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<td>C-20</td>
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</tbody>
</table>
PLAN of COVER
Bottom view

SECTION A-A

CAST IRON
Min. Wt. 36 lbs.

1-1/4" 1-1/4"

PLAN
Min. Wt of Frame 160 lbs.

CAST IRON FRAME

Mix. Bit Surf.

Agg. Base

Class A Concrete

Concrete Base

Original Stone to be used when found.

Survey Monument
Class A Concrete
See Type E RIW Marker

DETAILED OF LETTERS

TYPE A RIW MARKER

Posts to be native juniper, native cedar, or native cypress. Minimum 5" diameter at top. Top to be beveled 2" and two sides to be dressed to a minimum 4" face.

RIW MARKERS to be erected where shown on the plans, or as determined by the engineer.

TYPE B RIW MARKER

TYPE C RIW MARKER

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION
SURVEY MONUMENT AND COVER
RIGHT OF WAY MARKERS

TYPE E

When RIW Markers are in solid rock, Type "D" may be substituted for Type E below the ground surface.

TYPE D

Chip surface of rock for bond
2" drilled hole filled with cement grout
See Plans for details of roadway width, cut ditch, type and thickness of roadway surfacing, super-elevation, and curve widening.

Standard Crown Slope for R.C. Concrete: 8 by 12' per foot; for Bit. Surf. Treat. and Mix. Bit. Surf. 0.015' per foot.

Standard Cut and embankment slopes as shown on this sheet may be superseded by special slopes where shown on plans.

For Cuts up to 6' use 5' semi-tangents (L) for slope rounding. For each additional foot of cut add 1' to semi-tangent to 11' maximum. Finish with approved drag so that the ground will not have a scarred appearance. Do not daylight small negative slopes, but round as indicated.
PAVED TURNOUTS

NOTES

W indicates width of paved surface of turnout.
L indicates length of paved surface of turnout.
Farm road turnout, 10 min. width, (W)
County road turnout, 20 min. width, (W)
Size and type of turnouts is noted on plans
as follows: W, L, Surface, and Type (12'x30' M.B.S. Type A).
Base material thickness under turnouts is the same
as shown on the roadway section, unless otherwise noted.
Any excavation or embankment for turnouts is
included in the roadway quantities.
Turnouts are to be placed where shown on plans,
or as directed by the Engineer.
CROWN DYKE
To be paid for by lineal measure.

CROWN DITCH
To be paid for by lineal measure.

Crown protection should be constructed in such a manner that the flow of intercepted water shall not exceed 0.5%.

Grader ditch section may be used with the approval of the Engineer, or where called for on Plans.

GRADER DITCH
To be paid for by lineal measure.

TYPICAL DIKE INSTALLATION AT STRUCTURE
Dykes of structures to be so placed that they create a water cushion.

TYPE B DIKE

TYPE A DIKE

DITCH OR CHANNEL

Dimensions of ditches and dikes as shown on plans are respectively width, depth or height, and length.
ROADWAY WIDTH

5-DEPTH GAUGE

FLOWS

3-2"x12" BOARDS

4"x4" 5'0" POSTS @ 5' CTS.

5-DEPTH GAUGE

FINISHED GRADE

SLOPE 0.015' PER FT

ROADWAY WIDTH

5-DEPTH GAUGE

FINISHED GRADE

SLOPE NOT MORE THAN 0.02' PER FT

MIX. BIT SURFACE FORD

WOOD WALLS

ROCK BASKET

USE ONLY WHEN CALLED FOR ON PLANS.

3" CAP

3" DEPTH GAUGE

3"x5'0" PIPE

PAINT WHITE WITH BLACK BANDS 1" WIDE.

TIE WITH 2 STRANDS #9 G.D. METAL WIRE @ 2' CTS.

DIAMOND MESH WOVEN WIRE FENCING

STANDARD SPECIFICATION 68

WIRE BASKET TO BE FILLED WITH 8" ROCK.

2" IRON PIPES 7'-0" LG

SPACED @ 8' CTS.

