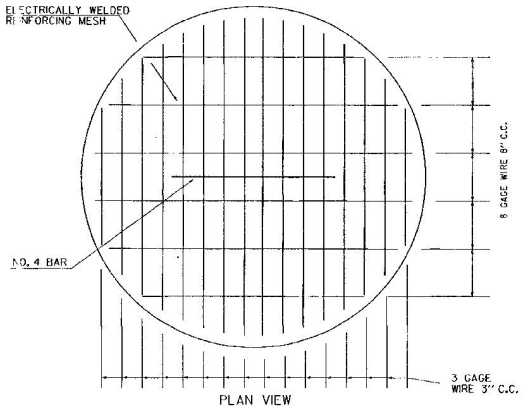
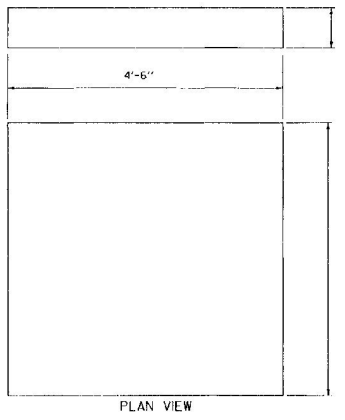
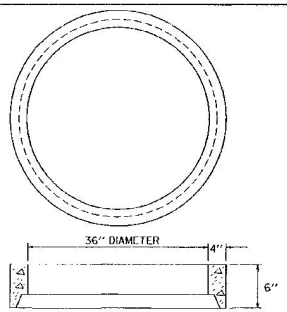


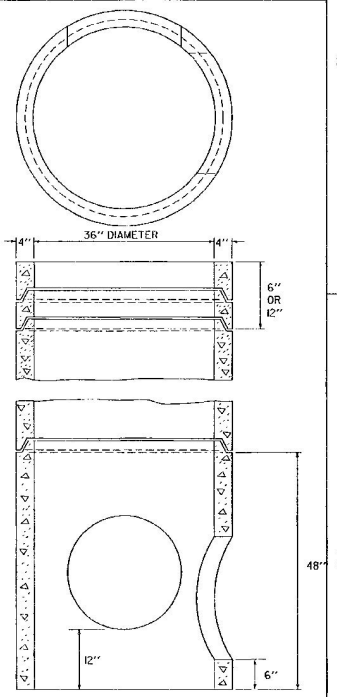

PRECAST REINFORCED CONCRETE BASE



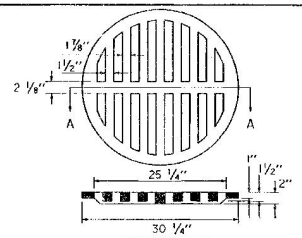

DROP INLET PIPE BASE CAST IN PLACE
( CONCRETE CONFORMING TO STRUCTURAL CONCRETE CLASS B )



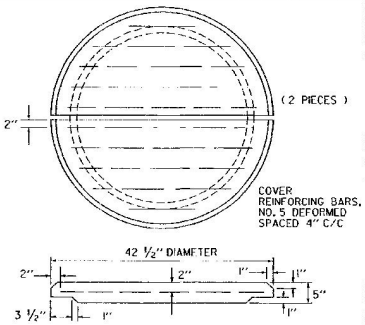

PRECAST REINFORCED CONCRETE PIPE RISER



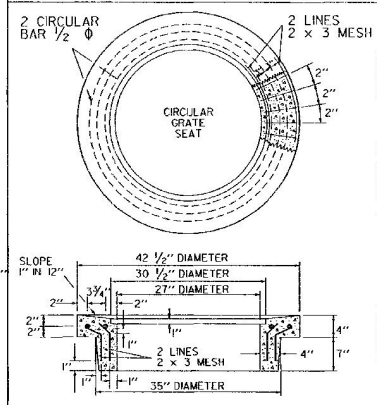

PIPE SECTIONS FOR DROP INLETS



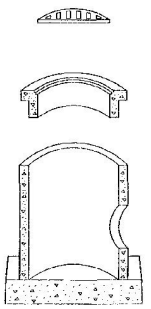

SECTION A-A
CAST IRON GRATE



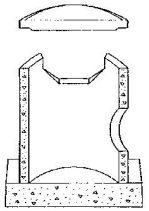

PRECAST REINFORCED CONCRETE COVER



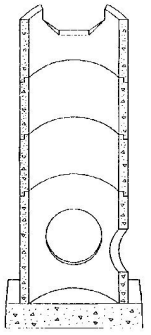

PRECAST REINFORCED CONCRETE RING FOR GRATE



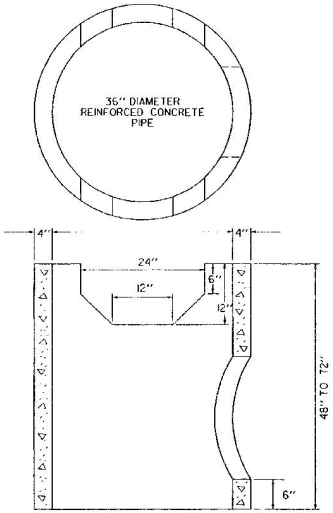
PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CAST IRON GRATE



PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CONCRETE COVER



PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH THROATED RISER




PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH THROAT

NOTE :
THESE DROP INLETS SHOULD NOT BE USED IN AREAS OF VEHICULAR TRAFFIC OR IN BENCHES ON CUT SLOPES.

REVISIONS AND CORRECTIONS

DEC. 6, 1971 - ORIGINAL APPROVAL DATE
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

Gordon S. MacMillan P.E.
DIRECTOR OF ENGINEERING

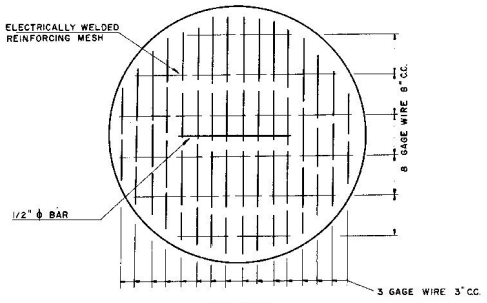
PE
DESIGN ENGINEER

**PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CAST IRON GRATE**

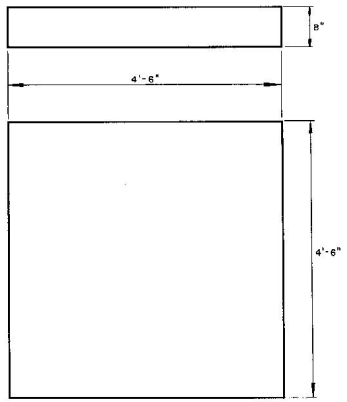
**PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CONCRETE COVER**

VERMONT AGENCY OF TRANSPORTATION

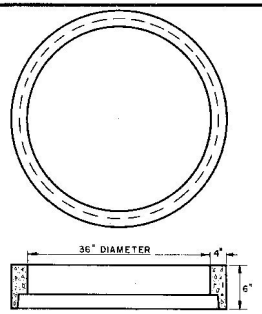
# STANDARD D-1



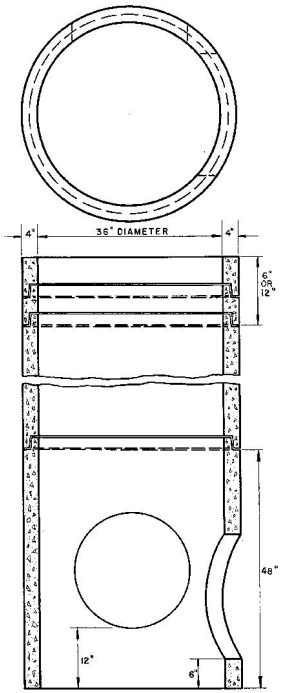

PRECAST REINFORCED CONCRETE BASE



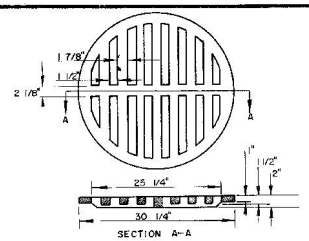

DROP INLET PIPE BASE CAST IN PLACE
(CONCRETE CONFORMING TO CONCRETE CLASS B, ITEM 401-B)



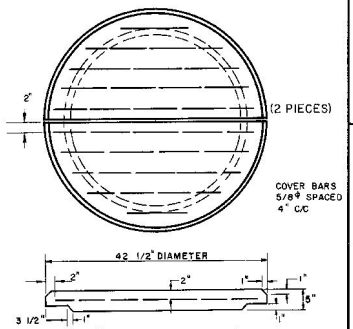

PRECAST REINFORCED CONCRETE PIPE RISER



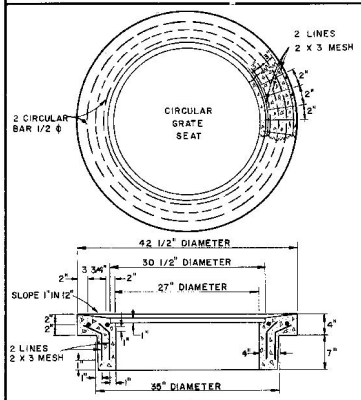

PIPE SECTIONS FOR DROP INLETS



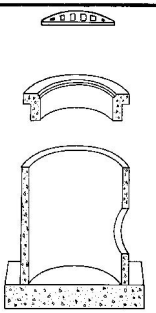

CAST IRON GRATE



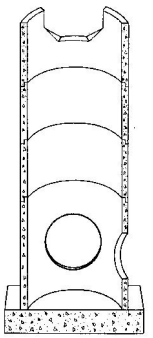

PRECAST REINFORCED CONCRETE COVER



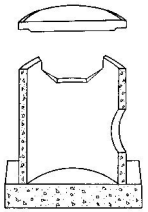

PRECAST REINFORCED CONCRETE RING FOR GRATE



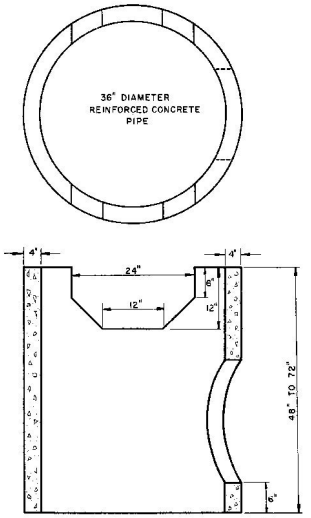
PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CAST IRON GRATE



PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH THROATED RISER



PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CONCRETE COVER




PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CONCRETE COVER

NOTE: DROP INLET-TYPE I, ITEM 530, SHOULD NOT BE USED IN AREAS OF VEHICULAR TRAFFIC.
IN HEAVY CUT SLOPES, PREFERENCE SHOULD BE GIVEN TO PRECAST DROP INLETS OVER HEADWALLS

REVISIONS AND CORRECTIONS

THICKNESS OF PIPE SECTIONS FOR CATCH BASINS & PIPE RISER CHANGED FROM 3 1/4" TO 4" APRIL 26, 1963
MAR 1, 1965 - REVISED TO MEET THE 1964 SPECIFICATIONS
AUG. 1, 1966 - CAST IRON GRATE CHANGED

APPROVED DATE MARCH 10, 1965

C. D. Bishop
CHIEF ENGINEER

L. M. Lane
HIGHWAY ENGINEER

E. W. Hickney
CONSTRUCTION ENGINEER

# DROP INLET - TYPE I-A

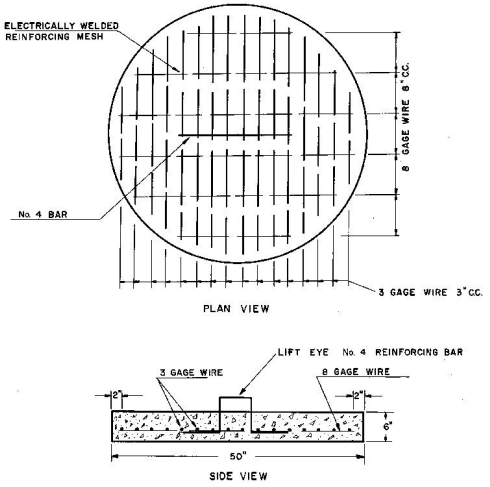
(PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CAST IRON GRATE) ITEM 530-A

# DROP INLET - TYPE I-B

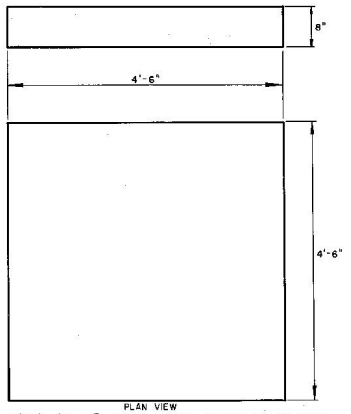
(PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CONCRETE COVER) ITEM 530-B

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

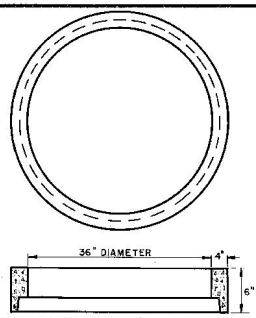
D - 1



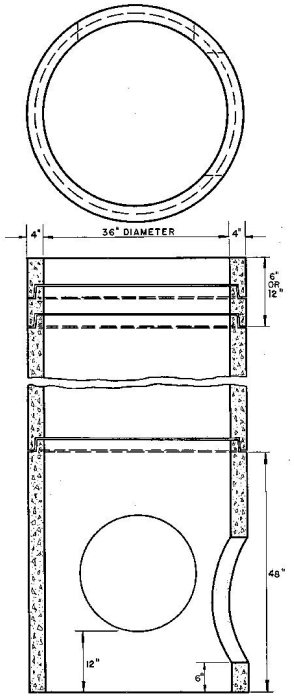

PRECAST REINFORCED CONCRETE BASE



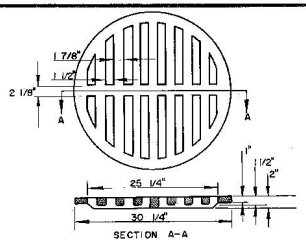

DROP INLET PIPE BASE CAST IN PLACE
(CONCRETE CONFORMING TO STRUCTURAL CONCRETE CLASS B



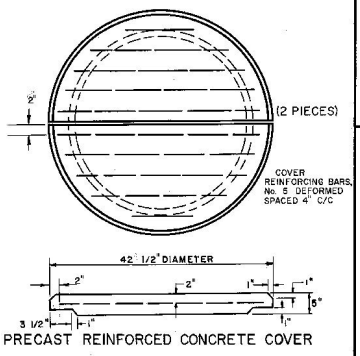

PRECAST REINFORCED CONCRETE PIPE RISER



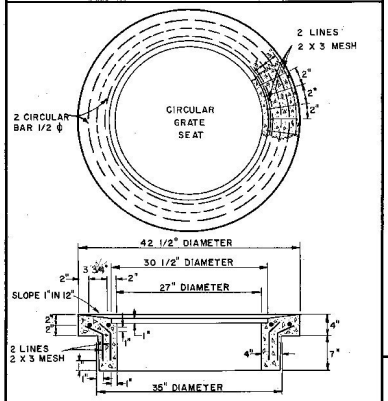

PIPE SECTIONS FOR DROP INLETS



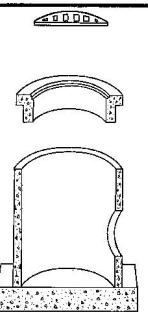

CAST IRON GRATE



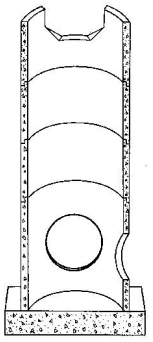

PRECAST REINFORCED CONCRETE COVER



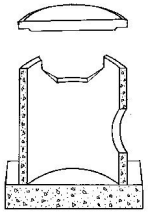

PRECAST REINFORCED CONCRETE RING FOR GRATE



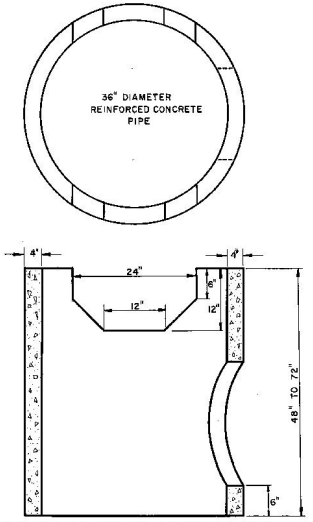
PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CAST IRON GRATE



PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH THROATED RISER



PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CONCRETE COVER




PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH THROAT

NOTE: THESE DROP INLETS SHOULD NOT BE USED IN AREAS OF VEHICULAR TRAFFIC OR IN BENCHES ON CUT SLOPES

REVISIONS AND CORRECTIONS

APPROVED

DATE Dec 6, 1971

R. W. Arnold
CHIEF ENGINEER

E. S. Stickney
ASST. CHIEF ENGINEER

R. M. Lane
HIGHWAY ENGINEER

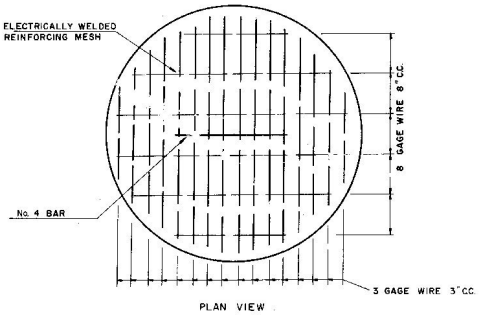
DRAWN R.F.N.
TRACED TROMBLEY

PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CAST IRON GRATE

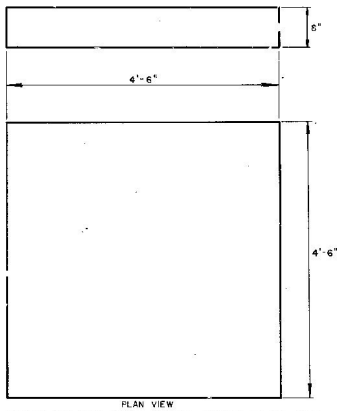
PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CONCRETE COVER

VERMONT AGENCY OF TRANSPORTATION

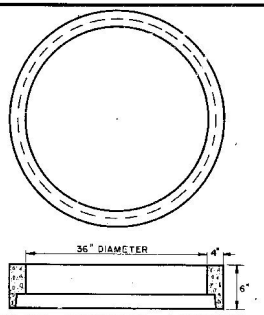
STANDARD
D-1



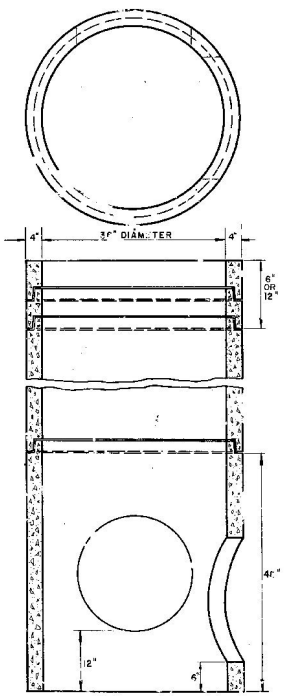

PRECAST REINFORCED CONCRETE BASE



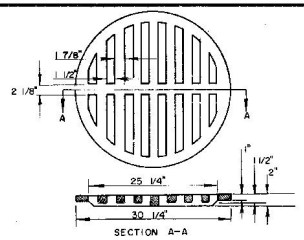

DROP INLET PIPE BASE CAST IN PLACE
(CONCRETE CONFORMING TO STRUCTURAL CONCRETE CLASS B



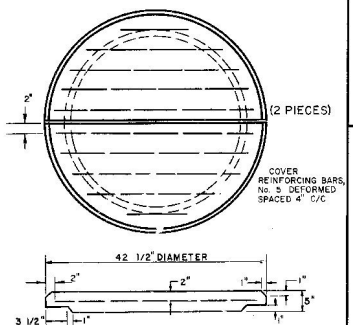

PRECAST REINFORCED CONCRETE PIPE RISER



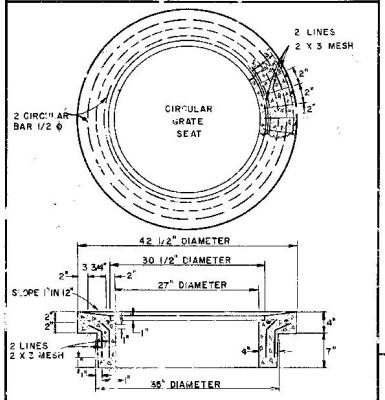

PIPE SECTIONS FOR DROP INLETS



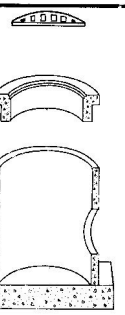

CAST IRON GRATE




PRECAST REINFORCED CONCRETE COVER

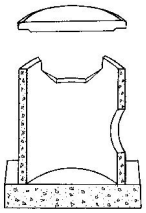



PRECAST REINFORCED CONCRETE RING FOR GRATE

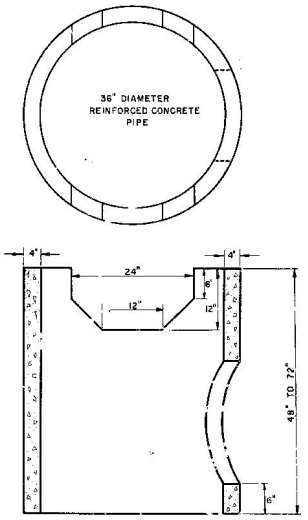


PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CAST IRON GRATE

PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH THROATED RISER



PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CONCRETE COVER




PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH THROAT

NOTE: THESE DROP INLETS SHOULD NOT BE USED IN AREAS OF VEHICULAR TRAFFIC OR IN DENCHES ON CUT SLOPES

REVISIONS AND CORRECTIONS

APPROVED DATE Dec 6, 1971

P. N. Arnold
CHIEF ENGINEER

E. H. Hickney
ASST. CHIEF ENGINEER

R. M. Lane
HIGHWAY ENGINEER

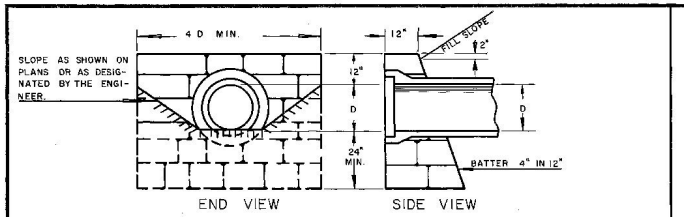
DRAWN R.F.N.
TRACED TROMBLEY

PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CAST IRON GRATE

PRECAST REINFORCED CONCRETE PIPE DROP INLET WITH CONCRETE COVER

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D - 1

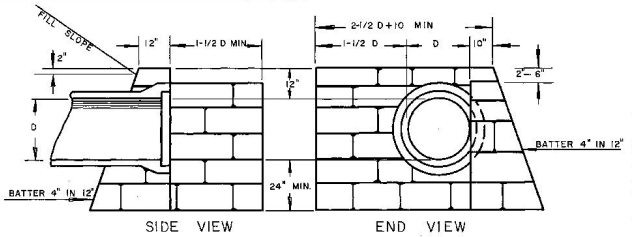



QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY, ITEM 411

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 1.0 | 1.3 | 1.8 | 2.7 | 3.5 | 4.9 | 6.4 | 8.0 | 10.0 | 12.3 |

C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE

## STRAIGHT HEADWALL

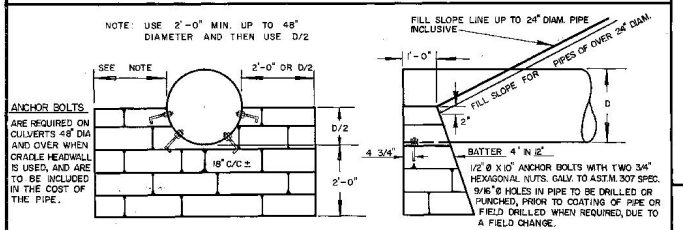



QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY, ITEM 411

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" |
|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 1.3 | 1.7 | 2.1 | 3.2 | 4.1 | 5.5 | 7.1 | 8.9 |

C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

## "L" TYPE HEADWALL

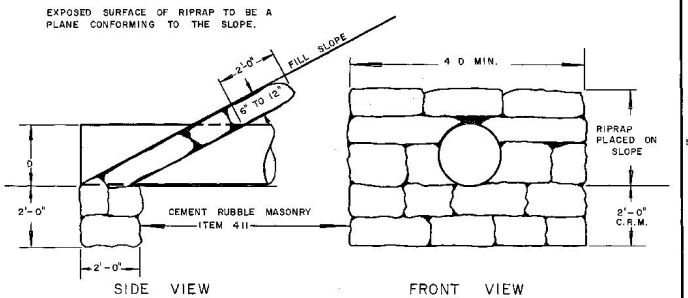



QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY, ITEM 411

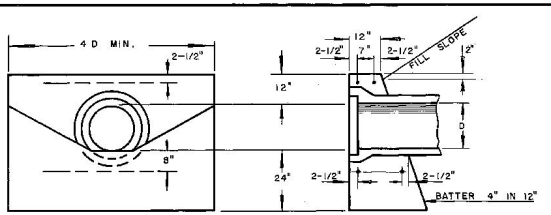
| PIPE DIAMETER | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" |
|---|---|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 0.8 | 1.0 | 1.2 | 1.4 | 1.5 | 1.7 | 2.0 | 2.4 | 2.8 | 3.3 |

DEDUCTION IS MADE FOR PIPE WHEN PIPE DIAMETER IS 42" OR LARGER
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

## CRADLE HEADWALL




## RIPRAP HEADWALL
USING ITEM 513-B




QUANTITY SCHEDULE FOR REINFORCED CONCRETE HEADWALL, ITEM 401-B

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| CONCRETE QUANTITY | 1.0 | 1.3 | 1.8 | 2.7 | 3.5 | 4.9 | 6.4 | 8.0 | 10.0 | 12.3 |

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL, ITEM 402

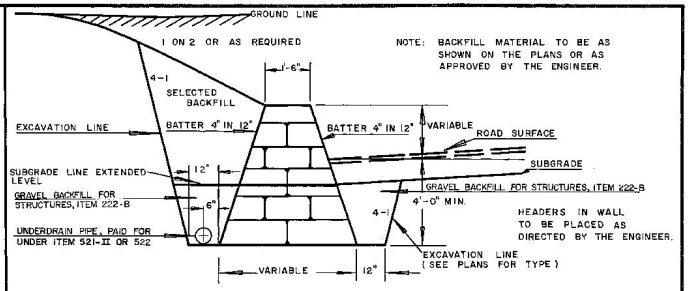
| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| NUMBER | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| LENGTH OF BARS | 3'-0" | 3'-0" | 3'-0" | 3'-0" | 4'-0" | 4'-0" | 5'-0" | 5'-0" | 6'-0" | 6'-0" |

ALL REINFORCING STEEL TO BE 5/8" DIAMETER DEFORMED BARS.
CONCRETE QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

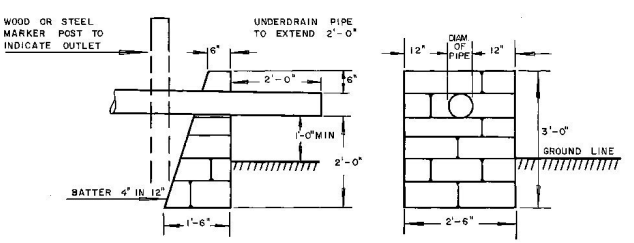
## REINFORCED CONCRETE STRAIGHT HEADWALL

GENERAL NOTES:

1. CEMENT RUBBLE MASONRY:
   (A) MORTAR BETWEEN ALL EXPOSED JOINTS TO BE RECESSED 1/2".
   (B) ALL MORTAR IS TO BE CLEANED FROM THE EXPOSED SURFACES OF ALL STONES.
   (C) JOINTS AND BEDS SHALL NOT AVERAGE OVER ONE (1) INCH IN THICKNESS.
2. THE HEIGHT OF HEADWALLS ON DRIVEWAY PIPES IS TO BE REDUCED TO 6" ABOVE THE TOP OF PIPE.
3. BELL AND SPIGOT PIPE IS TO BE LAID WITH THE BELL UPSTREAM.
4. HEADWALL QUANTITIES, FOR THE SAME TYPE HEADWALLS ON PIPES OF EQUAL DIAMETER, ARE THE SAME FOR BOTH CONCRETE AND METAL PIPE. LENGTH OF HEADWALLS ARE BASED ON INSIDE DIAMETER OF PIPES.
5. THE NECESSITY OF CONSTRUCTING A FLOOR AT THE ENTRANCE TO AN L TYPE HEADWALL SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER AND ANY INSTALLATION THEREOF SHALL BE AT HIS DIRECTION.

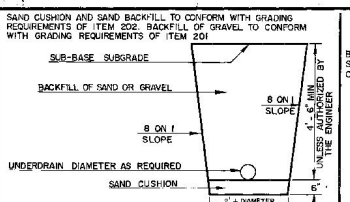



## CEMENT RUBBLE MASONRY RETAINING WALL

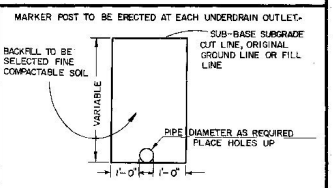



UNDERDRAIN PIPE OUTLET TO CLEAR GROUND LINE BY A MINIMUM OF 1'-0" TO HELP PREVENT CLOGGING.

## UNDERDRAIN OUTLET CONSTRUCTION

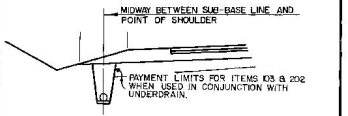



## UNDERDRAIN CONSTRUCTION, ITEM 521-I OR 522




## UNDERDRAIN CONSTRUCTION, ITEM 521-II OR 522

## UNDERDRAIN LOCATION, ITEM 521-I




UNDERDRAIN TO BE LAID MIDWAY BETWEEN SUB-BASE LINE AND POINT OF SHOULDER OR AS DIRECTED BY THE ENGINEER.

GENERAL NOTES:
GRADE FOR UNDERDRAIN PIPE SHALL BE PARALLEL WITH THE GRADE OF THE ROAD UNLESS OTHERWISE DIRECTED BY THE ENGINEERING. A FLUSHING BASIN IS TO BE INSTALLED AT INLET WHEN LESS THAN 3% GRADE IS USED OR AS ORDERED BY THE ENGINEER.
THE UNDERDRAIN SHALL BE TAKEN TO A PROPER OUTLET AND PROTECTED WITH A HEADWALL OF CEMENT RUBBLE MASONRY IF SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER. ELBOWS, Ts AND OTHER JUNCTION UNITS NECESSARY FOR PROPER INSTALLATION OF UNDERDRAIN, AS DIRECTED BY THE ENGINEER, ARE TO BE INCLUDED IN THE UNIT BID PRICE FOR UNDERDRAIN.

REVISIONS AND CORRECTIONS

POSITIONING OF UNDERDRAIN CHANGED, OCT 31, 1961
MAR. 1, 1965 NOTES AND DRAWING FOR ITEM 521-II OR 522 ADDED. NOTES ADDED TO C.R.M. WALL. CRADLE HEADWALL - FILL SLOPES AND NOTES FOR SAME, REVISED. NOTE FOR CUTTING PIPE ENDS, ELIMINATED. GENERAL NOTES REVISED.
APRIL 5, 1965 NOTE ON LENGTH OF HEADWALLS ADDED TO GENERAL NOTES
FEB. 6, 1967 ANCHOR BOLTS ADDED
MAR. 23, 1967 FILL SLOPE LINES CHANGED TO 2" FROM TOP OF HEADWALL
JULY 25, 1967 DETAILS OF ANCHOR BOLT ADDED.
APR. 14, 1969 NOTE ON COST OF ANCHOR BOLTS ADDED.
MAR. 3, 1971 PAY LIMITS FOR ITEMS 103 & 202 WHEN USED WITH UNDERDRAIN.

APPROVED DATE MARCH 3, 1971

R. H. Arnold
CHIEF ENGINEER

E. H. Stickney
ASST. CHIEF ENGINEER

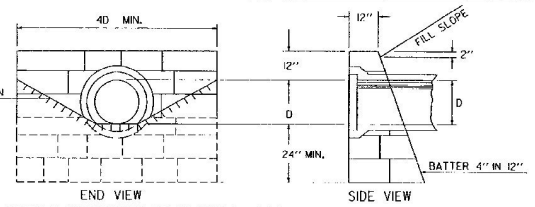
G. M. Lane
HIGHWAY ENGINEER

DRAWN: J.R.P.
TRACED: GUS AJA

# CEMENT RUBBLE MASONRY, ITEM 411
# RIPRAP HEADWALL - ITEM 411 AND ITEM 513-B
# REINFORCED CONCRETE HEADWALL, ITEM 401-B AND 402
## PERFORATED ASPHALT COATED CORRUGATED GALVANIZED METAL UNDERDRAIN PIPE, ITEM 521 OR PERFORATED CORRUGATED ALUMINUM ALLOY PIPE UNDERDRAIN, ITEM 522

VERMONT
DEPARTMENT OF HIGHWAYS
STANDARD

# D - 2

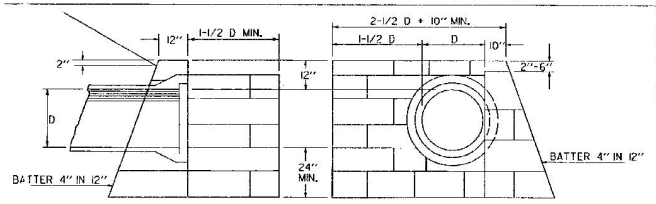



QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 1.0 | 1.3 | 1.8 | 2.7 | 3.5 | 4.9 | 6.4 | 8.0 | 10.0 | 12.3 |

C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

CEMENT RUBBLE MASONRY STRAIGHT HEADWALL




QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

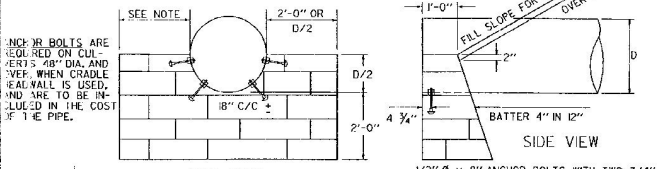
| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" |
|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 1.3 | 1.7 | 2.1 | 3.2 | 4.1 | 5.5 | 7.1 | 8.9 |

C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

CEMENT RUBBLE MASONRY "L" TYPE HEADWALL

NOTE: USE 2'-0" MIN. UP TO 48" DIAMETER AND THEN USE D/2.

FILL SLOPE LINE UP TO 24" DIAM. PIPE INCLUSIVE.




QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

| PIPE DIAMETER | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" |
|---|---|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 0.8 | 1.0 | 1.2 | 1.4 | 1.5 | 1.7 | 2.0 | 2.1 | 2.8 | 3.3 |

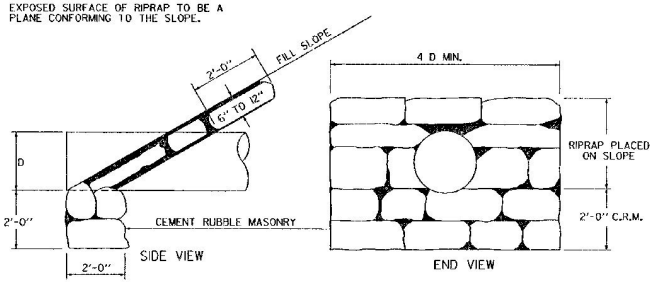
C.R.M. QUANTITIES DEDUCTED WHEN PIPE DIAMETER FOR 42" OR LARGER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

WHEN CONCRETE CLASS B IS USED, TWO PIECES OF REINFORCING STEEL WILL BE PLACED BELOW THE CULVERT SIMILAR TO THOSE SHOWN ON REINFORCED CONCRETE STRAIGHT HEADWALL.

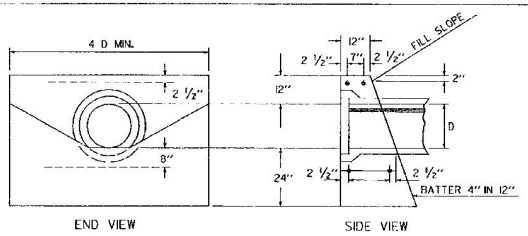
1/2" Ø x 8" ANCHOR BOLTS WITH TWO 3/4" HEXAGONAL NUTS, 9/16" Ø HOLES IN PIPE TO BE DRILLED OR PUNCHED, PRIOR TO COATING OF PIPE OR FIELD DRILLED WHEN REQUIRED, DUE TO A FIELD CHANGE.

CEMENT RUBBLE MASONRY CRADLE HEADWALL

EXPOSED SURFACE OF RIPRAP TO BE A PLANE CONFORMING TO THE SLOPE.




RIPRAP LIGHT TYPE SLOPE HEADWALL WITH CEMENT RUBBLE MASONRY FOOTING




QUANTITY SCHEDULE FOR REINFORCED CONCRETE HEADWALL, CLASS B

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| CONCRETE QUANTITY | 1.0 | 1.3 | 1.8 | 2.7 | 3.5 | 4.9 | 6.4 | 8.0 | 10.0 | 12.3 |

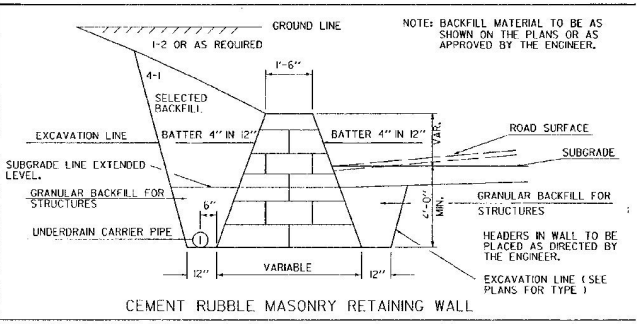
STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| CONCRETE QUANTITY | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| LENGTH OF BARS | 3'-0" | 3'-0" | 3'-0" | 3'-0" | 4'-0" | 4'-0" | 5'-0" | 5'-0" | 6'-0" | 6'-0" |

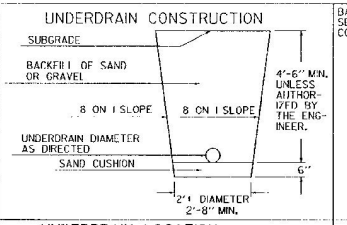
ALL REINFORCING STEEL TO BE ⅝" DIAMETER DEFORMED BARS.
CONCRETE QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

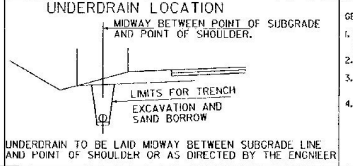
GENERAL NOTES - HEADWALLS:

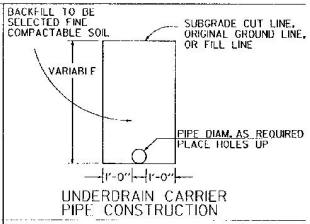
1. THE HEIGHT OF HEADWALLS ON DRIVEWAY PIPES IS TO BE REDUCED TO 6" ABOVE THE TOP OF PIPE.
2. BELL AND SPIGOT PIPE IS TO BE LAID WITH THE BELL UPSTREAM.
3. HEADWALL QUANTITIES, FOR THE SAME TYPE HEADWALLS ON PIPES OF EQUAL DIAMETER, ARE THE SAME FOR BOTH CONCRETE AND METAL PIPE. LENGTH OF HEADWALLS ARE BASED ON INSIDE DIAMETER OF PIPES.
4. THE NECESSITY OF CONSTRUCTING A FLOOR AT THE ENTRANCE TO AN L TYPE HEADWALL SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER AND ANY INSTALLATION THEREOF SHALL BE AT HIS DIRECTION.




CEMENT RUBBLE MASONRY RETAINING WALL




GENERAL NOTES - UNDERDRAIN:

1. GRADE FOR UNDERDRAIN PIPE SHALL BE PARALLEL WITH THE GRADE OF THE ROAD UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. A FLUSHING BASIN IS TO BE INSTALLED AT INLET WHEN LESS THAN 3% GRADE IS USED OR AS ORDERED BY THE ENGINEER.
3. THE UNDERDRAIN SHALL BE TAKEN TO A PROPER OUTLET AND PROTECTED WITH A HEADWALL OF CEMENT RUBBLE MASONRY IF SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
4. ELBOWS, Ts, AND OTHER JUNCTION UNITS NECESSARY FOR PROPER INSTALLATION OF UNDERDRAIN AS DIRECTED BY THE ENGINEER, ARE TO BE INCLUDED IN THE UNIT BID PRICE FOR UNDERDRAIN OR CARRIER PIPE.

REVISIONS AND CORRECTIONS

DEC. 5, 1971 - ORIGINAL APPROVAL DATE
MAR. 8, 1972 - CHANGED ANCHOR BOLTS FROM 10" L TO 8" CARRIAGE
DEC. 16, 1976 - NOTE ADDED ON REINFORCING STEEL FOR CRADLE HEADWALLS
OCT. 30, 1985 - REVISED TO CONFORM TO 1986 SPECIFICATIONS
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

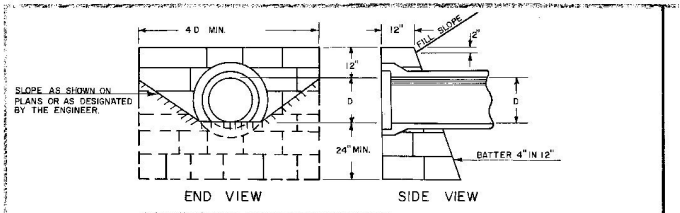
DIRECTOR OF ENGINEERING

DESIGN ENGINEER

# CEMENT RUBBLE MASONRY HEADWALLS & RETAINING WALL
# RIPRAP LIGHT TYPE SLOPE HEADWALL
# REINFORCED CONCRETE HEADWALL
# UNDERDRAIN & CARRIER PIPE CONSTRUCTION DETAILS

VERMONT AGENCY OF TRANSPORTATION

STANDARD
D-2

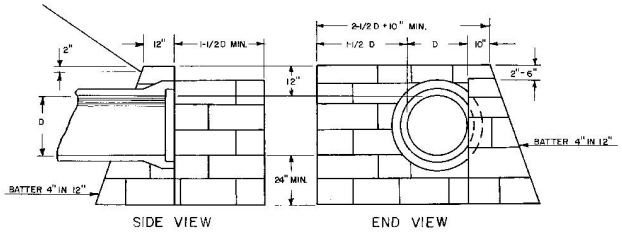



QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 1.0 | 1.3 | 1.8 | 2.7 | 3.5 | 4.9 | 6.4 | 8.0 | 10.0 | 12.3 |

C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS FOR METAL PIPE.

## CEMENT RUBBLE MASONRY STRAIGHT HEADWALL

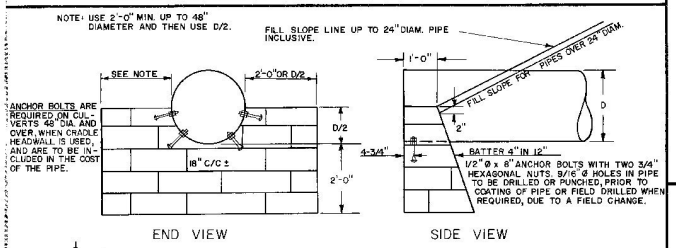


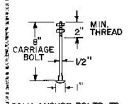

QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" |
|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 1.3 | 1.7 | 2.1 | 3.2 | 4.1 | 5.5 | 7.1 | 8.9 |

C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS FOR METAL PIPE.

## CEMENT RUBBLE MASONRY "L" TYPE HEADWALL



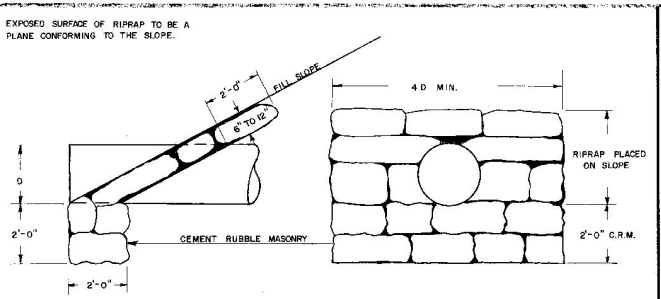

QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

| PIPE DIAMETER | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" |
|---|---|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 0.8 | 1.0 | 1.2 | 1.4 | 1.5 | 1.7 | 2.0 | 2.4 | 2.8 | 3.3 |

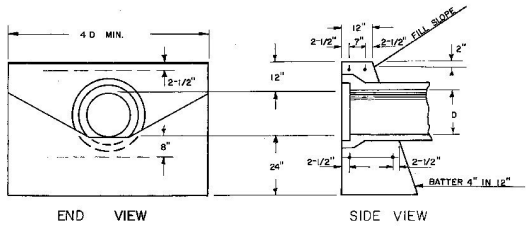
C.R.M. QUANTITIES ARE DEDUCTED WHEN PIPE DIAMETER 42" OR LARGER
SAME DEDUCTION MADE FOR CONCRETE PIPE AS FOR METAL PIPE.

WHEN CONCRETE CLASS B IS USED, TWO PIECES OF REINFORCING STEEL WILL BE PLACED BELOW THE CULVERT SIMILAR TO THOSE SHOWN ON REINFORCED CONCRETE STRAIGHT HEADWALL.

## CEMENT RUBBLE MASONRY CRADLE HEADWALL




## RIPRAP LIGHT TYPE SLOPE HEADWALL WITH CEMENT RUBBLE MASONRY FOOTING




QUANTITY SCHEDULE FOR REINFORCED CONCRETE HEADWALL, CLASS B

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| CONCRETE QUANTITY | 1.0 | 1.3 | 1.8 | 2.7 | 3.5 | 4.9 | 6.4 | 8.0 | 10.0 | 12.3 |

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL

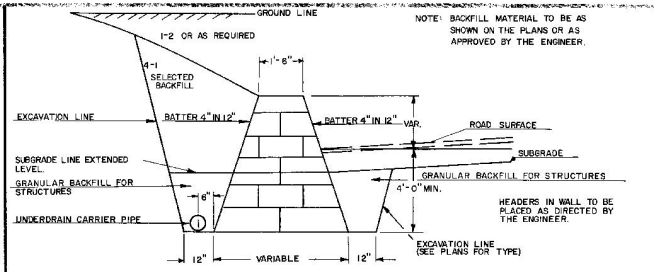
| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| NUMBER | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| LENGTH OF BARS | 3'-0" | 3'-0" | 3'-0" | 3'-0" | 4'-0" | 4'-0" | 5'-0" | 5'-0" | 6'-0" | 6'-0" |

ALL REINFORCING STEEL TO BE 5/8" DIAMETER DEFORMED BARS.
CONCRETE QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

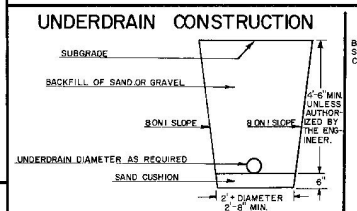
## REINFORCED CONCRETE STRAIGHT HEADWALL

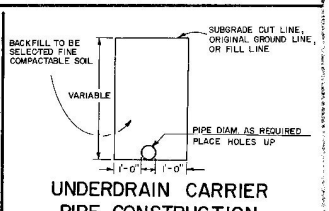
GENERAL NOTES – HEADWALLS:

1. THE HEIGHT OF HEADWALLS ON DRIVEWAY PIPES IS TO BE REDUCED TO 6" ABOVE THE TOP OF PIPE.
2. BELL AND SPIGOT PIPE IS TO BE LAID WITH THE BELL UPSTREAM.
3. HEADWALL QUANTITIES, FOR THE SAME TYPE HEADWALLS ON PIPES OF EQUAL DIAMETER, ARE THE SAME FOR BOTH CONCRETE AND METAL PIPE. LENGTH OF HEADWALLS ARE BASED ON INSIDE DIAMETER OF PIPES.
4. THE NECESSITY OF CONSTRUCTING A FLOOR AT THE ENTRANCE TO AN L TYPE HEADWALL SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER AND ANY INSTALLATION THEREOF SHALL BE AT HIS DIRECTION.

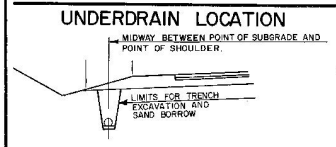



## CEMENT RUBBLE MASONRY RETAINING WALL




## UNDERDRAIN CARRIER PIPE CONSTRUCTION




UNDERDRAIN TO BE LAID MIDWAY BETWEEN SUBGRADE LINE AND POINT OF SHOULDER OR AS DIRECTED BY THE ENGINEER.

GENERAL NOTES – UNDERDRAIN:

1. GRADE FOR UNDERDRAIN PIPE SHALL BE PARALLEL WITH THE GRADE OF THE ROAD UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. A FLUSHING BASIN IS TO BE INSTALLED AT INLET WHEN LESS THAN 3% GRADE IS USED OR AS ORDERED BY THE ENGINEER.
3. THE UNDERDRAIN SHALL BE TAKEN TO A PROPER OUTLET AND PROTECTED WITH A HEADWALL OF CEMENT RUBBLE MASONRY IF SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
4. ELBOWS, Ys, AND OTHER JUNCTION UNITS NECESSARY FOR PROPER INSTALLATION OF UNDERDRAIN, AS DIRECTED BY THE ENGINEER, ARE TO BE INCLUDED IN THE UNIT BID PRICE FOR UNDERDRAIN OR CARRIER PIPE.

REVISIONS AND CORRECTIONS

MAR. 8, 1972 : CHANGED ANCHOR BOLTS FROM 10" "L" TO 8" CARRIAGE BOLTS.
DEC. 16, 1976 : NOTE ADDED ON REINFORCING STEEL FOR CRADLE HEADWALLS.
OCT. 30, 1986 : REVISED TO CONFORM TO 1986 SPECIFICATIONS.

APPROVED:

DATE: Dec. 6, 1971

P.H. Cruold
CHIEF ENGINEER

E.H. Stichney
ASST. CHIEF ENGINEER

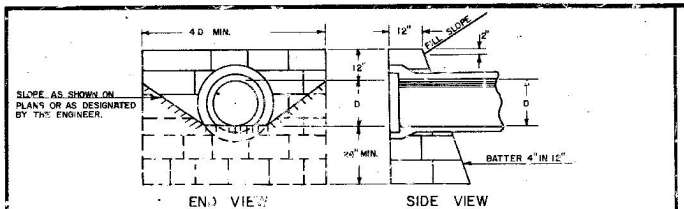
R.M. Lane
HIGHWAY ENGINEER

# CEMENT RUBBLE MASONRY HEADWALLS & RETAINING WALL
# RIPRAP LIGHT TYPE SLOPE HEADWALL
# REINFORCED CONCRETE HEADWALL
# UNDERDRAIN & CARRIER PIPE CONSTRUCTION DETAILS

VERMONT AGENCY OF TRANSPORTATION

STANDARD

D-2

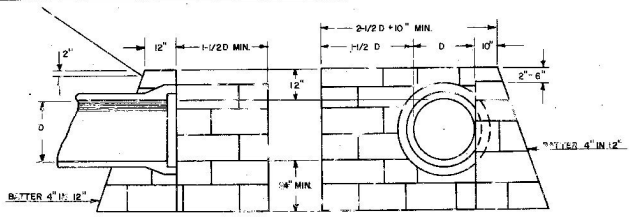



QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 1.0 | 1.3 | 1.8 | 2.7 | 3.5 | 4.9 | 6.4 | 8.0 | 10.0 | 12.3 |

C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS FOR METAL PIPE.

## CEMENT RUBBLE MASONRY STRAIGHT HEADWALL

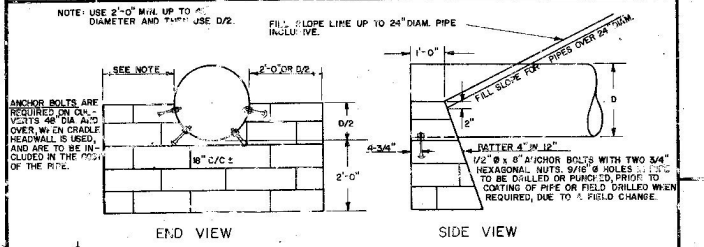


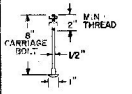

QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" |
|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 1.3 | 1.7 | 2.1 | 3.2 | 4.1 | 5.5 | 7.1 | 8.9 |

C.R.M. QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS FOR METAL PIPE.

## CEMENT RUBBLE MASONRY "L" TYPE HEADWALL




CALV. ANCHOR BOLTS TO BE PLACED 18" C/C.

QUANTITY SCHEDULE FOR CEMENT RUBBLE MASONRY

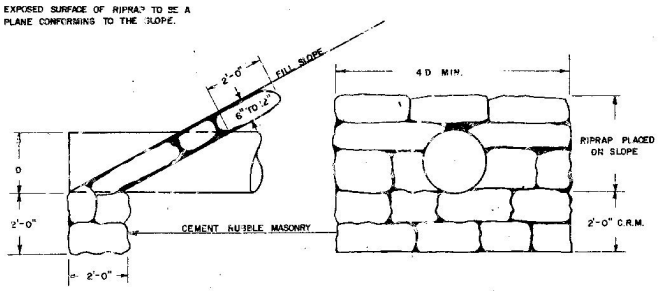
| PIPE DIAMETER | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" |
|---|---|---|---|---|---|---|---|---|---|---|
| C.R.M. QUANTITY | 0.8 | 1.0 | 1.2 | 1.4 | 1.5 | 1.7 | 2.0 | 2.4 | 2.8 | 3.3 |

C.R.M. QUANTITIES ARE DEDUCTED WHEN PIPE DIAMETER 42" OR LARGER
SAME DEDUCTION MADE FOR CONCRETE PIPE AS FOR METAL PIPE.

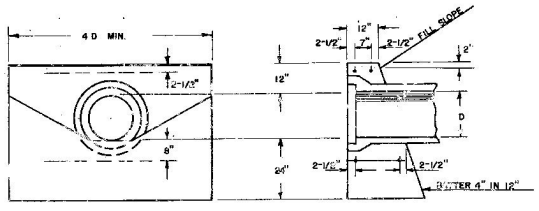
WHEN CONCRETE CLASS B IS USED, TWO PIECES OF REINFORCING STEEL WILL BE PLACED BELOW THE CULVERT SIMILAR TO THOSE SHOWN ON REINFORCED CONCRETE STRAIGHT HEADWALL.

## CEMENT RUBBLE MASONRY CRADLE HEADWALL

EXPOSED SURFACE OF RIPRAP TO BE A PLANE CONFORMING TO THE SLOPE.




