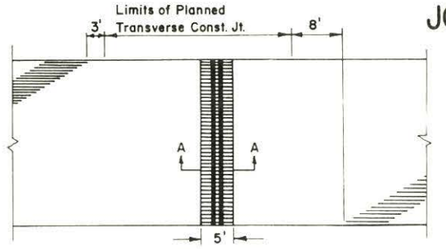


DETAIL A

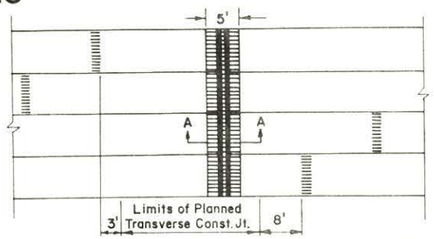


DETAIL B

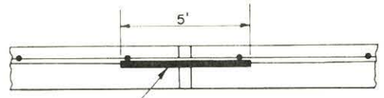
TRANSVERSE CONSTRUCTION JOINT DETAILS



LOOSE BARS

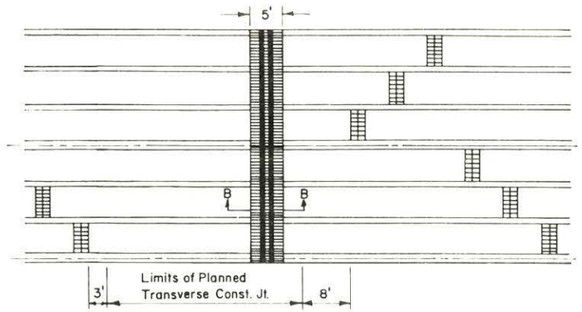


BAR MAT



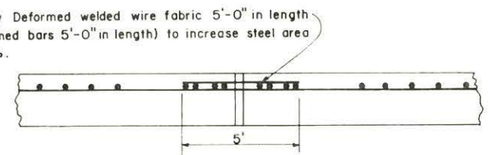
Supplementary Deformed Bars (same size as longitudinal steel) 5' in length to increase steel area at least 33%.

SECTION A-A



DEFORMED WELDED WIRE FABRIC

Supplementary Deformed welded wire fabric 5'-0" in length (or #5 deformed bars 5'-0" in length) to increase steel area at least 33%.



SECTION B-B

NOTES

1. Transverse Construction Joints are required at the end of a days work or whenever paving operations are interrupted for 30 min. or more. The paving operation shall be planned so that the construction joint will fall within the Limits of Planned Transverse Construction Joint shown on the Transverse Construction Joint Details. Any joint outside this area will be considered an Emergency Construction Joint.
2. The bulkhead must be set perpendicular to the centerline of the pavement and be approved by the engineer.
3. Longitudinal steel shall extend through the bulkhead and be properly supported from the subbase beyond the bulkhead to prevent undue deflection during paving operations.
4. Supplementary deformed bars, 5' long and of the same nominal size as the longitudinal reinforcement shall be placed symmetrically with the joint and at a uniform spacing when loose or bar mats are utilized. The number of supplementary bars shall be such as to increase the area of steel through the joint, by at least one-third.
5. Supplementary deformed welded wire fabric 5'-0" in length (or #5 deformed bars 5'-0" in length) shall be placed symmetrically with the joint when deformed welded wire fabric is utilized. The deformed wire fabric used (or #5 deformed bars) shall be such as to increase the area of steel through the joint by at least one-third.

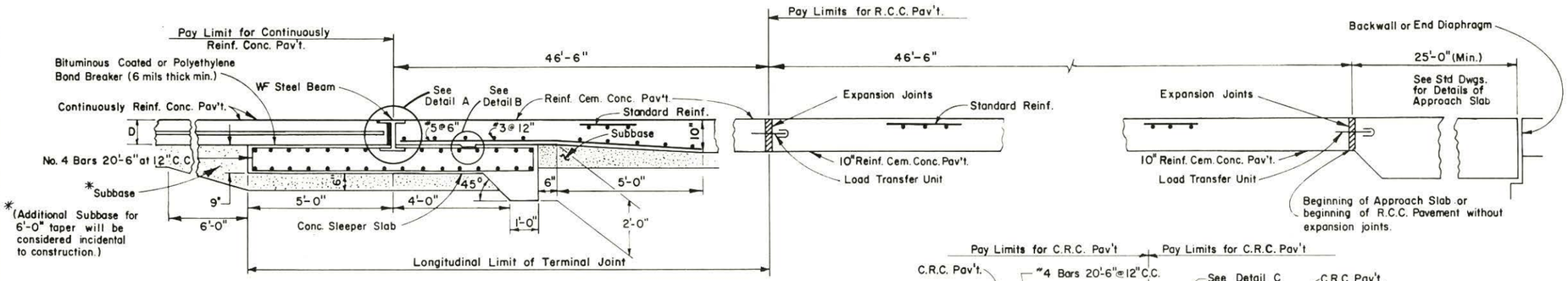
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

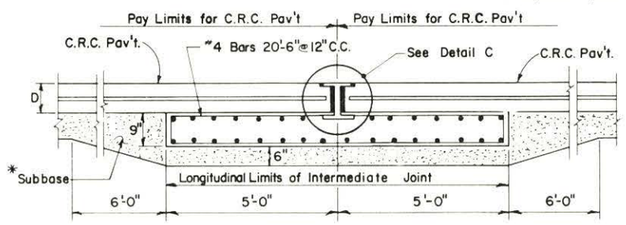
Recommended June 1, 1976
B.O. Sanders
Director, Bureau of Design

Approved June 1, 1976
Robert P. Maxwell
Deputy Chief Hwy. Engr.

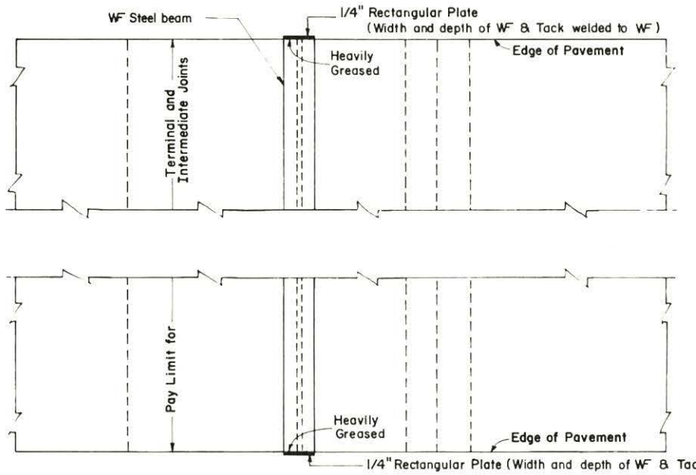
Sht. 4 Of 5
RC-22

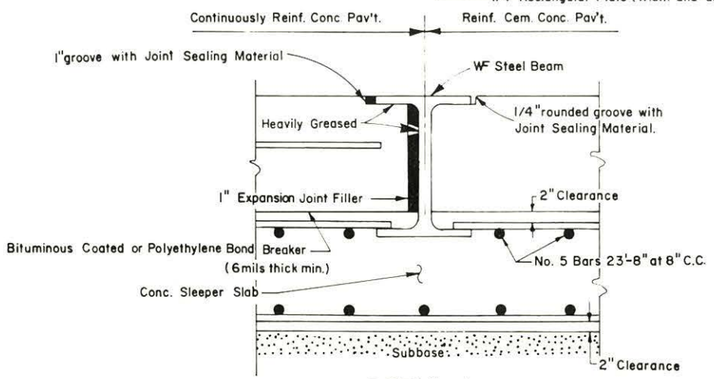


TERMINAL JOINT

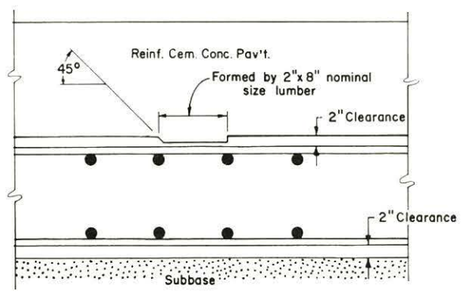


INTERMEDIATE JOINT

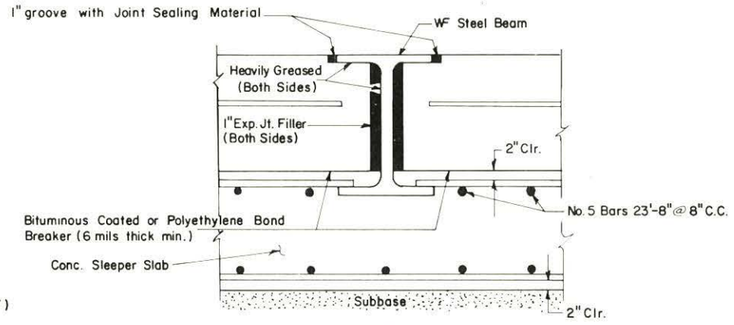




DETAIL A



DETAIL B



DETAIL C

NOTES

1. All materials and workmanship shall be in accordance with specifications Form 408.
2. Joint sealing material for the grooved joint shall comply with Section 705.5 of Form 408.
3. Expansion joint filler shall be cork or rubber and shall comply with AASHO Designation M 153.
4. The surface of the conc. sleeper slab on the continuously reinforced conc. pavement side of the joint shall be steel trowel finished.
5. Pipe foundation under drain Type A with Type II backfill shall be used for transverse drainage under the Sleeper Slab on the upgrade side and will be measured and paid for as specified in Section 610.
6. Length under 500' between Structures use Reinforced Cement Concrete Pavement only, conventionally jointed, 46½' slabs, as required.
7. Length 500' and over between structures-use:
   a. Continuously Reinforced Concrete Pavement.
   b. One (1) Terminal Joint at each end of pavement at struct.
   c. One (1), 46½' length slabs, conventionally jointed (exp. jt.) pavement, at each end of pavement between terminal joint and approach slab.
   d. One (1) Bridge Approach Slab adjacent to each structure.
8. At the termini of each continuously reinforced paving project, an Intermediate Joint will be required if the adjacent projects are not paved during the same construction season. If paving an adjacent project started during the same construction season the "Emergency Construction Joint" may be utilized at the project terminus.

TABLE 3

WIDE FLANGE WEIGHT & DIMENSIONS						
Pavement Thickness D (inches)	Embedment in Sleeper Slab (inches)	Beam Weight Lb.	Beam Depth (inches)	Flange Width (inches)	Flange Thickness (inches)	Web Thickness (inches)
8	4 1/4	58	12 1/4	10	5/8	3/8
9	3 1/4	58	12 1/4	10	5/8	3/8
10	3 7/8	61	13 7/8	10	5/8	3/8

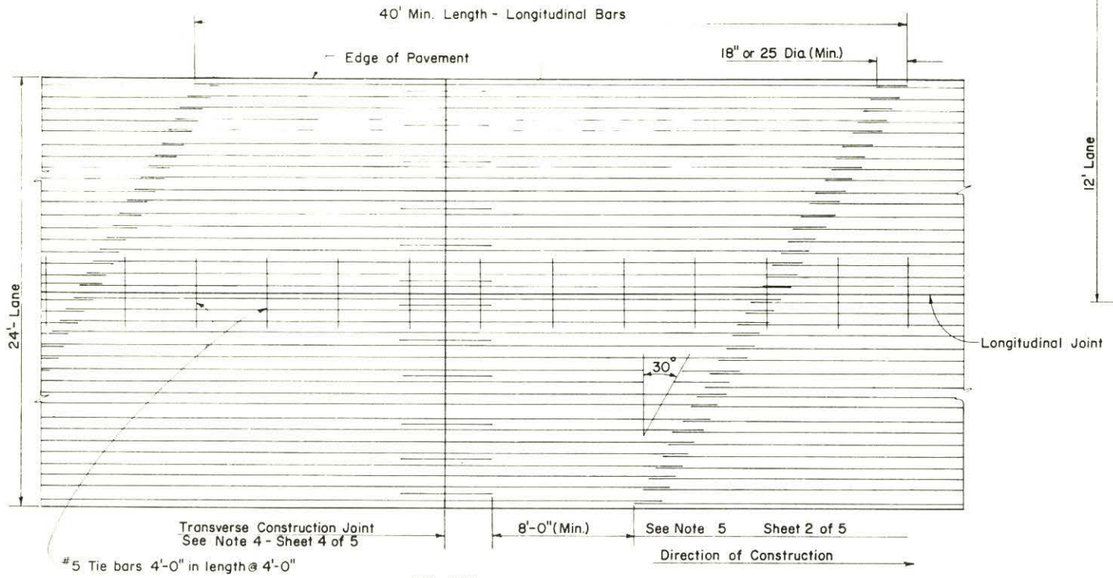
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

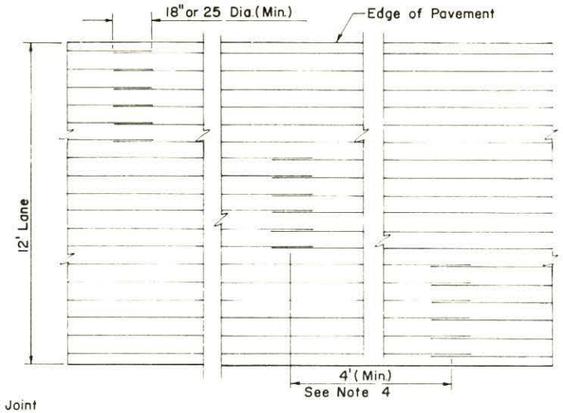
Recommended June 4, 1976
R.D. Pumbia
Director, Bureau of Design

Approved June 1, 1976
Deputy Chief Hwy. Engr.

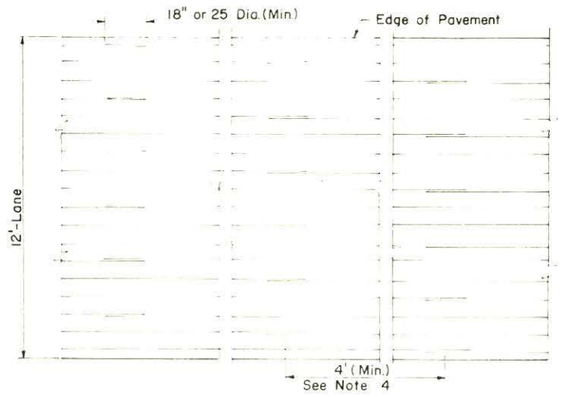
Sht. 5 Of 5
RC-22



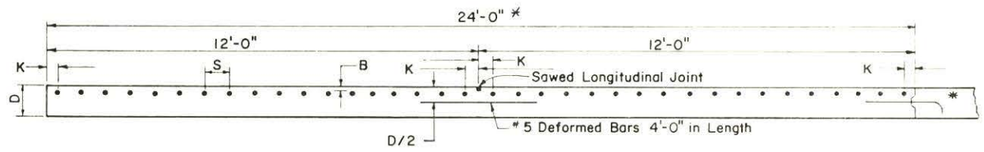
PLAN
LOOSE BARS



ALTERNATE PLAN
LOOSE BARS



ALTERNATE PLAN
LOOSE BARS



* See General Notes 5,6 and 8.

TYPICAL CROSS SECTION
LOOSE BARS

TABLE I

Thickness D (inches)	Longitudinal Steel 12' Lane				Transverse Bars (when required) ⊕
	No. of Bars	Bar Size	S (in.)	K (in.)	
8	23	#5	6¼	3¼	#3 Bars @ 22" or #4 Bars @ 40"
9	25	#5	5¾	3	#4 Bars @ 34" or #5 Bars @ 48"
	18	#6	8	4	
10	28	#5	5	4½	#4 Bars @ 30" or #5 Bars @ 48"
	20	#6	7¼	3⅛	

⊕ Transverse bars required by special provision only

NOTES

1. Material and workmanship shall be in accordance with Specification Form 408.
2. All Longitudinal Bars shall have a minimum lap of 18" or 25 diameters whichever is greater.
3. Bars of high yield strength shall not be bent.
4. No more than one-third of the Longitudinal Bars shall be lapped within the same transverse plane. The minimum distance between laps is 4'-0".
5. For 36' pavement width in one operation on a straight slope, both joints at 12' intervals shall be sawed Longitudinal Joints in accordance with Form 408, Section 501.3. For 36' pavement width in two operations, 24' and 12' widths, the center joint for the 24' width shall be a sawed Longitudinal Joint and the remaining joint shall be a keyed and tied construction joint.
6. For 48' pavement width, the outer joints shall be sawed longitudinal joints and the center joint shall be a keyed construction joint with no ties.
7. Longitudinal construction joints are to be constructed in accordance with Standard Drawings RC-20, except ties are eliminated at the center joint of the 48' pavement width.
8. Transverse steel bars, when required by special provision, may be provided in full width lengths for 24' and 36' pavement widths, and tie bars will not be required. When Transverse Bars are provided in one lane widths, the 4' tie bar shall be provided and be positioned between the Transverse Bars. Transverse Bars shall have a 2" min. clearance from end of bar to edge of pavement or lane.
9. Longitudinal bar placement measured from top of pavement to the top of bar shall be as indicated below with a tolerance of ±½":

D	B
8"	3"
9"	3¼"
10"	3¾"

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CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

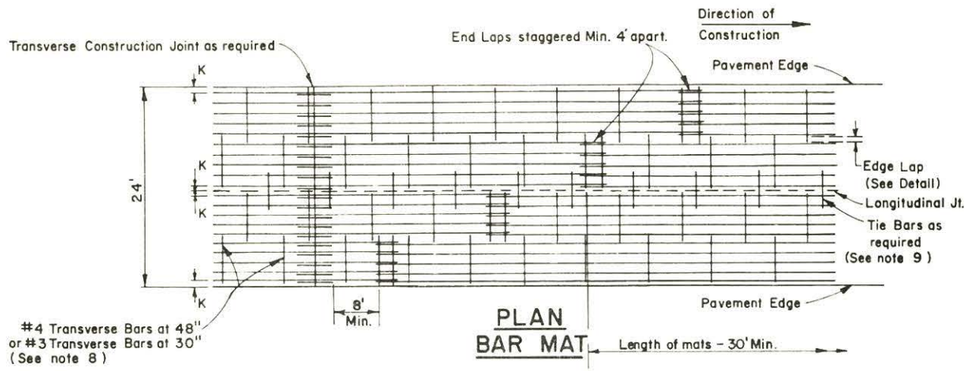
Recommended Jan. 6, 1975
J.D. Gaudler
Director, Bureau of Design

Approved Jan. 6, 1975
Deputy Chief Hwy. Engr.

Sht. 1 Of 5
RC-22

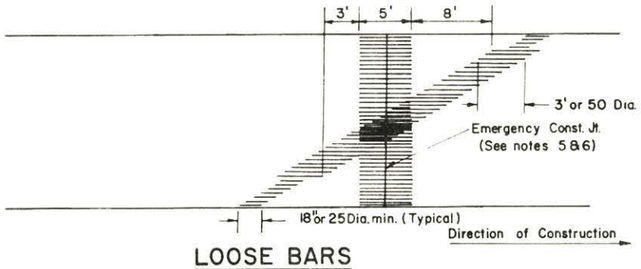
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FORM 4237 REV 3-61

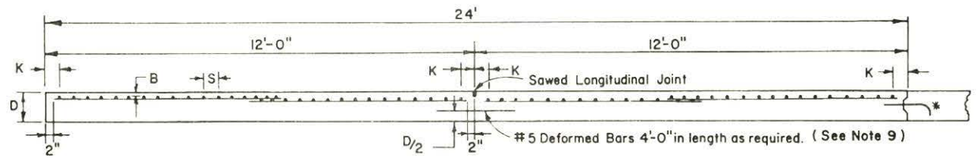


PLAN
BAR MAT

Length of mats - 30' Min.



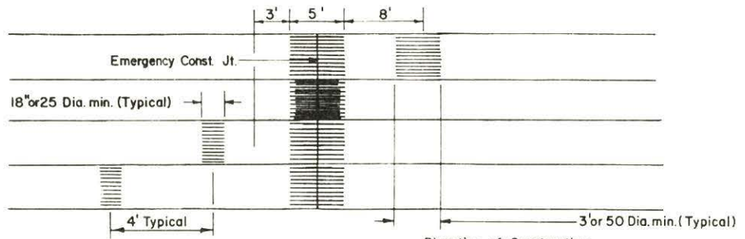
LOOSE BARS
EMERGENCY CONSTRUCTION JOINT



TYPICAL CROSS SECTION
BAR MAT

*See notes 5, 6, & 7 Sheet 1 of 5

NOTE:
See table I for values of S,K,D
Sheet 1 of 5



BAR MAT
EMERGENCY CONSTRUCTION JOINT

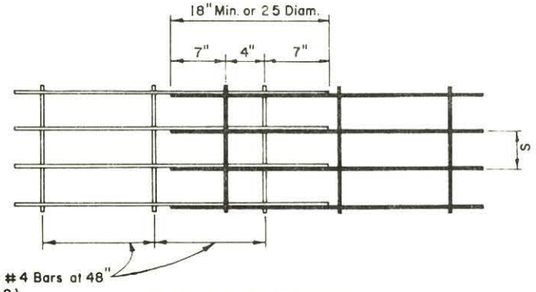
NOTES

1. Materials and workmanship shall be in accordance with Specification Form 408.
2. All Longitudinal Bars shall have a minimum lap of 18" or 25 Diameters which ever is greater.
3. Bars of high yield strength shall not be bent.
4. Longitudinal bar placement measured from top of pavement to the top bar shall be as indicated below with a tolerance of ± 1/2":

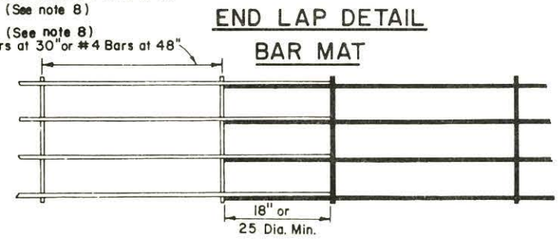
D	B
8"	3"
9"	3 1/4"
10"	3 3/4"

Transverse steel may be on the top or bottom except as qualified in note 9.

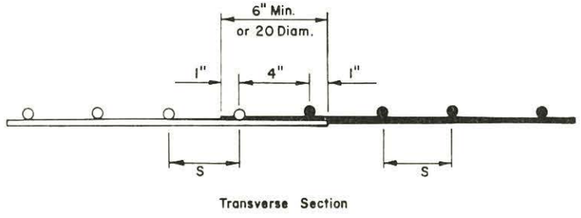
5. At all Lap splices occurring within 8 feet beyond the Joint limits, in the direction of paving and 3 feet back of the Construction Joint limits, the length of lap shall be double that normally specified, (3' or 50 Diameters minimun whichever is greater) or each splice shall be strengthened by splicing in symmetrically with the lap, a 6 foot length of deformed bar of the same nominal size as the longitudinal reinforcement.
6. The Emergency Construction Joint shall be strengthened by the addition of supplementary deformed bars, 5 foot long and of the same nominal size as the longitudinal reinforcement, placed symmetrically with the joint and at a uniform spacing along the joint. The number of supplementary bars shall be as to increase the areas of steel through the joint by at least one third.
7. Bar Mats shall have a nominal width of 4', 6', or 8'.
8. When transverse bars are required by special provision, the transverse bars for bar mats shall be as indicated in Table I on Sheet 1 of 5.
9. When 8' mats are used, the tie bar shall not be used because the bar mat extends through the longitudinal joint and transverse steel must be on the bottom.



END LAP DETAIL
BAR MAT



ALTERNATE END LAP DETAIL-BAR MAT



EDGE LAP DETAIL
BAR MAT

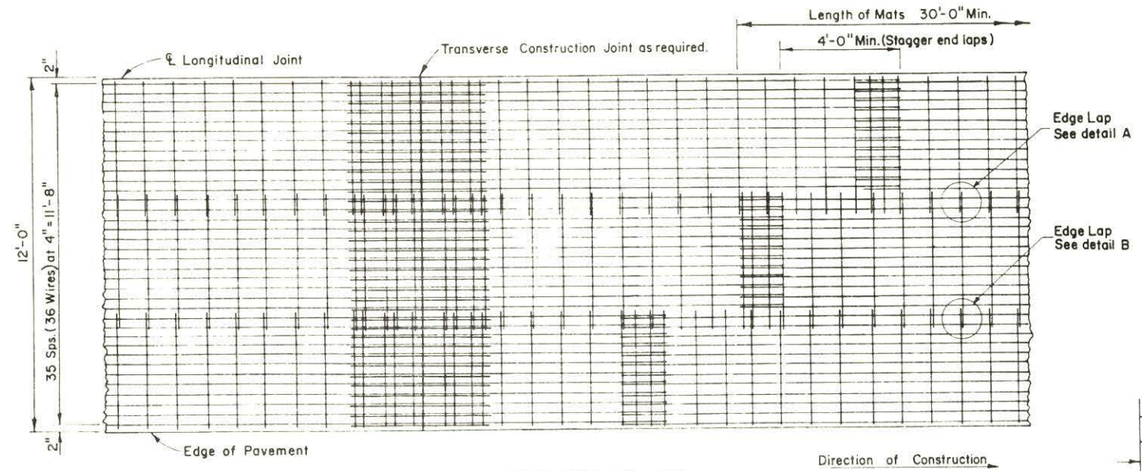
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended Jan 6, 1975	Approved Jan 6, 1975	Sht. 2 Of 5
J. D. Fowler	Robert E. Moore	RC-22
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

VOID

FORM 4237 REV 3-61

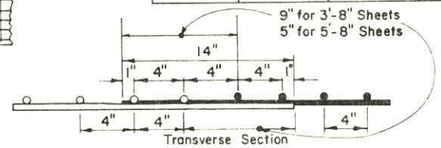


TYPICAL REINFORCING PLAN USING DEFORMED WELDED WIRE FABRIC

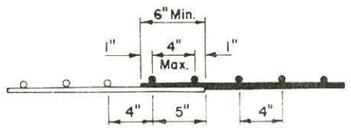
TABLE 2

DEFORMED WELDED WIRE FABRIC DETAILS

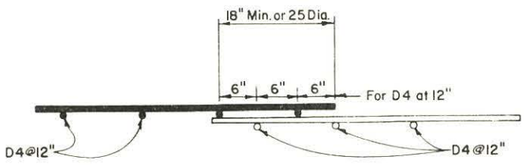
12' Slab		Longitudinal Steel 12' Slab			Transverse Steel
			36 at 4"		
Slab Thickness D (Inches)	Cross Sectional Area of 12' Slab Sq. In.	Req'd Cross Sectional Area of Steel Sq. In.	Wire Size	Area Sq. In.	Size & Spacing
8	1,152	6.912	D-19.2	6.912	D4 @ 12"
9	1,296	7.776	D-21.6	7.776	D4 @ 12"
10	1,440	8.640	D-24.0	8.640	D4 @ 12"



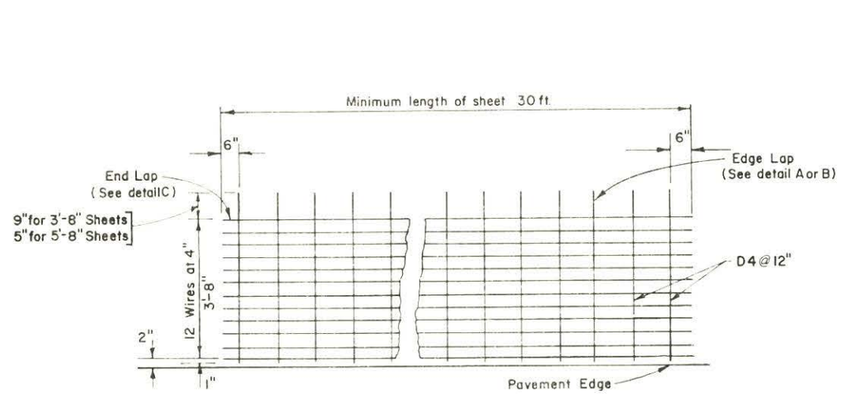
EDGE LAP DETAIL
Detail A



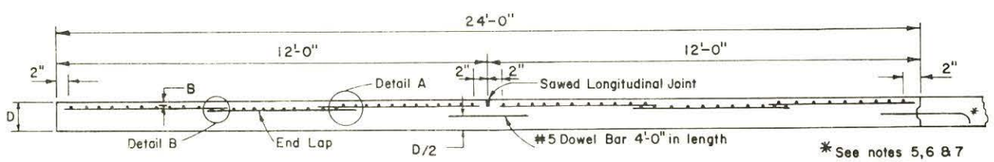
EDGE LAP DETAIL
Detail B



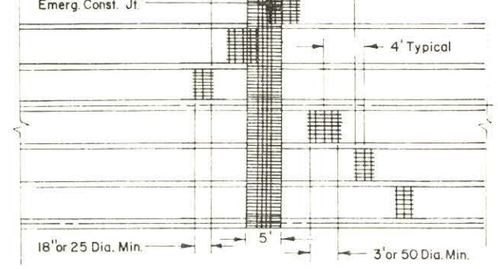
END LAP DETAIL
Detail C



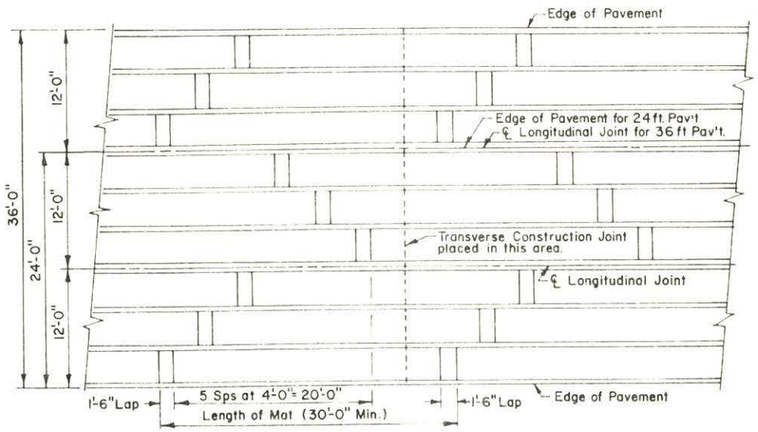
TYPICAL REINFORCING PLAN DEFORMED WELDED WIRE FABRIC



TYPICAL CROSS SECTION



EMERGENCY CONSTRUCTION JOINT DEFORMED WELDED WIRE FABRIC



TYPICAL MAT PLACEMENT PATTERN DEFORMED WELDED WIRE FABRIC

The number of supplementary bars shall be such as to increase the area of steel through the joint by at least one third.

6. At all Lap splices occuring within 8 feet beyond the Const. Joint limits, in the direction of paving and 3 feet back of the Const. Joint limits, the length of lap shall be double that normally specified, (3' or 50 Diameters minimum whichever is greater) or each splice shall be strengthened by splicing in symmetrically with the lap, a 6 foot length of deformed bar of the same nominal size as the longitudinal reinforcement.
7. Deformed Welded Wire Fabric may have a nominal width of either 4', 6' or 8'. The sawed long. jt. is required at center line of 24' pavement width (See Note 9 on RC-22, Sheet 2 of 5)
8. Longitudinal wire placement measured from top of pavement to the top of wire shall be as indicated below with a tolerance of ± ½":

D	B
8"	3"
9"	3 ¼"
10"	3 ¾"

NOTES

1. All Materials and Workmanship shall be in accordance with Specifications Form 408.
2. Deformed Tie Bars in the Longitudinal Joint shall be placed at Mid Point of the Slab and shall conform to the spacing indicated in Table 1.
3. All Longitudinal Wires in the Fabric shall have a minimum Lap of 18" or 25 Dia., whichever is greater.
4. Transverse Wire in the consecutive Fabric sheets shall have a minimum edge lap of 6".
5. The Emergency Construction Joint shall be strengthened by the addition of supplementary Deformed Bars, 5 feet long and of the same nominal size as the Longitudinal Reinforcement, (or #5 Deformed Bars) placed symmetrically with the joint and at a uniform spacing along the joint.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended Jan. 6, 1975
S. C. Goudsie
Director, Bureau of Design

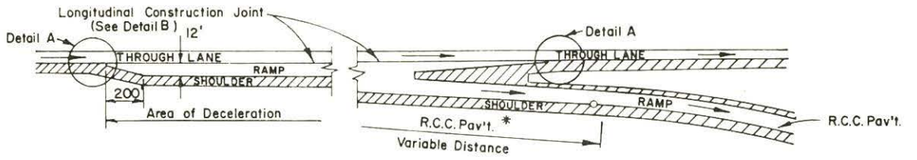
Approved Jan. 6, 1975
Deputy Chief Hwy. Engr.

Sht. 3 of 5
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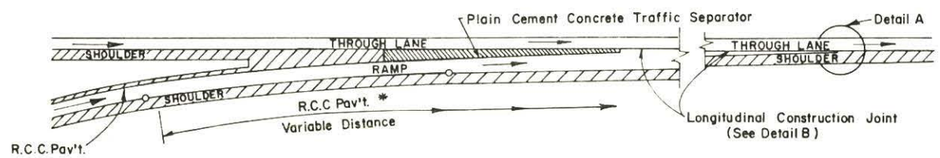
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FORM 4237 REV 3-61

RAMP CONNECTION DETAILS

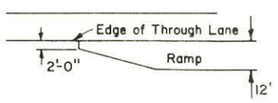


EXIT TERMINAL

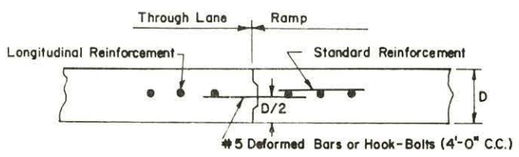


ENTRANCE TERMINAL

* When the ramp connection is located 500' or less from the terminus of the main line C.R.C. pavement, this portion of the ramp pavement shall be C.R.C. and a terminal joint shall be used on the ramp.

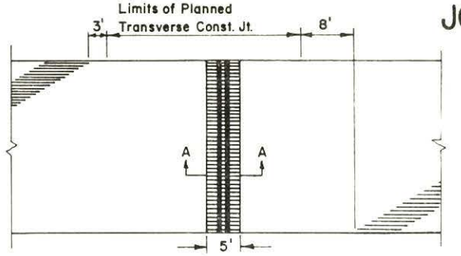


DETAIL A

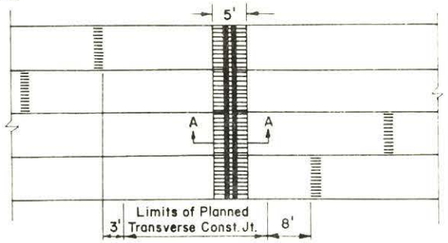


DETAIL B

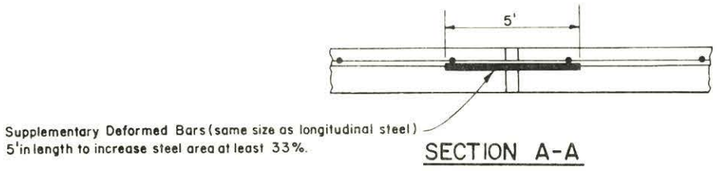
TRANSVERSE CONSTRUCTION JOINT DETAILS



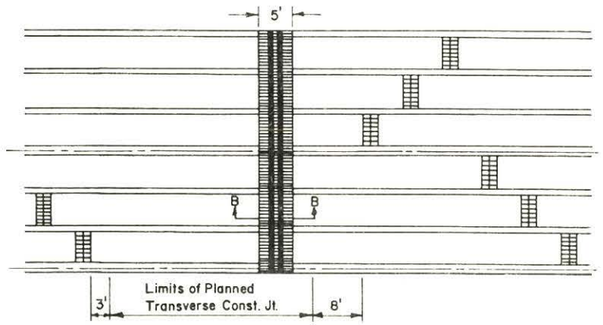
LOOSE BARS



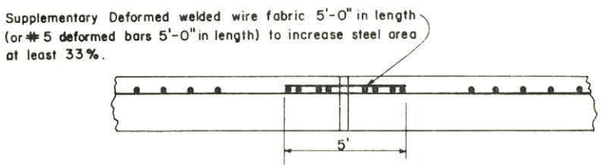
BAR MAT



SECTION A-A



DEFORMED WELDED WIRE FABRIC



SECTION B-B

NOTES

1. Transverse Construction Joints are required at the end of a days work or whenever paving operations are interrupted for 30 min. or more. The paving operation shall be planned so that the construction joint will fall within the Limits of Planned Transverse Construction Joint shown on the Transverse Construction Joint Details. Any joint outside this area will be considered an Emergency Construction Joint.
2. The bulkhead must be set perpendicular to the centerline of the pavement and be approved by the engineer.
3. Longitudinal steel shall extend through the bulkhead and be properly supported from the subbase beyond the bulkhead to prevent undue deflection during paving operations.
4. Supplementary deformed bars, 5' long and of the same nominal size as the longitudinal reinforcement shall be placed symmetrically with the joint and at a uniform spacing when loose or bar mats are utilized. The number of supplementary bars shall be such as to increase the area of steel through the joint, by at least one-third.
5. Supplementary deformed welded wire fabric 5'-0" in length (or # 5 deformed bars 5'-0" in length) shall be placed symmetrically with the joint when deformed welded wire fabric is utilized. The deformed wire fabric used (or # 5 deformed bars) shall be such as to increase the area of steel through the joint by at least one-third.

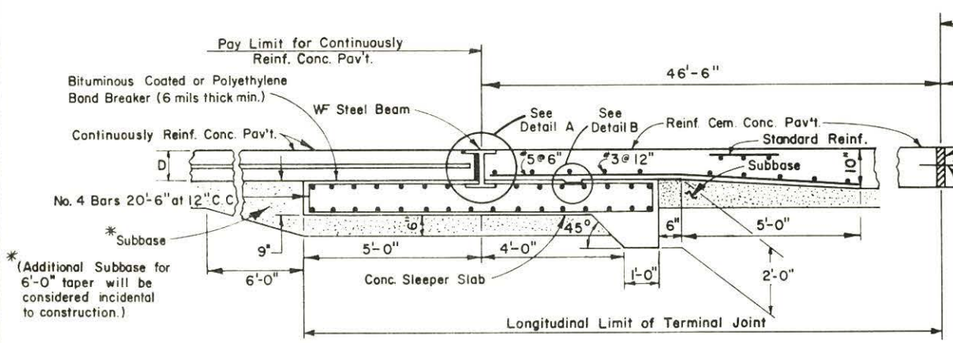
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

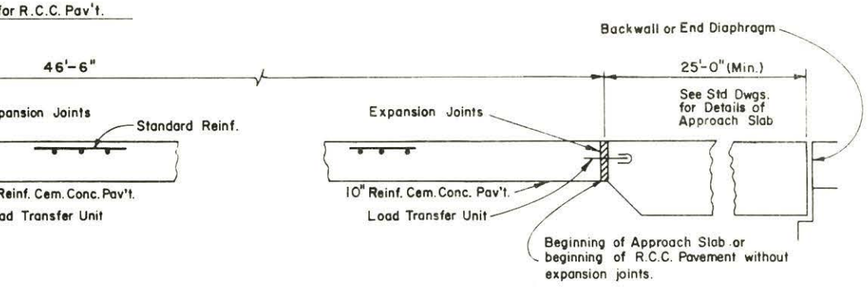
Recommended Jan 6, 1975	Approved Jan 6, 1975	Sht. 4 Of 5
J.O. Gramlich	Kurt A. Musser	
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-22

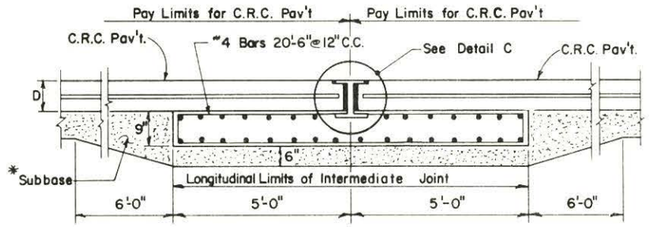
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FORM 4237 REV 3-41

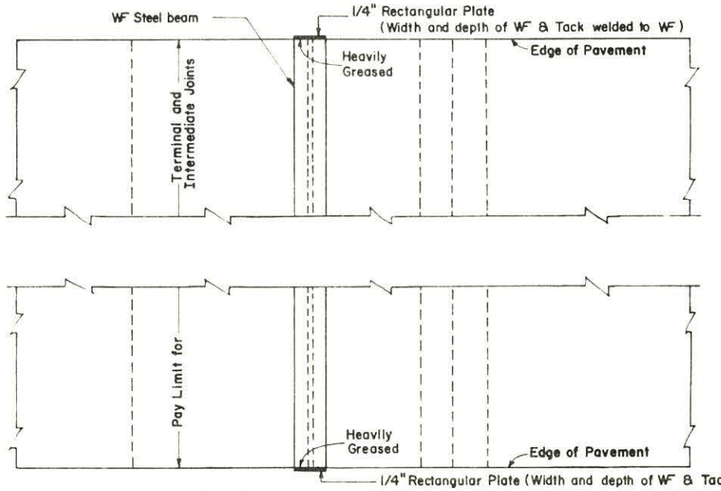


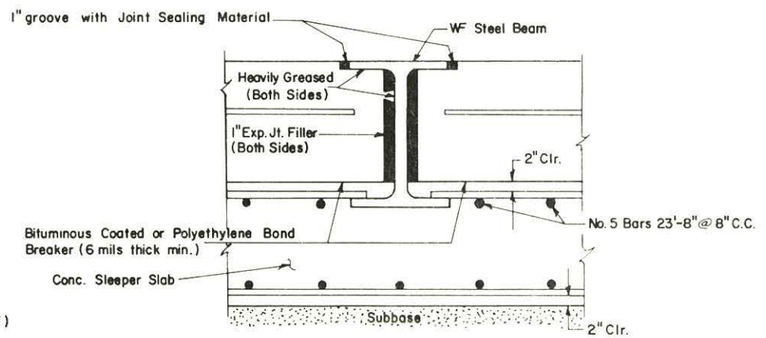
TERMINAL JOINT



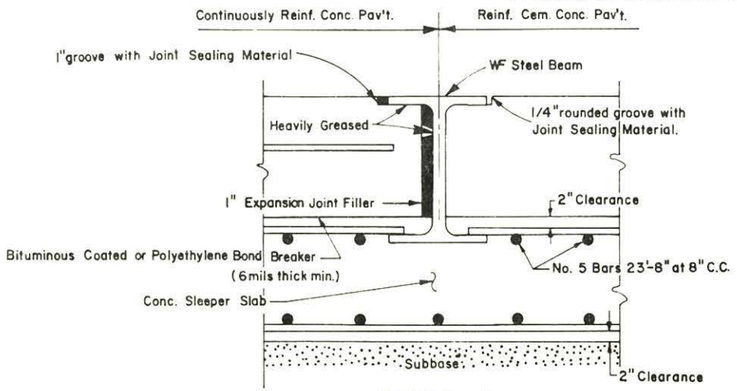


INTERMEDIATE JOINT

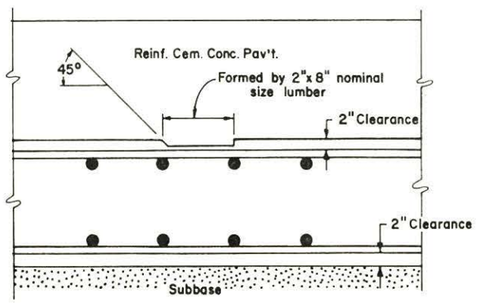




DETAIL C



DETAIL A



DETAIL B

NOTES

1. All materials and workmanship shall be in accordance with specifications Form 408.
2. Joint sealing material for the grooved joint shall comply with Section 705.5 of Form 408.
3. Expansion joint filler shall be cork or rubber and shall comply with AASHO Designation M 153.
4. The surface of the conc. sleeper slab on the continuously reinforced conc. pavement side of the joint shall be steel trowel finished.
5. When the Terminal Joint is located at or near the low point of a sag vertical curve, pipe foundation under drain Type A with Type II backfill will be used for transverse drainage under the sleeper slab located below the WF Beam, and will be measured and paid for as specified in Section 610 Form 408.
6. Length under 400' between Structures-use:
   a. Reinforced Cement Concrete Pavement only, conventionally jointed, 46 1/2' slabs, as required.
   b. One (1) Pavement Relief Joint, preferably midway between structures.
   c. One (1) Bridge Approach Slab adjacent to each structure. (Note: For pavement lengths less than 200' eliminate the Pavement Relief Joint.)
7. Length 400' and over between structures-use:
   a. Continuously Reinforced Concrete Pavement.
   b. One (1) Terminal Joint at each end of pavement at struct.
   c. Two (2) 46 1/2' length slabs, conventionally jointed (exp. jt.) pavement, at each end of pavement between terminal joint and approach slab.
   d. One (1) Bridge Approach Slab adjacent to each structure.
8. At the termini of each continuously reinforced paving project, an Intermediate Joint will be required if the adjacent projects are not paved during the same construction season. If paving an adjacent project started during the same construction season the "Emergency Construction Joint" may be utilized at the project terminus.

TABLE 3

WIDE FLANGE WEIGHT & DIMENSIONS						
Pavement Thickness D (inches)	Embedment in Sleeper Slab (inches)	Beam Weight Lb.	Beam Depth (inches)	Flange Width (inches)	Flange Thickness (inches)	Web Thickness (inches)
8	4 1/4	58	12 1/4	10	5/8	3/8
9	3 1/4	58	12 1/4	10	5/8	3/8
10	3 7/8	61	13 7/8	10	5/8	3/8

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended Jan 6, 1975
B.D. Hawkes
Director, Bureau of Design

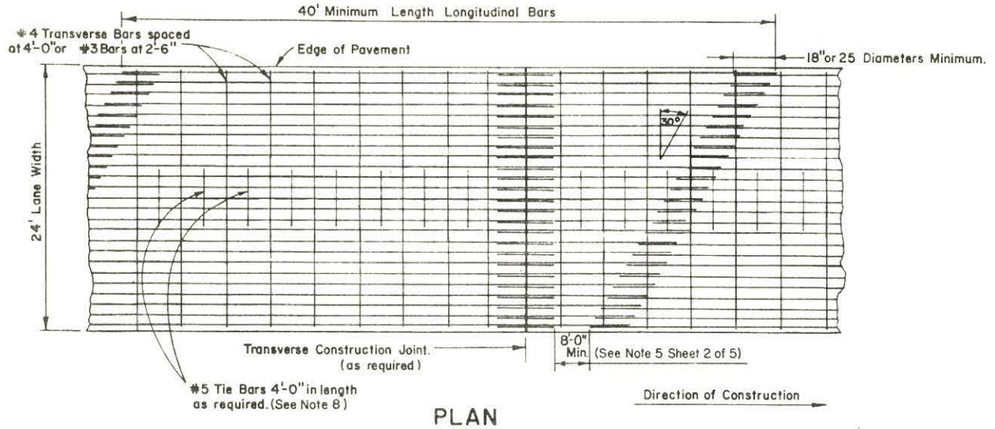
Approved Jan 6, 1975
Deputy Chief Hwy. Engr.

Sht 5 Of 5

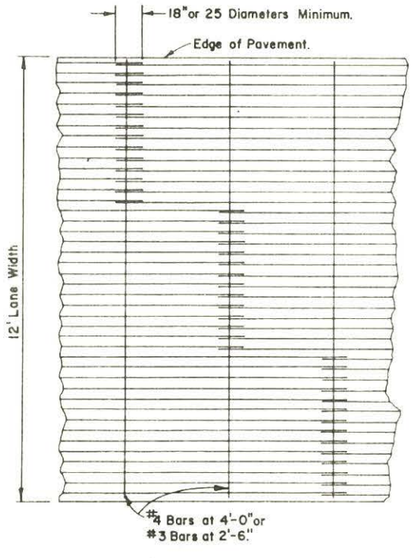
RC-22

VOID

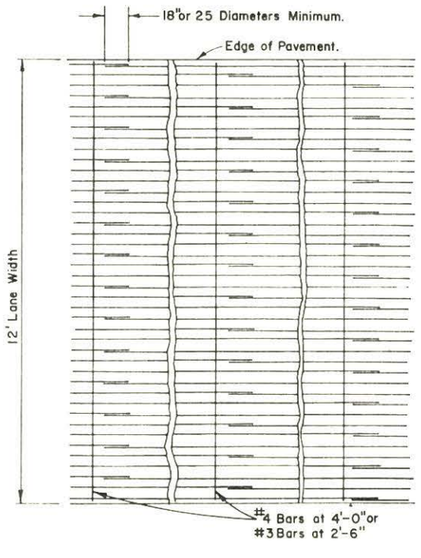
FORM 4337 REV 3-61



PLAN
LOOSE BARS



ALTERNATE PLAN
LOOSE BARS



ALTERNATE PLAN
LOOSE BARS

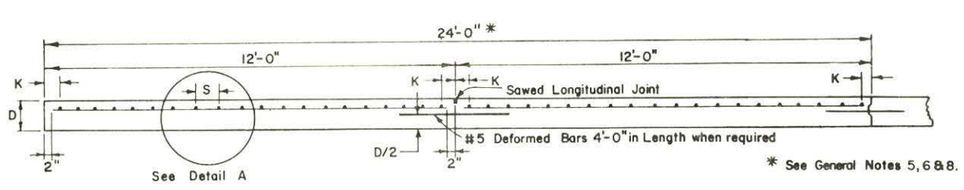
TABLE I

DEFORMED BAR DETAILS

12' SLAB		LONGITUDINAL STEEL-12' SLAB						TRANSVERSE BARS & TIE BAR REQUIREMENTS						
								24' Pavement Width		⊛ 36' Pavement Width		⊛ 48' Pavement Width		
Thickness (Inches) D	Cross Sectional Area of 12' Slab Sq. In.	Area of Steel Sq. inches	No. of Bars	Bar Sizes	Bar Area $(in.)^2$	Bar Spac's (In.)	Total Area $(in.)^2$	Transverse Steel ‡ (See Note 7)	Tie Bars	Transverse Steel ‡	Tie Bars	Transverse Steel ‡	Tie Bars (Outer Jts.)	Tie Bars (Center Joint)
8	1152	6.912	35	#4	.2	S=4 K=4	7.00	#4 Bars 23'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 35'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 47'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"
9	1296	7.776	39	#4	.2	S=3 5/8 K=3 1/8	7.80	#4 Bars 23'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 35'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 47'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#5 Bars 4'-0" Lg. at 2'-2" or #6 Bars 4'-0" Lg. at 3'-2"
9	1296	7.776	25	#5	.31	S=5 3/4 K=3	7.75	#4 Bars 23'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 35'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 47'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#5 Bars 4'-0" Lg. at 2'-2" or #6 Bars 4'-0" Lg. at 3'-2"
10	1440	8.640	28	#5	.31	S=5 K=4 1/2	8.68	#4 Bars 23'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 35'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 47'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#5 Bars 4'-0" Lg. at 2'-2" or #6 Bars 4'-0" Lg. at 3'-0"
10	1440	8.640	20	#6	.44	S=7 1/8 K=4 5/16	8.80	#4 Bars 23'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 35'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#4 Bars 47'-8" in Length at 4'-0"	#5 Bars 4'-0" Lg. at 4'-0"	#5 Bars 4'-0" Lg. at 2'-2" or #6 Bars 4'-0" Lg. at 3'-0"

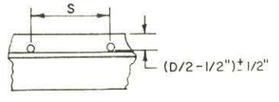
⊛ Transverse bar lengths apply only to full 36' or 48' width construction in one operation. In lieu of using 35'-8" or 47'-8" transverse bars, when 36' or 48' widths are constructed in two operations, the pavements, 24' and 12' or 24' and 24' shall be tied at the dowelled longitudinal joint in accordance with the above table, column "Tie Bars(Center Joint)" specifying bar size, length and spacing.

‡ When #3 bars are used the spacing will be 2'-6".



* See General Notes 5, 6 & 8.

TYPICAL CROSS SECTION
LOOSE BARS



Detail A

NOTES

1. Material and workmanship shall be in accordance with Specification Form 408.
2. All Longitudinal Bars shall have a minimum lap of 18" or 25 Diameters which ever is greater.
3. Bars of high yield strength shall not be bent.
4. Tie bars will be positioned midway between transverse bars.
5. For 36' Pavement width in one operation on a straight slope, both joints at 12' intervals shall be sawed longitudinal joints in accordance with form 408.

   Section 501.3(K)1.b. For 36' pavement width in two operations, 24' and 12' width, the center joint for 24' width shall be a sawed longitudinal joint and the remaining joint at the break in the paving shall be a dowelled longitudinal joint.
6. For 48' pavement width, two 24' widths shall slope down left and right from center line. The outer joints shall be sawed longitudinal joints and the center joint shall be a dowelled longitudinal joint.
7. Longitudinal construction joints are to be constructed in accordance with Std. Dwg. RC-20 and the details pertaining to one lane at a time construction or slip form paving method.
8. Transverse steel bars may be provided in either 11'-8" or 23'-8" lengths. When the 24' width is constructed using 11'-8" long transverse bars, then the 4'-0" tie bar shall be provided. When the 24' width is constructed using the 23'-8" long transverse bars, then the tie bar shall not be used.
9. Tolerance for longitudinal bar placement measured from top of pavement to the bottom of bar:

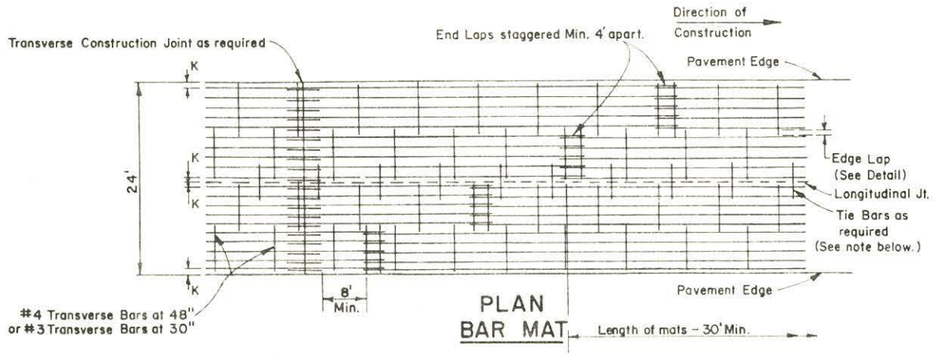
D	Max.	Min.
8"	4"	3"
9"	4 1/2"	3 1/2"
10"	5"	4"

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

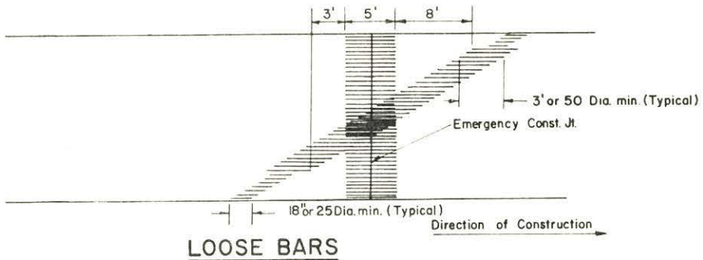
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 2
R R Musser	W. J. Kaver	RC-22
Location & Design Engineer	Deputy Chief Hwy. Engr.	

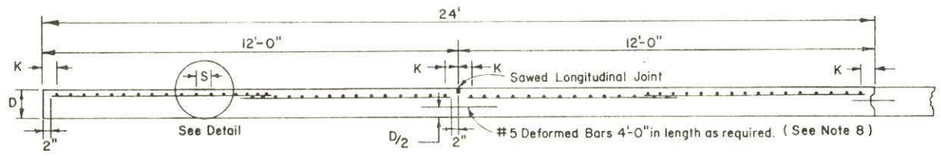
FORM 4237 REV 3-61



PLAN
BAR MAT

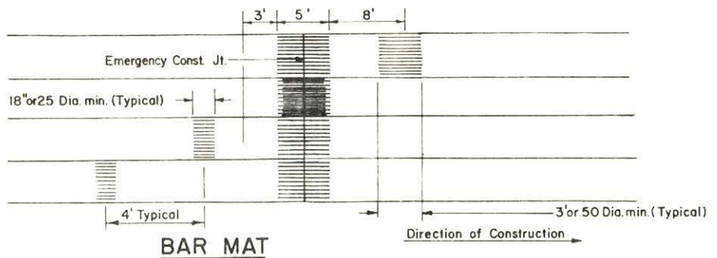


LOOSE BARS
EMERGENCY CONSTRUCTION JOINT

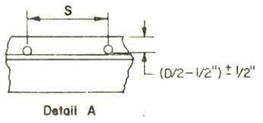


TYPICAL CROSS SECTION
BAR MAT

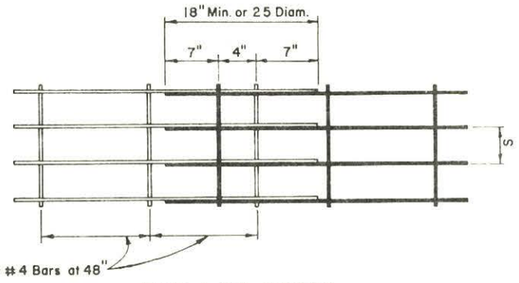
NOTE:
See table I for values of S, K, D and tie bars, Sheet 1 of 5



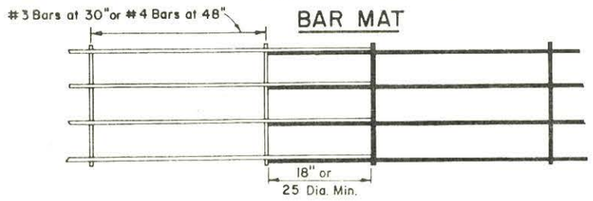
BAR MAT
EMERGENCY CONSTRUCTION JOINT



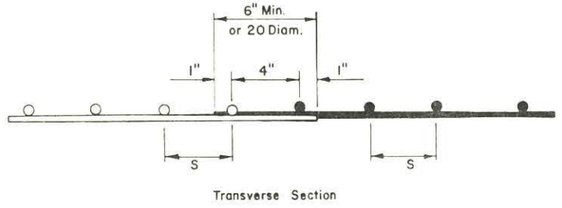
Detail A



END LAP DETAIL
BAR MAT



ALTERNATE END LAP DETAIL-BAR MAT



Transverse Section

EDGE LAP DETAIL
BAR MAT

NOTES

1. Materials and workmanship shall be in accordance with Specification Form 408.
2. All Longitudinal Bars shall have a minimum lap of 18" or 25 Diameters which ever is greater.
3. Bars of high yield strength shall not be bent.
4. Tolerance for longitudinal bar placement measured from top of pavement to bottom of bar:

D	Max	Min
8"	4"	3"
9"	4 1/2"	3 1/2"
10"	5"	4"

Transverse steel may be on the top or bottom except as qualified in note 8.

5. At all Lap splices occurring within 8 feet beyond the Joint limits, in the direction of paving and 3 feet back of the Construction Joint limits, the length of lap shall be double that normally specified, (3' or 50 Diameters minimun whichever is greater) or each splice shall be strengthened by splicing in symmetrically with the lap, a 6 foot length of deformed bar of the same nominal size as the longitudinal reinforcement.
6. The Emergency Construction Joint shall be strengthened by the addition of supplementary deformed bars, 5 foot long and of the same nominal size as the longitudinal reinforcement, placed symmetrically with the joint and at a uniform spacing along the joint. The number of supplementary bars shall be as to increase the areas of steel through the joint by at least one third.
7. Bar Mats shall have a nomifial width of 4', 6', or 8'.

The sawed longitudinal joint is required at center line of 24' pavement width.

8. When 8' mats are used, the tie bar shall not be used because the bar mat extends through the longitudinal joint and transverse steel must be on the bottom.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

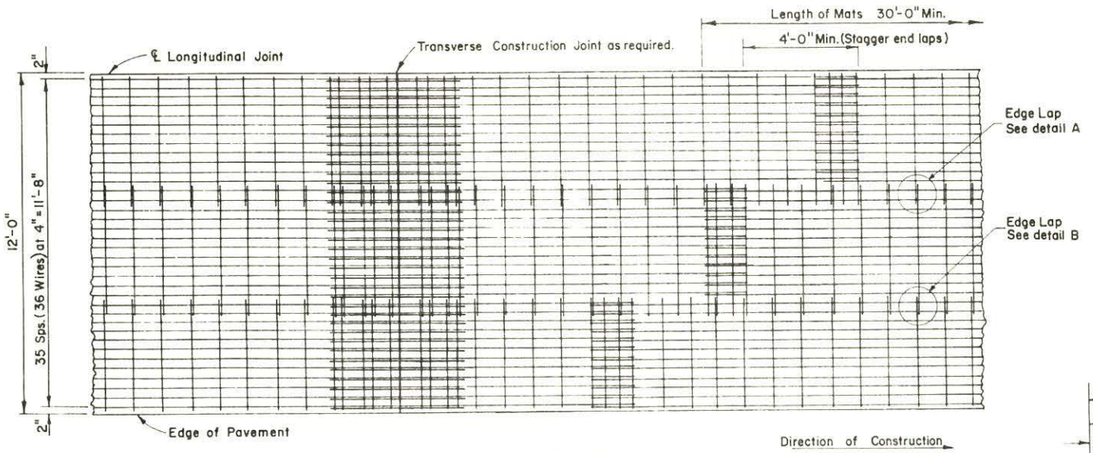
Recommended Dec. 1, 1971
R R Maser
Location & Design Engineer

Approved Dec. 1, 1971
W. J. Ravitz
Deputy Chief Hwy. Engr.

Sht. 2 Of 5
RC-22

VOID

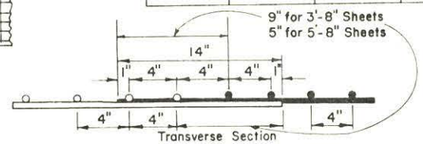
FORM 4237 REV 3-61



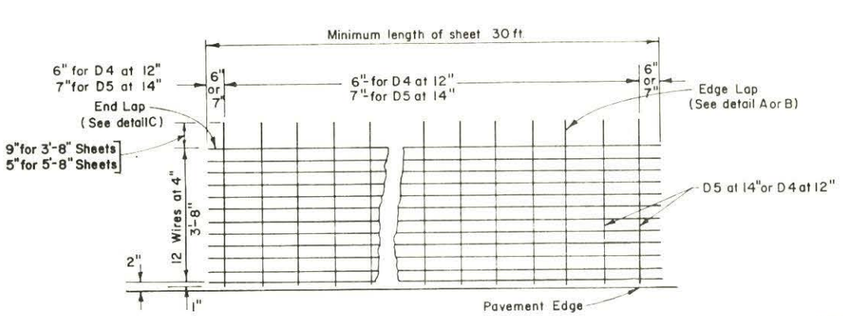
TYPICAL REINFORCING PLAN USING DEFORMED WELDED WIRE FABRIC

DEFORMED WELDED WIRE FABRIC DETAILS

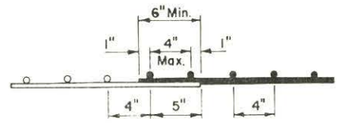
12' Slab		Longitudinal Steel 12' Slab			Transverse Steel
Slab Thickness D (Inches)	Cross Sectional Area of 12' Slab Sq. In.	Req'd Cross Sectional Area of Steel Sq. In.	36 at 4" Wire Size	36 at 4" Area Sq. In.	Size & Spacing
8	1,152	6.912	D-19.2	6.912	D4 at 12" or D5 at 14"
9	1,296	7.776	D-21.6	7.776	D4 at 12" or D5 at 14"
10	1,440	8.640	D-24.0	8.640	D4 at 12" or D5 at 14"



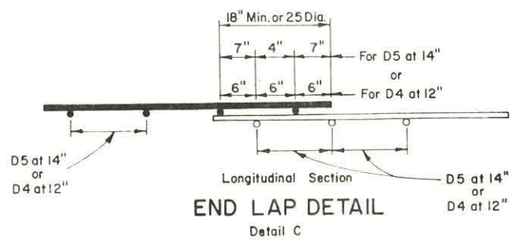
EDGE LAP DETAIL
Detail A



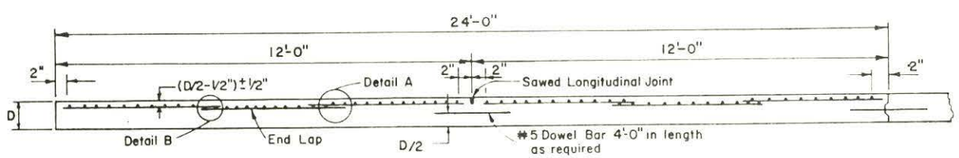
TYPICAL REINFORCING PLAN DEFORMED WELDED WIRE FABRIC



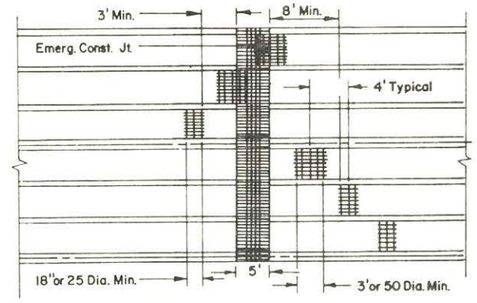
EDGE LAP DETAIL
Detail B



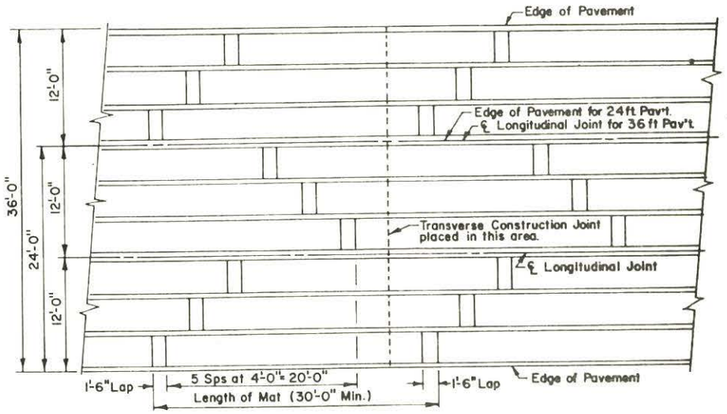
END LAP DETAIL
Detail C



TYPICAL CROSS SECTION



EMERGENCY CONSTRUCTION JOINT DEFORMED WELDED WIRE FABRIC



TYPICAL MAT PLACEMENT PATTERN DEFORMED WELDED WIRE FABRIC

NOTES

1. All Materials and Workmanship shall be in accordance with Specifications Form 408.
2. Deformed Tie Bars in the Longitudinal Joint shall be placed at Mid Point of the Slab and shall conform to the spacing indicated in Table I.
3. All Longitudinal Wires in the Fabric shall have a minimum Lap of 18" or 25 Dia., whichever is greater.
4. Transverse Wire in the consecutive Fabric sheets shall have a minimum edge lap of 6".
5. The Emergency Construction Joint shall be strengthened by the addition of supplementary Deformed Bars, 5 feet long and of the same nominal size as the Longitudinal Reinforcement, (or #5 Deformed Bars) placed symmetrically with the joint and at a uniform spacing along the joint. The number of supplementary bars shall be such as to increase the area of steel through the joint by at least one third.
6. At all Lap splices occuring within 8 feet beyond the Const. Joint limits, in the direction of paving and 3 feet back of the Const. Joint limits, the length of lap shall be double that normally specified, (3' or 50 Diameters minimum whichever is greater) or each splice shall be strengthened by splicing in symmetrically with the lap, a 6 foot length of deformed bar of the same nominal size as the longitudinal reinforcement.
7. Deformed Welded Wire Fabric may have a nominal width of either 4', 6' or 8'. The sawed long. jt. is required at center line of 24' pavement width. (See Note 8 on RC-22, Sheet 2 of 5)
8. Tolerance for longitudinal bar placement measured from top of pavement to bottom of bar.

D	Max.	Min.
8"	4"	3"
9"	4 1/2"	3 1/2"
10"	5"	4"

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended Dec. 1, 1971
R R Musser
Location & Design Engineer

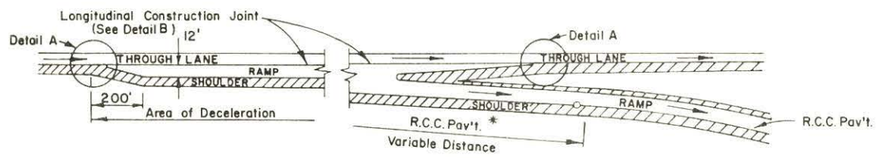
Approved Dec. 1, 1971
W. J. Raver
Deputy Chief Hwy. Engr.

Sht. 3 Of 5
RC-22

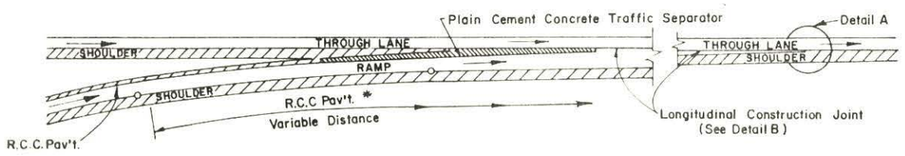
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FORM 4237 REV 3-61

RAMP CONNECTION DETAILS

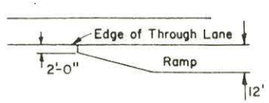


EXIT TERMINAL

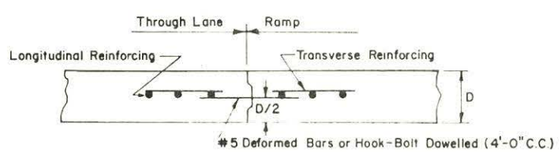


ENTRANCE TERMINAL

* When the ramp connection is located 500' or less from the terminus of the main line C.R.C. pavement, this portion of the ramp pavement shall be C.R.C. and a terminal joint shall be used on the ramp.

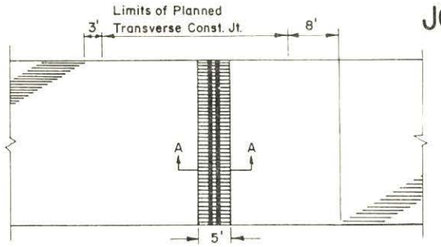


DETAIL A

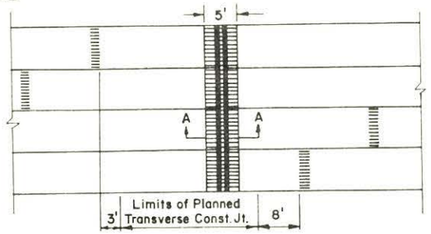


DETAIL B

TRANSVERSE CONSTRUCTION JOINT DETAILS

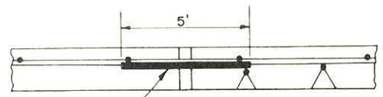


LOOSE BARS

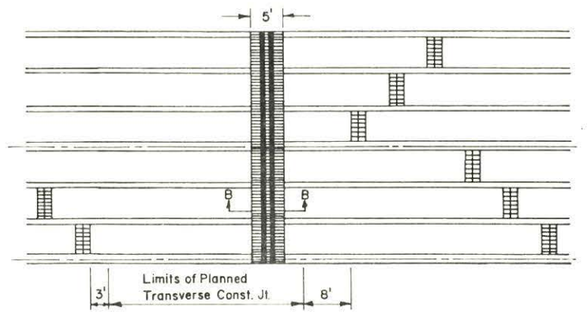


BAR MAT

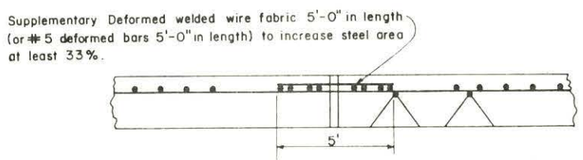
1. Transverse Construction Joints are required at the end of a days work or whenever paving operations are interrupted for 30 min. or more. The paving operation shall be planned so that the construction joint will fall within the Limits of Planned Transverse Construction Joint shown on the Transverse Construction Joint Details. Any joint outside this area will be considered an Emergency Construction Joint.
2. The Headerboard must be set perpendicular to the centerline of the pavement and be approved by the engineer.
3. Longitudinal steel shall extend through the Headerboard and be properly supported from the subbase beyond the headerboard to prevent undue deflection during paving operations.
4. Supplementary deformed bars, 5' long and of the same nominal size as the longitudinal reinforcement shall be placed symmetrically with the joint and at a uniform spacing when loose or bar mats are utilized. The number of supplementary bars shall be such as to increase the area of steel through the joint, by at least one-third.
5. Supplementary deformed welded wire fabric 5'-0" in length (or #5 deformed bars 5'-0" in length) shall be placed symmetrically with the joint when deformed welded wire fabric is utilized. The deformed wire fabric used (or #5 deformed bars) shall be such as to increase the area of steel through the joint by at least one-third.



SECTION A-A



DEFORMED WELDED WIRE FABRIC



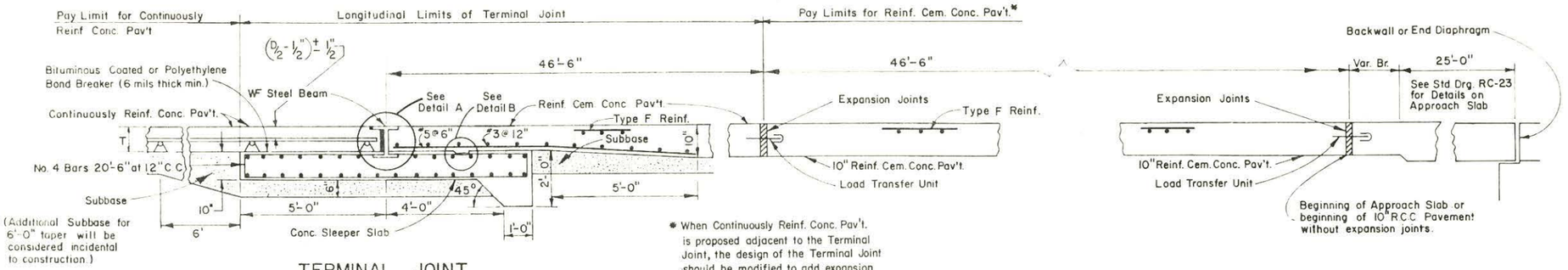
SECTION B-B

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 4 Of 5
RR Musser	W. J. Raven	RC-22
Location & Design Engineer	Deputy Chief Hwy. Engr.	

VOID

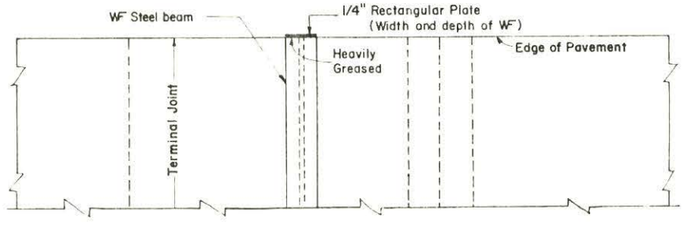


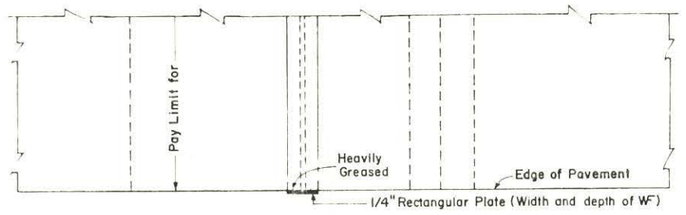
TERMINAL JOINT

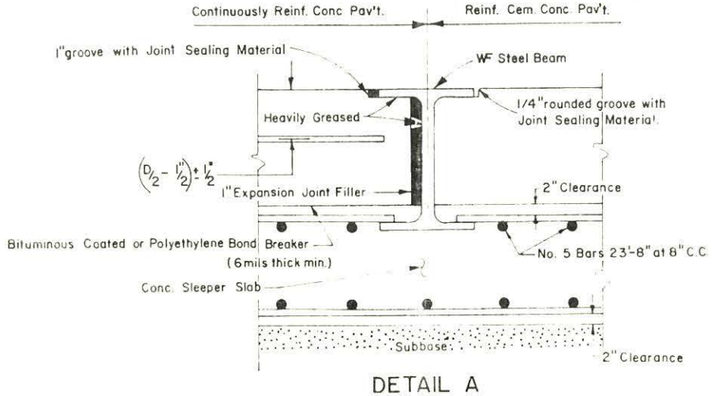
* When Continuously Reinf. Conc. Pav't. is proposed adjacent to the Terminal Joint, the design of the Terminal Joint should be modified to add expansion joint filler on both sides of the WF Steel Beam web and an anchor key on both ends of the sleeper slab. The key in Detail B will be eliminated and a bond breaker used on this side of the sleeper slab.

NOTES

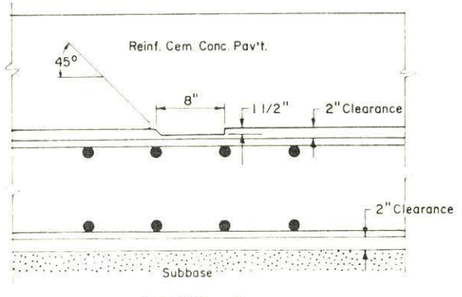
1. All materials and workmanship shall be in accordance with specifications Form 408.
2. Joint sealing material for the grooved joint shall comply with Section 705.5 of Form 408.
3. Expansion joint filler shall be cork or rubber and shall comply with AASHO Designation M 153.
4. The surface of the conc. sleeper slab on the continuously reinforced conc. pavement side of the joint shall be steel trowel finished.
5. When the Terminal Joint is located at or near the low point of a sag vertical curve, pipe foundation underdrain Type A with Type II backfill will be used for transverse drainage under the sleeper slab located below the WF Beam, and will be measured and paid for as specified in Section 610 Form 408.
6. Length under 400' between Structures - use:
   a. Reinforced Cement Concrete Pavement only, conventionally jointed, 46 1/2' slabs, as required.
   b. One (1) Pavement Relief Joint, preferably midway between structures.
   c. One (1) Bridge Approach Slab adjacent to each structure (Note: For pavement lengths less than 200' eliminate the Pavement Relief Joint.)
7. Length 400' and over between structures - use:
   a. Continuously Reinforced Concrete Pavement.
   b. One (1) Terminal Joint at each end of pavement at struct.
   c. Two (2) 46 1/2' length slabs, conventionally jointed (exp. jt.) pavement, at each end of pavement between terminal joint and approach slab.
   d. One (1) Bridge Approach Slab adjacent to each structure.
8. At the termini of each continuously reinforced paving project, a Terminal Joint will be required if the adjacent projects are not paved during the same construction season. If paving on adjacent projects is started during the same construction season, the "Emergency Construction Joint" may be utilized at the project terminus.







DETAIL A



DETAIL B

WIDE FLANGE WEIGHT & DIMENSIONS

Pavement Thickness T (Inches)	Embedment in Sleeper Slab (Inches)	Beam Weight Lb.	Beam Depth (Inches)	Flange Width (Inches)	Flange Thickness (Inches)	Web Thickness (Inches)
8	4-1/4	58	12-1/4	10	5/8	3/8
9	3-1/4	58	12-1/4	10	5/8	3/8
10	4-7/8	61	13-7/8	10	5/8	3/8

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

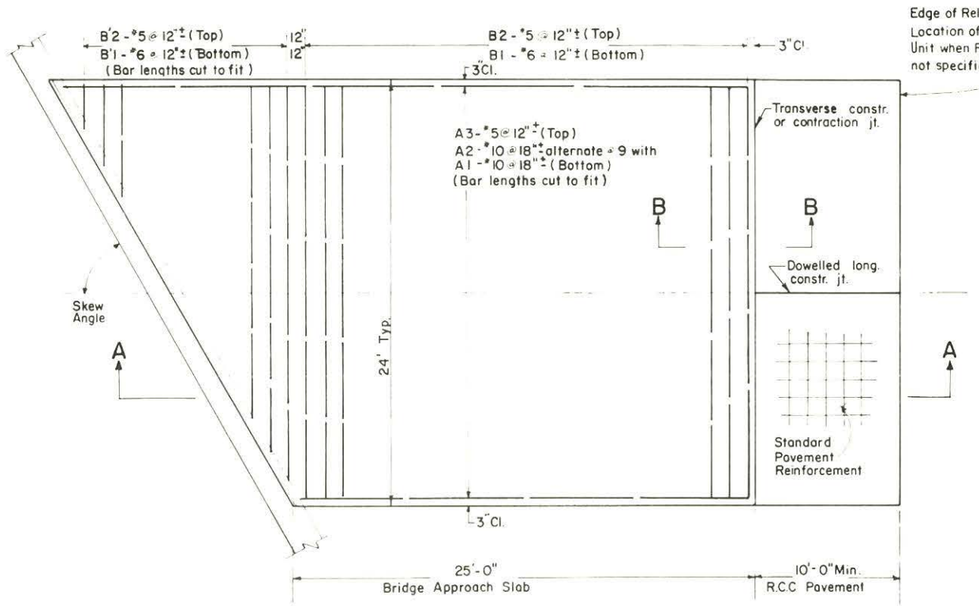
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

Recommended Dec. 1, 1971
R R Mason
Location & Design Engineer

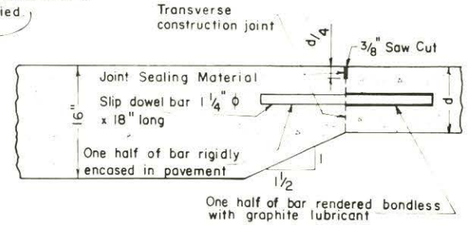
Approved Dec. 1, 1971
W. J. Raver
Deputy Chief Hwy. Engr.

Sht 5 Of 5
RC-22

VOID



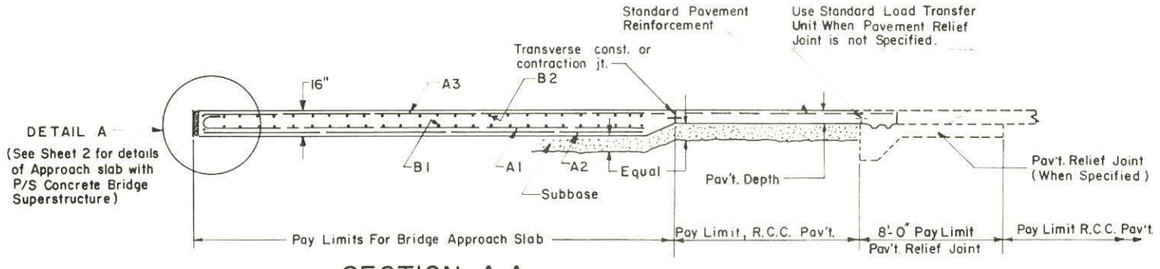
PLAN



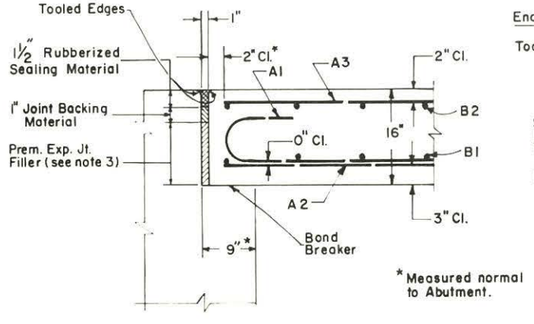
SECTION B-B

NOTES

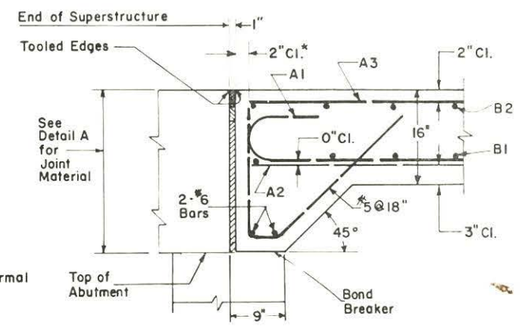
1. Materials, workmanship and method of payment shall be in accordance with Section 505 of Form 408.
2. Bridge Approach Slab shall be constructed in accordance with this Standard Drawing unless otherwise modified or shown on the structure drawings.
3. When the Pavement Relief Joint is not used adjacent to the bridge approach slab, replace premolded Expansion Joint filler at backwall or end diaphragm with closed cell neoprene sponge.



SECTION A-A



DETAIL A



DETAIL A (ALTERNATE)

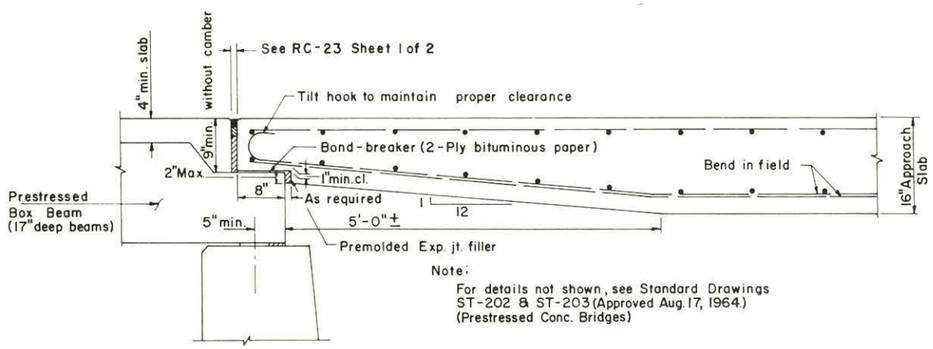
(TO APPLY ONLY WHEN INDICATED ON STRUCTURE DRAWINGS)

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

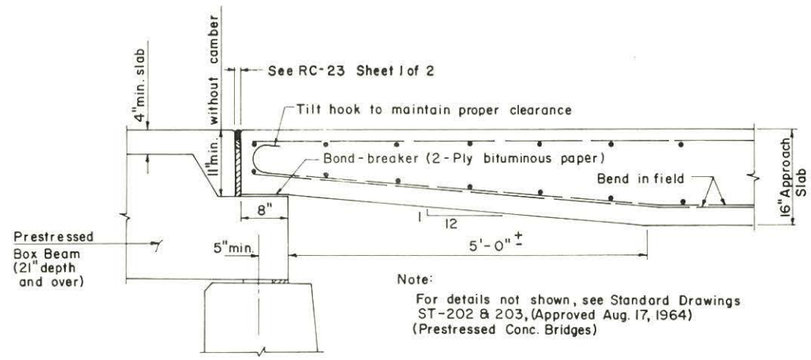
BRIDGE APPROACH SLAB

Recommended Oct 1, 1974	Approved Oct. 1, 1974	Sht. 1 Of 2
B B Kotalik	Robert R. Thomas	RC-23
Chief Bridge Engr.	Deputy Chief Hwy. Engr.	

FORM 4237 REV 3-61

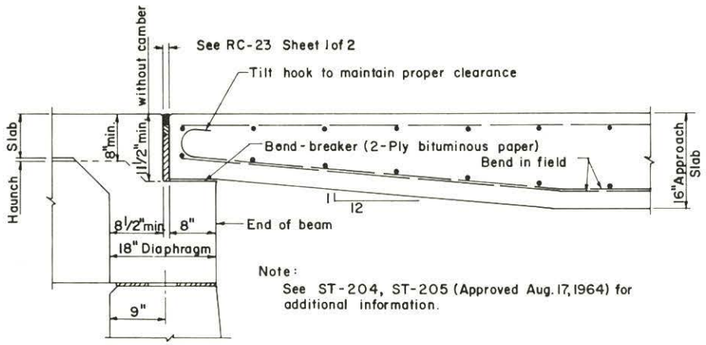


17" DEEP ADJACENT COMPOSITE BOX BEAMS WITH 9" DEEP APPROACH SLAB NOTCH

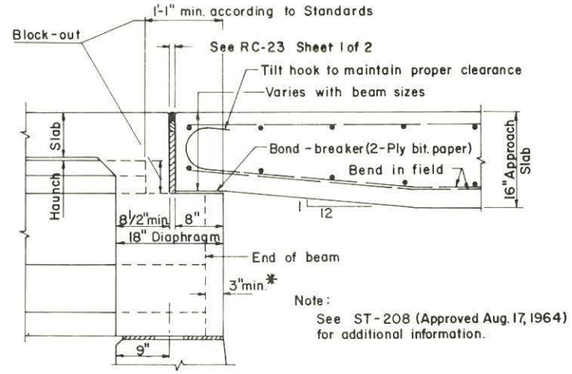


Notes for Construction Revisions

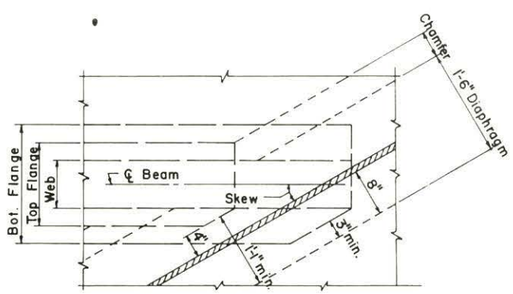
- When making construction changes in the field this drawing is to serve as a guide for modifying notch details shown on P/S Standard Drawings (ST-200 Series, Approved Aug. 17, 1964) for accommodating the Standard 16" Bridge Approach Slab.
- At beam ends, burn off reinforcement protruding into approach slab notch.
- * Increase in field, providing overhang, if required.



SPREAD BOX BEAMS WITH APPROACH SLAB NOTCH 11 1/2" OR DEEPER



I-BEAMS

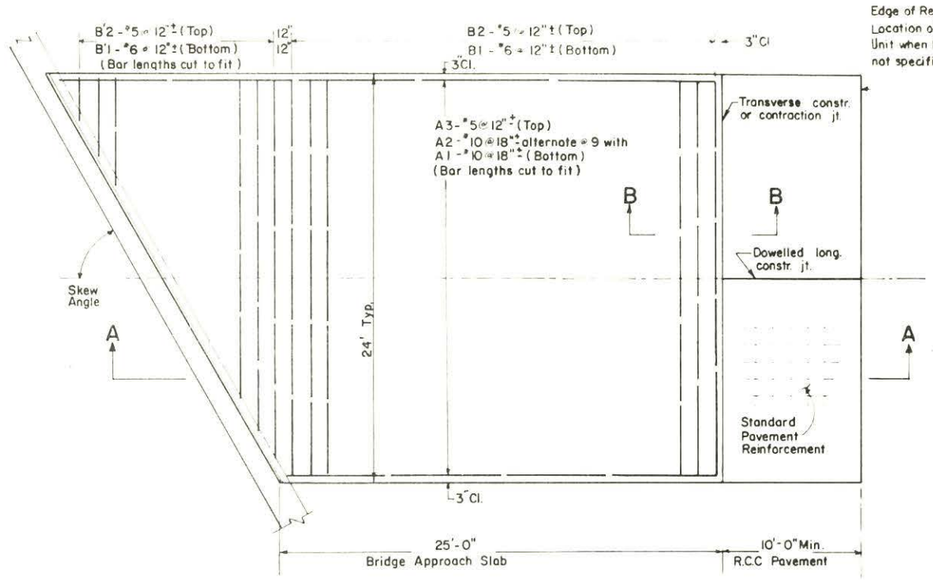


PLAN - I-BEAMS

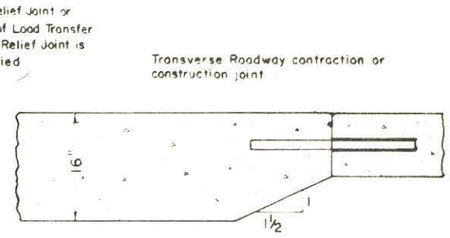
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BRIDGE APPROACH SLAB

Recommended Oct 1, 1974	Approved Oct. 1, 1974	Sht. 2 Of 2
J. J. Kozak	Robert R. Mueser	RC-23
Chief Bridge Engr.	Deputy Chief Hwy. Engr.	



PLAN

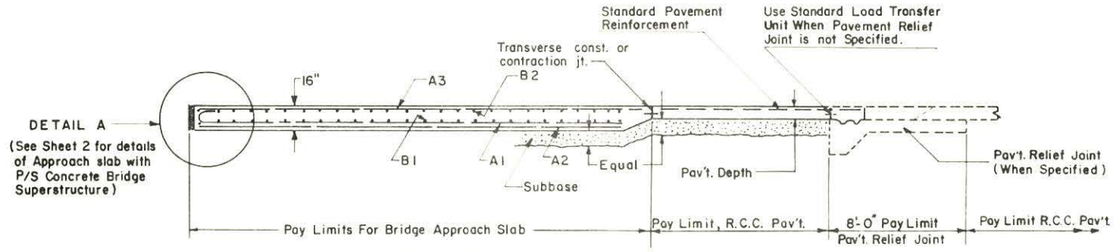


SECTION B-B

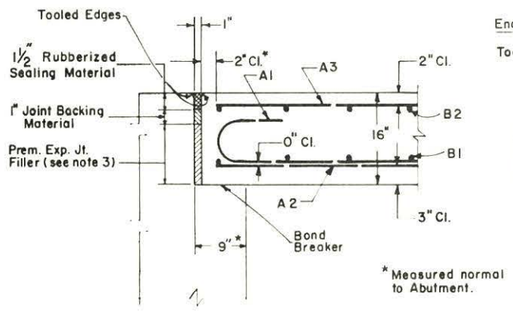
(Reinforcement not shown)

NOTES

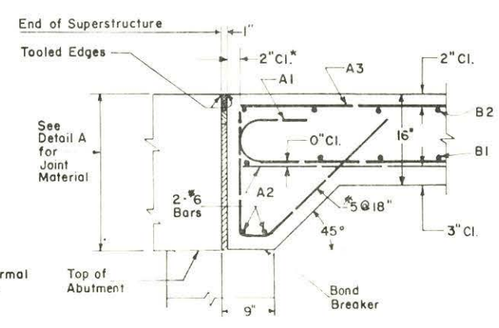
1. Materials, workmanship and method of payment shall be in accordance with Section 666 of Form 408.
2. Bridge Approach Slab shall be constructed in accordance with this Standard Drawing unless otherwise modified or shown on the structure drawings.
3. When the Pavement Relief Joint is not used adjacent to the bridge approach slab, replace premolded Expansion Joint filler at backwall or end diaphragm with closed cell neoprene sponge.



SECTION A-A



DETAIL A



DETAIL A (ALTERNATE)

(TO APPLY ONLY WHEN INDICATED ON STRUCTURE DRAWINGS)

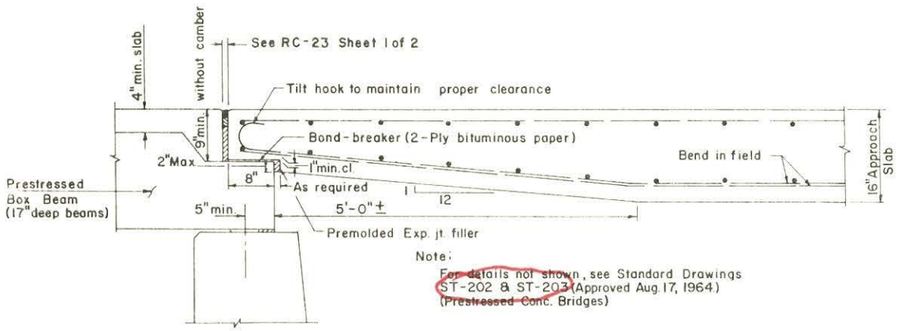
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BRIDGE APPROACH SLAB

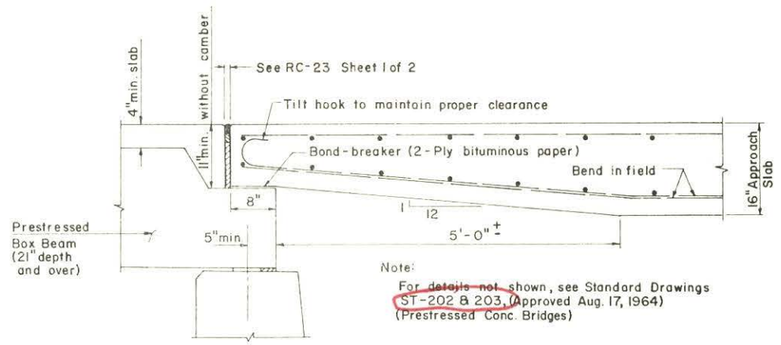
Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 3
Chief Bridge Engr.	Deputy Chief Hwy. Engr.	RC-23

V011

FORM 4737 REV 3-61



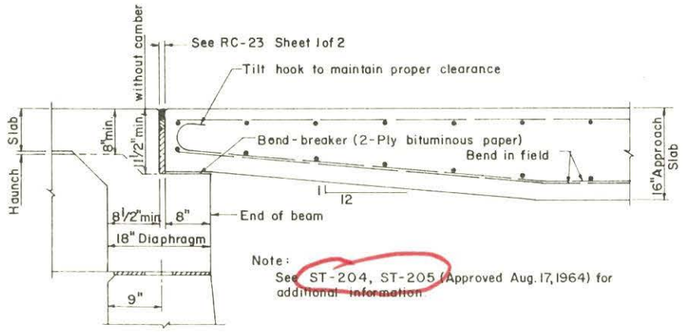
17" DEEP ADJACENT COMPOSITE BOX BEAMS WITH 9" DEEP APPROACH SLAB NOTCH



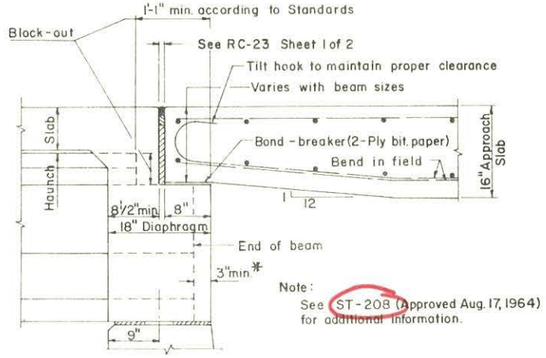
21" TO 48" DEEP ADJACENT COMPOSITE BOX BEAMS WITH 11" DEEP APPROACH SLAB NOTCH

Notes for Construction Revisions

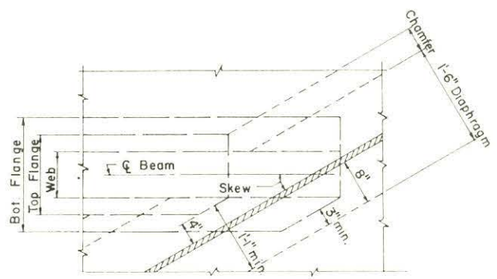
- When making construction changes in the field this drawing is to serve as a guide for modifying notch details shown on P/S Standard Drawings (ST-200 Series, Approved Aug. 17, 1964) for accommodating the Standard 16" Bridge Approach Slab.
- At beam ends, burn off reinforcement protruding into approach slab notch.
- * Increase in field, providing overhang, if required.
- Adjust concrete quantities shown in tables on Sheet 1 when approach slab is tapered.



SPREAD BOX BEAMS WITH APPROACH SLAB NOTCH 11½" OR DEEPER



I-BEAMS



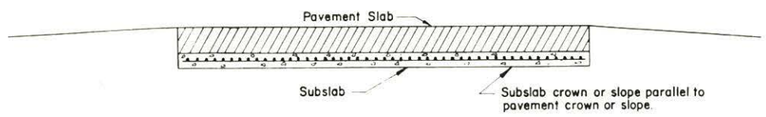
PLAN - I-BEAMS

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

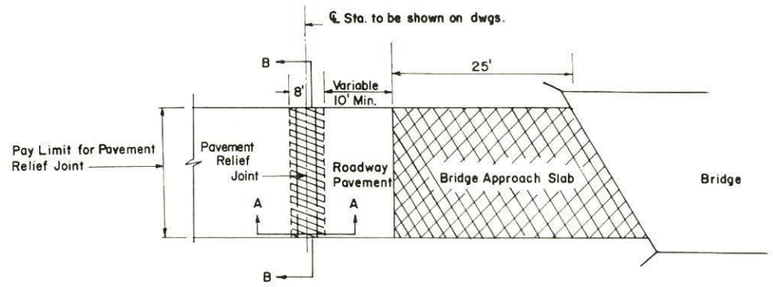
BRIDGE APPROACH SLAB

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 2 Of 2
J. F. Kalata, Chief Bridge Engr.	W. J. Bauer, Deputy Chief Hwy. Engr.	RC-23

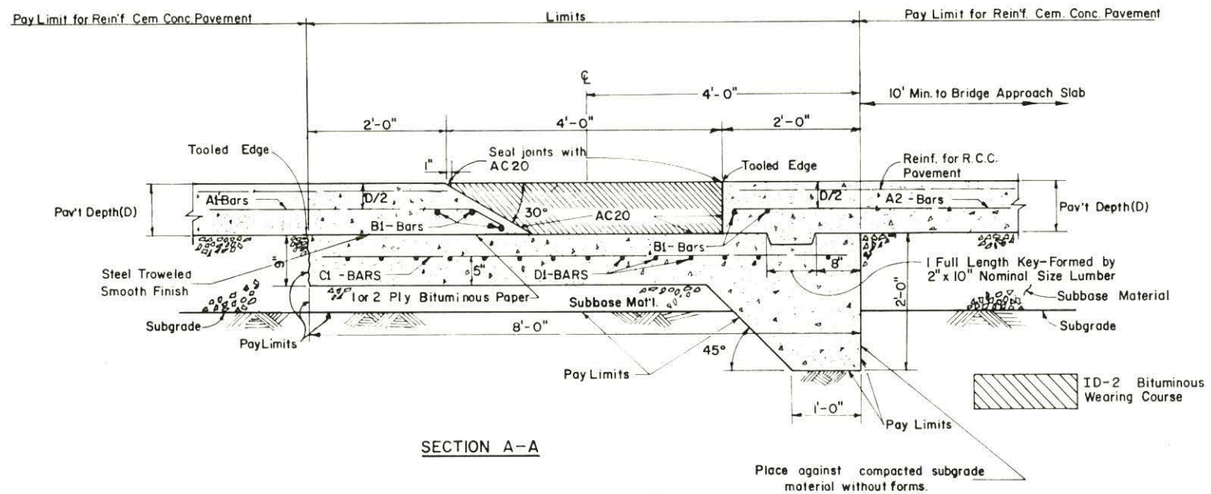
VOID



SECTION B–B



PLAN



SECTION A–A

NOTES

Material, workmanship and method of payment shall be in accordance with Section 504 of Form 408.

Concrete in subslab to be Class AA (at contractors option subslab concrete may be H.E.S.)

Portions of A1- Bars and A2- Bars which are outside of the indicated pay lines are to be included in price bid for complete joint.

Bituminous wearing course to be placed in lifts not to exceed 5" compacted depth.

Pipe foundation under drain Type A with Type II backfill shall be used for transverse drainage under the subslab on the upgrade side and will be measured and paid for as specified in Section 610.

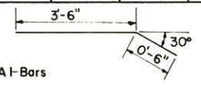
When plain cement concrete base course is specified the pavement relief joint shall be shown on the construction drawings as a special design.

Where bridges are located less than 500 feet apart, (measured from the face of nearest abutments) no relief joint will be used between the bridges.

Where bridges are located between 500 feet and 1000 feet apart, one relief joint shall be placed midway between the bridges.

SCHEDULE OF REINFORCEMENT STEEL

MARK	SIZE	SPACING C–C	LENGTH	NO. REQ'D	WEIGHT/FT. TRANSVERSE MEASURE LBS.
A1	5	12"	4'-0"	(W)	4.172
A2	5	12"	3'-0"	(W)	3.129
B1	5	6"	W minus 4"	5	5.215
C1	4	6"	7'-8"	(W)(2)	10.240
D1	4	6"	W minus 4"	16	10.688



A1-Bars

APPROXIMATE QUANTITIES PER FOOT OF TRANSVERSE MEASURE

	MAIN LINE PAVEMENT DEPTH		
	8"	9"	10"
Cu. Yds. Class AA Conc.	.30	.30	.30
Lbs. Reinforcement Steel	33.44	33.44	33.44
Tons ID-2 Bit. Wearing Crse.*	.17	.19	.20
Sq. Yds. R.C.C. Pavement **	.51	.52	.53

* Calculated using 145#/ft³

** Beveled portion of pavement slab has been converted to equivalent design depth of main line pavement.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

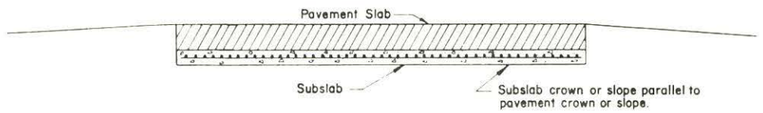
PAVEMENT RELIEF JOINT

Recommended June 1, 1976
B.D. Rountree
Director, Bureau of Design

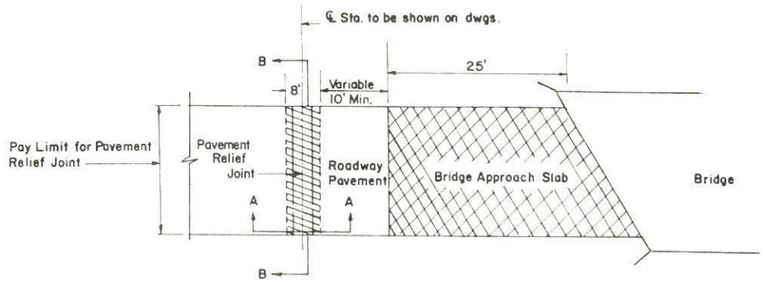
Approved June 1, 1976
Deputy Chief Hwy. Engr.

Sht. 1 Of 1

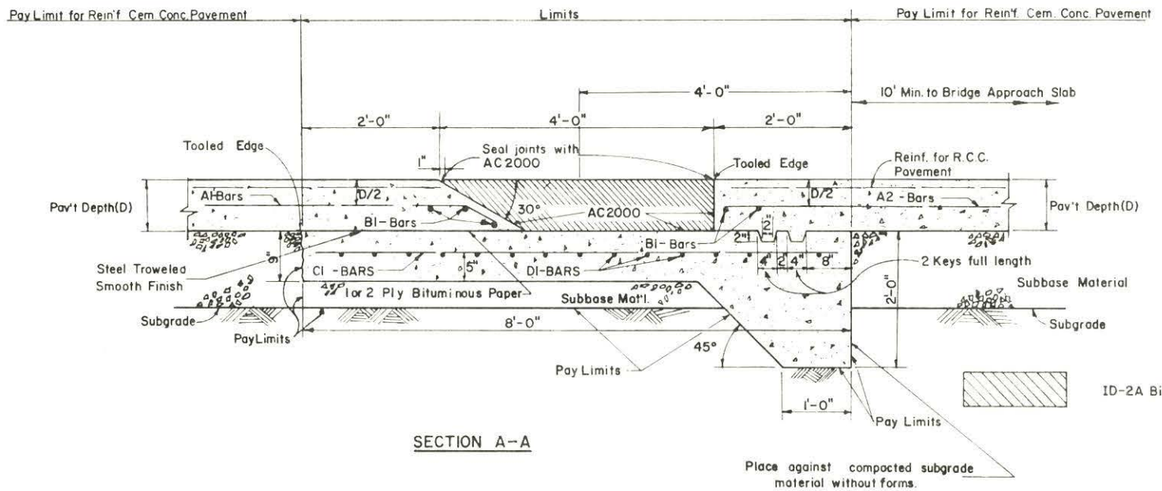
RC-24



SECTION B–B



PLAN



SECTION A–A

ID-2A Bituminous Wearing Course

NOTES

Material, workmanship and method of payment shall be in accordance with Section 504 of Form 408.

Concrete in subslab to be Class AA (at contractors option subslab concrete may be H.E.S.)

Portions of A1-Bars and A2-Bars which are outside of the indicated pay lines are to be included in price bid for complete joint.

Bituminous Wearing Course to be placed in lifts not to exceed 5" compacted depth.

When the relief joint is located at or near the low point of a sag vertical curve, pipe foundation under drain Type A with Type II backfill shall be used for transverse drainage under the subslab on the roadway side and will be measured and paid for as specified in Section 610.

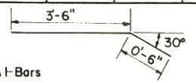
When plain cement concrete base course is specified the pavement relief joint shall be shown on the construction drawings as a special design.

Where bridges are located less than 200 feet apart, (measured from the face of nearest abutments) no relief joint will be used between the bridges.

Where bridges are located between 200 feet and 400 feet apart, one relief joint shall be placed midway between the bridges.

SCHEDULE OF REINFORCEMENT STEEL

MARK	SIZE	SPACING C–C	LENGTH	NO. REQ'D	WEIGHT/FT. TRANSVERSE MEASURE LBS.
A1	5	12"	4'-0"	(W)	4.172
A2	5	12"	3'-0"	(W)	3.129
B1	5	6"	W minus 4"	5	5.215
C1	4	6"	7'-8"	(W)(2)	10.240
D1	4	6"	W minus 4"	16	10.688



A1-Bars

APPROXIMATE QUANTITIES PER FOOT OF TRANSVERSE MEASURE

	MAIN LINE PAVEMENT DEPTH		
	8"	9"	10"
Cu. Yds. Class AA Conc.	.30	.30	.30
Lbs. Reinforcement Steel	33.44	33.44	33.44
Tons ID-2A Bit. Wearing Crse.*	.17	.19	.20
Sq. Yds. R.C.C. Pavement **	.51	.52	.53

* Calculated using 145#/ft³

** Beveled portion of pavement slab has been converted to equivalent design depth of main line pavement.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PAVEMENT RELIEF JOINT

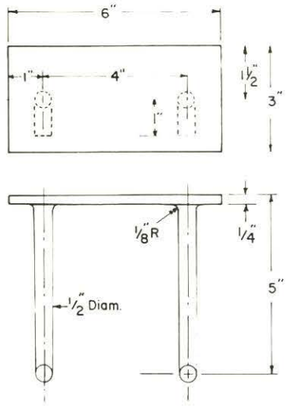
Recommended Dec. 1, 1974
B.D. Lousdie
Director, Bureau of Design

Approved Dec. 1, 1974
Robert R. Mease
Deputy Chief Hwy. Engr.

Sht. 1 Of 1

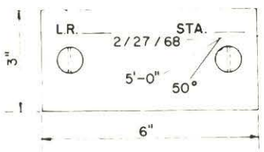
RC-24

VOID

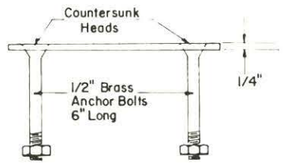


NOTE:
As an alternate to a complete casting anchor bars may be brazed to the plate in such a manner as to achieve equal strength.

ALTERNATE BRASS DATA PLATE

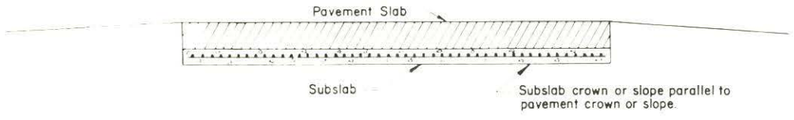


Example: L.R., STA. Date, Measurement, & Temperature

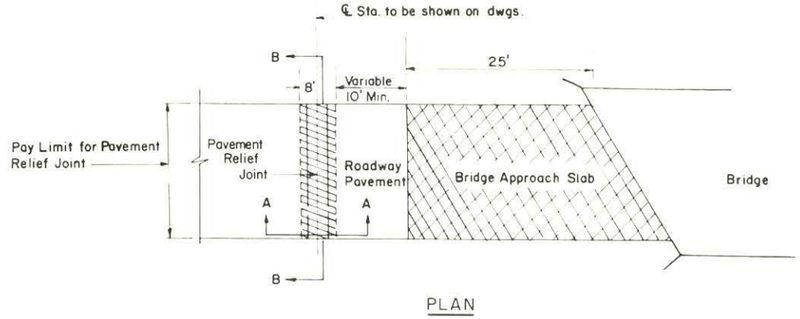


BRASS DATA PLATE

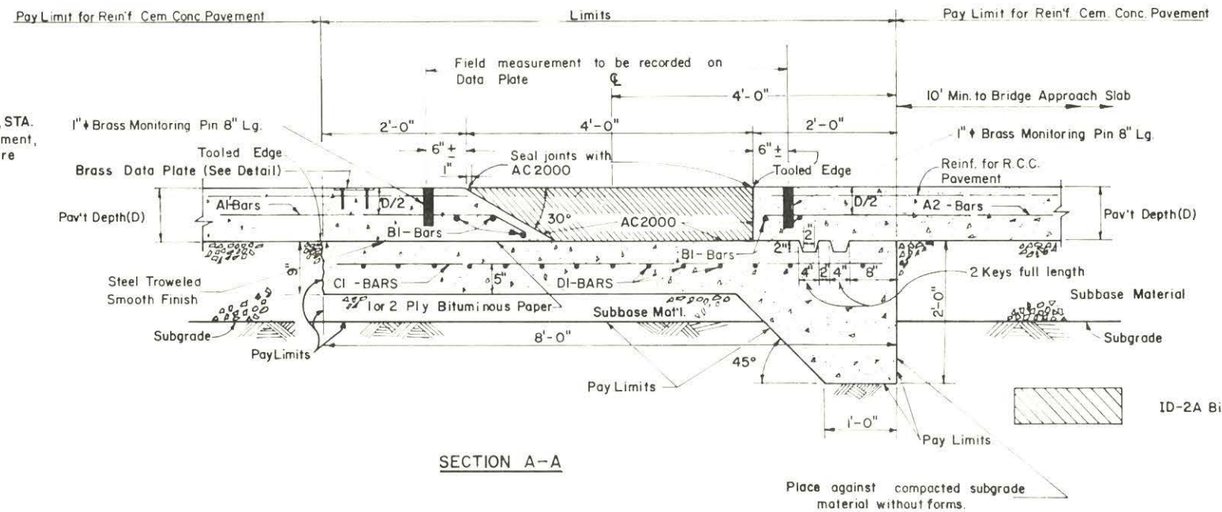
NOTES:
1. Numerals shall be legibly stamped into brass plate.
2. Brass plate shall be placed 6" from outside edge of pavement.
3. Slotted bolt heads optional.



SECTION B–B



PLAN



SECTION A–A

NOTES

Material, workmanship and method of payment shall be in accordance with Section 504 of Form 408.

Concrete in subslab to be Class AA (at contractors option subslab concrete may be H.E.S.)

Portions of A1 - Bars and A2 - Bars which are outside of the indicated pay lines are to be included in price bid for complete joint.

Bituminous Wearing Course to be placed in lifts not to exceed 5" compacted depth.

When the relief joint is located at or near the low point of a sag vertical curve, pipe foundation under drain Type A with Type II backfill **shall be used** for transverse drainage under the subslab on the roadway side and will be measured and paid for as specified in Section 610.

When plain cement concrete base course is specified the pavement relief joint shall be shown on the construction drawings as a special design.

The monitoring pins and brass data plate shall be considered as part of the pavement relief joint construction and no separate payment will be made.

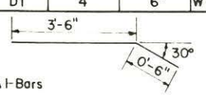
The brass monitoring pins shall be center marked with a punch and the field measurement taken (to nearest ½") between punch marks **by contractor.**

Where bridges are located less than 200 feet apart, (measured from the face of nearest abutments) no relief joint will be used between the bridges.

Where bridges are located between 200 feet and 400 feet apart, one relief joint shall be placed midway between the bridges.

SCHEDULE OF REINFORCEMENT STEEL

MARK	SIZE	SPACING C–C	LENGTH	NO. REQ'D	WEIGHT/FT. TRANSVERSE MEASURE LBS.
A1	5	12"	4'-0"	(W)	4.172
A2	5	12"	3'-0"	(W)	3.129
B1	5	6"	W minus 4"	5	5.215
C1	4	6"	7'-8"	(W)(2)	10.240
D1	4	6"	W minus 4"	16	10.688



A1-Bars

APPROXIMATE QUANTITIES PER FOOT OF TRANSVERSE MEASURE

	MAIN LINE PAVEMENT DEPTH		
	8"	9"	10"
Cu. Yds. Class AA Conc.	.30	.30	.30
Lbs. Reinforcement Steel	33.44	33.44	33.44
Tons ID-2A Bit. Wearing Crse.*	.17	.19	.20
Sq. Yds. R.C.C. Pavement **	.51	.52	.53

* Calculated using 145 #/ft³

** Beveled portion of pavement slab has been converted to equivalent design depth of main line pavement.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PAVEMENT RELIEF JOINT

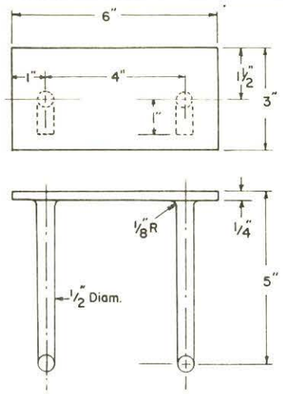
Recommended Oct. 1, 1974
P. F. Katalek
Chief Bridge Engineer

Approved Oct. 1, 1974
Robert R. Musser
Deputy Chief Hwy. Engr.

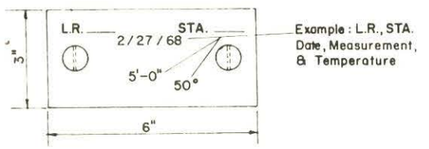
Sht. 1 Of 1
RC-24

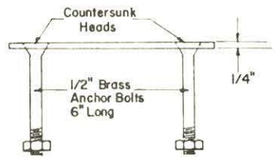
VOID

FORM 4237 REV. 3-81



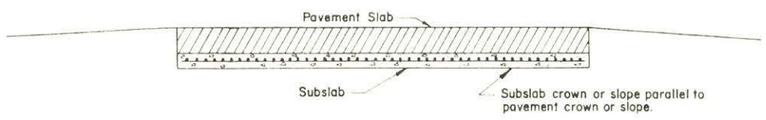
ALTERNATE BRASS DATA PLATE



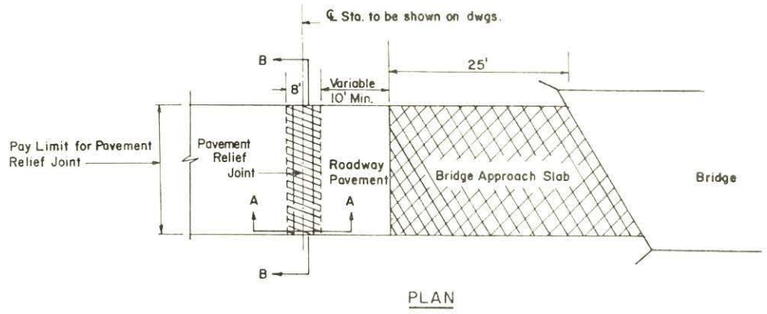


BRASS DATA PLATE

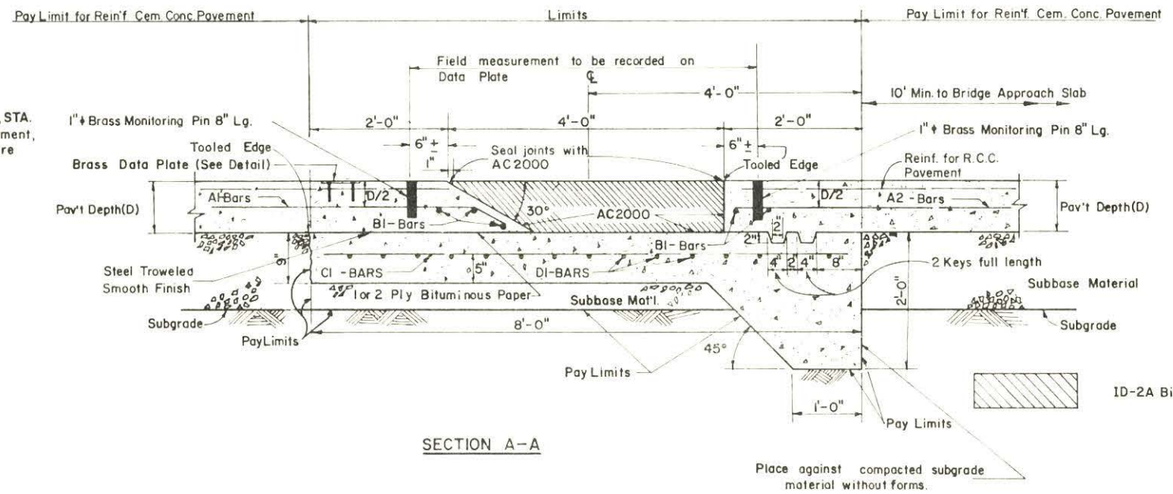
NOTES:
1. Numerals shall be legibly stamped into brass plate.
2. Brass plate shall be placed 6" from outside edge of pavement.
3. Slotted bolt heads optional.



SECTION B–B



PLAN



SECTION A–A

NOTES

504

Material, workmanship and method of payment shall be in accordance with Section 665 of Form 408.

Concrete in subslab to be Class AA (at contractors option subslab concrete may be H.E.S.)

Portions of A1-Bars and A2-Bars which are outside of the indicated pay lines are to be included in price bid for complete joint.

Bituminous Wearing Course to be placed in lifts not to exceed 5" compacted depth.

When the relief joint is located at or near the low point of a sag vertical curve, pipe foundation under drain Type A with Type II backfill shall be used for transverse drainage under the subslab on the roadway side and will be measured and paid for as specified in Section 610.

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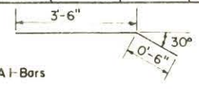
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A1-Bars

APPROXIMATE QUANTITIES PER FOOT OF TRANSVERSE MEASURE

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	8"	9"	10"
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Lbs. Reinforcement Steel	33.44	33.44	33.44
Tons ID-2A Bit. Wearing Crse *	.17	.19	.20
Sq. Yds. R.C.C. Pavement * *	.51	.52	.53

* Calculated using 145#/ft³

* * Beveled portion of pavement slab has been converted to equivalent design depth of main line pavement.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

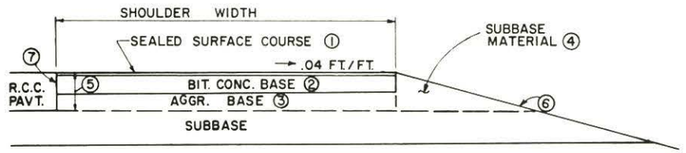
PAVEMENT RELIEF JOINT

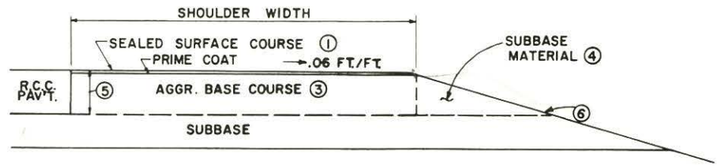
Recommended Dec. 1, 1971
P. F. Kotalik
Chief Bridge Engineer

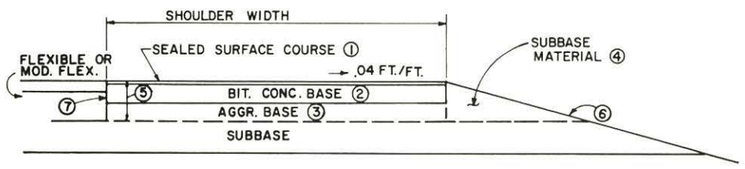
Approved Dec. 6, 1971
W. J. Raver
Deputy Chief Hwy. Engr.

Sht. 1 Of 1
RC-24

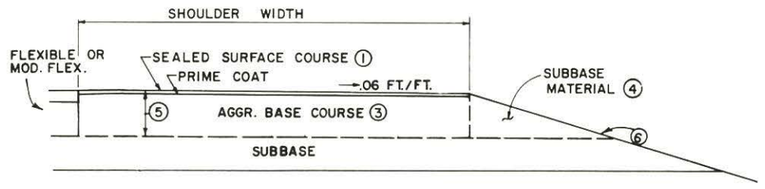
VOID







PAVED SHOULDERS
TYPE 1



PAVED SHOULDERS
TYPE 3

NOTES

① The Sealed Surface Course shall be placed to an approximate depth of 3/4" after rolling in accordance with Form 408.

② The Bit. Conc. Base shall have a depth of 4" min. after final compaction.

③ The Aggr. Base Course shall be constructed as specified in Section 350.3 of Form 408, and shall be considered part of the shoulder.

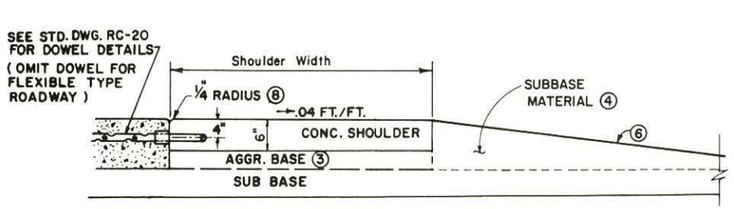
④ The payment for this area of subbase material shall be considered incidental to the shoulder.

⑤ Depth of shoulder to be the combined depth of surface and base courses or depth of R.C.C. Pavement.

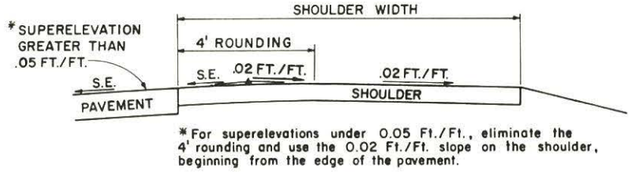
⑥ Variable slope as shown on typical sections.

⑦ Paint the vertical edge of the roadway pavement with a coat of bituminous material Class AC-2000, E-6, RC-250 or RC-800.

⑧ All shoulder joints shall be sealed in accordance with Section 501.3(q.)

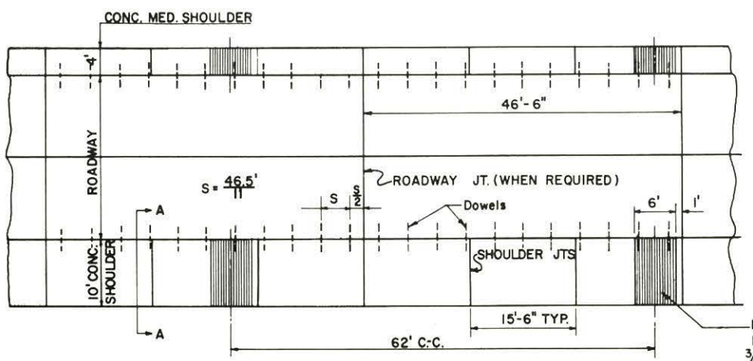


SECTION A-A

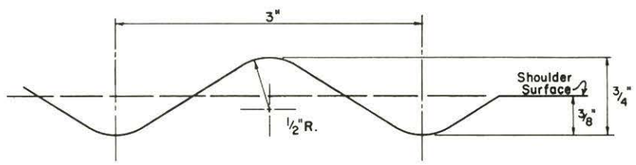


*For superelevations under 0.05 Ft./Ft., eliminate the 4' rounding and use the 0.02 Ft./Ft. slope on the shoulder, beginning from the edge of the pavement.

SHOULDER ROUNDING ON HIGH SIDE OF SUPERELEVATED CURVES



PLAN



CORRUGATION DETAIL

RUMBLE CORRUGATIONS SHALL BE FORMED BY USING 3/4" DEPTH BY 3" PITCH CORRUGATIONS.

START RUMBLE CORRUGATIONS 2" FROM THE EDGE OF THE ROADWAY PAVEMENT.

WHERE A CURB IS USED AT THE OUTSIDE EDGE OF THE SHOULDER, THE CORRUGATIONS SHOULD BE TERMINATED AT THE GUTTER OR A MINIMUM OF 1 FT. FROM THE CURB.

CONCRETE SHOULDERS

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

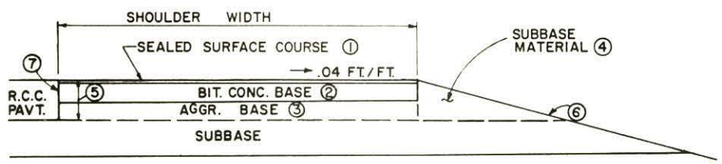
TYPE 1, TYPE 3 & CONCRETE SHOULDERS

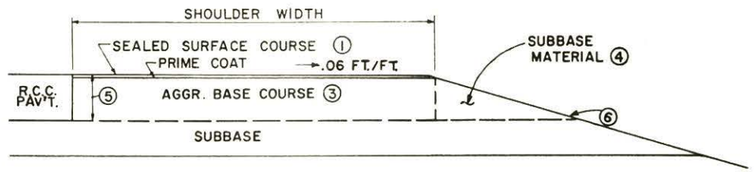
Recommended Aug. 20, 1975
B.D. Rumble
Director, Bureau of Design

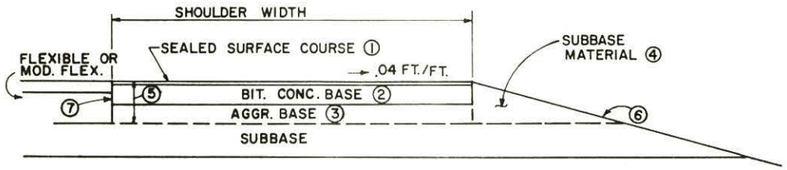
Approved Aug. 20, 1975
Deputy Chief Hwy. Engineer

Sht. 1 Of 1

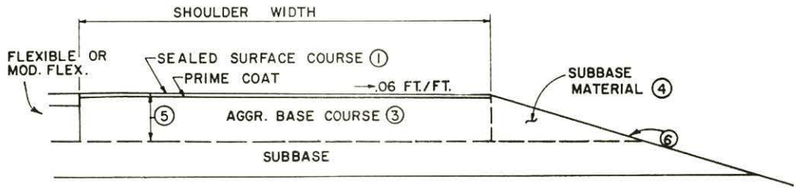
RC-25







PAVED SHOULDERS
TYPE 1



PAVED SHOULDERS
TYPE 3

NOTES

(1) The Sealed Surface Course shall be placed to an approximate depth of 3/4" after rolling in accordance with Form 408.

(2) The Bit. Conc. Base shall have a depth of 4" min. after final compaction.

(3) The Aggr. Base Course shall be constructed as specified in Section 350.3 of Form 408, and shall be considered part of the shoulder.

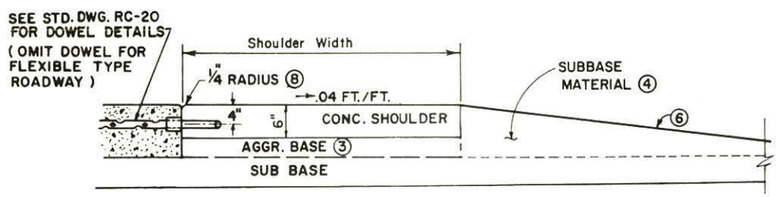
(4) The payment for this area of subbase material shall be considered incidental to the shoulder.

(5) Depth of shoulder to be the combined depth of surface and base courses or depth of R.C.C. Pavement.

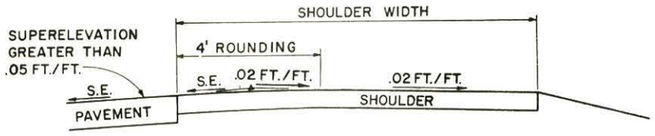
(6) Variable slope as shown on typical sections.

(7) Paint the vertical edge of the roadway pavement with a coat of bituminous material Class AC-2000, E-6, RC-250 or RC-800.

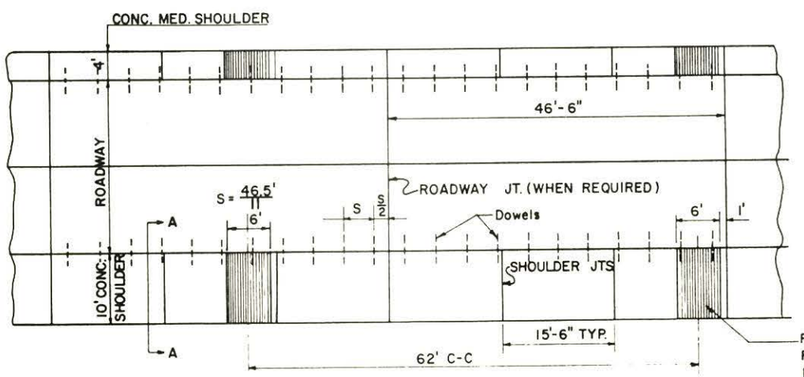
(8) All shoulder joints shall be sealed in accordance with Section 501.3(q.)



SECTION A-A



SHOULDER ROUNDING ON HIGH SIDE
OF SUPERELEVATED CURVES



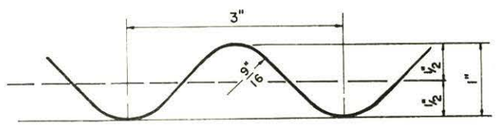
PLAN

RUMBLE CORRUGATIONS SHALL BE FORMED BY USING STANDARD 1" DEPTH BY 3" PITCH CORRUGATIONS.

