Several revisions to the Construction Standard Drawings have been made and are included in a supplemental packet to be inserted into the April 2000 Construction Standard Drawings. Significant revisions included in the update are:

1. Standard C-15.92 Catch Basin frame has been modified to accept a revised Standard C-15.50 bicycle safe grate as an alternate for locations where bicycle traffic is allowed.

2. Guard rail height to top of rail has been revised from 27” to 28”. This necessitates a corresponding 1” increase in the height of the thrie beam transition to concrete barrier.

3. Welding for catch basin frames and grates will conform to the requirements of Standard Specification 604-3.06 for structural steel.

4. PCCP joint details for transverse and longitudinal construction joints have been added to conform to current ADOT materials design practice. Weakened plane joints are revised to show only a single saw cut.

5. Standard Right of Way Markers have added a rebar to make them magnetically detectable. Brass caps require stamping with the surveyor’s registration number to comply with state board regulations.

A listing of all the revised standards with a brief description of the revisions is shown on the following page.

Design personnel should review the revised drawings and incorporate the updates into their design plans as appropriate. Construction personnel should review the drawings for possible implementation with ongoing construction. Please arrange for additional copies for all users within your Group or District. Additional copies (8 1/2”x 11” or 11”x 17”) may be obtained from Engineering Records at 602-712-8216.

An updated 1A sheet (List of Standards) is available at the Roadway Support Desk at 602-712-8667 or 8491.
Questions regarding the revisions may be directed to Tom Scheck (602-712-8674), Bob Trujillo (602-712-7383) or Terry Otterness (602-712-4285).

JLL/THO

C:
Roadway Engineering Group
Traffic Group
Valley Freeway Group
Statewide Project Management Group
Districts (10)
FHWA
Bridge Group
Construction Group

Regional Traffic Engineers (4)
Materials Group
Local Government Section
Engineering Consultant Services
Central Maintenance Group
District Permits (9)
Contracts and Specifications Section
Engineering Records

Standard -- Revision
6.10 - eliminate old Type B turnout
7.01 - Sh. 1- PCCP Joint Updates
10.01,10.02- revised general note
10.03 - Sh. 1 - complete update of drawing
10.03 - Sh. 2 – deleted
10.06 - update transition
10.20, 10.21, 10.22 2 Sh.-raise guard rail height
10.23 - deleted
10.24 - update thrie beam transition
10.28 2 Sh.- clarify posts, add note for application
10.29 2 Sh – clarify posts, increase guard rail height
10.30,10.31- raise thrie beam transition, add special block
10.32 – raise thrie beam, change sleeve requirement
10.45 – raise guard rail height
10.62, 10.63 – revised general note 8
10.65 – delete previous note 4
10.70, 10.71, 10.72, 10.73 (2 sh. each) – raise thrie beam 1”, revise sleeve
13.60, 13.75, 15.10, 15.20, 15.40- new welding specification
15.50 – revise grate dimensions
15.80, 15.81, 15.90, 15.91 (2 sh) – new welding specification
15.92 – revised catch basin frame
21.10 – add rebar for magnetic detection
21.20 – add notes for surveyor ID stamp
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**CONSTRUCTION DRAWING SYMBOLS**

- Section Corner
- Survey Control Point
- Bench Mark
- Access Control
- Sidewalk, Curb & Gutter w/Depressed Curb ("*<50") or larger"
- Curb & Gutter with Depressed Curb ("*<100")
- Curb, Single with Depressed Area
- Pavement and Sidewalk Edge
- Turnout
- Top of Cut
- Toe of Fill
- Transition, Cut to Fill
- Railroad Track ("*<30") or larger"
- Railroad Track ("*<100")
- Bank Protection
- Bridge
- Building

**CONSTRUCTION DRAWING SYMBOLS**

- 30° DC
### Construction Drawing Symbols

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2. Depressed Intermediate Contour Line
3. Block Wall (1:1:20)
4. Median Barrier
5. Fire Hydrant
6. Standpipe
7. Transmission Tower
8. Windmill
9. Melt Box
10. Flag Pole
11. North Arrow
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GENERAL NOTES

1. Roadway width, cut-off width, grades, and pavement structure section will be shown on project plans.
2. Design highway should not be located above the subgrade in an unpaved ditch.
3. Pavement structure slope is nominal. Actual slope is controlled by 0/2i, see Shoulder Wedge Detail.
4. Slopes beyond the pavement structure, such as embankments and cut slopes, are relative to horizontal.
5. For slope controls within interchange areas, see project plans.
6. When median slopes intersect, see project plans for controls.
7. These slopes are intended to be used with new or reconstructed roadways.

- The 0/2i is required when guard rail is utilized on the project. Treatment shall be uniform throughout the project length. The 0/2i requirement may be waived under special conditions where guard rail is not utilized. The 0/2i shall not be waived when the thickness of structure section has not been finalized.

MINIMUM SLOPES

INTERMEDIATE SLOPES

MAXIMUM SLOPES

MINIMUM DITCH CONDITIONS DETAIL

① SHOULDER WEDGE DETAIL

② SLOPE Rounding DETAIL

Except in solid rock, or as directed by the Engineer, the intersection of roadway cut slopes with the ground surfaces shall be rounded. For curves up to 61, use 5° semi-tangents for slope rounding. For each additional foot of cut add 1° semi-tangent to 10° maximum.
GENERAL NOTES

1. Roadway width, cut ditch width, cross slope, and pavement structure section will be shown on project plans.
2. Design highwater should not be located above the subgrade in unbedded ditch.
3. Pavement structure slope is nonlinear. Actual slope is controlled by ID. See Shoulder Wedge Detail.
4. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.
5. When median slopes intersect, see project plans for controls.
6. These slopes are intended to be used with new or reconstructed roadways.

■ The 9 min is required when guard rail is utilized on the project. Treatment shall be uniform throughout the project length. The 9 requirement may be waived under special conditions where guard rail is not utilized. The 9 min shall not be waived when the thickness of structure section has not been finalized.

INTERMEDIATE SLOPES

MINIMUM SLOPES

INTERMEDIATE SLOPES

MAXIMUM SLOPES

MINIMUM DITCH CONDITIONS DETAIL

SLOPE RUNDING DETAIL

Exceeds in solid rock, or as directed by the engineer, the intersection of road edge cut slopes with the ground surfaces shall be rounded.
For cuts up to 0, use semi-sag for slope rounding. For each additional foot of cut add 1 to semi-sag to 15 max.
1. Roadway width, cut off ditch width, cross slope, and pavement structure section will be shown on project plans.

2. Design highwater should not be located above the subgrade in ungraded ditches.

3. Pavement structure slope is normal. Actual slope is controlled by 3/8 shoulder wedge detail.

4. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.

5. These slopes are intended to be used with new or reconstructed roadways.

   a. The 0.5% min is required when guard rail is utilized on the project. Treatment shall be uniform throughout the project length. The 0.5% requirement may be waived under special conditions where guard rail is not utilized. The 0.5% min shall not be waived when the thickness of structure section has not been finalized.

MINIMUM SLOPES

INTERMEDIATE SLOPES

MAXIMUM SLOPES

MINIMUM DITCH CONDITIONS DETAIL

SHOULDER WEDGE DETAIL

SLOPE ROUNGING DETAIL

Expect in solid rock, or as directed by the Engineer, the intersection of roadway cut slopes with the ground surfaces shall be rounded. For cuts up to 6', use 5' semi-tangents for slope rounding. For each additional foot of cut add 1' to semi-tangent to 10' maximum.
GENERAL NOTES
1. Round edge profile intersections with vertical curves having an approximate length in feet equal to the design speed in mph.

2. For main roadway curves without spirals, $L_s$ is the same as for spiral curves but with $0.7L_s$ on tangent and $0.3L_s$ on curve.

3. Shoulders transition with the adjacent travel lane when their normal cross slopes are the same.

4. If shoulders have a normal cross slope steeper than the adjacent lane, the shoulder transition will begin at a different point than that of the adjacent lane. See shoulder transition details.

LEGEND
A: Point at which adverse crown removal begins.
B: Point at which superelevation transition begins.
C: Point of equality between superelevation and normal crown.
D: P.C. location for circular curve transition.
E: Point at which full superelevation is reached.

1. $L_s$: Length of Normal Crown Removal
2. $L_{sp}$: Length of Superelevation Runoff
E.T.L.: Edge of traveled lane
- $t$: Distance $t = \text{INCH}$ $L_{sp}$
- $s$: Length of Shoulder Transition = INCH $L_{sp}$/INCH of shoulder

SHOULDER TRANSITION DETAIL

2-WAY ROADWAY-AXIS OF ROTATION AT $\theta$
(FOR OPPOSITE DEFLECTING CURVE, E.T.L. PROFILES ARE REVERSED)
GENERAL NOTES

1. Dimensions of ditches shall be shown on the plans, as bottom width, depth and length.

2. Stitches shall be constructed with a minimum grade to prevent erosion. Ditch outlet treatment shall be as provided on plans.

CROWN DITCH

GRADER DITCH

CHANNEL

DITCH

DITCH AND DIKE
GENERAL NOTES

1. Dimensions of dikes shall be shown on the plans as top width, height, length and top of dike elevation.

2. Dike side slopes outside the recovery area shall be shown on the plans.

TYPE A DIKE

CROWN DIKE

SLOPE TABLE

<table>
<thead>
<tr>
<th>Inside Recovery Area</th>
<th>Outside Recovery Area</th>
<th>Desirable</th>
<th>Maximum</th>
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<tbody>
<tr>
<td>10%</td>
<td>6%</td>
<td>4%</td>
<td>10%</td>
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TYPE B TRANSVERSE MEDIAN DIKE

- Slope relative to grade of median at intersection with toe.

① TYPICAL TRANSVERSE MEDIAN DIKE INSTALLATION
GENERAL NOTES

1. Dimensions for ditch dikes shall be shown on the plans as dike stationing, height, length, dike back slope and top of dike elevation.

2. Dimensions for cut ditch widening shall be shown on the plans as beginning and ending stations.

CUT DITCH WIDENING DETAIL

SECTION B-B

- Slope relative to grade of cut ditch at intersection with toe
GENERAL NOTES

1. Pipe berm not required when pipe projection is protected by guard rail.

2. Berm construction shall for multiple pipe installations and for pipes without end sections.

3. Berm construction shown is for pipe extensions. Berm construction shown is for new pipe installation. See Pipe Berm Requirement Detail.

If Point A is within the recovery area, then a slope berm is required and Point B is set at the edge of the recovery area.

PIECE BERM REQUIREMENT DETAIL

STRAIGHT PIPE PLAN

ELEVATION

SKewed PIPE PLAN

NOTE:
Single Pipe Installations: D = Outside Diameter of Pipe
Multiple Pipe Installations: D = Outside Edge to Outside Edge of Pipes

Pipe Backfill and Bedding Material Limits

10 Min

2.5 Min

0

2.5 Min
GENERAL NOTES

1. Berm construction similar for box culvert and pipe with headwall.

2. Berm construction shown is for extension of existing facilities, berm construction similar for new facilities.

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

DESIGN APPROVALS

DITCHES, CHANNELS, DRIES AND BELLS
HEADWALL BELLS

C-031D
Sheet 1 of 2

3/94
GENERAL NOTES

1. Concrete for the spillway inlet, spillway outlet shall be Class B.

2. Where rock is encountered, the outlet may be omitted.

3. When outlet is used, the wire mesh shall extend through the joint into the outlet in lieu of bending into the key.

4. Spillway invert slope shall be uniformly downward from A to B.
# General Notes

1. For C-02.10 slopes with embankment height over 20', use length for 24' embankment height from Table 1.22.

2. For C-02.20 slopes with embankment height over 23', use length for 27' embankment height from Table 1.3.

3. For C-02.30 slopes with embankment height over 23', use length for 30' embankment height from Table 1.5.

4. For spillway details, see Std C-04.10.

---

### C-02.10 and C-02.20 SLOPES

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### C-02.30 SLOPES

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![Spillway Diagram](image-url)
### General Notes

1. For C-02.10 slopes with embankment height over 24", use length for 24" embankment height from Table A-2.4.

2. For C-02.20 slopes with embankment height over 32", use length for 32" embankment height from Table A-1.

3. For C-02.30 slopes with embankment height over 36", use length for 36" embankment height from Table A-1.

4. For downdrain details, see Std C-04.20.

### Downdrain Length Table

#### C-02.10 and C-02.20 Slopes

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#### C-02.30 Slopes

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*Figures shown are for illustrative purposes only.*
GENERAL NOTES

1. Stub shall have annular corrugation. Downstream piping beyond stub may be either annular or helical.

2. Couplings shall be mechanical heat-shrinkable polyolefin sheets, one place to type neoprene sheet or tape seams at 12 in. min. width and 18 ga min.

3. Maximum Q Allowable = 8 cfs
   Minimum V Allowable = 1 fps
GENERAL NOTES

SINGLE CURB AND CURB AND CUTTER

1. Single curb, and curb and gutter may be constructed by the use of forms or the concrete may be extruded.

2. When the pavement section slopes away from the gutter, the slope of the gutter shall match the pavement cross slope. Therefore, the gutter depression is not applicable.

3. Two inch deep contraction joints shall be placed in the curb and the gutter at locations which match the joints in adjacent pavement. These joints shall not coincide with pavement, and at approximate 60 foot centers when adjacent to asphaltic concrete pavement, joints shall be either hand troweled or sawed.

4. Expansion joints shall be located at tangent points in curb returns, at structures and at maximum 60 foot intervals. The one-inch thin joint filler shall extend the full depth at the concrete.

5. Concrete shall be finished with a steel trowel followed by brushing with a fine brush along the length of the curb and gutter.

6. All exposed edges and hand troweled joints shall be finished with a tool having a one-fourth inch radius unless a larger radius is indicated.

EMBANKMENT CURB

1. No additional finishing will be required after extrusion or removal of the forms when the curb presents a neat appearance and the surface is uniform in texture and color.