## RIPRAP LIGHT TYPE SLOPE HEADWALL WITH CEMENT RUBBLE MASONRY FOOTING




QUANTITY SCHEDULE FOR REINFORCED CONCRETE HEADWALL, CLASS B

| PIPE DIAMETER | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| CONCRETE QUANTITY | 1.0 | 1.3 | 1.8 | 2.7 | 3.5 | 4.9 | 6.4 | 8.0 | 10.0 | 12.3 |

STEEL SCHEDULE FOR REINFORCED CONCRETE HEADWALL

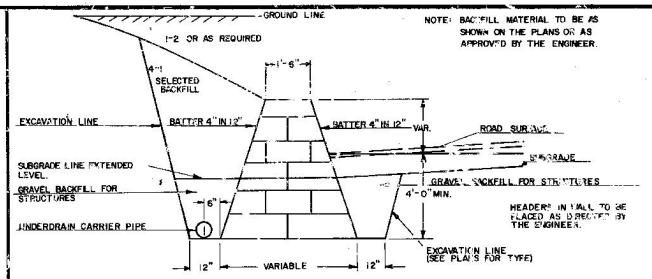
| PIPE DIAMETER | 12 | 15" | 18" | 24" | 30" | 36" | 42" | 48 | 54" | 60" |
|---|---|---|---|---|---|---|---|---|---|---|
| NUMBER | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 4 | 4 |
| LENGTH OF BARS | 3'-0" | 3'-0" | 3'-0" | 3'-0" | 4'-0" | 4'-0" | 4'-0" | 5'-0" | 6'-0" | 6'-0" |

ALL REINFORCING STEEL TO BE 3/8" DIAMETER DEFORMED BARS.
CONCRETE QUANTITIES EXCLUDE PIPE DIAMETERS FOR 30" AND OVER.
SAME DEDUCTION MADE FOR CONCRETE PIPE AS IS MADE FOR METAL PIPE.

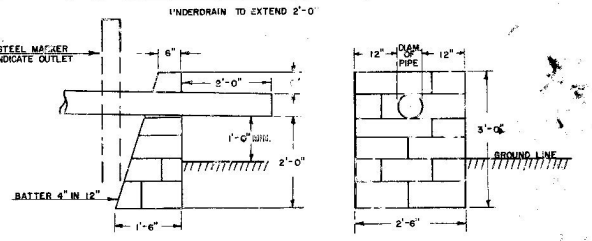
## REINFORCED CONCRETE STRAIGHT HEADWALL

GENERAL NOTES -- HEADWALLS:

1. THE HEIGHT OF HEADWALLS ON DRIVEWAY PIPES IS TO BE REDUCED TO 6" ABOVE THE TOP OF PIPE.
2. BELL AND SPIGOT PIPE IS TO BE LAID WITH THE BELL UPSTREAM.
3. HEADWALL QUANTITIES, FOR THE SAME TYPE HEADWALLS ON PIPES OF EQUAL DIAMETER, ARE THE SAME FOR BOTH CONCRETE AND METAL PIPE. LENGTH OF HEADWALLS ARE BASED ON INSIDE DIAMETER OF PIPES.
4. THE NECESSITY OF CONSTRUCTING A FLOOR AT THE ENTRANCE TO AN L TYPE HEADWALL SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER AND ANY INSTALLATION THEREOF SHALL BE AT HIS DIRECTION.

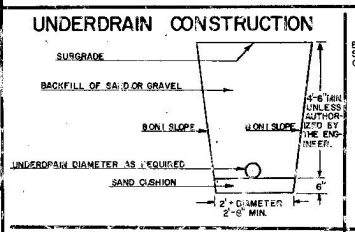


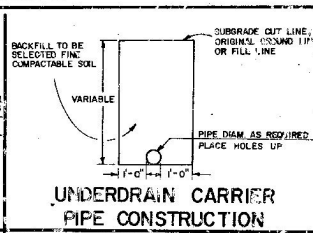

## CEMENT RUBBLE MASONRY RETAINING WALL

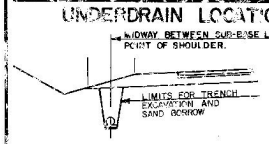



UNDERDRAIN OUTLET TO CLEAR GROUND LINE BY A MINIMUM OF 1'-0" TO HELP PREVENT CLOGGING.

## CEMENT RUBBLE MASONRY UNDERDRAIN OUTLET CONSTRUCTION




UNDERDRAIN TO BE LAID MIDWAY BETWEEN SUB-BASE LINE AND POINT OF SHOULDER OR AS DIRECTED BY THE ENGINEER.

GENERAL NOTES -- UNDERDRAIN:

1. GRADE FOR UNDERDRAIN PIPE SHALL BE PARALLEL WITH THE GRADE OF THE ROAD UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. A FLUSHING BASIN IS TO BE INSTALLED AT INLET WHEN LESS THAN 3% GRADE IS USED OR AS ORDERED BY THE ENGINEER.
3. THE UNDERDRAIN SHALL BE TAKEN TO A PROPER OUTLET AND PROTECTED WITH A HEADWALL OF CEMENT RUBBLE MASONRY IF SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
4. ELBOWS, TEES AND OTHER JUNCTION UNITS NECESSARY FOR PROPER INSTALLATION OF UNDERDRAIN, AS DIRECTED BY THE ENGINEER, ARE TO BE INCLUDED IN THE UNIT BID PRICE FOR UNDERDRAIN OR CARRIER PIPE.

REVISIONS AND CORRECTIONS

MAR 8, 1972 CHANGED ANCHOR BOLTS FROM 10" "L" TO 8" CARRIAGE BOLTS

DEC. 15, 1976 NOTE ADDED ON REINFORCING STEEL FOR CRADLE HEADWALLS.

APPROVED:

DATE: Dec. 6, 1971

R. W. Arnold
CHIEF ENGINEER

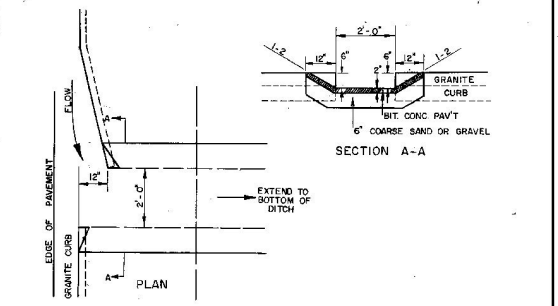
E. H. Stickney
ASST. CHIEF ENGINEER

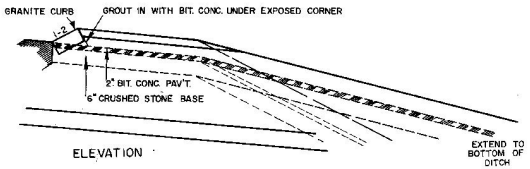
G. M. Lane
HIGHWAY ENGINEER

# CEMENT RUBBLE MASONRY HEADWALLS & RETAINING WALL
# RIPRAP LIGHT TYPE SLOPE HEADWALL
# REINFORCED CONCRETE HEADWALL
# UNDERDRAIN & CARRIER PIPE CONSTRUCTION DETAILS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

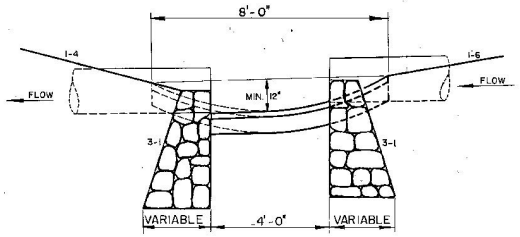
D-2



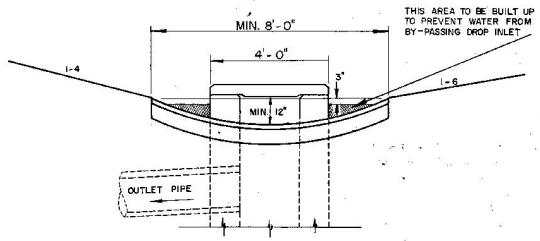




## DETAIL OF CURB DRAINS

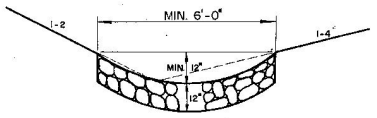
NOT TO BE USED ON GRADES EXCEEDING 2%



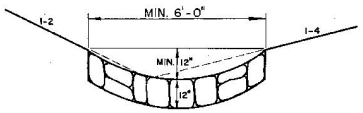

## TREATED GUTTER WITH CRADLE HEADWALLS



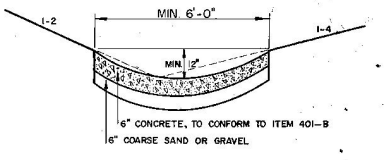

## DROP INLET WITH TREATED GUTTER



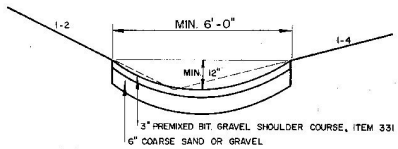

## BITUMINOUS GROUTED STONE GUTTER
## ITEM 553



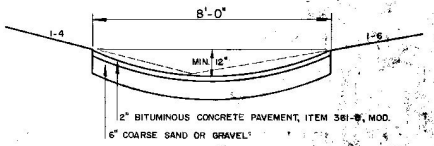

## PLAIN RUBBLE PAVING
## ITEM 413-A



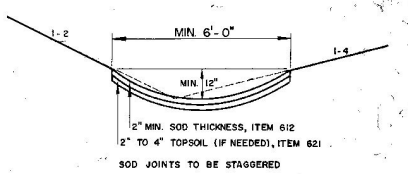

## PLAIN CEMENT CONCRETE GUTTER
## ITEM 551




## BITUMINOUS GUTTER, USING ITEM 331

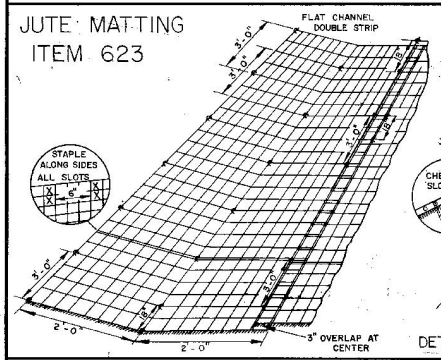


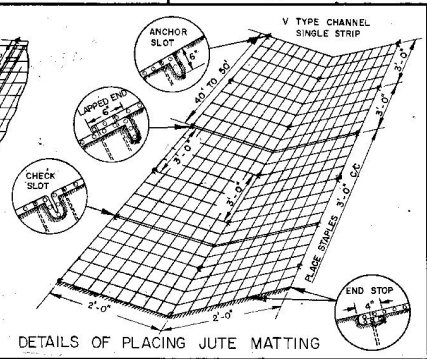

## BITUMINOUS GUTTER, USING ITEM 554, MODIFIED
## (MEDIAN)



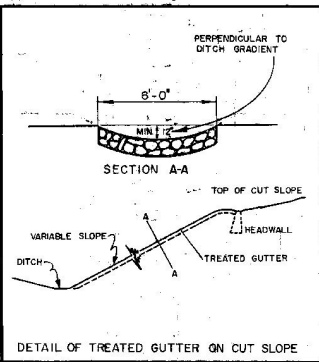

## SODDING, ITEM 612

## JUTE MATTING
## ITEM 623

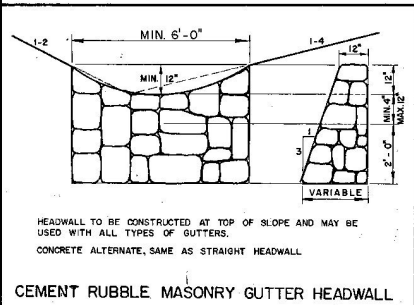



## DETAILS OF PLACING JUTE MATTING




## DETAIL OF TREATED GUTTER ON CUT SLOPE




HEADWALL TO BE CONSTRUCTED AT TOP OF SLOPE AND MAY BE USED WITH ALL TYPES OF GUTTERS.
CONCRETE ALTERNATE, SAME AS STRAIGHT HEADWALL

## CEMENT RUBBLE MASONRY GUTTER HEADWALL
## ITEM 411

### REVISIONS & CORRECTIONS

THIS SHEET SUPERSEDES SHEET D-3 OF MARCH 18, 1960
CRUSHED STONE BASE COURSE HAS BEEN CHANGED TO COURSE SAND OR GRAVEL ... NOV. 21, 1960
JUTE MATTING ADDED TO STANDARD, JULY 20, 1961
DESIGN OF DROP INLET WITH TREATED GUTTER, MODIFIED FEB. 26, 1962
DETAIL OF CURB DRAINS (PLAN) HAS BEEN CHANGED JUNE 27, 1963
ITEM NUMBER ON BITUMINOUS GUTTER CHANGED TO 554 ... FEB. 14, 1964

APPROVED DATE AUG. 2, 1960

A. D. Sisley
CHIEF ENGINEER

G. M. Lane
HIGHWAY ENGINEER

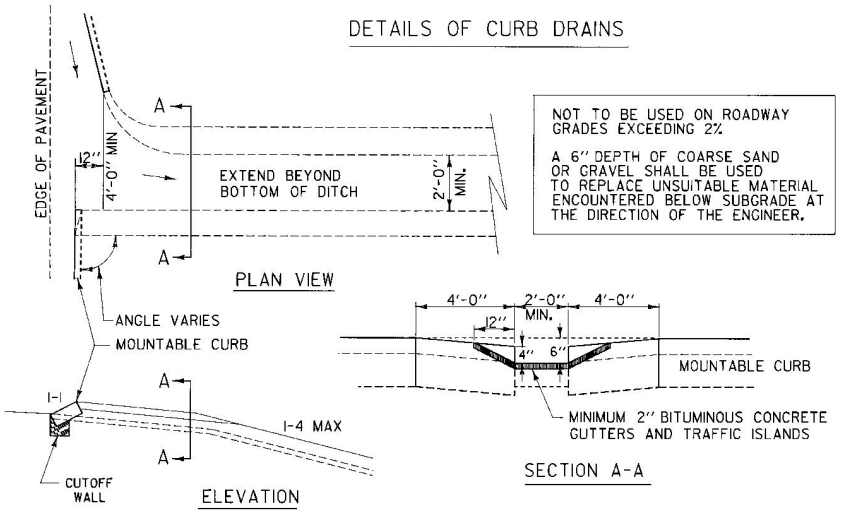
E. W. Stickney
CONSTRUCTION ENGINEER

# JUTE MATTING, ITEM 623
# TREATED GUTTERS

VERMONT
DEPARTMENT OF HIGHWAYS
STANDARD

D-3

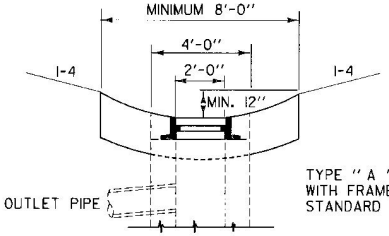
## DETAILS OF CURB DRAINS



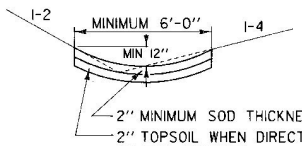

NOT TO BE USED ON ROADWAY GRADES EXCEEDING 2%

A 6" DEPTH OF COARSE SAND OR GRAVEL SHALL BE USED TO REPLACE UNSUITABLE MATERIAL ENCOUNTERED BELOW SUBGRADE AT THE DIRECTION OF THE ENGINEER.

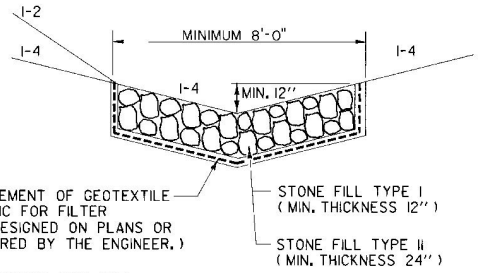
## DROP INLET WITH GRATE IN TREATED GUTTER




## SODDING

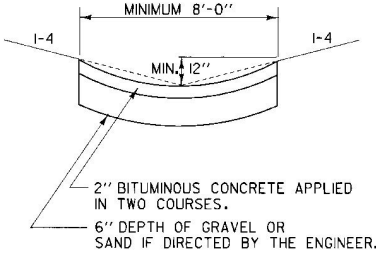



## STONE FILL TYPE I
## STONE FILL TYPE II

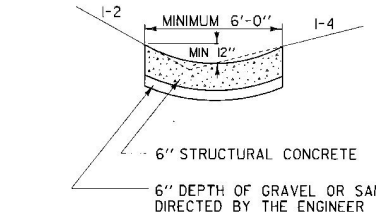



EXCAVATION PAID FOR AS COMMON EXCAVATION.

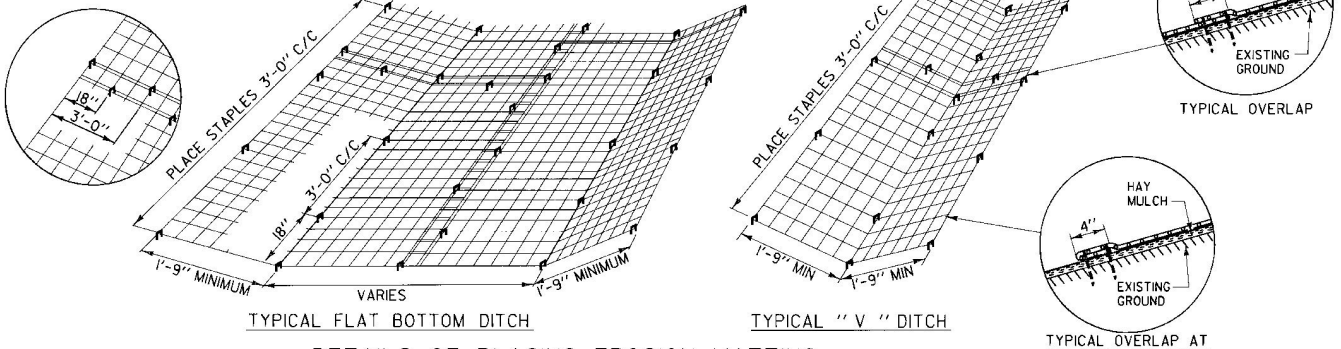
## BITUMINOUS CONCRETE GUTTERS AND TRAFFIC ISLANDS




## PORTLAND CEMENT CONCRETE GUTTER




ON ALL OVERLAPS , PLACE STAPLES EVERY 18", ALTERNATING ON BOTH SIDES OF 6" OVERLAP.




## DETAILS OF PLACING EROSION MATTING

REVISIONS AND CORRECTIONS

APPROVED APRIL 2, 1986
DATE

CHIEF ENGINEER

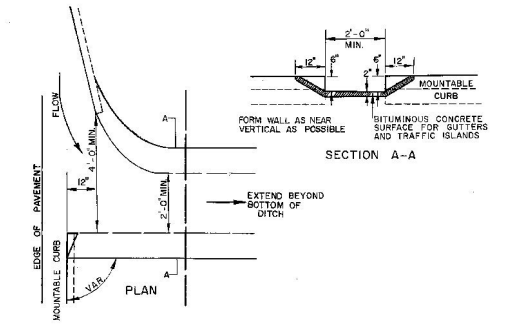
CHIEF OF DESIGN

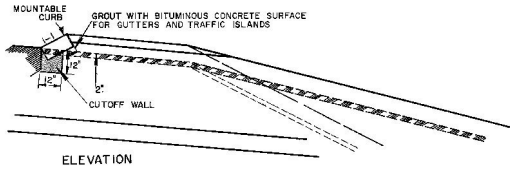
SURVEY AND PLANS ENGINEER

# TREATED GUTTERS

VERMONT AGENCY OF TRANSPORTATION

STANDARD
D-3




## DETAIL OF CURB DRAINS

NOT TO BE USED ON ROADWAY GRADES EXCEEDING 2%

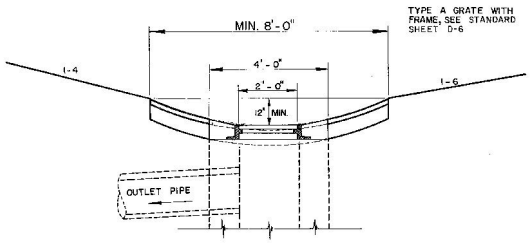
A 6" DEPTH OF COARSE SAND OR GRAVEL SHALL BE USED TO REPLACE UNSUITABLE MATERIAL ENCOUNTERED BELOW SUBGRADE AT THE DIRECTION OF THE ENGINEER.

GENERAL NOTES

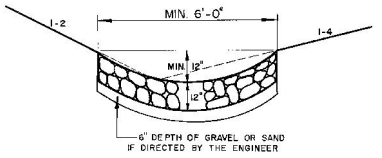
CHANGES IN ALIGNMENT AND GRADE FOR GUTTERS SHOULD BE AS GRADUAL AS THE WIDTH OF RIGHT-OF-WAY AND TERRAIN WILL PERMIT.

CURVED PORTIONS OF TREATED GUTTERS MAY REQUIRE ADDITIONAL PROTECTION ALONG THE OUTSIDE EDGE OF THE GUTTER TO AID IN REDIRECTING THE WATER AND HELP PREVENT EROSION.

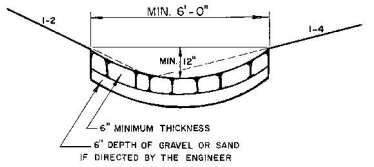
THE USE OF SOD STRIPS ALONG BOTH EDGES OF GUTTERS SHOULD BE CONSIDERED AS A MEANS OF PREVENTING EROSION AND UNDERMINING OF THE GUTTER.



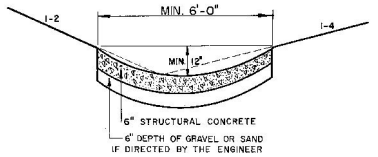

## DROP INLET WITH GRATE IN TREATED GUTTER



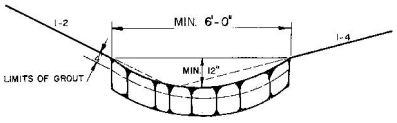

## BITUMINOUS GROUTED STONE GUTTER



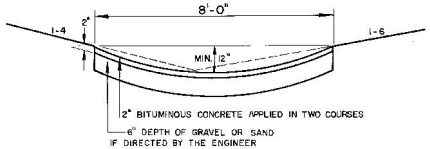

## RIPRAP, LIGHT TYPE



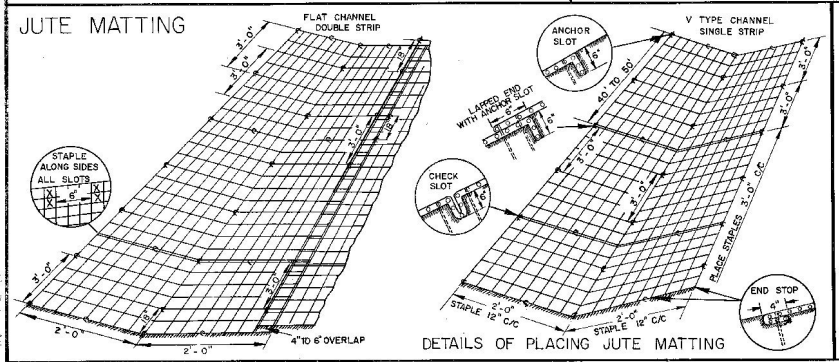

## PLAIN CEMENT CONCRETE GUTTER



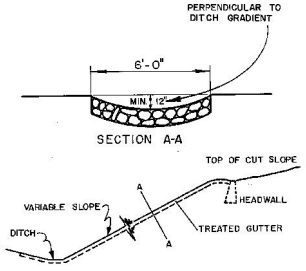

## PLAIN RUBBLE PAVING
## GROUTED RUBBLE PAVING



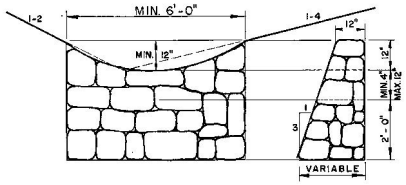

## BITUMINOUS CONCRETE SURFACE FOR GUTTERS AND TRAFFIC ISLANDS




## DETAILS OF PLACING JUTE MATTING



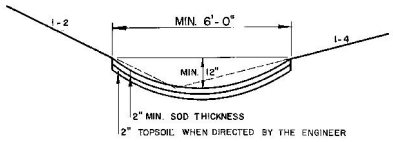

## DETAIL OF TREATED GUTTER ON CUT SLOPE




HEADWALL TO BE CONSTRUCTED AT TOP OF SLOPE AND MAY BE USED WITH ALL TYPES OF GUTTERS.

CONCRETE ALTERNATE, SEE SUB-SECTION 602.11

## CEMENT RUBBLE MASONRY GUTTER HEADWALL




SOD JOINTS TO BE STAGGERED

## SODDING

REVISIONS & CORRECTIONS

APRIL 27, 1973 — GENERAL NOTES ADDED.

APPROVED

DATE Dec. 6, 1971

R. N. Arnold
CHIEF ENGINEER

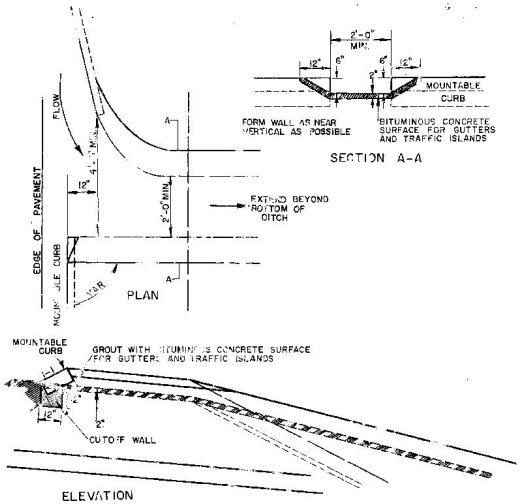
E. H. Ritchney
ASST. CHIEF ENGINEER

G. M. Lane
HIGHWAY ENGINEER

# TREATED GUTTERS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-3




## DETAIL OF CURB DRAINS

NOT TO BE USED ON ROADWAY GRADES EXCEEDING 2%

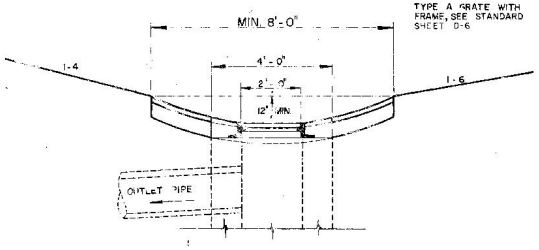
A 6" DEPTH OF COARSE SAND OR GRAVEL SHALL BE USED TO REPLACE UNSUITABLE MATERIAL ENCOUNTERED BELOW SUBGRADE AT THE DIRECTION OF THE ENGINEER.

GENERAL NOTES

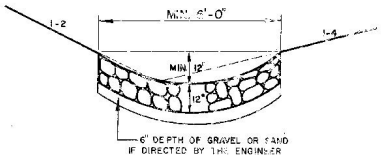
CHANGES IN ALIGNMENT AND GRADE FOR GUTTERS SHOULD BE AS GRADUAL AS THE WIDTH OF RIGHT-OF-WAY AND TERRAIN WILL PERMIT

CURVED PORTIONS OF TREATED GUTTERS MAY REQUIRE ADDITIONAL PROTECTION ALONG THE OUTSIDE EDGE OF THE GUTTER TO AID IN REDIRECTING THE WATER AND HELP PREVENT EROSION

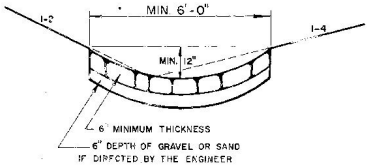
THE USE OF SOD STRIPS ALONG BOTH EDGES OF GUTTERS SHOULD BE CONSIDERED AS A MEANS OF PREVENTING EROSION AND UNDERMINING OF THE GUTTER



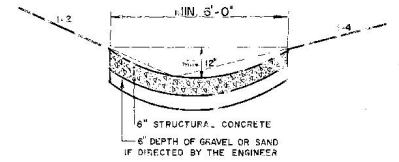

## DROP INLET WITH GRATE IN TREATED GUTTER



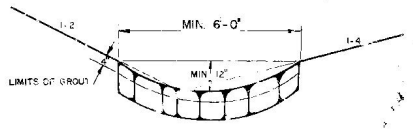

## BITUMINOUS GROUTED STONE GUTTER



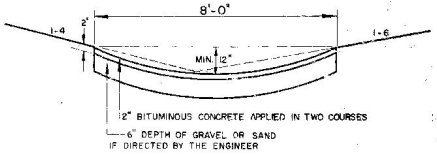

## RIPRAP, LIGHT TYPE



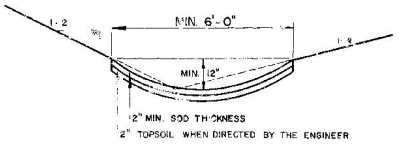

## PLAIN CEMENT CONCRETE GUTTER



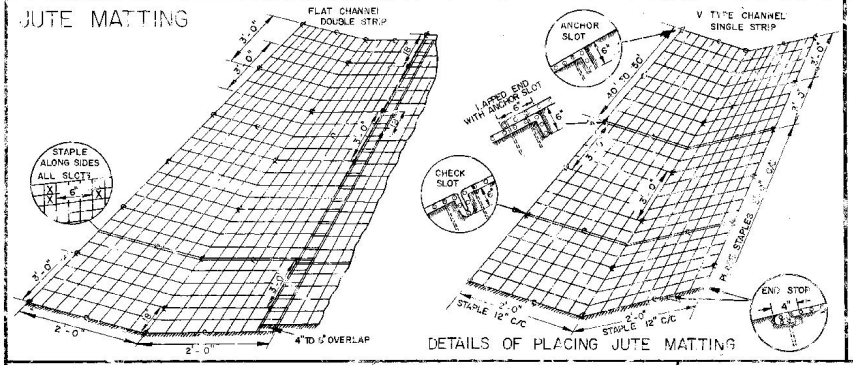

## PLAIN RUBBLE PAVING
## GROUTED RUBBLE PAVING



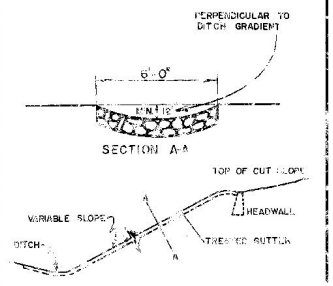

## BITUMINOUS CONCRETE SURFACE FOR GUTTERS AND TRAFFIC ISLANDS



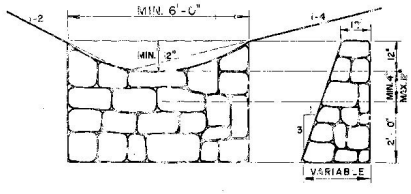

## SODDING




## DETAILS OF PLACING JUTE MATTING




## DETAIL OF TREATED GUTTER ON CUT SLOPE




HEADWALL TO BE CONSTRUCTED AT TOP OF SLOPE AND MAY BE USED WITH ALL TYPES OF GUTTERS

CONCRETE ALTERNATE, SEE SUB-SECTION 601.11

## CEMENT RUBBLE MASONRY GUTTER HEADWALL

REVISIONS & CORRECTIONS

APRIL 27, 1973 - GENERAL NOTES ADDED

APPROVED DATE Dec. 6, 1971

R. N. Arnold
CHIEF ENGINEER

E. H. Ackerney
ASST. CHIEF ENGINEER

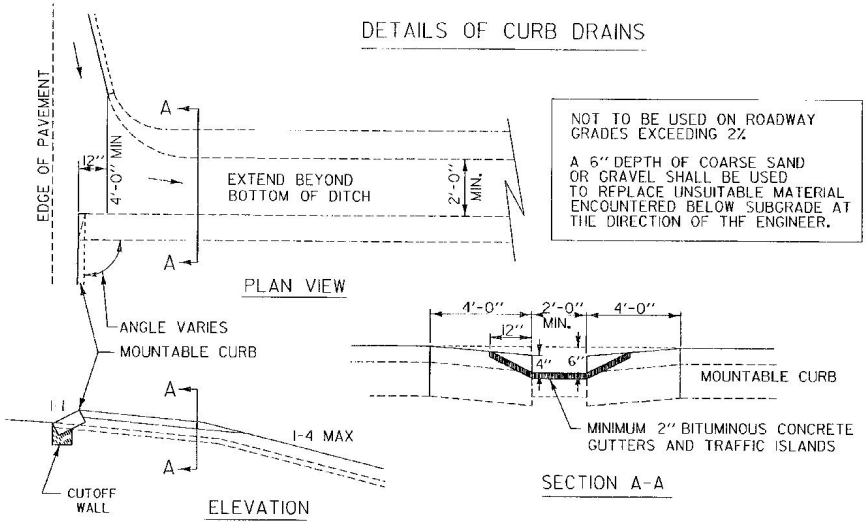
L. M. Lane
HIGHWAY ENGINEER

# TREATED GUTTERS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

# D-3

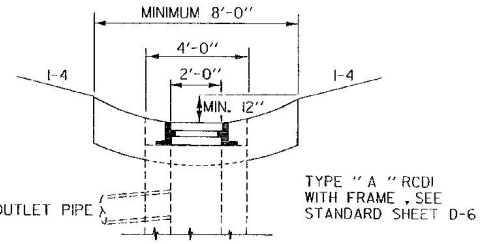
## DETAILS OF CURB DRAINS



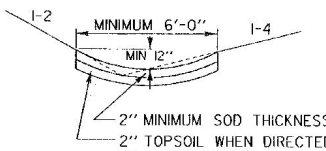

NOT TO BE USED ON ROADWAY GRADES EXCEEDING 2%

A 6" DEPTH OF COARSE SAND OR GRAVEL SHALL BE USED TO REPLACE UNSUITABLE MATERIAL ENCOUNTERED BELOW SUBGRADE AT THE DIRECTION OF THE ENGINEER.

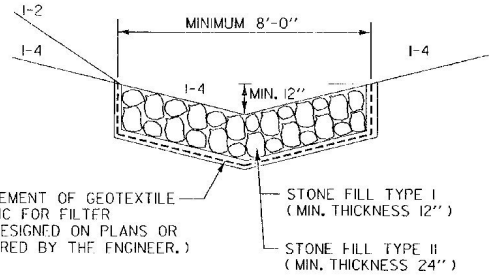
## DROP INLET WITH GRATE IN TREATED GUTTER




## SODDING

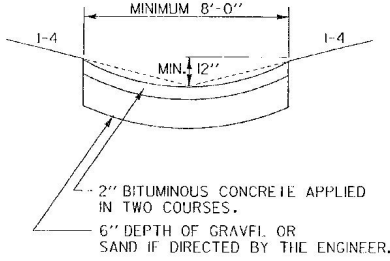



## STONE FILL TYPE I
## STONE FILL TYPE II

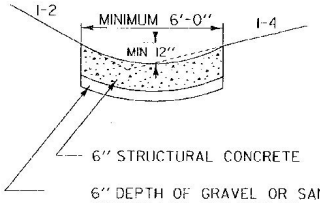



EXCAVATION PAID FOR AS COMMON EXCAVATION.

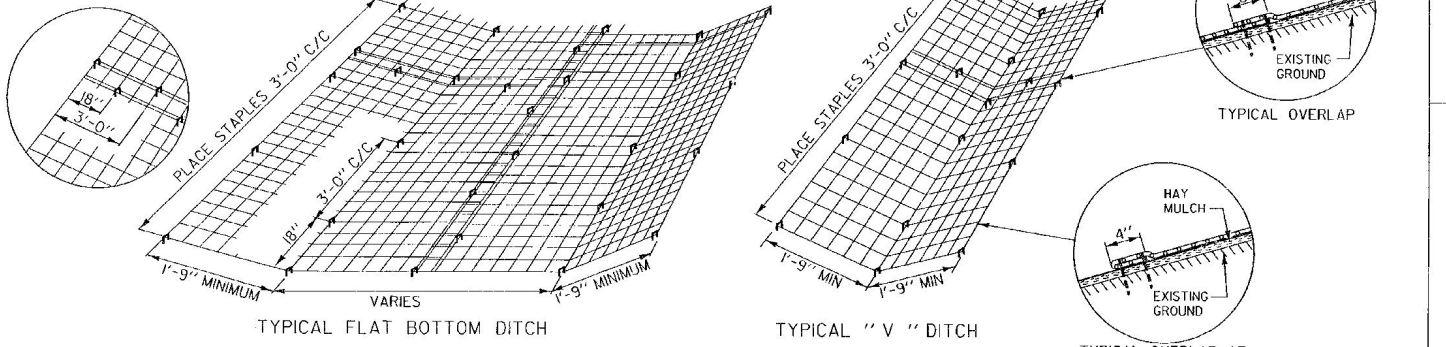
## BITUMINOUS CONCRETE GUTTERS AND TRAFFIC ISLANDS




## PORTLAND CEMENT CONCRETE GUTTER




ON ALL OVERLAPS, PLACE STAPLES EVERY 18", ALTERNATING ON BOTH SIDES OF 6" OVERLAP.




## DETAILS OF PLACING EROSION MATTING

REVISIONS AND CORRECTIONS

APR. 2, 1986 - ORIGINAL APPROVAL DATE

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

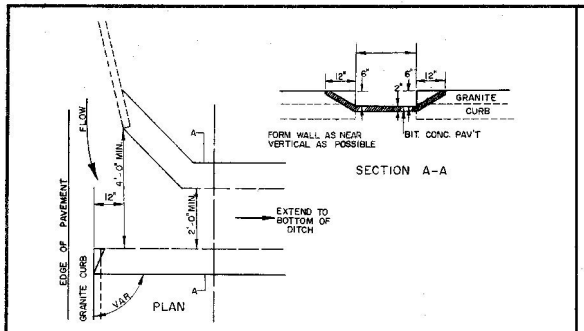
DIRECTOR OF ENGINEERING

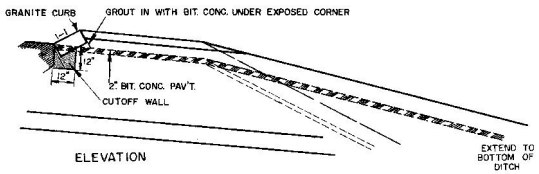
DESIGN ENGINEER

# TREATED GUTTERS

VERMONT AGENCY OF TRANSPORTATION

STANDARD D-3

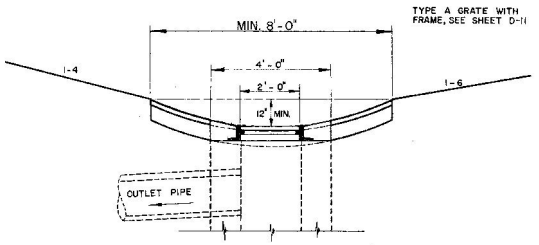


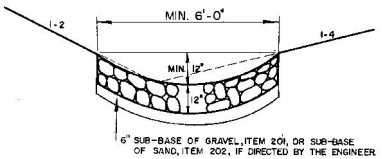

## DETAIL OF CURB DRAINS

NOT TO BE USED ON GRADES EXCEEDING 2%

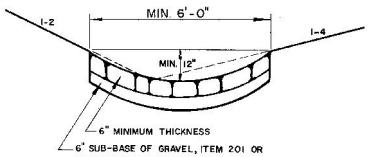
A 6" DEPTH OF COARSE SAND OR GRAVEL SHALL BE USED TO REPLACE UNSUITABLE MATERIAL ENCOUNTERED BELOW SUBGRADE AT THE DIRECTION OF THE ENGINEER.



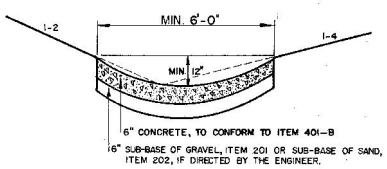

## DROP INLET WITH GRATE IN TREATED GUTTER



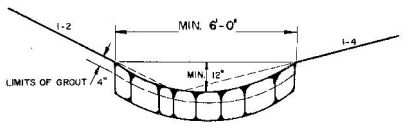

## BITUMINOUS GROUTED STONE GUTTER
ITEM 553



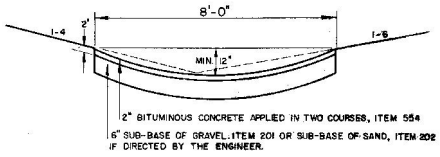

## RIPRAP (LIGHT TYPE)
ITEM 513-B



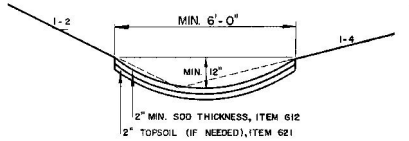

## PLAIN CEMENT CONCRETE GUTTER
ITEM 552




## PLAIN RUBBLE PAVING, ITEM 413-A
## GROUTED RUBBLE PAVING, ITEM 413-B

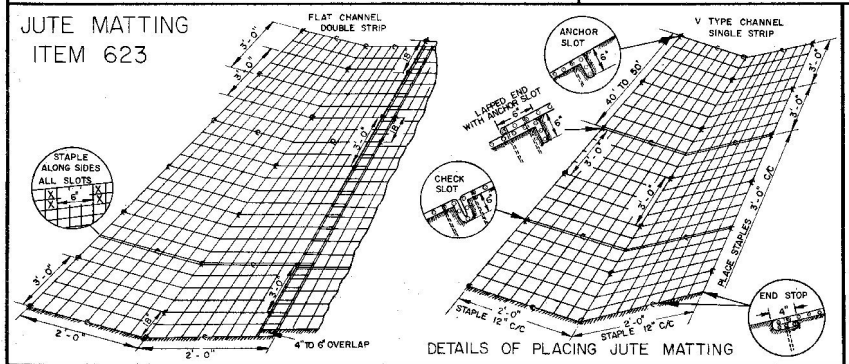



## BITUMINOUS CONCRETE SURFACE FOR GUTTERS AND TRAFFIC ISLANDS, ITEM 554

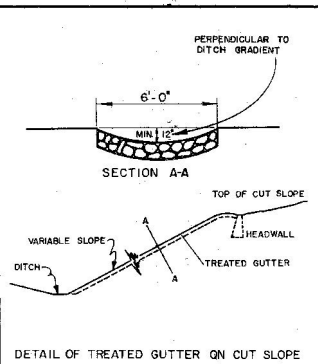



## SODDING, ITEM 612

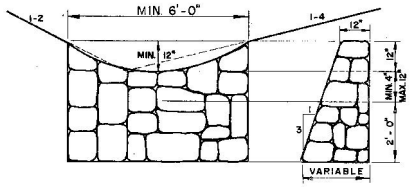
## JUTE MATTING
ITEM 623




## DETAILS OF PLACING JUTE MATTING




## DETAIL OF TREATED GUTTER ON CUT SLOPE




HEADWALL TO BE CONSTRUCTED AT TOP OF SLOPE AND MAY BE USED WITH ALL TYPES OF GUTTERS.

CONCRETE ALTERNATE, SEE SUB-SECTION 411.05 OF ITEM 411

## CEMENT RUBBLE MASONRY GUTTER HEADWALL
ITEM 411

### REVISIONS & CORRECTIONS

THIS SHEET SUPERSEDES SHEET D-3 OF MARCH 18, 1960

CRUSHED STONE BASE COURSE HAS BEEN CHANGED TO COURSE SAND OR GRAVEL – NOV. 21, 1960

JUTE MATTING ADDED TO STANDARD, JULY 20, 1961

MAR 1, 1965 – DRAWINGS REVISED AND NOTES ADDED, ON CURB DRAINS, JUTE MATTING AND SURFACE FOR GUTTERS AND ISLANDS. DRAWING OF BIT. GUTTER, ITEM 331 REMOVED AND GROUTED RUBBLE PAVING, ITEM 413-B DRAWING ADDED.

MAY 12, 1967 – RIPRAP (LIGHT TYPE) ADDED.

JULY 19, 1967 – TREATED GUTTERS WITH HEADWALLS OMMITED D.I. WITH TREATED GUTTER CHANGED.

APPROVED DATE MARCH 10, 1965

CHIEF ENGINEER

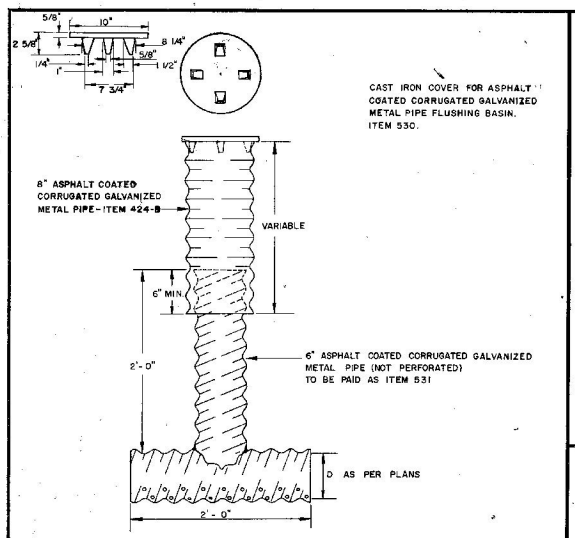
HIGHWAY ENGINEER

CONSTRUCTION ENGINEER

# JUTE MATTING, ITEM 623
# TREATED GUTTERS

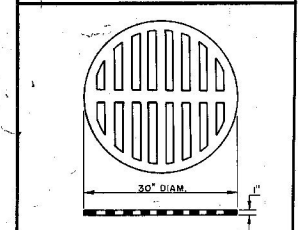
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-3

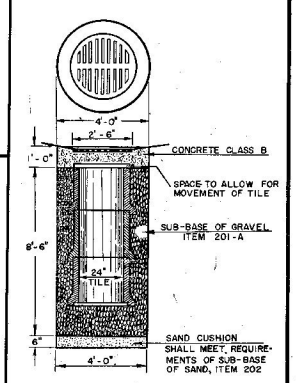



UNDERDRAIN FLUSHING BASIN

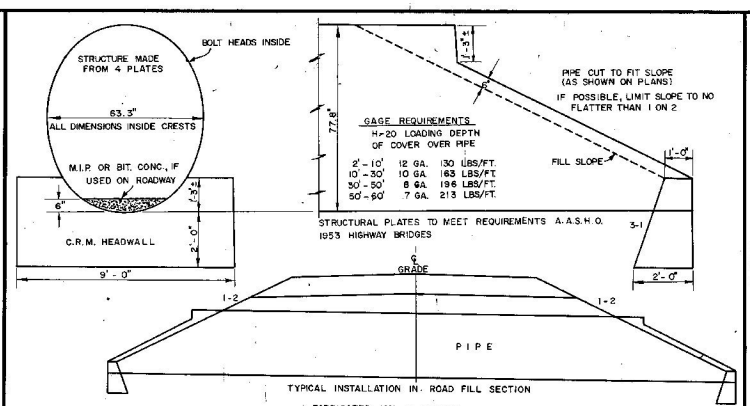
FLUSHING BASINS AT BEGINNING OF LINE, SHALL HAVE A 90° ELBOW RATHER THAN A "T" AS SHOWN ABOVE.



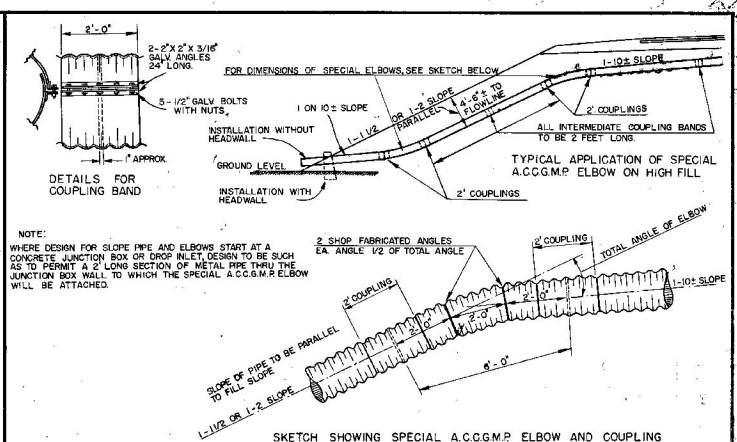

CAST IRON GRATE FOR LEACHING BASIN




LEACHING BASIN

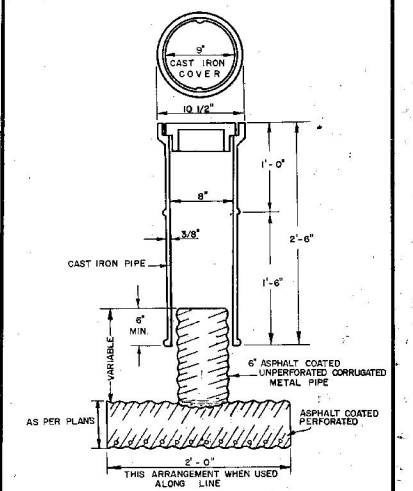



CATTLE PASS OF 72" CORR. GALV. METAL PLATE PIPE, ITEM 429-A

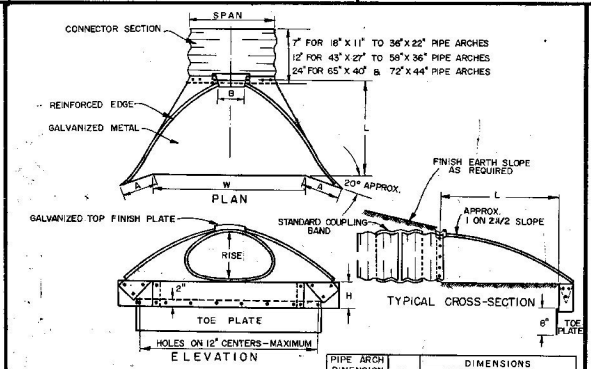



SKETCH SHOWING SPECIAL A.C.C.G.M.P. ELBOW AND COUPLING

FLUSHING BASINS AT BEGINNING OF LINE, SHALL HAVE A 90° ELBOW RATHER THAN A "T" AS SHOWN BELOW.




CAST IRON PIPE UNDERDRAIN FLUSHING BASINS WITH CAST IRON COVERS, ITEM 532




| PIPE ARCH DIMENSION SPAN | RISE | GA. | DIMENSIONS A (1"±) | B MAX | H (1"±) | L (1 1/2") | W (2"±) |
|---|---|---|---|---|---|---|---|
| 18" | 11" | 16 | 4 1/2" | 9" | 6" | 19" | 30" |
| 22" | 13" | 16 | 5 1/4" | 10" | 6" | 23" | 36" |
| 29" | 18" | 16 | 7" | 14" | 6" | 31 1/2" | 48" |
| 36" | 22" | 14 | 8 3/4" | 16" | 6" | 38 1/2" | 60" |
| 43" | 27" | 14 | 10 3/4" | 17 1/2" | 7 5/8" | 47" | 75" |
| 50" | 31" | 12" | 12 1/4" | 20" | 9 1/8" | 54" | 85" |
| 58" | 36" | 12" | 14" | 26" | 10 5/8" | 63" | 98" |
| 65" | 40" | 12 | 15 3/4" | 23" | 10 5/8" | 70" | 112" |
| 72" | 44" | 10" | 17 1/4" | 24" | 12 1/8" | 77" | 128" |

TOE PLATE, WHERE NEEDED, TO BE PUNCHED TO MATCH HOLES IN SKIRT L.IP. 3/8" GALV. BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE IS W+10" FOR PIPE-ARCHES WITH RISE OF 11" TO 27" INCL. AND W+18" MIN. FOR PIPE-ARCHES WITH RISE OF 31" TO 44" INCL.

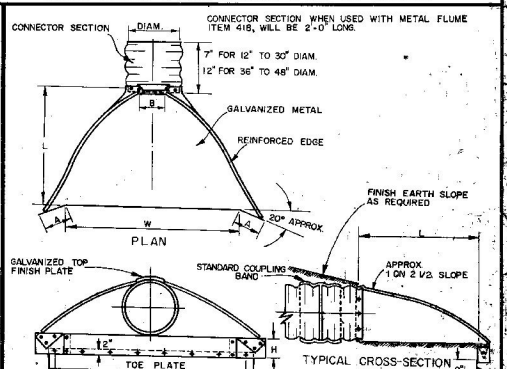
SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 11" TO 22" INCL. TO BE MADE IN ONE PIECE.

SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 27" TO 36" INCL., MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTER LINE.

SKIRT SECTION FOR PIPE ARCHES WITH RISE OF 40" TO 44" INCL. MAY BE MADE FROM THREE SHEETS JOINED BY RIVETING OR BOLTING AT EQUAL DISTANCES FROM CENTER LINE.

CONNECTOR SECTION, CORNER PLATE AND TOE PLATE, TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.

STANDARD METAL END SECTION FOR PIPE ARCHES




| PIPE DIAM. | GA. | DIMENSIONS A (1"±) | B (MAX) | H (1"±) | L (1 1/2") | W (2"±) |
|---|---|---|---|---|---|---|
| 12" | 16 | 4 3/4" | 6" | 6" | 21" | 24" |
| 15" | 16 | 6" | 8" | 6" | 26" | 30" |
| 18" | 16 | 7" | 9" | 6" | 31" | 36" |
| 21" | 16 | 8 1/4" | 11" | 6" | 36" | 42" |
| 24" | 16 | 9 1/2" | 12" | 6" | 42" | 48" |
| 30" | 14 | 12" | 15" | 7 1/2" | 52 1/2" | 60" |
| 36" | 14 | 14" | 18" | 9" | 63" | 72" |
| 42" | 12 | 16" | 21" | 10 1/2" | 73 1/2" | 84" |
| 48" | 12 | 18" | 27" | 12" | 84" | 90" |

TOE PLATE, WHERE NEEDED, TO BE PUNCHED TO MATCH HOLES IN SKIRT L.IP. 3/8" GALV. BOLTS TO BE FURNISHED LENGTH OF TOE PLATE IS W+10" FOR 12" TO 30" DIAM. PIPE INCL. AND W+22" FOR 36" TO 48" DIAM. PIPE INCL.

SKIRT SECTION FOR 12" TO 24" DIA. PIPE INCL. TO BE MADE IN ONE PIECE.

SKIRT SECTION FOR 30" TO 48" DIA. PIPE INCL. MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTER LINE.

CONNECTOR SECTION, CORNER PLATE AND TOE PLATE TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.

