PIMA COUNTY, ARIZONA
DEPARTMENT OF WASTEWATER MANAGEMENT
DESIGN STANDARDS FOR SANITARY SEWERS

These standards set forth the minimum standards acceptable for the design of all sanitary sewer facilities which are to be incorporated into the Pima County sewerage system. These facilities shall be installed/constructed into the existing public system in accordance with the latest Pima County Department of Wastewater Management Construction Standards and Specifications.

IT IS NOT INTENDED THAT THESE STANDARDS COVER ALL SITUATIONS THAT WILL ARISE OR THAT THEY BE A SUBSTITUTE FOR ENGINEERING DESIGN. CREATIVE DESIGN BASED ON SOUND ENGINEERING PRINCIPLES IS ENCOURAGED. Any deviations from these design standards, as described heretofore, shall have prior (preferably prior to the first formal design plan submittal) written approval by the Department of Wastewater Management.

CRITERIA FOR SANITARY SEWER CONSTRUCTION PLAN LAYOUT

General

All construction plans shall be drawn on 24" x 36" material (paper, mylar, linen, etc.) and accomplished in such a manner and quality that clear, readable blueline prints are attainable. Plans for modifications or extensions to existing systems shall indicate clearly the connections and relation thereto. If not already on file, submission of plans for the existing system may also be required.

Adequate design data shall accompany all final plans

Plan documents for sewage facilities shall be prepared by a registered professional engineer licensed to practice in the State of Arizona under provisions of ARS 32:141-145 and shall have the necessary professional seal "legibly" affixed to each sheet of the plan documents, signed and dated.

One complete blueline set of the detailed construction plans and specifications
shall be required for initial review and one set for each subsequent review required. The original check prints are to be resubmitted with each subsequent submittal.

Complete detailed specifications for the construction of the sewers and required appurtenances shall accompany or be placed on the construction plans and/or reference made on the plans to appropriate Pima County Department of Wastewater Management Standard Specifications and/or Details. The "General Notes" as shown on Attachment "A" shall be incorporated onto the plan's title or detail sheet(s).

Revisions to approved plans - any deviations from approved plans or specifications affecting structural integrity, capacity, operational and maintenance characteristics, change in grade or alignment, must be approved in writing before such changes are made. Plans or specifications so revised should be submitted well in advance of any construction work which will be affected by such changes to permit sufficient time for review and approval. If "as-built" plans are required, such plans, suitable for microfilming and clearly showing the lines as constructed shall be placed on file with the Pima County Department of Wastewater Management before final release will be issued.

Title Sheet

The title sheet for sanitary sewer plans shall show the following:

a. The recorded subdivision name or job title.

b. The specific lots to be served; if certain lots of the platted subdivision are to remain unserved, it shall be boldly called out on the title sheet by note and labeling of the specific lots.

c. The overall system layout and the location of the sewers (inclusive of the manholes, clean-outs and HCS's) - scaled but not dimensioned. The background plan for this layout shall be a scaled presentation of the plat, the subdivision, or development plan, inclusive of street names and lot numbers. Sheet numbers shall be called out. Also, the lots
requiring backwater valves on the house connection sewer shall be called out by symbol and/or listed in numerical order as the situation/scale permits.

d. The developer's name, address and phone number.

e. The consulting engineering firm's name, address and phone number.

f. Information such as the plan scale, north arrow, bench mark and datum base.

g. Location plan - scale 3" = 1 mile, with proposed development, projected or high-lighted, adjacent platted subdivisions called out, major street intersections and the section(s), township(s) and range(s) noted.

h. Legend for all symbols utilized.

i. The boundary line of the municipality, sewer district or area (property) to be sewered shall be indicated.

Plan, Profile and Detail Sheets

The plan and profile views shall be aligned at the beginning of each sheet. All stationing shall be from downstream to upstream.