2. The curb shall conform to the cross section as shown except that the horizontal dimensions shall not vary more than one-half inch.

EXPANSION JOINT DETAIL

EMBANKMENT CURB

CURB TERMINAL SECTION
GENERAL NOTES

1. All gutter flow lines shall be constructed to an accurate grade.
2. See Spotted Drain Sides, C-13.60 and C-15.91, for curb end gutter with spotted drain.
3. See Std. C-05.10 for additional general notes and dimensions.

SECTION A-A

LENGTH VARIANCE - SEE PLANS

SECTION B-B

TYPE 1 - CURB & GUTTER TRANSITION - AT RAMP TAPERS
* Dimension may vary where exit occurs on curves, see plans

TYPE 2 - CURB & GUTTER TRANSITION
① PERSPECTIVE VIEW

② ELEVATION

③ TYPE 4 - CURB & GUTTER TRANSITION

PLAN VIEW

TYPE 3 - CURB & GUTTER TRANSITION AT PAVED GORE

SECTION A-A

Curb height varies 0" to 1" max. in depressed curb area beyond the end of barrier. See Plans for curb height.
**GENERAL NOTES**

1. Unless otherwise specified, driveways shall be 6 inches in depth.

2. Two inch deep transverse contraction joints shall be placed in driveways if the driveway width is over 20 feet. If the driveway thickness is greater than 6 inches, then the contraction joint depth shall be 1 1/2 times the thickness of the driveway. Joints shall be either formed or sawed. Formed joints shall be finished with a tool having a 1/8" radius. See sheet 2 of 2 for the Contraction Joint detail.

3. Expansion joints shall be located between driveways and sidewalks and at abutting structures. The one-half inch joint type shall extend the full depth of the concrete. See sheet 2 of 2 for the Expansion Joint detail.

4. Concrete shall be finished by means of a float, then steel troweled and then broomed with a fine brush in a transverse direction.

5. Top of curb (TC) and driveway elevations shown are in relation to the gutter. Gutter "0".

6. When curb heights of 6" or less are shown on plans, use dimensions shown in 1:10.

7. When curb heights of 7" or more are shown on plans, see plans.

---

**LEGEND**

- Cross slope 0.01' Per Ft (Type)
- Straight grade with downward slope.
- Maximum slope = 0.02' Per Ft.

---

**SECTION A-A**

- Sidewalk Width as Shown on Project Plan
- Slope 0.01' Per Ft (Type)

**SECTION B-B**

- Parkway Width as Shown on Project Plan
- Slope 0.01' Per Ft (Type)
GENERAL NOTES

1. Unless otherwise specified, sidewalks shall be 4 inches in depth.

2. One inch deep transverse contraction joints shall be placed in sidewalks at intervals of approximately 15 feet or at a spacing that matches adjacent curb and gutter. If the sidewalk is over 7 feet in width, a 2 inch deep longitudinal contraction joint shall be placed in the center of the sidewalk. The maximum area of a sidewalk without contraction joints or scoring lines shall be approximately 36 square feet. Joints shall be either formed or sewed. Filled joints shall be finished with a tool having a 1/8" radius.

3. Expansion joints shall be located between sidewalks and driveways and at abutting structures. Expansion joints shall match the joints in the adjacent concrete pavement or existing concrete curbs and sidewalks. Maximum length of sidewalk without an expansion joint shall be 50 transverse feet. The one-half inch joint filler shall extend the full depth of the concrete.

4. Concrete shall be finished by means of a float, then steel troweled and then broomed with a fine brush in a transverse direction.

5. Sidewalks shall be constructed to a desirable width of 5 feet on major streets, a minimum width of 4 feet on residential streets or as shown on the plans.

6. Scoring lines shall be 1/2 inch in depth. They shall be placed at 5 foot spacing when the contraction joint interval is 15 feet and at 6 foot spacing when the contraction joint interval is 12 feet.
GENERAL NOTES

1. For use when sidewalk is not continuous both sides. If sidewalk is anticipated in the future, utilize Type 1 or Type 2 Ramp.
2. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter and are located directly, gutter to TC.
3. See Std C-05J-10 and C-05J-20 for joint requirements.
4. When curb heights of 6" or less are shown on plans, use dimensions shown in 1/4".
5. When curb heights of greater than 7" are shown on plans, see plans and ADA requirements.

SECTION A-A

SIDEWALK RAMP WITHOUT PEDESTRIAN BYPASS

ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP

GROOVE DETAIL
GENERAL NOTES

1. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter, Gutter Top.
2. See Std C-05.30 and C-05.20 for joint requirements.
3. When curb heights of 6" are shown on plans, use dimensions shown in 1 1/2.
4. If field modification is required, bottom width shall be 4" minimum, as per ADA requirements.
   ○ Use type A curb if median is to be landscaped.

---

PLAN

ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP

SECTION A-A

PERSPECTIVE

GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

Sheet 5 of 8

DESIGN APPROVED
Joseph H. O'Donnell
6/99

ENGINEERED
Tom Williams
6/99

SHEET NO.
C-05.30

REVISION
0
GENERAL NOTES
1. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter and are located radially, gutter 0'.
2. See Std C-05-20 for joint requirements.
3. When curb heights of 8" or less are shown on plans, use dimensions shown in 1 7/8.
4. When curb heights of greater than 8" are shown on plans, see plans and ADA requirements.

LEGEND
- Cross slope 0.01 Per Ft (Typ.)
- Maximum slope = 0.02 Per Ft.
- 30" x 48" access area for Pedestrian Push Button
- Control for Field Layout

SIDEWALK RAMP WITH PEDESTRIAN BYPASS
( FOR USE WITH PEDESTRIAN PUSH BUTTON)
GENERAL NOTES

1. Traffic signal foundations, traffic sign foundations and pull boxes for traffic signs and traffic signals shall be installed prior to placement of median paving.

2. See Std C-05.10, C-05.11 and C-05.20 for joint requirements.

3. Decorative median paving shall be placed on the signal foundation where decorative paving is specified on the project plans.

4. Decorative median paving shall be placed on the signal foundation for the median nose transition or on a median island on a structure.

5. A 4" x 6" concrete header shall be used to end decorative paving at locations when concrete slowdown ramps are not present.

6. Median nose transitions shall not be placed on departure ends of raised medians.

7. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter, gutter edge.

8. When curb heights of 6" are shown on plans, use dimensions shown in (1) ft.

9. See Structure Plans for raised median on structures.
SECTION A-A

Note 4

Variates - 12'-0" maximum

2'-0"

Roadway Width

0.07' F1

Type D-1 C&S

Note 6

New Concrete Sidewalk

SECTION B-B

4' - 2'-0"

Note 5

Curb and Gutter Transition

SECTION C-C

PLAN VIEW OF SECTION C-C

GENERAL NOTES

1. The PCCP surfaces within the bus bay area shall be textured transversely, surface texturing to conform to Section 401.

2. Transverse weakened plane joints shall be constructed at a minimum spacing of 15' and shall align with the joints in the concrete curb and gutter.

3. For additional data on slotted drains, See slotted drain Stia C-1565.

4. For Y2 expansion joint with preformed joint filler, See Detail A.

5. Concrete pad to be poured separately from concrete bus bay pavement.

6. For sidewalk construction details, see Stia C-0520.
GENERAL NOTES

1. Driveway types:
   - Residential: providing access to a single-family residence, a duplex, or an apartment building containing five or fewer dwelling units.
   - Commercial: providing access to an office, retail or institutional building, or an apartment building having more than five dwelling units.
   - Industrial: directly serving a substantial number of truck movements to and from loading docks of an industrial facility, warehouse or truck terminal.

2. Joint use driveways may become desirable for landowners of adjacent properties to service both properties. If this is the case, only one of the two adjacent landowners need apply for the access permit, but a notarized written mutual agreement, signed by all parties involved, must accompany the application form. The property line can be located anywhere, in reference to the driveway, depending on mutual agreement.

3. Driveways for high-volume traffic generators shall be approved individually by Traffic Engineering section.

4. Driveways with curb returns in urban areas shall be installed only with the approval of the Traffic Engineering section.

5. Driveways and depressed curbs shall be located as noted on plans or as directed by the Engineer.

6. Drainage structures shall be provided under driveways where necessary.

7. Dimensions indicated as minimum shall be avoided whenever possible in favor of those indicated as desirable.

8. The Type 'A' turnout is the preferred turnout design. Type 'B' shall only be used when absolutely necessary.

9. Paved turnouts, plane notation, will be W X L, surface materials, type and standards. Example: 20' X 30' AC10, Type A, Std C-0632, Snow radius R, graphically.

10. Construction of curb, gutter, sidewalk and drainage facilities in urban areas by the permittee along that portion of the highway frontage under permit application, may be a stipulation of the permit approval. If there appears to be reasonable need.

11. Excavation or embankment for turnouts shall be included in quantities for main roads.

12. Base material shall be the same as that shown for main roads, unless otherwise noted.

13. Desirable slopes for rural turnouts are 6:1.

RURAL DEVELOPMENTS

(1) 15 Min, 20' Desirable
(2) 15 Min, 20' Desirable
(3) 25 Min, 40' Desirable
(4) 40 Min
(5) One Way, Double for Residential - 10 Min, 30' Max
(6) Driveways - 20 Min, 40' Max
(7) Two Ways, 25 Min, 40' Max
(8) Residential - 10 Min, 30' Max
(9) Commercial - One Way, 15 Min, 30' Max
(10) Commercial - Two Ways, 25 Min, 40' Max

URBAN DEVELOPMENTS

(1) 15 Min, 20' Desirable
(2) 15 Min, 20' Desirable
(3) 25 Min, 40' Desirable
(4) 40 Min
(5) Residential - 10 Min, 30' Max
(6) Commercial - One Way, 15 Min, 30' Max
(7) Commercial - Two Ways, 25 Min, 40' Max
(8) Residential - 10 Min, 30' Max
(9) Commercial - One Way, 15 Min, 30' Max
(10) Commercial - Two Ways, 25 Min, 40' Max
GENERAL NOTES

1. Grade as shown on plans or as negotiated between Property Owner and Engineer.

2. When field conditions require modifications to plans, contact Design Engineer for assistance.

3. See Sheet 1 of 2 for all other General Notes.

1. Erosion greater than 6% requires a vertical curve. (100') Min. Vertical curve shall not encroach on roadway or sidewalk.

See General Notes.

See General Notes.

See General Notes.

See General Notes.

See General Notes.
1. When load transfer dowel assemblies are required, use dimensions shown in its assembly. See Assembly Placement and Edge Clearance Details, Std. C-07.02.

2. In all form type pavement construction, LWP joints shall be used. In fixed form construction either LWP or LC joints may be used.

JOINT ABBREVIATIONS

LWP - Longitudinal Weakened Plane Joint
LCP - Transverse Weakened Plane Joint
LC - Longitudinal Construction Joint
TC - Transverse Construction Joint
E, H - Expansion Joints
S - AC/PCCP Pavement Edge Seal Joint
T - PCCP Thickness

GENERAL NOTES

TRANVERSE WEAKENED PLANE JOINT

TC Joint

w/o Load Transfer Dowel Assemblies

EXPANSION JOINT

E Joint

S Joint (Where Specified on Plans)

AC/PCCP EDGE SEAL JOINT

Construction Joint SAW AND SEAL DETAIL

Recess Silicone Sealant from Pavement Surface

Depth Varies

Silicone Sealant

V min Diameter Polyethylene Backer Rod

Min Diameter Polyethylene Backer Rod

Initial Sawcut

AC/PCCP

Clean Loosened Particles and Fill w/ Asphalt Rubber Sealant

1/2" Min. Saw Cut

1/4" Min. Saw Cut

O P R O Kit

REVISION 704

ADDED DETAIL

ADDED NOTE

PCCP JOINTS

STATE OF ARIZONA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

STANDARD DRAWINGS

C-07.01

Sheet 1 of 2
GENERAL NOTES

1. Joints are generally shown with pavement sloping toward the joint. Joints are similar with pavement sloping away from the joint.

2. A "B" joint shall be placed where piers, abutments, barrier transitions, light pole foundations, sign structure foundations, catch basins, or other obstructions are within 4 feet of the PCCP edge unless otherwise noted in the plans or the standard drawings.

JOINT ABBREVIATIONS

G - Gutter Joint
T - PCCP Thickness
D - Gutter Thickness
B - Barrier Joint

C - Curb Joint
P - PCCP Joint
C - Curb Joint
A - A Joint
B - B Joint
C - C Joint
G - G Joint
H - Half Barrier Joint
S - Single Curb Joint
M - Median Barrier Joint

Curb & Gutter Joint

Half Barrier Joint

Single Curb Joint

Median Barrier Joint

PCCP On Both Sides of Barrier

AC Pavement On Back Side of Barrier
GENERAL NOTES

1. Load transfer dowel assemblies shall be used with non-swept PCP joints.

2. Load transfer dowel assemblies are to be placed at each transverse weakened plane joint on the traveled lanes as shown on the plans.

3. See Std C-07.03 thru C-07.05 for additional information.

4. See plans or Std C-07.03 thru C-07.05 for transverse joint spacing.

5. See plans for pavement thickness less than 12" or greater than 14".

Load transfer dowel assembly shall be assembled from the following materials. (See Quantity Table)

- Dowel bars - 1½" dia x 1½" plain round bars w/coating. See Special Provisions.
- Intermediate legs - 2 Ga or #10-5.5 wire.
- End legs - 2 Ga or #10-5.5 wire.
- Upper space bar - 2 Ga or #10-5.5 wire x (32) (See Dimension Table)
- Lower space bar - 2 Ga or #10-5.5 wire x (32) (See Dimension Table
- Tie bars - #10-5.5 wire x 16".
- Anchor straps - 1"x3" steel strap, 0.079 thick. Piece with 1-1/8" slotted holes for 1/4" bolt; 9/16" slotted holes for 5/16" bolt; Galv steel; O1150 die ASTM A27 Class I w/1½" head or washer to be power driven.