DETAILED OF ROCK FILLED WIRE BASKET

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

TYPE "B" FORD

ROCK BASKET

DRAWN
C.B.B. JULY 1945

DRAWING NO.
C-6

TRACED
GM NOV. 1945

CHECKED
H.F.L.

APPROVED
R.P.

3% MAX.

3% MAX.

ELEVATION LOOKING UPSTREAM

Note: All timber to be structural grade.

Wall to be built to one foot above high water level.

3-2"x12" BOARDS

4"x4" 5'0" POSTS @ 5' CTS.

5-DEPTH GAUGE

FINISHED GRADE

SLOPE 0.015' PER FT

ROADWAY WIDTH

5-DEPTH GAUGE

FINISHED GRADE

SLOPE 0.015' PER FT

ROADWAY WIDTH

5-DEPTH GAUGE

FINISHED GRADE

SLOPE NOT MORE THAN 0.02' PER FT

MIX. BIT SURFACE FORD

WOOD WALLS

ROCK BASKET

USE ONLY WHEN CALLED FOR ON PLANS.

3" CAP

3" DEPTH GAUGE

3"x5'0" PIPE

PAINT WHITE WITH BLACK BANDS 1" WIDE.

TIE WITH 2 STRANDS #9 G.D. METAL WIRE @ 2' CTS.

DIAMOND MESH WOVEN WIRE FENCING

STANDARD SPECIFICATION 68

WIRE BASKET TO BE FILLED WITH 8" ROCK.

2" IRON PIPES 7'-0" LG

SPACED @ 8' CTS.

DETAILED OF ROCK FILLED WIRE BASKET

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

TYPE "B" FORD

ROCK BASKET

DRAWN
C.B.B. JULY 1945

DRAWING NO.
C-6

TRACED
GM NOV. 1945

CHECKED
H.F.L.

APPROVED
R.P.

3% MAX.

3% MAX.

ELEVATION LOOKING UPSTREAM

Note: All timber to be structural grade.

Wall to be built to one foot above high water level.

3-2"x12" BOARDS

4"x4" 5'0" POSTS @ 5' CTS.

5-DEPTH GAUGE

FINISHED GRADE

SLOPE 0.015' PER FT

ROADWAY WIDTH

5-DEPTH GAUGE

FINISHED GRADE

SLOPE 0.015' PER FT

ROADWAY WIDTH

5-DEPTH GAUGE

FINISHED GRADE

SLOPE NOT MORE THAN 0.02' PER FT

MIX. BIT SURFACE FORD

WOOD WALLS

ROCK BASKET

USE ONLY WHEN CALLED FOR ON PLANS.

3" CAP

3" DEPTH GAUGE

3"x5'0" PIPE

PAINT WHITE WITH BLACK BANDS 1" WIDE.

TIE WITH 2 STRANDS #9 G.D. METAL WIRE @ 2' CTS.

DIAMOND MESH WOVEN WIRE FENCING

STANDARD SPECIFICATION 68

WIRE BASKET TO BE FILLED WITH 8" ROCK.

2" IRON PIPES 7'-0" LG

SPACED @ 8' CTS.

DETAILED OF ROCK FILLED WIRE BASKET

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

TYPE "B" FORD

ROCK BASKET

DRAWN
C.B.B. JULY 1945

DRAWING NO.
C-6

TRACED
GM NOV. 1945

CHECKED
H.F.L.

APPROVED
R.P.

3% MAX.

3% MAX.

ELEVATION LOOKING UPSTREAM

Note: All timber to be structural grade.

Wall to be built to one foot above high water level.
After submission and approval of plate manufacturers plans & specifications shall be used in conjunction with Std. erection details on this drawing.

**TYPE B ROAD GUARD**  
(Deep Beam Type)
Round posts shall be 6" min. and 9" max. diameter at a point 6" below top of post and 7½ min. and 10½ max. diameter at the butt. They shall be graded for size so that in any one continuous row of guide posts the top diameters shall not vary more than 1". Measurement for size shall be made after shrinkage.

Where rectangular posts are used, they shall be 3"x8", 5.4S. All guide posts shall conform to Std. Specifications.