The Plan View shall show all easement boundaries, land ownership and recording data. It will be necessary to include such pertinent features as existing and proposed utilities (both public and private), all structures such as driveways, roads, bridges and culverts and an adequate description of them. All plan views will show such items as 100-year flood limit, bench mark(s), north arrow, scale, matchlines and associated sheet number.

Stationing shall be shown for all appurtenances such as manholes, cleanouts and house connections. The new sewer facility shall be correctly dimensioned from section lines, survey control line, property lines and within easements.
Coordinates and bearings or bearings (only) will be utilized to define the horizontal position of the proposed main line sewer in all instances except when the main is located within dedicated/monumented public rights-of-way. Within said rights-of-way the alignment of the main shall be described using either bearings or coordinates or calculated stationing in combination with calculated right angle dimensional ties to the centerline of the right-of-way.

THE PROFILE VIEW shall contain information describing each reach of sewer line and include both the existing and finished ground profile, material used, length, size, slope and station of each appurtenance relevant to the system. Elevations of all manhole inverts and rims must also appear in profile and called out to the nearest hundredth of a foot (0.01').

All pertinent utilities which could affect construction should be plotted in the profile view to show their relationship to that which is proposed. All special fittings must be properly identified and described as to their size, material and their affect upon the elevations of the facility.

Where adjacent drainageways or washes are in possible conflict with a proposed line, special details such as enlarged profiles or cross sections may be required by the reviewing agency. Attention must be given to local run-off conditions where flood damage to the line may occur, or where runoff may be diverted onto contiguous private property.

Special profiles or details drawn to scale may be required for connections to existing manholes and large diameter (24" or more in diameter) trunk or interceptor sewers, as well as non-standard structures which are a part of the system or provide some support function. All details should be accompanied by notes explaining their function, capacities and their location in the system. Where Pima County Department of Wastewater Management standard details apply, reference may be made to these details by number only.

Unless otherwise approved the scales used in the main body of the drawings shall conform to the standard of this agency and shall be one inch equals forty feet (1" = 40') horizontally and one inch equals four feet (1" = 4') vertically. Where the profile is exceptionally irregular or steep, a vertical scale up to one inch equals eight feet (1" = 8') may be used.
DESIGN CRITERIA FOR SANITARY SEWERS AND RELATED FACILITIES

The design of sanitary sewers and related facilities to be installed within public right-of-way and/or easements for public maintenance shall conform to the Arizona State Department of Health's Bulletin No. 11, entitled: \(\text{Minimum Requirements for Design, Submission of Plans and Specifications of Sewage Works} ,\) latest revision, and to the Pima County Department of Wastewater Management Standard Specifications and Details, latest revision.

Design Capacities

All new sanitary sewers shall be designed to carry the PWFF (peak wet weather flow) from the area ultimately tributary to the respective reach of sewer. The PWFF (mgd) shall be calculated utilizing the ultimate population (i.e., saturation of the existing zoning of the tributary area - usually at a time 50 years hence).

All new sewers, for which the ultimate service area is restricted to the property/development/subdivision in question, shall be designed to carry (with adequate velocity - see sub-section entitled: Required Grades, page 9) the resulting ultimate tributary flow, calculated as follows:

Residential: \[A_f \times \text{Pop} \times P_f + I_f \times A_t = \text{PWFF Flow (mgd)}\]

Commercial/Industrial:

\[A_c \times A_t \times P_f + I_f \times A_t = \text{PWFF Flow (mgd)}\]

\[A_f = \text{Average Flow (gal/cap/day): 100 gal/cap/day for single family residential (including townhouses and mobile homes) and 80 gal/cap/day for multi-family residential.}\]

\[A_c = \text{Average Flow (gal/acre/day)} = 1000 \text{ gal/acre/day}\]

\[\text{Pop = Tributary population (average of 3 persons/dwelling unit for all types of living units), calculated from Pop: 3 persons/living unit times number of tributary living units.}\]
\[ P_f = \text{Peaking Factor} \]

\[ I_f = \text{Stormwater Infiltration (gal/acre/day)} = 250 \text{gal/acre/day} \]

\[ A_t = \text{Tributary land area (acres)} \]