START RUMBLE CORRUGATIONS 2" FROM THE EDGE OF THE ROADWAY PAVEMENT.

WHERE A CURB IS USED AT THE OUTSIDE EDGE OF THE SHOULDER, THE CORRUGATIONS SHOULD BE TERMINATED AT THE GUTTER OR A MINIMUM OF 1 FT. FROM THE CURB.

CONCRETE SHOULDERS



CORRUGATION DETAIL

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

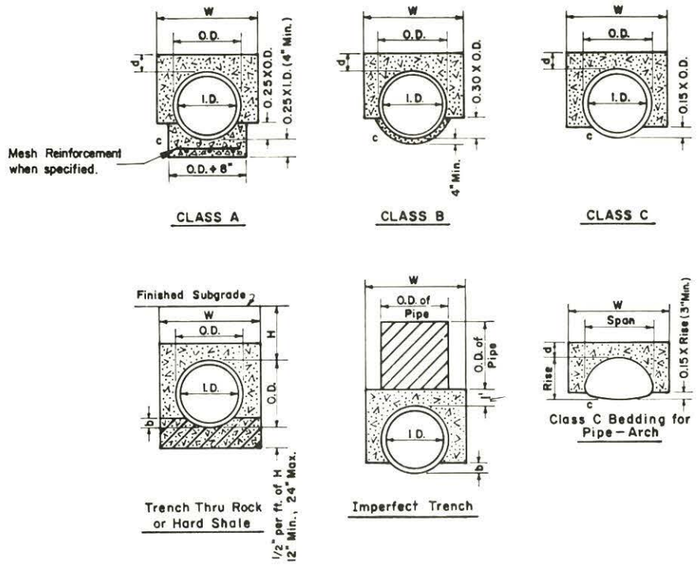
TYPE 1, TYPE 3 & CONCRETE SHOULDERS

Recommended Mar. 7, 1973
Director, Bureau of Design

Approved Mar. 7, 1973
Deputy Chief Hwy. Engineer

Sht. 1 Of 1
RC-25

VOID



PIPE BEDDING AND BACKFILL

COARSE AGGREGATE FOR PIPE TRENCH BACKFILL

~~CLASS B~~ CEMENT CONCRETE (or better)

FINE AGGREGATE FOR CLASS B BEDDING

SELECTED FINE COMPRESSIBLE MATERIAL or when directed COARSE AGGREGATE

LOOSE, HIGHLY COMPRESSIBLE EARTH or other APPROVED MATERIAL

I.D. — Nominal inside diameter of pipe.

O.D — Outside diameter of pipe barrel or shell.

H.D (Hub Diameter) — Outside diameter of pipe at bell or band.

* W — 2.0 ft. + H.D. for pipes or pipe-arches not exceeding 48" I.D. or Span, respectively.
2.5 ft. + H.D. for pipes or pipe-arches exceeding 48" I.D. or Span, respectively.

b — Varies in conformance with class of bedding applicable to pipe installation.

c — When unstable material under the pipe has been removed, it shall be replaced with suitable material compacted to a satisfactory density, and the bed shaped as specified in Section 601.3

d — 1.0 ft. minimum, where practicable.

H — Height of fill over top of pipe.

Note: The use of Coarse Aggregate for pipe backfill will be based upon the location and type of pipe installation. The material and method of backfill shall be in accordance with Section 601.3(d) and it will be used for all pipes carrying surface drainage under the roadway in cut sections for the full length of the pipe, or within the limits bounded by the toes of slopes in embankment sections except under the following conditions.

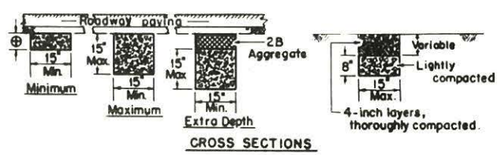
The exceptions are:

(1) Pipes located in medians.
(2) Pipes located under swales or ditch lines.
(3) Slope pipes in cut or fill.
(4) Pipes under drives to private properties.
(5) Combination storm sewer and underdrain.
(6) Pipes located in graded sections of interchange areas.
(7) Storm sewer outside shoulder area.

For calculating quantities of coarse aggregate, deduct volume occupied by pipe.

* The trench width for combination storm sewer and underdrain shall have a specified width of 1.0 ft. + H.D.

BEDDING FOR PIPE CULVERTS & METAL PIPE-ARCH CULVERTS



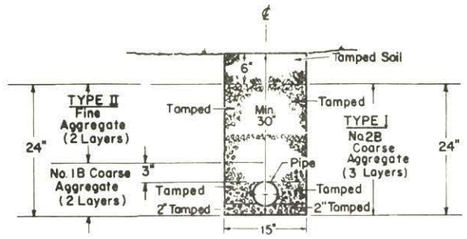
CROSS SECTIONS

⊕ — Six (6) inches minimum or depth of adjacent insulation material or Subbase

Aggregate in excess of 15-inch depth is payable as No. 2B Coarse Aggregate
Excavation in excess of 15-inch depth is payable as Class 4 Excavation.

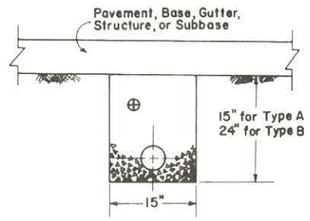
The top of aggregate under concrete pavement, base or gutter and through the shoulder area shall be covered with either one (1) layer of approved Bit. paper or one (1) layer of subgrade paper twenty-four (24) inches in width.

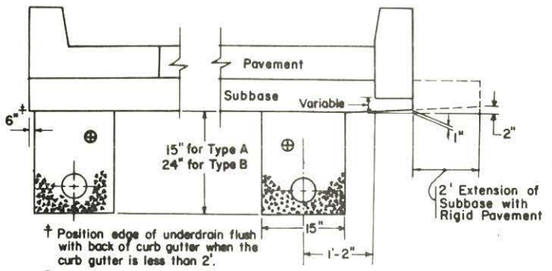
SUBGRADE DRAINS



TYPE I & TYPE II BACKFILL

PIPE UNDERDRAIN



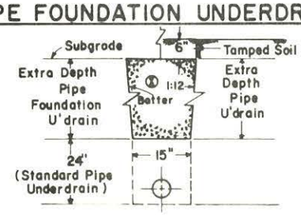


† Position edge of underdrain flush with back of curb gutter when the curb gutter is less than 2'.

⊕ For details of Type I and II Backfill, see PIPE UNDERDRAIN

Where placed under rigid base, pavement, gutter, or other structures, the top of the aggregate shall be covered with one(1) layer of approved bituminous paper.

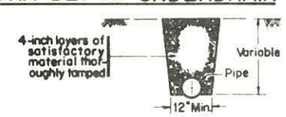
PIPE FOUNDATION UNDERDRAIN



① No. 2B coarse aggregate used over Pipe Underdrain Type I Backfill is payable as Coarse Aggregate for Extra Depth U'drain.

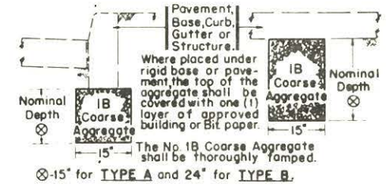
Fine aggregate used over Pipe Underdrain-Type II Backfill is payable as Fine Aggregate for Extra Depth Underdrain

EXTRA DEPTH UNDERDRAIN



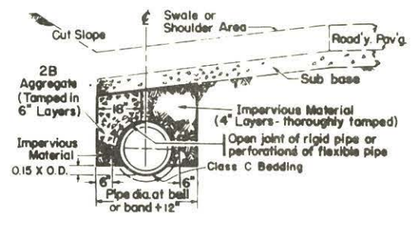
Excavation over 36 inches in depth and for a maximum width of 24 inches is payable as Class 4 Excavation.

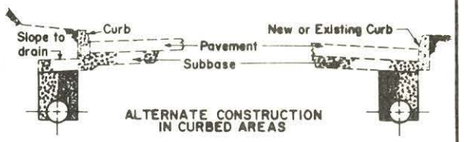
PIPE UNDERDRAIN OUTLETS



⊗-15" for TYPE A and 24" for TYPE B.

STONE FOUNDATION UNDERDRAIN TYPES A & B





ALTERNATE CONSTRUCTION IN CURBED AREAS

The pipe shall be in accordance with the type specified in Section 604 of the Specifications (Form 408)

Where required, pipe perforations shall be grouped as follows:

125° for 15" pipe	80° for 30" pipe
110° for 18" pipe	75° for 33" pipe
90° for 24" pipe	70° for 36" pipe
85° for 27" pipe	60° for 48" pipe

Aggregate shall be No. 2B Coarse Aggregate for backfill and will be paid for at the contract unit price per cu. yd. compacted and complete in place.

Excavation shall be Class 4 with a trench width equal to the outside diameter of the pipe at the bell or band plus one (1) foot.

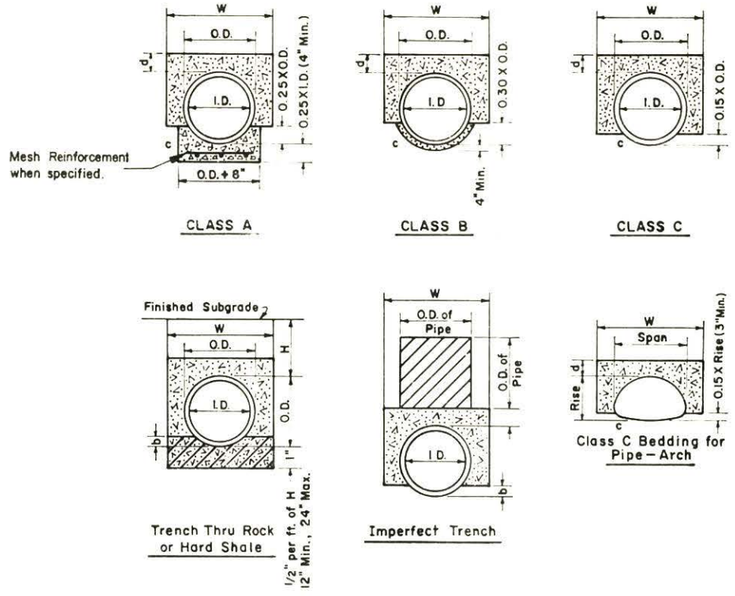
COMBINATION STORM SEWER & U'DRAIN

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SUB SURFACE DRAINS

June 1 1976

Recommended	Approved	Sht. 1 Of 1
Aug. 20, 1975	Aug. 20, 1975	
B.O. Rousbie	R.R. Moore	RC-30
Director, Bureau of Design	Deputy Chief Hwy. Engr.	



PIPE BEDDING AND BACKFILL

COARSE AGGREGATE FOR PIPE TRENCH BACKFILL

CLASS B CEMENT CONCRETE (or better)

FINE AGGREGATE FOR CLASS B BEDDING

SELECTED FINE COMPRESSIBLE MATERIAL or when directed

COARSE AGGREGATE

LOOSE, HIGHLY COMPRESSIBLE EARTH or other APPROVED MATERIAL

I.D. — Nominal inside diameter of pipe.
O.D — Outside diameter of pipe barrel or shell.
H.D (Hub Diameter) — Outside diameter of pipe at bell or band.
* W — 2.0 ft. + H.D. for pipes or pipe-arches not exceeding 48" I.D. or Span, respectively.
2.5 ft. + H.D. for pipes or pipe-arches exceeding 48" I.D. or Span, respectively.
b — Varies in conformance with class of bedding applicable to pipe installation.
c — When unstable material under the pipe has been removed, it shall be replaced with suitable material compacted to a satisfactory density, and the bed shaped as specified in Section 601.3
d — 1.0 ft. minimum, where practicable.
H — Height of fill over top of pipe.

Note: The use of Coarse Aggregate for pipe backfill will be based upon the location and type of pipe installation. The material and method of backfill shall be in accordance with Section 601.3(d) and it will be used for all pipes carrying surface drainage under the roadway in cut sections for the full length of the pipe, or within the limits bounded by the toes of slopes in embankment sections except under the following conditions.

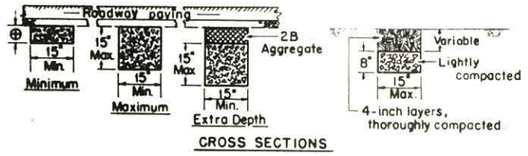
The exceptions are:

(1) Pipes located in medians.
(2) Pipes located under swales or ditch lines.
(3) Slope pipes in cut or fill.
(4) Pipes under drives to private properties.
(5) Combination storm sewer and underdrain.
(6) Pipes located in graded sections of interchange areas.
(7) Storm sewer outside shoulder area.

For calculating quantities of coarse aggregate, deduct volume occupied by pipe.

* The trench width for combination storm sewer and underdrain shall have a specified width of 1.0 ft. + H.D.

BEDDING FOR PIPE CULVERTS & METAL PIPE-ARCH CULVERTS



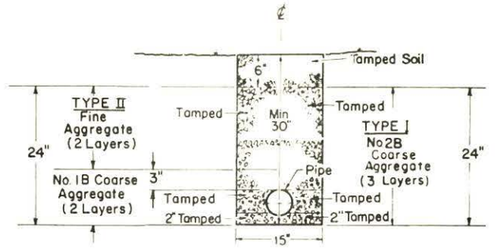
CROSS SECTIONS

⊕ — Six (6) inches minimum or depth of adjacent insulation material or Subbase

Aggregate in excess of 15-inch depth is payable as No. 2B Coarse Aggregate
Excavation in excess of 15-inch depth is payable as Class 4 Excavation.

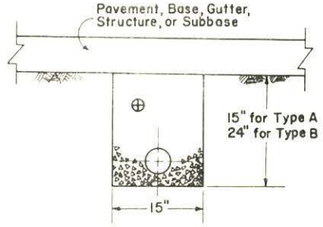
The top of aggregate under concrete pavement, base or gutter and through the shoulder area shall be covered with either one (1) layer of approved Bit. paper or one (1) layer of subgrade paper twenty-four (24) inches in width.

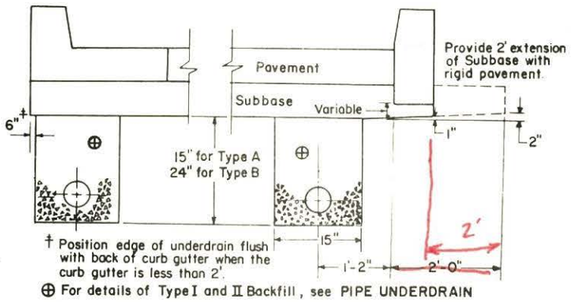
SUBGRADE DRAINS



TYPE I & TYPE II BACKFILL

PIPE UNDERDRAIN



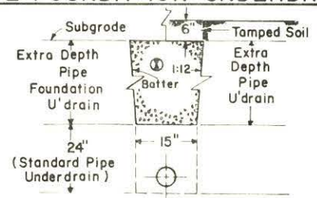


† Position edge of underdrain flush with back of curb gutter when the curb gutter is less than 2'.

⊕ For details of Type I and II Backfill, see PIPE UNDERDRAIN

Where placed under rigid base, pavement, gutter, or other structures, the top of the aggregate shall be covered with one(1) layer of approved bituminous paper.

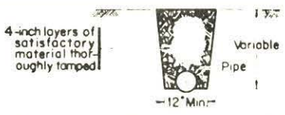
PIPE FOUNDATION UNDERDRAIN



① No. 2B coarse aggregate used over Pipe Underdrain Type I Backfill is payable as Coarse Aggregate for Extra Depth U'drain.

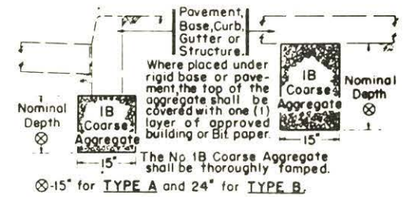
Fine aggregate used over Pipe Underdrain - Type II Backfill is payable as Fine Aggregate for Extra Depth Underdrain

EXTRA DEPTH UNDERDRAIN



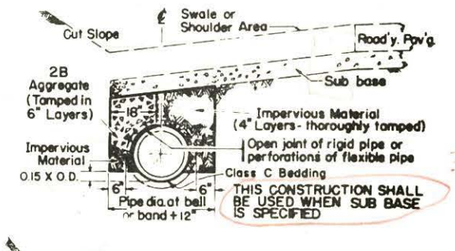
Excavation over 36 inches in depth and for a maximum width of 24 inches is payable as Class 4 Excavation

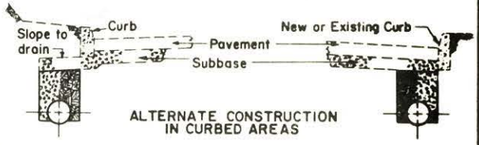
PIPE UNDERDRAIN OUTLETS



⊗-15" for TYPE A and 24" for TYPE B.

STONE FOUNDATION UNDERDRAIN TYPES A & B





ALTERNATE CONSTRUCTION IN CURBED AREAS

The pipe shall be in accordance with the type specified in Section 604 of the Specifications (Form 408).

Where required, pipe perforations shall be grouped as follows:

125° for 15" pipe	80° for 30" pipe
110° for 18" pipe	75° for 33" pipe
90° for 24" pipe	70° for 36" pipe
85° for 27" pipe	60° for 48" pipe

Aggregate shall be No. 2B Coarse Aggregate for backfill and will be paid for at the contract unit price per cu. yd. compacted and complete in place.

Excavation shall be Class 4 with a trench width equal to the outside diameter of the pipe at the bell or band plus one (1) foot.

COMBINATION STORM SEWER & U'DRAIN

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

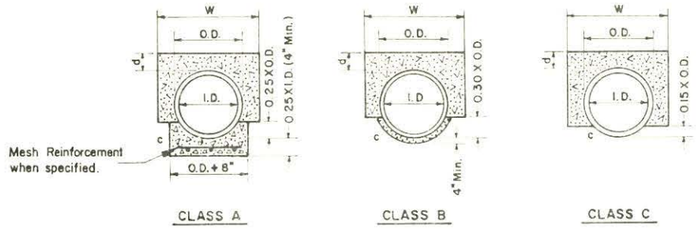
SUB SURFACE DRAINS

Recommended Mar 7, 1973
Director, Bureau of Design

Approved Mar 7, 1973
Deputy Chief Hwy. Engr.

Sht. 1 Of 1

RC-30



PIPE BEDDING AND BACKFILL

- COARSE AGGREGATE FOR PIPE TRENCH BACKFILL
- CLASS B CEMENT CONCRETE (or better)
- FINE AGGREGATE FOR CLASS B BEDDING
- SELECTED FINE COMPRESSIBLE MATERIAL or when directed COARSE AGGREGATE
- LOOSE, HIGHLY COMPRESSIBLE EARTH or other APPROVED MATERIAL

I.D — Nominal inside diameter of pipe.
O.D — Outside diameter of pipe barrel or shell.
H.D (Hub Diameter) — Outside diameter of pipe at bell or band.
* W — 2.0 ft. + H.D. for pipes or pipe-arches not exceeding 48" I.D. or Span, respectively.
2.5 ft. + H.D. for pipes or pipe-arches exceeding 48" I.D. or Span, respectively.
b — Varies in conformance with class of bedding applicable to pipe installation.
c — When unstable material under the pipe has been removed, it shall be replaced with suitable material compacted to a satisfactory density, and the bed shaped as specified in Section 601.3
d — 1.0 ft. minimum, where practicable.
H — Height of fill over top of pipe.

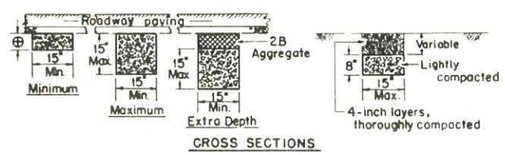
Note: The use of Coarse Aggregate for pipe backfill will be based upon the location and type of pipe installation. The material and method of backfill shall be in accordance with Section 601.3(d) Except as noted, it will be used for all pipes carrying surface drainage located within the limits bounded by the outer edges of shoulders in cut sections, or by the toes of slopes in embankment sections.

The exceptions are:
(1) Pipes located in medians.
(2) Pipes located under swales or ditch lines.
(3) Slope pipes in cut or fill.
(4) Pipes under drives to private properties.
(5) Combination storm sewer and underdrain.
(6) Pipes located in graded sections of interchange areas.
(7) Storm sewer outside shoulder area.

For calculating quantities of coarse aggregate, deduct volume occupied by pipe.

* The trench width for combination storm sewer and underdrain shall have a specified width of 1.0 ft. + H.D.

BEDDING FOR PIPE CULVERTS & METAL PIPE-ARCH CULVERTS

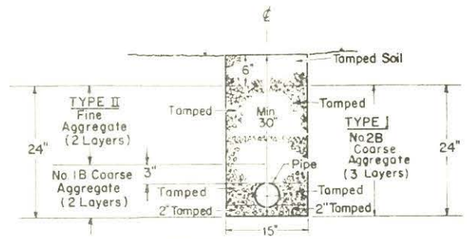


⊕ — Six (6) inches minimum or depth of adjacent insulation material or Subbase

Aggregate in excess of 15-inch depth is payable as No. 2B Coarse Aggregate
Excavation in excess of 15-inch depth is payable as Class 4 Excavation.

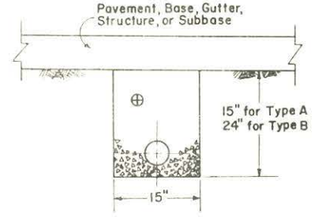
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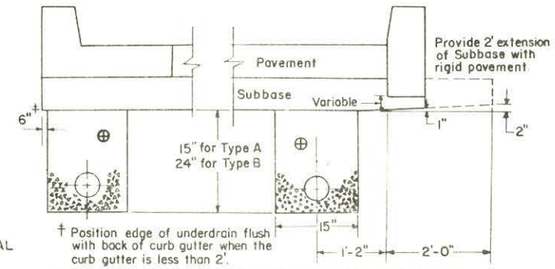
SUBGRADE DRAINS



TYPE I & TYPE II BACKFILL

PIPE UNDERDRAIN



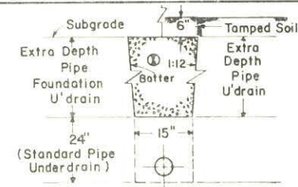


† Position edge of underdrain flush with back of curb gutter when the curb gutter is less than 2'.

⊕ For details of Type I and II Backfill, see PIPE UNDERDRAIN

Where placed under rigid base, pavement, gutter, or other structures, the top of the aggregate shall be covered with one(1) layer of approved bituminous paper.

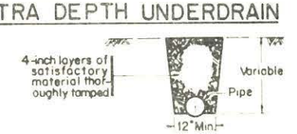
PIPE FOUNDATION UNDERDRAIN



① No. 2B coarse aggregate used over Pipe Underdrain Type I Backfill is payable as Coarse Aggregate for Extra Depth U'drain.

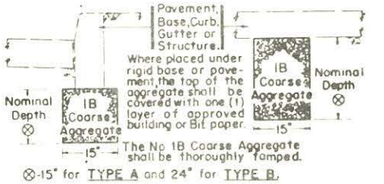
Fine aggregate used over Pipe Underdrain - Type II Backfill is payable as Fine Aggregate for Extra Depth Underdrain

EXTRA DEPTH UNDERDRAIN



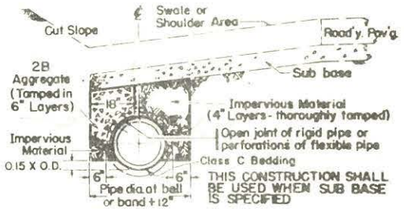
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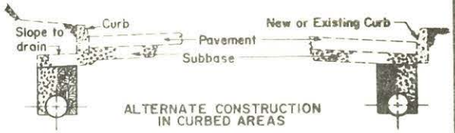
PIPE UNDERDRAIN OUTLETS



⊗ 15" for TYPE A and 24" for TYPE B.

STONE FOUNDATION UNDERDRAIN TYPES A & B





The pipe shall be in accordance with the type specified in Section 604 of the Specifications (Form 408).

Where required, pipe perforations shall be grouped as follows:

125° for 15" pipe	80° for 30" pipe
110° for 18" pipe	75° for 33" pipe
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Aggregate shall be No. 2B Coarse Aggregate for backfill and will be paid for at the contract unit price per cu. yd. compacted and complete in place.

Excavation shall be Class 4 with a trench width equal to the outside diameter of the pipe at the bell or band plus one (1) foot.

COMBINATION STORM SEWER & U'DRAIN

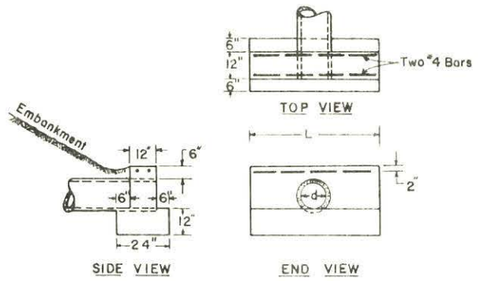
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SUB SURFACE DRAINS

Recommended Dec. 1, 1971 — R.R. Muse — Location & Design Engineer	Approved Dec. 1, 1971 — W. J. Kaven — Deputy Chief Hwy. Engr.	Sht. 1 Of 1 — RC-30

VOID

Pipe d	L
18" & 21"	5'
24" & 27"	7'
30" & 33"	9'



TYPE D ENDWALL

2:1 EMBANKMENT SLOPES															
PIPE ϕ	Skew ∠ = 90° to 60° θ = 30°			Skew ∠ = 55° θ = 35°			Skew ∠ = 50° θ = 40°			Skew ∠ = 45° θ = 45°				
d	L	ℓ	W1	L	ℓ	W1	L	ℓ	W1	L	ℓ	W1	W2	A
in.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	in.
36	5.8	0	4.6	6.0	.33	4.9	6.2	.5	5.2	6.5	.67	5.7	4.6	12
42	6.3	0	5.8	6.6	.33	6.1	6.9	.5	6.5	7.3	.67	7.1	5.8	12
48	6.9	0	6.9	7.2	.33	7.3	7.5	.5	7.8	8.0	.67	8.5	6.9	12
54	7.5	0	8.0	7.8	.33	8.5	8.2	.5	9.1	8.7	.67	9.9	8.0	12
60	8.1	0	9.2	8.4	.33	9.8	8.8	.5	10.4	9.4	.67	11.3	9.2	15
72	9.2	0	11.5	9.6	.33	12.2	10.1	.5	13.0	10.8	.67	14.1	11.5	15

2:1 EMBANKMENT SLOPES															
PIPE ϕ	Skew ∠ = 40° θ = 50°			Skew ∠ = 30° θ = 60°			Skew ∠ = 20° θ = 70°			Skew ∠ = 10° θ = 80°				
d	L	ℓ	W1	L	ℓ	W1	L	ℓ	W1	L	ℓ	W1	W2	A
in.	ft.	ft	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	in.
36	7.0	.75	6.2	8.3	1.33	8.0	11.1	1.75	11.7	19.6	5.0	23.0	4.6	12
42	7.8	.75	7.8	9.3	1.33	10.0	12.5	1.75	14.6	22.5	5.0	28.8	5.8	12
48	8.5	.75	9.4	10.3	1.33	12.0	14.0	1.75	17.5	25.3	5.0	34.6	6.9	12
54	9.3	.75	10.9	11.3	1.33	14.0	15.5	1.75	20.5	28.2	5.0	40.3	8.0	12
60	10.1	.75	12.5	12.3	1.33	16.0	16.9	1.75	23.4	31.1	5.0	46.0	9.2	15
72	11.7	.75	15.6	14.3	1.33	20.0	19.8	1.75	29.2	36.9	5.0	57.6	11.5	15

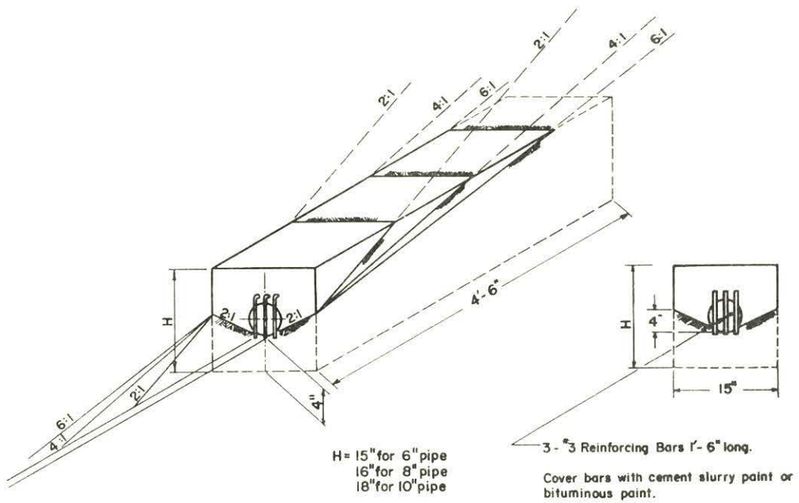
$SD = \frac{d}{\text{Cos. }\theta} = \frac{d}{\text{Sin Skew } \angle}$

$L = SD + 2.3'$

W_1 for 2:1 Slope $= \frac{2d-2'}{\text{Cos. }\theta}$

W for variable slope when X = horizontal dimension of the slope designation.

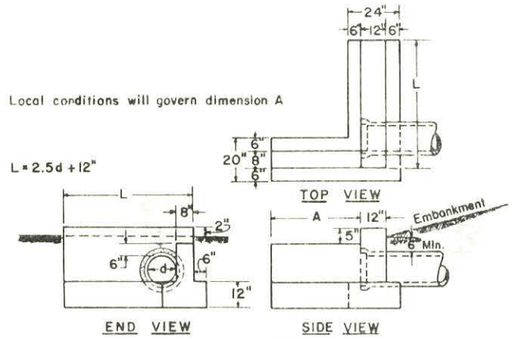
$W = \frac{X}{\text{Cos.}\theta}(d - 0.5 - \frac{1.0}{X})$



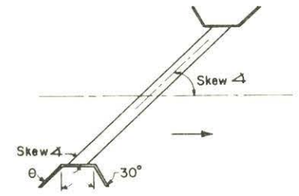
H = 15" for 6" pipe
16" for 8" pipe
18" for 10" pipe

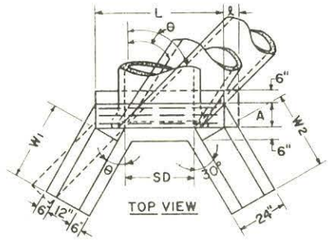
Cover bars with cement slurry paint or bituminous paint.

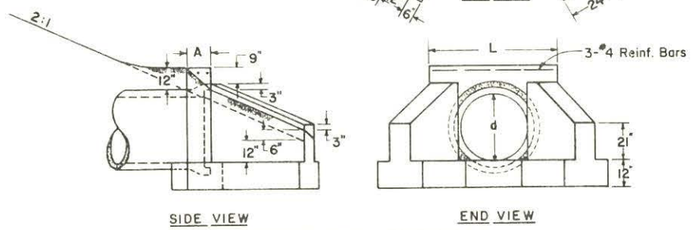
PIPE UNDERDRAIN OUTLET ENDWALL



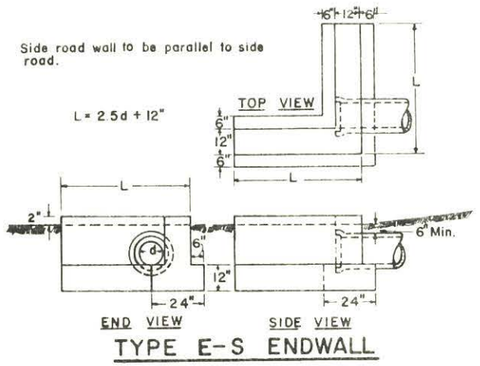
TYPE D-E ENDWALL







TYPE D-W ENDWALL



TYPE E-S ENDWALL

NOTE:
All exposed edges shall be chamfered (1) one inch.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

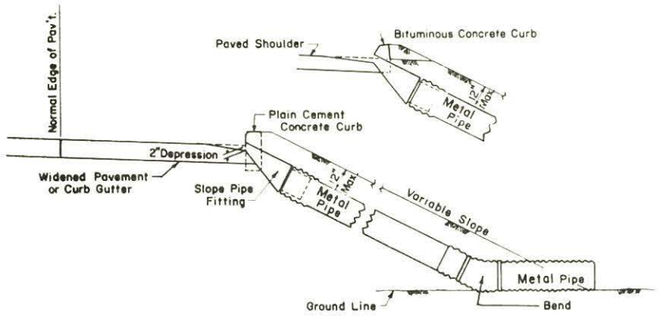
ENDWALLS

Recommended Dec. 1, 1971
R.R. Mueller
Location & Design Engineer

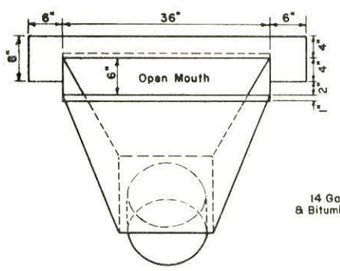
Approved Dec. 6, 1971
W.J. Ravier
Deputy Chief Hwy. Engr.

Sht. 1 of 1

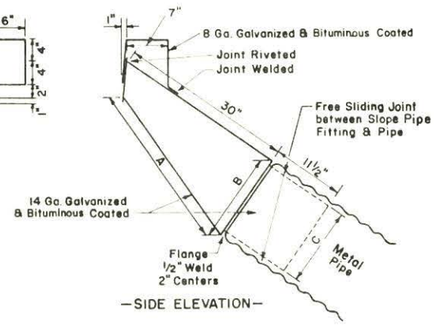
RC-31



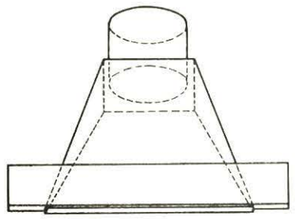
ADJACENT TO STRUCTURE AND/OR PAVED SHOULDER



—FRONT ELEVATION—



—SIDE ELEVATION—

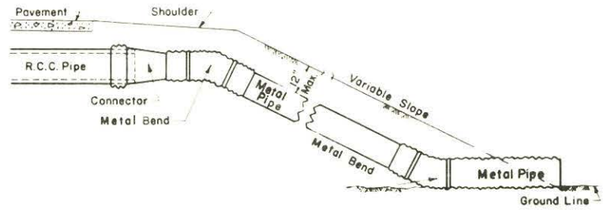


—PLAN—

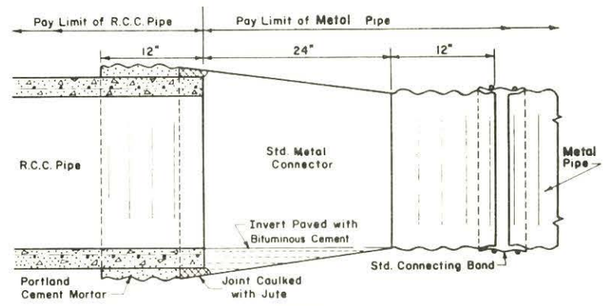
Nominal Diameter of Pipe*	Dimensions (Inches) for 2:1 Slopes		
	A	B	C
12"	$28\frac{15}{16}$	13	11
15"	$29\frac{13}{16}$	16	14
18"	$31\frac{5}{16}$	19	17

* NOTE: Slope pipes draining only shoulder areas in embankments, other than those adjacent to structures, shall be restricted to 12" in diameter (Minimum)

SLOPE PIPE FITTING – TYPE A

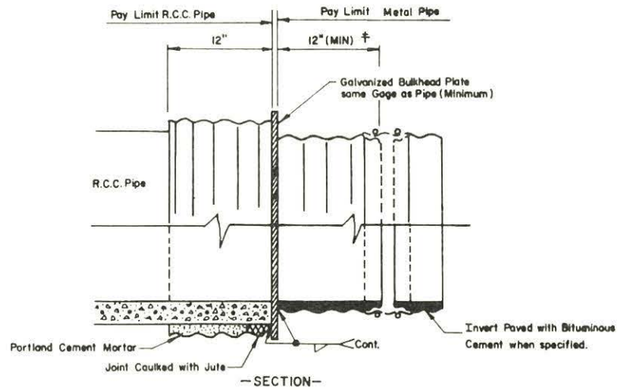


OUTLET PIPE THRU EMBANKMENT SLOPE



—SECTION—

METAL PIPE CONNECTOR



—SECTION—

ALTERNATE METAL PIPE CONNECTOR

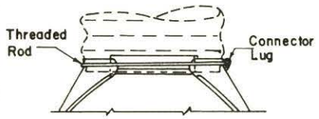
† Adjust Length to obtain even 2 ft. Lengths of Connecting Pipe.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

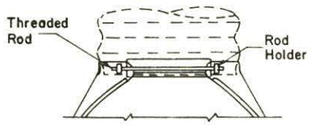
SLOPE PIPE FITTINGS AND CONNECTORS

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
RR Mueser	W. J. Rover	RC-32
Location & Design Engineer	Deputy Chief Hwy. Engr.	

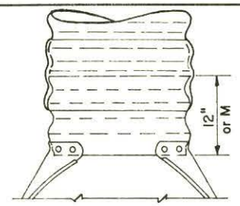
FORM 4237 REV 3-61



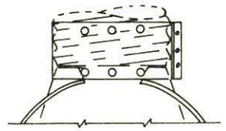
TYPE-1 CONNECTION
Sizes: 18"-24" Circular Pipe



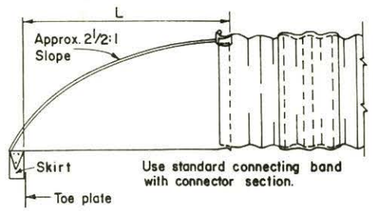
TYPE-2 CONNECTION
Sizes: 30"-36" Circular Pipe
& 18"x11" to 58"x36" Pipe-Arch



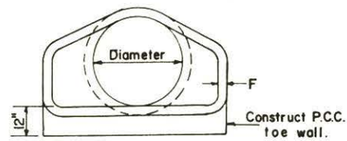
TYPE-3 CONNECTION
Sizes: 42" & Greater Circular Pipe
& 65"x40" to 85"x54" Pipe-Arch



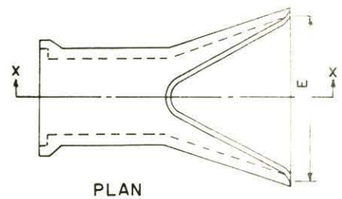
TYPE-D CONNECTION
Sizes: 18"-36" Circular Pipe
& 18"x11" to 58"x36" Pipe Arch



SIDE VIEW OF TYPE-3 CONNECTION

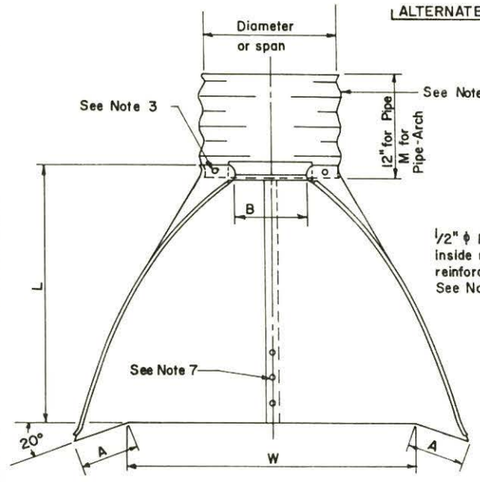


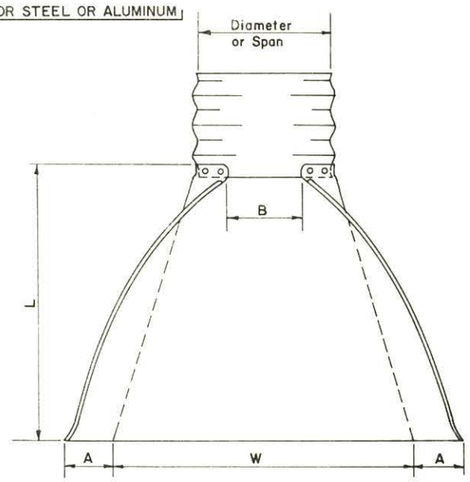
END VIEW

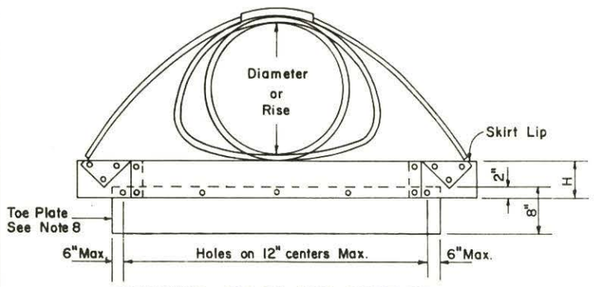


PLAN

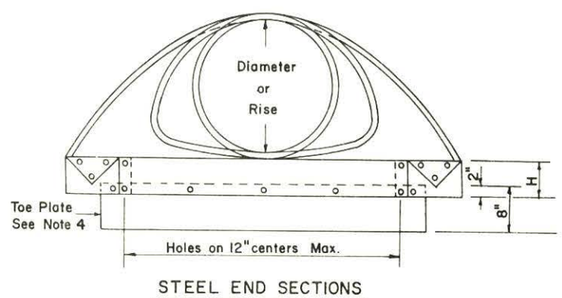
ALTERNATE TYPE CONNECTIONS FOR STEEL OR ALUMINUM







ALUMINUM ALLOY END SECTION



STEEL END SECTIONS

NOTES FOR STEEL END SECTIONS

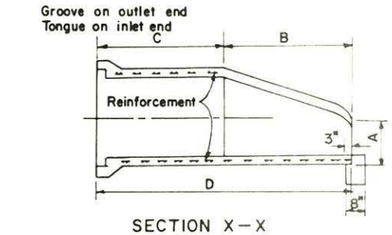
1. All 3 pc. bodies to have 12 Ga. sides and 10 Ga. center panels. Width of center panels to be greater than 20% of the pipes periphery. Multiple panel bodies to have top seams which are to be tightly joined by 3/8" ϕ galvanized rivets or bolts.
2. Reinforced edges to be supplemented with galvanized stiffner angles for the 60" thru 84" circular pipe, 79"x49" and 85"x54" pipe arch sizes. The angles will be 2"x2"x1/4" for 60" thru 72" circular pipe, 79"x49" and 85"x54" pipe arch sizes and 2½"x2½"x1/4" for 78" and 84" circular pipe. The angles to be attached by 3/8" ϕ galvanized nut and bolts.
3. Angle reinforcement will be placed under the center panel seams on the 79"x49" and 85"x54" pipe arch sizes.
4. Galvanized toe plates to be provided on all end sections.
5. The Type D connection shall be used to connect end sections to pipe which have other than annular corrugations. Other designs will be acceptable provided no leakage results from the connection.

NOTES FOR ALUMINUM ALLOY END SECTION

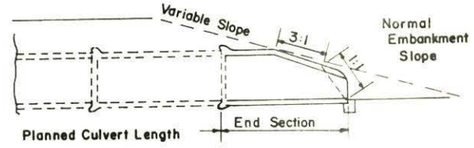
1. Skirt shall be made from aluminum alloy 3004-0, clad 5% each side with alloy 7072.
2. Corner plate and top plate shall be the same material and gage as skirt.
3. Rivets shall be aluminum alloy 6053-T4.
4. Threaded rods shall be aluminum alloy 6061-T6.
5. Connector lugs, bolts, and nuts shall be hot-dipped galvanized steel.
6. Skirt for pipe sizes 18" to 24" incl. and spans 18" to 36" incl. for pipe arch shall be from one (1) sheet.
7. Skirt for pipe sizes 30" to 48" incl. and spans 43" to 58" incl. for pipe arch shall be from two (2) sheets. Skirts for pipe arch with spans of 65" and 72" shall be made from three (3) sheets. Provide 2" lap joint fastened with 3/8" ϕ rivets on center line spaced 6"c-c.
8. Toe plate shall be from the same material and gage as skirt. Locate punched holes to match holes in skirt. Provide 3/8" bolts and nuts for assembly.

Pipe-Arch span size	Length Toe Plate	Pipe size	Length Toe Plate
18"-43"	W+10"	18"-30"	W+10"
50"-72"	W+18"	36"-48"	W+22"

9. Connector section, when specified, shall be corrugated aluminum alloy pipe.
10. Reinforcement for edge of skirt shall be aluminum alloy 6063-F.



SECTION X-X



SLOPE DETAIL

CONCRETE END SECTION

CONCRETE END SECTION DIMENSIONS						
Diam"	A"	B'-"	C'-"	D'-"	E'-"	F"
18"	9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	9	2-11	3-2	6'-1	3-6	2¾
24	9½	3-7½	2-6	6-1½	4-0	3
27	10½	4-0	2-1½	6-1½	4-6	3¼
30	12	4-6	1-7¾	6-1¾	5-0	3½
33	13½	4-10½	3-3¼	8-1¾	5-6	3¾
36	15	5-3	2-10¾	8-1¾	6-0	4
42	21	5-3	2-11	8-2	6-6	4½
48	24	6-0	2-2	8-2	7-0	5
54	27	5-5	2-11	8-4	7-6	5½

GENERAL NOTES

1. End section shall be of the same material as the pipe or pipe arch culvert to which it is attached. No Bit. Coating is required.
2. End sections for aluminum alloy or steel pipe, with a diameter larger than 54" used on the inlet end of a pipe culvert, shall be anchored. Details of the anchor shall be shown on the drawings.

DIMENSIONS OF END SECTIONS FOR ALUMINUM ALLOY PIPE

Pipe Diam. in Inches	Gage	Dimensions - Inches A ±1"	B Max.	H ±1"	L ±1½"	W ±2"
18	16	7	9	6	31	36
21	16	8¼	11	6	36	42
24	14	9½	12	6	42	48
30	14	12	15	7½	52½	60
36	12	14	18	9	63	72
42	12	16	21	10½	73½	84
48	12	18	27	12	84	90

DIMENSIONS OF END SECTIONS FOR ALUMINUM ALLOY PIPE-ARCH

Pipe Arch in Inches Span	Rise	Gage	Dimensions - Inches A ±1"	B Max.	H ±1"	L ±1½"	W ±2"	M
18	11	16	4½	9	6	19	30	12
22	13	16	5¼	10	6	23	36	12
25	16	16	6¼	11½	6	28	42	12
29	18	14	7	14	6	31½	48	12
36	22	14	8¾	16	6	38½	60	12
43	27	12	10¾	17½	7⅝	47	75	12
50	31	12	12¼	20	9⅛	54	85	12
58	36	12	14	26	10⅝	63	96	12
65	40	12	15¾	23	10⅝	70	112	24
72	44	10	17¼	24	12⅛	77	128	24

DIMENSIONS OF END SECTIONS FOR GALVANIZED STEEL PIPE

Pipe Diam. In Inches	Gage	Dimensions - Inches A ±1"	B Max.	H ±1"	L ±1½"	W ±2"
18	16	8	10	6	31	36
21	16	9	12	6	36	42
24	16	10	13	6	41	48
30	14	12	16	8	51	60
36	14	14	19	9	60	72
42	12	16	22	11	69	84
48	12	18	27	12	78	90
54	12	18	30	12	84	102
60	12	18	33	12	87	114
66	12	18	36	12	87	120
72	12	18	39	12	87	126
78	12	18	42	12	87	132
84	12	18	45	12	87	138

DIMENSIONS OF END SECTIONS FOR GALVANIZED STEEL PIPE-ARCH

Pipe Arch in Inches Span	Rise	Gage	Dimensions - Inches A ±1"	B Max.	H ±1"	L ±1½"	W ±2"
18	11	16	7	9	6	19	30
22	13	16	7	10	6	23	36
25	16	16	8	12	6	28	42
29	18	16	9	14	6	32	48
36	22	14	10	16	6	39	60
43	27	14	12	18	8	46	75
50	31	12	13	21	9	53	85
58	36	12	18	26	12	63	90
65	40	12	18	30	12	70	102
72	44	12	18	33	12	77	114
79	49	12	18	36	12	77	126
85	54	12	18	39	12	77	138

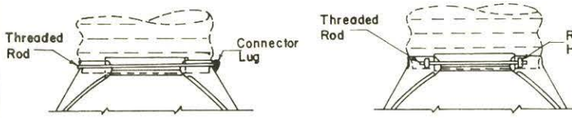
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

END SECTIONS FOR PIPE CULVERTS

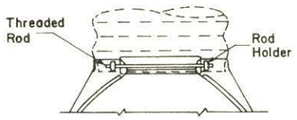
Recommended Mar. 7, 1973
Director, Bureau of Design

Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

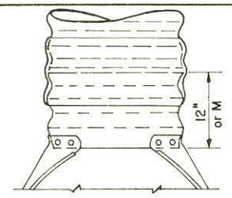
Sht. 1 Of 1
RC-33



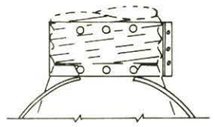
TYPE-1 CONNECTION
Sizes: 18"–24" Circular Pipe



TYPE-2 CONNECTION
Sizes: 30"–36" Circular Pipe
& 18⅞"x11" to 58"x36" Pipe-Arch

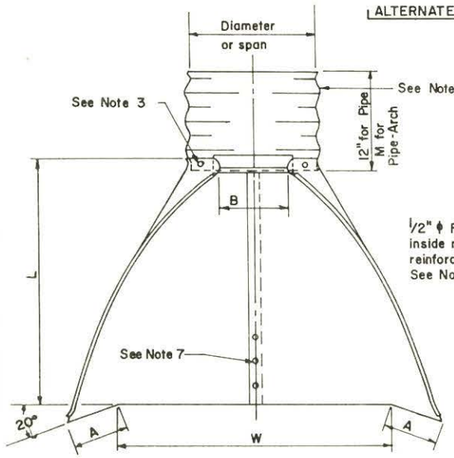


TYPE-3 CONNECTION
Sizes: 42" & Greater Circular Pipe
& 65"x40" to 85"x54" Pipe-Arch

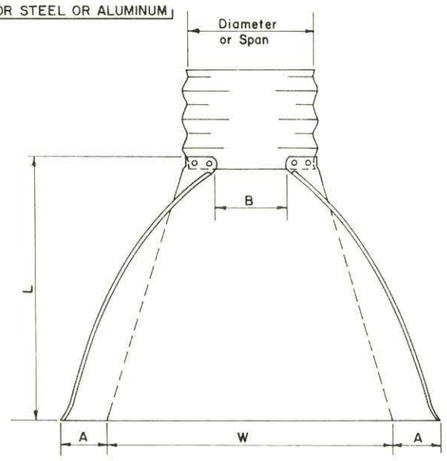


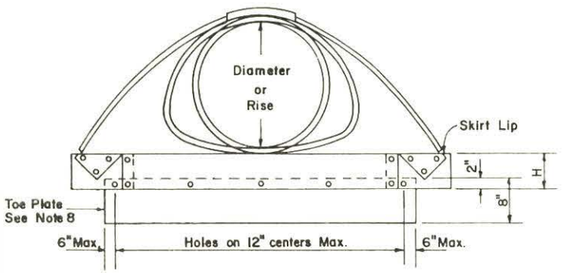
TYPE-D CONNECTION
Sizes: 18"–36" Circular Pipe
& 18"x11" to 58"x36" Pipe Arch

ALTERNATE TYPE CONNECTIONS FOR STEEL OR ALUMINUM

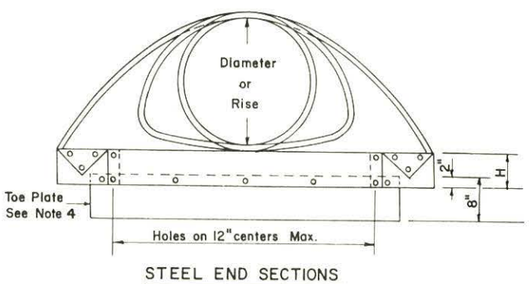


½" ϕ Rod approx. 18" Lg. inside rolled edge to reinforce corner. See Note 10

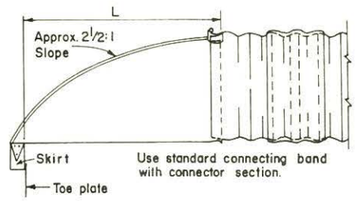




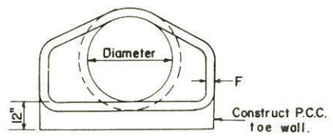
ALUMINUM ALLOY END SECTION



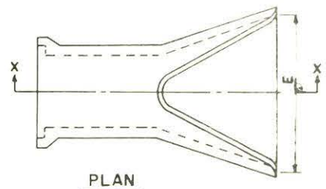
STEEL END SECTIONS



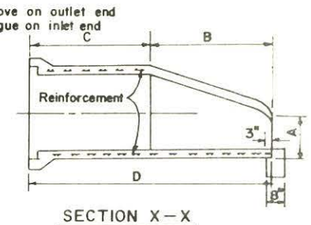
SIDE VIEW OF TYPE-3 CONNECTION



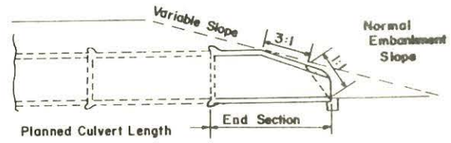
END VIEW



PLAN



SECTION X–X



SLOPE DETAIL

NOTES FOR STEEL END SECTIONS

1. All 3 pc. bodies to have 12 Ga. sides and 10 Ga. center panels. Width of center panels to be greater than 20% of the pipes periphery. Multiple panel bodies to have top seams which are to be tightly joined by 3/8" ϕ galvanized rivets or bolts.
2. Reinforced edges to be supplemented with galvanized stiffner angles for the 60" thru 84" circular pipe, 79"x49" and 85"x54" pipe arch sizes. The angles will be 2½x2½x1/4" for 60" thru 72" circular pipe, 79"x49" and 85"x54" pipe arch sizes and 2½"x2½"x1/4" for 78" and 84" circular pipe. The angles to be attached by 3/8" ϕ galvanized nut and bolts.
3. Angle reinforcement will be placed under the center panel seams on the 79"x49" and 85"x54" pipe arch sizes.
4. Galvanized toe plates to be provided on all end sections.
5. The Type D connection shall be used to connect end sections to pipe which have other than annular corrugations. Other designs will be acceptable provided no leakage results from the connection.

NOTES FOR ALUMINUM ALLOY END SECTION

1. Skirt shall be made from aluminum alloy 3004-0, clad 5% each side with alloy 7072.
2. Corner plate and top plate shall be the same material and gage as skirt.
3. Rivets shall be aluminum alloy 6053-T4.
4. Threaded rods shall be aluminum alloy 6061-T6.
5. Connector lugs, bolts, and nuts shall be hot-dipped galvanized steel.
6. Skirt for pipe sizes 18" to 24" incl. and spans 18" to 36" incl. for pipe arch shall be from one (1) sheet.
7. Skirt for pipe sizes 30" to 48" incl. and spans 43" to 58" incl. for pipe arch shall be from two (2) sheets. Skirts for pipe arch with spans of 65" and 72" shall be made from three (3) sheets. Provide 2" lap joint fastened with 3/8" ϕ rivets on center line spaced 6" c-c.
8. Toe plate shall be from the same material and gage as skirt. Locate punched holes to match holes in skirt. Provide 3/8" bolts and nuts for assembly.

Pipe-Arch span size	Length Toe Plate	Pipe size	Length Toe Plate
18"–43"	W+10"	18"–30"	W+10"
50"–72"	W+18"	36"–48"	W+22"

9. Connector section, when specified, shall be corrugated aluminum alloy pipe.
10. Reinforcement for edge of skirt shall be aluminum alloy 6063-F.

CONCRETE END SECTION

CONCRETE END SECTION DIMENSIONS						
Diam"	A"	B'-"	C'-"	D'-"	E'-"	F"
18"	9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	9	2-11	3-2	6'-1	3-6	2¾
24	9½	3-7½	2-6	6-1½	4-0	3
27	10½	4-0	2-1½	6-1½	4-6	3¼
30	12	4-6	1-7¾	6-1¾	5-0	3½
33	13½	4-10½	3-3¼	8-1¾	5-6	3¾
36	15	5-3	2-10¾	8-1¾	6-0	4
42	21	5-3	2-11	8-2	6-6	4½
48	24	6-0	2-2	8-2	7-0	5
54	27	5-5	2-11	8-4	7-6	5½

GENERAL NOTES

1. End section shall be of the same material as the pipe or pipe arch culvert to which it is attached and fully coated for metal.
2. End sections for aluminum alloy or steel pipe, with a diameter larger than 54", used on the inlet end of a pipe culvert, shall be anchored. Details of the anchor shall be shown on the drawings.

DIMENSIONS OF END SECTIONS FOR ALUMINUM ALLOY PIPE

Pipe Diam. in Inches	Gage	Dimensions – Inches A ±1"	B Max.	H ±1"	L ±1½"	W ±2"
18	16	7	9	6	31	36
21	16	8¼	11	6	36	42
24	14	9½	12	6	42	48
30	14	12	15	7½	52½	60
36	12	14	18	9	63	72
42	12	16	21	10½	73½	84
48	12	18	27	12	84	90

DIMENSIONS OF END SECTIONS FOR ALUMINUM ALLOY PIPE-ARCH

Pipe Arch in Inches Span	Rise	Gage	Dimensions – Inches A ±1"	B Max.	H ±1"	L ±1½"	W ±2"	M
18	11	16	4½	9	6	19	30	12
22	13	16	5¼	10	6	23	36	12
25	16	16	6¼	11½	6	28	42	12
29	18	14	7	14	6	31½	48	12
36	22	14	8¾	16	6	38½	60	12
43	27	12	10¾	17½	7⅝	47	75	12
50	31	12	12¼	20	9⅛	54	85	12
58	36	12	14	26	10⅝	63	96	12
65	40	12	15¾	23	10⅝	70	112	24
72	44	10	17¼	24	12⅛	77	128	24

DIMENSIONS OF END SECTIONS FOR GALVANIZED STEEL PIPE

Pipe Diam. in Inches	Gage	Dimensions – Inches A ±1"	B Max.	H ±1"	L ±1½"	W ±2"
18	16	8	10	6	31	36
21	16	9	12	6	36	42
24	16	10	13	6	41	48
30	14	12	16	8	51	60
36	14	14	19	9	60	72
42	12	16	22	11	69	84
48	12	18	27	12	78	90
54	12	18	30	12	84	102
60	12	18	33	12	87	114
66	12	18	36	12	87	120
72	12	18	39	12	87	126
78	12	18	42	12	87	132
84	12	18	45	12	87	138

DIMENSIONS OF END SECTIONS FOR GALVANIZED STEEL PIPE-ARCH

Pipe Arch in Inches Span	Rise	Gage	Dimensions – Inches A ±1"	B Max.	H ±1"	L ±1½"	W ±2"
18	11	16	7	9	6	19	30
22	13	16	7	10	6	23	36
25	16	16	8	12	6	28	42
29	18	16	9	14	6	32	48
36	22	14	10	16	6	39	60
43	27	14	12	18	8	46	75
50	31	12	13	21	9	53	85
58	36	12	18	26	12	63	90
65	40	12	18	30	12	70	102
72	44	12	18	33	12	77	114
79	49	12	18	36	12	77	126
85	54	12	18	39	12	77	138

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

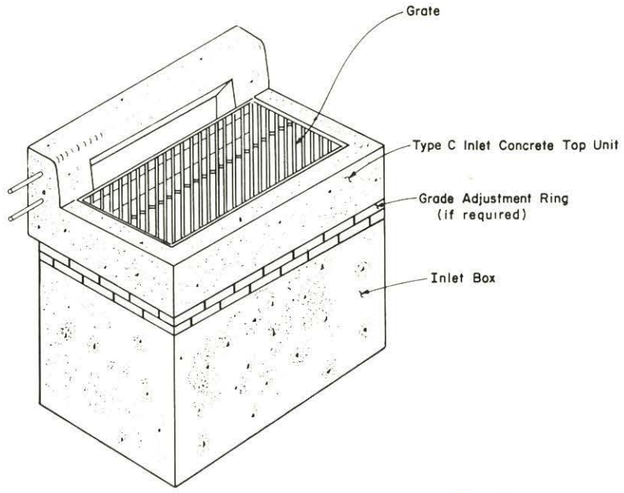
END SECTIONS FOR PIPE CULVERTS

Recommended Dec. 1, 1971
R.R. Moore
Location & Design Engineer

Approved Dec. 1, 1971
W.J. Ravar
Deputy Chief Hwy. Engr.

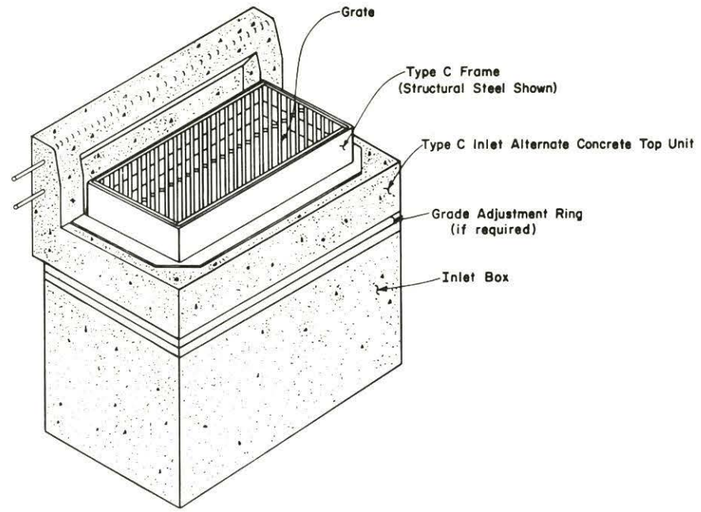
Sht. 1 Of 1
RC-33

VOID



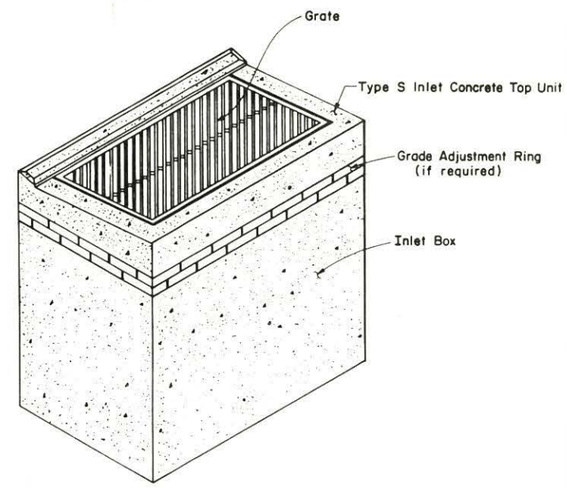
PREFERRED CONSTRUCTION

Deleted by Change # 7 (6/8/76)

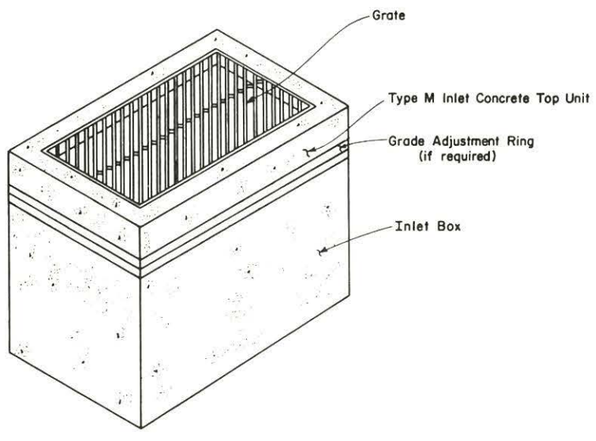


ALTERNATE CONSTRUCTION

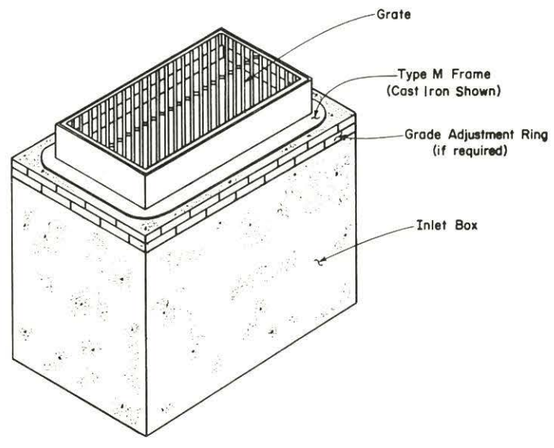
TYPE C INLET



TYPE S INLET



PREFERRED CONSTRUCTION



ALTERNATE CONSTRUCTION

TYPE M INLET

NOTES:

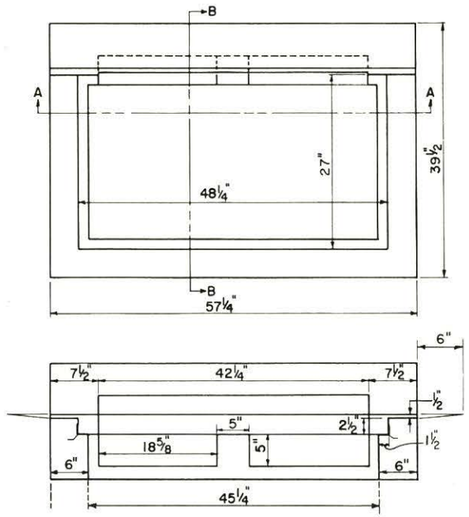
1. This drawing is intended to depict the various components required in a complete inlet. For the details of the various items see the following sheets:
   - Sheet 2 - Concrete Top Units
   - Sheet 3 - Grates
   - Sheet 4 - Frames
   - Sheet 5 - Inlet Boxes
2. Each type of Inlet shown is suited for a particular situation.
   a. Type C Inlet is to be designated for installation in non-mountable curbs.
   b. Type M Inlet is designated for installation in median areas and mountable curbs.
   c. Type S Inlet is designated for installation in shoulder swale areas.
3. A Light Weight grate may be specified for installation in the Type M and S Inlets, providing that the inlet is located more than 30 feet from the edge of the roadway. The inlet that will accommodate the light weight grate shall be designated with the suffix "LW" such as Type M-LW Inlet.
4. The selection of components to achieve a specified inlet configuration is the contractor's responsibility. Type
5. Pipes will be located as required.
6. Weep holes shall be installed as required by Section 605, Form 408.
7. Grade Adjustment Rings may be of masonry or precast concrete construction.

Commonwealth of Pennsylvania
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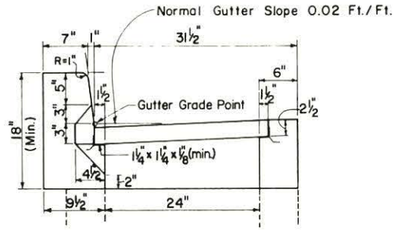
INLETS
INLET ASSEMBLIES

Recommended Aug. 20, 1975	Approved Aug. 20, 1975	Sht. 1 Of 5
B.D. Enslin	Lou R. Musser	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

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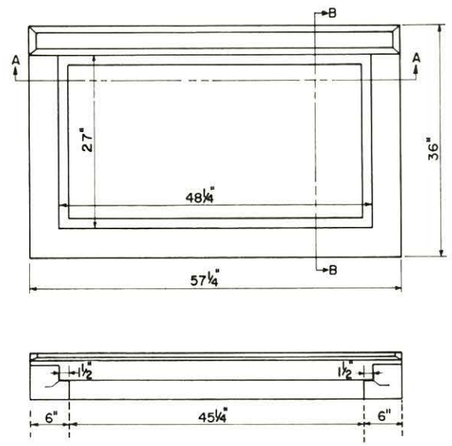


SECTION A-A

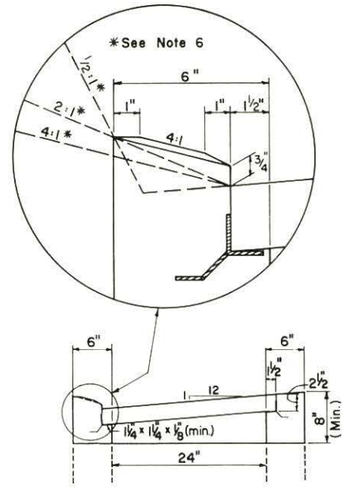


SECTION B-B

TYPE C



SECTION A-A

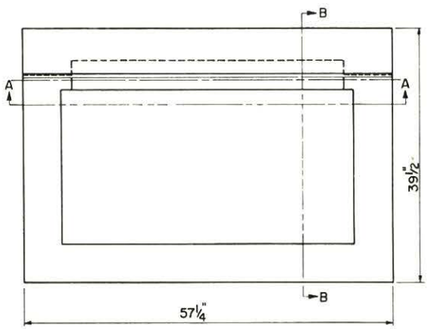


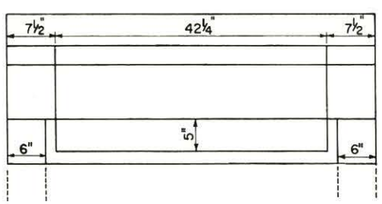
SECTION B-B

TYPE S

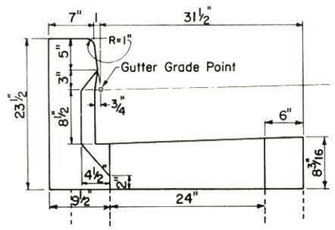
NOTES:

1. All Inlet Tops that are Cast-In-Place shall conform to the shape and dimensions as shown on the standard and, at the option of the contractor, may be monolithic with the Inlet Box.
2. Concrete Top Units which seat the grate directly within the unit shall utilize 1¼" x 1¼" angles embedded in the concrete as a bearing area for the grate.
3. This standard depicts the shape and dimensions required for uniformity and compatability. It is not intended to show the details required for manufacturing and handling. Only those items which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.
4. Whenever an inlet is required within a Mountable Curb Section, a Type M Inlet will be located adjacent to the back edge of the curb and will be flush with the pavement surface. See RC-65 for installation details.
5. Type C Inlet Concrete Top Units shall be dowelled with 2 - #8 X 1'-0" dowell bars and ¼" premolded expansion joint filler when connecting adjacent curb sections.
6. The placement of the Type S Inlet relative to the gutter invert is dependent on the rate of back slope. Back slopes greater than 2:1 shall have the inlet located where the back slope line intersects the back, top, outside corner of the inlet. Back slopes less than 2:1 shall have the inlet located where the back slope line intersects the edge of the inlet grate.



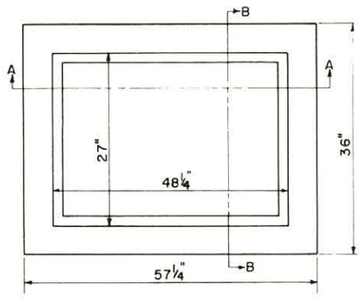


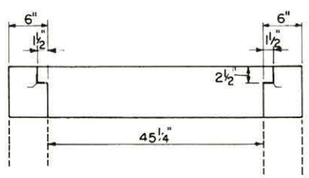
SECTION A-A



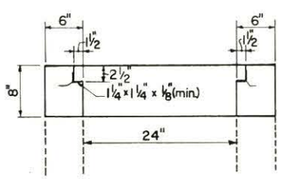
SECTION B-B

TYPE C ALTERNATE





SECTION A-A



SECTION B-B

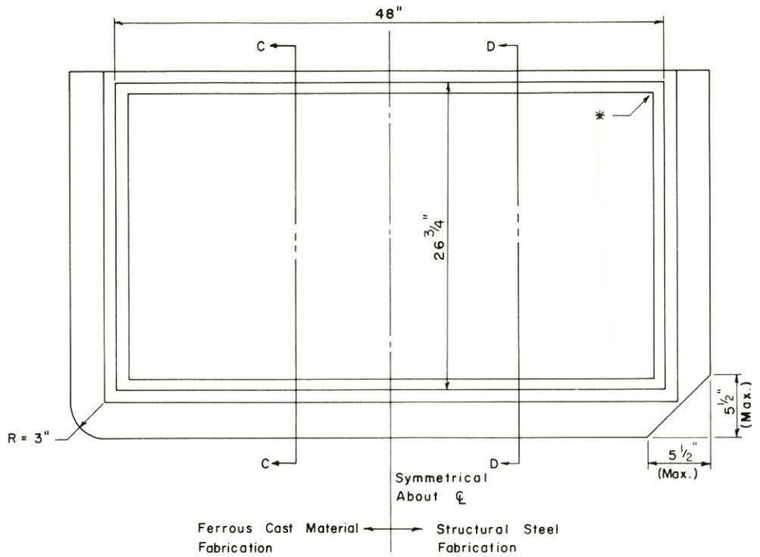
TYPE M

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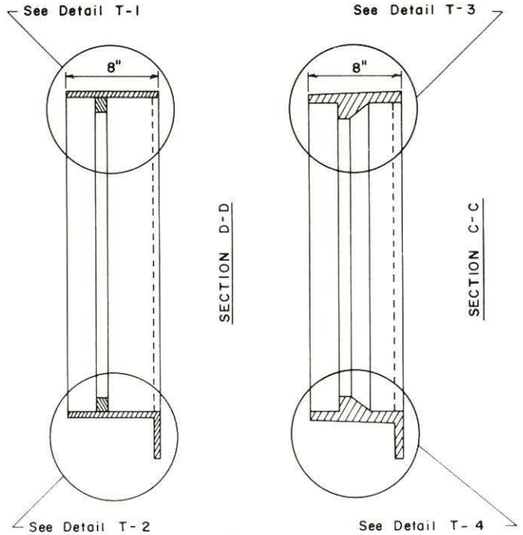
INLETS
CONCRETE TOP UNITS

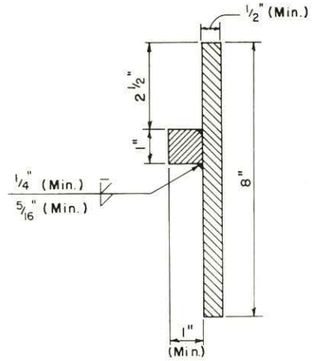
Recommended June 1, 1976	Approved June 1, 1976	Sht. 2 Of 5
B.D. Kunkis	Chas. K. Mercer	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

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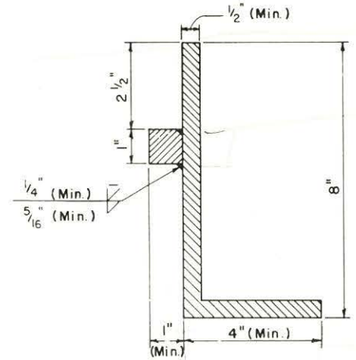


TYPE C FRAME

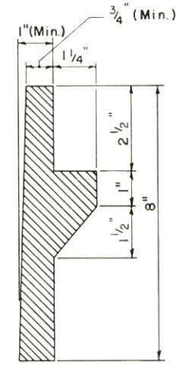




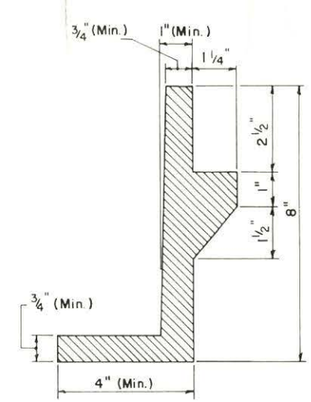
DETAIL T-1



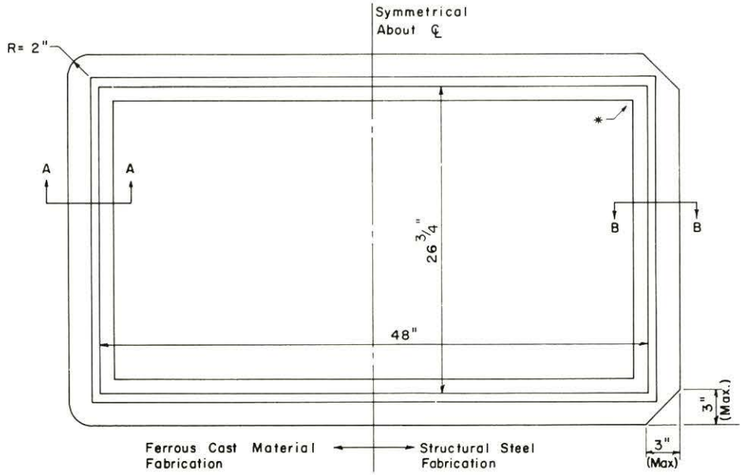
DETAIL T-2



DETAIL T-3

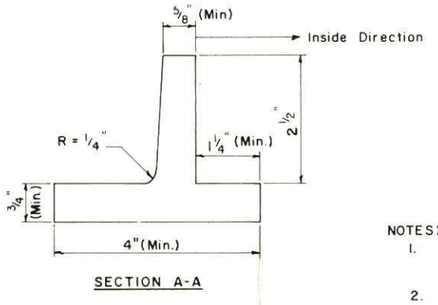


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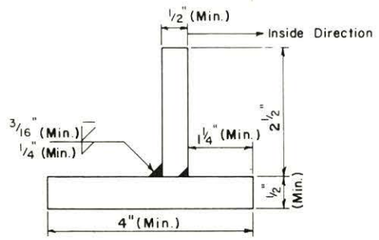


TYPE M FRAME

* Corner configuration details are fabricators responsibility & shall be approved



SECTION A-A



SECTION B-B

NOTES:

1. Frames shall be either gray, ductile or malleable cast iron or structural grade steel.
2. All welding required for the fabricated frame shall be accomplished by a welder certified as required in Section 1053.21, Form 409.
3. This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the various details required for fabrication or manufacturing. Only those items which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

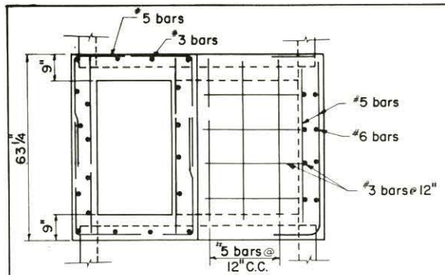
INLETS
FRAMES

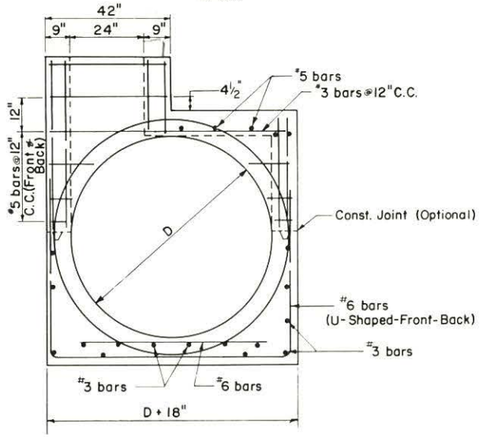
Recommended June 1, 1976
B.D. Kandle
Director, Bureau of Design

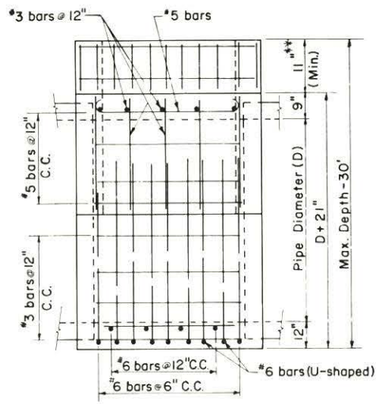
Approved June 1, 1976
Robert R. Master
Deputy Chief Hwy. Engr.

Sht. 4 Of 5

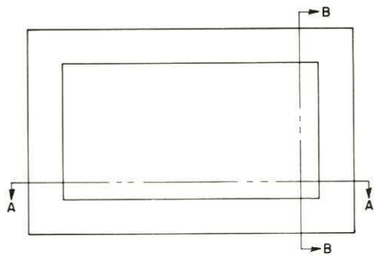
RC-34

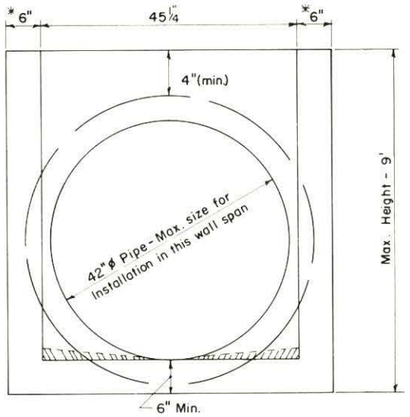


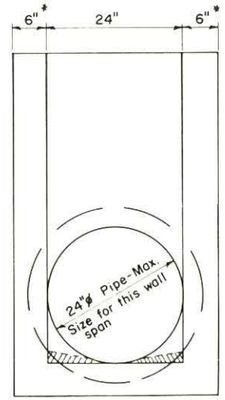




INLET BOX MODIFIED TYPE I







* For brick construction use 8" wall thickness

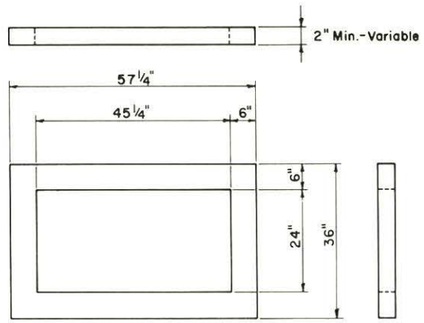
For Pipe Dia. over 42" see Modified Type II

SECTION A-A

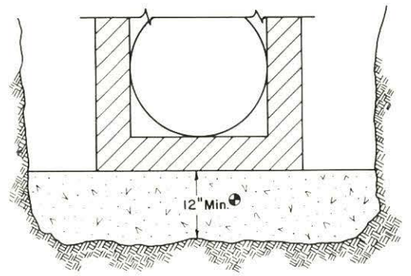
For Pipe Dia. over 24" see Modified Type I

SECTION B-B

INLET BOX

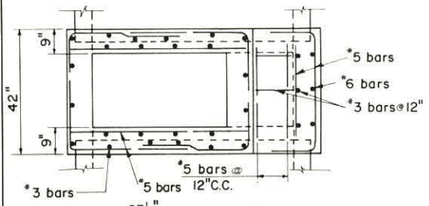


GRADE ADJUSTMENT RING (PRECAST)

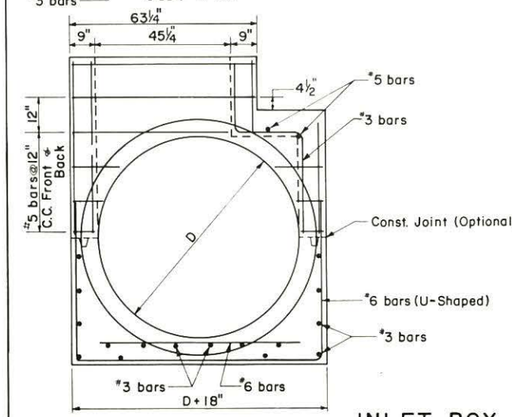


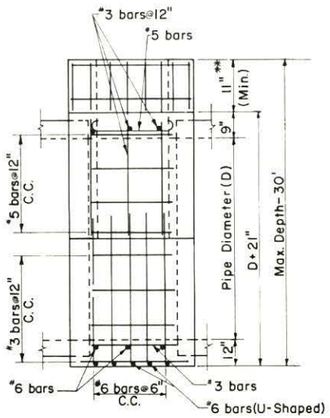
PRECAST INLET BOX BASE PREPARATION DETAIL

Material shall meet the requirements of Form 408, Section 350.2 and be placed in 4" layers, thoroughly compacted to a density satisfactory to the engineer.



** See Note 7

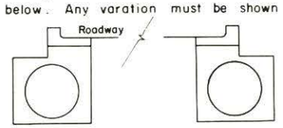




INLET BOX MODIFIED TYPE II

NOTES:

1. Materials and construction shall comply with the requirements of specifications Form 408, section 605 for Cast-in-Place, and Section 713.2 for Precast Cement Concrete Units.
2. Pipe or pipes shall be located as required, with the inlet bottom shaped to channel the flow toward the outlet pipe.
3. Precast Concrete Inlet Boxes may be used in lieu of Cast-in-Place Boxes. This standard depicts the shape and dimensions required for uniformity and compatability. It is not intended to show the details required for manufacturing and handling. If precast inlet boxes are used, only items supplied by an appoved manufacturer as listed in Bulletin 15 will be permitted.
4. Inlets that exceed the maximum depth as shown shall require a special detail and design for the inlet walls and base.
5. When pipes which are to be installed in adjacent walls have diameters exceeding the normal span for both walls, special details and design must be provided.
6. For orientation of the Type C Inlet with Modified Type I Inlet Box, the typical installation details are shown below. Any varation must be shown on the construction drawings by special details.

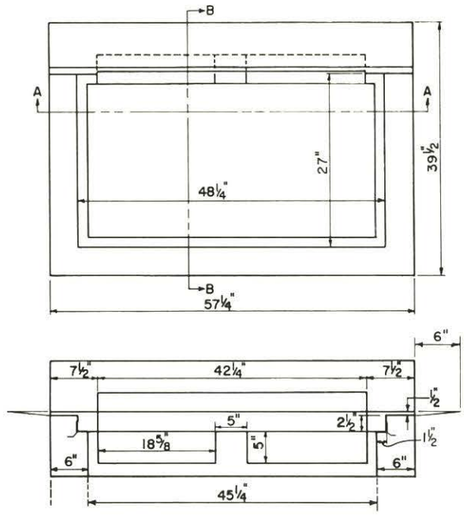


7. When the top unit and box are constructed monolithically (no construction joint), a minimum depth of 20" must be measured from the top surface of the top unit to the inside top of the pipe.
8. Precast Boxes shall be placed on a properly prepared base as shown in the above details; incidental to the inlet pay item.

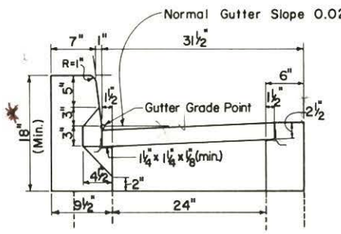
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
INLET BOXES

Recommended June 1, 1976	Approved June 1, 1976	Sht. 5 Of 5
B.O. Rambo	Robert R. Meier	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

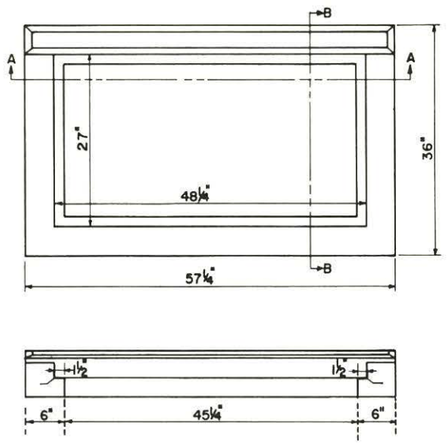


SECTION A-A

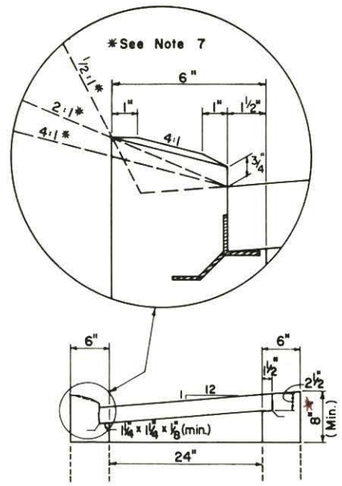


SECTION B-B

TYPE C

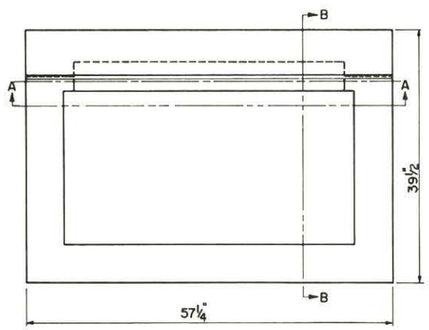


SECTION A-A

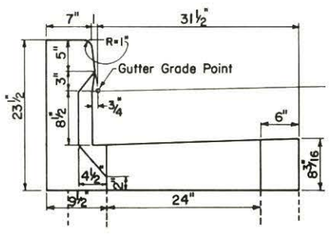


SECTION B-B

TYPE S

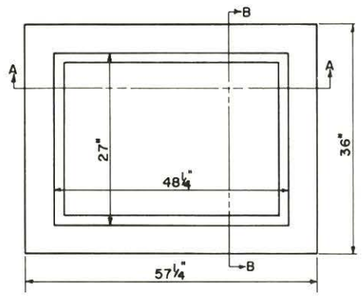


SECTION A-A

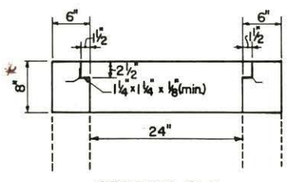


SECTION B-B

TYPE C ALTERNATE



SECTION A-A



SECTION B-B

TYPE M

NOTES:

1. All Inlet Tops that are Cast-In-Place shall conform to the shape and dimensions as shown on the standard and, at the option of the contractor, may be monolithic with the Inlet Box.
2. Concrete Top Units which seat the grate directly within the unit shall utilize 1¼ x 1¼ angles embedded in the concrete as a bearing area for the grate.
3. A shop drawing, 22" x 36", shall be prepared and submitted by any manufacturer desiring to supply Precast Concrete Inlet Tops. The shop drawing shall show the size and placement of all reinforcement, dimensions, and any notes for explanation. This standard depicts the shape and dimensions required for uniformity and compatability. It is not intended to show the details required for manufacturing and handling.
4. All exposed edges shall be chamfered 1 inch x 1 inch.
5. Whenever an inlet is required within a Mountable Curb Section, a Type M Inlet will be located adjacent to the back edge of the curb and will be flush with the pavement surface. See RC-65 for installation details.
6. Type C Inlet Concrete Top Units shall be dowelled with 2 - #8 X 1'-0" dowell bars and ¼" premolded expansion joint filler when connecting adjacent curb sections.
7. The placement of the Type S Inlet relative to the gutter invert is dependent on the rate of back slope. Back slopes greater than 2:1 shall have the inlet located where the back slope line intersects the back, top, outside corner of the inlet. Back slopes less than 2:1 shall have the inlet located where the back slope line intersects the edge of the inlet grate.

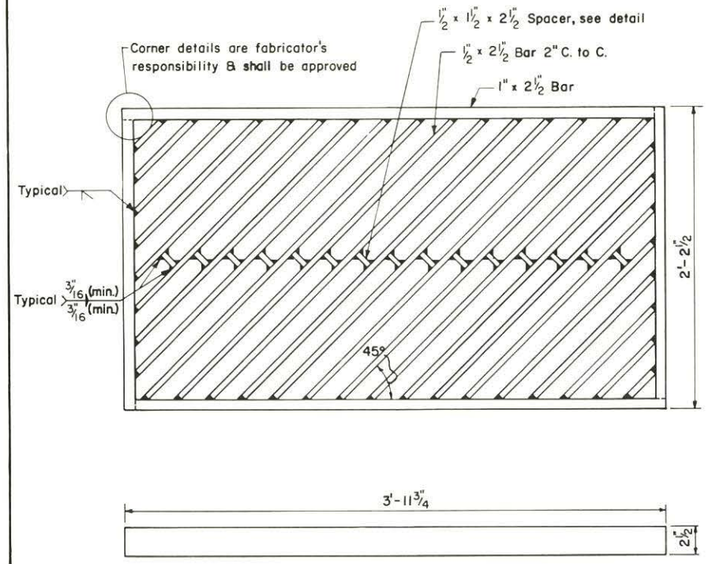
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
CONCRETE TOP UNITS

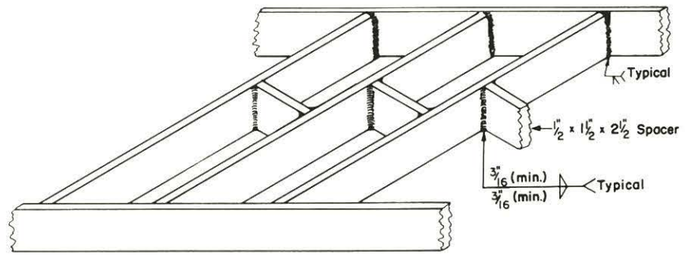
Recommended Aug. 20, 1975	Approved Aug. 20, 1975	Sht. 2 Of 5
B.D. Bunkin, Director, Bureau of Design	Robert Moses, Deputy Chief Hwy. Engr.	RC-34

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FINAL BY

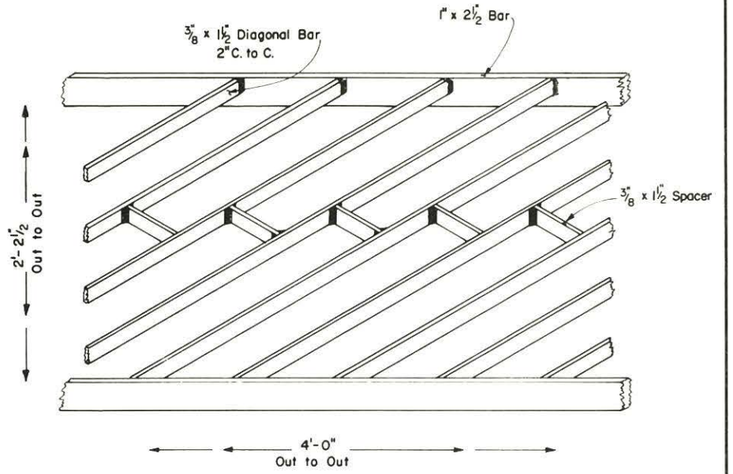
VOID



STRUCTURAL STEEL GRATE

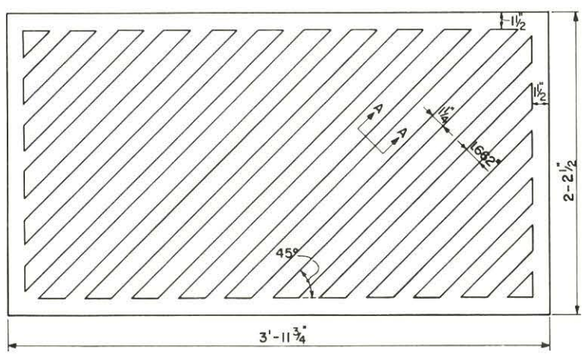


GRATE SPACER DETAIL

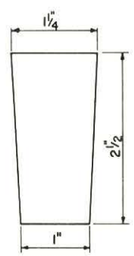


LIGHT-WEIGHT GRATE

(For use in Type M and S Inlets when located more than 30 feet from edge of the roadway. Inlets utilizing such grate will be designated by the suffix-LW such as Type M-LW or Type S-LW Inlet.)



CAST IRON GRATE



SECTION A-A

NOTES:

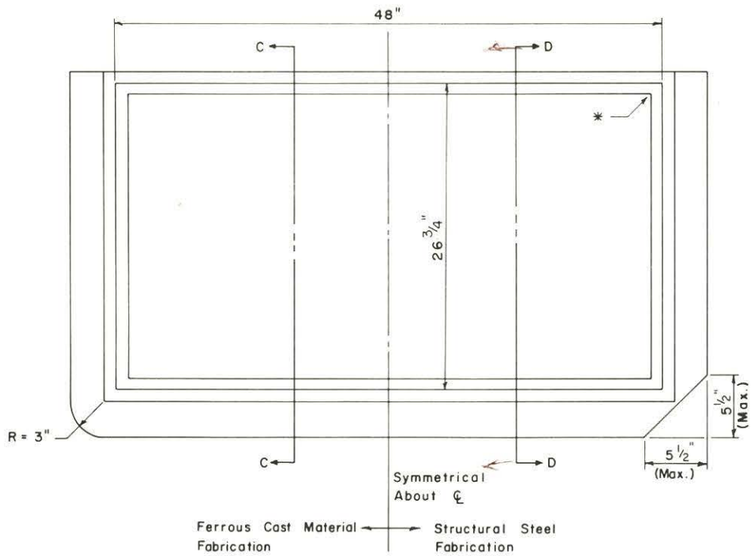
1. Grates shall be ductile or malleable cast iron or structural grade steel. Grates manufactured from Gray Cast Iron shall be submitted for approval.
2. All welding required for the fabricated grates shall be accomplished by a welder certified as required in Section 1053.21, Form 409.
3. This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the various details required for fabrication or manufacturing. A shop drawing 22" x 36" shall be submitted by the manufacturer to show all the details of the grate that is intended to be supplied. Details to be shown shall include the type, size, and location of typical weld; dimensions required for draft; and any pertinent remarks.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

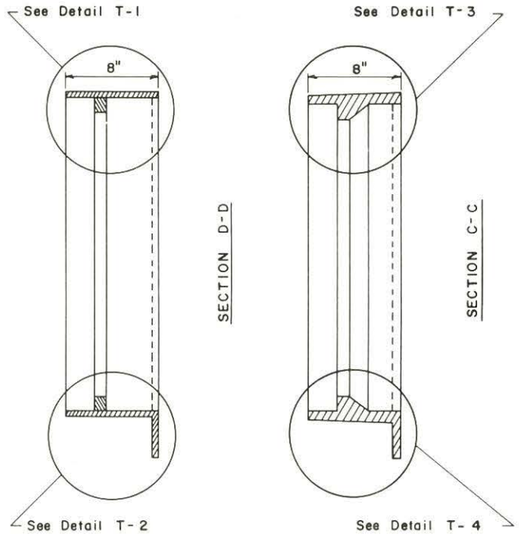
INLETS
GRATES

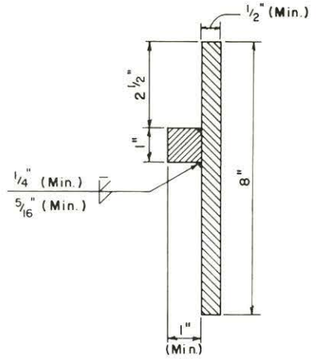
Recommended Aug. 20, 1975	Approved Aug. 29, 1975	Sht. 3 Of 5
B.D. Kowalski	Robert H. Mattes	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

VOID

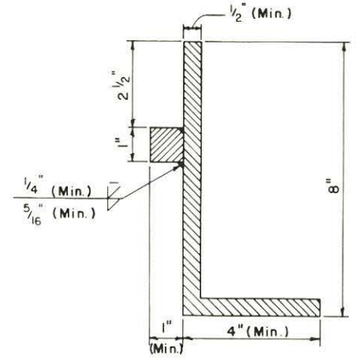


TYPE C FRAME

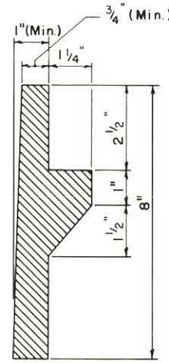




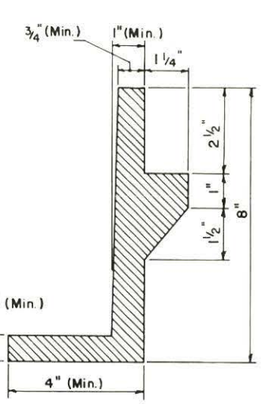
DETAIL T-1



DETAIL T-2

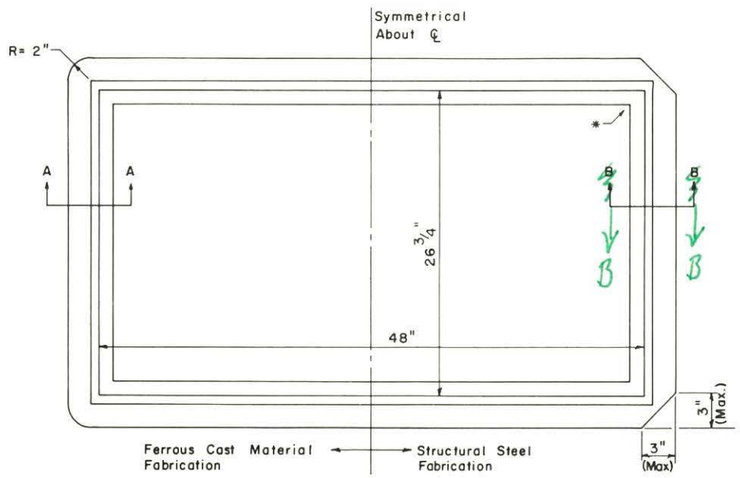


DETAIL T-3

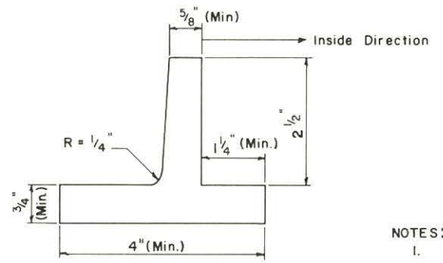


DETAIL T-4

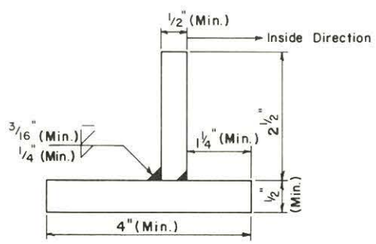
* Corner configuration details are fabricators responsibility & shall be approved



TYPE M FRAME



SECTION A-A



SECTION B-B

NOTES:

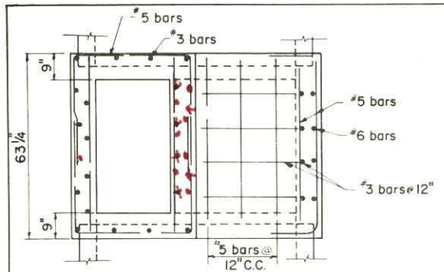
1. Frames shall be either gray, ductile or malleable cast iron or structural grade steel.
2. All welding required for the fabricated frame shall be accomplished by a welder certified as required in Section 1053.21, Form 409.
3. This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the various details required for fabrication or manufacturing. A shop drawing 22" x 36" shall be submitted by the manufacturer to show all the details of the frame that is intended to be supplied. Details to be shown shall include the type, size, and location of typical welds, dimensions required for draft, and any pertinent information.

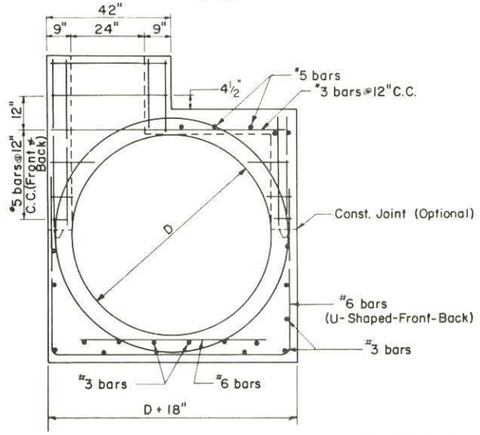
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

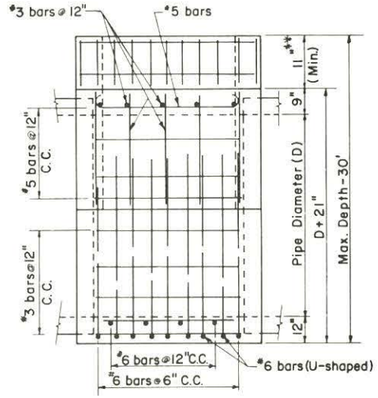
INLETS
FRAMES

Recommended Aug. 20, 1975	Approved Aug. 20, 1975	Sht 4 Of 5
B.D. Rowalia	Robert R. Mueser	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

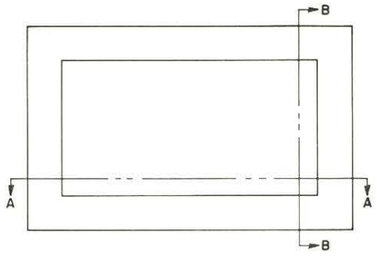
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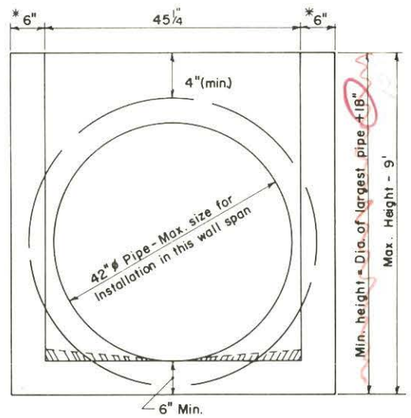






INLET BOX MODIFIED TYPE I

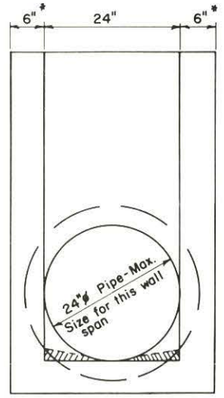




For Pipe Dia. over 42" see Modified Type II

SECTION A-A

* For brick construction use 8" wall thickness



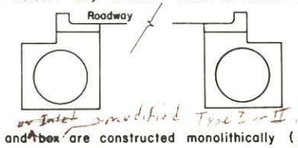
For Pipe Dia. over 24" see Modified Type I

SECTION B-B

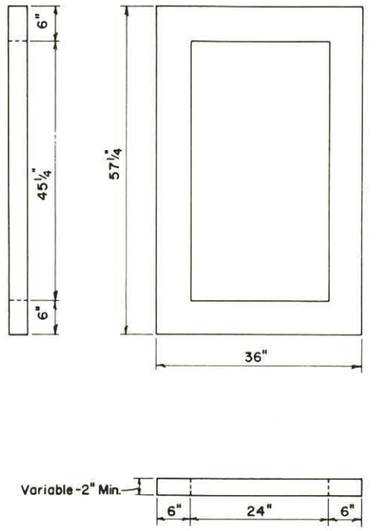
INLET BOX

NOTES:

1. Materials and construction shall comply with the requirements of specifications Form 408, section 605 for Cast-in-Place, and Section 713.2 for Precast Cement Concrete Units.
2. Pipe or pipes shall be located as required, with the inlet bottom shaped to channel the flow toward the outlet pipe.
3. Precast Concrete Inlet Boxes may be used in lieu of Cast-in-Place Boxes. Any producer desiring to supply such Precast Units shall submit a 22" x 36" shop drawing indicating the size, type and location of reinforcing, wall thickness, and box dimensions as required by Section 713 Form 408 for approval prior to acceptance as a certified supplier.
4. Inlets that exceed the maximum depth as shown shall require a special detail and design for the inlet walls and base.
5. When pipes which are to be installed in adjacent walls have diameters exceeding the normal span for both walls, special details and design must be provided.
6. For orientation of the Type C Inlet with Modified Type I Inlet Box, the typical installation details are shown below. Any varation must be shown on the construction drawings by special details.

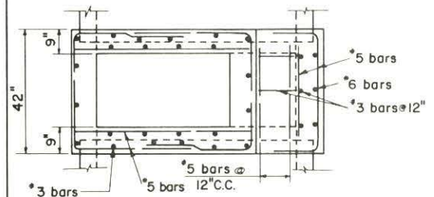


7. When the top unit and box are constructed monolithically (no construction joint), a minimum depth of 20" must be measured from the top surface of the top unit to the inside top of the pipe.

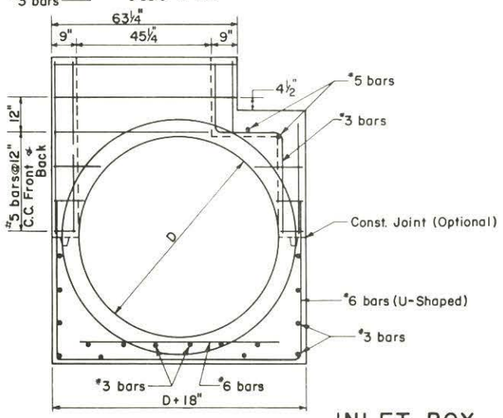


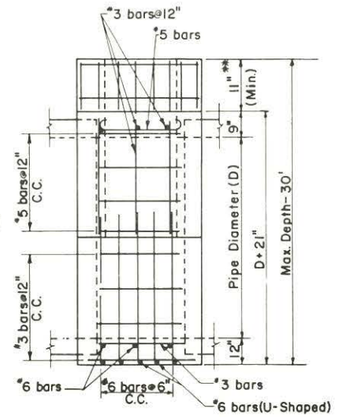
GRADE ADJUSTMENT RING (PRECAST)





** See Note 7



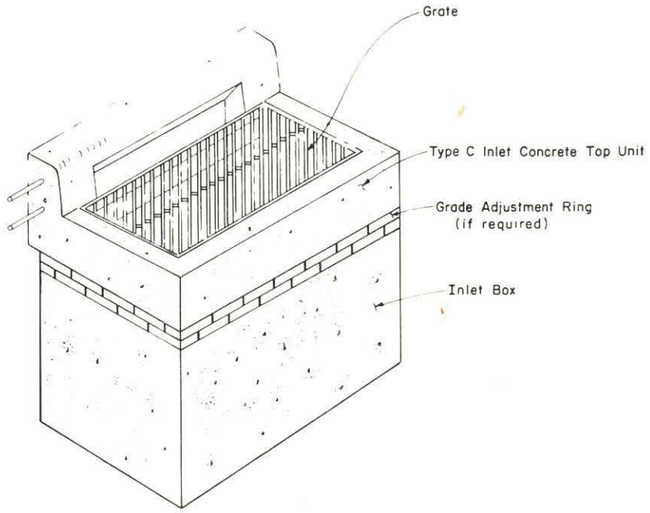


INLET BOX MODIFIED TYPE II

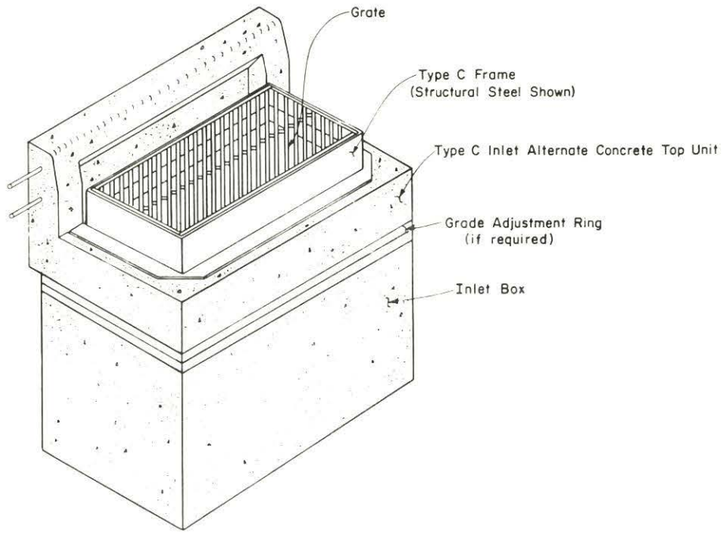
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Commonwealth of Pennsylvania DEPARTMENT OF TRANSPORTATION BUREAU OF DESIGN		
INLETS INLET BOXES		
Recommended Aug. 20, 1975 B.O. Rourke Director, Bureau of Design	Approved Aug. 20, 1975 Robert P. Master Deputy Chief Hwy. Engr.	Sht. 5 Of 5 RC-34

VOID

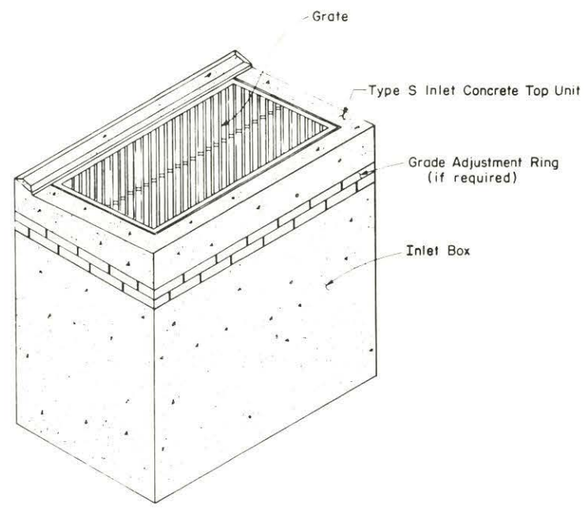


PREFERRED CONSTRUCTION

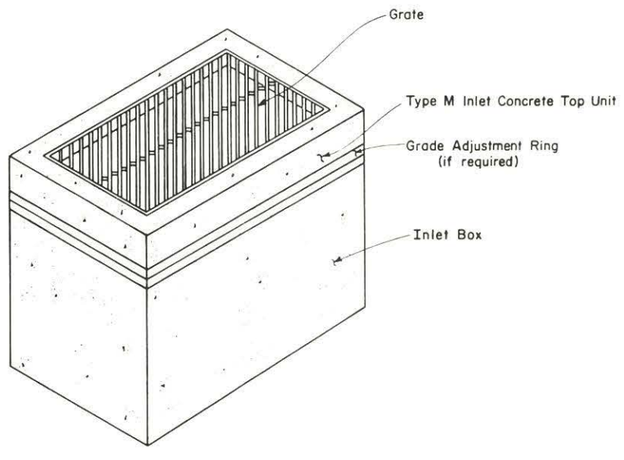


ALTERNATE CONSTRUCTION

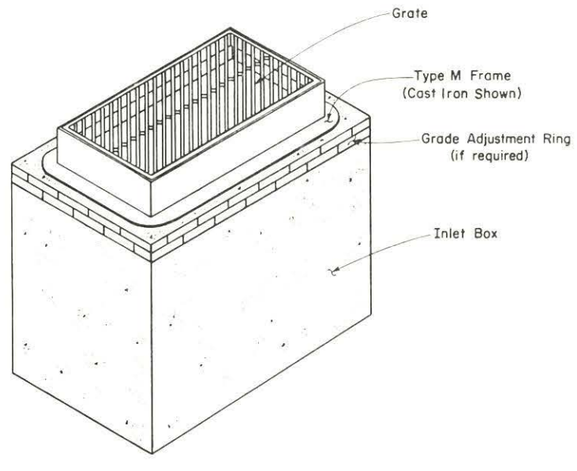
TYPE C INLET



TYPE S INLET



PREFERRED CONSTRUCTION



ALTERNATE CONSTRUCTION

TYPE M INLET

NOTES:

1. This drawing is intended to depict the various components required in a complete inlet. For the details of the various items see the following sheets:
   - Sheet 2 - Concrete Top Units
   - Sheet 3 - Grates
   - Sheet 4 - Frames
   - Sheet 5 - Inlet Boxes
2. Each type of Inlet shown is suited for a particular situation.
   a. Type C Inlet is to be designated for installation in non-mountable curbs.
   b. Type M Inlet is designated for installation in median areas and mountable curbs.
   c. Type S Inlet is designated for installation in shoulder swale areas.
3. A Light Weight grate may be specified for installation in the Type M and S Inlets, providing that the inlet is located more than 30 feet from the edge of the roadway. The inlet that will accommodate the light weight grate shall be designated with the suffix "LW" such as Type M-LW Inlet.
4. The selection of components to achieve a specified inlet configuration is the contractor's responsibility.
5. Pipes will be located as required.
6. Weep holes shall be installed as required by Section 605, Form 408.
7. Grade Adjustment Rings may be of masonry or precast concrete construction.

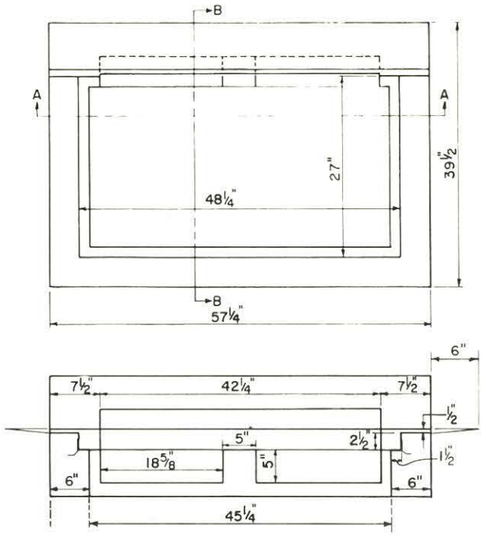
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
INLET ASSEMBLIES

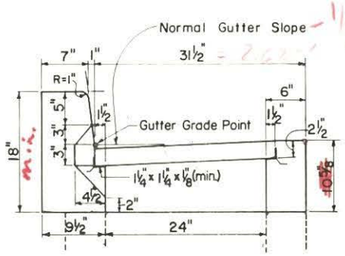
Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 1 Of 5
B.D. Kowalski	John R. Musser	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

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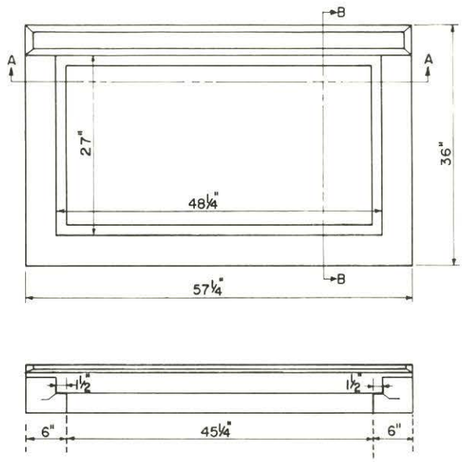


SECTION A-A

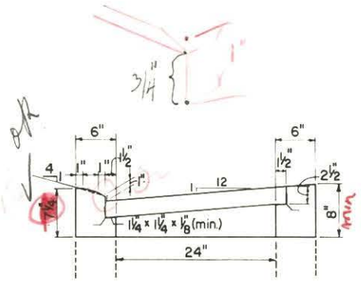


SECTION B-B

TYPE C



SECTION A-A

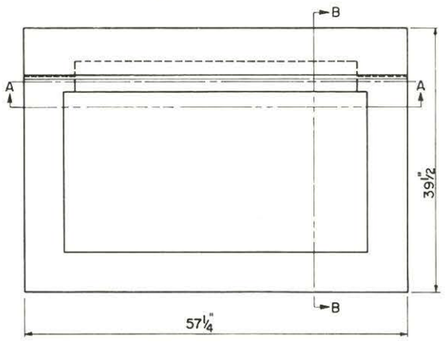


SECTION B-B

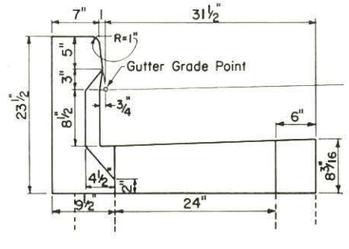
TYPE S

NOTES:

1. All Inlet Tops that are Cast-In-Place shall conform to the shape and dimensions as shown on the standard and, at the option of the contractor, may be monolithic with the Inlet Box.
2. Concrete Top Units which seat the grate directly within the unit shall utilize 1¼" x 1¼" angles embedded in the concrete as a bearing area for the grate.
3. A shop drawing, 22"x 36", shall be prepared and submitted by any manufacturer desiring to supply Precast Concrete Inlet Tops. The shop drawing shall show the size and placement of all reinforcement, dimensions, and any notes for explanation. This standard depicts the shape and dimensions required for uniformity and compatability. It is not intended to show the details required for manufacturing and handling.
4. All exposed edges shall be chamfered 1 inch x 1 inch.
5. Whenever an inlet is required within a Mountable Curb Section, a Type M Inlet will be located adjacent to the back edge of the curb and will be flush with the pavement surface. See RC-65 for installation details.
6. Type C Inlet Concrete Top Units shall be dowelled with 2 - #8 x 1'-0" dowell bars and ¼" premolded expansion joint filler when connecting adjacent curb sections.

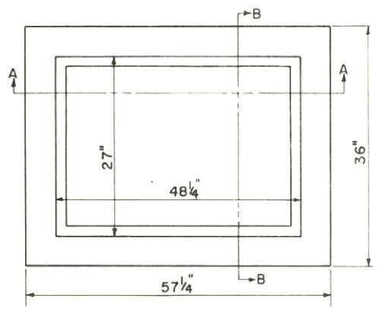


SECTION A-A

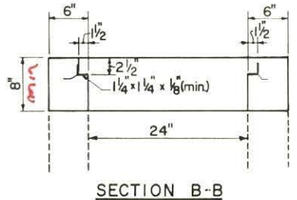


SECTION B-B

TYPE C ALTERNATE



SECTION A-A



SECTION B-B

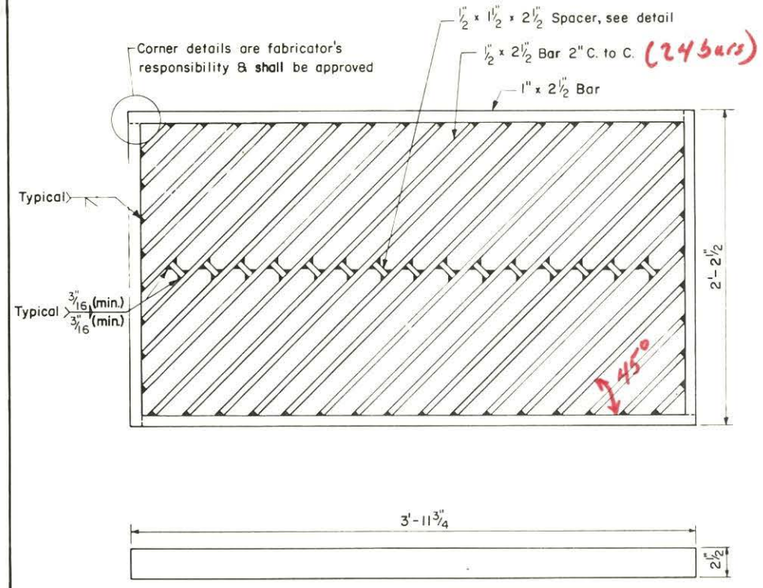
TYPE M

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

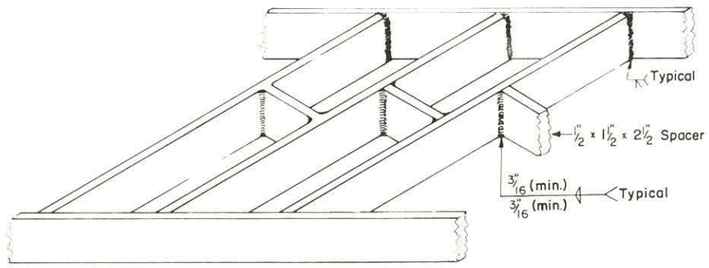
INLETS
CONCRETE TOP UNITS

Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 2 Of 5
B D Lovekin	Robert R. Musser	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

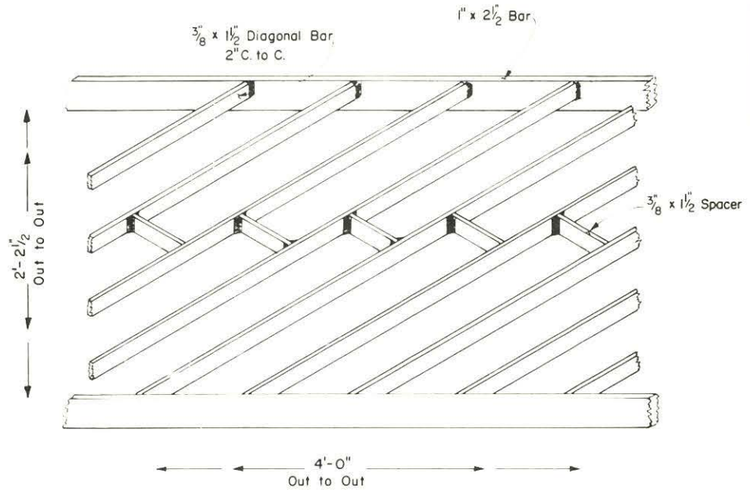
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STRUCTURAL STEEL GRATE

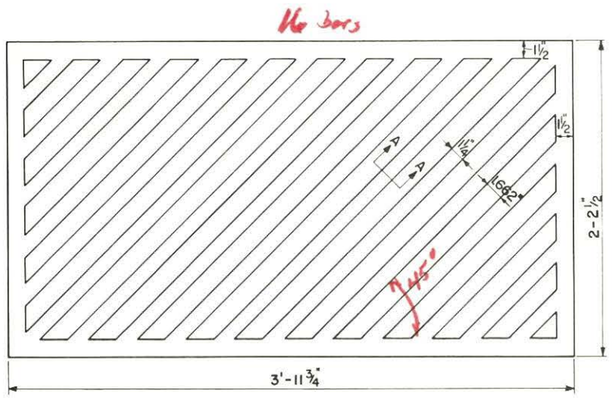


GRATE SPACER DETAIL



LIGHT-WEIGHT GRATE

(For use in Type M and S Inlets when located more than 30 feet from edge of the roadway. Inlets utilizing such grate will be designated by the suffix-LW such as Type M-LW or Type S-LW Inlet.)



CAST IRON GRATE



SECTION A-A

NOTES:

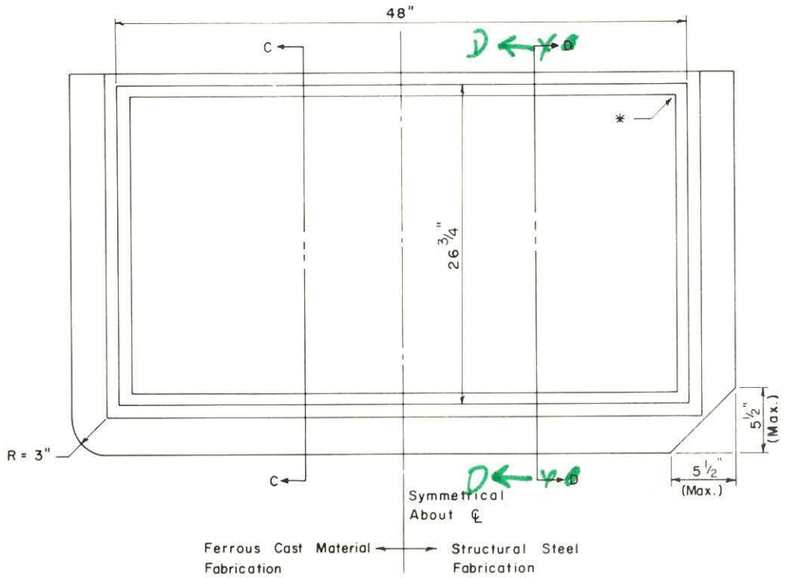
1. Grates shall be ductile or malleable cast iron or structural grade steel. Grates manufactured from Gray Cast Iron shall be submitted for approval.
2. All welding required for the fabricated grates shall be accomplished by a welder certified as required in Section 1053.21, Form 409.
3. This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the various details required for fabrication or manufacturing. A shop drawing 22" x 36" shall be submitted by the manufacturer to show all the details of the grate that is intended to be supplied. Details to be shown shall include the type, size, and location of typical weld; dimensions required for draft; and any pertinent remarks.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

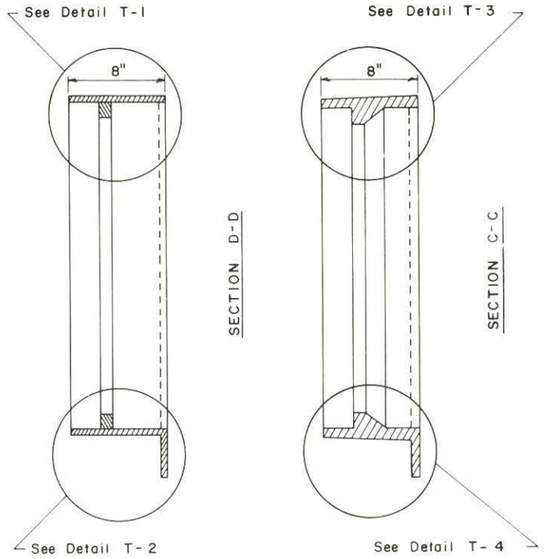
INLETS
GRATES

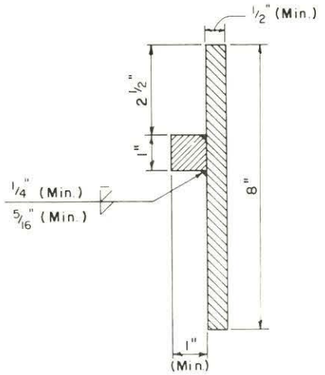
Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 3 Of 5
B.D. Kunkle	Robert R. Musser	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

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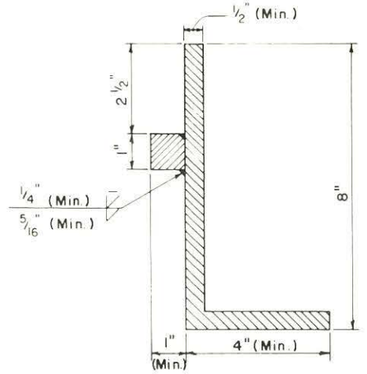


TYPE C FRAME

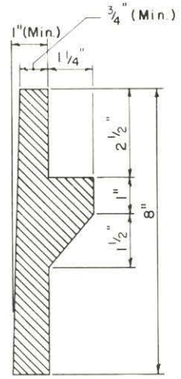




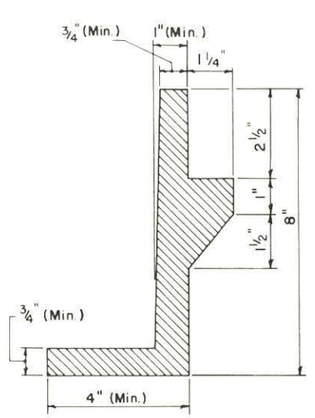
DETAIL T-1



DETAIL T-2

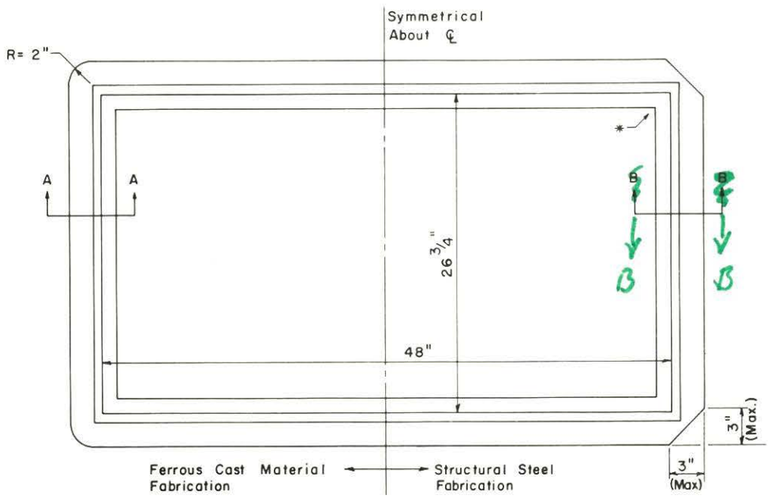


DETAIL T-3

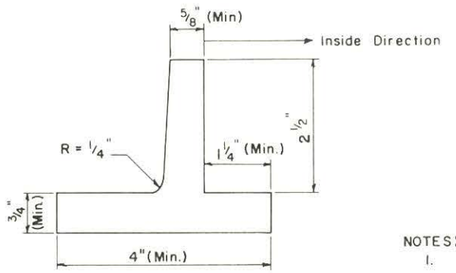


DETAIL T-4

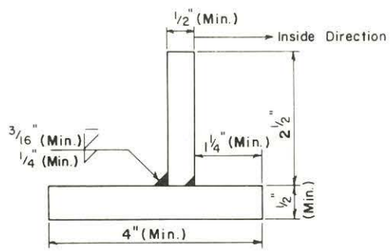
* Corner configuration details are fabricators responsibility & shall be approved



TYPE M FRAME



SECTION A-A



SECTION B-B

NOTES:

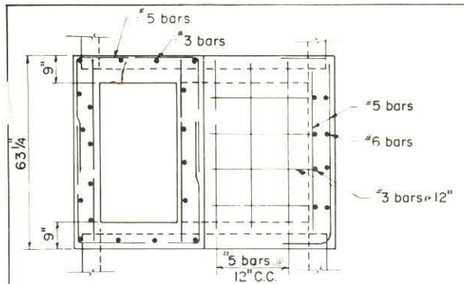
1. Frames shall be either gray, ductile or malleable cast iron or structural grade steel.
2. All welding required for the fabricated frame shall be accomplished by a welder certified as required in Section 1053.21, Form 409.
3. This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the various details required for fabrication or manufacturing. A shop drawing 22" x 36" shall be submitted by the manufacturer to show all the details of the frame that is intended to be supplied. Details to be shown shall include the type, size, and location of typical welds, dimensions required for draft, and any pertinent information.