Guide post locations shown on plans are approximate and changes may be necessary to meet field conditions.

When placed in rows, guide posts shall be spaced at 200 ft. chs. unless otherwise called for on plans.

After erection and painting, install a No. 1 Crystal reflector button or Silver Scotchlite tab in each post, facing traffic.
Note: All reinforcing to be 5/8 deformed bars approx. 12 o.c.
**U TYPE**

**WING TYPE**

**SECTION B-B**

**ELEVATION SINGLE**

**ELEVATION DOUBLE PIPE**

**SECTION A-A**

**Plan**

**U TYPE**

**WING TYPE**

**NOTE**

Chamfer on all exposed corners of conc. headwalls.

**A.S.T.M. MIN. SHELL THICKNESS OF CONCRETE PIPE**

<table>
<thead>
<tr>
<th>In Dia</th>
<th>Shell Thickness</th>
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<tr>
<td>18</td>
<td>2&quot;</td>
</tr>
<tr>
<td>24</td>
<td>3&quot;</td>
</tr>
<tr>
<td>30</td>
<td>3 1/2&quot;</td>
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<tr>
<td>36</td>
<td>4&quot;</td>
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<tr>
<td>42</td>
<td>4 1/2&quot;</td>
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<tr>
<td>48</td>
<td>5&quot;</td>
</tr>
<tr>
<td>54</td>
<td>5 1/2&quot;</td>
</tr>
<tr>
<td>60</td>
<td>6&quot;</td>
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</table>

**STRAIGHT TYPE HEADWALLS**

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<tr>
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<th>Double Pipe</th>
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<tr>
<td>18&quot;</td>
<td>2.00</td>
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<tr>
<td>24&quot;</td>
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<td>2.00</td>
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<tr>
<td>36&quot;</td>
<td>2.00</td>
<td>2.00</td>
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<tr>
<td>42&quot;</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>48&quot;</td>
<td>2.00</td>
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<tr>
<td>54&quot;</td>
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<td>2.00</td>
</tr>
<tr>
<td>60&quot;</td>
<td>2.00</td>
<td>2.00</td>
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**Note**

Quantities are for one headwall only.

**WING AND U TYPE HEADWALLS**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Single Pipe</th>
<th>Double Pipe</th>
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<td>60&quot;</td>
<td>2.00</td>
<td>2.00</td>
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**Note**

Dimensions and quantities shown are calculated on a basis of using concrete pipe. See Table for shell thickness of various sizes of pipe. Dimension W to be increased in take care of increased width or length due to slope.
Length of culvert "L" shall be computed in even 2' lengths for C.M.P. and Conc. Pipes as a basis for estimates. Each side where height of embankment "H" is more than 10', add 1/4"H to measured "L" to obtain total length required. Inside face of headwall should be at least 1' outside of finished shoulder line.

Pipe should be laid on a straight gradient (1/2 min.) and on solid base at all points.

Minimum cover "C" shall be 24" for standard strength tile or conc. pipes and 30" for double strength conc., tile, or corrugated metal pipes.

Catch basins, in connection with angle headwalls, shall be excavated as shown in Fig. A and classed as channel excavation.

Warp embankment slopes of pipe culverts to 2:1 where Std. C-2 calls for flatter slopes.
**GENERAL PLAN**

**SECTION ON CENTER LINE FOR ANY WIDTH ROADWAY**

- **Length as called for on plans (multiples of 1/6%):**
  - 2/3% Clear
  - 2/4% Clear
  - 2/6% Clear

- **Top of pavement:**
  - 2/4% Clear
  - 2/3% Clear

- **Grade:**
  - For Grade 2

- **Note:**
  - Second hand rails may be used providing they are clean, free from rust scales, of uniform cross section and weighing at least 82% of original nominal weight, 25 lbs Min.