Flow = Resulting calculated Peak Wet Weather sewage flow (mgd)

<table>
<thead>
<tr>
<th>Residential</th>
<th>Commercial/Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trib. Pop.</td>
<td>Pf</td>
</tr>
<tr>
<td>100</td>
<td>3.62</td>
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<tr>
<td>150</td>
<td>3.35</td>
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<tr>
<td>800</td>
<td>2.46</td>
</tr>
<tr>
<td>(&lt;1000)</td>
<td>2.38</td>
</tr>
<tr>
<td>1200</td>
<td>2.34</td>
</tr>
</tbody>
</table>

*Pf for larger Trib. Pop. - consult Pima County Department of Wastewater Management.

The required minimum capacities (PWWF) for all new sewers, which are being designed (or oversized as the specific case dictates) to provide flow-through capacity, or are classified as outfall or as off-site augmentation sewers, shall be established by the Pima County Department of Wastewater Management, Engineering Division.

**Size, Depth and Velocity of Flow**

The accepted pipe materials for use in the public sewerage system and for the HCS(s) from the main to the right-of-way or easement boundary shall be limited to Extra-Strength V.C.P., Asbestos Cement Pipe and Ductile Iron Pipe (class and type of joint to be specified on the plans). Use of other pipe materials and any variation of pipe material within a project will be reviewed/considered upon written request to the Department of Wastewater Management.
All pipe materials selected are to meet local conditions, with special consideration being given to; the typical and chemical characteristics of the wastes to be carried, possibilities of septicity, depth of cover, exceptional heavy external loadings, abrasion, the necessity of reducing the number of joints, soft foundations and similar problems.

Material used for sewer joints shall have satisfactory records for preventing or reducing infiltration and the entrance of roots.

No public sewer should be less than eight (8) inches in diameter; however, consideration will be given to six (6) inch pipe for lines not over 200 feet in length and where the line cannot be extended under any circumstances.

Sewers shall be designed to provide a minimum of four (4) feet of cover over the H.C.S. at the property line. Main depths in alleys, easements or extensions from or connecting to existing shallow sewer systems shall be evaluated on a available depth basis.

For all major sewers crossing a wash, the Engineer shall submit calculations evaluating the anticipated scour depth in the wash for a 50-year storm. If required (always where the cover is less than 4' or as the specific case evaluation dictates), asbestos cement or vitrified clay sewer pipe shall be completely encased with a reinforced concrete envelope six (6) inches (minimum) in thickness with respect to the bell of the pipe' (Type "B" encasement). The encasement shall extend from the top of one bank of the drainageway to the top of the opposite bank. Ductile iron pipe, along with any required supporting structures and/or mechanical joints, may be allowed or required in lieu of the encased sewer for wash crossings. These same protective measures may be required if the sewer line is to lie underneath a culvert or other type of structure.
Type and class of pipe and class of bedding shall be calculated based on soil conditions, depth of cover to each width at the top of the pipe and a required minimum safety factor of 1.5. This criteria shall be specified on the plans and any deviating from the stated conditions (subject to the Pima County Department of Wastewater Management Engineering Manager) shall require higher class pipe and/or bedding.

In the case of sewers where slope, pipe diameter and quantity of sewage being transported are such that velocities of 10 feet per second or greater are realized at average dry weather flow, special provisions shall be made to protect against erosion and shock.

Size Changes

When sewers are increased in size, or when a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. (An approximate method for obtaining this result is to place the crowns of both sewer lines at the same elevation).