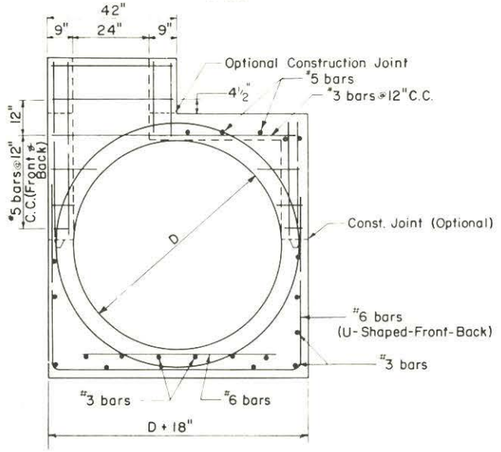
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

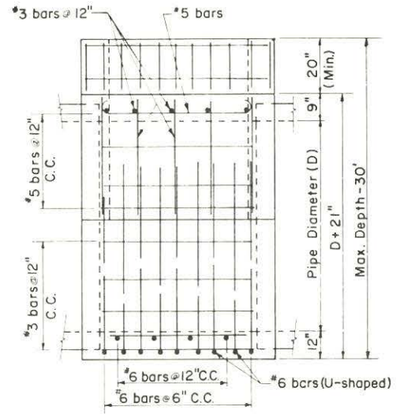
INLETS
FRAMES

Recommended Oct 1, 1974	Approved Oct 1, 1974	Sht. 4 Of 5
B.D. Kaufhold	Robert P. Maslar	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

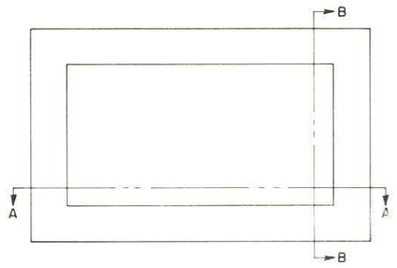
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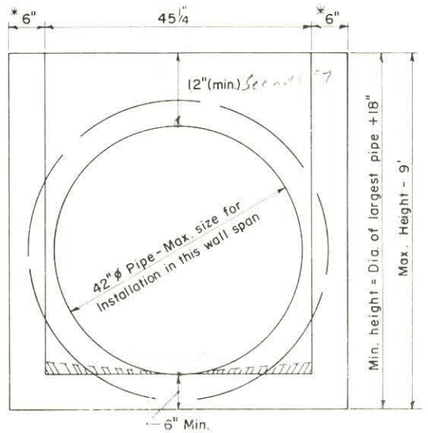






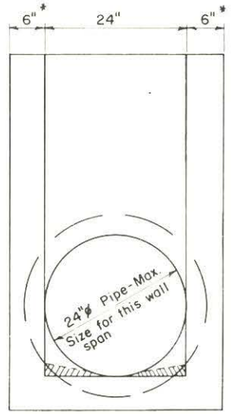
INLET BOX MODIFIED TYPE I





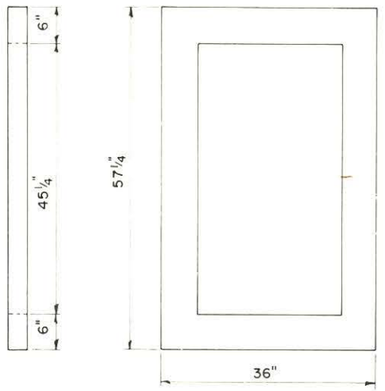
For Pipe Dia. over 42" see Modified Type II

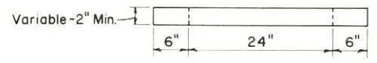
SECTION A-A



For Pipe Dia. over 24" see Modified Type I

SECTION B-B



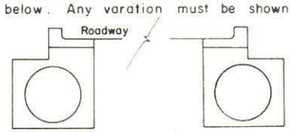


GRADE ADJUSTMENT RING (PRECAST)

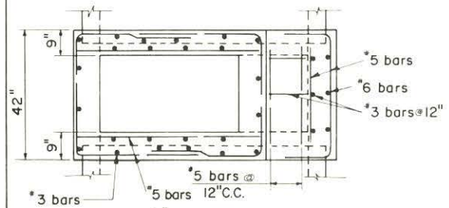
INLET BOX

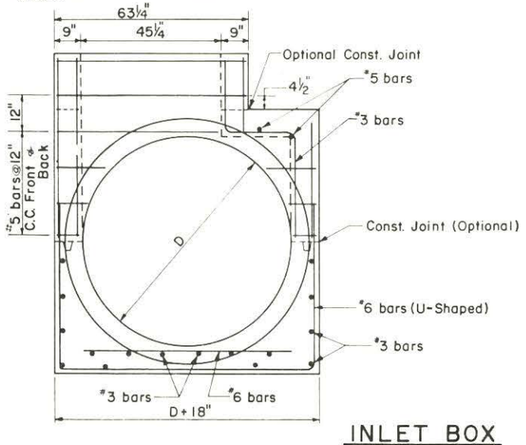
NOTES:

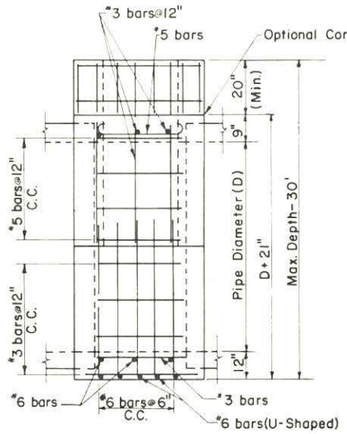
1. Materials and construction shall comply with the requirements of specifications Form 408, section 605 for Cast-in-Place, and Section 713.2 for Precast Cement Concrete Units.
2. Pipe or pipes shall be located as required, with the inlet bottom shaped to channel the flow toward the outlet pipe.
3. Precast Concrete Inlet Boxes may be used in lieu of Cast-in-Place Boxes. Any producer desiring to supply such Precast Units shall submit a 22" x 36" shop drawing indicating the size, type and location of reinforcing, wall thickness, and box dimensions as required by Section 713 Form 408 for approval prior to acceptance as a certified supplier.
4. Inlets that exceed the maximum depth as shown shall require a special detail and design for the inlet walls and base.
5. When pipes which are to be installed in adjacent walls have diameters exceeding the normal wall span, special details and design must be provided.
6. For orientation of the Type C Inlet with Modified Type I Inlet Box, the typical installation details are shown below. Any variation must be shown on the construction drawings by special details.



(7 When the top unit and box are constructed monolithically (no construction joint), the minimum depth may be measured from the surface of the top unit to the inside top of the pipe.







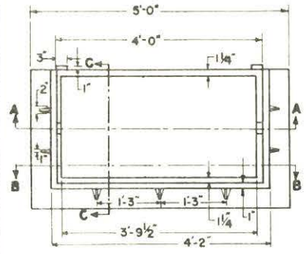
INLET BOX MODIFIED TYPE II

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

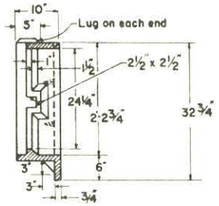
INLETS
INLET BOXES

Recommended Oct 1, 1974	Approved Oct. 1, 1974	Sht. 5 Of 5
B.O. Rankin	Robert P. Mussen	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

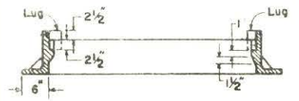
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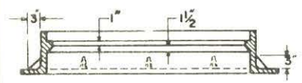
PLAN OF FRAME



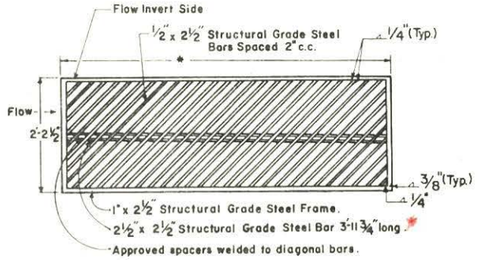
SECTION C-C



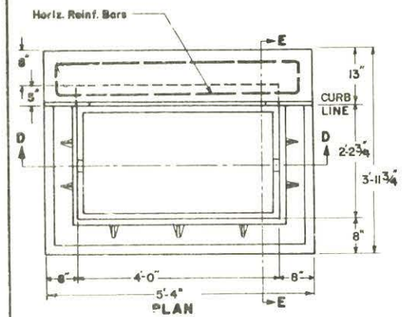
SECTION A-A



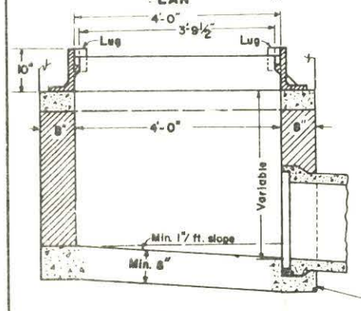
SECTION B-B



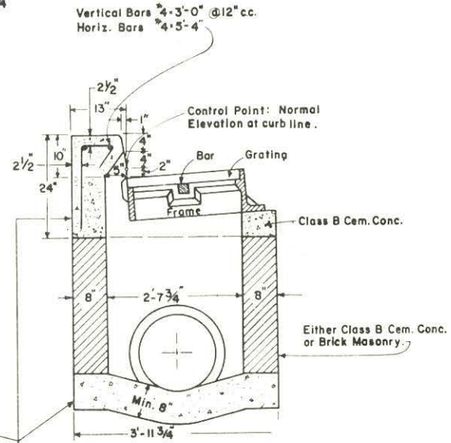
* 3'-11¾" for 4 ft. & 4 ft. Special Inlet.
6'-2½" for 6 ft. & 6 ft. Special Inlet.



PLAN



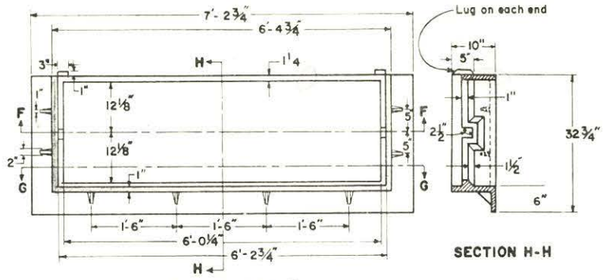
SECTION D-D



Class B Cem. Conc.

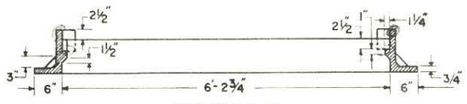
SECTION E-E

4-FT. SPECIAL INLET

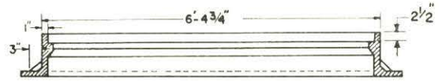


PLAN OF FRAME

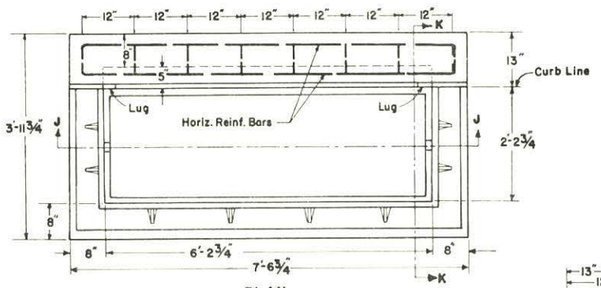
SECTION H-H



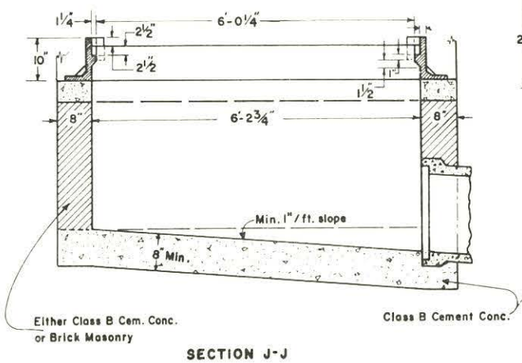
SECTION F-F



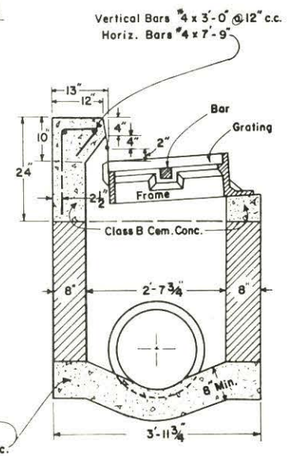
SECTION G-G



PLAN



SECTION J-J



SECTION K-K

6-FT. SPECIAL INLET

NOTES

FRAMES SHALL BE GRAY, DUCTILE OR MALLEABLE IRON CASTINGS. GRATINGS SHALL BE DUCTILE CAST IRON OR STRUCTURAL GRADE STEEL.

FABRICATED GRATINGS SHALL BE OF THE MATERIALS, DESIGN AND DIMENSIONS SHOWN ON THIS DRAWING AND SUSTAIN H-20 LOADING.

THE MEMBERS OF THE FABRICATED GRATING SHALL BE JOINED AS SHOWN BY APPROVED WELDING.

PIPE OR PIPES SHALL BE LOCATED AS REQUIRED

THE EXPOSED FACE OF THE BACKWALL SHALL BE CONSTRUCTED VERTICAL WHEN ADJACENT EXISTING OR PROPOSED CURB HAS A VERTICAL FACE.

INLET WALLS SHALL BE MODIFIED SIMILIAR TO MANHOLE CONSTRUCTION (STD. DWG. RC 39) WHEN THE DIAMETER OF THE REQUIRED PIPE EXCEEDS THE INLET BOX DIMENSIONS SHOWN.

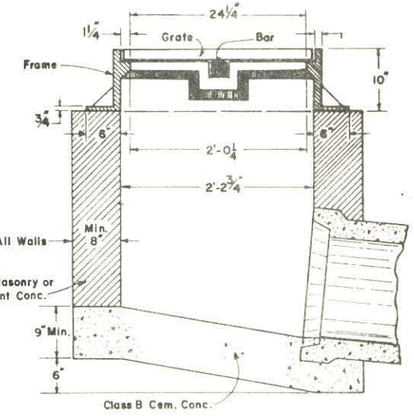
MAX. INLET DEPTH:

4 FT. INLET (CONC.)	= 15 FT.
4 FT. INLET (MASONRY)	= 9 FT.
6 FT. INLET (CONC.)	= 10 FT.
6 FT. INLET (MASONRY)	= 7 FT.

INLETS THAT EXCEED THE MAX DEPTHS SHOWN WILL REQUIRE A SPECIAL DETAIL AND DESIGN TO VERIFY THE STRUCTURAL REQUIREMENTS OF THE INLET WALLS AND BASE.

CHAMFER EXPOSED EDGES 1"

REFERENCE SHOULD BE MADE TO SECTION 605.3 OF FORM 408 FOR NECESSARY WEEP HOLES.



4-FT. and 6-FT. INLETS

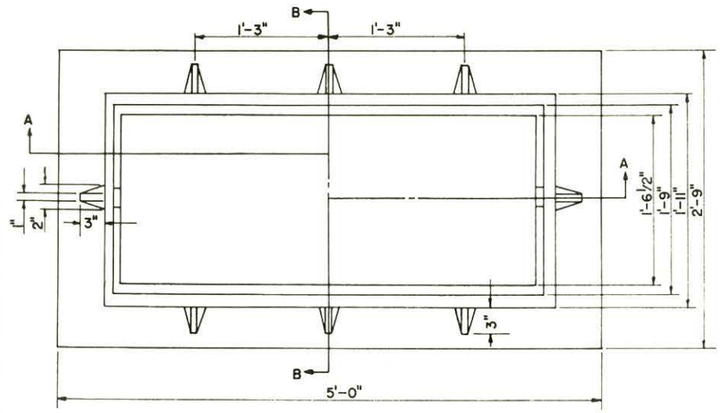
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

4 FOOT & 6 FOOT INLETS

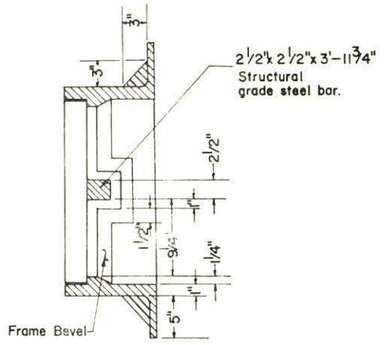
Recommended Dec. 1, 1971 RR Measer Location & Design Engineer	Approved Dec. 1, 1971 W. J. Raver Deputy Chief Hwy. Engr.	Sht. 1 of 1 RC-34

VOID

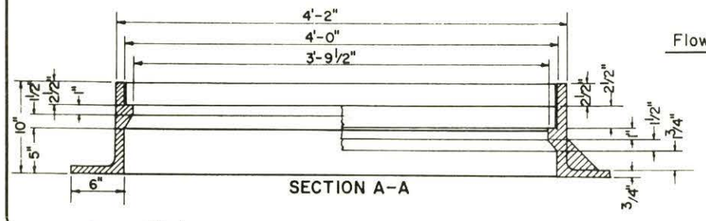
FORM 4237 REV 3-61



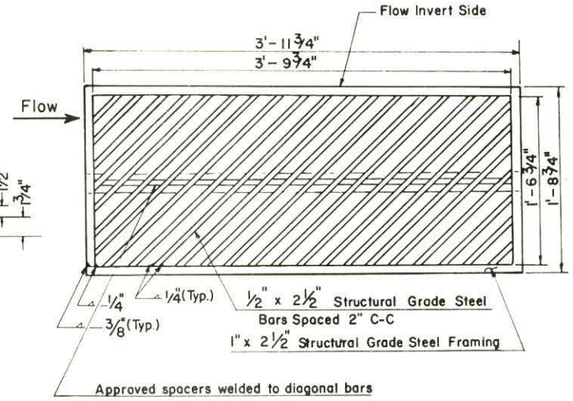
FRAME PLAN



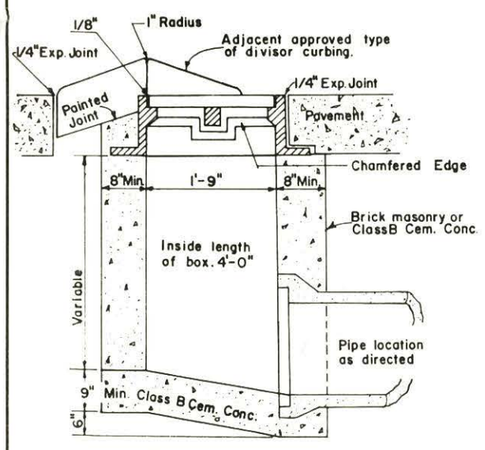
SECTION B-B



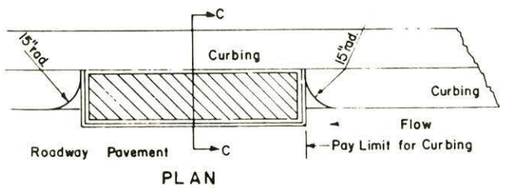
SECTION A-A



PLAN OF GRATING



SECTION C-C

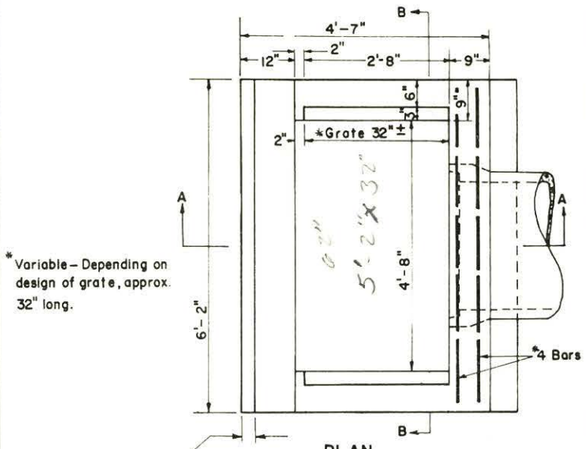


PLAN

NOTES

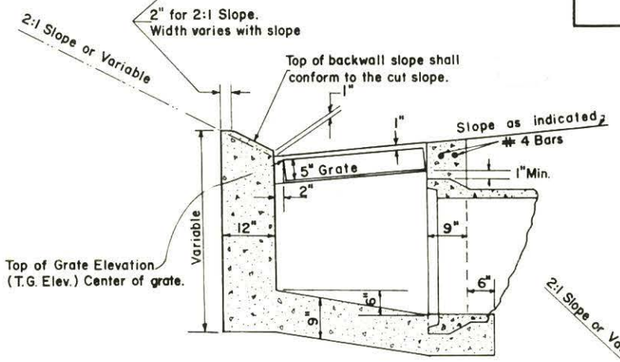
1. Frames shall be gray, ductile or malleable iron castings.
2. Gratings and bars shall be structural grade steel.
3. Fabricated gratings shall be of the materials, design and dimensions shown on this drawing and sustain H-20 loading.
4. The members of the fabricated grating shall be joined as shown by approved welding.
5. Pipe or pipes shall be located as required.
6. The exposed face of the backwall shall be constructed vertical when adjacent existing or proposed curb has a vertical face.
7. See Specification Form 408 for painting and treatment of Grates and Frames.
8. For max. depth, see note for 4 ft. inlet on RC-34.

TYPE J INLET



*Variable – Depending on design of grate, approx. 32" long.

PLAN



SECTION A-A

NOTES

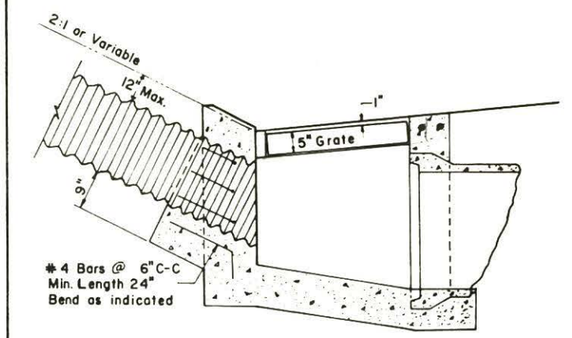
1. Construct inlet box of Class B Cem. Concrete Chamfer exposed edges one (1) inch.
2. Pipe location or locations shall be as directed.
3. All reinforcement bars shall be #4, placed 2½" from face of concrete.
4. Longitudinal bars (2 Ea.) are 5'-10" long.
5. The gratings may consist of structural grade steel or open steel beam flooring of approved design and capable of sustaining H-20 loading.
6. See Specification Form 408 for painting and treatment of Grates and Frames.

NOTE - ALL INLETS

Inlet walls shall be modified similar to manhole construction (RC-39) when the diameter of the required pipe exceeds the inlet box dimensions shown.

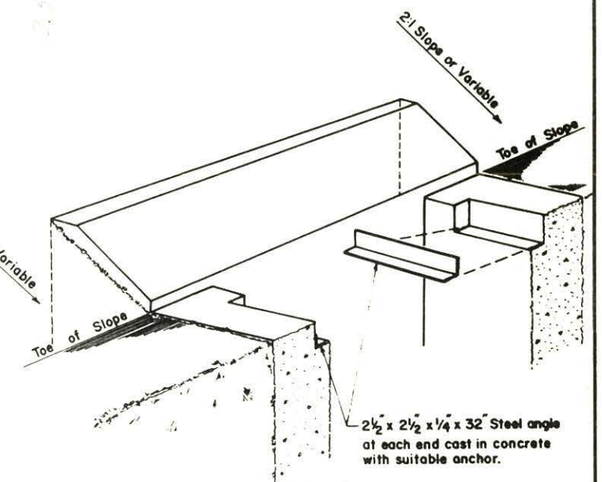
7. For max. depth, see note for 4 ft. inlet on RC-34.

TYPE H INLET



All other details shall conform to Type H Inlets

TYPE H-INLET MODIFIED



PERSPECTIVE
SECTION B-B

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

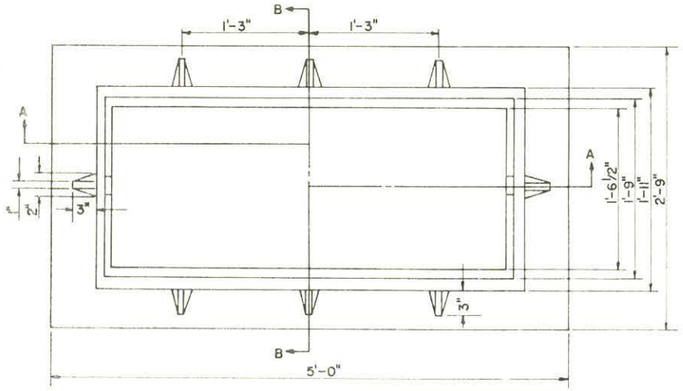
TYPES H & J INLETS

Recommended Mar. 7, 1973
Director, Bureau of Design

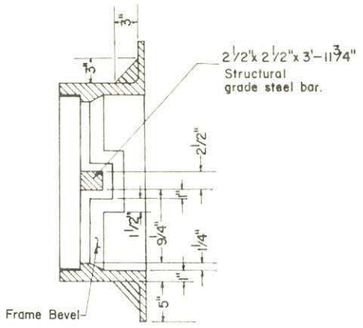
Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

Sht. 1 Of 1
RC-35

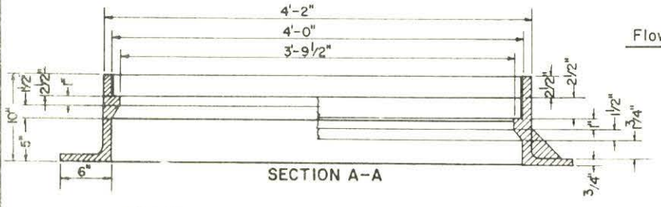
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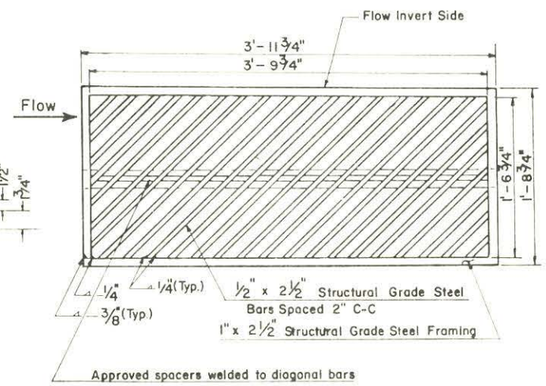
FRAME PLAN



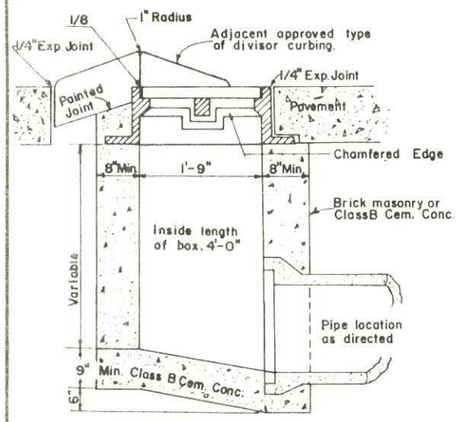
SECTION B-B



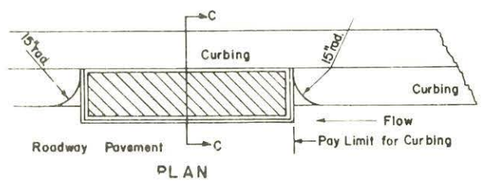
SECTION A-A



PLAN OF GRATING



SECTION C-C

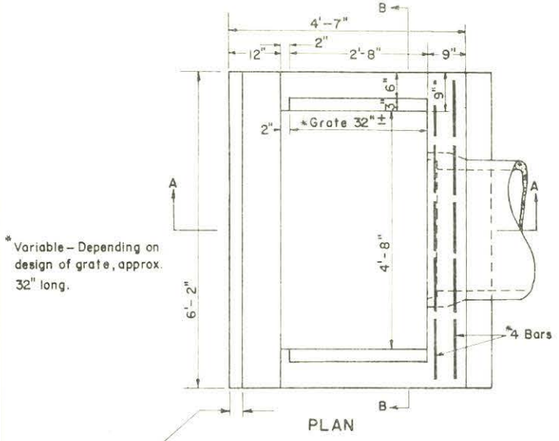


PLAN

NOTES

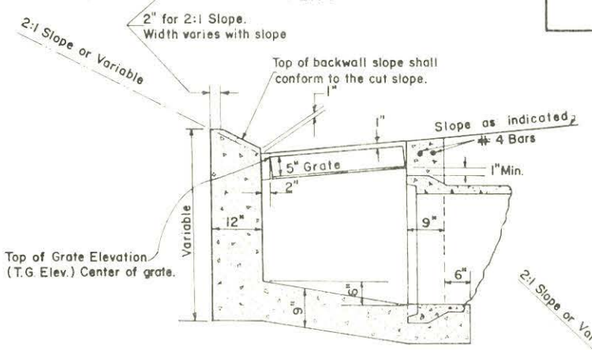
1. Frames shall be gray, ductile or malleable iron castings.
2. Gratings and bars shall be structural grade steel.
3. Fabricated gratings shall be of the materials, design and dimensions shown on this drawing and sustain H-20 loading.
4. The members of the fabricated grating shall be joined as shown by approved welding.
5. Pipe or pipes shall be located as required.
6. The exposed face of the backwall shall be constructed vertical when adjacent existing or proposed curb has a vertical face.
7. See Specification Form 408 for painting and treatment of Grates and Frames.

TYPE J INLET



* Variable – Depending on design of grate, approx. 32" long.

PLAN



SECTION A-A

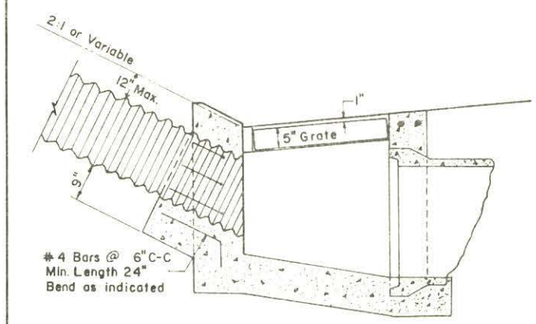
NOTES

1. Construct inlet box of Class B Cem. Concrete
   Chamfer exposed edges one (1) inch.
2. Pipe location or locations shall be as directed.
3. All reinforcement bars shall be # 4, placed 2½" from face of concrete.
4. Longitudinal bars (2 Ea.) are 5'-10" long.
5. The gratings may consist of structural grade steel or open steel beam flooring of approved design and capable of sustaining H-20 loading
6. See Specification Form 408 for painting and treatment of Grates and Frames.

NOTE – ALL INLETS

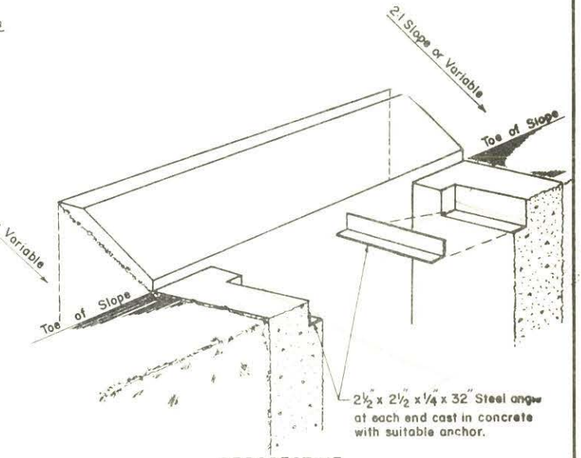
Inlet walls shall be modified similar to manhole construction (RC-39) when the diameter of the required pipe exceeds the inlet box dimensions shown.

TYPE H INLET



All other details shall conform to Type H Inlets

TYPE H-INLET MODIFIED



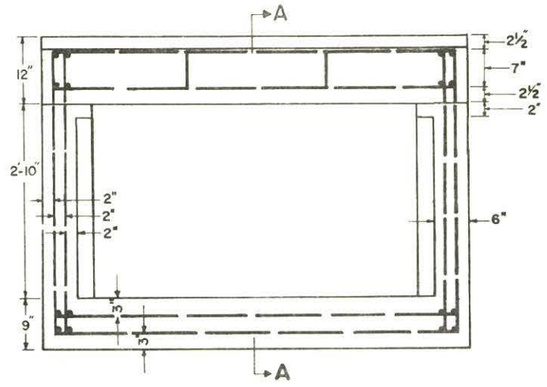
PERSPECTIVE
SECTION B-B

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

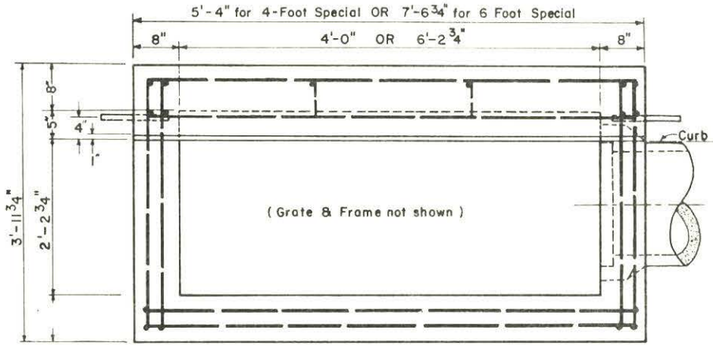
TYPES H & J INLETS

Recommended Dec. 1, 1971	Approved Dec. 6 1971	Sht. 1 Of 1
R R Moser	W. J. Raver	RC-35
Location & Design Engineer	Deputy Chief Hwy. Engr.	

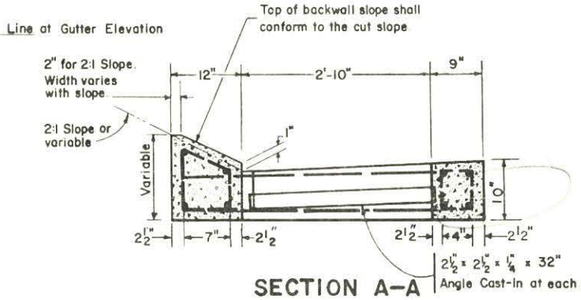
VOID



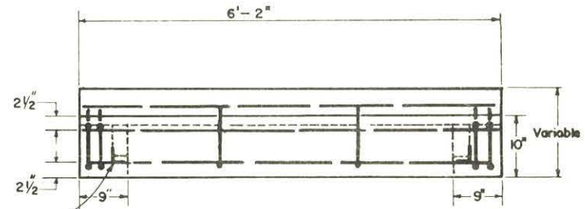
PLAN VIEW



PLAN VIEW

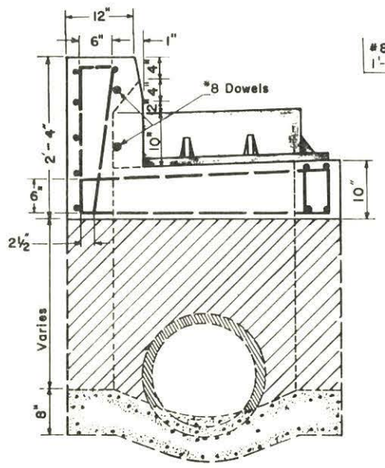


SECTION A-A

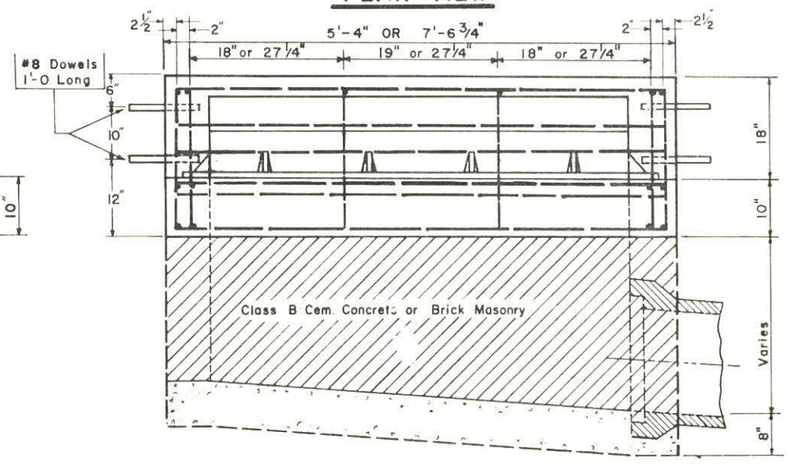


FRONT ELEVATION

PRECAST TOP SECTION FOR TYPE H INLETS



SIDE ELEVATION



FRONT ELEVATION

PRECAST TOP SECTION FOR 4 FT. & 6 FT. SPECIAL INLET

NOTES

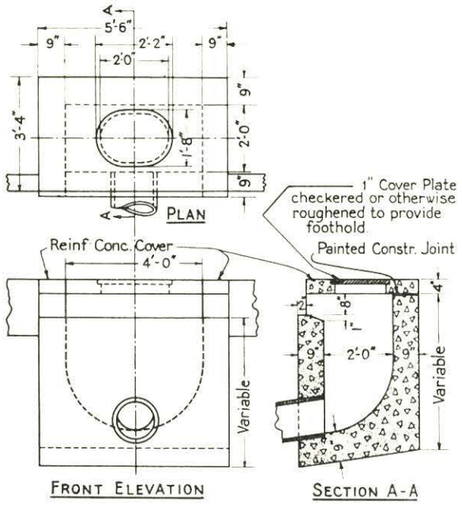
1. All reinforcement shall be *4 bars and shall be placed 2½" from the face of concrete, unless otherwise noted.
2. Precast units shall be set on a grout joint between the inlet box and the precast top section unit.
3. Chamfer all edges 1".
4. Approved precast inlet boxes meeting the requirements of Section 713.2(d) of Form 408 may be substituted for cast in place.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

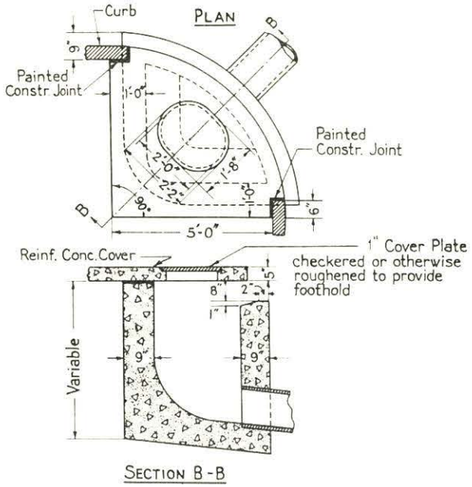
PRECAST UNITS

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
R R Moore	W. J. Ravon	RC-36
Location & Design Engineer	Deputy Chief Hwy. Engr.	

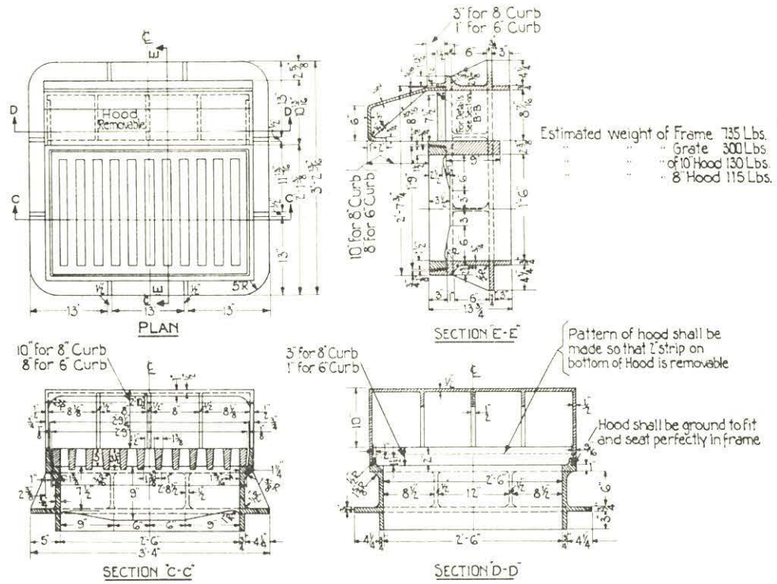
VOID



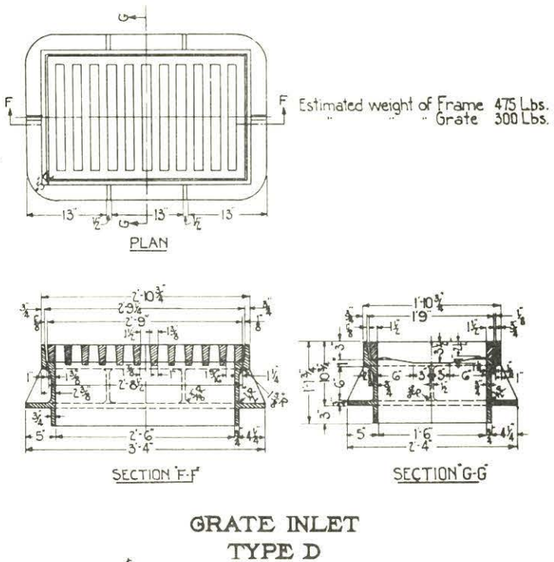
OPEN MOUTH SIDE INLET TYPE A



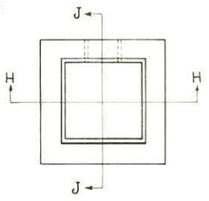
OPEN MOUTH CORNER INLET TYPE B

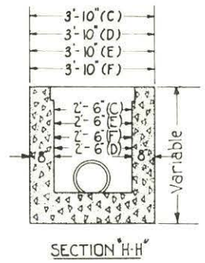


COMBINATION GRATE OPEN MOUTH INLET TYPE C

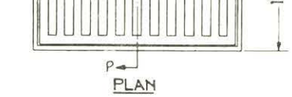


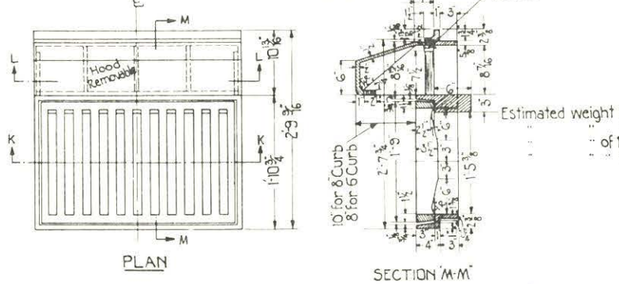
GRATE INLET TYPE D

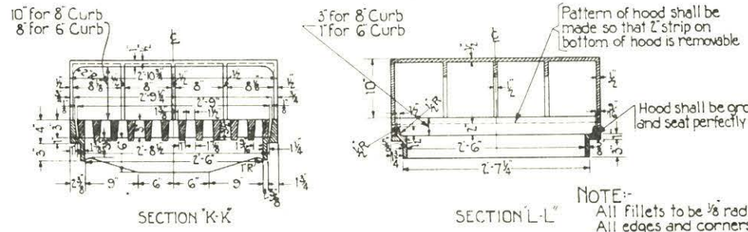




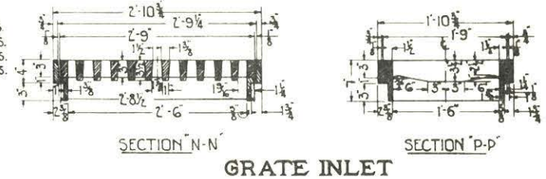
INLET WALLS







COMBINATION GRATE OPEN MOUTH INLET TYPE F



GRATE INLET TYPE E

NOTE:- Walls of inlets shall be modified similar to manhole construction (Std. Dwg. RC-39) when the diameter of the required pipe exceeds the dimensions shown for the specified inlet box.

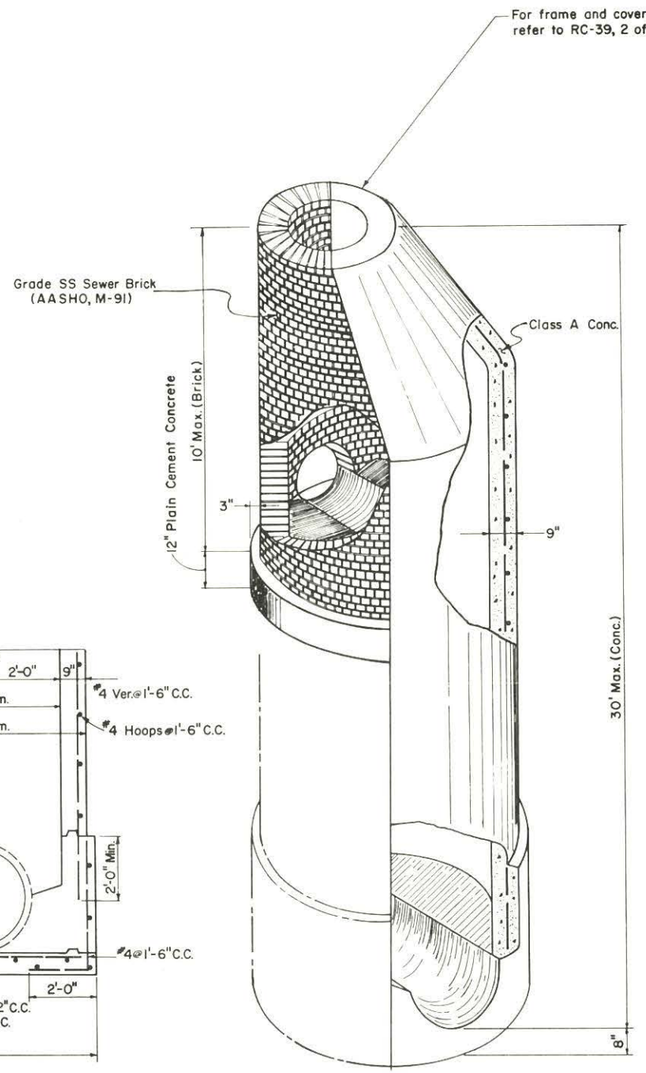
NOTE:-
All fillets to be 1/8 radius.
All edges and corners to be rounded to 1/16 radius unless otherwise shown.
All inlets shall be set approximately 2" below the grade of the gutter, or ditch as directed by the Engineer in each case.
Deviation in weight of castings not to exceed 5% under weights specified on drawings.

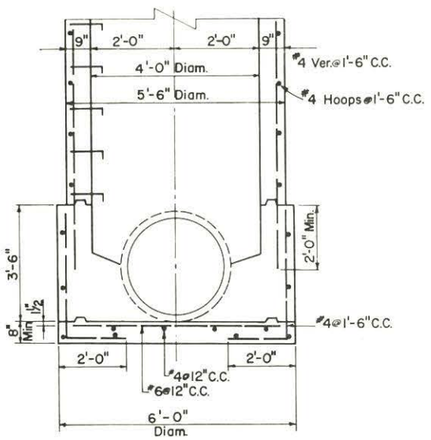
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

MISCELLANEOUS INLETS

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 of 1
R R Mosser — Location & Design Engineer	W. J. Raver — Deputy Chief Hwy. Engr.	RC-38

VOID

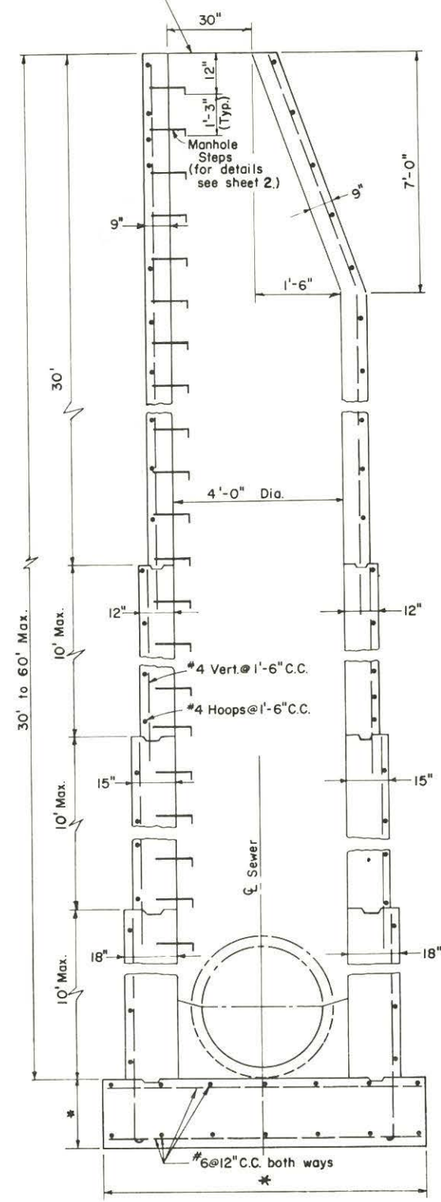




FOUNDATION DETAIL FOR CONCRETE MANHOLE, TYPE A

TYPE A

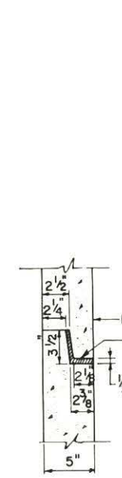
(IN PLACE CONSTRUCTION)



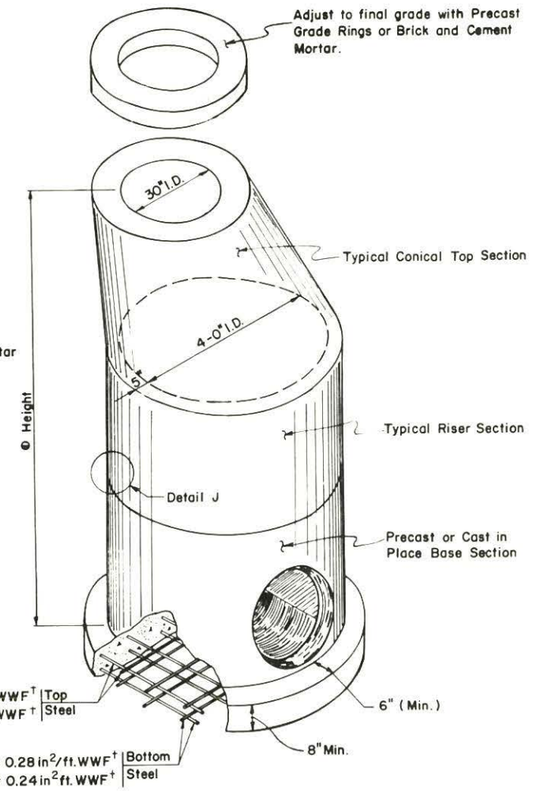
TYPE B

(IN PLACE CONSTRUCTION)

*For base dia. and thickness see table on sheet 2 of 2 RC.-39.



DETAIL J



H=0'-30', #5@12" or 0.18 in²/ft. WWF† | Top Steel
H=30'-60' #6@12" or 0.15 in²/ft. WWF† | Top Steel

H=0'-30', #4@12" or 0.28 in²/ft. WWF† | Bottom Steel
H=30'-60', #4@6" or 0.24 in²/ft. WWF† | Bottom Steel

PRECAST

● Precast Manholes shall meet the requirements of Section 713.2(c) of Form 408, and may be substituted for Types A and B Manholes.

† Welded wire fabric shall conform to the requirements of Section 709.3 of Form 408.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

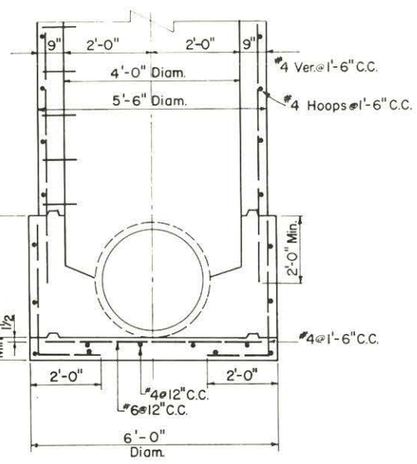
STANDARD MANHOLES

Recommended Aug. 20, 1973
B.D. Pawlus
Director, Bureau of Design

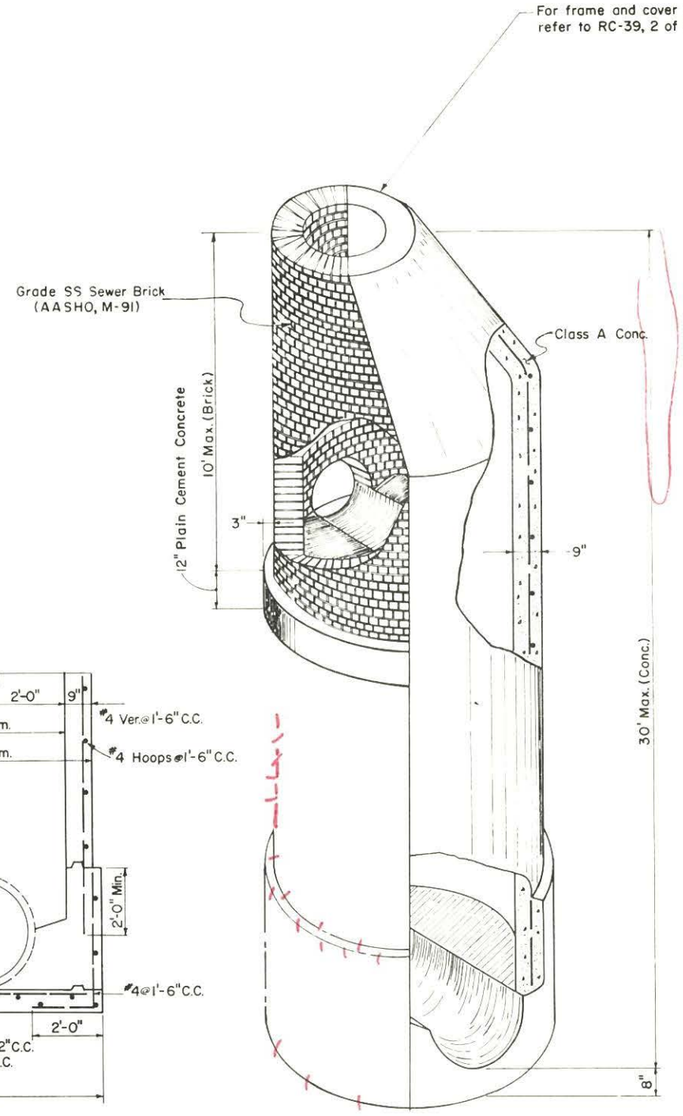
Approved Aug. 20, 1975
Robert P. Maxwell
Deputy Chief Hwy. Engr.

Sht. 1 Of 2
RC-39

TRACED BY
FINAL BY

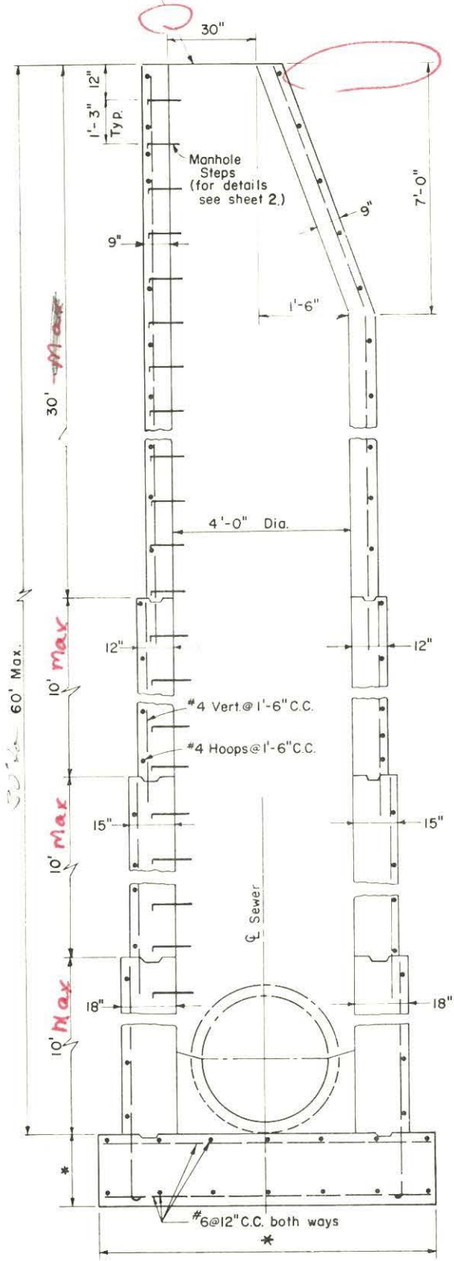


FOUNDATION DETAIL FOR CONCRETE MANHOLE, TYPE A



TYPE A

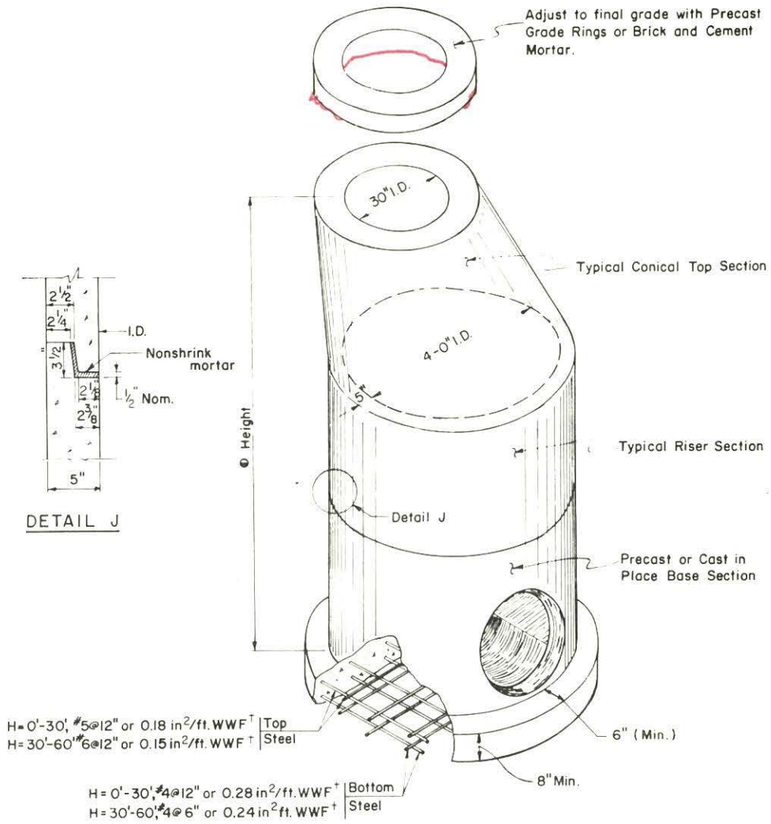
(In Place Construction)



TYPE B

(In Place Construction)

*For base dia. and thickness see table on sheet 2 of 2 RC.-39.



DETAIL J

PRECAST

● Precast Manholes shall meet the requirements of Section 713.2(c) of Form 408, and may be substituted for Types A and B Manholes.

† Welded wire fabric shall conform to the requirements of Section 709.3 of Form 408.

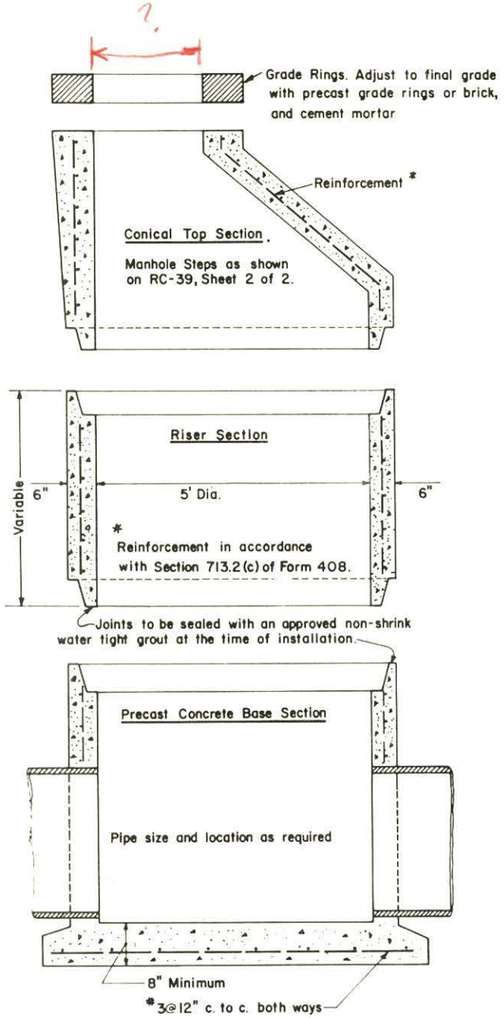
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

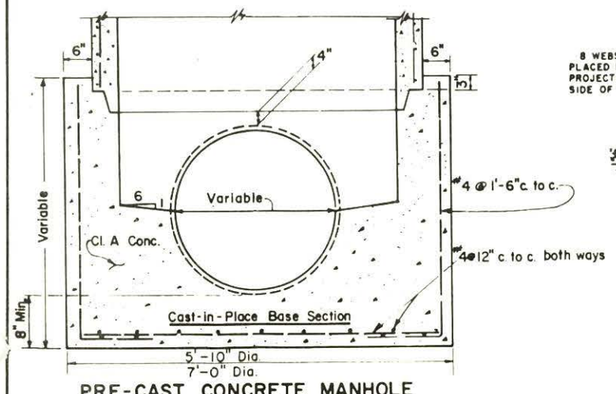
STANDARD MANHOLES

Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 1 Of 2
B.D. Supinka	Robert P. Maurer	RC-39
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

TRACED BY
FINAL BY

VOID





PRE-CAST CONCRETE MANHOLE

(To meet requirements of Section 713.2(c) of Form 408)

—∘— NOTE —∘—

The base pressures in tons per square foot are shown for each type of manhole. Where the supporting ground at the bottom of footing of any manhole is incapable of sustaining the indicated loading, the footings shall be increased in size in accordance with the dimensions shown in the tabulation below. Proper allowance shall be made for variations in height of the various types of manholes. In general it has been presumed that a safe loading of one ton per square foot will obtain. The contractor shall not proceed with the construction of any manhole until the engineer has made tests of the foundation and determined the load capacity of the underlying soil.

Where necessary to increase the size of footing over and above the dimensions shown for any type of manhole at any specified depth, the contractor will be reimbursed for the increased quantity of Class A Cem. Conc. and Reinforcement Bars at the contract unit price for each of these items.

In such cases the lengths of reinforcement bars shall be increased to conform to the increased size of footing.

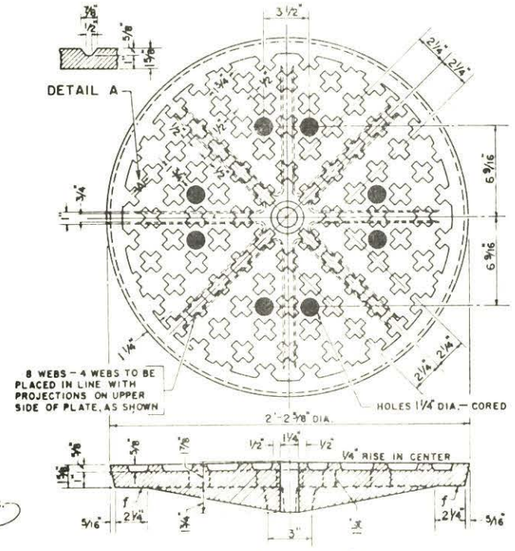
The depth or thickness of footing below the bottom of the pipe shall be not less than the dimension shown in the tabulation for each type of manhole.

The maximum depth of each type shall not exceed the total maximum shown i.e. 30'-0" for Type A and 60'-0" for Type B.

The minimum base dimensions shall conform in all cases to the minimum shown on the drawings.

Precast Manholes shall meet the requirements of Section 713.2(c) of form 408 and may be substituted for Type A & B Manholes.

MAXIMUM DIAMETER OF PIPE	TYPE OF MANHOLE	DEPTH FROM TOP OF MANHOLE TO INVERT OF PIPE	AS DESIGNED			BASE PRESSURES FOR VARIOUS SIZE FOOTINGS					
			TONS PER SQ. FT.	WIDTH OF BASE	MIN THICKNESS OF BASE	LOADING IN TONS/SQ. FT.	MAX. WIDTH OF BASE	LOADING IN TONS/SQ. FT.	MAX. WIDTH OF BASE	LOADING IN TONS/SQ. FT.	MAX. WIDTH OF BASE
42"	A	MAX. 10'-0"	0.65	6'-6"	0'-8"						
42"	A	MAX 20'-0"	0.82	7'-0"	0'-8"						
42"	A	MAX. 30'-0"	1.12	7'-0" DIA.	0'-8"	0.89	8'-0" DIA.				
42"	B	MAX. 40'-0"	1.38	7'-6" DIA.	1'-0"	1.07	8'-6" DIA.				
42"	B	MAX. 50'-0"	1.69	8'-0" DIA.	1'-6"	1.16	9'-0" DIA.	0.96	10'-0" DIA.		
42"	B	MAX. 60'-0"	1.90	8'-6" DIA.	2'-0"	1.36	10'-0" DIA.	1.13	11'-0" DIA.	0.95	12'-0" DIA.
78"	A Mod.	MAX. 30'-0"	0.89	7'-6" x 7'-6"							
78"	B Mod.	MAX. 40'-0"	1.05	9'-0" x 7'-6"							

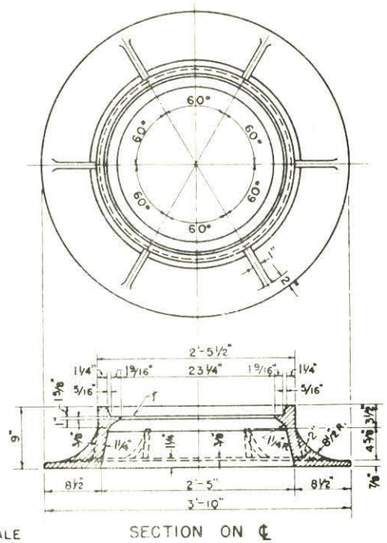


SECTION ON ℄

COVER CASTING

ESTIMATED WEIGHT 205 LBS.

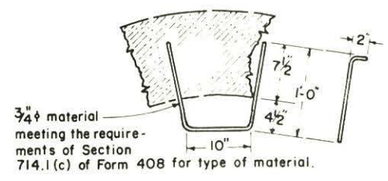
NO SCALE



SECTION ON ℄

FRAME CASTING

ESTIMATED WEIGHT 555 LBS.



MANHOLE STEPS

Alternate shapes, as approved by the engineer, may also be used.

CASTINGS FOR MANHOLES

NOTE:- FOR ALL MANHOLE CASTINGS.
ALL FILLETS TO BE 1/8" RADIUS
ALL EDGES AND CORNERS TO BE ROUNDED TO 1/16" RADIUS
UNLESS OTHERWISE SHOWN.
DEVIATION IN WEIGHT OF CASTINGS NOT TO EXCEED 5% UNDER WEIGHTS SPECIFIED.

THE METAL BEARING AREAS OF FRAMES AND COVERS IN CONTACT SHALL BE MACHINE GROUND TO FIT IN PAIRS, SHALL BE MARKED AS PAIRS AND EACH PAIR SHALL BE MATCH MARKED WITH NOTCHES.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD MANHOLES

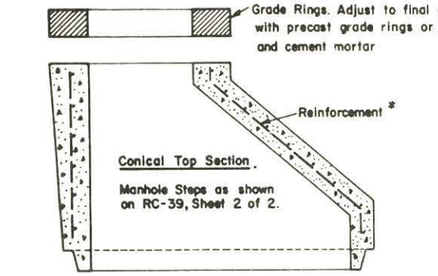
Recommended Mar 7, 1973
Director, Bureau of Design

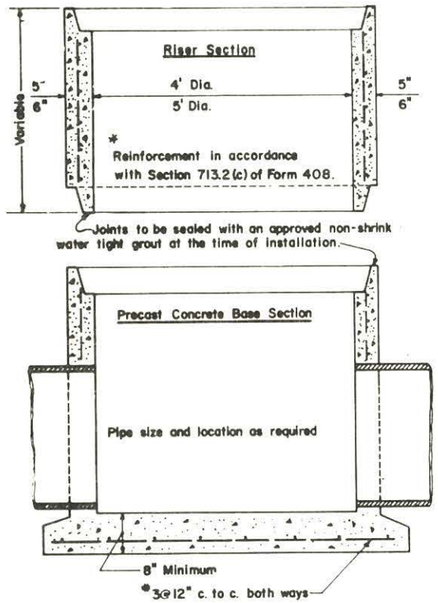
Approved Mar 7, 1973
Deputy Chief Hwy. Engr.

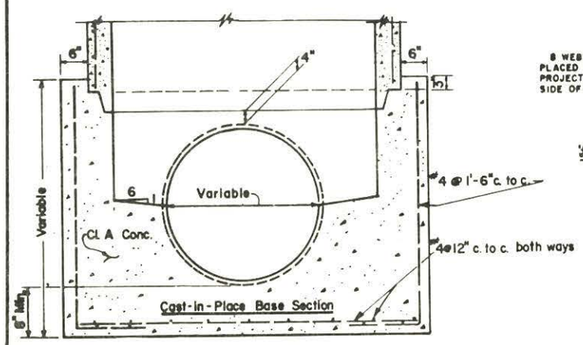
Sht. 1 Of 2

RC-39

VOID







PRE-CAST CONCRETE MANHOLE
(To meet requirements of Section 713.2(c) of Form 408)

—•—NOTE—•—

The base pressures in tons per square foot are shown for each type of manhole. Where the supporting ground at the bottom of footing of any manhole is incapable of sustaining the indicated loading, the footings shall be increased in size in accordance with the dimensions shown in the tabulation below. Proper allowance shall be made for variations in height of the various types of manholes. In general it has been presumed that a safe loading of one ton per square foot will obtain. The contractor shall not proceed with the construction of any manhole until the engineer has made tests of the foundation and determined the load capacity of the underlying soil.

Where necessary to increase the size of footing over and above the dimensions shown for any type of manhole at any specified depth, the contractor will be reimbursed for the increased quantity of Class A Cem. Conc. and Reinforcement Bars at the contract unit price for each of these items.

In such cases the lengths of reinforcement bars shall be increased to conform to the increased size of footing.

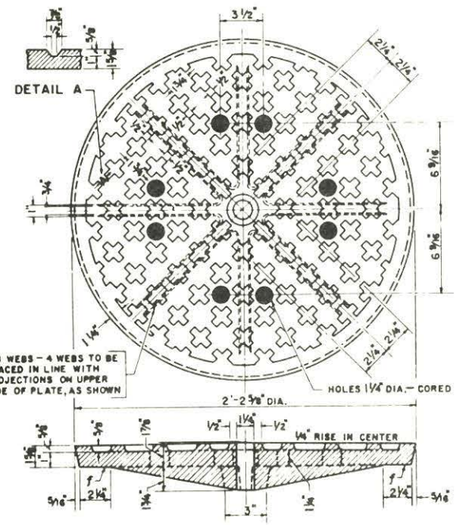
The depth or thickness of footing below the bottom of the pipe shall be not less than the dimension shown in the tabulation for each type of manhole.

The maximum depth of each type shall not exceed the total maximum shown i.e. 30'-0" for Type A and 60'-0" for Type B.

The minimum base dimensions shall conform in all cases to the minimum shown on the drawings.

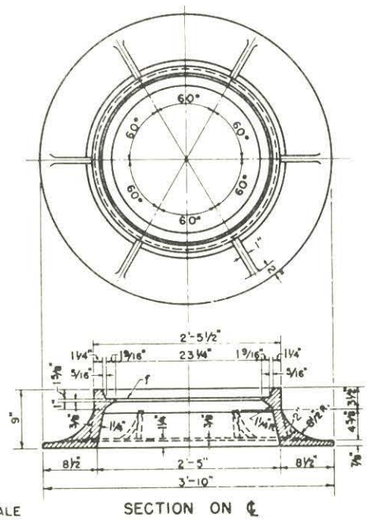
Precast Manholes shall meet the requirements of Section 713.2(c) of form 408 and may be substituted for Type A Manholes.

MAXIMUM DIAMETER OF PIPE	TYPE OF MANHOLE	DEPTH FROM TOP OF MANHOLE TO INVERT OF PIPE	AS DESIGNED			BASE PRESSURES FOR VARIOUS SIZE FOOTINGS					
			TONS PER SQ. FT.	WIDTH OF BASE	MIN. THICKNESS OF BASE	LOADING IN TONS/SQ. FT.	MAX. WIDTH OF BASE	LOADING IN TONS/SQ. FT.	MAX. WIDTH OF BASE	LOADING IN TONS/SQ. FT.	MAX. WIDTH OF BASE
42"	A	MAX. 10'-0"	0.65	6'-6"	0'-8"						
42"	A	MAX 20'-0"	0.82	7'-0"	0'-8"						
42"	A	MAX. 30'-0"	1.12	7'-0" DIA.	0'-8"	0.89	8'-0" DIA.				
42"	D	MAX. 40'-0"	1.38	7'-6" DIA.	1'-0"	1.07	8'-6" DIA.				
42"	D	MAX. 50'-0"	1.69	8'-0" DIA.	1'-6"	1.16	9'-0" DIA.	0.96	10'-0" DIA.		
42"	D	MAX. 60'-0"	1.90	8'-6" DIA.	2'-0"	1.36	10'-0" DIA.	1.13	11'-0" DIA.	0.95	12'-0" DIA.
78"	A Mod.	MAX. 30'-0"	0.89	7'-6" x 7'-6"							
78"	D Mod.	MAX. 40'-0"	1.05	9'-0" x 7'-6"							



SECTION ON ℄
COVER CASTING
ESTIMATED WEIGHT 205 LBS.

NO SCALE

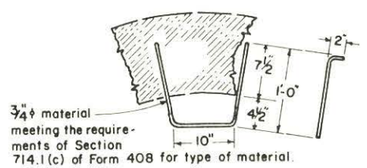


SECTION ON ℄
FRAME CASTING
ESTIMATED WEIGHT 555 LBS.

CASTINGS FOR MANHOLES

NOTE:- FOR ALL MANHOLE CASTINGS.
ALL FILLETS TO BE 1/8" RADIUS.
ALL EDGES AND CORNERS TO BE ROUNDED TO 1/16" RADIUS UNLESS OTHERWISE SHOWN.
DEVIATION IN WEIGHT OF CASTINGS NOT TO EXCEED 5% UNDER WEIGHTS SPECIFIED.

THE METAL BEARING AREAS OF FRAMES AND COVERS IN CONTACT SHALL BE MACHINE GROUND TO FIX IN PAIRS, SHALL BE MARKED AS PAIRS AND EACH PAIR SHALL BE MATCH MARKED WITH NOTCHES.



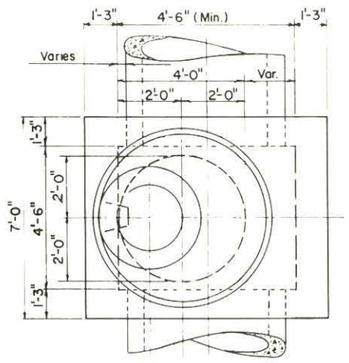
MANHOLE STEPS

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

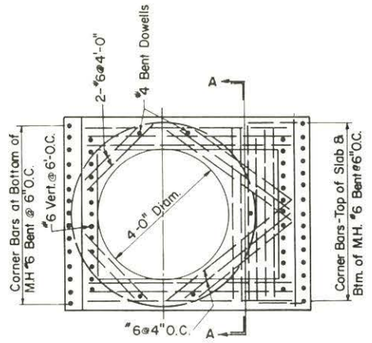
STANDARD MANHOLES

Recommended Dec. 1, 1971 — R.R. Thurner — Location & Design Engineer
Approved Dec. 1, 1971 — W.J. Raven — Deputy Chief Hwy. Engr.
Sht. 1 Of 2
RC-39

VOID



PLAN

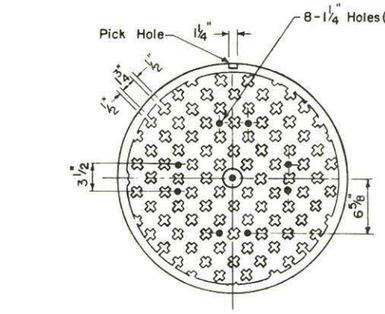


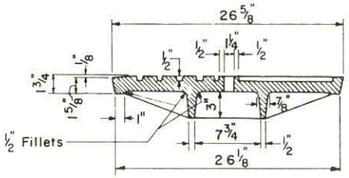
PLAN OF SLAB OVER PIPE

(Indicating Placing of Bars)

TABLE OF BASE SLAB DIMENSIONS					
Maximum Diam. of Pipe	Type of Manhole	Depth from Top of Manhole to Invert of Pipe	As Designed		
			Tons per Sq. ft.	Minimum width of Base	Min. thickness of Base below the bottom of the pipe
30"	A	Max. 10'-0"	0.65	6'-6"	0'-8"
30"	A	Max. 20'-0"	0.82	7'-0"	0'-8"
30"	A	Max. 30'-0"	1.12	7'-0"Dia.	0'-8"
30"	B	Max. 40'-0"	1.38	7'-6"Dia.	1'-0"
30"	B	Max. 50'-0"	1.50	8'-6"Dia.	1'-6"
30"	B	Max. 60'-0"	1.55	9'-6"Dia.	2'-0"
	A Mod.	Max. 30'-0"	0.89	7'-0"x7'-0"	
*	B Mod.	Max. 40'-0"	1.05	7'-0"x7'-0"	

** A safe bearing capacity of 1.50 t/ft.² is assumed to determine the base size. When the subsoil is extremely poor, the contractor shall proceed with the construction only after the engineer specifies an adequate base design.



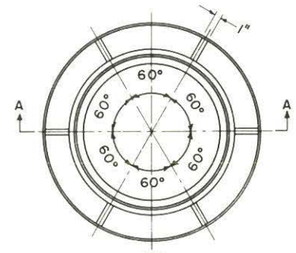


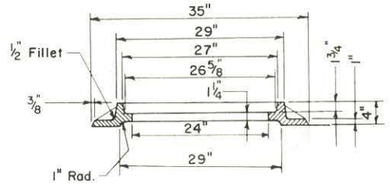
SECTION ℄

COVER CASTING

Notes:

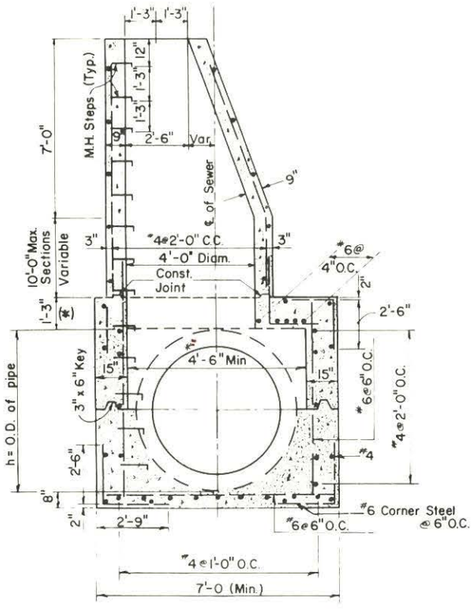
For all manhole castings:
All fillets to be ⅛" Radius.
All edges & corners to be rounded to 1/16" radius unless otherwise shown.





SECTION A-A

FRAME CASTING

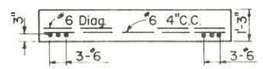


SECTION

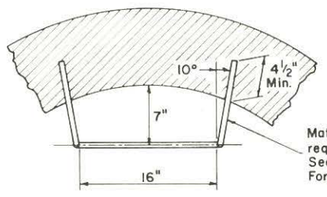
(For pipes 36" Dia. and greater)

Type A - Construct as shown.

* Type B - Construct similar to above using 1'-6" thickness for top of Box Structure (*), and the wall thicknesses and Reinforcement shown for TYPE B.

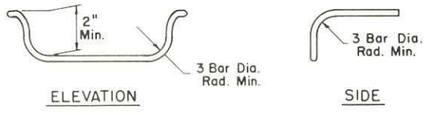


SECTION A-A



Material meeting the requirements of Section 714.1(C) of Form 408.

PLAN



ELEVATION SIDE

MANHOLE STEPS

Alternate shapes, as approved by the engineer, may also be used.

* For pipe dia. greater than 54", increase the box size and keep the inside dia. flush with the walls. Maintain the required wall thickness of 15"

Alternate designs for adapting larger pipes may be submitted for approval.

TYPE A & B MODIFIED

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

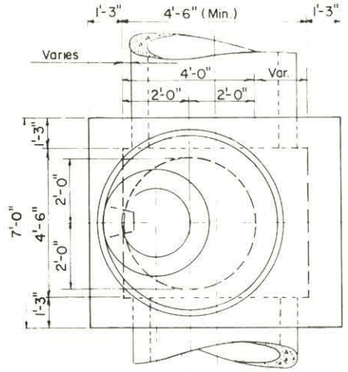
STANDARD MANHOLES

Recommended Aug 20, 1973
B.O. Lewis
Director, Bureau of Design

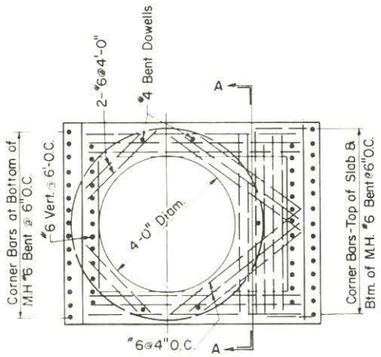
Approved Aug 20, 1973
Robert H. Mason
Deputy Chief Hwy. Engr.

Sht. 2 Of 2
RC-39

TRACED BY
FINAL BY



PLAN

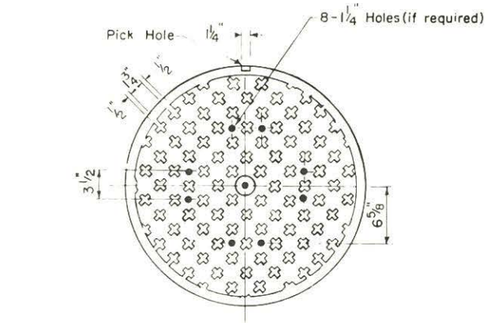


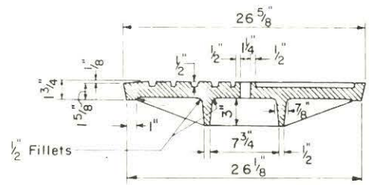
PLAN OF SLAB OVER PIPE

(Indicating Placing of Bars)

TABLE OF BASE SLAB DIMENSIONS					
Maximum Diam. of Pipe	Type of Manhole	Depth from Top of Manhole to Invert of Pipe	As Designed		
			Tons per Sq. ft.	Minimum width of Base	Min thickness of Base below the bottom of the pipe
30"	A	Max. 10'-0"	0.65	6'-6"	0'-8"
30"	A	Max. 20'-0"	0.82	7'-0"	0'-8"
30"	A	Max. 30'-0"	1.12	7'-0" Dia.	0'-8"
30"	B	Max. 40'-0"	1.38	7'-6" Dia.	1'-0"
30"	B	Max. 50'-0"	1.50	8'-6" Dia.	1'-6"
30"	B	Max. 60'-0"	1.55	9'-6" Dia	2'-0"
	A Mod.	Max. 30'-0"	0.89	7'-0" x 7'-0"	
@	B Mod.	Max. 40'-0"	1.05	7'-0" x 7'-0"	

** A safe bearing capacity of 1.50 t/ft.^{2} is assumed to determine the base size. When the subsoil is extremely poor, the contractor shall proceed with the construction only after the engineer specifies an adequate base design.



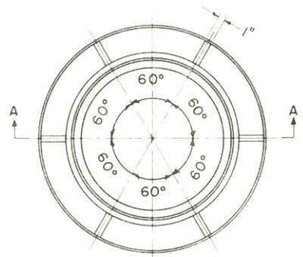


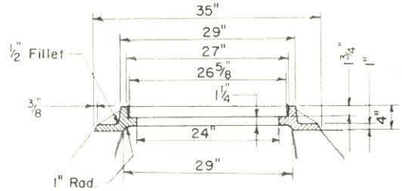
SECTION ℄

COVER CASTING

Notes:

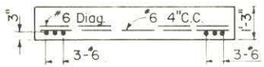
For all manhole castings:
All fillets to be ⅛" Radius.
All edges & corners to be rounded to 1/16" radius unless otherwise shown.



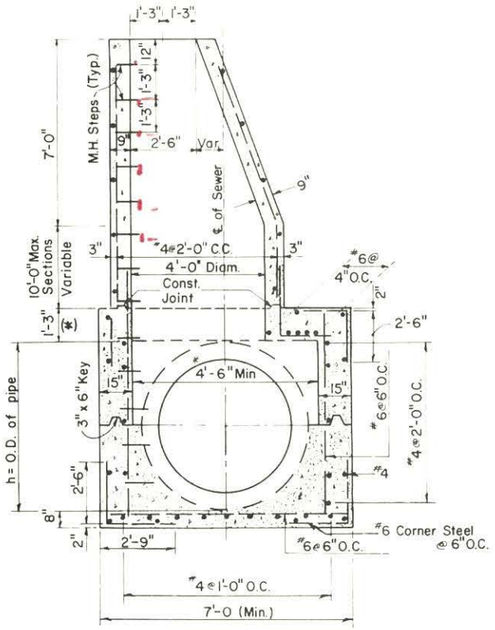


SECTION A-A

FRAME CASTING



SECTION A-A



SECTION

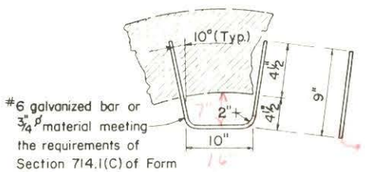
*(For pipes 36" Dia. and greater)

Type A - Construct as shown.

@ Type B - Construct similar to above using 1'-6" thickness for top of Box Structure (*), and the wall thicknesses and Reinforcement shown for TYPE B.

* For pipe dia. greater than 54", increase the box size and keep the inside dia. flush with the walls. Maintain the required wall thickness of 15"

Alternate designs for adapting larger pipes may be submitted for approval.



MANHOLE STEPS

Alternate shapes, as approved by the engineer, may also be used.

TYPE A & B MODIFIED

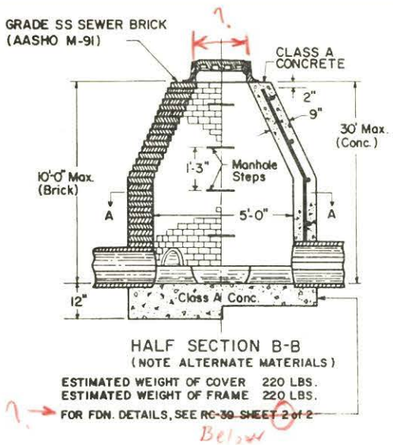
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD MANHOLES

Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 2 Of 2
B.D. Ramsburg	Robert P. Maslow	RC-39
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

TRACED BY
FINAL BY

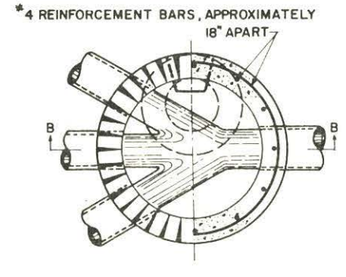
VOID



HALF SECTION B-B
(NOTE ALTERNATE MATERIALS)

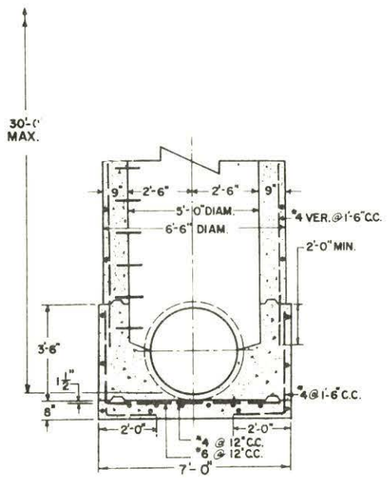
ESTIMATED WEIGHT OF COVER 220 LBS.
ESTIMATED WEIGHT OF FRAME 220 LBS.

FOR FDN. DETAILS, SEE RC-39 SHEET 2 of 2 Below

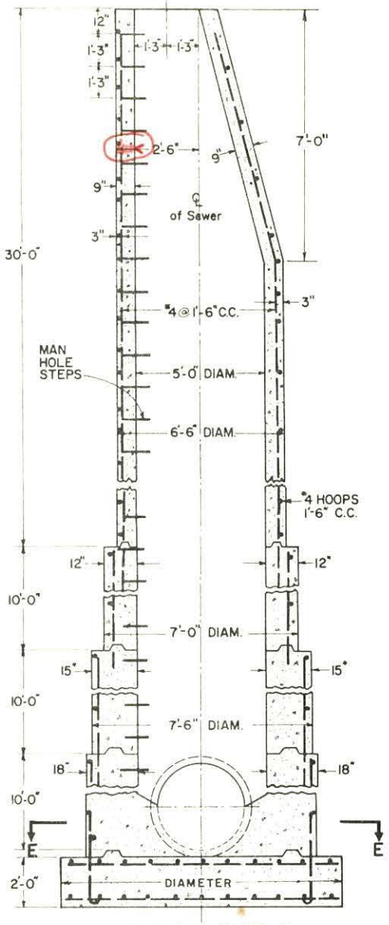


HALF SECTION A-A

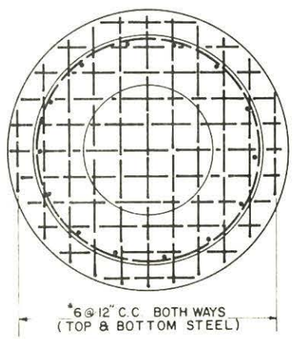
TYPE A MANHOLE



TYPE A MANHOLE FOUNDATION DETAIL

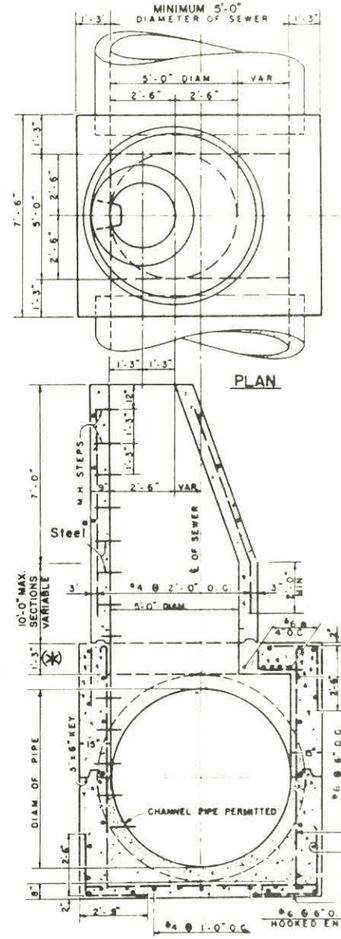


SECTION - TYPE B
(FOR PIPES 42" DIA. & LESS)



SEC. E-E
OF MANHOLE - TYPE B
INDICATING FOUNDATION REINFORCEMENT

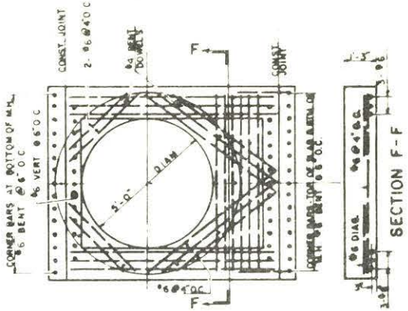
TYPE B MANHOLE



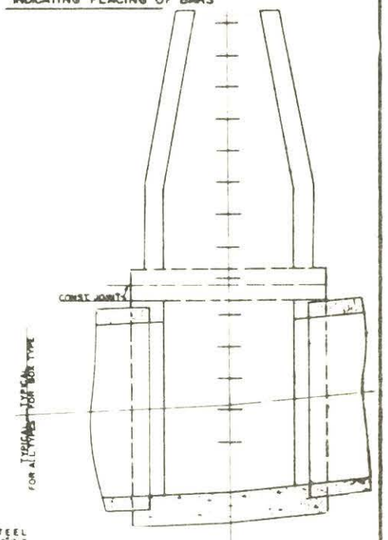
PLAN

SECTION
(FOR PIPES 48" DIA. AND GREATER)

TYPE A - CONSTRUCT AS SHOWN.
TYPE B - CONSTRUCT SIMILAR TO ABOVE USING 1'-6" THICKNESS FOR TOP OF BOX STRUCTURE (OR), AND THE WALL THICKNESSES, BASE THICKNESS AND REINFORCEMENT SHOWN ON "SECTION-TYPE B"

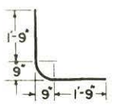


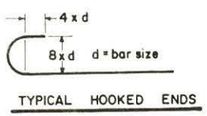
PLAN OF SLAB OVER PIPE
INDICATING PLACING OF BARS



TYPICAL LONGITUDINAL SECTION
FOR REINFORCEMENT SEE PLAN & X-SECTION

TYPE A & B MODIFIED





TYPICAL HOOKED ENDS

NOTES

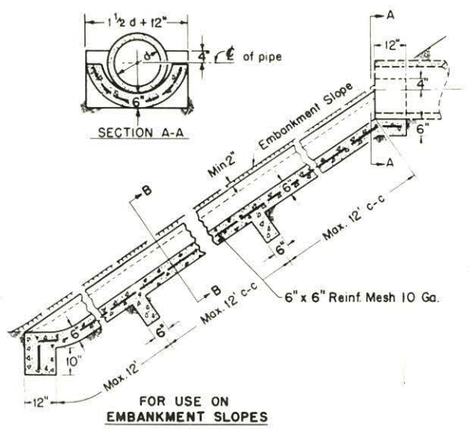
ALL CONCRETE SHALL BE CLASS A CEMENT CONC
ALL BARS STRAIGHT UNLESS MARKED OTHERWISE
MINIMUM LAP OF BARS = 45 DIAM.
DEPTH & SIZE OF FOOTING SUBJECT TO CHANGE, DUE TO SOIL, TO BE DETERMINED BY THE ENG'R
3" x 6" KEYS AT CONSTRUCTION JOINTS.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

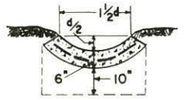
STANDARD MANHOLES

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht 2 Of 2
R R Moser	J J Raver	RC-39
Location & Design Engineer	Deputy Chief Hwy Engr	

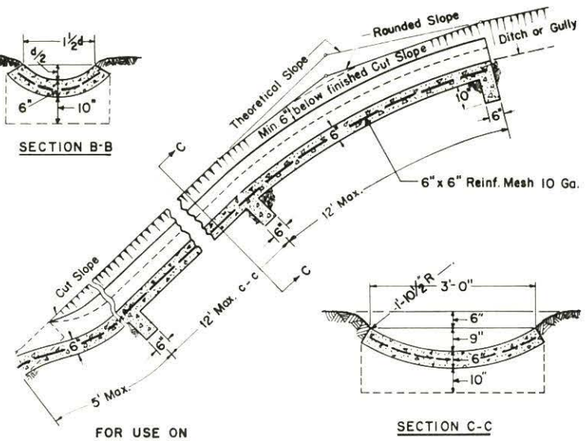
VOID



FOR USE ON
EMBANKMENT SLOPES

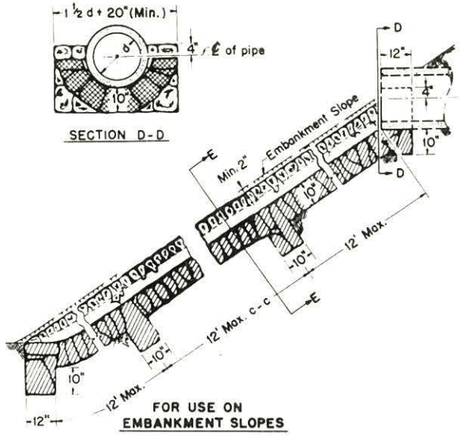


SECTION B-B

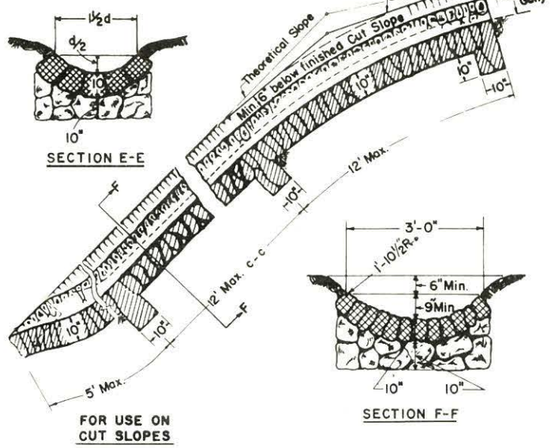


FOR USE ON
CUT SLOPES

SECTION C-C



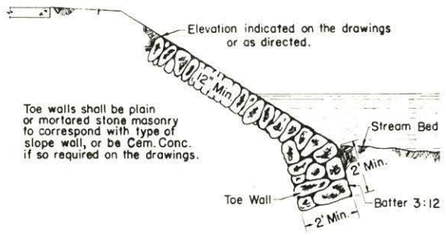
FOR USE ON
EMBANKMENT SLOPES



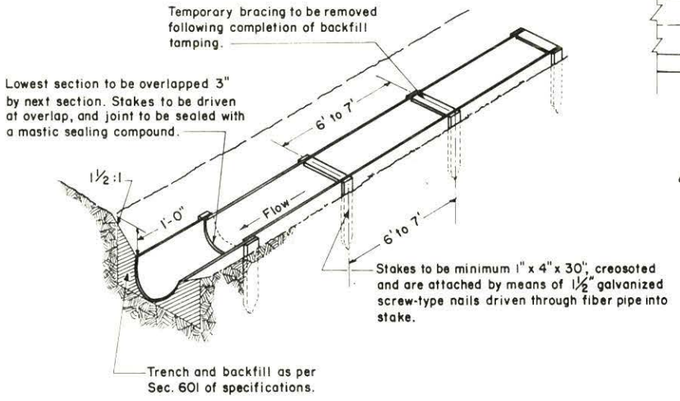
FOR USE ON
CUT SLOPES

MORTARED STONE SPILLWAYS

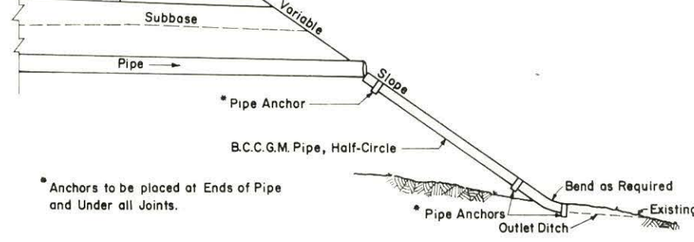
CEMENT CONCRETE SPILLWAYS



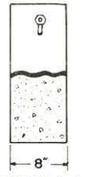
PLAIN AND MORTARED
STONE SLOPE WALL

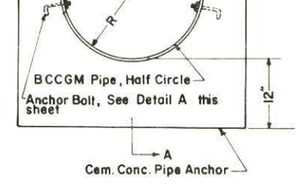


INSTALLATION OF HALF SECTION BITUMINIZED
FIBER PIPE



SKETCH OF HALF CIRCLE PIPE IN FILL SLOPE

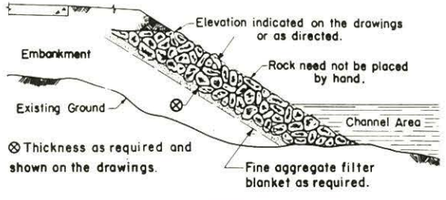




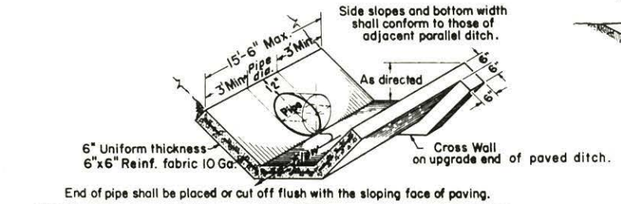
DETAIL OF PIPE ANCHOR

NOTES

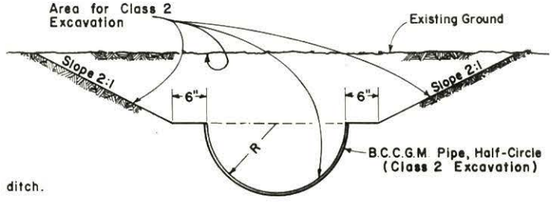
1. All items shall conform to the requirements of Form 408.



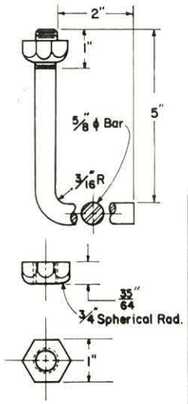
ROCK EMBANKMENT
FOR SLOPE PROTECTION



CEMENT CONCRETE PAVING for STREAM BEDS
(PAVED PARALLEL DITCH)



INSTALLATION DETAIL FOR
HALF-CIRCLE PIPE



DETAIL A - ANCHOR BOLT

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

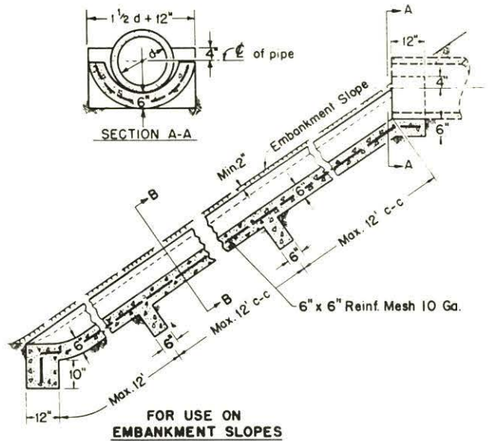
SLOPE PROTECTION

Recommended June 1, 1976
R. A. Tomlin
Director, Bureau of Design

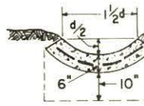
Approved June 1, 1976
R. L. Thomas
Deputy Chief Engr.

Sht. 1 Of 1

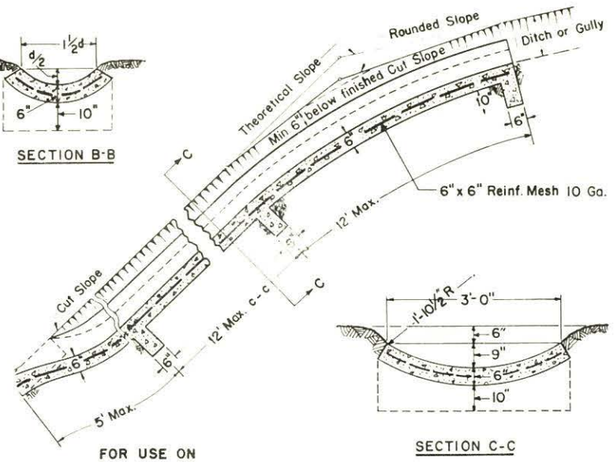
RC-40



FOR USE ON
EMBANKMENT SLOPES

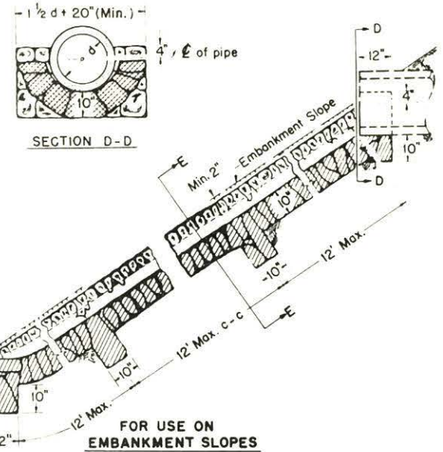


SECTION B-B

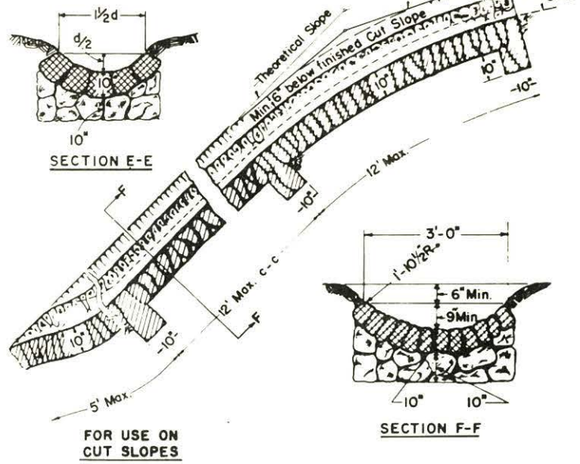


FOR USE ON
CUT SLOPES

SECTION C-C



FOR USE ON
EMBANKMENT SLOPES

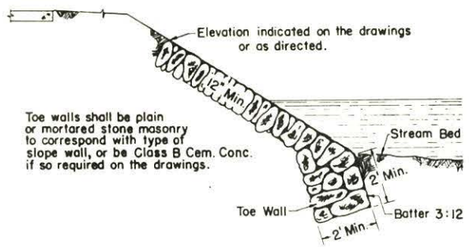


FOR USE ON
CUT SLOPES

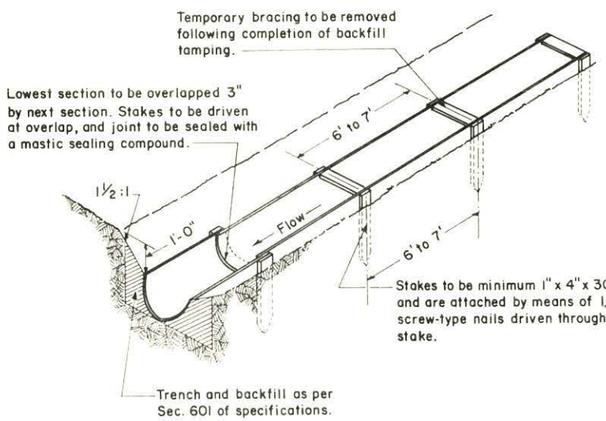
SECTION F-F

MORTARED STONE SPILLWAYS

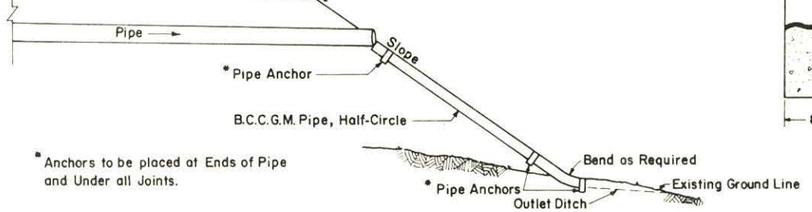
CEMENT CONCRETE SPILLWAYS



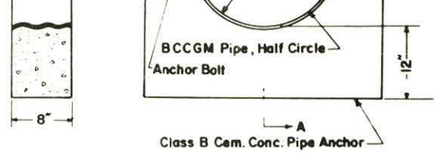
PLAIN AND MORTARED
STONE SLOPE WALL



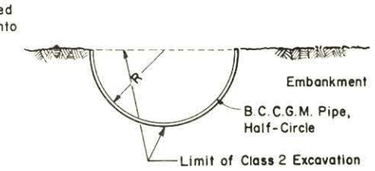
INSTALLATION OF HALF SECTION BITUMINIZED
FIBER PIPE

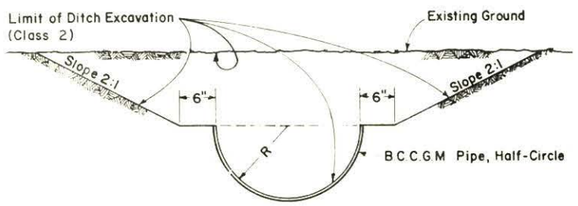


SKETCH OF HALF CIRCLE PIPE IN FILL SLOPE

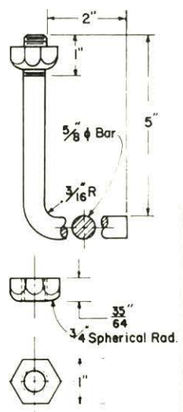


DETAIL OF PIPE ANCHOR

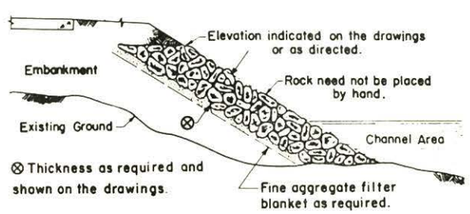




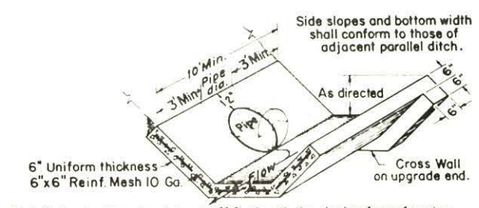
DETAIL SHOWING LIMIT OF CLASS 2 EXCAVATION



DETAIL OF ANCHOR BOLT



ROCK EMBANKMENT
FOR SLOPE PROTECTION



CLASS B CEM. CONC. PAV'G. for STREAM BEDS
(PAVED PARALLEL DITCH)

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

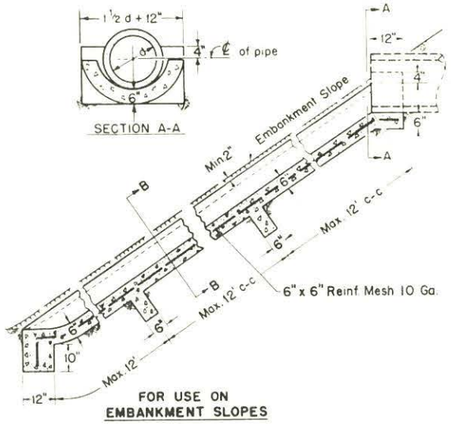
SLOPE PROTECTION

Recommended Mar. 7, 1973
Director, Bureau of Design

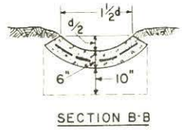
Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

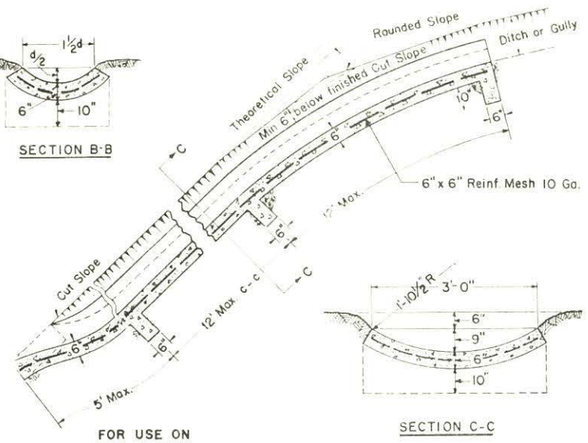
Sht. 1 Of 1
RC-40

VOID

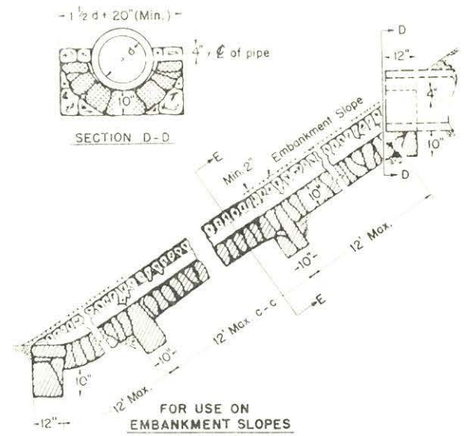


FOR USE ON
EMBANKMENT SLOPES

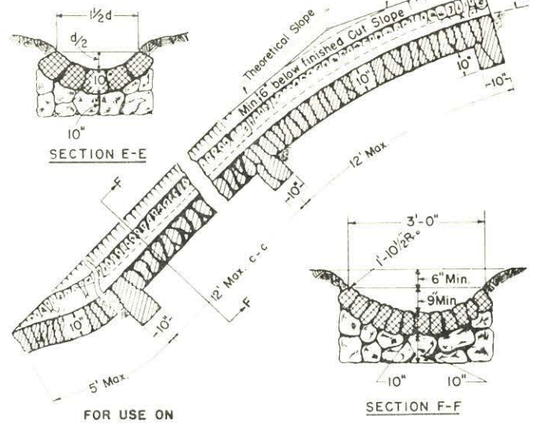




FOR USE ON
CUT SLOPES



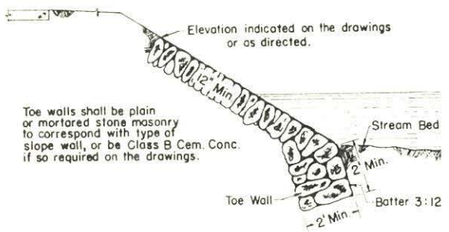
FOR USE ON
EMBANKMENT SLOPES



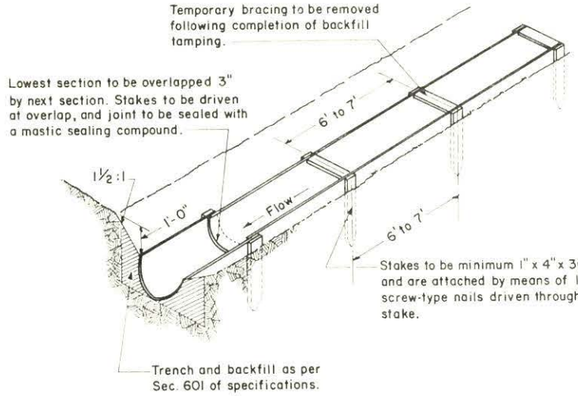
FOR USE ON
CUT SLOPES

MORTARED STONE SPILLWAYS

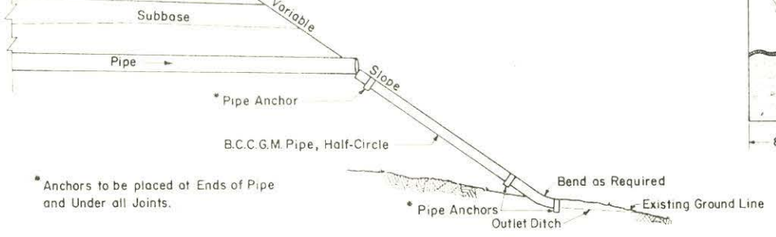
CEMENT CONCRETE SPILLWAYS



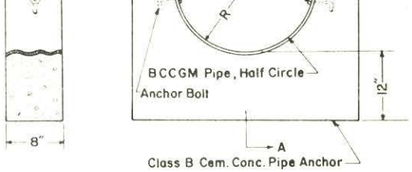
PLAIN AND MORTARED
STONE SLOPE WALL



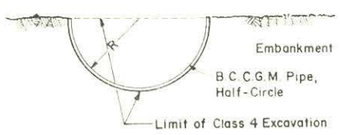
INSTALLATION OF HALF SECTION BITUMINIZED
FIBER PIPE

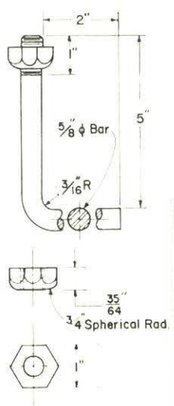


SKETCH OF HALF CIRCLE PIPE IN FILL SLOPE

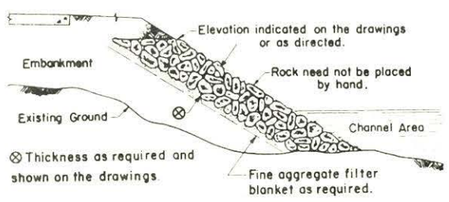


DETAIL OF PIPE ANCHOR

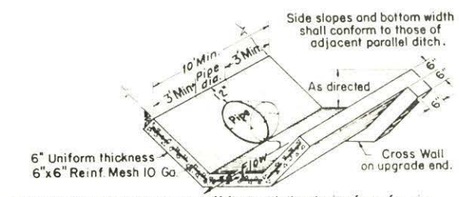




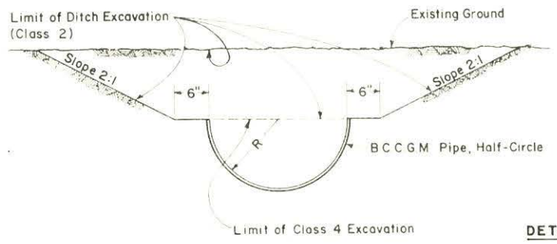
DETAIL OF ANCHOR BOLT



ROCK EMBANKMENT
FOR SLOPE PROTECTION



CLASS B CEM. CONC. PAV'G. for STREAM BEDS
(PAVED PARALLEL DITCH)



DETAIL SHOWING LIMIT OF CLASS 2 & 4 EXCAVATION

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SLOPE PROTECTION

Recommended Dec. 1, 1971
K R Wagner
Location & Design Engineer

Approved Dec. 1, 1971
W. J. Raven
Deputy Chief Hwy. Engr.

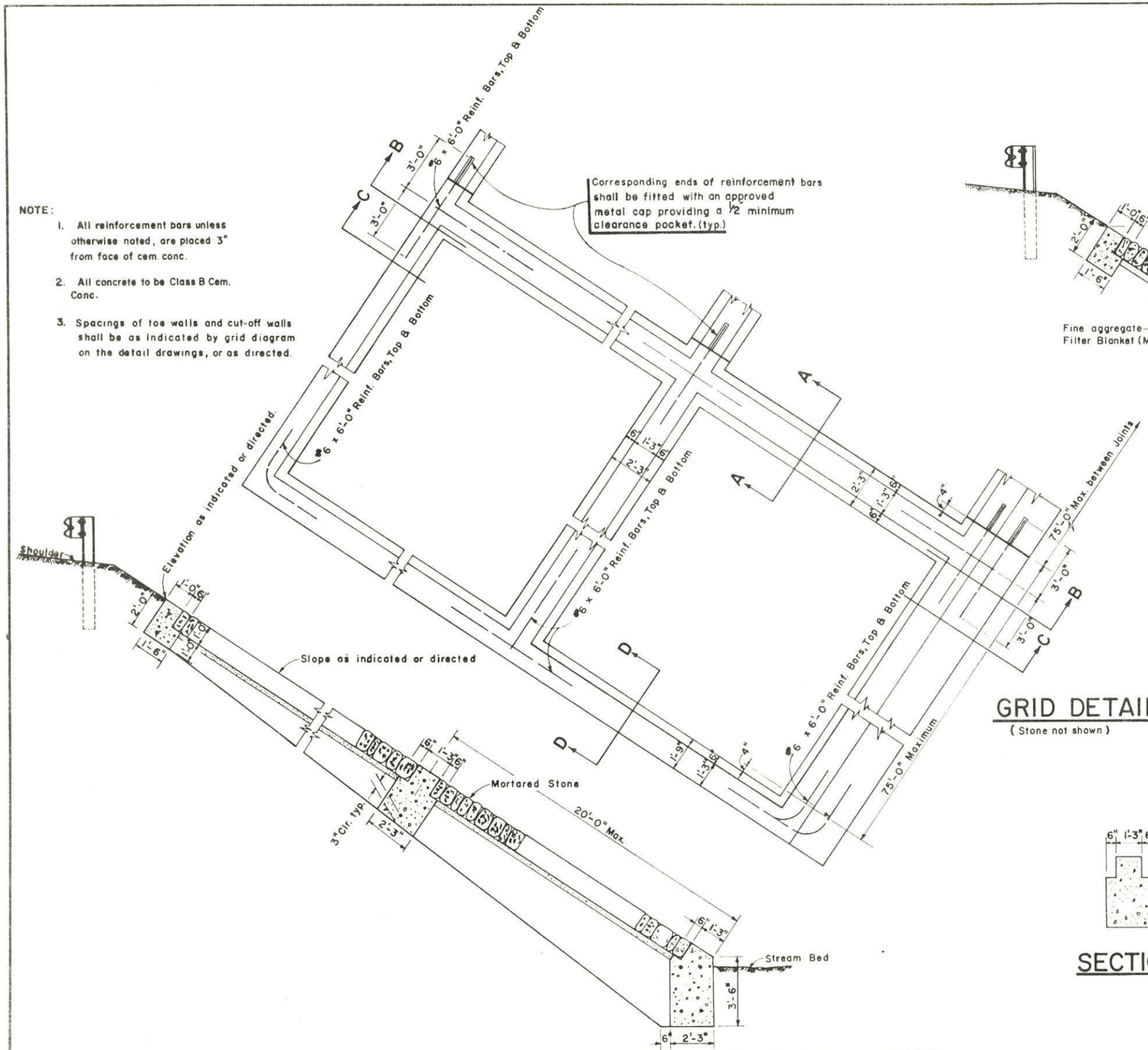
Sht. 1 Of 1

RC-40

VOID

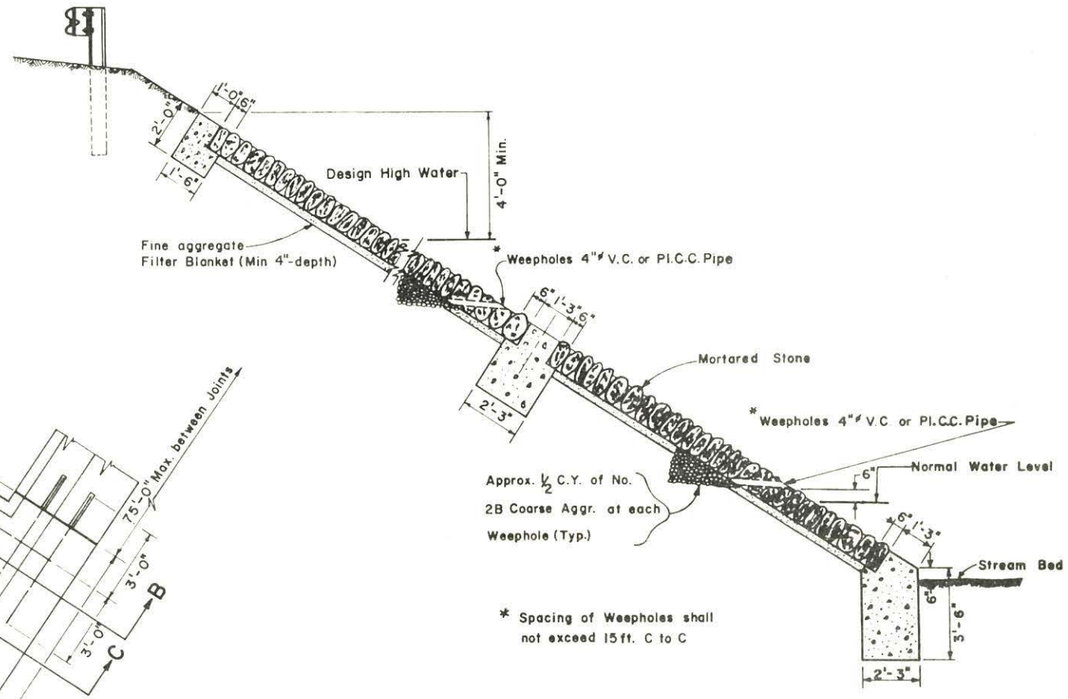
NOTE:

1. All reinforcement bars unless otherwise noted, are placed 3" from face of cem. conc.
2. All concrete to be Class B Cem. Conc.
3. Spacings of toe walls and cut-off walls shall be as indicated by grid diagram on the detail drawings, or as directed.



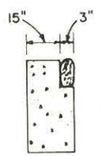
GRID DETAIL
(Stone not shown)

SECTION B-B THRU COMPLETED WALL

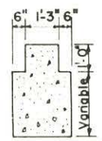


* Spacing of Weepholes shall not exceed 15 ft. C to C

SECTION C-C



SECTION D-D



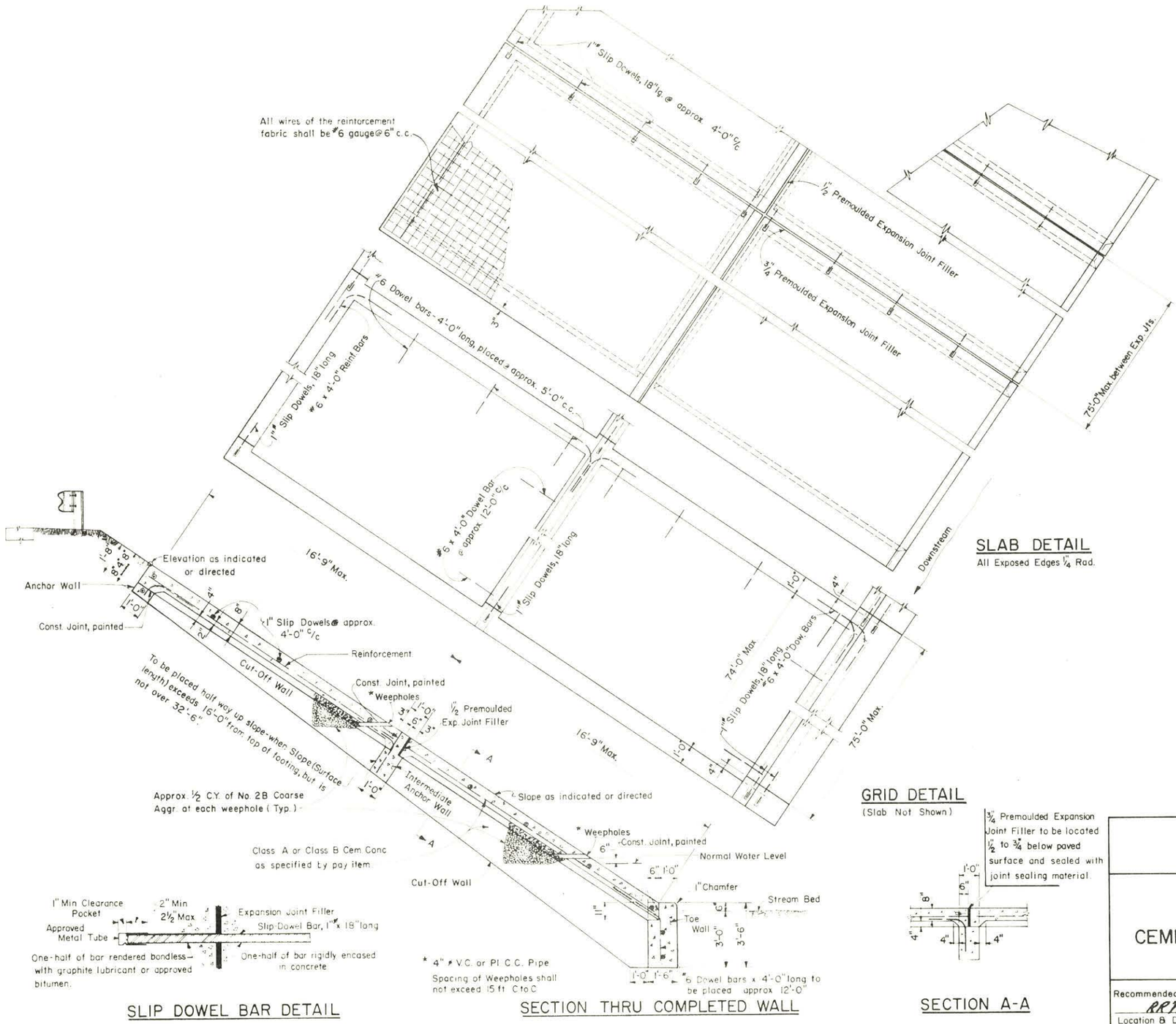
SECTION A-A

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SPECIAL MORTARED STONE SLOPE WALL

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
A R Musser	W J. Power	RC-41
Location & Design Engineer	Deputy Chief Hwy. Engr.	

7283 © PBL-2 POLYCHROME CORPORATION



SLAB DETAIL
All Exposed Edges 1/4 Rad.

SLIP DOWEL BAR DETAIL

SECTION THRU COMPLETED WALL

GRID DETAIL
(Slab Not Shown)

3/4 Premoulded Expansion Joint Filler to be located 1/2 to 3/4 below paved surface and sealed with joint sealing material.

SECTION A-A

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

REINFORCED CEMENT CONCRETE SLOPE WALL

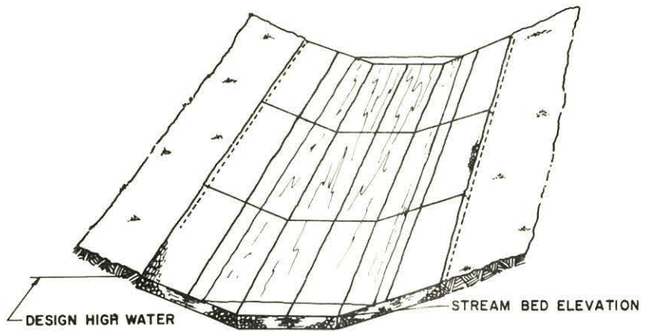
Recommended Dec. 1, 1971
R R Musser
Location & Design Engineer

Approved Dec. 6, 1971
W. J. Ravor
Deputy Chief Hwy. Engr

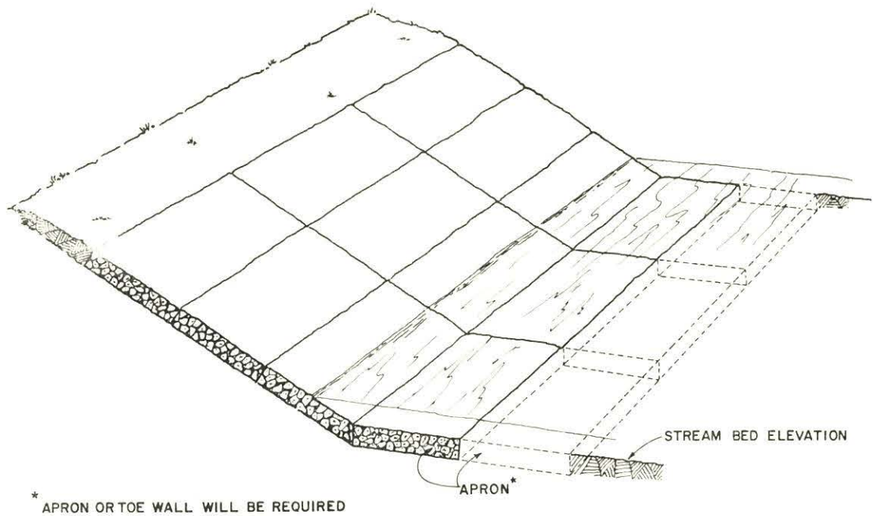
Sht. 1 Of 1

RC-42

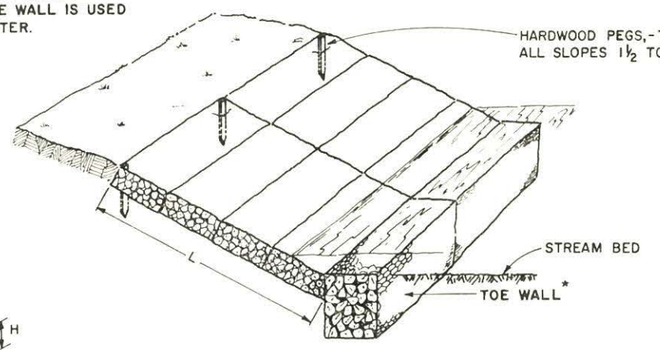
FORM 4837 REV. 7-68

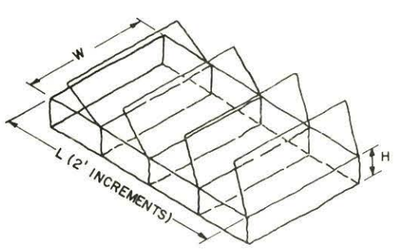


CHANNEL LINING

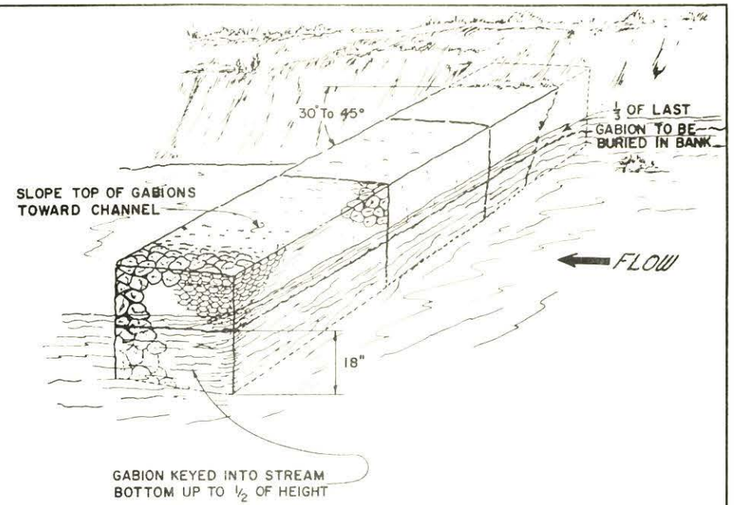


* APRON OR TOE WALL WILL BE REQUIRED WHERE THE SLOPE WALL IS USED ADJACENT TO WATER.