**PART SECTION A-A**

- **Electrical outlet at each intersection on side rail guard.**
- **No outlet required on 3/4% side rail guard.**

**DETAIL OF WELDS AT EACH INTERSECTION**

- **8 1/6" welds**

---

**MATERIAL LIST**

- **Concrete:**
  - 12.71
  - 1833

- **Strip Steel:**
  - 14.48
  - 5.57
  - 4.68

- **Gates:**
  - 10.5

**ARIZONA HIGHWAY DEPARTMENT**

**PLANS DIVISION**

**CATTLE GUARDS**

**DRAWN:**

**REVIEWED:**

**TRACED:**

**CHECKED:**

**DRAWING NO.:** C-14
Min 2½ diam. pipe with cap or
- Min. 2½ x 2½ x ½ L

6' G.I. Bars - 12' x 12' x ½ L

- Steel Gate - 1½ x 1½ Tubing - 2 Start Braces

G.I. Mesh 4 x 4 x 1½ L, 6 fuse wire with cross wires

Adjustable diagonal guy. Min. Weight 10 lb

Corner Angle

Screw Block

GAGE A 32

STD LINE PANEL

Typical line post

(Approved Spec)

Min. 2½ x 2½ x ½ L

STD twisted wire stays

Typical line post with stay

6" x 6" x ½ L angle brace

3½ twisted wire stays

End panel for flood gate only

STD FLOOD GATE

Length is variable

NOTE:

Line posts may be T rail, U section or similar commercial production (excluding pipes or all). They shall be rail steel grade and rolled from standard section the rails or rebar. Rails, both produced by the open hearth process. They shall have a narrow web, slots or corrugated edges to hold wire. wire shall be of good quality of 12.5 lbs per ft, exclusive of anchor, with a minimum yield of 2% of the allowable. Clamps of 10 gauge (or heavier) gal wire shall be provided for attaching fence and post. T type fasteners are not permitted.

All posts and braces shall be painted to manufacturer's standard or galvanized.

Typical Steel Line Post Sections

TYPICAL STEEL LINE POST SECTIONS

ARIZONA HIGHWAY DEPARTMENT

PLANS DIVISION

LINE FENCE AND GATES
STEEL POSTS

DRAWN

TRACED

CHECKED

REVISED

C-16

1.0 1.0 1.0 1.0

9 30 30
FABRICATED WIRE FENCE & GATE.
Any standard make of fence may be used which is similar to detail shown above. Entire assembly to be hot galvanized.

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION
INDUSTRIAL TYPE
FABRICATED WIRE FENCE

DRAWING NO. C-17
Expansion Joints @ 600' centers or as shown on plans

Contraction Joints @ 15' centers

CONTRACTION JOINT

10' Thickenend ends of Expansion Jts.

CONSTRUCTION JOINT
(IF NOT AT EXPANSION JT.)

EXPANSION JOINT

LONGITUDINAL SECTION THRU PAVEMENT

TRANSVERSE EXPANSION JOINT

TRANSVERSE CONTRACTION JOINT

All general requirements may be superseded by special notations on the plans. At intersections of side roads or streets, joints shall be so placed as to give the intersection a symmetrical appearance and to conform to the cross section of the intersecting road or street.
PLAN OF LONGITUDINAL JOINT
DETAIL "E" OR "F"

LONGITUDINAL JOINT
DETAIL "G"

LONGITUDINAL JOINT
DETAIL "H"

GENERAL NOTES

Width (f) of longitudinal expansion joints shall be 2 unless otherwise noted on the plans.

All tie bars in center joints shall be deformed bars and shall have unbroken band. They shall be held securely in place, parallel to the subgrade and perpendicular to the center line of the road, by the use of metal chairs of approved design and made for that purpose.

The edge of web used for all longitudinal joints shall be so constructed as to provide a smooth traveled surface 3' wide on each side of the joint.

All general requirements may be superseded by special notations on the plans.

If approved by the District Engineer, other deformations may be used.
GENERAL NOTES

All curbs & gutters to be single course Class A concrete, unless otherwise specified on plans. Where plaster coat is called for it shall consist of 3/4 of 1/2 cement mortar on exposed surfaces of curb & gutter.

All curbs shall be trowel finished. All flow lines of gutters shall be troweled to an accurate grade for a width of 8".

Curbs, or curb & gutter shall have a 1/4" open expansion joint, extending all the way through the concrete, every 20 feet.