STANDARD METAL END SECTION FOR ROUND METAL PIPE

REVISIONS AND CORRECTIONS

WORDS "ASPHALT COATED" FOR ITEM 530 ADDED 6-3-1959

2 INTERMEDIATE COUPLING BANDS ADDED TO SKETCH OF SPECIAL A.C.C.G.M.P. ELBOWS — JAN. 11, 1960.

DETAILS OF FLUSHING BASIN COVER ADDED.. SEPT 22, 1960

NOTE ON CONNECTOR SECTION FOR METAL FLUME ADDED OCT 11, 1961

CATTLE PASS GAGE REQUIREMENTS MODIFIED, APR. 18, 1962

GAGES OF METAL END SECTIONS REVISED... JAN. 19, 1965

APPROVED: DATE NOV 24, 1958

H.E. Laraquet
CHIEF ENGINEER

L.M. Lane
HIGHWAY ENGINEER

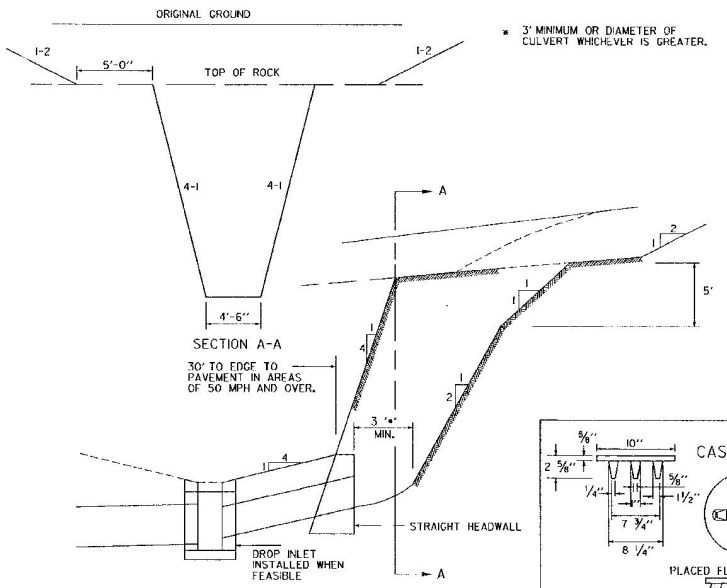
F. Coates
CONSTRUCTION ENGINEER

DRAWN AJR
TRACED AJR

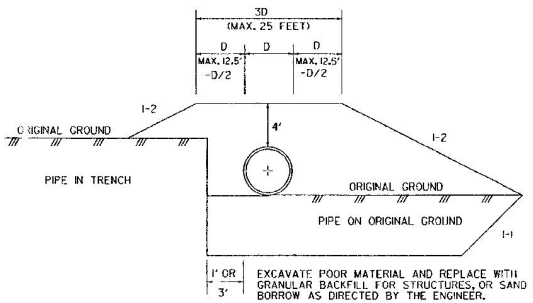
# 72" CORRUGATED GALVANIZED METAL PLATE PIPE, ITEM 429-A
# SPECIAL ASPH. CTD. CORR. GALV. METAL PIPE ELBOW, ITEM 422
# CAST IRON PIPE UNDERDRAIN FLUSHING BASINS WITH CAST IRON COVERS, ITEM 532
# METAL END SECTIONS FOR CORR. GALV. METAL PIPE, ITEM 430-1
# METAL END SECTIONS FOR CORR. GALV. METAL PIPE ARCH, ITEM 430-2
# LEACHING BASIN, ITEM 534
# CAST IRON COVER FOR A.C.C.G.M.P. FLUSHING BASIN, ITEM 530

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

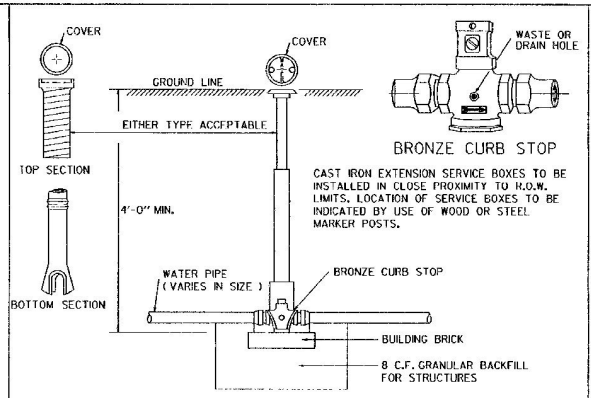
D-4



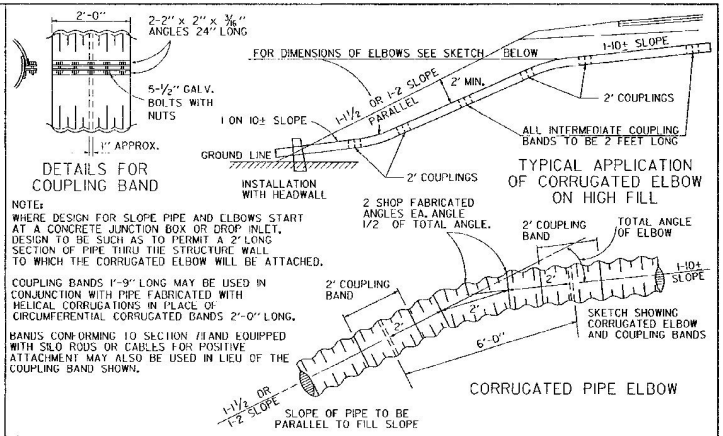

TYPICAL WATERFALL FOR CULVERT UP TO AND INCLUDING 48" DIAMETER

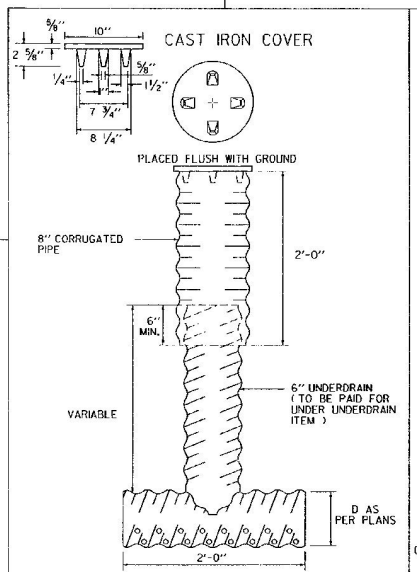



GRANULAR MATERIAL AT CULVERT LOCATIONS

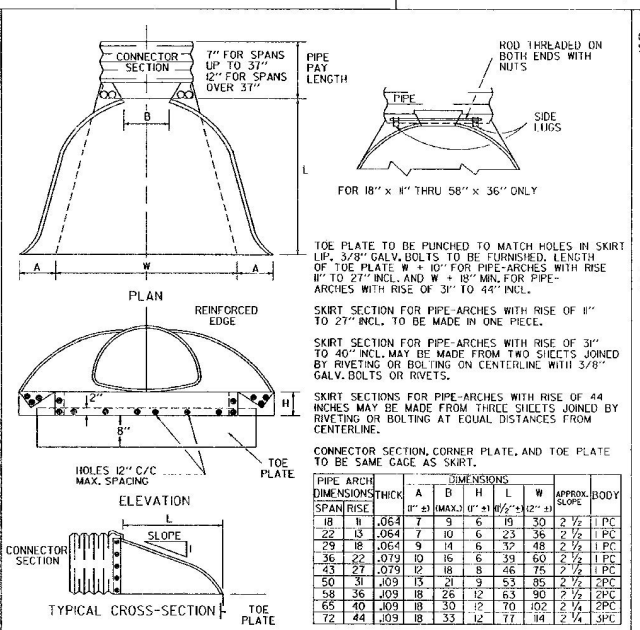



EXTENSION SERVICE BOX AND CURB STOP



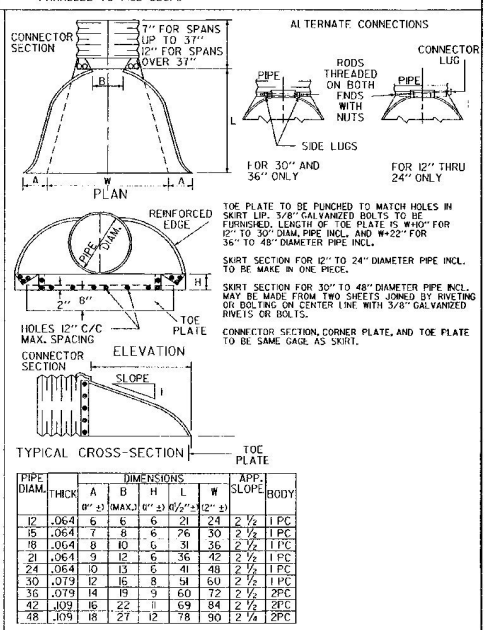




UNDERDRAIN FLUSHING BASIN




| PIPE ARCH DIMENSIONS SPAN | RISE | THICK | DIMENSIONS A (0" ±) | B (MAX.) | H (1" ±) | L (1½"±) | W (12" ±) | APPROX. SLOPE | BODY |
|---|---|---|---|---|---|---|---|---|---|
| 18 | 11 | .064 | 7 | 9 | 6 | 19 | 30 | 2 ½ | 1 PC |
| 22 | 13 | .064 | 7 | 10 | 6 | 23 | 36 | 2 ½ | 1 PC |
| 29 | 18 | .064 | 9 | 14 | 6 | 32 | 48 | 2 ½ | 1 PC |
| 36 | 22 | .079 | 10 | 16 | 6 | 39 | 60 | 2 ½ | 1 PC |
| 43 | 27 | .079 | 12 | 18 | 8 | 46 | 75 | 2 ½ | 1 PC |
| 50 | 31 | .109 | 13 | 21 | 9 | 53 | 85 | 2 ½ | 2PC |
| 58 | 36 | .109 | 18 | 26 | 12 | 63 | 90 | 2 ½ | 2PC |
| 65 | 40 | .109 | 18 | 30 | 12 | 70 | 102 | 2 ¼ | 2PC |
| 72 | 44 | .109 | 18 | 33 | 12 | 77 | 114 | 2 ¼ | 3PC |

CORRUGATED STEEL PIPE ARCH END SECTION




| PIPE DIAM. | THICK | DIMENSIONS A (0" ±) | B (MAX.) | H (0" ±) | L (0"±) | W (12" ±) | APP. SLOPE | BODY |
|---|---|---|---|---|---|---|---|---|
| 12 | .064 | 6 | 6 | 6 | 21 | 24 | 2 ½ | 1 PC |
| 15 | .064 | 7 | 8 | 6 | 26 | 30 | 2 ½ | 1 PC |
| 18 | .064 | 8 | 10 | 6 | 31 | 36 | 2 ½ | 1 PC |
| 21 | .064 | 9 | 12 | 6 | 36 | 42 | 2 ½ | 1 PC |
| 24 | .064 | 10 | 13 | 6 | 41 | 48 | 2 ½ | 1 PC |
| 30 | .079 | 12 | 16 | 8 | 51 | 60 | 2 ½ | 1 PC |
| 36 | .079 | 14 | 19 | 9 | 60 | 72 | 2 ½ | 2PC |
| 42 | .109 | 16 | 22 | 11 | 69 | 84 | 2 ½ | 2PC |
| 48 | .109 | 18 | 27 | 12 | 78 | 90 | 2 ¼ | 2PC |

CORRUGATED STEEL PIPE END SECTION

REVISIONS AND CORRECTIONS

DEC 6, 1971 - ORIGINAL APPROVAL DATE
JULY 17, 1972 - HELICAL CORRUGATED COUPLING NOTE ADDED
JULY 24, 1975 - GRANULAR MATERIAL AT CULVERT LOCATIONS CORRECTED
OCT. 30, 1985 - REVISED TO CONFORM TO 1986 SPECIFICATIONS
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

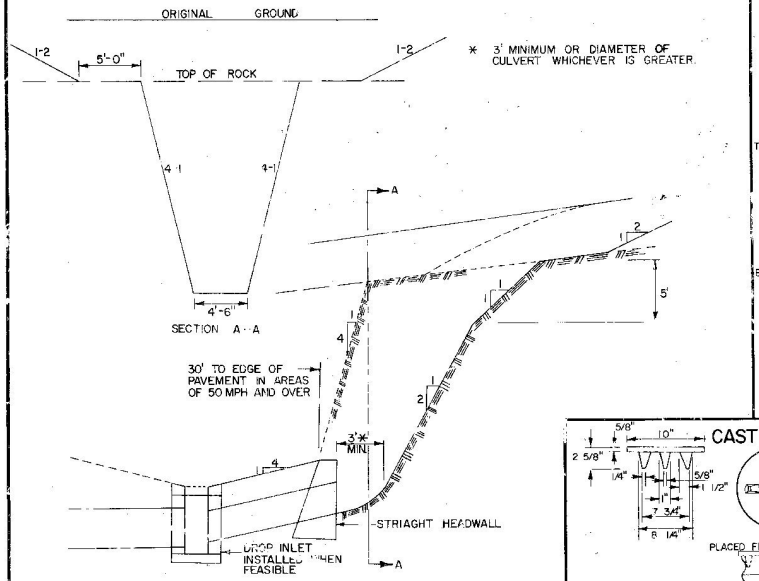
Gordon D. McCallum P.E.
DIRECTOR OF ENGINEERING

DESIGN ENGINEER

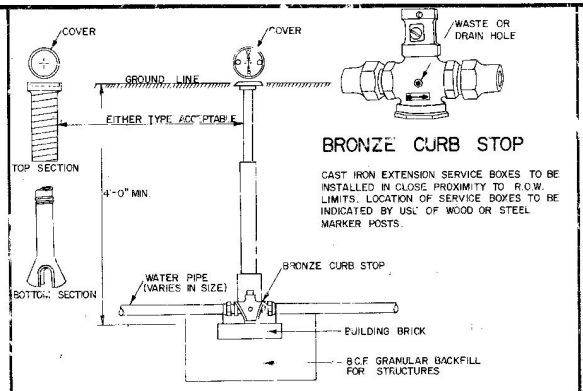
# TYPICAL WATERFALL FOR CULVERTS UP TO AND INCLUDING 48" DIAMETER
# EXTENSION SERVICE BOX AND CURB STOP
# CORRUGATED PIPE ELBOW
# GRANULAR BORROW AT CULVERT LOCATIONS
# UNDERDRAIN FLUSHING BASIN
# CORRUGATED STEEL PIPE END SECTION
# CORRUGATED STEEL PIPE ARCH END SECTION

VERMONT AGENCY OF TRANSPORTATION

STANDARD
D-4



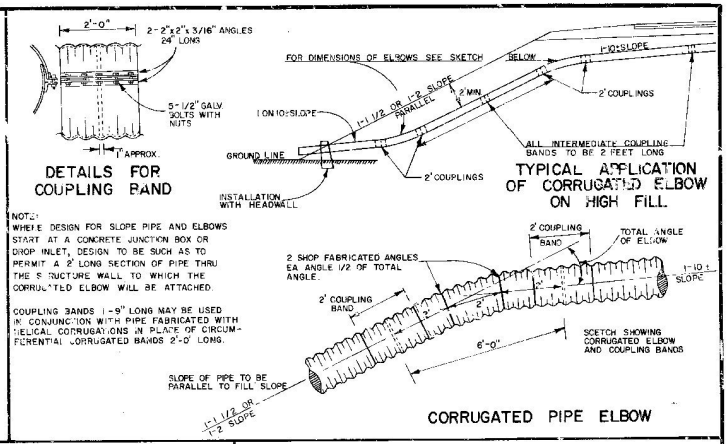

## TYPICAL WATERFALL FOR CULVERTS UP TO AND INCLUDING 48" DIAMETER




## BRONZE CURB STOP

CAST IRON EXTENSION SERVICE BOXES TO BE INSTALLED IN CLOSE PROXIMITY TO R.O.W. LIMITS. LOCATION OF SERVICE BOXES TO BE INDICATED BY USE OF WOOD OR STEEL MARKER POSTS.

## EXTENSION SERVICE BOX AND CURB STOP



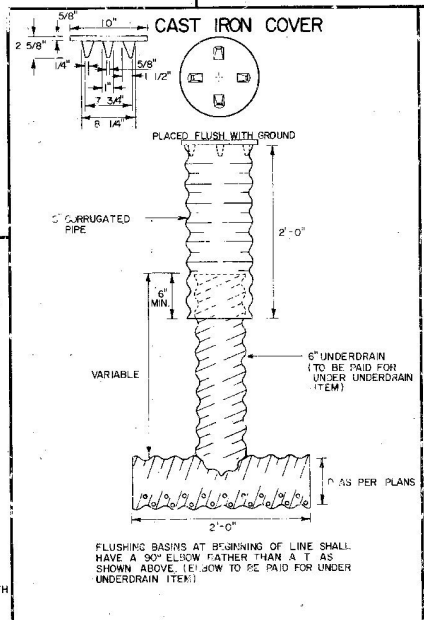

## DETAILS FOR COUPLING BAND

## TYPICAL APPLICATION OF CORRUGATED ELBOW ON HIGH FILL.

NOTE:
WHERE DESIGN FOR SLOPE PIPE AND ELBOWS START AT A CONCRETE JUNCTION BOX OR DROP INLET, DESIGN TO BE SUCH AS TO PERMIT A 2' LONG SECTION OF PIPE THRU THE STRUCTURE WALL TO WHICH THE CORRUGATED ELBOW WILL BE ATTACHED.

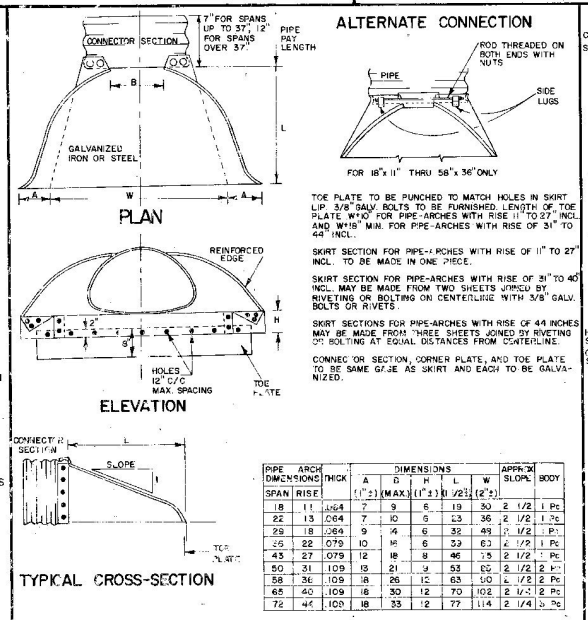
COUPLING BANDS 1-9" LONG MAY BE USED IN CONJUNCTION WITH PIPE FABRICATED WITH HELICAL CORRUGATIONS IN PLACE OF CIRCUMFERENTIAL CORRUGATED BANDS 2'-0" LONG.

## CORRUGATED PIPE ELBOW




FLUSHING BASINS AT BEGINNING OF LINE SHALL HAVE A 90° ELBOW RATHER THAN A T AS SHOWN ABOVE. (ELBOW TO BE PAID FOR UNDER UNDERDRAIN ITEM)

## UNDERDRAIN FLUSHING BASIN




## ALTERNATE CONNECTION




FOR 18"x11" THRU 58"x36" ONLY

TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP. 3/8" GALV. BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE W+10 FOR PIPE-ARCHES WITH RISE 11" TO 27" INCL AND W+18" MIN. FOR PIPE-ARCHES WITH RISE OF 31" TO 44" INCL.

SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 11" TO 27" INCL. TO BE MADE IN ONE PIECE.

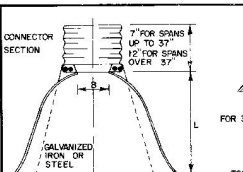
SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 31" TO 44" INCL. MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE WITH 3/8" GALV. BOLTS OR RIVETS.

SKIRT SECTIONS FOR PIPE-ARCHES WITH RISE OF 44 INCHES MAY BE MADE FROM THREE SHEETS JOINED BY RIVETING OR BOLTING AT EQUAL DISTANCES FROM CENTERLINE.

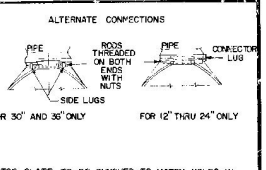
CONNECTOR SECTION, CORNER PLATE, AND TOE PLATE TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.

| PIPE ARCH DIMENSIONS SPAN | RISE | THICK | DIMENSIONS A (1"±) | B (MAX.) | H (1"±) | L (1 1/2"±) | W (2"±) | APRON SLOPE | APRON BODY |
|---|---|---|---|---|---|---|---|---|---|
| 18 | 11 | .064 | 7 | 9 | 6 | 19 | 30 | 2 1/2 | 1 Pc |
| 22 | 13 | .064 | 7 | 10 | 6 | 23 | 36 | 2 1/2 | 1 Pc |
| 29 | 18 | .064 | 9 | 14 | 6 | 32 | 48 | 2 1/2 | 1 Pc |
| 36 | 22 | .079 | 10 | 16 | 6 | 39 | 60 | 2 1/2 | 1 Pc |
| 43 | 27 | .079 | 12 | 18 | 8 | 46 | 72 | 2 1/2 | 1 Pc |
| 50 | 31 | .109 | 13 | 21 | 9 | 53 | 82 | 2 1/2 | 2 Pc |
| 58 | 36 | .109 | 18 | 26 | 12 | 63 | 90 | 2 1/2 | 2 Pc |
| 65 | 40 | .109 | 18 | 30 | 12 | 70 | 102 | 2 1/2 | 2 Pc |
| 72 | 44 | .109 | 18 | 33 | 12 | 77 | 114 | 2 1/4 | 2 Pc |

## METAL END SECTION FOR C.G.M.P. ARCH




ALTERNATE CONNECTIONS




FOR 30" AND 36" ONLY FOR 12" THRU 24" ONLY

TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP. 3/8" GALVANIZED BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE IS W+10 FOR 12" TO 30" DIAM. PIPE INCL. AND W+22" FOR 36" TO 48" DIAMETER PIPE INCL.

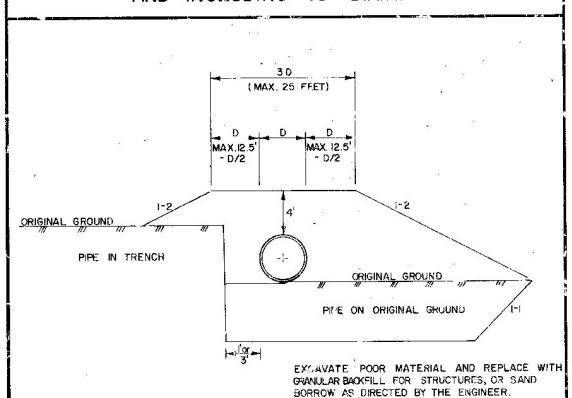
SKIRT SECTION FOR 12" TO 24" DIAMETER PIPE INCL. TO BE MADE IN ONE PIECE.

SKIRT SECTION FOR 30" TO 48" DIAMETER PIPE INCL. MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTER LINE WITH 3/8" GALVANIZED RIVETS OR BOLTS.

CONNECTOR SECTION, CORNER PLATE, AND TOE PLATE TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.

| PIPE DIAM | THICK | DIMENSIONS A (1"±) | B (MAX.) | H (1"±) | L (1 1/2"±) | W (2"±) | APRON SLOPE | APRON BODY |
|---|---|---|---|---|---|---|---|---|
| 12 | .064 | 6 | 6 | 6 | 21 | 24 | 2 1/2 | 1 Pc |
| 15 | .064 | 7 | 8 | 6 | 26 | 30 | 2 1/2 | 1 Pc |
| 18 | .064 | 8 | 10 | 6 | 31 | 36 | 2 1/2 | 1 Pc |
| 21 | .064 | 9 | 12 | 6 | 36 | 42 | 2 1/2 | 1 Pc |
| 24 | .064 | 10 | 13 | 6 | 41 | 48 | 2 1/2 | 1 Pc |
| 30 | .079 | 12 | 16 | 8 | 51 | 60 | 2 1/2 | 1 Pc |
| 36 | .079 | 14 | 19 | 9 | 60 | 72 | 2 1/2 | 2 Pc |
| 42 | .109 | 16 | 22 | 11 | 69 | 84 | 2 1/2 | 2 Pc |
| 48 | .109 | 18 | 27 | 12 | 78 | 90 | 2 1/4 | 2 Pc |

## METAL END SECTION FOR C.G.M.P. (ROUND)




EXCAVATE POOR MATERIAL AND REPLACE WITH GRANULAR BACKFILL FOR STRUCTURES, OR SAND BORROW AS DIRECTED BY THE ENGINEER.

## GRANULAR MATERIAL AT CULVERT LOCATIONS

REVISIONS AND CORRECTIONS

JULY 17, 1972 HELICAL CORRUGATED COUPLING BAND NOTE ADDED

JULY 24, 1975 GRANULAR MATERIAL AT CULVERT LOCATIONS CORRECTED

APPROVED:

DATE: Dec 6, 1972

R.H. Crandall
CHIEF ENGINEER

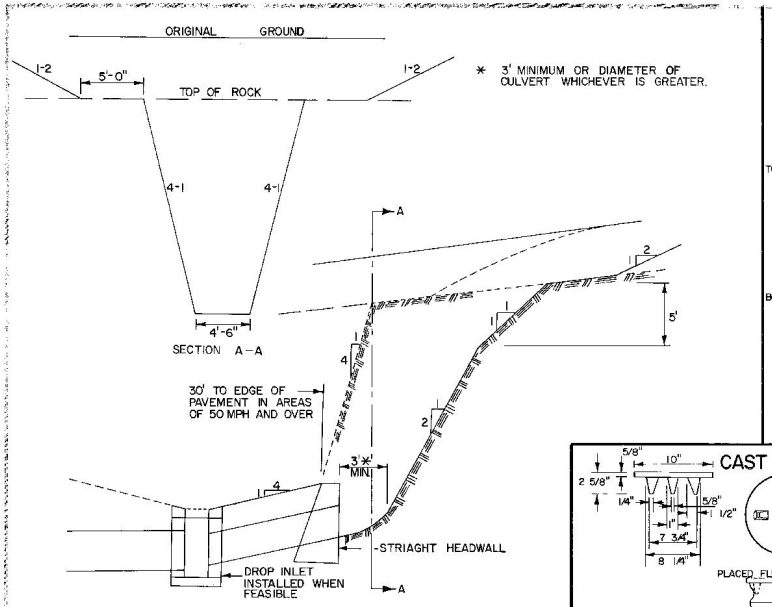
E.W. Stickney
ASST. CHIEF ENGINEER

G.M. Lane
HIGHWAY ENGINEER

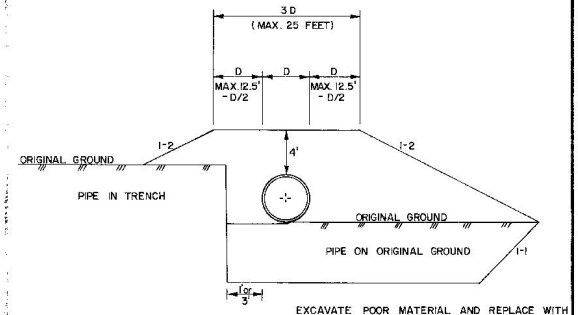
TYPICAL WATERFALL FOR CULVERTS UP TO AND INCLUDING 48" DIAMETER
EXTENSION SERVICE BOX AND CURB STOP
CORRUGATED PIPE ELBOW
GRANULAR BORROW AT CULVERT LOCATIONS
UNDERDRAIN FLUSHING BASIN
METAL END SECTION FOR CORRUGATED GALVANIZED METAL PIPE
METAL END SECTION FOR CORRUGATED GALVANIZED METAL PIPE ARCH

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

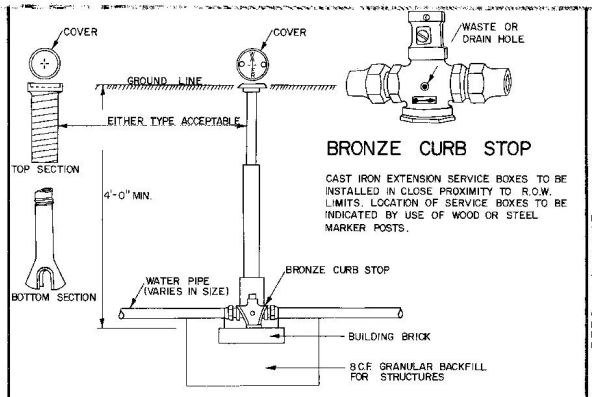
D-4




## TYPICAL WATERFALL FOR CULVERTS UP TO AND INCLUDING 48" DIAMETER



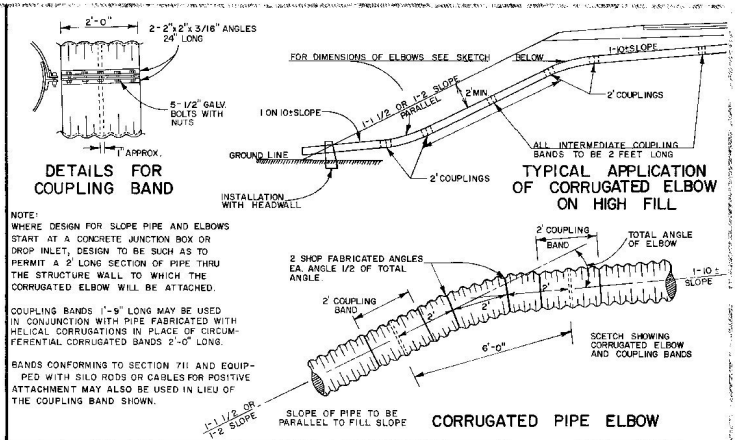

## GRANULAR MATERIAL AT CULVERT LOCATIONS



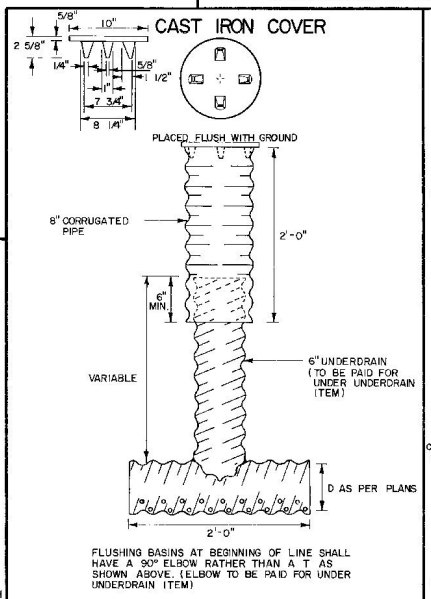

## BRONZE CURB STOP

CAST IRON EXTENSION SERVICE BOXES TO BE INSTALLED IN CLOSE PROXIMITY TO R.O.W. LIMITS. LOCATION OF SERVICE BOXES TO BE INDICATED BY USE OF WOOD OR STEEL MARKER POSTS.

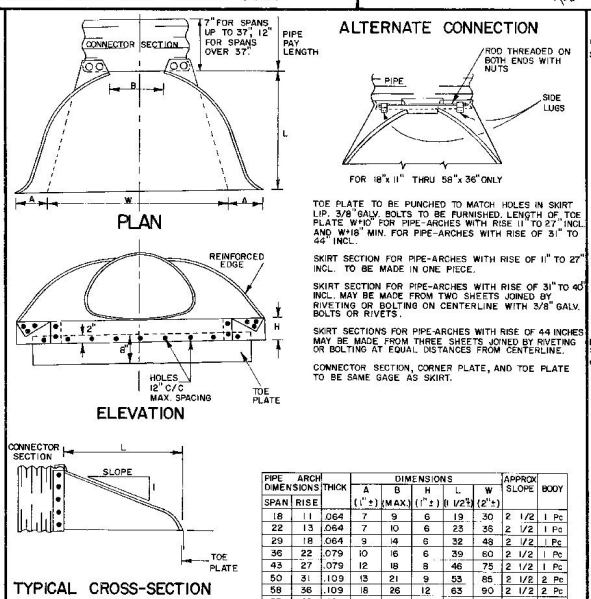
## EXTENSION SERVICE BOX AND CURB STOP




## CORRUGATED PIPE ELBOW

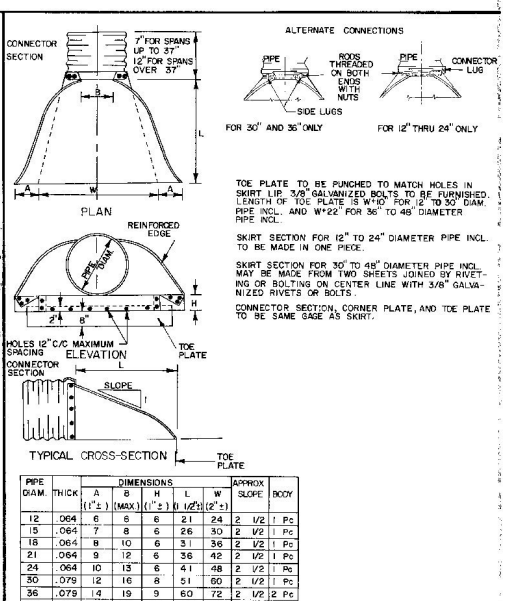



## UNDERDRAIN FLUSHING BASIN




## CORRUGATED STEEL PIPE ARCH END SECTION

| PIPE ARCH DIMENSIONS SPAN | RISE | THICK | DIMENSIONS A (1" ±) | B (MAX.) | H (1" ±) | L (1 1/2" ±) | W (2" ±) | APPROX SLOPE | BODY |
|---|---|---|---|---|---|---|---|---|---|
| 18 | 11 | .064 | 7 | 9 | 6 | 19 | 30 | 2 1/2 | 1 Pc |
| 22 | 13 | .064 | 7 | 10 | 6 | 23 | 35 | 2 1/2 | 1 Pc |
| 29 | 18 | .064 | 9 | 14 | 8 | 32 | 48 | 2 1/2 | 1 Pc |
| 36 | 22 | .079 | 10 | 16 | 6 | 39 | 60 | 2 1/2 | 1 Pc |
| 43 | 27 | .079 | 12 | 18 | 8 | 46 | 75 | 2 1/2 | 1 Pc |
| 50 | 31 | .109 | 13 | 21 | 9 | 53 | 85 | 2 1/2 | 2 Pc |
| 58 | 36 | .109 | 18 | 26 | 12 | 63 | 90 | 2 1/2 | 2 Pc |
| 65 | 40 | .109 | 18 | 30 | 12 | 70 | 102 | 2 1/4 | 2 Pc |
| 72 | 44 | .109 | 18 | 33 | 12 | 77 | 114 | 2 1/4 | 3 Pc |




## CORRUGATED STEEL PIPE END SECTION

| PIPE DIAM. | THICK | DIMENSIONS A (1" ±) | B (MAX.) | H (1" ±) | L (1 1/2" ±) | W (2" ±) | APPROX SLOPE | BODY |
|---|---|---|---|---|---|---|---|---|
| 12 | .064 | 6 | 8 | 6 | 21 | 24 | 2 1/2 | 1 Pc |
| 15 | .064 | 7 | 8 | 6 | 26 | 30 | 2 1/2 | 1 Pc |
| 18 | .064 | 8 | 10 | 6 | 31 | 36 | 2 1/2 | 1 Pc |
| 21 | .064 | 9 | 12 | 6 | 36 | 42 | 2 1/2 | 1 Pc |
| 24 | .064 | 10 | 13 | 6 | 41 | 48 | 2 1/2 | 1 Pc |
| 30 | .079 | 12 | 16 | 8 | 51 | 60 | 2 1/2 | 1 Pc |
| 36 | .079 | 14 | 19 | 9 | 60 | 72 | 2 1/2 | 2 Pc |
| 42 | .109 | 16 | 22 | 11 | 69 | 84 | 2 1/2 | 2 Pc |
| 48 | .109 | 18 | 27 | 12 | 78 | 90 | 2 1/4 | 2 Pc |

## CORRUGATED STEEL PIPE END SECTION

REVISIONS AND CORRECTIONS

JULY 17, 1972 HELICAL CORRUGATED COUPLING BAND NOTE ADDED.
JULY 24, 1975 GRANULAR MATERIAL AT CULVERT LOCATIONS CORRECTED.
OCT 30, 1985 REVISED TO CONFORM WITH 1986 SPECIFICATIONS.

APPROVED:

DATE: Dec 6, 1977

R. H. Arnold
CHIEF ENGINEER

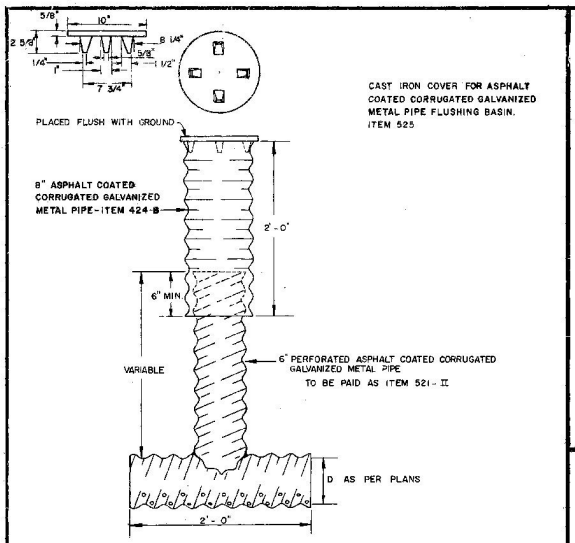
E. H. Stickney
ASST. CHIEF ENGINEER

G. M. Lane
HIGHWAY ENGINEER

TYPICAL WATERFALL FOR CULVERTS UP TO AND INCLUDING 48" DIAMETER
EXTENSION SERVICE BOX AND CURB STOP
CORRUGATED PIPE ELBOW
GRANULAR BORROW AT CULVERT LOCATIONS
UNDERDRAIN FLUSHING BASIN
CORRUGATED STEEL PIPE END SECTION
CORRUGATED STEEL PIPE ARCH END SECTION

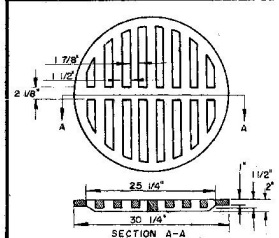
VERMONT AGENCY OF TRANSPORTATION

STANDARD
D-4

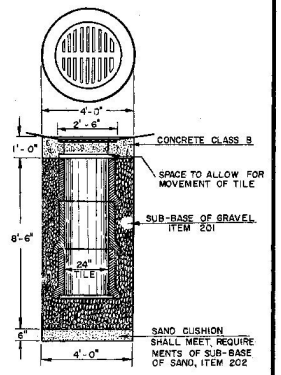



UNDERDRAIN FLUSHING BASIN

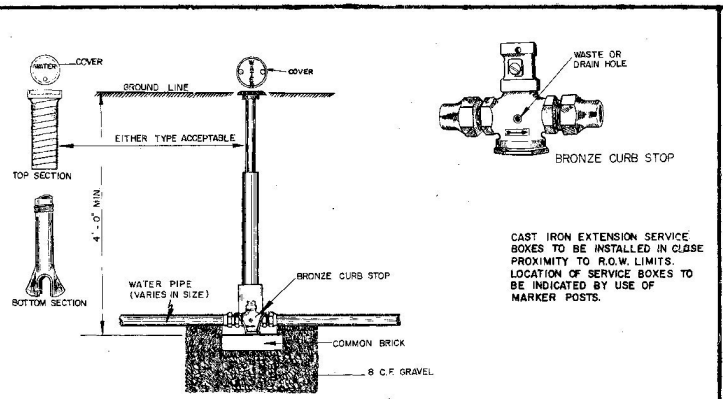
FLUSHING BASINS AT BEGINNING OF LINE, SHALL HAVE A 90° ELBOW RATHER THAN A "T" AS SHOWN ABOVE.




CAST IRON GRATE FOR LEACHING BASIN UNDER ITEM 526




LEACHING BASIN, ITEM 526

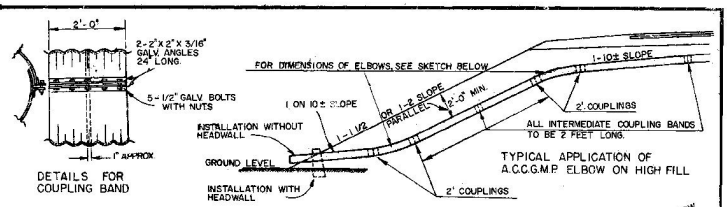



EXTENSION SERVICE BOX AND CURB STOP ITEM 596

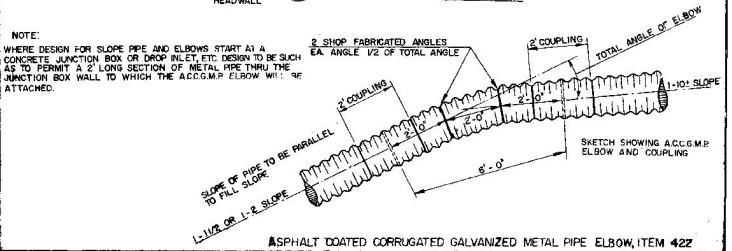



BRONZE CURB STOP

CAST IRON EXTENSION SERVICE BOXES TO BE INSTALLED IN CLOSE PROXIMITY TO R.O.W. LIMITS. LOCATION OF SERVICE BOXES TO BE INDICATED BY USE OF MARKER POSTS.

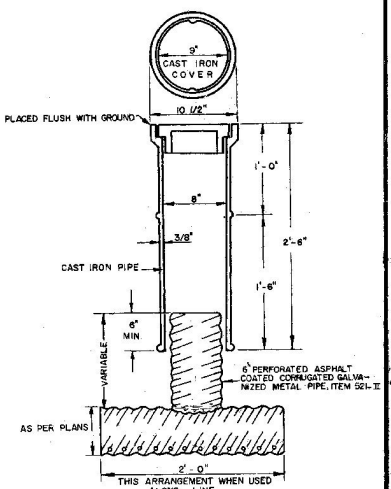



NOTE:
WHERE DESIGN FOR SLOPE PIPE AND ELBOWS START AT A CONCRETE JUNCTION BOX OR DROP INLET, ETC. DESIGN TO BE SUCH AS TO PERMIT A 2' LONG SECTION OF METAL PIPE THRU THE JUNCTION BOX WALL TO WHICH THE A.C.C.G.M.P. ELBOW WILL BE ATTACHED.

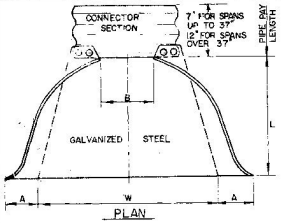


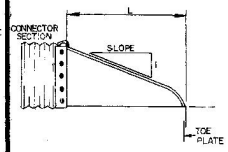

ASPHALT COATED CORRUGATED GALVANIZED METAL PIPE ELBOW, ITEM 422

FLUSHING BASINS AT BEGINNING OF LINE, SHALL HAVE A 90° ELBOW RATHER THAN A "T" AS SHOWN BELOW.

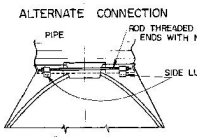



CAST IRON PIPE UNDERDRAIN FLUSHING BASIN WITH CAST IRON COVER ITEM 523




TYPICAL CROSS-SECTION




FOR 18" x 11" THRU 58" x 36" ONLY

TOE PLATE, TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP. 3/8" GALV. BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE IS W+10" FOR PIPE-ARCHES WITH RISE OF 11" TO 27" INCL. AND W+18" MIN. FOR PIPE-ARCHES WITH RISE OF 31" TO 44" INCL.

SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 11" TO 27" INCL. TO BE MADE IN ONE PIECE.

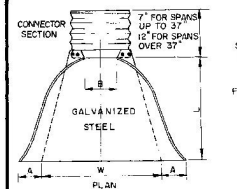
SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 31" TO 40" INCL. MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE WITH 3/8" GALV. BOLTS OR RIVETS.

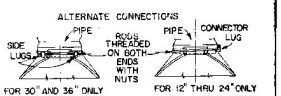
SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 44 INCHES MAY BE MADE FROM THREE SHEETS JOINED BY RIVETING OR BOLTING AT EQUAL DISTANCES FROM CENTERLINE.

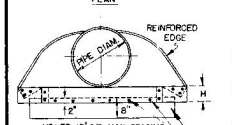
CONNECTOR SECTION, CORNER PLATE AND TOE PLATE TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.

| PIPE ARCH DIMENSIONS SPAN | RISE | GA | DIMENSIONS A (1"±) | B MAX | H (1"±) | L (1 1/2"±) | W (2"±) | APPROX SLOPE | BODY |
|---|---|---|---|---|---|---|---|---|---|
| 18 | 11 | 16 | 7 | 9 | 6 | 19 | 30 | 2 1/2 | 1 Pc. |
| 22 | 13 | 16 | 7 | 10 | 6 | 23 | 36 | 2 1/2 | 1 Pc. |
| 29 | 18 | 16 | 9 | 14 | 6 | 32 | 48 | 2 1/2 | 1 Pc. |
| 36 | 22 | 14 | 10 | 16 | 6 | 39 | 60 | 2 1/2 | 1 Pc. |
| 43 | 27 | 14 | 12 | 18 | 8 | 46 | 75 | 2 1/2 | 1 Pc. |
| 50 | 31 | 12 | 13 | 21 | 9 | 53 | 85 | 2 1/2 | 2 Pc. |
| 58 | 36 | 12 | 18 | 26 | 12 | 63 | 90 | 2 1/2 | 2 Pc. |
| 65 | 40 | 12 | 18 | 30 | 12 | 70 | 102 | 2 1/4 | 2 Pc. |
| 72 | 44 | 12 | 18 | 33 | 12 | 77 | 114 | 2 1/4 | 3 Pc. |

METAL END SECTION FOR A.C.C.G.M.P. ARCH, UNDER ITEM 430-II



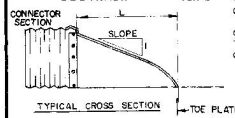




TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP. 3/8" GALVANIZED BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE IS W+10" FOR 12" TO 30" DIAMETER PIPE INCL. AND W+22" FOR 36" TO 48" DIAMETER PIPE INCL.

SKIRT SECTION FOR 12" TO 24" DIAMETER PIPE INCL. TO BE MADE IN ONE PIECE.

SKIRT SECTION FOR 30" TO 48" DIAMETER PIPE INCL. MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTER LINE WITH 3/8" GALVANIZED RIVETS OR BOLTS.

CONNECTOR SECTION, CORNER PLATE AND TOE PLATE TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.




TYPICAL CROSS SECTION

| PIPE DIAM. | GA. | DIMENSIONS A (1"±) | B (MAX) | H (1"±) | L (1 1/2"±) | W (2"±) | APPROX SLOPE | BODY |
|---|---|---|---|---|---|---|---|---|
| 12 | 16 | 6 | 6 | 6 | 21 | 24 | 2 1/2 | 1 Pc. |
| 15 | 16 | 7 | 8 | 6 | 26 | 30 | 2 1/2 | 1 Pc. |
| 18 | 16 | 8 | 10 | 6 | 31 | 36 | 2 1/2 | 1 Pc. |
| 21 | 16 | 9 | 12 | 6 | 36 | 42 | 2 1/2 | 1 Pc. |
| 24 | 16 | 10 | 13 | 6 | 41 | 48 | 2 1/2 | 1 Pc. |
| 30 | 14 | 12 | 16 | 8 | 51 | 60 | 2 1/2 | 1 Pc. |
| 36 | 14 | 14 | 19 | 9 | 60 | 72 | 2 1/2 | 2 Pc. |
| 42 | 12 | 16 | 22 | 11 | 69 | 84 | 2 1/2 | 2 Pc. |
| 48 | 12 | 18 | 27 | 12 | 78 | 90 | 2 1/4 | 2 Pc. |

METAL END SECTION FOR A.C.C.G.M.P. (ROUND) UNDER ITEM 430-I

REVISIONS AND CORRECTIONS

WORDS "ASPHALT COATED" FOR ITEM 530 ADDED 6-3-1959

2 INTERMEDIATE COUPLING BANDS ADDED TO SKETCH OF SPECIAL A.C.C.G.M.P. ELBOWS -- JAN. 11, 1960.

DETAILS OF FLUSHING BASIN COVER ADDED.. SEPT 22, 1960
NOTE ON CONNECTOR SECTION FOR METAL FLUME ADDED OCT 11, 1961
CATTLE PASS GAGE REQUIREMENTS MODIFIED, APR. 18, 1962

GAGES OF METAL END SECTIONS REVISED.. JAN. 19, 1965
MAR. 1, 1965.. CATTLE PASS' REMOVED
JAN 31, 1966.. BLOCK WITH EXTENSION SERVICE BOX ADDED
AUG 1, 1966.. CAST IRON GRATE CHANGED.
DEC. 1, 1968.. EXTENSION SERVICE BOX CHANGED

APPROVED: DATE MARCH 10, 1965

G. D. Bishop
CHIEF ENGINEER

L. M. Lane
HIGHWAY ENGINEER

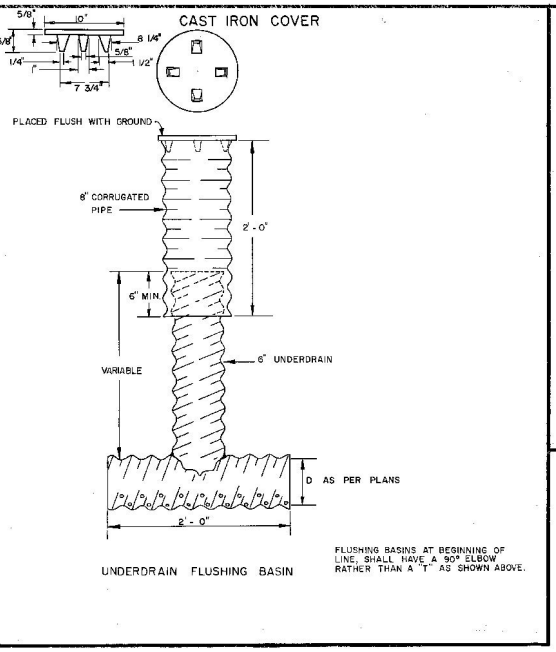
E. H. Stickney
CONSTRUCTION ENGINEER

DRAWN AJA
TRACED AJA

ASPHALT COATED CORRUGATED GALV. METAL PIPE ELBOW, ITEM 422
CAST IRON PIPE UNDERDRAIN FLUSHING BASIN WITH CAST IRON COVERS, ITEM 523
METAL END SECTIONS FOR ASPH. CTD. CORR. GALV. METAL PIPE, ITEM 430-I
METAL END SECTIONS FOR ASPH. CTD. CORR. GALV. METAL PIPE ARCH, ITEM 430-II
LEACHING BASIN, ITEM 526
CAST IRON COVER FOR A.C.C.G.M.P. FLUSHING BASIN, ITEM 526
EXTENSION SERVICE BOX AND CURB STOP ITEM 596

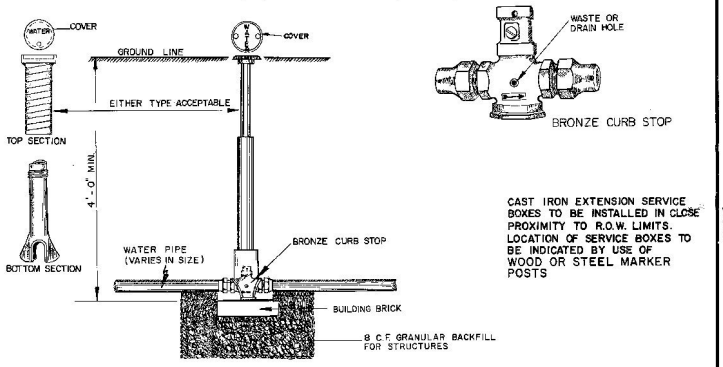
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-4



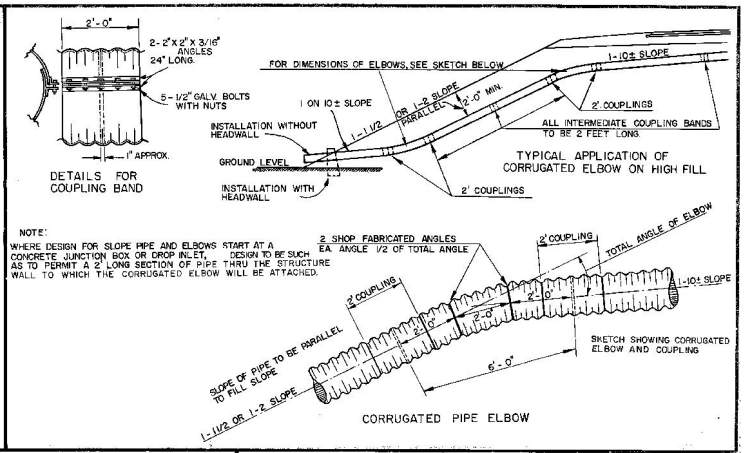

UNDERDRAIN FLUSHING BASIN

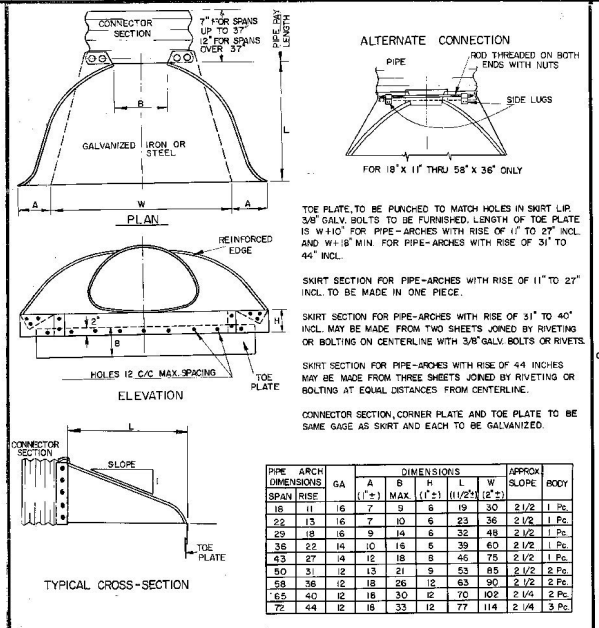
FLUSHING BASINS AT BEGINNING OF LINE, SHALL HAVE A 90° ELBOW RATHER THAN A "T" AS SHOWN ABOVE.




CAST IRON EXTENSION SERVICE BOXES TO BE INSTALLED IN CLOSE PROXIMITY TO R.O.W. LIMITS. LOCATION OF SERVICE BOXES TO BE INDICATED BY USE OF WOOD OR STEEL MARKER POSTS

EXTENSION SERVICE BOX AND CURB STOP




TOE PLATE, TO BE PUNCHED TO MATCH HOLES IN SKIRT L.P. 3/8" GALV. BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE IS W+10" FOR PIPE-ARCHES WITH RISE OF 17" TO 27" INCL. AND W+18" MIN. FOR PIPE-ARCHES WITH RISE OF 31" TO 44" INCL.

SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 11" TO 27" INCL. TO BE MADE IN ONE PIECE.

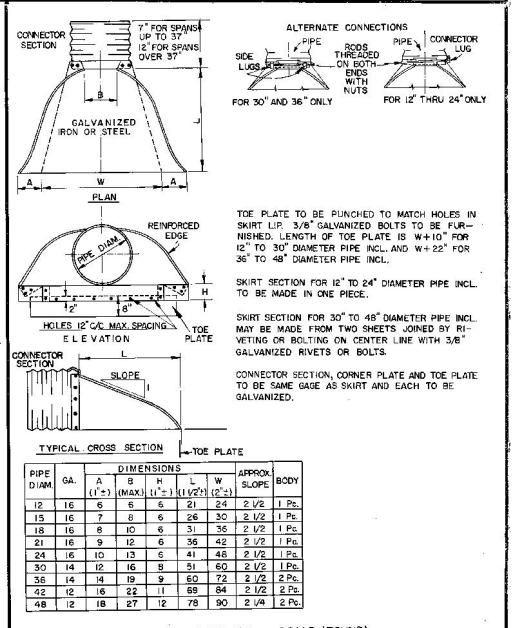
SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 31" TO 40" INCL. MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE WITH 3/8" GALV. BOLTS OR RIVETS.