Required Grades

All sanitary sewers shall be designed to provide self cleansing velocities. All sanitary sewers shall be designed to provide a minimum velocity of two feet per second at peak daily dry weather flow. In all cases, unless otherwise approved by the Engineering Manager of the Pima County Department of Wastewater Management, the minimum slopes for 8" diameter sewers shall be; V.C.P. and D.I.P. .44%, A.C.P. .60%. Slopes for all new sewers, 10" diameter and larger, shall be reviewed on a case by case basis.

Where situations are encountered and the above noted slopes for 8" diameter sewers cannot be maintained, and with written justification, the Department of Wastewater Management may approve flatter slopes. True slope of the pipe shall be shown.
When slope changes are required, they shall be made only at manholes. The base of the manhole shall be designed to avoid hydraulic jumps and to insure full capacity without excessive head losses.

H.C.S. (House Connection Sewer) slopes within the public rights-of-way shall correspond to the minimum required by the Uniform Plumbing Code (latest edition).

H.C.S. connections to the public main shall be made via wye or tee fittings or epoxy joined saddles (utilizing a machine cut tap through the wall of the main). H.C.S. connections to manholes are to be avoided. If a lateral main terminates in a culdesac, with no feasibility of future extension, and a manhole is placed at the upstream terminal end of this sewer, a maximum of three (3) H.C.S.(s) may be connected into the manhole. Crowns of the 4" diameter H.C.S.(s) are to match the crown of the outgoing public main, and a channel through the sidebench of the manhole base shall be constructed for each H.C.S. - as per Standard Detail No. 3 to insure a smooth transition of flow between the H.C.S. and the public main. The balance of the H.C.S.(s) from the culdesac lots will be connected directly into the main.

If H.C.S.(s) are installed via saddles/machine cut holes, the minimum spacing shall be five (5) feet, i.e., one (1) connection per laying length of mainline for ESVCP and two (2) per laying length for A-C main (the 5' minimum dimension being respected at all times).

In all other instances, H.C.S. connections to manholes will only be allowed upon written request/justification by the Engineer and subsequent approval by the Department of Wastewater Management.

Proposed House Connection Sewers shall be located such that they do not violate the frontage of an adjacent lot(s) while traversing to the point of connection with the public main. The overall length of the H.C.S. conduit within public rights-of-way is to be minimized.
An approved backwater valve shall be installed when the FFE is one (1) foot or less above the nearest upstream manhole or clean-out rim elevation. For 30" manhole covers the elevation criteria is increased to eighteen (18) inches. A self explanatory tabulated numerical listing of lots requiring backwater valves shall appear on the plans.

**Alignment**

Sewers shall be laid with uniform slope and alignment (horizontally and vertically) between manholes and between manholes and clean-outs.

**Separation of Water and Sewer Mains**

Sewers shall be designed in such a manner that no sewage or waste may find its way into, or otherwise contaminate, any potable water supply. When water lines and sewers are laid parallel to each other, the horizontal distance between shall not be less than six (6) feet (outside surface to outside surface dimension). Each line should be laid in a separate trench. Where conditions prevent the minimum horizontal separation set forth above, or where both lines are in the same trench, the sewer line shall be constructed of asbestos cement pipe or vitrified clay pipe completely encased in concrete or ductile iron pipe with mechanical joints. In such instances, a complete description of the circumstances and details of the proposed construction shall be attached to the plans submitted to the Department for review.

Where the sewer line crosses over or is less than 2.0 feet below a water main, the sewer shall be fully concrete encased or constructed of ductile iron pipe with mechanical joint - either shall be installed for a distance of 10 feet (horizontal distance measured perpendicularly from the center line of the crossed water main) in both directions from the crossing.
Manholes and Clean-outs

Manholes shall be installed at the end of each line; at all changes of grade, size alignment; at all sewer intersections; and at distances shown below:

Manhole Spacing

<table>
<thead>
<tr>
<th>Pipe Size (In.)</th>
<th>Max. Manhole Spacing (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>450</td>
</tr>
<tr>
<td>10 - 15</td>
<td>550</td>
</tr>
<tr>
<td>18 - 24</td>
<td>600</td>
</tr>
<tr>
<td>27 and larger</td>
<td>1000</td>
</tr>
</tbody>
</table>

Clean-outs may be used at the upstream terminal end of 6" or 8" diameter laterals, less than 200 feet in length, when conditions are such that the line cannot be extended.