In integral curb all expansion & contraction joints shall extend through the curb. Expansion joints to be placed at all radius points.

CONCRETE SCAWALK

Sidewalk shall be single course Class A concrete, float finished and shall be marked in squares.

A 1/8 open expansion joint shall be placed every 15 ft and a 1/4" premolded filler joint between sidewalk & curb, as shown in detail below. Sidewalk across driveways shall be 6" thick.

CONCRETE CURBS, GUTTERS & SIDEWALKS

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

DEPRESSED CURB FOR DRIVEWAY ENTRANCE
SECTION

TYPE A

RUBBLE CAP DETAIL

Material to be used in construction of wall to be approved by laboratory.

SECTION

TYPE B

TERSAIL RETAINING WALL

To find quantities of rock required

\[
\frac{3}{4} \times 24 = \text{Cu Yds per linear ft of wall}
\]

Example:

To find Cu Yds of rock per ft of 10' high wall

\[
\frac{3}{4} \times 24 \times 10 = 180 \text{ Cu Yds per lin ft}
\]

Note:

Due to disintegrating character of some types of rock, height of wall should be limited to 10 ft unless otherwise approved by Laboratory.
Rip Rop or Rubble when called for on plans, or directed by the engineer.

**Embankment**

**Natural Ground**

**Type B**

Corrugated Metal Catch Basin

**Plan**

**Type A Installation**

Note:
- Include elbow as part of total length. Call for hinged band coupling for pipe joints. Use 12” band width for pipes over 12' long, 1" band width for pipes 12' long or less. Catch basin to have bituminous coating. C.M.P. shall be plain unless otherwise specified. Catch basin shall be shifted to fill the ground so as to lessen the angle in the C.M.P. as much as possible.

**SECTION**

**16 ga. Corrugated Metal**

Two foot length of 8” pipe included as part of catch basin. Additional length of pipe shown on plans.

**SIDE ELEVATION**

**TYPE B**

CATCH BASINS

**FRONT ELEVATION**

**SIDE ELEVATION**

**TYPE A**

16 ga. Corrugated Metal Plate.

60° Unless otherwise shown.

PERFORATED C.M.P. INSTALLATION

8" Perforated C.M.P. -- Place holes down.

Varies

3/4" to 2 1/2" Rock Backfill Std. Spec. Item 34
The finish of the top slab shall conform in color, marking and finish to the adjacent concrete work. Where a sidewalk exists the surface shall be trowel finished without mortar coat.

The concrete cover shall be composed of one part Portland cement and three parts clean well graded aggregate, passing a 3/4" screen. All other concrete shall be class A.

When catch basins are located in a curb return the angle iron above the mud flap conform to the curbing of the curb.

All exposed edges shall be finished with a suitable edge.
Half Plan Gutter & Grate
Half Plan Frame & Anchors

Section XX Details of Steel Frame

Section YY Weld

Section ZZ Curb Height

-longitudinal Section Details of No. 3 Catch Basin

cross section

All concrete to be class H, and all exposed edges to be finished with a suitable edge

Arizona Highway Department
Plans Division

Catch Basin
No. 3

Drawn: A.H.W.
Traced: H.H.
Checked: H.H.
Approved: H.H.
**Type A** Cover
Approx. weight 190 lbs.

**Type B** Cover
Approx. weight 280 lbs.

**Type A-1** Cover: shall be the same as Type A except that the cover shall be vented with at least six one-inch holes, equally spaced in a circle 8" from the center of the cover.

Type A cover shall be used unless otherwise specified.

Notations as shown on the plans shall be as follows: Std. M.H. Frame & Cover No. 1-B, the latter denoting the type of cover.

The bearing faces shall be machined so that the cover will have a uniform bearing in any position in the frame.
HALF PLAN TOP OF COVER

HALF PLAN BOTTOM OF COVER

SECTION A-B-C OF COVER
Approx weight 210 lbs.

SECTION B-B
The bearing faces shall be machined so that the cover will have a uniform bearing in any position in the frame.