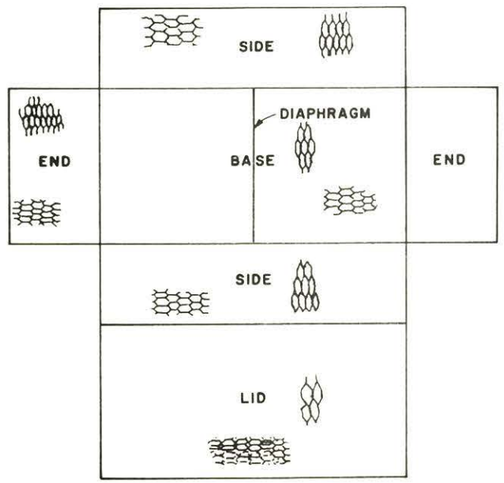


SLOPE WALLS

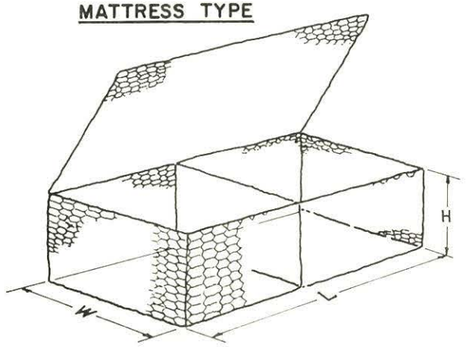


CHANNEL DEFLECTOR

- Type A Gabions shall consist of wire baskets filled by hand placement of coarse aggregate at least along the exposed faces for a uniform appearance.
- Type B Gabions shall consists of wire baskets filled completely with small power equipment or by hand.
- Corrosion Resistant Type A and B Gabions shall be the same as Type A and B Gabions except that the basket wire shall be sheathed in poly-vinyl chloride plastic.



MATTRESS TYPE



WIRE MESH BASKETS

GABIONS		
W	H	L
3'-3"	3'-3"	6'-6"
3'-3"	3'-3"	9'-9"
3'-3"	3'-3"	13'-1"
3'-3"	1'-8"	6'-6"
3'-3"	1'-8"	9'-9"
3'-3"	1'-8"	13'-1"
3'-3"	1'-0"	6'-6"
3'-3"	1'-0"	9'-9"
3'-3"	1'-0"	13'-1"
GABION (MATTRESS)		
6'-6"	6"	8'-0"
6'-6"	6"	10'-0"
6'-6"	6"	12'-0"
6'-6"	10" #	8'-0"
6'-6"	10" #	10'-0"
6'-6"	10" #	12'-0"

9" For Corrosion Resistant

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

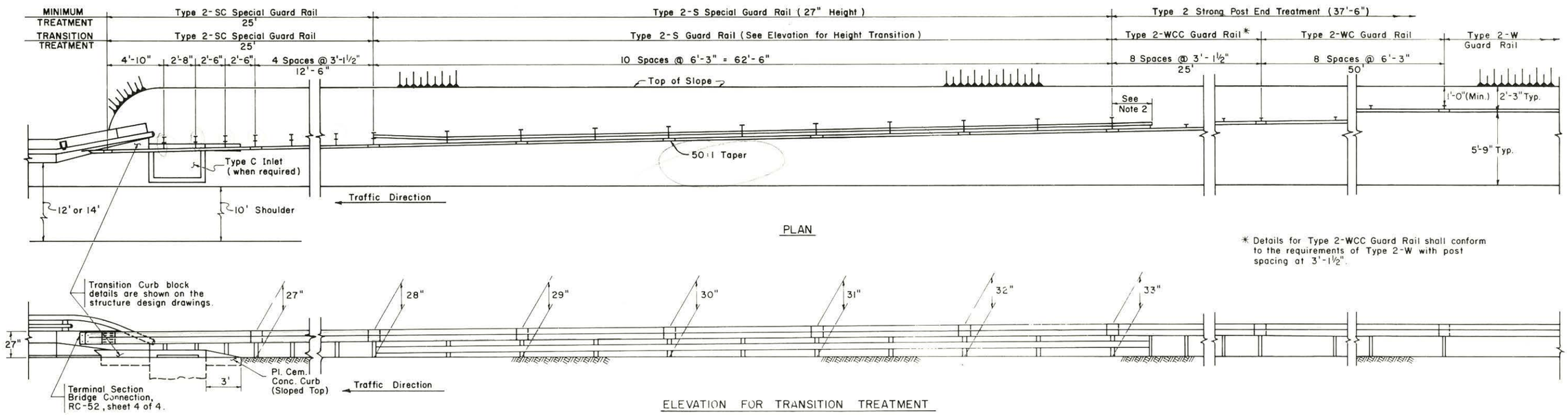
GABIONS

Recommended Mar. 7, 1973
Director, Bureau of Design

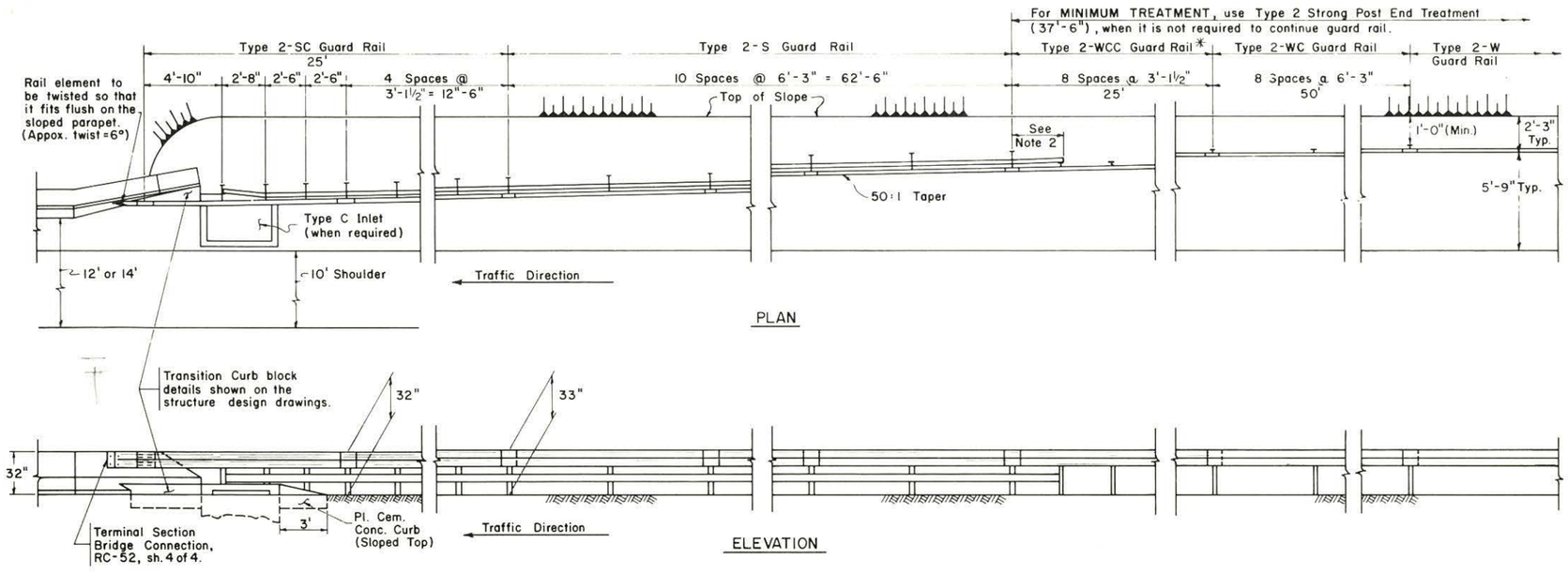
Approved Mar. 7, 1973
Deputy Chief Hwy Engr.

Sht. 1 Of 1

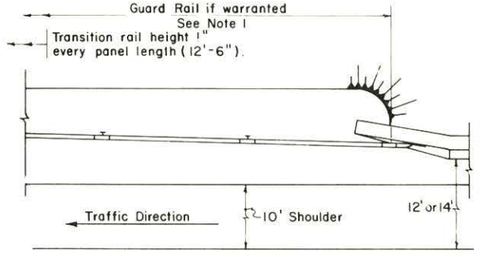
RC-43



APPROACH END GUARD RAIL TRANSITION AT SLOPED CURB PARAPET
(27" Height)



APPROACH END GUARD RAIL TRANSITION AT SLOPED PARAPET
(32" Height)



TRAILING END GUARD RAIL AT STRUCTURE PARAPET FOR DIVIDED HIGHWAY WHERE REQUIRED
(See Note 1)

NOTES

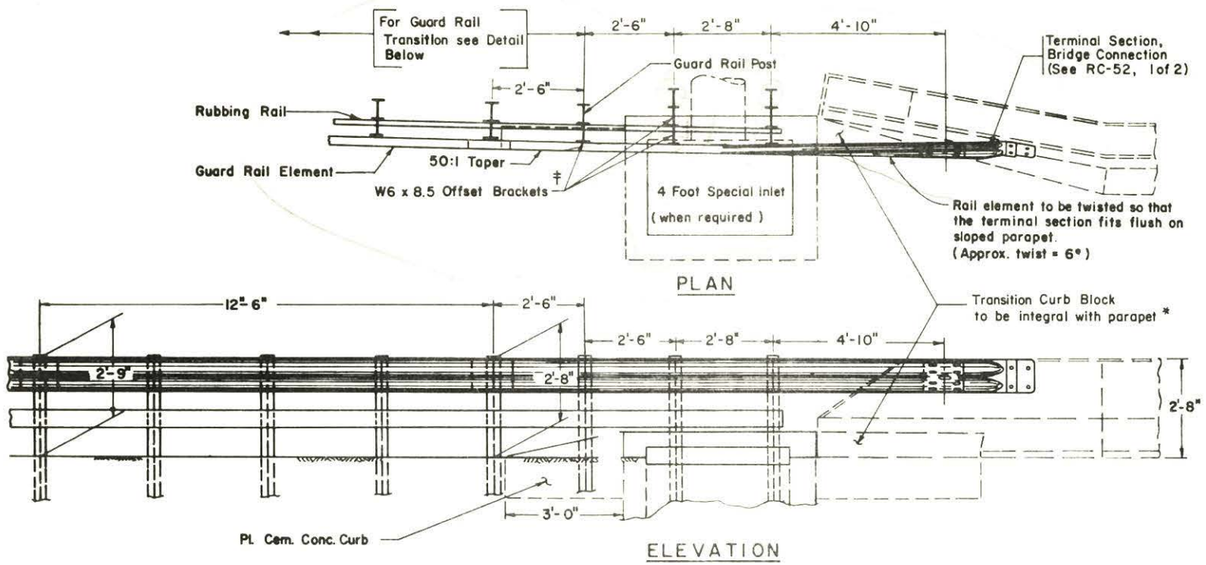
1. Approach End Guard Rail Treatment should be provided at both the Approach and Trailing Ends of Structure Parapets on two lane facilities with two way traffic. On four lane divided highways guard rail is not required on trailing ends of parapets unless warranted by other obstructions.
2. This length of the Rubbing Rail is not to be included as part of the Type 2-WCC Guard Rail and should be incidental to the Type 2-S Guard Rail pay item.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

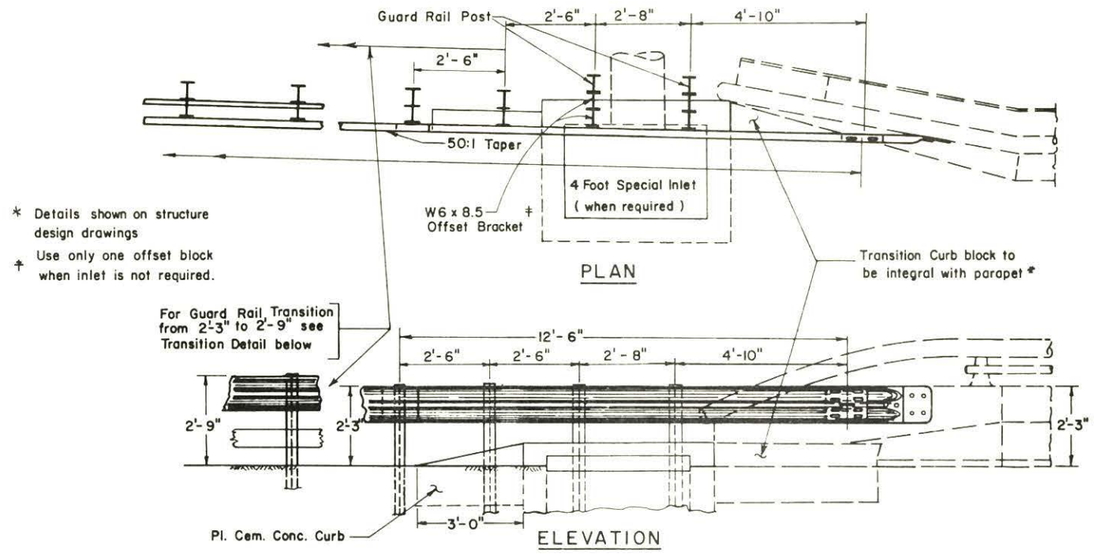
GUARD RAIL TRANSITION AT END OF STRUCTURES

Recommended June 1, 1976	Approved June 1, 1976	Sht. 1 Of 1
B.O. Rourkie, Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-50

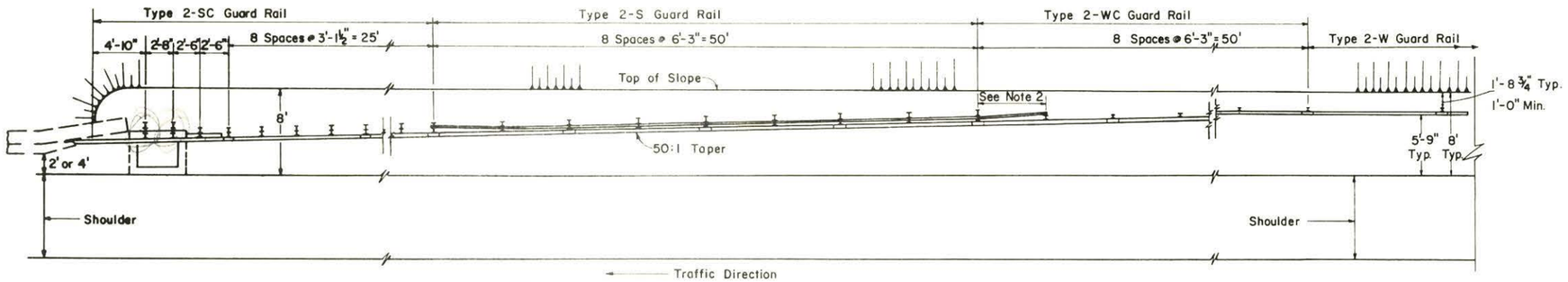
TRACED BY
FINAL BY



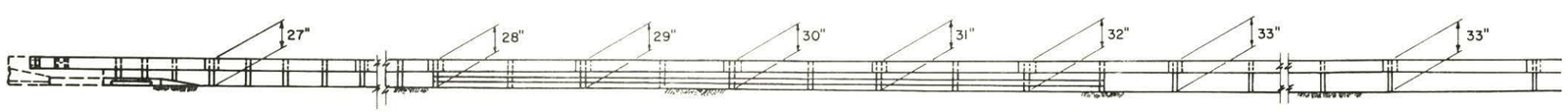
SLOPED PARAPET



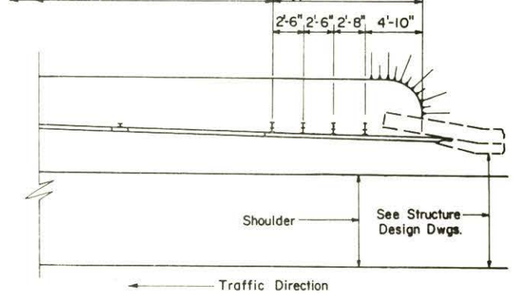
SLOPED CURB PARAPET



PLAN (SLOPED PARAPET & SLOPED CURB PARAPET)



ELEVATION (SLOPED CURB PARAPET)



NOTES:

1. Approach Guard Rail Treatment should be provided at both the Approach and Trailing Ends of Structure Parapets on two lane facilities with two way traffic.
2. This length of the Rubbing-rail is not to be included as part of the Type 2-WC Guard Rail and should be included as part of the Type 2-S Guard Rail pay item.

GUARD RAIL TRANSITION AT STRUCTURE PARAPET

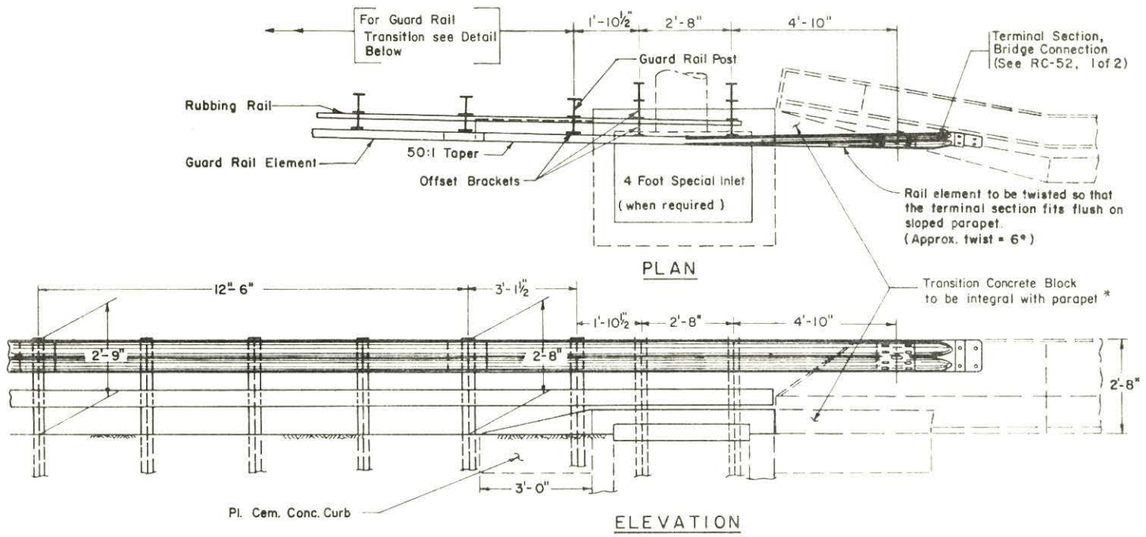
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUARD RAIL CONNECTION AT END OF STRUCTURES

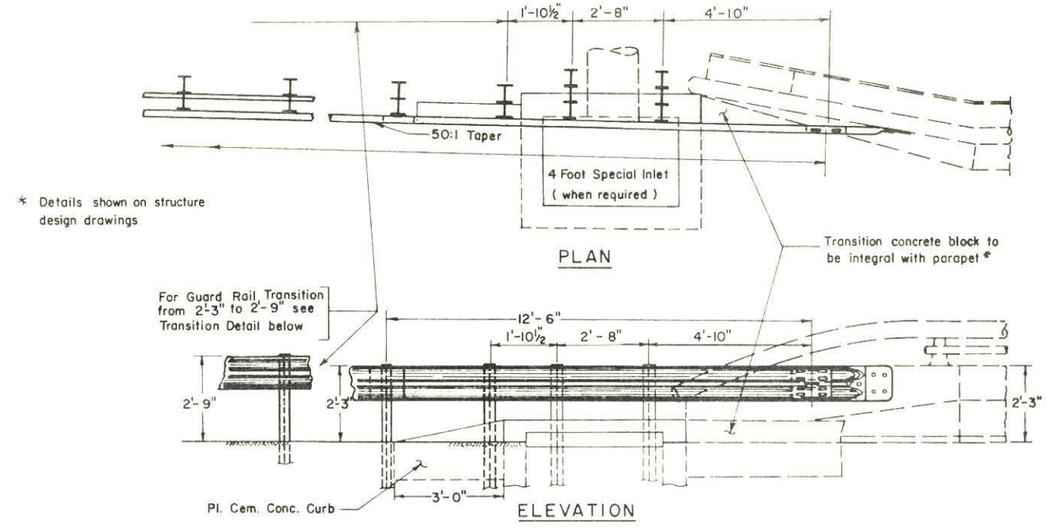
Recommended Mar. 7, 1973	Approved Mar. 7, 1973	Sht. 1 of 1
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-50

TRACED BY
FINAL BY

VOID by Change No. 7

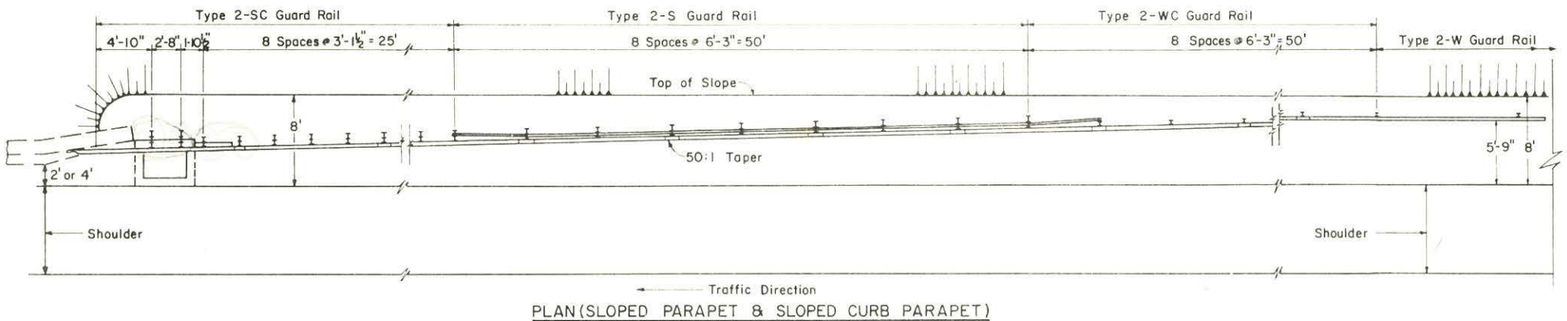


SLOPED PARAPET



* Details shown on structure design drawings

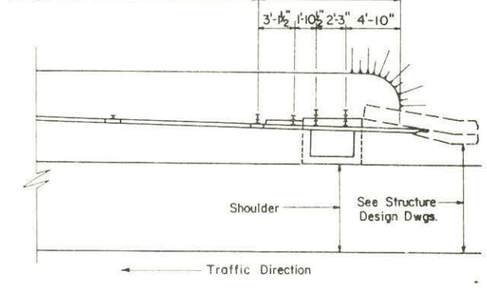
SLOPED CURB PARAPET



PLAN (SLOPED PARAPET & SLOPED CURB PARAPET)



ELEVATION (SLOPED CURB PARAPET)



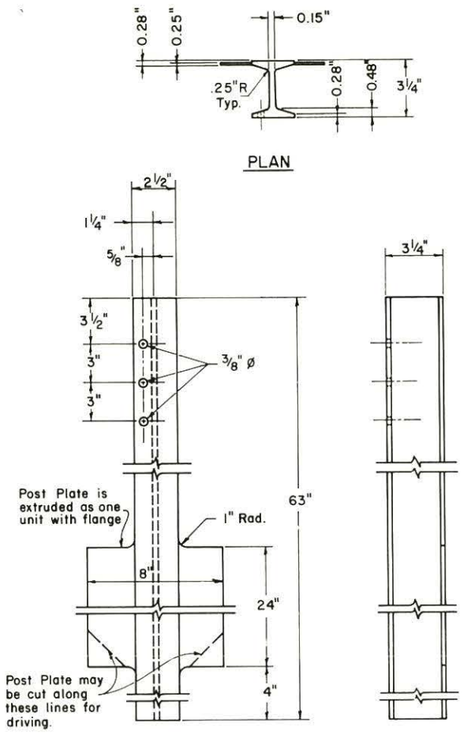
GUARD RAIL TRANSITION AT STRUCTURE PARAPET

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

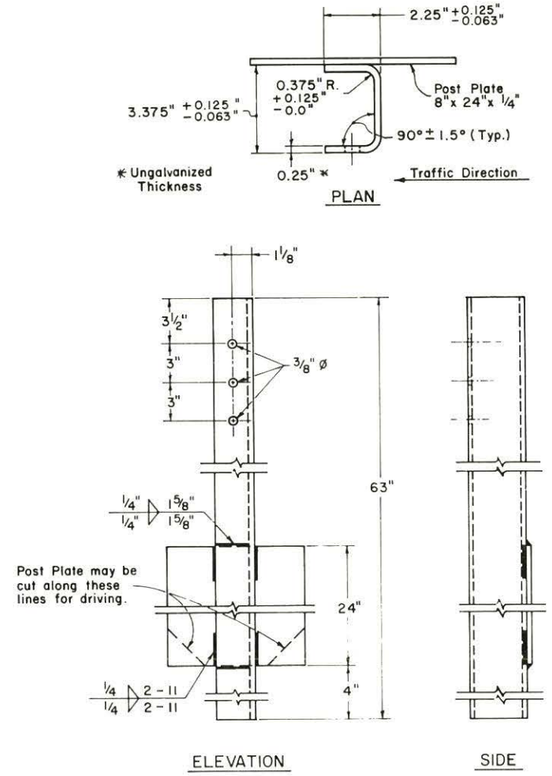
GUARD RAIL CONNECTION AT END OF STRUCTURES

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
R R Meeder	W. J. Ravas	RC-50
Location & Design Engineer	Deputy Chief Hwy. Engr.	

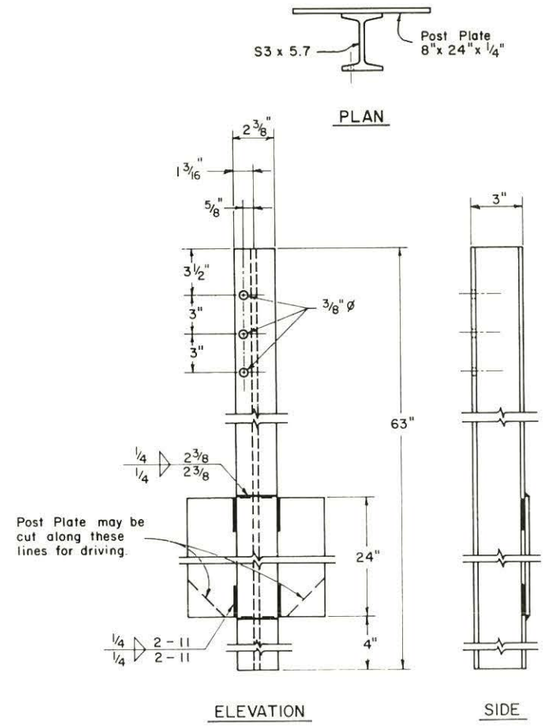
VOIDED BY CHANGE #1



ALUMINUM ALLOY POST

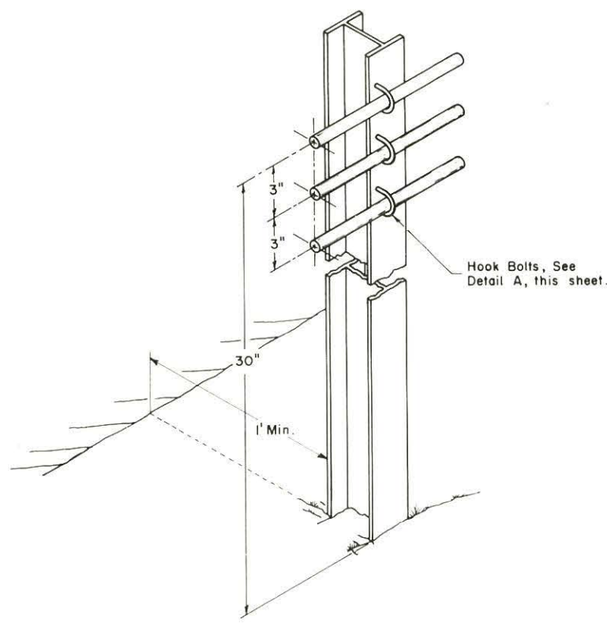


3⅜" x 2¼" COLD FORMED CHANNEL POST



S3 x 5.7

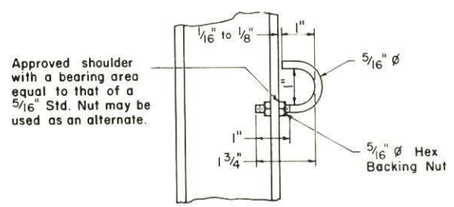
TYPE I-W GUARD RAIL POSTS



TYPICAL INSTALLATION

NOTES

1. All materials shall conform to the requirements of Form 408.
2. The 3⅜" x 2¼" cold formed channel post, S3 x 5.7 post and aluminum alloy post may be bid as alternatives for Type I Weak Post Guard Rail System. However, mixing of different posts will not be acceptable within a project.



DETAIL A
5/16" HOOK BOLT

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE I WEAK POST GUARD RAIL

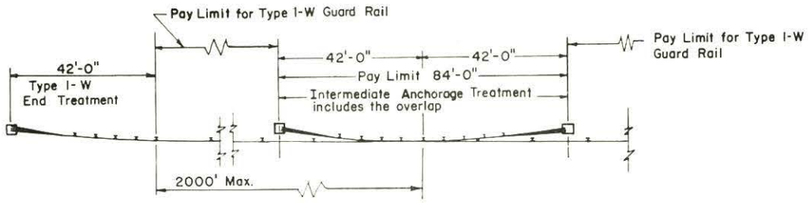
Recommended June 1, 1976
Director, Bureau of Design

Approved June 1, 1976
Deputy Chief Hwy. Engr.

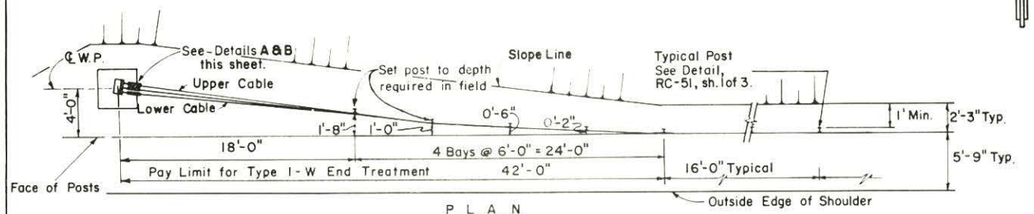
Sht. 1 Of 3

RC-51

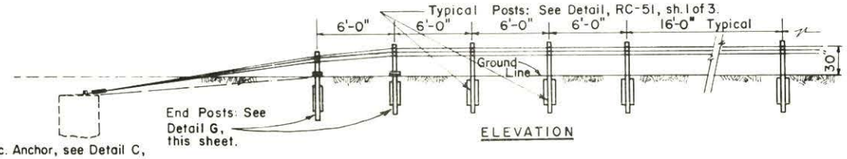
TRACED BY
FINAL BY



SKETCH OF TYPICAL LAYOUT
(PLAN)

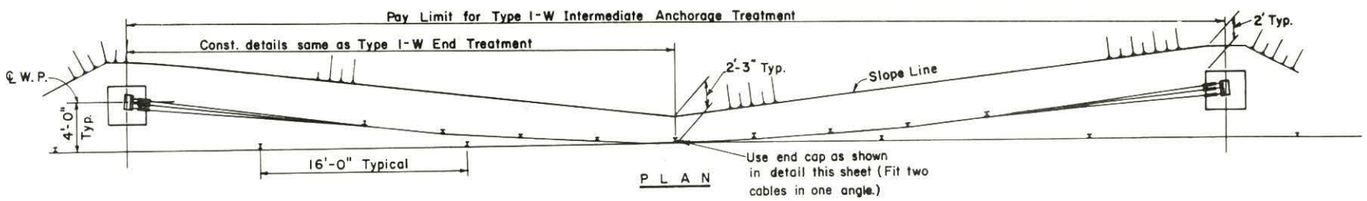


PLAN

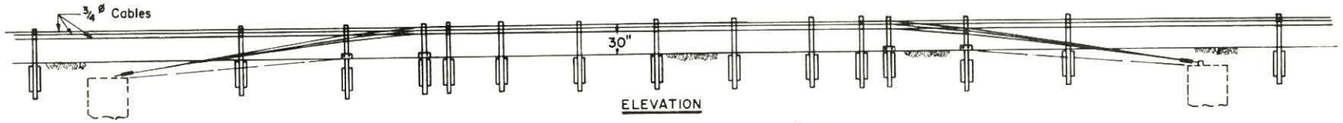


ELEVATION

TYPE 1-W END TREATMENT

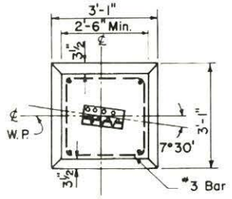


PLAN

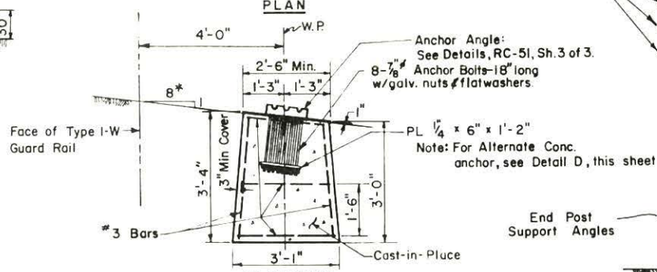


ELEVATION

TYPICAL INTERMEDIATE ANCHORAGE TREATMENT



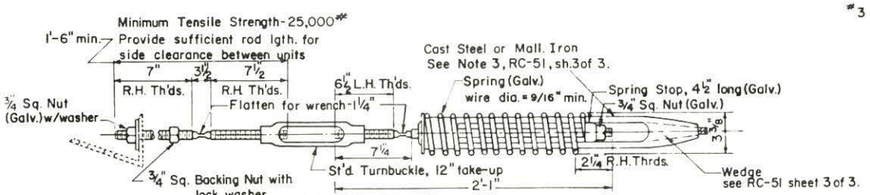
PLAN



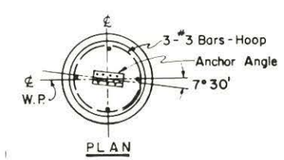
ELEVATION

DETAIL C
CONCRETE ANCHOR

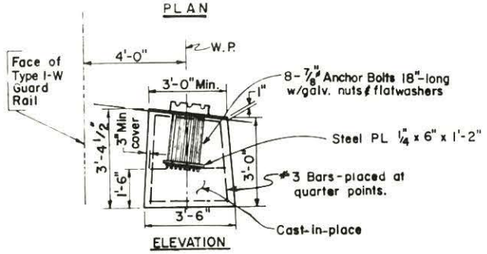
* can be varied
if warranted



DETAIL A
SPRING CABLE END ASSEMBLY
(COMPENSATING DEVICE)

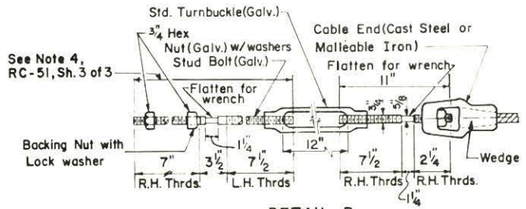


PLAN

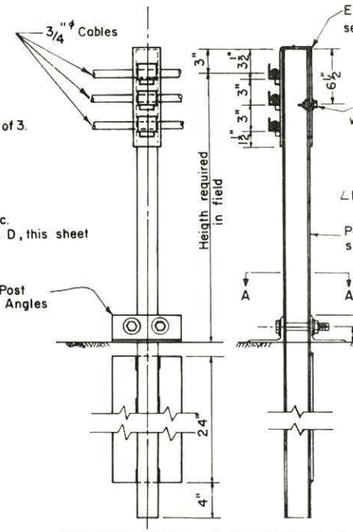


ELEVATION

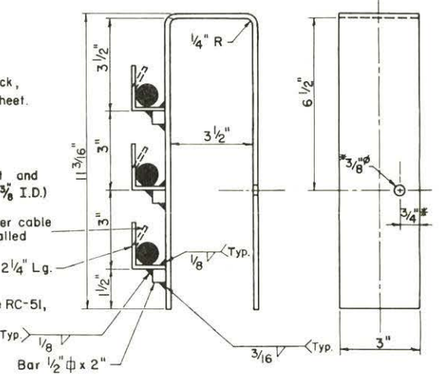
DETAIL D
ALTERNATE CONC. ANCHOR



DETAIL B
STEEL TURNBUCKLE CABLE END ASSEMBLY

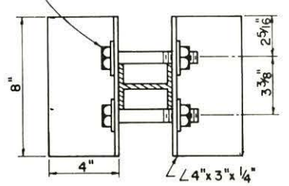


TYPICAL END POST DETAIL G



END CAP

* 3/8" Ø hole to be located on ℄ for Channel Post.



SECTION A-A

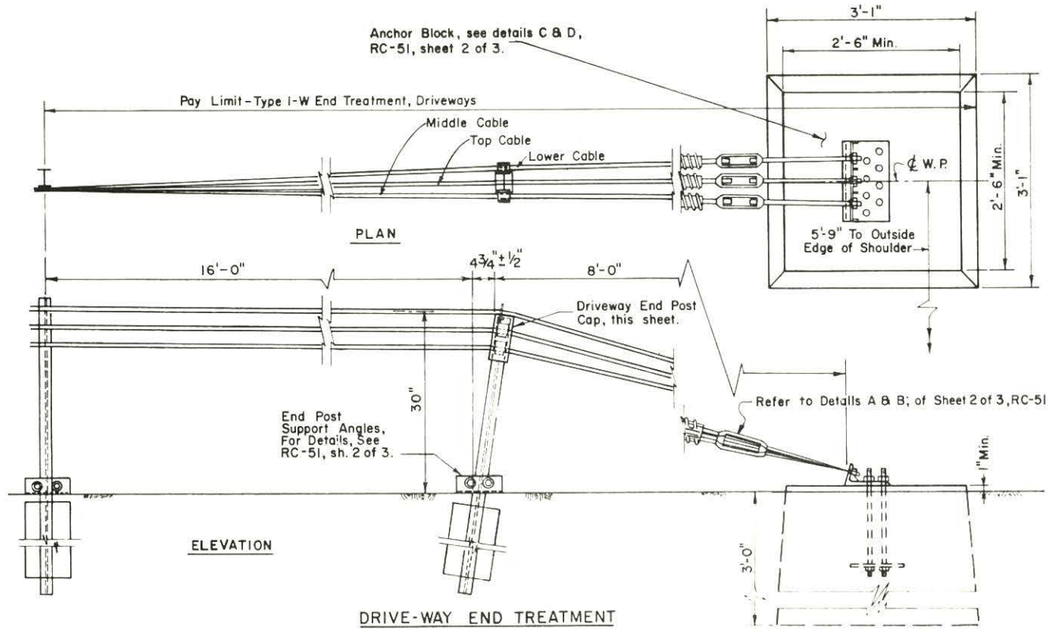
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 1 WEAK POST GUARD RAIL

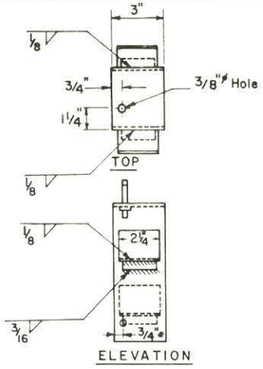
Recommended June 1, 1976
B.O. Rowsbie
Director, Bureau of Design

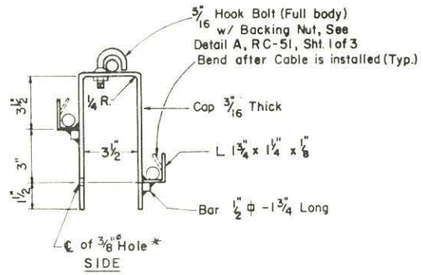
Approved June 1, 1976
Robert R. Mason
Deputy Chief Hwy. Engr.

Sht. 2 of 3
RC-51



DRIVE-WAY END TREATMENT





DRIVEWAY END POST CAP

* For Channel Post, 3/8" ∅ hole to be located on ℄.

NOTES

1. The following criteria shall apply for arrangement of Spring Cable End Assemblies and Turnbuckle Cable End Assemblies:

   Length of Cable Runs:
   To 1000'- Use Compensating Device on one end, and Turnbuckle on other end of each individual cable.
   Over 1000' to 2000'- Use Compensating Device & Turnbuckle on each end of each individual cable.
   Over 2000'- Start new Stretch by overlapping at last parallel post. (See Typical layout Sketch)

2. Fittings: All fittings shall be so designed and be of such section as to develop the full strength of a single cable or cable assemblies, as the case may be.
   Single Cable End Assembly - Min. Tensile Strength = 25,000 Lbs.

   All fittings shall be galvanized according to ASTM, A153.

3. Material indicated as "Cast Steel" shall conform to AASHTO-M103, or ASTM-A27, that indicated as "Malleable Iron" shall conform to AASHTO-M106 or ASTM-A47. Reference should be made to Form 409 for details.

4. Designs for a combination or single unit compensating device and turnbuckle assembly may be submitted for approval.

5. Hook bolts, as installed, shall develop an ultimate pull open strength of from 500 Lbs. to 1000 Lbs. applied in a direction normal to the longitudinal axis of the post.

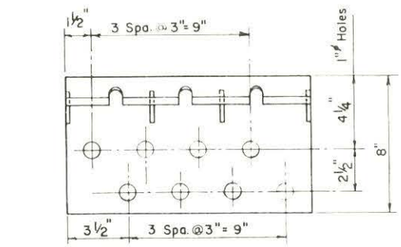
6. At all locations where the cable is connected to a cable socket with a wedge type connection, one wire of the wire rope shall be crimped over the base of the wedge to hold it firmly in place.

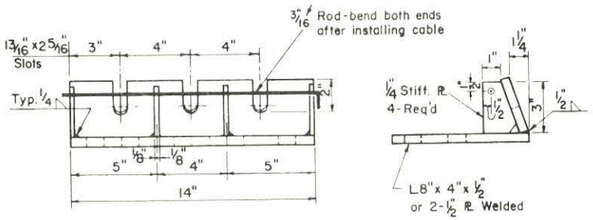
7. Compensating devices must have a spring rate of 450± 50 lbs. per inch and a total available "throw" of 6" min.

8. The cable tension shall be controlled by the following table:

Temp. range-	120° To 100°	99° To 80°	79° To 60°	59° To 40°	39° To 20°	19° To 0°	-1° To -20°
Spring Compression from unloaded position in each spring	1"	1½"	2"	2½"	3"	3½"	4"

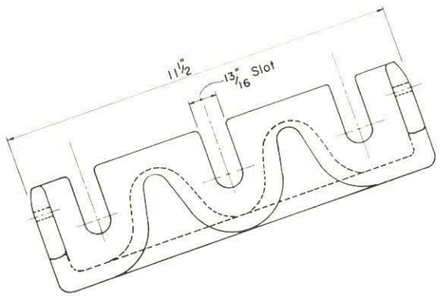
9. Alternate designs may be submitted for approval.
10. Installation of delineator assemblies shall be done under a separate pay item or contract. See Traffic Standard TC-7709, sheet 3 of 4.
11. Guard Rail over underground structures shall be constructed as shown on RC-53, sheet 1 of 2.





CABLE ANCHOR ANGLE

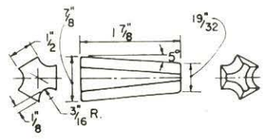
See Note 9.



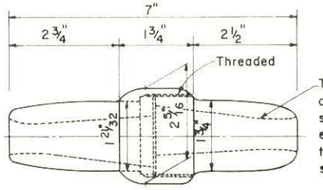
ALTERNATE CABLE ANCHOR ANGLE CASTING

(Malleable Iron)

See Note 9.



WEDGE DETAIL



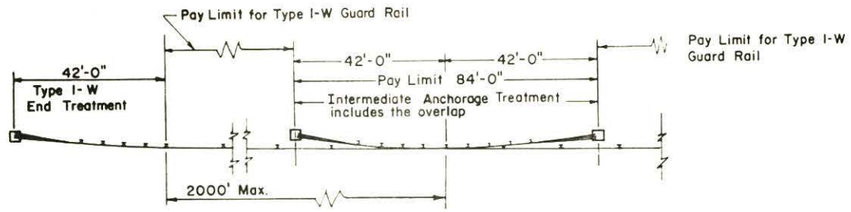
The shape and size of the core shall be so designed as to enable the use of the wedge detail shown in this drawing.

CABLE SPLICE

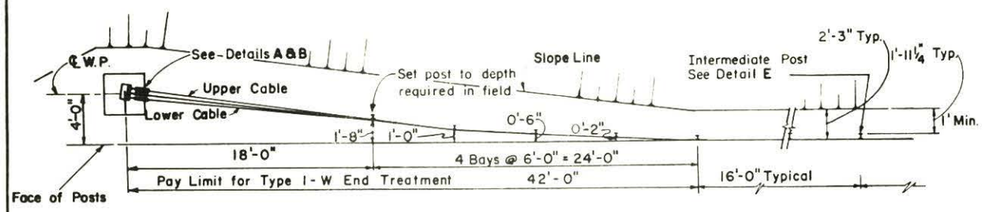
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 1 WEAK POST GUARD RAIL

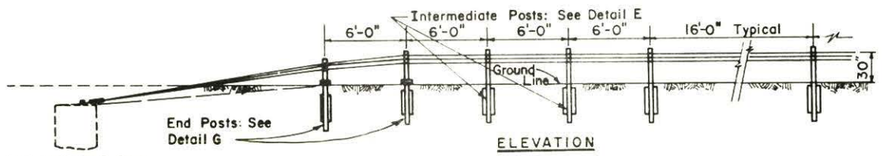
Recommended June 1, 1976	Approved June 1, 1976	Sht. 3 of 3
A.D. Rousakis	Robert R. Mease	RC-51
Director, Bureau of Design	Deputy Chief Hwy. Engr.	



SKETCH OF TYPICAL LAYOUT
(PLAN)



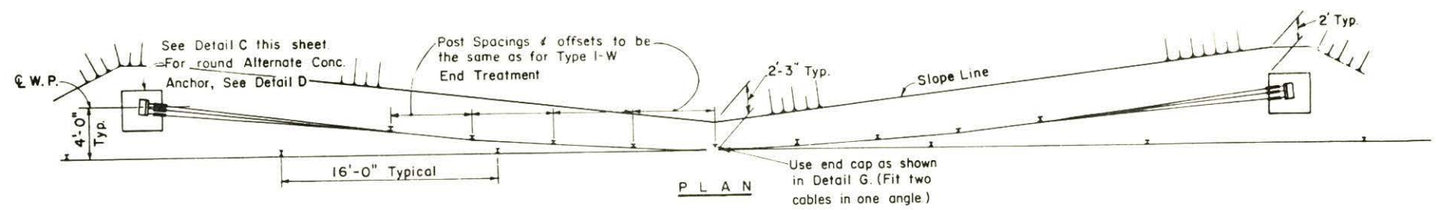
PLAN



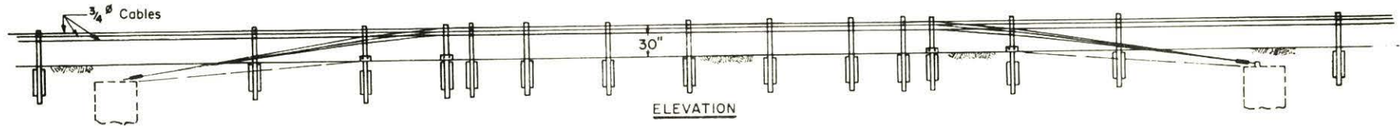
ELEVATION

TYPE I-W END TREATMENT

Conc. Anchor, Class B Conc.
See Detail C. Alternate
Concrete anchor as per Detail D.

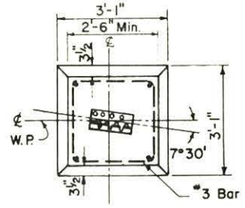


PLAN

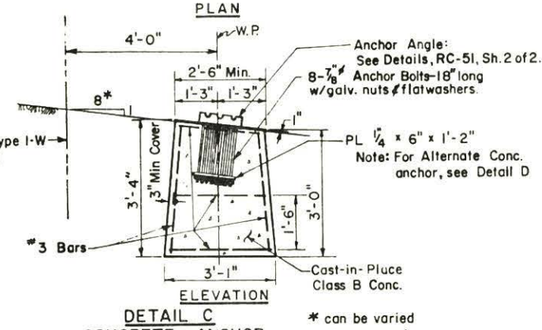


ELEVATION

TYPICAL INTERMEDIATE ANCHORAGE TREATMENT



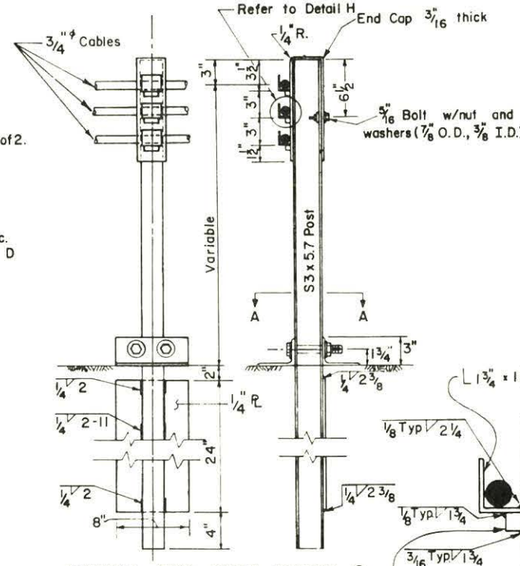
PLAN



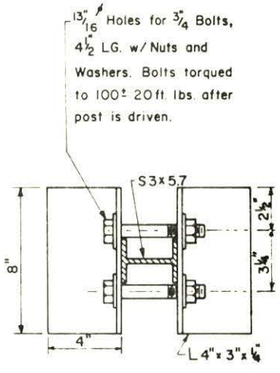
ELEVATION

DETAIL C
CONCRETE ANCHOR

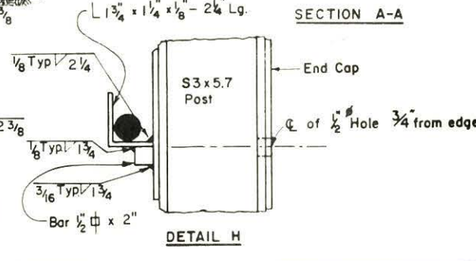
* can be varied
if warranted



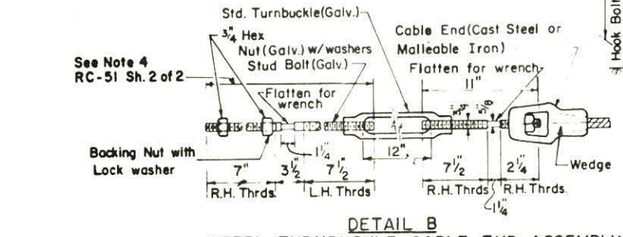
TYPICAL END POST DETAIL G



SECTION A-A



DETAIL H

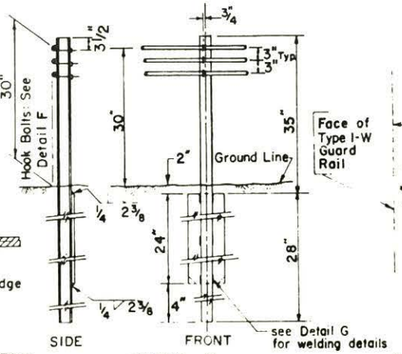


DETAIL A
SPRING CABLE END ASSEMBLY
(COMPENSATING DEVICE)

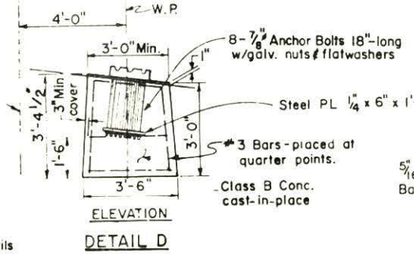


PLAN

DETAIL B
STEEL TURNBUCKLE CABLE END ASSEMBLY

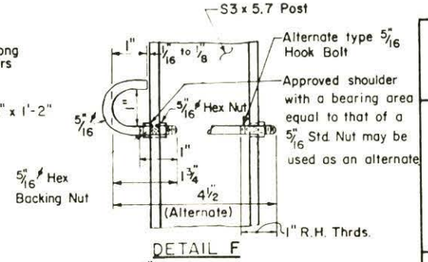


DETAIL E
INTERMEDIATE POST
S3x5.7



ELEVATION

DETAIL D
ALTERNATE CONC. ANCHOR



DETAIL F
5/16" HOOK BOLT

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

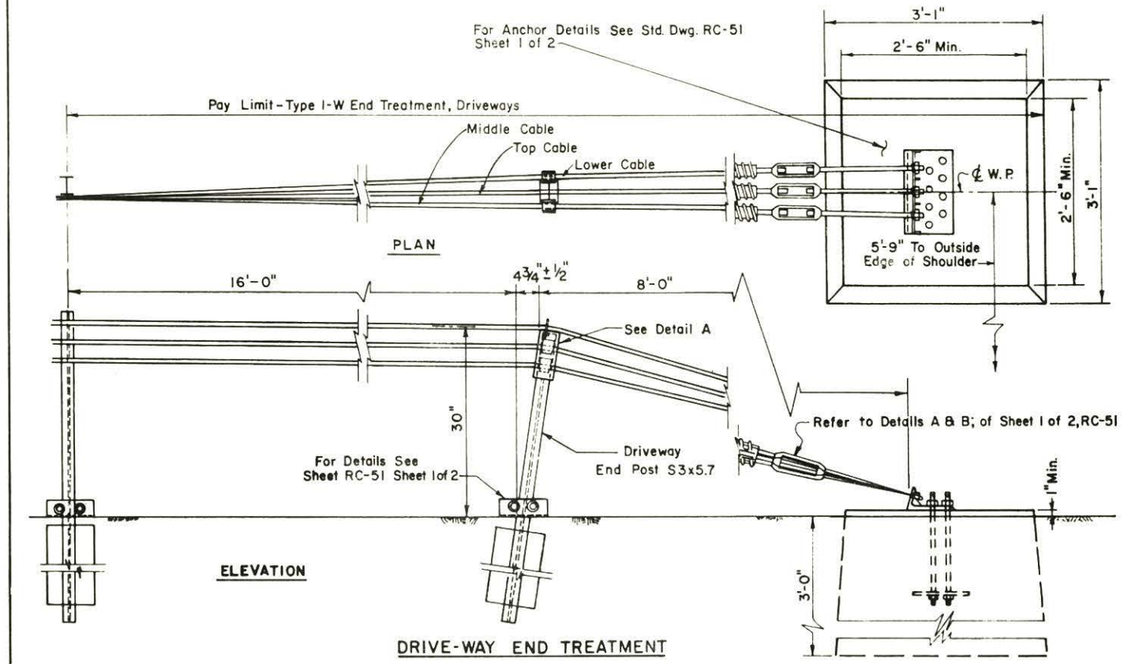
TYPE I-W GUARD RAIL

Recommended Mar. 7, 1973
Director, Bureau of Design

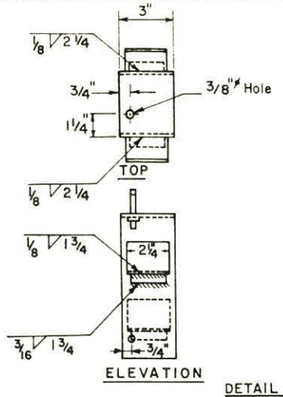
Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

Sht. 1 of 2
RC-51

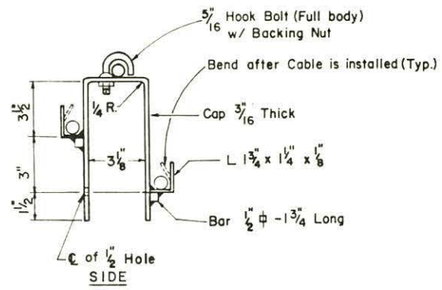
VOIDED BY
CHANGE #7



DRIVE-WAY END TREATMENT



DETAIL A



DRIVEWAY END POST CAP

NOTES

1. The following criteria shall apply for arrangement of Spring Cable End Assemblies and Turnbuckle Cable End Assemblies:

   Length of Cable Runs:
   To 1000' - Use Compensating Device on one end, and Turnbuckle on other end of each individual cable.
   Over 1000' to 2000' - Use Compensating Device & Turnbuckle on each end of each individual cable.
   Over 2000' - Start new Stretch by overlapping at last parallel post. (See Typical layout Sketch)

2. Fittings: All fittings shall be so designed and be of such section as to develop the full strength of a single cable or cable assemblies, as the case may be.
   Single Cable End Assembly - Min. Tensile Strength = 25,000 Lbs.

   All fittings shall be galvanized according to ASTM, A153.

3. Material indicated as "Cast Steel" shall conform to AASHO-M103, or ASTM-A27, that indicated as "Malleable Iron" shall conform to AASHO-M106 or ASTM-A47. Reference should be made to Form 409 for details.

4. Designs for a combination or single unit compensating device and turnbuckle assembly may be submitted for approval.

5. Hook bolts, as installed, shall develop an ultimate pull open strength of from 500 Lbs. to 1000 Lbs. applied in a direction normal to the longitudinal axis of the post.

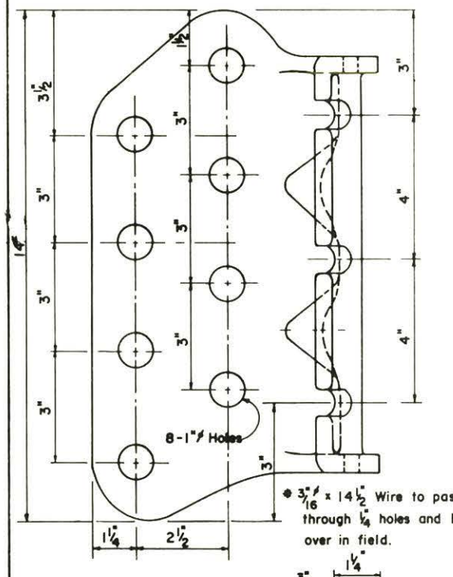
6. At all locations where the cable is connected to a cable socket with a wedge type connection, one wire of the wire rope shall be crimped over the base of the wedge to hold it firmly in place.

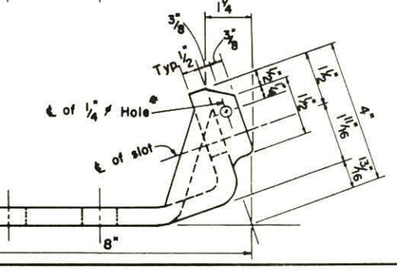
7. Compensating devices must have a spring rate of 450± 50 lbs. per inch and a total available "throw" of 6" min.

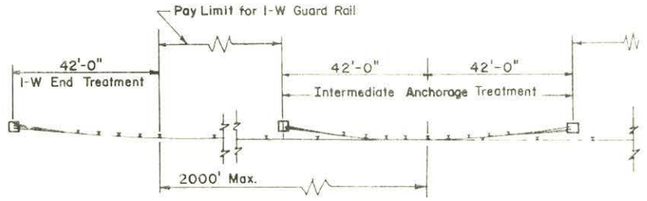
8. The cable tension shall be controlled by the following table:

Temp. range-	120° To 100°	99° To 80°	79° To 60°	59° To 40°	39° To 20°	19° To 0°	-1° To -20°
Spring Compression from unloaded position in each spring	1"	1½"	2"	2½"	3"	3½"	4"

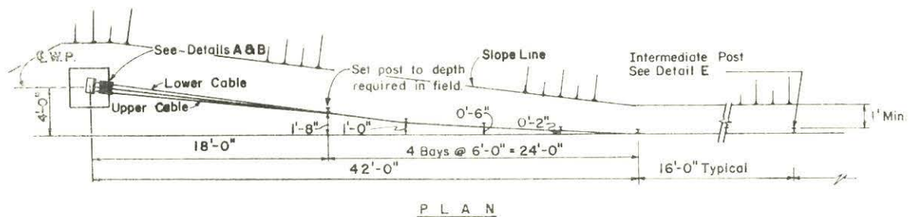
† Alternate designs may be submitted for approval.



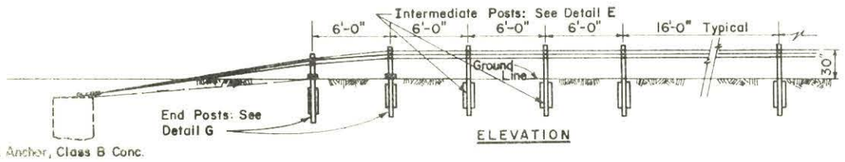

1¼"
3/8"
3/8"
Typ. ½"
℄ of ¼" ϕ Hole
℄ of slot
1½"
1½"
1½"



SKETCH OF TYPICAL LAYOUT
(PLAN)



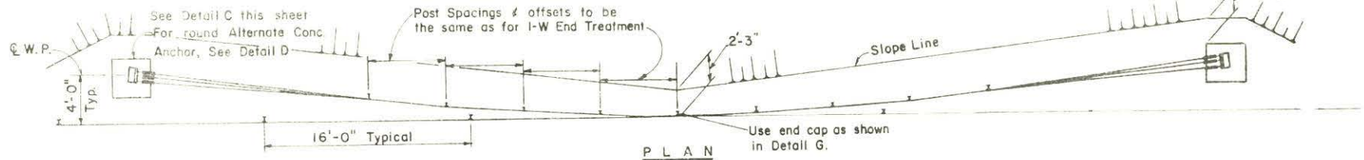
PLAN



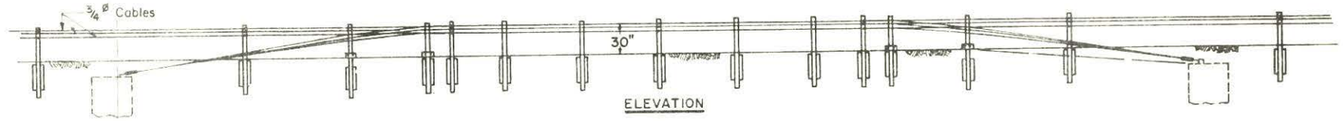
ELEVATION

Conc. Anchor, Class B Conc.
See Detail C . Alternate
Concrete anchor as per Detail D.

TYPE I-W END TREATMENT

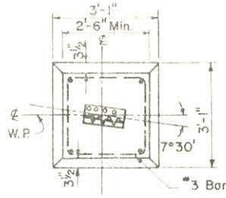


PLAN

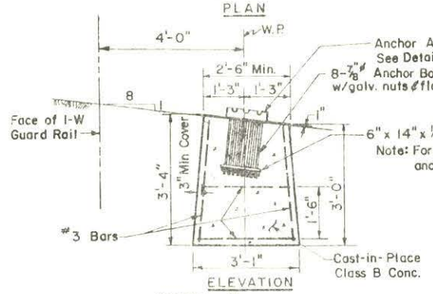


ELEVATION

TYPICAL INTERMEDIATE ANCHORAGE TREATMENT

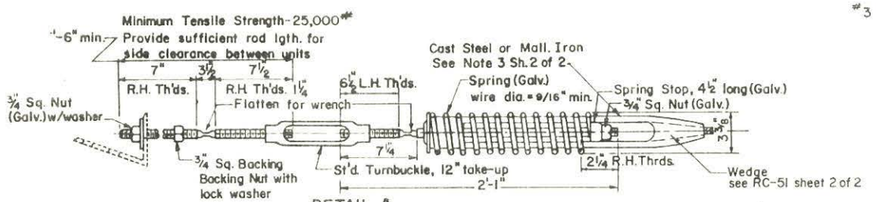


PLAN

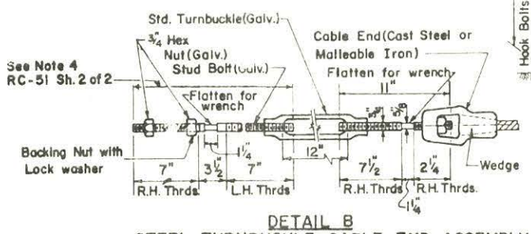


ELEVATION

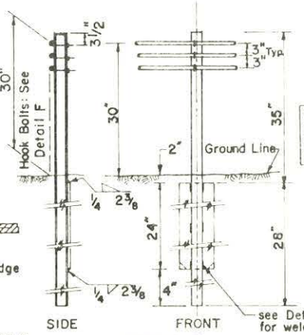
DETAIL C
CONCRETE ANCHOR



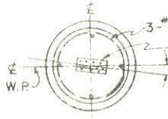
DETAIL A
SPRING CABLE END ASSEMBLY
(COMPENSATING DEVICE)



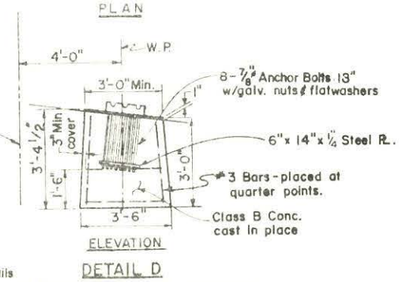
DETAIL B
STEEL TURNBUCKLE CABLE END ASSEMBLY



DETAIL E
INTERMEDIATE POST
S3x5.7

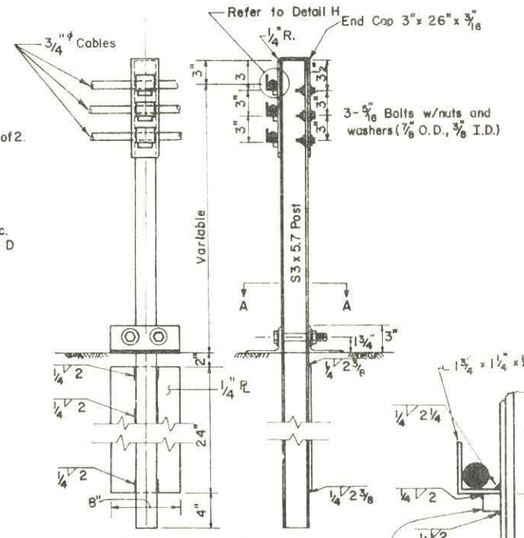


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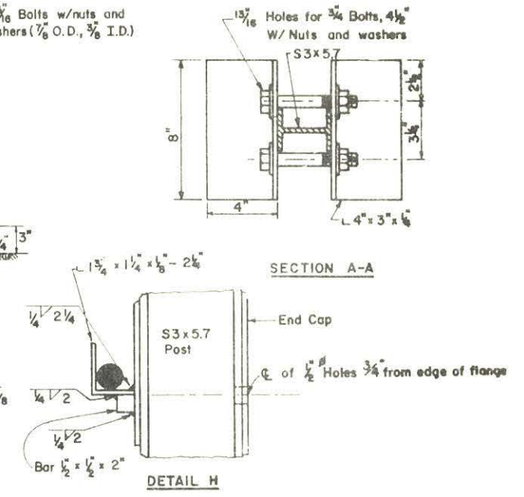


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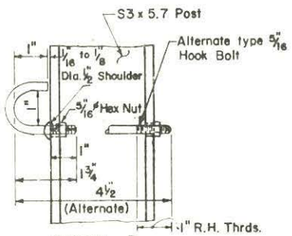
DETAIL D
ALTERNATE CONC. ANCHOR



TYPICAL END POST DETAIL G



DETAIL H



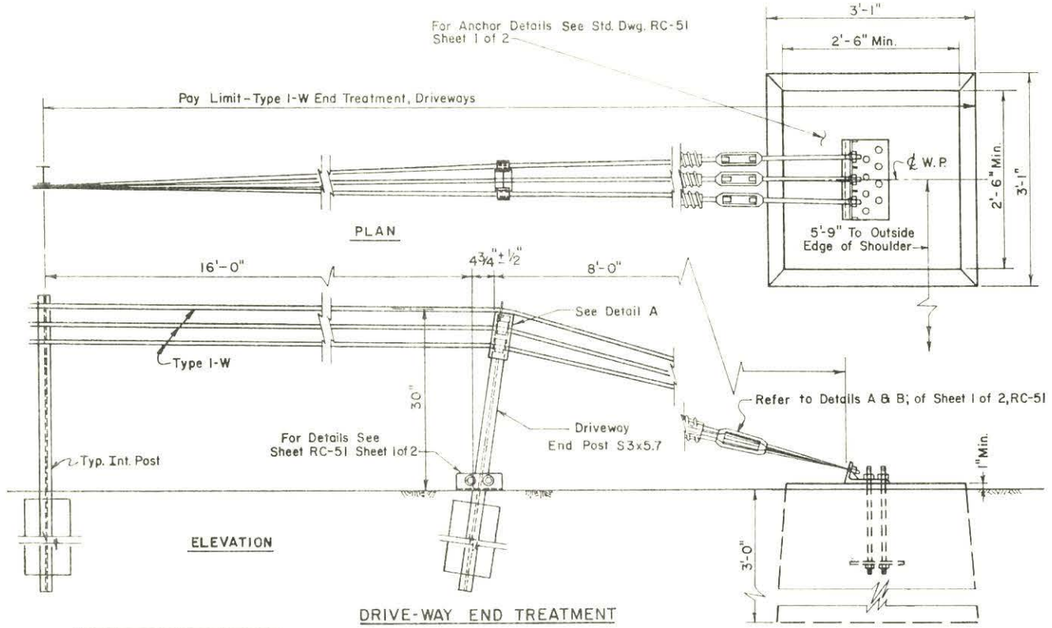
DETAIL F
5/16" HOOK BOLT

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

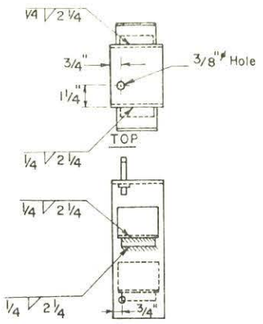
TYPE I-W GUARD RAIL

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 of 2
RR Mucsar	W.J. Raver	RC-51
Location & Design Engineer	Deputy Chief Hwy. Engr.	

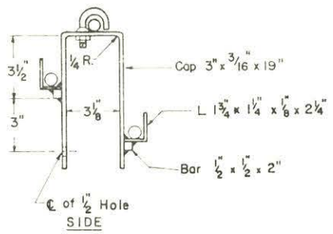
VOIDED BY CHANGE #1



DRIVE-WAY END TREATMENT

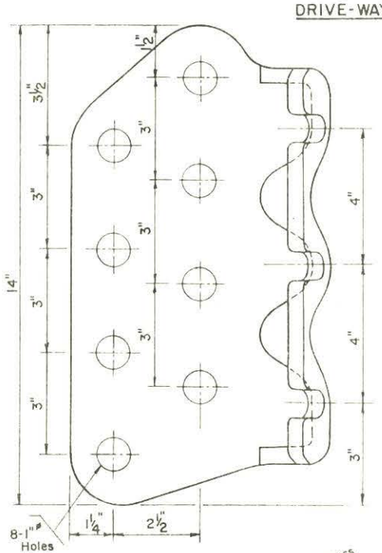


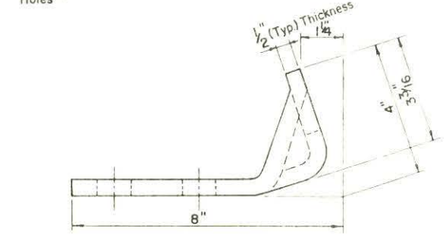
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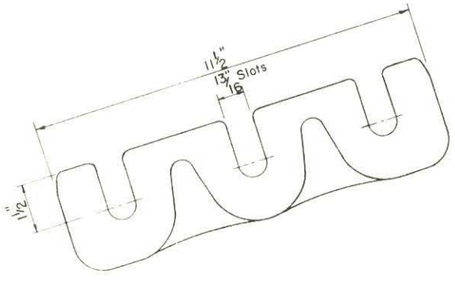


DETAIL A

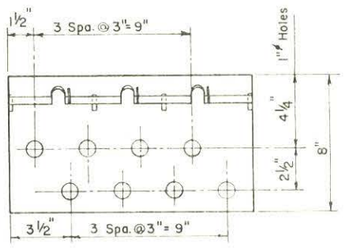
DRIVEWAY END POST CAP

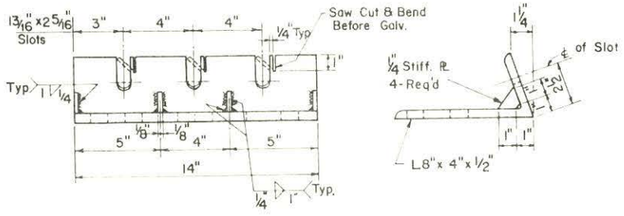




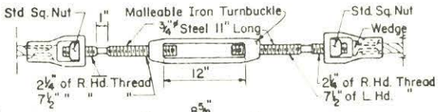


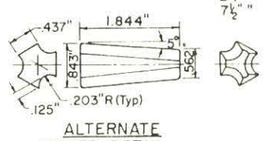
ALTERNATE CABLE ANCHOR ANGLE CASTING
(Malleable Iron)



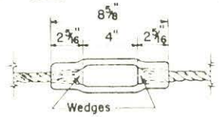


CABLE ANCHOR ANGLE





ALTERNATE WEDGE DETAIL



CABLE SPLICES

Note. Cable Splices and Cable Ends shall be positive and of any type and design coinciding with the intent, design and strength of the structure, and meeting with the approval of the engineer.

NOTES

1. The following criteria shall apply for arrangement of Spring Cable End Assemblies and Turnbuckle Cable End Assemblies:

   Length of Cable Runs:
   To 1000'- Use Compensating Device on one end, and Turnbuckle on other end of each individual cable.
   Over 1000' to 2000'- Use Compensating Device & Turnbuckle on each end of each individual cable.
   Over 2000'- Start new Stretch by overlapping at last parallel post. (See Typical layout Sketch)

2. Fittings: All fittings shall be so designed and be of such section as to develop the full strength of a single cable or cable assemblies, as the case may be.
   Single Cable End Assembly- Min. Tensile Strength = 25,000 Lbs.

   All fittings shall be galvanized according to ASTM, A153.

3. Material indicated as "Cast Steel" shall conform to AASHO-M103, or ASTM-A27, that indicated as "Malleable Iron" shall conform to AASHO-M106 or ASTM-A47. Reference should be made to Form 409 for details.

4. Designs for a combination or single unit compensating device and turnbuckle assembly may be submitted for approval.

5. Hook bolts, as installed, shall develop an ultimate pull open strength of from 500 Lbs. to 1000 Lbs. applied in a direction normal to the longitudinal axis of the post.

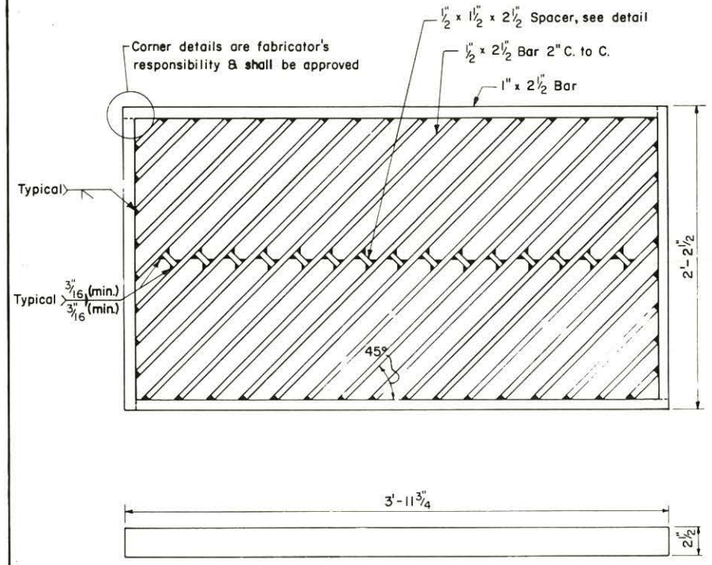
6. At all locations where the cable is connected to a cable socket with a wedge type connection, one wire of the wire rope shall be crimped over the base of the wedge to hold it finmly in place.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE I-W GUARD RAIL

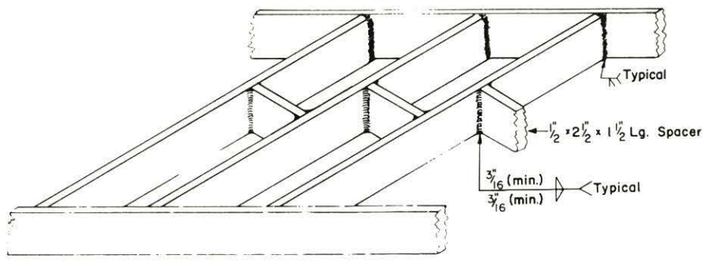
Recommended Dec. 1, 1971	Approved Dec. 6, 1971	Sht 2 Of 2
Location & Design Engineer	Deputy Chief Hwy Engr	RC-51

VOIDED BY CHANGE #1

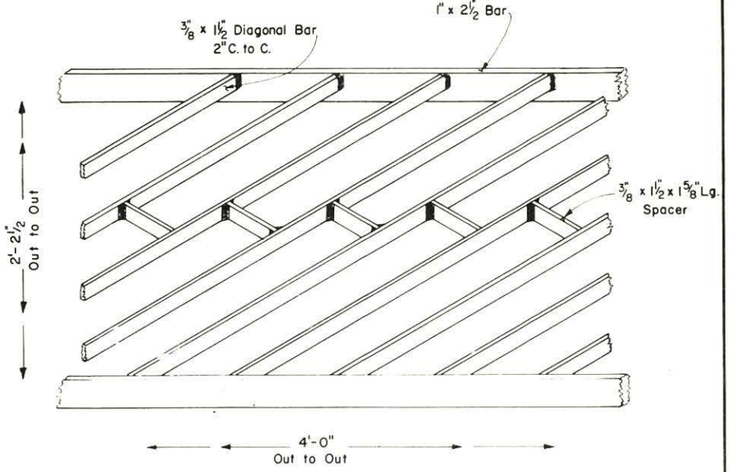


STRUCTURAL STEEL GRATE

24 bars

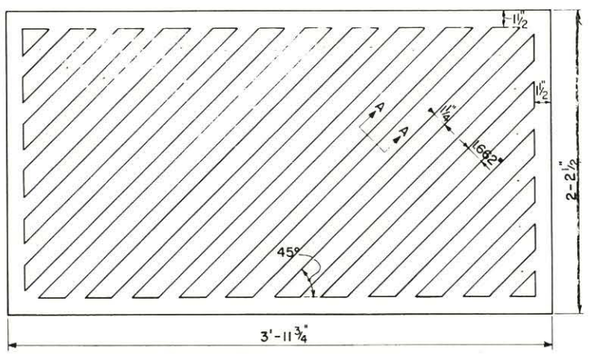


GRATE SPACER DETAIL



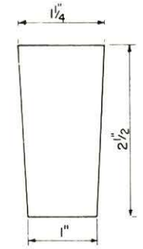
LIGHT-WEIGHT GRATE

(For use in Type M and S Inlets when located more than 30 feet from edge of the roadway. Inlets utilizing such grate will be designated by the suffix-LW such as Type M-LW or Type S-LW Inlet.)



CAST IRON GRATE

16 bars



SECTION A-A

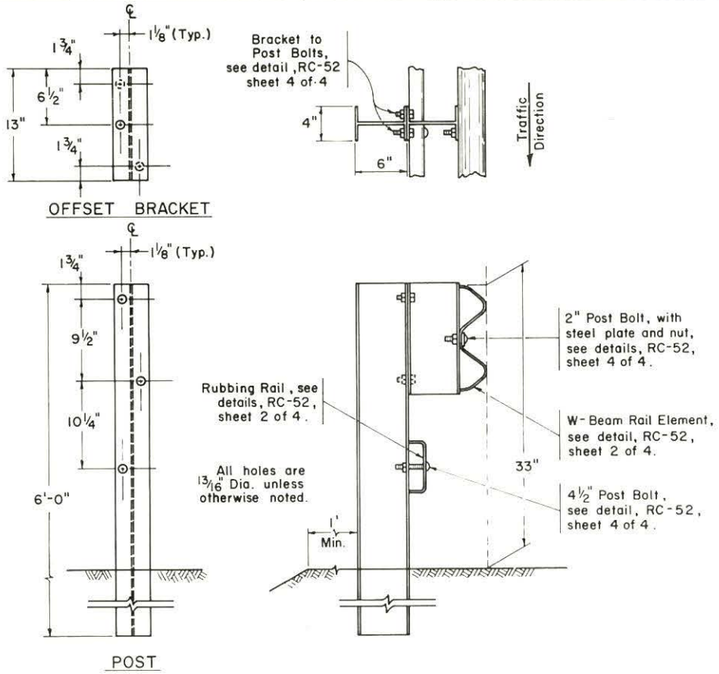
NOTES:

1. Grates shall be ductile or malleable cast iron or structural grade steel. Grates manufactured from Gray Cast Iron shall be submitted for approval.
2. All welding required for the fabricated grates shall be accomplished by a welder certified as required in Section 1053.21, Form 409.
3. This standard depicts the dimensions required for uniformity and interchangeability. It is not intended to show the various details required for fabrication or manufacturing. Only those items which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.

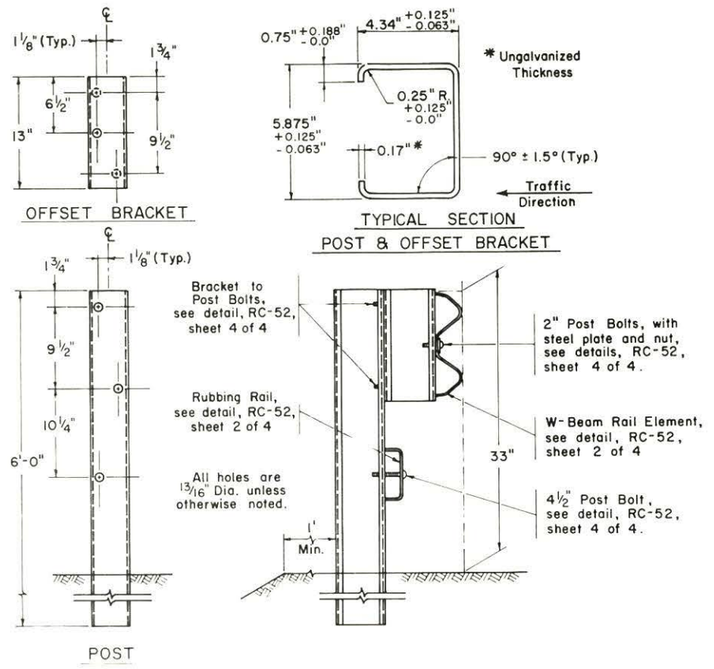
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
GRATES

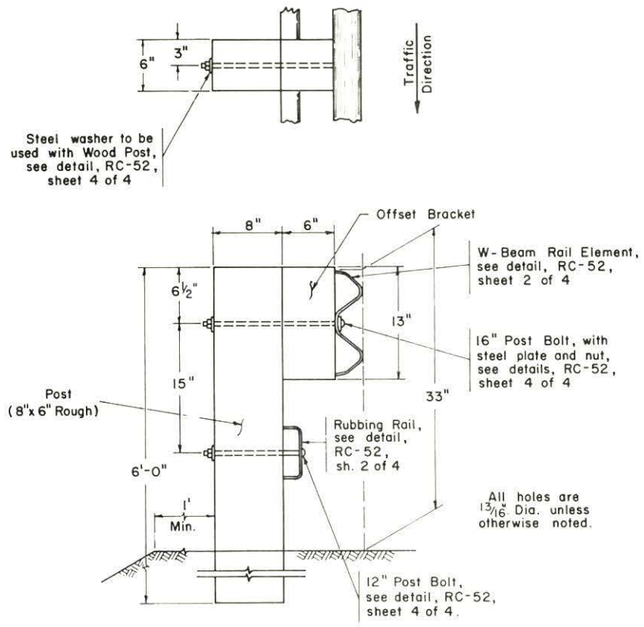
Recommended June 1, 1976	Approved June 1, 1976	Sht. 3 Of 5
B.D. Rourke	Robert K. Musser	RC-34
Director, Bureau of Design	Deputy Chief Hwy. Engr.	



W6 x 8.5 POST DETAILS

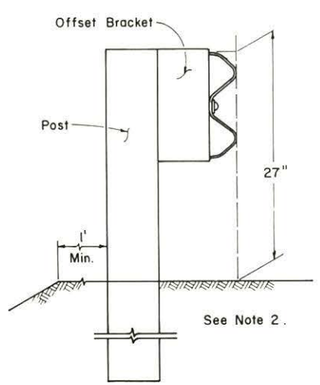


5⅞" COLD FORMED C-POST DETAILS

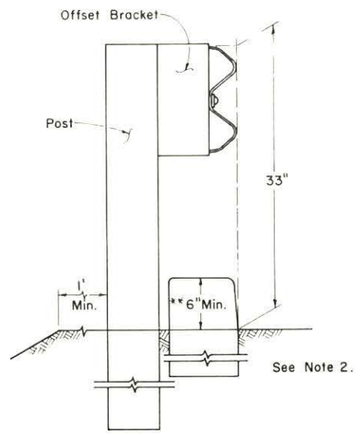


8"x6" WOOD POST DETAILS

TYPE 2-S & 2-SC GUARD RAIL



TYPE 2-S SPECIAL & 2-SC SPECIAL GUARD RAIL



TYPE 2-S MODIFIED & 2-SC MODIFIED GUARD RAIL

** Standard Type 2-S & 2-SC Guard Rail (with rubbing rail), will be used with conc. or bit. curbs less than 6" in height and located as shown in the detail for Type 2-S Modified & 2-SC Modified Guard Rail.

NOTES

1. All materials shall conform to the requirements of Form 408.
2. Details other than those shown for the 2-S Special, 2-SC Special, 2-S Modified, and 2-SC Modified shall conform to the details of the 2-S and 2-SC Guard Rail, but without rubbing rail.
3. The 5⅞" Cold Formed C-Posts, W6 x 8.5 Posts and Wood Posts with matching offset brackets may be bid as alternatives for the Strong Post Guard Rail Systems. However, mixing of different posts and offset brackets will not be acceptable within a project.
4.

TYPE	POST SPACING
2-S	6'-3"
2-SC	3'-1½"
2-S Special	6'-3"
2-SC Special	3'-1½"
2-S Modified	6'-3"
2-SC Modified	3'-1½"

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST GUARD RAIL

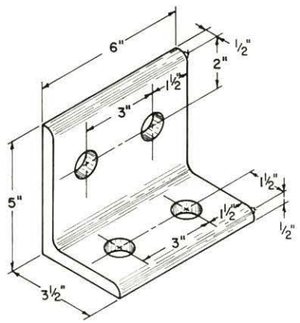
Recommended June 1, 1976
B.D. Rowlett
Director, Bureau of Design

Approved June 1, 1976
Robert P. Messer
Deputy Chief Hwy. Engr.

Sht. 1 Of 4

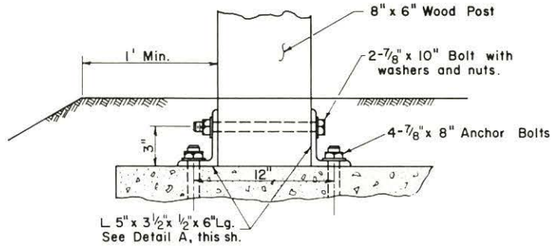
RC-52

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FINAL BY



DETAIL A

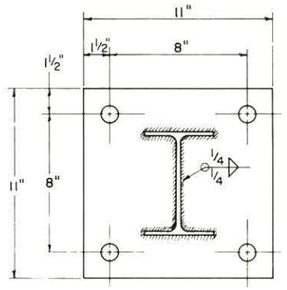
All holes to be 1" diameter.



WOOD POSTS OVER UNDERGROUND STRUCTURES

All other details shall be as in the Steel Posts Over Underground Structures details.

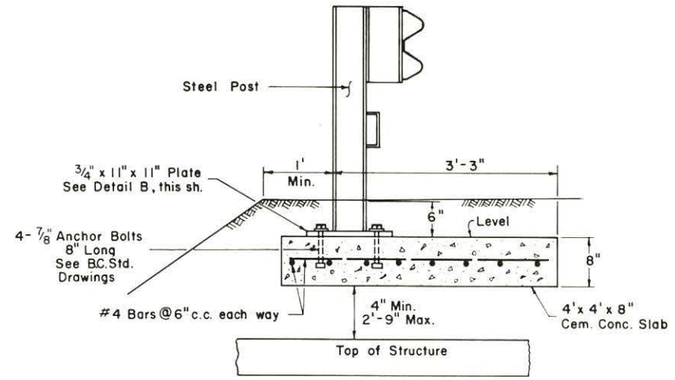
Angles to be mounted on front and back of posts. See Note 1, this sheet.



DETAIL B

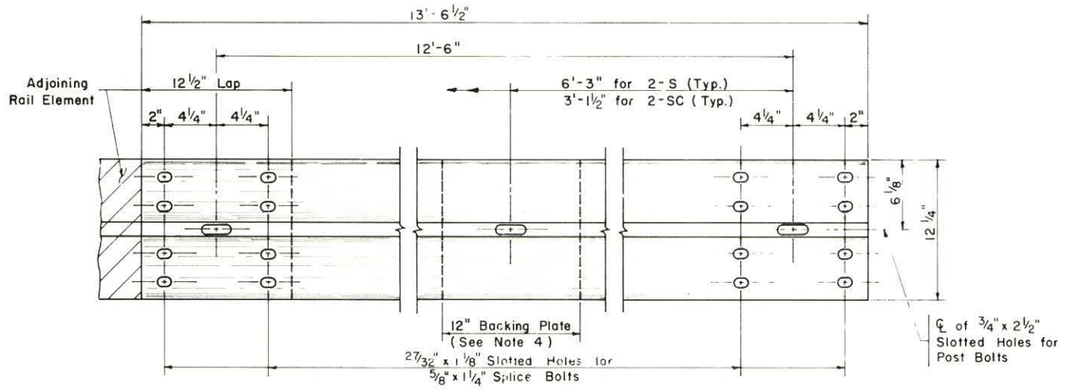
Thickness is ¾"

All holes 1" Ø unless otherwise noted. Use same base plate details for 5 7/8" Cold Formed C-Post and W6 x 8.5 Post.

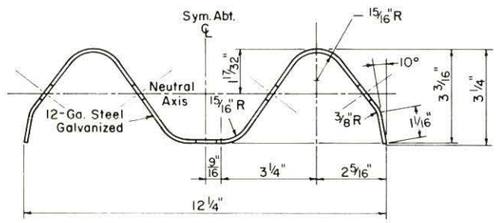


STEEL POSTS OVER UNDERGROUND STRUCTURES

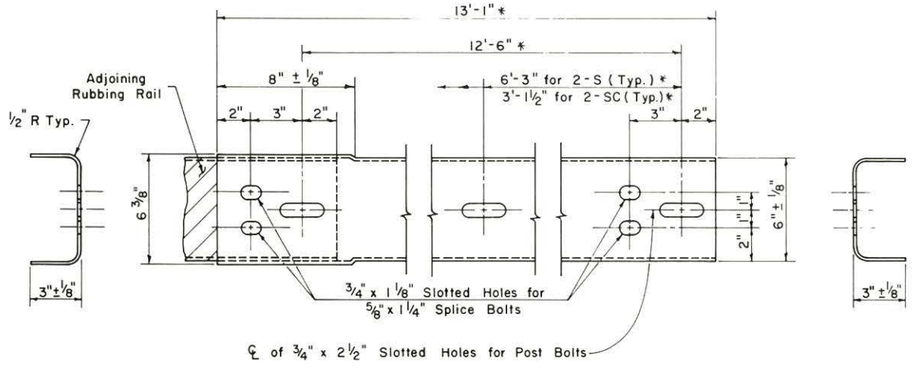
See Note 1, this sheet.



W-BEAM RAIL ELEMENT



SECTION THRU W-BEAM RAIL ELEMENT



6" x 3" x 10 GA. COLD FORMED CHANNEL RUBBING RAIL

* See Note 2

NOTES

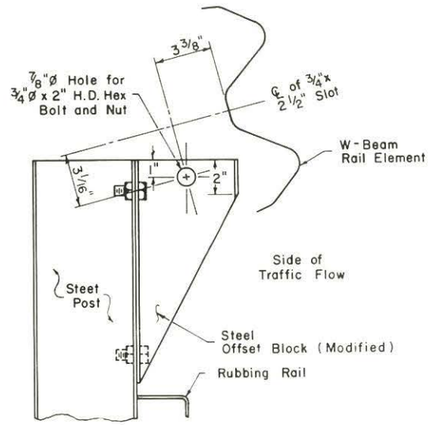
1. No separate payment will be made for installation of guard rail over underground structures. Concrete, reinforcement bars, and hardware shall be considered incidental to the guard rail pay item.
2. For rubbing rails installed on small radii, dimensions noted for hole spacing should be adjusted to allow splices to only occur at posts.
3. W-Beam and rubbing rails shall be attached to each post. Splices shall only occur at posts and be lapped in the direction of traffic.
4. The 12" Backing Plate for the W-Beam Rail Elements shall be used at all intermediate posts and shall be the same section as the W-Beam Rail Element.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

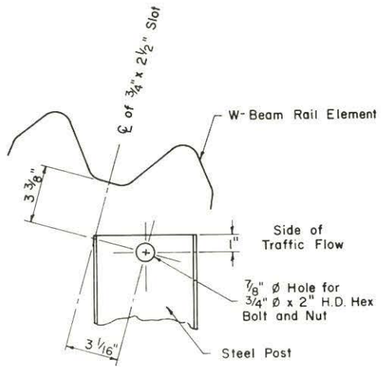
TYPE 2 STRONG POST GUARD RAIL

Recommended	Approved	Sht. 2 Of 4
June 1, 1976	June 1, 1976	RC-52
B.D. Rambo	Geo. R. Moore	
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

TRACED BY
FINAL BY

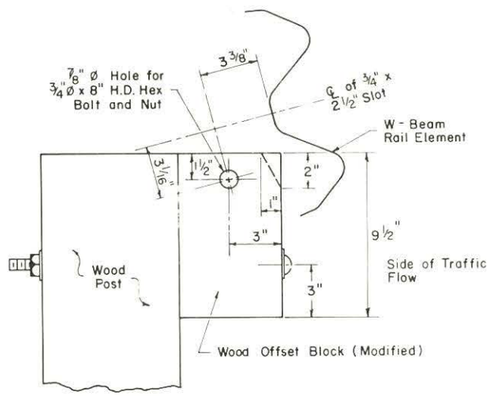


15° POSITION

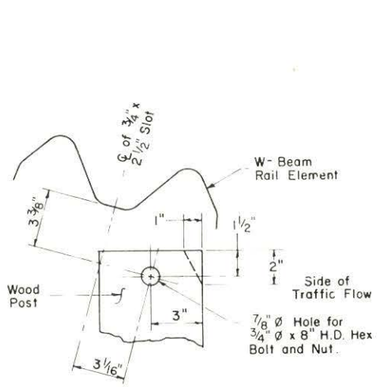


TYPICAL FOR
30° THRU 75° POSITIONS

STEEL POSTS



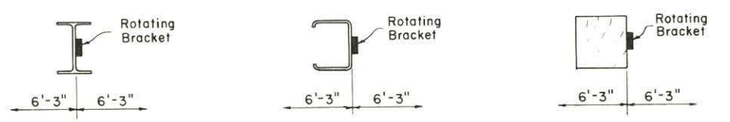
15° POSITION



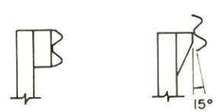
TYPICAL FOR
30° THRU 75° POSITIONS

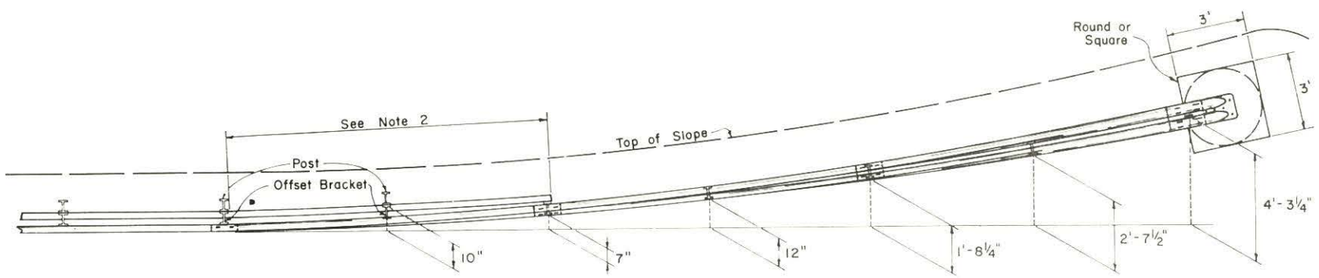
WOOD POSTS

ROTATING BRACKET REQUIREMENTS

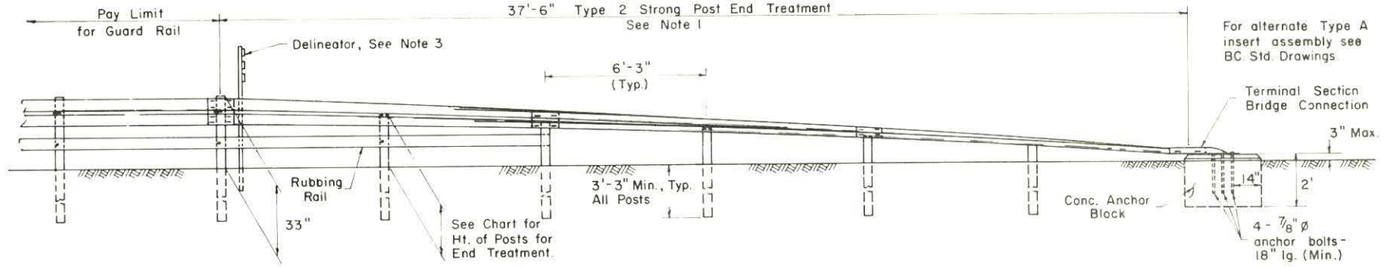


POSITIONING OF ROTATING BRACKET ON POSTS OF THE END TREATMENT





PLAN
(See Note 5)



ELEVATION

TYPICAL TYPE 2 STRONG POST END TREATMENT

Type 2 Strong Post End Treatment shall be used for Type 2-S, Type 2-SC, Type 2-S Special, Type 2-SC Special, Type 2-S Modified and Type 2-SC Modified Guard Rail.

HEIGHT OF POST					
ROTATION ANGLE	15°	30°	45°	60°	75°
2-S, 2-S MODIFIED, 2-SC, 2-SC MODIFIED	1'-10"	1'-7"	1'-2 3/4"	10 1/2"	5 1/2"
2-S SPECIAL, 2-SC SPECIAL	1'-5"	1'-2 1/2"	11 3/4"	8 1/2"	4 1/2"

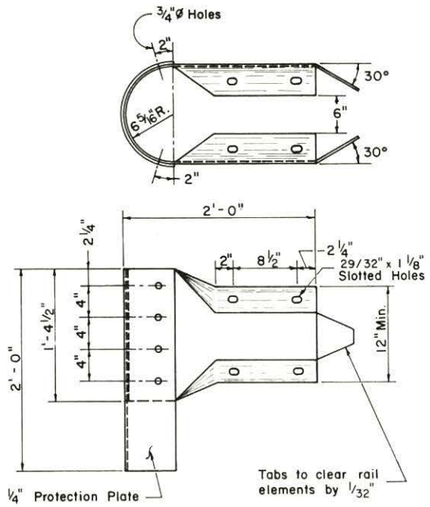
NOTES

1. Payment for Type 2 Strong Post End Treatment will include the last 37'-6" of sloping rail, terminal section, hardware, and concrete.
2. This length of rubbing rail is not to be included as part of the end treatment and should be incidental to the guard rail pay item.
3. Installation of delineator assemblies shall be done under a separate pay item or contract. For additional details, see Traffic Standard TC-7709, sheet 3 of 4.
4. This standard depicts only the necessary dimensions for uniformity and interchangeability of rotating brackets. It does not show details of the rotating bracket for supporting the rotated portion of the end treatment. Only rotating brackets which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.
5. All offsets are measured from the projected front face of the guard rail to the face of the post.

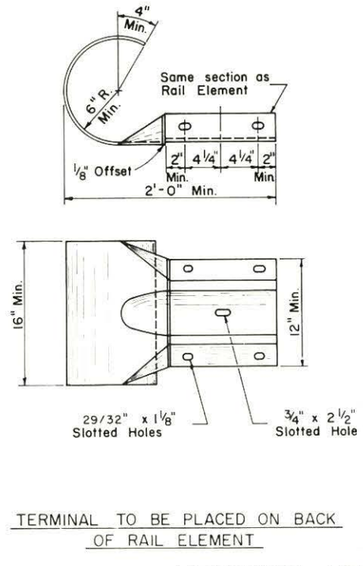
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST GUARD RAIL

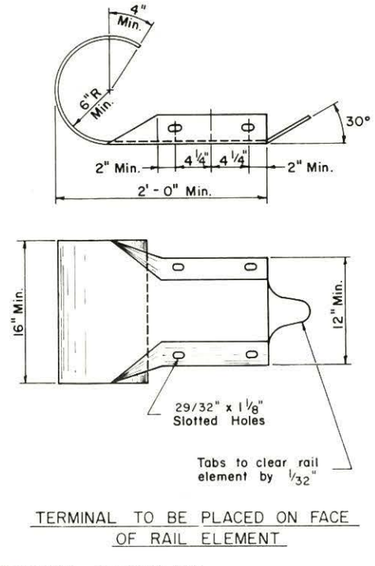
Recommended	Approved	Sht. 3 Of 4
June 1, 1976	June 1, 1976	RC-52
B.D. Rowalsie	Robert R. Meuser	
Director, Bureau of Design	Deputy Chief Hwy. Engr.	



TERMINAL SECTION (DOUBLE)

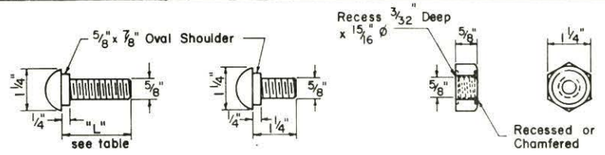


TERMINAL TO BE PLACED ON BACK OF RAIL ELEMENT



TERMINAL TO BE PLACED ON FACE OF RAIL ELEMENT

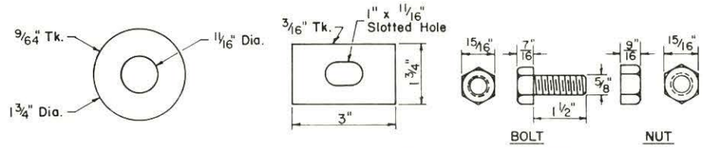
ALTERNATE TERMINAL SECTIONS (SINGLE)



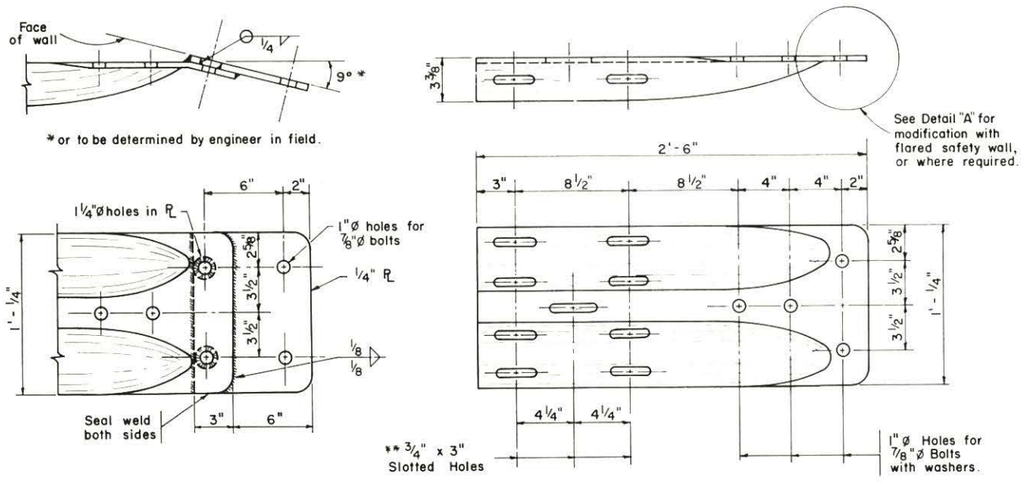
POST BOLT SPLICE BOLT NUT

TABLE OF POST BOLT LENGTHS - L

Post	Rubbing Rail	W-Beam
W6 x 8.5 & 5 7/8" C Post	4 1/2" Post Bolt	2" Post Bolt
Wood Post	12" Post Bolt	16" Post Bolt



STEEL WASHER STEEL PLATE BRACKET TO POST



DETAIL "A"

The bridge connection terminal modification may be fabricated as one piece to eliminate welding.

TERMINAL SECTION BRIDGE CONNECTION

** Splice bolts shall be provided with a lock nut or double nut and shall be tightened only to a point that will allow guard rail to be free to move. Splice bolts shall be centered in the slotted holes. See B.C. Standard Drawings for attachment details.

NOTES

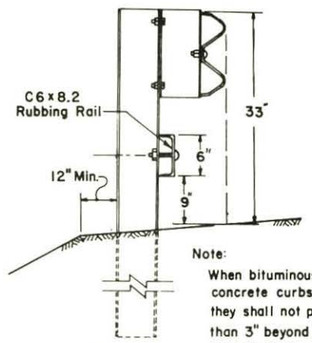
1. Splice bolts shall develope the design strength of the rail element.
2. Post bolts shall withstand a 5000 pound side pull in either direction without rupture.
3. No additional compensation will be allowed for providing Terminal Section Bridge Connection with welded plate for flared walls.
4. The round heads of the Post and Splice Bolts may be slightly notched to provide for wrench.
5. All terminal sections shall be 12 gauge galvanized steel.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST GUARD RAIL

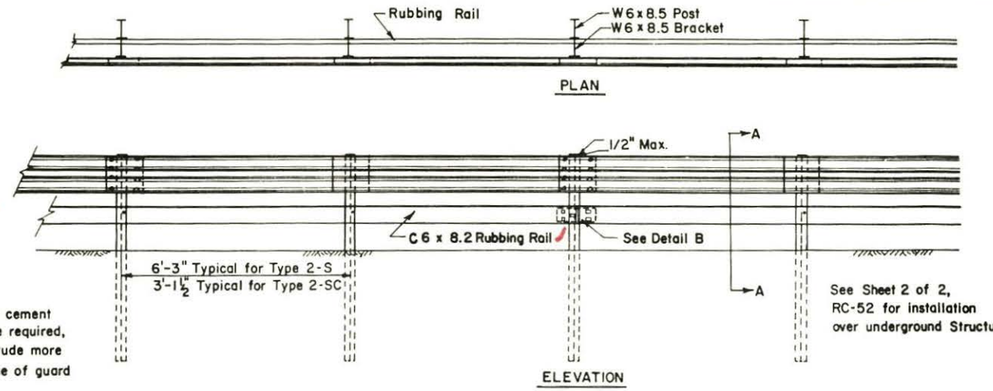
Recommended June 1, 1976	Approved June 1, 1976	Sht. 4 Of 4
B.D. Pawlukie	Robert R. Mueser	RC-52
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

TRACED BY
FINAL BY



Note:
When bituminous or cement concrete curbs are required, they shall not protrude more than 3" beyond face of guard rail element.

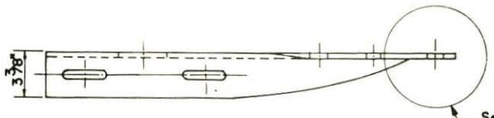
SECTION A-A



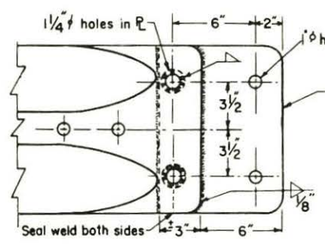
See Sheet 2 of 2, RC-52 for installation over underground Structures.



* or to be determined by engineer in field

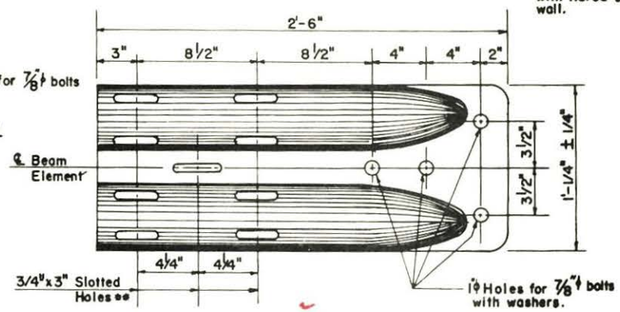


See **DETAIL "A"** for modification with flared safety wall.



DETAIL "A"

The Bridge Connection Terminal Modification may be fabricated as one piece to eliminate welding.

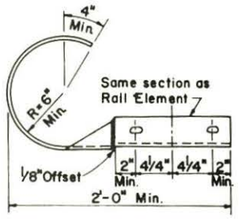


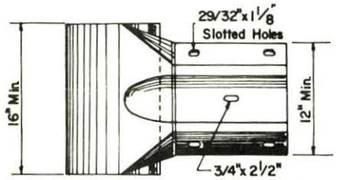
TERMINAL SECTION BRIDGE CONNECTION

** Splice bolts shall be provided with a lock nut or double nut and shall be tightened only to a point that will allow guard rail to be free to move. Splice bolts shall be centered in the slotted holes.

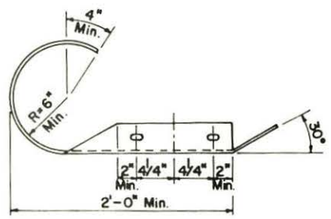
GENERAL NOTES

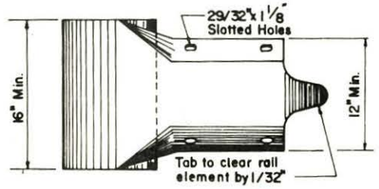
1. All materials shall conform to the requirements of Form 408.
2. Splice bolts shall develop the design strength of the rail element.
3. Post bolts shall withstand a 5,000 pound side pull in either direction without rupture.
4. Where guard rail is required on curves of less than 150 feet radius, the rail element shall be shop formed.
5. No additional compensation will be allowed for providing Terminal Section Bridge Connection with welded plate for flared walls.
6. The round heads of the Post and Splice Bolts may be slightly notched to provide for wrench.





TERMINAL TO BE PLACED ON BACK OF RAIL ELEMENT





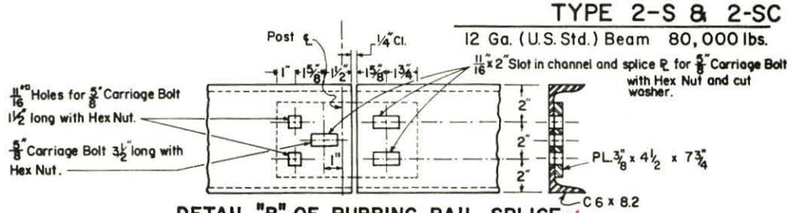
TERMINAL TO BE PLACED ON FACE OF RAIL ELEMENT

ALTERNATE TERMINAL SECTIONS (SINGLE)

Min. 12 Ga. (U.S. Std.)

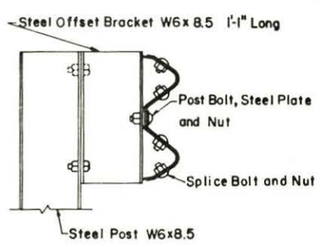
TYPE 2-S & 2-SC

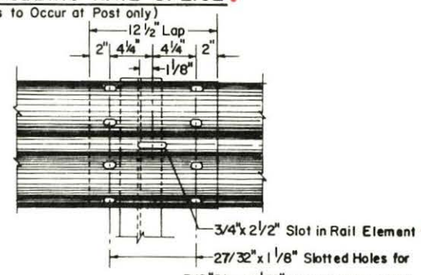
12 Ga. (U.S. Std.) Beam 80,000 lbs.



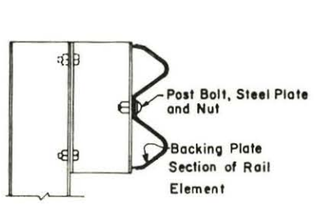
DETAIL "B" OF RUBBING RAIL SPLICE

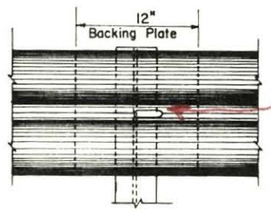
(Rail Splices to Occur at Post only)





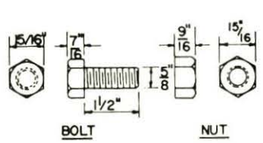
TYPICAL RAIL SPLICE



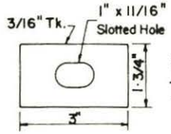


also required at intermediate post.

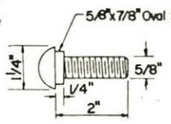
TYPICAL RAIL BACKING PLATE



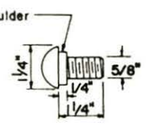
BRACKET TO POST



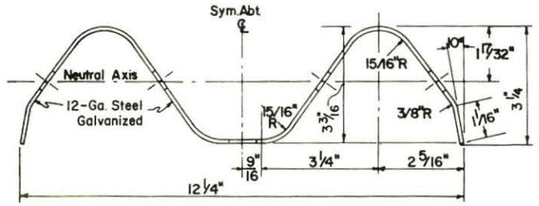
STEEL PLATE



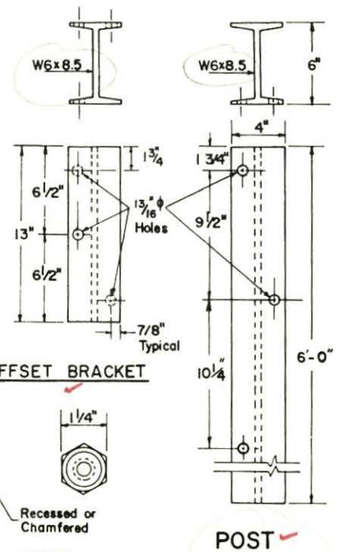
POST BOLT



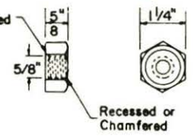
SPLICE BOLT



SECTION THRU RAIL ELEMENT

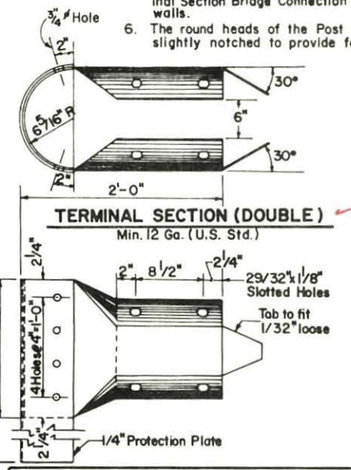


OFFSET BRACKET



NUT

POST DETAIL



TERMINAL SECTION (DOUBLE)

Min. 12 Ga. (U.S. Std.)

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2-S & 2-SC GUARD RAIL

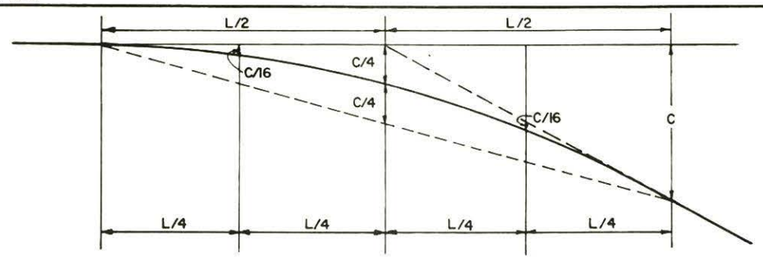
Recommended Mar. 7, 1973
Director, Bureau of Design

Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

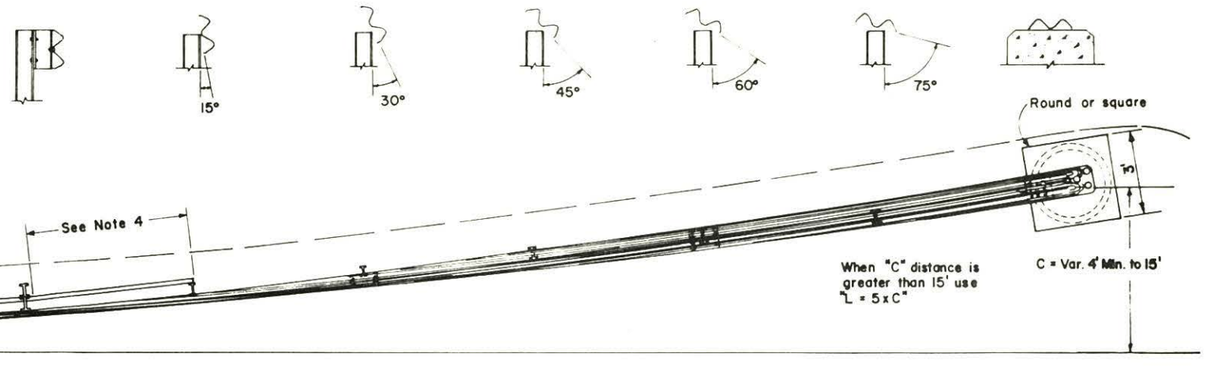
Sht. 1 Of 2
RC-52

VOIDED BY CHANGE #7

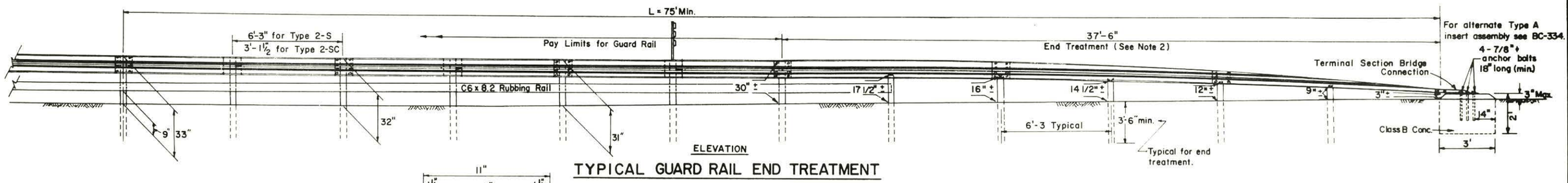
FORM 4237 REV 3-81



TYPICAL PARABOLIC LAYOUT (No Scale)

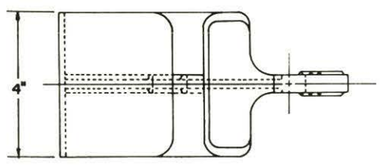


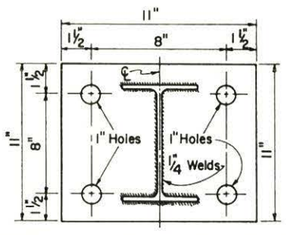
PLAN



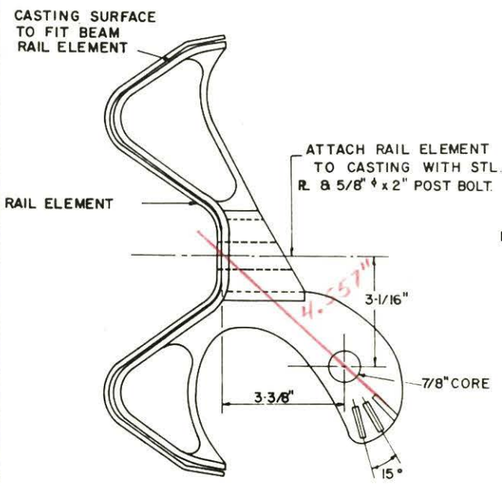
ELEVATION

TYPICAL GUARD RAIL END TREATMENT

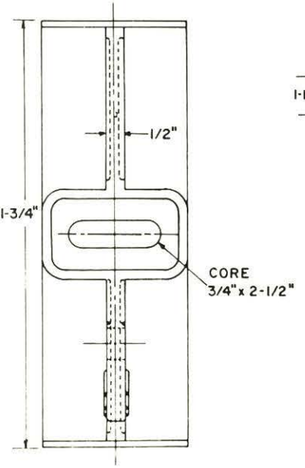


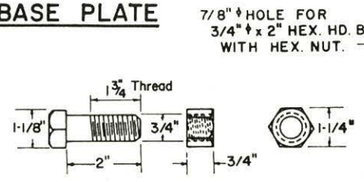


DETAIL C OF BASE PLATE

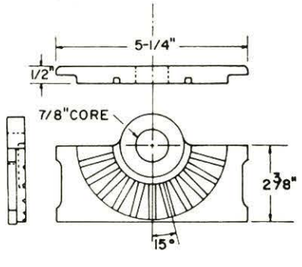


ANCHORAGE CASTING *

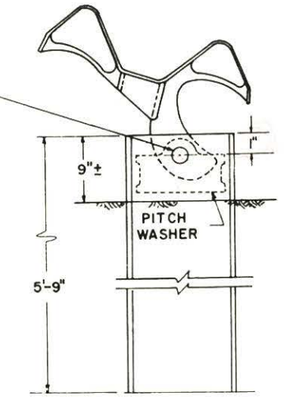




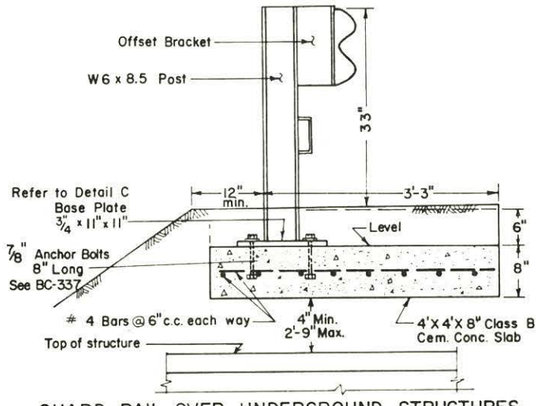
BOLT



PITCH WASHER *



ANCHORAGE CASTING
(AT 75° POSITION)



GUARD RAIL OVER UNDERGROUND STRUCTURES

NOTES

1. Flare offset (C) to be a minimum of 4', actual dimensions to be determined by the engineer to meet field condition.
2. Payment for End Treatment shall include the last 37-1/2 linear feet of sloping rail, terminal section, hardware, and Class B Concrete.
3. Other types of rotating brackets may be used as approved by the engineer.
4. This length of rubbing rail is not to be included as part of the end treatment and should be included as part of the 2-S guard rail pay item.
5. No separate payment will be made for installation of guard rail over underground structures. Class B Concrete, reinforcement bars and hardware shall be considered incidental to the guard rail pay item.
6. Installation of delineator assemblies shall be done under a separate pay item or contract. For additional details, see Traffic Standard 7709, Sheet 3 of 4.

* Malleable cast iron ASTM A-47 Grade 35018 and galvanized in accordance with AASHO designation M111

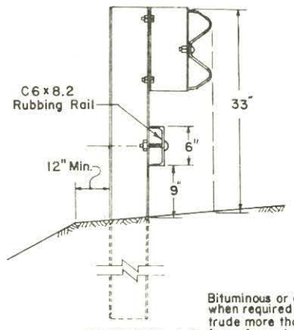
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2-S & 2-SC GUARD RAIL

Recommended Mar. 7, 1973	Approved Mar. 7, 1973	Sht. 2 Of 2
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-52

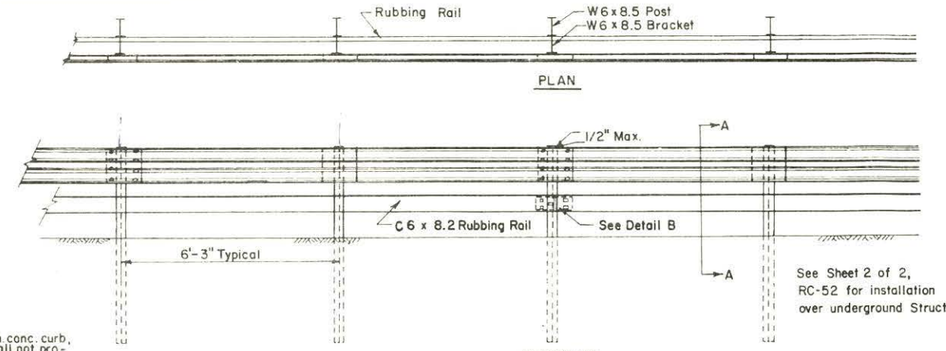
VOIDED BY CHANGE #7

FORM 4237 REV 3-61

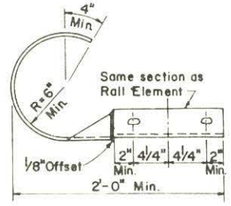


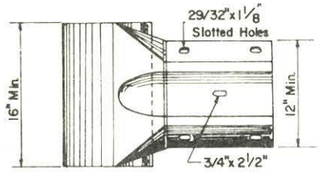
SECTION A-A

Bituminous or cem. conc. curb, when required shall not protrude more than 3" beyond face of guard rail element.

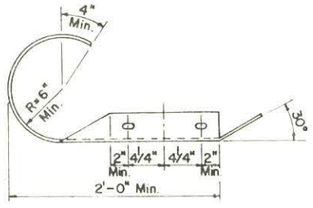


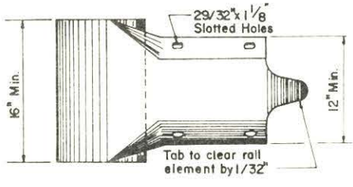
See Sheet 2 of 2, RC-52 for installation over underground Structures.





TERMINAL TO BE PLACED ON BACK OF RAIL ELEMENT





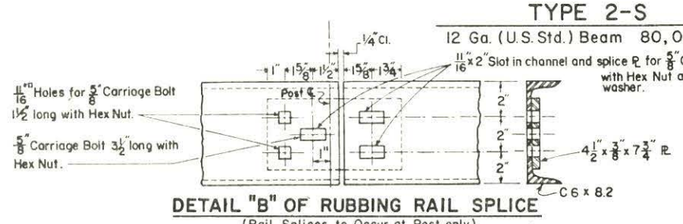
TERMINAL TO BE PLACED ON FACE OF RAIL ELEMENT

ALTERNATE TERMINAL SECTIONS (SINGLE)

Min. 12 Ga. (U.S. Std.)

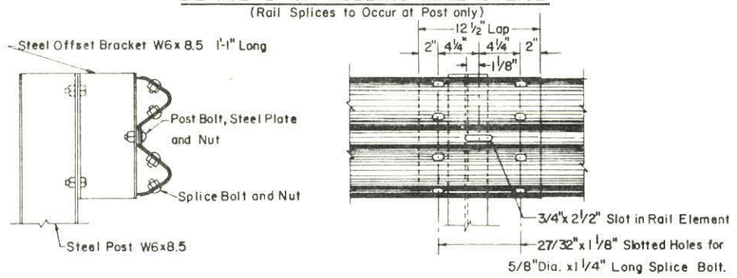
TYPE 2-S

12 Ga. (U.S. Std.) Beam 80,000 lbs.

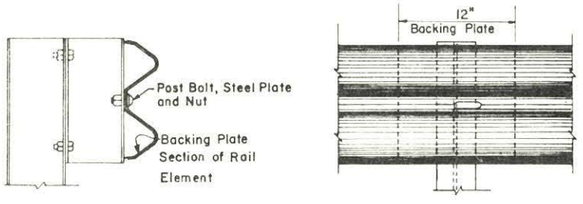


DETAIL "B" OF RUBBING RAIL SPLICE

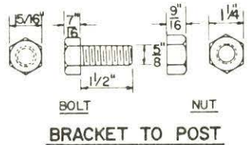
(Rail Splices to Occur at Post only)



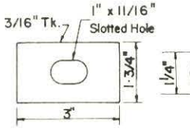
TYPICAL RAIL SPLICE



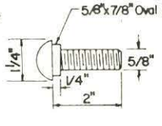
TYPICAL RAIL BACKING PLATE



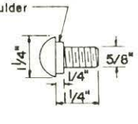
BRACKET TO POST



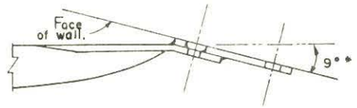
STEEL PLATE



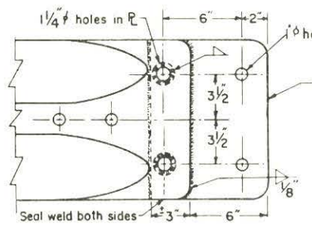
POST BOLT



SPLICE BOLT

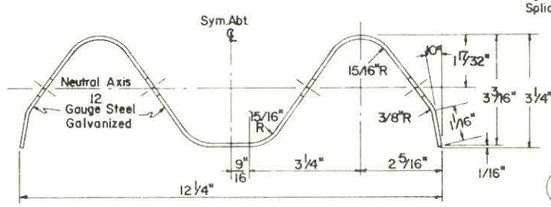


* or to be determined by engineer in field

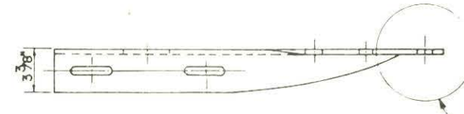


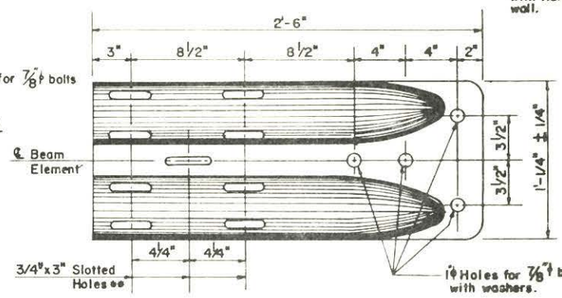
DETAIL "A"

The Bridge Connection Terminal Modification may be fabricated as one piece to eliminate welding.



SECTION THRU RAIL ELEMENT



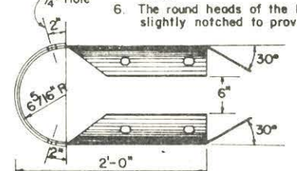


TERMINAL SECTION BRIDGE CONNECTION

** Splice bolts shall be provided with a lock nut or double nut and shall be tightened only to a point that will allow guard rail to be free to move. Splice bolts shall be centered in the slotted holes.

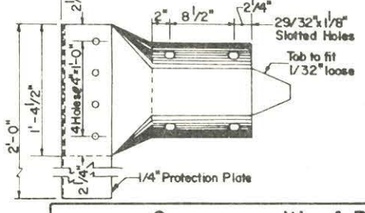
GENERAL NOTES

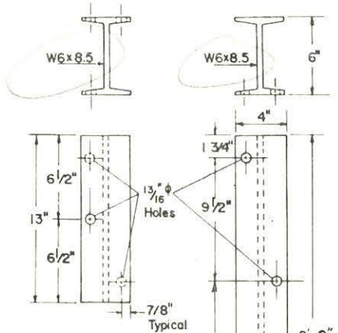
1. All materials shall conform to the requirements of Form 408.
2. Splice bolts shall develop the design strength of the rail element.
3. Post bolts shall withstand a 5,000 pound side pull in either direction without rupture.
4. Where guard rail is required on curves of less than 150 feet radius, the rail element shall be shop formed.
5. No additional compensation will be allowed for providing Terminal Section Bridge Connection with welded plate for flared walls.
6. The round heads of the Post and Splice Bolts may be slightly notched to provide for wrench.



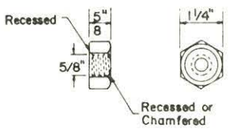
TERMINAL SECTION (DOUBLE)

Min. 10 Ga. (U.S. Std.)





OFFSET BRACKETS



NUT

POST DETAIL

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2-S GUARD RAIL

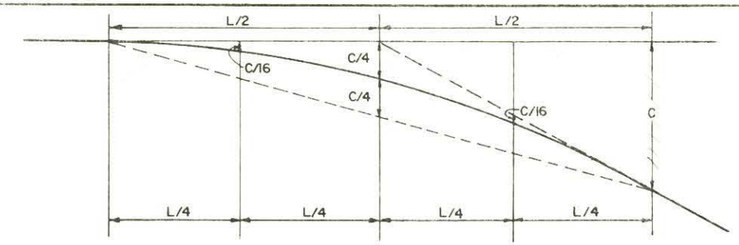
Recommended Dec. 1, 1971
R R Moser
Location & Design Engr.

Approved Dec. 1, 1971
W J Rover
Deputy Chief Hwy. Engr.