SKIRT SECTION FOR PIPE-ARCHES WITH RISE OF 44 INCHES MAY BE MADE FROM THREE SHEETS JOINED BY RIVETING OR BOLTING AT EQUAL DISTANCES FROM CENTERLINE.

CONNECTOR SECTION, CORNER PLATE AND TOE PLATE TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.

| PIPE ARCH DIMENSIONS SPAN | RISE | GA | DIMENSIONS A (1"±) | B MAX. | H (1"±) | L (11/2"±) | W (2"±) | APPROX. SLOPE | BODY |
|---|---|---|---|---|---|---|---|---|---|
| 18 | 11 | 16 | 7 | 9 | 6 | 19 | 30 | 2 1/2 | 1 Pc. |
| 22 | 13 | 16 | 7 | 10 | 6 | 23 | 36 | 2 1/2 | 1 Pc. |
| 29 | 18 | 16 | 9 | 14 | 6 | 32 | 48 | 2 1/2 | 1 Pc. |
| 36 | 22 | 14 | 10 | 16 | 6 | 39 | 60 | 2 1/2 | 1 Pc. |
| 43 | 27 | 14 | 12 | 18 | 8 | 46 | 75 | 2 1/2 | 1 Pc. |
| 50 | 31 | 12 | 13 | 21 | 9 | 53 | 85 | 2 1/2 | 2 Pc. |
| 58 | 36 | 12 | 18 | 26 | 12 | 63 | 90 | 2 1/2 | 2 Pc. |
| 65 | 40 | 12 | 18 | 30 | 12 | 70 | 102 | 2 1/4 | 2 Pc. |
| 72 | 44 | 12 | 18 | 33 | 12 | 77 | 114 | 2 1/4 | 3 Pc. |

METAL END SECTION FOR C.G.M.P ARCH




TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT L.P. 3/8" GALVANIZED BOLTS TO BE FURNISHED. LENGTH OF TOE PLATE IS W+10" FOR 12" TO 30" DIAMETER PIPE INCL. AND W+22" FOR 36" TO 48" DIAMETER PIPE INCL.

SKIRT SECTION FOR 12" TO 24" DIAMETER PIPE INCL. TO BE MADE IN ONE PIECE.

SKIRT SECTION FOR 30" TO 48" DIAMETER PIPE INCL. MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTER LINE WITH 3/8" GALVANIZED RIVETS OR BOLTS.

CONNECTOR SECTION, CORNER PLATE AND TOE PLATE TO BE SAME GAGE AS SKIRT AND EACH TO BE GALVANIZED.

| PIPE DIAM. | GA. | DIMENSIONS A (1"±) | B (MAX.) | H (1"±) | L (1 1/2"±) | W (2"±) | APPROX. SLOPE | BODY |
|---|---|---|---|---|---|---|---|---|
| 12 | 16 | 6 | 6 | 6 | 21 | 24 | 2 1/2 | 1 Pc. |
| 15 | 16 | 7 | 8 | 6 | 26 | 30 | 2 1/2 | 1 Pc. |
| 18 | 16 | 8 | 10 | 6 | 31 | 36 | 2 1/2 | 1 Pc. |
| 21 | 16 | 9 | 12 | 6 | 36 | 42 | 2 1/2 | 1 Pc. |
| 24 | 16 | 10 | 13 | 6 | 41 | 48 | 2 1/2 | 1 Pc. |
| 30 | 14 | 12 | 16 | 8 | 51 | 60 | 2 1/2 | 1 Pc. |
| 36 | 14 | 14 | 19 | 9 | 60 | 72 | 2 1/2 | 2 Pc. |
| 42 | 12 | 16 | 22 | 11 | 69 | 84 | 2 1/2 | 2 Pc. |
| 48 | 12 | 18 | 27 | 12 | 78 | 90 | 2 1/4 | 2 Pc. |

METAL END SECTION FOR C.G.M.P (ROUND)

REVISIONS AND CORRECTIONS

APPROVED: DATE Dec 6th 1971

P.W. Arnold
CHIEF ENGINEER

E.B. Hickney
ASST. CHIEF ENGINEER

R.M. Lane
HIGHWAY ENGINEER

DRAWN AJA.
TRACED AJA

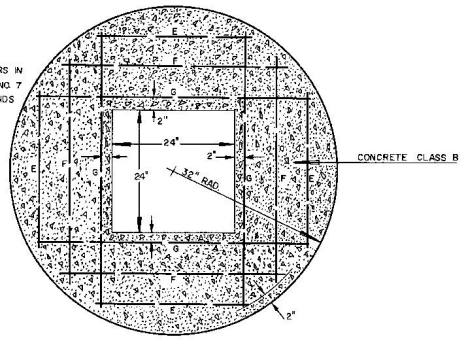
CORRUGATED PIPE ELBOW
METAL END SECTIONS FOR CORRUGATED GALVANIZED METAL PIPE
METAL END SECTIONS FOR CORRUGATED GALVANIZED METAL PIPE ARCH
UNDERDRAIN FLUSHING BASIN

EXTENSION SERVICE BOX AND CURB STOP

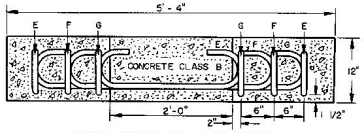
VERMONT
DEPARTMENT OF HIGHWAYS
STANDARD

D-4

ALL REINFORCING STEEL BARS IN SEAT ADAPTER ARE NO. 7 (7/8" DIAM.) WITH HOOKED ENDS AND SPACED 6" C/C




TOP VIEW OF ADAPTER




SIDE VIEW OF ADAPTER


COMPOSITE WEIGHT OF 7/8" DIAM. REINFORCING BARS 141 LBS.

| ITEM | NO. PIECES | SIZE | LENGTH | MARK | TYPE | A | B | G | J |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 7 | 4'-9" | E | 1 | 0'-10" | 2'-6" | 0'-10" | 0'-7" |
| 2 | 4 | 7 | 5'-9" | F | 1 | 0'-10" | 3'-6" | 0'-10" | 0'-7" |
| 3 | 4 | 7 | 6'-9" | G | 1 | 0'-10" | 4'-6" | 0'-10" | 0'-7" |

SEAT ADAPTER

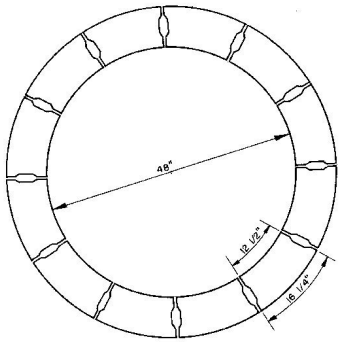
SEAT ADAPTER TO BE CONSTRUCTED OF CONCRETE. CONCRETE TO CONFORM TO THE REQUIREMENTS OF CONCRETE CLASS "B", ITEM 401-8 AND PAYMENT TO BE INCLUDED IN THE LUMP SUM BID PRICE FOR CATCH BASIN OR MANHOLE, TYPE II, ITEM 528

THREE COURSES OF COMMON BRICK TO BE PLACED ON TOP OF SEAT ADAPTER PRIOR TO PLACING GRATE OR COVER UNIT TO FACILTATE CHANGING ELEVATION OF CATCH BASIN WHEN REQUIRED.

FURNISHING AND LAYING OF BRICKS AND MORTAR TO BE INCLUDED IN LUMP SUM BID PRICE FOR CATCH BASIN OR MANHOLE - TYPE II, ITEM 528

REINFORCING STEEL TO CONFORM TO THE REQUIREMENTS FOR REINFORCING STEEL, ITEM 402 AND PAYMENT TO BE INCLUDED IN THE LUMP SUM BID PRICE FOR CATCH BASIN OR MANHOLE - TYPE II, ITEM 528

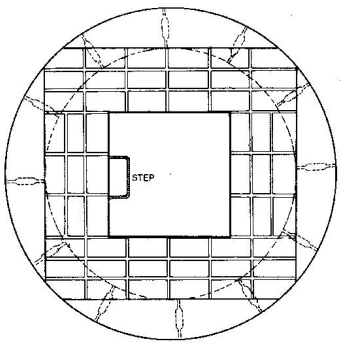
FRAME, GRATE AND COVER TO CONFORM TO THE MATERIAL AND COATING REQUIREMENTS OF ITEM 534, SUB-ARTICLE 534.02 A OR 534.02 B AND PAYMENT TO BE INCLUDED IN THE LUMP BID PRICE FOR ITEM 528




TOP VIEW OF BARREL BLOCKS

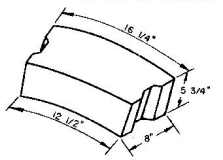
BARREL BLOCK QUANTITIES

| DEPTH OF MANHOLE | NO. OF BLOCKS | DEPTH OF MANHOLE | NO. OF BLOCKS |
|---|---|---|---|
| 5'-0" | 120 | 8'-0" | 192 |
| 5'-6" | 132 | 8'-6" | 204 |
| 6'-0" | 144 | 9'-0" | 216 |
| 6'-6" | 156 | 9'-6" | 228 |
| 7'-0" | 168 | 10'-0" | 240 |
| 7'-6" | 180 | 10'-6" | 252 |



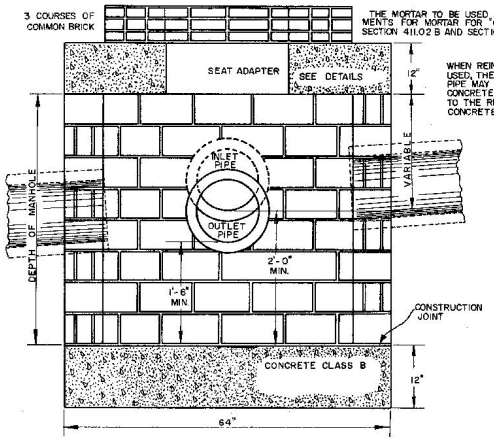

TOP VIEW

BARREL BLOCK



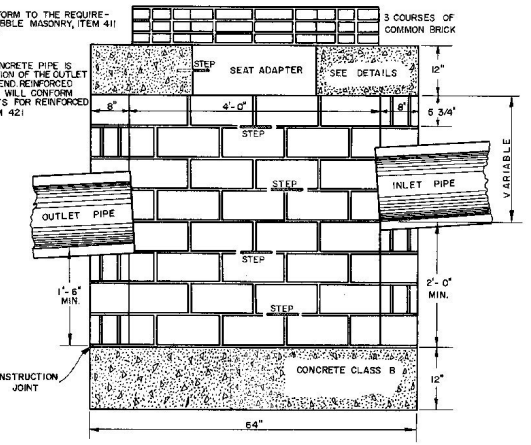

NOTE: ANY MANUFACTURED CONCRETE BLOCK APPROXIMATING THESE DIMENSIONS AND APPROVED BY THE CHIEF ENGINEER MAY BE USED, AND MUST CONFORM TO THE REQUIREMENTS SET FORTH UNDER SECTION 528.02 C OF SPECIFICATIONS.

ANY OF THE COMBINATIONS OF TOPS, CURBS AND GRATES FOUND ON SHEETS D-9, D-10, D-11 AND D-16 CAN BE ADAPTED FOR USE WITH THIS STRUCTURE.

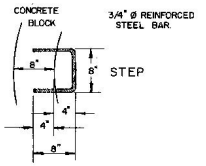



FRONT VIEW

WHEN REINFORCED CONCRETE PIPE IS USED, THE FIRST SECTION OF THE OUTLET PIPE MAY BE A STUB END REINFORCED CONCRETE PIPE WHICH WILL CONFORM TO THE REQUIREMENTS FOR REINFORCED CONCRETE PIPE, ITEM 421




SIDE VIEW




TOP STEP LOCATED MIDWAY IN ADAPTER OPENING, THEN AT 12" VERTICAL SPACINGS.

REVISIONS AND CORRECTIONS

MAR. 1, 1965. NOTES AND DRAWING OF GRATE IN TOP VIEW ELIMINATED, STEP DETAILS ADDED. TILE IN BASE REMOVED GENERAL NOTES ALTERED

APPROVED: DATE MARCH 10, 1965

A D Bishop
CHIEF ENGINEER

G. M. Lane
HIGHWAY ENGINEER

E. W. Stickney
CONSTRUCTION ENGINEER

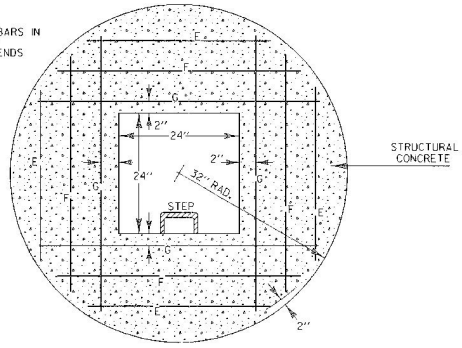
DRAWN AJA
TRACED AJA

# CATCH BASIN OR MANHOLE - TYPE II, ITEM 528

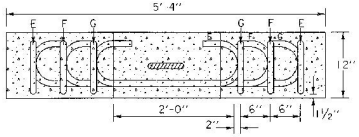
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-5

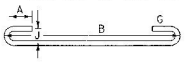
ALL REINFORCING STEEL BARS IN SEAT ADAPTER ARE NO.7 DEFORMED WITH HOOKED ENDS AND SPACED 6" C/C




TOP VIEW OF ADAPTER




SIDE VIEW OF ADAPTER



COMPOSITE WEIGHT OF NO.7 DEFORMED REINFORCING BARS 141 LBS.

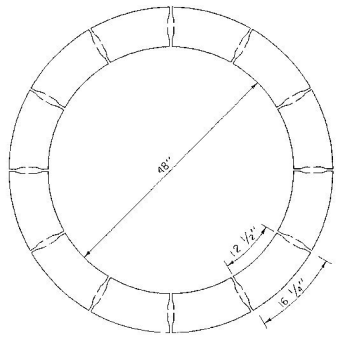
| ITEM | NO. PIECES | SIZE | LENGTH | MARK | TYPE | A | B | G | J |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 7 | 4'-9" | E | 1 | 0'-10" | 2'-5" | 0'-10" | 0'-7" |
| 2 | 4 | 7 | 5'-9" | F | 1 | 0'-10" | 3'-6" | 0'-10" | 0'-7" |
| 3 | 4 | 7 | 6'-9" | G | 1 | 0'-10" | 4'-6" | 0'-10" | 0'-7" |

SEAT ADAPTER

BASE AND SEAT ADAPTER TO BE CONSTRUCTED OF STRUCTURAL CONCRETE, SECTION 501, AND INCLUDED IN THE BID PRICE FOR CONCRETE BLOCK CATCHBASIN WITH CAST IRON GRATE OR CONCRETE BLOCK MANHOLE WITH CAST IRON COVER.

THREE COURSES OF BUILDING BRICK TO BE PLACED ON TOP OF SEAT ADAPTER PRIOR TO PLACING GRATE OR COVER UNIT TO FACILITATE CHANGING ELEVATION OF CATCH BASIN OR MANHOLE.

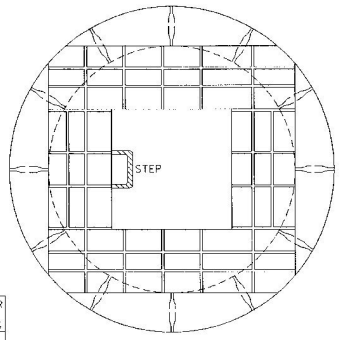
FRAME, GRATE AND COVER TO BE INCLUDED IN THE BID PRICE FOR CONCRETE BLOCK CATCHBASIN WITH CAST IRON GRATE OR CONCRETE BLOCK MANHOLE WITH CAST IRON COVER.




TOP VIEW OF BARREL BLOCKS

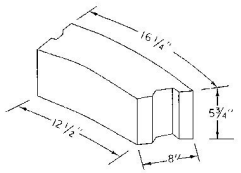
BARREL BLOCK QUANTITIES

| DEPTH OF CATCHBASIN OR MANHOLE | NUMBER OF BLOCKS | DEPTH OF CATCHBASIN OR MANHOLE | NUMBER OF BLOCKS |
|---|---|---|---|
| 5'-0" | 120 | 8'-0" | 192 |
| 5'-6" | 132 | 8'-6" | 204 |
| 6'-0" | 144 | 9'-0" | 216 |
| 6'-6" | 156 | 9'-6" | 228 |
| 7'-0" | 168 | 10'-0" | 240 |
| 7'-6" | 180 | 10'-6" | 252 |




TOP VIEW

BARREL BLOCK

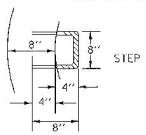



NOTE : ANY MANUFACTURED CONCRETE BLOCK APPROXIMATING THESE DIMENSIONS AND APPROVED BY THE ENGINEER MAY BE USED.

ANY OF THE COMBINATIONS OF TOPS, CURBS AND GRATES FOUND ON SHEETS D-9, D-10 AND D-16 CAN BE ADAPTED FOR USE WITH THIS STRUCTURE

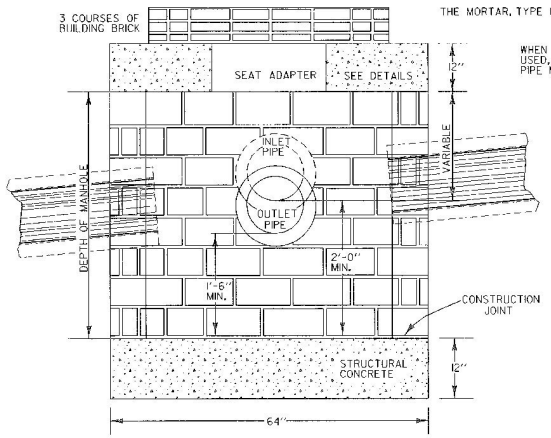
USE NO.6 REINFORCED STEEL BAR, FOR STEP.

TOP STEP LOCATED MIDWAY IN ADAPTER OPENING, THEN AT 12" VERTICAL SPACINGS.

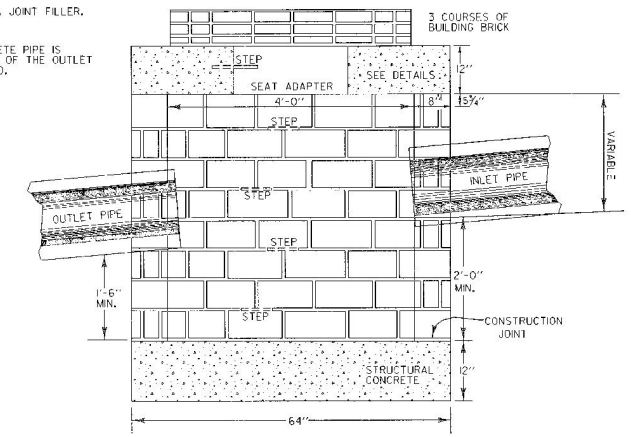



THE MORTAR, TYPE II, TO BE USED AS A JOINT FILLER.

WHEN REINFORCED CONCRETE PIPE IS USED, THE FIRST SECTION OF THE OUTLET PIPE MAY BE A STUB END.




FRONT VIEW




REVISIONS AND CORRECTIONS

DEC. 14, 1971 - ORIGINAL APPROVAL DATE

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING

DIRECTOR OF ENGINEERING

DESIGN ENGINEER

# CONCRETE BLOCK CATCHBASIN WITH CAST IRON GRATE

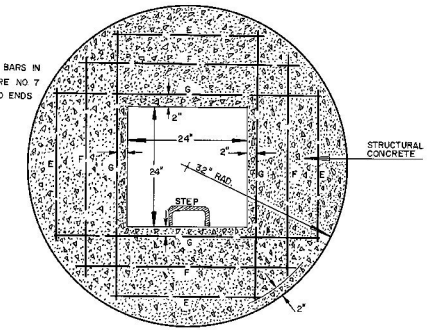
# CONCRETE BLOCK MANHOLE WITH CAST IRON COVER

VERMONT AGENCY OF TRANSPORTATION

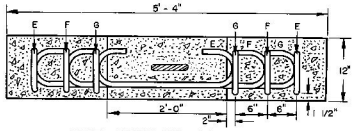
STANDARD

D-5

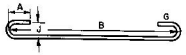
ALL REINFORCING STEEL BARS IN SEAT ADAPTER ARE NO. 7 DEFORMED WITH HOOKED ENDS AND SPACED 6" C/C




TOP VIEW OF ADAPTER




SIDE VIEW OF ADAPTER




COMPOSITE WEIGHT OF NO.7 DEFORMED REINFORCING BARS 141 LBS.

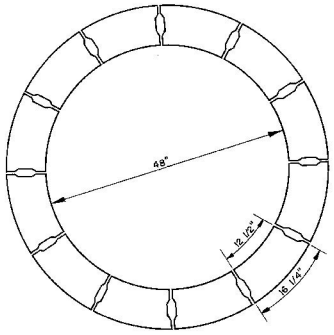
| ITEM | NO. PIECES | SIZE | LENGTH | MARK | TYPE | A | B | G | J |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 7 | 4'-9" | E | 1 | 0'-10" | 2'-6" | 0'-10" | 0'-7" |
| 2 | 4 | 7 | 5'-9" | F | 1 | 0'-10" | 3'-6" | 0'-10" | 0'-7" |
| 3 | 4 | 7 | 6'-9" | G | 1 | 0'-10" | 4'-6" | 0'-10" | 0'-7" |

SEAT ADAPTER

BASE AND SEAT ADAPTER TO BE CONSTRUCTED OF STRUCTURAL CONCRETE, SECTION 501, AND INCLUDED IN THE BID PRICE FOR CONCRETE BLOCK CATCHBASIN WITH CAST IRON GRATE OR CONCRETE BLOCK MANHOLE WITH CAST IRON COVER.

THREE COURSES OF BUILDING BRICK TO BE PLACED ON TOP OF SEAT ADAPTER PRIOR TO PLACING GRATE OR COVER UNIT TO FACILTATE CHANGING ELEVATION OF CATCH BASIN OR MANHOLE.

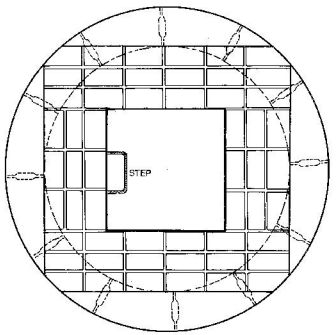
FRAME, GRATE AND COVER TO BE INCLUDED IN THE THE BID PRICE FOR CONCRETE BLOCK CATCHBASIN WITH CAST IRON GRATE OR CONCRETE BLOCK MANHOLE WITH CAST IRON COVER.




TOP VIEW OF BARREL BLOCKS

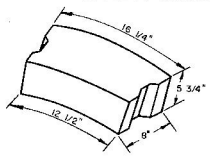
BARREL BLOCK QUANTITIES

| DEPTH OF CATCHBASIN OR MANHOLE | NO. OF BLOCKS | DEPTH OF CATCHBASIN OR MANHOLE | NO. OF BLOCKS |
|---|---|---|---|
| 5'-0" | 120 | 8'-0" | 192 |
| 5'-6" | 132 | 8'-6" | 204 |
| 6'-0" | 144 | 9'-0" | 216 |
| 6'-6" | 156 | 9'-6" | 228 |
| 7'-0" | 168 | 10'-0" | 240 |
| 7'-6" | 180 | 10'-6" | 252 |



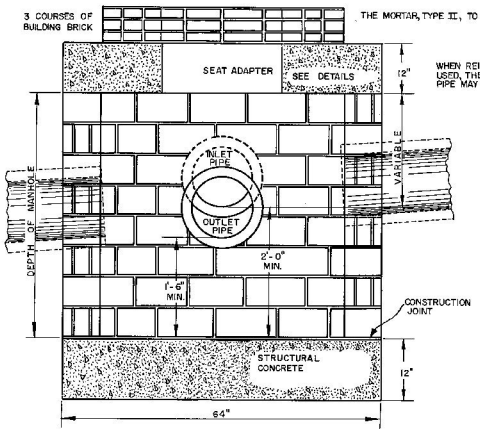

TOP VIEW

BARREL BLOCK



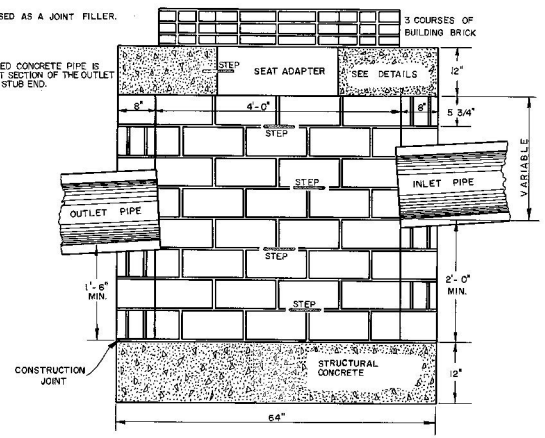

NOTE: ANY MANUFACTURED CONCRETE BLOCK APPROXIMATING THESE DIMENSIONS AND APPROVED BY THE ENGINEER MAY BE USED.

ANY OF THE COMBINATIONS OF TOPS, CURBS AND GRATES FOUND ON SHEETS D-9, D-10, D-11 AND D-16 CAN BE ADAPTED FOR USE WITH THIS STRUCTURE.

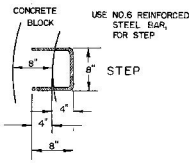



FRONT VIEW

WHEN REINFORCED CONCRETE PIPE IS USED, THE FIRST SECTION OF THE OUTLET PIPE MAY BE A STUB END.




SIDE VIEW




TOP STEP LOCATED MIDWAY IN ADAPTER OPENING, THEN AT 12" VERTICAL SPACINGS.

REVISIONS AND CORRECTIONS

APPROVED: DATE December 14, 1971

R. H. Crowell
CHIEF ENGINEER

E. W. Hackney
ASST. CHIEF ENGINEER

A. M. Lane
HIGHWAY ENGINEER

DRAWN AJA
TRACED AJA

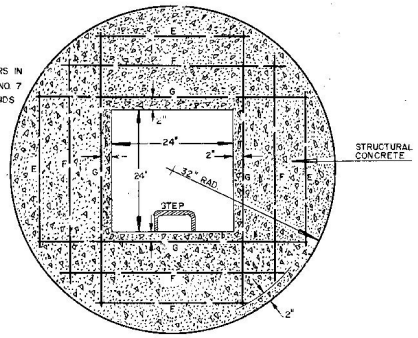
# CONCRETE BLOCK CATCHBASIN WITH CAST IRON GRATE
# CONCRETE BLOCK MANHOLE WITH CAST IRON COVER

VERMONT AGENCY OF TRANSPORTATION

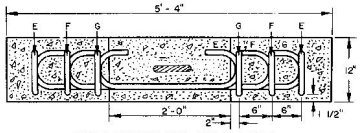
STANDARD

D-5

ALL REINFORCING STEEL BARS IN SEAT ADAPTER ARE NO. 7 DEFORMED WITH HOOKED ENDS AND SPACED 6" C/C




TOP VIEW OF ADAPTER




SIDE VIEW OF ADAPTER


COMPOSITE WEIGHT OF NO.7 DEFORMED REINFORCING BARS 141 LBS.

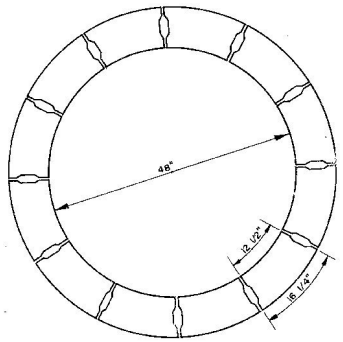
| ITEM | NO. PIECES | SIZE | LENGTH | MARK | TYPE | A | B | G | J |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 7 | 4'-9" | E | 1 | 0'-10" | 2'-6" | 0'-10" | 0'-7" |
| 2 | 4 | 7 | 5'-9" | F | 1 | 0'-10" | 3'-6" | 0'-10" | 0'-7" |
| 3 | 4 | 7 | 6'-9" | G | 1 | 0'-10" | 4'-6" | 0'-10" | 0'-7" |

SEAT ADAPTER

BASE AND SEAT ADAPTER TO BE CONSTRUCTED OF STRUCTURAL CONCRETE, SECTION 501, AND INCLUDED IN THE BID PRICE FOR CONCRETE BLOCK CATCHBASIN WITH CAST IRON GRATE OR CONCRETE BLOCK MANHOLE WITH CAST IRON COVER.

THREE COURSES OF BUILDING BRICK TO BE PLACED ON TOP OF SEAT ADAPTER PRIOR TO PLACING GRATE OR COVER UNIT TO FACILITATE CHANGING ELEVATION OF CATCH BASIN OR MANHOLE.

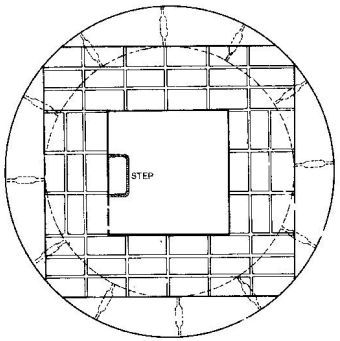
FRAME, GRATE AND COVER TO BE INCLUDED IN THE THE BID PRICE FOR CONCRETE BLOCK CATCHBASIN WITH CAST IRON GRATE OR CONCRETE BLOCK MANHOLE WITH CAST IRON COVER.




TOP VIEW OF BARREL BLOCKS

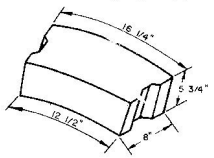
BARREL BLOCK QUANTITIES

| DEPTH OF CATCHBASIN OR MANHOLE | NO. OF BLOCKS | DEPTH OF CATCHBASIN OR MANHOLE | NO. OF BLOCKS |
|---|---|---|---|
| 5'-0" | 120 | 8'-0" | 192 |
| 5'-6" | 132 | 8'-6" | 204 |
| 6'-0" | 144 | 9'-0" | 216 |
| 6'-6" | 156 | 9'-6" | 228 |
| 7'-0" | 168 | 10'-0" | 240 |
| 7'-6" | 180 | 10-6" | 252 |



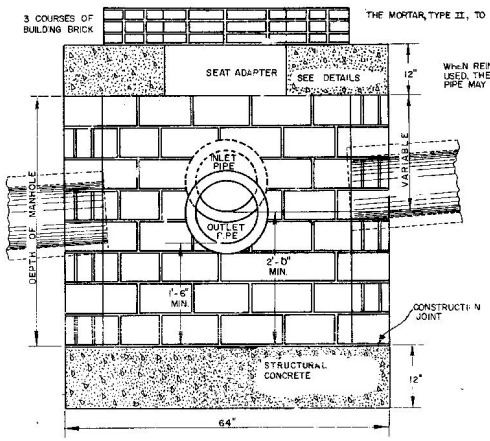

TOP VIEW

BARREL BLOCK



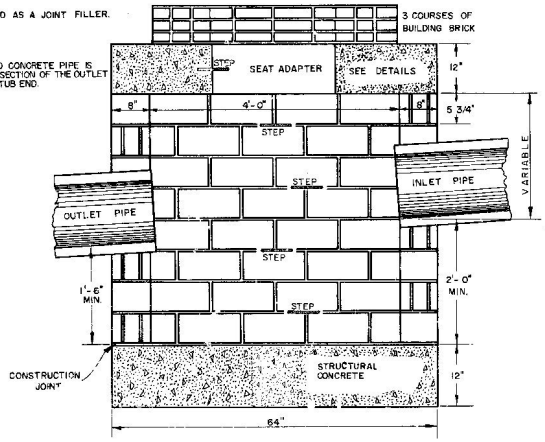

NOTE: ANY MANUFACTURED CONCRETE BLOCK APPROXIMATING THESE DIMENSIONS AND APPROVED BY THE ENGINEER MAY BE USED.

ANY OF THE COMBINATIONS OF TOPS, CURBS AND GRATES FOUND ON SHEETS D-9, D-10, D-11 AND D-16 CAN BE ADAPTED FOR USE WITH THIS STRUCTURE.

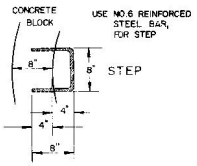



FRONT VIEW

When reinforced concrete pipe is used, the first section of the outlet pipe may be a stub end.




SIDE VIEW




TOP STEP LOCATED MIDWAY IN ADAPTER OPENING, THEN AT 12" VERTICAL SPACINGS.

REVISIONS AND CORRECTIONS

APPROVED: DATE December 14, 1971

R N Conwell
CHIEF ENGINEER

E W Hackney
ASST. CHIEF ENGINEER

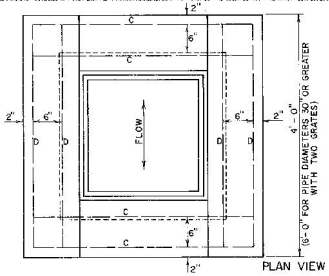
G M Lane
HIGHWAY ENGINEER

DRAWN AJA
TRACED AJA

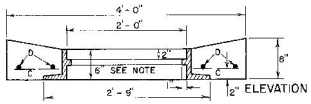
# CONCRETE BLOCK CATCHBASIN WITH CAST IRON GRATE
# CONCRETE BLOCK MANHOLE WITH CAST IRON COVER

VERMONT
DEPARTMENT OF HIGHWAYS
STANDARD

D-5



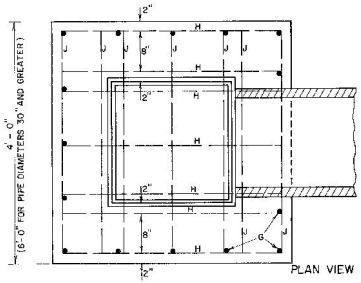

PLAN VIEW




ELEVATION

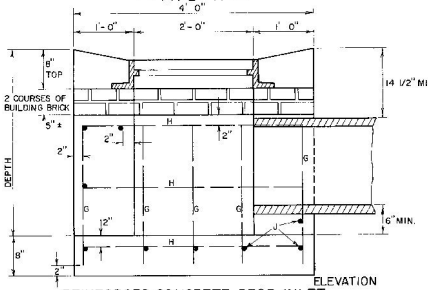
NOTE—FRAME SHOWN IS FOR TYPE 'A' GRATE, SEE SHEET D-11. FOR TYPE 'B' GRATE AND FRAME, SEE SHEET D-16 (EXCEPT THE FRAME DEPTH DIMENSION SHALL BE 6").

TOP FOR REINFORCED CONCRETE
DROP INLET WITH GRATE
FOR USE IN DITCHES




PLAN VIEW

— TYPE A —




ELEVATION

REINFORCED CONCRETE DROP INLET
FOR USE IN DITCHES

## STEEL SCHEDULE

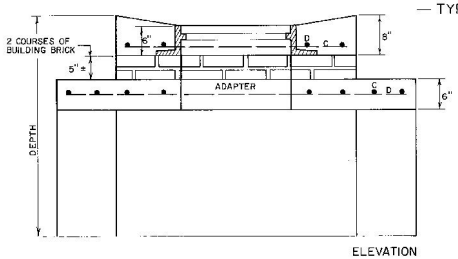
| 4'x4' DROP INLET TYPE A | | | | | | | 4'x6' DROP INLET WITH TWO GRATES TYPE B | | | | | | | | | TYPE C | 4'x6' DROP INLET WITH ONE GRATE WITH 4'x6' TOP | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 12", 15", 18", 24" | | | | | 30", 36" | | | | | | | | | | 30", 36" | | | | | | | | |
| DEPTH | G | LENGTH | H, J | LENGTH | C, D | LENGTH | G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH | G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH |
| 3'-0" | 15 | 2'-3" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | | | 3'-0" | | | | | | | | | | |
| 3'-6" | 15 | 2'-9" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | | | 3'-6" | | | | | | | | | | |
| 4'-0" | 15 | 3'-3" | 28 | 3'-8" | 8 | 3'-8" | 17 | 3'-3" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 4'-0" | 17 | 3'-8" | 19 | 3'-8" | 10 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 4'-0" |
| 4'-6" | 15 | 3'-9" | 29 | 3'-8" | 8 | 3'-8" | 17 | 3'-9" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 4'-6" | 17 | 4'-2" | 19 | 3'-8" | 10 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 4'-6" |
| 5'-0" | 15 | 4'-3" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-3" | 23 | 3'-8" | 13 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 5'-0" | 17 | 4'-8" | 23 | 3'-8" | 13 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 5'-0" |
| 5'-6" | 15 | 4'-9" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-9" | 23 | 3'-8" | 13 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 5'-6" | 17 | 5'-2" | 23 | 3'-8" | 13 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 5'-6" |
| 6'-0" | 15 | 5'-3" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-3" | 27 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 6'-0" | 17 | 5'-8" | 27 | 3'-8" | 15 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 6'-0" |
| 6'-6" | 15 | 5'-9" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-9" | 31 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 6'-6" | 17 | 6'-2" | 31 | 3'-8" | 15 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 6'-6" |
| 7'-0" | 15 | 6'-3" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-3" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 7'-0" | 17 | 6'-8" | 35 | 3'-8" | 17 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 7'-0" |
| 7'-6" | 15 | 6'-9" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-9" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 7'-6" | 17 | 7'-2" | 35 | 3'-8" | 17 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 7'-6" |
| 8'-0" | 15 | 7'-3" | 53 | 3'-8" | 8 | 3'-8" | 17 | 7'-3" | 39 | 3'-8" | 19 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 8'-0" | 17 | 7'-8" | 39 | 3'-8" | 19 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 8'-0" |

## STEEL AND CONCRETE QUANTITIES

| 4'x4' DROP INLET | | | 4'x6' DROP INLET WITH TWO GRATES | | | | | 4'x6' DROP INLET WITH ONE GRATE WITH 4'x6' TOP | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12"-15"-18"-24" TYPE A | | 30" TYPE B | | 36" | | | 30" TYPE C | | 36" | | | | | | | | | | | | | | | | | |
| DEPTH | CONCRETE C.Y. | STEEL LBS. | CONCRETE C.Y. | STEEL LBS. | CONCRETE C.Y. | STEEL LBS. | DEPTH | CONCRETE C.Y. | STEEL LBS. | CONCRETE C.Y. | STEEL LBS. | DEPTH | G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH |
| 3'-0" | 1.7 | 150 | | | | | 3'-0" | | | | | | | | | | | | | | | | |
| 3'-6" | 1.9 | 158 | | | | | 3'-6" | | | | | | | | | | | | | | | | |
| 4'-0" | 2.1 | 193 | 2.7 | 228 | | | 4'-0" | 2.8 | 244 | | | | 17 | 3'-7" | 23 | 3'-8" | 13 | 5'-8" | 12 | 3'-8" | 4<br>4 | 5'-8"<br>3'-8" | 5'-0" |
| 4'-6" | 2.3 | 200 | 3.0 | 237 | 2.9 | 237 | 4'-6" | 3.1 | 252 | 3.0 | 252 | 4'-6" | 17 | 4'-1" | 23 | 3'-8" | 13 | 5'-8" | 12 | 3'-8" | 4<br>4 | 5'-8"<br>3'-8" | 5'-6" |
| 5'-0" | 2.6 | 231 | 3.3 | 279 | 3.2 | 279 | 5'-0" | 3.4 | 294 | 3.3 | 294 | 5'-0" | 17 | 4'-7" | 27 | 3'-8" | 15 | 5'-8" | 12 | 3'-8" | 4<br>4 | 5'-8"<br>3'-8" | 6'-0" |
| 5'-6" | 2.8 | 239 | 3.6 | 288 | 3.5 | 288 | 5'-6" | 3.7 | 303 | 3.6 | 303 | 5'-6" | 17 | 5'-1" | 31 | 3'-8" | 15 | 5'-8" | 12 | 3'-8" | 4<br>4 | 5'-8"<br>3'-8" | 6'-6" |
| 6'-0" | 3.0 | 270 | 3.9 | 324 | 3.8 | 324 | 6'-0" | 4.0 | 339 | 3.9 | 339 | 6'-0" | 17 | 5'-7" | 35 | 3'-8" | 17 | 5'-8" | 12 | 3'-8" | 4<br>4 | 5'-8"<br>3'-8" | 7'-0" |
| 6'-6" | 3.2 | 278 | 4.2 | 348 | 4.1 | 348 | 6'-6" | 4.3 | 363 | 4.2 | 363 | 6'-6" | 17 | 6'-1" | 35 | 3'-8" | 17 | 5'-8" | 12 | 3'-8" | 4<br>4 | 5'-8"<br>3'-8" | 7'-6" |
| 7'-0" | 3.5 | 308 | 4.5 | 384 | 4.4 | 384 | 7'-0" | 4.6 | 399 | 4.5 | 399 | 7'-0" | 17 | 6'-7" | 39 | 3'-8" | 19 | 5'-8" | 12 | 3'-8" | 4<br>4 | 5'-8"<br>3'-8" | 8'-0" |
| 7'-6" | 3.7 | 316 | 4.8 | 393 | 4.7 | 393 | 7'-6" | 4.9 | 408 | 4.8 | 408 | 7'-6" | | | | | | | | | | | | | | | |
| 8'-0" | 3.9 | 347 | 5.1 | 429 | 5.0 | 429 | 8'-0" | 5.2 | 444 | 5.1 | 444 | 8'-0" | | | | | | | | | | | | | | | |

FOR 2nd 30" PIPE DEDUCT 0.18 C.Y. FOR 2nd 36" PIPE DEDUCT 0.26 C.Y.
FOR 2nd 42" PIPE DEDUCT 0.36 C.Y., OR 0.18 FOR 1 PIPE
FOR 2nd 48" PIPE DEDUCT 0.47 C.Y., OR 0.24 FOR 1 PIPE

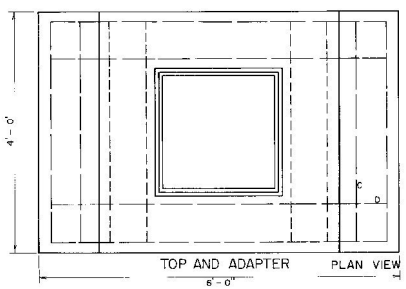
ALL REINFORCING STEEL TO BE NO. 5 DEFORMED BARS, EVENLY SPACED WITH A MAXIMUM SPACING OF 12" C/C.
ALL STEEL TO HAVE 2 INCH MIN. COVER.
DROP INLET TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501.
GRATES TO CONFORM TO DROP INLETS, CATCH BASINS, AND MANHOLES, SECTION 604.
FURNISHING AND LAYING OF BRICKS FOR ADJUSTING ELEVATION OF GRATE SHALL BE INCLUDED IN UNIT BID PRICE FOR CONCRETE, CLASS B, PAY ITEM 501.25, AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES.
MORTAR, TYPE II, TO BE USED AS JOINT FILLER AND LAYING OF BRICK.
FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE. ABOVE TABLES INDICATE DEDUCTION FOR ONE PIPE.




ELEVATION

4'x6' DROP INLET
WITH 4'x4' TOP
TOP WITH ONE CAST IRON GRATE

— TYPE D —




TOP 4'-0" PLAN VIEW




TOP AND ADAPTER PLAN VIEW
6'-0"

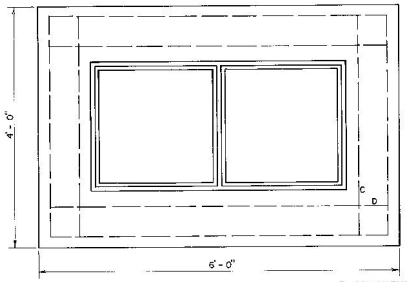
## STEEL AND CONCRETE QUANTITIES

4'x6' DROP INLET WITH ONE GRATE WITH 4'x4' TOP TYPE D

| DEPTH | 30" CONCRETE C.Y. | 30" STEEL LBS | 36" CONCRETE C.Y. | 36" STEEL LBS |
|---|---|---|---|---|
| 5'-0" | 3.2 | 313 | 3.1 | 313 |
| 5'-6" | 3.5 | 322 | 3.4 | 322 |
| 6'-0" | 3.8 | 358 | 3.7 | 358 |
| 6'-6" | 4.1 | 382 | 4.0 | 382 |
| 7'-0" | 4.4 | 418 | 4.3 | 418 |
| 7'-6" | 4.7 | 427 | 4.6 | 427 |
| 8'-0" | 5.0 | 463 | 4.9 | 463 |

— TYPE B —


ELEVATION

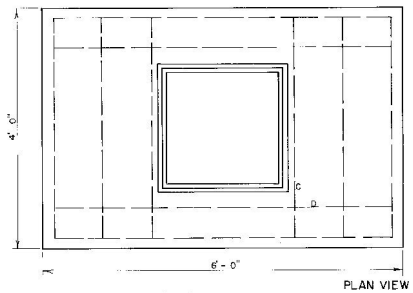



6'-0" PLAN VIEW

4'x6' DROP INLET
TOP WITH TWO CAST IRON GRATES

— TYPE C —


ELEVATION




6'-0" PLAN VIEW

4'x6' DROP INLET
TOP WITH ONE CAST IRON GRATE

REVISIONS AND CORRECTIONS
APR. 2, 1973—ORIGINAL D-6 REDRAWN.

APPROVED April 4, 1973 DATE

R. H. Arnold CHIEF ENGINEER

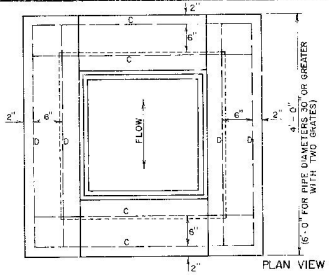
E. H. Stickney by F. ASST. CHIEF ENGINEER

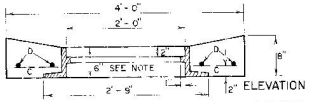
H. M. Lane HIGHWAY ENGINEER

# REINFORCED CONCRETE DROP INLET WITH GRATE
## FOR USE IN DITCHES

VERMONT AGENCY OF TRANSPORTATION

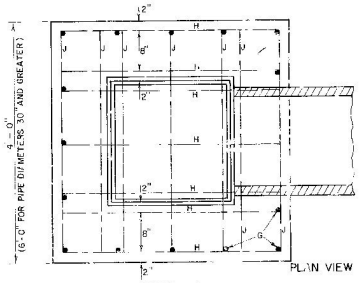
# STANDARD
# D-6



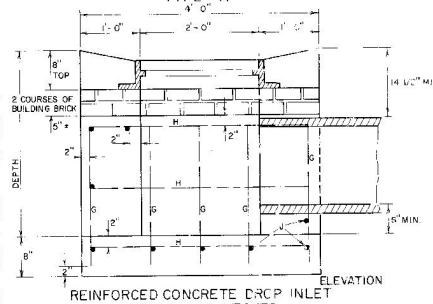




NOTE—FRAME SHOWN IS FOR TYPE A GRATE, SEE SHEET D-11. FOR TYPE B GRATE AND FRAME, SEE SHEET D-16 (EXCEPT THE FRAME DEPTH DIMENSION SHALL BE 6").

TOP FOR REINFORCED CONCRETE DROP INLET WITH GRATE FOR USE IN DITCHES




—TYPE A—




REINFORCED CONCRETE DROP INLET FOR USE IN DITCHES

## STEEL SCHEDULE

| 4'x4' DROP INLET TYPE A | | | | | | | 4'x6' DROP INLET WITH TWO GRATES TYPE B | | | | | | | | | | TYPE C 4'x6' DROP INLET WITH ONE GRATE WITH 4'x6' TOP | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12", 15", 18", 24" | | | | | | | 30", 36" | | | | | | | | | | 30", 36" | | | | | | | | | |
| DEPTH | G | LENGTH H,J | LENGTH C,D | LENGTH | G | LENGTH I | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH | G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH |
| 3'-0" | 15 | 2'-3" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | 3'-0" | | | | | | | | | | | |
| 3'-6" | 15 | 2'-9" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | 3'-6" | | | | | | | | | | | |
| 4'-0" | 15 | 3'-3" | 29 | 3'-8" | 8 | 3'-8" | 17 | 3'-3" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4'-0" | 17 | 3'-8" | 19 | 3'-8" | 10 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 4'-0" |
| 4'-6" | 15 | 3'-9" | 29 | 3'-8" | 8 | 3'-8" | 17 | 3'-9" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4'-6" | 17 | 4'-2" | 19 | 3'-8" | 10 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 4'-6" |
| 5'-0" | 15 | 4'-3" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-3" | 23 | 3'-8" | 13 | 5'-8" | 4 | 3'-8" | 5'-0" | 17 | 4'-8" | 23 | 3'-8" | 13 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 5'-0" |
| 5'-6" | 15 | 4'-9" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-9" | 23 | 3'-8" | 13 | 5'-8" | 4 | 3'-8" | 5'-6" | 17 | 5'-2" | 23 | 3'-8" | 13 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 5'-6" |
| 6'-0" | 15 | 5'-3" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-3" | 27 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 6'-0" | 17 | 5'-8" | 27 | 3'-8" | 15 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 6'-0" |
| 6'-6" | 15 | 5'-9" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-9" | 31 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 6'-6" | 17 | 6'-2" | 31 | 3'-8" | 15 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 6'-6" |
| 7'-0" | 15 | 6'-3" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-3" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 7'-0" | 17 | 6'-8" | 35 | 3'-8" | 17 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 7'-0" |
| 7'-6" | 15 | 6'-9" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-9" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 7'-6" | 17 | 7'-2" | 35 | 3'-8" | 17 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 7'-6" |
| 8'-0" | 15 | 7'-3" | 53 | 3'-8" | 8 | 3'-8" | 17 | 7'-3" | 39 | 3'-8" | 19 | 5'-8" | 4 | 3'-8" | 8'-0" | 17 | 7'-8" | 39 | 3'-8" | 19 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 8'-0" |

## STEEL AND CONCRETE QUANTITIES

| 4'x4' DROP INLET | | | 4'x6' DROP INLET WITH TWO GRATES | | | | | 4'x6' DROP INLET WITH ONE GRATE WITH 4'x4' TOP | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12"-15"-18"-24" TYPE A | | 30" TYPE B | | 36" | | | 30" TYPE C | | 36" | | | | | | | | | |
| DEPTH | CONCRETE C.Y. | STEEL LBS. | CONCRETE C.Y. | STEEL LBS. | CONCRETE C.Y. | STEEL LBS. | DEPTH | CONCRETE C.Y. | STEEL LBS. | CONCRETE C.Y. | STEEL LBS. | DEPTH | | | | | | | |
| 3'-0" | 1.7 | 150 | | | | | 3'-0" | | | | | | | | | | | | |
| 3'-6" | 1.9 | 158 | | | | | 3'-6" | | | | | | | | | | | | |
| 4'-0" | 2.1 | 193 | .7 | 228 | | | 4'-0" | 2.8 | 244 | | | | | | | | | | |
| 4'-6" | 2.3 | 200 | 3.0 | 237 | 2.0 | 237 | 4'-6" | 3.1 | 252 | 3.0 | 256 | 4'-0" | | | | | | | |
| 5'-0" | 2.5 | 231 | 3.3 | 279 | 3.2 | 279 | 5'-0" | 3.4 | 294 | 3.3 | 294 | 5'-0" | | | | | | | |
| 5'-6" | 2.8 | 239 | 3.6 | 288 | 3.5 | 288 | 5'-6" | 3.7 | 303 | 3.6 | 303 | 5'-6" | | | | | | | |
| 6'-0" | 3.0 | 270 | 3.9 | 324 | 3.8 | 324 | 6'-0" | 4.0 | 339 | 3.9 | 339 | 6'-0" | | | | | | | |
| 6'-6" | 3.2 | 278 | 4.2 | 348 | 4.1 | 348 | 6'-6" | 4.3 | 363 | 4.2 | 363 | 6'-6" | | | | | | | |
| 7'-0" | 3.5 | 308 | 4.5 | 384 | 4.4 | 384 | 7'-0" | 4.6 | 399 | 4.5 | 399 | 7'-0" | | | | | | | |
| 7'-6" | 3.7 | 316 | 4.8 | 393 | 4.7 | 393 | 7'-6" | 4.9 | 408 | 4.0 | 406 | 7'-6" | | | | | | | |
| 8'-0" | 3.9 | 367 | 5.1 | 429 | 5.0 | 429 | 8'-0" | 5.2 | 444 | 5.1 | 444 | 8'-0" | | | | | | | |

FOR 2nd 30" PIPE DEDUCT 0.18 CY.
FOR 2nd 36" PIPE DEDUCT 0.26 CY.
FOR 2nd 42" PIPE DEDUCT 0.36 CY, OR 0.18 FOR 1 PIPE
FOR 2nd 48" PIPE DEDUCT 0.47 CY, OR 0.24 FOR 1 PIPE

## STEEL SCHEDULE TYPE D

| 4'x6' DROP INLET WITH ONE GRATE WITH 4'x4' TOP | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 30", 36" | | | | | | | | | | |
| G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH |
| 17 | 3'-7" | 23 | 3'-6" | 13 | 5'-8" | 12 | 3'-4" | 4 | 5'-8" | 5'-0" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 4'-1" | 23 | 3'-8" | 13 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 5'-6" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 4'-7" | 27 | 3'-8" | 15 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 6'-0" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 5'-1" | 31 | 3'-8" | 15 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 6'-6" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 5'-7" | 35 | 3'-8" | 17 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 7'-0" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 6'-1" | 35 | 3'-8" | 17 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 7'-6" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 6'-7" | 39 | 3'-8" | 19 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 8'-0" |
| | | | | | | | | 4 | 3'-8" | |

ALL REINFORCING STEEL TO BE NO. 5 DEFORMED BARS, EVENLY SPACED WITH A MAXIMUM SPACING OF 12" C/C.

ALL STEEL TO HAVE 2 INCH MIN. COVER.

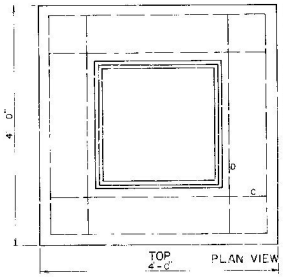
DROP INLET TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501.

GRATES TO CONFORM TO DROP INLETS, CATCH BASINS, AND MANHOLES, SECTION 604.

FURNISHING AND LAYING OF BRICKS FOR ADJUSTING ELEVATION OF GRATE SHALL BE INCLUDED IN UNIT BID PRICE FOR CONCRETE, CLASS B, PAY ITEM 501.25, AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES.

MORTAR, TYPE II, TO BE USED AS JOINT FILLER AND LAYING OF BRICK.

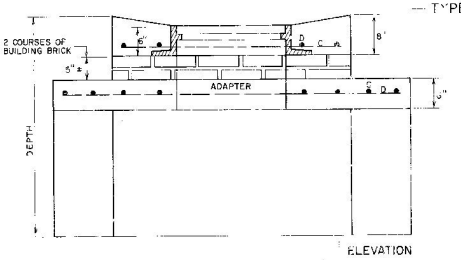
FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE. ABOVE TABLES INDICATE DEDUCTION FOR ONE PIPE.