SECTION OF FRAME
Approx weight 317 lbs

Scale 1"=10'

ARIZONA HIGHWAY DEPARTMENT PLANS DIVISION
MANHOLE FRAME & COVER NO. 2

REV.

DRAWING NO. C-29
HALF PLAN

4'8" (2 x Wall Thickness)

HALF SECTION A-A

BRICK

CONCRETE

SECTION B-B

BRICK

CONCRETE

STANDARD MANHOLE NO.1
FOR PIPES 6' TO 21'

1/2 cement plaster

Dia. - 4'6" (2 x Wall Thickness)

Turn 4' arch over all pipes 12" dia. or less. 8' arch over all pipes of more than 12" dia.

Inlet pipes as shown on the plans.

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

MANHOLE
NO. 1 & NO. 2

BRICK

CONCRETE

STANDARD MANHOLE NO.2
FOR PIPES 30" OR MORE

Method of setting frame in earth.

Method of setting frame in pavement.

In Portland Cement Concrete use 2 rings of 1 3/4 bars.

Manhole frame & cover No.1 is shown. Other types may be substituted if noted on the plans.

All concrete shall be Class 'A'.

Every 5th course of brick shall be laid as stretchers.
Cement Plaster

Snow alfalfa valve or its equivalent. Number of valve shall correspond to the size of the pipe in inches. No. 6 to No. 20.

Concrete "Tor'f" to be included with valve.

PART SECTION

STANDARD IRRIGATION VALVE DETAIL "C"

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

IRRIGATION VALVE IRRIGATION GATE

DRAWN O.K. Dec. 1935 DRAWING NO. C-32
TRAILED G.M. Nov. 1935
CHECKED H.L.A. Dec. 1935
APPROVED E.C. Miller
**BEVELED END CONCRETE PIPE**

1:2 Cement Mortar

1-2" Cement Mortar

**BELT & SPIGOT CONCRETE PIPE OR VITRIFIED CLAY PIPE**

1:2 Cement Mortar

**TYPICAL INSTALLATION OF CONCRETE OR TILE PIPE**

Structure Excavation

Structure Excavation

Embankment

Embankment

Shape accurately to pipe

Shape accurately to pipe

Min. 1/4 D.O.

Min. 1/4 D.O.

W = D + 2'

W = D + 2'

Selected Backfill Material

Selected Backfill Material

8" Min. or

8" Min. or

1/2 per ft. of H.

1/2 per ft. of H.

Rock excav. or unstable soil.

Rock excav. or unstable soil.

Backfill to this line before placing pipe.

Backfill to this line before placing pipe.

**DETAIL "X" CONCRETE ENCASEMENT**

Width of trench

Width of trench

4" min.

4" min.

4" min.

4" min.

Note: Prior to placing pipe, the roadway embankment shall be placed and compacted to an elevation of at least 3' above the proposed grade for the top of double strength pipe and 24" above the top of std. strength pipe. Then the trench shall be excavated and the pipe installed, backfilled and tamped as per specifications.

See specifications for strength requirements.
Notes —
Standard R.R. Crossing consists of two flange rails and necessary number of brace plates and brace nuts. Welded nut and brace plate to be placed every third tile. Construction and assembly details as shown. Length of R.R. Crossing is noted on plans in linear feet.

Finished roadway surface of crossing (between rails) shall be same as adjacent roadway, unless noted otherwise on plans.
### Type C: Important Public Crossings

**Bill of Material**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Length</th>
<th>Metric</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 frames 8'0&quot; long and leveled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4 frames 8'0&quot; long and beveled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4 frames 8'0&quot; short and beveled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4 frames 8'0&quot; long and beveled</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
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<td></td>
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</tr>
<tr>
<td>6</td>
<td>4 frames 8'0&quot; long and beveled</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>4 frames 8'0&quot; short and beveled</td>
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</tr>
</tbody>
</table>

**Type C: Important Public Crossings**

- **Material:**
  - **Track:**
    - Size: 32"
    - 4 frames 8'0" long and beveled
  - **Planking:**
    - Size: 24"
    - 4 frames 8'0" long and beveled
  - **Vans:**
    - Size: 16"
    - 4 frames 8'0" long and beveled
  - **Turf:**
    - 4 frames 8'0" long and beveled