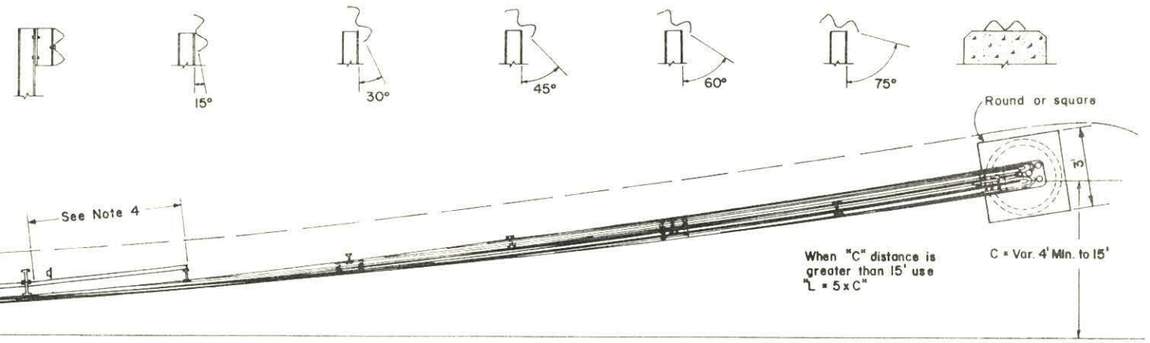
Sht. 1 of 2
RC-52

TRACED BY
PENNS BY

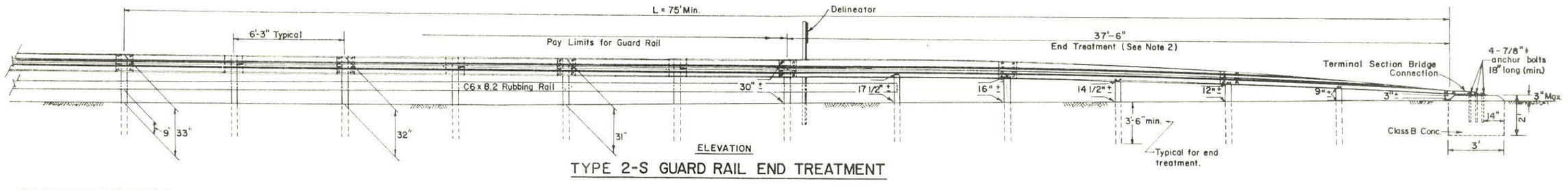
VOIDED BY CHANGE #1



TYPICAL PARABOLIC LAYOUT (No Scale)

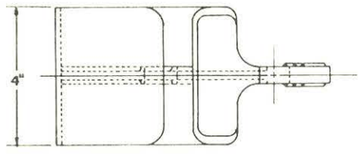


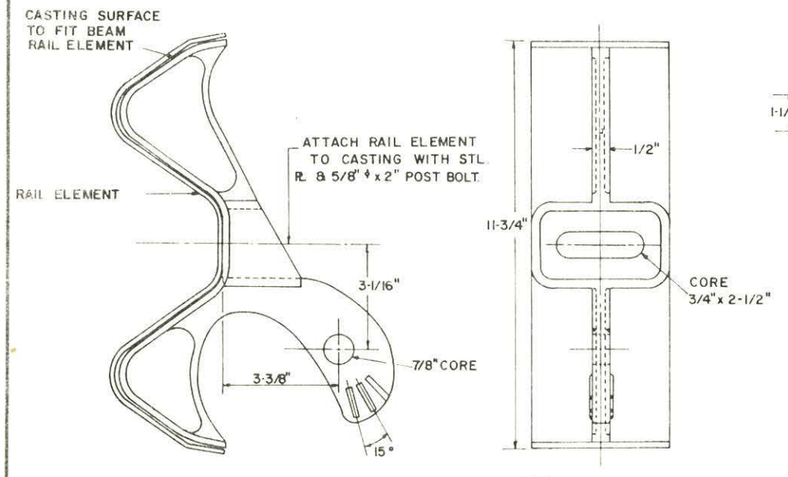
PLAN



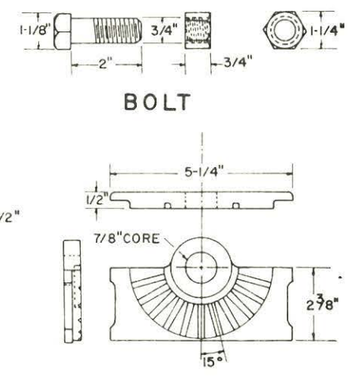
ELEVATION

TYPE 2-S GUARD RAIL END TREATMENT

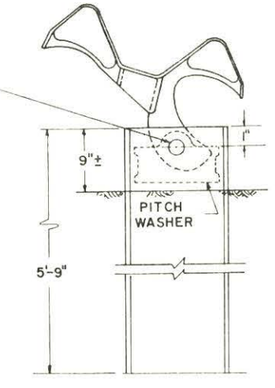




ANCHORAGE CASTING **

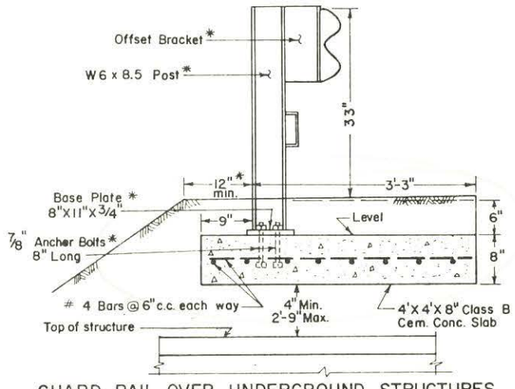


PITCH WASHER **



ANCHORAGE CASTING
(AT 75° POSITION)

** Malleable cast iron ASTM A-47 Grade 35018 and galvanized in accordance with AASHO designation M 111



GUARD RAIL OVER UNDERGROUND STRUCTURES

* For installation of Type-2-W use S3X5.7 post without offset block, and rubbing rail. The distance from the slope break to the back of the post should be 1'-9". Also the base plate size should be 6"x 6"x 1/2" with 3/4" anchor bolts 8" long

NOTES

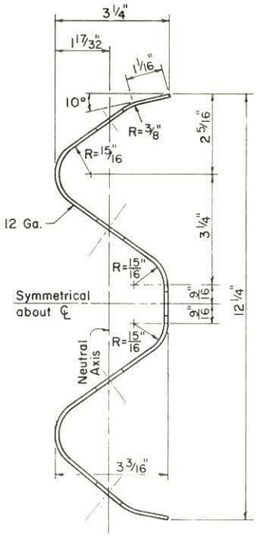
1. Flare offset (C) to be a minimum of 4', actual dimensions to be determined by the engineer to meet field condition.
2. Payment for End Treatment shall include the last 37-1/2 linear feet of sloping rail, terminal section, hardware, and Class B Concrete.
3. Other types of rotating brackets may be used as approved by the engineer.
4. This length of rubbing rail is not to be included as part of the end treatment and should be included as part of the 2-S guard rail pay item.
5. No separate payment will be made for installation of guard rail over underground structures.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

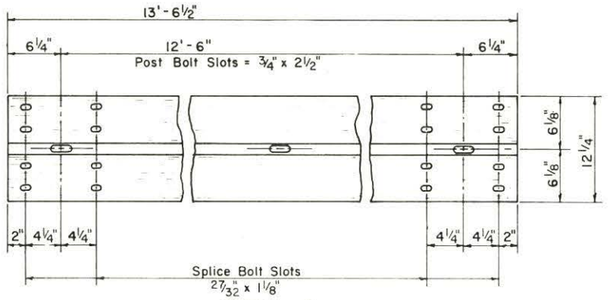
TYPE 2-S GUARD RAIL

Recommended Dec. 1, 1971 R.P. Wagner Location & Design Engineer	Approved Dec. 1, 1971 W.J. Raver Deputy Chief Hwy. Engr.	Sht. 2 Of 2 RC-52

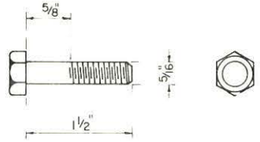
VOIDED BY CHANGE #1



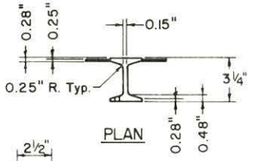
DETAIL D
RAIL ELEMENT



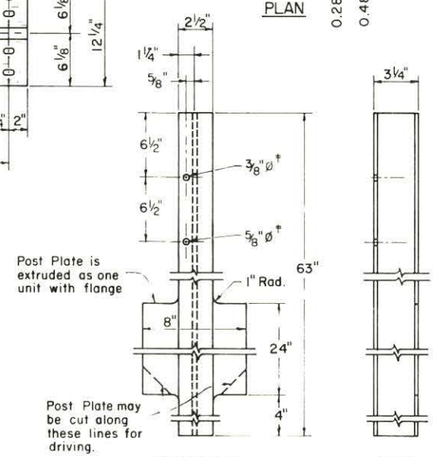
DETAIL E
TYPICAL RAIL SECTION



DETAIL G
5/16" DIA. HEX. BOLT

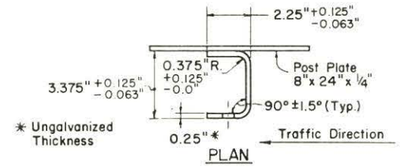


PLAN

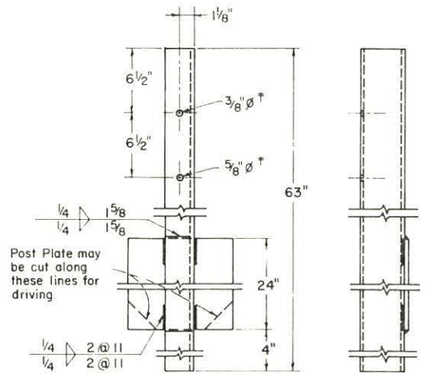


ELEVATION SIDE

ALUMINUM ALLOY POST

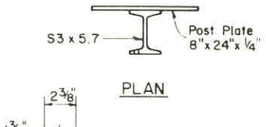


PLAN

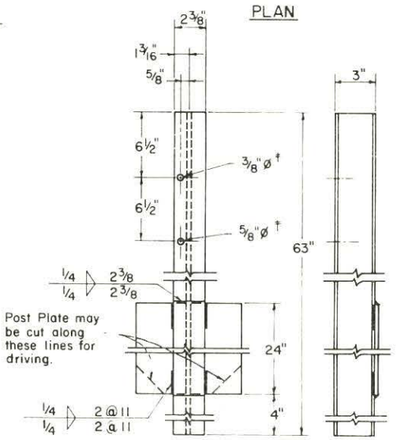


ELEVATION SIDE

3 3/8" x 2 1/4" COLD FORMED CHANNEL POST



PLAN



ELEVATION SIDE

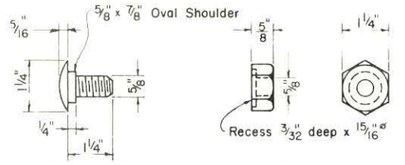
S3 x 5.7

TYPE 2-W GUARD RAIL POSTS

† Post details for Type 2-WM median barrier shall conform to the details as shown, except that the mounting bolt and support bolt holes shall be located on the front and rear flanges.

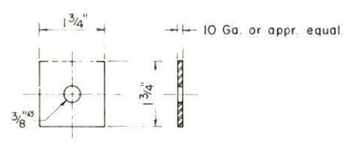
Notes

1. All materials shall conform to the requirements of Form 408.
2. The 3 3/8" x 2 1/4" Cold Formed Channel Post, S3 x 5.7 Post and Aluminum Alloy Post may be bid as alternates for Type 2 Weak Post Guard Rail System, however, mixing of different posts will not be acceptable within a project.

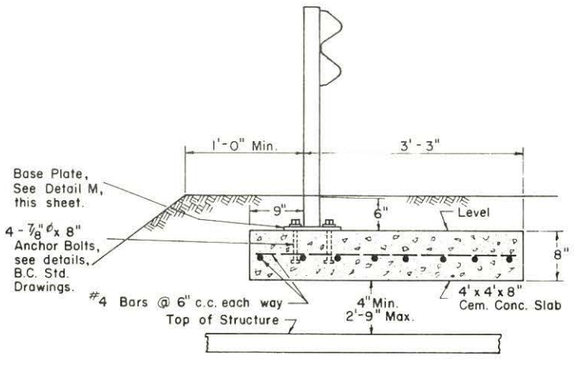


SPLICE BOLT HEX NUT

DETAIL F
BEAM SPLICE HARDWARE

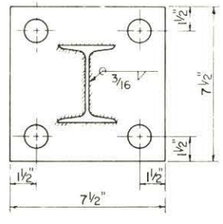


DETAIL I
SQUARE WASHER



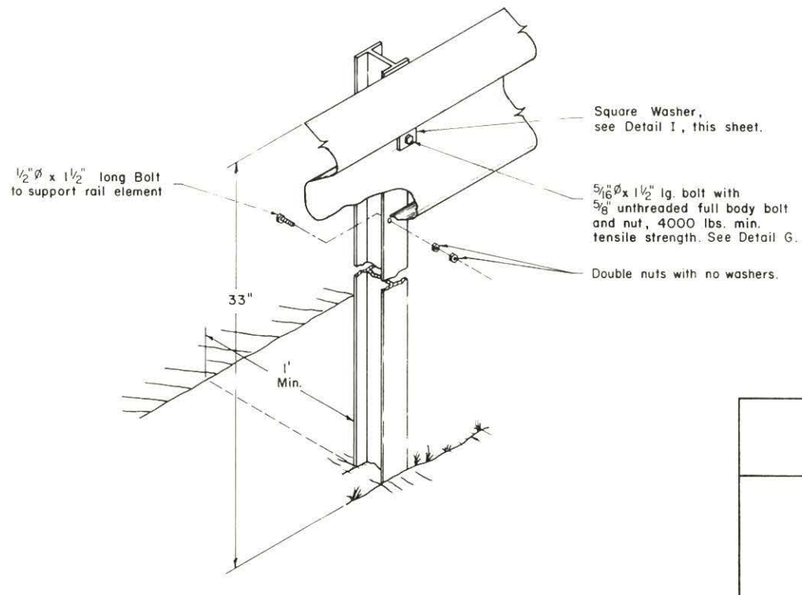
GUARD RAIL OVER UNDERGROUND STRUCTURES

No separate payment will be made for installation of guard rail over underground structures. Concrete, reinforcement bars, and hardware shall be considered incidental to the guard rail pay item.



BASE PLATE DETAIL M

Note: All holes 1"ø unless otherwise noted. Use same base plate details for 3 3/8" x 2 1/4" Cold Formed Channel Post, Aluminum Alloy Post and S3 x 5.7 Post.



TYPICAL INSTALLATION

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 WEAK POST GUARD RAIL

Recommended June 1, 1976
B. D. Ronaldson
Director, Bureau of Design

Approved June 1, 1976
Robert R. Meeser
Deputy Chief Hwy. Engr.

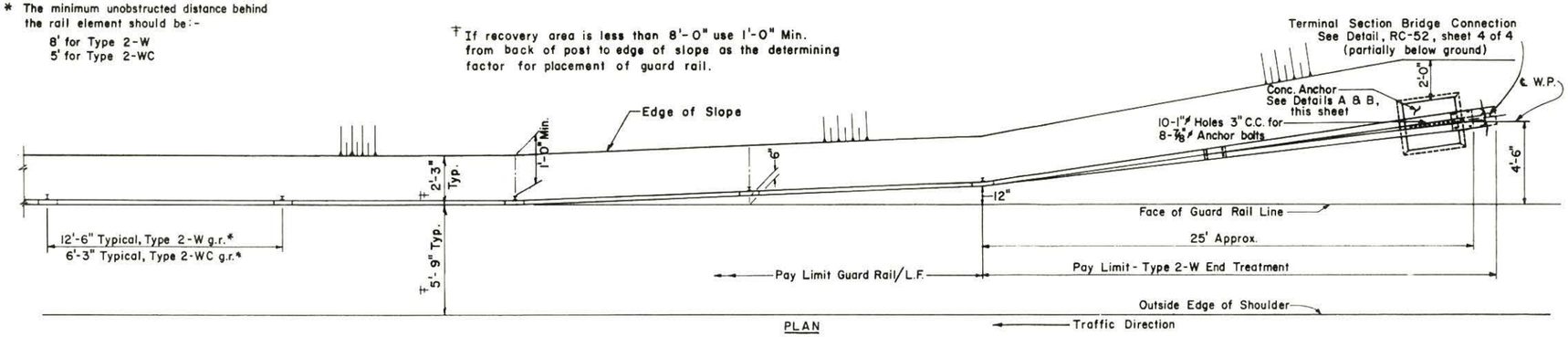
Sht. 1 Of 2

RC-53

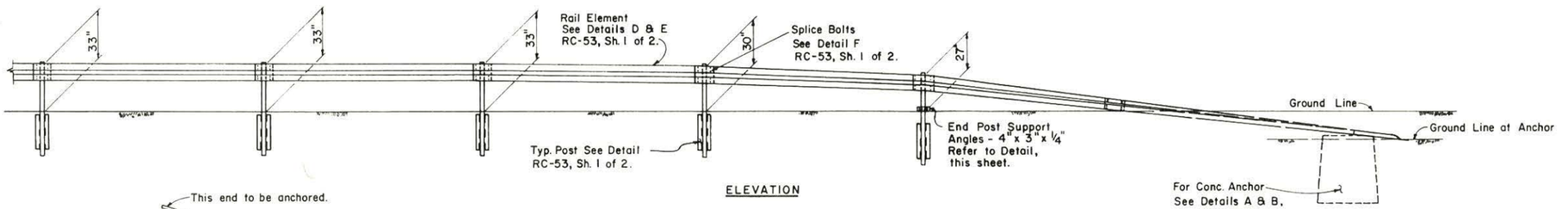
FORM 4237 REV. 7-68

* The minimum unobstructed distance behind the rail element should be:-
8' for Type 2-W
5' for Type 2-WC

† If recovery area is less than 8'-0" use 1'-0" Min. from back of post to edge of slope as the determining factor for placement of guard rail.

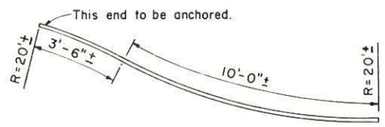


PLAN



ELEVATION

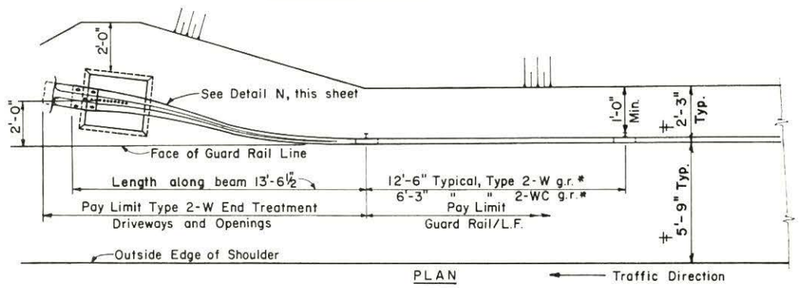
TYPE 2-W END TREATMENT



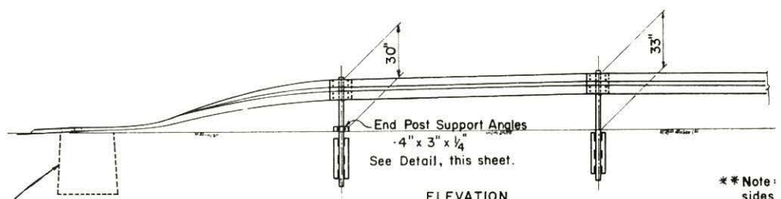
Shop bending required to make the End Treatment at Driveways & Openings.

DETAIL N

SHOP CURVED RAIL



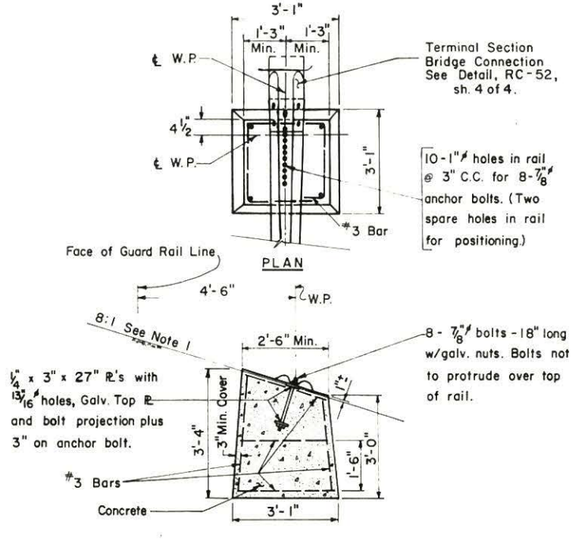
PLAN ← Traffic Direction



ELEVATION

TYPE 2-W END TREATMENT** DRIVEWAYS & OPENINGS

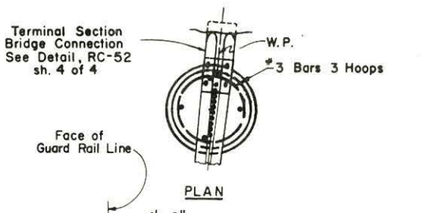
** Note: To be used on both sides of driveways and openings.



PLAN

ELEVATION

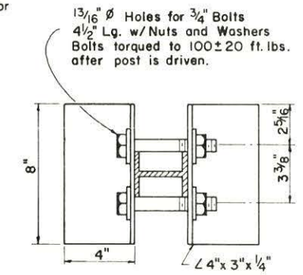
DETAIL A CONCRETE ANCHOR



PLAN

ELEVATION

DETAIL B ALTERNATE CONC. ANCHOR



END POST SUPPORT ANGLES

NOTES

1. Slope can be varied if warranted.
2. Installation of delineator assemblies shall be done under a separate pay item or contract. See Traffic Standard TC-7709, sheet 3 of 4.
3. Type 2-W End Treatment must be used at approach and trailing ends of Type 2-W Guard Rail.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 WEAK POST GUARD RAIL

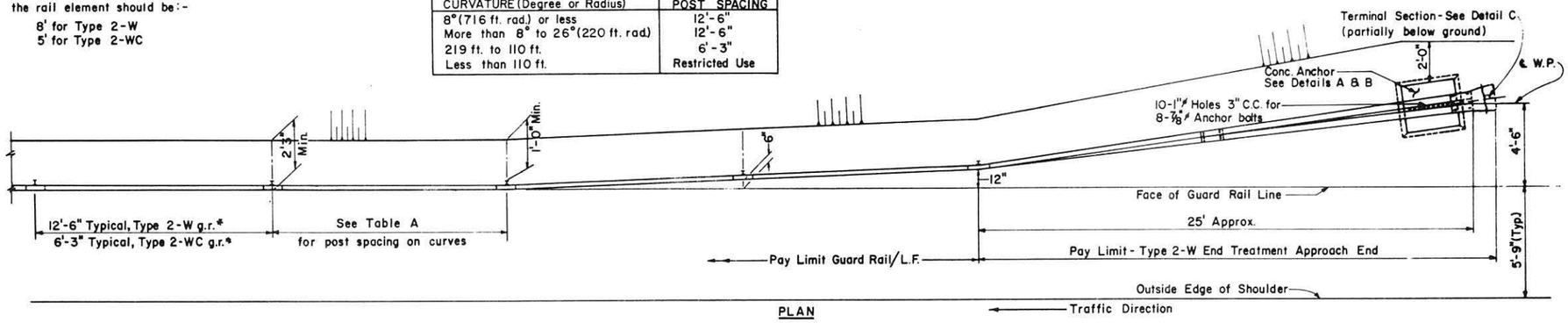
Recommended June 1, 1976	Approved June 1, 1976	Sht. 2 Of 2
B.D. Reynolds	Robert R. Meyer	RC-53
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

TRACED BY
TRIAL BY

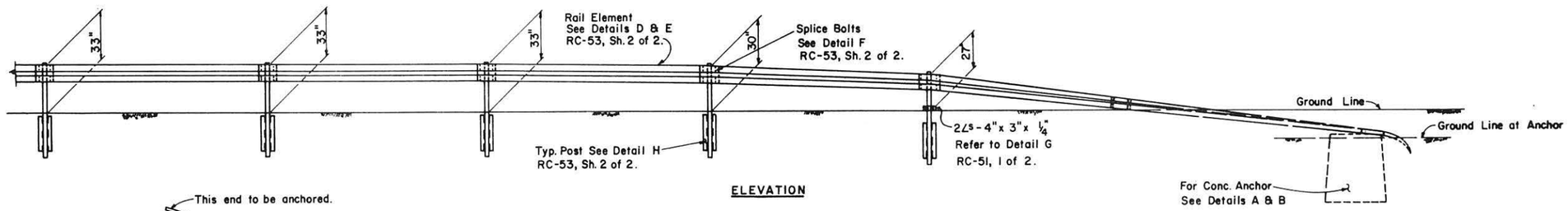
FORM 4237 REV. 7-68

* The minimum unobstructed distance behind the rail element should be:-
8' for Type 2-W
5' for Type 2-WC

TABLE A	
CURVATURE (Degree or Radius)	POST SPACING
8°(716 ft. rad.) or less	12'-6"
More than 8° to 26°(220 ft. rad.)	12'-6"
219 ft. to 110 ft.	6'-3"
Less than 110 ft.	Restricted Use

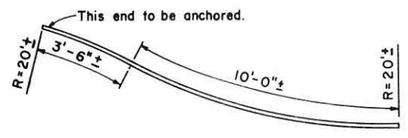


PLAN



ELEVATION

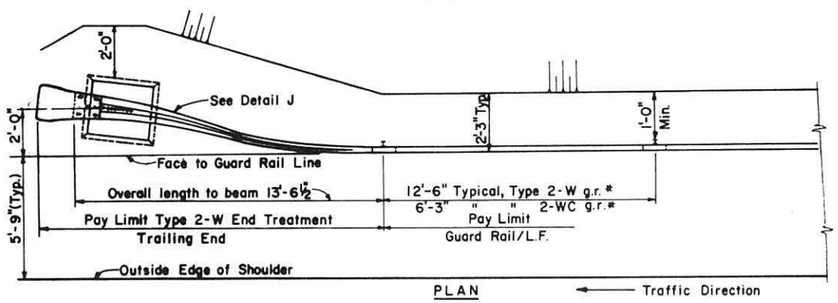
TYPICAL APPROACH SECTION

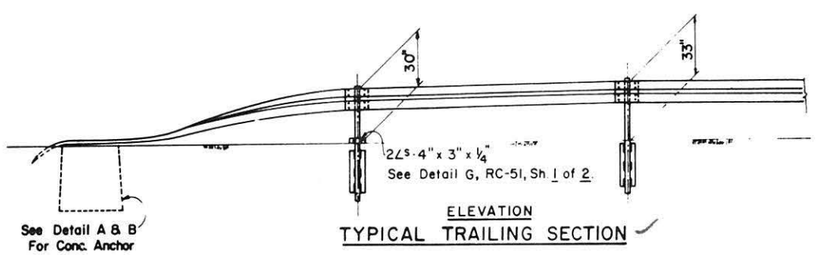


Shop bending required to make the End Treatment at the Trailing End.

DETAIL J

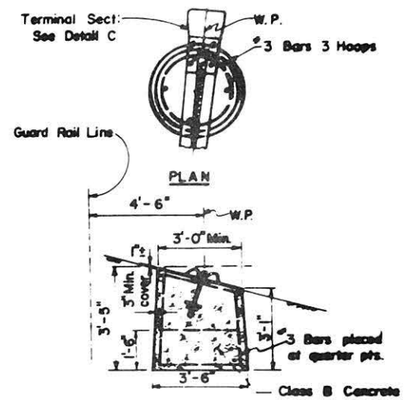
SHOP CURVED RAIL



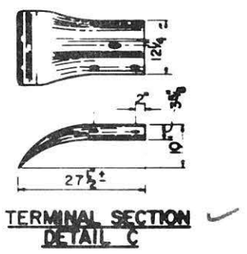


ELEVATION

TYPICAL TRAILING SECTION

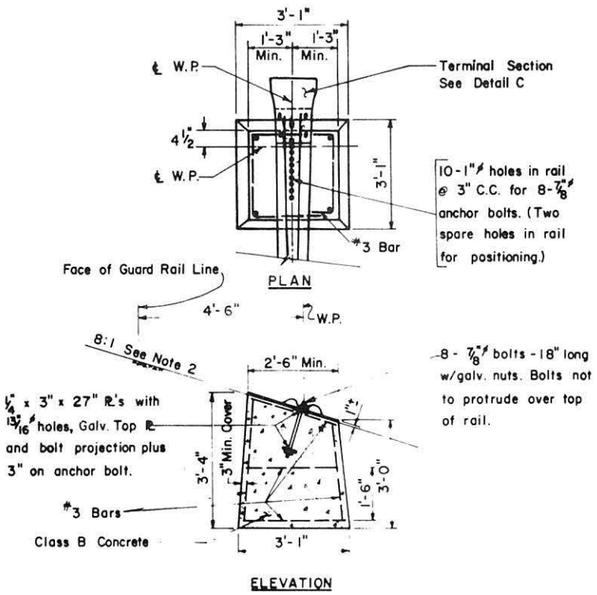


DETAIL B
ALTERNATE CONC. ANCHOR



TERMINAL SECTION
DETAIL C

Note:
1. No support bolts will be used in the last three posts of each end of each installation.
2. Slope can be varied if warranted.



DETAIL A
CONCRETE ANCHOR

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

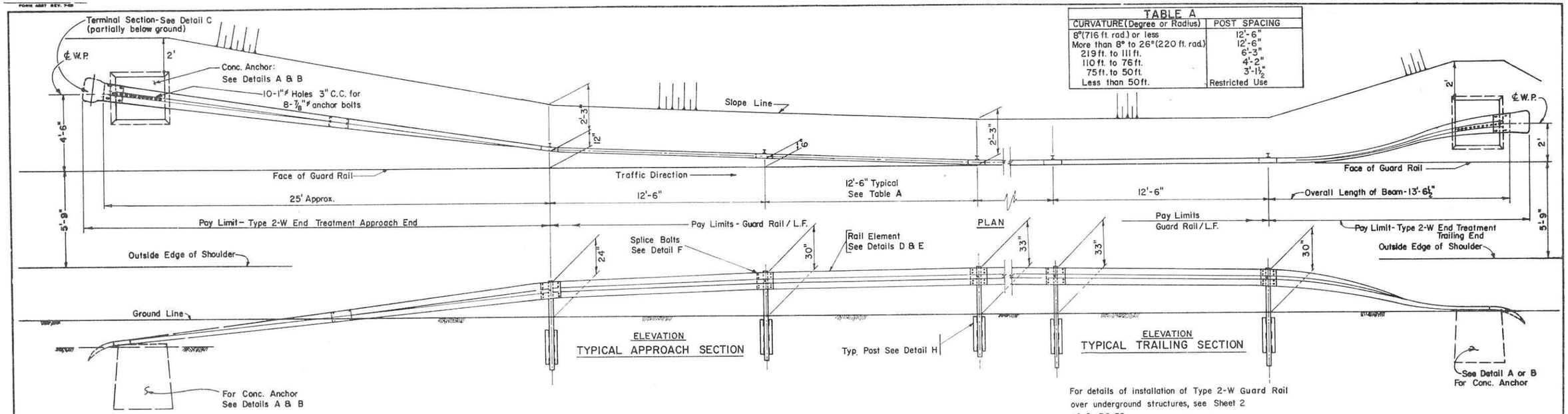
TYPE 2-W AND 2-WC GUARD RAIL

Recommended Mar 7, 1973	Approved Apr 7, 1973	Sht 1 of 2
Director, Bureau of Design	Deputy Chief Highway Engr	RC-53

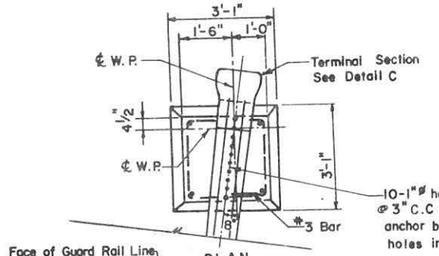
VOIDED BY CHANGE #7

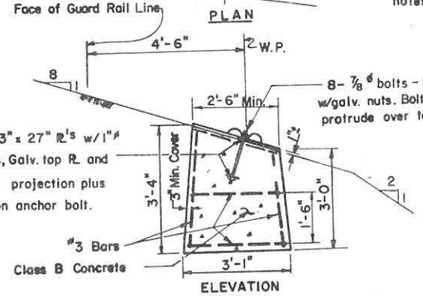
FORM 4697 REV. 7-69

TABLE A	
CURVATURE (Degree or Radius)	POST SPACING
8° (716 ft. rad.) or less	12'-6"
More than 8° to 26° (220 ft. rad.)	12'-6"
219 ft. to 111 ft.	6'-3"
110 ft. to 76 ft.	4'-2"
75 ft. to 50 ft.	3'-1½"
Less than 50 ft.	Restricted Use

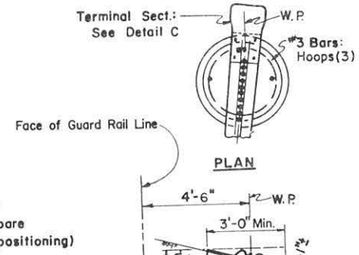


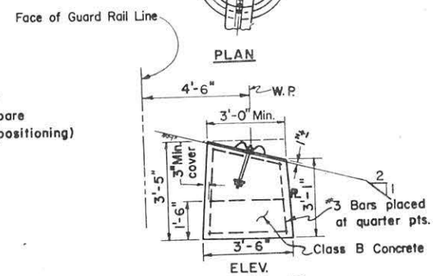
For details of installation of Type 2-W Guard Rail over underground structures, see Sheet 2 of 2, RC-52.



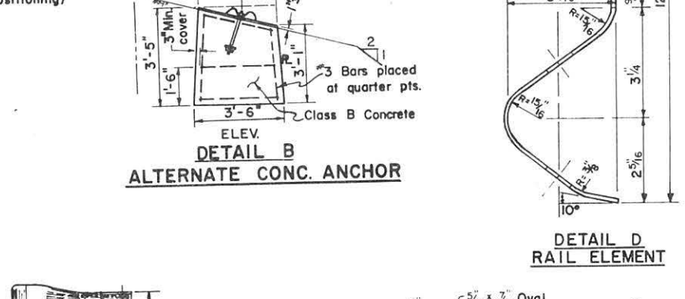


DETAIL A
CONCRETE ANCHOR

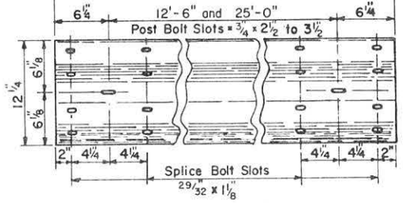




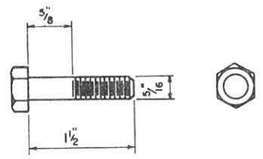
DETAIL B
ALTERNATE CONC. ANCHOR



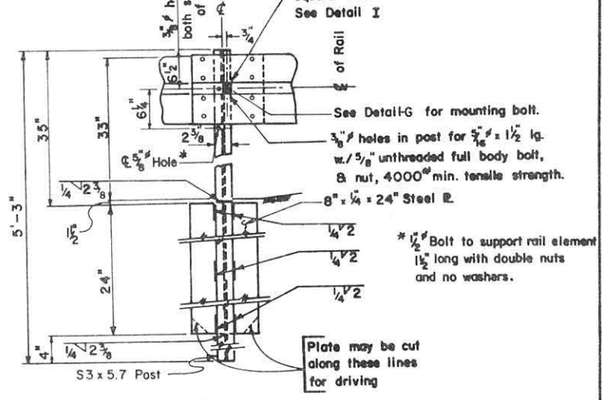
DETAIL D
RAIL ELEMENT



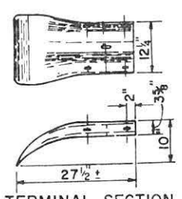
DETAIL E
TYPICAL RAIL SECTION



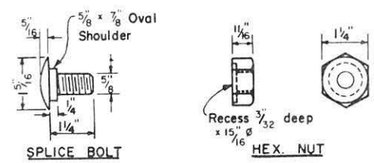
DETAIL G
5/16" DIA. HEX. BOLT



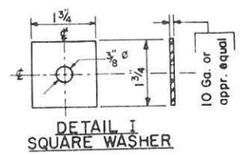
DETAIL H
2-W GUARD RAIL POST



TERMINAL SECTION
DETAIL C



DETAIL F
BEAM SPLICE HARDWARE



DETAIL I
SQUARE WASHER

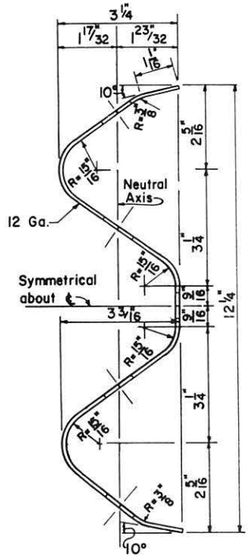
Placed in valley of beam for mounting to intermed. post.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

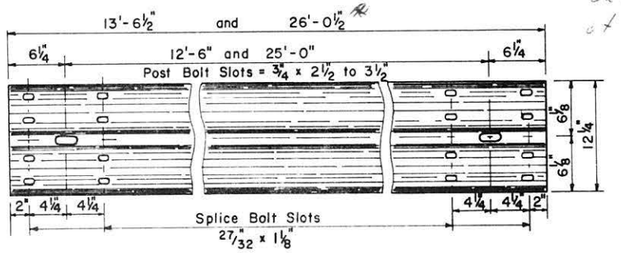
TYPE 2-W GUARD RAIL

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
R R Mueser	W. J. Reves	RC-53
Location & Design Engineer	Deputy Chief Hwy. Engr.	

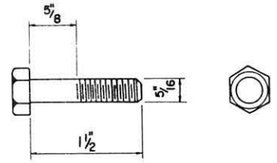
VOIDED BY CHANGE #1



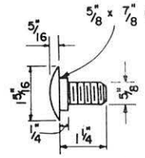
DETAIL D
RAIL ELEMENT



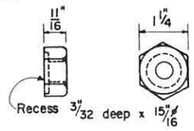
DETAIL E
TYPICAL RAIL SECTION



DETAIL G
5/16" DIA. HEX. BOLT

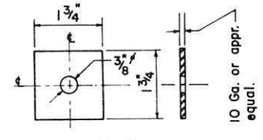


SPLICE BOLT



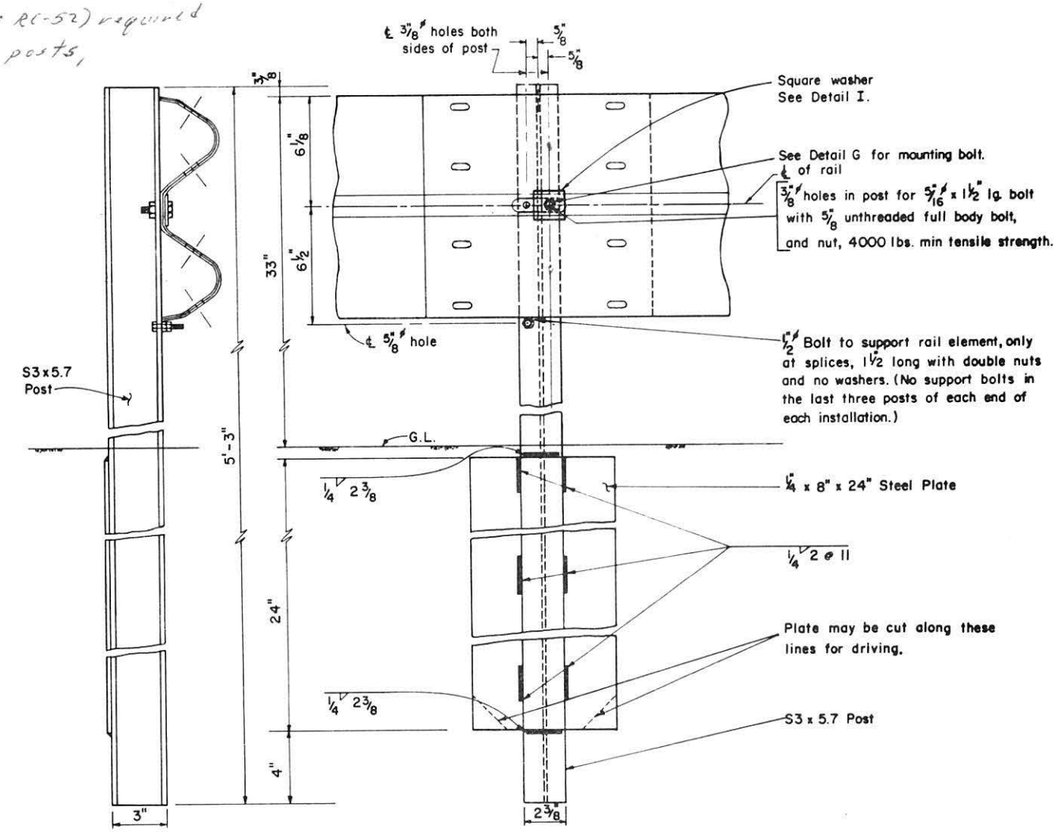
HEX NUT

DETAIL F
BEAM SPLICE HARDWARE

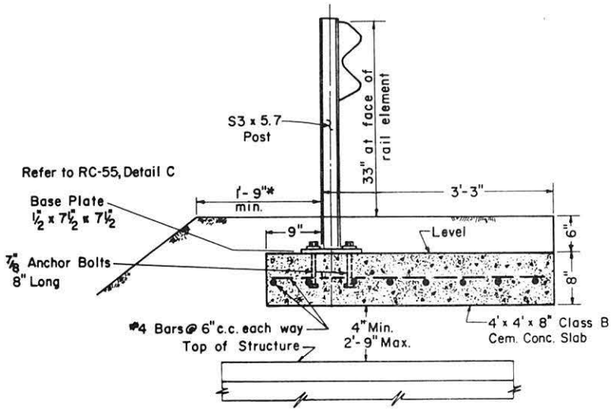


DETAIL I
SQUARE WASHER
Placed in valley of beam for mounting to intermediate post.

* holes for mounting bolt and backing plated (see RC-52) required at intermediate posts,



DETAIL H
TYPE 2-W & 2-WC GUARD-RAIL POST



GUARD RAIL OVER UNDERGROUND STRUCTURES

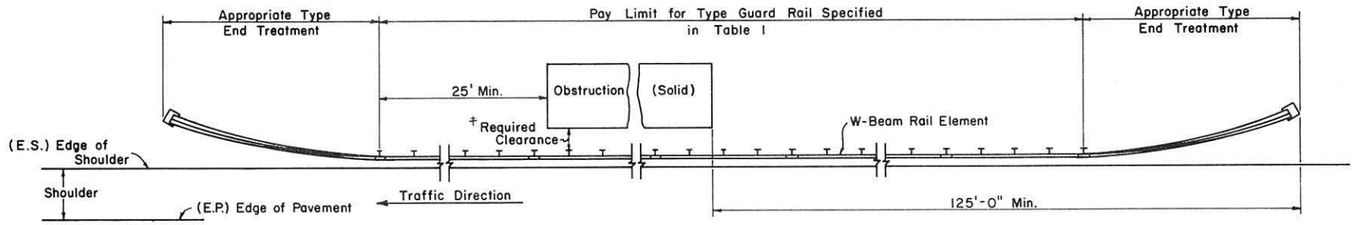
No separate payment will be made for installation of guard rail over underground structures. Class B Concrete, reinforcement bars and hardware shall be considered incidental to the guard rail pay item.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2-W AND 2-WC GUARD RAIL

Recommended Mar. 7, 1973	Approved Mar. 7, 1973	Sht. 2 Of 2
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-53

VOIDED
BY CHANGE #7

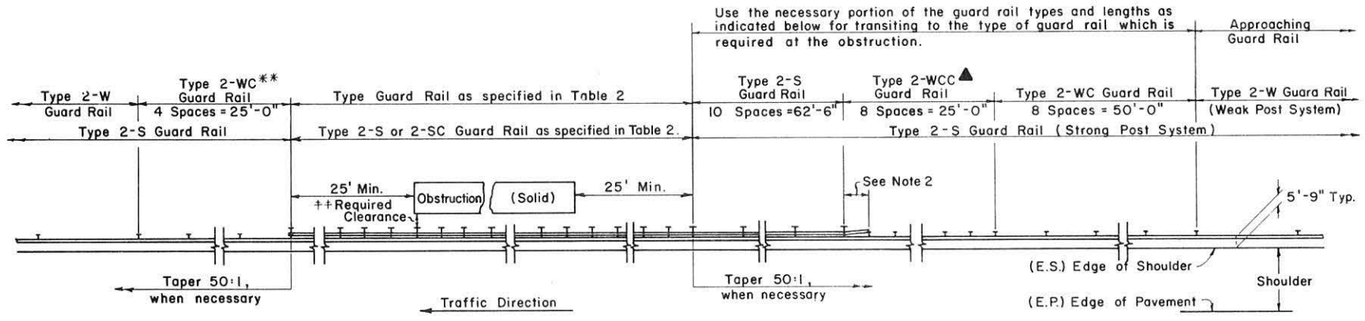


TREATMENT WHEN EDGE OF SHOULDER TO FACE OF OBSTRUCTION IS 3' OR GREATER WHERE CONTINUOUS GUARD RAIL IS NOT USED ◔

◔ If the situation requires continuous guard rail at one end and not continuous guard rail at the other end of an obstruction, an appropriate modification of the treatment should be used.

TABLE I

Dist. to Obst. from Edge of Shld.	Type of Guard Rail	† Required Clearance (Dist. to Obst. from Back of Post)
3' up to 6'	2-SC	1'-9"
6'-1" up to 8'	2-S	3'
8'-1" up to 12'	2-WC	5'
12'-1"& Greater	2-W	8'



** If 2-W or 2-WC Guard Rail is used at the obstruction this section of 2-WC Guard Rail may be eliminated.

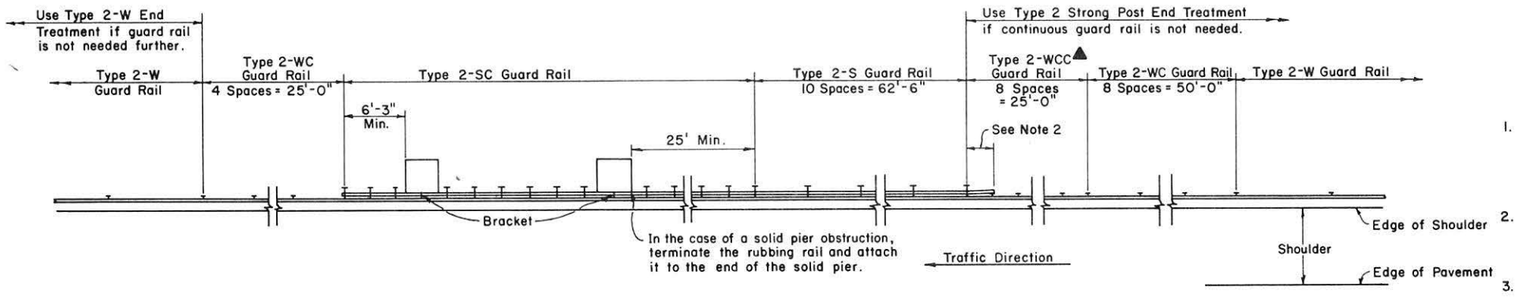
TREATMENT WHEN EDGE OF SHOULDER TO FACE OF OBSTRUCTION IS 3' OR GREATER WHERE CONTINUOUS GUARD RAIL IS USED ◔

TABLE 2

Type of Approaching Guard Rail	Dist. to Obst. from Edge of Shld.	Type of Guard Rail	†† Required ① Clearance (Dist. to Obst. from Back of Post)
Weak Post	3' up to 6'	2-SC	1'-9"
	6'-1" up to 7'	2-WCC	3'-9"
	7'-1" up to 14'	2-WC	5'
	14'-1"& Greater	2-W	8'
Strong Post	3' up to 6'	2-SC	1'-9"
	6'-1"& Greater	2-S	3'

① Maintain the alignment of the approaching guard rail, when it allows greater clearance (dist. from obstacle to back of post) than what is shown as the required clearance on the table.

▲ Details for Type 2-WCC Guard Rail shall conform to the requirements of Type 2-W with post spacing at 3'-1½"



TREATMENT WHEN EDGE OF SHOULDER TO FACE OF OBSTRUCTION IS LESS THAN 3'

NOTES

1. The treatments shown are for four lane divided highways. The appoach end side of the treatments should be used at both sides of the obstruction on two lane facilities with two way traffic.
2. This length of the Rubbing Rail is not to be included as part of the Type 2-WCC Guard Rail and should be incidental to the Type 2-S Guard Rail pay item.
3. This standard has been prepared as a guide for the placement of guard rail and median barrier. It is impractical to provide a standard for all possible conditions. Modifications of treatments can be made to fit existing conditions, however they shall follow recommended guide lines.

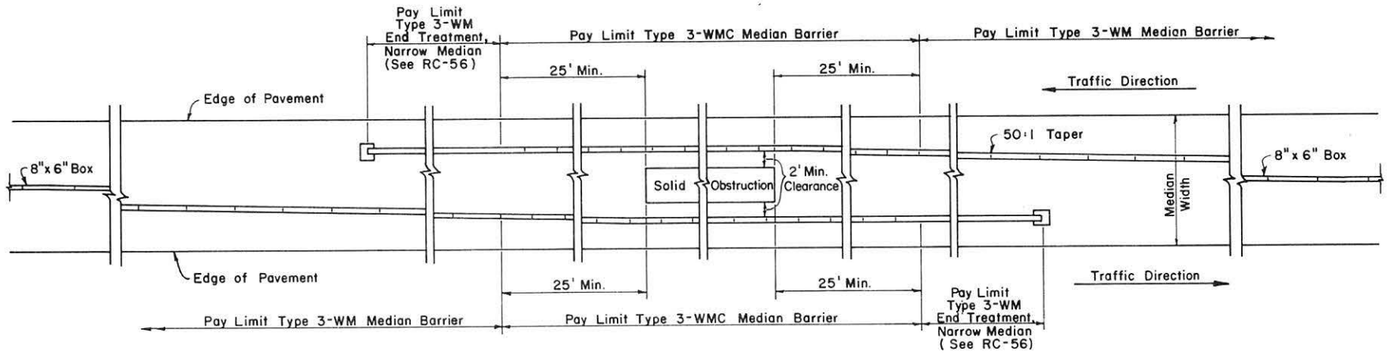
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUARD RAIL AND MEDIAN BARRIER PLACEMENT

Recommended June 1, 1976
B.D. Rowalis
Director, Bureau of Design

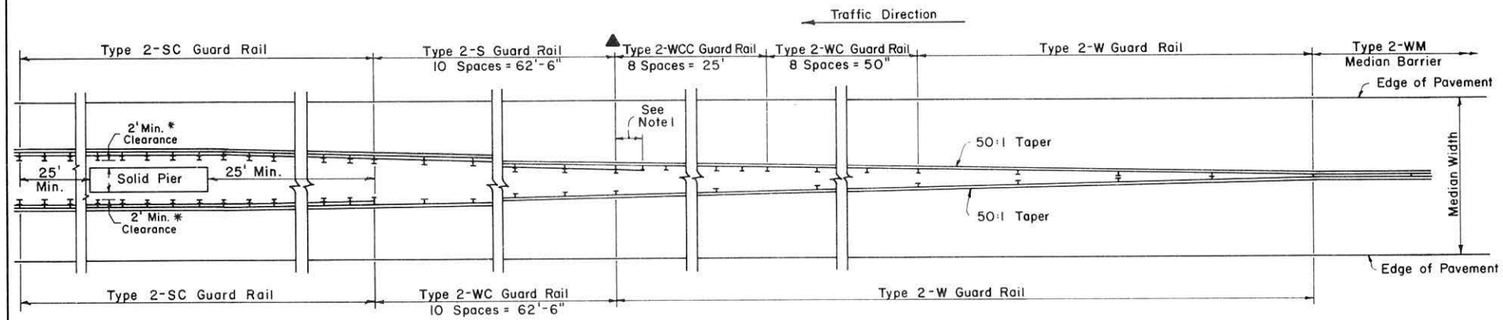
Approved June 1, 1976
Robert R. Mauser
Deputy Chief Hwy. Engineer

Sht. 1 Of 3
RC-54



TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS UP TO 16'
WHERE CONTINUOUS BARRIER IS USED

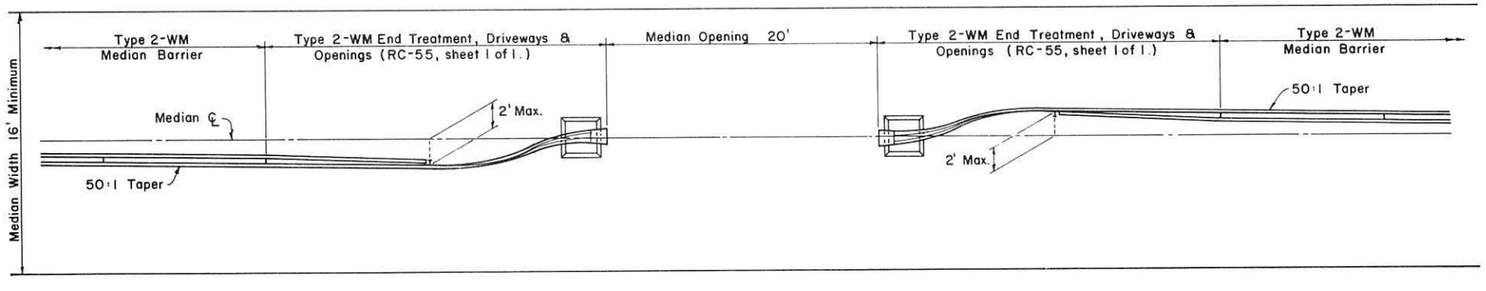
▲ Details for Type 2-WCC Guard Rail shall conform to the requirements of Type 2-W with post spacing at 3'-1½"



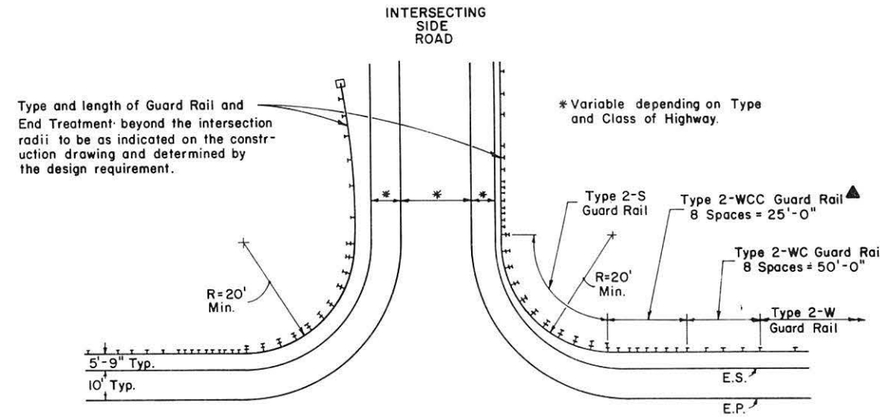
* See Notes 3 & 4

TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS GREATER THAN 16'
WHERE CONTINUOUS BARRIER IS USED ⊕

⊕ This treatment is intended for median widths up to 20'. In special instances where median barrier is used in median widths greater than 20' use appropriate type guard rail.



TREATMENT FOR TYPE 2-WM MEDIAN BARRIER CROSS-OVER



TREATMENT AT INTERSECTIONS

NOTES

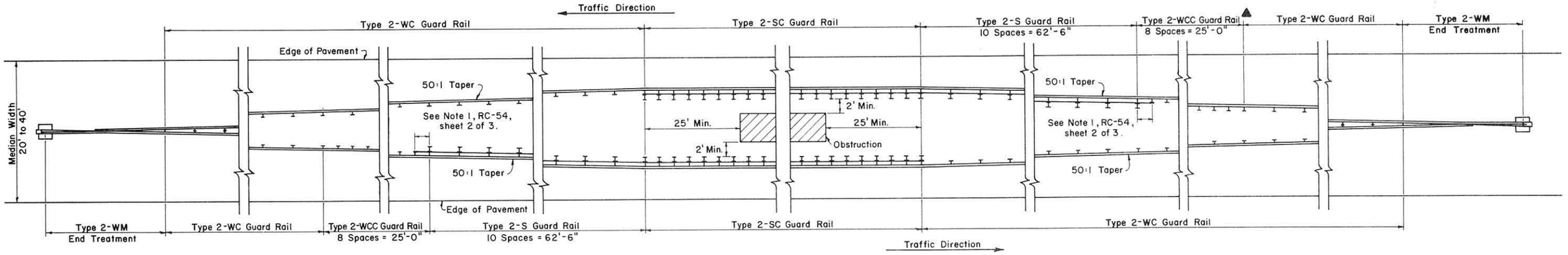
1. This length of the Rubbing Rail is not to be included as part of the Type 2-WCC Guard Rail and should be incidental to the Type 2-S Guard Rail pay item.
2. This standard has been prepared as a guide for the placement of guard rail and median barrier. It is impractical to provide a standard for all possible conditions. Modifications of treatments can be made to fit existing conditions, however they shall follow recommended guide lines.
3. If 2' minimum clearance is not available, fasten the guard rail to the obstruction and continue offset bracket spacing of 3'-1 up to the end of the obstruction.
4. When the guard rail is fastened to a solid obstruction, terminate the rubbing rail at each end and fasten it to the obstruction.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUARD RAIL AND MEDIAN BARRIER PLACEMENT

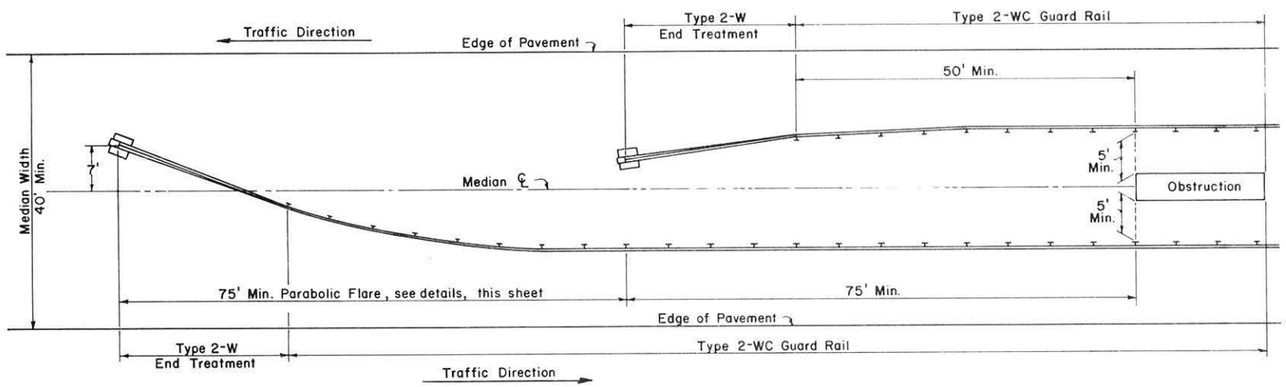
Recommended June 1, 1976	Approved June 1, 1976	Sht. 2 Of 3
B.D. Gaudio	Robert R. Monroe	RC-54
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

TRACED BY
FINAL BY

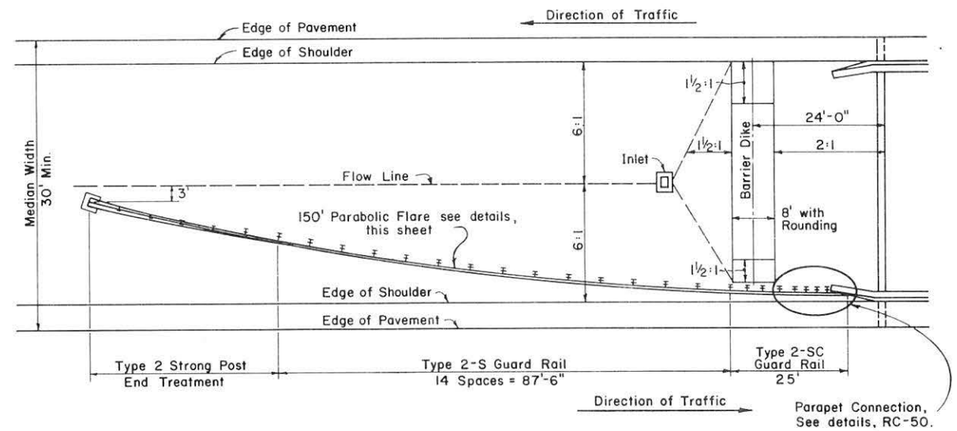


TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS OF 20' TO 40' WHERE CONTINUOUS BARRIER IS NOT USED

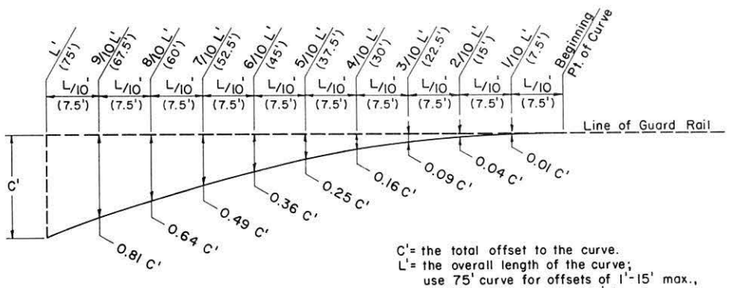
▲ Details for Type 2-WCC Guard Rail shall conform to the requirements of Type 2-W with post spacing at 3'-1½"



TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS OF 40' OR GREATER WHERE CONTINUOUS BARRIER IS NOT USED

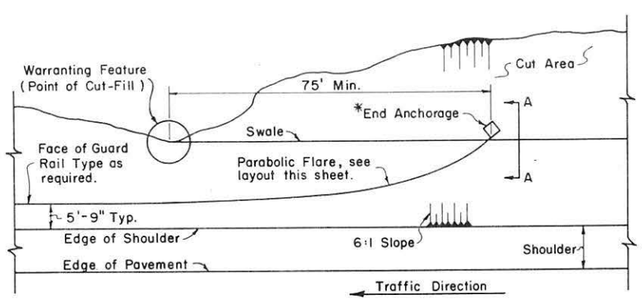


MEDIAN TREATMENT AT DUAL STRUCTURES

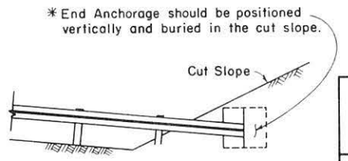


C'= the total offset to the curve.
L'= the overall length of the curve; use 75' curve for offsets of 1'-15' max., for larger offsets, use 150' length curve. (Distances for a 75' curve are shown in parentheses.)

PARABOLIC FLARE LAYOUT



TREATMENT - CUT TO FILL CONDITIONS



Payment for end anchorage shall include excavation, concrete, reinf. & hardware. See Details A & B, RC-55. (Terminal section not required.)

SECTION A-A

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

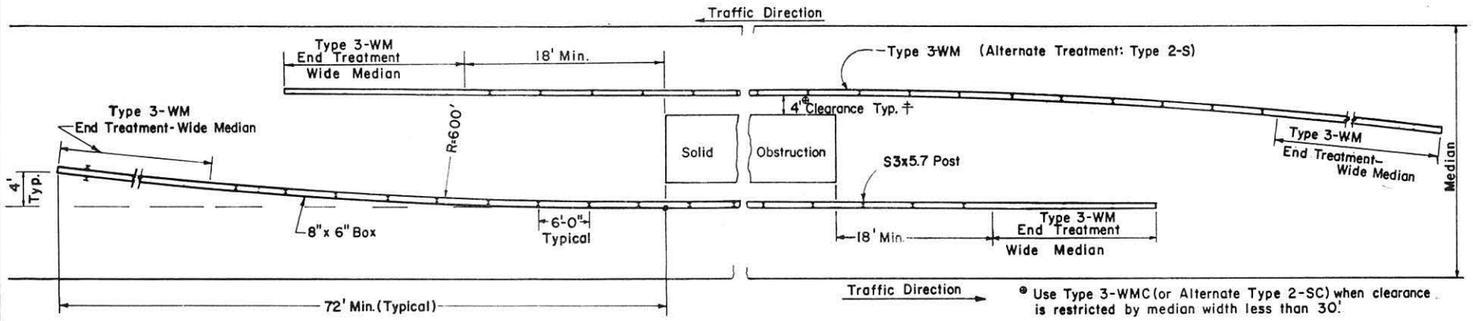
GUARD RAIL AND MEDIAN BARRIER PLACEMENT

Recommended June 1, 1976
B.D. Rambie
Director, Bureau of Design

Approved June 1, 1976
Robert P. Messner
Deputy Chief Hwy. Engr.

Sht. 3 Of 3
RC-54

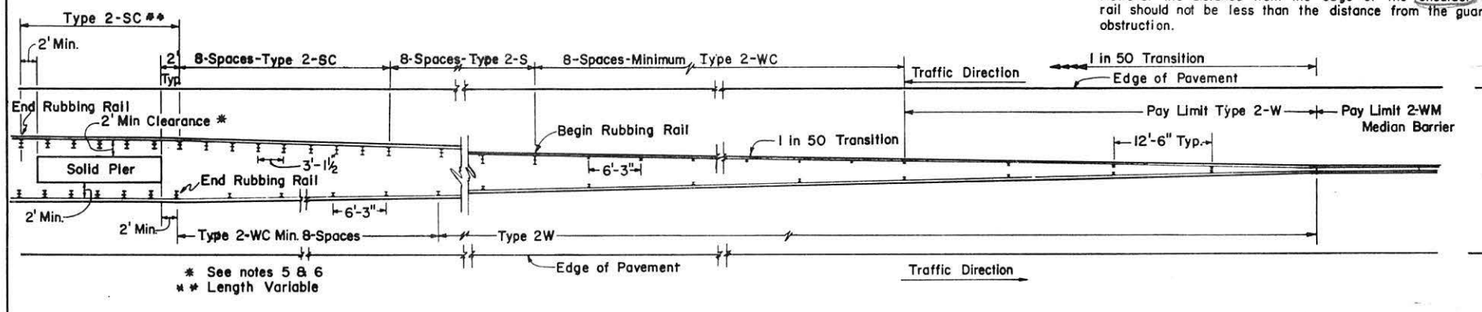
FORM 4237 REV. 7-69



* Use Type 3-WMC (or Alternate Type 2-SC) when clearance is restricted by median width less than 30'.

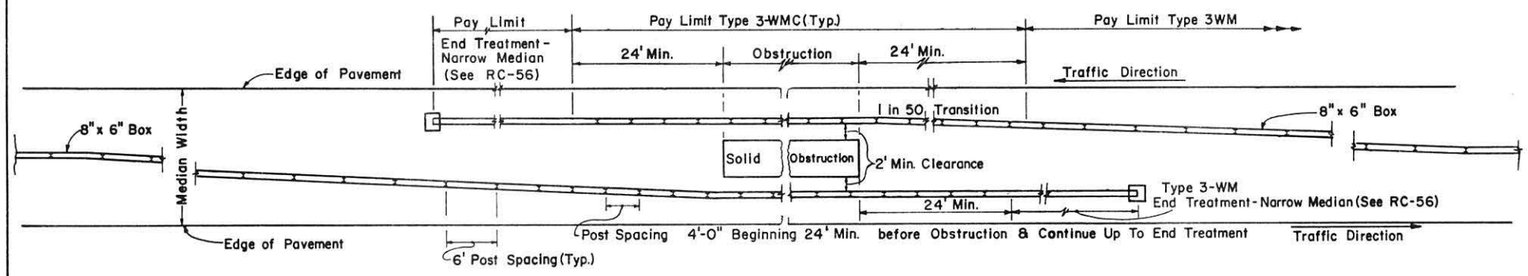
BARRIER TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS WHERE CONTINUOUS BARRIER IS NOT USED

† Where there is adequate distance from the edge of the pavement to the face of the obstruction, the use of 2-W Guard Rail is permissible. However the distance from the edge of the shoulder to the guard rail should not be less than the distance from the guard rail to the obstruction.

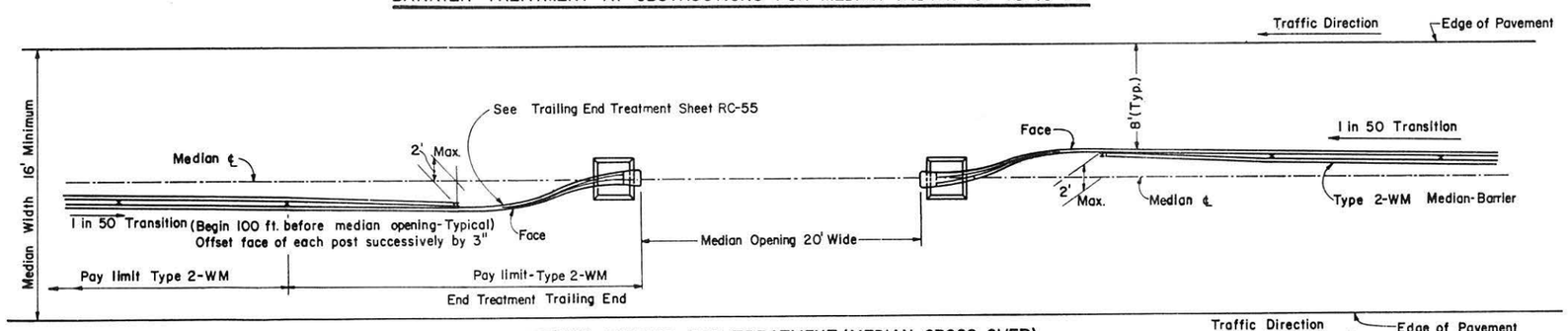


* See notes 5 & 6
** Length Variable

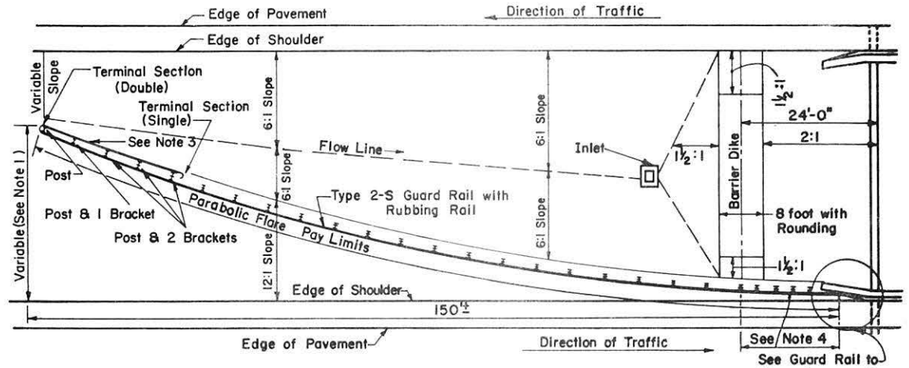
BARRIER TREATMENT AT OBSTRUCTIONS ON ALL MEDIANS GREATER THAN 16' WHEN TYPE 2-WM MEDIAN BARRIER IS USED



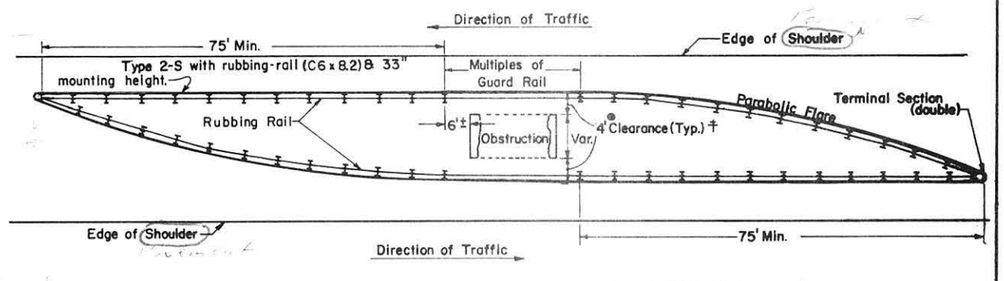
BARRIER TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS UP TO 16 FT.



MEDIAN BARRIER END TREATMENT (MEDIAN CROSS-OVER)



PLACEMENT WITH ADJACENT STRUCTURES



ALTERNATE BARRIER TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS WHERE CONTINUOUS BARRIER IS NOT USED

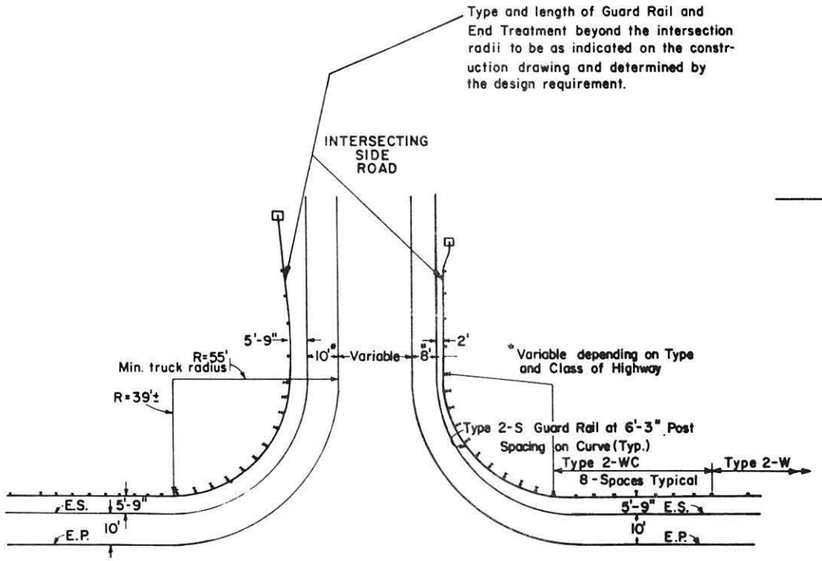
1. This offset to be 32 feet for median widths of 60 feet or more, and 16 feet for medians less than 60 feet.
2. This standard has been prepared as a guide for the placement of guard rail. It is impractical to provide a standard for all possible conditions. Modifications to be made as directed in field.
3. The 25 foot return section of rail element, on the back, will not be measured.
4. No separate or additional payment will be made for additional post or block outs for 3'-1½" post spacing.
5. If 2ft. minimum clearance is not available, fasten the guard rail to the obstruction and continue offset bracket spacing of 3'-1½" up to the end of obstruction.
6. When the guard rail is fastened to a solid obstruction, terminate the rubbing rail at each end and fasten it to the obstruction.

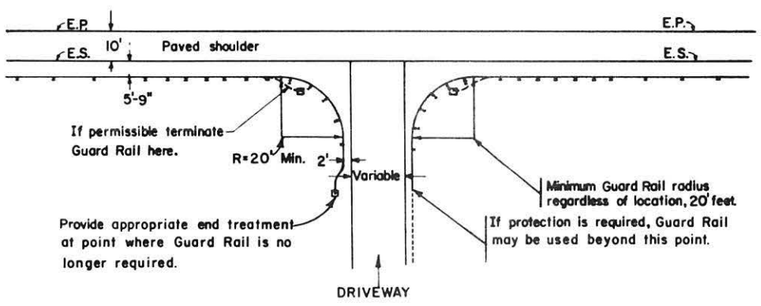
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUARD RAIL & MEDIAN BARRIER PLACEMENT

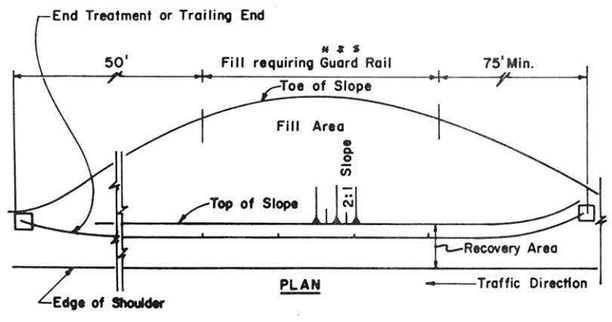
Recommended Mar. 7, 1973	Approved Mar. 7, 1973	Sht. 1 Of 2
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-54

VOIDED BY CHANGE #7



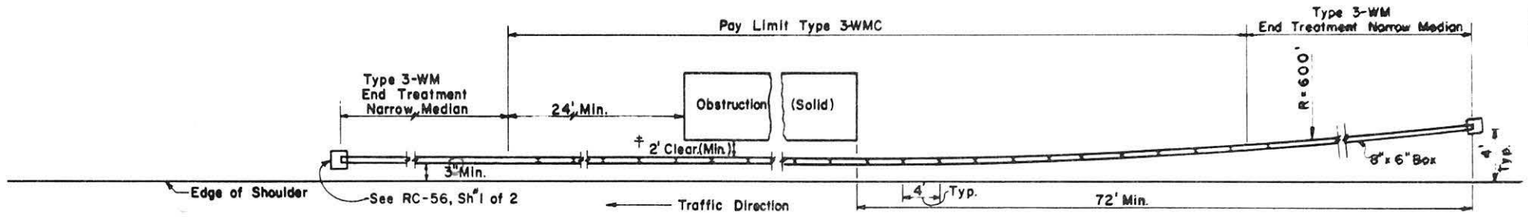


TREATMENT - INTERSECTIONS



* * * Chapter 15, Design Manual II should be consulted while establishing the location of the beginning and ending of this length of Guard Rail. The final decision is at the discretion of the designer and the field engineer. Adequate length (Minimum 75') at approach end is essential to ensure safety.

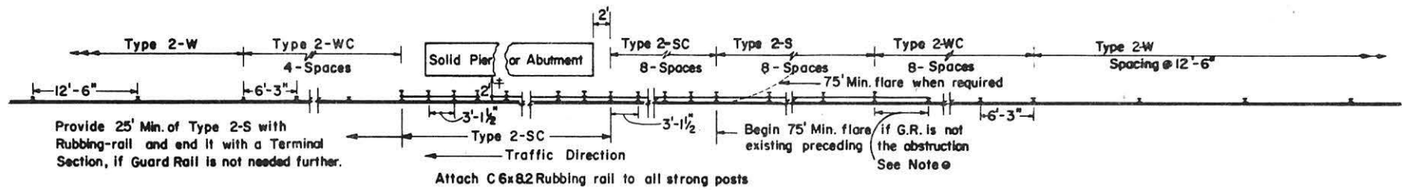
TREATMENT FOR FILL CONDITIONS



TREATMENT WHEN EDGE OF PAVEMENT TO FACE OF OBSTRUCTION IS 13' OR GREATER

For alternate Strong Post W Beam Treatment, Refer to Sketch Below

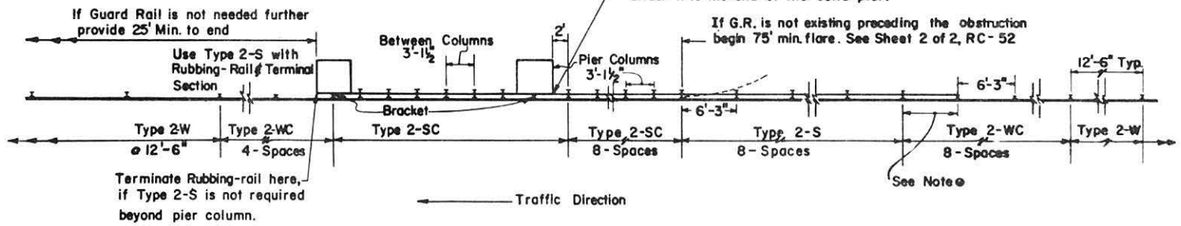
† Where there is adequate distance from the edge of the pavement to the face of the obstruction, the use of 2-W Guard Rail is permissible. However the distance from the edge of the shoulder to the Guard Rail should not be less than the distance from the Guard Rail to the obstruction.



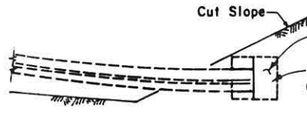
Attach C6x8.2 Rubbing rail to all strong posts

TREATMENT WHEN DISTANCE FROM PAVEMENT EDGE TO FACE OF OBSTRUCTION IS 13' OR GREATER

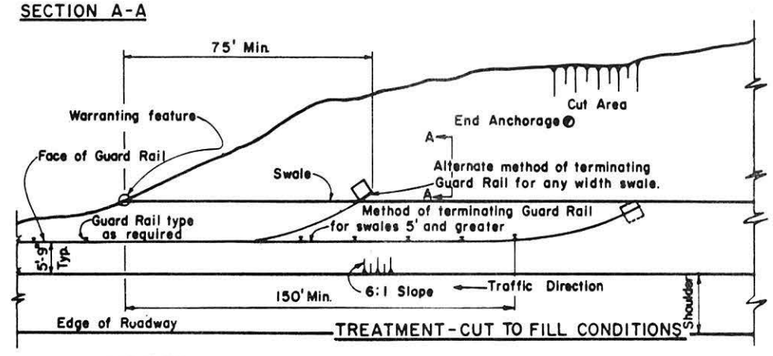
● This length of Rubbing-rail shall be included as part of the Type 2-S or Type 2-SC Guard Rail pay item.



TREATMENT WHEN DISTANCE FROM EDGE OF PAVEMENT TO FACE OF OBSTRUCTION IS LESS THAN 13'



SECTION A-A



TREATMENT - CUT TO FILL CONDITIONS

● End Anchorage should be positioned vertically and buried in cut slope.

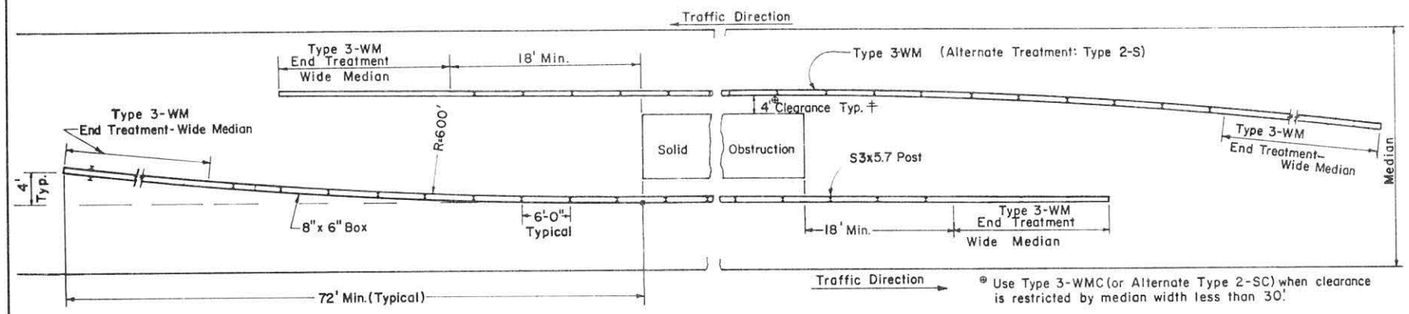
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUARD RAIL AND MEDIAN BARRIER PLACEMENT

Recommended Mar. 7, 1975	Approved Mar. 7, 1975	SHT 2 OF 2
Director, Bureau of Design	Deputy Chief Hwy Engineer	RC-54

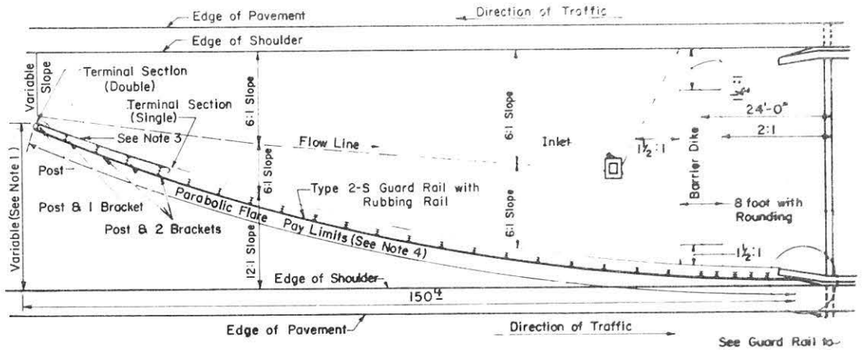
VOIDED BY CHANGE #7

FORM 4237 REV. 7-68

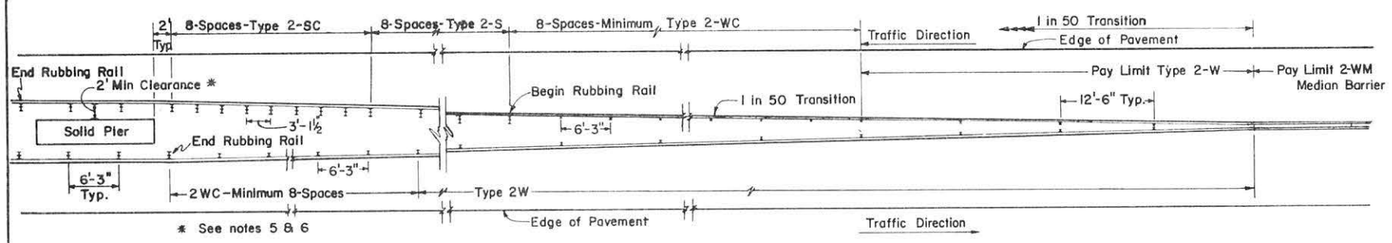


BARRIER TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS WHERE CONTINUOUS BARRIER IS NOT USED

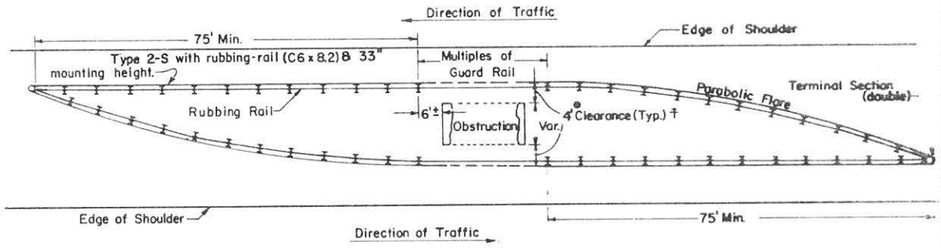
† Where there is adequate distance from the edge of the pavement to the face of the obstruction, the use of 2-W Guard Rail is permissible. However the distance from the edge of the shoulder to the guard rail should not be less than the distance from the guard rail to the obstruction.



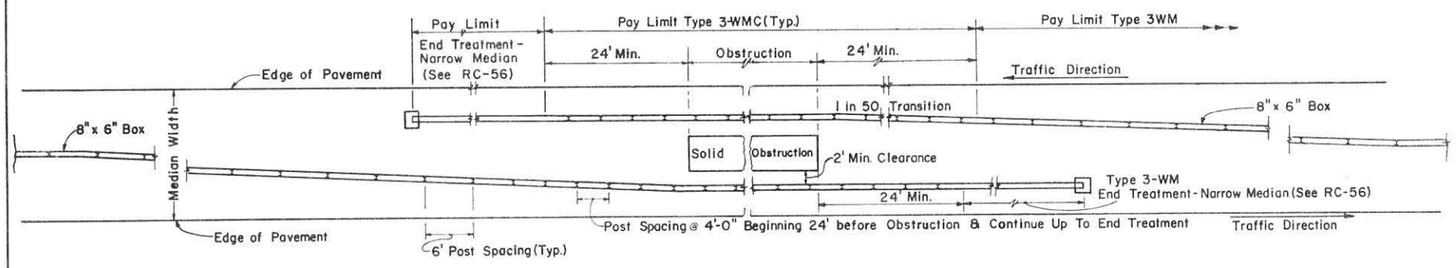
PLACEMENT WITH ADJACENT STRUCTURES



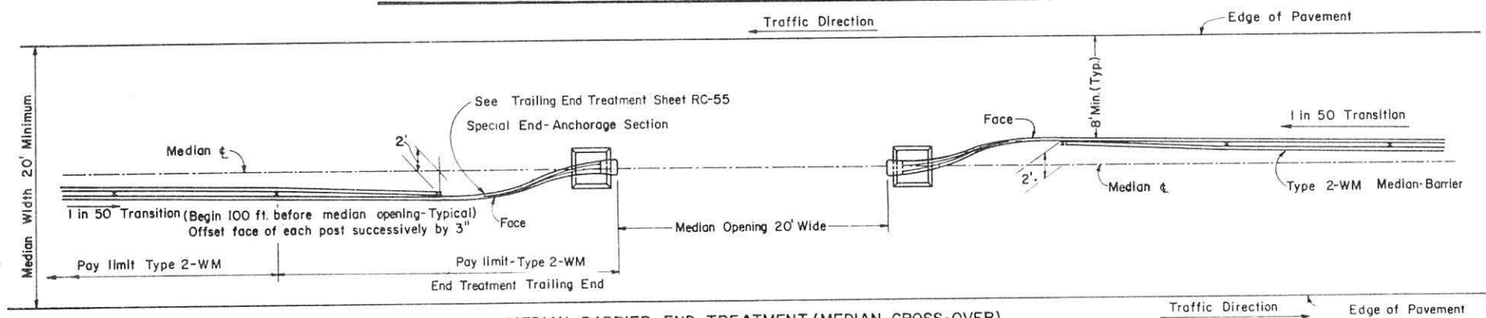
BARRIER TREATMENT AT OBSTRUCTIONS ON ALL MEDIANS OF 16' TO 20' WIDTH & UP TO 30' WHEN ADT EXCEEDS 20,000



ALTERNATE BARRIER TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS WHERE CONTINUOUS BARRIER IS NOT USED



BARRIER TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS UP TO 16 FT.



MEDIAN BARRIER END TREATMENT (MEDIAN CROSS-OVER)

1. This offset to be 32 feet for median widths of 60 feet or more, and 16 feet for medians less than 60 feet.
2. This standard has been prepared as a guide for the placement of guard rail. It is impractical to provide a standard for all possible conditions. Modifications to be made as directed in field.
3. The 25 foot return section of rail element, on the back, will not be measured.
4. No separate or additional payment will be made for additional post or block outs for 3'-1½" post spacing.
5. If 2ft. minimum clearance is not available, fasten the guard rail to the obstruction and continue offset bracket spacing of 3'-1½" up to the end of obstruction.
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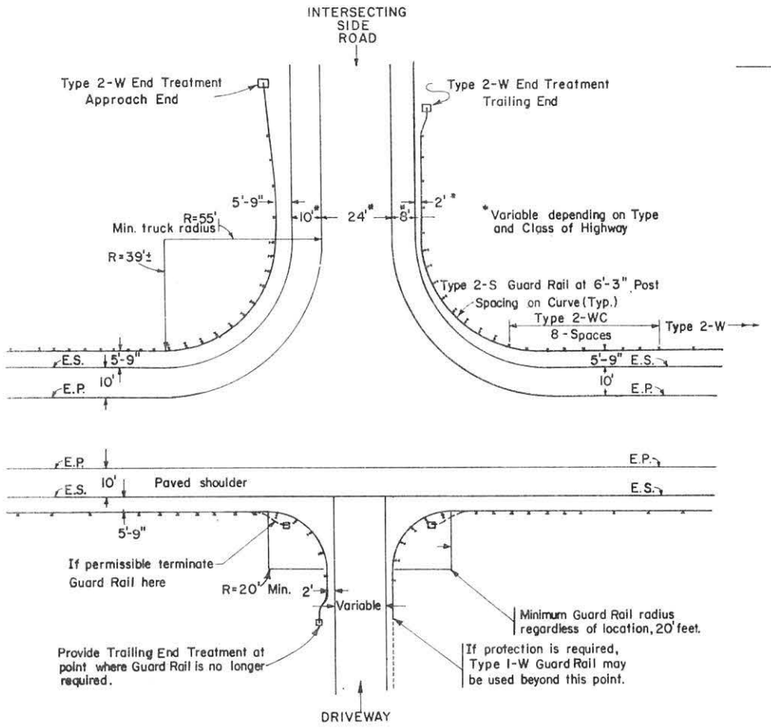
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUARD RAIL & MEDIAN BARRIER PLACEMENT

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht 1 Of 2
R R Moore		RC-54
Location & Design Engineer	Deputy Chief Hwy. Engr.	

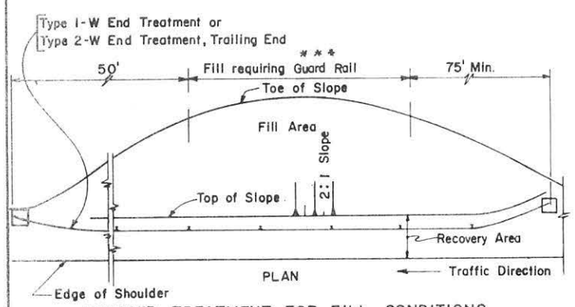
VOIDED BY CHANGE #1

FORM 4237 REV. 7-69

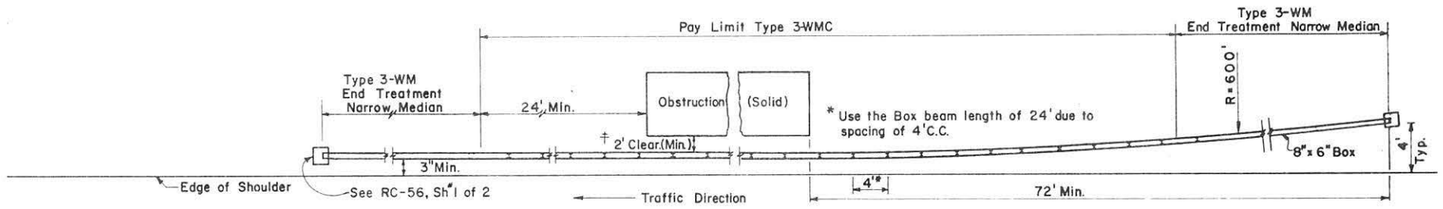


BARRIER TREATMENT - INTERSECTIONS

*** Chapter 15, Design Manual II should be consulted while establishing the location of the beginning and ending of this length of guard rail. The final decision is at the discretion of the designer and the field engineer. Adequate length (Minimum 75') at approach end is essential to ensure safety.



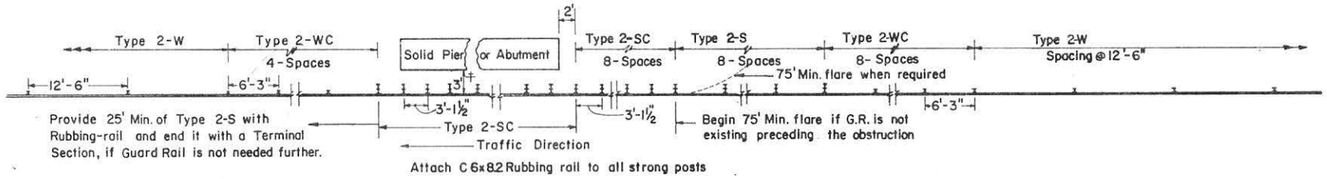
BARRIER TREATMENT FOR FILL CONDITIONS



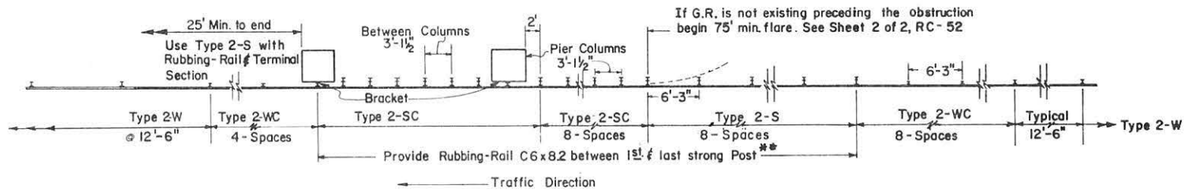
BARRIER TREATMENT WHEN EDGE OF PAVEMENT TO FACE OF OBSTRUCTION IS 13' OR GREATER

For alternate Strong Post W Beam Treatment, Refer to Sketch Below

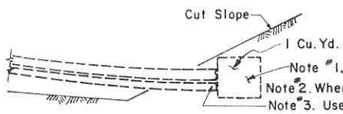
† Where there is adequate distance from the edge of the pavement to the face of the obstruction, the use of 2-W Guard Rail is permissible. However the distance from the edge of the shoulder to the Guard Rail should not be less than the distance from the Guard Rail to the obstruction.



BARRIER TREATMENT WHEN DISTANCE FROM PAVEMENT EDGE TO FACE OF OBSTRUCTION IS 13' OR GREATER

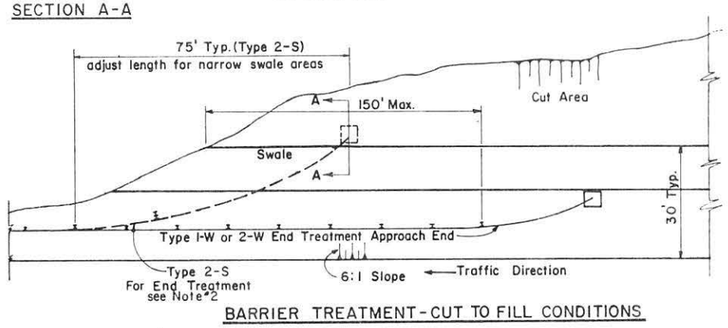


BARRIER TREATMENT WHEN DISTANCE FROM EDGE OF PAVEMENT TO FACE OF OBSTRUCTION IS LESS THAN 13'



** Terminate Rubbing Rail at the end of Solid Pier Obstructions and Attach Rail to the end of the Obstruction. Do not continue the Rubbing Rail through the length of the Obstruction.

SECTION A-A



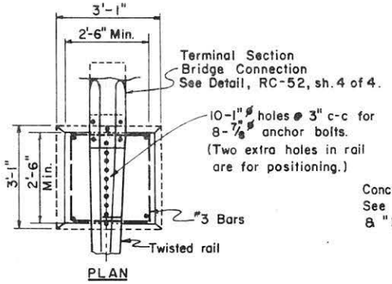
BARRIER TREATMENT - CUT TO FILL CONDITIONS

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

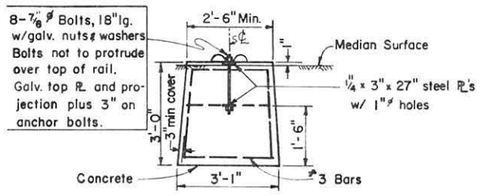
GUARD RAIL AND MEDIAN BARRIER PLACEMENT

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 2 Of 2
RR Musser	W.J. Raver	RC-54
Location & Design Engineer	Deputy Chief Hwy. Engineer	

VOIDED BY CHANGE #1

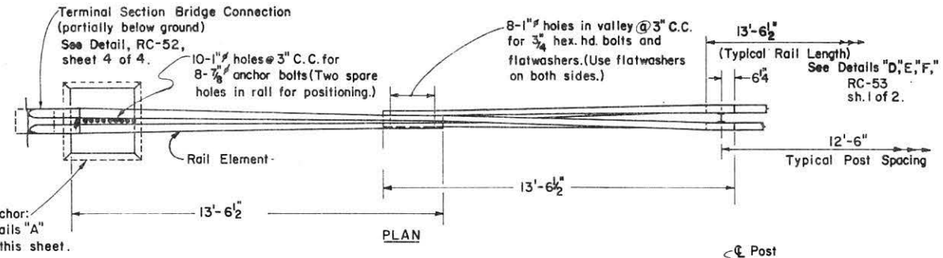


PLAN

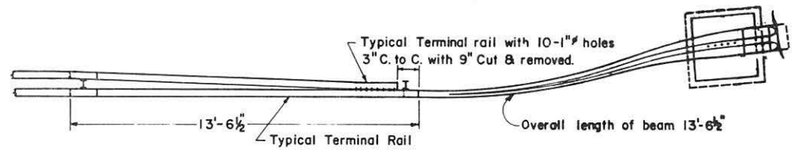


ELEVATION

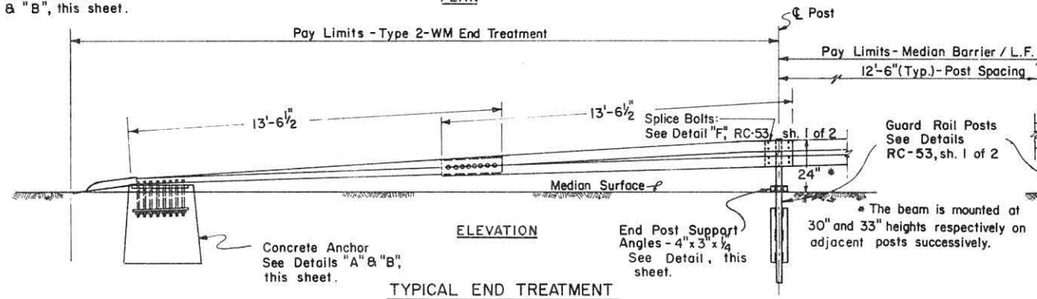
DETAIL "A"
CONCRETE ANCHOR



PLAN

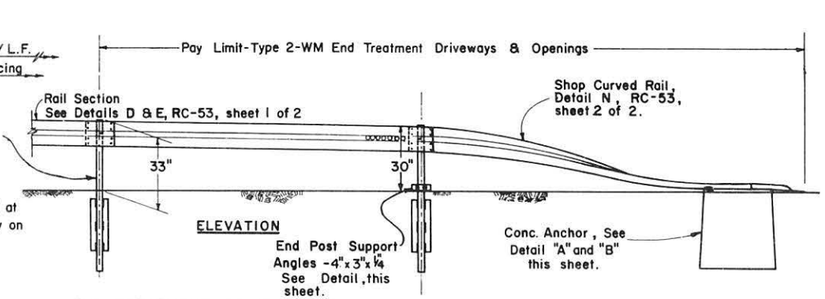


PLAN



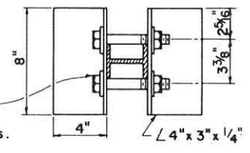
ELEVATION

TYPICAL END TREATMENT

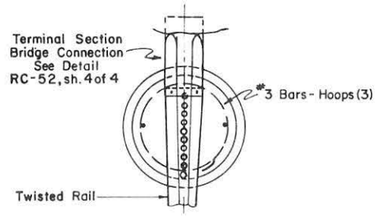


ELEVATION

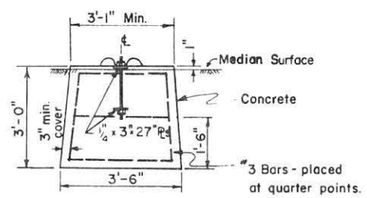
END TREATMENT DRIVEWAYS & OPENINGS



END POST SUPPORT ANGLES

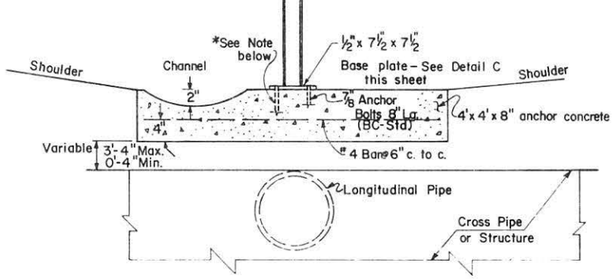


PLAN



ELEVATION

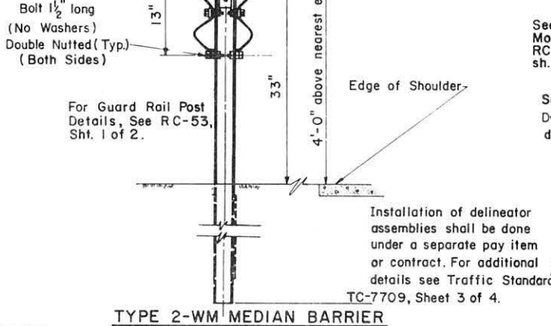
DETAIL "B"
ALTERNATE CONC. ANCHOR



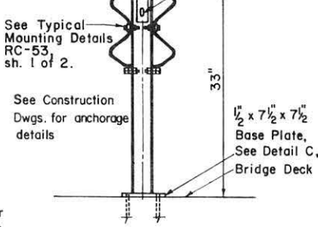
TYPICAL INSTALLATION WHEN CROSSING UNDERGROUND STRUCTURE

No separate payment will be made for this type construction. See Note 1 on RC-52 sheet 2 of 4

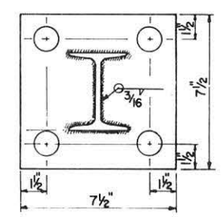
* For anchorage to existing bridge decks and divisors, see Bridge Construction Drawings.



TYPE 2-WM MEDIAN BARRIER
WITH TRAFFIC DELINEATOR BRACKET

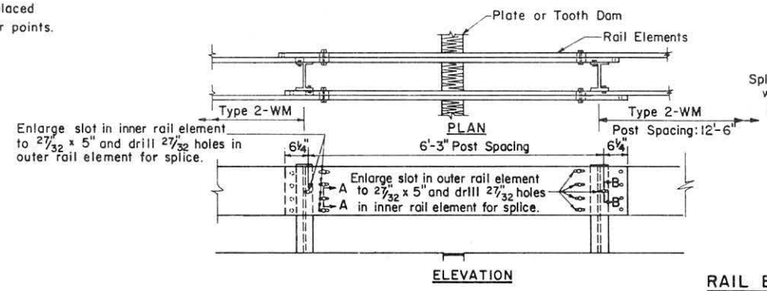


STRUCTURE MOUNTED BARRIER
(Existing Structure)



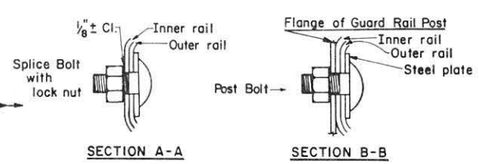
BASE PLATE DETAIL C

Note: All holes 1" ø unless otherwise noted. All welds 3/16". Use the same Base Plate Details all Type 2-W & 2-WC Guard Rail Posts.



ELEVATION

RAIL EXPANSION JT. DETAIL



SECTION A-A

SECTION B-B

No separate or additional payments will be made for installing Rail Expansion Joints.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

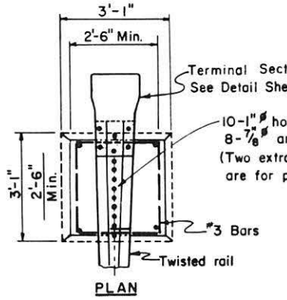
TYPE 2 WEAK POST MEDIAN BARRIER

Recommended June 1, 1976
B.D. Barbis
Director, Bureau of Design

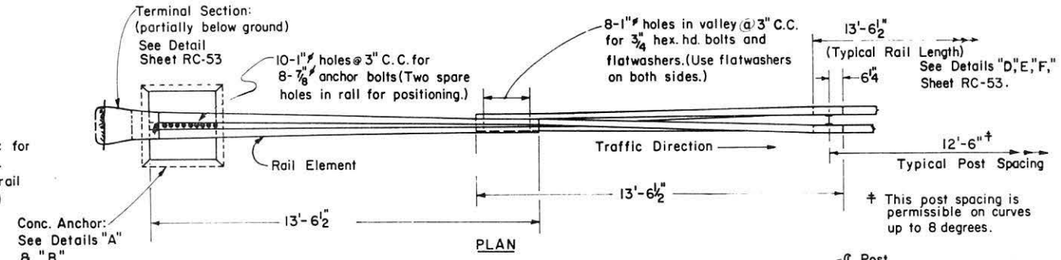
Approved June 1, 1976
Robert R. Moore
Deputy Chief Highway Engr.

Std. 1 of 1
RC-55

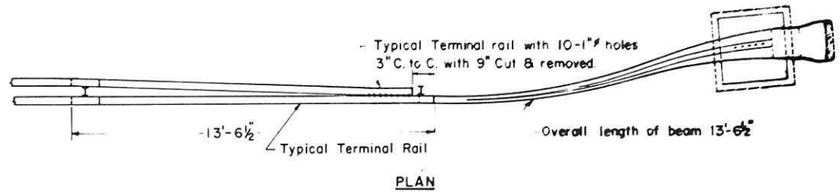
TRACED BY
DETAIL BY



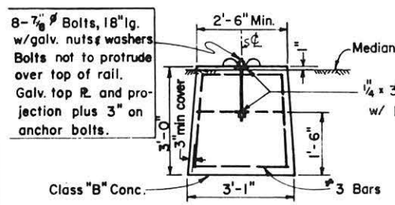
PLAN



PLAN

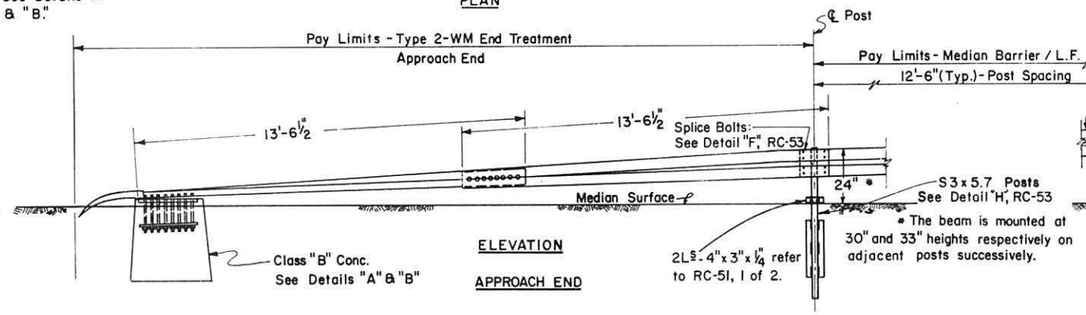


PLAN



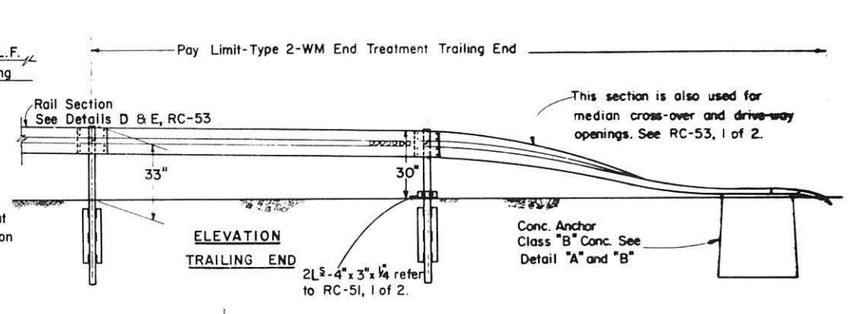
ELEVATION

DETAIL "A"
CONCRETE ANCHOR



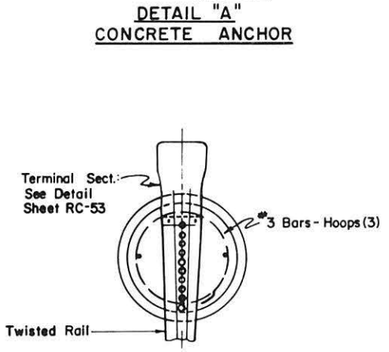
ELEVATION

APPROACH END

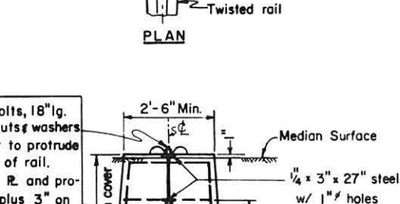


ELEVATION

TRAILING END

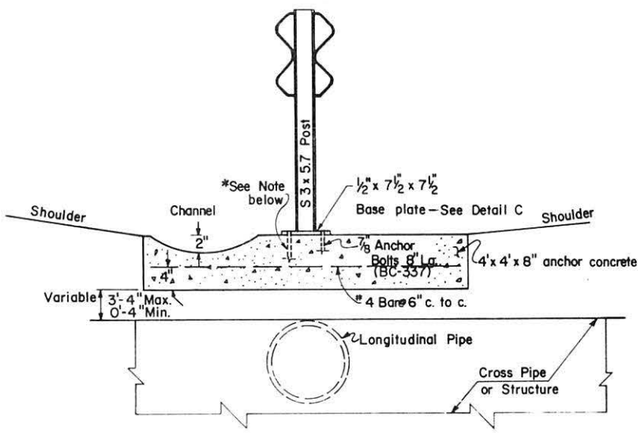


PLAN



ELEVATION

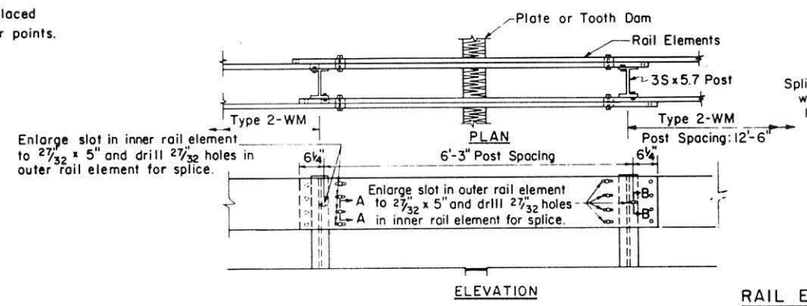
DETAIL "B"
ALTERNATE CONC. ANCHOR



TYPICAL INSTALLATION WHEN CROSSING UNDERGROUND STRUCTURE

No separate payment will be made for this type construction. See Note 5 on RC-52 sheet 2 of 2.

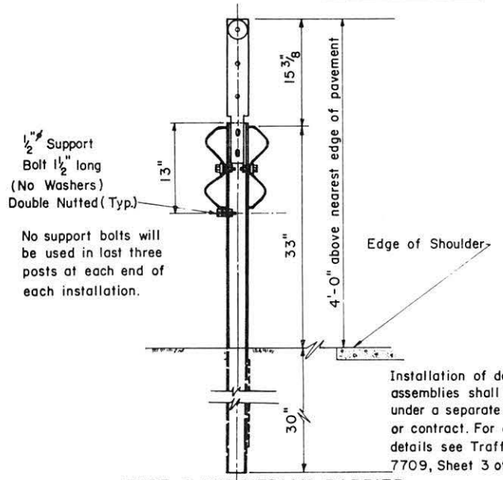
* For anchorage to existing bridge decks and divisors, see Bridge Construction Drawings.



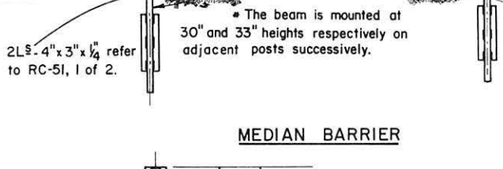
PLAN

ELEVATION

MEDIAN BARRIER

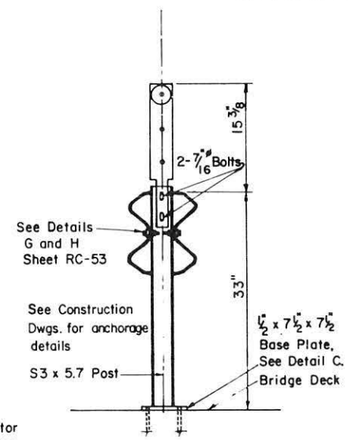


TYPE 2-WM MEDIAN BARRIER
WITH TRAFFIC DELINEATOR BRACKET

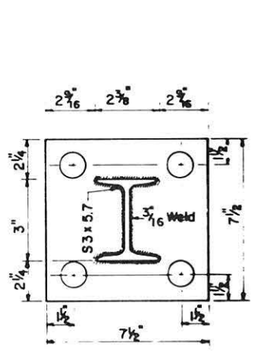


No separate or additional payments will be made for installing Rail Expansion Joints.

RAIL EXPANSION JT. DETAIL



STRUCTURE MOUNTED BARRIER
(Existing Structure)



BASE PLATE DETAIL C

Note: All holes 1" ϕ unless otherwise noted. All Welds 3/16"

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

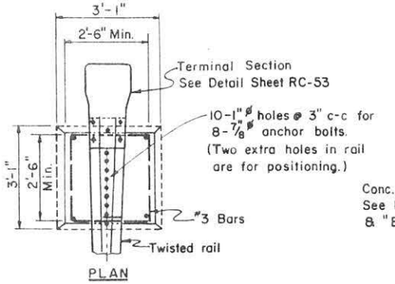
TYPE 2-WM MEDIAN BARRIER

Recommended Mar. 7, 1973
Director, Bureau of Design

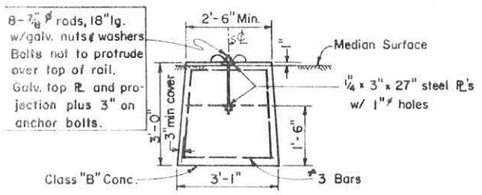
Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

SHT. 1 OF 1
RC-55

VOIDED BY CHANGE #7

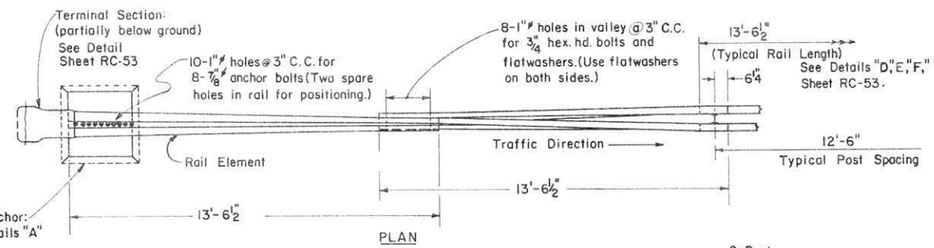


PLAN

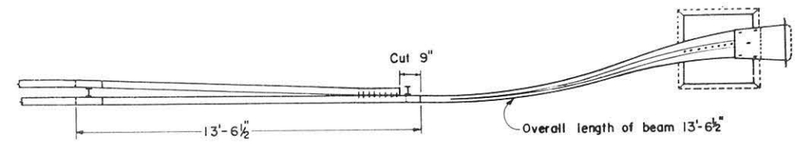


ELEVATION

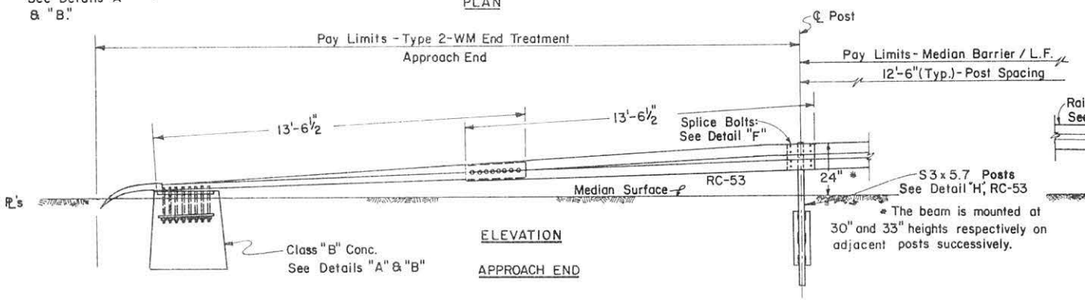
DETAIL "A" CONCRETE ANCHOR



PLAN

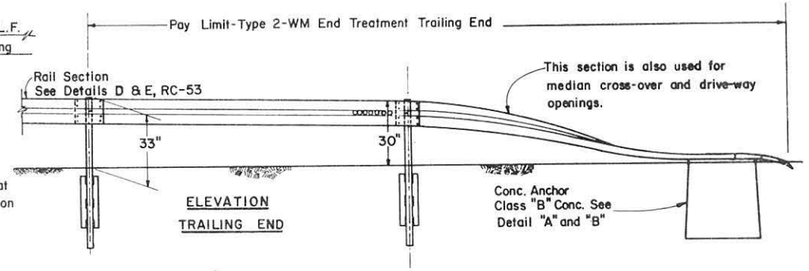


PLAN



ELEVATION

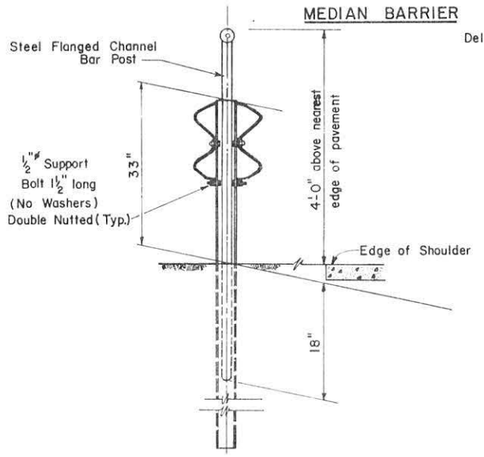
APPROACH END

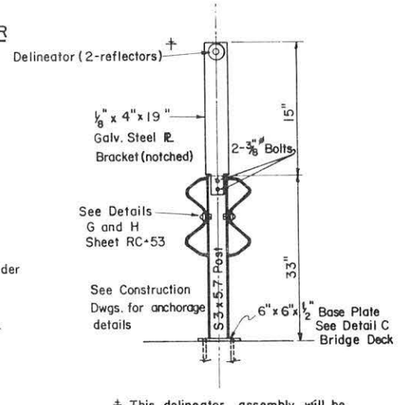


ELEVATION

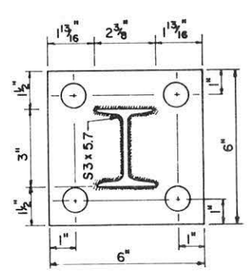
TRAILING END

MEDIAN BARRIER



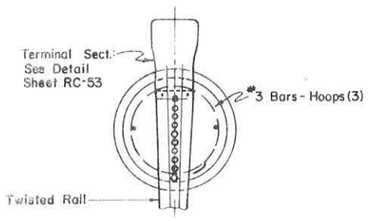


† This delineator assembly will be considered incidental to the median barrier item.

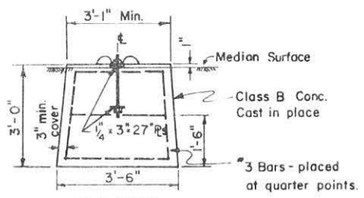


BASE PLATE DETAIL C

Note: All holes 7/8" ø unless otherwise noted. All Welds 3/16"

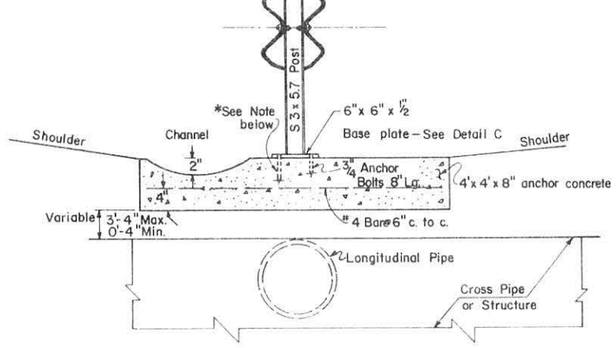


PLAN



ELEVATION

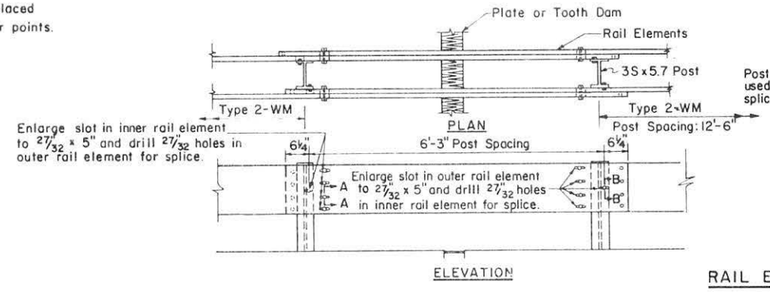
DETAIL "B" ALTERNATE CONC. ANCHOR



TYPICAL INSTALLATION WHEN CROSSING UNDERGROUND STRUCTURE

No separate payment will be made for this type construction.

* For anchorage to existing bridge decks and divisors, see Bridge Construction Drawings.

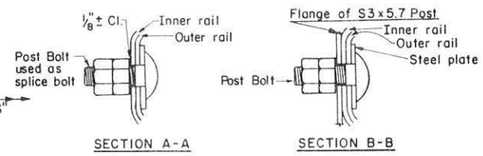


ELEVATION

RAIL EXPANSION JT. DETAIL

TRAFFIC DELINEATOR

Note: Delineator Spacing 200 ft.
For additional details refer sheet
1 of 3 Traffic Standard 7709



SECTION A-A

SECTION B-B

No separate or additional payments will be made for installing Rail Expansion Joints.

STRUCTURE MOUNTED BARRIER

(Existing Structure)

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

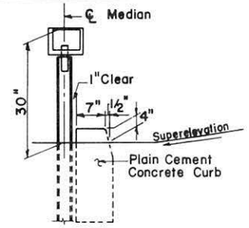
TYPE 2-WM MEDIAN BARRIER

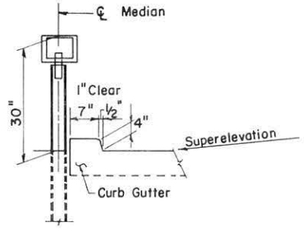
Recommended Dec. 1, 1971
R R Musser
Location & Design Engr.

Approved Dec. 1, 1971
W. J. Ravier
Deputy Chief Hwy. Engr.

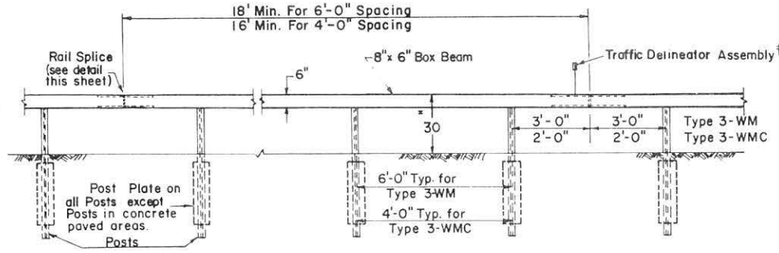
Sht. 1 of 1
RC-55

VOIDED BY CHANGE #1



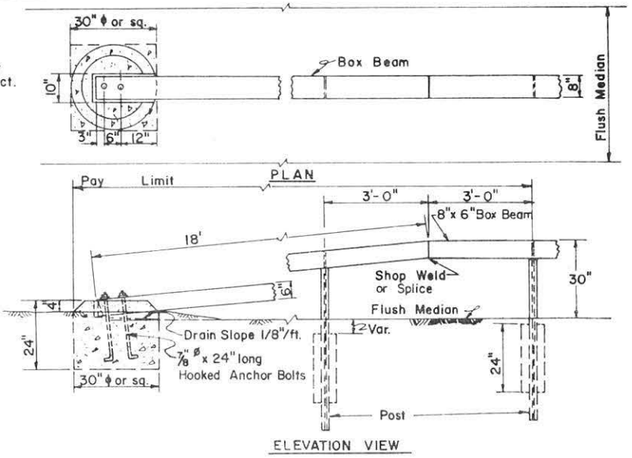


METHODS FOR CONTROLLING MEDIAN DRAINAGE

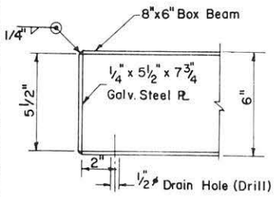


TYPICAL RAIL SPLICE & POST SPACING

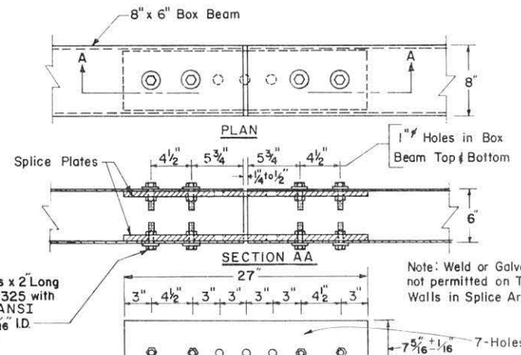
† Note: Installation of delineator assemblies shall be done under a separate pay item or contract. For additional details see Traffic Std. TC-7709.



TYPE 3-WM END TREATMENT- NARROW MEDIAN

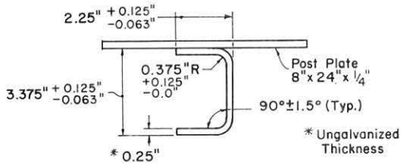


BOX BEAM END PLATE DETAIL



INTERNAL SPLICE PLATE DETAIL

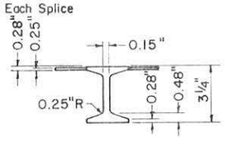
Note: Weld or Galvanizing Protrusions not permitted on Top or Bottom inside Walls in Splice Area.



PLAN

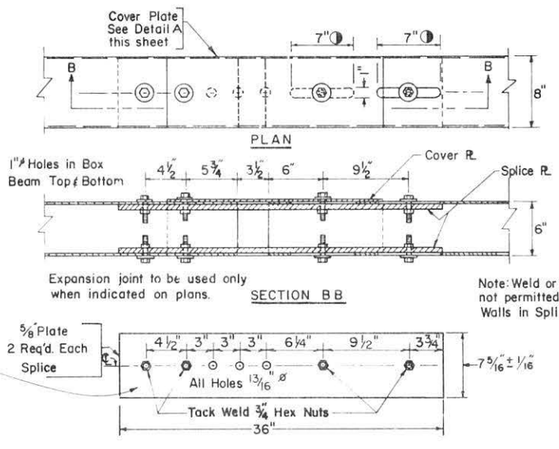
* Ungalvanized Thickness

BOX BEAM SPLICE JOINT



PLAN

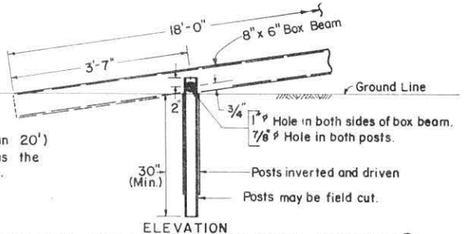
◑ Slot at top and bottom of box beam



INTERNAL SPLICE PLATE DETAIL

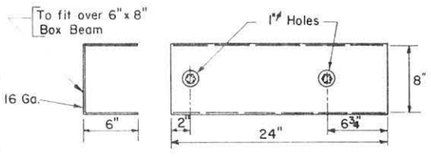
BOX BEAM EXPANSION JOINT

Note: Weld or Galvanizing Protrusions not permitted on Top or Bottom inside Walls in Splice Area.

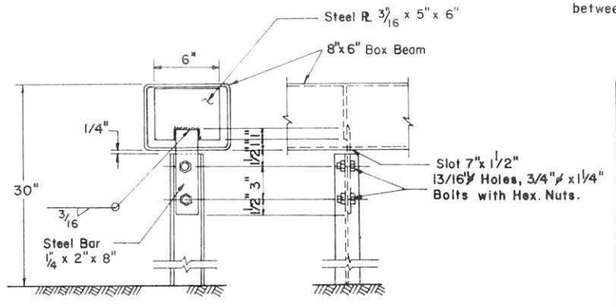


(For median widths greater than 20') Pay limit shall be the same as the end treatment - narrow median.

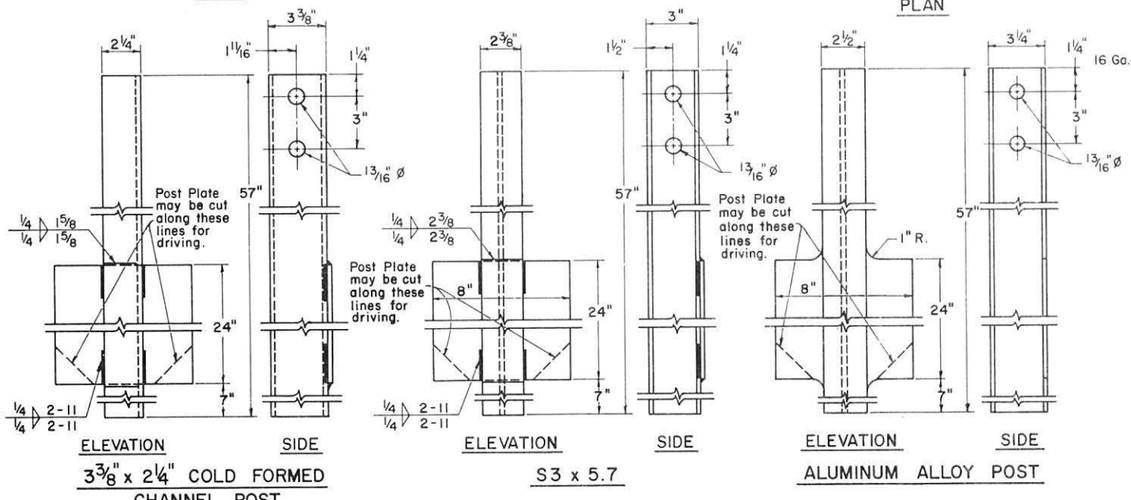
TYPE 3-WM END TREATMENT-WIDE MEDIANS



DETAIL A - COVER PLATE



TYPICAL MOUNTING DETAIL



TYPE 3-WM GUARD RAIL POSTS

NOTES

1. Median Barrier over underground structures shall be constructed as shown on RC-53, sheet 1 of 2.
2. For degree of curves greater than 3° 30', the rail elements shall be shop worked to the required curvature. No separate or additional compensation will be allowed for this work.
3. Where typical post spacing results in posts being located over cross drains, posts shall be shifted 1'-0" in direction to provide maximum clearance between post and cross drain.