<p>| QUANTITY TABLE |
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<th>Item No.</th>
<th>Lane Width</th>
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</table>
GENERAL NOTES

1. Skewed PCCP joints shall be used when load transfer dowel assemblies are not required.

2. 'A' shall equal 4' minimum typical.
   'B' shall equal 2' minimum typical.
   'C' shall equal 2' minimum typical.

3. See Std C-07.01 for PCCP joints and additional notes.

4. All transverse joints shall be in line with joints in adjacent slabs.

5. See Std C-05.10 for curb and gutter joint requirements.

6. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.

7. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-3" from the TC joint.

   Transverse Construction Joint (TC) allowable limits (Typ).

PLAN
56" PCCP

PLAN
55.5" PCCP

Direction of Pour & Traffic

Concrete Split Barrier or Concrete Curb & Gutter

Direction of Pour & Traffic

AC Shoulder

Typical Joint Sequence (LWP Joints)

Typical Joint Sequence (LWP Joints)
GENERAL NOTES

1. Skewed PCCP joints shall be used when load transfer dowel assemblies are not required.

2. "A" shall equal 6" minimum (typical), "B" shall equal 3" minimum (typical), "C" shall equal 2" minimum (typical).

3. See Std C-07.01 for PCCP joints and additional notes.

4. All transverse joints shall be in line with joints in adjacent slabs.

5. See Std C-08.10 for curb and gutter joint requirements.

6. At intersection of slide roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.

7. The reinforcing bars in the LMP & LC joints shall be placed no greater than 1-3/4" from the TC joint.

Transverse Construction Joint TCO allowable limits (Typ.)
GENERAL NOTES

1. Non-skewed PCCP joints shall be used with load transfer dowel assemblies.

2. See Std C-07.01 for PCCP joints and additional notes.

3. All transverse joints shall be in line with joints in adjacent slabs and are perpendicular to the longitudinal joints.

4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.

5. See Std C-05.10 for curb and gutter joint requirements.

6. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-0" from the LC joint.

7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.
GENERAL NOTES

1. Non-skewed PCCP joints shall be used with load transfer dowel assemblies.

2. See Std C-07-01 for PCCP Joints and additional notes.

3. All transverse joints shall be in line with joints in adjacent slabs and are perpendicular (90°) to the longitudinal joints.

4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.

5. See Std C-05-10 for curb and gutter joint requirements.

6. The reinforcing bars in the LNP & LC joints shall be placed no greater than 1-3" from the LC joint.

7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.

Direction of Pour & Traffic

PLAN
58' PCCP

Direction of Pour & Traffic

Concrete Half Barrier or Concrete Curb & Gutter

PLAN
55.5' PCCP
GENERAL NOTES

1. Non-skewed PCCP joints shall be used with load transfer dowel assemblies.

2. See Std C-07.01 for PCCP joints and additional notes.

3. All transverse joints shall be in line with joints in adjacent ends and are perpendicular (90°) to the longitudinal joints.

4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.

5. See Std C-06.10 for curb and gutter joint requirements.

6. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1-1/2" from the LC joint.

7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.

PLAN
70° PCCP

PLAN
67.5° PCCP
GENERAL NOTES

1. Non-splayed PCCP joints shall be used with load transfer dowel assemblies.
2. See Std C-07.01 for PCCP joints and additional notes.
3. All transverse joints shall be in line with joints in adjacent slabs and are perpendicular to the longitudinal joints.
4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetric appearance while conforming to the cross section of the intersecting road or street.
5. See Std C-05.00 for curb and gutter joint requirements.
6. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-3" from the LC joint.
7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.
GENERAL NOTES

1. Dimensions with a tolerance may be adjusted to align with the nearest transverse weakened plane construction joint as directed.

2. See Std C-07.01 for joint information.

3. See plans for ramp dimensions.

4. See Std C-07.05 for Sections A-A and B-B.

5. The ratio of transverse to longitudinal joint spacing shall be greater than 3:1 but no more than 1:2.

6. Ramp transverse joints shall be perpendicular (90°) to the ramp longitudinal joints, except as shown at the ramp terminal.

7. Joint spacing in ramp taper varies to match mainline joint spacing.

TYPICAL TRANSVERSE WEAKENED PLANE JOINT LAYOUT AT GORE AREAS

RAMP TERMINAL AT CROSSROAD

RAMP WITHOUT CURB AND GUTTER

RAMP WITH CURB AND GUTTER
GENERAL NOTES

1. Bedding per Section 501 of the Standard Specifications.
2. Asphalt concrete shall be in accordance with the requirements of the Standard Specifications.
3. 12" tp is required on the sides of trenches that are not parallel at the center line of the street.
4. Types D & E require 9" of AB at top of trench when there is an existing base.
5. See Standard Drawing C-1315 for Typical pipe Installation.

LEGEND

- Compacted Backfill Density Per Section 501
- AB, Granular Backfill or Native Backfill Per Section 302-2 and 501
- AB Per Section 303-2 and 501

TYPE A
AC Pavement: Match Existing Pavement and Course by Type and Thickness

TYPE B
AC Pavement: Match Existing Pavement and Course by Type and Thickness

TYPE C
Class P Concrete
Existing RCP

TYPE D
Asphalt Concrete
Oil Cake

TYPE E
Chlo Seal Coat Per Section 404 & 406

TYPE F
Surface Outside of Trench Lines Damaged During Construction shall be Restored to Original Thickness and Condition

TYPE G
AC Base Course
AC Surface Course

TYPE H
Utility Concrete
GENERAL NOTES
1. See Std C-07.01 for joint information.
2. See plans for crossroad dimensions.
3. See Std C-07.04 and C-07.05 for ramp joints.
4. The ratio of transverse to longitudinal joint spacing shall be greater than 3:5 but not more than 1:2.
5. Transverse joints shall be perpendicular (90°) to the longitudinal joints, except as shown at the ratio terminals.
   ▲ 6" Minimum
   ◇ 8" Maximum
   ● Varies - 12" Minimum
   ◇ 12" when adjacent gutter widths are 2" or less.
   ▲ 15" when adjacent gutter widths are greater than 2".

CROSSROAD AT RAMP TERMINAL

See Note 3

See Note 3
GENERAL NOTES

1. All embankment curb shall be protected by guard rail.
2. Guard rail shall extend beyond the limits of embankment curb.
3. See Std. C-10.03 for measurement limits.
4. See Standard Specifications for reflector tab materials, reflective sheeting, and spacing requirements.
GENERAL NOTES

1. All embankment curb shall be protected by guard rail.
2. Guard rail shall extend beyond the limits of embankment curb.
3. See Std. C-10.03 for measurement limits.
4. See Standard Specifications for reflector tab materials, reflective sheeting, and spacing requirements.

TYPE B GUARD RAIL INSTALLATION
### GENERAL NOTES

1. Length shall be as shown unless otherwise indicated on project plans.
2. Post type (timber or steel) for transitions shall match post type of adjoining guard rail.
3. Shown for one-way traffic. For two-way traffic, departure requires approach and treatment when located within the clear zone of opposing traffic.
4. See Specifications for standard guard rail pay item.

---

**Concrete Barrier Transition Off Structure**

Concrete Barrier Transitions

*Constructed on Top of Wingwalls*
GENERAL NOTES

1. See plans and barrier summary sheets for location and type of guardrail and end treatments. Timber post installation shown.

2. See Construction Standard Drawings 0505-01, 0506-01, and 1002 for dimensions and details not shown.

3. Type B guard rail installation shown. For Type A guard rail installation, use Type D-1 Curb and Gutter instead of the Type D-2 Curb and Gutter shown.

4. See Plans for type and location of drainage facilities.

5. Bimetallic joint fiber (BF) shall be placed where the curb & gutter or concrete widening abuts socketed grates, catch basins, manholes, barriers, etc. Scored joints, 2 inches in depth, shall be placed to match adjacent joints in PCCP or at 15 ft intervals where adjacent to AC or continuously reinforced concrete pavement.

SECTION A-A

SECTION B-B

PLAN
TYPICAL HALF BARRIER TERMINAL
W/TYPE B OR C CURB & GUTTER
GENERAL NOTES
1. See Std. 4-C-102 for other typical installations at bridge piers.
2. Transition median paving cross slope to meet level foundation piers. See Plans for length and location.

MODIFIED SINGLE PIER OR COLUMN

SECTION C-C

SECTION A-A

SECTION B-B
GENERAL NOTES
1. Height of curb shall not exceed 4 inches.
   * Indicates ATRBA designation

PLAN

ELEVATION

G4(1S-MODIFIED)

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

G4MODIFIED: BLOCKED OUT W BEAM
WITH SPECIAL CURB AND GUTTER
G43-MODIFIED (STEEL POST)

DESIGNER:

DRAWN:

CHECKED:

DATE:

C-10520
Sheet 1 of 2
GENERAL NOTES

1. Use Type 3 Nested Steel W Beam to span down-drain or spillway inlets as shown in the plan view.

2. Use Type 3 to span multiple obstructions as shown in the elevation view.

PLAN

ELEVATION

NESTED STEEL W BEAM - TYPE 3 - LONG SPAN
Length = 37'-6"
GENERAL NOTES
1. See Std C-10.20 and C-10.21 for additional information and dimensions.

PLAN

ELEVATION
BOLTED ANCHOR
BOX CULVERT INSTALLATION

System Post

Bolted Anchor
See Timber or Steel Post Installation Details for

Box Culvert - Width Varies

Traffic

Steel I Beam

6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3"

System Post

72' Timber Post
GENERAL NOTES

1. Drill through top of box culvert with rotary drill.
2. Bracket may be made of one piece hot bent, or two pieces welded together.
3. Short timber posts anchored to box culvert roof shall be 8" x 8" only.

INSTALLATION DETAIL

BOLTED ANCHOR
TIMBER POST INSTALLATION DETAIL

INSTALLATION DETAIL

BOLTED ANCHOR
STEEL POST INSTALLATION DETAIL

BRACKET DETAIL
GENERAL NOTES

1. For use with one-way traffic or with two-way traffic outside the clear zone.
   • Indicate ARTBA designation.

PLAN

Concrete Barrier Transition, Type F to I Beam
Type C(10.7) or Bridge Concrete Barrier Transition

Thrie Beam Terminal Connector (C)

Traffic

6" x 8" x 64" Wood Post (Typ)

6" x 8" x 18" Wood Blocks (Typ)

SECTION

1.5" Sleeve (Typ)

5-7/8" BUNC(4)
Hex Bolt and Hex Nut

Thrie Beam Guardrail Transition System
See Std C(10.3) for Transition Details not Shown

18.9'

6'-3"

6'-3"

6'-3"

10'

3'

ELEVATION

ANCHOR PLATE - DETAIL A

No Washer under Nut Head (Typ)
GENERAL NOTES

1. The cable assembly shall be tightened to remove slack.

2. To ensure that the bearing plate remains in position, one wrap of 14-gauge galvanized steel wire shall be wrapped around the terminal post near the top of the plate.

3. See Std. C-10.03 for measurement limits.

• See W-Beam End Section (Rounded), ARTBA Std.
  RS-6-75, for dimension variables.

O = Indicates ARTBA designation

ELEVATION

Anchorage Plate, Pl/W

1"-BUNC Hex Nut
with Type A Plain Washer

SIDE VIEW

ANCHOR PLATE DETAIL

Front View

Steel W Beam, Sections 12 Gauge

4.6-24"x3/16" Bolt and
Hex Nut with Wide Type A
Plain Washers (Typ) Do Not Torque Bolt

Cable Anchor Assembly

1/4" Die (Typ)

2/4" Die for Lock Pin

ELEVATION

Elevation View

Steel W Beam, Section 12 Gauge

1/4"-BUNC Hex Nut
with Type A Plain Washer

SIDE VIEW

BEARING PLATE DETAIL

Front View

Wood Post

51/2"x71/2"x45" Wood Post

8"x8"x16" Bearing Plate

3/8" Diameter Hole

5/8" Hex Bolt and
Hex Nut with Wide Type A
Plain Washers (Typ) Under Head

8"x8"x16" Steel Tube

Cable Sleeve

Anchor Plate Assembly

SIDE VIEW

BEARING PLATE DETAIL

Front View

Steel W Beam, Section 12 Gauge

1/4"-BUNC Hex Nut
with Type A Plain Washer

4.6-24"x3/16" Bolt and
Hex Nut with Wide Type A
Plain Washers (Typ) Do Not Torque Bolt

Cable Anchor Assembly

1/4" Die (Typ)

2/4" Die for Lock Pin

ELEVATION

Anchorage Plate, Pl/W

1"-BUNC Hex Nut
with Type A Plain Washer

SIDE VIEW

ANCHOR PLATE DETAIL

Front View

Steel W Beam, Sections 12 Gauge

1/4"-BUNC Hex Nut
with Type A Plain Washer

4.6-24"x3/16" Bolt and
Hex Nut with Wide Type A
Plain Washers (Typ) Do Not Torque Bolt

Cable Anchor Assembly

1/4" Die (Typ)

2/4" Die for Lock Pin
GENERAL NOTES

1. Half Barrier shall be constructed by the slip form or formed cast-in-place method.

2. When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.

3. Concrete shall be Class 5, design strength #2:3300 PSF.

4. If the footing and barrier are cast monolithically, No. 6 S shaped rebar will not be required.

5. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.

6. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.

Depth to match adjacent PCCP thickness (8" Min).

