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### DIVISION V  SANITARY SEWER

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For comments or corrections please E-Mail at: jcengineering@jeffcitymo.org
1. All required pipe openings shall be plant cast in manhole units. Field alterations of openings will be permitted, provided walls are scored with a masonry saw to a depth sufficient to sever reinforcing steel. A chipping hammer may then be used to remove concrete.

2. Use precast base and riser with A-Lok (or equivalent) connector or, poured base and precast riser with A-Lok (or equivalent) for max. grade of 15%. Use Z-Lok (or equivalent) for grades over 15%.

3. Minimum distance between any two adjacent pipes shall be 4".

4. When making connections to existing manholes core holes as specified in manhole and install A-LOK Inserta-LOK for grades less than 12% or A-LOK G3 boot system for grades at or above 12%.

5. Grout pipes to provide smooth transition into and from invert with expansive grout. Do not grout sides and top of pipe when using water tight rubber gaskets.

6. Manhole top adjustment shall be accomplished by the use of concrete or HDPE adjusting rings.

7. Reinforcement shall meet AASHTO M199, section 14.4. Circumferential reinforcement shall consist of either one or two lines of steel. The total area of reinforcement per vertical foot shall not be less than 0.0025 times the internal diameter in inches.

Ground line

Frame and lid

Type "M"

Adjustment ring 12" max

Gasket between precast concrete surfaces shall be asphalitic material

Precast manhole risers & eccentric cone. Concentric cone to be used only on approval by the Department of Public Works

<table>
<thead>
<tr>
<th>Pipe Size Inside Diameter</th>
<th>&quot;D&quot; Diameter Manhole Required</th>
<th>Min. Wall Thickness of Precast Manhole</th>
</tr>
</thead>
<tbody>
<tr>
<td>21&quot; &amp; less</td>
<td>4' - 0&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>24&quot; - 33&quot;</td>
<td>5' - 0&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>36&quot; - 42&quot;</td>
<td>6' - 0&quot;*</td>
<td>6&quot;</td>
</tr>
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</table>

* Or square structure 12" larger than pipe O.D.

Exterior of manhole to be waterproofed (see standard specs.)

Plastic coated steel manhole steps, 16" on-center. (see detail)

Precast base:
- 6" thick < = 14' depth
- 8" thick > 14' depth

Minimum fall through manhole = 0.10'

See sheet 50.02 for incoming pipe grades exceeding 5%

Standard Manhole Section
Construct spillway where invert of upper sewer is above mid height of lower sewer

Plan View

Section View

Standard Manhole
**Plan View**

**Section View**

**Standard Outside Drop Manhole**

*When the slope of the incoming sewer main exceeds 10% slope a wye fitting shall be used in place of a tee.*
Plan View

Rework invert to direct outflow (min radius of 1.50 x dia. of pipe)

45° PVC elbow angled toward outflow pipe

Section View

Compacted native or imported soil in unpaved areas, compacted granular material under pavements.

Water tight flexible gasket

1" clean rock

Core drill and match existing pipe grade

PVC drop inlet pipe

See note #4

Flowline of invert from branch sewer to be 1/4 of the pipe diameter above main invert

See sheet 50.01 for manhole details

Inside Drop Manhole

Manhole Notes:

1. Inside drop connection only allowed with Public Works Department approval.
2. Drop inlet pipe shall be the same size and material as sewer line.
3. Drop inlet pipe may be adjusted to maximum of 5% deflection.
4. Secure PVC pipe to manhole wall with stainless steel pipe brackets/straps and stainless steel bolts. Brackets/straps shall be a minimum of 6" from any pipe joint. Bracket/straps shall be placed a maximum of 4 feet apart. There shall be a minimum of 2 brackets/straps.
**A-LOK Inserta-LOK**

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Hole Size Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; ø SDR 35</td>
<td>7.75&quot;</td>
</tr>
<tr>
<td>8&quot; ø SDR 35</td>
<td>10&quot;</td>
</tr>
<tr>
<td>10&quot; ø SDR 35</td>
<td>12&quot;</td>
</tr>
<tr>
<td>12&quot; ø SDR 35</td>
<td>14&quot;</td>
</tr>
</tbody>
</table>

* Refer to manufacturers specifications for other pipe types and sizes.

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**Section View**

**Connection to Existing Manhole**

**Grades less than 12%**

---

**A-LOK G3 Boot**

<table>
<thead>
<tr>
<th>Pipe O.D.</th>
<th>Hole Size Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; - 9.5&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>10.0&quot; - 11.25&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>12.0&quot; - 13.5&quot;</td>
<td>16&quot;</td>
</tr>
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</table>

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**Section View**

**Connection to Existing Manhole**

**Grades at or above 12%**
Shallow Manhole < 4'
Concentric Cone Section View

Frame and lid Type "M"

12" max

Concrete Invert (same as standard manhole)

4" max

2'

2'

8" 8"

Frame and lid Type "M"

Shallow Manhole < 4'
Slap Top Section View

2' dia. or 2'x2' square concrete collar 6" thick

#5 bars at 6" OC each way or 4x4xW 20xW20 WWF 2" clear of bottom

2'-0" dia. opening 2" clear inside face of manhole

Outside dia. of manhole

Slab Top Plan View

Frame and lid Type "L"

Unpaved Paved

Compacted granular material

Match pavement or street patch details

Compacted native material

Section View

Lamp Hole Cover Detail

Frame and lid Type "L"

Concrete collar

45° long sweep elbow

Compacted granular material

Sewer Lamp Hole Detail
Cradle under pipe and up to 1/6th of pipe O.D. above bottom of pipe.