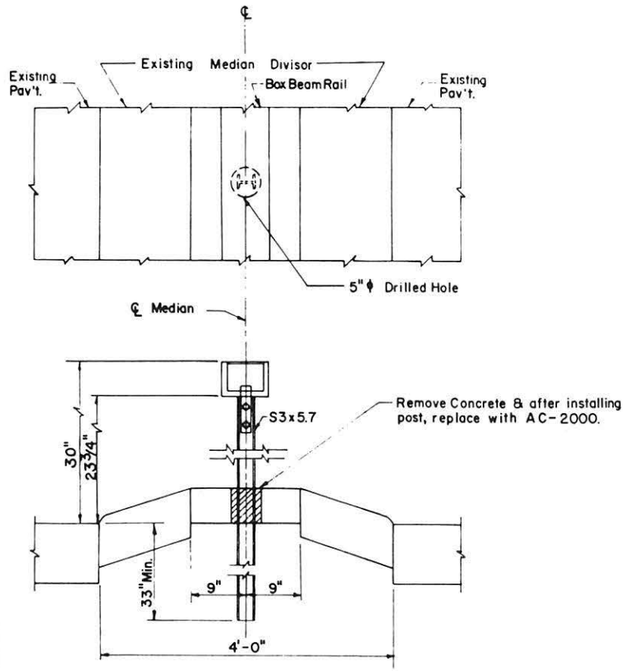
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 3 WEAK POST MEDIAN BARRIER

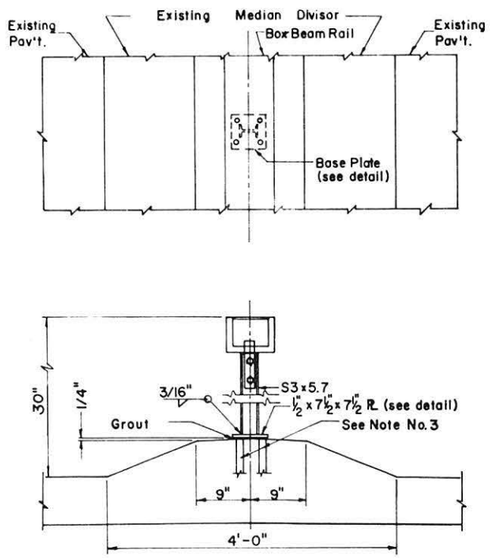
Recommended June 1, 1976
B.D. Rawlins
Director, Bureau of Design

Approved June 1, 1976
Robert R. Mercer
Deputy Chief Hwy. Engr.

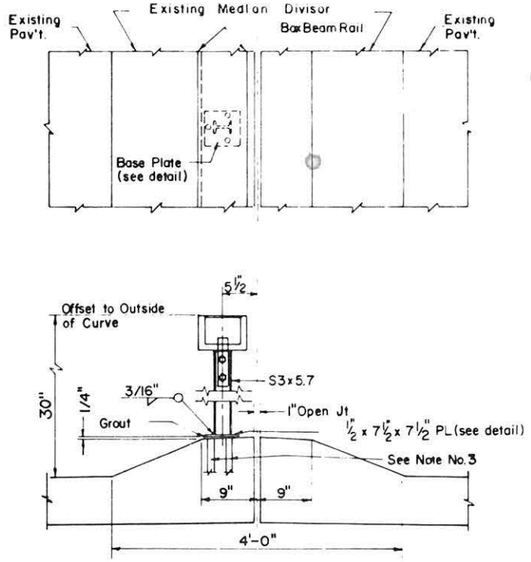
Sht. 1 Of 1
RC-56



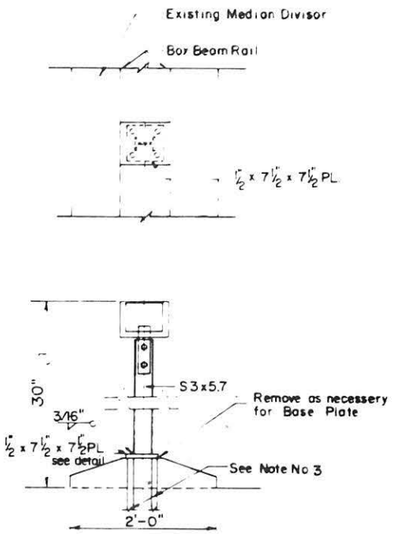
TYPICAL INSTALLATION ON EXISTING
4' ROADWAY MEDIAN DIVISOR



TYPICAL INSTALLATION ON EXISTING
STRUCTURE WITHOUT ℄ JOINT 4' MEDIAN DIVISOR

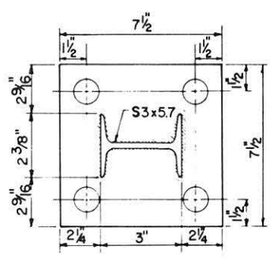


TYPICAL INSTALLATION ON EXISTING
STRUCTURE WITH ℄ JOINT 4' MEDIAN DIVISOR

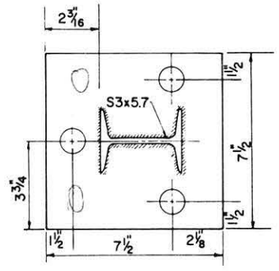


TYPICAL INSTALLATION ON EXISTING
STRUCTURE WITHOUT ℄ JOINT 2' MEDIAN DIVISOR

BOX BEAM MEDIAN BARRIER (STRUCTURE MOUNTED)



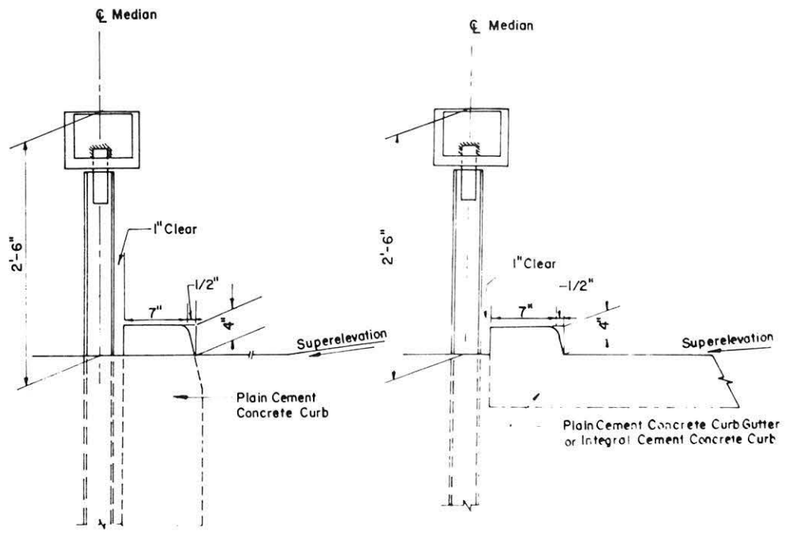
FOR MEDIAN DIVISORS
WITHOUT ℄ JOINT



FOR 4' MEDIAN DIVISOR
WITH ℄ JOINT

Note:
All holes 1"ϕ unless otherwise noted. All welds 3/16

BASE PLATE DETAILS



METHODS FOR CONTROLLING MEDIAN DRAINAGE

NOTES:

1. For curves, with a degree of curve in excess of 3°30' the rail elements shall be shop worked to the required curvature. No separate or additional compensation will be allowed for shop working of the rail elements.

2. Where typical post spacing results in post being located over cross drain, post shall be shifted 1'-0" in direction to provide maximum clearance between post and cross drain.

dge decks and divisors, see Anchor bolts, Refer BC-337.

a shorter section of rail, the bridge, to provide for a

ates shall consist of 1 layer of No. 10 Cotton Duck or with red lead paint

to the requirments of Form 406

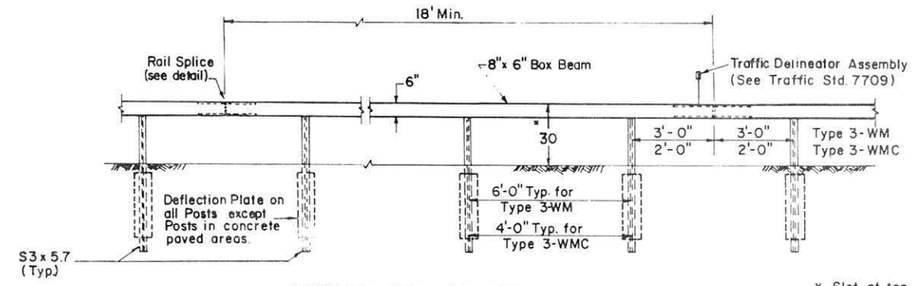
Thanks Paul - Georged

nonwealth of Pennsylvania
RTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 3-WM MEDIAN BARRIER

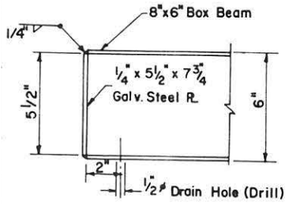
Recommended Mar 2 1973	Approved Mar 7 1973	SHT 2 OF 2
Director, Bureau of Design	Deputy Chief Hwy Engr	RC-56

VOIDED B
CHANGE #7

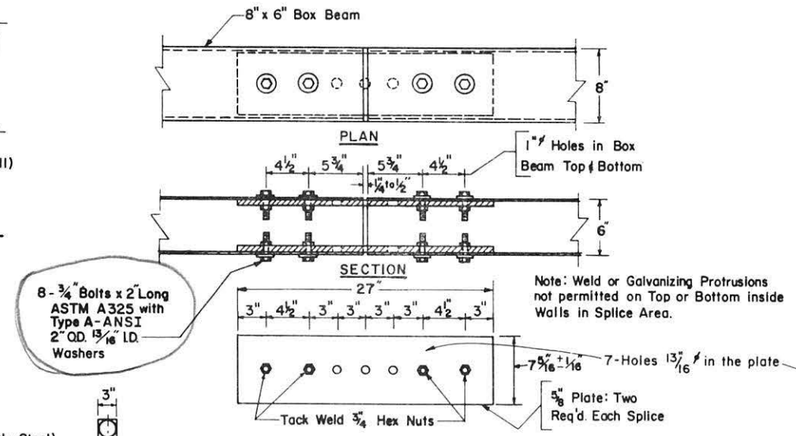


TYPICAL RAIL SPLICE & POST SPACING

* Slot at top and bottom of box beam

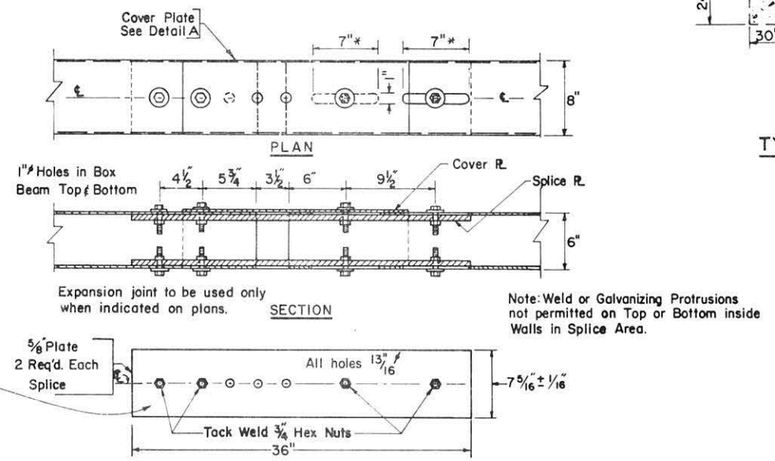


BOX BEAM END PLATE DETAIL



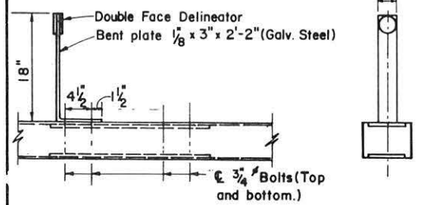
INTERNAL SPLICE PLATE DETAIL

BOX BEAM SPLICE JOINT



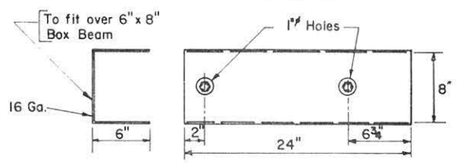
INTERNAL SPLICE PLATE DETAIL

BOX BEAM EXPANSION JOINT

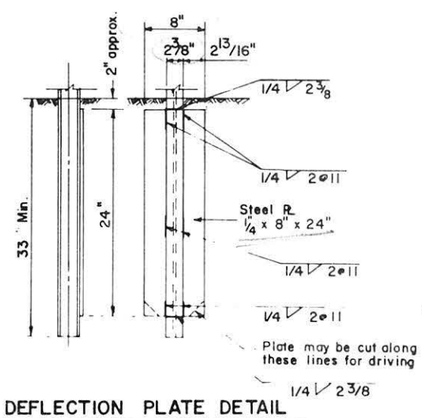


TRAFFIC DELINEATOR MOUNTING DETAIL

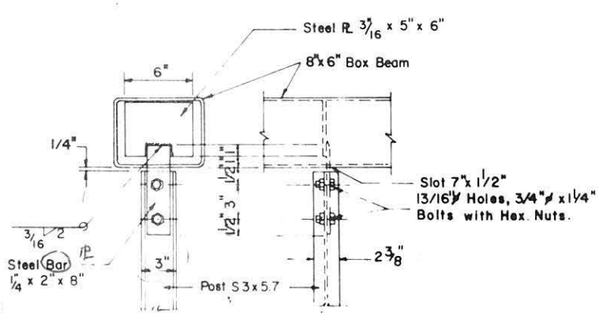
NOTE: Installation of delineator assemblies shall be done under a separate pay item or contract. For additional details see Traffic Standard 7709, Sheet 3 of 4.



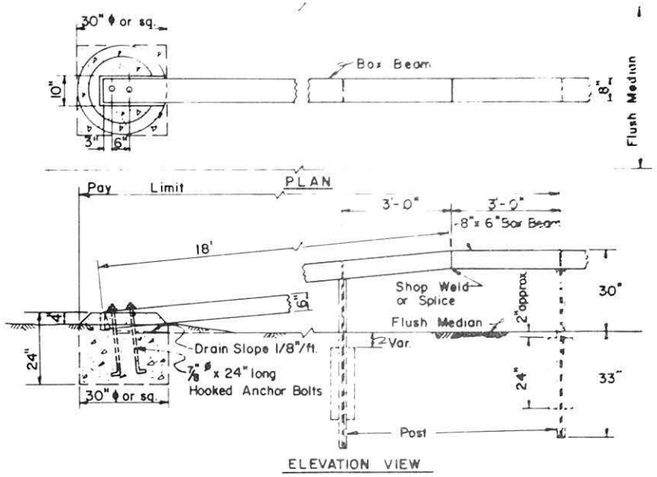
DETAIL A - COVER PLATE



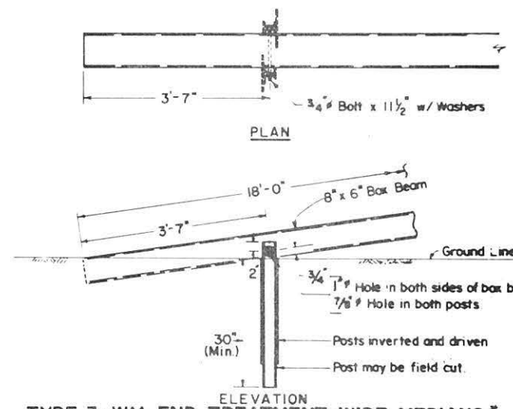
DEFLECTION PLATE DETAIL



TOP OF POST DETAIL



TYPE 3-WM END TREATMENT- NARROW MEDIAN



TYPE 3-WM END TREATMENT-WIDE MEDIANS*

*(For median widths greater than 20')

Pay limit shall be the same as the end treatment narrow median.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 3-WM AND TYPE 3-WMC MEDIAN BARRIER

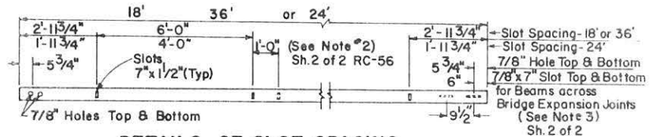
Recommended Mar. 7, 1973
Director, Bureau of Design

Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

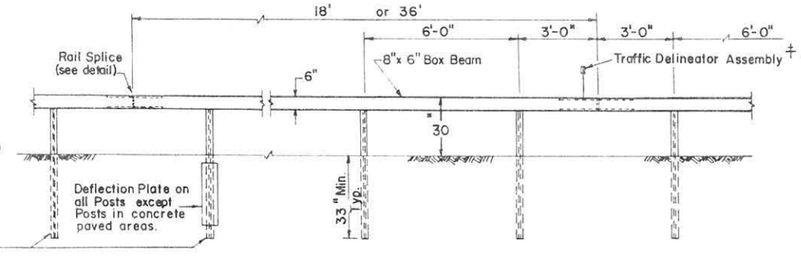
Sht 1 Of 2

RC-56

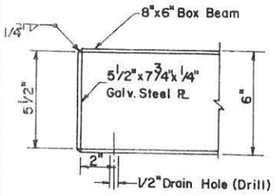
VOIDED BY CHANGE #7



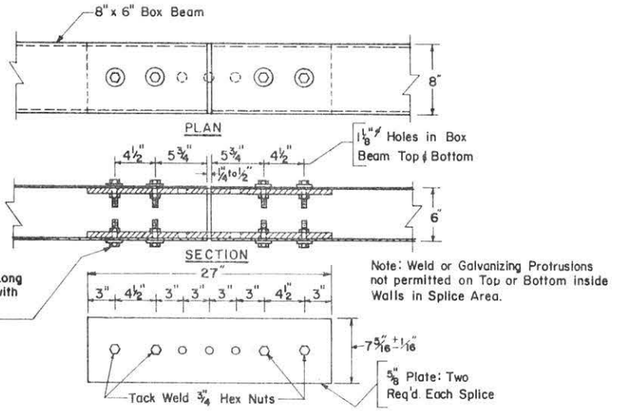
DETAILS OF SLOT SPACING



TYPICAL RAIL SPLICE & POST SPACING



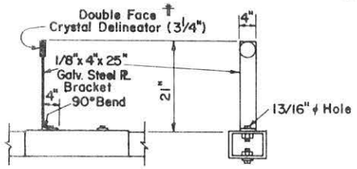
BOX BEAM END PLATE DETAIL



Note: Weld or Galvanizing Protrusions not permitted on Top or Bottom inside Walls in Splice Area.

INTERNAL SPLICE PLATE DETAIL

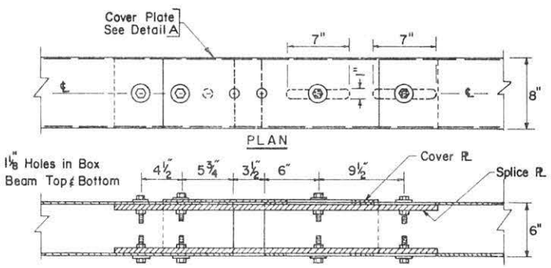
BOX BEAM SPLICE JOINT



TRAFFIC DELINEATOR MOUNTING DETAIL

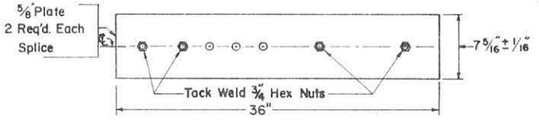
Note: Delineator spacing 198'

‡ This delineator assembly will be considered incidental to the box beam median barrier item.



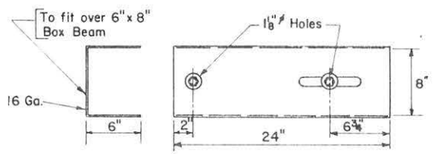
Expansion joint to be used only when indicated on plans.

Note: Weld or Galvanizing Protrusions not permitted on Top or Bottom inside Walls in Splice Area.

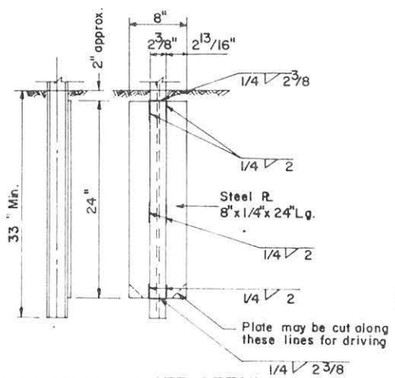


INTERNAL SPLICE PLATE DETAIL

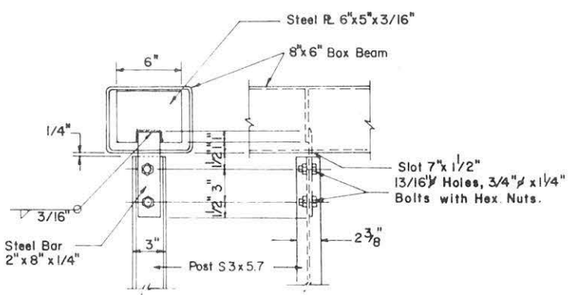
BOX BEAM EXPANSION JOINT



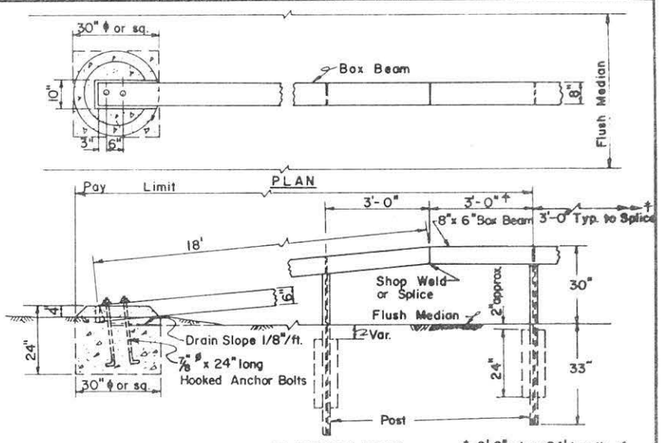
DETAIL A - COVER PLATE



DEFLECTION PLATE DETAIL

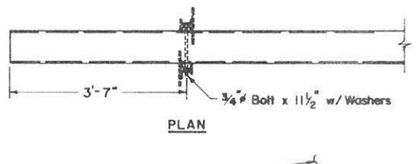


TOP OF POST DETAIL

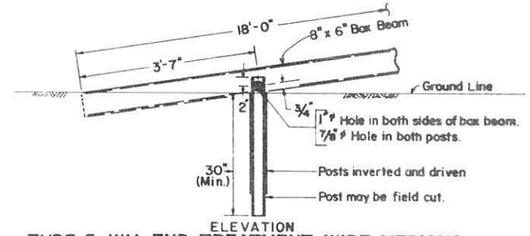


‡ 2'-0" when 24' length of box beam is used.

TYPE 3-WM END TREATMENT- NARROW MEDIAN



PLAN



ELEVATION

TYPE 3-WM END TREATMENT-WIDE MEDIANS

* For median widths greater than 20' Pay limit shall be the same as the end treatment narrow median.

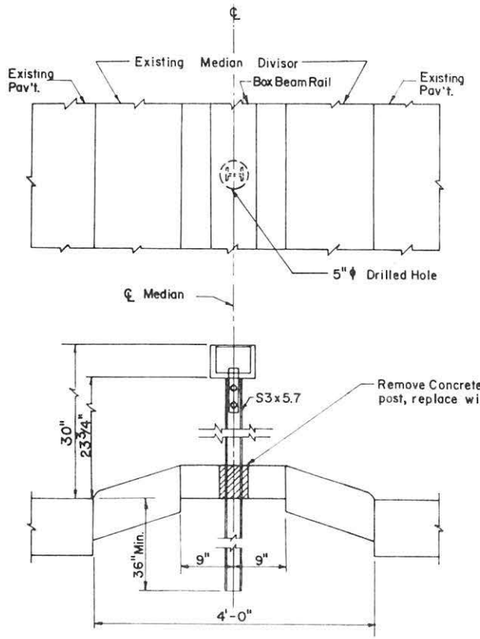
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 3-WM MEDIAN BARRIER

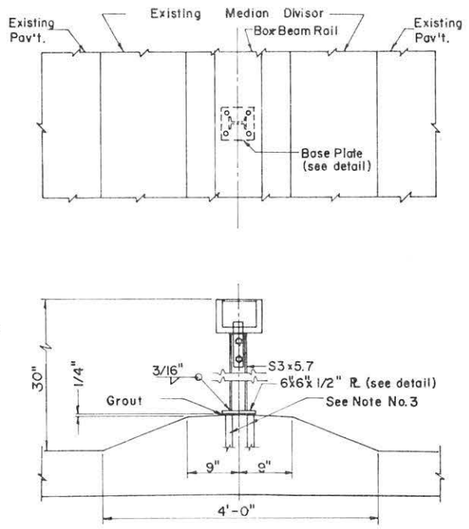
Recommended Dec. 1, 1971 R.R. Musser Location & Design Engineer	Approved Dec. 1, 1971 W.J. Raver Deputy Chief Hwy. Engr.	Sht. 1 Of 2 RC-56

VOIDED BY CHANGE #1

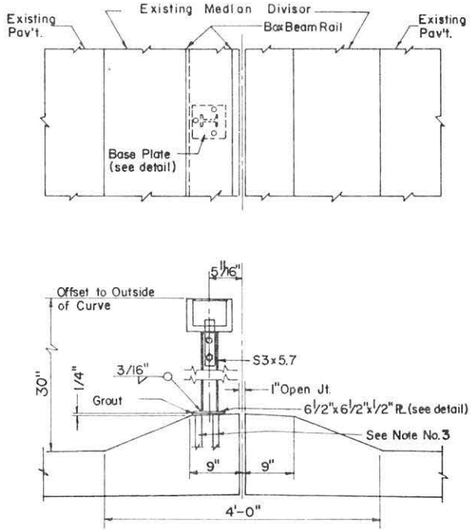
FORM 4237 REV 3-61



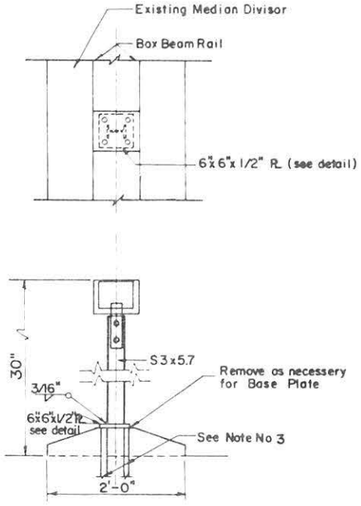
TYPICAL INSTALLATION ON EXISTING
4' ROADWAY MEDIAN DIVISOR



TYPICAL INSTALLATION ON EXISTING
STRUCTURE WITHOUT ℄ JOINT 4' MEDIAN DIVISOR

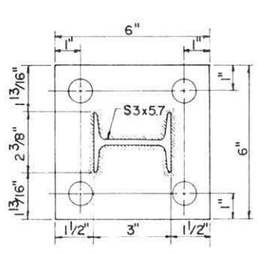


TYPICAL INSTALLATION ON EXISTING
STRUCTURE WITH ℄ JOINT 4' MEDIAN DIVISOR

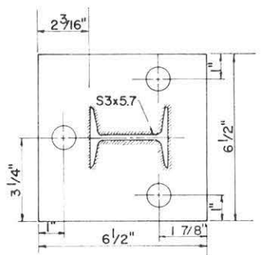


TYPICAL INSTALLATION ON EXISTING
STRUCTURE WITHOUT ℄ JOINT 2' MEDIAN DIVISOR

BOX BEAM MEDIAN BARRIER (STRUCTURE MOUNTED)



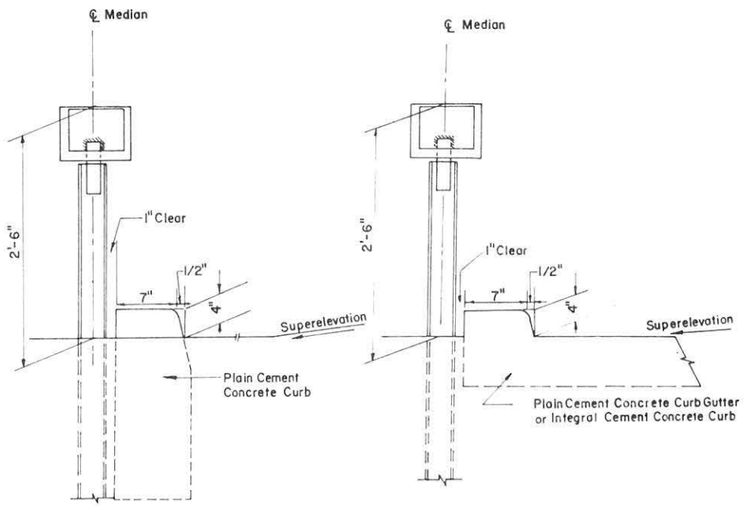
FOR MEDIAN DIVISORS
WITHOUT ℄ JOINT



FOR 4' MEDIAN DIVISOR
WITH ℄ JOINT

Note: All holes 7/8" ϕ unless otherwise noted.
All Welds 3/16"

BASE PLATE DETAILS



METHODS FOR CONTROLLING MEDIAN DRAINAGE

NOTES:

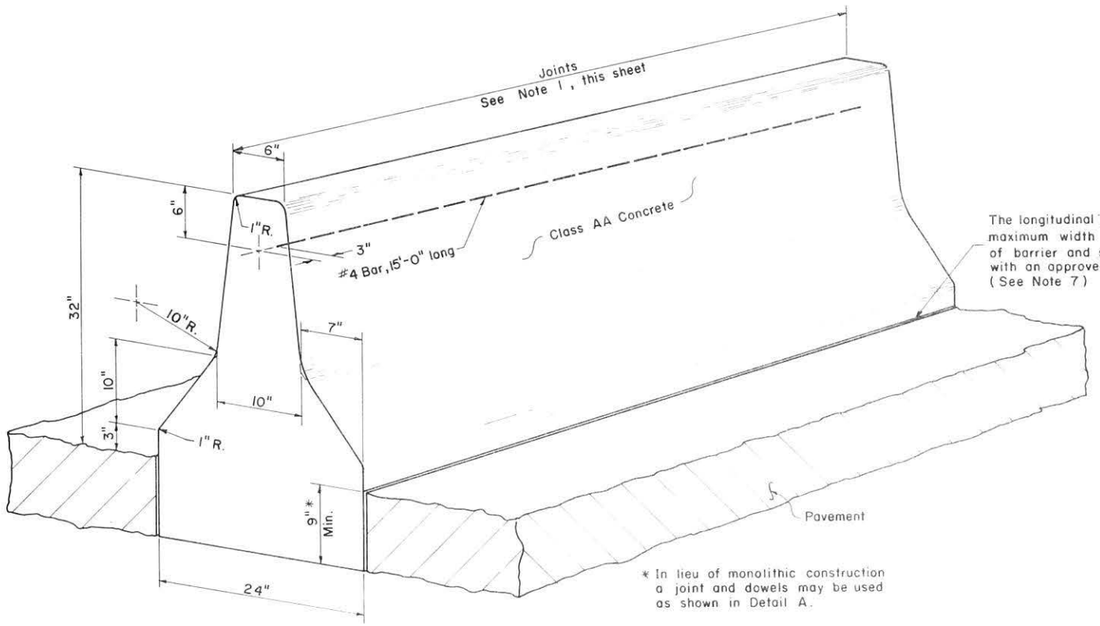
1. For curves, with a degree of curve in excess of 3°30' the rail elements shall be shop worked to the required curvature. No separate or additional compensation will be allowed for shop working of the rail elements.
2. Where typical post spacing results in post being located over cross drain, post shall be shifted 1'-0" in direction to provide maximum clearance between post and cross drain.
3. For anchorage to existing bridge decks and divisors, see construction drawings.
4. It may be necessary to use a shorter section of rail, near the expansion joint of the bridge, to provide for a splice across the joint.
5. When grout is not used, place 1 layer of Number 10 Cotton Duck or 12 oz. Army Duck, swabbed with red lead paste between base PL and concrete.
6. All materials shall conform to the requirments of Form 408.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 3-WM MEDIAN BARRIER

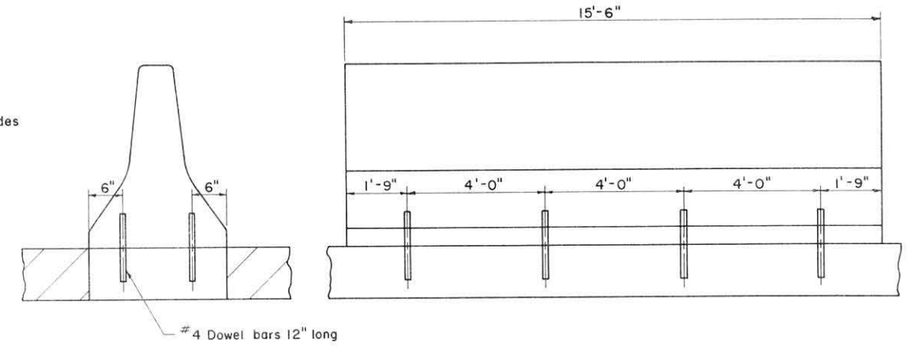
Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht 2 Of 2
R K Musser	W. J. Raver	RC-56
Location & Design Engineer	Deputy Chief Hwy Engr.	

VOIDED BY CHANGE #1

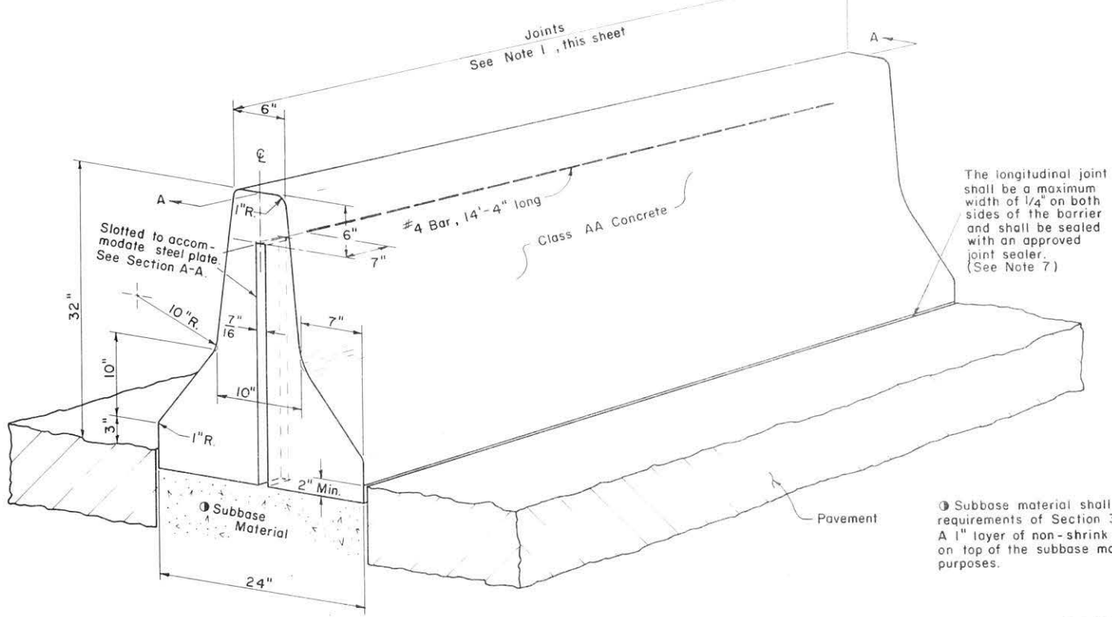


CONCRETE MEDIAN BARRIER WITHOUT JOINT CONTINUITY

(See Note 2)

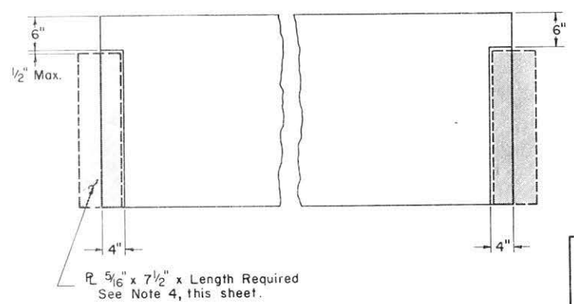


DETAIL A



CONCRETE MEDIAN BARRIER WITH JOINT CONTINUITY

(See Note 2)



SECTION A-A

NOTES

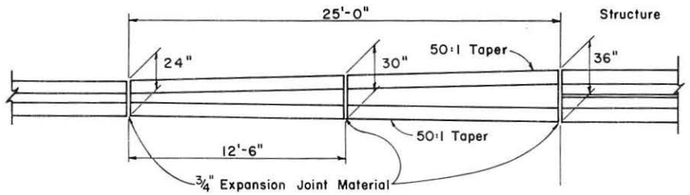
1. Barrier joints, alignment, surface texture, and other construction details shall be in accordance with Section 623, Form 408.
2. The concrete median barrier shown may be constructed using either slip forming, cast in place, or precast units. Modifications or deviation from the standards will require special details to be submitted for approval. Only precast barriers which are supplied by an approved manufacturer as listed in Bulletin No. 15 will be permitted.
3. For sections that are designated as removable sections, a bond breaker such as bituminous paper or polyethylene shall be used where required to assure removability. Lifting holes will be required and shall be plugged with removable plastic or other approved type plugs.
4. The material used for the plates in the joints shall conform to the requirements of AASHTO Designation M183 or ASTM A36, structural steel. Plates shall be galvanized in accordance with AASHTO Designation M111.
5. Concrete median barrier construction on existing pavement will require special details to be shown on the construction drawings.
6. 1/2" Premolded Joint Material shall be used at all construction joints.
7. For precast units on curved sections a maximum 1/2" joint on one side will be permitted. For curves greater than 2° 30', 30' barriers must be adjusted to maintain longitudinal joint tolerances.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

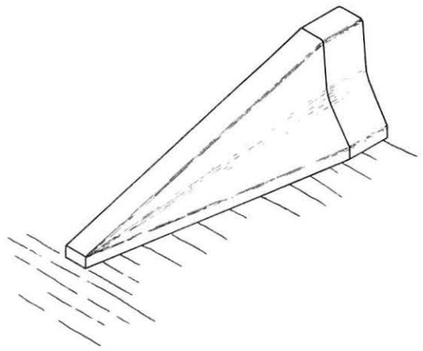
CONCRETE MEDIAN BARRIER

Recommended June 1, 1976	Approved June 1, 1976	Sht. 1 Of 2
B.D. Rundio	Robert R. Meester	RC-57
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

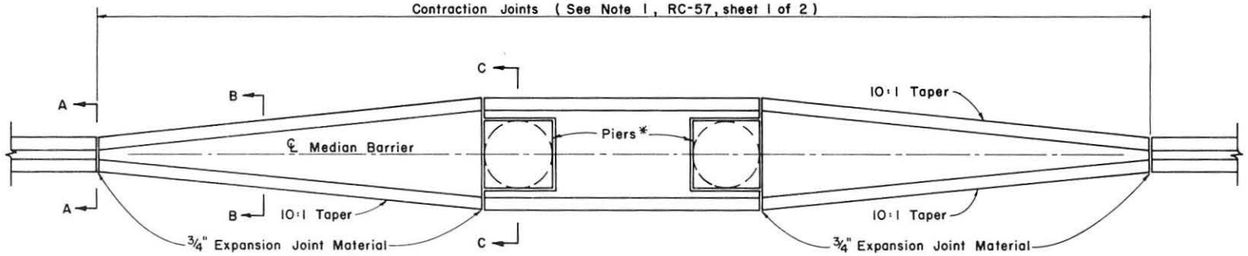
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FINAL BY



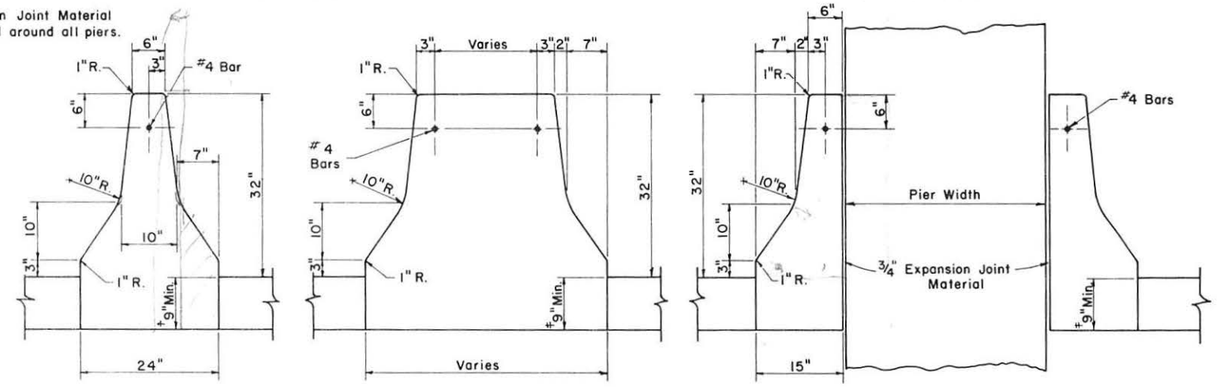
MEDIAN BARRIER TRANSITION DETAIL



† See RC-57, sheet 1 of 2, for other approved foundation alternates.



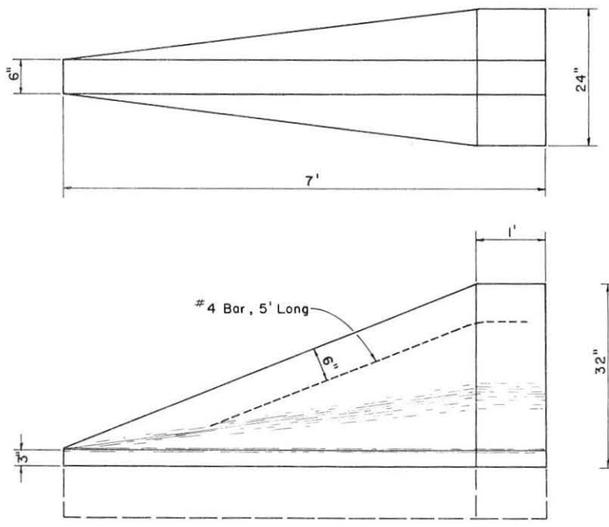
* ¾" Expansion Joint Material shall be used around all piers.



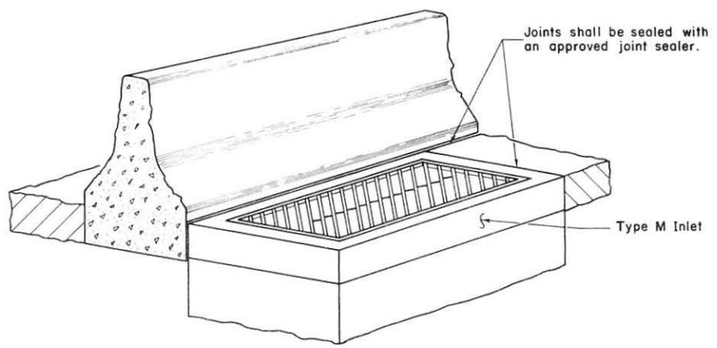
CONCRETE MEDIAN BARRIER TREATMENT AT PIERS

NOTES

1. No additional compensation will be allowed for transitions in the concrete median barrier at piers or structures.
2. At hazardous locations, impact attenuators such as Hydro Cushion, G.R.E.A.T. System, or Texas Barrels, should only be considered for installations after all alternative protective methods have been ruled out.
3. See Bridge Construction Standard Drawings for details of concrete median barrier across structures.



CONCRETE MEDIAN BARRIER END TRANSITION



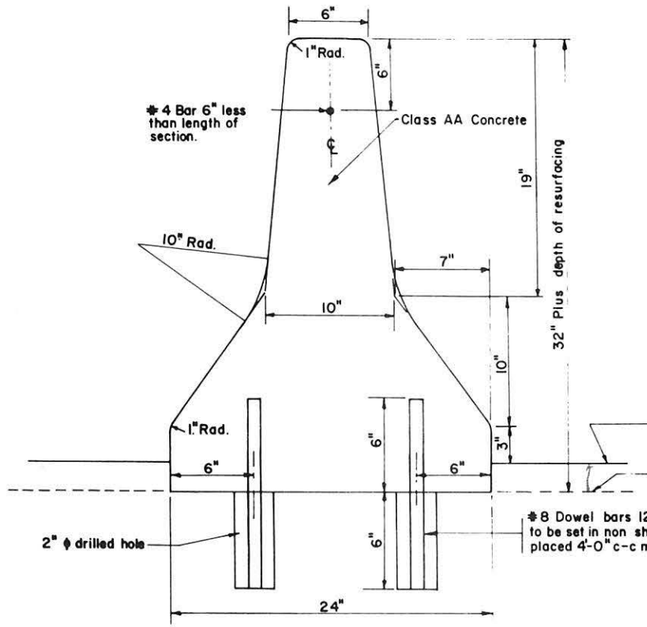
INLET PLACEMENT AT CONCRETE MEDIAN BARRIER

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

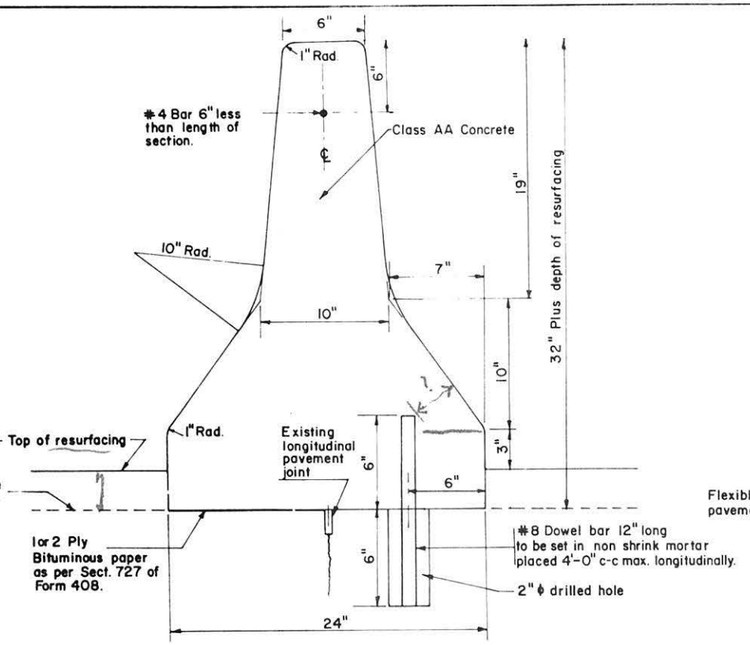
CONCRETE MEDIAN BARRIER

Recommended June 1, 1976	Approved June 1, 1976	Sht. 2 Of 2
B.D. Pawlak	Robert R. Mueser	RC-57
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

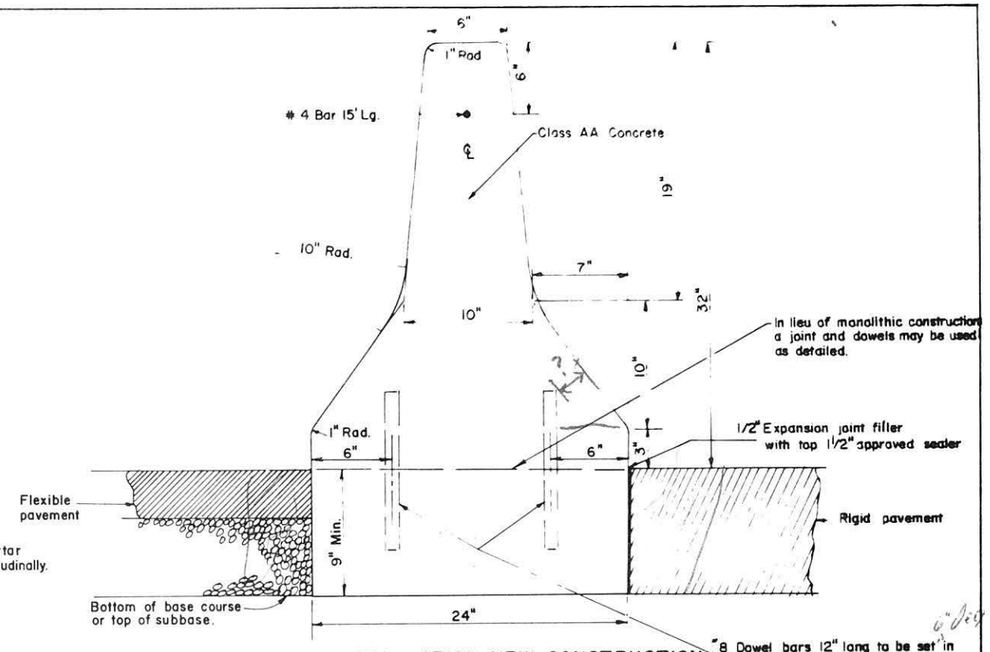
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FINAL BY



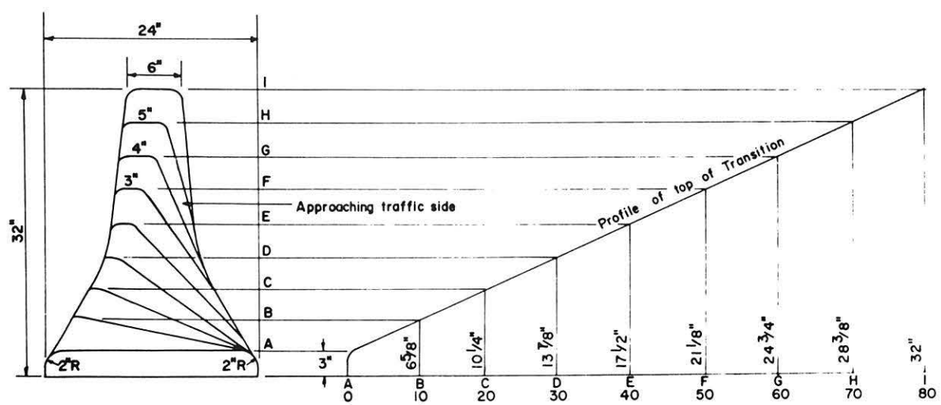
TYPICAL INSTALLATION ON EXISTING CONCRETE PAVEMENT WITHOUT ℄ JOINT



TYPICAL INSTALLATION ON EXISTING CONCRETE PAVEMENT WITH ℄ JOINT



TYPICAL INSTALLATION NEW CONSTRUCTION (RIGID AND FLEXIBLE PAVEMENT)



DETAIL OF END TRANSITION *

NOTES APPLYING TO ALL TYPES OF CONCRETE MEDIAN BARRIER

Where Median Barrier is to be constructed on existing conc. pavement or existing conc. base course.

1. Transverse joints shall be installed in the barrier directly over transverse joints in the pavement. Definite cracks thru the pavement shall also be treated as joints. Additional joints shall be constructed in the Barrier spaced so as to make equal sections not over 15'-6" in length.
2. The transverse joints shall be filled with premolded joint filler complying with the requirments for premolded filler for expansion joints in structures, Section 705 Form 408, and be recessed 1/4" from faces and top of barrier. The cost of the transverse expansion joints shall be included in the unit price bid for the barrier.
3. The thickness of the transverse expansion joint filler shall be as follows: 1/2" for intermediate joints and joints over definite cracks: 1/2" over pavement joints where slab length is 50' or less.: 1" over pavement joints when length is more than 50': Variable in multiples of 1/2" but not less than existing width of the transverse joints between the approach slabs and bridges.
4. For thicknesses of 1" or more, layers of 1/2" material may be glued or otherwise fastened together by a means satisfactory to the engineer. Where the required joint opening exceeds 1" the contractor may construct open joints if desired.
5. The surface of the existing concrete pavement or concrete base course shall be cleaned of all dirt, bituminous material and other loose or adhering matter prior to the construction of the barrier thereon.
6. Where Median Barrier is to be constructed across a longitudinal joint in existing concrete pavement, the dowels shall be placed on one side, with bituminous paper placed as a bond breaker on the opposite side.

Where Median Barrier is to be constructed on New Construction.

Transverse joints 1/2" wide shall be installed in the barrier not over 15'-6" apart. The joints shall be filled with premolded joint filler, complying with requirments of Section 705 Form 408, recessed 1/4" from faces and top of barrier. The cost of the transverse expansion joints in the barrier shall be included in the unit price bid for the barrier.

General

1. The finished surface of the barrier shall be smooth, dense, unpitted and free from air bubble pockets, depressions and honey comb.
2. See Special Design on BC-333 drawing for details of Concrete Median Barrier across structures.
3. If slip form method of construction is used, the joint spacing shall be a maximum of 46'-6" and it will be necessary to submit for approval a design for adequate longitudinal reinforcement steel.

* PROFILE SCALE

Horizontal 0 10' 20'

Vertical 0 8" 16"

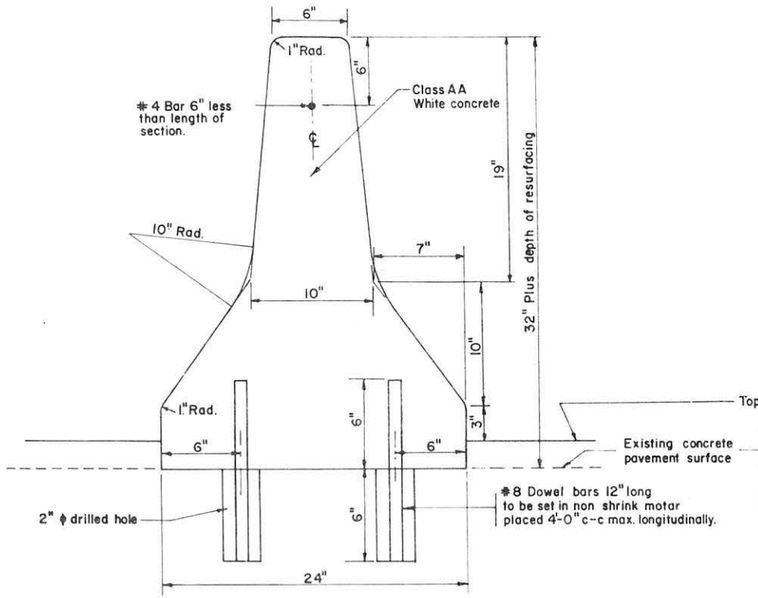
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER

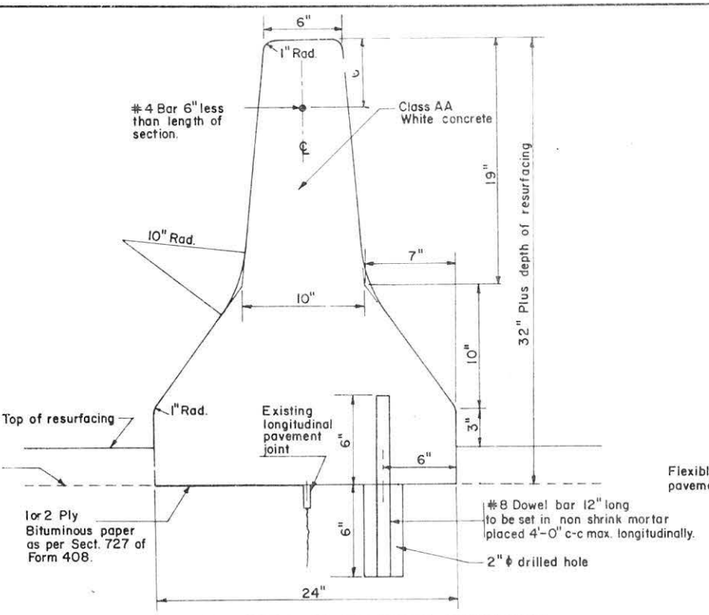
Recommended Mar 7, 1973	Approved Mar 7, 1973	Sht. 1 Of 2
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-57

VOID

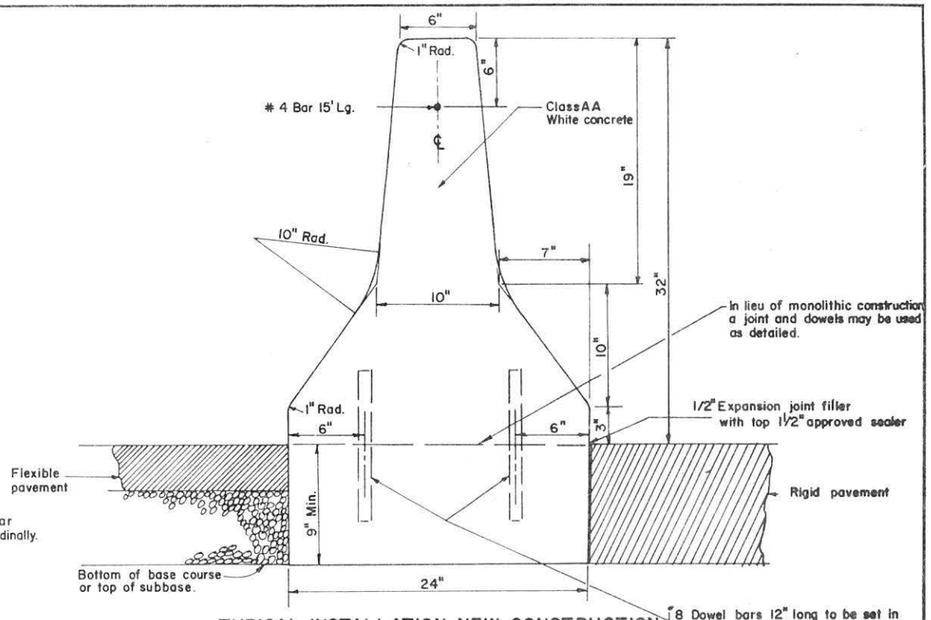
FORM 4237 REV 3-61



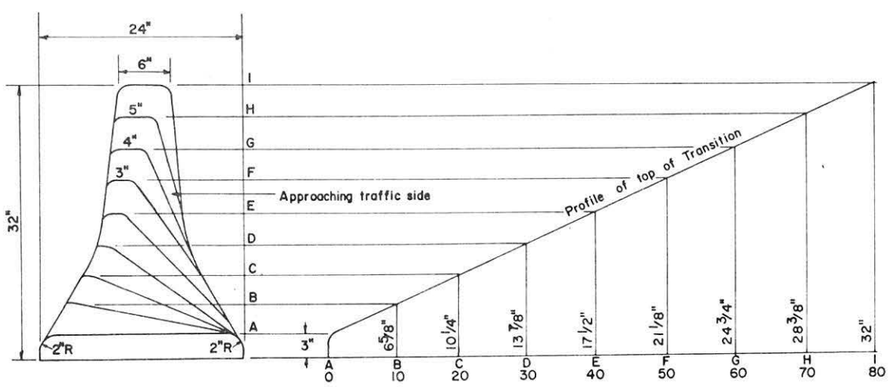
TYPICAL INSTALLATION ON EXISTING CONCRETE PAVEMENT WITHOUT ℄ JOINT



TYPICAL INSTALLATION ON EXISTING CONCRETE PAVEMENT WITH ℄ JOINT



TYPICAL INSTALLATION NEW CONSTRUCTION (RIGID AND FLEXIBLE PAVEMENT)



DETAIL OF END TRANSITION *

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General

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2. See Special Design on BC-333 drawing for details of Concrete Median Barrier across structures.
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* PROFILE SCALE

Horizontal 0 10' 20'

Vertical 0 8" 16"

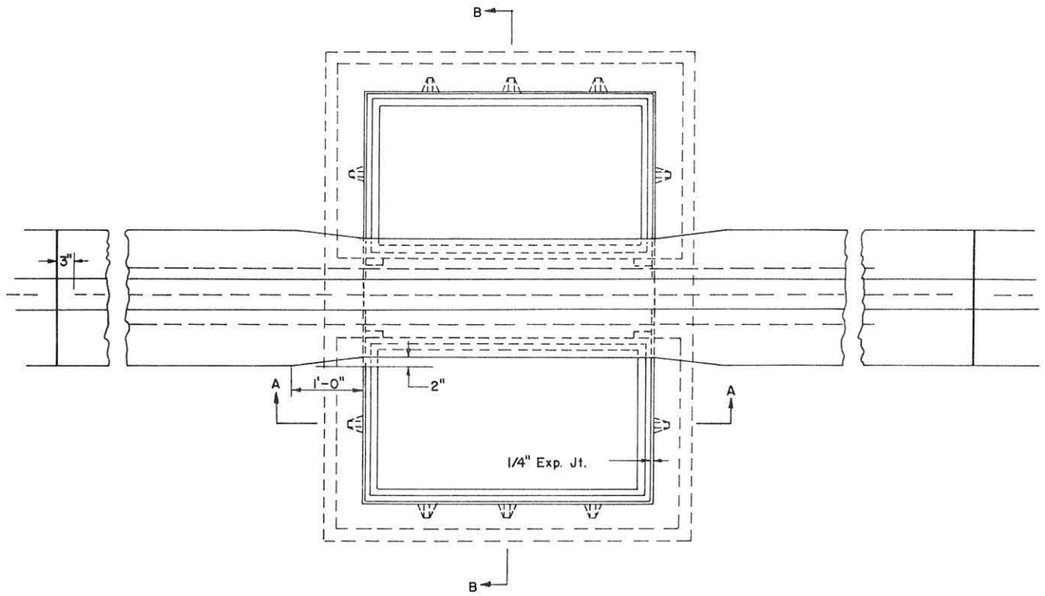
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER

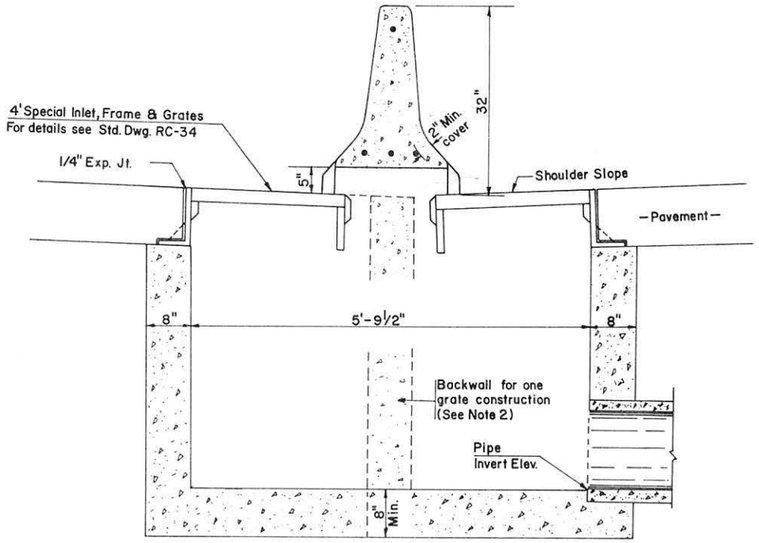
Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 of 2
R R Maurer	W. J. Ravis	RC-57
Location & Design Engineer	Deputy Chief Hwy. Engr.	

VOID

FORM 4237 REV 3-61



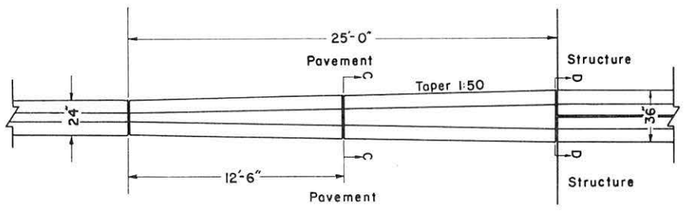
PLAN VIEW



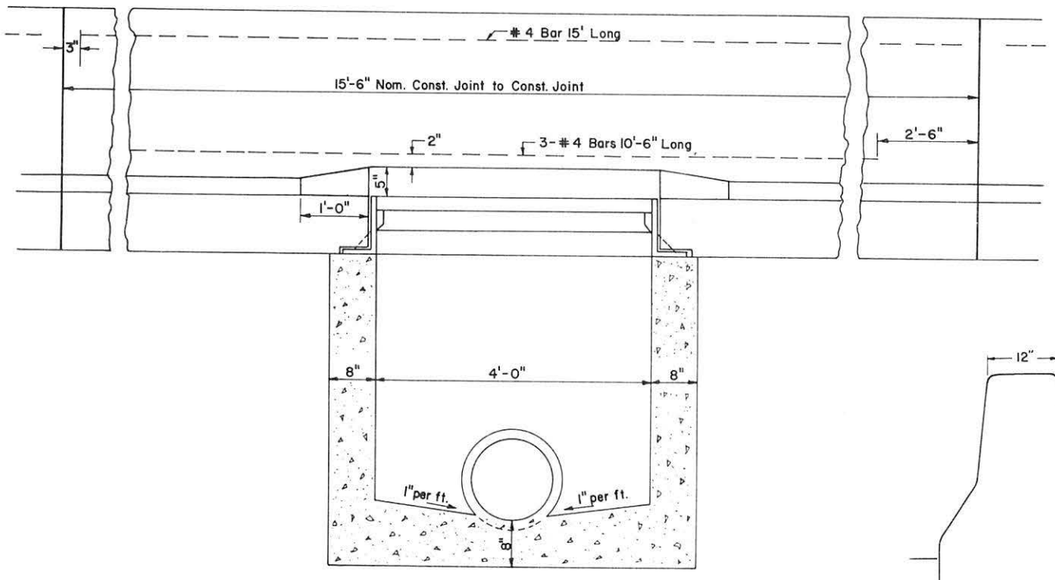
SECTION B-B

NOTES

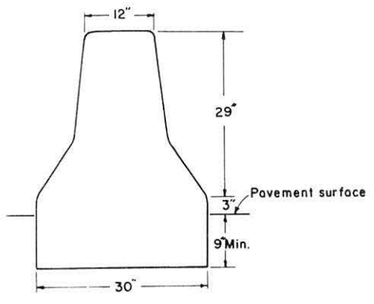
1. Inlets to be constructed in barrier at the locations shown on the drawings.
2. Where inlets are located on superelevated sections the inlet will be located on the low side of the section using one grate. The barrier construction will not change when one grate is used.
3. No additional compensation will be allowed for the added width in making transitions in concrete median barrier.



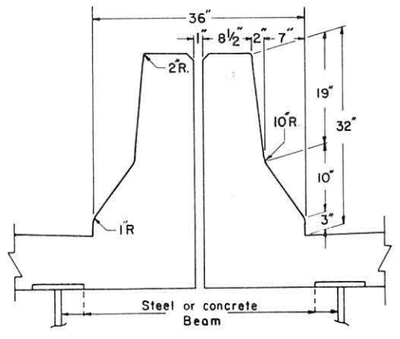
MEDIAN BARRIER
TRANSITION DETAIL



SECTION A-A



SECTION C-C



SECTION D-D

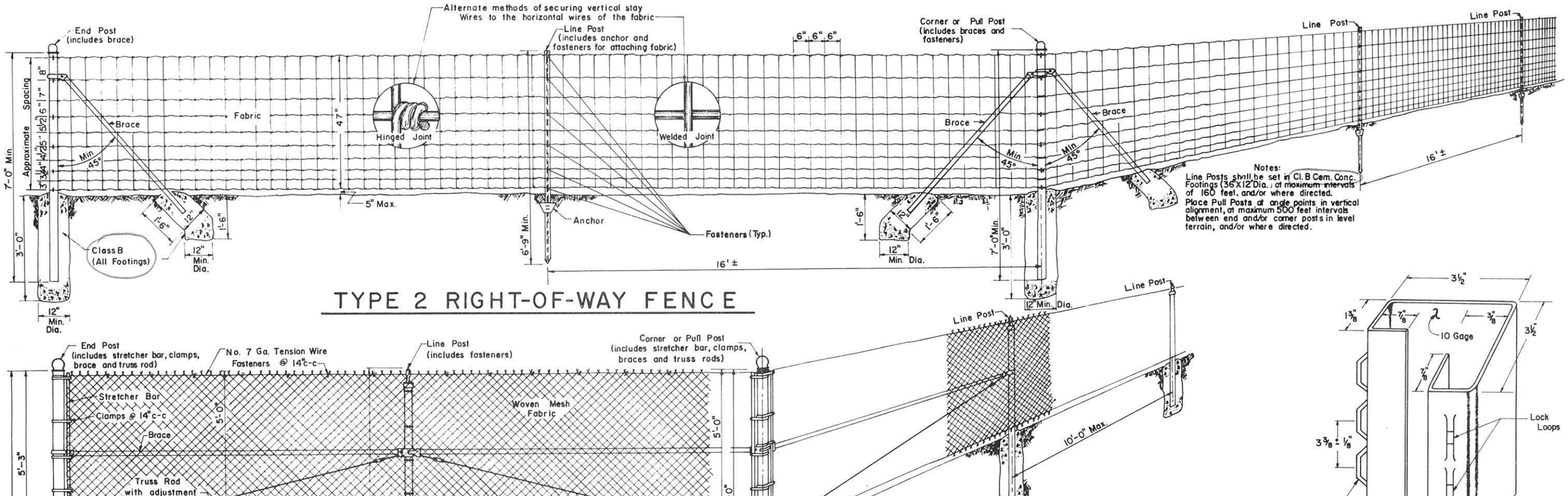
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER

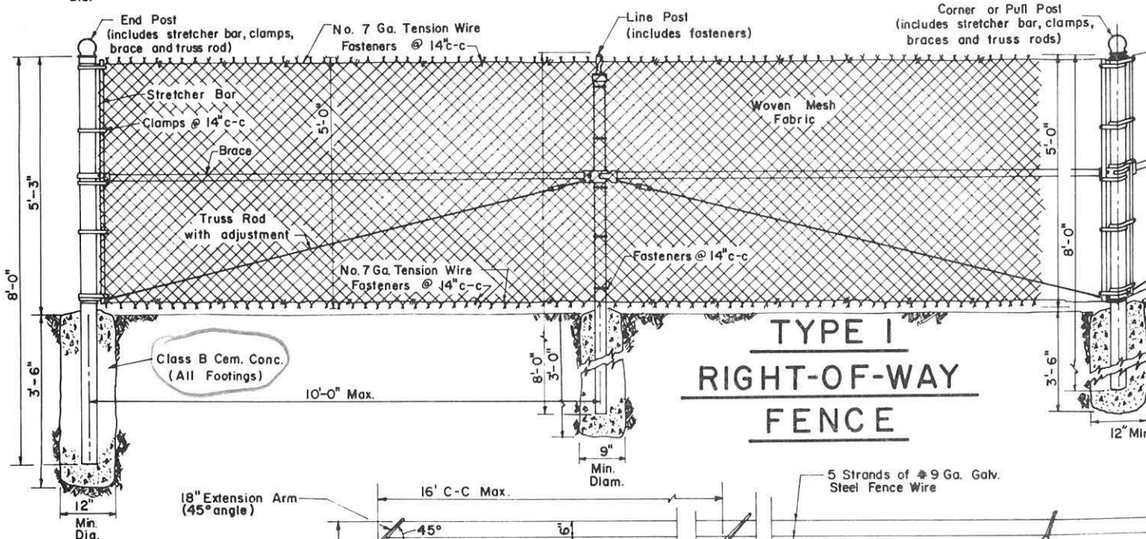
Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 2 Of 2
R R Moore	W J. Rover	
Location & Design Engineer	Deputy Chief Hwy. Engr.	RC-57

Mar 7, 1973 March 7, 1973

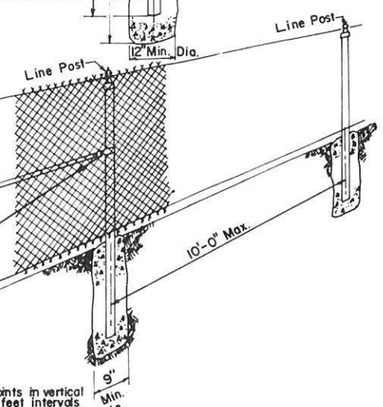
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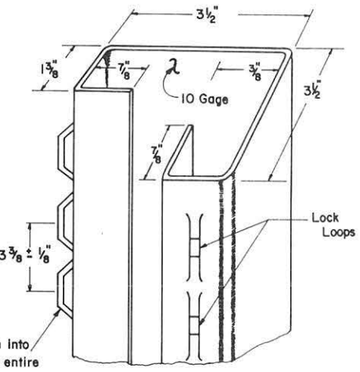


TYPE 2 RIGHT-OF-WAY FENCE

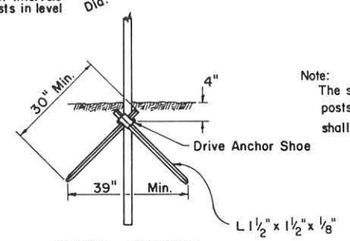


TYPE 1 RIGHT-OF-WAY FENCE





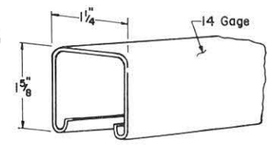
ALTERNATE END, PULL, OR CORNER POST FOR TYPE I FENCE



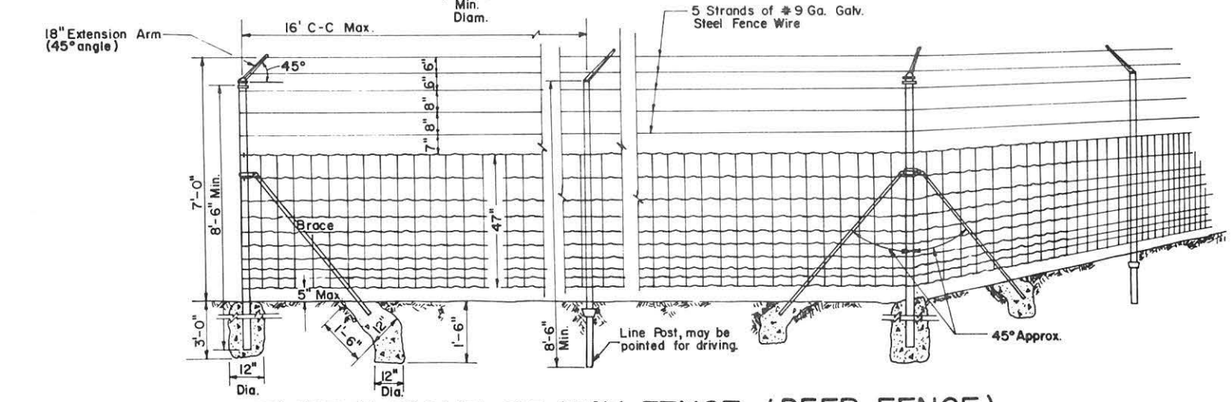
DRIVE ANCHOR

Where warranted and as directed by the engineer, drive anchors may be permitted at 160 feet line post intervals in lieu of cement concrete footings, for Types 2 and 3 R/W Fence.

Note:
The steel in the alternate end or corner posts and top rails (roll formed sections) shall meet the following requirements:
Yield Point, min. psi 41,000



ALTERNATE BRACE RAIL



TYPE 3 RIGHT-OF-WAY FENCE (DEER FENCE)

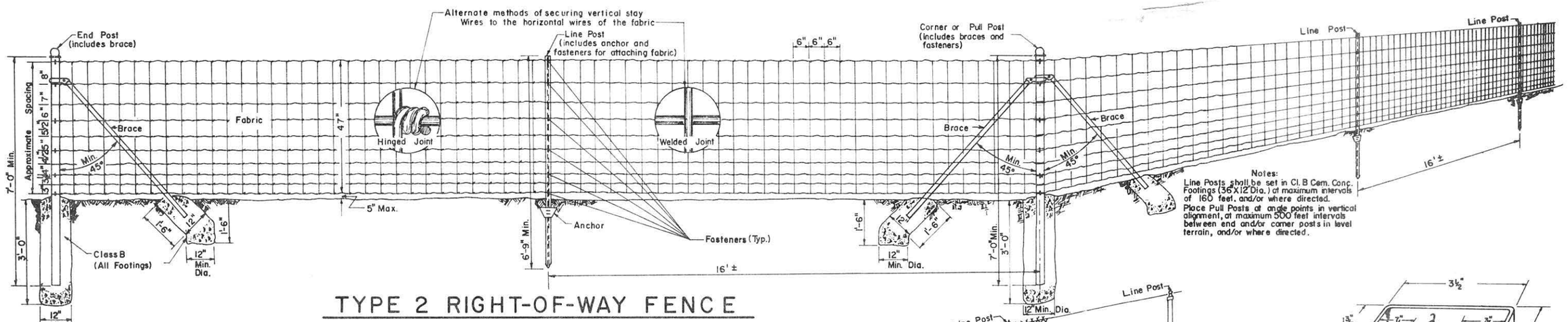
Notes
Extension Arm mounted away from roadway.
Details not shown, same as for Type 2 R/W Fence.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

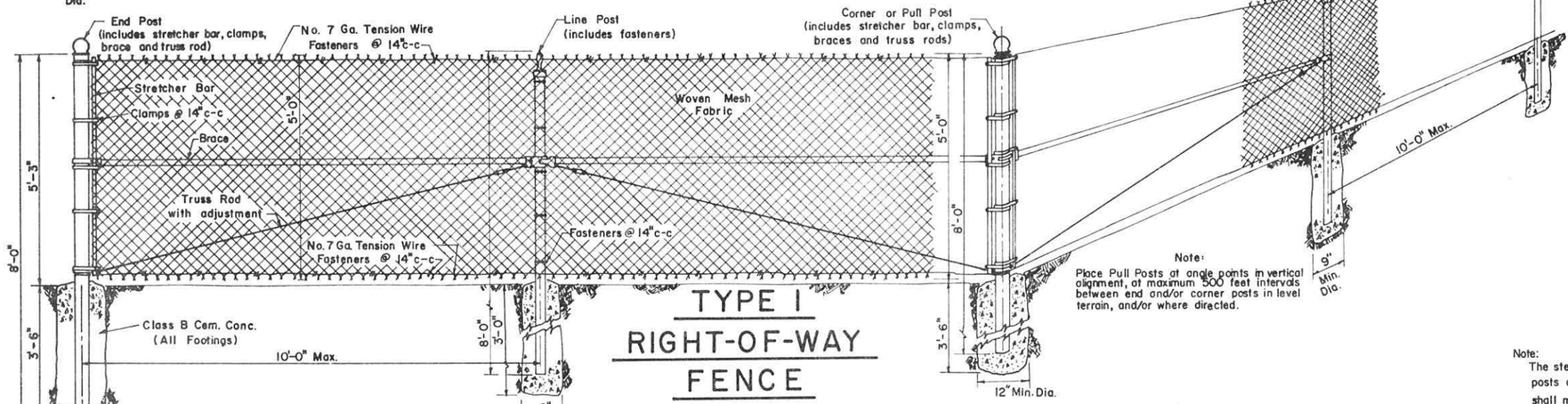
TYPES 1, 2, & 3 R/W FENCE

Recommended Aug. 20, 1975 B.D. Coumbie Director, Bureau of Design	Approved Aug. 20, 1975 R.R. Mercer Deputy Chief Hwy. Engr.	Sht. 1 Of 1 RC-60

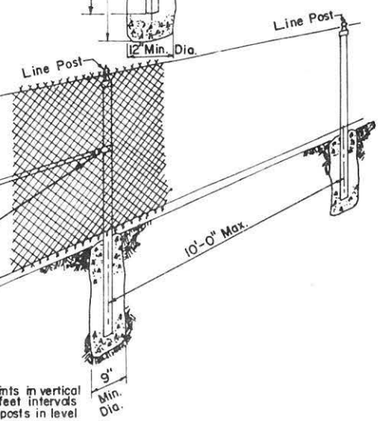
FORM 4237 REV 3-61

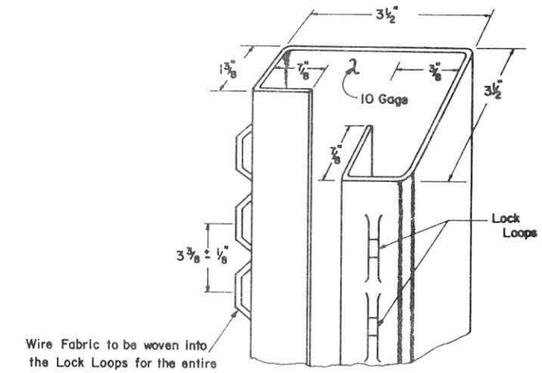


TYPE 2 RIGHT-OF-WAY FENCE

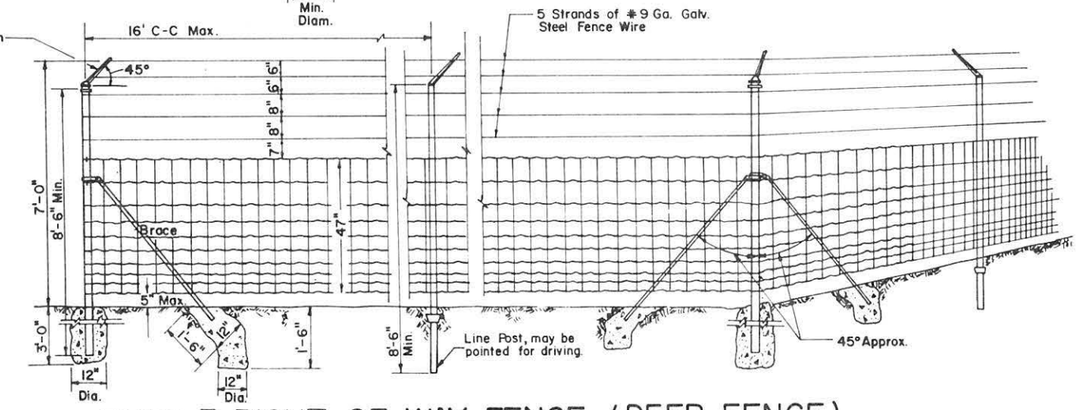


TYPE 1 RIGHT-OF-WAY FENCE





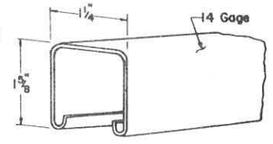
ALTERNATE END, PULL, OR CORNER POST FOR TYPE I FENCE



TYPE 3 RIGHT-OF-WAY FENCE (DEER FENCE)

Notes
Extension Arm mounted away from roadway.
Details not shown, same as for Type 2 R/W Fence.

Note:
The steel in the alternate end or corner posts and top rails (roll formed sections) shall meet the following requirements:
Yield Point, min. psi 41,000



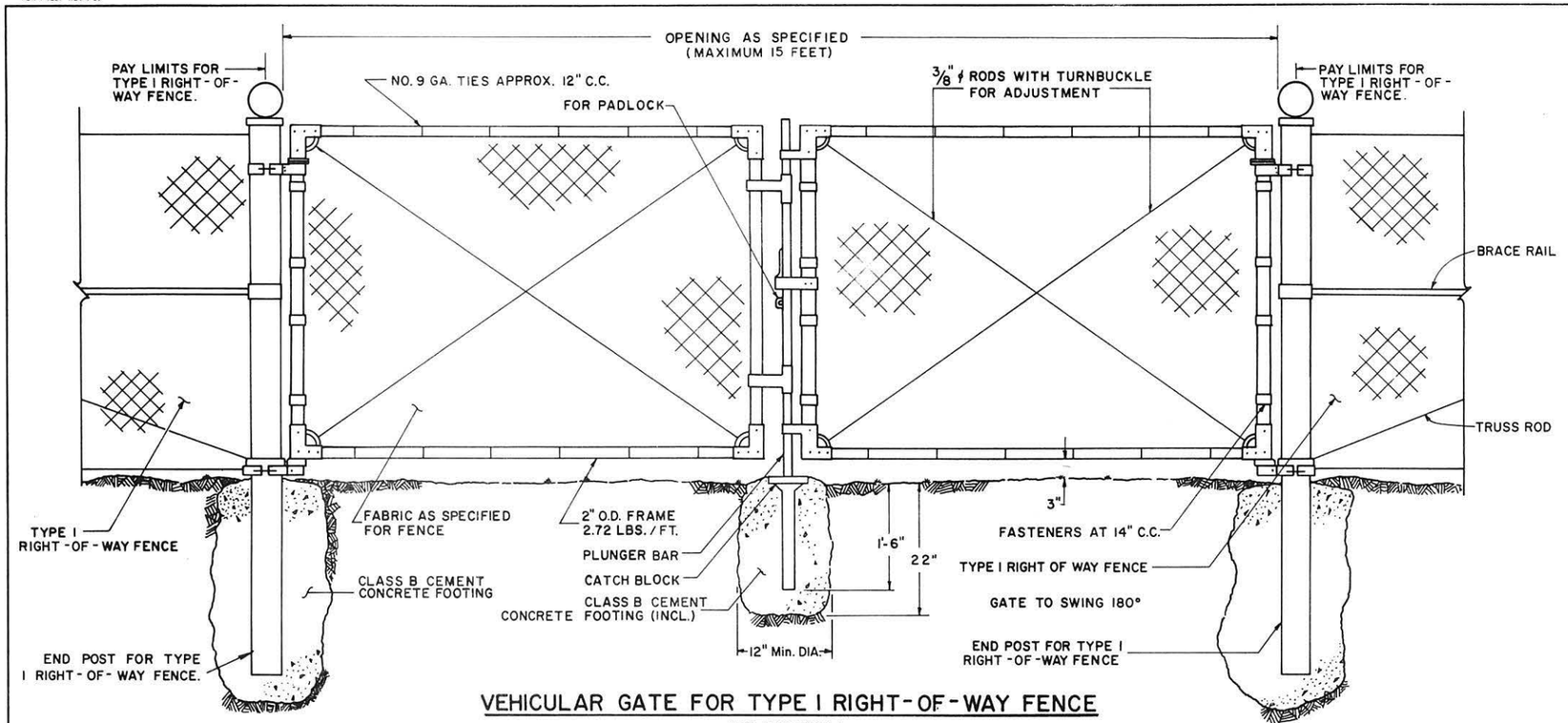
ALTERNATE BRACE RAIL

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPES 1, 2, & 3 R/W FENCE

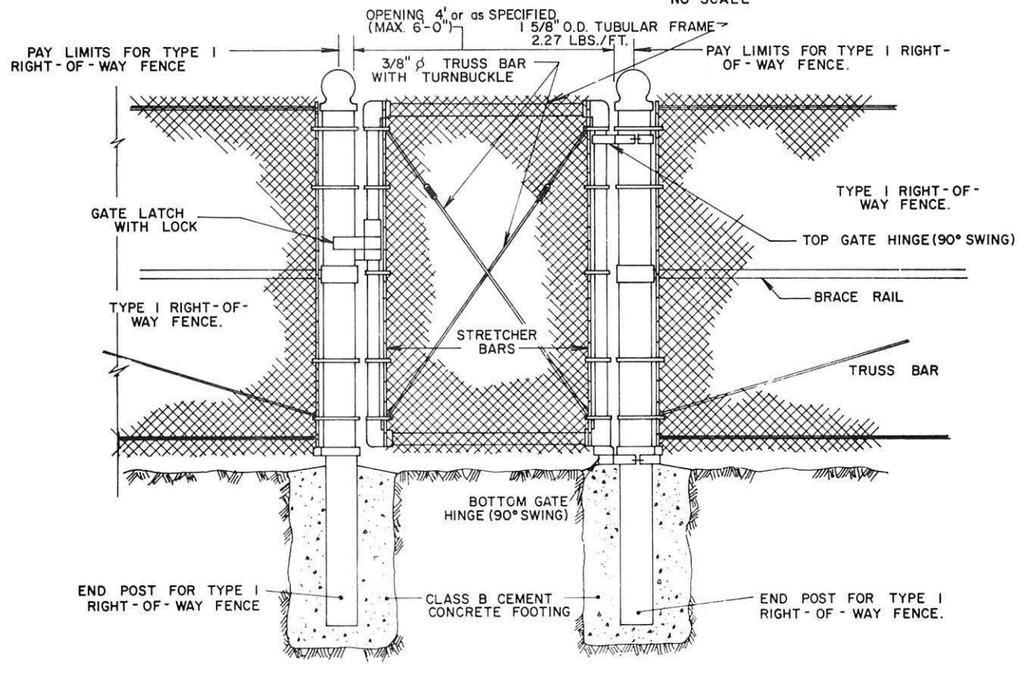
Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
R R Musser	W. J. Reves	RC-60
Location & Design Engineer	Deputy Chief Hwy. Engr.	

VOID

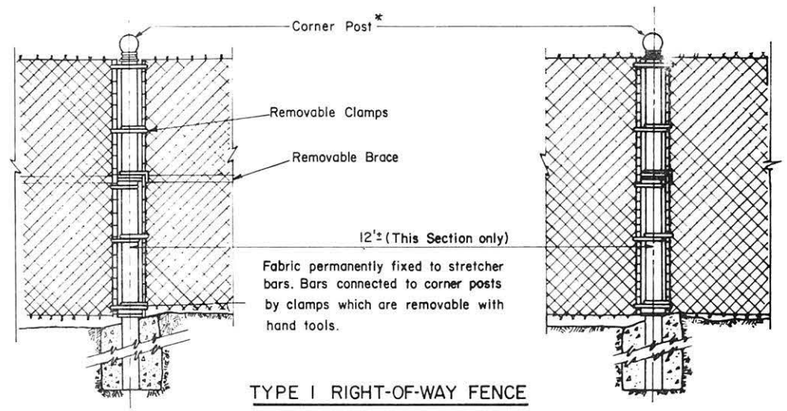


VEHICULAR GATE FOR TYPE I RIGHT-OF-WAY FENCE

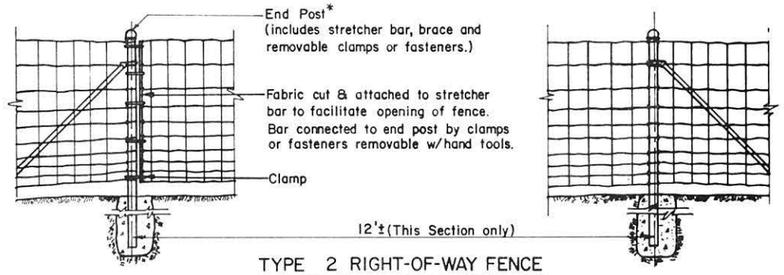
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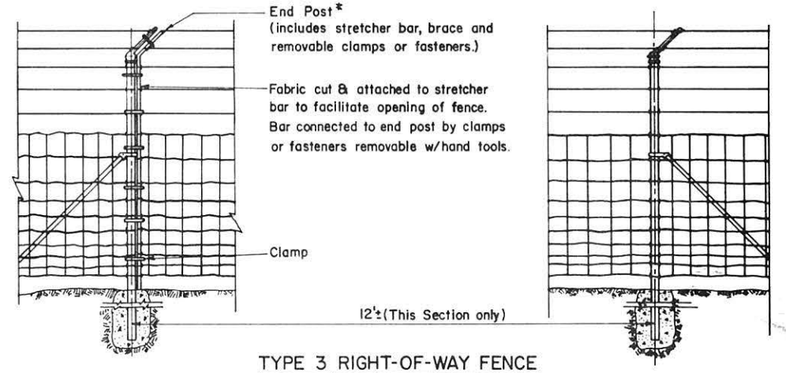
PEDESTRIAN GATE FOR TYPE I RIGHT-OF-WAY FENCE



TYPE I RIGHT-OF-WAY FENCE



TYPE 2 RIGHT-OF-WAY FENCE



TYPE 3 RIGHT-OF-WAY FENCE

* See sheet RC-60 for details.

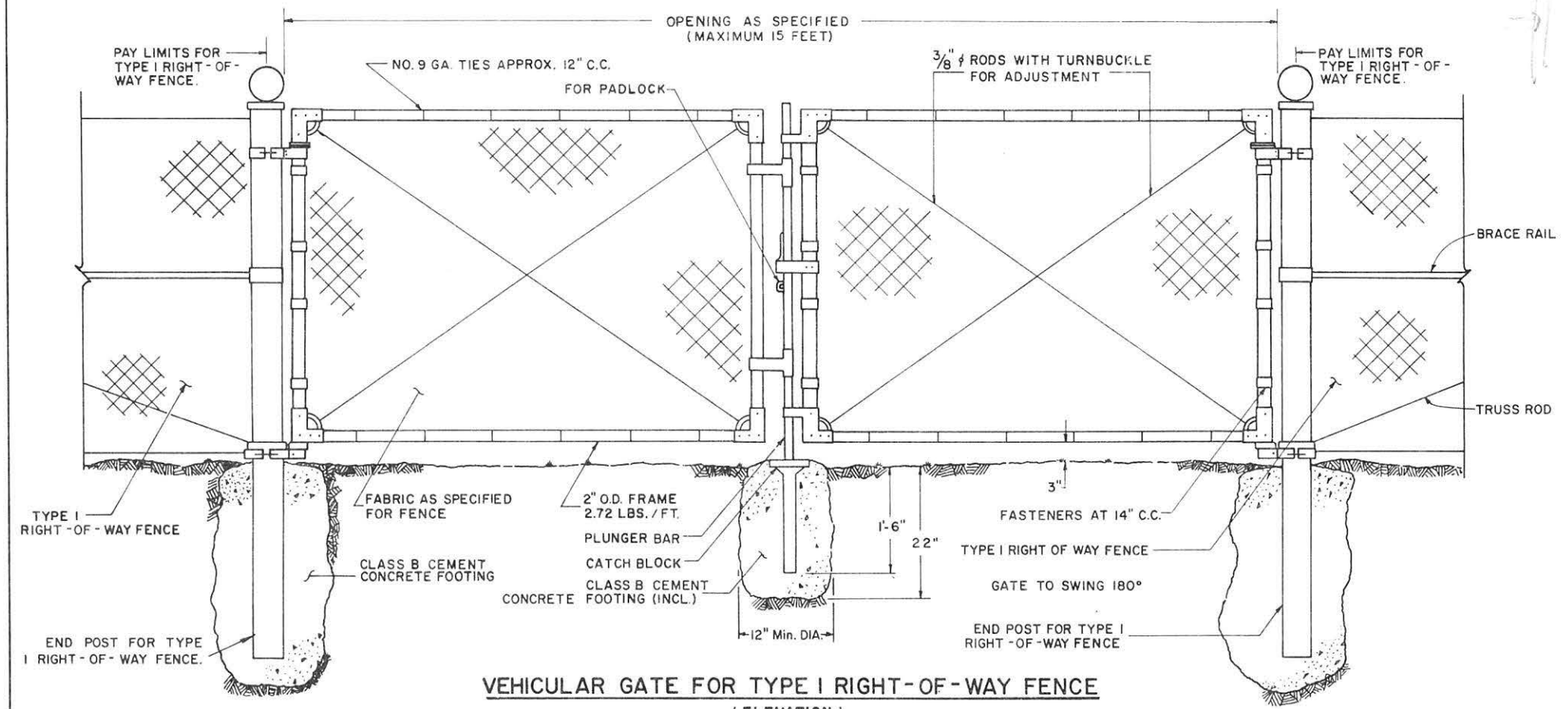
REMOVABLE FENCE SECTIONS

Note:
The payment for Removable Fence Sections will be considered incidental to the R/W fence.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

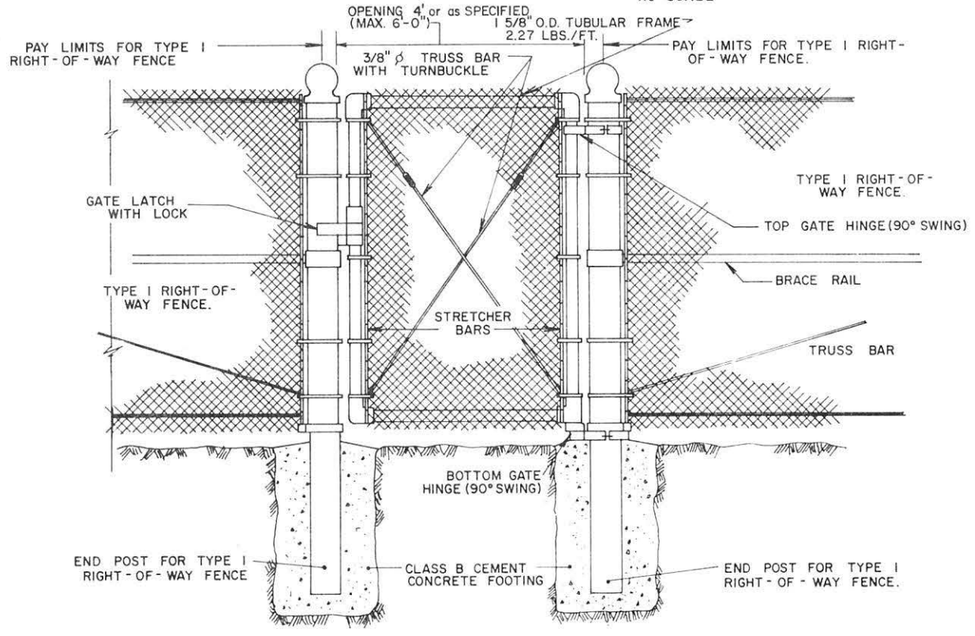
R/W GATE AND REMOVABLE FENCE SECTIONS

Recommended Mar. 7, 1973	Approved Mar. 7, 1973	Sht. 1 Of 1
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-61

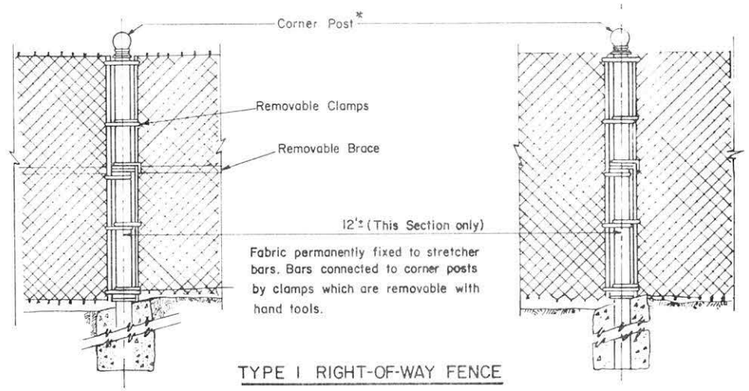


VEHICULAR GATE FOR TYPE I RIGHT-OF-WAY FENCE

(ELEVATION)
NO SCALE



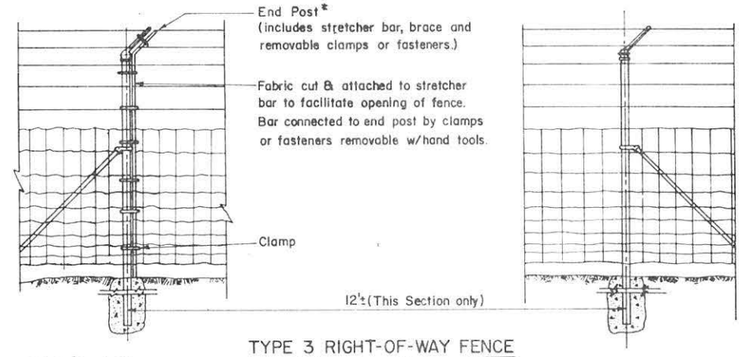
PEDESTRIAN GATE FOR TYPE I RIGHT-OF-WAY FENCE



TYPE I RIGHT-OF-WAY FENCE



TYPE 2 RIGHT-OF-WAY FENCE



TYPE 3 RIGHT-OF-WAY FENCE

* See sheet RC-60 for details.

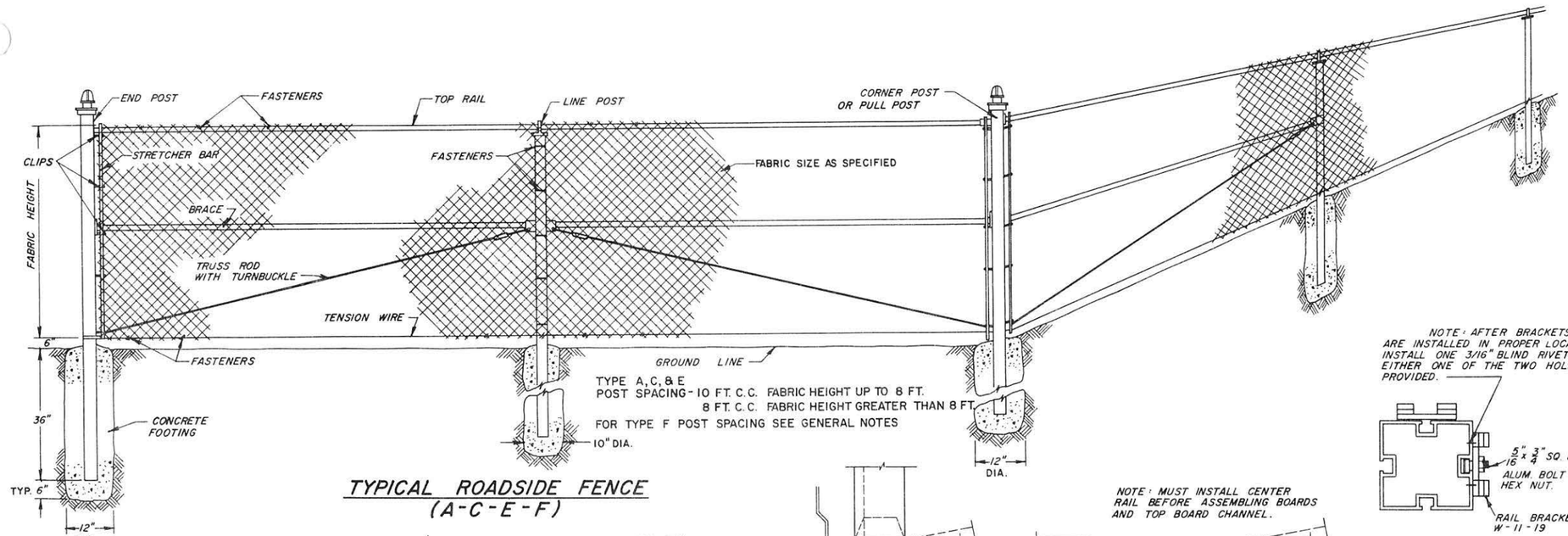
REMOVABLE FENCE SECTIONS

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

R/W GATE AND REMOVABLE FENCE SECTIONS

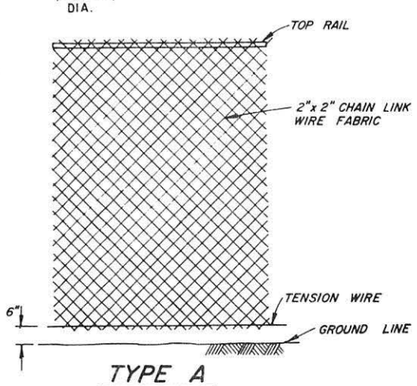
Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
RR Musser	W.J. Raver	RC-61
Location & Design Engineer	Deputy Chief Hwy. Engr.	

VOID

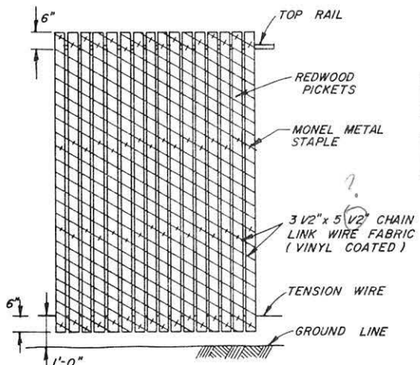


TYPE A, C, & E
POST SPACING - 10 FT. C.C. FABRIC HEIGHT UP TO 8 FT.
8 FT. C.C. FABRIC HEIGHT GREATER THAN 8 FT.
FOR TYPE F POST SPACING SEE GENERAL NOTES

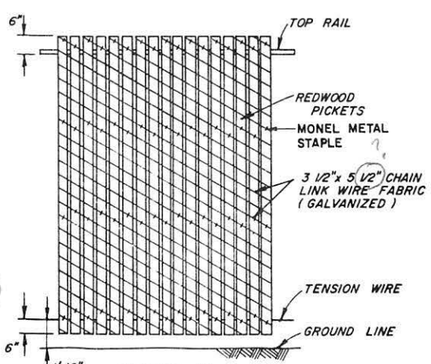
TYPICAL ROADSIDE FENCE (A-C-E-F)



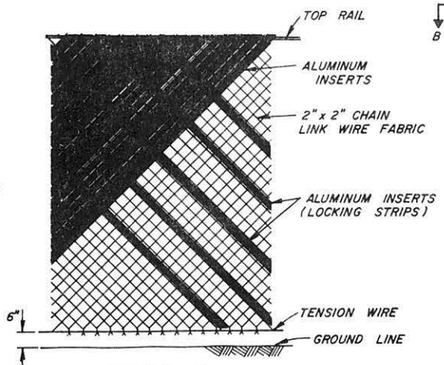
TYPE A



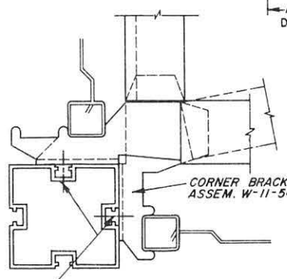
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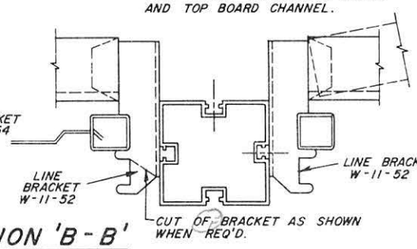


TYPE E

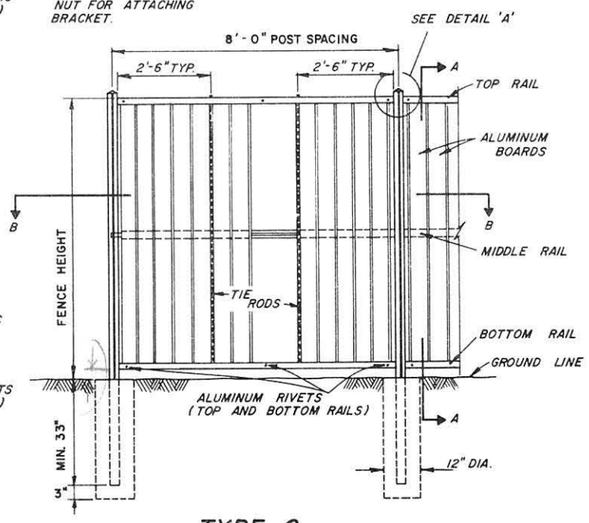


TYPE F

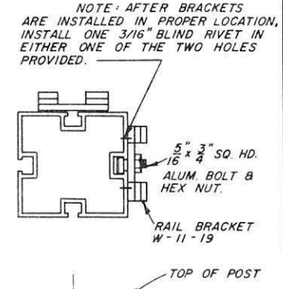


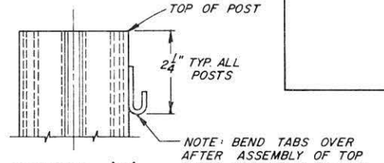


SECTION 'B-B'

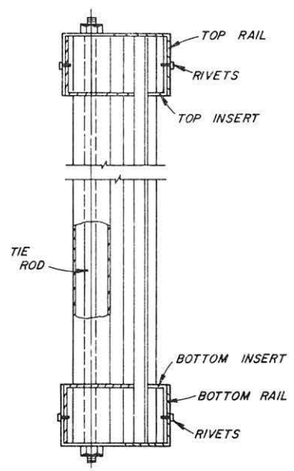


TYPE G

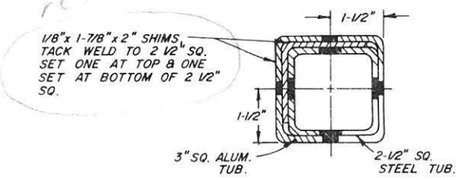




DETAIL 'A'
ATTACHMENT FOR TOP AND BOTTOM RAILS



SECTION 'A-A'



DETAIL OF GATE POST REINFORCING

GENERAL NOTES

POST SPACING & FOOTING SIZES - TYPE F			
FABRIC HEIGHT (FT.)	POST SPACING STEEL (FT)	POST SPACING ALUMINUM (FT)	FOOTING SIZE (IN.)
6	10	10	9 x 42
7	10	6	10 x 42
8	8	6	12 x 42
9	6	5 *	15 x 42
10	5	5 *	18 x 42
11	5 *	6 **	18 x 48
12	5 *	6 **	18 x 48

NOTE: STEEL H-BEAM 2.25"x 1.95" HI-CARBON
ALUMINUM 2.25"x 1.95" H-BEAM
* 3" SQUARE POSTS 0.155" WALL
** SCH. 40 4" O.D. POSTS 0.226" WALL

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

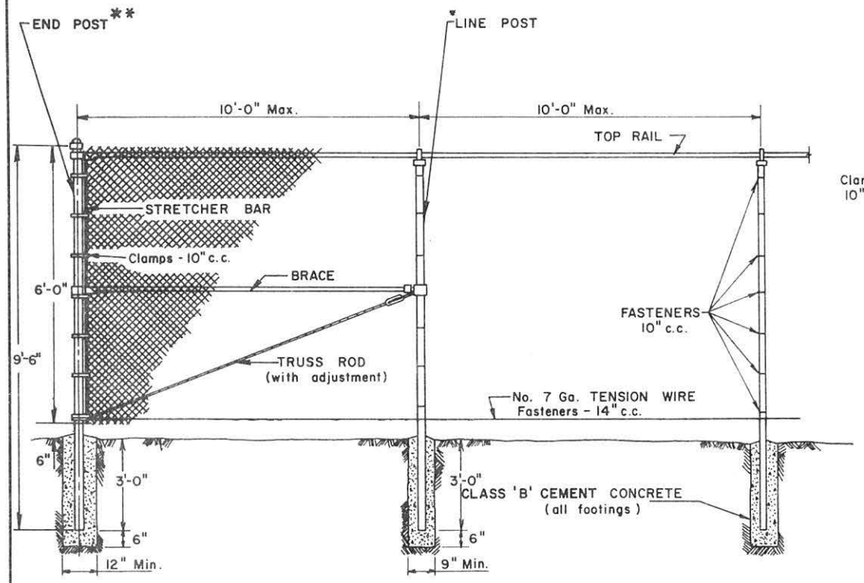
ROADSIDE FENCE

Recommended Jan. 6, 1975
Director, Bureau of Design

Approved Jan. 6, 1975
Deputy Chief Hwy Engr.

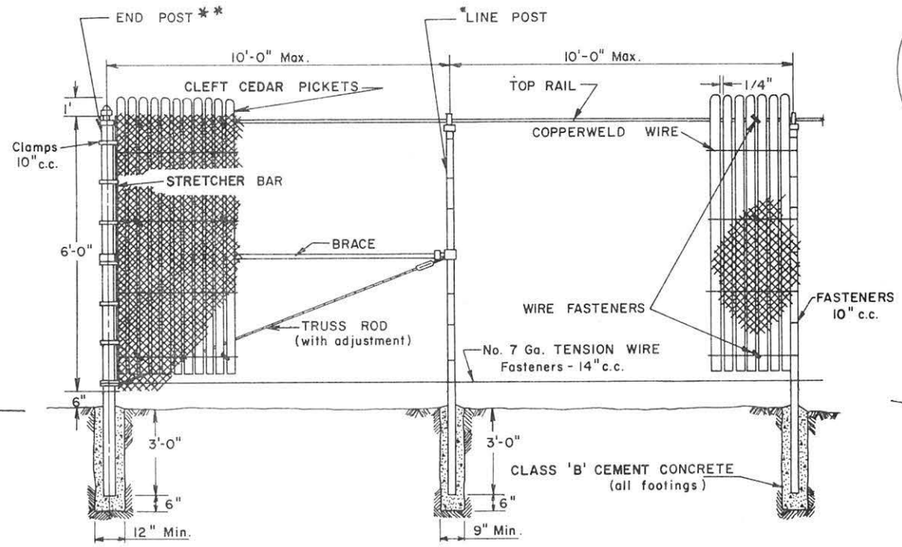
Sht. 1 Of 1

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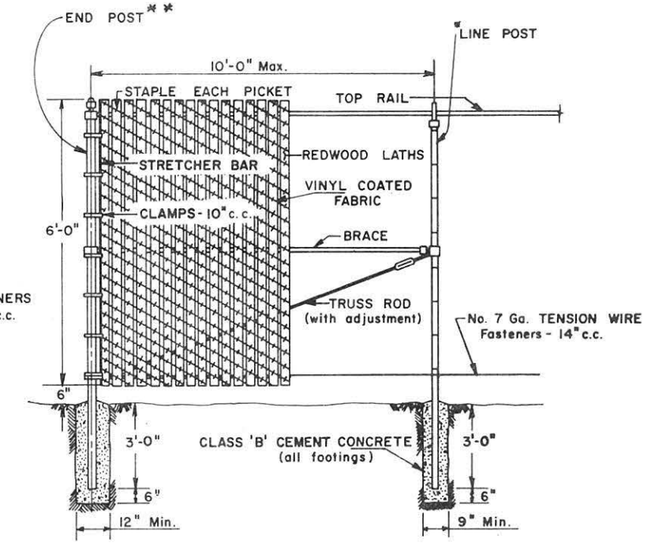
TYPE - A

(CHAIN LINK WIRE FENCE)



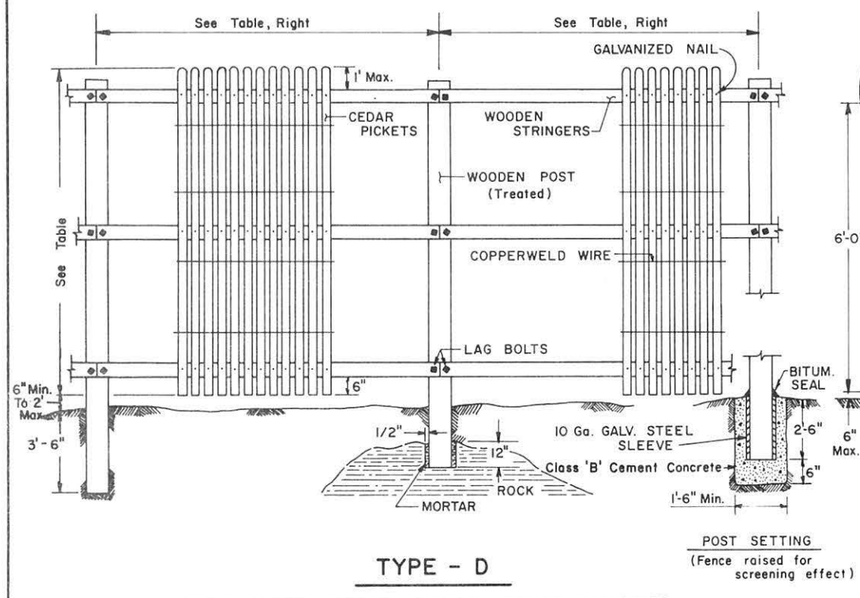
TYPE - B

(CHAIN LINK WIRE FENCE WITH MOUNTED WOVEN CLEFT CEDAR PICKETS)



TYPE - C

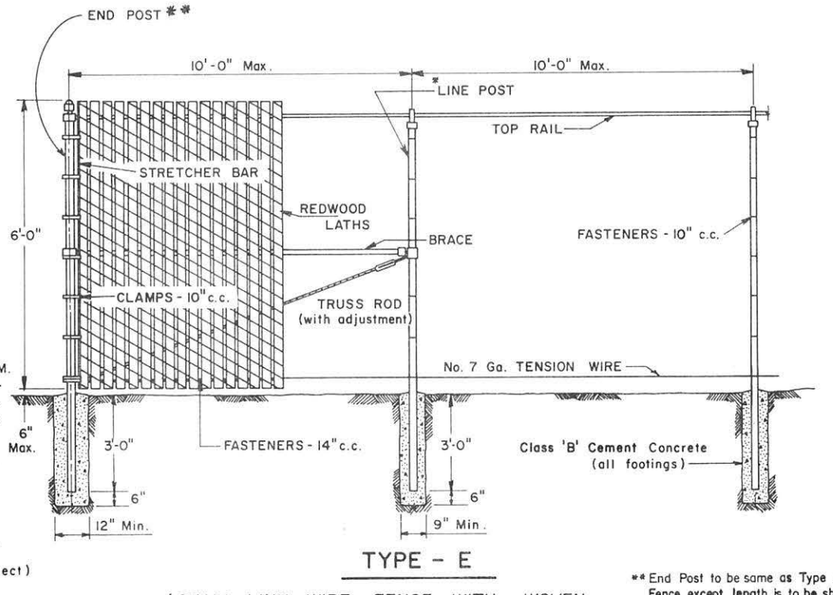
(VINYL COATED CHAIN LINK FENCE WITH WOVEN REDWOOD PICKETS)



POST SETTING
(Fence raised for screening effect)

TYPE - D

(WOVEN CLEFT CEDAR PICKET FENCE MOUNTED ON WOODEN FRAME)



TYPE - E

(CHAIN LINK WIRE FENCE WITH WOVEN REDWOOD PICKETS)

** End Post to be same as Type I R/W Fence except length is to be shown as above.

*Line post to be H Column 2.25" x 1.95" x 4.1#

POST SIZE & SPACING FOR TYPE D FENCE				
FENCE HEIGHT	PICKET LENGTH	POST SIZE	POST LENGTH	POST SPACING
6'-6"	6'-6"	4"x 4"	10'	6'
7'-6"	6'-6"	6"x 6"	11'	6'
8'-6"	8'-0"	6"x 6"	12'	5'
9'-6"	8'-0"	6"x 6"	13'	5'
10'-0"	8'-0"	6"x 6"	14'	5'

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORATION
BUREAU OF DESIGN

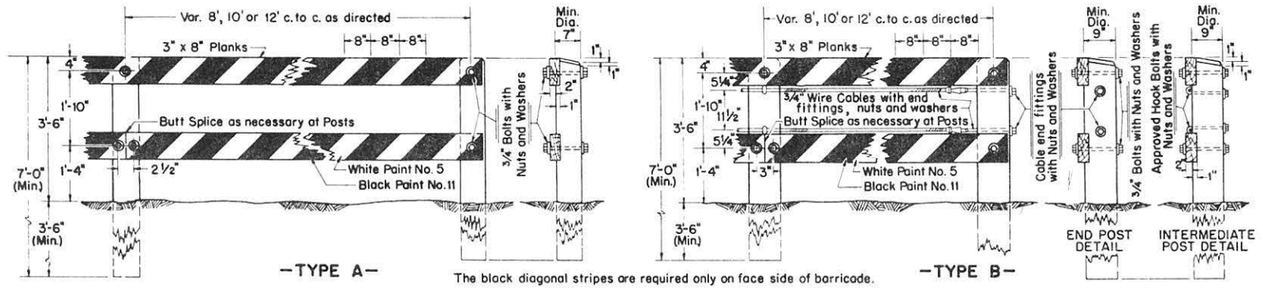
ROADSIDE FENCE

Recommended Dec. 1, 1971
R R Musser
Location & Design Engineer

Approved Dec. 1, 1971
W. J. Ravo
Deputy Chief Hwy. Engr.

Sht. 1 of 1

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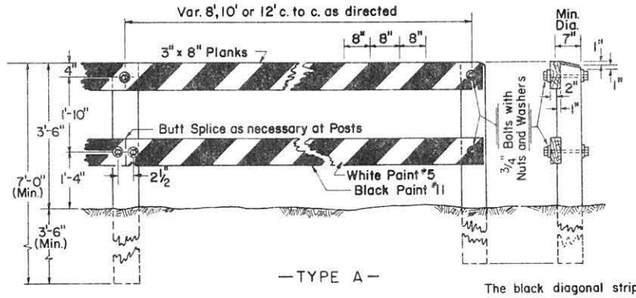


PERMANENT BARRICADES-TYPES A AND B

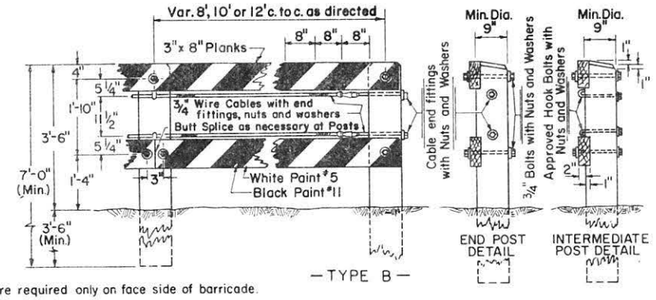
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BARRICADES

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
R R Mason Location & Design Engineer	W. J. Raver Deputy Chief Hwy. Engr	RC-63



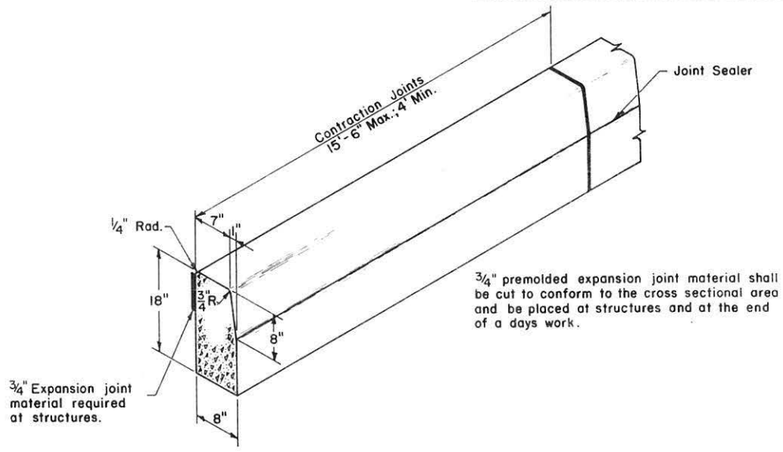
—TYPE A—



—TYPE B—

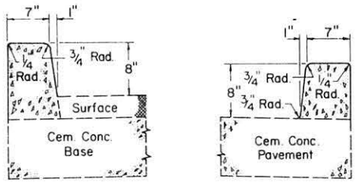
The black diagonal stripes are required only on face side of barricade.

PERMANENT BARRICADES - TYPES A AND B



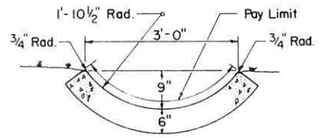
¾" premolded expansion joint material shall be cut to conform to the cross sectional area and be placed at structures and at the end of a days work.

PLAIN CEMENT CONCRETE CURB

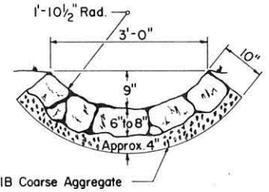


Curb face may be constructed vertical as permitted for PLAIN CEMENT CONCRETE CURB

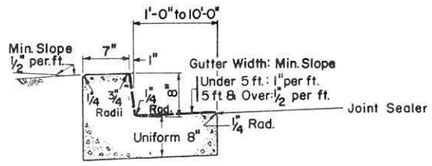
INTEGRAL CEMENT CONCRETE CURB



PLAIN CEMENT CONCRETE GUTTER

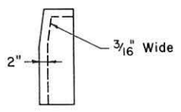


PLAIN OR MORTARED RUBBLE GUTTER

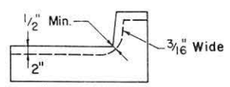


The width of gutter used in computing the pay area is indicated by — — — — —
The gutters shall be reinforced when indicated on the drawings or specified.

PLAIN CEMENT CONCRETE CURB GUTTER

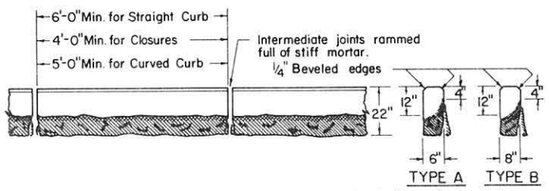


PLAIN CEMENT CONCRETE CURB



PLAIN CEMENT CONCRETE CURB GUTTERS

SAWED JOINT DETAILS



The top, the face for a depth of 12 inches and the back for a depth of 4 inches, as indicated, shall be peen-hammer dressed.

The bottom of curb may have a tolerance of 1 inch less or 2 inches more than the specified width.

Joints shall not exceed ¼-inch in width for a distance of 12 inches below the top of curb and ½-inch in width for the remainder of the joint.

STONE CURB - TYPES A & B

NOTES

1. All items shall conform to the requirements of Form 408.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BARRICADES CURBS AND GUTTERS

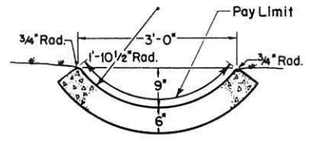
Recommended June 1, 1976
B. D. Kunkle
Director, Bureau of Design

Approved June 1, 1976
Robert R. Meyer
Deputy Chief Hwy. Engr.

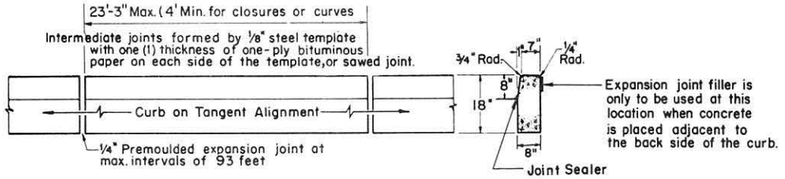
Sht. 1 Of 1
RC-64

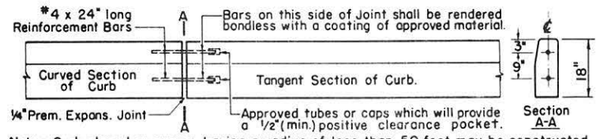
TRACED BY
FINAL BY

140



PLAIN CEMENT CONCRETE GUTTER

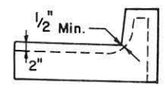




Note : Curb placed on curves having a radius of less than 50 feet may be constructed with a vertical face, warped as necessary to obtain the 1" batter (required on tangent alignment) at the P.C. and P.T. of the curve. Vertical face curb shall have a uniform width of 8 inches.

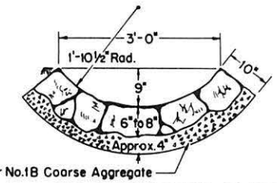
PLAIN CEMENT CONCRETE CURB

PLAIN CEMENT CONCRETE CURB

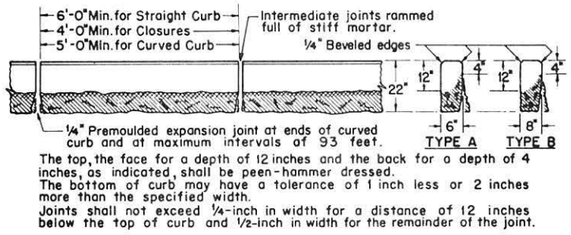


PLAIN CEMENT CONCRETE CURB GUTTERS

SAWED JOINT DETAILS

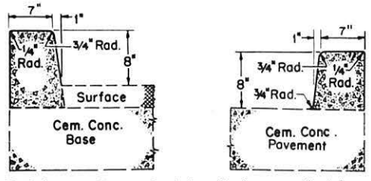


PLAIN OR MORTARED RUBBLE GUTTER



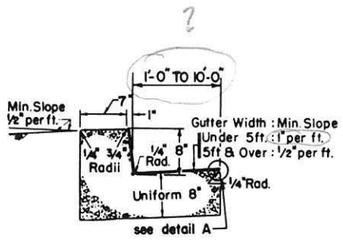
The top, the face for a depth of 12 inches and the back for a depth of 4 inches, as indicated, shall be peen-hammer dressed.
The bottom of curb may have a tolerance of 1 inch less or 2 inches more than the specified width.
Joints shall not exceed ¼-inch in width for a distance of 12 inches below the top of curb and ½-inch in width for the remainder of the joint.

STONE CURB - TYPES A & B



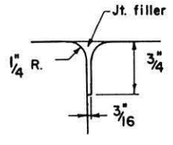
Curb face may be constructed vertical as permitted for PLAIN CEMENT CONCRETE CURB

INTEGRAL CEMENT CONCRETE CURB



The width of gutter used in computing the pay area is indicated by _____
These gutters shall be reinforced when indicated on the drawings or specified.

PLAIN CEMENT CONCRETE CURB GUTTERS



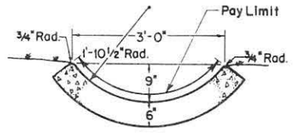
DETAIL A

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

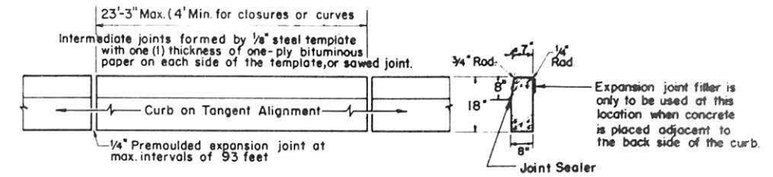
CURBS AND GUTTERS

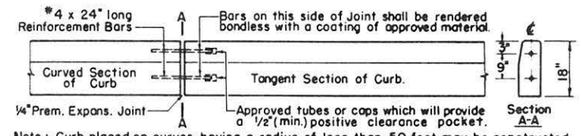
Recommended Mar. 7, 1973	Approved Mar. 7, 1973	Sht. 1 Of 1
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-64

VOID



PLAIN CEMENT CONCRETE GUTTER-TYPE C

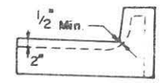




Note : Curb placed on curves having a radius of less than 50 feet may be constructed with a vertical face, warped as necessary to obtain the 1" batter (required on tangent alignment) at the P.C. and P.T. of the curve. Vertical face curb shall have a uniform width of 8 inches.

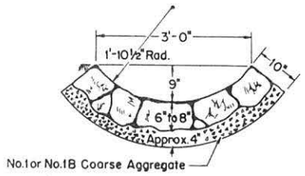
PLAIN CEMENT CONCRETE CURB

PLAIN CEMENT CONCRETE CURB

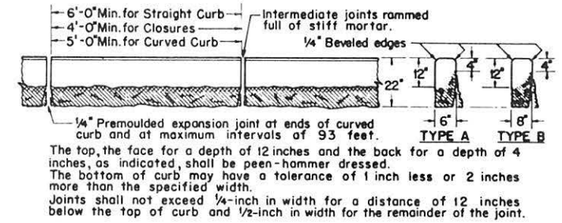


PLAIN CEMENT CONCRETE CURB GUTTERS – TYPES A & C

SAWED JOINT DETAILS

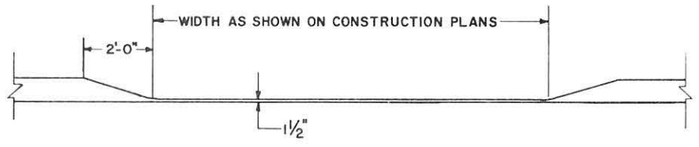


PLAIN OR MORTARED RUBBLE GUTTER-TYPE C

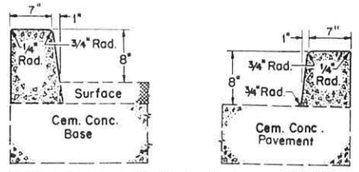


The top, the face for a depth of 12 inches and the back for a depth of 4 inches, as indicated, shall be peen-hammer dressed.
The bottom of curb may have a tolerance of 1 inch less or 2 inches more than the specified width.
Joints shall not exceed 1/4-inch in width for a distance of 12 inches below the top of curb and 1/2-inch in width for the remainder of the joint.

STONE CURB - TYPES A & B

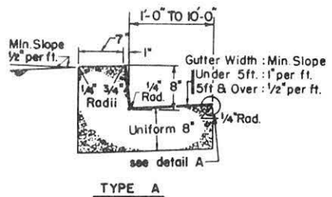


DEPRESSED CURB

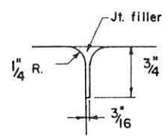


Curb face may be constructed vertical as permitted for PLAIN CEMENT CONCRETE CURB

INTEGRAL CEMENT CONCRETE CURB



TYPE A



DETAIL A

The width of gutter used in computing the pay area is indicated by ———
These gutters shall be reinforced when indicated on the drawings or specified.
Curb face of Types – A may be constructed vertical as permitted for PLAIN CEMENT CONCRETE CURB

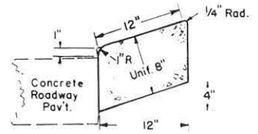
PLAIN CEMENT CONCRETE CURB GUTTERS - TYPES A

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

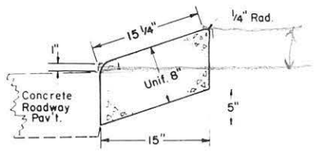
CURBS AND GUTTERS

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	SHT 1 OF 1
R R Mason	W. J. Ravar	RC-64
Location & Design Engineer	Deputy Chief Hwy. Engr.	