A sufficient number of manholes shall be placed in curved streets so that the sewer stays within the proposed curb lines of the street. Drop manholes shall be avoided.

The minimum diameter of manholes shall be 48 inches for mains \( \frac{10}{12} \)" or less in diameter and 60 inches for lines \( \frac{15}{16} \)" to 36" in diameter. Where special conditions exist, larger diameters may be required (a special detail will be required on the plan for manholes with a diameter greater than 5').

The flow channel through manholes shall be made to conform in size and shape to that of the interior surface of the servicing sewer lines. Where no break in grade occurs through a manhole, and where there is no horizontal deflection in the alignment, the channel shall conform to the slope of the sewer line. For horizontal alignment changes of 10° to 44°, a minimum of 0.10 foot fall shall be designed into the channel invert. For alignment changes of 45° through 90° (maximum), a minimum of 0.20 foot fall shall be designed into the channel invert. Where changes in grade occur at a manhole, the slope of the channel bottom through said manhole shall be such as to provide for a smooth transition of flow from all inlet pipes to the outlet pipe(s).
All channels within new manholes shall be shaped and formed to provide a smooth transition of flow from all the inlet(s) to the outlet(s). The minimum flow line radius shall be 2.0 feet.

When plans call for the construction of a new manhole over an existing main, the following note (with data blanks accurately completed) shall be placed in the profile view in the immediate vicinity of the manhole in question:

"New Manhole # is to be constructed over the existing in service " diameter (material) sewer. The rough base and/or benches shall be constructed with existing main intact. Thereafter, cut out the top portion of the " diameter main and complete the construction of the new manhole in accordance with referenced standard details."

Where the placement of the public sewer through the manhole is adjusted dimensionally (from the "standard" location as called for on the standard detail) to compensate for construction problems, etc., a special, scaled detail shall be placed on plan sheet describing dimensioning of the required layout for the manhole in question.

Special Facilities

Special facilities are such items as inverted siphons, junction chambers, sampling and/or metering manholes, structures and/or pilings for wash crossings, etc. Scaled details shall be shown on the contract plans, adequately specifying such items as materials of construction, dimensions, joints, welds, reinforcement, slopes, lengths, etc.

Design calculations shall be submitted by the Engineer for review and approval by the Department of Wastewater Management for all siphons, structures, wash crossing structures and pilings, etc., prior to final approval of the construction plans.

Use of inverted siphons shall be avoided.
Sewage pumping facilities shall only be incorporated into the public sewerage system after concept approval by the Department of Wastewater Management via the rezoning/subdivision plat/development plan review process.

Pump stations will be constructed in accordance with Standard Detail Nos. 13 and 14 or as per a special design. Site conditions, permanency and/or tributary area will dictate the choice. The Consultant shall contact the Pima County Department of Wastewater Management prior to the initial submittal of the plans for review. In all cases, a complete plan and profile of the route for the new pressure main shall be provided – see Plan, Profile and Detail Sheets section for plan requirements.

In those cases where Standard Details Nos. 13 and 14 will suffice, the following additional information will be placed on the contract plans:

a. Pump data, inclusive of the rated horsepower, pumping capacity, total dynamic head, manufacturer and model number (complete design calculations for the sewage lift station and pressure main system shall be submitted to the Engineer for review and approval).

b. Sump capacity and fill time.

c. Complete plan and profile of the pump station and valve manhole site, inclusive of an overall, scaled site plan (including surface drainage and two foot interval contours) for stations not located within public streets and/or alleys. Show elevation of extraordinary high water (100-year flood-plain) at the site and elevation of sewage overflow in the collection system in the event there is a station malfunction.