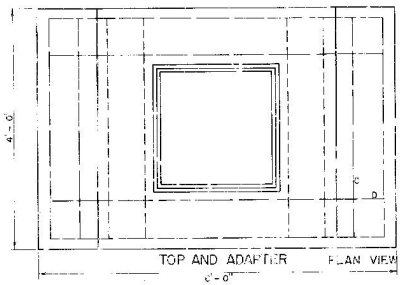

## STEEL AND CONCRETE QUANTITIES

| 4'x6' DROP INLET WITH ONE GRATE WITH 4'x4' TOP TYPE D | | | | |
|---|---|---|---|---|
| | 30" | | 36" | |
| DEPTH | CONCRETE C.Y. | STEEL LBS | CONCRETE C.Y. | STEEL LBS |
| 5'-0" | 3.2 | 313 | 3.1 | 313 |
| 5'-6" | 3.5 | 322 | 3.4 | 322 |
| 6'-0" | 3.8 | 358 | 3.7 | 358 |
| 6'-6" | 4.1 | 382 | 4.0 | 382 |
| 7'-0" | 4.4 | 413 | 4.3 | 418 |
| 7'-6" | 4.7 | 427 | 4.6 | 427 |
| 8'-0" | 5.0 | 463 | 4.9 | 463 |

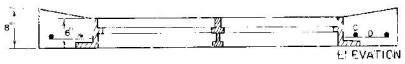
—TYPE D—

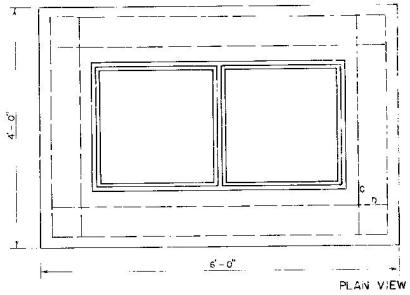



4'x6' DROP INLET WITH 4'x4' TOP WITH ONE CAST IRON GRATE



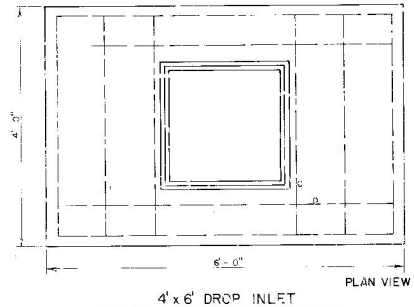

—TYPE B—




4'x6' DROP INLET TOP WITH TWO CAST IRON GRATES

—TYPE C—


4'x6' DROP INLET TOP WITH ONE CAST IRON GRATE

REVISIONS AND CORRECTIONS
APR 2, 1973 - ORIGINAL D-6 REDRAWN.

APPROVED April 9, 1973 DATE

R. H. Arnold CHIEF ENGINEER

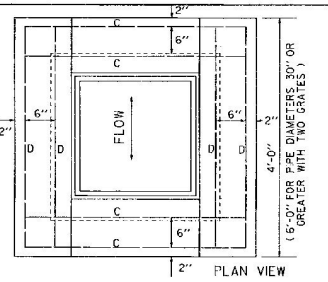
E. H. Steenburg ASST. CHIEF ENGINEER

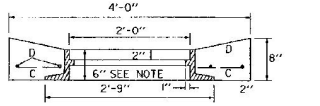
J. M. Lane HIGHWAY ENGINEER

# REINFORCED CONCRETE DROP INLET WITH GRATE
## FOR USE IN DITCHES

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

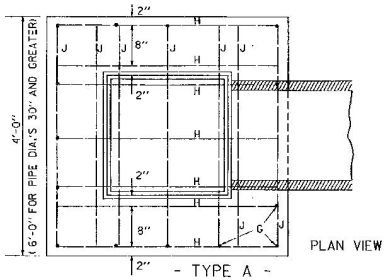
# D-6

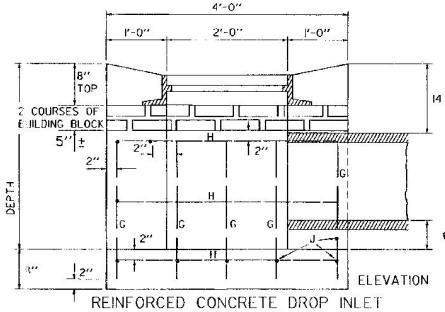


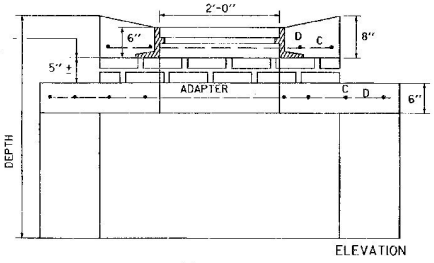

NOTE : FRAME SHOWN IS FOR TYPE A GRATE, SEE SHEET D-14 FOR TYPE B GRATE AND FRAME, SEE SHEET D-16 (EXCEPT THE FRAME DEPTH DIMENSION SHALL BE 6").

TOP FOR REINFORCED CONCRETE DROP INLET WITH GRATE FOR USE IN DITCHES

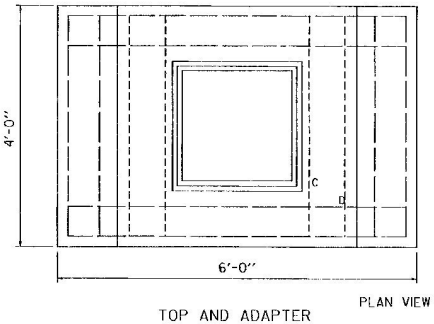


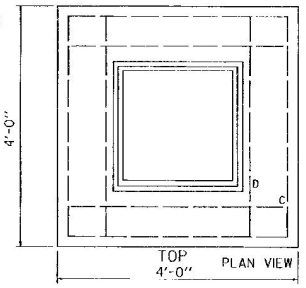

REINFORCED CONCRETE DROP INLET FOR USE IN DITCHES



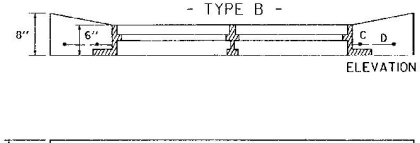

4'x6' DROP INLET WITH 4'x4' TOP
TOP WITH ONE CAST IRON GRATE

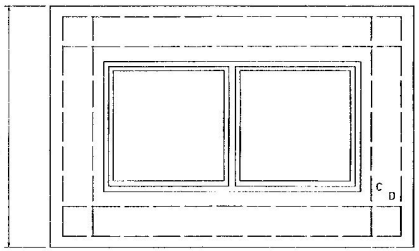



TOP AND ADAPTER



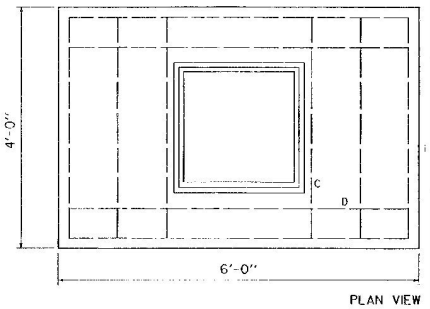

- TYPE D -




4'x6' DROP INLET
TOP WITH TWO CAST IRON GRATES


- TYPE C -




4'x6' DROP INLET
TOP WITH ONE CAST IRON GRATE

STEEL SCHEDULE

| 4'x4' DROP INLET TYPE A 12", 15", 18", 24" | | | | | | | 4'x6' DROP INLET WITH TWO GRATES TYPE B 30", 36" | | | | | | | | | | 4'x6' DROP INLET WITH ONE GRATE WITH 4'x6' TOP TYPE C 30", 36" | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH | G | LENGTH | H,J | LENGTH | C,D | LENGTH | G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH | G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH |
| 3'-0" | 15 | 2'-3" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | | | 3'-0" | | | | | | | | | | | |
| 3'-6" | 15 | 2'-9" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | | | 3'-6" | | | | | | | | | | | |
| 4'-0" | 15 | 3'-3" | 29 | 3'-8" | 8 | 3'-8" | 17 | 3'-3" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 4'-0" | 17 | 3'-8" | 19 | 3'-8" | 10 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 4'-0" |
| 4'-6" | 15 | 3'-9" | 29 | 3'-8" | 8 | 3'-8" | 17 | 3'-9" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 4'-6" | 17 | 4'-2" | 19 | 3'-8" | 10 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 4'-6" |
| 5'-0" | 15 | 4'-3" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-3" | 23 | 3'-8" | 13 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 5'-0" | 17 | 4'-8" | 23 | 3'-8" | 13 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 5'-0" |
| 5'-6" | 15 | 4'-9" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-9" | 23 | 3'-8" | 13 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 5'-6" | 17 | 5'-2" | 23 | 3'-8" | 13 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 5'-6" |
| 6'-0" | 15 | 5'-3" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-3" | 27 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 6'-0" | 17 | 5'-8" | 27 | 3'-8" | 15 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 6'-0" |
| 6'-6" | 15 | 5'-9" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-9" | 31 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 6'-6" | 17 | 6'-2" | 31 | 3'-8" | 15 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 6'-6" |
| 7'-0" | 15 | 6'-3" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-3" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 7'-0" | 17 | 6'-8" | 35 | 3'-8" | 17 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 7'-0" |
| 7'-6" | 15 | 6'-9" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-9" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 7'-6" | 17 | 7'-2" | 35 | 3'-8" | 17 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 7'-6" |
| 8'-0" | 15 | 7'-3" | 53 | 3'-8" | 8 | 3'-8" | 17 | 7'-3" | 39 | 3'-8" | 19 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 8'-0" | 17 | 7'-8" | 39 | 3'-8" | 19 | 5'-8" | 6 | 3'-8" | 4 | 5'-8" | 8'-0" |

STEEL AND CONCRETE QUANTITIES

| 4'x4' DROP INLET TYPE A 12"-15"-18"-24" | | | 4'x6' DROP INLET WITH TWO GRATES TYPE B 30" | | TYPE B 36" | | DEPTH | 4'x6' DROP INLET WITH ONE GRATES TYPE C 30" | | 36" | | DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH | CONC. C.Y. | STEEL LBS | CONC. C.Y. | STEEL LBS | CONC.* C.Y. | STEEL LBS | | CONC. C.Y. | STEEL LBS | CONC. C.Y. | STEEL LBS | |
| 3'-0" | 1.7 | 150 | | | | | 3'-0" | | | | | |
| 3'-6" | 1.9 | 158 | | | | | 3'-6" | | | | | |
| 4'-0" | 2.1 | 193 | 2.7 | 278 | | | 4'-0" | 2.8 | 244 | | | |
| 4'-6" | 2.3 | 200 | 3.0 | 237 | 2.9 | 237 | 4'-6" | 3.1 | 252 | 3.0 | 252 | 4'-6" |
| 5'-0" | 2.6 | 274 | 3.3 | 279 | 3.2 | 279 | 5'-0" | 3.4 | 294 | 3.3 | 294 | 5'-0" |
| 5'-6" | 2.8 | 239 | 3.6 | 288 | 3.5 | 288 | 5'-6" | 3.7 | 303 | 3.6 | 303 | 5'-6" |
| 6'-0" | 3.0 | 270 | 3.9 | 324 | 3.8 | 324 | 6'-0" | 4.0 | 339 | 3.9 | 339 | 6'-0" |
| 6'-6" | 3.2 | 278 | 4.2 | 348 | 4.1 | 348 | 6'-6" | 4.3 | 363 | 4.2 | 363 | 6'-6" |
| 7'-0" | 3.5 | 308 | 4.5 | 384 | 4.4 | 384 | 7'-0" | 4.6 | 399 | 4.5 | 399 | 7'-0" |
| 7'-6" | 3.7 | 316 | 4.8 | 393 | 4.7 | 393 | 7'-6" | 4.9 | 408 | 4.8 | 408 | 7'-6" |
| 8'-0" | 3.9 | 347 | 5.1 | 429 | 5.0 | 429 | 8'-0" | 5.2 | 444 | 5.1 | 444 | 8'-0" |

FOR 2nd 30" PIPE DEDUCT 0.18 C.Y.
FOR 2nd 36" PIPE DEDUCT 0.26 C.Y.
FOR 2nd 42" PIPE DEDUCT 0.36 C.Y., OR 0.18 FOR 1 PIPE
FOR 2nd 48" PIPE DEDUCT 0.47 C.Y., OR 0.24 FOR 1 PIPE

STEEL SCHEDULE TYPE D
4'x6' DROP INLET WITH ONE GRATE WITH 4'x4' TOP
30", 36"

| G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 | 3'-7" | 23 | 3'-8" | 13 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 5'-0" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 4'-1" | 23 | 3'-8" | 13 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 5'-6" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 4'-7" | 27 | 3'-8" | 15 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 6'-0" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 5'-1" | 31 | 3'-8" | 15 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 6'-6" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 5'-7" | 35 | 3'-8" | 17 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 7'-0" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 6'-1" | 35 | 3'-8" | 17 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 7'-6" |
| | | | | | | | | 4 | 3'-8" | |
| 17 | 6'-7" | 39 | 3'-8" | 19 | 5'-8" | 12 | 3'-8" | 4 | 5'-8" | 8'-0" |
| | | | | | | | | 4 | 3'-8" | |

STEEL AND CONCRETE QUANTITIES
4'x6' DROP INLET WITH ONE GRATE WITH 4'x4' TOP TYPE D

| DEPTH | 30" STEEL LBS. | 30" CONC. C.Y. | 36" CONC. C.Y. | 36" STEEL LBS. |
|---|---|---|---|---|
| 5'-0" | 3.2 | 313 | 3.1 | 313 |
| 5'-6" | 3.5 | 322 | 3.4 | 322 |
| 6'-0" | 3.8 | 358 | 3.7 | 358 |
| 6'-6" | 4.1 | 382 | 4.0 | 382 |
| 7'-0" | 4.4 | 418 | 4.3 | 418 |
| 7'-6" | 4.7 | 427 | 4.6 | 427 |
| 8'-0" | 5.0 | 463 | 4.9 | 463 |

ALL REINFORCING STEEL TO BE NO. 5 DEFORMED BARS, EVENLY SPACED WITH A MAXIMUM SPACING OF 12" C/C.

ALL STEEL TO HAVE 2 INCH MIN. COVER.

DROP INLET TO BE CONSTRUCTURED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501.

GRATES TO CONFORM TO DROP INLETS, CATCH BASINS, AND MANHOLES, SECTION 604.

FURNISHING AND LAYING OF BRICKS FOR ADJUSTING ELEVATION OF GRATE SHALL BE INCLUDED IN UNIT BID PRICE FOR CONCRETE, CLASS B, PAY ITEM 501.25, AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES.

MORTAR, TYPE II, TO BE USED AS JOINT FILLER AND LAYING OF BRICK.

FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE. ABOVE TABLES INDICATE DEDUCTION FOR ONE PIPE.

REVISIONS AND CORRECTIONS

APR. 4, 1973 - ORIGINAL APPROVAL

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

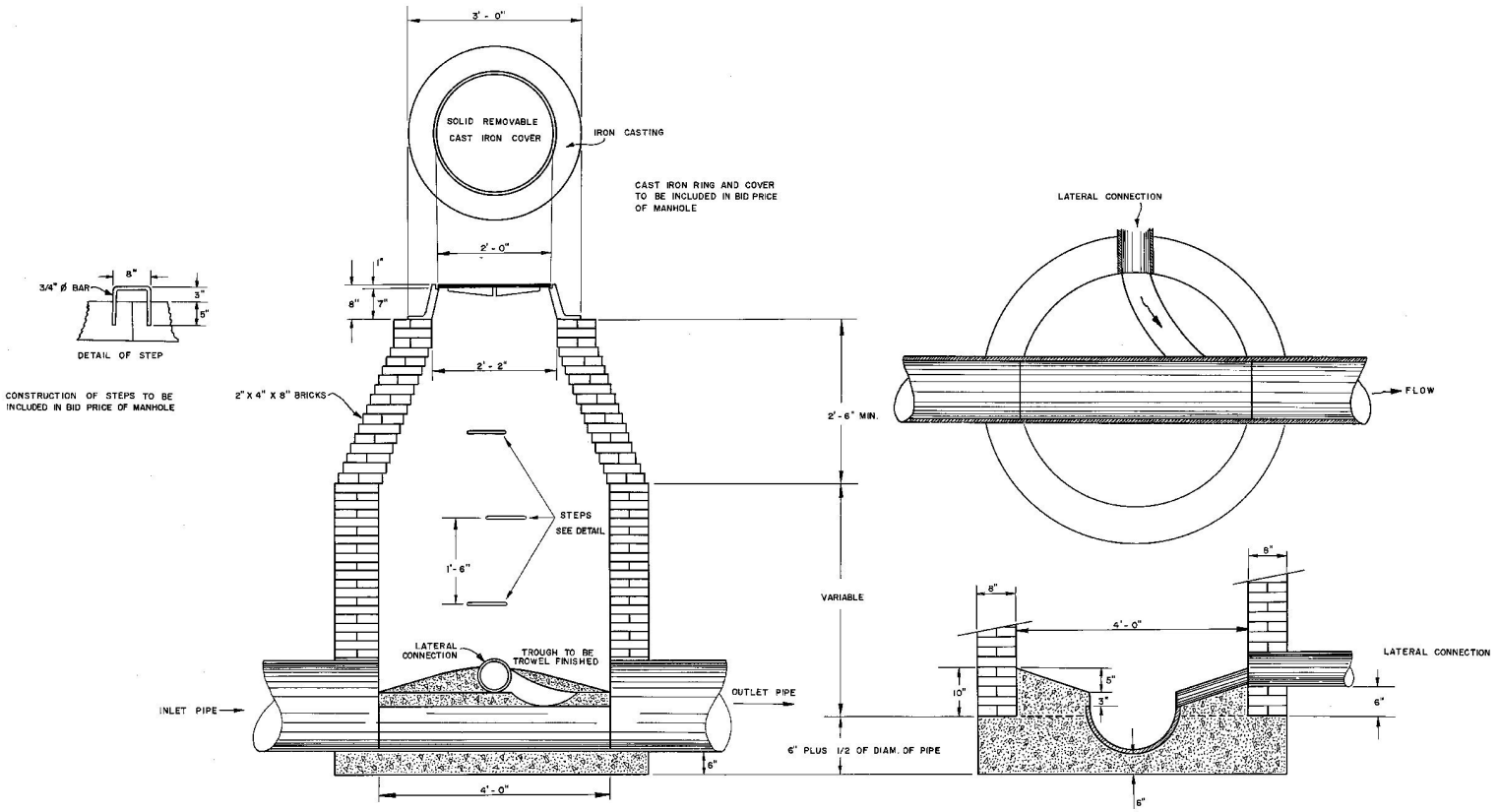
DIRECTOR OF ENGINEERING

DESIGN ENGINEER

# REINFORCED CONCRETE DROP INLET WITH GRATE FOR USE IN DITCHES

VERMONT AGENCY OF TRANSPORTATION

STANDARD D-6




REVISIONS AND CORRECTIONS

APPROVED: DATE NOV. 4, 1958

H. E. Saigust
CHIEF ENGINEER

L. M. Lane
HIGHWAY ENGINEER

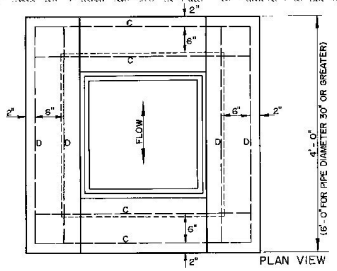
F. F. Chester
CONSTRUCTION ENGINEER

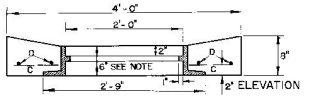
DRAWN AJA
TRACED AJA

# BRICK MANHOLE FOR SANITARY SEWER, ITEM 535-A MOD.

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

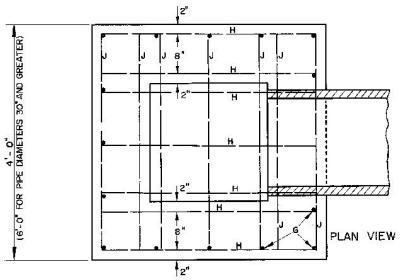
D-6

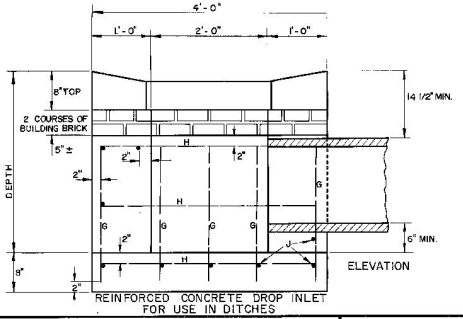



NOTE: FRAME SHOWN IS FOR TYPE A GRATE, SEE SHEET D-11. FOR TYPE B GRATE AND FRAME, SEE SHEET D-16. (EXCEPT THE FRAME DEPTH DIMENSION SHALL BE 6")

## TOP FOR REINFORCED CONCRETE DROP INLET WITH GRATE
FOR USE IN DITCHES




REINFORCED CONCRETE DROP INLET FOR USE IN DITCHES

| STEEL SCHEDULE | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12", 15", 18", 24" | | | | | | 30", 36" | | | | | | | | | | |
| DEPTH | G | LENGTH | H, J | LENGTH | C, D | LENGTH | G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH |
| 3'-0" | 15 | 2'-3" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | | | 3'-0" |
| 3'-6" | 15 | 2'-9" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | | | 3'-6" |
| 4'-0" | 15 | 3'-3" | 29 | 3'-8" | 8 | 3'-8" | 17 | 3'-3" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 4'-0" |
| 4'-6" | 15 | 3'-9" | 29 | 3'-8" | 8 | 3'-8" | 17 | 3'-9" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 4'-6" |
| 5'-0" | 15 | 4'-3" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-3" | 23 | 5'-8" | 13 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 5'-0" |
| 5'-6" | 15 | 4'-9" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-9" | 23 | 5'-8" | 13 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 5'-6" |
| 6'-0" | 15 | 5'-3" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-3" | 27 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 6'-0" |
| 6'-6" | 15 | 5'-9" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-9" | 31 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 6'-6" |
| 7'-0" | 15 | 6'-3" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-3" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 7'-0" |
| 7'-6" | 15 | 6'-9" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-9" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 7'-6" |
| 8'-0" | 15 | 7'-3" | 53 | 3'-8" | 8 | 3'-8" | 17 | 7'-3" | 39 | 3'-8" | 19 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 8'-0" |

| STEEL AND CONCRETE QUANTITIES | | | | | | | |
|---|---|---|---|---|---|---|---|
| DEPTH | 12" – 15" – 18" – 24" | | 30" | | 36" | | DEPTH |
| | CONCRETE C.Y. | STEEL LBS. | CONCRETE C.Y. | STEEL LBS. | CONCRETE * C.Y. | STEEL LBS. | |
| 3'-0" | 1.7 | 150 | | | | | 3'-0" |
| 3'-6" | 1.9 | 158 | | | | | 3'-6" |
| 4'-0" | 2.1 | 193 | 2.7 | 228 | | | 4'-0" |
| 4'-6" | 2.3 | 200 | 3.0 | 237 | 2.9 | 237 | 4'-6" |
| 5'-0" | 2.6 | 231 | 3.3 | 279 | 3.2 | 279 | 5'-0" |
| 5'-6" | 2.8 | 239 | 3.6 | 288 | 3.5 | 288 | 5'-6" |
| 6'-0" | 3.0 | 270 | 3.9 | 324 | 3.8 | 324 | 6'-0" |
| 6'-6" | 3.2 | 278 | 4.2 | 348 | 4.1 | 348 | 6'-6" |
| 7'-0" | 3.5 | 308 | 4.5 | 384 | 4.4 | 384 | 7'-0" |
| 7'-6" | 3.7 | 316 | 4.8 | 393 | 4.7 | 393 | 7'-6" |
| 8'-0" | 3.9 | 347 | 5.1 | 429 | 5.0 | 429 | 8'-0" |

* FOR 42" PIPE, DEDUCT 0.1 C.Y.
FOR 48" PIPE, DEDUCT 0.2 C.Y.

ALL REINFORCING STEEL TO BE NO. 5 DEFORMED BARS, EVENLY SPACED WITH A MAXIMUM SPACING OF 12" C/C.
ALL STEEL TO HAVE 2 INCH MIN. COVER.

DROP INLET TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501.

GRATES TO CONFORM TO DROP INLETS, CATCH BASINS, AND MANHOLES, SECTION 604.

FURNISHING AND LAYING OF BRICKS FOR ADJUSTING ELEVATION OF GRATE, SHALL BE INCLUDED IN UNIT BID PRICE FOR CONCRETE, CLASS B, PAY ITEM 501.25, AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES.

MORTAR, TYPE II, TO BE USED AS JOINT FILLER AND LAYING OF BRICK.

FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE.

REVISIONS AND CORRECTIONS

APPROVED:

DATE Dec 6, 1971

CHIEF ENGINEER

ASST. CHIEF ENGINEER

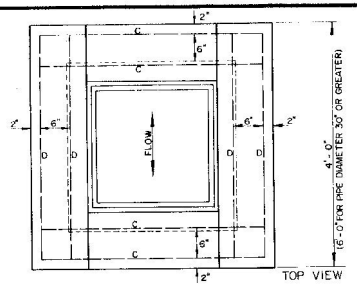
HIGHWAY ENGINEER

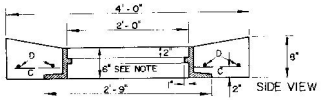
DRAWN: F.C.E
TRACED: A.J.A

# REINFORCED CONCRETE DROP INLET WITH GRATE
FOR USE IN DITCHES

VERMONT
DEPARTMENT OF HIGHWAYS
STANDARD

D-6



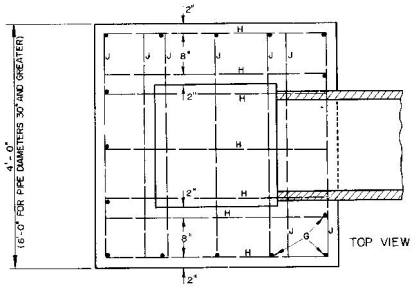

NOTE: FRAME SHOWN IS FOR TYPE A GRATE, SEE SHEET D-11 (EXCEPT THE FRAME DEPTH DIMENSION FOR TYPE B GRATE AND FRAME SEE SHEET D-16 SHALL BE 6")

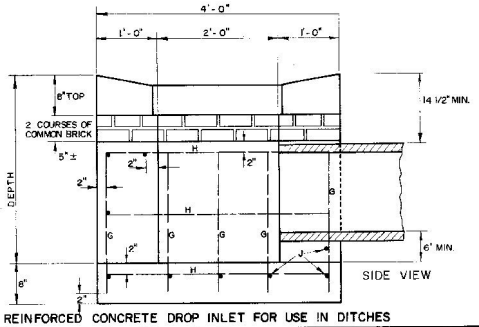
TOP FOR REINFORCED CONCRETE DROP INLET WITH GRATE FOR USE IN DITCHES

| STEEL SCHEDULE | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12", 15", 18", 24" | | | | | | 30", 36" | | | | | | | | | |
| DEPTH | G | LENGTH H, J | | LENGTH | C, D | LENGTH | G | LENGTH | H | LENGTH | J | LENGTH | C | LENGTH | D | LENGTH | DEPTH |
| 3'-0" | 15 | 2'-3" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | | | 3'-0" |
| 3'-6" | 15 | 2'-9" | 22 | 3'-8" | 8 | 3'-8" | | | | | | | | | | | 3'-6" |
| 4'-0" | 15 | 3'-3" | 29 | 3'-8" | 8 | 3'-8" | 17 | 3'-3" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 4'-0" |
| 4'-6" | 15 | 3'-9" | 29 | 3'-8" | 8 | 3'-8" | 17 | 3'-9" | 19 | 3'-8" | 10 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 4'-6" |
| 5'-0" | 15 | 4'-3" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-3" | 23 | 3'-8" | 13 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 5'-0" |
| 5'-6" | 15 | 4'-9" | 35 | 3'-8" | 8 | 3'-8" | 17 | 4'-9" | 23 | 3'-8" | 13 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 5'-6" |
| 6'-0" | 15 | 5'-3" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-3" | 27 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 6'-0" |
| 6'-6" | 15 | 5'-9" | 41 | 3'-8" | 8 | 3'-8" | 17 | 5'-9" | 31 | 3'-8" | 15 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 6'-6" |
| 7'-0" | 15 | 6'-3" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-3" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 7'-0" |
| 7'-6" | 15 | 6'-9" | 47 | 3'-8" | 8 | 3'-8" | 17 | 6'-9" | 35 | 3'-8" | 17 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 7'-6" |
| 8'-0" | 15 | 7'-3" | 53 | 3'-8" | 8 | 3'-8" | 17 | 7'-3" | 39 | 3'-8" | 19 | 5'-8" | 4 | 3'-8" | 4 | 5'-8" | 8'-0" |

| STEEL AND CONCRETE QUANTITIES | | | | | | | |
|---|---|---|---|---|---|---|---|
| DEPTH | 12" – 15" – 18" – 24" | | 30" | | 36" | | DEPTH |
| | CONCRETE C.Y. | STEEL LBS. | CONCRETE C.Y. | STEEL LBS. | CONCRETE * C.Y. | STEEL LBS. | |
| 3'-0" | 1.7 | 150 | | | | | 3'-0" |
| 3'-6" | 1.9 | 158 | | | | | 3'-6" |
| 4'-0" | 2.1 | 193 | 2.7 | 228 | | | 4'-0" |
| 4'-6" | 2.3 | 200 | 3.0 | 237 | 2.9 | 237 | 4'-6" |
| 5'-0" | 2.6 | 231 | 3.3 | 279 | 3.2 | 279 | 5'-0" |
| 5'-6" | 2.8 | 239 | 3.6 | 288 | 3.5 | 288 | 5'-6" |
| 6'-0" | 3.0 | 270 | 3.9 | 324 | 3.8 | 324 | 6'-0" |
| 6'-6" | 3.2 | 278 | 4.2 | 348 | 4.1 | 348 | 6'-6" |
| 7'-0" | 3.5 | 308 | 4.5 | 384 | 4.4 | 384 | 7'-0" |
| 7'-6" | 3.7 | 316 | 4.8 | 393 | 4.7 | 393 | 7'-6" |
| 8'-0" | 3.9 | 347 | 5.1 | 429 | 5.0 | 429 | 8'-0" |

* FOR 42" PIPE, DEDUCT 0.1 C.Y.
FOR 48" PIPE, DEDUCT 0.2 C.Y.




REINFORCED CONCRETE DROP INLET FOR USE IN DITCHES

ALL REINFORCING STEEL TO BE NO. 5 DEFORMED BARS, EVENLY SPACED WITH A MAXIMUM SPACING OF 12" C/C AND TO CONFORM TO THE REQUIREMENTS FOR REINFORCING STEEL, ITEM 402. ALL STEEL TO HAVE 2 INCH MIN. COVER.

DROP INLET TO BE CONSTRUCTED OF CONCRETE, CLASS B, ITEM 401-B

DROP INLET GRATES TO CONFORM TO AND BE PAID FOR AS ITEM 534, IF ITEM 534-B IS USED THE GRATES ARE TO BE PAINTED WITH 2 COATS OF BLACK BRIDGE PAINT, CONFORMING TO THE REQUIREMENTS OF SECTION 404.03-C 2a OF STANDARD SPECIFICATIONS, IN ADDITION TO A SHOP COAT OF RED LEAD, CONFORMING TO THE REQUIREMENTS OF SUB-ARTICLE 404.03-B SHOP PAINT (PRIMING COAT.)

FURNISHING AND LAYING OF BRICKS FOR ADJUSTING ELEVATION OF GRATE, SHALL BE INCLUDED IN UNIT BID PRICE FOR CONCRETE, CLASS B, ITEM 401-B AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES.

THE MORTAR FOR LAYING OF BRICKS, SHALL CONFORM TO THE REQUIREMENTS OF MORTAR FOR "CEMENT RUBBLE MASONRY," ITEM 411, PARAGRAPH 411.02-B AND PARAGRAPH 411.03-A.

FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE.

ALLOWABLE DESIGN STRESSES

CONCRETE $f'c$ = 3,000 p.s.i.
$fc$ = 1,200 p.s.i.
REINFORCING STEEL = 20,000 p.s.i.

REVISIONS AND CORRECTIONS

APPROVED: DATE DEC 23, 1966

R. H. Crandall
CHIEF ENGINEER

E. J. Dickney
ASST. CHIEF ENGINEER

L. M. Lane
HIGHWAY ENGINEER

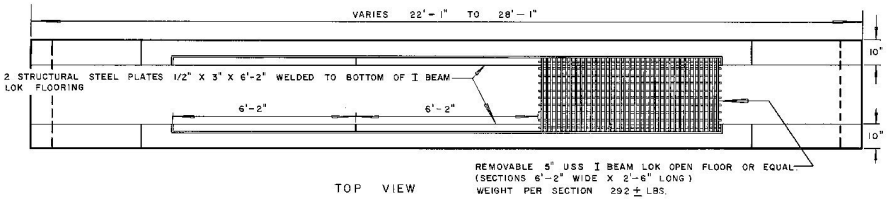
L. J. Funk
CONSTRUCTION ENGINEER

DRAWN: P.C.E.
TRACED: A.J.A.

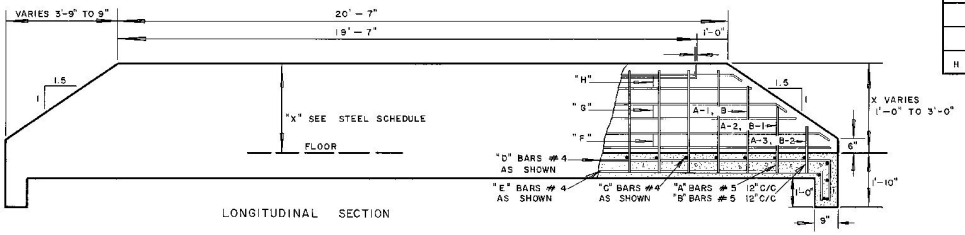
# REINFORCED CONCRETE DROP INLET WITH GRATE FOR USE IN DITCHES

VERMONT
DEPARTMENT OF HIGHWAYS
STANDARD

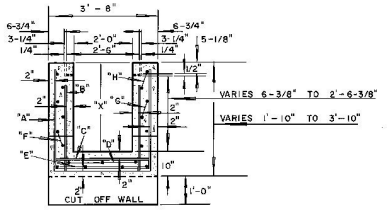
D-6




TOP VIEW




LONGITUDINAL SECTION




END VIEW

| "X" = 1'-0" | | | | | "X" = 1'-6" | | | | | "X" = 2'-0" | | | | | "X" = 2'-6" | | | | | "X" = 3'-0" | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MARK | SIZE | NO. OF PIECES | LENGTH | DETAIL | MARK | SIZE | NO. OF PIECES | LENGTH | DETAIL | MARK | SIZE | NO. OF PIECES | LENGTH | DETAIL | MARK | SIZE | NO. OF PIECES | LENGTH | DETAIL | MARK | SIZE | NO. OF PIECES | LENGTH | DETAIL |
| A | 5 | 21 | 6'-1" | 5 3'-3" 5 | A | 5 | 21 | 7'-1" | 5 3'-3" 5 | A | 5 | 21 | 8'-1" | 5 3'-3" 5 | A | 5 | 21 | 9'-1" | 5 3'-3" 5 | A | 5 | 21 | 10'-1" | 5 3'-3" 5 |
| | | | | | A-1 | 5 | 2 | 6'-1" | 5 3'-3" 5 | A-1 | 5 | 2 | 7'-1" | 5 3'-3" 5 | A-1 | 5 | 2 | 8'-1" | 5 3'-3" 5 | A-1 | 5 | 2 | 9'-1" | 5 3'-3" 5 |
| | | | | | | | | | | | | | | | A-2 | 5 | 2 | 6'-9" | 5 3'-3" 5 | A-2 | 5 | 2 | 7'-9" | 5 3'-3" 5 |
| | | | | | | | | | | | | | | | | | | | | A-3 | 5 | 2 | 6'-5" | 5 3'-3" 5 |
| B | 5 | 42 | 0'-11" | STRAIGHT | B | 5 | 46 | 1'-5" | STRAIGHT | B | 5 | 46 | 1'-11" | STRAIGHT | B | 5 | 46 | 2'-5" | STRAIGHT | B | 5 | 46 | 2'-11" | STRAIGHT |
| | | | | | | | | | | | | | | | B-1 | 5 | 4 | 1'-9" | STRAIGHT | B-1 | 5 | 4 | 2'-3" | STRAIGHT |
| | | | | | | | | | | | | | | | | | | | | B-2 | 5 | 4 | 1'-7" | STRAIGHT |
| C | 4 | 31 | 3'-3" | STRAIGHT | C | 4 | 33 | 3'-3" | STRAIGHT | C | 4 | 33 | 3'-3" | STRAIGHT | C | 4 | 35 | 3'-3" | STRAIGHT | C | 4 | 37 | 3'-3" | STRAIGHT |
| D | 4 | 3 | 24'-6" | 5 2'-8" 5 | D | 4 | 3 | 26'-0" | 5 23-2" 5 | D | 4 | 3 | 27'-6" | 5 24'-8" 5 | D | 4 | 3 | 29'-0" | 5 26'-2" 5 | D | 4 | 3 | 30'-6" | 5 27'-8" 5 |
| E | 4 | 4 | 23'-0" | 5 21'-0" 5 | E | 4 | 4 | 24'-6" | 5 22'-6" 5 | E | 4 | 4 | 26'-0" | 5 24'-0" 5 | E | 4 | 4 | 27'-6" | 5 25'-6" 5 | E | 4 | 4 | 29'-0" | 5 27'-0" 5 |
| | | | | | | | | | | | | | | | F | 4 | 2 | 26'-2" | STRAIGHT | F | 4 | 4 | 27'-8" | STRAIGHT |
| | | | | | G | 4 | 2 | 23'-2" | STRAIGHT | G | 4 | 4 | 24'-8" | STRAIGHT | G | 4 | 4 | 25'-3" | STRAIGHT | G | 4 | 4 | 25'-3" | STRAIGHT |
| H | 4 | 4 | 21'-8" | STRAIGHT | H | 4 | 4 | 22'-3" | STRAIGHT | H | 4 | 4 | 22'-3" | STRAIGHT | H | 4 | 4 | 22'-3" | STRAIGHT | H | 4 | 4 | 22'-3" | STRAIGHT |

REINFORCING STEEL

| ITEM | "X" 1'-0" | "X" 1'-6" | "X" 2'-0" | "X" 2'-6" | "X" 3'-0" |
|---|---|---|---|---|---|
| CONCRETE CLASS B | 3.8 C.Y. | 4.8 C.Y. | 5.7 C.Y. | 6.7 C.Y. | 7.8 C.Y. |
| REINFORCING STEEL | 409 # | 515 # | 605 # | 723 # | 845 # |
| STRUCTURAL STEEL | 189 ∓ # | | | | |
| I BEAM LOK FLOORING | 876 ∓ # | | | | |

REVISIONS AND CORRECTIONS

APPROVED DATE NOV. 4, 1958

H E Daigneault
CHIEF ENGINEER

G. M. Lane
HIGHWAY ENGINEER

F. C. Cates
CONSTRUCTION ENGINEER

DRAWN: N.L.S.
TRACED: GUS A.A.

# REINFORCED CONCRETE DRAINAGE CHANNEL WITH 5" I-BEAM LOK GRATING

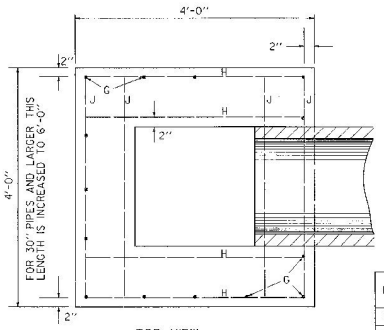
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-7

## REINFORCED CONCRETE DROP INLET WITH GRATE ( BOTTOM SECTION )

SEE SHEETS D-9, D-10, D-11, AND D-16 FOR TOP SECTION

MINIMUM DEPTH FOR
15" 3'-6"
18" 3'-6"
24" 4'-0"




TOP VIEW

STEEL SCHEDULE FOR DROP INLET ( BOTTOM SECTION ONLY )

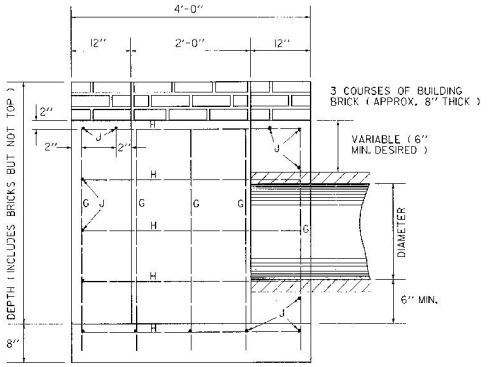
| DEPTH | 12" TO 24" DIAMETER 4' x 4' D.I. | | | | | | 30" DIAMETER 4' x 6' D.I. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NO. J | LENGTH | NO. H | LENGTH | NO. G | LENGTH | NO. J | LENGTH | NO. H | LENGTH | NO. G | LENGTH |
| 3'-0" | 12 | 3'-8" | 13 | 3'-8" | 15 | 2'-8" | | | | | | |
| 3'-6" | 12 | 3'-8" | 13 | 3'-8" | 15 | 3'-2" | | | | | | |
| 4'-0" | 14 | 3'-8" | 15 | 3'-8" | 15 | 3'-8" | | | | | | |
| 4'-6" | 14 | 3'-8" | 15 | 3'-8" | 15 | 4'-2" | 12 | 5'-8" | 17 | 3'-8" | 17 | 4'-2" |
| 5'-0" | 16 | 3'-8" | 17 | 3'-8" | 15 | 4'-8" | 14 | 5'-8" | 19 | 3'-8" | 17 | 4'-8" |
| 5'-6" | 16 | 3'-8" | 17 | 3'-8" | 15 | 5'-2" | 14 | 5'-8" | 19 | 3'-8" | 17 | 5'-2" |
| 6'-0" | 18 | 3'-8" | 19 | 3'-8" | 15 | 5'-8" | 16 | 5'-8" | 21 | 3'-8" | 17 | 5'-8" |

| DEPTH | 36" DIAMETER 4' x 6' D.I. | | | | | |
|---|---|---|---|---|---|---|
| | NO. J | LENGTH | NO. H | LENGTH | NO. G | LENGTH |
| 5'-0" | 14 | 5'-8" | 19 | 3'-8" | 17 | 4'-8" |
| 5'-6" | 14 | 5'-8" | 19 | 3'-8" | 17 | 5'-2" |
| 6'-0" | 16 | 5'-8" | 21 | 3'-8" | 17 | 5'-8" |

BRICKS ARE INCLUDED IN CONCRETE QUANTITIES IN CHART

CONCRETE AND STEEL QUANTITIES FOR DROP INLETS ( BOTTOM SECTION ONLY )

| DEPTH | 12"-24" DIA. | | 30" DIA. | | 36" DIA. | |
|---|---|---|---|---|---|---|
| | CONC BY C.Y. | STEEL | CONC BY C.Y. | STEEL | CONC BY C.Y. | STEEL |
| 3'-0" | 1.73 | 138 | | | | |
| 3'-6" | 1.95 | 145 | | | | |
| 4'-0" | 2.17 | 168 | | | | |
| 4'-6" | 2.40 | 176 | 3.08 | 210 | | |
| 5'-0" | 2.62 | 199 | 3.37 | 238 | 3.29 | 238 |
| 5'-6" | 2.84 | 207 | 3.67 | 247 | 3.59 | 247 |
| 6'-0" | 3.06 | 230 | 3.97 | 276 | 3.89 | 276 |




SIDE VIEW

TO FIND VOLUME OF CONCRETE FOR THE ENTIRE STRUCTURE, ADD THE VOLUME FOR THE TOP USED, TO THE VOLUME IN THIS TABLE. FOR VOLUME IN TOP, SEE SHEETS D-9, D-10.

ALL REINFORCING STEEL TO BE NO. 5 Ø DEFORMED BARS, EVENLY SPACED, WITH A MAXIMUM SPACING OF 12" CENTER TO CENTER.

DROP INLET TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501.

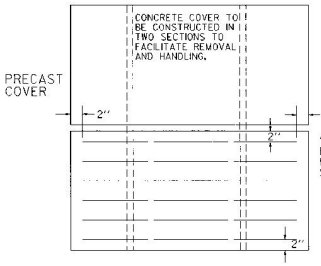
FURNISHING AND LAYING OF BRICKS FOR ADJUSTING ELEVATION OF GRATE, SHALL BE INCLUDED IN UNIT BID PRICE FOR CONCRETE, CLASS B, PAY ITEM 501.25, AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES.

MORTAR, TYPE II, TO BE USED FOR JOINT FILLER AND LAYING OF BRICK.

FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE.

## REINFORCED CONCRETE DROP INLET WITH PRECAST COVER

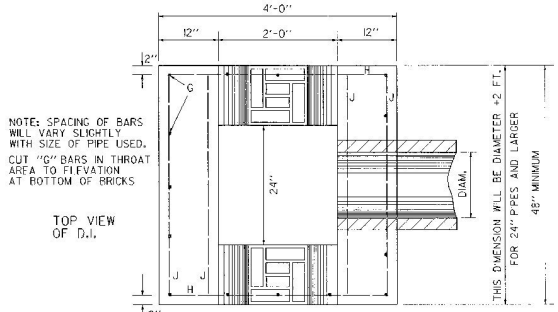
DROP INLET AND COVER TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501

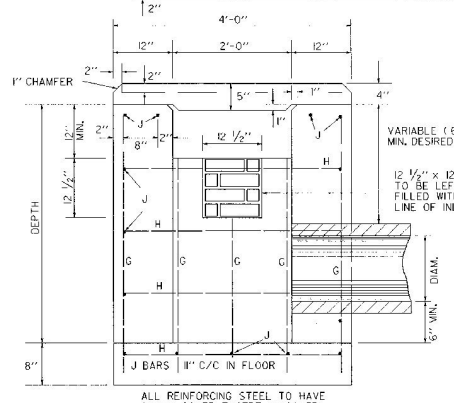



STEEL SCHEDULE FOR DROP INLETS WITH PRECAST COVERS

| DEPTH | 12" TO 24" DIAMETER | | | | 30" DIAMETER | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | G | LENGTH | H-J | LENGTH | G | LENGTH | J | LENGTH | H | LENGTH |
| 2'-0" | 15 | 2'-4" | 31 | 3'-8" | | | | | | |
| 2'-6" | 15 | 2'-10" | 33 | 3'-8" | | | | | | |
| 3'-0" | 15 | 3'-4" | 36 | 3'-8" | | | | | | |
| 3'-6" | 15 | 3'-10" | 36 | 3'-8" | 16 | 3'-10" | 12 | 4'-2" | 23 | 3'-8" |
| 4'-0" | 15 | 4'-4" | 39 | 3'-8" | 16 | 4'-4" | 14 | 4'-2" | 23 | 3'-8" |
| 4'-6" | 15 | 4'-10" | 39 | 3'-8" | 16 | 4'-10" | 14 | 4'-2" | 25 | 3'-8" |
| 5'-0" | 15 | 5'-4" | 42 | 3'-8" | 16 | 5'-4" | 16 | 4'-2" | 25 | 3'-8" |
| 5'-6" | 15 | 5'-10" | 42 | 3'-8" | 16 | 5'-10" | 16 | 4'-2" | 27 | 3'-8" |
| 6'-0" | 15 | 6'-4" | 45 | 3'-8" | 16 | 6'-4" | 18 | 4'-2" | 27 | 3'-8" |

| DEPTH | 36" DIAMETER | | | | | |
|---|---|---|---|---|---|---|
| | G | LENGTH | J | LENGTH | H | LENGTH |
| 4'-0" | 16 | 4'-4" | 14 | 4'-8" | 28 | 3'-8" |
| 4'-6" | 16 | 4'-10" | 14 | 4'-8" | 28 | 3'-8" |
| 5'-0" | 16 | 5'-4" | 16 | 4'-8" | 30 | 3'-8" |
| 5'-6" | 16 | 5'-10" | 16 | 4'-8" | 30 | 3'-8" |
| 6'-0" | 16 | 6'-4" | 18 | 4'-8" | 32 | 3'-8" |




SIDE VIEW OF D.I.

CONCRETE AND STEEL QUANTITIES FOR DROP INLETS OF VARIOUS DEPTHS

DROP INLETS WITH PRECAST COVERS

| DEPTH | 12" 15" 18" | | 24" | | 30" | | 36" | |
|---|---|---|---|---|---|---|---|---|
| | CONC BY C.Y. | STEEL LBS | CONC BY C.Y. | STEEL LBS. | CONC BY C.Y. | STEEL LBS | CONC BY C.Y. | STEEL LBS. |
| 2'-0" | 1.4 | 155 | | | | | | |
| 2'-6" | 1.6 | 171 | 1.6 | 171 | | | | |
| 3'-0" | 1.8 | 190 | 1.8 | 190 | | | | |
| 3'-6" | 2.0 | 198 | 2.0 | 198 | 2.1 | 204 | | |
| 4'-0" | 2.3 | 217 | 2.3 | 217 | 2.3 | 221 | 2.5 | 248 |
| 4'-6" | 2.5 | 225 | 2.5 | 225 | 2.6 | 237 | 2.7 | 256 |
| 5'-0" | 2.7 | 244 | 2.7 | 244 | 2.8 | 254 | 3.0 | 282 |
| 5'-6" | 2.9 | 252 | 2.9 | 252 | 3.0 | 270 | 3.2 | 290 |
| 6'-0" | 3.2 | 271 | 3.2 | 271 | 3.3 | 287 | 3.5 | 316 |

ALL REINFORCING BARS SHALL BE NO.5 Ø DEFORMED BARS, EVENLY SPACED, WITH A MAXIMUM SPACING OF 12" CENTER TO CENTER, EXCEPT IN THE COVER, WHERE THE MAXIMUM SPACING IS 4" CENTER TO CENTER.

FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE.

FURNISHING AND LAYING OF BRICKS, SHALL BE INCLUDED IN THE UNIT BID PRICE FOR CONCRETE, CLASS B, AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES. ONLY SUFFICIENT MORTAR TO BE USED TO PROVIDE A VERY LIGHT BOND TO ALLOW WITH EASE, FUTURE REMOVAL, FOR CORRECTION OF ELEVATION OF FLOW LINE.

MORTAR, TYPE II, TO BE USED FOR JOINT FILLER AND LAYING OF BRICK.

REVISIONS AND CORRECTIONS

DEC. 6, 1971 - ORIGINAL APPROVAL

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

DIRECTOR OF ENGINEERING

DESIGN ENGINEER

# REINFORCED CONCRETE DROP INLET WITH PRECAST COVER

# REINFORCED CONCRETE DROP INLET WITH GRATE ( BOTTOM SECTION )

( SEE SHEETS D-9, D-10, AND D11 FOR TOP SECTION )

VERMONT AGENCY OF TRANSPORTATION

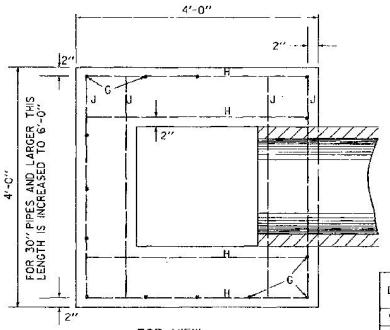
STANDARD

D-8

## REINFORCED CONCRETE DROP INLET WITH GRATE ( BOTTOM SECTION )

SEE SHEETS D-9,D-10,D-11, AND D-16 FOR TOP SECTION

MINIMUM DEPTH FOR
15" 3'-6"
18" 3'-6"
24" 4'-0"




TOP VIEW

STEEL SCHEDULE FOR DROP INLET ( BOTTOM SECTION ONLY )

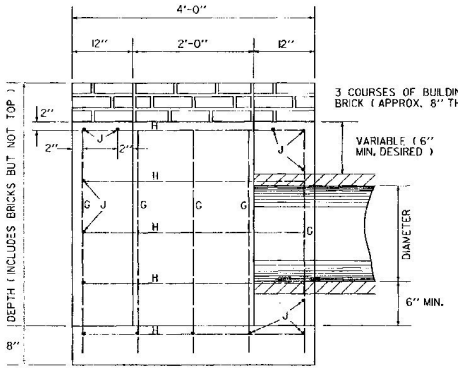
| DEPTH | 12" TO 24" DIAMETER 4' x 4' D.I. | | | | | | 30" DIAMETER 4' x 6' D.I. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NO. J | LENGTH | NO. H | LENGTH | NO. G | LENGTH | NO. J | LENGTH | NO. H | LENGTH | NO. G | LENGTH |
| 3'-0" | 12 | 3'-8" | 13 | 3'-8" | 15 | 2'-8" | | | | | | |
| 3'-6" | 12 | 3'-8" | 13 | 3'-8" | 15 | 3'-2" | | | | | | |
| 4'-0" | 14 | 3'-8" | 15 | 3'-8" | 15 | 3'-8" | | | | | | |
| 4'-6" | 14 | 3'-8" | 15 | 3'-8" | 15 | 4'-2" | 12 | 5'-8" | 17 | 3'-8" | 17 | 4'-2" |
| 5'-0" | 16 | 3'-8" | 17 | 3'-8" | 15 | 4'-8" | 14 | 5'-8" | 19 | 3'-8" | 17 | 4'-8" |
| 5'-6" | 16 | 3'-8" | 17 | 3'-8" | 15 | 5'-2" | 14 | 5'-8" | 19 | 3'-8" | 17 | 5'-2" |
| 6'-0" | 18 | 3'-8" | 19 | 3'-8" | 15 | 5'-8" | 16 | 5'-8" | 21 | 3'-8" | 17 | 5'-8" |

| DEPTH | 36" DIAMETER 4' x 6' D.I. | | | | | |
|---|---|---|---|---|---|---|
| | NO. J | LENGTH | NO. H | LENGTH | NO. G | LENGTH |
| 5'-0" | 14 | 5'-8" | 19 | 3'-8" | 17 | 4'-8" |
| 5'-6" | 14 | 5'-8" | 19 | 3'-8" | 17 | 5'-2" |
| 6'-0" | 16 | 5'-8" | 21 | 3'-8" | 17 | 5'-8" |

BRICKS ARE INCLUDED IN CONCRETE QUANTITIES IN CHART

CONCRETE AND STEEL QUANTITIES FOR DROP INLETS ( BOTTOM SECTION ONLY )

| DEPTH | 12"-24" DIA. | | 30" DIA. | | 36" DIA. | |
|---|---|---|---|---|---|---|
| | CONC BY C.Y. | STEEL | CONC BY C.Y. | STEEL | CONC BY C.Y. | STEEL |
| 3'-0" | 1.73 | 138 | | | | |
| 3'-6" | 1.95 | 145 | | | | |
| 4'-0" | 2.17 | 168 | | | | |
| 4'-6" | 2.40 | 176 | 3.08 | 210 | | |
| 5'-0" | 2.62 | 199 | 3.37 | 238 | 3.29 | 238 |
| 5'-6" | 2.84 | 207 | 3.67 | 247 | 3.59 | 247 |
| 6'-0" | 3.06 | 230 | 3.97 | 276 | 3.89 | 276 |




SIDE VIEW

TO FIND VOLUME OF CONCRETE FOR THE ENTIRE STRUCTURE, ADD THE VOLUME FOR THE TOP USED, TO THE VOLUME IN THIS TABLE. FOR VOLUME IN TOP, SEE SHEETS D-9, D-10.