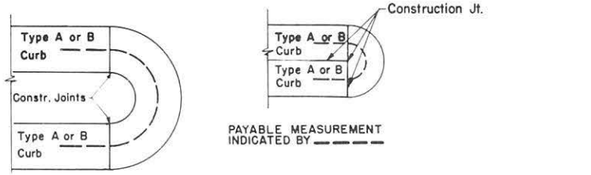
VOID



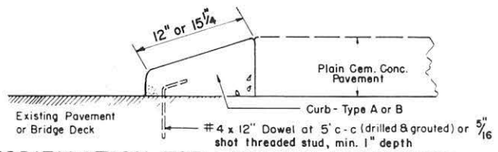
TYPE A



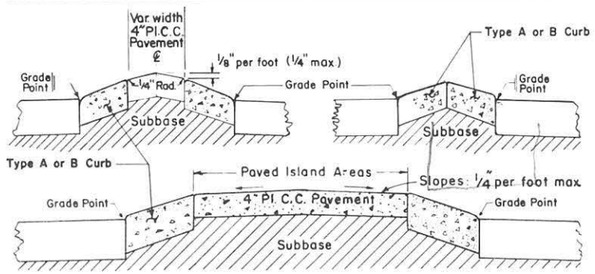
TYPE B



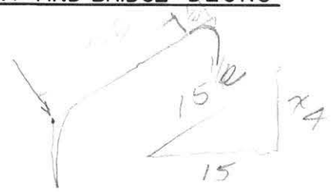
END DETAILS

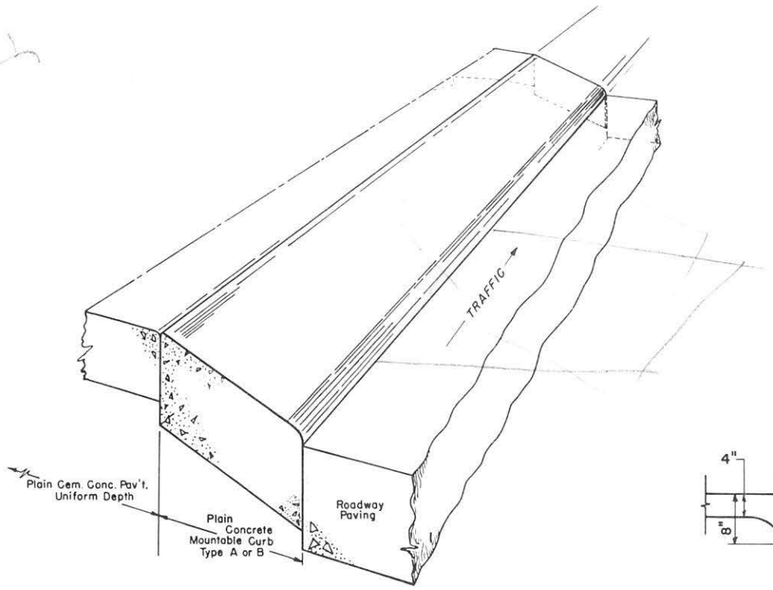


MODIFICATION FOR EXISTING CONCRETE PAVEMENT AND BRIDGE DECKS



TYPICAL CONSTRUCTION



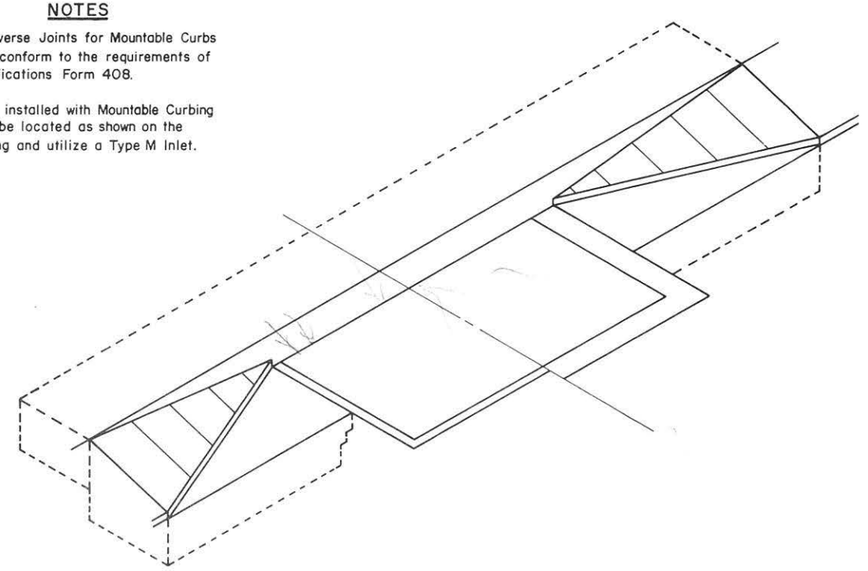


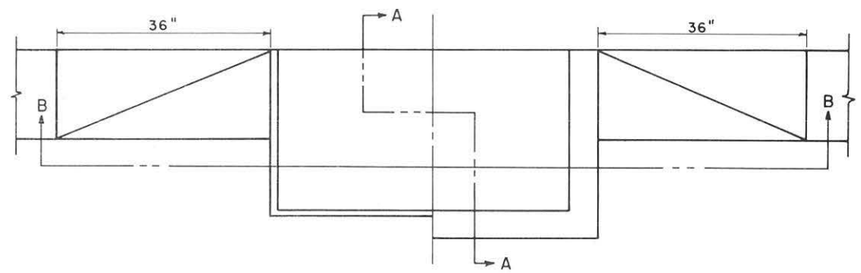
TYPICAL DIVISOR AREA

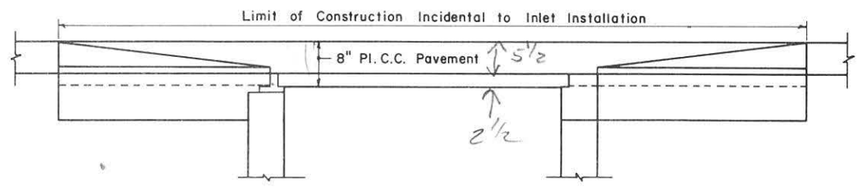
NOTES

(1) Transverse Joints for Mountable Curbs shall conform to the requirements of specifications Form 408.

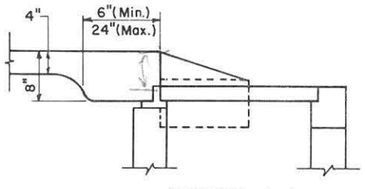
(2) Inlets installed with Mountable Curbing shall be located as shown on the drawing and utilize a Type M Inlet.







SECTION B-B



SECTION A-A

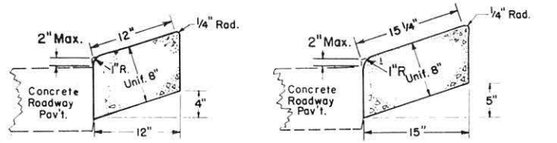
INLET INSTALLATION DETAIL

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MOUNTABLE CURBS

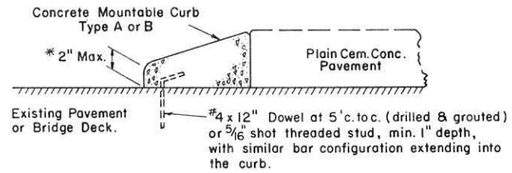
Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 1 Of 1
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-65

VOID



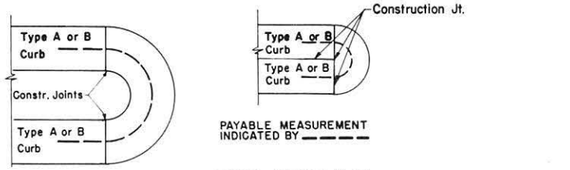
TYPE A TYPE B

CONCRETE MOUNTABLE CURBS

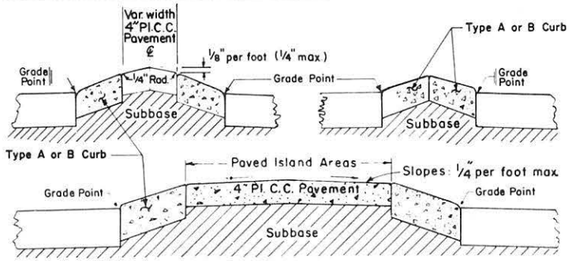


CONCRETE MOUNTABLE CURB ON EXISTING CONCRETE PAVEMENT AND BRIDGE DECKS

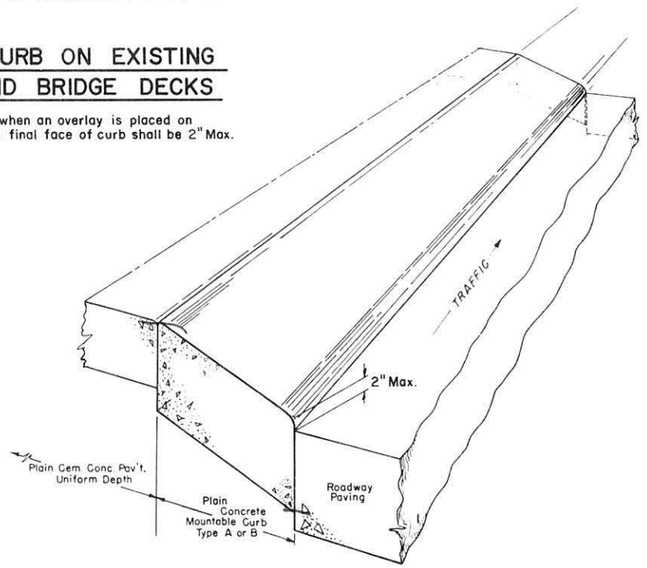
*Plans may provide for a deeper face at curb when an overlay is placed on the existing pavement, however this exposed final face of curb shall be 2" Max.



END DETAILS



TYPICAL CONSTRUCTION

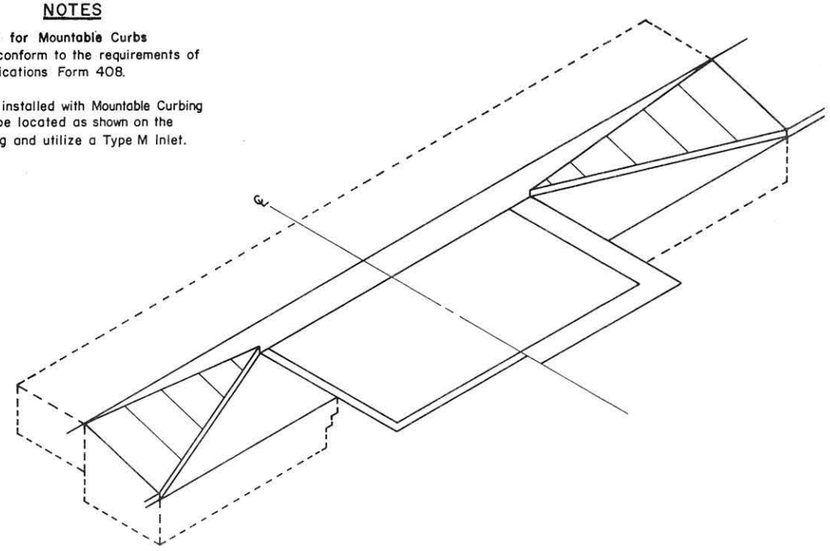


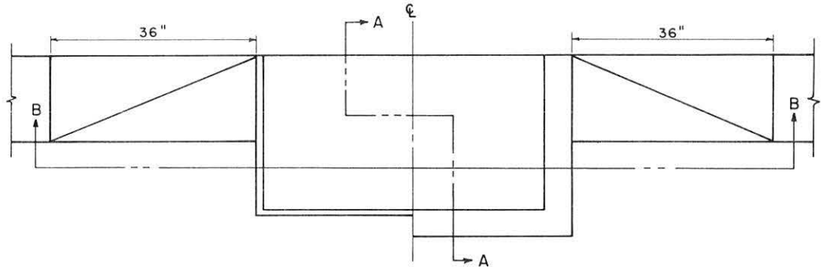
TYPICAL DIVISOR AREA

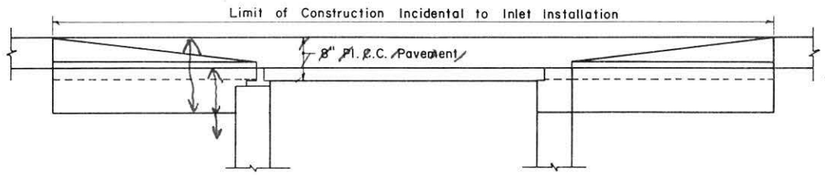
NOTES

(1) Joints for Mountable Curbs shall conform to the requirements of specifications Form 408.

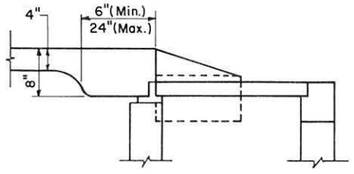
(2) Inlets installed with Mountable Curbing shall be located as shown on the drawing and utilize a Type M Inlet.







SECTION B-B



SECTION A-A

TREATMENT FOR CONCRETE MOUNTABLE CURBS AT INLETS

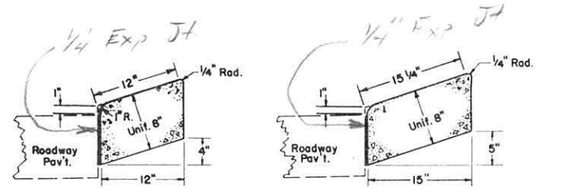
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MOUNTABLE CURBS

Recommended June 1, 1976
B.D. Rumble
Director, Bureau of Design

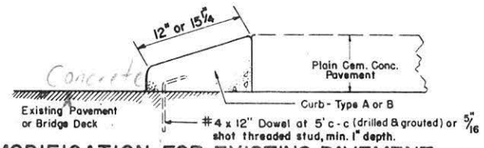
Approved June 1, 1976
Robert R. Mason
Deputy Chief Hwy. Engr.

Sht. 1 Of 1
RC-65

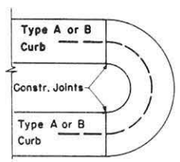


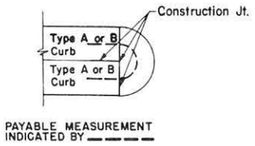
TYPE A

TYPE B

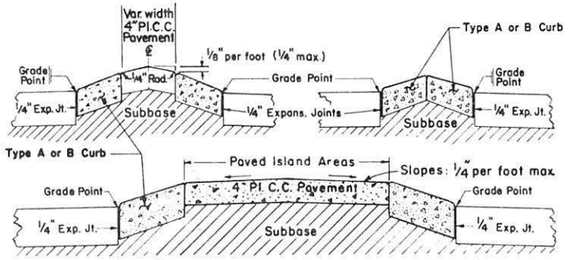


MODIFICATION FOR EXISTING PAVEMENT AND BRIDGES



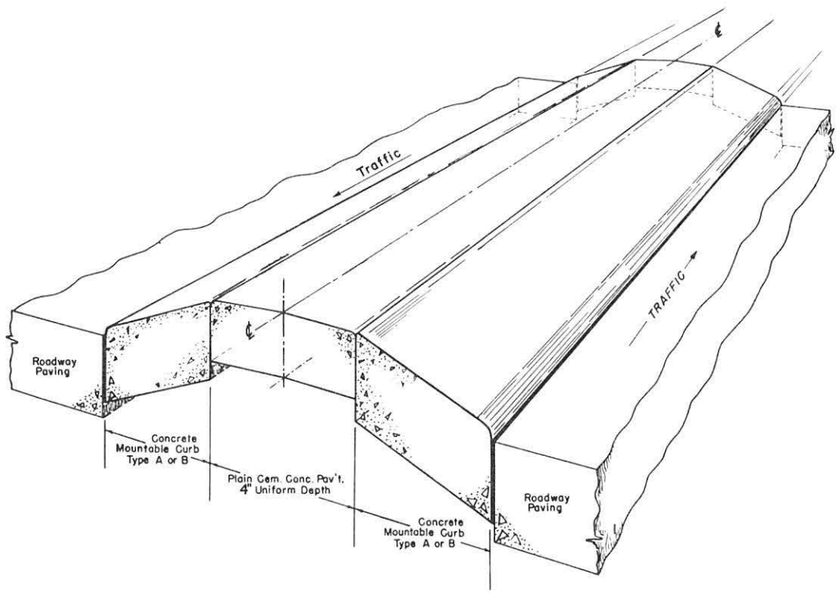


END DETAILS



Note: Omit the indicated 1/4" expansion joints when curb is adjacent to bituminous surface courses.

TYPICAL CONSTRUCTION



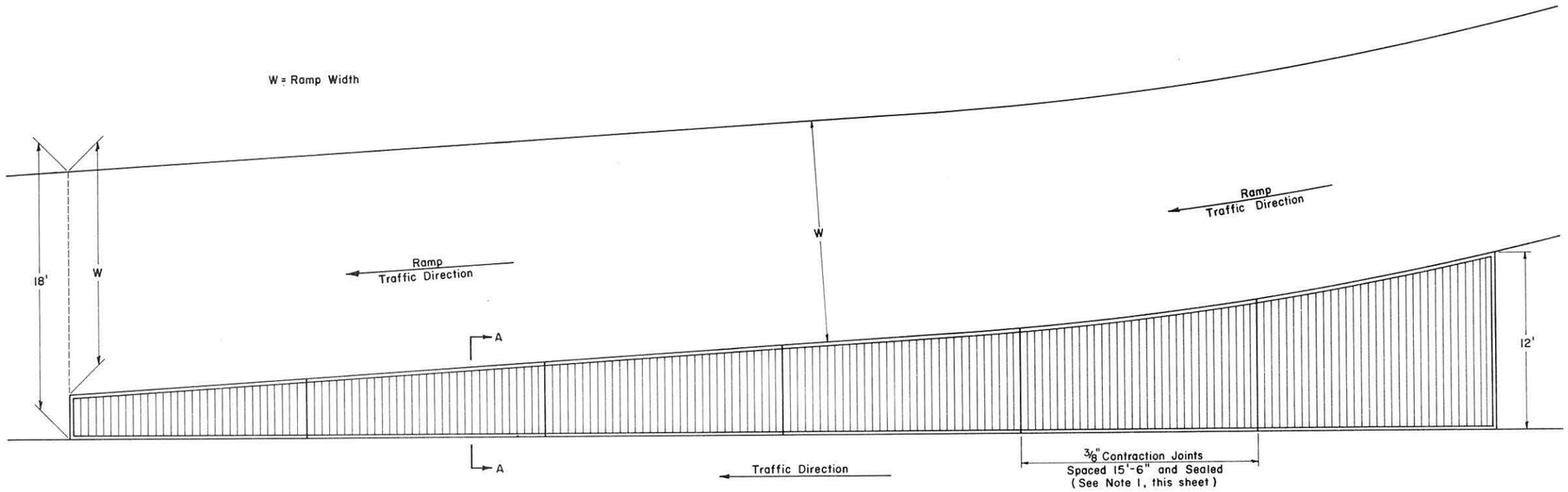
TYPICAL DIVISOR AREA

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

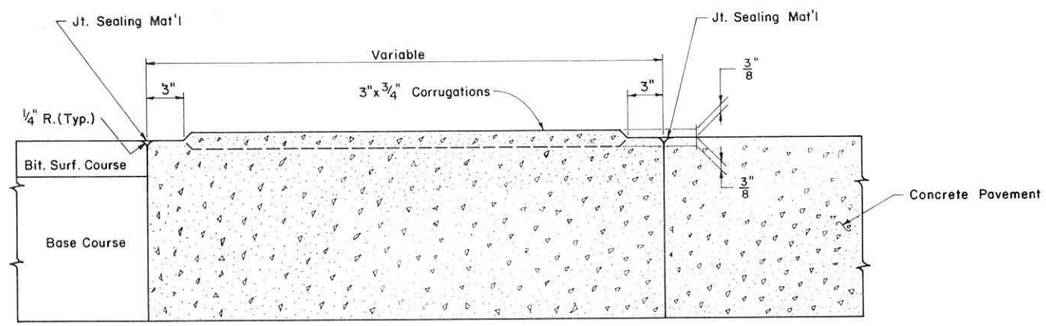
CONCRETE MOUNTABLE CURBS

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 of 1
R R Musser Location & Design Engineer	W. J. Ravor Deputy Chief Hwy. Engr.	RC-65

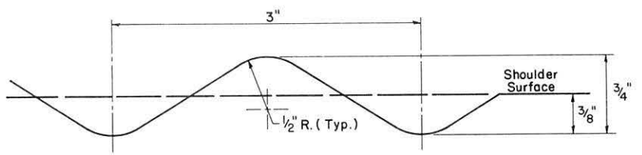
VOID



TRAFFIC SEPARATOR IN RAMP GORE AREA



SECTION A-A



CORRUGATION DETAIL

NOTES

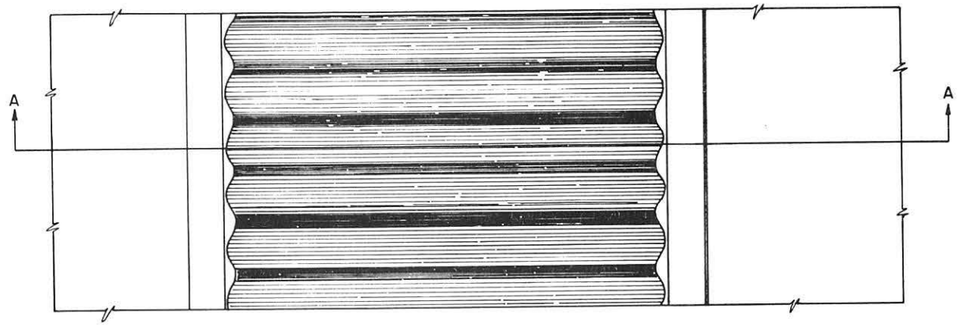
1. Contraction joints shall be spaced in uniform lengths or sections of 15.5' and shall be placed in line with adjacent pavement contraction joints. They may be either hand-formed or sawed joints, but shall be 3/8" wide and the depth equal to 1/4 of the pavement depth.
2. Concrete traffic separator shall conform to Section 629, Form 408.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

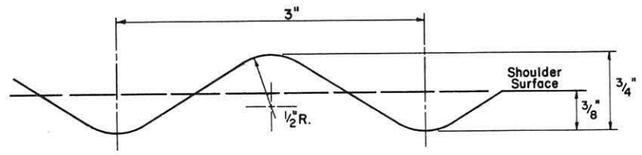
CONCRETE TRAFFIC SEPARATOR

Recommended June 1, 1976	Approved June 1, 1976	Sht. 1 Of 1
B.D. Barkdale	Robert K. Mosser	RC-66
Director, Bureau of Design	Deputy Chief Hwy. Engineer	

TRACED BY
FINAL BY



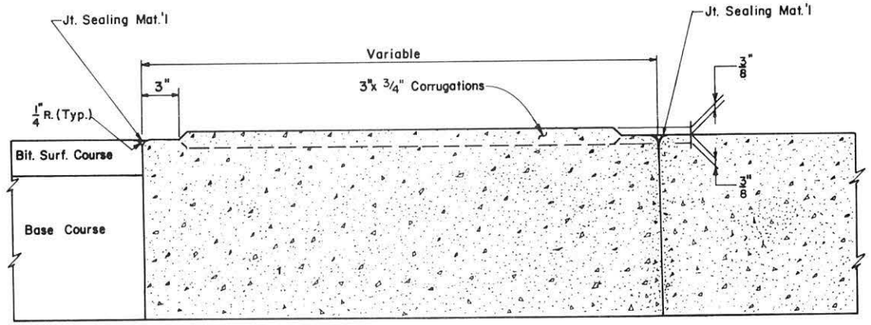
PLAN



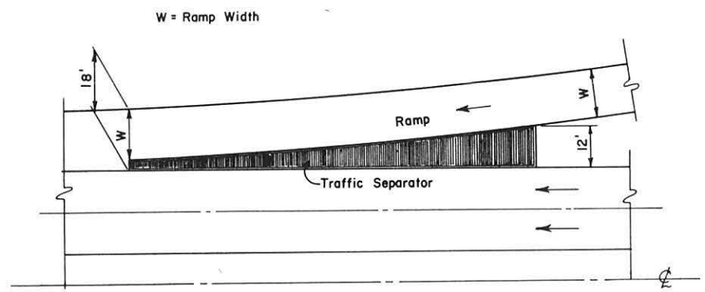
CORRUGATION DETAIL

NOTES:

Sawed Transverse Joints to be spaced 23'-3"



SECTION A-A



TRAFFIC SEPARATOR IN RAMP GORE AREA

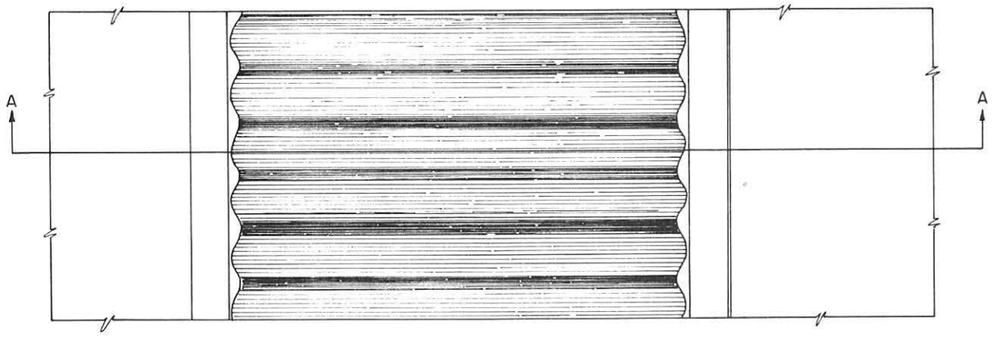
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE TRAFFIC SEPARATOR

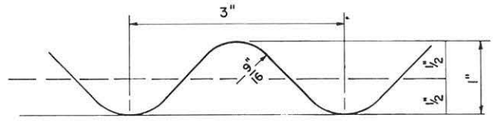
Recommended Aug 20, 1975	Approved Aug 29, 1975	Sht. 1 Of 1
B.O. Lounsbury	Robert R. Mercer	RC-66
Director, Bureau of Design	Deputy Chief Hwy. Engineer	

TRACED BY
FINAL 8

VOID



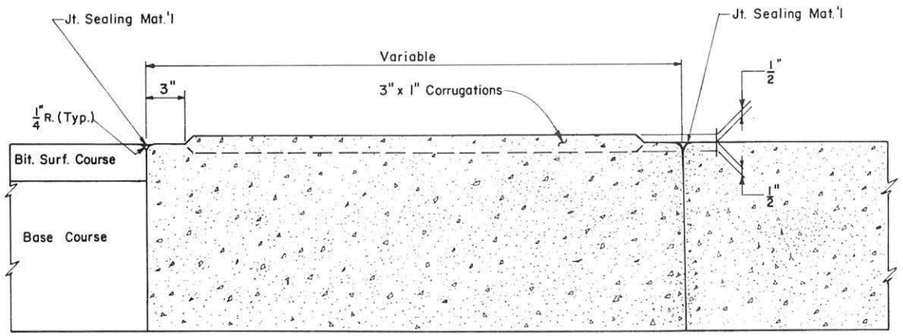
PLAN



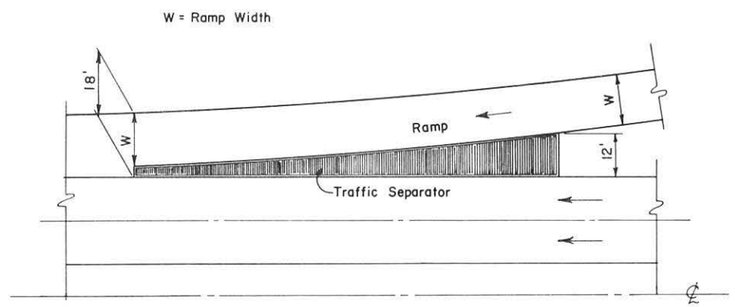
CORRUGATION DETAIL

NOTES:

Sawed Transverse Joints to be spaced 23'-3"



SECTION A-A



TRAFFIC SEPARATOR IN RAMP GORE AREA

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

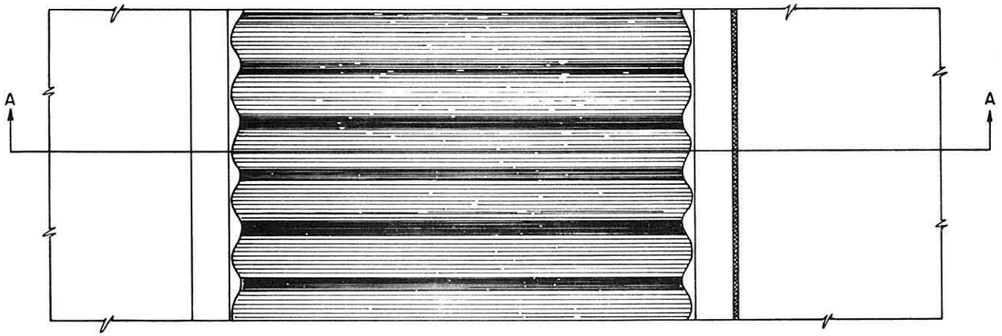
CONCRETE TRAFFIC SEPARATOR

Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 1 Of 1
Director, Bureau of Design	Deputy Chief Hwy. Engineer	RC-66

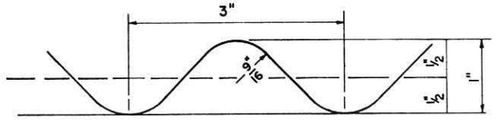
TRACED BY

VOID

FORM 4237 REV. 7-68



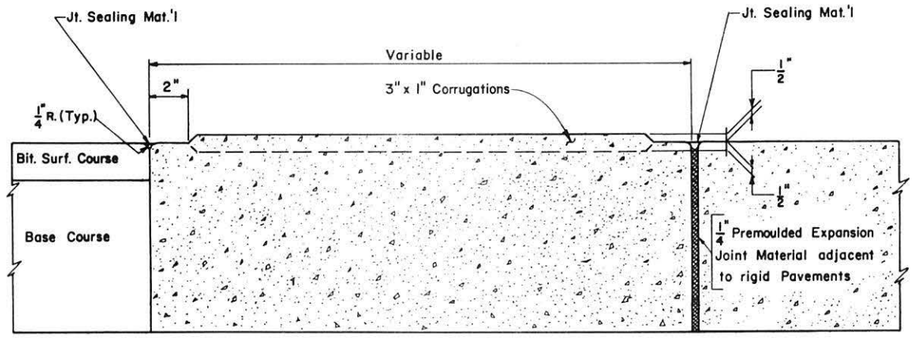
PLAN



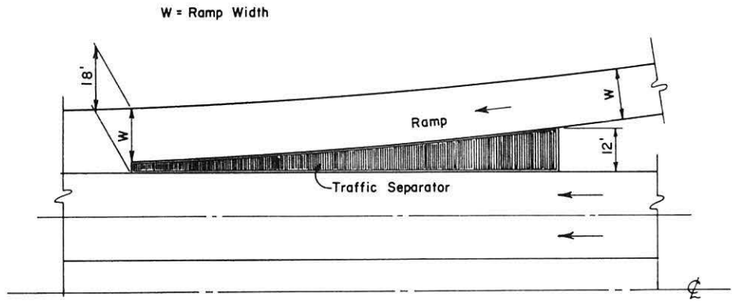
CORRUGATION DETAIL

NOTES:

Sawed Transverse Joints to be spaced 23'-3"



SECTION A-A



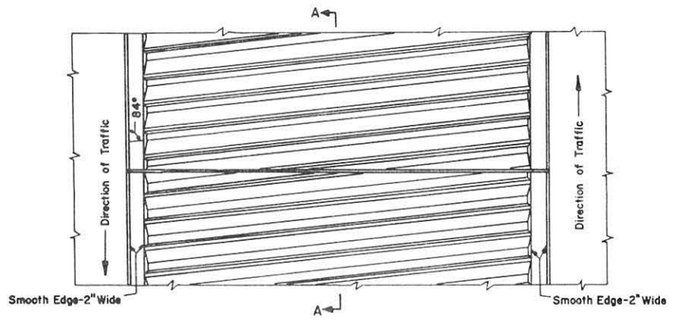
TRAFFIC SEPARATOR IN RAMP GORE AREA

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

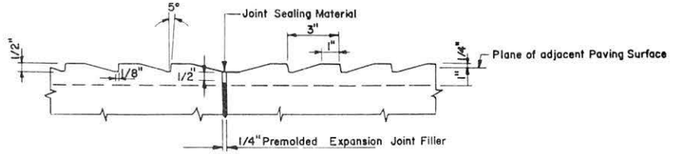
CONCRETE TRAFFIC SEPARATOR

Recommended Mar 7, 1973	Approved Mar 7, 1973	Sht 1 Of 1
Director, Bureau of Design	Deputy Chief Hwy Engineer	RC-66

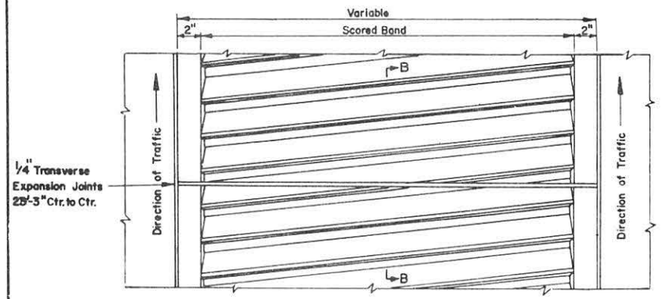
VOID



(Between lanes of opposing traffic direction)

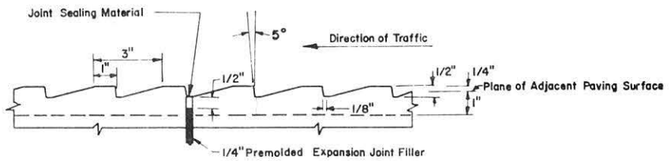


SECTION A-A THROUGH SCORING



(Between lanes of same traffic direction)

PLAN VIEWS



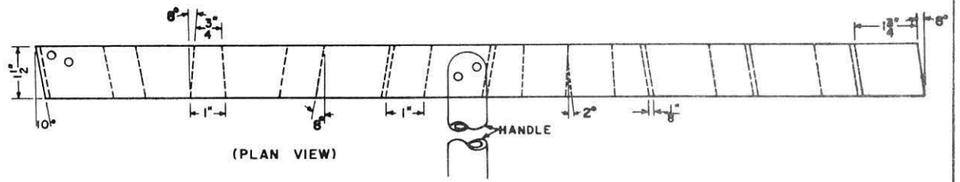
SECTION B-B THROUGH SCORING

NOTES

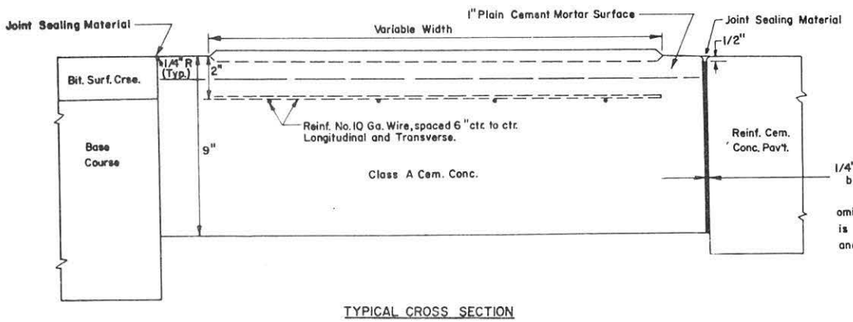
All surfaces of the scored band shall be smooth, with true inclinations and draft. All corners shall be sharp. The edging on each side of the scored band shall be smooth, true to grade and alignment and shall be free from an excess of mortar at it's junction with the scored band.

Transverse Expansion Joints of corresponding thickness shall be placed directly opposite those in the adjacent pavement. Also 1/4" expansion joints shall be placed in line with construction joint in the adjacent concrete pavement and at intermediate intervals of 23'-3".

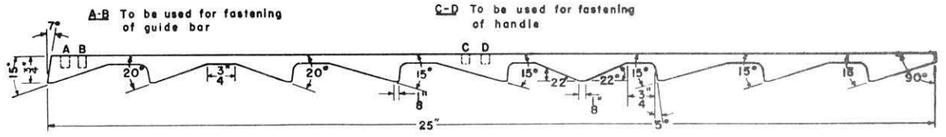
At the option of the contractor, either type scoring tool may be used when scoring between lanes of opposing traffic.



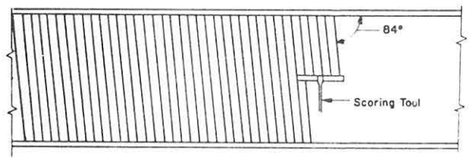
(PLAN VIEW)



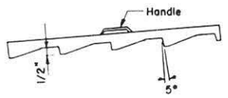
TYPICAL CROSS SECTION



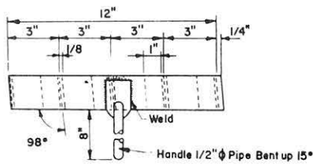
Alternate Scoring Tool For Scoring Between Lanes of Opposing Traffic. (ELEVATION VIEW)



PLAN OF SCORING



SCORING TOOL (ELEVATION)



SCORING TOOL (PLAN VIEW)

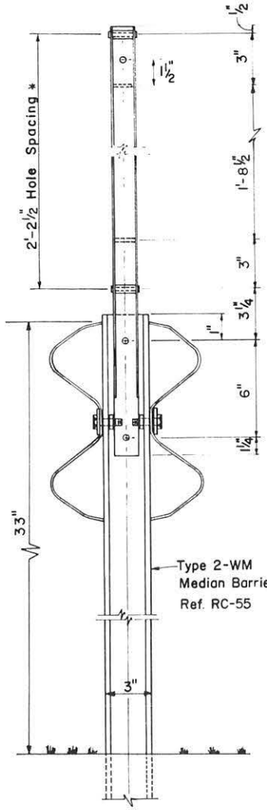
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE TRAFFIC SEPARATOR

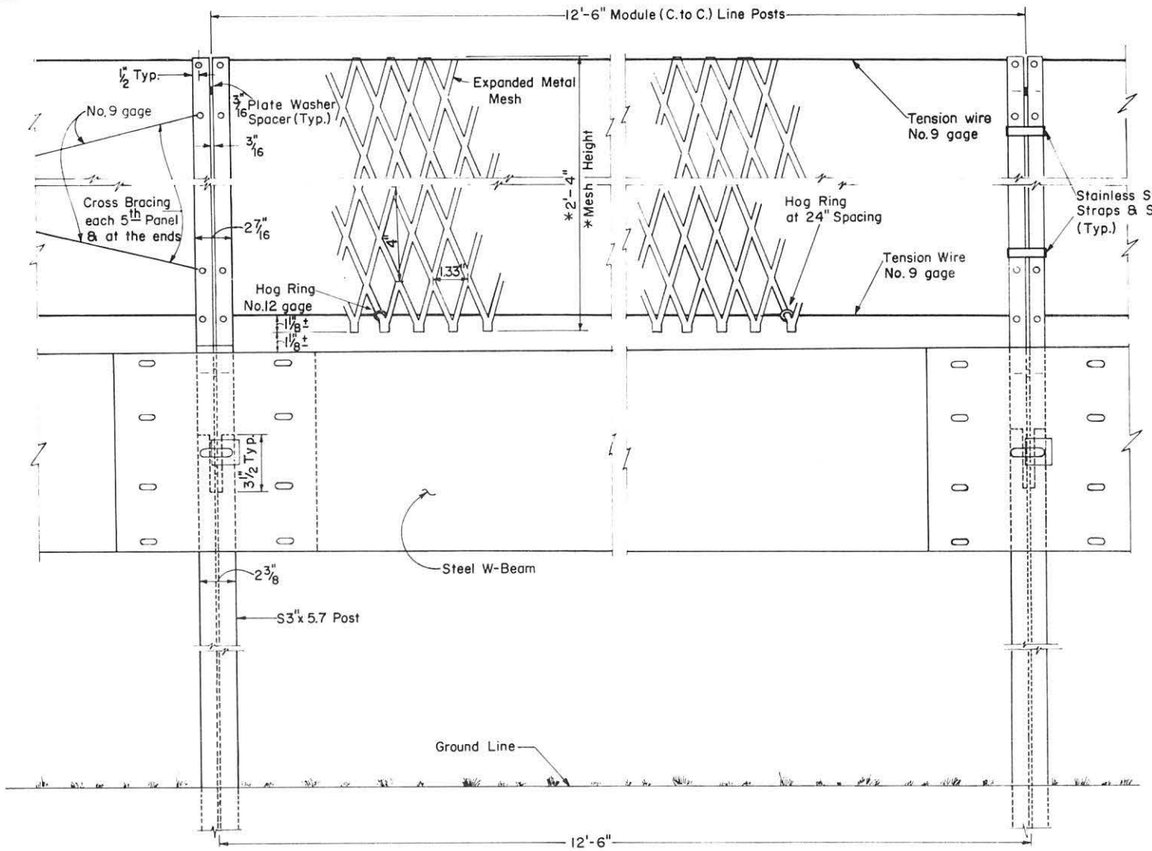
Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
R R Muse	W. J. Rave	RC-66
Location & Design Engineer	Deputy Chief Hwy. Engr.	

VOID

7530 2350 0140

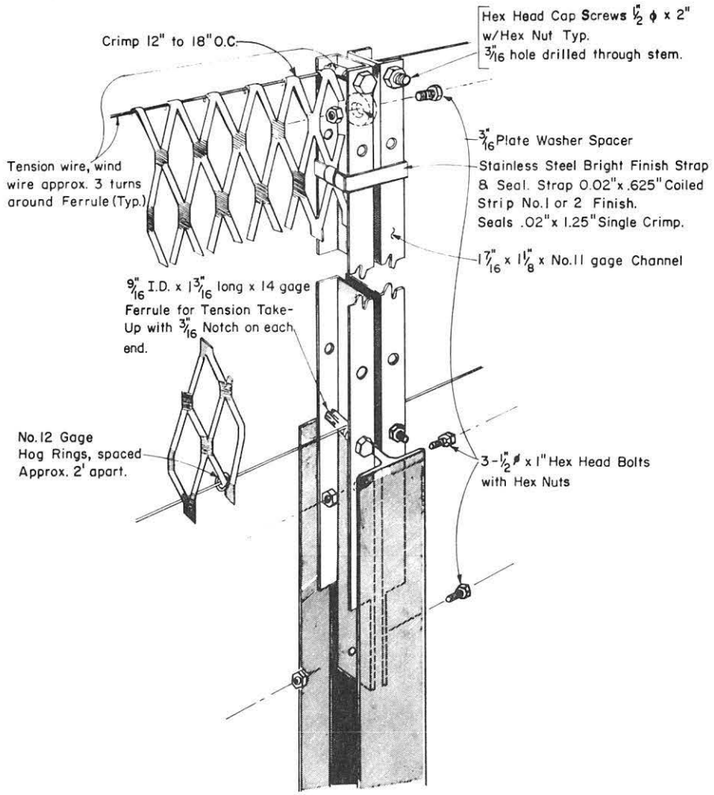


SECTION



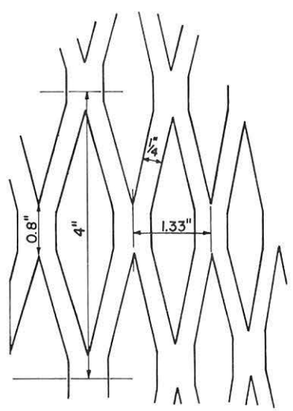
* Hole spacing for different mesh-heights when required: 2'-10½" for 3' height
3'- 10½" for 4' height

ELEVATION



LINE POST DETAILS

TYPE-A INSTALLATION ON TYPE 2-WM MEDIAN BARRIER



MESH SIZE AND TOLERANCES

The mesh openings shall have the following nominal dimensions:

Diamond Size – 1.33" ± .05" short dimension (center to center of bridges)
4.00" ± .05" long dimension (center to center of bridges)

Bridge size – 0.80" ± .10" uncut, vertical bridge distance between diamonds.

Strand size – 0.25" minimum width
0.050" nominal thickness, excluding paint (aluminum panels)
0.0478" (18 gage) nominal thickness, excluding paint and zinc coating (steel panels)

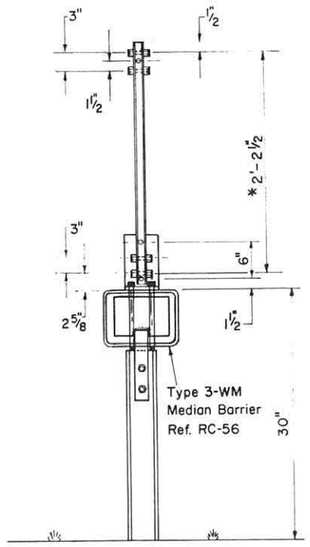
Panel size – 2' – 4 3/16" ± 0.25" along the long dimension of diamonds before bending, (2'-4" finished height) 12'-2" along short dimension of diamonds.

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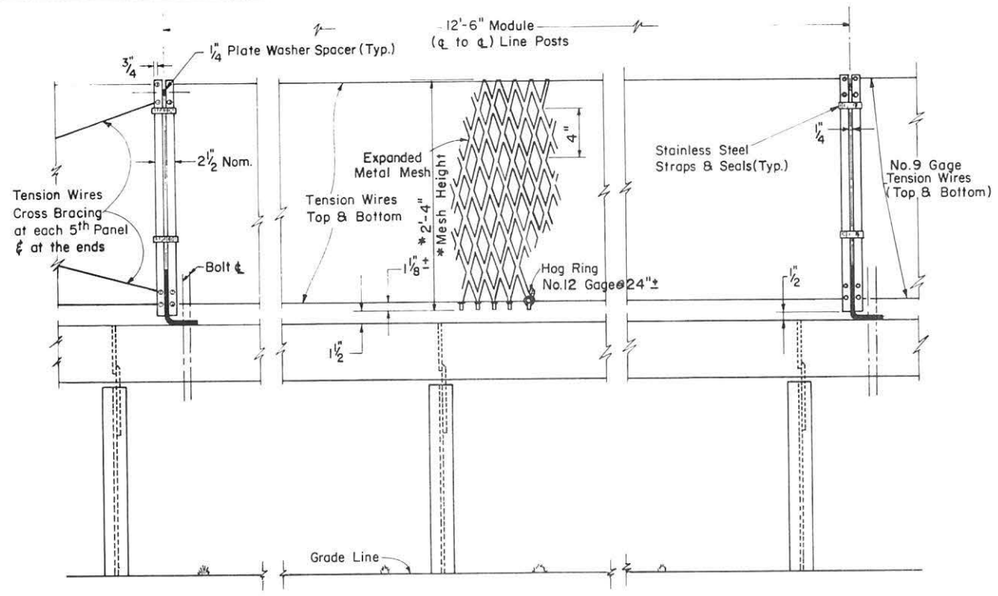
ANTI-GLARE SCREEN

Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 1 Of 2
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-67

TRACED BY
FINAL BY



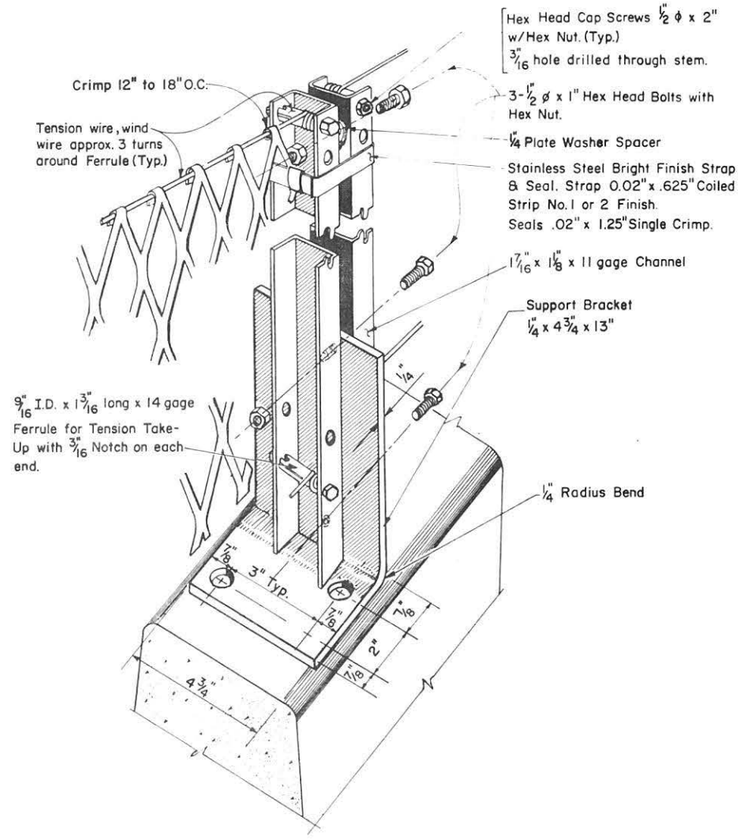
SECTION



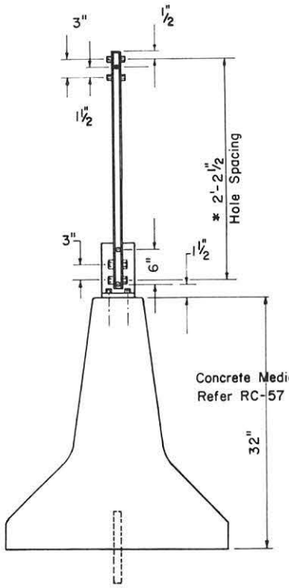
ELEVATION

* Hole spacing for different mesh-heights when required: 2'-10½" for 3' height
3'-10½" for 4' height

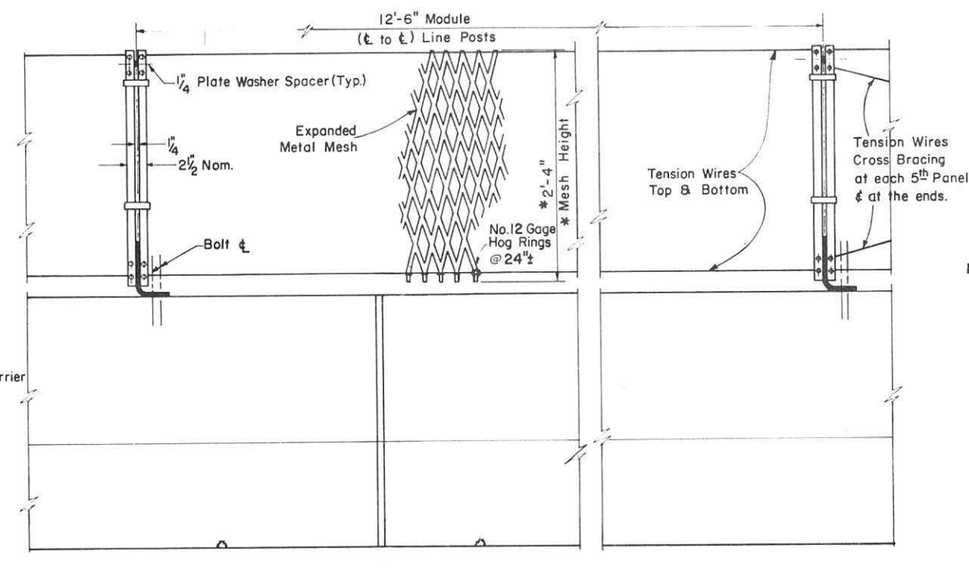
TYPE B-INSTALLATION ON TYPE 3-WM MEDIAN BARRIER



LINE POST AND MOUNTING DETAILS



SECTION



ELEVATION

INSTALLATION ON CONCRETE MEDIAN BARRIER TYPE B

Notes:

For a split concrete median barrier on a structure fasten the line posts to either side of the barrier.

Cross bracing or diagonal bracing may be provided at each panel of anti-glare screen to stop vibrations at critical locations like bridges.

½" dia. x 7" bolts should extend thru the box beam with a hex nut & washer at the bottom.

Use double support brackets (back to back) at every third post for installation on curves with curvature greater than 3°, and at end posts. Use double washer spacers at top of posts.

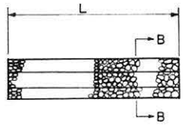
Drill concrete to receive ½" dia. x 3¾" long, expansion bolt of the Hilti-Fastening system type, or Wej-It type, or an approved equal.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

ANTI-GLARE SCREEN

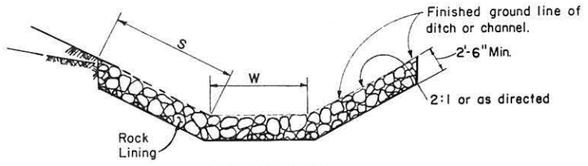
Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 2 Of 2
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-67

7530-2350-0140



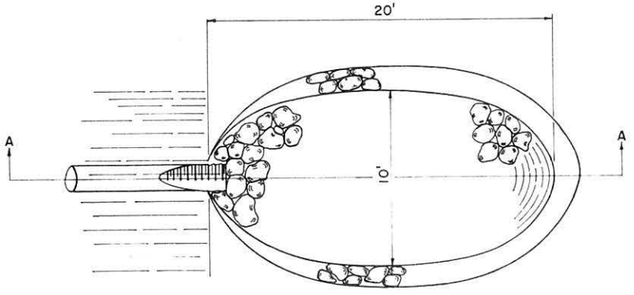
PLAN

S, L & W as shown on the drawings or as directed by the engineer.

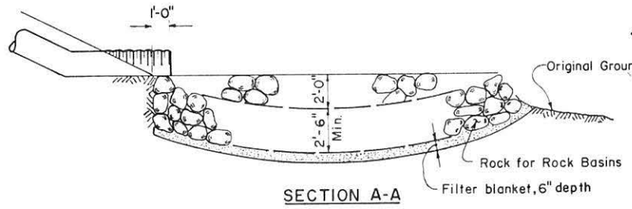


SECTION B-B

ROCK LINING



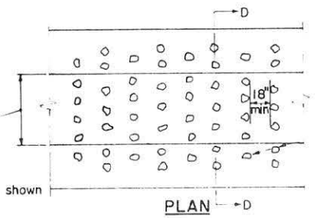
PLAN



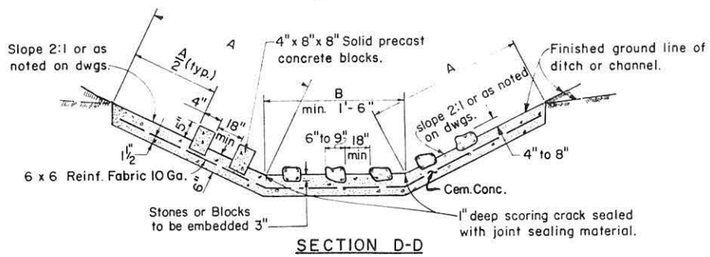
SECTION A-A

ROCK BASIN

When bottom of ditch width is less than 36", a single staggered row of stones or blocks shall be used on the bottom of the ditch.

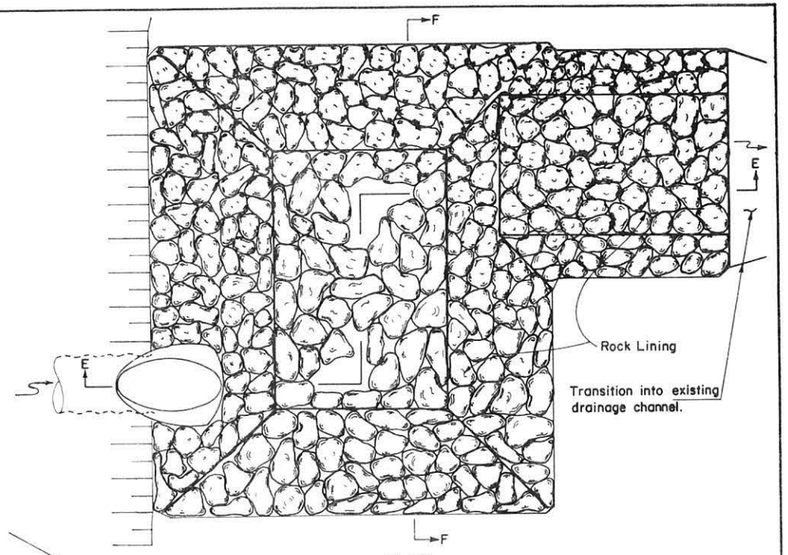


PLAN

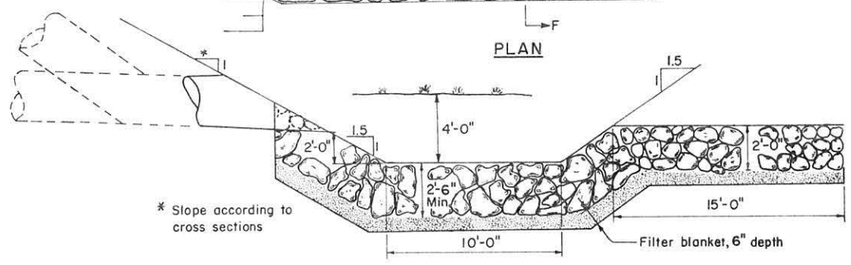


SECTION D-D

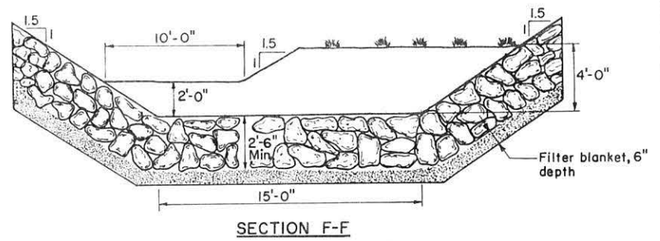
PAVED ENERGY DISSIPATOR



PLAN



SECTION E-E



SECTION F-F

ROCK ENERGY DISSIPATOR

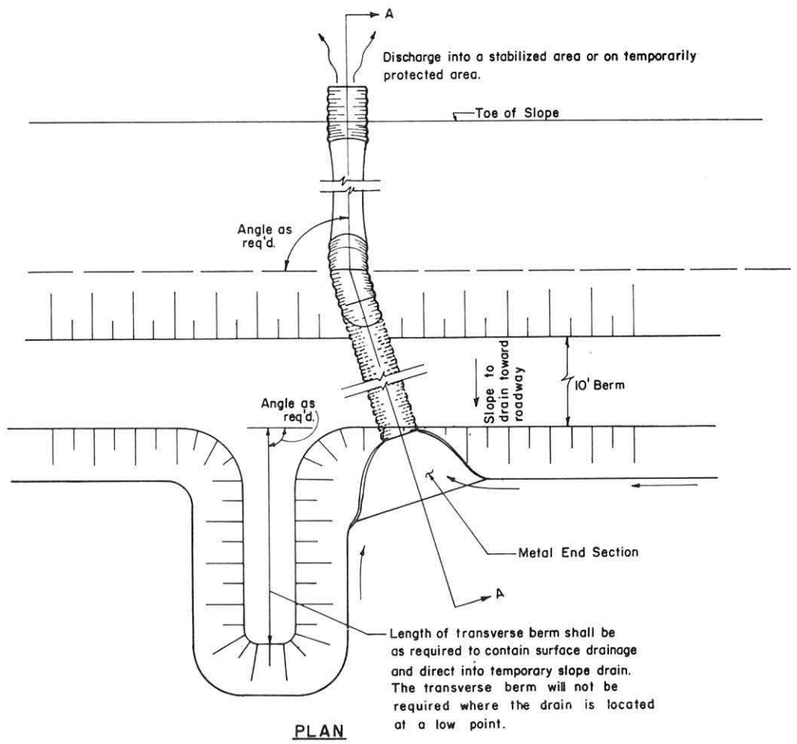
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

Recommended June 1, 1976	Approved June 1, 1976	Sht. 1 Of 1
B.D. Gaudio	Robert P. Elliott	RC-70
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

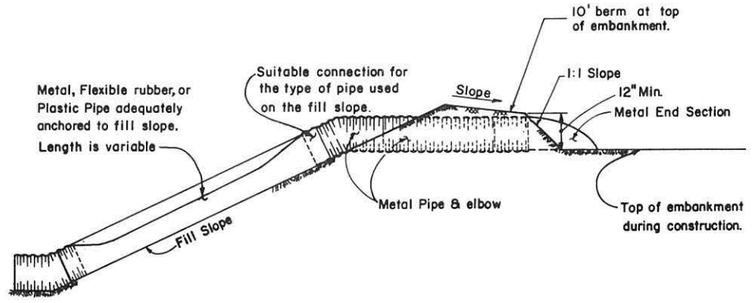
TRACED BY
FINAL BY

7530-2350-0140



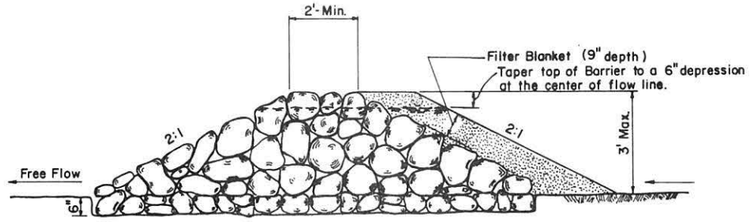
PLAN

SUGGESTED MIN. SIZES		
Drainage Area (acres)	Smooth Pipe Size	Corrugated Pipe Size
0 - 3	8"	12"
3 - 6	10"	15"
6 - 10	12"	18"

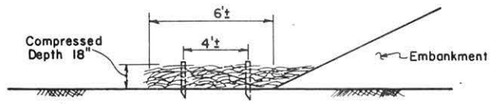


SECTION A-A

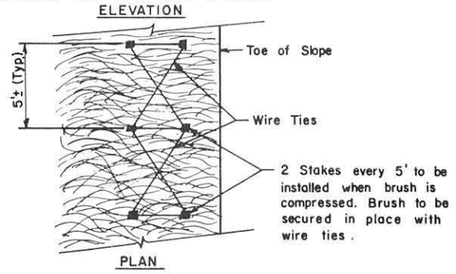
TEMPORARY SLOPE PIPE DRAIN



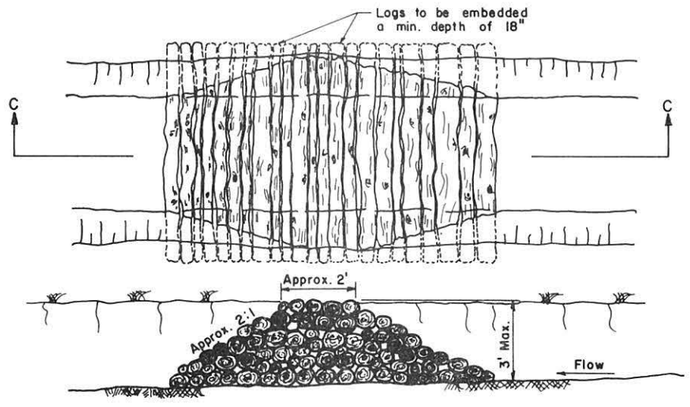
ROCK BARRIER



2" Maximum diameter brush from clearing operation to be placed at start of embankment fill or in drainage swale areas and compressed in place.

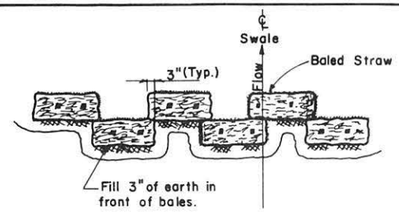


BRUSH BARRIER

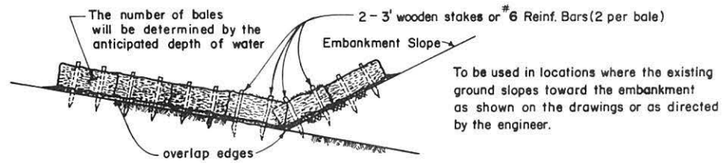


SECTION C-C

LOG BARRIER



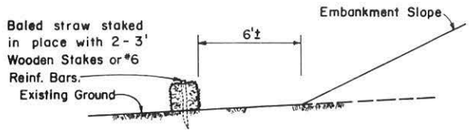
PLAN



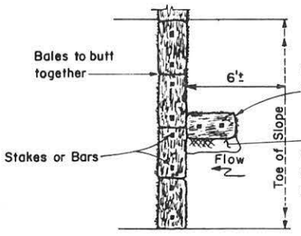
To be used in locations where the existing ground slopes toward the embankment as shown on the drawings or as directed by the engineer.

ELEVATION

DITCH CONDITION



ELEVATION



To be used where the existing ground slopes away from the embankment as shown on drawings or as directed by the engineer.

PLAN

TOE OF SLOPE CONDITION

BALED STRAW BARRIER

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

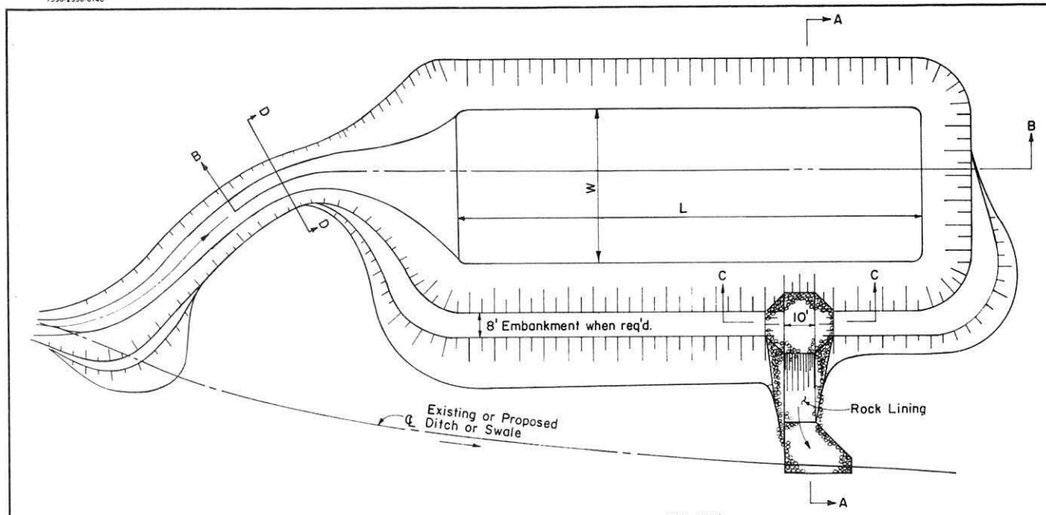
EROSION & SEDIMENT CONTROL

June 1, 1976

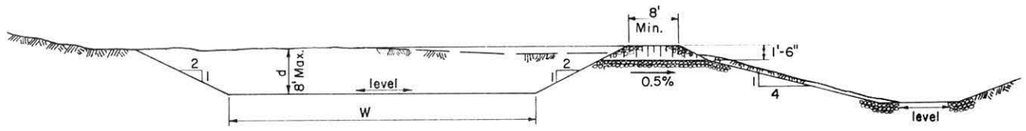
Recommended Aug. 20, 1975	Approved Aug. 20, 1975	Sht. 2 Of 4
B.D. Lourdis	Robert R. Musser	RC-70
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

TRACED BY
FINAL BY

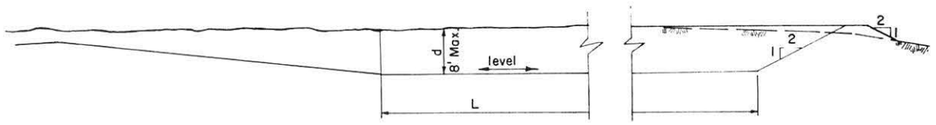
7530-2350-0140



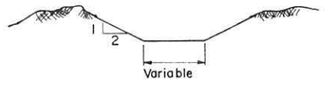
PLAN



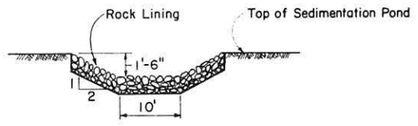
SECTION A-A



SECTION B-B

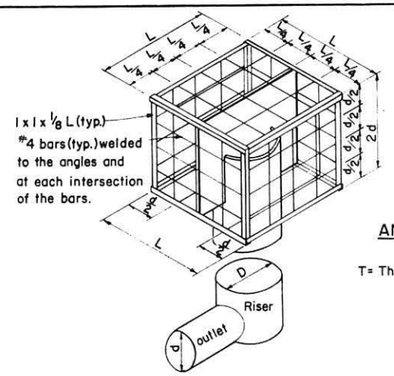


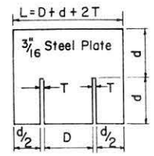
SECTION D-D



SECTION C-C

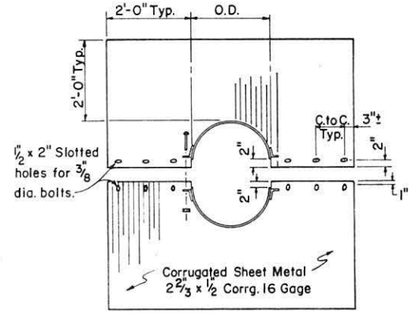
SEDIMENTATION POND - TYPE 2



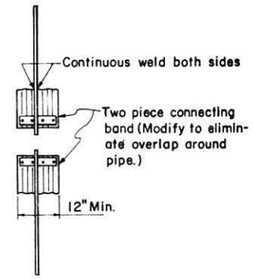


ANTI-VORTEX DEVICE

T= Thickness of riser pipe.



ELEVATION

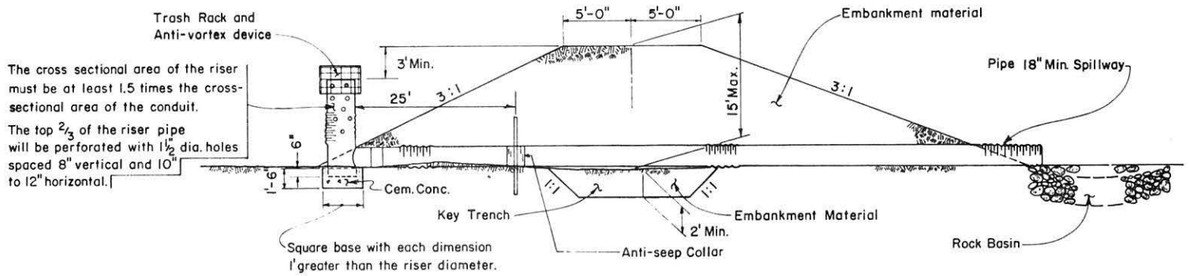


END VIEW

The lap between the two half sections shall be caulked with bituminous mastic at the time of installation Unassembled collars shall be marked by painting or tagging to identify matching pairs.

TRASH RACK AND ANTI-VORTEX DEVICE

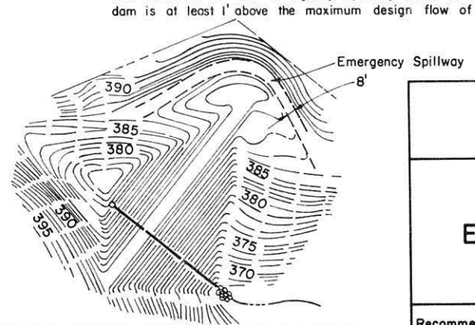
DETAIL OF ANTI-SEEP COLLAR



SEDIMENTATION POND - TYPE 1

NOTES:

- An emergency spillway with a min. bottom width of 8' must be provided for every Sedimentation Pond - Type 1.
- The emergency spillway must be placed in undisturbed ground and cannot be placed in embankment areas. The emergency spillway can go over the embankment if Rock Lining is used.
- The elevation of the emergency spillway must be such that the dam is at least 1' above the maximum design flow of the spillway.



PLAN VIEW OF AN EMERGENCY SPILLWAY CUT INTO EXISTING GROUND

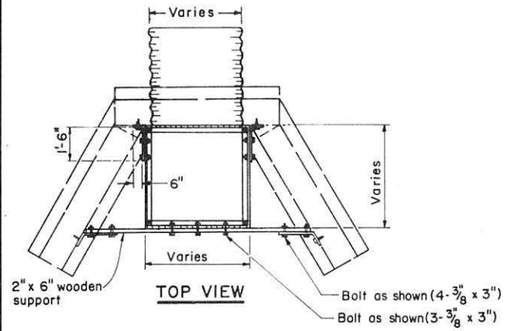
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

Recommended June 1, 1976	Approved June 1, 1976	Sht. 3 Of 4
B.D. Rowdis Director, Bureau of Design	Robert R. Musser Deputy Chief Hwy. Engr.	RC-70

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FINAL BY

7330-3390-0140

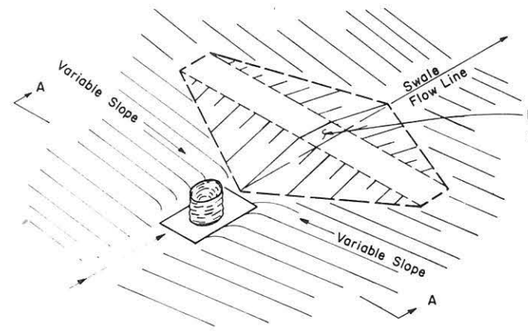


TOP VIEW

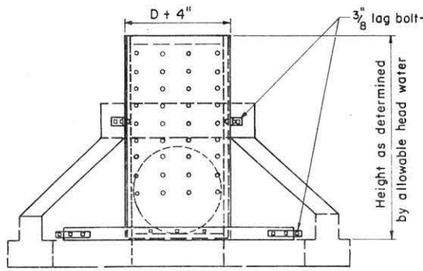
Notes:

Upon establishment of suitable soil stabilization and at the direction of the engineer, the Endwall Standboxes shall be removed and shall become the property of the Contractor.

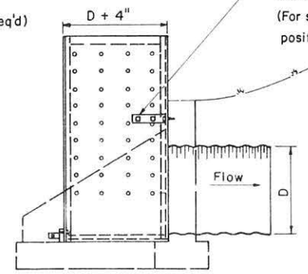
The Basin and/or area upstream from the Standbox shall be cleaned periodically and the sediment and debris disposed of in an area approved by the engineer.



ISOMETRIC VIEW OF INLET RISER PIPE & DRAINAGE DIKE



END VIEW

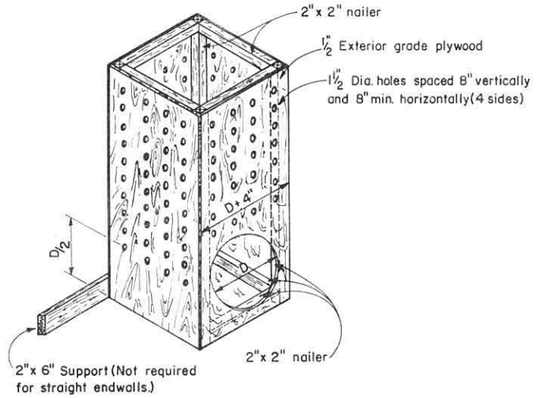


SIDE VIEW

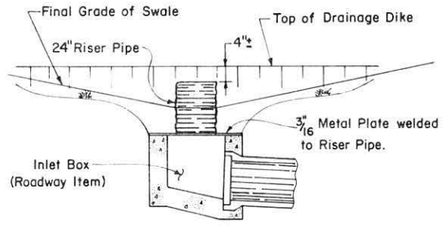
3" x 1/4" Galv. Steel Brackets 2' long Bolt as shown (4-Req'd.)
(For straight Endwalls lower the position of the brackets to D/2.)

Note:
Drill holes 2" deep in concrete endwall & insert lead expander to receive 3/8" lag bolt.
Upon removal of standbox fill holes in the endwall with non-staining, non-shrinking Mortar in accordance with section 705.8(c) of the 408.

ENDWALL STANDBOX



ISOMETRIC OF PLYWOOD STANDBOX



SECTION A-A

INLET RISER PIPE

Upon establishment of suitable soil stabilization and at the direction of the engineer, the Inlet Riser Pipe shall be removed and the frame and grate installed.

Upon removal the Inlet Riser Pipe shall become the property of the contractor and may be used at other locations as required.

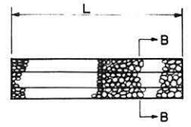
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

Recommended June 1, 1976	Approved June 1, 1976	Sht. 4 Of 4
B.O. Dubbs	Robert R. Mayer	RC-70
Director, Bureau of Design	Deputy Chief Hwy Engr.	

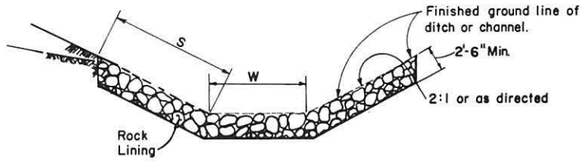
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FINAL BY

7530-2350-0140



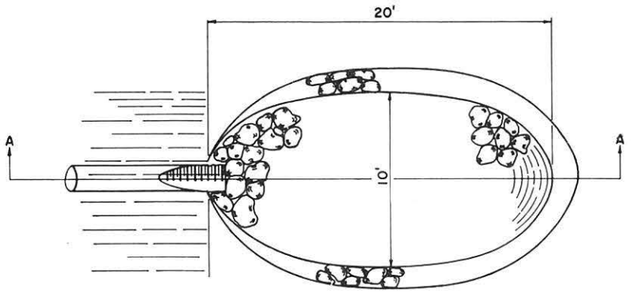
PLAN

S, L & W as shown on the drawings or as directed by the engineer.

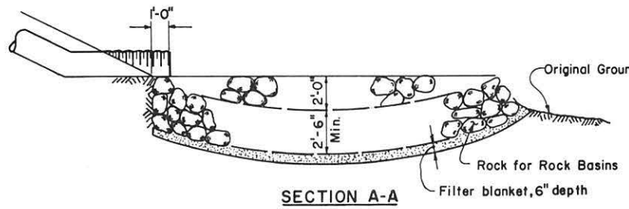


SECTION B-B

ROCK LINING

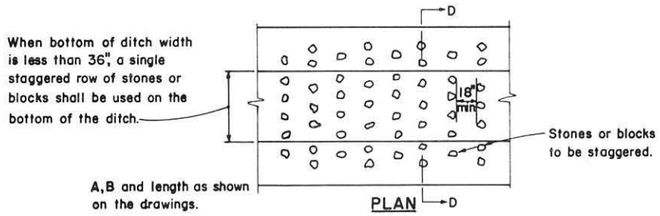


PLAN

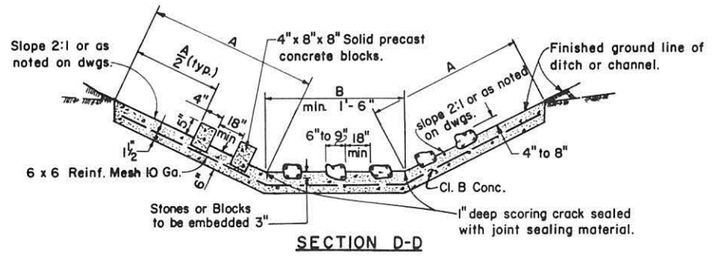


SECTION A-A

ROCK BASIN

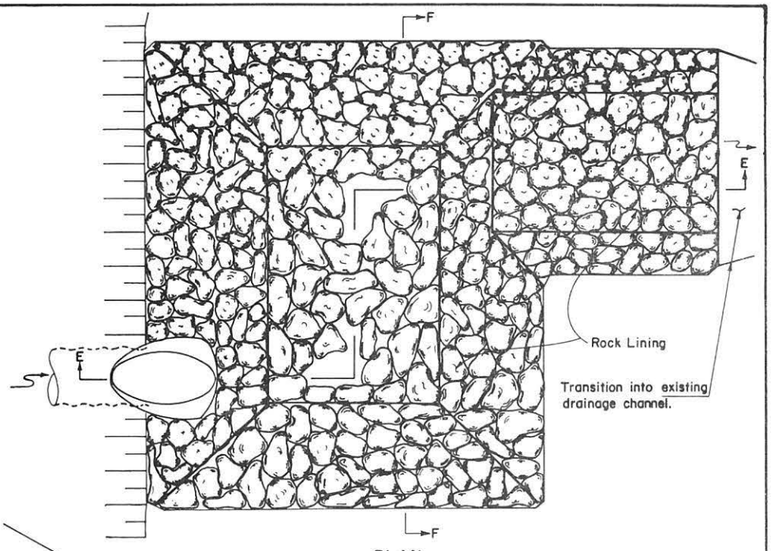


PLAN

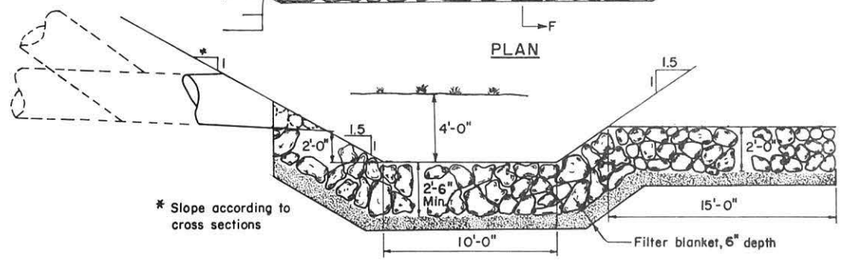


SECTION D-D

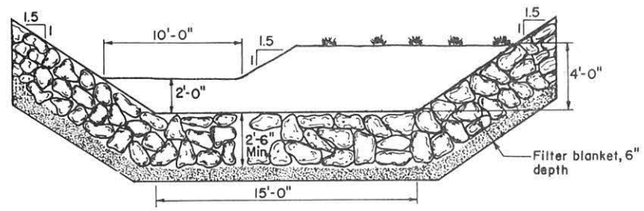
PAVED ENERGY DISSIPATOR



PLAN



SECTION E-E



SECTION F-F

ROCK DISSIPATOR

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

Recommended Aug. 20, 1975
B.D. Laush
Director, Bureau of Design

Approved Aug. 20, 1975
Robert R. Mease
Deputy Chief Hwy. Engr.

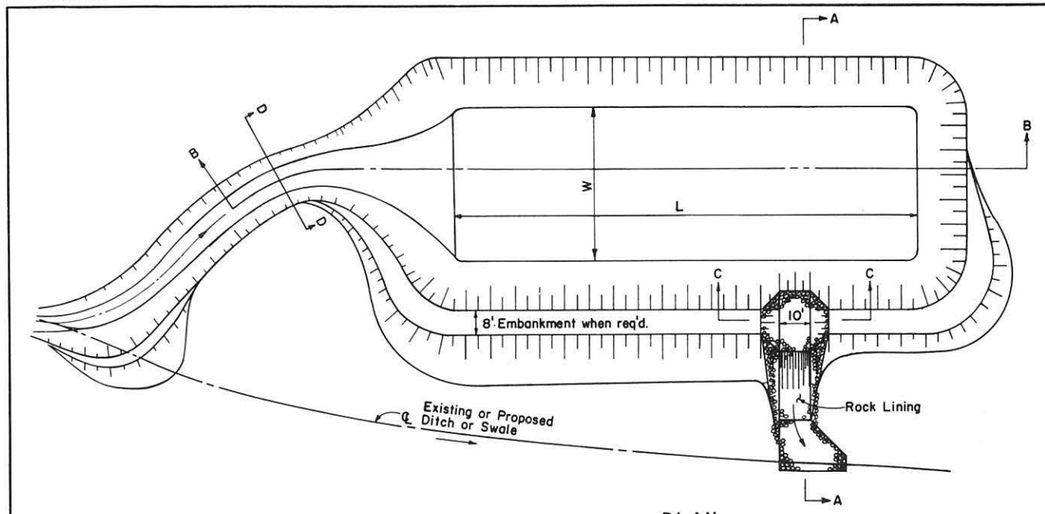
Sht. 1 Of 4

RC-70

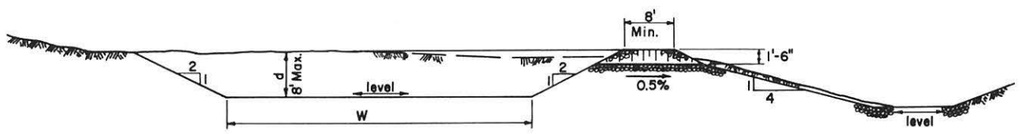
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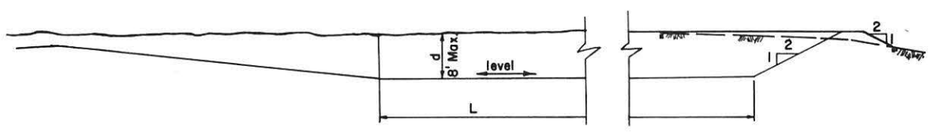
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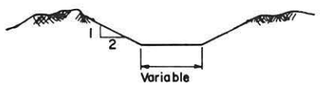
PLAN



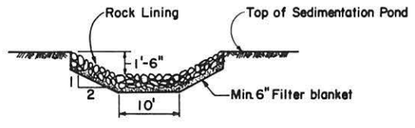
SECTION A-A



SECTION B-B

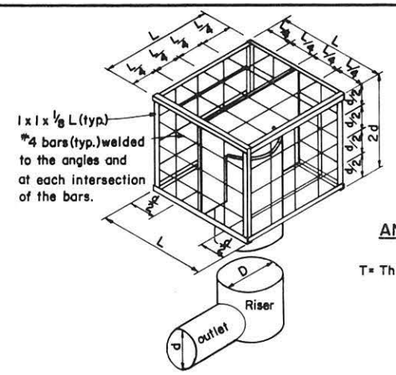


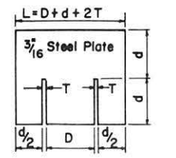
SECTION D-D



SECTION C-C

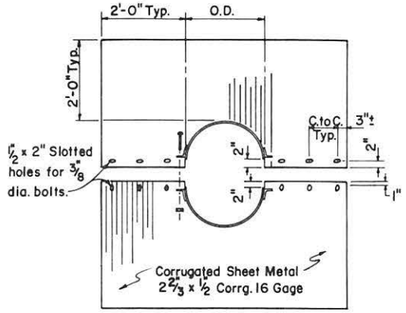
SEDIMENTATION POND - TYPE 2



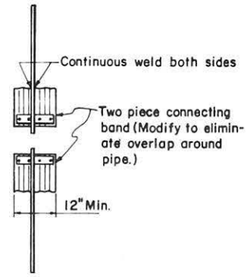


ANTI-VORTEX DEVICE

T= Thickness of riser pipe.



ELEVATION

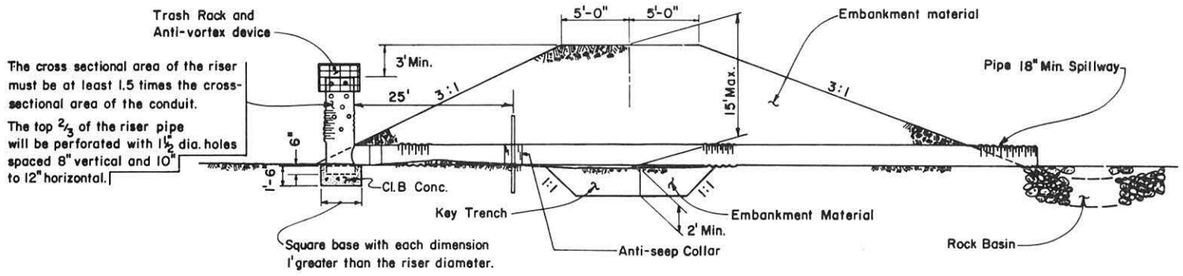


END VIEW

The lap between the two half sections shall be caulked with bituminous mastic at the time of installation Unassembled collars shall be marked by painting or tagging to identify matching pairs.

TRASH RACK AND ANTI-VORTEX DEVICE

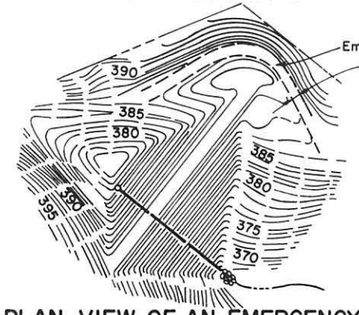
DETAIL OF ANTI-SEEP COLLAR



SEDIMENTATION POND - TYPE 1

NOTES:

- An emergency spillway with a min. bottom width of 8' must be provided for every Sedimentation Pond - Type 1.
- The emergency spillway must be placed in undisturbed ground and cannot be placed in embankment areas. The emergency spillway can go over the embankment if Rock Lining is used.
- The elevation of the emergency spillway must be such that the dam is at least 1' above the maximum design flow of the spillway.



PLAN VIEW OF AN EMERGENCY SPILLWAY CUT INTO EXISTING GROUND

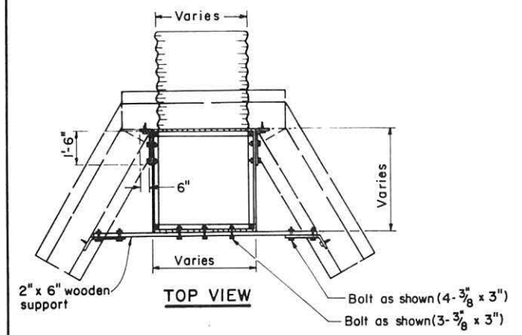
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

Recommended Aug. 20, 1975	Approved Aug. 20, 1975	Sht. 3 Of 4
B.O. Brooks	Robert P. Morrison	RC-70
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

TRACED BY
FINAL BY

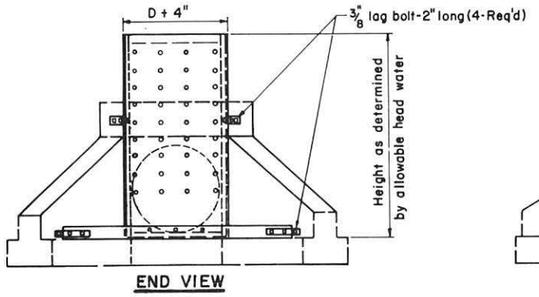
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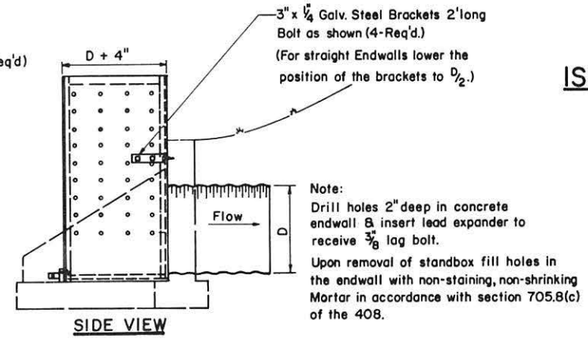


Notes:

Upon establishment of suitable soil stabilization and at the direction of the engineer, the Endwall Standboxes shall be removed and shall become the property of the Contractor.

The Basin and/or area upstream from the Standbox shall be cleaned periodically and the sediment and debris disposed of in an area approved by the engineer.

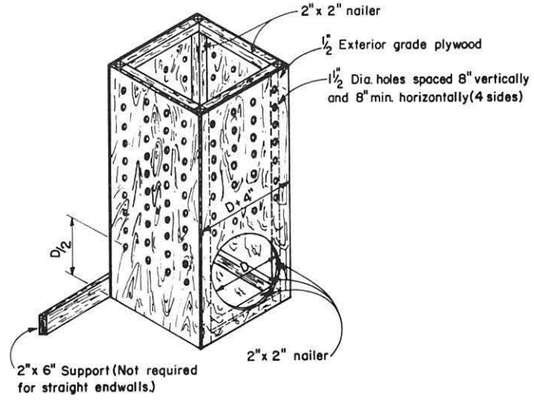




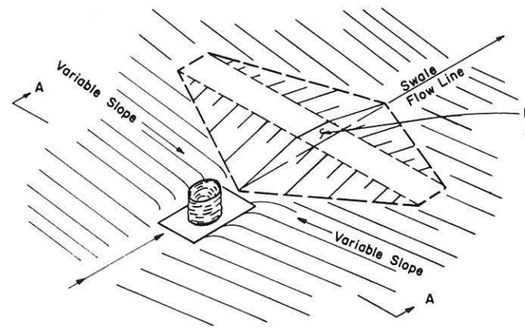
Note:
Drill holes 2" deep in concrete endwall & insert lead expander to receive 3/8" lag bolt.

Upon removal of standbox fill holes in the endwall with non-staining, non-shrinking Mortar in accordance with section 705.8(c) of the 408.

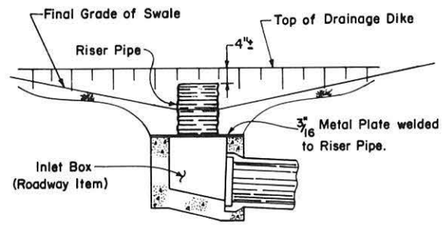
ENDWALL STANDBOX



ISOMETRIC OF PLYWOOD STANDBOX



ISOMETRIC VIEW OF INLET RISER PIPE & DRAINAGE DIKE



SECTION A-A

INLET RISER PIPE

Upon establishment of suitable soil stabilization and at the direction of the engineer, the Inlet Riser Pipe shall be removed and the frame and grate installed.

Upon removal the Inlet Riser Pipe shall become the property of the contractor and may be used at other locations as required.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

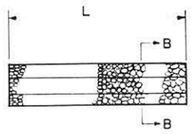
EROSION & SEDIMENT CONTROL

Recommended Aug. 20, 1975	Approved Aug. 20, 1975	Sht. 4 Of 4
B.D. Cowshie	Robert R. Musser	RC-70
Director, Bureau of Design	Deputy Chief Hwy Engr.	

TRACED BY
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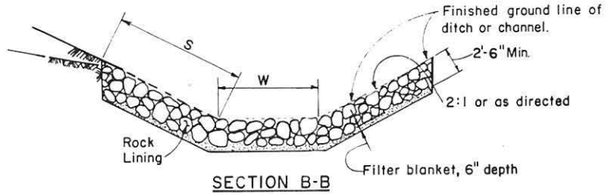
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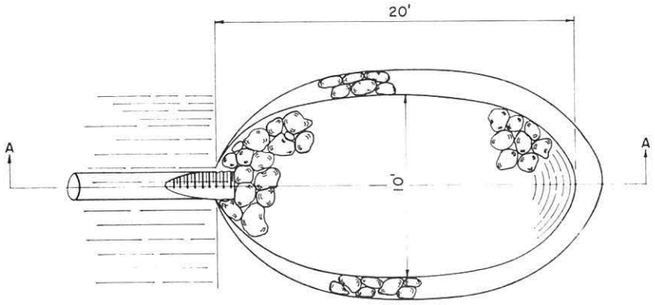
PLAN

S, L & W as shown on the drawings or as directed by the engineer.

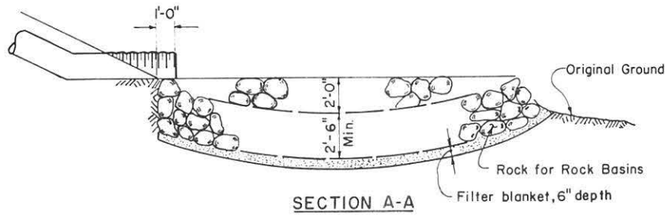


SECTION B-B

ROCK LINING

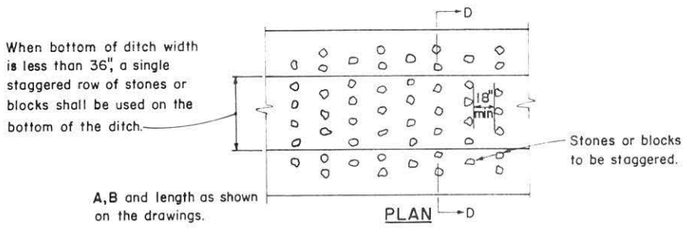


PLAN

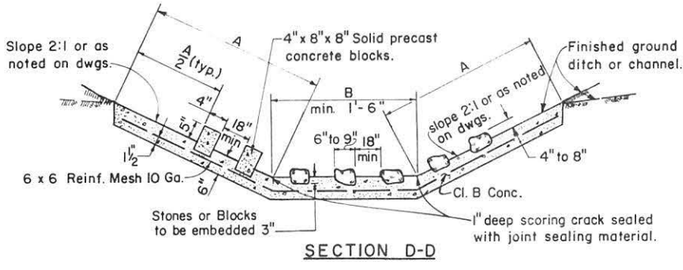


SECTION A-A

ROCK BASIN

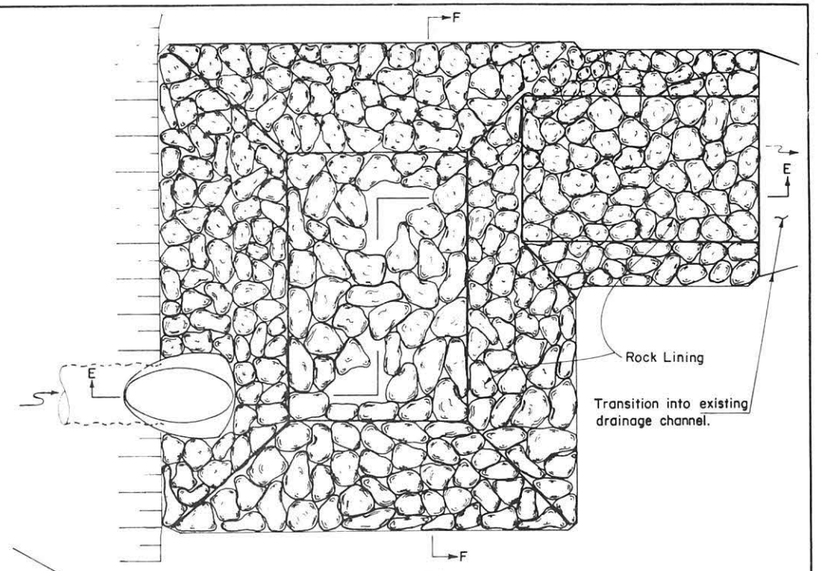


PLAN

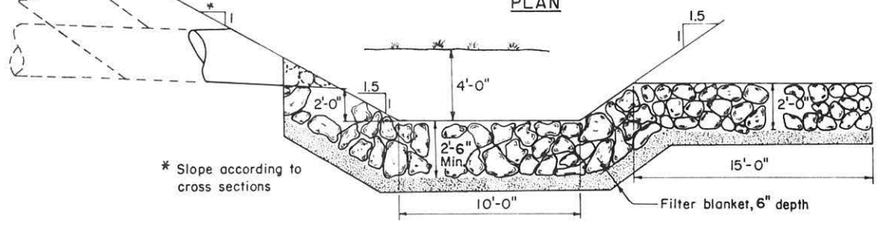


SECTION D-D

PAVED ENERGY DISSIPATOR

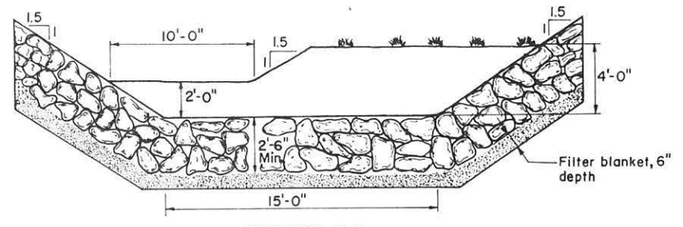


PLAN



* Slope according to cross sections

SECTION E-E



SECTION F-F

ROCK DISSIPATOR

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

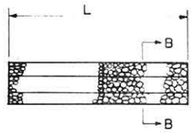
EROSION & SEDIMENT CONTROL

Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 1 Of 4
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-70

TRACED BY
FINAL BY

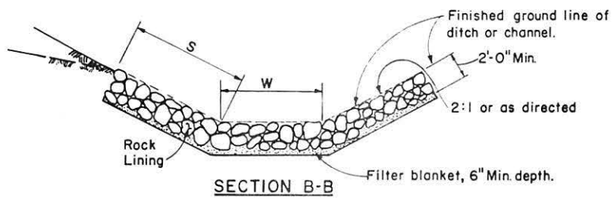
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7530 2350-0140



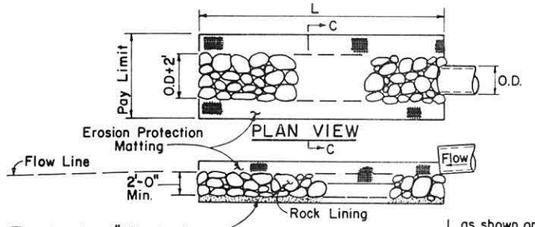
PLAN

S, L & W as shown on the drawings or as directed by the engineer.



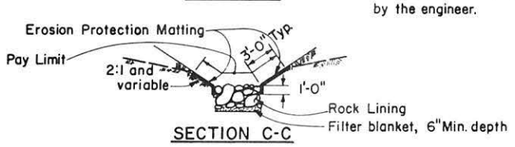
SECTION B-B

ROCK LINING



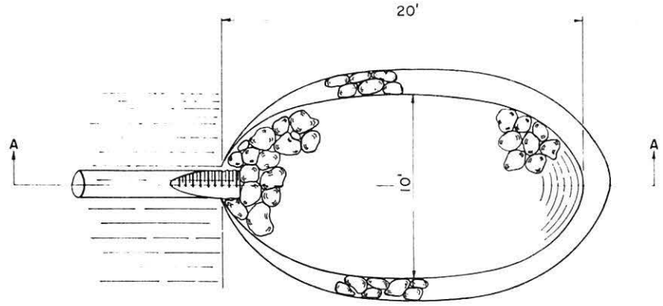
SIDE VIEW

L as shown on the drawings or as directed by the engineer.

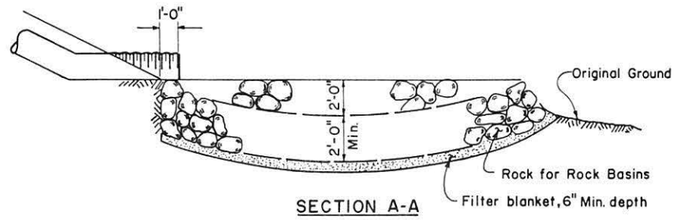


SECTION C-C

EROSION PROTECTION MATTING AND ROCK DITCH



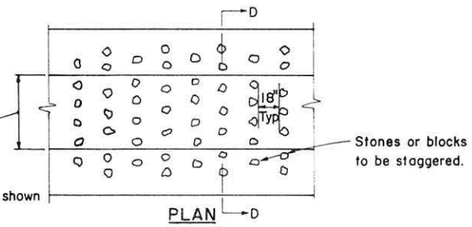
PLAN



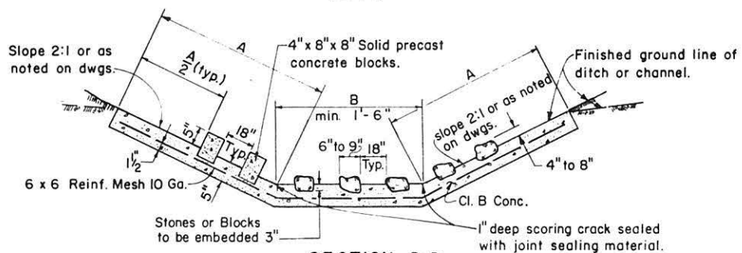
SECTION A-A

ROCK BASIN

When bottom of ditch width is less than 36", a single staggered row of stones or blocks shall be used on the bottom of the ditch.

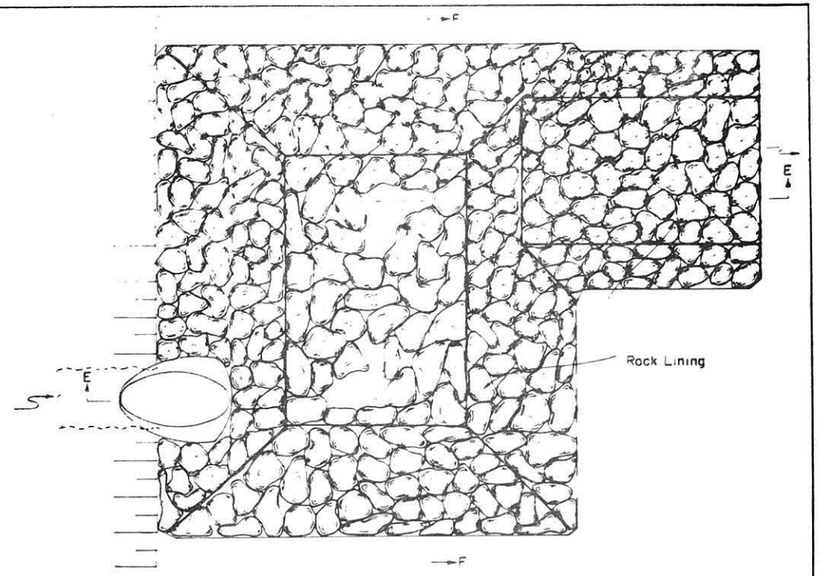


PLAN

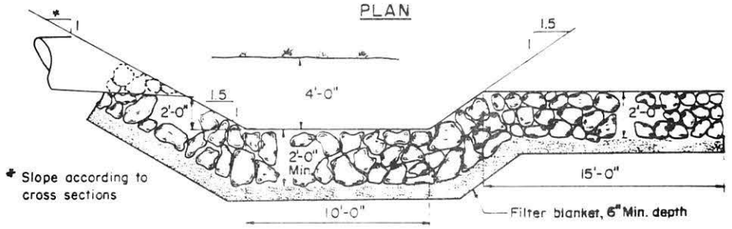


SECTION D-D

PAVED ENERGY DISSIPATOR

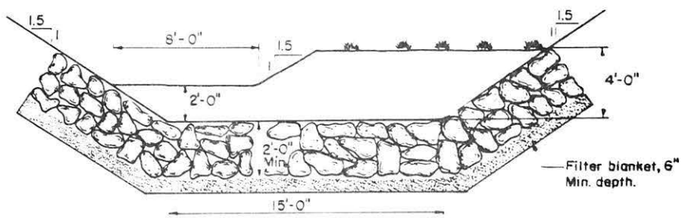


PLAN



* Slope according to cross sections

SECTION E-E



SECTION F-F

ROCK STILLING BASIN

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

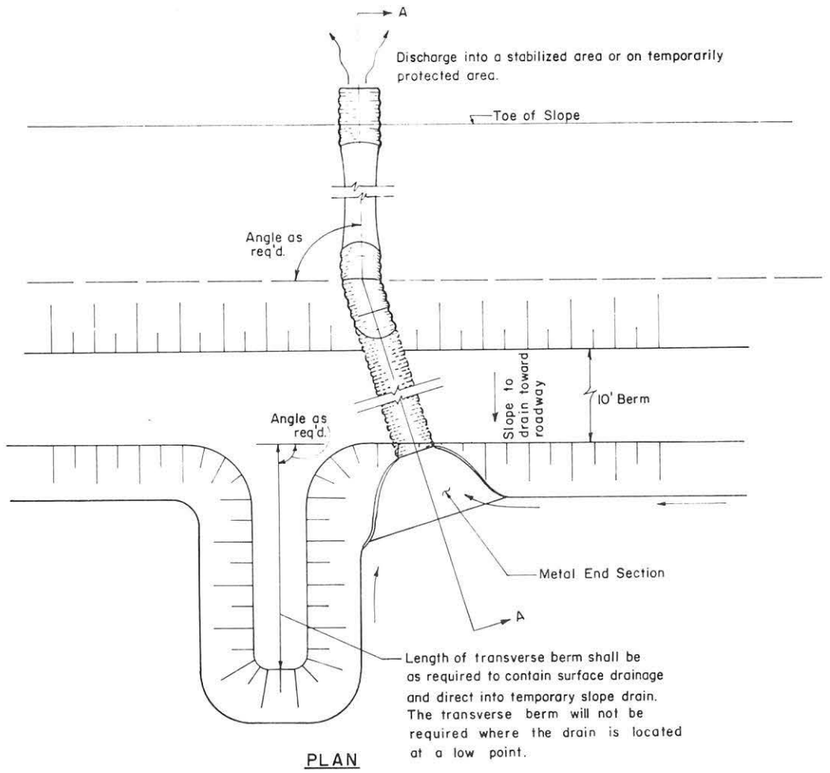
Recommended July 2, 1973
Director, Bureau of Design

Approved July 2, 1973
Deputy Chief Hwy. Engr.

Sht. 1 Of 4

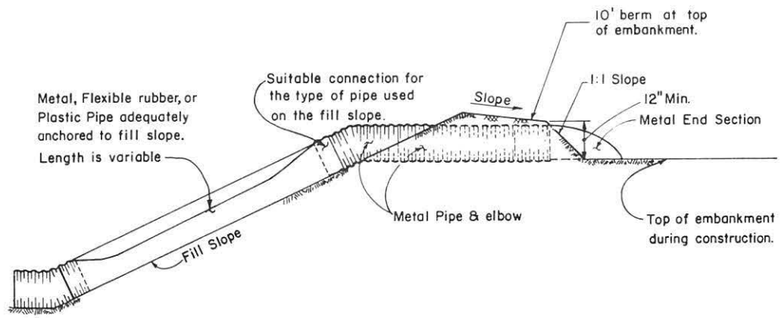
RC-70

7530-2350-0140



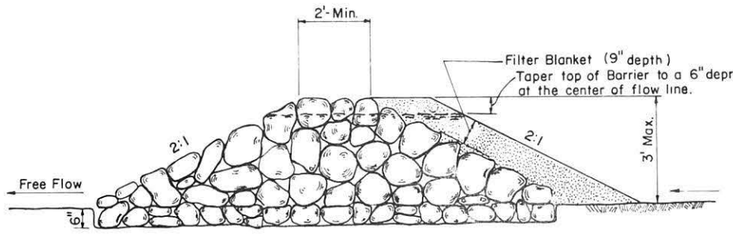
PLAN

SUGGESTED MIN. SIZES		
Drainage Area (acres)	Smooth Pipe Size	Corrugated Pipe Size
0 - 3	8"	12"
3 - 6	10"	15"
6 - 10	12"	18"

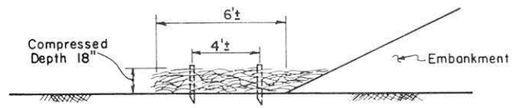


SECTION A-A

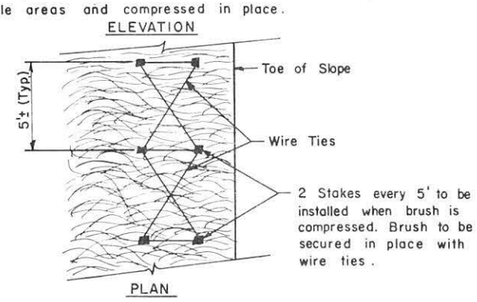
TEMPORARY SLOPE PIPE DRAIN



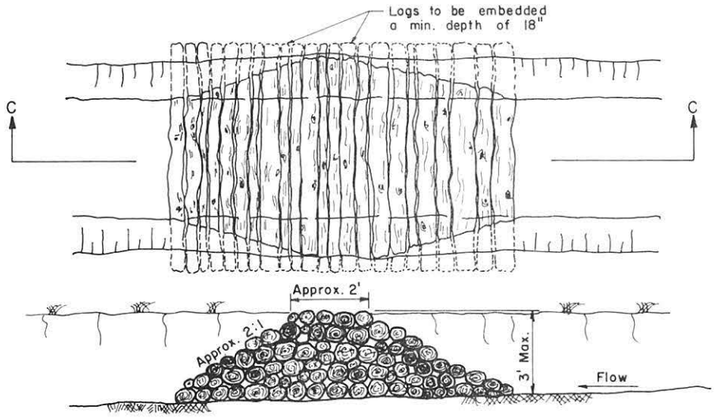
ROCK BARRIER



2" Maximum diameter brush from clearing operation to be placed at start of embankment fill or in drainage swale areas and compressed in place.

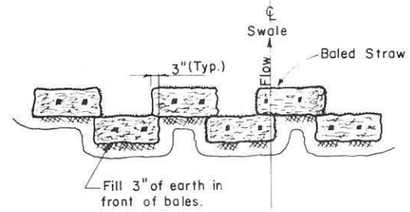


BRUSH BARRIER

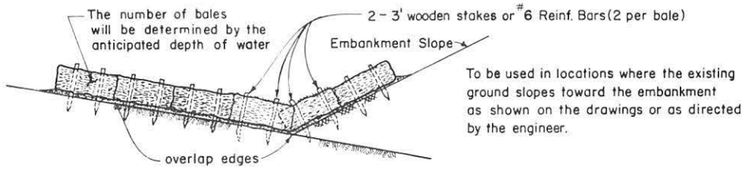


SECTION C-C

LOG BARRIER



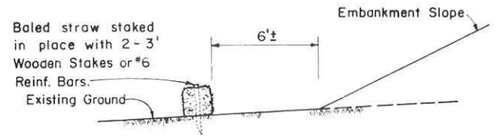
PLAN



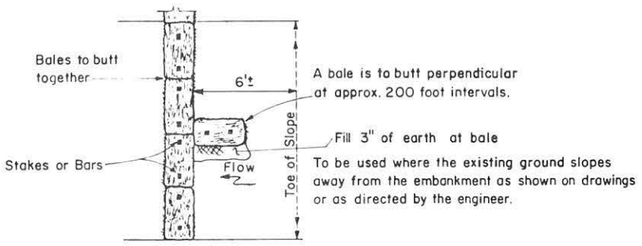
To be used in locations where the existing ground slopes toward the embankment as shown on the drawings or as directed by the engineer.

ELEVATION

DITCH CONDITION



ELEVATION



PLAN

TOE OF SLOPE CONDITION

BALED STRAW BARRIER

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

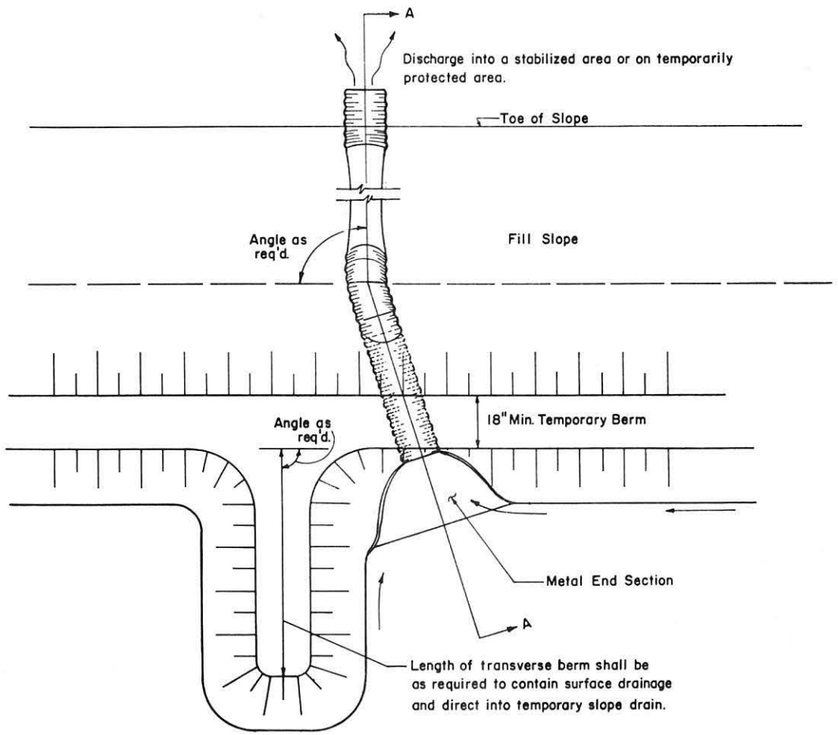
EROSION & SEDIMENT CONTROL

Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 2 Of 4
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-70

TRACED BY
FINAL BY

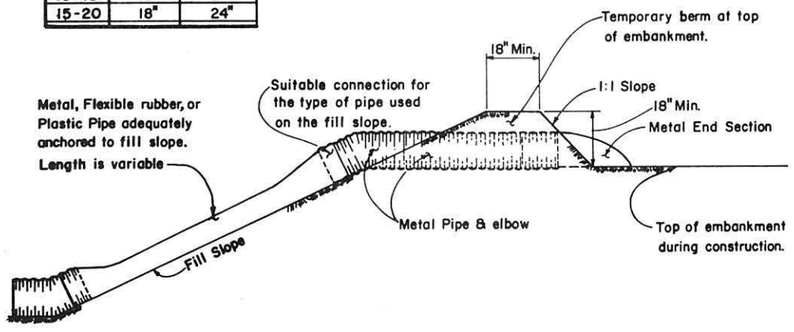
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7530-2350-0140



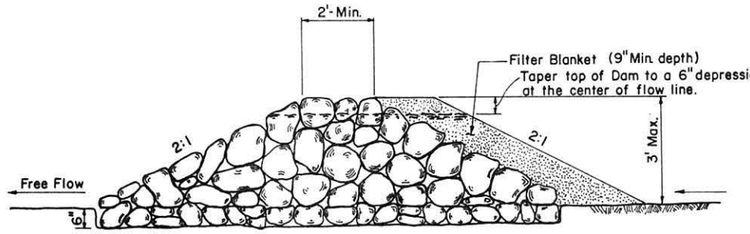
PLAN

SUGGESTED MIN. SIZES		
Drainage Area (acres)	Smooth Pipe Size	Corrugated Pipe Size
0 - 3	8"	12"
3 - 6	10"	15"
6 - 10	12"	18"
10 - 15	15"	21"
15 - 20	18"	24"

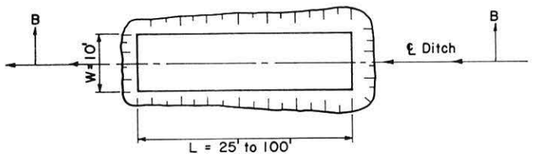


SECTION A-A

TEMPORARY SLOPE PIPE DRAIN



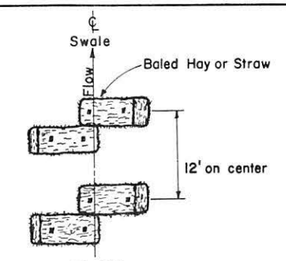
ROCK DAM



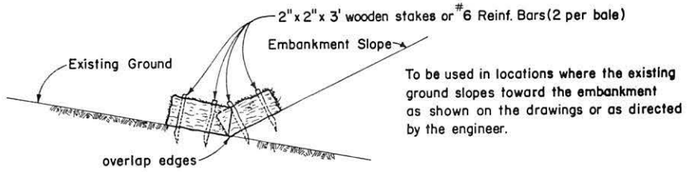
PLAN

SECTION B-B

SEDIMENTATION TRAP



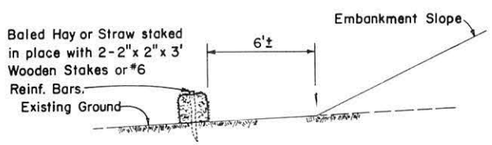
PLAN



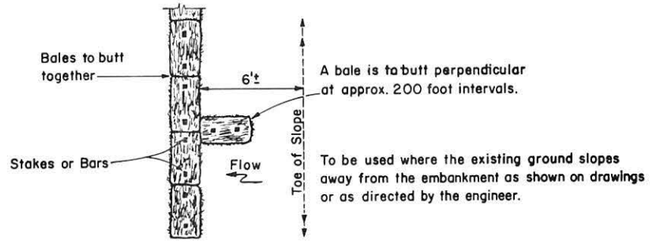
To be used in locations where the existing ground slopes toward the embankment as shown on the drawings or as directed by the engineer.

ELEVATION

DITCH CONDITION



ELEVATION



PLAN

TOE OF SLOPE CONDITION

BALED HAY OR STRAW EROSION CHECK

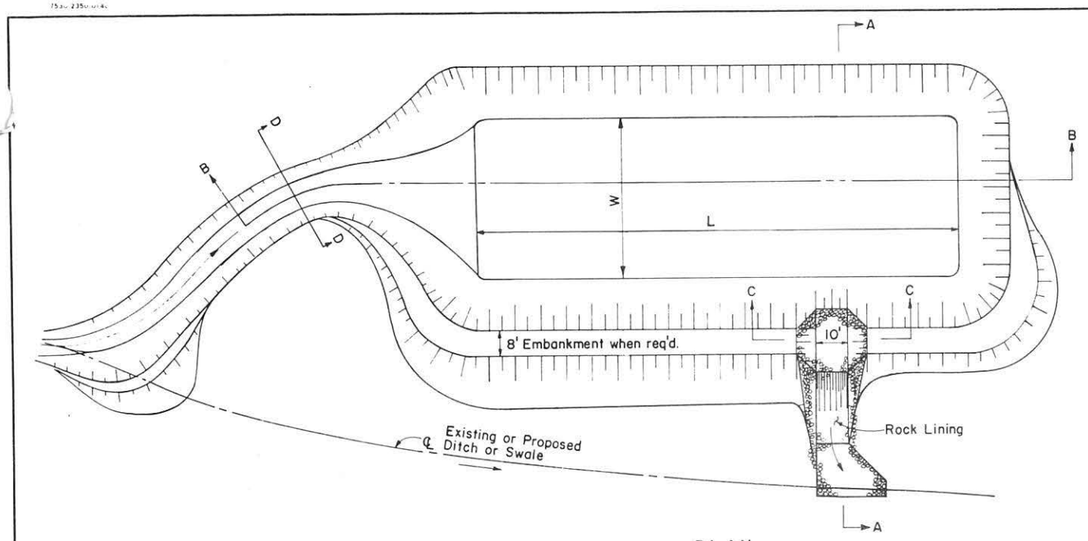
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

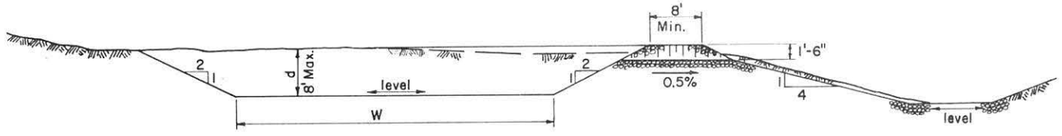
Recommended July 2, 1973	Approved July 2, 1973	Sht. 2 Of 4
B. D. Rowshis	Chas. P. Musser	RC-70
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

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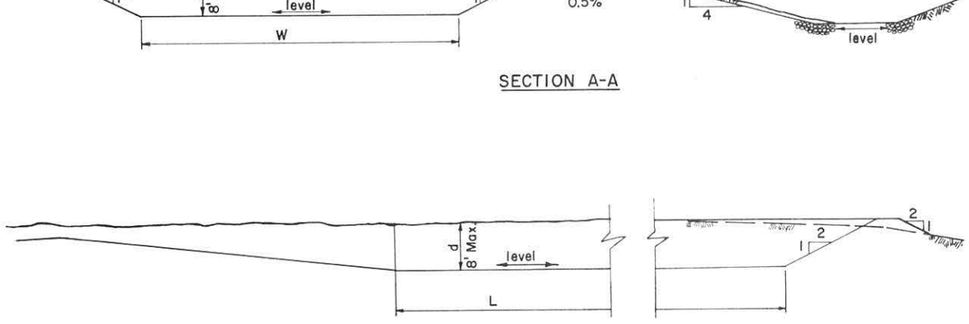
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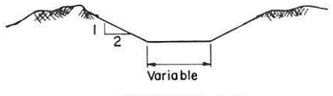
PLAN



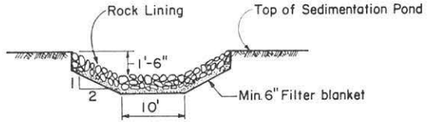
SECTION A-A



SECTION B-B

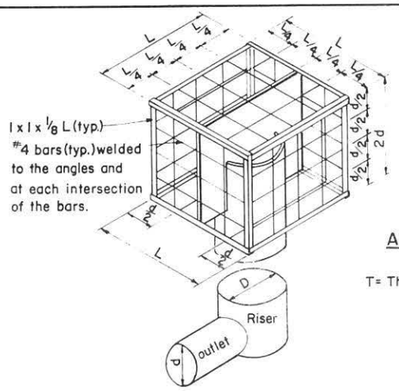


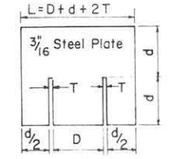
SECTION D-D



SECTION C-C

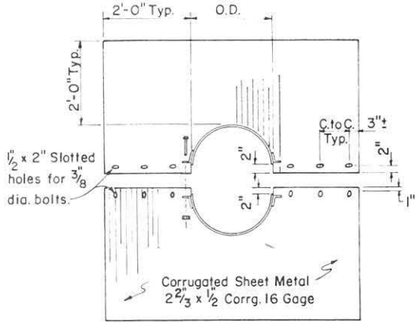
SEDIMENTATION POND - TYPE 2



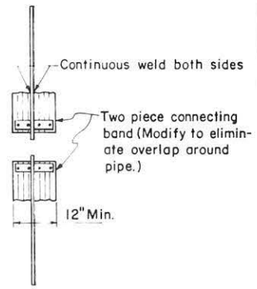


ANTI-VORTEX DEVICE

T= Thickness of riser pipe.



ELEVATION

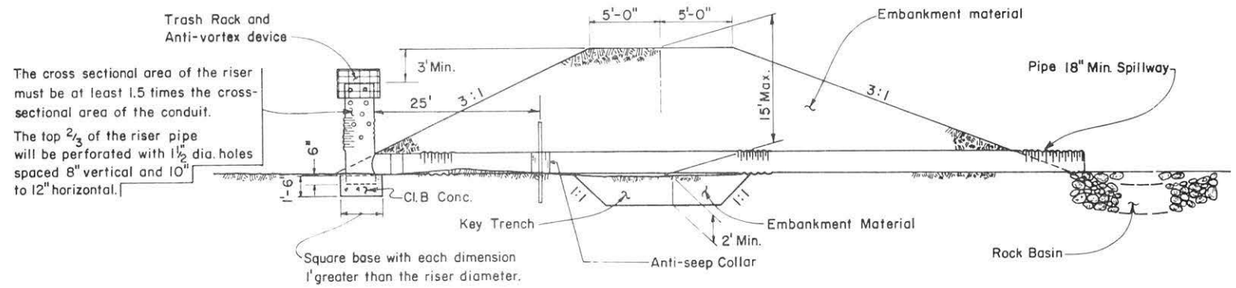


END VIEW

The lap between the two half sections shall be caulked with bituminous mastic at the time of installation Unassembled collars shall be marked by painting or tagging to identify matching pairs.

TRASH RACK AND ANTI-VORTEX DEVICE

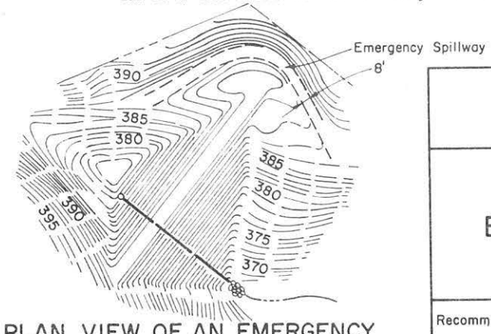
DETAIL OF ANTI-SEEP COLLAR



SEDIMENTATION POND - TYPE 1

NOTES:

- An emergency spillway with a min. bottom width of 8' must be provided for every Sedimentation Pond - Type 1.
- The emergency spillway must be placed in undisturbed ground and cannot be placed in embankment areas. The emergency spillway can go over the embankment if Rock Lining is used.
- The elevation of the emergency spillway must be such that the dam is at least 1' above the maximum design flow of the spillway.



PLAN VIEW OF AN EMERGENCY SPILLWAY CUT INTO EXISTING GROUND

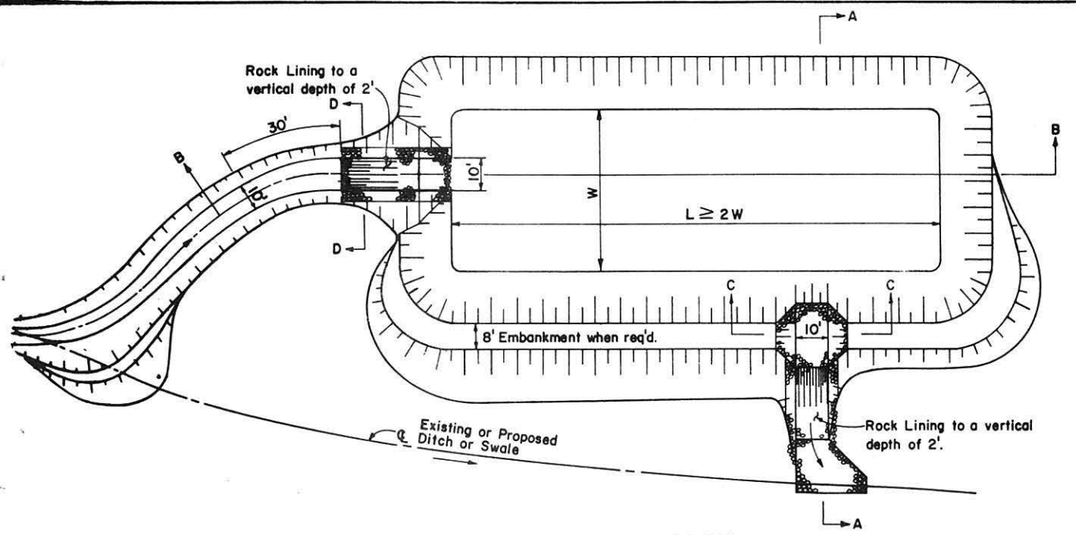
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

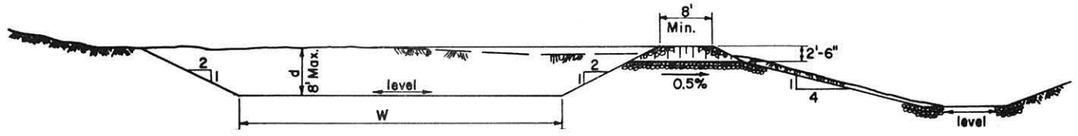
Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 3 Of 4
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-70

ERASED BY
FINAL BY

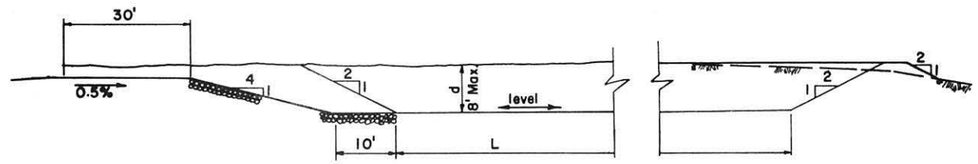
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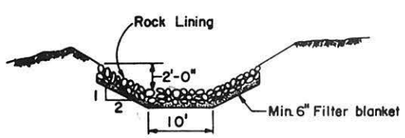
PLAN



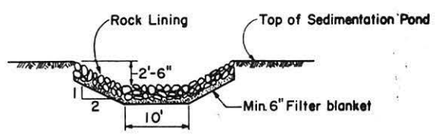
SECTION A-A



SECTION B-B

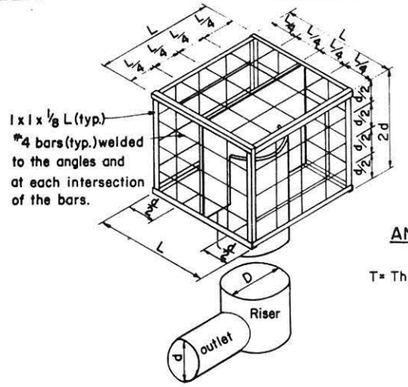


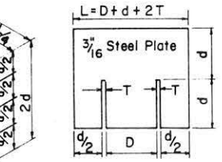
SECTION D-D



SECTION C-C

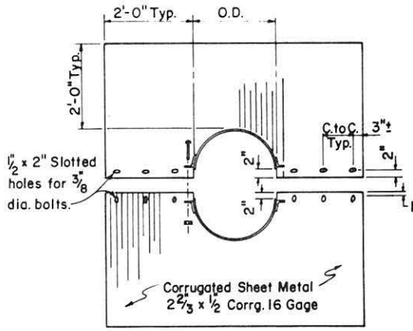
SEDIMENTATION POND



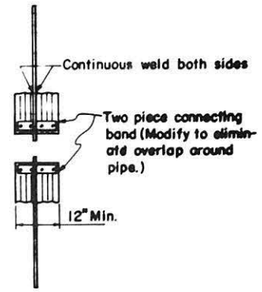


ANTI-VORTEX DEVICE

T= Thickness of riser pipe.