In those instances where a specially designed pump station is to be utilized, the following information/details, in addition to the information requested for the "standard" installations, will be shown on the plans:
a. All details (plan, cross-sections and otherwise) needed to specify the construction of the station and appurtenances - inclusive of mechanical, civil and electrical details/specifications.

b. Pertinent data on the individual pump or package unit to be installed.

It is recommended that the Engineer submit to the Department of Wastewater Management manufacturers' literature and design calculations for all non-standard pumping equipment for review/preliminary approval, all prior to incorporating the equipment into the final design.

Required Easements (those in addition to ones provided via the subdivision plat)

Complete detailed and accurate description for all new sewer easements shall be submitted to the Department of Wastewater Management for review and approval after the initial review of the plans has been completed and prior to the next plan submittal. Included with verbal description shall be a scaled plan of the property(s) involved, showing the Owner's name, property dimensions, location of the new easement (tied dimensionally to the property's corners at each end of the easement and at all horizontal deflection points along the easement) within the affected property . . . . i.e., all vital information necessary to accurately portray the location of easement for Pima County Department of Property Management uses.

Easements shall be required where the proposed facility is outside the limits of the road right-of-way. The easement shall be of sufficient width to allow maintenance of and access to the line, but in no case less than fifteen (15) feet.
1. All design standards, materials and workmanship for sewers are to be in accordance with Standard Specifications and Details of the Pima County Department of Wastewater Management, Pima County, Arizona, said specifications and details are on file in that office.

2. Contractor shall comply with all applicable Occupational Safety and Health Administration Regulations.

3. Contractor to verify locations and elevations of all existing utilities prior to any construction. Call "Blue Stake" 792-2211, two full working days prior to excavating.

4. Bench mark elevations are based on __________________________ Datum.

5. Bedding shall be Class ____ or as shown on the plans. Should ground water or other unanticipated soil condition be encountered, the bedding shall be modified as directed by the Engineer.

6. The horizontal distance between a public water pipe and a sewer main shall not be less than six (6) feet. Vertical clearance between water and sewer line shall be a minimum of 24 inches. (If these criteria cannot be met, design changes will be required.)

7. All changes shall be approved by the Pima County Department of Wastewater Management prior to construction.

8. Contractor shall field verify existing sewer elevations and alignments prior to construction.

9. All rough grading to be complete prior to the installation of sewers, including fill and compaction as indicated on plans.

10. Where connections to existing manholes are to be made, the contractor shall construct new inverts in the existing bench to direct the flow in the proper direction.

11. Contractor shall install all frames and covers for manholes and clean-outs to the elevations staked by the engineer.

12. Paving contractor shall adjust manhole and clean-out frames and covers to final pavement surface grade.

13. The contractor shall furnish, operate and maintain all equipment necessary to provide sewer service to all parties tributary to a live sewer to which a connection is to be made. Notify Pima County Department of Wastewater Management Maintenance Department 48 hours prior to construction affecting live sewers.

14. All house connection sewer stub-outs shall have a minimum slope of 2% and a minimum cover of four feet in the area between the main line sewer and property line. If cover is less than four feet, the HCS stub-out shall be ductile iron. All HCS stub-outs shall be marked at property line with #9 Wire anchored with a brick.
<table>
<thead>
<tr>
<th>NO.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Precast Manhole</td>
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<tr>
<td>2</td>
<td>Standard Brick Manhole</td>
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<tr>
<td>3</td>
<td>Flat Top Manhole</td>
</tr>
<tr>
<td>4</td>
<td>5' Diameter Top Manhole</td>
</tr>
<tr>
<td>5</td>
<td>Drop Manhole</td>
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<td>7</td>
<td>Cast Iron Manhole Step</td>
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<tr>
<td>8</td>
<td>Manhole Ring</td>
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<tr>
<td>9</td>
<td>Manhole Cover</td>
</tr>
<tr>
<td>10</td>
<td>30&quot; Manhole Frame &amp; Cover</td>
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<tr>
<td>11</td>
<td>Standard Cleanout - Ring &amp; Cover</td>
</tr>
<tr>
<td>12</td>
<td>Pump &amp; Valve Station</td>
</tr>
<tr>
<td>13</td>
<td>Plan View for Pump &amp; Valve Station</td>
</tr>
<tr>
<td>14</td>
<td>Standard Bedding</td>
</tr>
<tr>
<td>15</td>
<td>Concrete Encasement</td>
</tr>
<tr>
<td>16</td>
<td>Modified Concrete Encasement</td>
</tr>
<tr>
<td>17</td>
<td>Pavement Patch Over Trench</td>
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</table>
FLAT TOP