When base and invert are placed at the same time, inlet and outlet pipes and bottom riser of manhole shall set on solid concrete blocks.

Manhole water stop gasket and clamp (typ)

Pipe shall project completely into manhole 3” maximum

Optional: Concrete Block Base

Note:
Use of optional concrete block base is subject to approval of the Public Works Department.

Manhole Step Detail
Manhole step to be M.A. Industries Inc. #PS-1 or equivalent to be installed in manholes greater than 10 feet
Concrete Pipe Support Detail

Front View

Pipe dia. 6" (typ)

6" (typ) Varies

4-#4 equal spaced each face

2" wide x 1/4" thick stainless steel strap

3/4"x1'-2" long galv. steel anchor bolts (2 each way)

1'-0" 1'-0"

1-1/2" clear

Ductile iron pipe

#4 ties

Finished grade 3'-0" below grade

2' for 20" pipe

18" for 8" pipe

Side View

Concrete Anchor Detail

Section "A"

Sewer pipe

12" 6" min. 6" min

24" min. for concrete anchor

Trench width

Payline for concrete

Elevation

Class "B" concrete anchors

Concrete Anchor for pipe dia.

Gradation for Granular Bedding Material
ASTM Standard C33

<table>
<thead>
<tr>
<th>SIEVE SIZE</th>
<th>% PASSING</th>
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<tbody>
<tr>
<td>Passing 3/4&quot;</td>
<td>90 - 100%</td>
</tr>
<tr>
<td>Passing 1/2&quot;</td>
<td>--</td>
</tr>
<tr>
<td>Passing 3/8&quot;</td>
<td>20 - 55%</td>
</tr>
<tr>
<td>Passing No. 4</td>
<td>0 - 10%</td>
</tr>
<tr>
<td>Passing No. 8</td>
<td>0 - 10%</td>
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When In:
1. Dirt, grade approx. 8' without granular material & backfill with dirt (or clay)
2. Rock, grade ditch approx. 8' with dirt, (or clay) & backfill with dirt (or clay)
3. Wet area, place ditch blocks approx. 100' apart between manholes, in drier areas place one (1) ditch block between manholes.

Granular bedding

Water Stop Detail

Width of bucket

Clay material for water stop
14" I.D. steel casing (0.188" wall)

Use maximum standard lengths of carrier pipe in casing
Stainless steel casing spacer with plastic skids

Flexible casing seal banded to casing & carrier pipe with stainless steel band (typical each end of casing)

Section Thru Steel Casing

14" I.D. steel casing (0.188" wall)
8" ductile iron pipe

Stainless steel casing spacer with 1 1/2" wide by 12" long plastic skids at quarter points

Front View of Casing

Join pipes in proper alignment & fill joint so concrete will not flow into pipe

Concrete Collar

Use #9 wire (2 per joint of pipe) or #4 re-bar or tie down pipe to prevent floating

Concrete Encasement Details

Set concrete blocks to grade
Pour concrete directly against excavation or set on crushed rock it required for stabilization of wet trench

Note:
1. Use manufactures gasketed fittings. For other main types.
2. Gap between saw ends must be as small as possible with max. of 1/2" for VCP pipe.
Sanitary Sewer Lateral Cleanout
less than 2 feet of cover

Sanitary Sewer Lateral Cleanout
2 feet or more of cover

Section View
Plan View

Sanitary Sewer Lateral Cover
when cleanout is located in pavement

Sewer Lateral Notes:
1. The location of the cleanouts may vary from the location shown.
2. In the case where a lateral is being stubbed out for future use the lateral should extend a minimum of one foot beyond the cleanout or beyond the back of the sidewalk and shall be sealed with a glued cap.
3. 12 gauge insulated copper tracer wire shall extend to the limits of all lateral installation. The wire shall be taped to the lateral at intervals not exceeding 10 feet.
Threaded PVC cap flush with finished grade

Wind 3' of tracer wire around pipe

Tracer wire to be taped to cleanout at two foot intervals

Cleanout Tracer Wire Termination when cleanout is not in pavement

Frame and Lid Type "C"

Wind 3 feet of tracer wire around pipe.

Section View

Cleanout Tracer Wire Termination when cleanout is located in paved surface

Sewer Lateral Notes:

1. Tracer wire shall be 12 gauge solid copper per Jefferson City forcemain specifications.
2. For new construction tracer wire shall be placed from the sewer main to the building foundation. For retrofit or reconstruction the tracer wire shall be placed for the extent of the construction.