**Section End of Crossing:**

- **Material:**
  - Size: 32"
  - 4 frames 8'0" long and beveled

---

**Notes:**

1. **Planking:** All planks shall be cut to size, and the ends shall be beveled to a smooth finish. All planks shall be thoroughly cleaned and inspected for defects before installation.
2. **Turf:** The turf shall be cut to size, and the ends shall be beveled to a smooth finish. All turf shall be thoroughly cleaned and inspected for defects before installation.
3. **Vans:** All vans shall be cut to size, and the ends shall be beveled to a smooth finish. All vans shall be thoroughly cleaned and inspected for defects before installation.
4. **Track:** All track shall be cut to size, and the ends shall be beveled to a smooth finish. All track shall be thoroughly cleaned and inspected for defects before installation.

---

### Type D: Important Public Crossings

**Bill of Material**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Length</th>
<th>Metric</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>4 frames 8'0&quot; long and leveled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4 frames 8'0&quot; long and beveled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4 frames 8'0&quot; long and beveled</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Type D: Important Public Crossings**

- **Material:**
  - **Track:**
    - Size: 32"
    - 4 frames 8'0" long and beveled
  - **Planking:**
    - Size: 24"
    - 4 frames 8'0" long and beveled
  - **Vans:**
    - Size: 16"
    - 4 frames 8'0" long and beveled
  - **Turf:**
    - 4 frames 8'0" long and beveled

**Section End of Crossing:**

- **Material:**
  - Size: 32"
  - 4 frames 8'0" long and beveled

---

**Notes:**

1. **Planking:** All planks shall be cut to size, and the ends shall be beveled to a smooth finish. All planks shall be thoroughly cleaned and inspected for defects before installation.
2. **Turf:** The turf shall be cut to size, and the ends shall be beveled to a smooth finish. All turf shall be thoroughly cleaned and inspected for defects before installation.
3. **Vans:** All vans shall be cut to size, and the ends shall be beveled to a smooth finish. All vans shall be thoroughly cleaned and inspected for defects before installation.
4. **Track:** All track shall be cut to size, and the ends shall be beveled to a smooth finish. All track shall be thoroughly cleaned and inspected for defects before installation.
**PROJECT MARKER**

Project Marker to be furnished by the State and installed by the Project Engineer at each end of all Federal Aid Projects. Project Markers are to be placed on R/W line, but not more than 100 ft from E of road if R/W is greater than 100 ft.

**MILE POST**

Mile posts are furnished by State and shall be installed by the Project Engineer.

**ELEVATION**

STD. BENCH MARK

**SECTION A-A**

CONCRETE CONSTRUCTION MARKER

Scale: Full Size

Marker to be made of brass or bronze, and is to be furnished and placed at beginning and end of each section for, after marking, by Proj. Engs.

**ARIZONA HIGHWAY DEPARTMENT**

PLANS DIVISION

PROJECT MARKER

MILE POST, BENCH MARKER

CONC. CONST. MARKER
### PARABOLIC CROWN FORMULA AND TABLE

#### USE OF TABLE

Find $W$ in ft., and $C = 0.4$ ft.

#### FORMULA

$$w = p - \frac{a}{c}$$

### CUMULATIVE PERCENT OF CROWN C - FOR EACH FOOT RIGHT OR LEFT OF $w$

<table>
<thead>
<tr>
<th>$P$</th>
<th>$1'$</th>
<th>$3'$</th>
<th>$5'$</th>
<th>$7'$</th>
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<th>$10'$</th>
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<th>$15'$</th>
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<th>$25'$</th>
<th>$30'$</th>
<th>$35'$</th>
<th>$40'$</th>
<th>$45'$</th>
<th>$50'$</th>
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</thead>
<tbody>
<tr>
<td>$w$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CUMULATIVE PERCENT OF CROWN C - FOR EACH FOOT RIGHT OR LEFT OF $w$

Here, $w$ is the width of the roadway, and $C$ is the crown height. The table provides cumulative percent values for each foot right or left of $w$. The formula $w = p - \frac{a}{c}$ is used to calculate $w$, where $p$ is the point where the crown begins and $c$ is the crown height.