5'-4"

5/8" Ø BARS
8 - 4'-5"
4 - 3'-6"

2'-2 1/2"
5'-4"

PAVING

STANDARD MANHOLE RING

4'-0" L.D.
2'-0"

PIMA COUNTY DEPT. OF SANITATION
STANDARD DETAILS

Dept. Director
Dept. Engineer BILLY J. JOPLIN

Designed H. H. Drawn F. H. Rev. Scale NONE Date 1-73 Dtl. No. 3
NOTE:

* Use C.I. or D.I. 90° Bend for Drop 5' or more.
MANHOLE STEP - PRECAST MANHOLE ONLY

POLYPROPYLENE PLASTIC

NO. 3 DEFORMED STEEL ROD

SECTION A-A

STEPS SHALL BE PLACED INTO WET CONCRETE WALL DURING MANUFACTURE OR MORTARRED INTO HOLES AFTER CONCRETE HAS SET

MANHOLE WALL
CAST IRON MANHOLE STEP

SECTION "A-A"

SECTION "B-B"

CASTING IS TO BE 1ST CLASS
GREY IRON, TOUGH, AND EVEN
GRAINED. PAINT WITH ONE SHOP
COAT (BLACK)

PIMA COUNTY DEPT. OF SANITATION
STANDARD DETAILS

Approved: Dept. Director
Dept. Engineer BILLY J. JOPLIN

Designed H.H. Drawn BL Rev. 11-72 Scale: none Date 12-72 Dwg. No. 7
MANHOLE RING

环形

环形横截面

环形替代横截面

注释

1. 环形和盖子的顶部应平齐，环形和盖子之间应有1/8"垂直间隙。

2. 整体铸造应涂一层车间漆（黑色）。

3. 不满足上述要求和尺寸的环形和盖子将被拒绝。

PIMA COUNTY DEPT. OF SANITATION

标准细节

已批准：
部. 经理

部. 工程师：BILLY J. JOPLIN

设计：H.H.  图画：BL

修订：12-72  规模：none  日期：12-72  图号：8
MANHOLE COVER

PLAN VIEW

SECTION "A-A"
GROUND FINISH TO REMOVE ALL BURRS & INSURE FIT ALL AROUND

BOTTOM VIEW

MILLED FINISH

NOTES

1. All Castings To Be Of 1st Class Grey Iron, Tough & Even Grained.

2. All Covers Are To Carry The Letter "S", Letter To Be Raised 5/16" and Shall Be 2-1/2" High.

3. The Surface Not Occupied By Ribs Shall Have 5/16" Raised Stubs 5/8" Square.

4. Entire Casting To Receive One Shop Coat (BLACK).

5. Cover Wt. 155 Lbs.
Ring Wt. 200 Lbs.

6. The Tops Of The Cover & Ring Shall Be Flush With 1/8" Vertical Clearance All Around.

7. Cover Shall Have 4-3/4" Vent Holes.
RING & COVER IS NOT TO BE INSTALLED UNTIL CONCRETE AROUND STACK HAS SET. CLASS 'C' CONCRETE.