ALL REINFORCING STEEL TO BE NO. 5 Ø DEFORMED BARS, EVENLY SPACED, WITH A MAXIMUM SPACING OF 12" CENTER TO CENTER.

DROP INLET TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501.

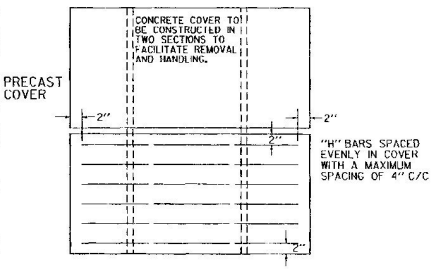
FURNISHING AND LAYING OF BRICKS FOR ADJUSTING ELEVATION OF GRATE, SHALL BE INCLUDED IN UNIT BID PRICE FOR CONCRETE, CLASS B, PAY ITEM 501.25, AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES.

MORTAR, TYPE II, TO BE USED FOR JOINT FILLER AND LAYING OF BRICK.

FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE.

## REINFORCED CONCRETE DROP INLET WITH PRECAST COVER

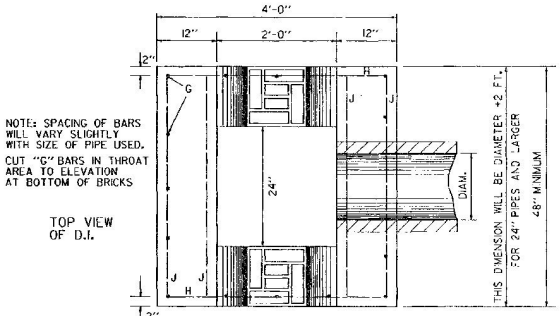
DROP INLET AND COVER TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501

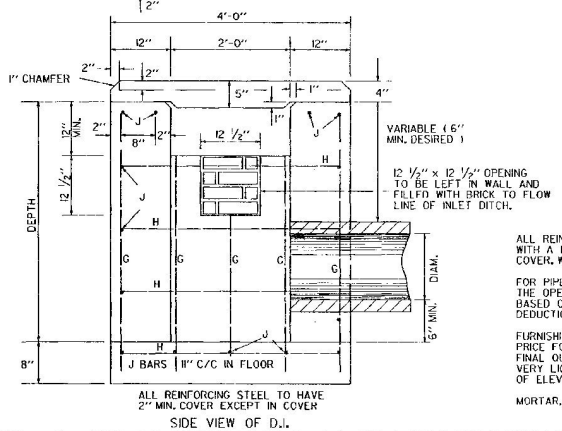



STEEL SCHEDULE FOR DROP INLETS WITH PRECAST COVERS

| DEPTH | 12" TO 24" DIAMETER | | | | 30" DIAMETER | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | G | LENGTH | H-J | LENGTH | G | LENGTH | J | LENGTH | H | LENGTH |
| 2'-0" | 15 | 2'-4" | 31 | 3'-8" | | | | | | |
| 2'-6" | 15 | 2'-10" | 33 | 3'-8" | | | | | | |
| 3'-0" | 15 | 3'-4" | 36 | 3'-8" | | | | | | |
| 3'-6" | 15 | 3'-10" | 36 | 3'-8" | 16 | 3' 10" | 12 | 4'-2" | 23 | 3'-8" |
| 4'-0" | 15 | 4'-4" | 39 | 3'-8" | 16 | 4'-4" | 14 | 4'-2" | 23 | 3'-8" |
| 4'-6" | 15 | 4'-10" | 39 | 3'-8" | 16 | 4'-10" | 14 | 4'-2" | 25 | 3'-8" |
| 5'-0" | 15 | 5'-4" | 42 | 3'-8" | 16 | 5'-4" | 16 | 4'-2" | 25 | 3'-8" |
| 5'-6" | 15 | 5'-10" | 42 | 3'-8" | 16 | 5'-10" | 16 | 4'-2" | 27 | 3'-8" |
| 6'-0" | 15 | 6'-4" | 45 | 3'-8" | 16 | 6'-4" | 18 | 4'-2" | 27 | 3'-8" |

| DEPTH | 36" DIAMETER | | | | | |
|---|---|---|---|---|---|---|
| | G | LENGTH | J | LENGTH | H | LENGTH |
| 4'-0" | 16 | 4'-4" | 14 | 4'-8" | 28 | 3'-8" |
| 4'-6" | 16 | 4'-10" | 14 | 4'-8" | 28 | 3'-8" |
| 5'-0" | 16 | 5'-4" | 16 | 4'-8" | 30 | 3'-8" |
| 5'-6" | 16 | 5'-10" | 16 | 4'-8" | 30 | 3'-8" |
| 6'-0" | 16 | 6'-4" | 18 | 4'-8" | 32 | 3'-8" |




SIDE VIEW OF D.I.

CONCRETE AND STEEL QUANTITIES FOR DROP INLETS OF VARIOUS DEPTHS

DROP INLETS WITH PRECAST COVERS

| DEPTH | 12" 15" 18" | | 24" | | 30" | | 36" | |
|---|---|---|---|---|---|---|---|---|
| | CONC BY C.Y. | STEEL LBS | CONC BY C.Y. | STEEL LBS. | CONC BY C.Y. | STEEL LBS | CONC BY C.Y. | STEEL LBS. |
| 2'-0" | 1.4 | 155 | | | | | | |
| 2'-6" | 1.6 | 171 | 1.6 | 171 | | | | |
| 3'-0" | 1.8 | 190 | 1.8 | 190 | | | | |
| 3'-6" | 2.0 | 198 | 2.0 | 198 | 2.1 | 204 | | |
| 4'-0" | 2.3 | 217 | 2.3 | 217 | 2.3 | 221 | 2.5 | 248 |
| 4'-6" | 2.5 | 225 | 2.5 | 225 | 2.6 | 237 | 2.7 | 256 |
| 5'-0" | 2.7 | 244 | 2.7 | 244 | 2.8 | 254 | 3.0 | 282 |
| 5'-6" | 2.9 | 252 | 2.9 | 252 | 3.0 | 270 | 3.2 | 290 |
| 6'-0" | 3.2 | 271 | 3.2 | 271 | 3.3 | 287 | 3.5 | 316 |

ALL REINFORCING BARS SHALL BE NO.5 Ø DEFORMED BARS, EVENLY SPACED, WITH A MAXIMUM SPACING OF 12" CENTER TO CENTER, EXCEPT IN THE COVER, WHERE THE MAXIMUM SPACING IS 4" CENTER TO CENTER.

FOR PIPES OF 30" OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE.

FURNISHING AND LAYING OF BRICKS, SHALL BE INCLUDED IN THE UNIT BID PRICE FOR CONCRETE, CLASS B, AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES. ONLY SUFFICIENT MORTAR TO BE USED TO PROVIDE A VERY LIGHT BOND TO ALLOW WITH EASE, FUTURE REMOVAL, FOR CORRECTION OF ELEVATION OF FLOW LINE.

MORTAR, TYPE II, TO BE USED FOR JOINT FILLER AND LAYING OF BRICK.

REVISIONS AND CORRECTIONS

DEC. 6, 1971 - ORIGINAL APPROVAL

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

Scudder B. MacMillan P.E.
DIRECTOR OF ENGINEERING

Robert M. Murphy P.E.
DESIGN ENGINEER

# REINFORCED CONCRETE DROP INLET WITH PRECAST COVER

# REINFORCED CONCRETE DROP INLET WITH GRATE ( BOTTOM SECTION )

( SEE SHEETS D-9, D-10, AND D11 FOR TOP SECTION )

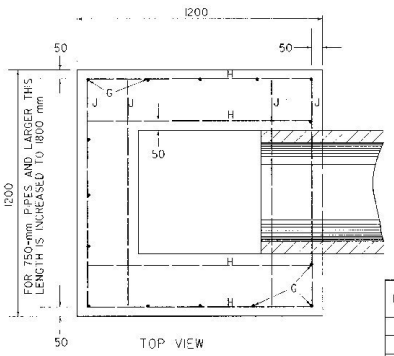
VERMONT AGENCY OF TRANSPORTATION

# STANDARD D-8

## REINFORCED CONCRETE DROP INLET WITH GRATE ( BOTTOM SECTION )

SEE SHEETS D-9M, D-10M, D-11M AND D-16M FOR TOP SECTION

| PIPE SIZE (mm) | MIN. DEPTH (mm) |
|---|---|
| 375 | 1050 |
| 450 | 1050 |
| 600 | 1200 |



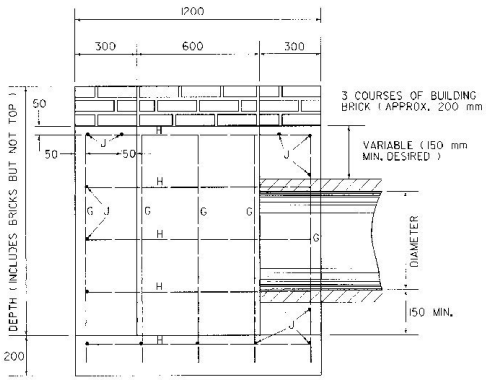

TOP VIEW

| STEEL SCHEDULE FOR DROP INLET ( BOTTOM SECTION ONLY ) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH | 300 TO 600 DIAMETER 1200 × 1200 D.I. | | | | | | 750 DIAMETER 1200 × 1800 D.I. | | | | | |
| | NO. J | LENGTH | NO. H | LENGTH | NO. G | LENGTH | NO. J | LENGTH | NO. H | LENGTH | NO. G | LENGTH |
| 900 | 12 | 1100 | 13 | 1100 | 15 | 800 | | | | | | |
| 1050 | 12 | 1100 | 13 | 1100 | 15 | 950 | | | | | | |
| 1200 | 14 | 1100 | 15 | 1100 | 15 | 1100 | | | | | | |
| 1350 | 14 | 1100 | 15 | 1100 | 15 | 1250 | 12 | 1700 | 17 | 1100 | 17 | 1250 |
| 1500 | 16 | 1100 | 17 | 1100 | 15 | 1400 | 14 | 1700 | 19 | 1100 | 17 | 1400 |
| 1650 | 16 | 1100 | 17 | 1100 | 15 | 1550 | 14 | 1700 | 19 | 1100 | 17 | 1550 |
| 1800 | 18 | 1100 | 19 | 1100 | 15 | 1700 | 16 | 1700 | 21 | 1100 | 17 | 1700 |

| DEPTH | 900 DIAMETER 1200 × 1800 D.I. | | | | | |
|---|---|---|---|---|---|---|
| | NO. J | LENGTH | NO. H | LENGTH | NO. G | LENGTH |
| 1500 | 14 | 1700 | 9 | 1100 | 17 | 1400 |
| 1650 | 14 | 1700 | 9 | 1100 | 17 | 1550 |
| 1800 | 16 | 1700 | 21 | 1100 | 17 | 1700 |

BRICKS ARE INCLUDED IN CONCRETE QUANTITIES IN CHART

| CONCRETE AND STEEL QUANTITIES FOR DROP INLETS ( BOTTOM SECTION ONLY ) | | | | | | |
|---|---|---|---|---|---|---|
| DEPTH | 300-600 DIA. | | 750 DIA. | | 900 DIA. | |
| | CONC m3 | STEEL kg | CONC m3 | STEEL kg | CONC m3 | STEEL kg |
| 900 | 1.26 | 61 | | | | |
| 1050 | 1.42 | 65 | | | | |
| 1200 | 1.58 | 75 | | | | |
| 1350 | 1.75 | 79 | 2.24 | 94 | | |
| 1500 | 1.91 | 89 | 2.46 | 106 | 2.40 | 106 |
| 1650 | 2.06 | 92 | 2.68 | 110 | 2.62 | 110 |
| 1800 | 2.23 | 103 | 2.89 | 123 | 2.83 | 123 |




SIDE VIEW

TO FIND VOLUME OF CONCRETE FOR THE ENTIRE STRUCTURE, ADD THE VOLUME FOR THE TOP USED, TO THE VOLUME IN THIS TABLE. FOR VOLUME IN TOP, SEE SHEETS D-9M, D-10M.

ALL REINFORCING STEEL TO BE 16M DEFORMED BARS, EVENLY SPACED, WITH A MAXIMUM SPACING OF 300 mm CENTER TO CENTER.

DROP INLET TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501.

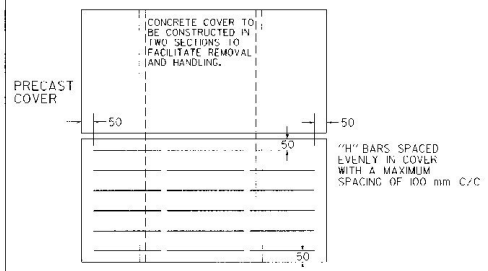
FURNISHING AND LAYING OF BRICKS FOR ADJUSTING ELEVATION OF GRATE SHALL BE INCLUDED IN UNIT BID PRICE FOR CONCRETE (CLASS B, PAY ITEM 501.251) AND THEIR VOLUME TO BE INCLUDED IN THE FINAL QUANTITIES.

MORTAR, TYPE II, TO BE USED FOR JOINT FILLER AND LAYING OF BRICK.

FOR PIPES OF 750 mm OR MORE IN DIAMETER, ALLOWANCE SHALL BE MADE FOR THE OPENING IN COMPUTING CONCRETE VOLUMES. THIS DEDUCTION WILL BE BASED ON THE RATED DIAMETER OF THE PIPE USED, WITH THE SAME DEDUCTION FOR CONCRETE AND METAL PIPE.

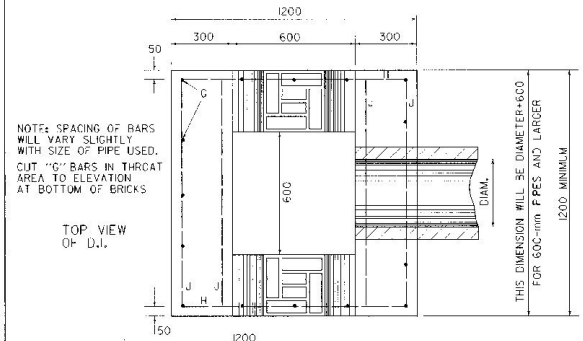
## REINFORCED CONCRETE DROP INLET WITH PRECAST COVER

DROP INLET AND COVER TO BE CONSTRUCTED IN ACCORDANCE WITH STRUCTURAL CONCRETE, SECTION 501

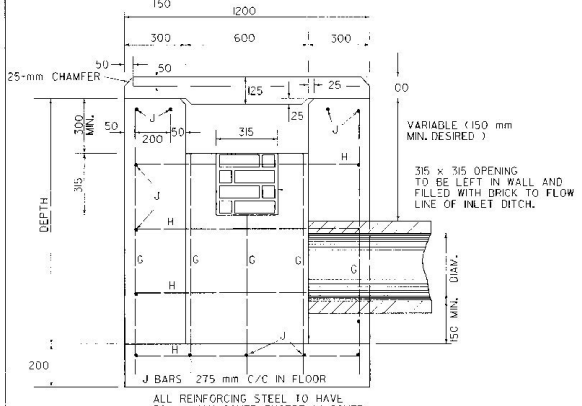



| STEEL SCHEDULE FOR DROP INLETS WITH PRECAST COVERS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DEPTH | 300 TO 600 DIAMETER | | | | 750 DIAMETER | | | | | |
| | G | LENGTH | H-J | LENGTH | G | LENGTH | J | LENGTH | H | LENGTH |
| 600 | 15 | 700 | 31 | 1100 | | | | | | |
| 750 | 15 | 850 | 33 | 1100 | | | | | | |
| 900 | 15 | 1000 | 36 | 1100 | | | | | | |
| 1050 | 15 | 1150 | 36 | 1100 | 16 | 1150 | 12 | 1250 | 23 | 1100 |
| 1200 | 15 | 1300 | 39 | 1100 | 16 | 1300 | 14 | 1250 | 23 | 1100 |
| 1350 | 15 | 1450 | 39 | 1100 | 16 | 1450 | 14 | 1250 | 25 | 1100 |
| 1500 | 15 | 1600 | 42 | 1100 | 16 | 1600 | 16 | 1250 | 25 | 1100 |
| 1650 | 15 | 1750 | 42 | 1100 | 6 | 1750 | 16 | 1250 | 27 | 1100 |
| 1800 | 15 | 1900 | 45 | 1100 | 16 | 1900 | 18 | 1250 | 27 | 1100 |

| DEPTH | 900 DIAMETER | | | | | |
|---|---|---|---|---|---|---|
| | G | LENGTH | J | LENGTH | H | LENGTH |
| 1200 | 16 | 1300 | 14 | 1400 | 28 | 1100 |
| 1350 | 16 | 1450 | 14 | 1400 | 28 | 1100 |
| 1500 | 16 | 1600 | 16 | 1400 | 30 | 1100 |
| 1650 | 16 | 1750 | 16 | 1400 | 30 | 1100 |
| 1800 | 16 | 1900 | 18 | 1400 | 32 | 1100 |




| CONCRETE AND STEEL QUANTITIES FOR DROP INLETS OF VARIOUS DEPTHS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DROP INLETS WITH PRECAST COVERS | | | | | | | | |
| DEPTH | 300,375,450 | | 600 | | 750 | | 900 | |
| | CONC m3 | STEEL kg | CONC m3 | STEEL kg | CONC m3 | STEEL kg | CONC m3 | STEEL kg |
| 600 | 0.99 | 69 | | | | | | |
| 750 | 1.15 | 76 | 1.15 | 76 | | | | |
| 900 | 1.31 | 85 | 1.31 | 85 | | | | |
| 1050 | 1.48 | 88 | 1.48 | 88 | 1.49 | 91 | | |
| 1200 | 1.64 | 97 | 1.64 | 97 | 1.67 | 99 | 1.78 | 111 |
| 1350 | 1.80 | 100 | 1.80 | 100 | 1.85 | 106 | 1.96 | 114 |
| 1500 | 1.96 | 109 | 1.96 | 109 | 2.02 | 114 | 2.15 | 126 |
| 1650 | 2.12 | 112 | 2.12 | 112 | 2.20 | 121 | 2.34 | 129 |
| 1800 | 2.29 | 121 | 2.29 | 121 | 2.37 | 28 | 2.53 | 141 |




ALL REINFORCING STEEL TO HAVE 50-mm MIN. COVER EXCEPT IN COVER

SIDE VIEW OF D.I.

NOTE: ALL DIMENSIONS ARE IN MILLIMETERS (mm) EXCEPT WHERE NOTED.

REVISIONS AND CORRECTIONS

JUNE 15, 1997 ORIGINAL APPROVAL DATE

APPROVED

DIRECTOR OF ENGINEERING

DESIGN ENGINEER

**REINFORCED CONCRETE DROP INLET WITH PRECAST COVER**

**REINFORCED CONCRETE DROP INLET WITH GRATE ( BOTTOM SECTION )**

**( SEE SHEETS D-9M, D-10M AND D-11M FOR TOP SECTION )**

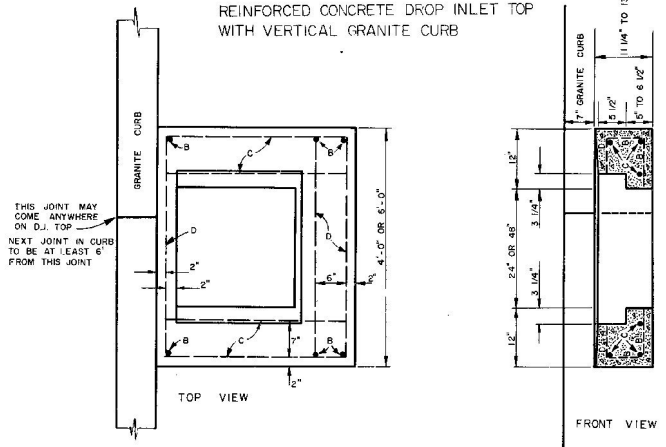
VERMONT AGENCY OF TRANSPORTATION

Not Metric

STANDARD

D-8M

## REINFORCED CONCRETE DROP INLET TOP WITH VERTICAL GRANITE CURB




STEEL SCHEDULE FOR 4'-0" X 4'-0" DI

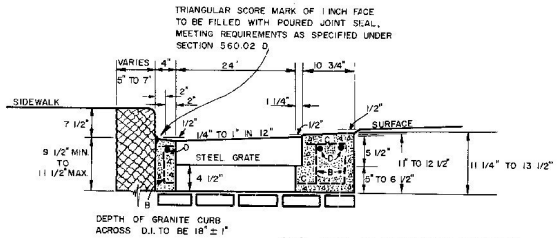
| BAR | NO. | LENGTH | |
|---|---|---|---|
| B | 3 | 4'-8" | |
| C | 6 | 3'-0" | STRAIGHT |
| D | 3 | 3'-8" | STRAIGHT |

CONCRETE CLASS B 0.33 C.Y.
REINFORCING STEEL 45 LBS.

STEEL SCHEDULE FOR 4'-0" X 6'-0" D.I.

| BAR | NO. | LENGTH | |
|---|---|---|---|
| B | 3 | 6'-8" | |
| C | 6 | 3'-0" | STRAIGHT |
| D | 3 | 5'-8" | STRAIGHT |

CONCRETE CLASS B 0.43 C.Y.
REINFORCING STEEL 57 LBS.




SIDE VIEW OF REINFORCED CONCRETE DROP INLET TOP WITH VERTICAL GRANITE CURB, ITEM 556-B

GENERAL NOTES:

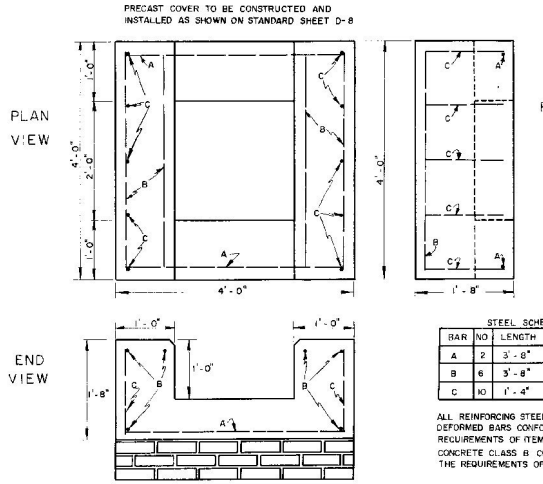
CONCRETE TO CONFORM TO THE REQUIREMENTS OF CONCRETE CLASS B, ITEM 401-B.

ALL REINFORCING STEEL TO BE 5/8" Ø DEFORMED BARS AND TO CONFORM TO THE REQUIREMENTS FOR REINFORCING STEEL, ITEM 402.

THESE TOPS TO BE USED WITH BOTTOM SECTIONS SHOWN ON STANDARD SHEETS D-5, D-8 AND D-13.

ON SHEET D-8, CONCRETE TOPS ARE PAID FOR AS CONCRETE, ITEM 401-B AND REINFORCING STEEL, ITEM 402 (TWO ITEMS). GRATES TO BE PAID FOR AS A SEPARATE ITEM. (ITEM 534)

PRECAST COVER TO BE CONSTRUCTED AND INSTALLED AS SHOWN ON STANDARD SHEET D-8




STEEL SCHEDULE

| BAR | NO | LENGTH | TYPE |
|---|---|---|---|
| A | 2 | 3'-8" | STRAIGHT |
| B | 6 | 3'-8" | STRAIGHT |
| C | 10 | 1'-4" | STRAIGHT |

ALL REINFORCING STEEL TO BE 5/8" Ø DEFORMED BARS CONFORMING TO THE REQUIREMENTS OF ITEM 402
CONCRETE CLASS B CONFORMING TO THE REQUIREMENTS OF ITEM 401-B

CONCRETE CLASS B (NOT INCLUDING COVER) 0.59 CY
REINFORCING STEEL 45 LBS.

4' X 4' CONCRETE THROAT ADAPTER

REVISIONS AND CORRECTIONS

MAR 1, 1965...SIDE VIEW OF R.C.DI. WITH BATTERED GRANITE CURB AND R.C. DI. WITH CONCRETE CURB DRAWINGS AND DETAILS DELETED. DRAWINGS OF CONC. THROAT ADAPTER ADDED.

APPROVED DATE MARCH 10, 1965

A D Bishop
CHIEF ENGINEER

G. M. Lane
HIGHWAY ENGINEER

E. H. Stuckmeyer
CONSTRUCTION ENGINEER

DRAWN: R. F.
TRACED: A.J.A.

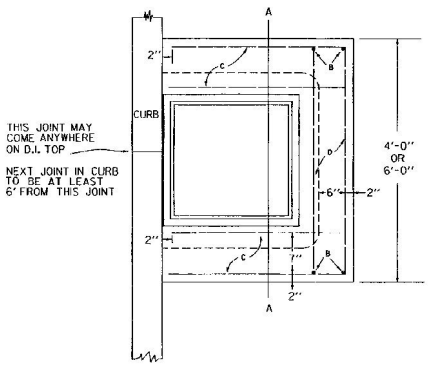
# REINFORCED CONCRETE DROP INLET TOP WITH GRANITE CURB

## 4' X 4' REINFORCED CONCRETE THROAT ADAPTER

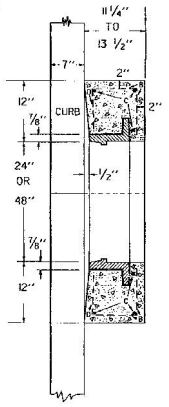
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-9

## REINFORCED CONCRETE DROP INLET TOP WITH VERTICAL CURB




PLAN




SECTION A-A

### STEEL SCHEDULE FOR 4'-0" X 4'-0" D.I.

| BAR | NO | LENGTH |
|---|---|---|
| B | 2 | 4'-8" |
| C | 6 | 2'-9" |
| D | 2 | 3'-8" |

0'-6" 3'-8" 0'-6"

STRAIGHT

STRAIGHT

CONCRETE CLASS B 0.28 C.Y.
REINFORCING STEEL 35 LBS.

### STEEL SCHEDULE FOR 4'-0" X 6'-0" D.I.

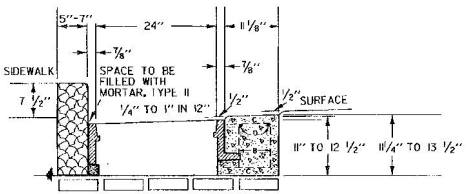
| BAR | NO | LENGTH |
|---|---|---|
| B | 2 | 6'-8" |
| C | 6 | 2'-9" |
| D | 2 | 5'-8" |

0'-6" 3'-8" 0'-6"

STRAIGHT

STRAIGHT

CONCRETE CLASS B 0.34 C.Y.
REINFORCING STEEL 43 LBS.




DEPTH OF CURB ACROSS D.I. TO BE 18" ± 1"

ELEVATION OF REINFORCED CONCRETE DROP INLET TOP WITH VERTICAL CURB

### GENERAL NOTES

CONCRETE TO CONFORM TO STRUCTURAL CONCRETE, SECTION 501.

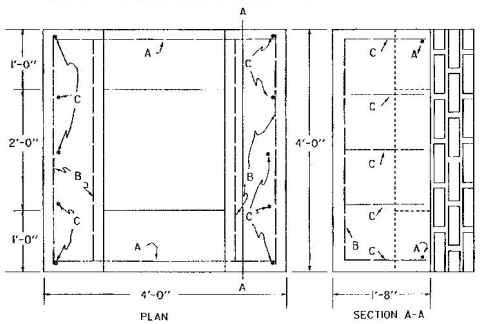
ALL REINFORCING STEEL TO BE No. 5 DEFORMED BARS.

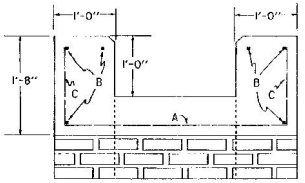
THESE TOPS TO BE USED WITH BOTTOM SECTIONS SHOWN ON STANDARD SHEETS D-5, D-8, AND D-13.

ALL REINFORCING STEEL TO HAVE A 2" MINIMUM COVER

CAST IRON GRATE AND FRAME IN ACCORDANCE AND PAID FOR UNDER SECTION 604.

PRECAST COVER TO BE CONSTRUCTED AND INSTALLED AS SHOWN ON STANDARD SHEET D-8.




ELEVATION

CONCRETE THROAT ADAPTER

STEEL SCHEDULE

| BAR | NO | LENGTH | TYPE |
|---|---|---|---|
| A | 2 | 3' - 8" | STRAIGHT |
| B | 6 | 3' - 8" | STRAIGHT |
| C | 10 | 1' - 4" | STRAIGHT |

ALL REINFORCING STEEL TO BE No. 5 DEFORMED BARS.

CONCRETE TO CONFORM TO STRUCTURAL CONCRETE SECTION 501.

CONCRETE CLASS B 0.59 C.Y.
(NOT INCLUDING COVER)
REINFORCING STEEL 45 LBS.

REVISIONS AND CORRECTIONS

DEC. 6, 1971 - ORIGINAL APPROVAL

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

DIRECTOR OF ENGINEERING

DESIGN ENGINEER

# REINFORCED CONCRETE DROP INLET WITH VERTICAL CURB

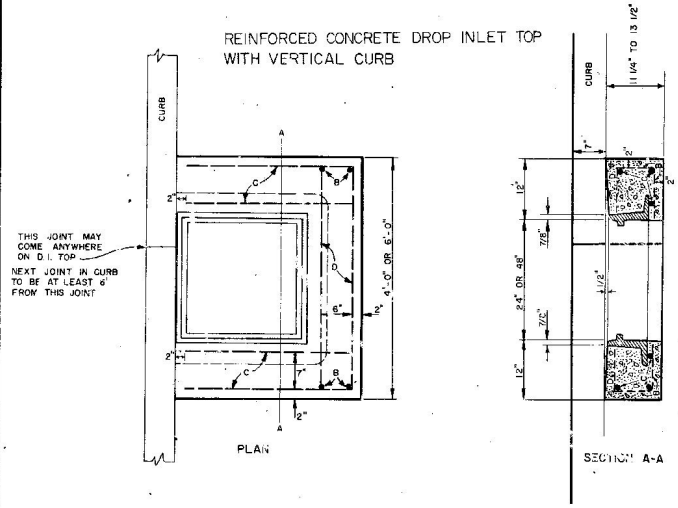
# REINFORCED CONCRETE DROP INLET THROAT ADAPTER

VERMONT AGENCY OF TRANSPORTATION

STANDARD

D-9

## REINFORCED CONCRETE DROP INLET TOP WITH VERTICAL CURB




STEEL SCHEDULE FOR 4'-0" X 4'-0" D.I.

| BAR | NO. | LENGTH |
|---|---|---|
| B | 2 | 4'-8" |
| C | 6 | 2'-9" |
| D | 2 | 3'-8" |


STRAIGHT
STRAIGHT

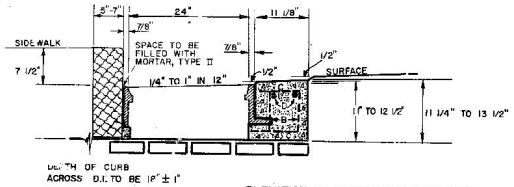
CONCRETE CLASS B 0.28 C.Y.
REINFORCING STEEL 35 LBS.

STEEL SCHEDULE FOR 4'-0" X 6'-0" D.I.

| BAR | NO. | LENGTH |
|---|---|---|
| B | 2 | 6'-8" |
| C | 6 | 2'-9" |
| D | 2 | 5'-8" |


STRAIGHT
STRAIGHT

CONCRETE CLASS B 0.34 C.Y.
REINFORCING STEEL 43 LBS.




ELEVATION OF REINFORCED CONCRETE DROP INLET TOP WITH VERTICAL CURB

GENERAL NOTES:

CONCRETE TO CONFORM TO STRUCTURAL CONCRETE, SECTION 501

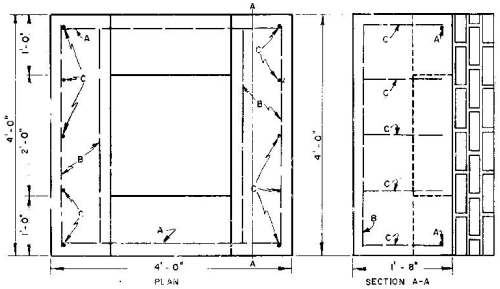
ALL REINFORCING STEEL TO BE NO. 5 DEFORMED BARS

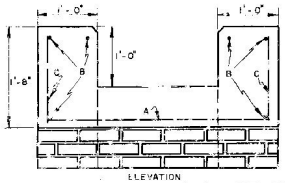
THESE TOPS TO BE USED WITH BOTTOM SECTIONS SHOWN ON STANDARD SHEETS D-5, D-8 AND D-13.

ALL REINFORCING STEEL TO HAVE A 2" MINIMUM COVER

CAST IRON GRATE AND FRAME IN ACCORDANCE AND PAID FOR UNDER SECTION 604

PRECAST COVER TO BE CONSTRUCTED AND INSTALLED AS SHOWN ON STANDARD SHEET D-7




STEEL SCHEDULE

| BAR | NO | LENGTH | TYPE |
|---|---|---|---|
| A | 2 | 3'-8" | STRAIGHT |
| B | 6 | 2'-8" | STRAIGHT |
| C | 10 | 1'-4" | STRAIGHT |

ALL REINFORCING STEEL TO BE No. 5 DEFORMED BARS

CONCRETE TO CONFORM TO STRUCTURAL CONCRETE SECTION 501

CONCRETE CLASS B (NOT INCLUDING COVER) 0.59 C.Y.
REINFORCING STEEL 45 LBS.

## CONCRETE THROAT ADAPTER

REVISIONS AND CORRECTIONS

APPROVED DATE Dec 6, 1971

R.W. Arnold
CHIEF ENGINEER

Edit Hackney
ASST. CHIEF ENGINEER

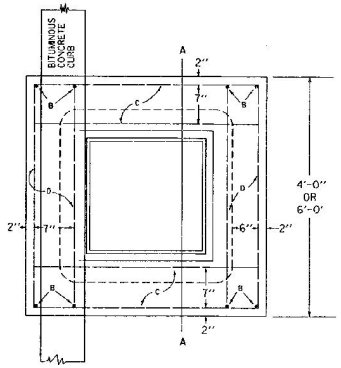
G. M. Lane
HIGHWAY ENGINEER

DRAWN: R. F.
TRACED: A.J.A.

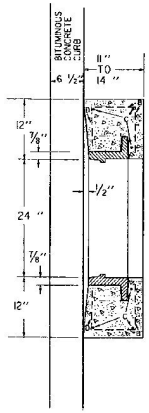
# REINFORCED CONCRETE DROP INLET TOP WITH VERTICAL CURB
# REINFORCED CONCRETE DROP INLET THROAT ADAPTER

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

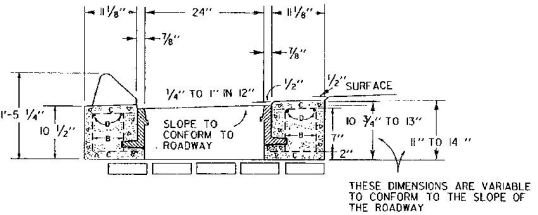
D-9




PLAN




SECTION A-A




ELEVATION

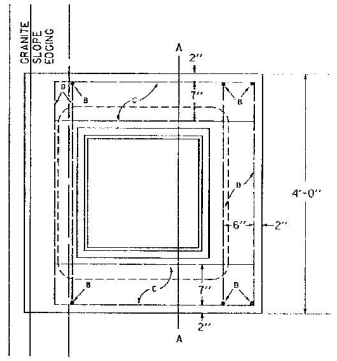
TOP FOR A REINFORCED CONCRETE DROP INLET WITH BITUMINOUS CONCRETE CURB

4'-0" X 4'-0"
STEEL SCHEDULE

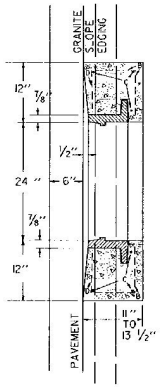
| BAR | NO | LENGTH | |
|---|---|---|---|
| B | 4 | 4'-8" | 3'-8" |
| C | 6 | 3'-6" | STRAIGHT |
| D | 4 | 3'-8" | STRAIGHT |

CONCRETE CLASS B = 0.41 C.Y.
REINFORCING STEEL = 58 LBS.

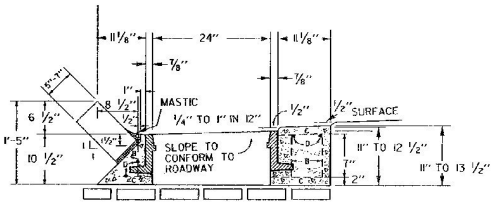
4'-0" X 6'-0"
CONCRETE CLASS B = 0.54 C.Y.
REINFORCING STEEL = 74 LBS.




PLAN




SECTION A-A




ELEVATION

TOP FOR A REINFORCED CONCRETE DROP INLET WITH GRANITE SLOPE EDGING

4'-0" X 4'-0"
STEEL SCHEDULE

| BAR | NO | LENGTH | |
|---|---|---|---|
| B | 2 | 4'-8" | 3'-8" |
| | 1 | 4'-4" | |
| C | 4 | 3'-4" | STRAIGHT |
| | 2 | 2'-10" | |
| D | 4 | 3'-8" | STRAIGHT |

4" OR 6"
4" OR 6"

CONCRETE CLASS B = 0.33 C.Y.
REINFORCING STEEL = 48 LBS.

4'-0" X 6'-0"
CONCRETE CLASS B = 0.42 C.Y.
REINFORCING STEEL = 63 LBS.

GENERAL NOTES

ALL REINFORCING STEEL TO BE No. 5 DEFORMED BARS.

FOR CAST IRON GRATE AND FRAME DETAIL, SEE STANDARD SHEET D-11 OR D-16.

REVISIONS AND CORRECTIONS

DEC. 6, 1971 - ORIGINAL APPROVAL

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

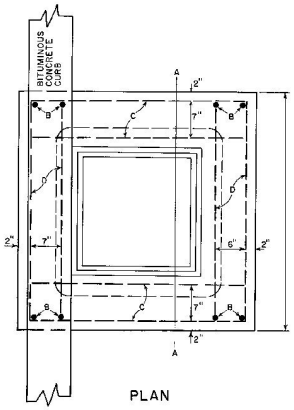
DIRECTOR OF ENGINEERING

DESIGN ENGINEER PE

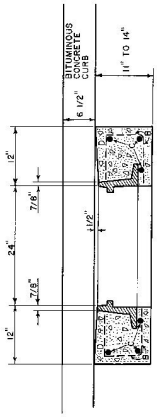
# TOP FOR A DROP INLET WITH BITUMINOUS CONCRETE CURB
# TOP FOR A DROP INLET GRANITE SLOPE EDGING

VERMONT AGENCY OF TRANSPORTATION

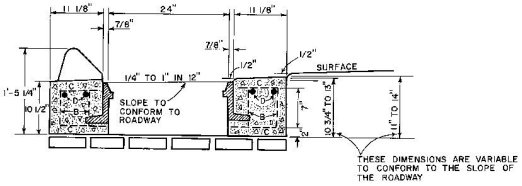
STANDARD
D-10




PLAN




SECTION A-A




ELEVATION

TOP FOR A REINFORCED CONCRETE DROP INLET WITH BITUMINOUS CONCRETE CURB

4'-0" x 4'-0"
STEEL SCHEDULE

| BAR | NO. | LENGTH |
|---|---|---|
| B | 4 | 4'-8" |
| C | 6 | 3'-6" |
| D | 4 | 3'-8" |


STRAIGHT

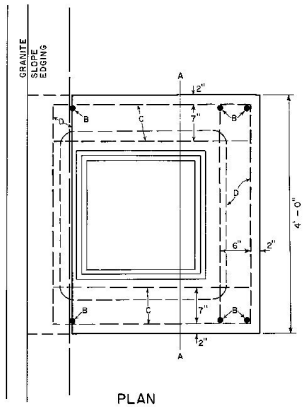
STRAIGHT

CONCRETE CLASS B = 0.41 C.Y.
REINFORCING STEEL = 58 LBS.

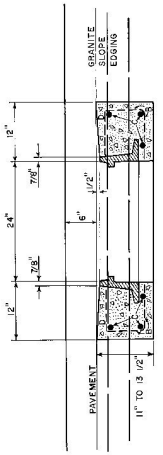
4'-0" x 6'-0"
CONCRETE CLASS B = 0.54 C.Y.
REINFORCING STEEL = 74 LBS

ALL REINFORCING STEEL TO BE No. 5 DEFORMED BARS

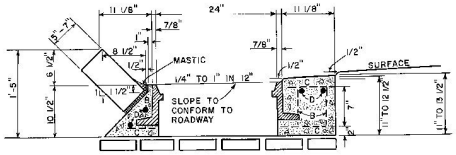
FOR CAST IRON GRATE AND FRAME DETAIL, SEE STANDARD SHEET D-11 OR D-16.




PLAN




SECTION A-A




ELEVATION

TOP FOR A REINFORCED CONCRETE DROP INLET WITH GRANITE SLOPE EDGING

4'-0" x 4'-0"
STEEL SCHEDULE

| BAR | NO. | LENGTH |
|---|---|---|
| B | 2<br>1 | 4'-8"<br>4'-4" |
| C | 4<br>2 | 3'-4"<br>2'-10" |
| D | 4 | 3'-8" |


STRAIGHT

STRAIGHT

CONCRETE CLASS B = 0.33 C.Y.
REINFORCING STEEL = 46 LBS.

4'-0" x 6'-0"
CONCRETE CLASS B = 0.42 C.Y.
REINFORCING STEEL = 63 LBS.

REVISIONS AND CORRECTIONS

APPROVED:

Dec. 6, 1971
DATE
CHIEF ENGINEER
ASST. CHIEF ENGINEER
HIGHWAY ENGINEER

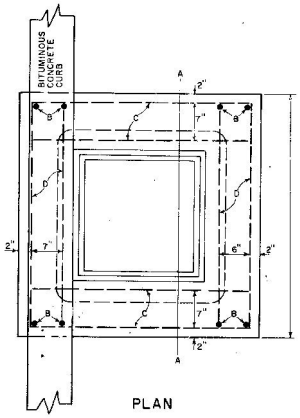
TOP FOR A DROP INLET WITH BITUMINOUS CONCRETE CURB

TOP FOR A DROP INLET WITH GRANITE SLOPE EDGING

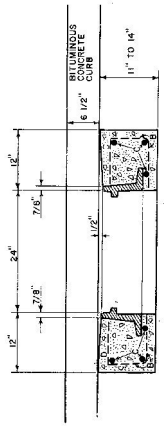
VERMONT AGENCY OF TRANSPORTATION

STANDARD

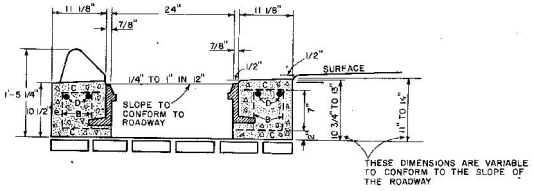
D-10




PLAN




SECTION A-A

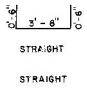



ELEVATION

TOP FOR A REINFORCED CONCRETE DROP INLET WITH BITUMINOUS CONCRETE CURB

4'-0" x 4'-0"
STEEL SCHEDULE

| BAR | NO. | LENGTH |
|---|---|---|
| B | 4 | 4'-8" |
| C | 6 | 3'-6" |
| D | 4 | 3'-8" |

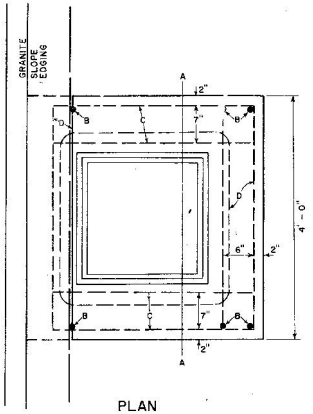



CONCRETE CLASS B = 0.41 C.Y.
REINFORCING STEEL = 58 LBS.

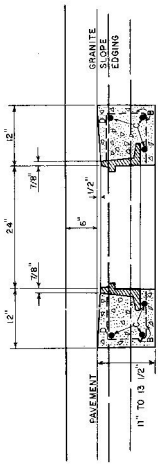
4'-0" x 6'-0"
CONCRETE CLASS B = 0.54 C.Y.
REINFORCING STEEL = 74 LBS

ALL REINFORCING STEEL TO BE No. 5 DEFORMED BARS

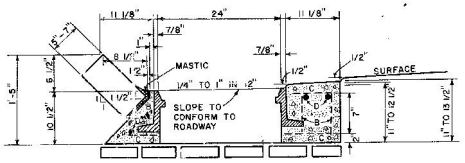
FOR CAST IRON GRATE AND FRAME DETAIL, SEE STANDARD SHEET D-11 OR D-16.




PLAN




SECTION A-A

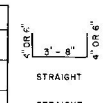



ELEVATION

TOP FOR A REINFORCED CONCRETE DROP INLET WITH GRANITE SLOPE EDGING

4'-0" x 4'-0"
STEEL SCHEDULE

| BAR | NO. | LENGTH |
|---|---|---|
| B | 2<br>1 | 4'-8"<br>4'-4" |
| C | 4<br>2 | 3'-4"<br>2'-10" |
| D | 4 | 3'-8" |




CONCRETE CLASS B = 0.33 C.Y.
REINFORCING STEEL = 48 LBS.

4'-0" x 6'-0"
CONCRETE CLASS B = 0.42 C.Y.
REINFORCING STEEL = 63 LBS.

REVISIONS AND CORRECTIONS

APPROVED:

Dec 6, 1971
DATE
R.H. Arnold
CHIEF ENGINEER
E.J. Stickney
ASST. CHIEF ENGINEER
G.M. Lane
HIGHWAY ENGINEER

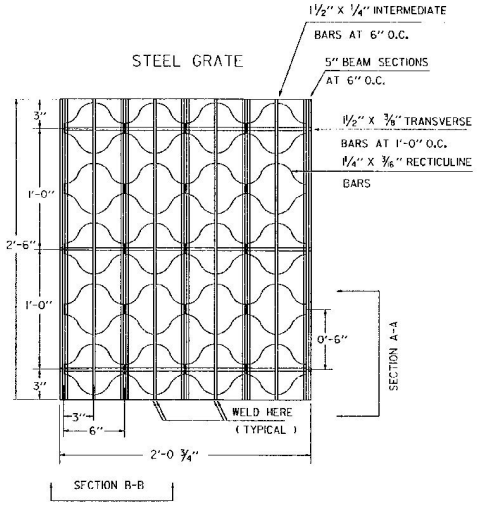
# TOP FOR A DROP INLET WITH BITUMINOUS CONCRETE CURB

# TOP FOR A DROP INLET WITH GRANITE SLOPE EDGING

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-10

## STEEL GRATE

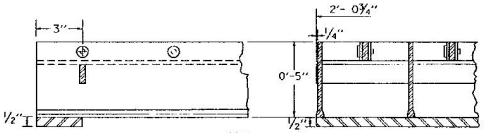



PLAN

GRATE SIZE SINGLE 24 ¾" X 30"
DOUBLE 24 ¾" X 54"

WEIGHT 95 LBS OR MORE
GRATES SHALL BE CAPABLE OF SUPPORTING H-20 ( 32,000 LB. AXLE LOAD ) INCLUDING 30% IMPACT.

| UNIT STRESSES ( LBS PER SQ. IN. ) | | 18,000 | 20,000 |
|---|---|---|---|
| MAIN BAR PARALLEL TO TRAFFIC | H-20 | 49" | 53" |
| MAIN BAR PERPENDICULAR TO TRAFFIC | H-20 | 39" | 42" |

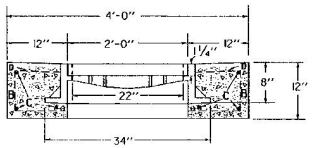



SECTION A-A SECTION B-B

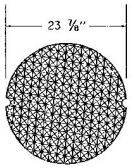
## CAST IRON COVER WITH FRAME

| BAR | NO. | LENGTH | |
|---|---|---|---|
| B | 4 | | 8" 3'-8" 8" |
| C | 6 | 3'-8" | STRAIGHT |
| D | 4 | 3'-8" | STRAIGHT |

ALL REINFORCING STEEL TO BE No. 5 DEFORMED BARS



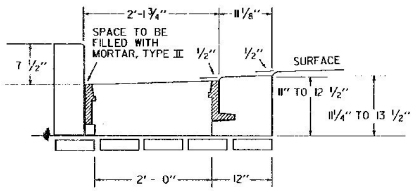

ELEVATION




PLAN

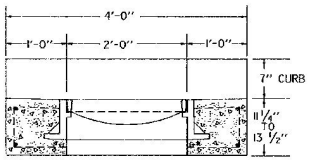
GENERAL NOTES:
WEIGHT OF FRAME AND COVER = 425 LBS.

## CAST IRON GRATE WITH FRAME



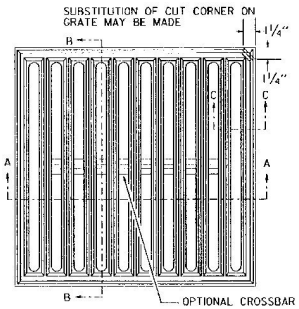

ELEVATION OF REINFORCED CONCRETE DROP INLET WITH VERTICAL GRANITE CURB AND 3 FLANGE CAST IRON FRAME FOR CAST IRON GRATE

SEE STANDARD D-9 FOR CONCRETE VOLUME, REINFORCING STEEL SCHEDULE, AND CURB JOINT DETAIL.

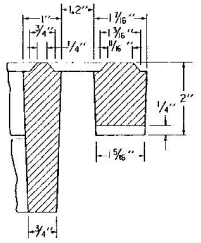



ELEVATION

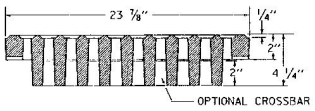
## CAST IRON GRATE, TYPE A



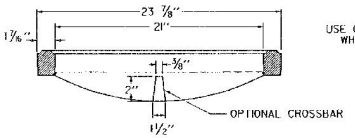

PLAN




SECTION C-C




SECTION A-A

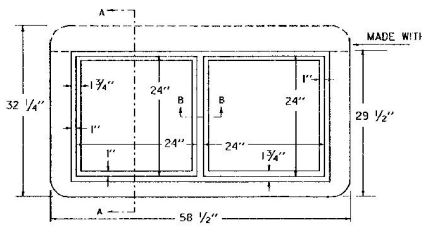



SECTION B-B

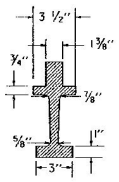
USE OF THE TYPE A GRATE IS PROHIBITED WHERE BICYCLE TRAFFIC IS EXPECTED

WEIGHT OF 3 FLANGED FRAME AND GRATE

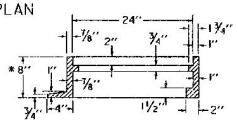
| | |
|---|---|
| GRATE | 220 LBS |
| FRAME | 260 LBS |
| TOTAL | 480 LBS |




PLAN

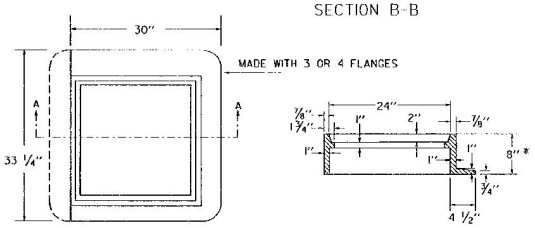



SECTION B-B




SECTION A-A

RECTANGULAR CAST IRON FRAME FOR TWO 24" SQUARE CAST IRON GRATES




PLAN SECTION A-A

SQUARE CAST IRON FRAME FOR CAST IRON GRATE TYPE A

* NOTE: FRAME DEPTH TO BE "6" WHEN USED IN CONJUNCTION WITH DROP INLET DETAILED ON STANDARD D-6.

THIS FRAME TO BE PLACED IN DROP INLET TOP BEFORE CONCRETE IS POURED.

4 FLANGES UNLESS OTHERWISE INDICATED. FRAMES TO BE FURNISHED WITH 3 FLANGES WHEN USED IN CONJUNCTION WITH CURB OR AS DIRECTED BY THE ENGINEER.

### REVISIONS AND CORRECTIONS

DEC. 6, 1971 - ORIGINAL APPROVAL
APR. 25, 1972 - CAST IRON COVER CHANGED FROM SQUARE TO CIRCULAR
SEPT. 4, 1980 - OPTIONAL CROSSBAR ADDED TO A GRATE; NOTE ADDED TO A GRATE FRAME DETAIL
AUG 25, 1981 - NOTE ADDED RESTRICTING USE OF TYPE A GRATE
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION, FHWA FINAL APPROVAL PENDING.

Gordon S. MacMillan, P.E.
DIRECTOR OF ENGINEERING

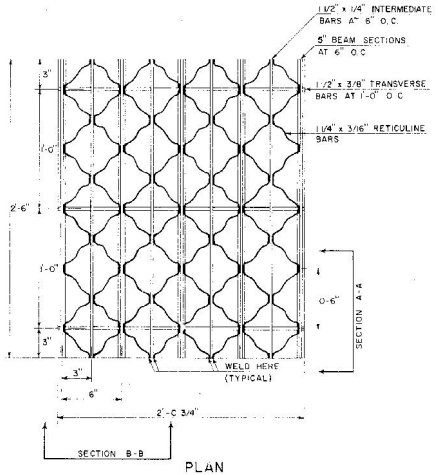
Robert D. Murphy, P.E.
DESIGN ENGINEER

# STEEL GRATE
# CAST IRON GRATE TYPE A
# CAST IRON COVER

VERMONT AGENCY OF TRANSPORTATION

# STANDARD D-11

## STEEL GRATE



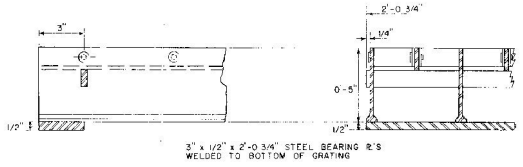

PLAN

GRATE SIZE SINGLE 24 3/4" x 30"
DOUBLE 24 3/4" x 54"

WEIGHT 95 LBS OR MORE

GRATES SHALL BE CAPABLE OF SUPPORTING H-20 (32,000 LB. AXLE LOAD) INCLUDING 30% IMPACT.

| UNIT STRESSES (LBS. PER SQ. IN.) | | 18,000 | 20,000 |
|---|---|---|---|
| MAIN BAR PARALLEL TO TRAFFIC | H-20 | 49" | 53" |
| MAIN BAR PERPENDICULAR TO TRAFFIC | H-20 | 39" | 42" |

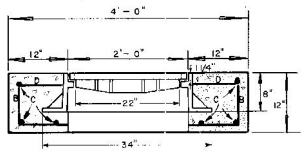



SECTION A-A

SECTION B-B

## CAST IRON COVER WITH FRAME

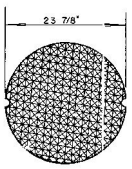
| BAR | NO. | LENGTH | |
|---|---|---|---|
| B | 4 | 3'-8" | STRAIGHT |
| C | 6 | 3'-8" | STRAIGHT |
| D | 4 | 3'-8" | STRAIGHT |




ELEVATION

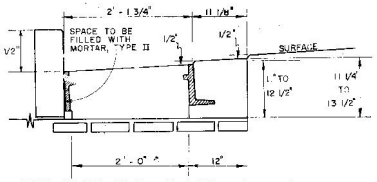
ALL REINFORCING STEEL TO BE No. 5 DEFORMED BARS

GENERAL NOTES:
WEIGHT OF FRAME AND COVER = 429 LBS.