---

ELEVATION

WITH PCC PAVEMENT
BARRIER WITH GUTTER

WITH AC PAVEMENT
SECTION B-B

WITH PCC PAVEMENT
SECTION A-A
GENERAL NOTES

1. Concrete shall be Class S, design strength f'c = 3000 PSI.

2. Half Barrier shall be placed upon either asphaltic or Portland Cement Concrete Pavement.

3. Pavement thickness adjacent to Half Barrier shall be 1/2" minimum.

4. The Half Barrier shall be placed upon a bed of grout in order to provide a uniform bearing.

5. Dowelled joints shall be grouted under pressure until all of the openings and the joints are filled.

6. This standard shall not be used when an individual run consists of less than five 20 foot sections.

7. At bend dimensions for reinforcing steel shall be cut-to-cut of bars.

PLAN

SECTION A-A

AT REBAR SECTION B-B

AT WEEP HOLE SECTION C-C

ELEVATION

CONSTRUCTION JOINT DETAIL
GENERAL NOTES

1. Concrete shall be Class C5, design strength 12 ksi @ 3000 PSL.

2. Half Barrier shall be placed upon either asphaltic or Portland cement concrete pavement.

3. Pavement thickness adjacent to half barrier shall be 3/4 inch minimum.

4. The half barrier shall be placed upon a bed of gravel in order to provide a uniform bearing.

5. Dowel joints shall be grouted under pressure until all of the openings and the joints are filled.

6. This standard shall not be used when an individual run consists of less than five 20 foot sections.

7. All bend dimensions for reinforcing steel shall be cut-out of bars.
1. Half Barrier shall be constructed by the slip form or formed Cast-In-Place method.
2. When obstacles are encountered which prevents the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.
3. Concrete shall be Class S, design strength $f_c = 3000$ PSI.
4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
5. Thickness of footing, 6" can be adjusted to match the PCP thickness, as approved by the Engineer.
6. When the pavement section slopes away from the gutter, the slope of the gutter shall match the pavement cross slope. Therefore, the 2" gutter depression is not applicable.
7. When bridges are encountered, the cross slope of the gutter shall be transitioned to match the cross slope of the bridge. Length of the transition is 15 feet.
8. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent Portland cement concrete pavement. Joints shall be either hand tooled or sawed.
GENERAL NOTES

1. Half Barrier shall be constructed by the slip form or formed Cast-In-Place method.

2. When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.

3. Concrete shall be Class 5, design strength f' ≥5000 PSI.

4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the slab pour.

5. Thickness of footing, "H" can be adjusted to match the PCP thickness, as approved by the Engineer.

6. When the pavement section slopes away from the gutter, the slope of the gutter shall match the pavement cross slope. Therefore, the 2" gutter depression is not applicable.

7. When bridges are encountered, the cross slope of the gutter shall be transitioned to match the cross slope of the bridge. Length of the transition is 15 feet.

8. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent Portland cement concrete pavement. Joints shall be either hand tooled or sawed.

ELEVATION

DEPARTURE TERMINATION WITHOUT GUARD RAIL

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

CONCRETE HALF BARRIER 42" TYPE "A" WITH GUTTER

C-15.63

7/01

IN.

REV.

SIGN.

1/00

1/01

DATE

7/01

7/01

PAGE

7/01

7/01

N.

SUP.

C-07.00

4.000

1.000

1.000
GENERAL NOTES

1. Concrete shall be Class S, design strength f'c = 3000 PSI.

2. If the footing and barrier are cast monolithically, No. 6 S shaped rebars will not be required.

3. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.

4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
GENERAL NOTES

1. Concrete shall be Class S, design strength \( f_{c} = 3000 \text{ PSI} \).

2. If the footing and barrier are cast monolithically, No. 6 5-shaped rebars will not be required.

3. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.

4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.

WITH AC
SECTION A-A

WITH RCCP
SECTION A-A

KEY WAY DETAIL
GENERAL NOTES

1. Concrete slab shall be Class S, design strength f_2 = 4000 PSI.

2. The false barrier shall be placed upon a bed of grout in order to provide a uniform bearing.

3. Dovetail joints shall be grouted under pressure until all of the openings and the joints are filled.

4. This standard shall not be used when an individual run consists of less than five 20 foot sections.

5. All bend dimensions for reinforcing steel shall be out-of-the-bar.
1. All concrete shall be Class "5" (fc = 3000 psi).
2. All reinforcing steel shall conform to Section 1003.
3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.
4. See drainage sheets for slotted drain and catch basin details.
5. Departure termination may be substituted for the C-1076 barrier transition under departure conditions.
6. See Std. C-05.20 for sidewalk construction.
7. All bend dimensions for reinforcing steel shall be out-to-out of bars.

**GENERAL NOTES**

**SECTION B-B AT CATCH BASINS**

**SECTION A-A**

**BARRIER GUTTER DETAIL**

**ELEVATION**

**PLAN VIEW**

**DEPARTURE TERMINATION DETAIL**

**STATE OF ARIZONA**
**DEPARTMENT OF TRANSPORTATION**
**DIVISION OF HIGHWAYS**
**STANDARD DRAWINGS**
**CONCRETE HALF BARRIER 32" WITH SIDEWALK**

**C-10.05**
GENERAL NOTES

1. Median Barrier shall be constructed by the slip form or formed Cast-in-Place method.

2. When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.

3. Concrete shall be Class 5, design strength f_c = 3000 PSI.

4. If the footing and barrier are cast monolithically, No. 6 5 Shaped rebars will not be required.

5. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.

6. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.

△ Depth to match adjacent PCCP thickness (8" Min).

SECTION A-A
GENERAL NOTES

1. Median Barrier shall be constructed by the slip form or by the formed Cast-In-Place method.
2. When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.
3. Concrete shall be Class S, design strength f = 3000 PSI.
4. If the topping and barrier are cast monolithically, No. 6 5-shaped rebar will not be required.
5. In no case shall the width of barrier exceed the width of the barrier forming or overhang the adjacent pavement.
6. No. 4 rebar shall extend 12" past the construction joint at the completion of the day's pour.

\[\text{Depth to match adjacent PCCP thickness 18" Min.}\]
1. Concrete shall be Class 5, design strength f'_c = 4000 PSL.
2. Heli Barrier shall be placed upon either Asphalt or Portland Cement Concrete Pavement.
3. Paver stone thickness adjacent to heli Barrier shall be ¾ minimum.
4. The heli Barrier shall be placed upon a bed of grout in order to provide a uniform bearing.
5. Doweled joints shall be grouted under pressure until all of the openings and the joints are filled.
6. This standard shall not be used when an individual run consists of less than five 20 foot sections.
7. All bend dimensions for reinforcing steel shall be out-to-out of bars.

GENERAL NOTES

CONSTRUCTION JOINT DETAIL

END SECTION

SECTION A-A

SECTION B-B

ELEVATION

PLAN

LIFTING DEVICE LOCATION

PLAN

PRESSURE GROUT HOLES

PRESSURE GROUT HOLES

PRESSURE GROUT HOLES
GENERAL NOTES

1. Concrete shall be constructed by the Fixed Form Cast-in-Place method.

2. Concrete shall be Class C, design strength f'c = 3000 psi.

3. All reinforcing steel shall have 3" minimum clear cover unless otherwise noted.

4. All bend dimensions for reinforcing steel shall out-to-out at bars.

ELEVATION
BARRIER WITHOUT CURB

See Construction Joint Detail (Optional)

Construction Joint (Optional)

1" Sleeve (Typ)

P. Ole (Typ)

1.9

2'-11/2"  3'-1/2"

3'-1/2"  3'-1/2"

2'-11/2"  2'-4"

20'-10"

BARRIER END DETAIL

See Barrier End Detail
GENERAL NOTES

1. See section B-B for caisson reinforcement.
CONSTRUCTION JOINT DETAIL (OPTIONAL)

Dowel Locations

CAISSON REINFORCEMENT

Anchor Plate
GENERAL NOTES

1. Concrete shall be constructed by the
   Fixed Form Cast-in-Place method.
2. Concrete shall be Class 5, design strength
   $f_{c} \geq 3000$ psi.
3. All reinforcing steel shall have 2" minimum
   cover cover unless otherwise noted.
4. All bend dimensions for reinforcing steel
   shall out-to-out of bars.
5. Two inch deep contraction joints shall be
   placed in the gutter at locations which
   match the joints in adjacent portland
cement concrete pavement and at
   locations adjacent to asphaltic concrete
   pavement. Joints shall be either hand foiled or
   sawed.

ELEVATION
BARRIER WITH CURB AND GUTTER

* 1"-0" Min or Match
  Thickness of Adjacent
  ACC Pavement

PLAN

BARRIER END DETAIL

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

CONCRETE M A L E B A R R I E R
TRANSITION TO VERTICAL 32°
TYPE 19 WITH GUTTER
C-HOLI
Sheet 1 of 2
GENERAL NOTES
1. Concrete shall be constructed by the Fixed Form Cast-in-Place method.
2. Concrete shall be Class 5, design strength f_c = 3000 psi.
3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.
4. All bend dimensions for reinforcing steel shall be out-to-out of bars.
5. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent portland cement concrete pavement and at approximate 15 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.

PLAN

ELEVATION
BARRIER WITH CURB AND GUTTER

* 2'-0" Min or Match
Thickness of Adjacent ACC Pavement

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

CONCRETE HALF BARRIERS
TRANSITION TO VERTICAL 45° TO 32°
TYPE "W" WITH GUTTER

C-100.73
Sheet 1 of 2
GENERAL NOTES

1. All concrete shall be Class "S" (f'c = 3000 psi).
2. All reinforcing steel shall conform to Section 1003.
3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.
4. See drainage sheets for slotted drain and catch basin details.
5. Barrier transition shall match both adjoining curb and gutter and concrete half barrier.
6. See Std. C-05.20 for sidewalk construction.
7. All band dimensions for reinforcing steel shall be "out-to-out of bars."
8. Two inch deep construction joints shall be placed in the gutter at locations which match the joints in the adjoining pavement and at approximate 15 foot centers when adjacent to aesthetic concrete pavement. Joints shall be either hand tooled or sawed.

BARRIER GUTTER DETAIL

SECTION A-A

SECTION B-B

SECTION C-C

TRANSITION TO VERTICAL TYPE CURB
GENERAL NOTES

1. All concrete shall be Class "S" 1PC with a 3000 psi.
2. All reinforcing steel shall conform to Section 1003.
3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.
4. See drainage sheets for slotted drain and catch basin details.
5. Barrier transition shall match the adjoining concrete half barrier.
7. All bond dimensions for reinforcing steel shall be cut-to-cut bars.
GENERAL NOTES

1. Half Barrier Transition shall be constructed by the formed Cast-in-Place method.
2. Concrete shall be Class 5, design strength f_c > 3000 PSI.
3. If the footing and barrier are cast monolithically, No. 6 S shaped rebars will not be required.
4. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.
5. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
6. Thickness of footing "D" can be adjusted to match the PCP thickness, as approved by the Engineer.
7. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent portland cement concrete pavement and at approximate 5 foot centers when adjacent to aesthetic concrete pavement. Joints shall be either tooled or sawed.

PLAN

ELEVATION

CONSTRUCTION JOINT DETAIL

OPPERATIONAL

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

CONCRETE HALF BARRIER
TRANSITION TYPE S TO TYPE T
C-10.86

8/99

DESIGN APPROVED
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

C-10.86
GENERAL NOTES

1. Posts shall be 12'-6" C to C. Structural steel shall conform to ASTM-A-36, galvanized ASTM-A-123.


5. Hog ring AMG No. 12 (0.016") galvanized ASTM-A-116 Class 2, fasten glare screen to top and bottom tension wire spaced approximately 2" apart.

6. Glare Screen, 8 Gauge steel, ASTM-A-526, galvanized ASTM-A-526/225, expanded to the following dimensions: L13" short edge of diamond and 4.0" long edge of diamond center to center of bridge deck with a strand width of 0.250" angled at 20° to the plane of the original sheet. Top edge to be sharp cut and clipped on 1" centers. Glare screen shall be installed such that flat portion of screen blocks light from headlights, see direction details.

7. Splices allowed in glare screen at posts only, with 1" flat diamond overlap.

8. Glare screen shall be constructed without interruption to the greatest degree possible.
CROSS BRACE POST DETAIL

INTERMEDIATE POST DETAIL

TYPICAL POST DETAIL

SECTION A-A

DIRECTION DETAIL

TYPE A WIRE TIE

TYPE B WIRE TIE

TYPE C WIRE TIE
GENERAL NOTES

1. Cattle guard shall be plowed to conform to the roadway grade and cross section, except that where an odd number of grill units is specified, a crowned roadway, the center grill unit shall have a level cross slope.

2. Grill units shall be set on an angle assembly consisting of one 6x3½x½ inch angle and ½ inch diameter studs with head. The studs shall be placed on 1'-0" alternate centers. See Angle Assembly Detail No. 1.

3. Where the adjacent roadway is paved, an angle assembly shall consist of one 4x4x½ inch angle and ½ inch diameter studs with head. The studs shall be placed on 1'-0" alternate centers. See Angle Assembly Detail No. 1.

4. Where the adjacent roadway is unpaved, an angle assembly shall consist of one 4x4x½ inch angle and one 2½x3½ inch angle and connected with ½ inch diameter studs. The assembly shall be crowned at the centerline and constructed with a bevel cut and waved. The studs shall be bent 90° and placed on 1'-0" centers. See Angle Assembly Detail No. 3.

5. Each angle and angle assembly shall be fabricated to form a single piece for the full length of the cattle guard.

6. Quantities shown for concrete and reinforcing bars are to be considered approximations for informational purposes only.

7. When guard rail is to be used at the cattle guard, it may be possible to reduce the number of grill units required.

UNIT TABLE

<table>
<thead>
<tr>
<th>Roadway Width</th>
<th>Grill Units Required</th>
<th>Concrete Cubic Yards</th>
<th>Reinforcing Lbs</th>
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<td>173.5</td>
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<td>16</td>
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<td>443.7</td>
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<td>511.2</td>
</tr>
<tr>
<td>40</td>
<td>7</td>
<td>16.9</td>
<td>511.2</td>
</tr>
</tbody>
</table>
1. Material for shoulder transition shall be placed to the finished roadway elevation for the entire length of the transition, then the roadway is paved. Aggregate Subbase or Aggregate Base shall be used, then roadway is paved, a material equivalent to the existing roadway shall be used.
GENERAL NOTES

1. See Std C-1110 for all other Cattle Guard details.
2. This standard shall be used in embankment or where highly erodible soil is found.
3. All concrete shall be Class B.