ELEVATION

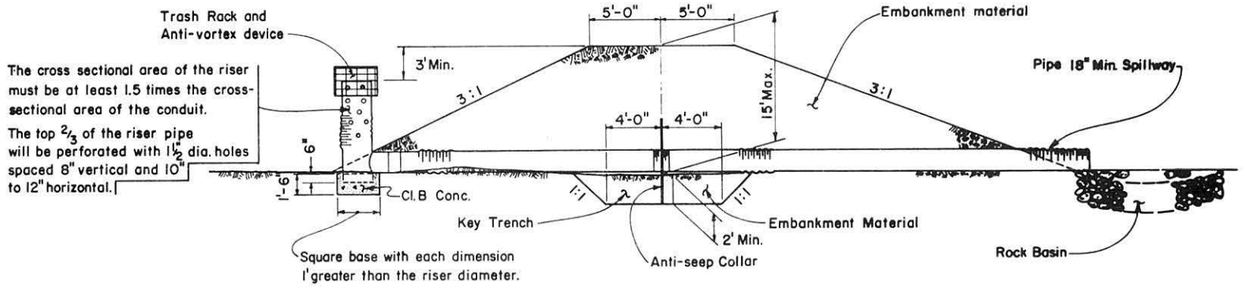


END VIEW

The lap between the two half sections shall be caulked with bituminous mastic at the time of installation Unassembled collars shall be marked by painting or tagging to identify matching pairs.

TRASH RACK AND ANTI-VORTEX DEVICE

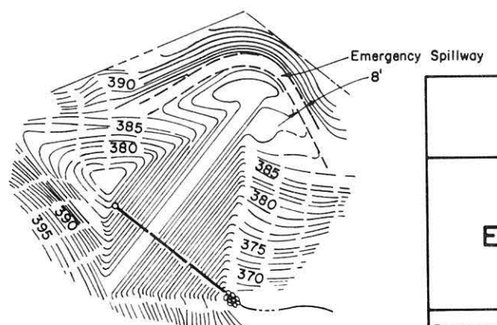
DETAIL OF ANTI-SEEP COLLAR



SEDIMENTATION BASIN

NOTES:

- An emergency spillway with a min. bottom width of 8' must be provided for every Sedimentation Basin.
- The emergency spillway must be placed in undisturbed ground and cannot be placed in embankment areas. The emergency spillway can go over the embankment if Rock Lining is used.
- The elevation of the emergency spillway must be such that the dam is at least 1' above the maximum design flow of the spillway.



PLAN VIEW OF AN EMERGENCY SPILLWAY CUT INTO EXISTING GROUND

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION & SEDIMENT CONTROL

Recommended July 2, 1973
B.O. Rumbie
Director, Bureau of Design

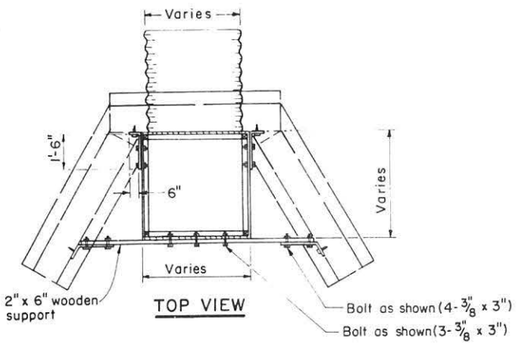
Approved July 2, 1973
Deputy Chief Hwy. Engr.

Sht. 3 Of 4

RC-70

TRACED BY
FINAL BY

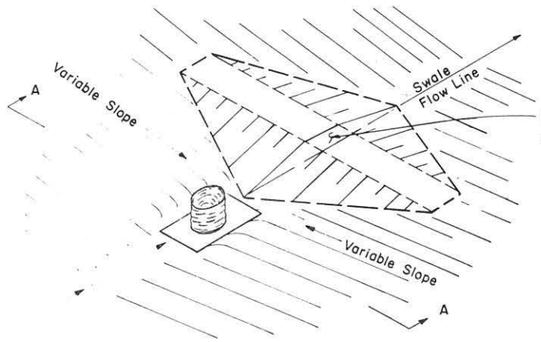
VOID



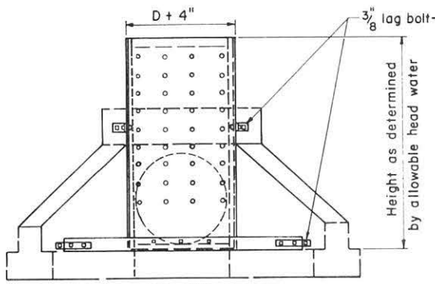
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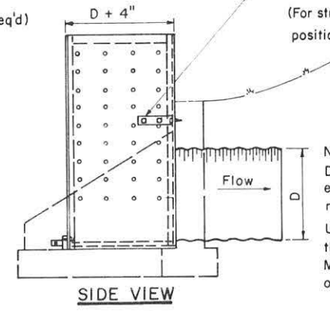
Upon establishment of suitable soil stabilization and at the direction of the engineer, the Endwall Standboxes shall be removed and shall become the property of the Contractor.

The Basin and/or area upstream from the Standbox shall be cleaned periodically and the sediment and debris disposed of in an area approved by the engineer.



ISOMETRIC VIEW OF INLET RISER PIPE & DRAINAGE DIKE

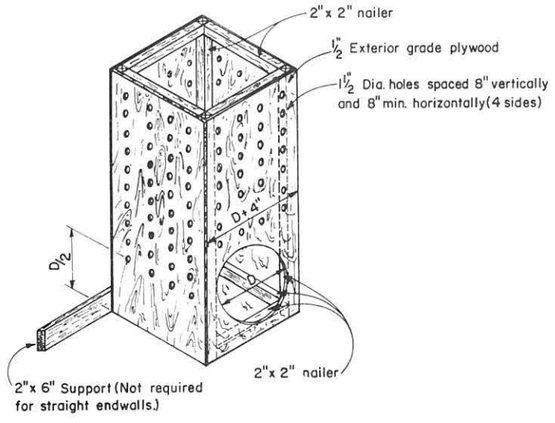




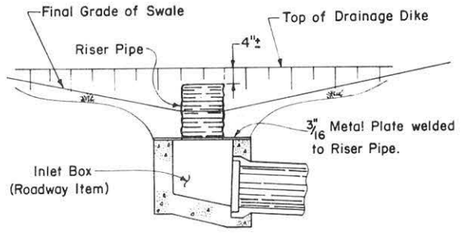
Note:
Drill holes 2" deep in concrete endwall & insert lead expander to receive 3/8" lag bolt.

Upon removal of standbox fill holes in the endwall with non-staining, non-shrinking Mortar in accordance with section 705.8(c) of the 408.

ENDWALL STANDBOX



ISOMETRIC OF PLYWOOD STANDBOX



SECTION A-A

INLET RISER PIPE

Upon establishment of suitable soil stabilization and at the direction of the engineer, the Inlet Riser Pipe shall be removed and the frame and grate installed.

Upon removal the Inlet Riser Pipe shall become the property of the contractor and may be used at other locations as required.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

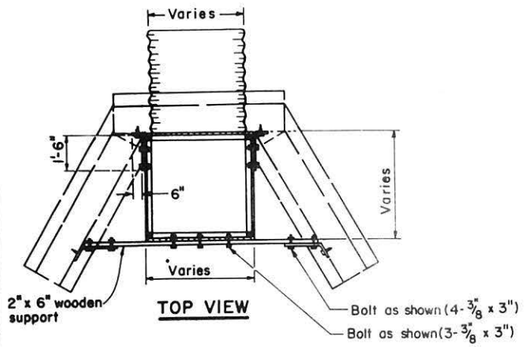
EROSION & SEDIMENT CONTROL

Recommended Oct. 1, 1974	Approved Oct. 1, 1974	Sht. 4 Of 4
Director, Bureau of Design	Deputy Chief Hwy Engr.	RC-70

TRACED BY
FINAL BY

VOID

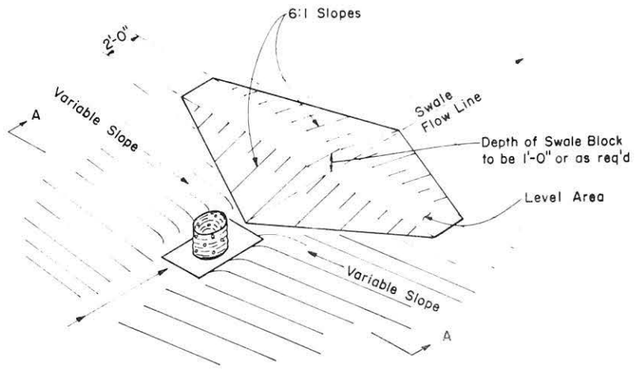
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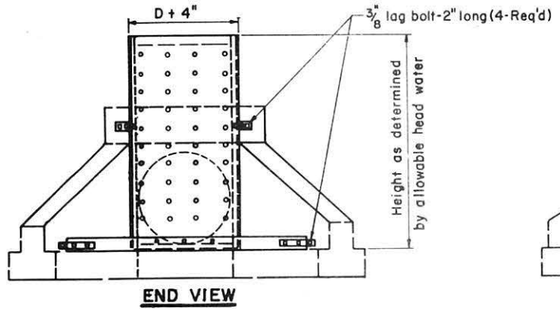
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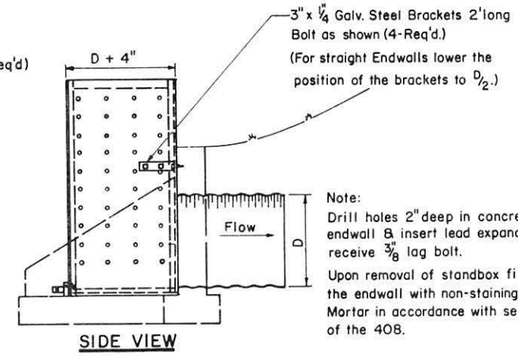
Upon establishment of suitable soil stabilization and at the direction of the engineer, the Endwall Standboxes shall be removed and shall become the property of the Contractor.

The Basin and/or area upstream from the Standbox shall be cleaned periodically and the sediment and debris disposed of in an area approved by the engineer.



ISOMETRIC VIEW OF INLET RISER PIPE & SWALE BLOCK

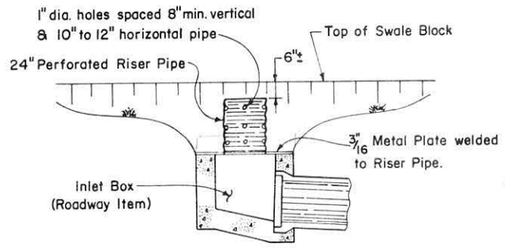




Note:
Drill holes 2" deep in concrete endwall & insert lead expander to receive 3/8" lag bolt.

Upon removal of standbox fill holes in the endwall with non-staining, non-shrinking Mortar in accordance with section 705.8(c) of the 408.

ENDWALL STANDBOX

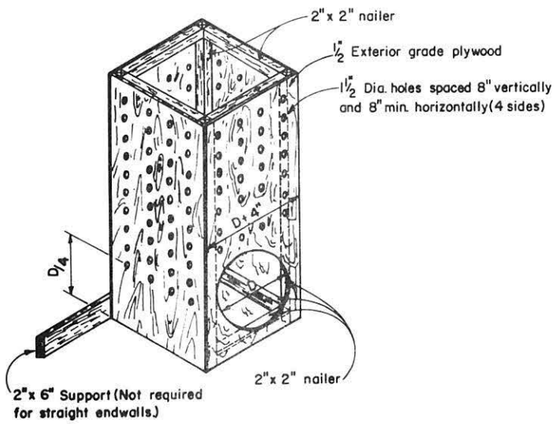


SECTION A-A

INLET RISER PIPE

Upon establishment of suitable soil stabilization and at the direction of the engineer, the Inlet Riser Pipe shall be removed and the frame and grate installed.

Upon removal the Inlet Riser Pipe shall become the property of the contractor and may be used at other locations as required.



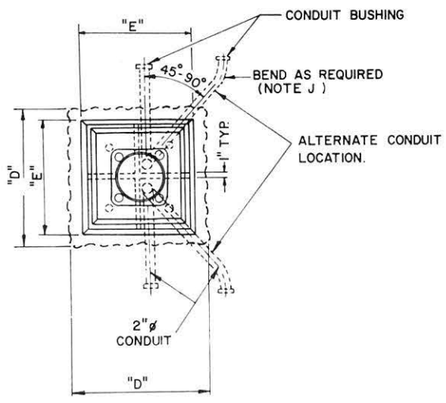
ISOMETRIC OF PLYWOOD STANDBOX

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

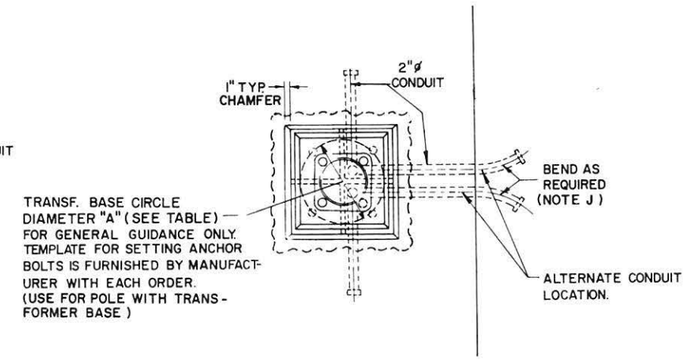
EROSION & SEDIMENT CONTROL

Recommended July 2, 1973	Approved July 2, 1973	Sht. 2 Of 2
B.D. Canbia		RC-70
Director, Bureau of Design	Deputy Chief Hwy Engr.	

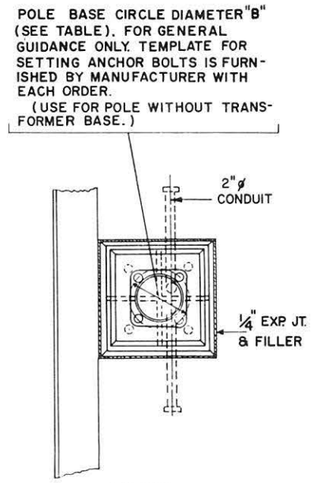
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PLAN



PLAN



PLAN

NOTES:

A- 4 ANCHOR BOLTS REQUIRED, (SEE TABLE)

B- TOP OF FORMS SHALL BE LEVEL IN BOTH DIRECTIONS.

C- ALL ANCHOR BOLT NUTS, STEEL SPRING LOCK WASHERS AND TOP 8" OF ANCHOR BOLTS SHALL BE GALVANIZED.

D- GROUND ROD 1/2"ø X 5' MIN., COPPER CLAD STEEL. MAX. RESISTANCE TO EARTH GROUND SHALL BE 25 OHMS.

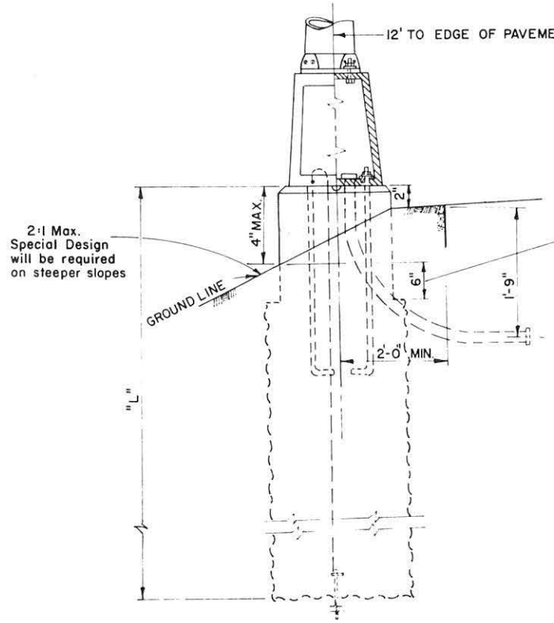
E- SEE RC-83 FOR POLE DETAILS.

F- FOR LIGHTING POLE ANCHORAGES ON BRIDGES, SEE BRIDGE CONSTRUCTION STANDARD DRAWINGS.

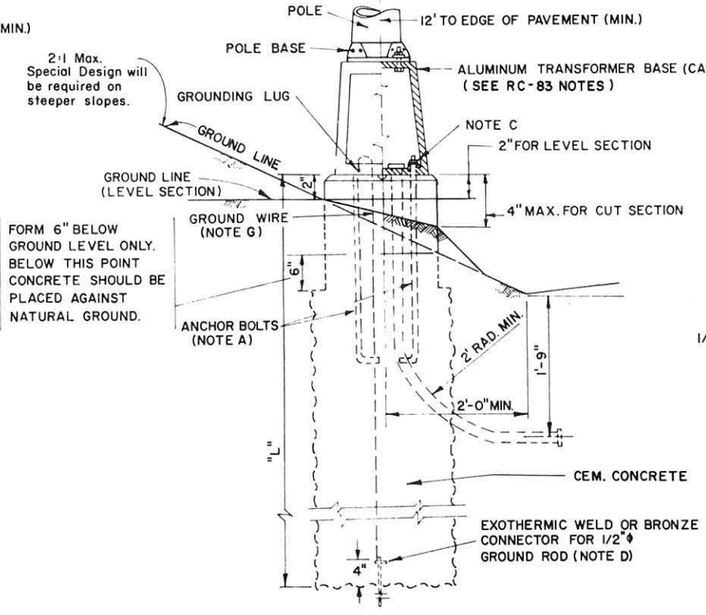
G- LEAVE 30 INCHES OF #4 GROUND WIRE COILED ABOVE FOUNDATION. (WIRE EXTENDS THROUGH CENTER OF FOUNDATION.)

H- TYPE FC FOUNDATIONS ARE DESIGNED FOR 30 FT. MAXIMUM ARM LENGTH, (SEE TABLE)

J- MINIMUM BEND RADIUS TO BE SIX TIMES CONDUIT DIAMETER, UNLESS OTHERWISE SPECIFIED.

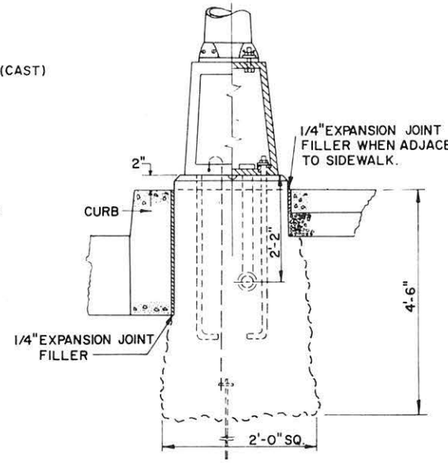


FOR FILL SECTION



FOR CUT OR LEVEL SECTION

TYPE - FC
(NOTE H)



FOR STREET LIGHTING

TYPE - P

30 FEET MAXIMUM MOUNTING HEIGHT.
15 FEET MAXIMUM ARM LENGTH.

	BOLT CIRCLE		
	TRANSF. BASE	POLE BASE	
MOUNTING HEIGHTS	"A"	"B"	ANCHOR BOLT SIZE
35' MAX.	15"	11"	1" x 40" *
40' — 50'	17 1/4"	15 1/4"	1 1/4" x 48" *

* LENGTH INCLUDES HOOK

FOUNDATION DIMENSIONS				
MOUNTING HEIGHT	"D" x "D"	"E" x "E"	AUGER DIAM.	"L"
UP TO 30'	2'-0" x 2'-0"	1'-8" x 1'-8"	2'-4"	6'-0"
35'	2'-6" x 2'-6"	2'-2" x 2'-2"	2'-10"	6'-0"
40'	2'-6" x 2'-6"	2'-2" x 2'-2"	2'-10"	6'-6"
45'	2'-6" x 2'-6"	2'-2" x 2'-2"	2'-10"	7'-0"
50'	2'-6" x 2'-6"	2'-2" x 2'-2"	2'-10"	7'-6"

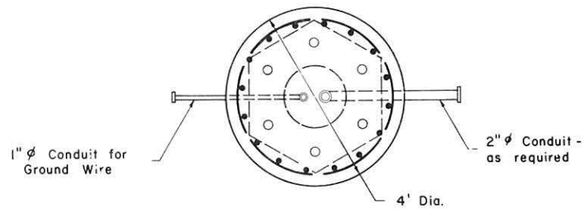
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING FOUNDATIONS
CONVENTIONAL LIGHTING POLE

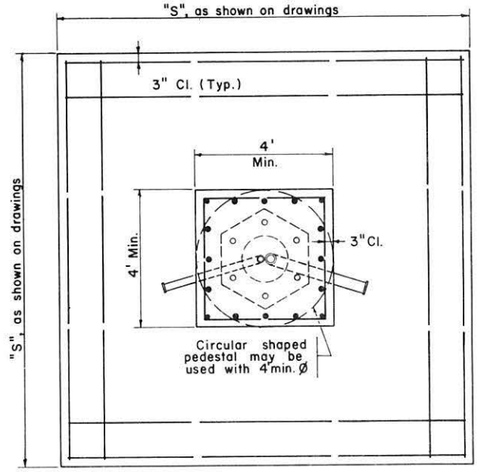
Recommended June 1, 1976
B.O. Lauchie
Director, Bureau of Design

Approved June 1 1976
Deputy Chief Hwy. Engr.

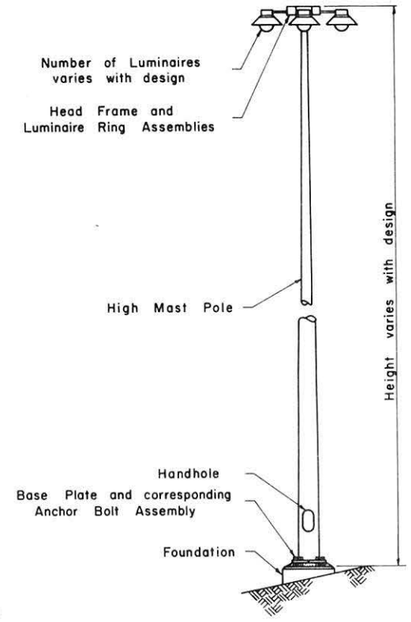
Sht. 1 of 2
RC-80



PLAN



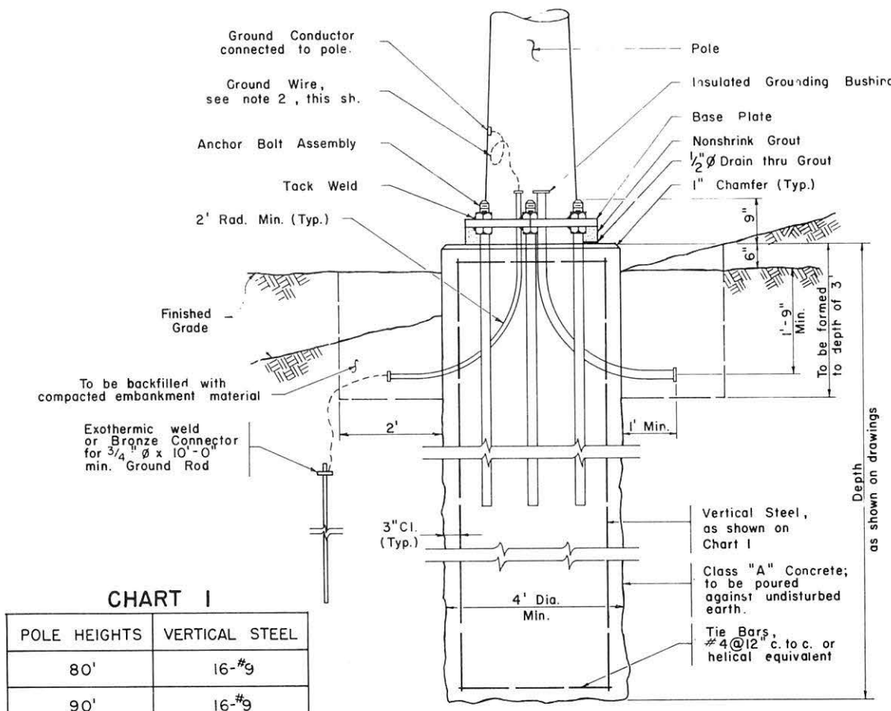
PLAN



TYPICAL HIGH MAST POLE ELEVATION

NOTES

1. The materials and workmanship shall be in accordance with Penn DOT Forms 408 & 409.
2. A 30" length of #4 ground wire shall be left coiled above foundation. The wire extends through the 1" conduit in the center of the foundation.
3. The size of pedestal or drilled caisson shown is adequate to accomodate the preassembled anchor bolt assembly, supplied by the manufacturer, for bolt circle diameters up to and including 34". For bolt circle diameters greater than 34", the pedestal or drilled caisson will have to be modified accordingly.
4. For reinforcement bar fabrication details see Bridge Construction Standard Drawings.

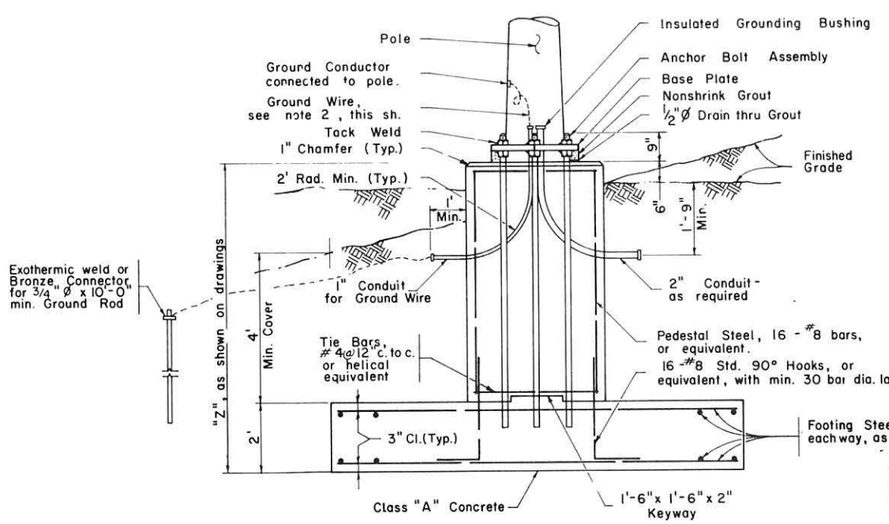


ELEVATION

DRILLED CAISSON FOUNDATION

CHART I

POLE HEIGHTS	VERTICAL STEEL
80'	16-#9
90'	16-#9
100'	16-#9
110'	16-#9
120'	16-#11



ELEVATION

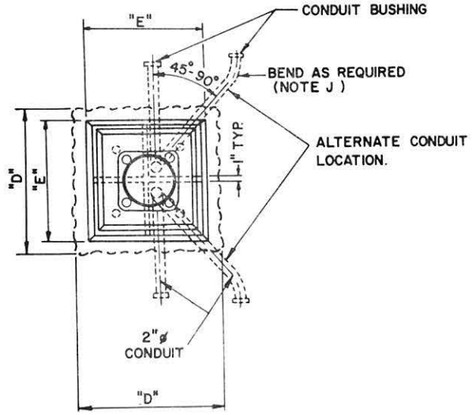
SPREAD FOOTING FOUNDATION

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

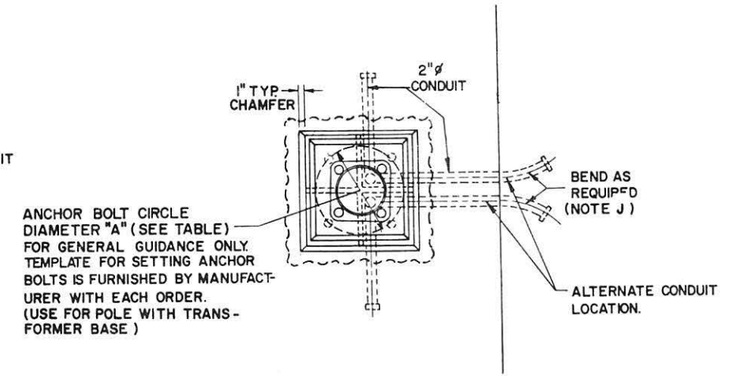
HIGHWAY LIGHTING FOUNDATIONS
HIGH MAST LIGHTING POLE

Recommended June 1, 1976	Approved June 1, 1976	Sht. 2 Of 2
B.D. Rondinie	Robert P. Messer	RC-80
Director, Bureau of Design	Deputy Chief Hwy. Engr.	

TRACED BY
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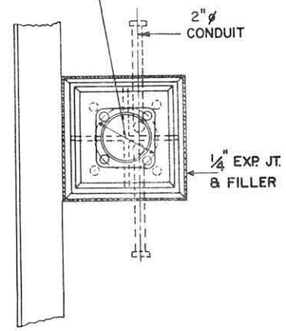


PLAN



PLAN

ANCHOR BOLT CIRCLE DIAMETER "B" (SEE TABLE). FOR GENERAL GUIDANCE ONLY. TEMPLATE FOR SETTING ANCHOR BOLTS IS FURNISHED BY MANUFACTURER WITH EACH ORDER. (USE FOR POLE WITHOUT TRANSFORMER BASE.)



PLAN

NOTES:

A- 4 ANCHOR BOLTS REQUIRED, (SEE TABLE)

B- TOP OF FORMS SHALL BE LEVEL IN BOTH DIRECTIONS.

C- ALL ANCHOR BOLT NUTS, STEEL SPRING LOCK WASHERS AND TOP 8" OF ANCHOR BOLTS SHALL BE GALVANIZED.

D- GROUND ROD 1/2"ø X 5' MIN., COPPER CLAD STEEL. MAX. RESISTANCE TO EARTH GROUND SHALL BE 25 OHMS.

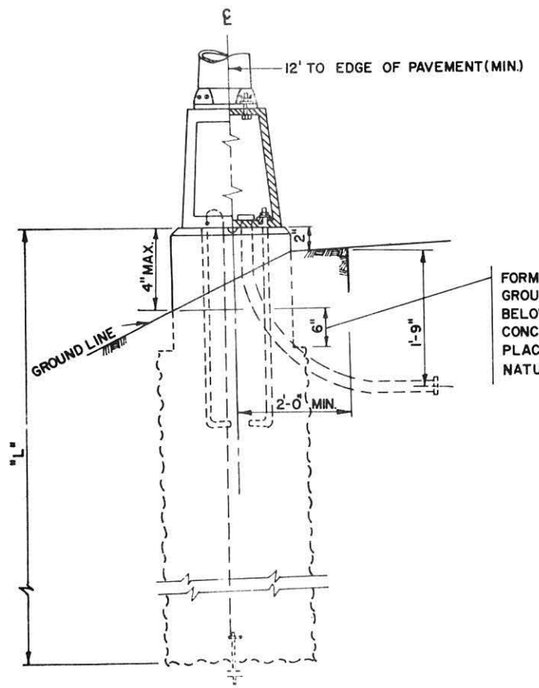
E- SEE RC-83 FOR POLE DETAILS.

F- FOR LIGHTING POLE ANCHORAGES ON BRIDGES, SEE STANDARD DRAWING BC-322.

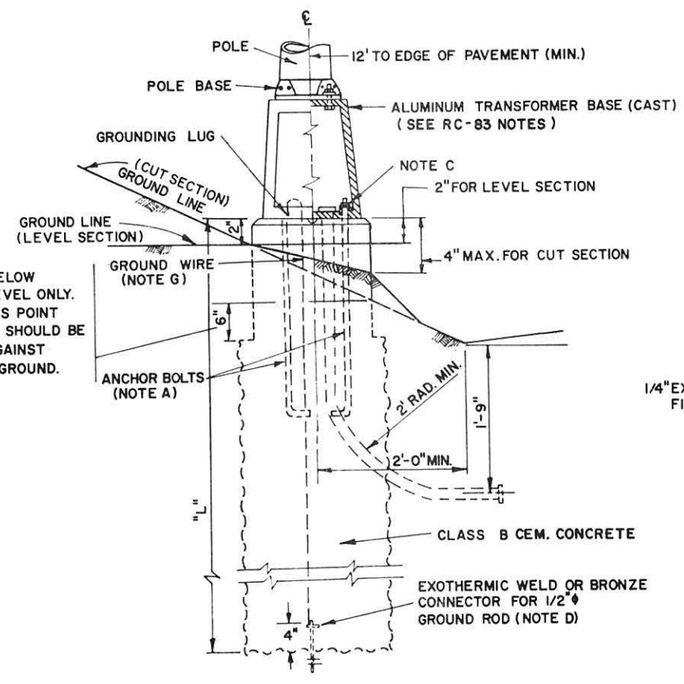
G- LEAVE 30 INCHES OF #4 GROUND WIRE COILED ABOVE FOUNDATION. (WIRE EXTENDS THROUGH CENTER OF FOUNDATION.)

H- TYPE FC FOUNDATIONS ARE DESIGNED FOR 30 FT. MAXIMUM ARM LENGTH, (SEE TABLE)

J- MINIMUM BEND RADIUS TO BE SIX TIMES CONDUIT DIAMETER, UNLESS OTHERWISE SPECIFIED.

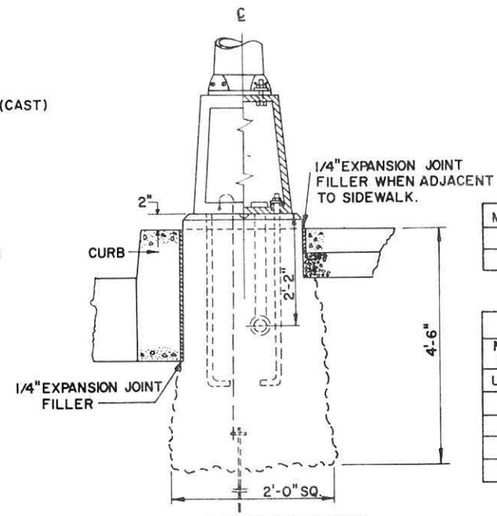


FOR FILL SECTION



FOR CUT OR LEVEL SECTION

TYPE - FC
(NOTE H)



FOR STREET LIGHTING

TYPE - P

30 FEET MAXIMUM MOUNTING HEIGHT.
15 FEET MAXIMUM ARM LENGTH.

MOUNTING HEIGHTS	TRANSF. BASE "A"	ANCHOR BASE "B"	ANCHOR BOLT SIZE
35' MAX.	15"	11"	1" x 40" *
40' — 50'	17¼"	15¼"	1¼" x 48" *

* LENGTH INCLUDES HOOK

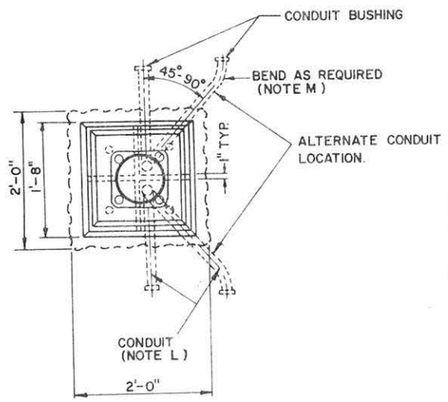
FOUNDATION DIMENSIONS				
MOUNTING HEIGHT	"D" x "D"	"E" x "E"	AUGER DIAM.	"L"
UP TO 30'	2'-0" x 2'-0"	1'-8" x 1'-8"	2'-4"	6'-0"
35'	2'-6" x 2'-6"	2'-2" x 2'-2"	2'-10"	6'-0"
40'	2'-6" x 2'-6"	2'-2" x 2'-2"	2'-10"	6'-6"
45'	2'-6" x 2'-6"	2'-2" x 2'-2"	2'-10"	7'-0"
50'	2'-6" x 2'-6"	2'-2" x 2'-2"	2'-10"	7'-6"

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

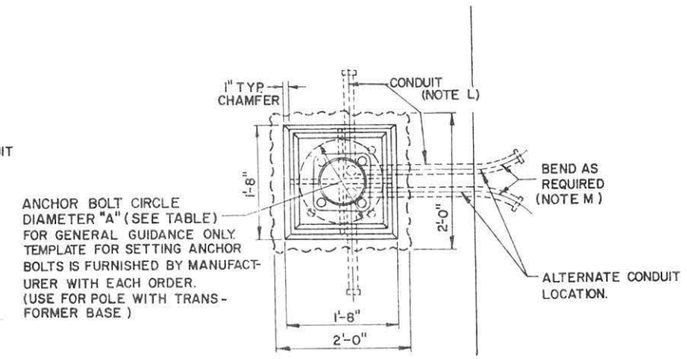
HIGHWAY LIGHTING FOUNDATIONS

Recommended Mar. 7, 1973	Approved Mar 7, 1973	Sht. 1 Of 1
Director, Bureau of Design	Deputy Chief Hwy. Engr	RC-80

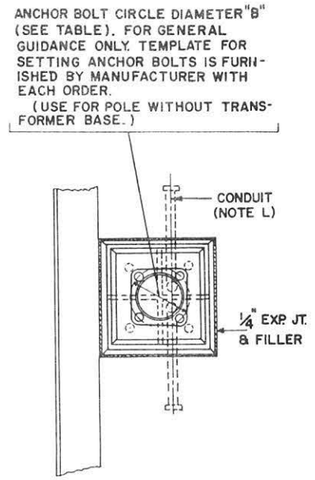
VOID



PLAN



PLAN



PLAN

NOTES:

A- 4 ANCHOR BOLTS REQUIRED, TO BE FURNISHED BY POLE MANUFACTURER. (SEE TABLE)

B- INSTEAD OF DIGGING 2'-0" SQ. HOLE, A 2'-4" DIAM. AUGER MAY BE USED.

C- TOP OF FORMS SHALL BE LEVEL IN BOTH DIRECTIONS.

D- ALL ANCHOR BOLT NUTS, STEEL SPRING LOCK WASHERS AND TOP 8" OF ANCHOR BOLTS SHALL BE GALVANIZED.

E- GROUND ROD 1/2"ϕ X 5' MIN., COPPER CLAD STEEL. MAX. RESISTANCE TO EARTH GROUND SHALL BE 25 OHMS.

F- SEE RC-83 FOR POLE DETAILS.

G- FOR LIGHTING POLE ANCHORAGES ON BRIDGES, SEE STANDARD DRAWING BC-322.

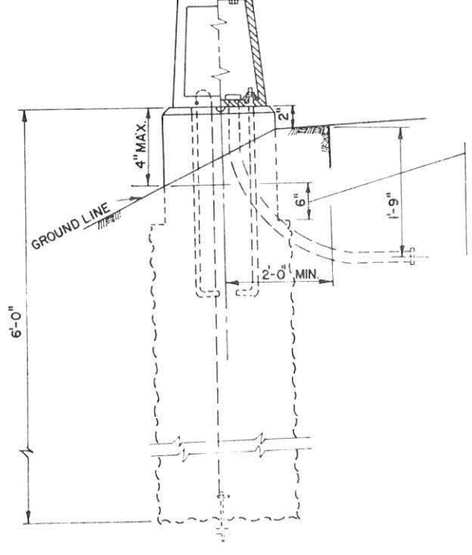
H- LEAVE 30 INCHES OF #4 GROUND WIRE COILED ABOVE FOUNDATION. (WIRE EXTENDS THROUGH CENTER OF FOUNDATION.)

J- FOUNDATIONS ARE DESIGNED FOR 30 FT. MOUNTING HEIGHT OF LUMINAIRES AND 15 FT. MAX. ARM LENGTH, FOR HIGHER MOUNTING HEIGHTS AND/OR LONGER ARMS, CHECK DESIGN AND REVISE, IF NECESSARY, FOR ADEQUATE STRENGTH.

K - FOR ALL DIMENSIONS AND NOMENCLATURE NOT SHOWN, SEE TYPE-C THIS SHEET.

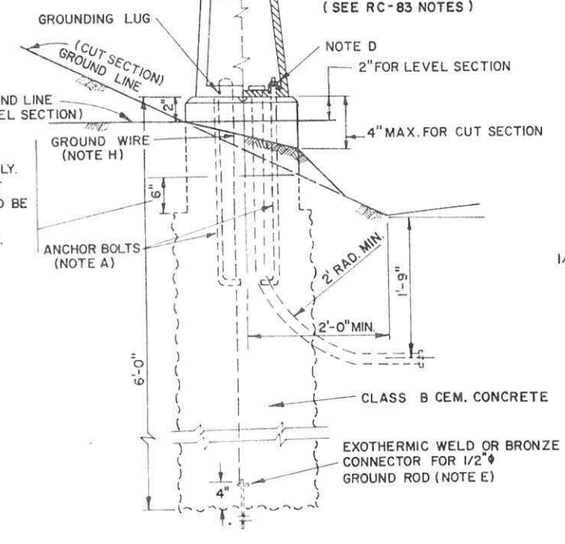
L- CONDUIT DIAMETER = 2" FOR USE WITH BURIAL CABLE ; 3" MAX. FOR USE WITH CABLE DUCT.

M - MINIMUM BEND RADIUS TO BE SIX TIMES CONDUIT DIAMETER, UNLESS OTHERWISE SPECIFIED.



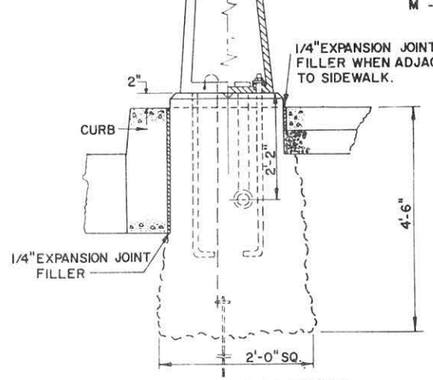
FOR FILL SECTION

TYPE-F



FOR CUT OR LEVEL SECTION

TYPE-C



FOR STREET LIGHTING

TYPE-P

MOUNTING HEIGHTS	TRANSF. BASE "A"	ANCHOR BASE "B"	ANCHOR BOLT SIZE
35' MAX.	15"	11"	1" x 40" *
40' — 50'	17¼"	15¼"	1¼" x 48" *

* LENGTH INCLUDES HOOK

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING FOUNDATIONS

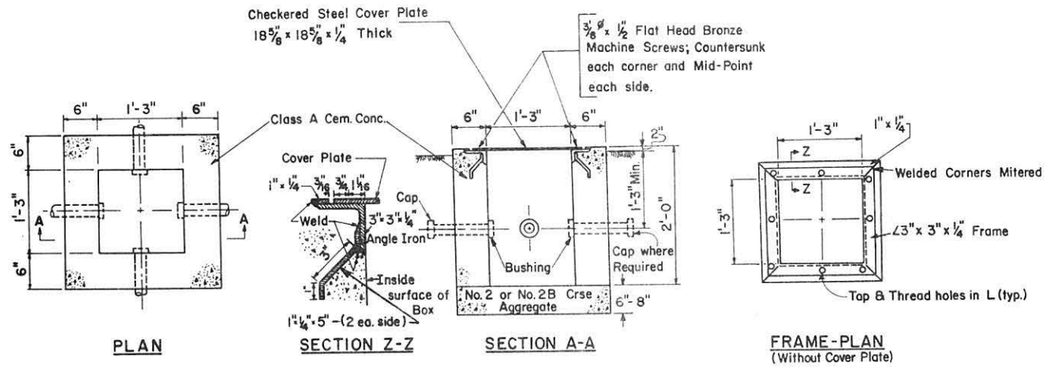
Recommended Dec. 1, 1971
R.R. Thomas
Location & Design Design

Approved Dec. 1, 1971
W.J. Ravo
Deputy Chief Hwy. Engr

Sht. 1 Of 1

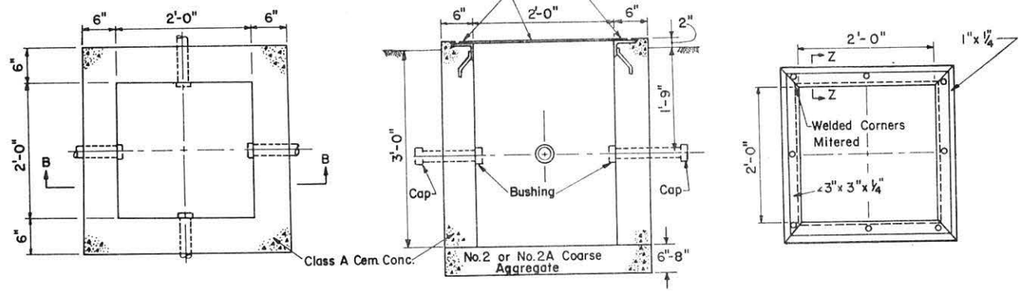
RC-80

VOID



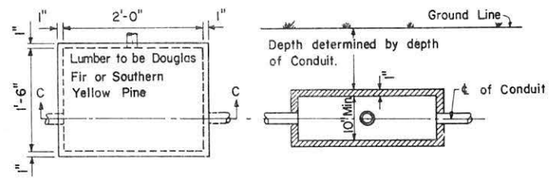
PLAN | SECTION Z-Z | SECTION A-A | FRAME-PLAN (Without Cover Plate)

TYPE JB-1
1'-3" x 1'-3"



PLAN | SECTION B-B | FRAME-PLAN (Without Cover Plate)

TYPE JB-2
2'-0" x 2'-0"



PLAN | ELEVATION SECTION C-C

BURIED TREATED WOOD JUNCTION BOX FOR OFF-SHOULDER LOCATIONS

TYPE JB-4

Notes:

JB-1 and JB-2 Shall be used in locations where they will be subject to loads no heavier than pedestrian traffic.

For other locations use JB-11 or JB-12 shown on RC-82.

Equivalent approved precast junction boxes may be substituted for JB-1 and JB-2 shown.

After installation, all exposed steel shall be painted with one coat of red lead and one coat approved bituminous paint.

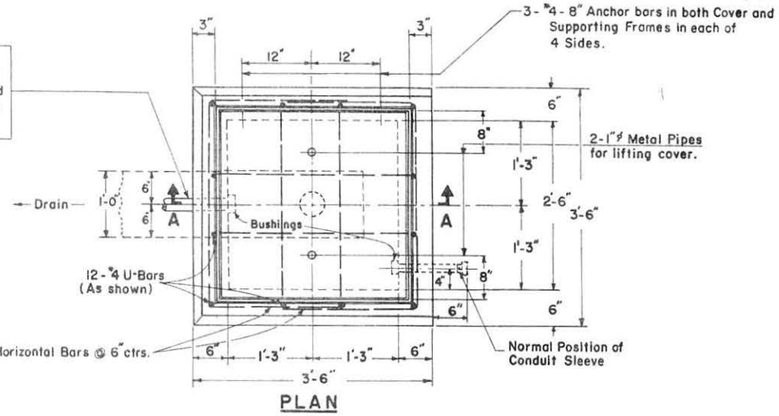
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING

JUNCTION BOXES - LIGHT DUTY

Recommended Dec. 1, 1971 R.R. Mayer, Location & Design Engineer	Approved Dec. 1, 1971 W. J. Rover, Deputy Chief Hwy. Engr.	Sht. 1 Of 1 RC-81

NOTE:
Normal Position of Conduit:
When two or more are indicated on same side they will be spaced 6" on centers symmetrical about ℄ of Box.

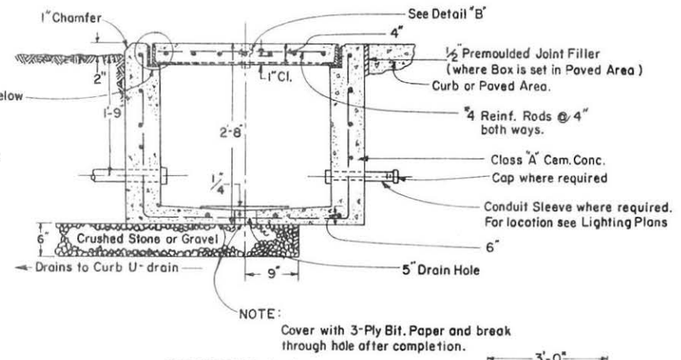


PLAN

NOTE:
Where Junction Box is in Sidewalk Area, top to conform with Sidewalk Slope. At all other locations top to be level.

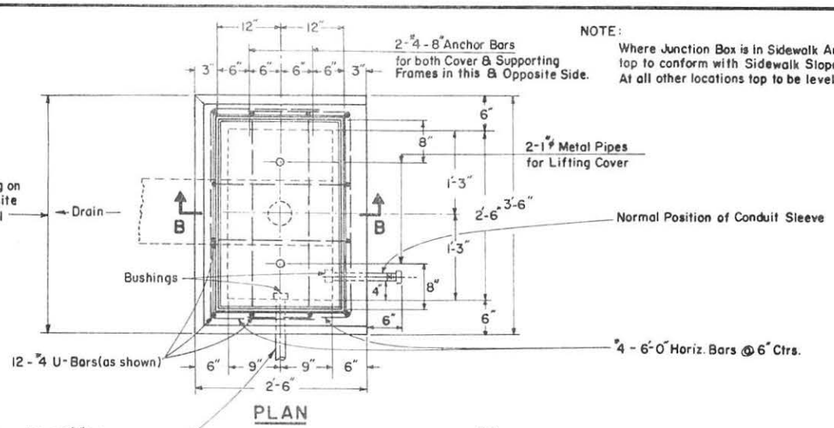
NOTE:
For location, size, and Number of Conduits for each Junction Box see Lighting Plans.

NOTE:
Provide two (2) Cu. Ft. of No. 2B Aggregate for Drain when no Underdrain is available.



SECTION A-A
JUNCTION BOX JB-11
2'-6" x 2'-6"

NOTE
Anchor Bar Spacing on this side and opposite side same as JB 11



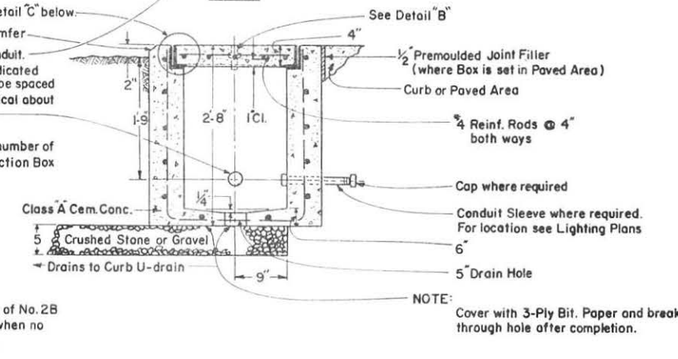
PLAN

NOTE:
Where Junction Box is in Sidewalk Area, top to conform with Sidewalk Slope. At all other locations top to be level.

NOTE:
Normal Position of Conduit. When 2 or more are indicated on same side they will be spaced 6" on centers symmetrical about ℄ of Box.

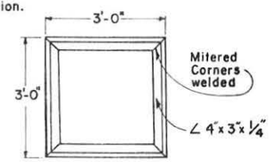
NOTE:
For location, size, and number of Conduits for each Junction Box see Lighting Plans.

NOTE:
Provide two (2) Cu. Ft. of No. 2B Aggregate for Drain when no U-drain is available.

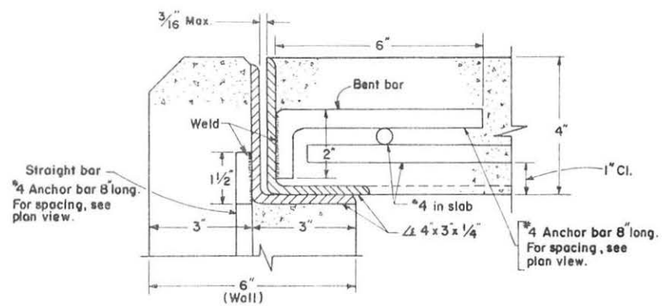


SECTION B-B
JUNCTION BOX JB-12
1'-6" x 2'-6"

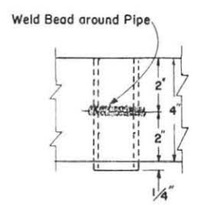
NOTES:
1. JB-11 & JB-12 shall be used in Shoulders or other locations where they will be subject to Vehicular Loads.
2. For other locations, Use JB-1 or JB-2 shown on RC-81
3. Equivalent Approved Precast Junction Boxes may be substituted for JB-11 & JB-12 shown.



∠-FRAME PLAN
(Steel or Aluminum) No Scale



ENLARGED DETAIL "C"
COVER FRAME & SUPPORTING FRAME



DETAIL "B"

- Structural Steel shall conform to ASTM A36 designation
- Structural Aluminum shall conform to ASTM-B221 Alloy 6061-T6 designation.
- All concrete to be Class "A" Cement Concrete
- After installation, all exposed steel shall be painted with one coat of red lead and one coat of approved bituminous.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING

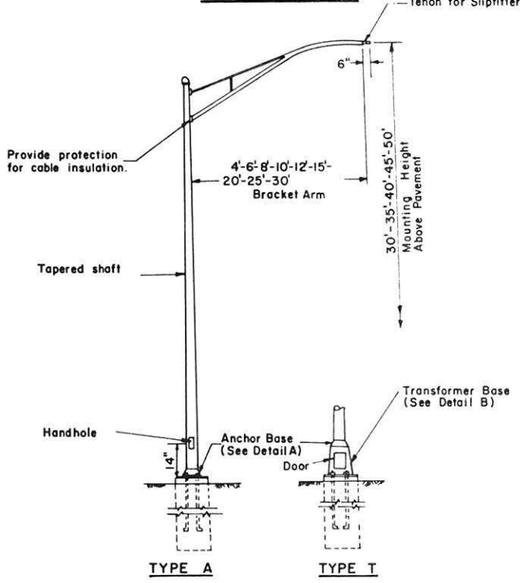
JUNCTION BOXES HEAVY DUTY

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
R R Musser	W. J. Kaver	RC-82
Location & Design Engineer	Deputy Chief Hwy. Engr.	

FORM 4237 REV 3-41

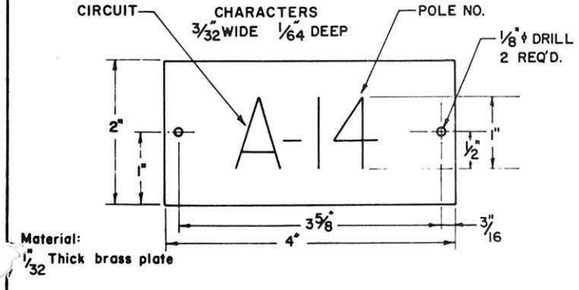
ROUND ALUMINUM and STEEL POLES AND OCTAGONAL STEEL POLES

(FLAT OR FLUTED)



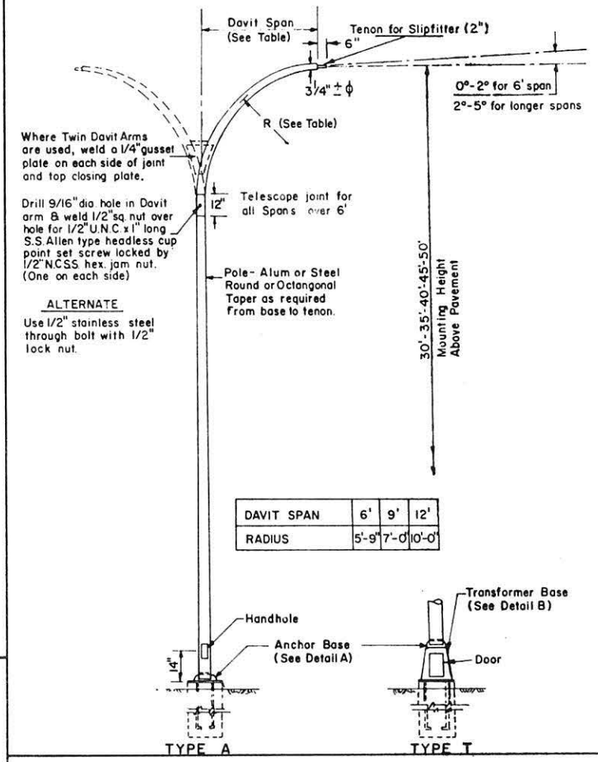
GENERAL NOTES

1. See RC-80 for details on pole foundations and transformer bases.
2. Aluminum Poles – Shaft base diameter may vary from 8"–14" and shaft wall thickness from .188"–.312" depending on mounting height and arm length.
3. Steel Poles – Shaft base diameter may vary from 7.5"–10.0". Nominal shaft wall thickness is 11 gage.(Does not apply to Sectional Steel Poles.)
4. Manufacturers certification of compliance with load tests outlined in Form 408 is required for all poles.
5. Where all steel and aluminum poles or transformer bases are in contact with concrete, a caulking compound shall be used which will be an approved aluminum impregnated gray mastic type, meeting the test requirements of the Federal Specification TT-C598(2).
6. Identification plates shall be provided for all poles.
7. Bolt template for anchor base or transformer base furnished by manufacturer.
8. Approved Materials for Poles:
   Aluminum and Steel as per Form 408.



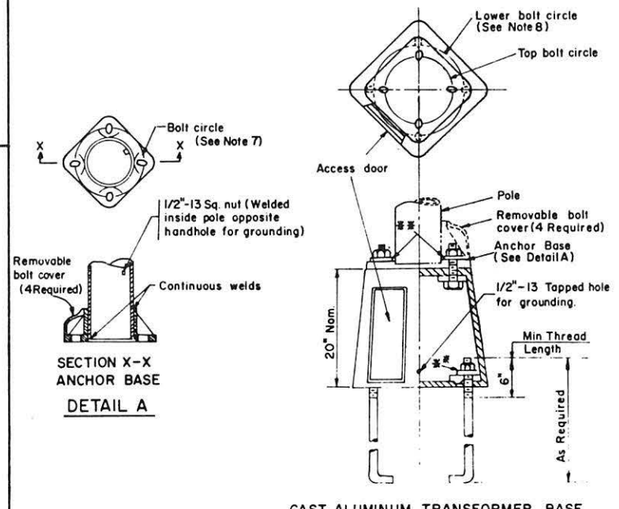
IDENTIFICATION TAG DETAIL

DAVIT-TYPE POLES

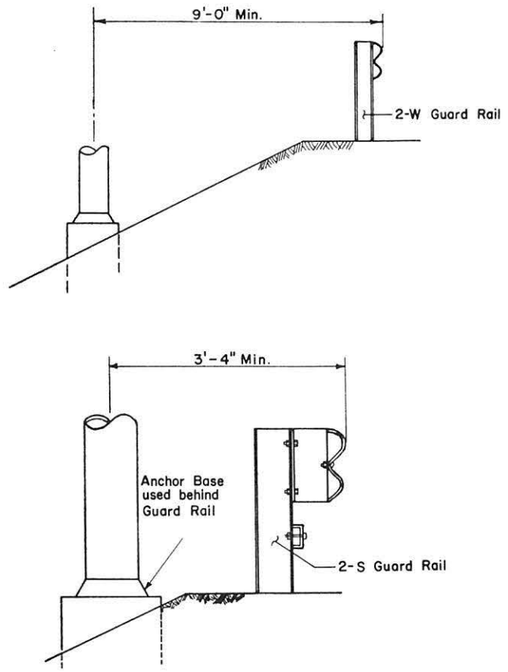


DAVIT SPAN	6'	9'	12'
RADIUS	5'-9"	7'-0"	10'-0"

POLE BASES

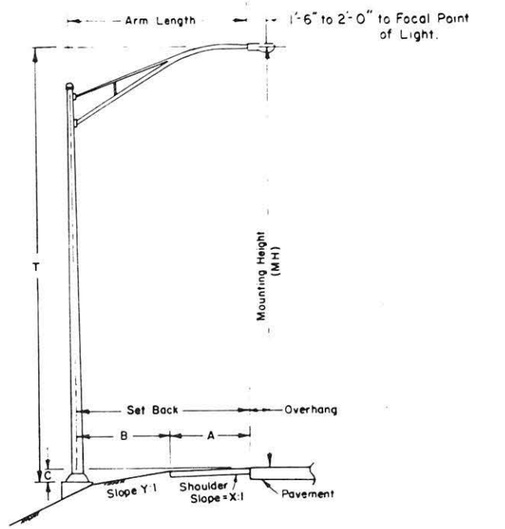


** Galvanized steel spring lock washer



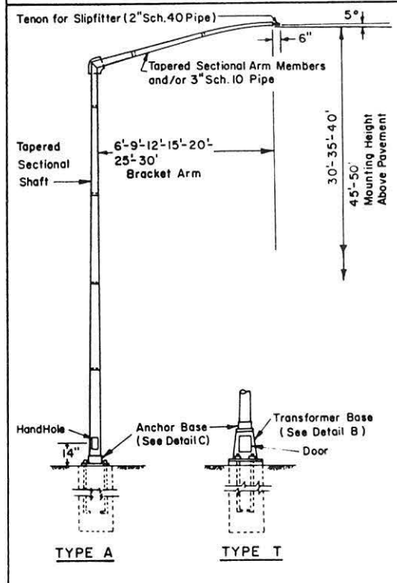
GUARD RAIL CLEARANCE

TERMINOLOGY

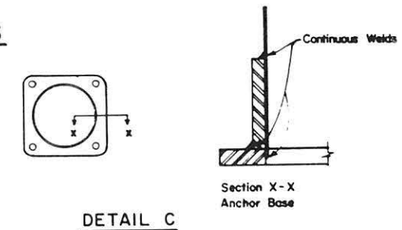


$C = \frac{A}{X} + \frac{B}{Y}$

$T = MH + C$



SECTIONAL STEEL POLES



DETAIL C

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING

LIGHTING POLE DETAILS

Recommended Mar. 7, 1973
Director, Bureau of Design

Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

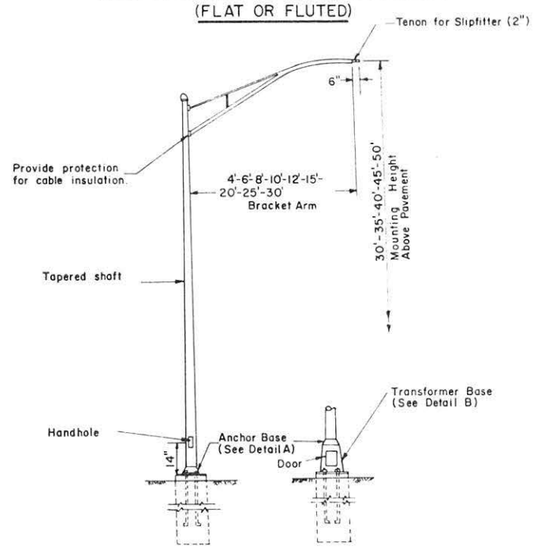
Sht. 1 Of 1

RC-83

FORM 4237 REV 3-61

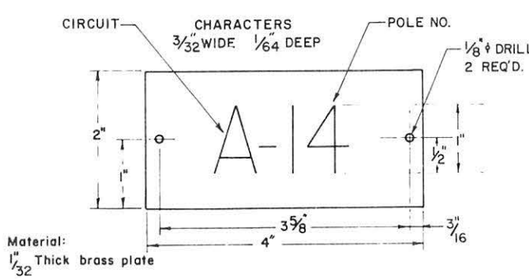
ROUND ALUMINUM and STEEL POLES AND OCTAGONAL STEEL POLES

(FLAT OR FLUTED)



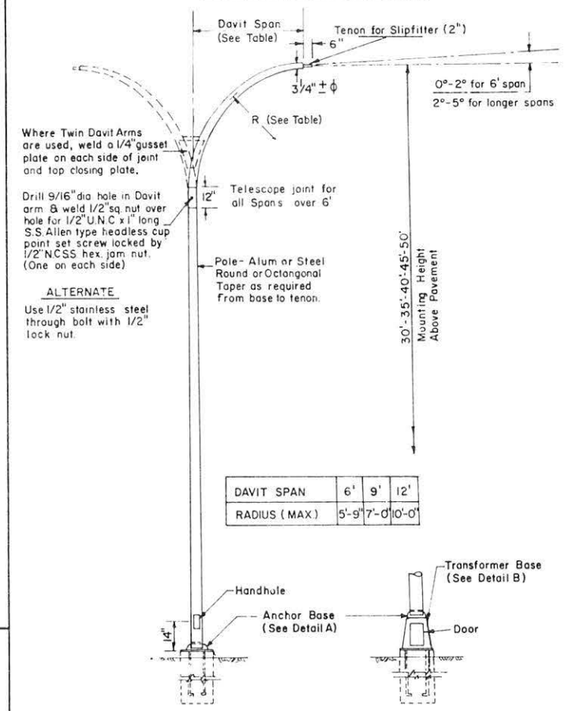
GENERAL NOTES

1. See RC-80 for details on pole foundations and transformer bases.
2. Aluminum Poles – Shaft base diameter may vary from 8"–14" and shaft wall thickness from .188"–.312" depending on mounting height and arm length.
3. Steel Poles – Shaft base diameter may vary from 7.5"–10.0". Nominal shaft wall thickness is 11 gage. (Does not apply to Sectional Steel Poles.)
4. Manufacturers certification of compliance with load tests outlined in Form 408 is required for all poles.
5. Cast aluminum transformer base is required for all poles within 30 feet of edge of pavement except when pole is mounted on parapet or wall, or when located behind guard rail.
6. Where all steel and aluminum poles or transformer bases are in contact with concrete, a caulking compound shall be used which will be an approved aluminum impregnated gray mastic type, meeting the test requirements of the Federal Specification TT-C598(2).
7. Identification plates shall be provided for all poles.
8. Bolt template for anchor base or transformer base furnished by manufacturer.
9. Approved Materials for Poles:
   Aluminum and Steel as per Form 408.



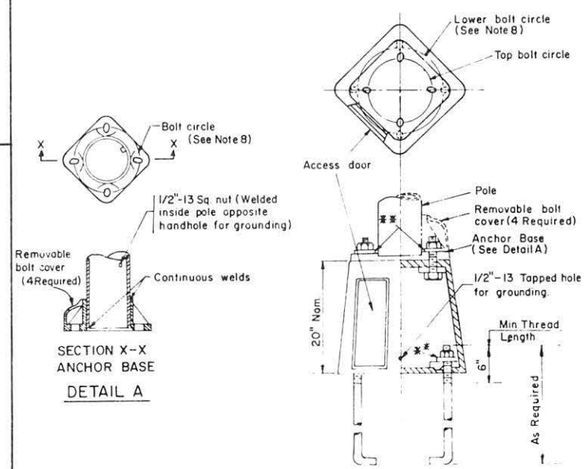
IDENTIFICATION TAG DETAIL

DAVIT-TYPE POLES

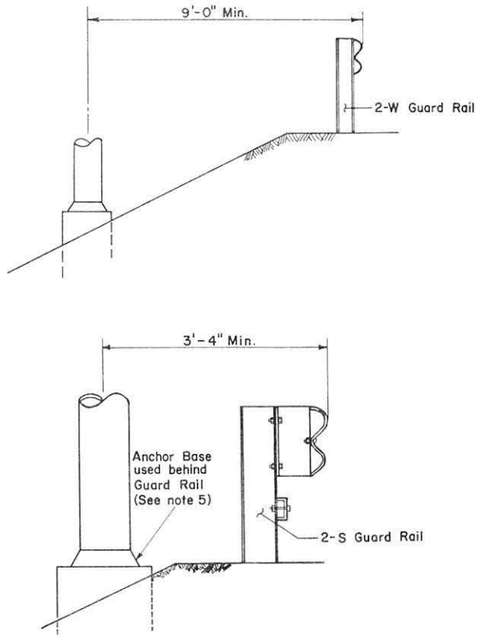


DAVIT SPAN	6'	9'	12'
RADIUS (MAX)	5'-9"	7'-0"	10'-0"

POLE BASES

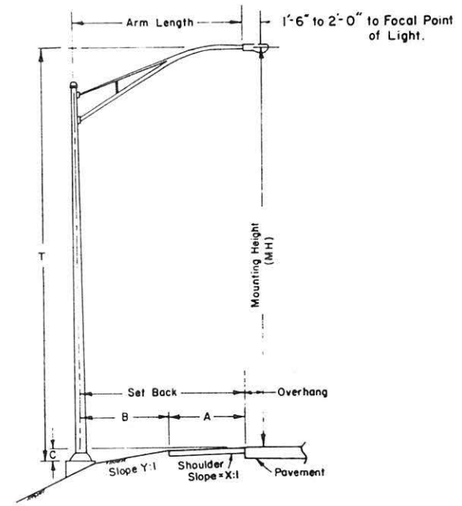


** Galvanized steel spring lock washer



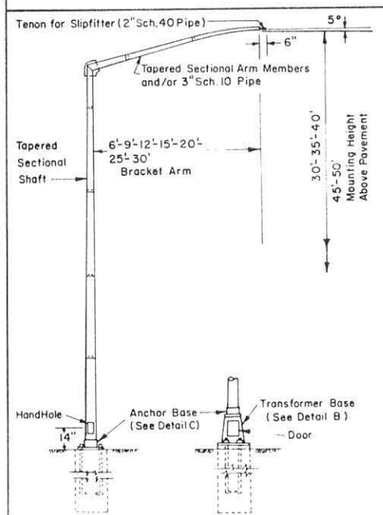
GUARD RAIL CLEARANCE

TERMINOLOGY

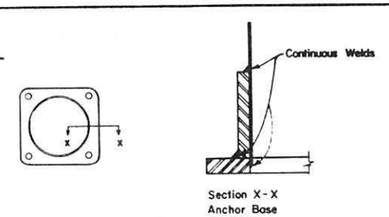


$C = \frac{A}{X} + \frac{B}{Y}$

$T = MH + C$



SECTIONAL STEEL POLES



DETAIL C

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

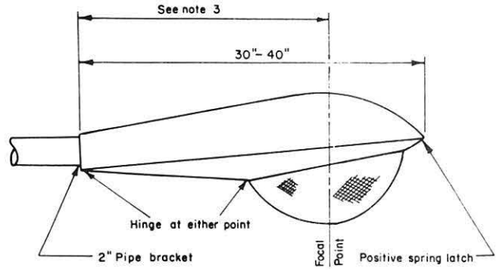
HIGHWAY LIGHTING

LIGHTING POLE DETAILS

Recommended Dec. 1, 1971	Approved Dec. 1, 1971	Sht. 1 Of 1
R R Musser	W J Raver	RC-83
Location & Design Engineer	Deputy Chief Hwy. Engr.	

VOID

LUMINAIRES FOR MERCURY LAMPS



BALLAST HOUSED IN LUMINAIRE

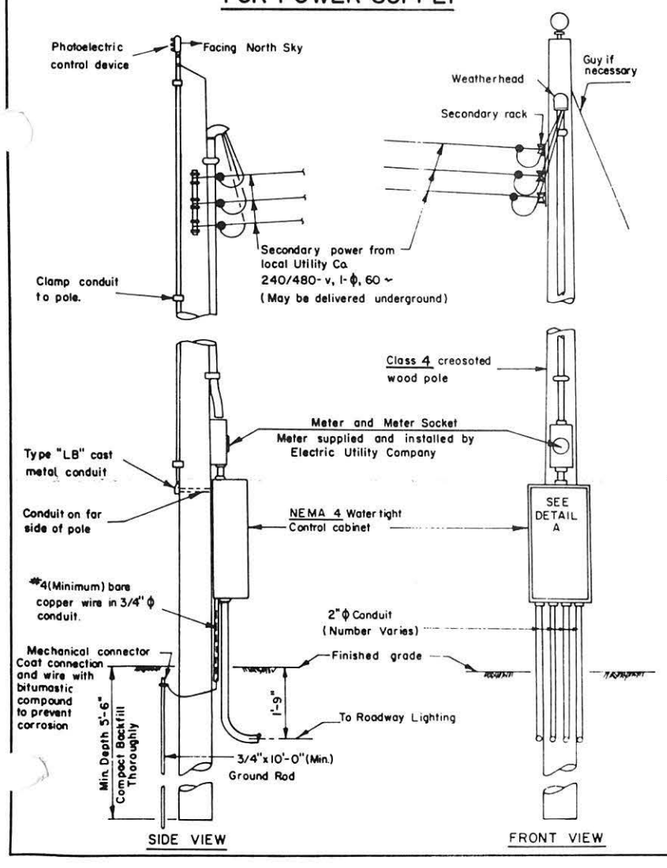
Notes:

(1) Luminaires to have Reflector-Refractor Type Optical System, with thermal shock-resisting Glass Prismatic Refractor.

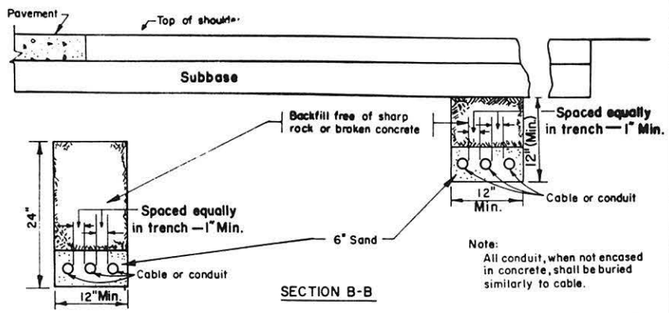
(2) Luminaires to accommodate 250, 400, 700 & 1000-Watt Mercury Lamps, in approximate horizontal position.

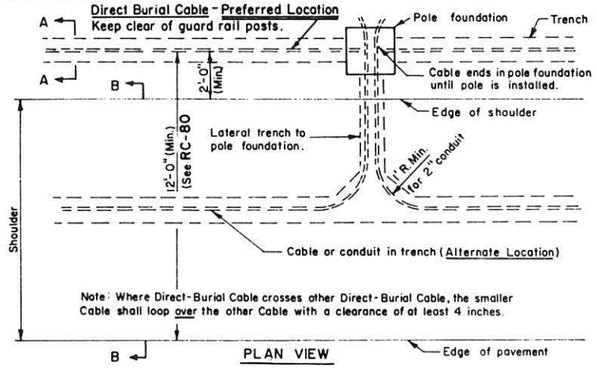
(3) Focal distance or light center varies from $1\frac{1}{2}$ to 2 ft.- Refer to RC-83

TYPICAL TERMINAL POLE EQUIPMENT ARRANGEMENT FOR POWER SUPPLY

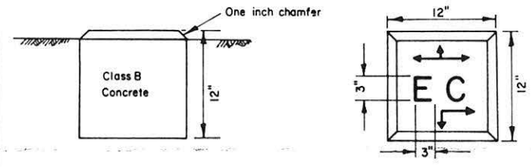


DIRECT-BURIAL CABLE & CONDUIT



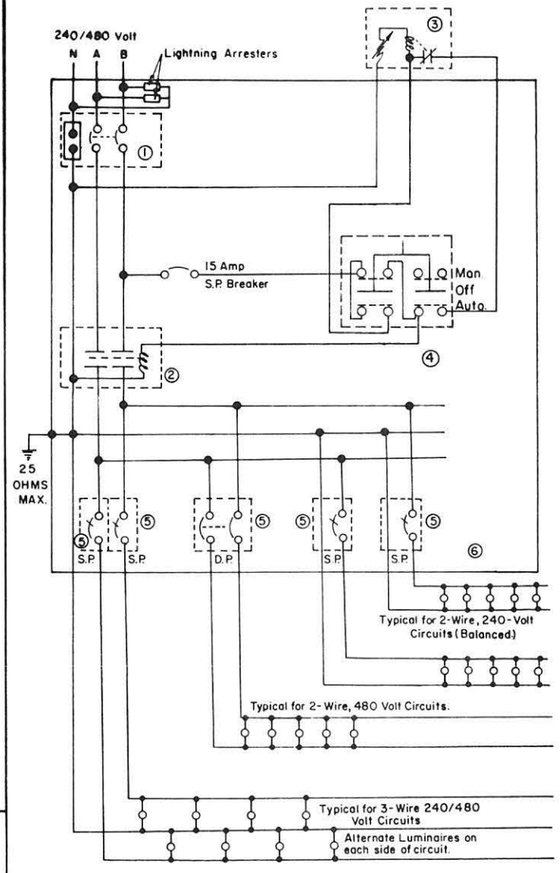


CABLE & CONDUIT MARKER



Note: Directional arrows as required. Arrow and letter depth 1/2 inch.

CONTROL CABINET SCHEMATIC WIRING DIAGRAM (TYPICAL)

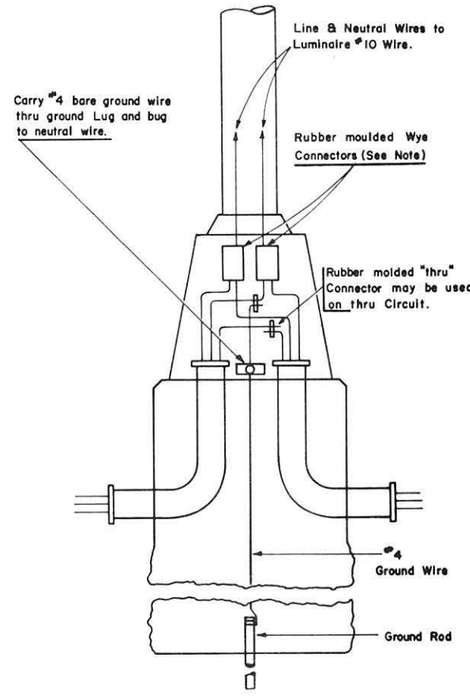


M- Manual
A- Automatic
1- Main Circuit Breaker
2- Control Contactor
3- Photoelectric Cell
4- Selector Switch
5- Distribution Breakers
6- Control Cabinet
SP- Single Pole
DP- Double Pole

Notes:
1- Items 2, 3, & 4 not required if each Luminaire has photoelectric control element.
2- Item 5 not required for single circuit.

DETAIL A

WIRING DETAIL TRANSFORMER BASE



NOTE: Rubber molded connectors optional for use in anchor base poles.

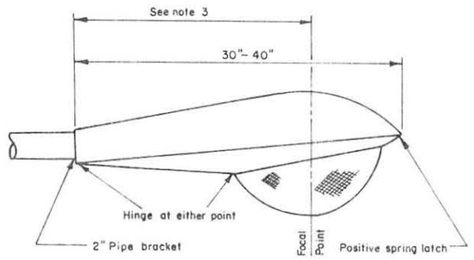
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING

LIGHTING & ELECTRICAL DETAILS

Recommended Mar. 7, 1978	Approved Mar. 7, 1978	Sht. 1 Of 1
Director, Bureau of Design	Deputy Chief Hwy. Engr.	RC-84

LUMINAIRES FOR MERCURY LAMPS



BALLAST HOUSED IN LUMINAIRE

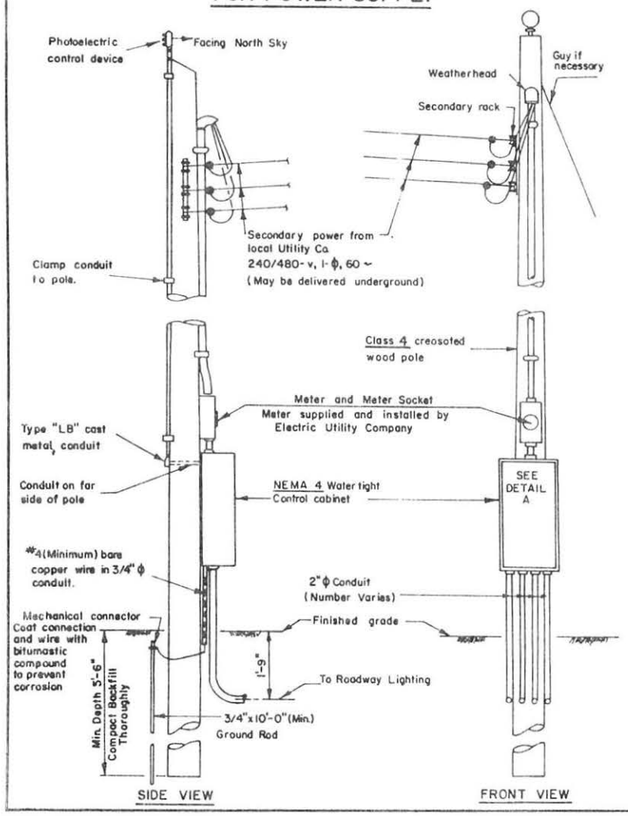
Notes:

(1) Luminaires to have Reflector-Refractor Type Optical System, with thermal shock-resisting Glass Prismatic Refractor.

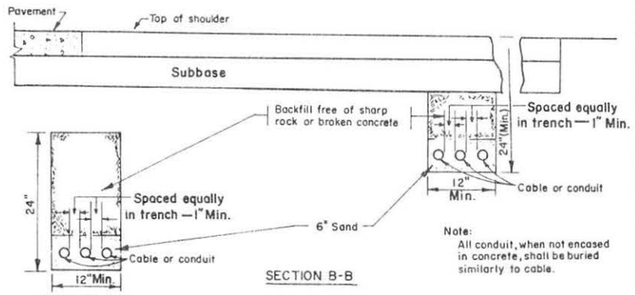
(2) Luminaires to accommodate 250, 400, 700 & 1000-Watt Mercury Lamps, in approximate horizontal position.

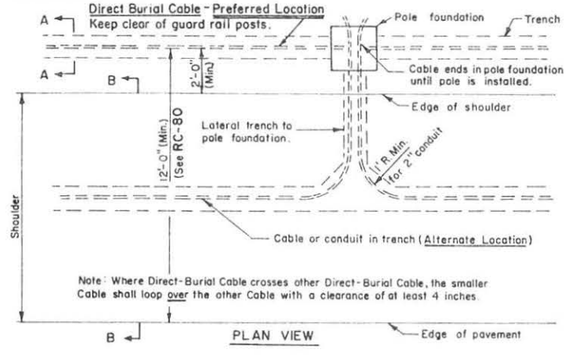
(3) Focal distance or light center varies from 1 1/2 to 2 ft.- Refer to RC-83

TYPICAL TERMINAL POLE EQUIPMENT ARRANGEMENT FOR POWER SUPPLY

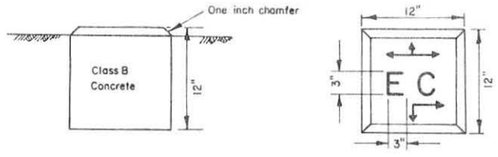


DIRECT-BURIAL CABLE & CONDUIT



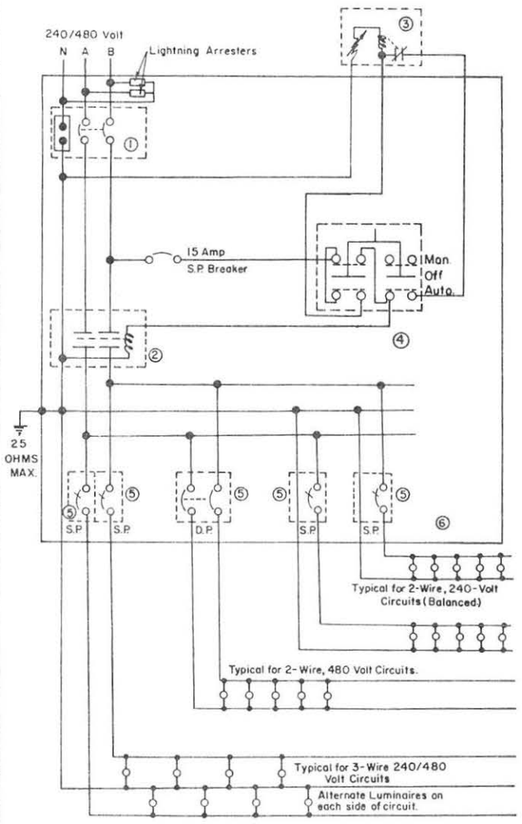


CABLE & CONDUIT MARKER



Note: Directional arrows as required. Arrow and letter depth 1/2 inch.

CONTROL CABINET SCHEMATIC WIRING DIAGRAM (TYPICAL)

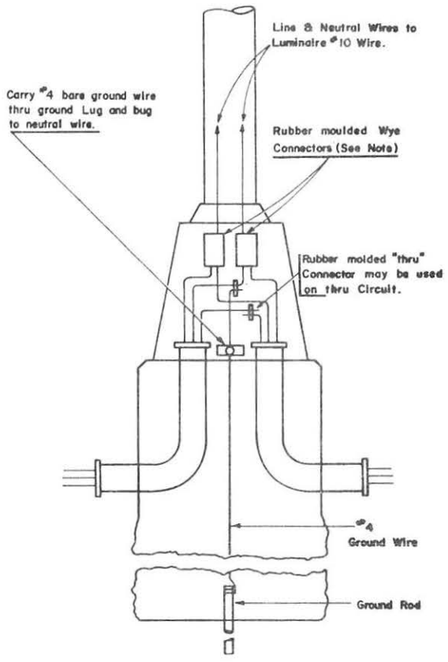


M- Manual
A- Automatic
1- Main Circuit Breaker
2- Control Contactor
3- Photoelectric Cell
4- Selector Switch
5- Distribution Breakers
6- Control Cabinet
SP- Single Pole
DP- Double Pole

Notes:
1- Items 2, 3, & 4 not required if each Luminaire has photoelectric control element.
2- Item 5 not required for single circuit.

DETAIL A

WIRING DETAIL TRANSFORMER BASE



NOTE: Rubber molded connectors optional for use in anchor base poles.

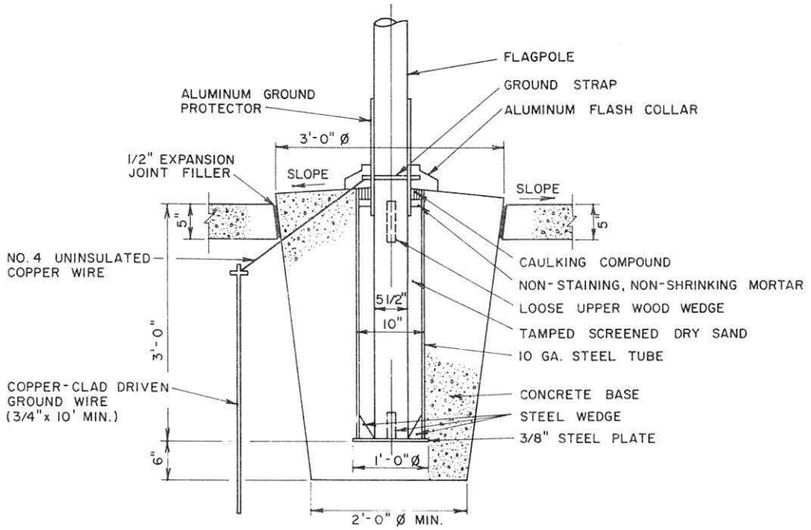
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING

LIGHTING & ELECTRICAL DETAILS

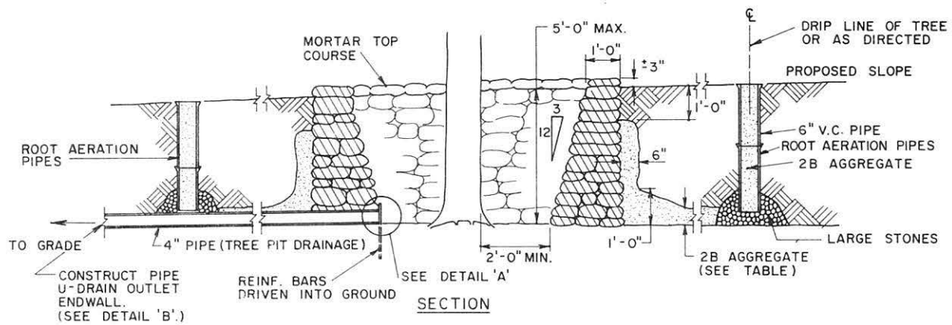
Recommended Dec. 1, 1971 R R Musser Location & Design Engineer	Approved Dec. 1, 1971 W. J. Reaser Deputy Chief Hwy. Engr.	Sht. 1 Of 1 RC-84

VOID



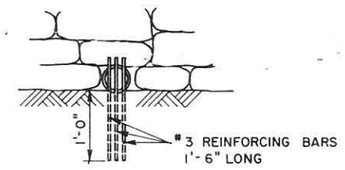
FLAGPOLE SETTING DETAIL

NO SCALE

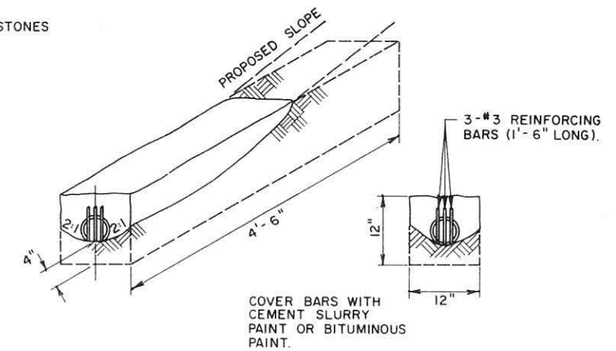


SECTION

TYPE A TREE WALL

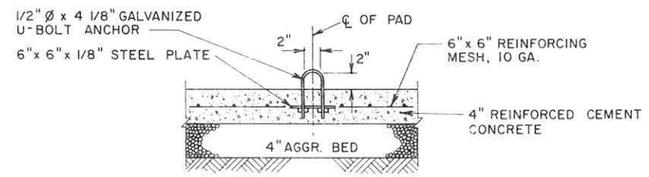


DETAIL 'A'

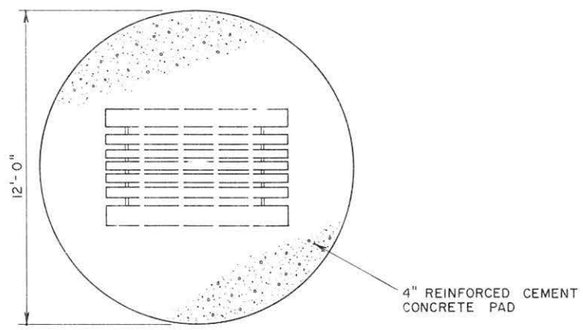


4" PIPE UNDERDRAIN OUTLET ENDWALL

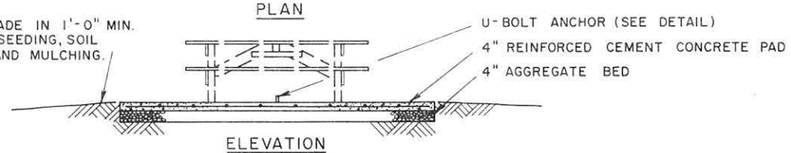
DETAIL 'B'



DETAIL OF U-BOLT ANCHOR



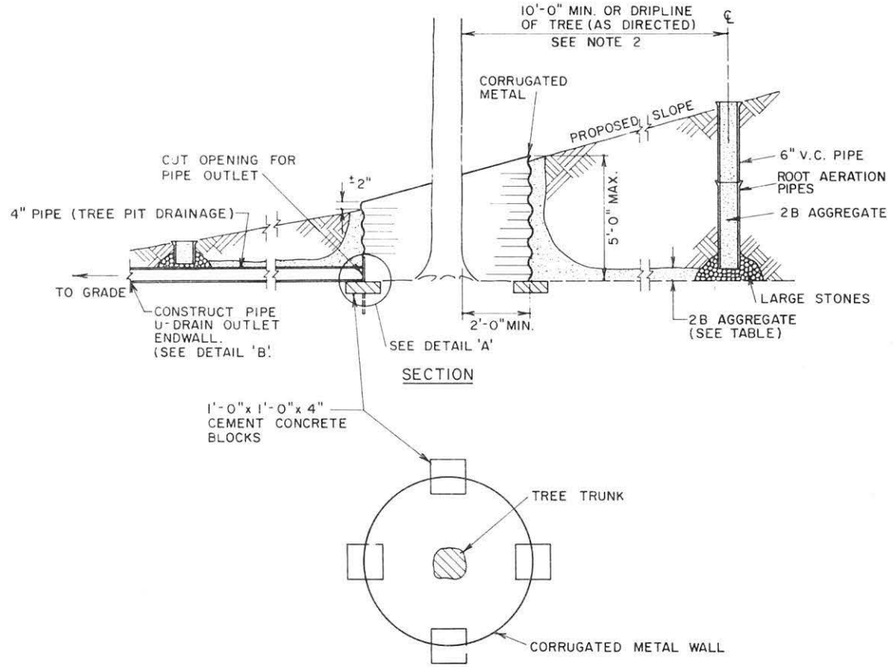
PLAN



ELEVATION

TABLE PAD

NO SCALE



SECTION

PLAN VIEW

TYPE C TREE WALL

CORRUGATED METAL

NOTES

1. TREE GRATES SHALL BE USED WHERE DESIGNATED.
2. TREE DRIPLINE SHALL BE DEFINED AS THE FURTHEREST EXTENSION OF THE TREES BRANCHES.
3. NON-CIRCULAR TYPE A TREE WALLS MAY BE ARRANGED AS DIRECTED IN ORDER TO PROTECT CLOSE GROUPINGS OF TREES OR TREE ROOT AREAS NOT ENTIRELY COVERED WITH EMBANKMENT.

AGGREGATE LAYER TABLE

AGGREGATE LAYER	AMOUNT OF EMBANKMENT AROUND TREE
NONE	LESS THAN 6 INCHES
4 INCHES	6 INCHES TO 1 FOOT
6 INCHES	1 FOOT TO 3 FEET
12 INCHES	GREATER THAN 3 FEET

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TREE WALLS & MISC. DETAILS FOR ROADSIDE REST AREAS

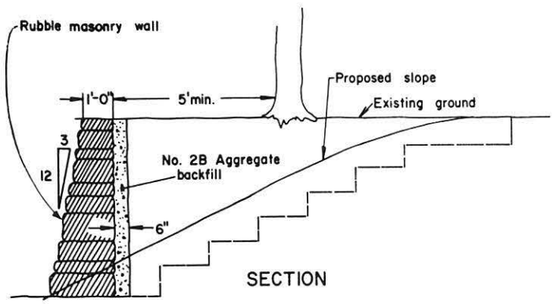
Recommended June 1, 1976
B.D. Rowshie
Director, Bureau of Design

Approved June 1, 1976
Robert R. Mercer
Deputy Chief Hwy. Engr.

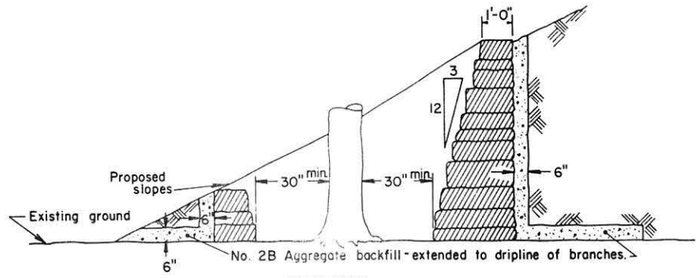
Sht. 1 Of 1

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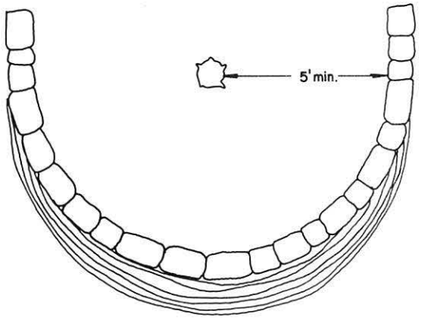
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FINAL BY



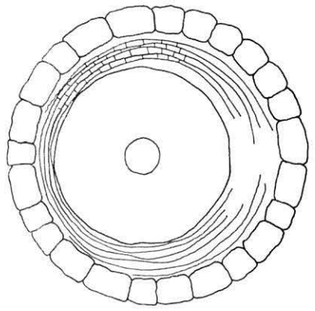
SECTION



SECTION



PLAN

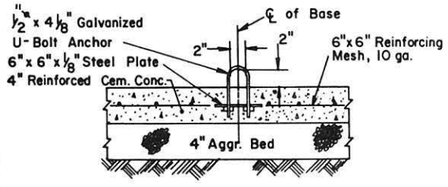


PLAN

TYPE A TREE WALL

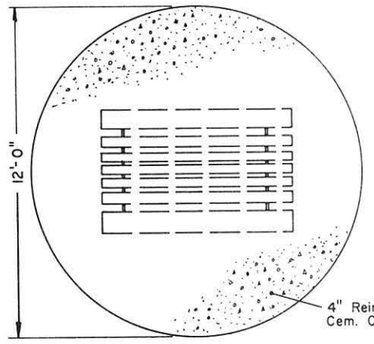
PLAIN RUBBLE MASONRY

CUT SECTION

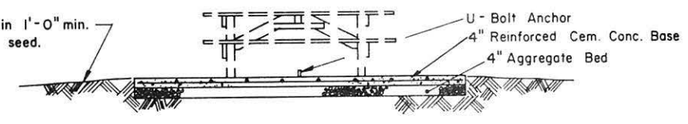


Detail of U-Bolt Anchor

FILL SECTION

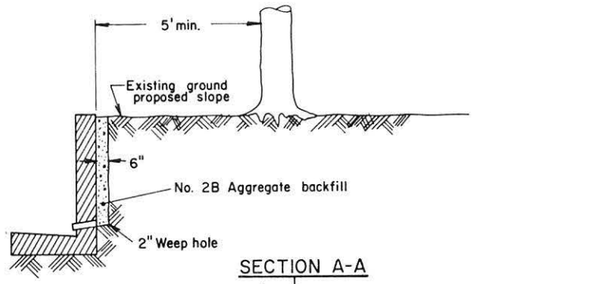


PLAN

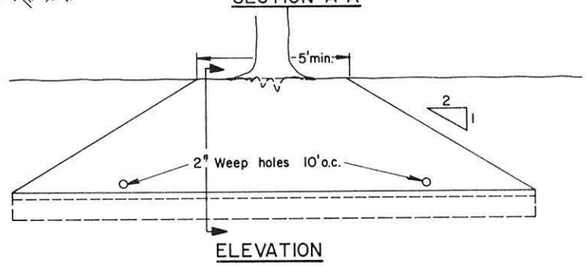


ELEVATION

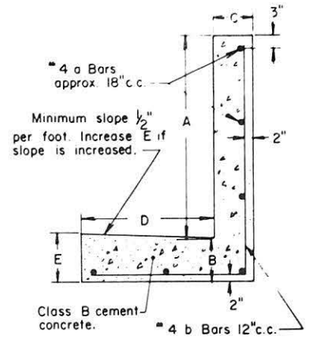
TABLE PAD



SECTION A-A



ELEVATION

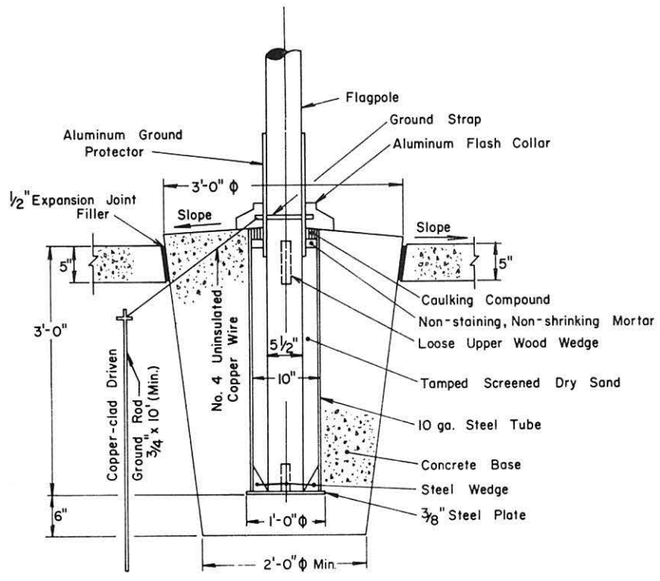


SECTION A-A

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3'-0"	10"	9"	1'-9"	1'-0⅝"	5	5'-6"
4'-0"	10"	10"	2'-2"	1'-1¼"	6	7'-0"
5'-0"	12"	11"	2'-7"	1'-3⅞"	7	8'-8"

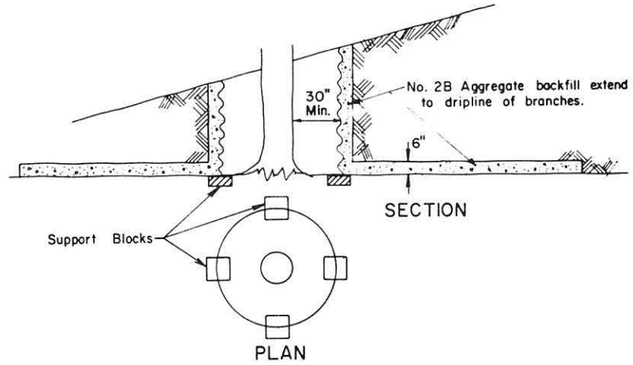
TYPE B TREE WALL

CLASS B CEMENT CONCRETE



FLAGPOLE SETTING DETAIL

NO SCALE



SECTION

PLAN

TYPE D TREE WALL

METAL PLATE PIPE

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TREE WALLS & MISC. DETAILS FOR ROADSIDE REST AREAS

Recommended Mar. 7, 1973
Director, Bureau of Design

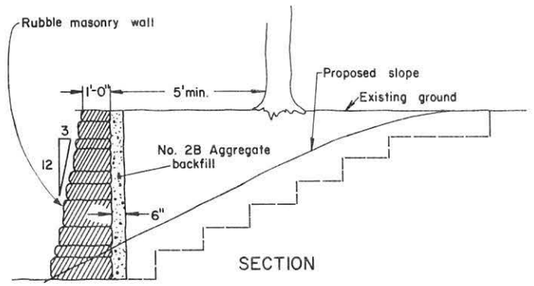
Approved Mar. 7, 1973
Deputy Chief Hwy. Engr.

Sht. 1 Of 1

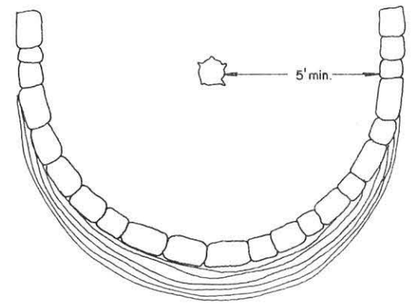
RC-90

VOID

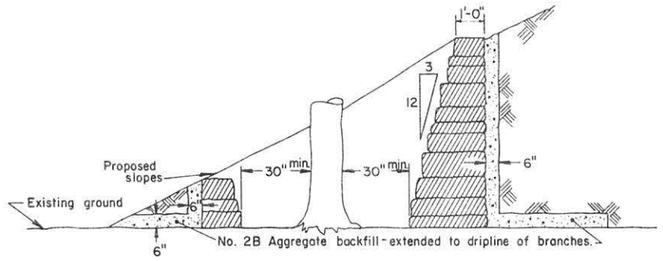
FORM 4237 REV 3-41



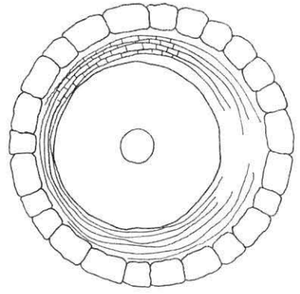
SECTION



PLAN



SECTION

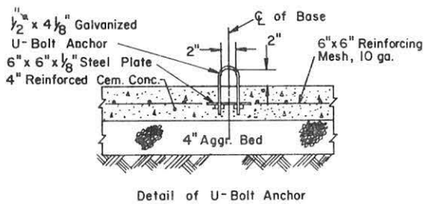


PLAN

TYPE A TREE WALL

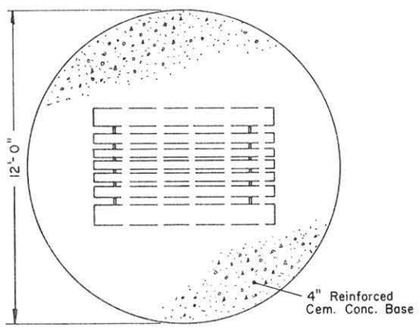
PLAIN RUBBLE MASONRY

CUT SECTION

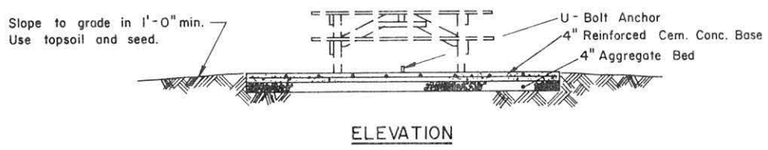


Detail of U-Bolt Anchor

FILL SECTION

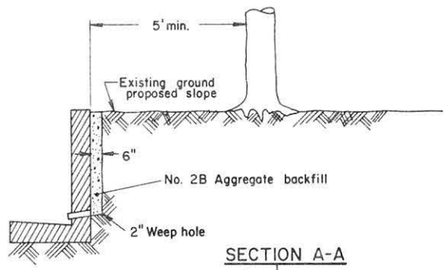


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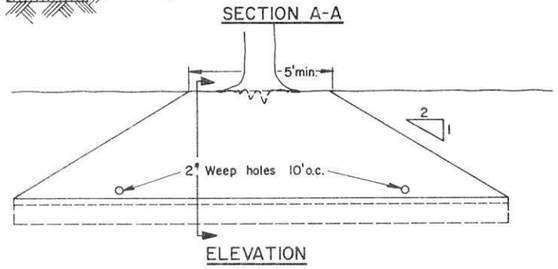


ELEVATION

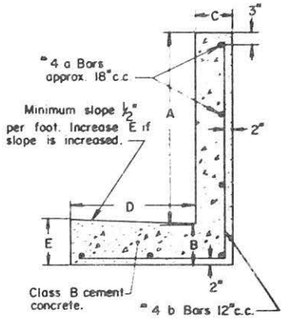
TABLE PAD



SECTION A-A



ELEVATION

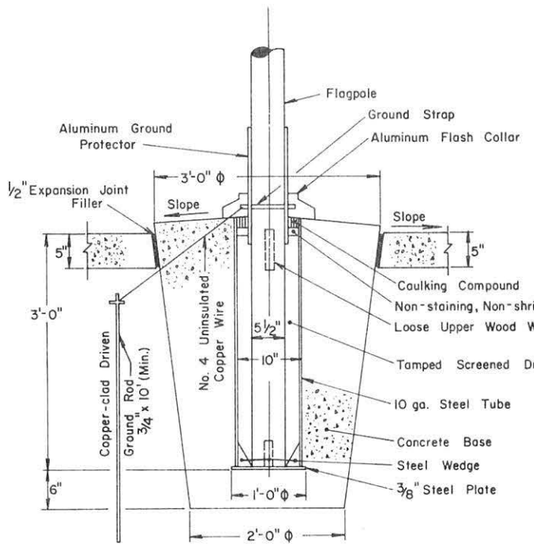


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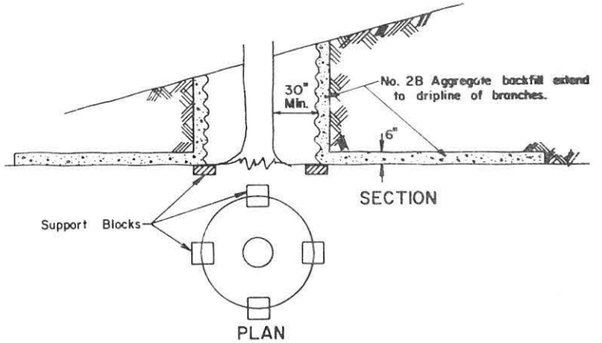
TYPE B TREE WALL

CLASS B CEMENT CONCRETE



FLAGPOLE SETTING DETAIL

NO SCALE



SECTION

PLAN

TYPE D TREE WALL

METAL PLATE PIPE

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TREE WALLS & MISC. DETAILS FOR ROADSIDE REST AREAS

Recommended Dec. 1, 1971
R.R. Thorn
Location & Design Engineer

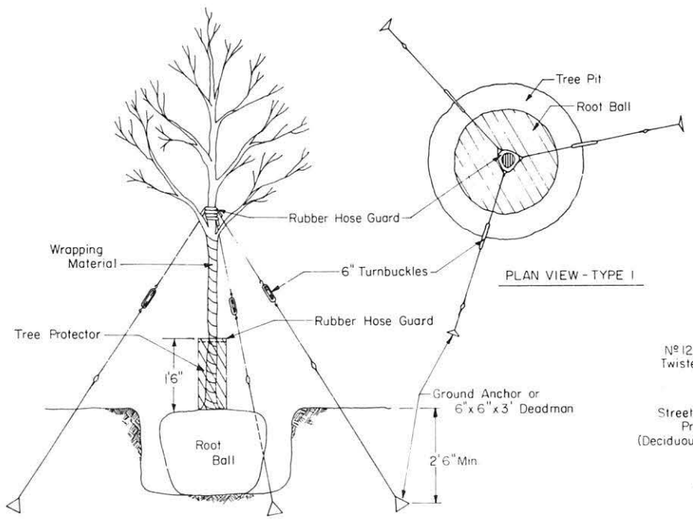
Approved Dec. 1, 1971
W.G. Reese
Deputy Chief Hwy. Engr.

Sht 1 of 1

RC-90

VOID

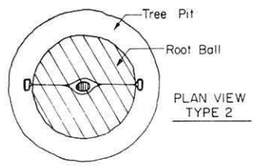
BRACING DETAILS



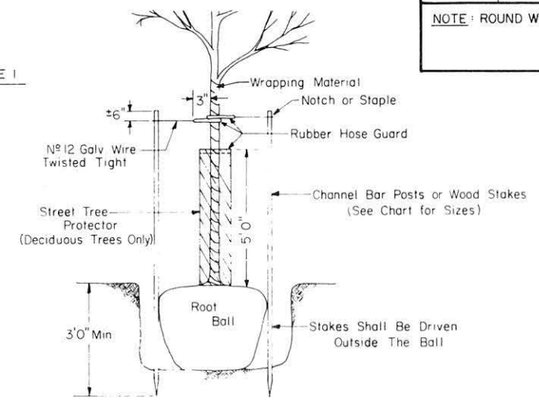
PLAN VIEW - TYPE 1

TYPE 1 BRACING

DECIDUOUS TREES OVER 3½" CALIPER
EVERGREEN TREES OVER 8' HIGH
(NOT FOR STREET TREES, SLOPE PLANTING, OR REST AREAS)



PLAN VIEW TYPE 2

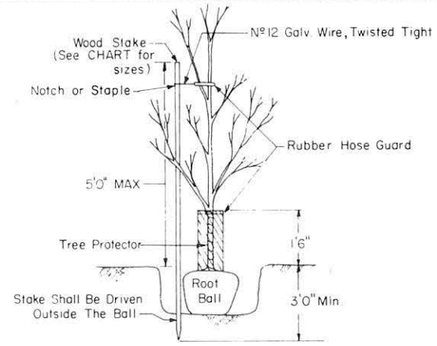


TYPE 2 BRACING

DECIDUOUS TREES 1½" TO 3½" CALIPER
EVERGREEN TREES 4' TO 8' HIGH
(FOR ALL STREET TREES & REST AREAS OVER 1½" CALIPER)

TABULATION OF BRACE POST REQUIREMENTS					
TYPE OF BRACING	SIZE OF MATERIAL DECIDUOUS	SIZE OF MATERIAL EVERGREEN	MIN. LENGTH	BRACE POST TYPE	REQ. SIZE (SEE NOTE)
2	———	4'-6' HT.	6'6"	CHANNEL BAR	1¼ lb. POST H2-1
				WOOD	2"x2" FULL DIM.
2	1½" – 2½" CAL.	6'-8' HT.	8'0"	CHANNEL BAR	3 lb. POST H2-2
				WOOD	2"x2" FULL DIM.
2	2½" – 3½" CAL.	———	11'0"	CHANNEL BAR	3 lb. POST H2-2
				WOOD	3"x3" FULL DIM.
2	OVER 3½" CAL.	———	12'6"	CHANNEL BAR	3 lb. POST H2-3
				WOOD	3"x3" FULL DIM.
3	5' HT.-1½" CAL.	———	8'0"	WOOD	2"x2" FULL DIM.

NOTE: ROUND WOOD STAKES MAY BE SUBSTITUTED AS FOLLOWS:
2"x2" = 2" DIA. ROUND STAKE
3"x3" = 3" DIA. ROUND STAKE



TYPE 3 BRACING

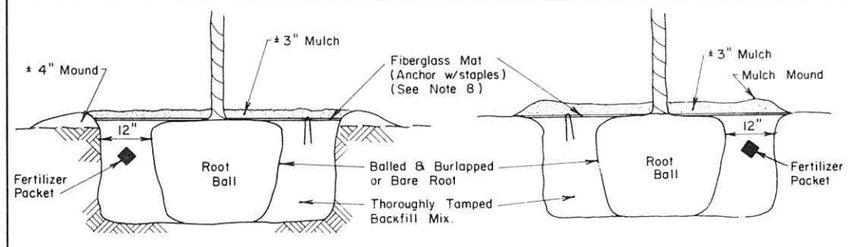
DECIDUOUS TREES
5' HIGH TO 1½" CALIPER

GENERAL NOTES

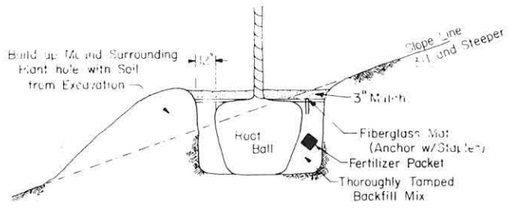
1. MOUNDS SHALL BE USED FOR ALL TREE PLANTING EXCEPT FOR REST AREAS AND OTHER HIGH MAINTENANCE AREAS, AS DIRECTED.
   MOUNDS SHALL CONSIST OF MATERIAL FROM THE EXCAVATION, FREE OF ALL STONES AND FOREIGN MATERIAL TWO INCHES (2") OR LARGER IN ANY DIMENSION.
2. WHERE MOUNDS ARE USED, THE TOP OF THE ROOT BALL SHALL BE SET ONE TO TWO INCHES (1"-2") HIGHER THAN THE SURROUNDING GROUND.
3. GUYS SHALL BE ATTACHED TO THE TREE ABOVE SUBSTANTIAL BRANCHES AT A POINT NOT LESS THAN ONE-HALF (½) THE HEIGHT OF THE TREE. THE DISTANCE ON THE GROUND FROM THE TREE TO THE GUY SHALL BE APPROXIMATELY EQUAL TO ONE-HALF (½) THE HEIGHT OF THE TREE FOR TYPE 1 BRACING.
4. TREE PROTECTOR DIAMETER SHALL BE AS FOLLOWS:
   3" FOR TREES UNDER 2" CALIPER
   6" FOR TREES 2" TO 4" CALIPER
   12" FOR TREES OVER 4" CALIPER
   TOP OF PROTECTOR SHALL BE LINED WITH A RUBBER HOSE GUARD.
5. BACKFILL MIX IN WET SOIL CONDITIONS, AS DETERMINED BY THE DEPARTMENT, SHALL NOT CONTAIN PEAT.
6. FIBERGLASS MAT FOR TREE PITS SHALL BE ANCHORED WITH A MINIMUM OF THREE (3) U-SHAPED STAPLES, EQUALLY SPACED AROUND THE TREE.
7. ROOT CONTACT FERTILIZER PACKETS SHALL BE EQUALLY SPACED AROUND THE BALL OR ROOTS IN THE QUANTITY SHOWN ON THE CHART. PACKETS SHALL BE SET 6" TO 8" DEEP.
8. FIBERGLASS MAT SHALL BE ELIMINATED FROM THE PIT FOR TREES TO BE PLANTED IN UNMOWED AREAS. MULCHING SHALL CONSIST OF CRUSHED NO. 2 GRADATION AGGREGATE.

REFERENCE: FORM NO. 408/76 - SECTIONS 805, 806, 808, 703 AND 941.

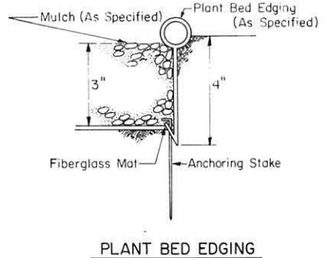
PLANTING DETAILS



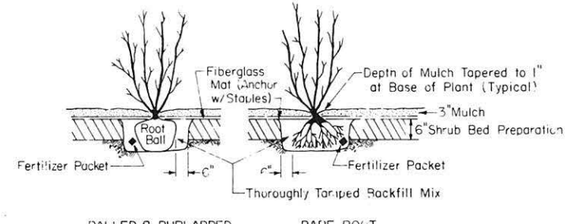
TREE PLANTING DETAILS
(See General Notes)



SLOPE PLANTING
DECIDUOUS AND EVERGREEN TREES
(Use Type 2 or Type 3 Bracing As Req'd)



PLANT BED EDGING



BALLED & BURLAPPED OR CONTAINER — BARE ROOT

SHRUB PLANTING AND
SHRUB BED PREPARATION

4 OZ, 8 YR. ROOT CONTACT FERTILIZER PACKET SCHEDULE	
EVERGREEN AND DECIDUOUS TREES	NUMBER OF PACKETS
8'-10' HT. AND WHIPS	1
1"-2" CAL.	2
2"-2½" CAL.	3
2½"-3" CAL.	4
3"-3½" CAL.	4
3½"-4" CAL.	5
4"-5" CAL.	6
FLOWERING TREES	NUMBER OF PACKETS
5'-10' HT.	2
SHRUBS	NUMBER OF PACKETS
12"-24" SPD. OR HT.	1
24"-36" SPD. OR HT.	2
3'-5' HT..	3
EVERGREEN TRANSPLANTS	NUMBER OF PACKETS
18"-30" HT.	1
18"-30" HT. REFORESTATION, TYPE 'B'	1

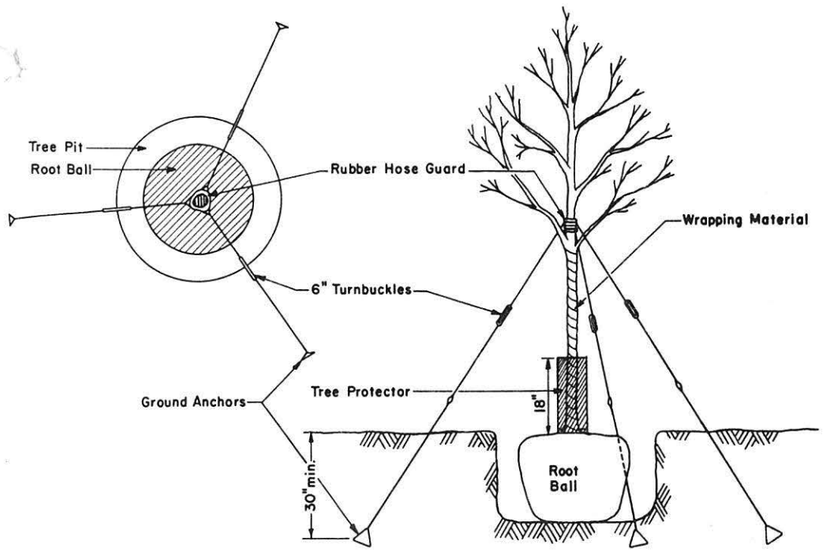
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BRACING & PLANTING DETAILS

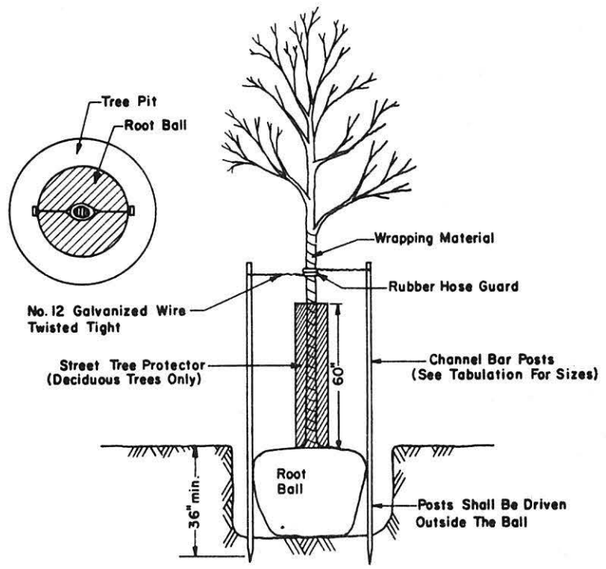
Recommended June 1, 1976
B.D. Rowalis
Director, Bureau of Design

Approved June 1, 1976
Robert R. Mercer
Deputy Chief Hwy. Engr.

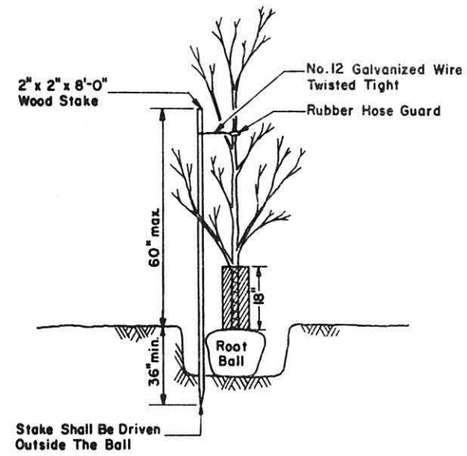
Sht. 1 of 1
RC-91



TYPE I BRACING
DECIDUOUS TREES OVER 3½" CALIPER
EVERGREEN TREES OVER 8' HIGH
(NOT FOR STREET TREES, SLOPE PLANTING, OR REST AREAS)

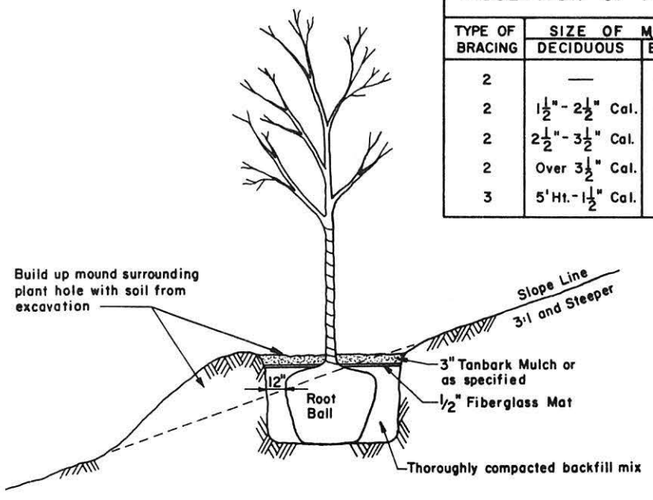


TYPE 2 BRACING
DECIDUOUS TREES 1½" TO 3½" CALIPER
EVERGREEN TREES 4' TO 8' HIGH
(USE FOR ALL STREET TREES & REST AREAS OVER 1½" CALIPER)

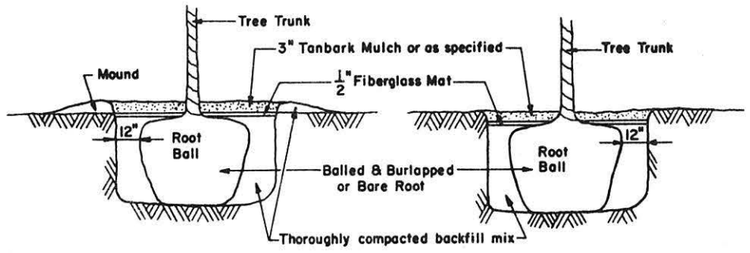


TYPE 3 BRACING
DECIDUOUS TREES
5' HIGH TO 1½" CALIPER

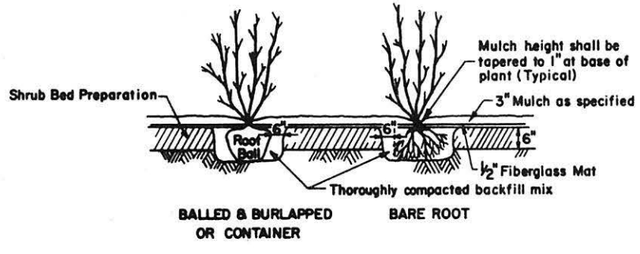
TABULATION OF POST REQUIREMENTS			
TYPE OF BRACING	SIZE OF MATERIAL DECIDUOUS	SIZE OF MATERIAL EVERGREEN	LENGTH & TYPE
2	—	4' - 6' Ht.	6'-6" STEEL
2	1½"- 2½" Cal.	6' - 8' Ht.	8'-0" STEEL
2	2½"- 3½" Cal.	—	11'-0" STEEL
2	Over 3½" Cal.	—	12'-6" STEEL
3	5'Ht.- 1½" Cal.	—	8'-0" WOOD



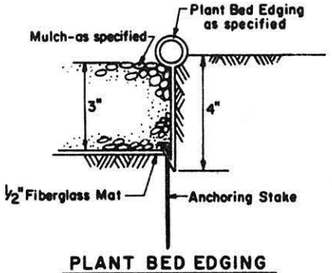
SLOPE PLANTING
DECIDUOUS AND EVERGREEN TREES



TREE PLANTING DETAILS
(SEE GENERAL NOTES)



SHRUB PLANTING and
SHRUB BED PREPARATION



PLANT BED EDGING

GENERAL NOTES:

1. COMPACTED BACKFILL MIX MOUNDS SHALL BE USED FOR ALL TREE PLANTING EXCEPT FOR REST AREAS AND OTHER HIGH MAINTENANCE AREAS AS DIRECTED.
2. WHERE BACKFILL MIX MOUNDS ARE USED, THE TOP OF THE ROOT BALL SHALL BE SET LEVEL WITH THE SURROUNDING GROUND.
3. GUYS SHALL BE ATTACHED TO THE TREE ABOVE SUBSTANTIAL BRANCHES AT A POINT NOT LESS THAN ONE-HALF THE HEIGHT OF THE TREE. DISTANCE ON THE GROUND FROM THE TREE TO THE GUY SHALL BE APPROX. EQUAL TO ½ THE HEIGHT OF THE TREE FOR TYPE I BRACING.
4. TREE PROTECTOR DIAMETER SHALL BE:
   3" FOR TREES UNDER 2" CALIPER
   6" FOR TREES FROM 2"- 4" CALIPER
   12" FOR TREES OVER 4" CALIPER
   TOP OF PROTECTOR SHALL BE LINED WITH RUBBER HOSE GUARD.

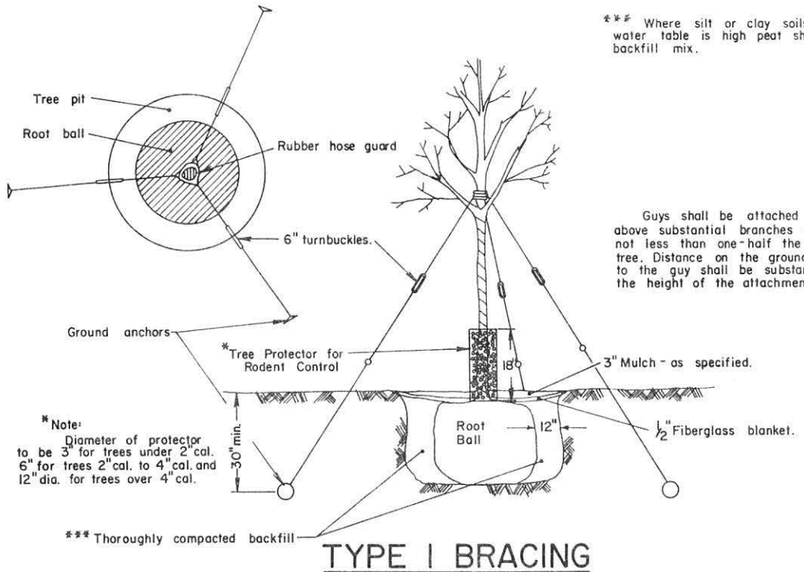
Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SHRUB & TREE BRACING AND PLANTING DETAILS

Recommended May 1, 1974	Approved May 1, 1974	Sht. 1 Of 1
B.D. Rosenbaum	Robert P. Maser	RC-91
Director, Bureau of Design	Deputy Chief Hwy Engr.	

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FORM 4237 REV 3-61

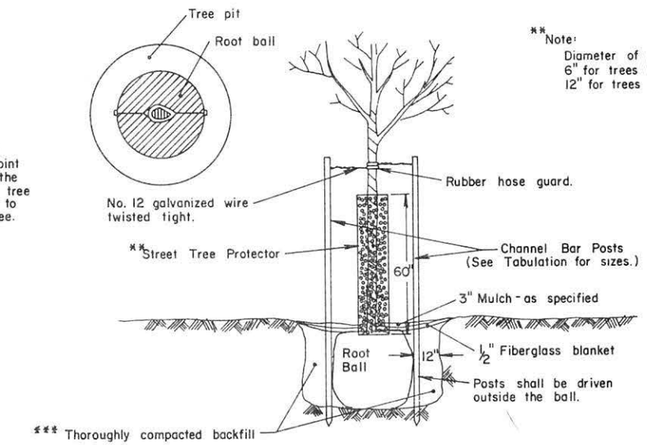


*** Where silt or clay soils are encountered or the water table is high peat shall not be used in the backfill mix.

Guys shall be attached to the tree above substantial branches and at a point not less than one-half the height of the tree. Distance on the ground from the tree to the guy shall be substantially equal to the height of the attachment to the tree.

TYPE 1 BRACING

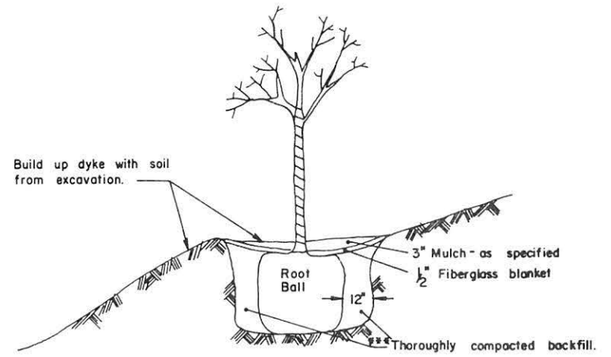
FOR DECIDUOUS TREES OVER 3 1/2" CALIPER AND EVERGREEN TREES OVER 8' HIGH.
(NOT RECOMMENDED FOR STREET TREES OR IN REST AREAS.)



**Note:
Diameter of protector to be 6" for trees under 4" cal. and 12" for trees over 4" cal.

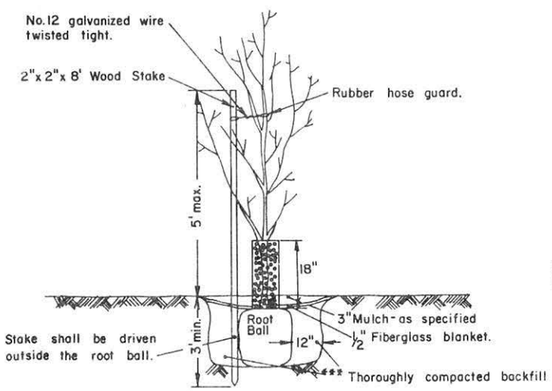
TYPE 2 BRACING

FOR DECIDUOUS TREES 1 1/2" TO 3 1/2" CALIPER AND EVERGREEN TREES 4' TO 8' HIGH.



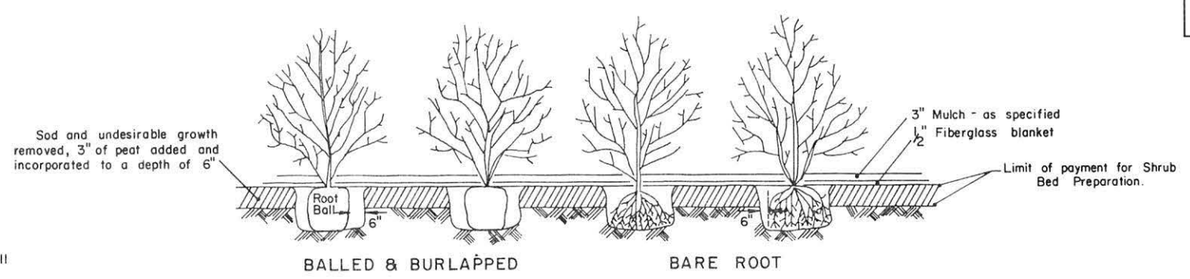
SLOPE PLANTING

DECIDUOUS AND EVERGREEN TREES
(GUYING AND PROTECTOR AS REQUIRED)



TYPE 3 BRACING

FOR DECIDUOUS TREES 5' HIGH TO 1 ½" CALIPER.



SHRUB BED PREPARATION

TABULATION OF POST REQUIREMENTS

TYPE OF BRACING	SIZE OF MATERIAL		LENGTH & TYPE
	DECIDOUS	EVERGREEN	
2	-	4' - 6' ht.	6' - 6" Steel
2	1 1/2" - 2 1/2" Cal.	6' - 8' ht.	8' - 0" Steel
2	2 1/2" - 3 1/2" Cal.	-	11' - 0" Steel
2	Over 3 1/2" Cal.	-	12' - 6" Steel
3	5' ht. - 1 1/2" Cal.	-	8' - 0" Wood

Note: TYPE 2 BRACING is recommended for all street trees and all rest area trees over 1 1/2" caliper.

Commonwealth of Pennsylvania
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TREE AND SHRUB PLANTING DETAILS

Recommended	Approved	Sht.
Dec. 1, 1971	Dec. 1, 1971	1 Of 1
R.R. Musser	W.J. Raver	
Location & Design Engineer	Deputy Chief Hwy. Engr.	RC-91

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