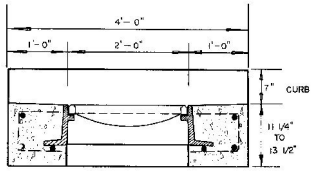

PLAN

## CAST IRON GRATE WITH FRAME



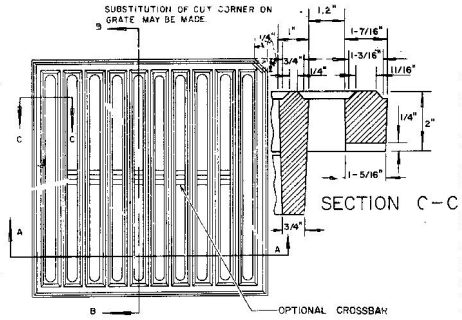

ELEVATION OF REINFORCED CONCRETE DROP INLET WITH VERTICAL GRANITE CURB AND 3 FLANGE CAST IRON FRAME FOR CAST IRON GRATE.

SEE STANDARD D-9 FOR CONCRETE VOLUME, REINFORCING STEEL SCHEDULE AND CURB JOINT DETAIL.

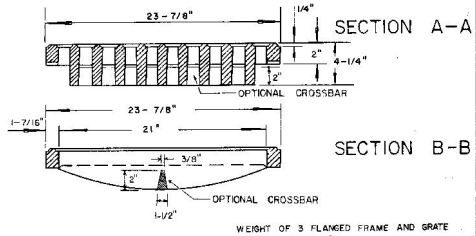



ELEVATION

SUBSTITUTION OF CUT CORNER ON GRATE MAY BE MADE.




PLAN

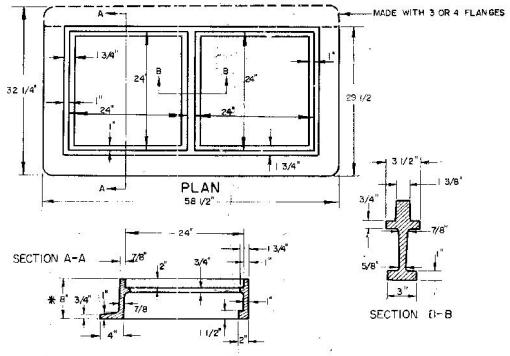



WEIGHT OF 3 FLANGED FRAME AND GRATE

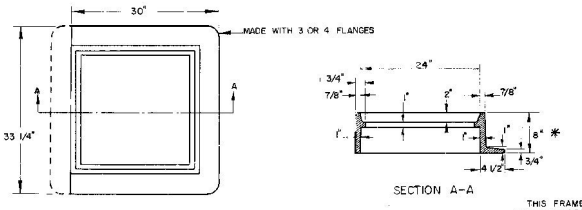
| | |
|---|---|
| GRATE | 220 LBS |
| FRAME | 260 LBS |
| TOTAL | 480 LBS |

## CAST IRON GRATE, TYPE A

USE OF THE TYPE A GRATE IS PROHIBITED WHERE BICYCLE TRAFFIC IS EXPECTED.




RECTANGULAR CAST IRON FRAME FOR TWO 24" SQUARE CAST IRON GRATES




PLAN

SQUARE CAST IRON FRAME FOR CAST IRON GRATE TYPE A

THIS FRAME TO BE PLACED IN DROP INLET TOP BEFORE CONCRETE IS POURED.

4 FLANGES UNLESS OTHERWISE INDICATED.

FRAMES TO BE FURNISHED WITH 3 FLANGES WHEN USED IN CONJUNCTION WITH CURB OR AS DIRECTED BY THE ENGINEER.

* NOTE: FRAME DEPTH TO BE "8" WHEN USED IN CONJUNCTION WITH DROP INLET DETAILED ON STANDARD D-6.

REVISIONS AND CORRECTIONS

APRIL 25, 1972 CAST IRON COVER CHANGED FROM SQUARE TO CIRCULAR
SEPT. 4, 1980 OPTIONAL CROSSBAR ADDED TO 'A' GRATE;
NOTE ADDED TO 'A' GRATE FRAME DETAIL.
AUG 24, 1981 NOTE ADDED RESTRICTING USE OF TYPE A GRATE.

APPROVED DATE Dec 6, 1911

R N Arnold
CHIEF ENGINEER

E H Stickney
ASST. CHIEF ENGINEER

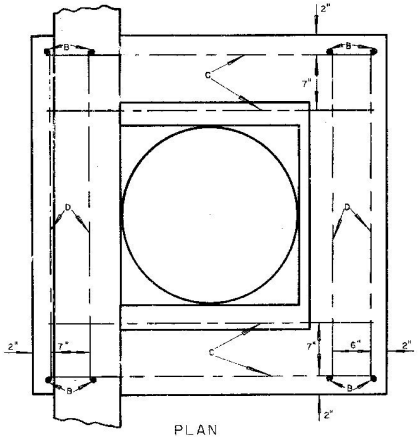
R. M. Lane
HIGHWAY ENGINEER

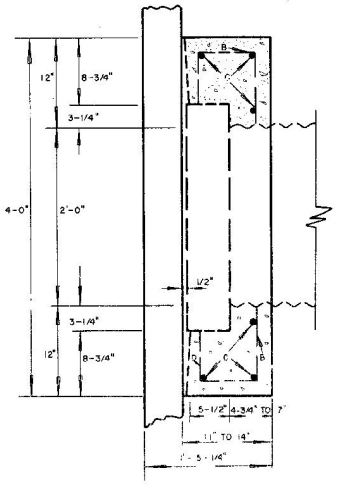
DRAWN: G. AJA
TRACED: A JA

# STEEL GRATE
# CAST IRON GRATE TYPE A
# CAST IRON COVER

VERMONT AGENCY OF TRANSPORTATION

STANDARD
D-11

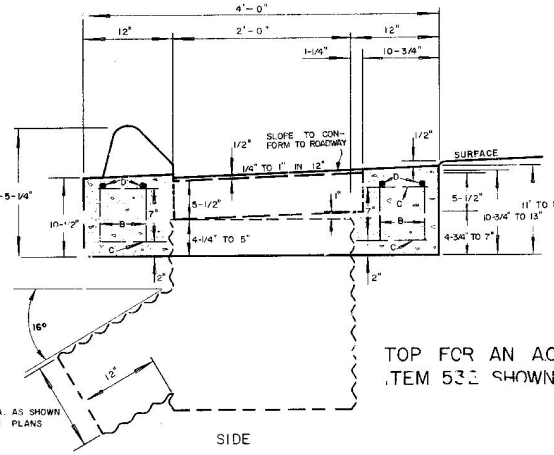



GENERAL NOTES:

QUANTITIES OF CONCRETE CLASS B AND OF REINFORCING STEEL ARE TO BE INCLUDED IN UNIT PRICE BID FOR ASPHALT COATED CORRUGATED GALVANIZED METAL DROP INLETS WITH GRATES, ITEM 532. ALL REINFORCING STEEL TO BE 5/8" DEFORMED AND SPACED AS SHOWN.

ALL PIPE OTHER THAN 12" SECTION MADE INTEGRAL WITH DROP INLET, TO BE PAID FOR AT UNIT PRICE BID FOR ASPHALT COATED CORRUGATED GALVANIZED METAL PIPE, OF DIAMETER SHOWN ON PLANS



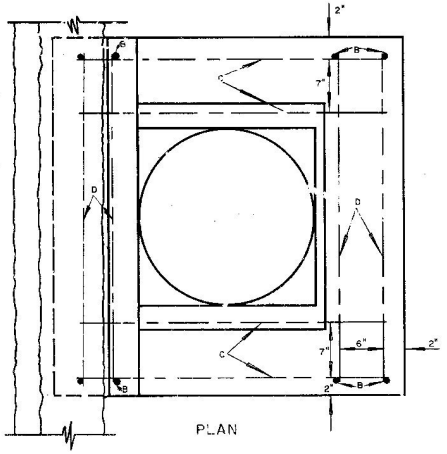

B BARS

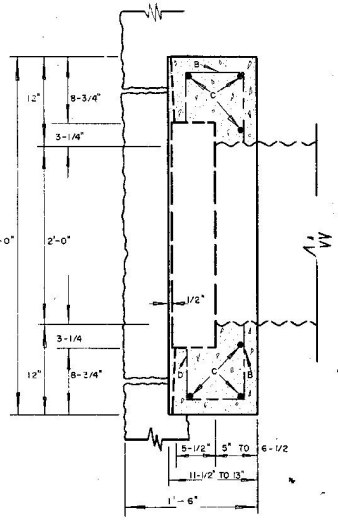
STEEL SCHEDULE 4'-0" X 4'-0"

| B | LENGTH | C | LENGTH | D | LENGTH |
|---|---|---|---|---|---|
| 4 | 4'-8" | 6 | 3'-8" | 4 | 3'-8" |

C AND D BARS ARE STRAIGHT

TOP FOR AN A.C.C.G.M. DROP INLET WITH GRATE ITEM 532 SHOWN WITH BITUMINOUS CONCRETE CURB

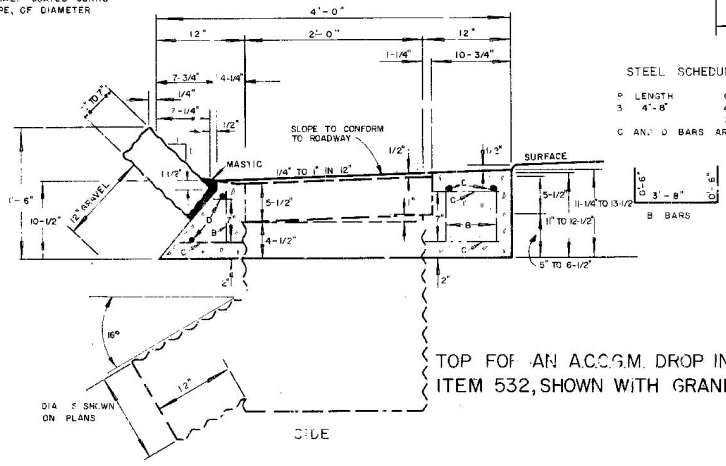



STEEL SCHEDULE 4'-0" X 4'-0"

| P | LENGTH | C | LENGTH | D | LENGTH |
|---|---|---|---|---|---|
| 3 | 4'-8" | 4 | 3'-6" | 4 | 3'-8" |
| | | 2 | 3'-2" | | |

C AND D BARS ARE STRAIGHT






B BARS

TOP FOR AN A.C.C.G.M. DROP INLET WITH GRATE ITEM 532, SHOWN WITH GRANITE SLOPE EDGING

ANY OF THE COMBINATIONS OF CURBS AND TOPS FOUND ON SHEETS D-9, D-10 AND D-11 MAY BE SUBSTITUED FOR THE TWO TYPES SHOWN

REVISIONS AND CORRECTIONS

APPROVED DATE MARCH 10, 1965

A. W. Bishop
CHIEF ENGINEER

G. M. Lasl
HIGHWAY ENGINEER

E. H. Stickney
CONSTRUCTION ENGINEER

DRAWN REN
TRACED GUS AJA

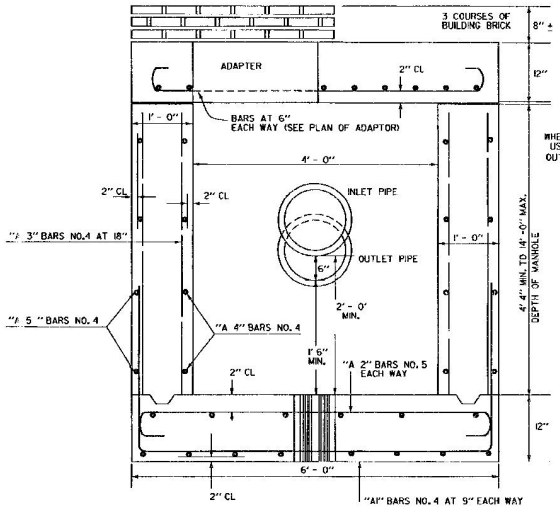
# TOPS FOR A.C.C.G.M.P DROP INLETS WITH GRATES, ITEM 532

VERMONT
DEPARTMENT
OF HIGHWAYS
STANDARD

D-12

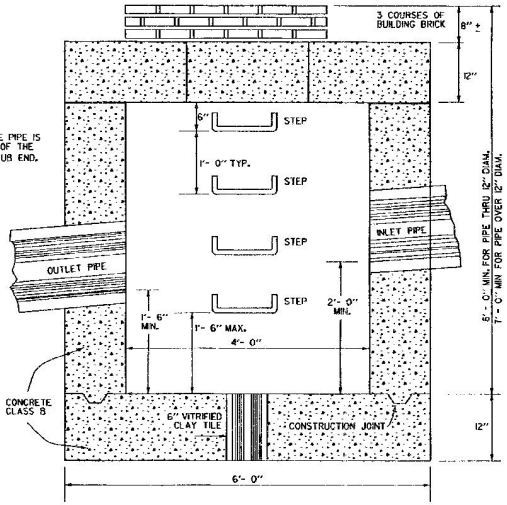
MORTAR TYPE II TO BE USED FOR JOINT FILLER AND LAYING OF BRICK

ANY OF THE COMBINATIONS OF TOPS, CURBS AND GRATES FOUND ON SHEETS D-6, D-9, D-10, AND D-11 CAN BE ADAPTED FOR USE WITH THIS STRUCTURE.

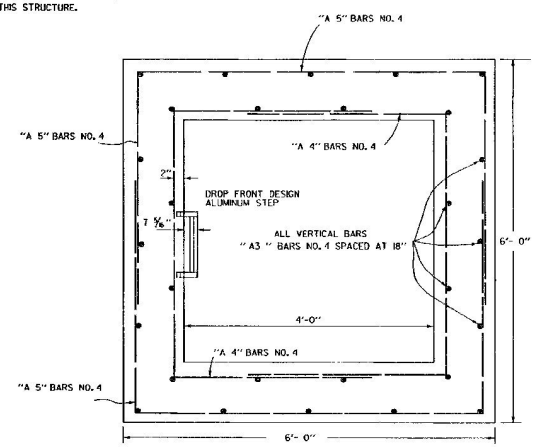



FRONT ELEVATION

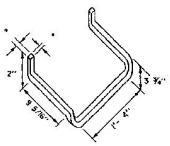
WHEN REINFORCED CONCRETE PIPE IS USED, THE FIRST SECTION OF THE OUTLET PIPE MAY BE A STUB END.




SIDE ELEVATION




PLAN OF MANHOLE OR CATCH BASIN




ALUMINUM STEP (DROP FRONT)

* - INDIVIDUAL METAL RUNGS SHALL HAVE A MINIMUM DIMENSION OF 1" OR SHALL BE PAINTED OR OTHERWISE TREATED TO RESIST CORROSION AND RUSTING.

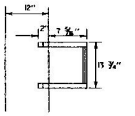
| REINFORCING STEEL SCHEDULE FOR MANHOLE OR CATCH BASIN | | | | | | |
|---|---|---|---|---|---|---|
| BAR | HEIGHT | | | | | |
| | 4'-4" MIN. | 6'-0" | 8'-0" | 10'-0" | 12'-0" | 14'-0" |
| A 1 | 16 BARS NO. 4 AT 9 " | 16 | 16 | 16 | 16 | 16 |
| A 2 | 12 BARS NO. 5 AT 15 " | 14 NO.5 AT 12" | 14 NO.5 AT 12" | 15 NO.5 AT 10" | 18 NO.5 AT 9" | 18 NO.5 AT 9" |
| A 3 | 28 BARS NO. 4 AT 18 " | 28 | 28 | 28 | 28 | 28 |
| A 4 | 8 BARS NO. 4 AT 15 " | 10 | 14 | 18 | 20 | 24 |
| A 5 | 8 BARS NO. 4 AT 15 " | 10 | 14 | 18 | 20 | 24 |
| A 6 | 12 BARS NO. 5 AT 6 " | 12 | 12 | 12 | 12 | 12 |
| A 7 | 8 BARS NO. 5 AT 6 " | 8 | 8 | 8 | 8 | 8 |
| A 8 | 4 BARS NO. 6 AT 6 " | 4 | 4 | 4 | 4 | 4 |
| A 9 | 4 BARS NO. 5 AT 6 " | 4 | 4 | 4 | 4 | 4 |
| TOTAL WEIGHT(LBS) | 576 | 654 | 756 | 873 | 954 | 1060 |

THREE COURSES OF BUILDING BRICK TO BE PLACED ON TOP OF CONCRETE ADAPTER PRIOR TO PLACING CONCRETE SEAT TO FACILITATE CHANGING ELEVATION OF CATCH BASIN OR MANHOLE

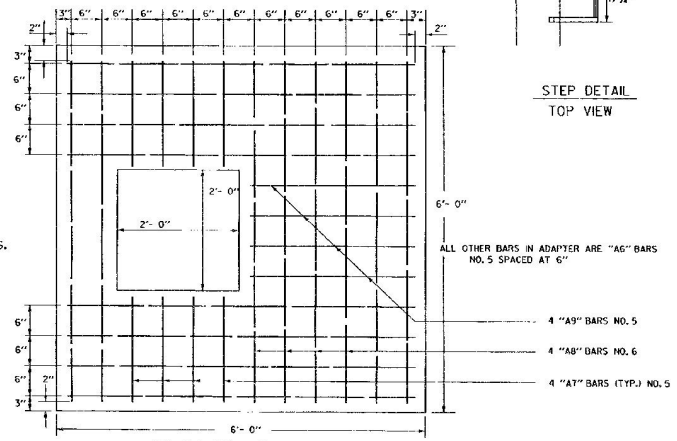
ALL REINFORCING BARS SPACED AS SHOWN OR NOTED. FOR SIZE AND LENGTH, SEE SCHEDULE. ALL REINFORCING STEEL TO BE Ø DEFORMED BARS.

THE ADAPTER SHALL BE PLACED ON THE CATCH BASIN SO AS TO PROVIDE DIRECT ACCESS TO STEPS.

NOTE: A7 AND A9 BARS MAY BE CUT FROM A6 BARS INORDER TO REDUCE THE NUMBER OF DIFFERENT BAR MARKS.




STEP DETAIL
TOP VIEW




PLAN OF ADAPTER

| A1 BARS NO. 4 | A2 BARS NO. 5 | A3 BARS NO. 4 STRAIGHT | | A4 BARS NO. 4 | A5 BARS NO. 4 | A6 BARS NO. 5 | A7 BARS NO. 5 | A8 BARS NO. 6 | A9 BARS NO. 5 |
|---|---|---|---|---|---|---|---|---|---|
| TOTAL LENGTH 11'- 3" | TOTAL LENGHT 6'- 10" | HEIGHT | LENGTH | TOTAL LENGHT 10'- 11" | TOTAL LENGHT 13'- 4" | TOTAL LENGHT 6'- 10" | TOTAL LENGHT 2'- 3" | TOTAL LENGHT 6'- 10" | TOTAL LENGHT 3'- 3" |
| B=2'-10" D=2'-10" C = 5'- 7" | A= 7" C= 7" B=5'- 8" | 4'- 4" | 4'- 2" | B=3'-3" C = 4'- 5" | B=3'-0" D=3'-10" C = 5'- 8" | A= 7" C= 7" B=5'- 8" | A= 7" B=1'- 9" | A= 7" G= 7" B=5'- 8" | A= 7" B=2'- 8" |
| | | 6'- 0" | 5'- 10" | | | | | | |
| | | 8'- 0" | 7'- 10" | | | | | | |
| | | 10'- 0" | 9'- 10" | | | | | | |
| | | 12'- 0" | 11'- 10" | | | | | | |
| | | 14'- 0" | 13'- 10" | | | | | | |

REVISIONS AND CORRECTIONS

DEC. 14, 1971 - ORIGINAL APPROVAL

AUG. 10, 1981 - REVISED STEP AND ADAPTER DESIGN

MAR. 23, 1994 - ADDED STEP DETAIL

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

Gordon R. MacArthur
DIRECTOR OF ENGINEERING

Robert M. Murphy
DESIGN ENGINEER

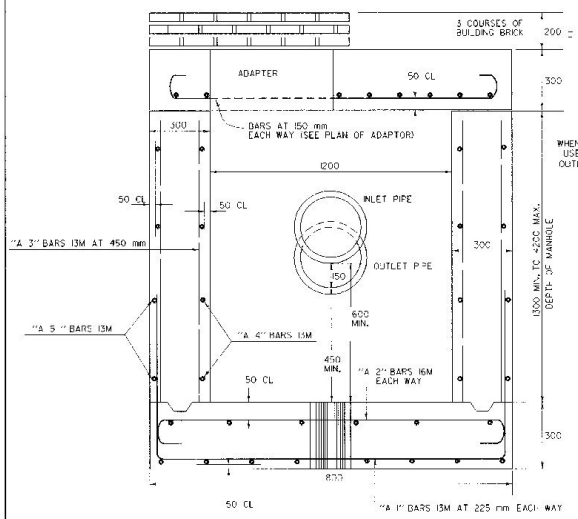
# CONCRETE CATCH BASIN WITH CAST IRON GRATE
# CONCRETE MANHOLE WITH CAST IRON GRATE

VERMONT AGENCY OF TRANSPORTATION

STANDARD
D - 13

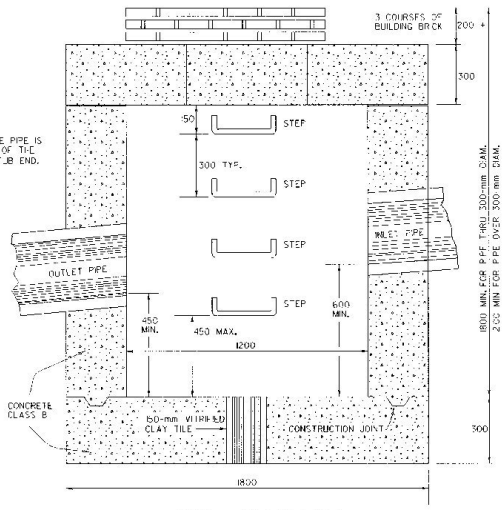
MORTAR TYPE II TO BE USED FOR JOINT FILLER AND LAYING OF BRICK.

ANY OF THE COMBINATIONS OF TOPS, CURBS AND GRATES FOUND ON SHEETS D-6M, D-9M, D-10M AND D-11M CAN BE ADAPTED FOR USE WITH THIS STRUCTURE.

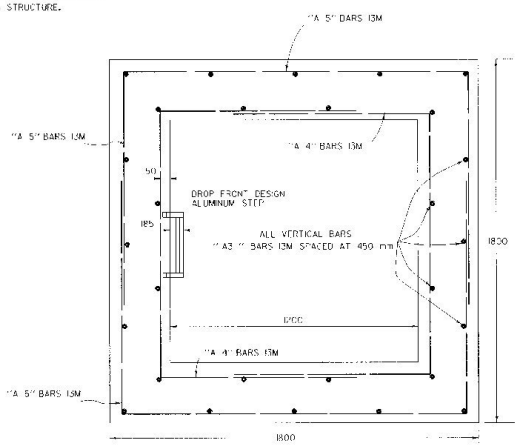



FRONT ELEVATION

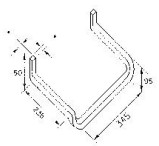
WHEN REINFORCED CONCRETE PIPE IS USED, THE FIRST SECTION OF THE OUTLET PIPE MAY BE A STUB END.




SIDE ELEVATION

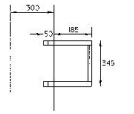



PLAN OF MANHOLE OR CATCH BASIN




ALUMINUM STEP (DROP FRONT)

+ - INDIVIDUAL METAL RUNGS SHALL HAVE A MINIMUM DIMENSION OF 25 mm OR SHALL BE PAINTED OR OTHERWISE TREATED TO RESIST CORROSION AND RUSTING.




STEP DETAIL TOP VIEW

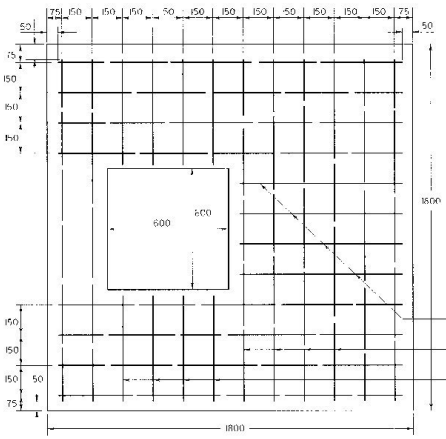
| REINFORCING STEEL SCHEDULE FOR MANHOLE OR CATCH BASIN | | | | | | |
|---|---|---|---|---|---|---|
| BAR | HEIGHT 1300 MIN. | 1800 | 2400 | 3000 | 3600 | 4200 |
| A 1 | 16 BARS 13M AT 225 | 16 | 16 | 16 | 16 | 16 |
| A 2 | 12 BARS 16M AT 375 | 14 16M AT 300 | 12 16M AT 300 | 15 16M AT 250 | 18 16M AT 225 | 3 16M AT 225 |
| A 3 | 28 BARS 13M AT 450 | 28 | 28 | 28 | 28 | 28 |
| A 4 | 8 BARS 13M AT 375 | 10 | 14 | 18 | 20 | 24 |
| A 5 | 8 BARS 13M AT 375 | 10 | 14 | 18 | 20 | 24 |
| A 6 | 17 BARS 16M AT 150 | 12 | 12 | 12 | 12 | 12 |
| A 7 | 8 BARS 16M AT 150 | 8 | 8 | 8 | 8 | 8 |
| A 8 | 4 BARS 19M AT 150 | 4 | 4 | 4 | 4 | 4 |
| A 9 | 4 BARS 16M AT 150 | 4 | 4 | 4 | 4 | 4 |
| TOTAL MASS (kg) | 255 | 290 | 336 | 388 | 425 | 471 |

THREE COURSES OF BUILDING BRICK TO BE PLACED ON TOP OF CONCRETE ADAPTER PRIOR TO PLACING CONCRETE SEAT TO FACILITATE CHANGING ELEVATION OF CATCH BASIN OR MANHOLE.

ALL REINFORCING BARS SPACED AS SHOWN OR NOTED. FOR SIZE AND LENGTH, SEE SCHEDULE. ALL REINFORCING STEEL TO BE ROUND DEFORMED BARS.

THE ADAPTER SHALL BE PLACED ON THE CATCH BASIN SO AS TO PROVIDE DIRECT ACCESS TO STEPS.

NOTE: A7 AND A9 BARS MAY BE CUT FROM A6 BARS TO REDUCE THE NUMBER OF DIFFERENT BAR MARKS.




PLAN OF ADAPTER

| A1 BARS 13M | A2 BARS 16M | A3 BARS 13M STRAIGHT HEIGHT | A3 BARS 13M STRAIGHT LENGTH | A4 BARS 13M | A5 BARS 13M | A6 BARS 16M | A7 BARS 16M | A8 BARS 19M | A9 BARS 16M |
|---|---|---|---|---|---|---|---|---|---|
| TOTAL LENGTH 3375 | TOTAL LENGTH 2050 | 1300 | 1250 | TOTAL LENGTH 3275 | TOTAL LENGTH 4000 | TOTAL LENGTH 2050 | TOTAL LENGTH 675 | TOTAL LENGTH 2050 | TOTAL LENGTH 905 |
| B=850 D=850 C = 1675 | A=175 G=175 B=1700 | 1800 | 1750 | B=975 D=975 C = 1325 | B=150 D=150 C = 1700 | A=175 G=175 D= 700 | A=175 B=500 | A=175 G=175 H=1200 | A=175 B=800 |
| | | 2400 | 2350 | | | | | | |
| | | 3000 | 2950 | | | | | | |
| | | 3600 | 3550 | | | | | | |
| | | 4200 | 4150 | | | | | | |

NOTE: ALL DIMENSIONS ARE IN MILLIMETERS (mm) EXCEPT WHERE NOTED.

REVISIONS AND CORRECTIONS

JUNE 13, 997 ORIGINAL APPROVAL DATE

APPROVED

DIRECTOR OF ENGINEERING

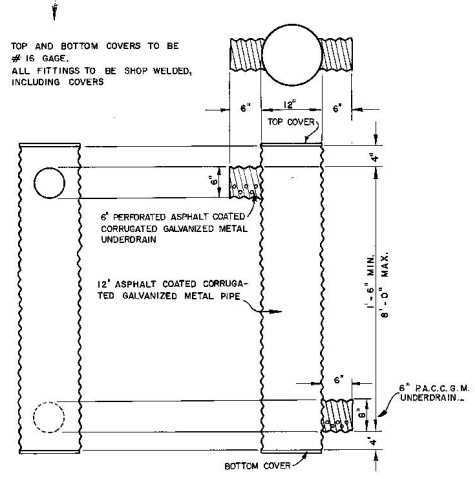
DESIGN ENGINEER

# CONCRETE CATCH BASIN WITH CAST IRON GRATE
# CONCRETE MANHOLE WITH CAST IRON GRATE

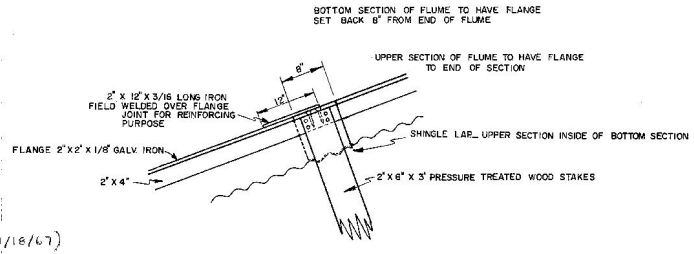
VERMONT AGENCY OF TRANSPORTATION

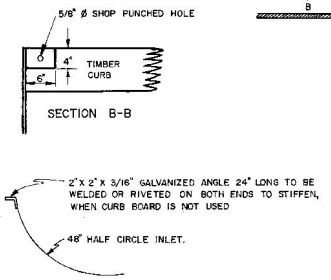
Metric STANDARD D-13M

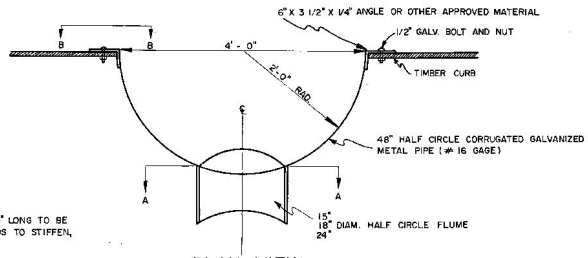
Now included in D 16 (Rev 7/18/67)



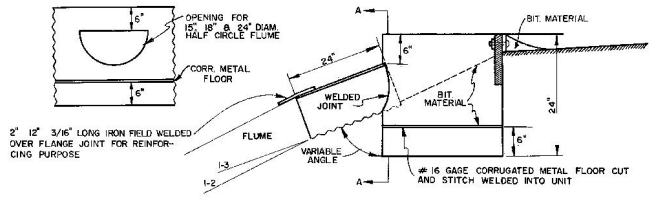

ASPHALT COATED CORRUGATED GALVANIZED METAL UNDERDRAIN RISER, ITEM 524



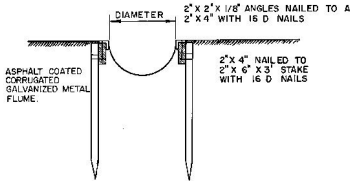




PLAN VIEW




ELEVATION VIEW OF TYPE "A"

STANDARD METAL END SECTIONS FOR ASPHALT COATED CORRUGATED GALVANIZED METAL FLUME-TYPE "A" SECTION, ITEM 430-III

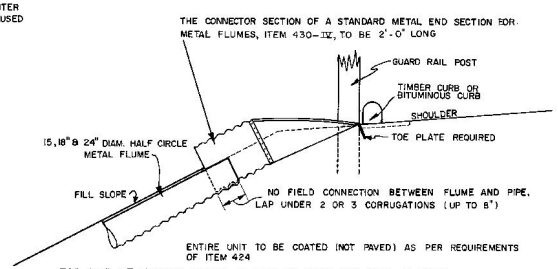



END VIEW




SIDE VIEW

| DIAMETER INCHES | GAGE |
|---|---|
| 15 | 16 |
| 18 | 16 |
| 24 | 14 |




FOR USE AT INLETS WHEN FLUME IS USED ON CUT SLOPES

ELEVATION OF TYPE "B"

METAL END SECTIONS FOR ASPHALT COATED CORRUGATED GALVANIZED METAL FLUME-TYPE "B" SECTION-ITEM 430-IV

ASPHALT COATED CORRUGATED GALVANIZED METAL FLUME, ITEM 418

REVISIONS AND CORRECTIONS

MAR. 1, 1965.... REVISED TO MEET THE 1964 SPECIFICATIONS.

APPROVED MARCH 10, 1965
DATE

A.S. Bishop
CHIEF ENGINEER

G. M. Lane
HIGHWAY ENGINEER

E. H. Blickney
CONSTRUCTION ENGINEER

METAL END SECTIONS FOR ASPHALT COATED CORRUGATED GALVANIZED METAL FLUME-TYPE "A" SECTION-ITEM 430 III

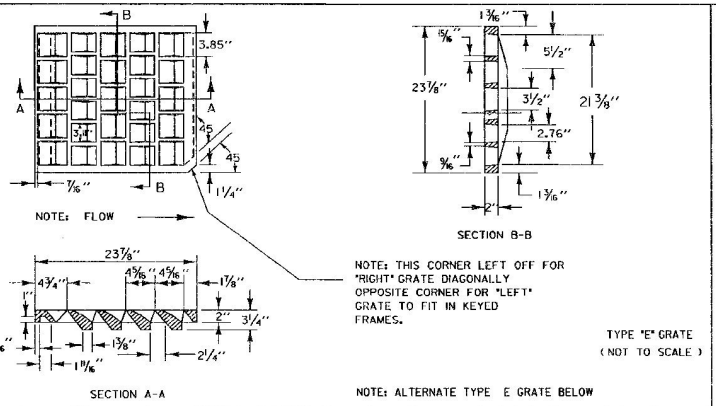
METAL END SECTIONS FOR ASPHALT COATED CORRUGATED GALVANIZED METAL FLUME-TYPE "B" SECTION-ITEM 430 IV

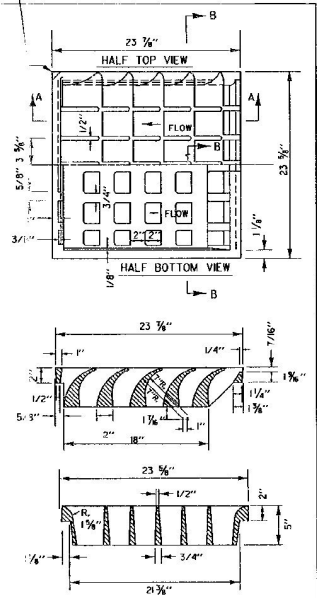
ASPHALT COATED CORRUGATED GALVANIZED METAL FLUME, ITEM 418

ASPHALT COATED CORRUGATED GALVANIZED METAL UNDERDRAIN. RISER, ITEM 524

VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-14



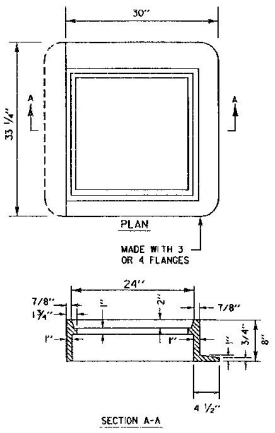




CAST IRON GRATE
TYPE E

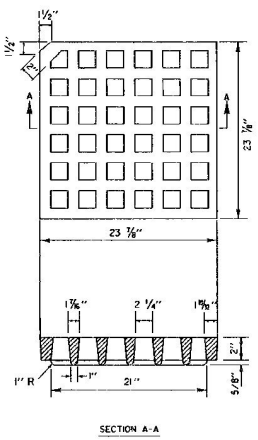
NOTE: THIS FRAME TO BE PLACED IN DROP INLET TOP BEFORE CONCRETE IS POURED.

4 FLANGES UNLESS OTHERWISE INDICATED.

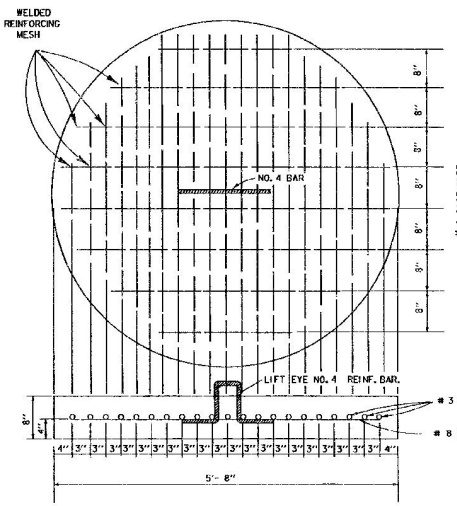
FRAMES TO BE FURNISHED WITH 3 FLANGES WHEN USED IN CONJUNCTION WITH CURB OR AS DIRECTED BY THE ENGINEER.



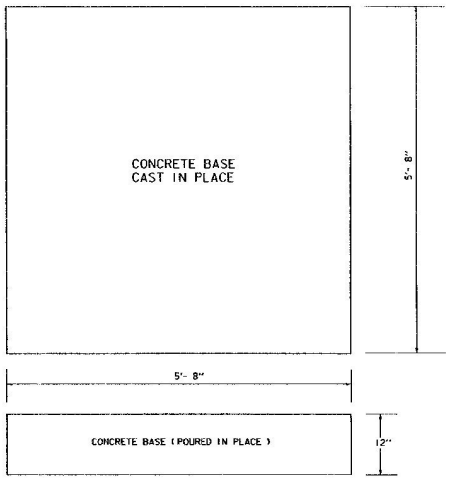

FRAME
FOR
TYPE D OR TYPE E
GRATE

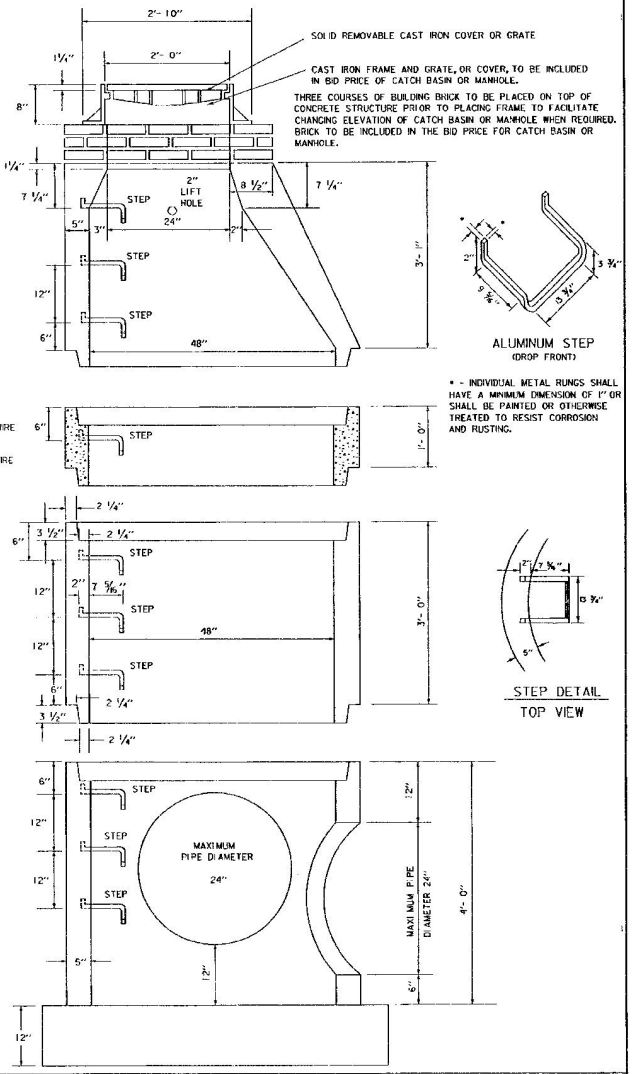



CAST IRON GRATE
TYPE D




PRECAST REINFORCED CONCRETE BASE




REVISIONS AND CORRECTIONS

DEC. 6, 1971 - ORIGINAL APPROVAL
OCT. 22, 1976 - CAST IRON GRATE WITH FRAME, TYPE E ADDED
OCT. 6, 1978 - TYPE D GRATE ADDED
OCT. 30, 1985 - IMPERFECT TRENCH DETAILS DELETED
FEB. 17, 1993 - SECOND CAST IRON GRATE TYPE E ADDED.
MAR 23, 1994 - ADDED NOTE FOR STEP DETAILS
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

DIRECTOR OF ENGINEERING

DESIGN ENGINEER

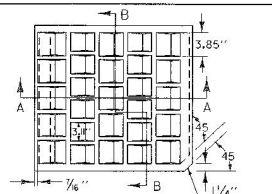
# PRECAST REINFORCED CONCRETE CATCH BASIN W/ CAST IRON GRATE
# PRECAST REINFORCED CONCRETE MANHOLE W/ CAST IRON COVER

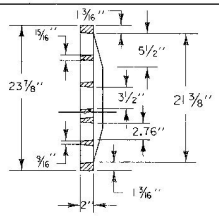
## CAST IRON GRATE WITH FRAME, TYPE D
## CAST IRON GRATE WITH FRAME, TYPE E

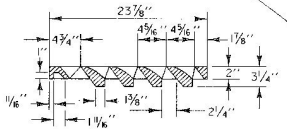
VERMONT AGENCY OF TRANSPORTATION

STANDARD

D-15



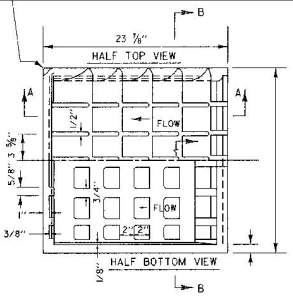



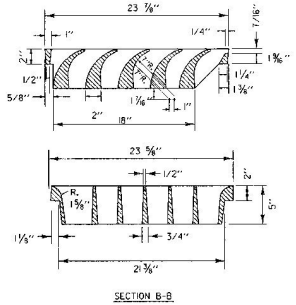

THIS CORNER LEFT OFF FOR "RIGHT" GRATE. DIAG. OPPOSITE CORNER FOR "LEFT" GRATE. TO FIT IN KEYED FRAMES.

NOTE: THIS CORNER LEFT OFF FOR "RIGHT" GRATE DIAGONALLY OPPOSITE CORNER FOR "LEFT" GRATE TO FIT IN KEYED FRAMES.

TYPE "E" GRATE
(NOT TO SCALE)

NOTE: ALTERNATE TYPE E GRATE BELOW



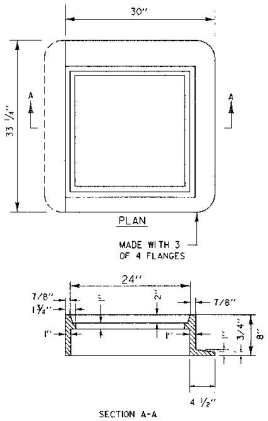




CAST IRON GRATE
TYPE E

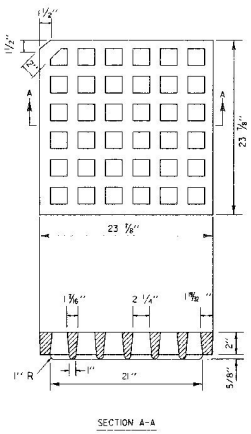
NOTE: THIS FRAME TO BE PLACED IN DROP INLET TOP BEFORE CONCRETE IS POURED.

4 FLANGES UNLESS OTHERWISE INDICATED.

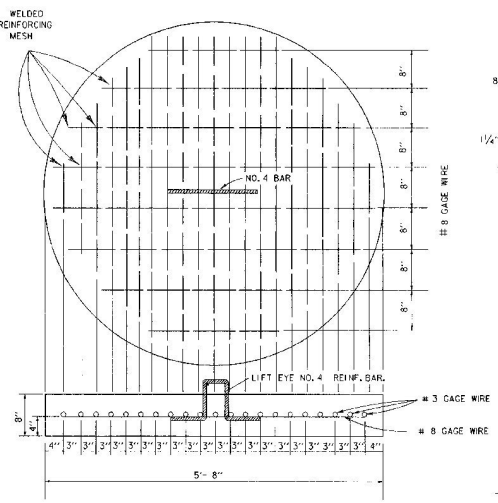
FRAMES TO BE FURNISHED WITH 3 FLANGES WHEN USED IN CONJUNCTION WITH CURB OR AS DIRECTED BY THE ENGINEER.



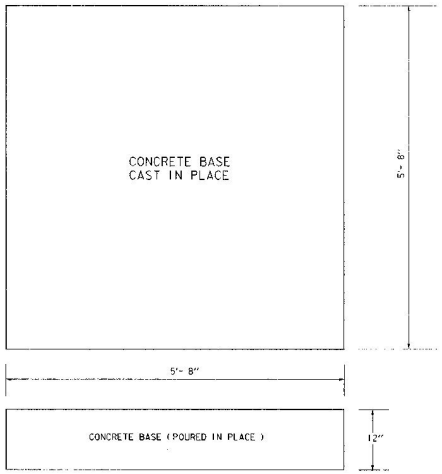

FRAME
FOR
TYPE D OR TYPE E
GRATE

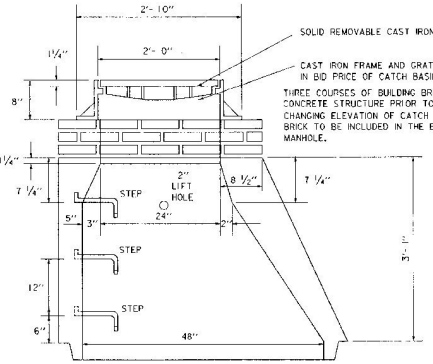


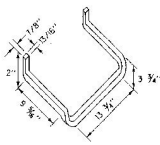

CAST IRON GRATE
TYPE D



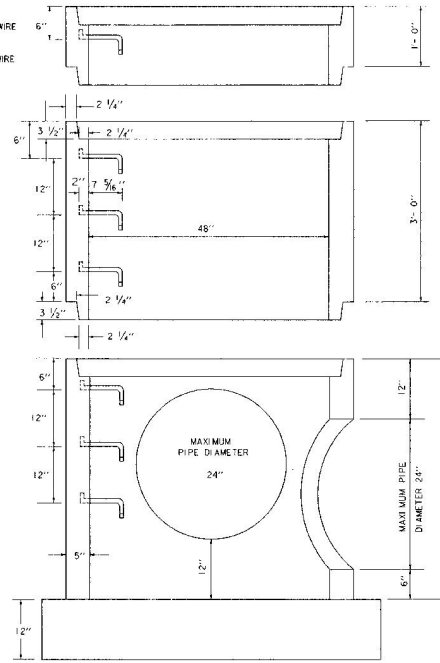

PRECAST REINFORCED CONCRETE BASE

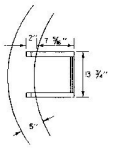



ALUMINUM STEP
(DROP FRONT)




STEP DETAIL
TOP VIEW

## REVISIONS AND CORRECTIONS

17 FEB 1993 - SECOND CAST IRON GRATE TYPE E ADDED.
1 JUNE 1992 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
30 OCT 1985 - IMPERFECT TRENCH DETAILS DELETED
6 OCT 1978 - TYPE D GRATE ADDED
22 OCT 1976 - CAST IRON GRATE WITH FRAME, TYPE E ADDED

APPROVED

12 Feb 1993
DATE

DIRECTOR OF ENGINEERING

DESIGN ENGINEER

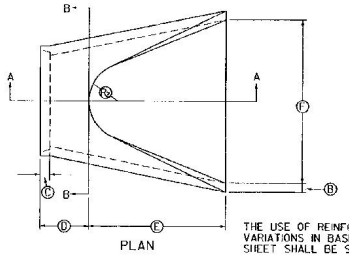
NOTE: ORIGINAL APPROVAL DATE WAS 6 DEC 1971

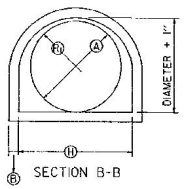
# PRECAST REINFORCED CONCRETE CATCH BASIN W/ CAST IRON GRATE
# PRECAST REINFORCED CONCRETE MANHOLE W/ CAST IRON COVER

## CAST IRON GRATE WITH FRAME, TYPE D
## CAST IRON GRATE WITH FRAME, TYPE E

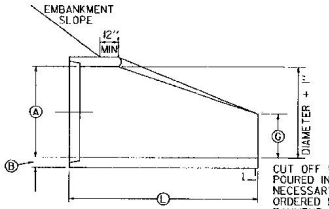
VERMONT AGENCY OF TRANSPORTATION

STANDARD
D-15

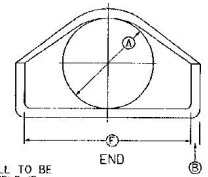



THE USE OF REINFORCED CONCRETE END SECTIONS HAVING VARIATIONS IN BASIC DIMENSIONS FROM THOSE SHOWN ON THIS SHEET SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.



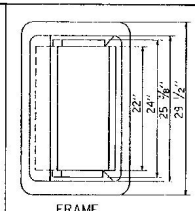

CUT OFF WALL TO BE POURED IN FIELD IF NECESSARY AND AS ORDERED BY THE ENGINEER. PAYMENT WILL BE MADE UNDER APPROPRIATE CONTRACT ITEMS.

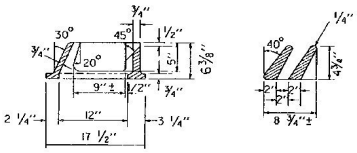



| BASIC DIMENSIONS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | DIAM+1" | SLOPE | $R_1$ | $R_2$ | * RATIO $\frac{A2}{A1}$ | L |
| 12" | 2" | SEE NOTE | 48 3/8" | 24" | 24" | 4" | 19 5/16" | 13" | 2.7 ± 1 | 10 1/8" | 9" | 1.92 | 6'-0 3/8" |
| 18" | 2 1/2" | | 46" | 27" | 36" | 9" | 29" | 19" | 2.7 ± 1 | 15 1/2" | 12" | 1.88 | 6'-1" |
| 24" | 3" | | 36" | 43 1/2" | 48" | 9 1/2" | 33 1/16" | 25" | 2.8 ± 1 | 16 7/8" | 14" | 1.58 | 6'-11 1/2" |
| 30" | 3 1/2" | | 19 3/4" | 54" | 60" | 12" | 37" | 31" | 2.8 ± 1 | 18 1/2" | 15" | 1.41 | 6'-1 1/4" |
| 36" | 4" | | 34 3/4" | 63" | 72" | 15" | 47 1/8" | 37" | 2.9 ± 1 | 24 3/8" | 20" | 1.50 | 8'-1 3/4" |
| 42" | 4 1/2" | | 35" | 63" | 78" | 21" | 53 1/8" | 43" | 2.9 ± 1 | 27 1/2" | 22" | 1.46 | 8'-2" |
| 48" | 5" | | 26" | 72" | 87" | 24" | 59 1/2" | 49" | 2.9 ± 1 | 30" | 22" | 1.40 | 8'-2" |

REINFORCED CONCRETE PIPE END SECTION

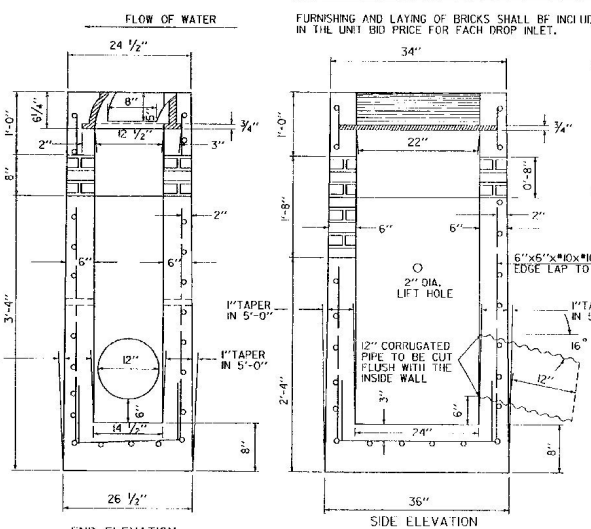
* AREA-1 = AREA OF NOMINAL DIAMETER
AREA-2 = AREA THRU SECTION B-B



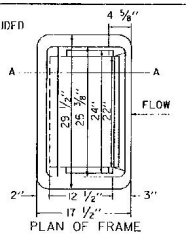



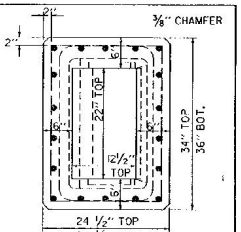

ALTERNATE GRATE AND FRAME

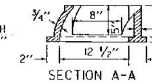
NOTE: JOINTS SHALL BE TONGUE AND GROOVE OR BELL AND SPIGOT AS REQUIRED AND DIMENSIONS SHALL CONFORM TO STANDARD REINFORCED CONCRETE PIPE SPECIFICATIONS.

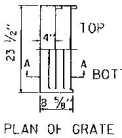


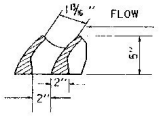

PRECAST REINFORCED CONCRETE CURB DROP INLET WITH CAST IRON GRATE

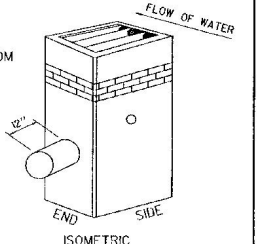


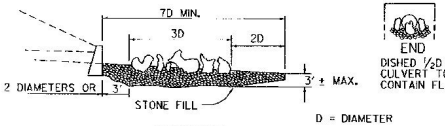



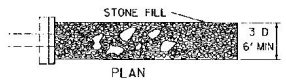




FOR USE ONLY AT LOCATIONS OF VERY HIGH DISCHARGE AND ERODABLE SOIL CONDITIONS.

IRREGULAR COBBLES APPROXIMATING THE MAXIMUM SIZE FOR TYPE OF SPECIFIED STONE FILL TO BE PLACED IN GENERAL PATTERN AS SHOWN. NO STONE TO BE CLOSER THAN 2D TO OUTLET OF PIPE. STONES SHOULD NOT BE PLACED TO DAM FLOW, BUT TO INDUCE TURBULENCE AND REDUCE VELOCITY. PLAN MAY BE ADAPTED TO FIELD CONDITIONS PREVAILING AT OUTLET. WHERE FLOW IS TO ULTIMATELY FOLLOW TOE OF SLOPE, DESIGN MAY BE SHORTENED OR WIDENED TO ACT AS A STILLING BASIN, AND DIRECT FLOW INTO DITCH.