SECTION A-A

SECTION C-C IN EMBANKMENT

SECTION C-C
WHERE USED FOR THRU DRAINAGE-
CATTLE GUARD OPEN BOTH ENDS

SECTION B-B
GENERAL NOTES

1. This design applicable only to wood tie track construction. Wood shingles shall be painted and cut from material meeting the specifications of the existing ties.

2. 2 1/2" x 3/4" three, 2 1/2" bearing bars and 2 1/2" normal diameter pipe are assemblies shall be primed with one coat of No. 1 paint and finished with two coats of yellow enamel paint.

SECTION B-B

SECTION A-A

DETAIL NO. 1

DETAIL NO. 2

DETAIL NO. 3

DETAIL NO. 4

DETAIL NO. 5

SHIM HEIGHT

<table>
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<tr>
<th>Rail</th>
<th>80</th>
<th>90</th>
<th>110</th>
<th>115</th>
<th>119</th>
<th>131</th>
<th>150</th>
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</thead>
<tbody>
<tr>
<td>LBS/YD</td>
<td>2 1/2&quot;</td>
<td>2 1/2&quot;</td>
<td>3 1/2&quot;</td>
<td>3 1/2&quot;</td>
<td>4 1/2&quot;</td>
<td>4 1/2&quot;</td>
<td>4 1/2&quot;</td>
</tr>
<tr>
<td>1/4&quot; DIAMETER GALVANIZED DOME HEAD SPIKE LENGTH</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11&quot;</td>
<td>11&quot;</td>
<td>11&quot;</td>
<td>11&quot;</td>
<td>13&quot;</td>
<td>13&quot;</td>
<td>13&quot;</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: For Section Between Double Track, Detail No. 3
GENERAL NOTES

1. Length of post and braces shall not be less than 7'-0".

2. Woven wire fence fabric shall be attached to the post at the top, bottom, and intermediate wires.

3. Intermediate Post Assemblies shall be located as shown and at intervals to utilize standard rolls to minimize cutting and waste.

4. A twisted wire stay shall be centered between posts.

5. ASTM design number

TYPICAL WOVEN WIRE FENCE INSTALLATION-TYPE 1 WW SHOWN

TYPE 1 WOVEN WIRE (WW)

TYPE 2 WOVEN WIRE (WW)

TYPE 3 WOVEN WIRE (WW)

TYPE 4 WOVEN WIRE (WW)

FENCE FABRIC DIMENSIONS AND DESIGN NUMBERS
GENERAL NOTES

1. Intermediate Post Assemblies shall be located as shown and at intervals not to exceed 600", or midway between all braced posts.

2. For game fence the bottom wire shall be barbless.

3. The stays on game fence shall have their ends turned up, to prevent injuries to game.

TYPICAL BARBED WIRE FENCE INSTALLATION-TYPE 2 BW SHOWN

TYPE 1 BARBED WIRE (BW) (4 WIRE)

BARBED WIRE GAME FENCE (GF)

TYPE 2 BARBED WIRE (BW) (5 WIRE)
GENERAL NOTES

1. Post assemblies shall consist of an upright angle 2½" x 2½" x ½ at 4,100 lbs/ft, and brace angles 2½" x ½ at 3,100 lbs/ft.

TYPICAL FENCE LOCATION AT CATTLE GUARD

ABUTTING FENCE

ABUTTING FENCE AT POST

DETAIL A
TYPICAL CROSS SECTIONS OF LINE POST SHAPES

DETAIL B
INTERMEDIATE POST ASSEMBLY

DETAIL C
END POST ASSEMBLY

DETAIL D
CORNER POST ASSEMBLY

FENCE CONNECTION TO WINGWALL
**GENERAL NOTES**

1. Posts shall be round, I-section, or rail-formed and shall conform to the nominal dimensional requirements shown on the plans. Dimensional tolerances for all shapes shall be according to ASTM A-500. In addition, the material of which posts are fabricated shall have a nominal thickness before galvanizing of not less than 0.125" for the posts and 0.130" for terminal posts.

2. Chain link fabric shall be either zinc-coated or aluminum-coated steel wire fence fabric. Zinc-coated steel fabric shall conform to the requirements of ASTM A-525. Class I coating. Aluminum-coated steel fabric shall conform to the requirements of ASTM A-495, with a minimum weight of coating of 0.004 ounce per square foot of wire surface area. Fabric shall be 3 gauge Type B fence fabric 60 inches or less in height. Steel fabric shall be 4 gauge for fabrics greater than 60 inches in height.

3. Tension wire shall be 3 gauge (0.017 inch diameter) galvanized steel wire with a minimum tensile strength of 15,000 pounds per square inch and shall be zinc-coated or aluminum-coated.

4. Truss rods shall be 1/4 inch diameter adjustable rods. Truss tighteners shall have a strap thickness of not less than 3/8 inch.

5. Stretcher bars shall be 3/8 inch by 3/4 inch steel flat bars. Stretcher bar bands shall be 3/8 inch by 1 inch preformed steel bands.

6. Bottom tension wire shall be 3 inches from top of crown on concrete footings.

7. Intermediate post assemblies shall be spaced at 500 feet intervals or moles between put posts when the distance between such posts is less than 1000 feet and more than 500 feet.

8. See sheet 3 of 3 for typical fence location.

---

**TYPICAL CHAIN LINK FENCE INSTALLATION - TYPE I SHOWN**

**TYPICAL POST DIMENSIONS**

<table>
<thead>
<tr>
<th>Fabric Height</th>
<th>Corner, End, Intermediate, Gate, Latch, and Put Posts</th>
<th>Line Posts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Round</td>
<td>I.O.D.</td>
</tr>
<tr>
<td>36&quot; 6-0&quot;</td>
<td>2.375&quot;</td>
<td>3.500&quot;</td>
</tr>
<tr>
<td>48&quot; 7-0&quot;</td>
<td>2.375&quot;</td>
<td>3.500&quot;</td>
</tr>
<tr>
<td>60&quot; 8-0&quot;</td>
<td>2.375&quot;</td>
<td>3.500&quot;</td>
</tr>
<tr>
<td>72&quot; 9-0&quot;</td>
<td>2.375&quot;</td>
<td>3.500&quot;</td>
</tr>
<tr>
<td>Over 72&quot;</td>
<td>Height</td>
<td>2.875&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Typical Board Sides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. Barbed wire for use with Type 2 chain link fence shall be 12 guage steel wire with 4 point 14 guage barbs spaced five inches apart and shall be either zinc-coated or aluminum-coated. Zinc-coated steel wire shall conform to the requirements of ASTM A225, Class 1 coating. Aluminum-coated steel wire shall conform to the requirements of ASTM D260, Type 1, Class 1 coating.

2. Barbed wire support arm shall be of the type shown on the plans. They shall be fabricated from structural quality steel, and shall be zinc-coated in accordance with the requirements of AASHTO M127.

3. Bottom tension wire shall just clear top of crown on concrete footings.

4. For details and notes not shown - see chain link fence Type 1, sheet 1 of 3.

5. See sheet 3 of 3 for typical fence location.

TYPICAL CHAIN LINK FENCE INSTALLATION - TYPE 2 SHOWN

TYPICAL POST DIMENSIONS

<table>
<thead>
<tr>
<th>Fabric Height</th>
<th>Corner, End, Intermediate, Gate, Latch and Pull Posts</th>
<th>Line Posts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Round</td>
<td>Roll Formed</td>
</tr>
<tr>
<td></td>
<td>(00)</td>
<td>(00)</td>
</tr>
<tr>
<td>72&quot;</td>
<td>5' 6&quot;</td>
<td>3.00' x 3.00'</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. All concrete shall be Class 5, 4000 psi.

2. All bolts, nuts, washers and fittings shall meet the dimensional requirements of the American National Standards Institute, unless otherwise designated and shall be galvanized in accordance with ASTM A53.

3. Galvanized swaged fitting and U-bolt shall conform to ASTM A449.

4. The 3/4" galvanized wire rope shall conform to ASTM A521 Class B, Type 2.

5. The wire fabric, ties, bands, stretcher bars, and other fittings and hardware shall conform to ANSI/ASME.

6. The wire fabric fence shall follow contour of the graded median.

7. The excavation for the concrete anchor blocks shall be to neat line, maximum excess shall be 2'.

8. Perforated posts shall be square tube formed from 112.5 x 112.5 gage ASTM A-36/A-36M cold rolled carbon steel. The square tube shall be welded directly in the corner by high frequency resistance welding or equal. The posts to be externally sprayed with standard corner radius of 9/16" and 1/4".

9. Perforated posts shall be galvanized to the requirements of ASTM A 653/A 653M. Coating Designator shall be Z275.

10. The cables shall have enough tension to prevent sagging. The location of the concrete anchor blocks may also be varied to provide enough tension to help prevent sagging.

11. Two interior U-bolt and clamp bars shall be spaced at 1/3 of the distance between posts.


13. An alternate to rectangular concrete anchor blocks shall be a 15" diameter round footing with an additional depth of 4'.

14. The median approach grade within 100' of the Chain Link Cable Barrier, shall not exceed a grade break of 10 percent.

NOTE: Shown G4 (2N) System Without Curb. May Use Other Systems With or Without Curb.
**GENERAL NOTES**

1. Minimum cover over pipe culverts shall be 12", measured from the top of pipe.

2. See remaining C-13 Series standards for other pipe details.

3. After welding, the damaged coating shall be cleaned by a wire brush and painted with at least one full coat of Paint No. 3, or given two coats of approved hot asphalt paint, as directed by the Engineer.

**SPECIAL MULTIPLE PIPE END SECTION DETAIL FOR PIPE CULVERT EXTENSIONS ONLY**

**PERFORATED CMP INSTALLATION**

**PIPE AND CATCH BASIN INSTALLATION AT SAG CONDITION OF CUT DITCH**

**PIPE AND CATCH BASIN INSTALLATION AT BASE OF TRANSVERSE DIKE**

**PIPE AND CATCH BASIN INSTALLATION AT FACE OF TRANSVERSE DIKE**
TRENCH CONDITION
IN NATURAL GROUND OR IN EMBANKMENT
WITHOUT BRACING

TRENCH CONDITION
IN NATURAL GROUND OR IN EMBANKMENT
WITH BRACING SHOWN

TRENCH CONDITION
NRCIPCP IN NATURAL GROUND
OR IN EMBANKMENT

GENERAL NOTES

1. Pipes shall be installed either in a trench condition or in a non-trench condition in natural ground or in embankment.

2. In a trench condition, the vertical and horizontal limits shall be maintained. If horizontal limits are exceeded or the vertical limits are not maintained, a non-trench condition exists.

3. Bracing and sheeting shall conform to OSHA requirements.

4. Pipe backfill may be bedding material.

5. In a non-trench condition, the embankment for pipe stability shall be constructed in lifts to the limits shown in the detail simultaneously with the backfilling and pipe backfill. If the contractor chooses to construct it as a trench condition, the embankment shall be constructed before excavating the trench.

6. Outside diameter of full circle pipe or outside diameter taken on rise of arch pipe, ellotflex pipe.

1. Minimum wall thickness for NRCIPCP. See Plans.

A. D-4 inches each side minimum for diameters less than 4 feet.
D-2 feet maximum for diameters up to 4 feet.
D-4 feet each side minimum for diameters equal to or over 4 feet.
D-3 feet maximum for diameters 4 feet or over.

6. 6 inches except when unloading or unstrake material. See standard specifications.

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

TYPICAL PIPE INSTALLATION
C-13.15
**GENERAL NOTES**

1. Design of end section shall conform to standards.
2. End section joint configuration shall match the pipe joints.
3. Embankment slope shall be warped to match slope of end section.

**Dimensions - Inches**

<table>
<thead>
<tr>
<th>Pipe Dia</th>
<th>Approxi Weight</th>
<th>Dimensions</th>
<th>Approx Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>24&quot;</td>
<td>1920&quot;</td>
<td>T A B C E F</td>
<td>3</td>
</tr>
<tr>
<td>27&quot;</td>
<td>1930&quot;</td>
<td>3 95 435 30 135 48</td>
<td>3</td>
</tr>
<tr>
<td>30&quot;</td>
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<td>3</td>
</tr>
<tr>
<td>36&quot;</td>
<td>4100&quot;</td>
<td>4 15 63 341 97 72</td>
<td>3</td>
</tr>
<tr>
<td>42&quot;</td>
<td>5380&quot;</td>
<td>4 21 63 35 98 78</td>
<td>3</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. The end section may be joined to the pipe or connector section by bolts, rivets, dimpled bands, slip-seam bands or threaded rod type fasteners. For allowable connector types, see table.

2. The type 1 connector is by means of bolts or rivets. Minimum circumferential fastener spacing shall be 12" and with a minimum of 8 fasteners per joint. The Type 1 joint may be used with either annular or helical corrugations.

3. Type 2 and 3 connectors shall be used only with annular or helical pipe with a requisite number of annular corrugations.