WHEN USING MECHANICAL TYPE JOINTS THIS PIPE MAY HAVE TO BE SHORTENED IN ORDER TO HAVE TOP OF C.O. AT PROPER GRADE. THIS SHALL BE DONE BY SAWING.

8" CLEANOUT STACK

45° WYE

NOT LESS THAN 3'

TO BELL OF WYE

NOTE: CONCRETE SHALL BE CLASS 'C'

STRIP PLASTIC OUT OF BELL & REPLACE WITH PACKING JUTE OR TWISTED (FED. SPEC. HH-P-117) COMPLETELY AROUND PIPE, BUT SHALL NOT FILL MORE THAN 1/4 THE ANNULAR SPACE.

ALTERNATE METHOD: HOT POUR C.P.I. OR EQUAL AS OUTLINED CITY OF TUCSON STD. SPEC. NO. 207
TYPES OF PUMPS AND CONTROL SYSTEMS WILL VARY ACCORDING TO APPLICATION OR DESIGN CONSIDERATIONS. PUMP STATION ILLUSTRATED IN PLAN AND SECTION VIEWS IS TYPICAL AND NOT INTENDED TO DEPICT ALL INSTALLATIONS.
STANDARD BEDDING

1. HAND BACKFILL OF SELECT MATERIAL WATER SETTLED AND, OR COMPACTED AS REQUIRED BY SPECIFICATIONS TO REQUIRED DENSITY. SELECT MATERIAL IS DEFINED AS EITHER IMPORTED OR TRENCH SITE EXCAVATED MATERIALS OF WHICH 75% WILL PASS THE 1/4" SIEVE WITH ALL MATERIAL PASSING THE 3/4" SIEVE.

2. SEE PLANS AND/OR SPECIFICATIONS FOR TYPE AND LOCATION OF BEDDING TO BE USED.

3. "D" SHALL NOT BE LESS THEN 12".

4. TRENCH BACKFILL: THIS MATERIAL WILL CONSIST OF 50% FINES AND SHALL NOT EXCEED 4" IN SIZE. COMPACTED AS REQUIRED BY SPECIFICATIONS.


6. SPECIAL COMPACTED GRANULAR MATERIAL SHALL BE -
   (a) FOR PIPE LESS THAN 27" IN DIAMETER USE MAXIMUM 3/4" ROCK WHICH IS NO. 4 ROCK DEFINED IN STD. SPECS.
   (b) FOR PIPE 27" OR LARGER USE MAXIMUM 1-1/2" ROCK WHICH IS NO. 3 ROCK AS DEFINED IN STD. SPECS.

DEPT. DIRECTOR

CHIEF ENGINEER

PIMA COUNTY DEPT. OF SANITATION

STANDARD DETAILS

DESIGN  DRAWN  REV.  SCALE  DATE  DTL. NO.

A. D.  4-71  NONE  4-77  14
CONCRETE ENCASEMENT

CLASS "A" CONCRETE

85% COMPACTION OF SPECIAL
GRANULAR MATERIAL
(See note 6—STANDARD BEDDING DTL.)

MIN. 3" BELOW BELL.

CONCRETE Encasement (Type "A")

CLASS "A" CONCRETE
NO 4 REBAR 18" O.C.
LAP 36 DIA.

2" MIN. COVER
NO 8 REBAR 4" O.C.
LAP 36 DIA.

85% COMPACTION ON SUBGRADE

CONCRETE Encasement (Type "B")
Concrete Pavement Patch (TYPE A)

Asphalt Pavement Patch (TYPE B)

Low Type Bituminous Surface Treatment Pavement Patch (TYPE C)

NOTE:
(1) Reference to Pima Co. Improvement District Specifications shall be to latest revision.
(2) Backfill compaction per A.A.S.H.O. Designation T-99, Method "C".
(3) Aggregate base course compaction per Ariz. Hwy. Dept. Test Method 225(A) and 227a.