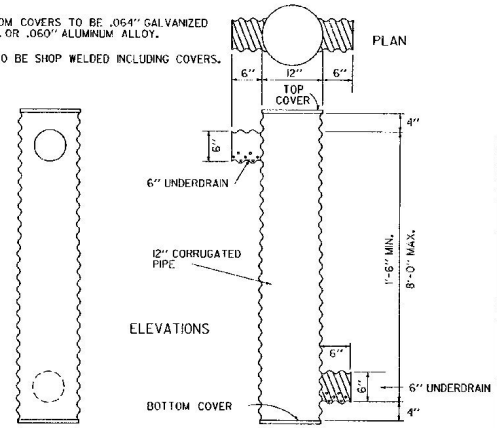
STONES FORMING BREAK SHOULD PROJECT ABOVE AND BELOW SURFACE OF STONE FILL APPROXIMATELY ¾ THE DIAMETER OF THE PIPE.

STONE FILL TYPE TO BE SPECIFIED ON PLANS.

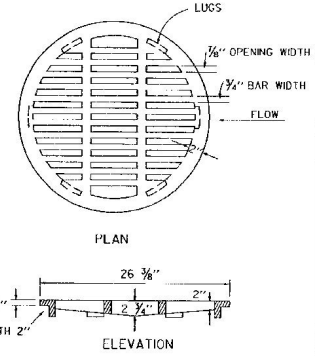
ENERGY DISSIPATOR FOR CULVERTS

TOP AND BOTTOM COVERS TO BE .064" GALVANIZED IRON OR STEEL, OR .060" ALUMINUM ALLOY.

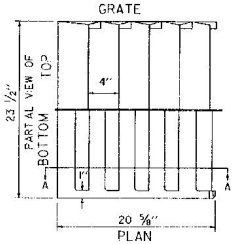
ALL FITTINGS TO BE SHOP WELDED INCLUDING COVERS.

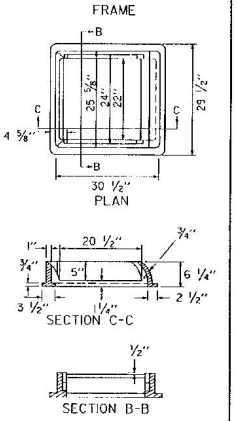



UNDERDRAIN RISER




CAST IRON GRATE, TYPE C
TO BE USED IN CONJUNCTION WITH 24" CORRUGATED STEEL PIPE




CAST IRON GRATE WITH FRAME, TYPE B

| REVISIONS AND CORRECTIONS |
|---|
| DEC. 8, 1971 - ORIGINAL APPROVAL |
| NOV. 14, 1972 - RCP END SECTION DIMENSION VARIANCE NOTE ADDED |
| OCT. 30, 1985 - REVISED TO CONFORM WITH 1986 SPECIFICATIONS |
| JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES. |

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

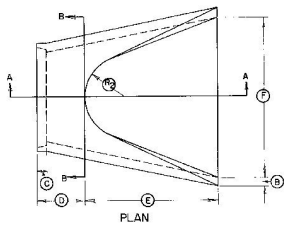
Standard R. MacArthur, PE
DIRECTOR OF ENGINEERING

John M. Murphy, PE
DESIGN ENGINEER

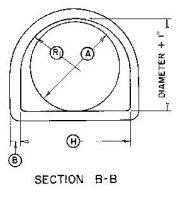
**PRECAST REINFORCED CONCRETE CURB DROP INLET WITH CAST IRON GRATE**
**CAST IRON GRATE, TYPE B**
**CAST IRON GRATE, TYPE C**
**UNDERDRAIN RISER**
**REINFORCED CONCRETE PIPE END SECTION**
**ENERGY DISSIPATOR FOR CULVERT**

VERMONT AGENCY OF TRANSPORTATION

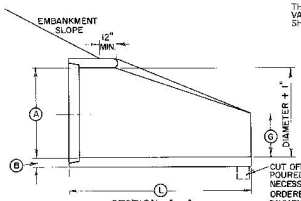
# STANDARD D-16




PLAN

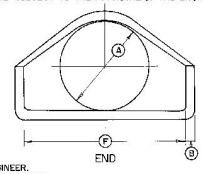



SECTION B-B




SECTION A-A

CUT OFF WALL TO BE POURED IN FIELD IF NECESSARY AND AS ORDERED BY THE ENGINEER. PAYMENT WILL BE MADE UNDER APPROPRIATE CONTRACT ITEMS.



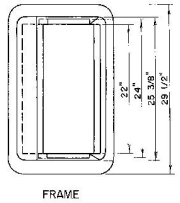

END

THE USE OF REINFORCED CONCRETE END SECTIONS HAVING VARIATIONS IN BASIC DIMENSIONS FROM THOSE SHOWN ON THIS SHEET SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

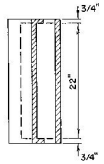
| BASIC DIMENSIONS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | DIAM. + 1" | SLOPE | R1 | R2 | RATIO * / ** | L |
| 12" | 2" | SEE NOTE | 48 3/8" | 24" | 24" | 4" | 19 15/16" | 13" | 2.7:1 | 10 1/8" | 9" | 1.92 | 6'-0 3/8" |
| 18" | 2 1/2" | | 46" | 27" | 36" | 9" | 29" | 19" | 2.7:1 | 15 1/2" | 12" | 1.88 | 6'-1" |
| 24" | 3" | | 30" | 43 1/2" | 48" | 9 1/2" | 33 3/16" | 25" | 2.8:1 | 16 13/16" | 14" | 1.58 | 6'-1 1/2" |
| 30" | 3 1/2" | | 19 3/4" | 54" | 60" | 12" | 37" | 31" | 2.8:1 | 18 1/2" | 15" | 1.41 | 6'-1 3/4" |
| 36" | 4" | | 34 3/4" | 63" | 72" | 15" | 47 13/16" | 37" | 2.9:1 | 24 5/16" | 20" | 1.50 | 8'-1 3/4" |
| 42" | 4 1/2" | | 35" | 63" | 78" | 21" | 53 7/8" | 43" | 2.9:1 | 27 1/2" | 22" | 1.46 | 8'-2" |
| 48" | 5" | | 26" | 72" | 87" | 24" | 59 1/2" | 49" | 2.9:1 | 30" | 22" | 1.40 | 8'-2" |

REINFORCED CONCRETE PIPE END SECTION

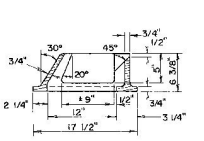
AREA-1 = AREA OF NOMINAL DIAMETER
* AREA-2 = AREA THRU SECTION B-B



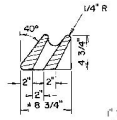
FRAME



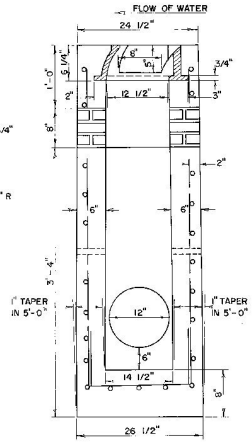

GRATE



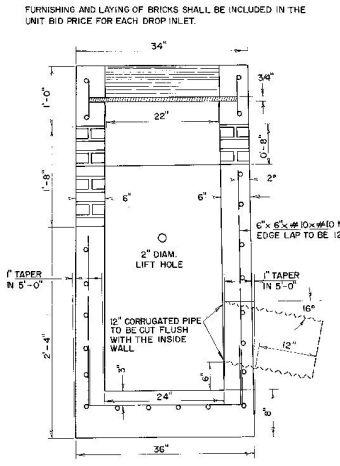

ALTERNATE GRATE AND FRAME




NOTE: JOINTS SHALL BE TONGUE AND GROOVE OR BELL AND SPIGOT AS REQUIRED AND DIMENSIONS SHALL CONFORM TO STANDARD REINFORCED CONCRETE PIPE SPECIFICATIONS.



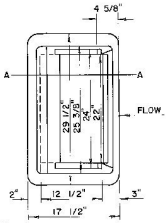

END ELEVATION



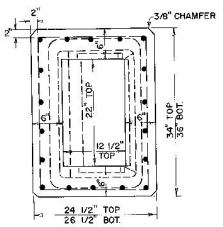

SIDE ELEVATION

ALLOW FOR 1'-8" OF BRICKS ON SIDE OPPOSITE OUTLET PIPE
0'-8" BRICKS ON OTHER 3 SIDES.

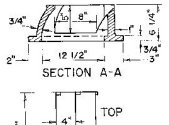
PRECAST REINFORCED CONCRETE CURB DROP INLET WITH CAST IRON GRATE



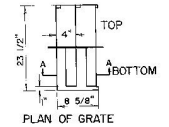

PLAN OF FRAME



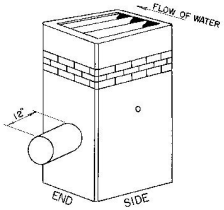

PLAN OF DROP INLET BARREL



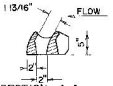

SECTION A-A



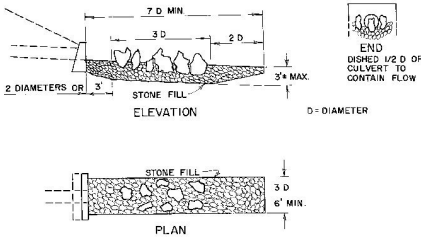

PLAN OF GRATE




ISOMETRIC




SECTION A-A
GRATE




FOR USE ONLY AT LOCATIONS OF VERY HIGH DISCHARGE AND ERODABLE SOIL CONDITIONS.

IRREGULAR COBBLES APPROXIMATING THE MAXIMUM SIZE FOR TYPE OF SPECIFIED STONE FILL TO BE PLACED IN GENERAL PATTERN AS SHOWN. NO STONE TO BE CLOSER THAN 20' TO OUTLET OF PIPE. STONES SHOULD NOT BE PLACED TO DAM FLOW, BUT TO INDUCE TURBULENCE AND REDUCE VELOCITY. PLAN MAY BE ADAPTED TO FIELD CONDITIONS PREVAILING AT OUTLET. WHERE FLOW IS TO ULTIMATELY FOLLOW TOE OF SLOPE, DESIGN MAY BE SHORTENED OR WIDENED TO ACT AS A STILLING BASIN, AND DIRECT FLOW INTO DITCH.

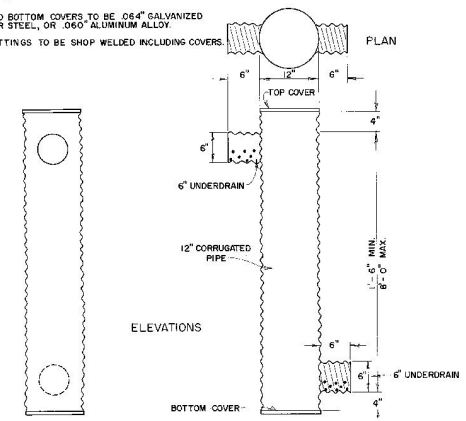
STONES FORMING BREAK SHOULD PROJECT ABOVE AND BELOW SURFACE OF STONE FILL APPROXIMATELY 3/4 THE DIAMETER OF THE PIPE.

STONE FILL TYPE TO BE SPECIFIED ON PLANS.

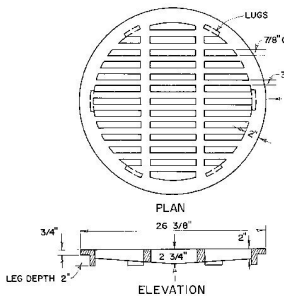
ENERGY DISSIPATOR FOR CULVERTS

TOP AND BOTTOM COVERS TO BE .064" GALVANIZED IRON OR STEEL, OR .060" ALUMINUM ALLOY.

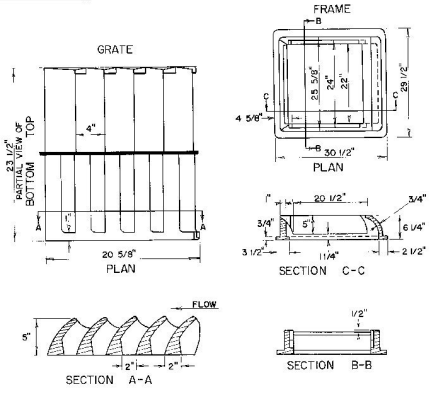
ALL FITTINGS TO BE SHOP WELDED INCLUDING COVERS.




UNDERDRAIN RISER




CAST IRON GRATE, TYPE C
TO BE USED IN CONJUNCTION WITH 24" CORRUGATED STEEL PIPE




CAST IRON GRATE WITH FRAME, TYPE B

REVISIONS & CORRECTIONS

NOV. 14, 1972 - RCP END SECTION DIMENSION VARIANCE NOTE ADDED.
30 OCT 1985 - REVISED TO CONFORM WITH 1986 SPECIFICATIONS.

APPROVED

DATE Dec. 8, 1971

R. A. Arnold
CHIEF ENGINEER

E. H. Stickney
ASST. CHIEF ENGINEER

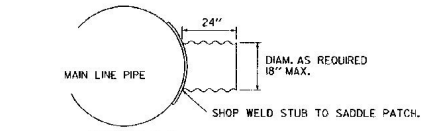
L. M. Lane
HIGHWAY ENGINEER

# PRECAST REINFORCED CONCRETE CURB DROP INLET WITH CAST IRON GRATE
# CAST IRON GRATE, TYPE B
# CAST IRON GRATE, TYPE C
# UNDERDRAIN RISER
# REINFORCED CONCRETE PIPE END SECTION
# ENERGY DISSIPATOR FOR CULVERT

VERMONT AGENCY OF TRANSPORTATION

STANDARD

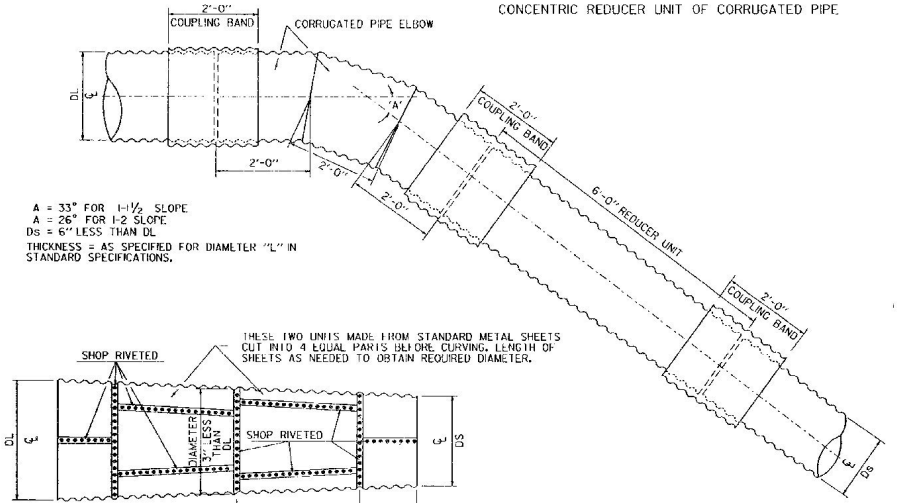
D-16




SADDLE BRANCH FOR CORRUGATED STEEL PIPE

( NOT TO BE USED WITH CORRUGATED GALVANIZED METAL PLATE PIPE )

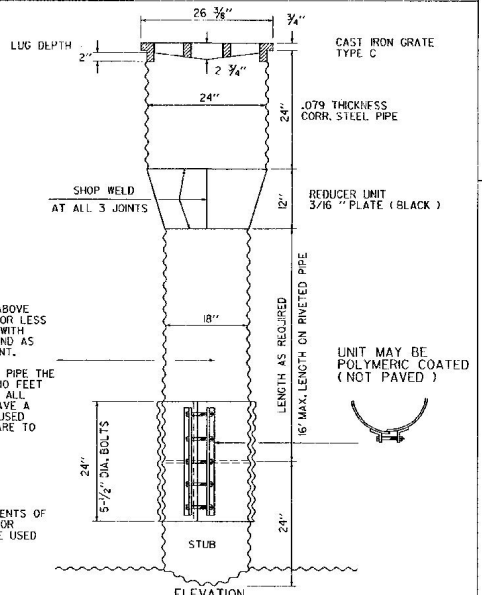
CONCENTRIC REDUCER UNIT OF CORRUGATED PIPE




A = 33° FOR 1-1½ SLOPE
A = 26° FOR 1-2 SLOPE
Ds = 6" LESS THAN DL
THICKNESS = AS SPECIFIED FOR DIAMETER "L" IN STANDARD SPECIFICATIONS.




REDUCER UNIT




WELDED OR RIVETED PIPE OR STRUCTURAL PLATE ( MAIN LINE )

CORRUGATED STEEL PIPE VERTICAL RISER

( SEE SPECIAL PROVISIONS FOR BASIS OF PAYMENT )

THE 18" DIAMETER PORTION OF THE RISER ABOVE THE STUB, TO BE IN SECTIONS OF 8 FEET OR LESS IN LENGTH. EACH JOINT MUST BE SECURED WITH THE SAME TYPE AND SIZE OF COUPLING BAND AS CALLED FOR AND SHOWN AT THE STUB JOINT.

ON POLYMERIC COATED CORRUGATED STEEL PIPE THE STUB MAY BE SHOP WELDED ON UNITS OF 10 FEET IN HEIGHT AND UNDER IN OVERALL LENGTH. ALL UNITS OVER 10 FEET IN LENGTH ARE TO HAVE A SADDLE BRANCH CONNECTION. ANY RISERS USED ON CORRUGATED GALVANIZED METAL PIPE ARE TO BE CONNECTED BY SHOP WELDS ONLY.

NOTE:

COUPLING BANDS CONFORMING TO REQUIREMENTS OF SECTION 711 AND EQUIPPED WITH SILO RODS OR CABLES FOR POSITIVE ATTACHMENT, MAY BE USED IN LIEU OF 24" COUPLING BAND SHOWN.

REVISIONS AND CORRECTIONS

DEC. 14, 1971 - ORIGINAL APPROVAL

OCT. 30, 1985 - REVISED TO CONFORM TO 1986 SPECIFICATIONS

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

Gordon S. MacMillan, P.E.
DIRECTOR OF ENGINEERING

John M. Murphy, P.E.
DESIGN ENGINEER

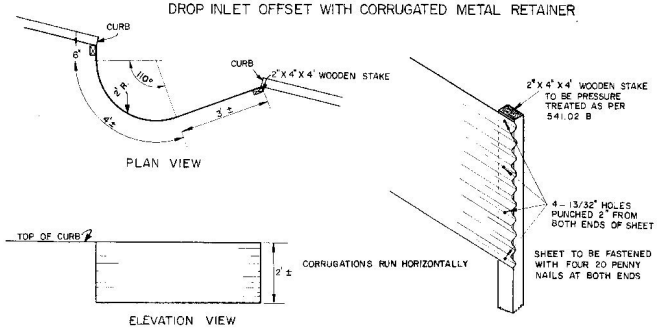
# SADDLE BRANCH FOR CORRUGATED STEEL PIPE
# CORRUGATED STEEL PIPE VERTICAL RISER
# CONCENTRIC REDUCER UNIT OF CORRUGATED METAL PIPE

VERMONT AGENCY OF TRANSPORTATION

STANDARD

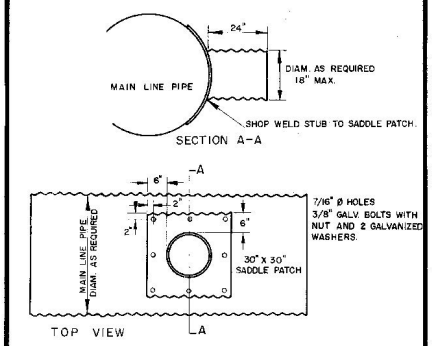
D-17

## DROP INLET OFFSET WITH CORRUGATED METAL RETAINER



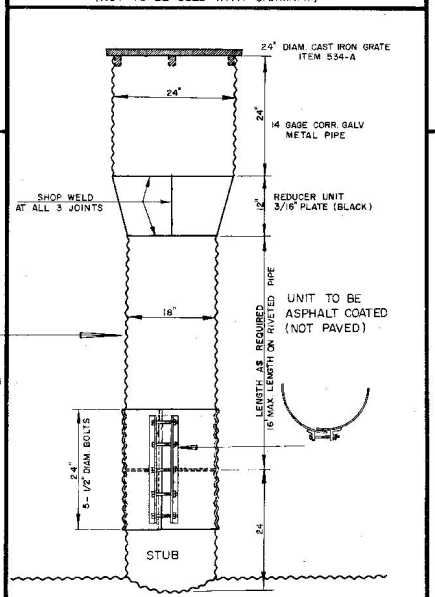

MATERIAL:
STANDARD ASPH. COATED CORR. GALV. METAL CULV. SHEET
LENGTH OF SHEET — 90"
GAGE — 14
SHEET FORMED SO THAT OUTSIDE EDGE IS INSIDE (ROLLED OPPOSITE FROM STD. CULV. CAN)

THIS RETAINER TO BE MEASURED AND PAID FOR AS CURB OF THE TYPE THAT THE RETAINER IS BEING USED WITH. (7'-6")




## SADDLE BRANCH FOR A.C.C.G.M.P.

(NOT TO BE USED WITH C.G.M.P.P.)



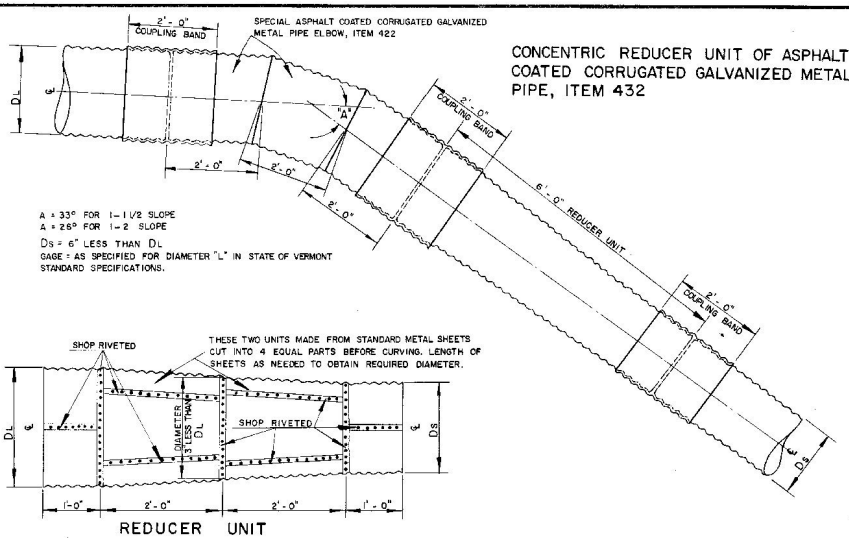

RIVETED PIPE OR STRUCTURAL PLATE (MAIN LINE)

## A.C.C.G.M.P. VERTICAL RISER

(SEE SPECIAL PROVISIONS FOR BASIS OF PAYMENT)

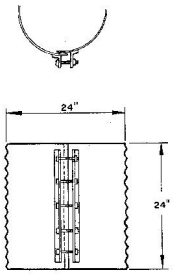
THE 18" DIAMETER PORTION OF THE RISER ABOVE THE STUB, TO BE IN SECTIONS OF 8 FEET OR LESS IN LENGTH. EACH JOINT MUST BE SECURED WITH THE SAME TYPE AND SIZE OF COUPLING BAND AS CALLED FOR AND SHOWN AT THE STUB JOINT.

ON A.C.C.G.M.P. THE STUB MAY BE SHOP WELDED ON UNITS OF 10 FEET AND UNDER IN OVERALL LENGTH. ALL UNITS OVER 10 FEET IN LENGTH ARE TO HAVE A SADDLE BRANCH CONNECTION. ANY RISERS USED ON C.G.M.P.P. ARE TO BE CONNECTED BY SHOP WELDS ONLY.



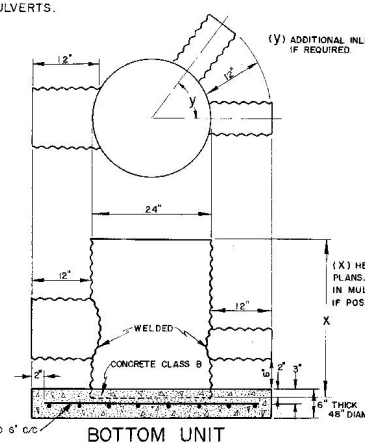

## REDUCER UNIT

ALL UNITS TO BE MADE OF A.C.C.G.M.P. GAGE AS USED IN ROADWAY CULVERTS.




## TOP UNIT

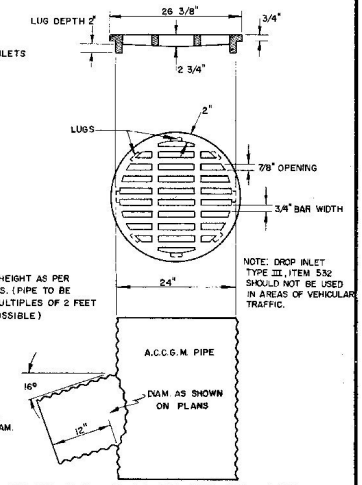
THIS SECTION NOT RIVETED, PERMITS ADJUSTMENT OF GRADE ELEVATION BY CHANGING LAP ONTO BOTTOM SECTION. EFFECTIVE LENGTH OF TOP UNIT FROM 12" TO 18".




1/2" Ø BARS — BOTH DIRECTIONS, SPACED 6" C/C
2" FROM EDGE

## BOTTOM UNIT

THE A.C.C.G.M.P. DROP INLET MAY HAVE A METAL BOTTOM WHICH IS TO BE SHOP WELDED BY THE FABRICATOR, OR A 48" DIAMETER REINFORCED CONCRETE BASE WHICH IS TO BE CAST IN PLACE BY THE CONTRACTOR. THE DROP INLET MAY HAVE BOTH AN INLET AND OUTLET PIPES OR JUST AN OUTLET PIPE. THESE PIPES MAY BE STRAIGHT OR ANGLED, AS PER PLANS.




## DROP INLET, TYPE III, ITEM 532

(ASPHALT COATED CORRUGATED GALVANIZED METAL DROP INLET WITH GRATE)

### REVISIONS & CORRECTIONS

CONCENTRIC REDUCER UNIT ADDED FEB. 5, 1964
ANGLE OF 16° ADDED TO OUTLET PIPE ON 24" ACCGMP D.I. APR. 6, 1964
DRAWINGS ON COUPLING BANDS CHANGED.. APRIL 10, 1964
SHOP WELDED PIPE (ON ACCGMP VERTICAL RIZER) CHANGED FROM 12' TO 24' JAN. 20, 1965
MAR 1, 1965... DRAWINGS OF TOPS ELIMINATED, NOTES ADDED ON VERTICAL RISER, AND A.C.C.G.M.P. D.I. WITH GRATE
JAN. 7, 1966... INFORMATION PERTAINING TO A.C.C.G.M.P. VERTICAL RISER ADDED.
JUL. 1, 1968... CORR. METAL RETAINER ADDED.

APPROVED:
MARCH 10, 1965 — DATE

A.D. Bishop — CHIEF ENGINEER
P.H. Arnold — ASST. CHIEF ENGINEER
L.M. Lane — HIGHWAY ENGINEER
E.J. Hickey — CONSTRUCTION ENGINEER

# DROP INLET — TYPE III, ITEM 532

(ASPHALT COATED CORRUGATED GALVANIZED METAL DROP INLET WITH GRATE)

## SADDLE BRANCH FOR A.C.C.G.M.P.

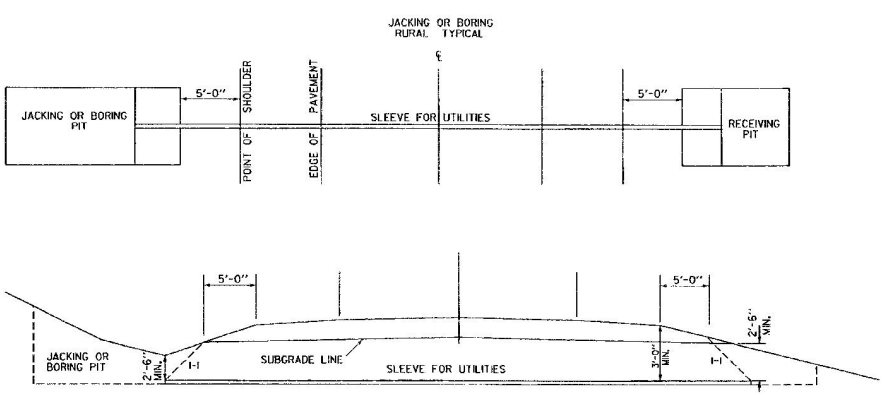
## A.C.C.G.M.P. VERTICAL RISER

## CONCENTRIC REDUCER UNIT OF ASPHALT COATED CORRUGATED GALVANIZED METAL PIPE, ITEM 432

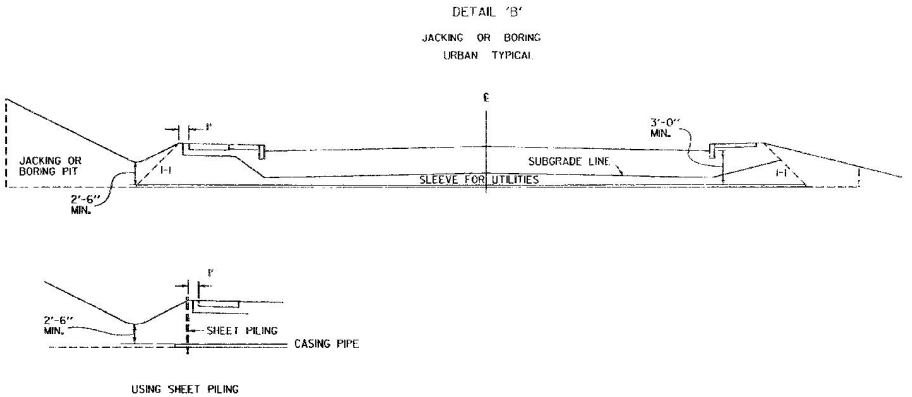
VERMONT DEPARTMENT OF HIGHWAYS STANDARD

D-17

DETAIL 'A'




DETAIL 'B'

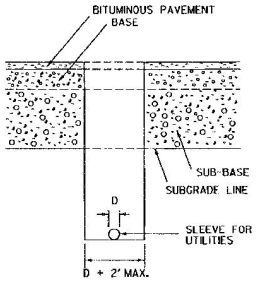



USING SHEET PILING

OPEN CUT AND PAVEMENT REPLACEMENT
APPLICABLE ONLY WHEN SPECIFICALLY AUTHORIZED BY HIGHWAY PERMIT

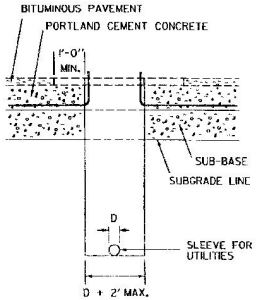
DETAIL 'C'
OPEN CUT WITH
BITUMINOUS CONCRETE PAVEMENT

BITUMINOUS TREATED BASE MATERIALS TO BE REPLACED WITH BITUMINOUS CONCRETE



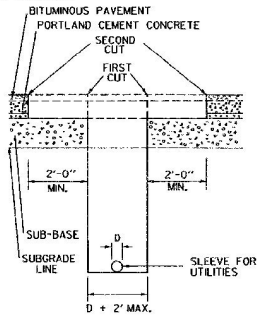

DETAIL 'D'
OPEN CUT WITH
PORTLAND CEMENT CONCRETE PAVEMENT

LONGITUDINAL STEEL TO BE CUT AND BENT BACK TO ALLOW FOR TRENCH EXCAVATION. REINFORCING BARS TO BE BENT BACK IN PLACE, SPLICED, AND NEW CROSS REINFORCING STEEL TO BE TIED TO THE LONGITUDINAL BARS PRIOR TO REPLACING THE PORTLAND CEMENT CONCRETE.



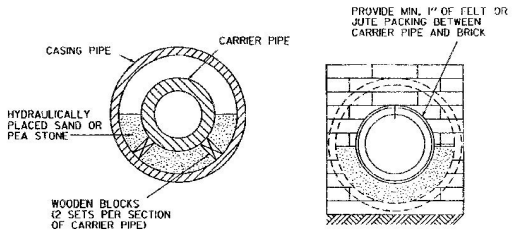

DETAIL 'E'
OPEN CUT WITH
PORTLAND CEMENT CONCRETE PAVEMENT

THE FIRST CUT WILL BE TO THE DESIRED WIDTH OF THE TRENCH. BACKFILL IS TO BE MADE TO THE ROAD SURFACE. THE SECOND CUT WILL THEN BE MADE AND ALL MATERIAL REMOVED TO THE BOTTOM ELEVATION OF THE CONCRETE SLAB. THE SUB-BASE WILL THEN BE RE-COMPACTED AND THE PORTLAND CEMENT CONCRETE REPLACED.




IN THE EVENT THAT AN ADJACENT TRANSVERSE JOINT IS LESS THAN FOUR FEET FROM THE FIRST CUT, THE PAVEMENT SHALL BE REMOVED TO THAT JOINT.

DETAIL 'F'
CASING AND CARRIER PIPE
(SLEEVE FOR UTILITIES)




OTHER METHODS OF SUPPORTING THE CARRIER PIPE MAY BE USED WHEN APPROVED BY THE ENGINEER.

WALL TO BE CONSTRUCTED AT ENDS OF CASING PIPE OR AS DIRECTED BY THE ENGINEER

CONSTRUCT WALL OF BRICK OR OTHER SUITABLE MATERIAL ON UNDISTURBED FOUNDATION

NOTE : MEASUREMENT FOR PAYMENT OF THIS COMPOSITE SLEEVE IS THE NUMBER OF LINEAR FEET OF THE COMPLETED INSTALLATION

GENERAL NOTES

1. SHEET PILING MAY BE DRIVEN VERTICALLY FIVE (5) FEET OUTSIDE THE SHOULDER POINT, OR ONE (1) FOOT BACK OF THE SIDEWALK, TO ALLOW FOR A SHORTER SLEEVE.
2. EARTH BACKFILL, TO BE MADE IN SIX (6) INCH LIFTS AND COMPACTED TO NOT LESS THAN 95% MAX. DRY DENSITY.
3. SEE DETAIL 'A' OR 'B' FOR DETERMINING SLEEVE LENGTH.
4. IN THE EVENT THAT PERMISSION IS GRANTED TO CUT AN EXISTING PORTLAND CEMENT CONCRETE OR BITUMINOUS PAVEMENT, ALL CUTS, IF POSSIBLE, SHALL BE MADE WITH A SAW TO A MINIMUM OF 1½".
5. BITUMINOUS PAVEMENTS TO BE REPLACED WITH BITUMINOUS CONCRETE. PORTLAND CEMENT CONCRETE AND SUB-BASE TO BE REPLACED IN KIND. MATERIAL BELOW SUBGRADE TO BE REPLACED WITH EXCAVATED MATERIAL OR AS DIRECTED BY THE HIGHWAY ENGINEER.
6. SUB-BASE TO BE REPLACED IN SIX (6) INCH COMPACTED LAYERS.
7. PORTLAND CEMENT CONCRETE PATCHES SHALL BE PROPERLY CURED FOR SEVEN (7) DAYS BEFORE BEING SUBJECTED TO TRAFFIC LOADS. WHEN HIGH EARLY STRENGTH CEMENT IS USED, PROPER CURING FOR THREE (3) DAYS SHALL BE REQUIRED BEFORE BEING SUBJECTED TO TRAFFIC LOADS. WHEN A HIGH STRENGTH, QUICK SETTING CONCRETE PATCHING COMPOUND IS APPROVED, IT SHALL BE PROPERLY CURED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS BEFORE BEING SUBJECTED TO TRAFFIC LOADS.

REVISIONS AND CORRECTIONS

DEC. 23, 1974 - ORIGINAL APPROVAL
SEPT. 9, 1975 - CARRIER PIPE AND PORTLAND CEMENT NOTES REVISED
OCT. 30, 1985 - REVISED TO CONFORM WITH 1986 SPECIFICATIONS
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
MAR. 10, 1995 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

DIRECTOR OF ENGINEERING

UTILITIES ENGINEER

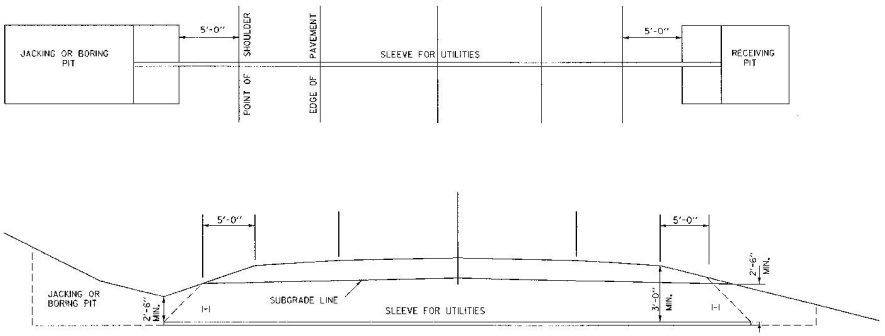
# HIGHWAY CROSSING SLEEVES FOR UNDERGROUND UTILITIES

VERMONT AGENCY OF TRANSPORTATION

STANDARD
D-20

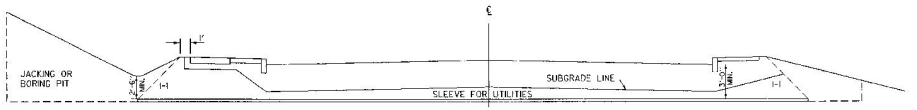
DETAIL 'A'

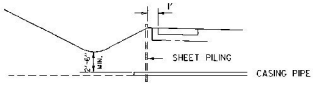
JACKING OR BORING
RURAL TYPICAL




DETAIL 'B'

JACKING OR BORING
URBAN TYPICAL



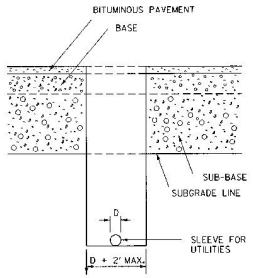




USING SHEET PILING

OPEN CUT AND PAVEMENT REPLACEMENT
APPLICABLE ONLY WHEN SPECIFICALLY AUTHORIZED BY HIGHWAY PERMIT

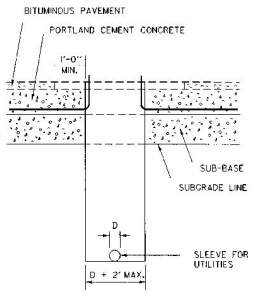
DETAIL 'C'
OPEN CUT WITH
BITUMINOUS CONCRETE PAVEMENT

BITUMINOUS TREATED BASE MATERIALS TO BE REPLACED WITH BITUMINOUS CONCRETE



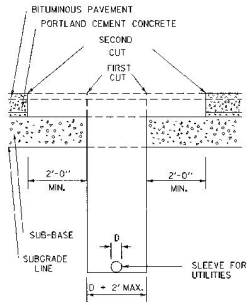

DETAIL 'D'
OPEN CUT WITH
PORTLAND CEMENT CONCRETE PAVEMENT

LONGITUDINAL STEEL TO BE CUT AND BENT BACK TO ALLOW FOR TRENCH EXCAVATION. REINFORCING BARS TO BE BENT BACK IN PLACE, SPLICED, AND NEW CROSS REINFORCING STEEL TO BE TIED TO THE LONGITUDINAL BARS PRIOR TO REPLACING THE PORTLAND CEMENT CONCRETE.




DETAIL 'E'
OPEN CUT WITH
PORTLAND CEMENT CONCRETE PAVEMENT

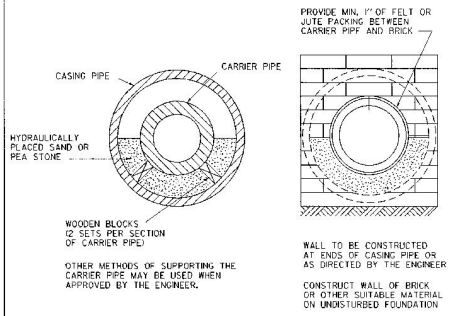
THE FIRST CUT WILL BE TO THE DESIRED WIDTH OF THE TRENCH. BACKFILL IS TO BE MADE TO THE ROAD SURFACE. THE SECOND CUT WILL THEN BE MADE AND ALL MATERIAL REMOVED TO THE BOTTOM ELEVATION OF THE CONCRETE SLAB. THE SUB-BASE WILL THEN BE RE-COMPACTED AND THE PORTLAND CEMENT CONCRETE REPLACED.




IN THE EVENT THAT AN ADJACENT TRANSVERSE JOINT IS LESS THAN FOUR FEET FROM THE FIRST CUT, THE PAVEMENT SHALL BE REMOVED TO THAT JOINT.

DETAIL 'F'

CASING AND CARRIER PIPE
(SLEEVE FOR UTILITIES)




OTHER METHODS OF SUPPORTING THE CARRIER PIPE MAY BE USED WHEN APPROVED BY THE ENGINEER.

NOTE : MEASUREMENT FOR PAYMENT OF THIS COMPOSITE SLEEVE IS THE NUMBER OF LINEAR FEET OF THE COMPLETED INSTALLATION

GENERAL NOTES

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2. EARTH BACKFILL TO BE MADE IN SIX (6) INCH LIFTS AND COMPACTED TO NOT LESS THAN 95 % MAX. DRY DENSITY.
3. SEE DETAIL 'A' OR 'B' FOR DETERMINING SLEEVE LENGTH.
4. IN THE EVENT THAT PERMISSION IS GRANTED TO CUT AN EXISTING PORTLAND CEMENT CONCRETE OR BITUMINOUS PAVEMENT, ALL CUTS, IF POSSIBLE , SHALL BE MADE WITH A SAW TO A MINIMUM OF 1½".
5. BITUMINOUS PAVEMENTS TO BE REPLACED WITH BITUMINOUS CONCRETE. PORTLAND CEMENT CONCRETE AND SUB-BASE TO BE REPLACED IN KIND. MATERIAL BELOW SUBGRADE TO BE REPLACED WITH EXCAVATED MATERIAL OR AS DIRECTED BY THE HIGHWAY ENGINEER.
6. SUB-BASE TO BE REPLACED IN SIX (6) INCH COMPACTED LAYERS.
7. PORTLAND CEMENT CONCRETE PATCHES SHALL BE PROPERLY CURED FOR SEVEN (7) DAYS BEFORE BEING SUBJECTED TO TRAFFIC LOADS.
   WHEN HIGH EARLY STRENGTH CEMENT IS USED, PROPER CURING FOR THREE (3) DAYS SHALL BE REQUIRED BEFORE BEING SUBJECTED TO TRAFFIC LOADS.
   WHEN A HIGH STRENGTH, QUICK SETTING CONCRETE PATCHING COMPOUND IS APPROVED IT SHALL BE PROPERLY CURED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS BEFORE BEING SUBJECTED TO TRAFFIC LOADS.

REVISIONS AND CORRECTIONS

DEC. 23, 1974 - ORIGINAL APPROVAL
SEPT. 9, 1975 - CARRIER PIPE AND PORTLAND CEMENT NOTES REVISED
OCT. 30, 1985 - REVISED TO CONFORM WITH 1986 SPECIFICATIONS
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

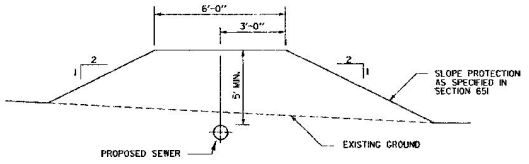
DIRECTOR OF ENGINEERING

DESIGN ENGINEER

# HIGHWAY CROSSING SLEEVES FOR UNDERGROUND UTILITIES

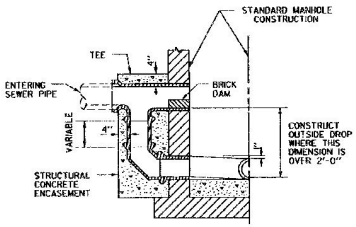
VERMONT AGENCY OF TRANSPORTATION

STANDARD
D-20

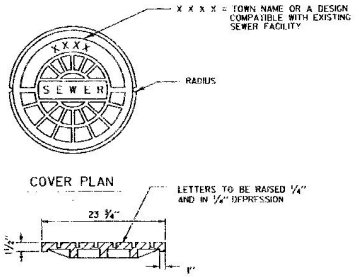



TYPICAL FILL SECTION OVER SEWER PIPE

FOR PIPES WITH LESS THAN 5' OF COVER




OUTSIDE MANHOLE DROP DETAIL




NOTES :

TRENCH EXCAVATION AND BACKFILLING OF SEWER PIPE SHALL BE AS SPECIFIED UNDER SECTION 628.

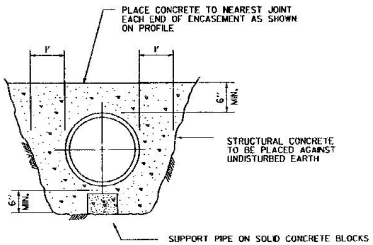
NO ADDITIONAL PAYMENT SHALL BE MADE FOR ABANDONING AND PLUGGING EXISTING PIPES WHEN DIRECTED BY THE ENGINEER.

CONCRETE ENCASEMENT OF SEWER LINES WILL BE REQUIRED WHERE THEY CROSS STORM DRAINS, WATER PIPES, OR OTHER STRUCTURES IN SUCH A MANNER AS TO IMPOSE UNUSUAL LOADING ON THE SEWER PIPE.

EMBANKMENTS SHALL BE COMPLETED AND COMPACTED TO AN ELEVATION AT LEAST 12 INCHES ABOVE THE TOP OF THE SEWER PIPE PRIOR TO EXCAVATING A TRENCH IN WHICH TO INSTALL THE PIPE

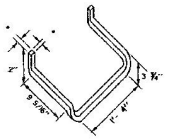
CHIMNEY DETAIL FOR HOUSE SEWER CONNECTION SHALL BE USED ONLY AS SHOWN ON THE PLANS OR WHEN DIRECTED BY THE ENGINEER.

HOUSE CONNECTIONS TO BE TEE, WYE OR SADDLE AS APPROVED BY THE ENGINEER AND COMPATIBLE WITH EXISTING FACILITIES.



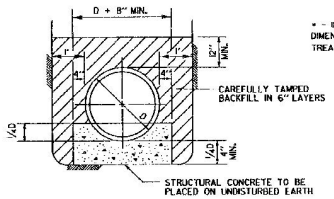

NOTE : PIPE SHALL BE SECURELY BRACED VERTICALLY AND HORIZONTALLY TO PREVENT FLOTATION DURING CONCRETE PLACEMENT.

TYPICAL CONCRETE ENCASEMENT

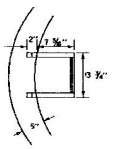



ALUMINUM STEP (DROP FRONT)

* - INDIVIDUAL METAL RUNGS SHALL HAVE A MINIMUM DIMENSION OF 1" OR SHALL BE PAINTED OR OTHERWISE TREATED TO RESIST CORROSION AND RUSTING.

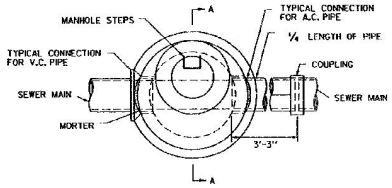



TYPICAL CONCRETE CRADLE

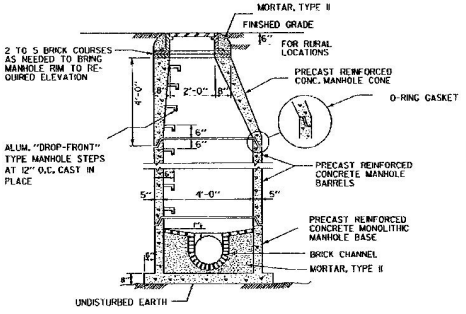



STEP DETAIL

TOP VIEW




PLAN



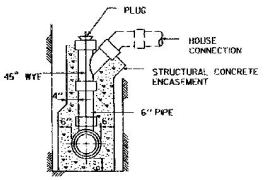

SECTION A-A

PRECAST REINFORCED CONCRETE SANITARY SEWER MANHOLE

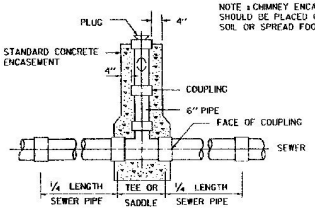



FRAME SECTION

MANHOLE FRAME AND COVER DETAIL

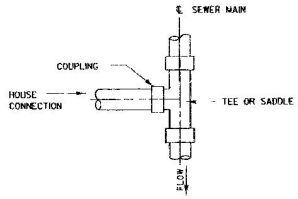



SECTION

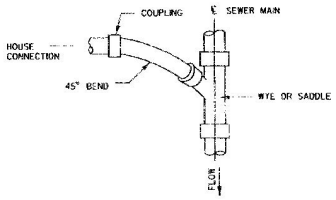



ELEVATION

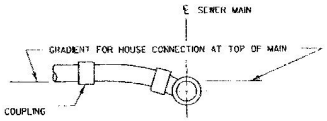
CHIMNEY DETAILS FOR HOUSE SEWER CONNECTION




PLAN




PLAN




ELEVATION

TYPICAL SEWER CONNECTION

REVISIONS AND CORRECTIONS

OCT. 1, 1976 - ORIGINAL APPROVAL
MAR. 23, 1994 - ADDED STEP DETAILS
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
MAR. 10, 1995 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.

APPROVED

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

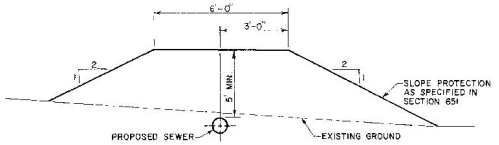
Gordon R. MacArthur
DIRECTOR OF ENGINEERING

Thomas Rapp
UTILITIES ENGINEER

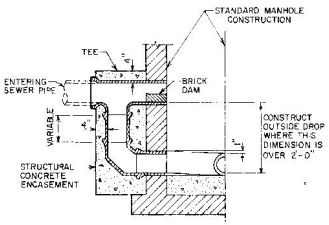
# SANITARY SEWER SYSTEMS

VERMONT AGENCY OF TRANSPORTATION

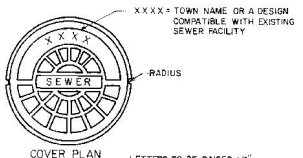
STANDARD D-22




TYPICAL FILL SECTION OVER SEWER PIPE
FOR PIPES WITH LESS THAN 5' OF COVER




OUTSIDE MANHOLE DROP DETAIL




MANHOLE FRAME AND COVER DETAIL

NOTES:

TRENCH EXCAVATION AND BACKFILLING OF SEWER PIPE SHALL BE AS SPECIFIED UNDER SECTION 628.

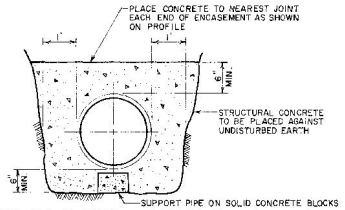
NO ADDITIONAL PAYMENT SHALL BE MADE FOR ABANDONING AND PLUGGING EXISTING PIPES WHEN DIRECTED BY THE ENGINEER.

CONCRETE ENCASEMENT OF SEWER LINES WILL BE REQUIRED WHERE THEY CROSS STORM DRAINS, WATER PIPES, OR OTHER STRUCTURES IN SUCH A MANNER AS TO IMPOSE UNUSUAL LOADING ON THE SEWER PIPE.

EMBANKMENTS SHALL BE COMPLETED AND COMPACTED TO AN ELEVATION AT LEAST 12 INCHES ABOVE THE TOP OF THE SEWER PIPE PRIOR TO EXCAVATING A TRENCH IN WHICH TO INSTALL THE PIPE.

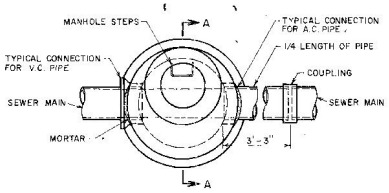
CHIMNEY DETAIL FOR HOUSE SEWER CONNECTION SHALL BE USED ONLY AS SHOWN ON THE PLANS OR WHEN DIRECTED BY THE ENGINEER.

HOUSE CONNECTIONS TO BE TEE, WYE OR SADDLE AS APPROVED BY THE ENGINEER, AND COMPATIBLE WITH EXISTING FACILITIES.

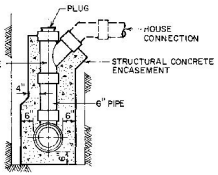



NOTE: PIPE SHALL BE SECURELY BRACED VERTICALLY AND HORIZONTALLY TO PREVENT FLOTATION DURING CONCRETE PLACEMENT.

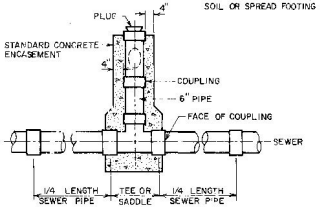
TYPICAL CONCRETE ENCASEMENT




PLAN



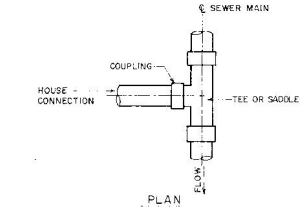

SECTION



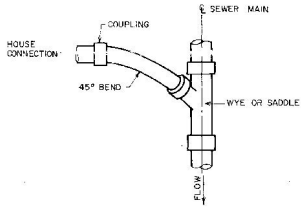

NOTE: CHIMNEY ENCASEMENT SHOULD BE PLACED ON UNDISTURBED SOIL OR SPREAD FOOTING

ELEVATION

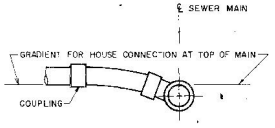
CHIMNEY DETAILS FOR
HOUSE SEWER CONNECTION




PLAN

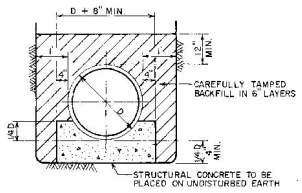



PLAN

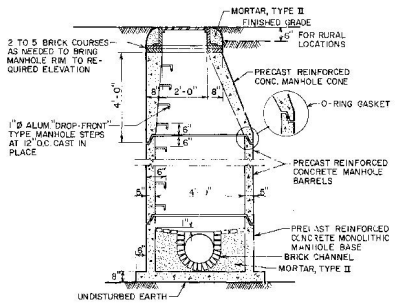



ELEVATION

TYPICAL HOUSE SEWER CONNECTION




TYPICAL CONCRETE CRADLE




SECTION A-A

PRECAST REINFORCED CONCRETE SANITARY SEWER MANHOLE

REVISIONS AND CORRECTIONS

APPROVED: DATE 12-1-75

E.V. Cushing
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# SANITARY SEWER SYSTEMS

VERMONT DEPARTMENT OF HIGHWAYS STANDARD D-22