### INTERPRETATION OF "W" AND "C"

When $w$ and $c$ are used.

**Example:**

Assume $W = 40$ ft., and $C = 0.4$ ft.

**Solution:**

Find $w$ in ft., and $C = 0.4$ ft.

**Calculation:**

$$w = p - \frac{a}{c}$$

where $p$ is the point where the crown begins, and $c$ is the crown height. The formula is based on the parabolic crown formula and table provided.
DETAIL OF SLOPE ROUNGING GAUGE

Note: Measure external distance on angle bisector

To determine oases for Semi-Tangents other than five feet square semi-tangent, divide by 25, and multiply by indicated area.
PLANT CONSERVATION

Save existing specimen trees. For traffic safety maintain 8 ft. min. horizontal shoulder clearance and 15 ft. min. vertical clearance of tree branches.

The final grade should conform as nearly as possible to the original surface where trees are involved.

Natural ground to be left around base of trees as directed by Engineer.

No clearing of right of way shall be done until a thorough inspection has been made for possible preservation of existing growth. The trees and shrubs to be retained will be carefully and clearly marked. Unnecessary destruction of existing ground cover is prohibited.

ROCK WORK:

Straight rock cuts should not be rounded. Where rock has an earth overburden, treat the overburden the same as a straight cut. In cuts which are composed of rock and earth abutting each other let the excavation follow a smooth rounding course.

If specimens to be retained should be in greater than 6" fill a dry rubble wall shall be constructed around same.

Small pockets of earth should be left between rocks to permit small growth to re-seed.

Trees and shrubs on top of cuts or crowns of VGs should be preserved where possible.

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

PLAN ~ ROCK & EARTH CUT.

SECTION "A-A"

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

PLANT CONSERVATION & ROCK AND EARTH CUTS

DRAWN W.M.D. JAN., 1946
TRACED J.S. JUNE, 1946
CHECKED H.H.M. JULY, 1946
REV. 4/24/48

DRAWING NO. C-41
TYPICAL INSTALLATION PLAN OF ROAD GUARD AT BRIDGE APPROACHES

Minimum length of Shoulder Flare - 50'

End of Structure

End of Road Guard Flare

(Deperds on W)

Control Line

Bracket if required

Dimension varies depending on make of Road Guard.

Face of Road Guard

Detail Section A-A

Basic Formula for Road Guard Flare

\[ Y = W \frac{x^2}{F} \]

W: Offset from top of Curb line (control line) to Shoulder line.

X: Length of Road Guard Flare.

F: Length of Road Guard Flare.

Y: Offset from beginning post away from structure.

GENERAL NOTES:

- When value of \( W \) is different than shown in Table, then use Basic formula to find values for \( Y \).

- When Road Guard Flare is required beyond end of Road Guard, use \( W \) offset, the face of Road guard shall then be continued at the shoulder line. Modify last offset toward center.

- When \( W = 0 \), no flare is required. Shoulder line is then the Control line.

- Offset from Roadway \( \delta = Y + \alpha \). All figures are expressed in feet.

- Place Road Guard both sides of roadway.

<table>
<thead>
<tr>
<th>X</th>
<th>W-3</th>
<th>W-4</th>
<th>W-5</th>
<th>W-6</th>
<th>W-7</th>
<th>W-8</th>
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<tr>
<td>10</td>
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<td>0.10</td>
<td>0.09</td>
<td>0.09</td>
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<tr>
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<td>0.48</td>
<td>0.44</td>
<td>0.41</td>
<td>0.38</td>
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<tr>
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<td>100</td>
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</tbody>
</table>

ARIZONA HIGHWAY DEPARTMENT
PLANS DIVISION

INSTALLATION
OF ROAD GUARD AT
STRUCTURE APPROACHES

DRAWN: L. Judd Liner
DRAWING NO: C-42
REV: V0/60

CED: 1/1/62
APPROVED: 1/1/62
ENGR. PENSHELL MILL