4. Type 4 and 5 connectors shall be used only with helical pipe.

5. All steel end section components shall be galvanized.

6. Top of embankment shall be warped to match toe of skewed end section.

7. A term shall be added to normal projections per Std C-1300.

8. The foregoing applies to all cross section configurations.

---

### Dimensions - Inches

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Pipe Dia</th>
<th>Ge</th>
<th>A</th>
<th>B Max</th>
<th>H</th>
<th>L</th>
<th>N</th>
<th>1/12</th>
<th>Approx Slope</th>
<th>Connection Type</th>
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<tbody>
<tr>
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<td>16</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>36</td>
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<td></td>
</tr>
<tr>
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<td>16</td>
<td>10</td>
<td>13</td>
<td>6</td>
<td>4</td>
<td>49</td>
<td>27/4</td>
<td>2, 3, 4</td>
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</tr>
<tr>
<td>30&quot;</td>
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<td>60</td>
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### Dimensions - Feet

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<th>Rise</th>
<th>Ge</th>
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<th>B Max</th>
<th>H</th>
<th>L</th>
<th>N</th>
<th>1/12</th>
<th>Approx Slope</th>
<th>Connection Type</th>
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<td>27/4</td>
<td>3</td>
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</table>
GENERAL NOTES

1. For lateral dimensions of invert paving, use 12" control for CMP and span for CMFA.

2. Paving shall be scored laterally at 7'-6" minimum intervals along the length of the pipe.

3. Use bevel on inlet headwall only.

4. Wire mesh shall be fastened or welded to corrugations at intervals and in a manner approved by the Engineer. Lip shall be 6" minimum.

5. Paving shall not be placed until backfilling is completed.

6. Concrete shall be Class B.

7. See Std B-1112 for headwall and bevel dimensions not shown.

HEADWALL INSTALLATION

PROJECTING INSTALLATION

SECTION A-A

SECTION B-B
GENERAL NOTES

1. This end treatment is to be used only for those sections where vehicle passes not used for drainage.

2. All concrete shall be Class B. An optional 12” AB invert paving base course and 6” of concrete may be used in the 144" diameter pipe.

3. Anchor bolts shall be retained in a horizontal position during pour with final tightening a minimum of 7 days after pour.

4. Pipe shall be backfilled before concrete bond beam is constructed. Minimum backfilling shall be used.

5. Edges of wire mesh shall be fastened or weaved to corrugation crests at intervals and in a manner approved by the Engineer. Laps shall be a minimum of 6:1.

6. For installation normal to roadway centerline only.
GENERAL NOTES

1. Pipe colors not required where direct catch basin connections can be made within 1' of a normal 90° installation, either horizontally or vertically.

2. "T" connections direct to the main drainage trunk line should be avoided and used only where manhole connections are impractical.

SECTION A-A
TYPICAL CONNECTION BETWEEN CATCH BASIN AND MANHOLE

SECTION B-B
Pipe Cross Connection

SECTION C-C
TYPICAL CONNECTION BETWEEN CATCH BASIN AND MAIN STORM DRAIN

SECTION D-D

PLAN
TYPICAL SLOTTED DRAIN AND CATCH BASIN INSTALLATION WITH MANHOLE

PLAN
TYPICAL SLOTTED DRAIN AND CATCH BASIN INSTALLATION WITHOUT MANHOLE
GENERAL NOTES

1. Prefabricated tee shall be used when the outside diameter of the inlet pipe exceeds one-half of the inside diameter of the main storm drain, except when the manholes are shown on plans.

2. Centerline of the inlet pipe shall intersect the centerline of the main storm drain except when elevation "E" is shown on plans.

3. If L is 45° or less, type 1 shall be used.

4. All concrete shall be class B.

5. All reinforcing steel shall conform to AASHTO grades 40.

6. Reinforcing steel shall have 2" minimum cover.

SECTION A-A

Dry Pack within 2 Min

Round Edge

"4" Bar Cotter (Typ)

ELEVATION S

See Note 2

Undisturbed Earth

SIDE INLET

Type 1

Plumb

Bearing of Inlet Pipe

Backfill Per Sect 303-2 and 500

Pipe Bedding

LESS THAN 45°

A

A

MORE THAN 45°

CATCH BASIN ABOVE STORM DRAIN

Type 2

Catch Basin

Round Edge

See Connection Detail

RCP, CP or as Specified
GENERAL NOTES

1. Compact soil at end of pipe plug to 95% of maximum density.
2. If depth of cover is less than 5' or greater than 10', increase plug thickness a minimum of 4'.

DRAINAGE OUTLET INTO CHANNEL

STORM DRAIN PLUG
GENERAL NOTES

1. All concrete shall be Class B.
2. All reinforcing steel shall conform to 1003-1, 2, Grade 40.
3. At reinforcing steel shall have 3" minimum clear cover.
4. A concrete collar shall be required where pipes of different diameters or materials are joined or where the design change in alignment or grade exceeds that allowed for a standard joint.
5. When pipes of different diameters are joined with a concrete collar, "T" & "I" shall be those of the larger diameter.
6. The diameter of the circular ties shall be the outside diameter of pipe + 1.
7. Pipe ends to be trimmed such that the maximum distance between pipes at any point is 2".

**PIPE COLLAR TABLE**

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>L</th>
<th>T</th>
<th># of Ties</th>
</tr>
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<tbody>
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<td>12&quot;</td>
<td>1.00</td>
<td>4&quot;</td>
<td>3</td>
</tr>
<tr>
<td>18&quot;</td>
<td>1.00</td>
<td>5&quot;</td>
<td>3</td>
</tr>
<tr>
<td>24&quot;</td>
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<td>6&quot;</td>
<td>3</td>
</tr>
<tr>
<td>30&quot;</td>
<td>1.50</td>
<td>8&quot;</td>
<td>3</td>
</tr>
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<td>36&quot;</td>
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<td>42&quot;</td>
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<tr>
<td>96&quot;</td>
<td>2.25</td>
<td>16&quot;</td>
<td>5</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. Catch basin can be used on grade or at roadway edge.

2. Catch basin has three configurations:
   - Sump only: Sump portion of catch basin (See Detail No. 4).
   - Single Wing Illustrated: Sump with wing basin upstream.
   - Double Wing Illustrated with symmetrical wing basins each side.

3. Pipes can be placed in any wall except wall adjacent to wing basin.

4. Floor shell have a wood travel finish. Slope of the sump portion of the catch basin along the axis of the pipe shell be 4:1.

5. Any specified joint depression shall be warped to opening according to Std C-15.70.

6. All structural steel shall be ASTM A36.

7. Nose plate, access frame and cover shall be given one shop coat of No. 1 paint.

8. All concrete shall be Class B.

9. All reinforcing bars shall be #4, 1/2" C to C both ways and 1/2" clear to inside of wall and outside of wing basin except as shown.

10. Curb opening area (sq ft) per inch of curb = Quiter depression + curb opening length (ft) x 0.0833.

11. All welding shall be done in accordance with Standard Specification 504-1.5a.1.

12. Construction joints and drains shall be placed to meet field conditions. See Std C-15.70.

13. Ø1 = 6" when it is 8" or less.
   - Ø1 = 6" when it is greater than 8."
GENERAL NOTES

1. Curb basin can be used on grade or at roadway seg.
2. Pipes can be placed in any wall.
3. Floor shall have a wood travel finish and a minimum 4:1 slope along the axis of the pipe toward the pipe.
4. Curb over catch basin shall not be constructed until catch basin concrete has set for a minimum of 24 hours.
5. Curb basin can be used with curb and gutter (as shown) or without.
6. See Std 0-15.50 for grate and frame details and opening areas.
7. Any specified inlet depression shall be warped to opening according to Std C-0-15.70.
8. All structural steel shall be ASTM A36.
9. Grate, frame, and beam shall be given one shop coat of No. 1 paint.
10. All concrete shall be Class B.
11. Construction joints and details shall be placed to meet field conditions. See Std C-15.10.
12. Silicon cement shall be placed between the grate frame and PPCP, recessed 3/8" from the pavement surface.
13. See Detail No. 2 for catch basin with wale gutter.
14. GT: 6" when H is 8" or less.
   8" when H is greater than 8.
   See Section B-B.
   9" when pavement is AC.
   Catch pavement thickness when pavement is PPCP.
   USE THIS SECTION WHEN H>8".

PLAN - CATCH BASIN TYPE 4 - SINGLE

PLAN - CATCH BASIN TYPE 4 - DOUBLE

SECTION A-A

SECTION B-B

SECTION C-C

DETAIL NO. 1

DETAIL NO. 2
GENERAL NOTES

1. Catch basin can be used on grade or at roadway sep.

2. Catch basin has three configurations:
   - Single ring, illustrated: Single with wing basin
   - Double ring, shown: Double with symmetrical wing basins on each side.

3. Pipes can be placed on any wall except wall adjacent to a wing basin.

4. Floor shall have a wood-trowel finish. Slope of the sump portion of the catch basin along the axis of the pipe shall be 4:1.

5. Any specified lateral depression shall be warped to opening according to Std. C-15.10.

6. All structural steel shall be ASTM A36.

7. Nose plate shall be given one shop coat of No. 1 paint.

8. All concrete shall be Class B.

9. All reinforcing bars shall be No. 4, 1/2" C to C in both ways and 1 3/4" clear to inside of walls and outside of wing basin floor except as shown.

10. Curb opening area is calculated by curb face + inlet depression + curb opening length (ft) x 0.0834.

11. All welding shall be in accordance with Standard Specification 604.3.26.

12. See Std. C-15.50 for grate and frame details and opening areas.

13. Construction joints and drainages shall be placed to meet field conditions, Std C-15.70.

14. Silicone sealant shall be placed between the grate frame and PCP, recessed 3/4" from the pavement surface.

15. \( \theta = 6" \) when \( H \) is 8" or less; \( 3" \) when \( H \) is greater than 8". See Section C-C.

16. \( \phi = 9" \) when pavement is AC. Match pavement thickness when pavement is PCP.

SECTION C-C
USE THIS SECTION WHEN \( H=8" \)

SECTION D-D

SECTION A-A
USE THIS SECTION WHEN \( H=5" \) OR LESS

SECTION B-B
GENERAL NOTES

1. Grating units and frames shall be fabricated from structural steel ASTM A36 except as noted.

2. All welding shall be in accordance with Standard Specification A606-06.

3. The completed assembly shall be given one shop coat of No. 1 paint.

4. Frames and grates shall fit a maximum rock of 0.093 at any point.

5. Grate opening is 3.60 Sq. Ft.

6. Bracing of frame is recommended for handling and placement purposes.

7. Frame and Grate to be used with Std C-1530, C-1533 and C-1540.

8. Grate may be used with Std C-1592 Frame.

SECTION A-A

PLAN

SECTION B-B

PLAN

TYPICAL INSTALLATION

C-1530 Catch Basin Shown
Similar for C-1533 and C-1540
GENERAL NOTES

1. Cover shall be non-locking.

2. Frame and cover shall be cast iron or structural steel.

3. Catch basin access frame and cover is for use in sidewalk area only.

4. Cover shall be filled with concrete and broom finished.
GENERAL NOTES

1. No inlet depression shall extend into a traffic lane.
2. Maximum combined inlet and gutter depression is 3 inches. See Detail No. 1.
3. Maximum distance along curb between catch basins where full gutter depression is used is 10 feet.
4. See Std. C-15.80 for aprons used with C-15.80 Catch Basin.
5. See Detail No. 2 for grate type catch basins with wide gutter.

LEGEND

- Normal pavement or gutter flow is elevation.
- D - Depressed elevation.
- G - Grade type with downward slope.
- W - Normal gutter width per Std. C-05.00.
- A - Types 1, 3, & 5.
- T - Type 4 & C-15.91.
GENERAL NOTES
1. Construction drain may be deleted at the option of the Engineer.

LEGEND
- Normal pavement or gutter flow line elevation.

SECTION

CATCH BASIN CONSTRUCTION DRAIN

CATCH BASIN WITHOUT CURB

TYPE 4
1. Apron shall be Portland cement concrete.
2. All concrete shall be Class B.
3. Grating shall be fabricated of structural steel.
4. Structural steel shall be in accordance with ASTM A36.
5. All welding shall be in accordance with Standard Specification 604-306.
6. Grating assembly shall be given one shop coat of No. 1 paint.
7. "B" indicated on plans.
   * B: When wall height exceeds B'

**GENERAL NOTES**

**SECTION B-B**

**MEDIAN DITCH GRADE DETAIL**

**PERSPECTIVE**

**PLAN**

**ELEVATION**

**SECTION A-A**

**DETAIL NO. 1**

**GRATING DETAIL**

**REMARKS**

**STATE OF ARIZONA**

**DEPARTMENT OF TRANSPORTATION**

**DIVISION OF HIGHWAYS**

**STANDARD DRAWINGS**

**CATCH BASIN, MEDIAN DITCH**

**C-15.80**
GENERAL NOTES

1. Apron shall be portland cement concrete, Class B.
2. All concrete shall be Class B.
3. Grating shall be fabricated of structural steel.
4. Structural steel shall be in accordance with ASTM A36.
5. All welding shall be in accordance with Standard Specification 504A-30.
6. Grating assembly shall be given one shop coat of No. 1 paint.
7. "W" indicated on plans.
   * 8" when wall height exceeds 8"
GENERAL NOTES

1. Concrete shall conform to the requirements for Class S Concrete. The minimum strength shall be 4000 psi.

2. Grout shall be in accordance with Standard Specifications except water content shall be such that the consistency is proper for smooth troweling.

3. All welding shall be in accordance with Standard Specification 604.3.06.

4. The completed grate shall be given one shop coat of No. 1 paint.

5. Foundation soil and backfill shall be in accordance with Section 203.9 of the Standard Specifications.

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

END VIEW

BOLT DOWN CLIP DETAIL

4x4 x 8.3 x 8.3 WWF

28" x 20" CMPA Opening

1/3" Clear

1' Clear

4x4 x 8.2 x 8.2 WWF

28" x 20" CMPA

Grout

4-1/2" Bars

2 1/2" C to C

3/4" Diameter cross bars may be fillet welded, resistance welded, or electro-welded to bearing bars.

2 7/8" x 1/2" bolt

1/4" Hole

3/8" x 1/2" Bolt

1/4" Clear

6" x 6" x 2 7/8" Bar

2" x 2" x 2 7/8" Bar

6" Lap

1/4" Rebar

5/8" x 1/4" Rebar

3" x 4 1/2"

3 1/2" x 2"
GENERAL NOTES

1. All concrete shall be Class B.
2. All reinforcing steel shall have 2" min clear cover unless otherwise noted.
3. Reinforcing steel shall be No. 4 rebar, 1/2" C to C horizontal & vertical in walls.
4. Pipe can be placed in any wall.
5. See Std C-1360 and C-1365 for more information and dimensions of slotted drain.
6. +t = 6" when T is less than B
   −6" when T is greater than B

PLAN

SECTION A-A

SECTION B-B

TEMPORARY TIMBER CAP DETAIL

NOTE:
Band Rebars and Cover with Two Layers of 4" x 6" Timbers

1" Gutter Flow Line

Roadway Width

4'-0"

4'-0"

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GENERAL NOTES

1. All structural steel shall be in accordance with ASTM Spec A 36.
2. Grate design is not suitable for locations subject to bicycle traffic.
3. All welding shall be in accordance with Standard Specification E60-E306.
4. The completed grate assembly (frame & grate) shall be given two shop coats of No.1 paint.

GRATE AND FRAME DIMENSIONS

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<thead>
<tr>
<th>Type</th>
<th>Curb Height</th>
<th>Gutter Width</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<td>2'-6&quot;</td>
<td>12%/4&quot;</td>
<td>26'-57'-40&quot;</td>
<td>12%/4&quot;</td>
<td>26'-57'-40&quot;</td>
</tr>
<tr>
<td>C</td>
<td>3&quot;</td>
<td>2'-6&quot;</td>
<td>13%/4&quot;</td>
<td>10'-37'-45&quot;</td>
<td>13%/4&quot;</td>
<td>10'-37'-45&quot;</td>
</tr>
</tbody>
</table>

PLAN VIEW FRAME

PLAN VIEW GRATE

SECTION A-A

SECTION B-B

BRACE PLATE DETAIL

3⅛"x½" Bar
3⅛"x½" Bar

3⅛"x3½" Bar
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GENERAL NOTES

1. See Std C-15.91 for dimensions, sizes and details not shown for installation of catch basin.

2. See Std C-10.62 and C-10.63 for dimensions, sizes and details not shown for installation of barrier.

3. See Std C-13.60 for dimensions, sizes and details not shown for installation of slotted drain.

4. Unless otherwise noted, reinforcement steel in half barrier for installation with catch basin and slotted drain shall conform to sizes and number specified.

5. All welding shall be in accordance with Standard Specification 604-306.

6. Where applicable, see Std C-10.60 for weld hole placement.

7. Grate design shown is not suitable for locations subject to bicycle traffic. Use C-15.50 grate with C-15.52 frame for locations with bicycle traffic.

8. Grate opening for grate shown is 4.75 sq. ft.

- For 18" Diameter Slotted Drain
- For 24" Diameter Slotted Drain

- Angle Varies Approx. 45°
- Beveled Side of Grate Toward Barrier
- Varies in Increased height over catch basin and slotted drain inlet depression.
- Match adjacent gutter depression. Additional inlet depression as specified.

HALF BARRIER INSTALLATION AT SLOTTED DRAIN LOCATIONS

18" or 24" Dia Slotted Drain

*4 Rebar 9" C to C
*6 Rebar, 2 Required

*4 Rebar 9" C to C
1" Minimum

*4 Rebar 9" C to C
2" Clear

*4 Rebar 9" C to C
1" Minimum
GENERAL NOTES

1. All concrete shall be Class B.

2. All reinforcing bars shall be #4 except two #6 bars over pipe. Bar spacing approximately 1'-0" center to center unless otherwise noted.

3. 30° wing wall shall slope 45° normally to dike face. See Hydraulics and Utility and Railroad Engineering Sections.

PIPE DIMENSIONS

<table>
<thead>
<tr>
<th>ID</th>
<th>L</th>
<th>E</th>
<th>f (Approx)</th>
<th>CF Concrete</th>
<th>CPM</th>
<th>RCP</th>
<th>Rein Steel</th>
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<tbody>
<tr>
<td>18&quot;</td>
<td>2'-0&quot;</td>
<td>1'-0&quot;</td>
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<td>0.96</td>
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<td>1'-0&quot;</td>
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<td>1.07</td>
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<td>1'-6&quot;</td>
<td>2'-7&quot;</td>
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<tr>
<td>36&quot;</td>
<td>4'-0&quot;</td>
<td>2'-0&quot;</td>
<td>3'-6&quot;</td>
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<td>2.01</td>
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<td>42&quot;</td>
<td>5'-0&quot;</td>
<td>2'-6&quot;</td>
<td>4'-4&quot;</td>
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<td>48&quot;</td>
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<td>3'-6&quot;</td>
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<tr>
<td>60&quot;</td>
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<td>4'-0&quot;</td>
<td>6'-11&quot;</td>
<td>4.96</td>
<td>4.80</td>
<td>410</td>
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</tbody>
</table>
GENERAL NOTES

1. All concrete shall be Class B.
2. Structural steel shall be in accordance with ASTM A36.
3. All cover steel and exposed appurtenances shall be given one shop coat of No. 1 paint.
4. Plans shall specify locked or bolted cover for standpipe No. 2.
5. For specific details of a flush pavement or sidewalk installation, see Utility and Railroad Engineering Section.
GENERAL NOTES

1. Irrigation sleeves shall be installed in a trench condition. See Std C-1355 and Std C-1060.

2. Bedding and backfill material shall be Class 2 Aggregate Base.

3. Pipe installation shall conform to Section 501 of Standard Specifications.

4. The Contractor shall imprint a 4" high letter "D" on the top of all curbs at sleeve locations. The width of the letter shall be 4", and shall penetrate the concrete surface 4".

5. For non-continuous sleeves under crossroads, Std C-530 Type "A-1" curb shall be required where median is irrigated. See plans for locations. Dumbell waterstop shall be at all expansion joints.

6. Materials used for caps or plugs shall be as recommended by the pipe supplier and approved by the Engineer.

** Generally, sleeves shall be installed parallel to the roadway subgrade. Slope may vary in super-elevated sections. Minimum slope nominal 10 to 1 drain.**
GENERAL NOTES

1. Rock shall be sound and durable, of rounded or angular shape and with a nominal diameter of 8" minimum and 12" maximum. Flat or needle shapes are not acceptable.

2. Wire mesh splice shall have a 6" minimum lap vertically and horizontally.

TYPE 1 AND 2 BANK PROTECTION

- Double Wrapped with 2 Strands *9 Galv Wire
- Single Wrapped with 2 Strands *9 Galv Wire 1'-0" C to C

5' - 1" Rock Backfill

Embankment Slope 2/1 or 1/2y

Win 20' Railroad Rail or Equal 1'-0" Center to Center
Type 1/10 Long Type 21/2 Long

TYPE 3 BANK PROTECTION

- Single Wrap
- Win 20' Railroad Rail or Equal 1'-0" Long
  1'-0" C to C

Embankment Slope 2/1 or 1/2y

* When other embankment slope rates are encountered, warp to 2/1 or 1/2y
GENERAL NOTES

1. Rock shall be sound and durable, of rounded or angular shape and with a nominal diameter of 8" minimum and 21" maximum, flat or needle shapes are not acceptable. Rock shall be comprised of 50% min 8" to 12" and 50% max 18" to 21".

2. Wire mesh panel shall have a 6" minimum lap vertically and horizontally.
GENERAL NOTES

1. Precast manholes shall conform to the requirements of AASHTO M299 except that the compressive strength of each unit will be determined and accepted in accordance with Section 1006.7 of the AASHTO Specifications.

2. Concrete for all other manholes shall be Class B.

3. Every fifth course of bricks in Manhole No. 1 shall be laid as stretchers.

4. See Std C-18.30 and C-18.40 for additional information and dimensions.

5. See plans for Std C-18.20 frame and cover type.

6. Steps shall be placed in manholes in accordance with the requirements of AASHTO M299.

7. See Std C-18.40 for location of Station Location Reference Point.

8. Manhole height, \( H_1 \), shall be measured from the lowest pipe invert to the top of the manhole frame.
GENERAL NOTES

1. When specified on the plans, the cover (excluding gasket) shall include agency identification and conform to the following. Lettering on manhole cover to contain name of agency and utility as directed. Letters and words to be equally spaced. Letters to be 7/8 in height and raised 3/16 above level of cover. Type of letters and layout to be submitted for approval.

2. Casting weights shown are minimum weights and are for either cast iron or ductile iron castings. Maximum casting weights shall not exceed 105 percent of weights shown.

3. HD2 loading minimum.

4. Details shown are typical.

5. Alternate designs of manhole frame and cover may be utilized with the approval of the engineer as long as minimum loading and weight are equivalent.

SECTION OF FRAME

24" MANHOLE FRAME & COVER
Approx Wt Frame 173 Lbs
Cover 170 Lbs

SECTION A-A OF COVER

SECTION OF FRAME

30" MANHOLE FRAME & COVER
Approx Wt Frame 204 Lbs
Cover 223 Lbs

SECTION B-B

SECTION C-C

36" NOMINAL CMP FRAME & GRATE
Approx Wt Frame 125 Lbs
Cover 167 Lbs

DESIGN APPROVED

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

MANHOLE FRAME
AND COVER DETAILS

C-1820
GENERAL NOTES
1. All dimensions are minimum except where noted.
2. Location & elevation shown on plans.
3. Compaction to conform to Sect. 303-2 or 501.

PLAN

PRECAST ADJUSTING RING DETAIL

SECTION
MANHOLE COVER FRAME
ADJUSTMENT - PAVEMENT
CUT AND REPLACEMENT
CONCRETE SURFACE ROAD CONCRETE WALLS

1. Ford walls shall be Class B concrete.
2. Depth gauge tubing shall be protected against concrete entering through bottom or perforations.
3. Depth gauge tubing and both sides of numeral tabs shall be painted with two coats of white enamel. Numerals and markers shall be painted with one coat of gloss black enamel.
GENERAL NOTES

1. All timber shall be rough, pressure treated and unplanned.

2. Rock basket, full length of structure, shall be included only when called for on plans.

3. See plans for bituminous surface and base materiel details.

4. See Std C-15.10 for Depth Gauge details. Depth Gauge Foundation may be utility concrete.

DETAIL A

Ex9 Wt. 4x16.4 Wedge Wire Fabric, tie with 2 Strings of 9-ga. Tie to top of Basket 10" from Plane and at each end. Tie top and bottom of Basket to top 2x4" Plank at 5'-3" intervals and at each end. Tie by encircling Plank with two Strands of No. 9 Wire.

WITH TREATED BASE

BITUMINOUS SURFACE ROAD

ELEVATION - TYPE 2

BITUMINOUS SURFACE FORD TIMBER CUTOFF WALLS
GENERAL NOTES

1. A survey monument, frame and cover, complete in place shall be considered a unit.

2. A right of way marker, consisting of a survey monument and a reference marker complete in place shall be considered a unit.

3. All markers shall be placed as shown on the plans or as directed by the engineer.

4. Frames may be either Type A or Type B.

5. Frames shall weigh at least 53 pounds.

6. Covers shall weigh at least 16 pounds.

7. Portions of the frame and cover to be machined is shown by the symbol "*". The allowable tolerance for machined areas shall be ±0.04. Concrete shall conform to the requirements of the specifications.

8. Survey monuments shall be magnetically detectable.
   * 1/2" or pavement structure thickness, whichever is greater.
GENERAL NOTES

1. Standard Marker may be used as bench, survey monument or R/W markers.

2. Standard Marker shall be made of brass, bronze or aluminum.

3. Standard Marker will be furnished by the Department. Cast-in lettering format may vary.

4. Bench Marks shall be established on headwalls, bridge curbs or other permanent structures.

5. Surfaces of Aluminum Markers in contact with concrete shall be epoxy coated.

6. Fluted shank may be straight or twisted.

7. Station, Elevation, Year, or other information shall be hand stamped in steel, as approved by the Engineer.

8. When used as a R/W Marker or on Section Lines, the Land Surveyor’s registration number shall be stamped on the marker.

9. When used to define Section Lines, the marker shall be stamped in accordance with the BLM “Manual of Surveying Instructions.”
GENERAL NOTES
1. All concrete shall be Class B.

FOR SINGLE INSTALLATION

<table>
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<tr>
<th>QUANTITIES PER FT OF SLAB LENGTH</th>
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<tbody>
<tr>
<td>CONCRETE</td>
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<tr>
<td>0.31 CY</td>
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<tr>
<td>REINFORCING STEEL</td>
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<tr>
<td>35.22 Lbs</td>
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</table>

CROSS SECTION

Utility Line
Concrete Slab
Sub Length as Shown on Plans
Roadway

SECTION A-A

5'-0"  5'-0"

*4 Bars 1'-0" C to C
Full length of Slab
Label 2 at Supports

*6 Bars C to C
GENERAL NOTES

1. Type A encasement to be used for sewer laterals or house connections BELOW water lines.

2. Type B encasement to be used for sewer laterals or house connections ABOVE water lines.

3. The encasement shell extend at least 6" on each side of the water line and must include the nearest joint.

4. Protection for Type A required when distance from bottom of water to top of sewer line is 24" or less. When the sewer is 6' or 8' house connection no protection is required. If distance is more than 12'.

5. For Type A crossings, Class 150 CIP, or ductile iron pipe may be used as an alternative. For Type B crossing reinforced encasement is always required.

TYPE A ENCASEMENT

TYPE B ENCASEMENT
GENERAL NOTES

1. Type A pipe support may be used for any type crossing condition.

2. Type C pipe support may be used for crossing pipes with a 6" diameter or less if sufficient clearance over storm sewer is available and total span is less than 34'.

3. Intermediate pipe support shall be used in conjunction with Type C pipe support if total span exceeds max. W in table.

4. The contractor shall be responsible for furnishing all supports both permanent and temporary. Temporary supports shall not be a separate pay item.

5. Permanent pipe supports may be decreased from plan quantities or extended to include some listed as temporary supports if conditions warrant these changes at the time of construction. Decision shall be made by the engineer.

6. When Type A pipe support is used and whenever so directed by the engineer, the contractor shall place the wall with suitable openings to prevent unequal pressure resulting from flooding of the backfill. The volume of the placed opening shall not exceed 3/5 the volume of the supporting wall.

7. Use Type B pipe support instead of Type C when clearance between pipes is less than Y in table.

8. Concrete cover for reinforcing shall be 3", minimum.

SCHEDULE OF REQUIRED SUPPORTS

<table>
<thead>
<tr>
<th>PERMANENT</th>
<th>TEMPORARY</th>
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<tr>
<td>Sewer Lines</td>
<td>Cast Iron Pipe</td>
</tr>
<tr>
<td>Conc Irrig Pipe</td>
<td>Conc Box Culvert</td>
</tr>
<tr>
<td>Buried Telco</td>
<td>Traffic Control Conduit</td>
</tr>
<tr>
<td>Gas Pipes</td>
<td>Water and Sewer Lines</td>
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</tbody>
</table>

NOTE:
Other utilities as noted on the plans or as required by the engineer at time of construction.
### Table

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<thead>
<tr>
<th>Depth of Cover on Supports</th>
<th>0&quot; to 8&quot;</th>
<th>8&quot; to 16&quot;</th>
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</thead>
<tbody>
<tr>
<td>W BAR NO.</td>
<td>T BAR NO.</td>
<td>W BAR NO.</td>
</tr>
<tr>
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<td>12&quot;</td>
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<tr>
<td>20&quot;</td>
<td>8</td>
<td>18&quot;</td>
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</table>

### Section C-C

- No. 2 Tees (3") C to C
- (4) No. 5 Bars
- 1/2" Spacing

### Section D-D

- Pipe OD+2" See Note 2
- No. 6 Rebar for Precast Beam Only
- 4" C to C Spacing, See Table for Bar Size
- Min. Bearing shall be 3/4" OD at Pipe

### Plan for Type B Support

- Crossing Pipe

### Intermediate Support for Type B Crossings

- Class B Concrete
- 1/2" Rebars (Equal to Beam Reinforcement)
- 12" or Y, whichever is Greater, See Table

### Type C

- Class B Concrete Bedding with Precast Beam Only
- See Section 501 for Backfill and Compaction

- Provide 1/2 mortar bed with precast beam crossing
ALTERNATE TO PIPE SUPPORT
GENERAL NOTES

1. Pre-cast, reinforced manhole sections shall be manufactured in accordance with ASNTD M99 except that the compressive strength of each unit will be determined and accepted in accordance with section 1006.7 of the specifications.

2. Manhole steps shall be installed at the site of the manhole section manufacturer in accordance with industry standards meeting ASNTD M99 requirements. Steps not required in 60" manhole.

3. Use low alkali cement only.

4. Pipe sizes and elevation shown on plans.

5. Frame and cover shall be adjusted to the finished grade prior to placing of the aesthetic concrete or RCCP surface.

PRECAST SEWER MANHOLE

TYPE B TOP

TYPE A TOP

Pre-Cast Eccentric Conical Top Manhole
GENERAL NOTES

1. Compact soil at end of pipe to 95% of maximum density.

2. If depth of cover is less than 5' or greater than 12', increase plug thickness a minimum of 4'.
TYPE A
2.5' TO 5' DROP

TYPE B
5' OR MORE DROP
GENERAL NOTES

1. Thrust blocks are to extend to undisturbed ground.
2. All concrete shall be class B.
3. Table is based on 3000# psi ft. sec. If conditions are found to indicate soft bearing less, the areas shall be increased accordingly.
4. Areas for pipe larger than 15" shall be calculated for each project.
5. Form all non-bearing vertical surfaces.

MINIMUM THRUST BLOCK AREA REQUIRED (Y x W)  

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>WATER PIPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEE, DEAD END, 90° BEND</td>
<td>45° &amp; 22½° BEND</td>
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<tr>
<td>4&quot; &amp; LESS</td>
<td>3 SQ. FEET</td>
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<tr>
<td>6&quot;</td>
<td>4 &quot;</td>
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<td>13 &quot;</td>
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<tr>
<td>16&quot;</td>
<td>23 &quot;</td>
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</tbody>
</table>

SECTION A-A
GENERAL NOTES

1. Gate valves 4" to 16" may be used with any type of pipe.
2. Gate valves larger than 16" to be detailed on plans.
3. Butterfly valves 3" to 12" may be used with any type of pipe.
4. Butterfly valves larger than 12" to be detailed on plans.
5. Valve box and cover required per Std C-23.30.
GENERAL NOTES

1. Either a steel or rebar restraint rod may be used when necessary to redirect a water line upward to cross over a conflict.
2. Ductile iron pipe may be used.
3. Anchor blocks for pipe larger than 12" shall be calculated for each project.
4. Reinforcing bars to be coated with 2 coats of coal tar, epoxy, or by other approved methods.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MINIMUM BAR SIZE</th>
<th>BLOCK DIMENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
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<td>6&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>

*For 125 psig Working Pressure*
GENERAL NOTES

1. This detail covers moving of water mains, 2" to 12" only.
2. Thrust blocking per Std C-23.10 and C-23.20.
3. If offset is to go over obstruction, joint restraints must be used.
4. Pipe is to be cast iron or ductile iron.
5. 45° cast iron bends may be used in place of cast iron offsets.
6. Drop section is to be prefabricated and installed as a single unit for cast iron mechanical joints.
GENERAL NOTES

1. Extension stems required on all valves where operating nut is over 3' below surface. Extension stem shall be 1½" minimum diameter steel designation A-15 with square socket on bottom to fit 2" square valve nut. Length to fit each installation. 2" square operating nut to be held on top of the extension stem with stop nut.

2. If two or more joints of ACP are used to make riser, use standard ACP pipe rubber gasket coupling to join pipe. Where riser pipe length exceeds 15', use 12" ACP pipe.

3. All steel to have prime coat of paint No. 4 and one heavy application finish coat of Light Grey Enamel paint as per Section 1026-406.

4. Valve box shall be adjusted to the finished grade prior to the paving of the asphaltic concrete surface or PCCP.

5. Ground below the concrete pad or three bricks to be compacted to 80% of the maximum density.

6. Use Parson, Tyler, Apeco, or equal deep skirted cover 14" or more type, sliding adjustable cast iron valve box, C minimum 15 30,000 psig.

TYPE A-I
TO BE USED IN AREAS SUBJECT TO VEHICULAR TRAFFIC

DETAIL A
TYPE A-2
TO BE USED WHEN VALVE BOX IS LOCATED WITHIN PCCP PAVEMENT

TYPE B
NOT SUBJECT TO VEHICULAR TRAFFIC
GENERAL NOTES

1. Thrust blocks are to extend to undisturbed ground.
2. Optional blocking of 2½ x 6 x 12 solid concrete masonry units may be used as indicated.
3. All concrete shall be class B normally, cure 24 hours before backfilling, or use high, early strength concrete.
4. All ties shall be made by city crews at prevailing rates.
5. Install permanent blocking under valve before tap is made. All flange bolts shall be clear of footing.
6. All tapping sleeves must be pressure tested prior to request for tap by city.
7. Contractor shall excavate as shown and shall set tapping sleeve and valve, and tighten all bolts prior to requesting city to make tap.
8. Tapping sleeve to be placed a minimum of 18" from any bell, coupling, valve, or other obstruction.
9. Areas for pipe larger than 16" shall be calculated for each project.

PLANT

ELEVATION

<table>
<thead>
<tr>
<th>SIZE OF PIPE BEING CONNECTED</th>
<th>MINIMUM THRUST AREA REQUIRED (A x B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; &amp; LESS</td>
<td>3 SQUARE FEET</td>
</tr>
<tr>
<td>6&quot;</td>
<td>4 SQUARE FEET</td>
</tr>
<tr>
<td>8&quot;</td>
<td>6 SQUARE FEET</td>
</tr>
<tr>
<td>10&quot;</td>
<td>9 SQUARE FEET</td>
</tr>
<tr>
<td>12&quot;</td>
<td>13 SQUARE FEET</td>
</tr>
<tr>
<td>16&quot;</td>
<td>23 SQUARE FEET</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. This detail is for use only on underground installations where the use of concrete thrust basepipe per Std C-22.25 cannot be used because of obstructions or requirements of the specifications.

2. Washers may be cast iron or steel, and may be round or square. Holes shall be 3/4 inch larger than the rods.

3. All the rods, rod couplings, turnbuckles, bolts and nuts for these joints shall be of carbon steel equivalent to ASTM A-507, grade B, with cadmium plating. In accordance with ASTM B 786, except that the minimum thickness of the coating shall be 0.002 of an inch. Cadmium plated bolts shall have class 2A threads and the nuts, rod couplings and turnbuckles shall have 8B threads.

4. High strength heat treated cast iron tee head bolts with hexagon nuts, all in accordance with the strength requirements of ANNA C-115, may be used in lieu of the cadmium plated bolts and nuts.

5. The sketches in this series of figures show acceptable methods of providing anchorages. There is no particular significance to be attached to whether the sketch shows a bell and spigot joint or a standard mechanical joint. The anchoring procedure illustrated applies in most cases to either type of joint. In some cases, dimensions of the particular pipe or hub and space available for working around the particular joint will influence the choice of methods used.

6. In certain assemblies of rod and clamps shown, the clamp run from a lug on the fitting or a clamp behind the hub of a bell to a clamp against a face of a bell. Note that this arrangement anchors only one joint. The stability of the joint where the clamp is against the face of the bell depends on having both above a relatively long piece of pipe on both sides of the joint. Consequently, if the distance between the first and the second joint is less than 12 feet, the second joint shown shall be anchored by a clamp behind the hub of the bell and rods to a clamp at the face of the next bell.

7. For pipe larger than 12 inch diameter, restraint details shall be submitted for review prior to installation.

8. All exposed metal shall be coated with asphaltsic primer as per subsection 307.10.00.

9. Bolt holes in clamps shall be 3/4 inch larger than the bolts.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>CLAMP</th>
<th>ROD BOLTS</th>
<th>WASHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>10.5&quot;</td>
<td>12.5&quot;</td>
<td>22.5&quot;</td>
<td>1X5</td>
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<tr>
<td>6&quot;</td>
<td>14&quot;</td>
<td>12.5&quot;</td>
<td>22.5&quot;</td>
<td>1X5</td>
<td>1/2 x 2&quot;</td>
<td>5/8 x 3&quot;</td>
<td>7/8 x 3&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>16X</td>
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<td>1/2 x 2&quot;</td>
<td>5/8 x 3&quot;</td>
<td>7/8 x 3&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>19X</td>
<td>12.5&quot;</td>
<td>22.5&quot;</td>
<td>1X5</td>
<td>1/2 x 2&quot;</td>
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<tr>
<td>12&quot;</td>
<td>22X</td>
<td>18X</td>
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<td>1/2 x 2&quot;</td>
<td>5/8 x 3&quot;</td>
<td>7/8 x 3&quot;</td>
</tr>
</tbody>
</table>
1. The meter boxes shall conform to the dimensions as shown and shall be made of Portland cement concrete poured and tamped or vibrated in true forms.

2. Use Class 5 concrete, f'c=4000 psi.

**GENERAL NOTES**

**METER BOX DIMENSIONS**

<table>
<thead>
<tr>
<th>DIM.</th>
<th>BOX NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>A</td>
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<tr>
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<tr>
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<td>G</td>
<td>7&quot;</td>
</tr>
<tr>
<td>H</td>
<td>9&quot;</td>
</tr>
<tr>
<td>J</td>
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<tr>
<td>L</td>
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<tr>
<td>M</td>
<td>16&quot;</td>
</tr>
<tr>
<td>N</td>
<td>25½&quot;</td>
</tr>
</tbody>
</table>

| ⅝ OR ⅞ FILL | 1" METER | 1½" METER | 2" METER |

*Break Out if Necessary to Set Box to Proper Grade.*
GENERAL NOTES

1. Cut and plugs must be adequately “dry blocked”.
2. Dry blocks shall be standard size solid masonry concrete blocks, (ASTM C-129).
3. The quantity and arrangement of the blocking must withstand the line pressure by holding the cap or plug in position.
4. Concrete thrust blocks shall not be poured until the pressure is restored and the cap or plug is inspected for leakage.
5. Concrete shall not be poured over any portion of the abandoned pipe.
6. Minimum thrust block area per Std C-2310.
7. Where a 4" or larger line is specified to be abandoned, the cut and plug should occur at the supply line main to avoid creating an unused dead-end line.

PLAN

SECTION A-A

ELEVATION

Abandoned Pipe

Concrete Thrust Block

Concrete Dry Block

Tapped Cap (w/ Gasket)

Class B Concrete

2" Corb Stop

3/4" Plywood

Blocks

Masonry Concrete Block
Solid (ASTM C-399)

Pipe Cut

Pipe Cut

2" Corb Stop

2'-90° Street El

Abandoned Pipe
GENERAL NOTES

1. All joints in hydrant run-out to be mechanical joints.
2. Hydrant Tee Elbow or approved equal may be used in place of tee and 90° bend.
3. 90° bend not required if sufficient room for perpendicular installation.
4. See Std C-23.10 and C-23.15 for concrete thrust blocks.
5. A flange by mechanical joint shutoff valve, connecting directly to the tee or below at the main shall be used.
6. Fire hydrant, fire hydrant threads, valve and valve boxes per municipality requirements.
GENERAL NOTES

1. Obstructions such as utility poles, street signs, irrigation boxes, fences, etc., must not be placed between curb and hydrant.

2. *Radius varies by municipality.

3. Dimensions shown on plans supersede locations shown on this detail.

4. On locations in midblock, the fire hydrant will be aligned with a property line.

AREA WITH SIDEWALK

PARKWAY AREA OR NO SIDEWALK