
SANITARY SEWER STANDARDS
URBANA & CHAMPAIGN SANITARY DISTRICT
AND
AFFILIATED COMMUNITIES
CHAMPAIGN
URBANA
SAVOY

Prepared by:

Intergovernmental
Joint Sanitary Sewer Technical Committee
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Introduction

The Intergovernmental Agreement Regarding Sanitary Sewers, which was adopted in 1992 by the Urbana & Champaign Sanitary District (District), the City of Champaign, City of Urbana and Village of Savoy, provided for the creation of a Sanitary Sewer Technical Committee charged with the responsibility of coordinating and implementing certain responsibilities set forth in that Agreement. One of those responsibilities is to control connections to, and set standards for construction of, all municipal sanitary sewer systems tributary to the District. To that end, the Technical Committee adopted a set of standards in December, 1994.

This document represents the second major revision to those 1994 standards, incorporating policy and technical changes that expand and clarify the practices and requirements that apply to all sanitary sewers within the District.

It is the Sanitary Sewer Technical Committee's intent through these standards that it is clear to the development, architectural and engineering community what the District and each community's standards are. This will result in consistent plan and specification submittals and simplify installation methods and expectations for contractors.

Urbana & Champaign Sanitary District

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SANITARY SEWER STANDARDS

100.00 PIPE MATERIALS

Pipe materials used for sanitary sewers shall conform to the following materials which are expressly manufactured for transmitting sanitary sewage and shall comply with requirements of the Illinois Environmental Protection Agency:

Extra strength vitrified clay per ASTM C700, ductile iron per AWWA C150, gasketed PVC truss pipe per ASTM D2680, PVC profile pipe (18-inch diameter and larger) per ASTM F949 or ASTM F1803, SDR 26 Solid Wall PVC pipe per ASTM D-3034, and others approved by the Executive Director of the UCSD with the concurrence of the approving authority.

Ductile iron pipe shall have an interior coating to protect against corrosion consisting of Protecto 401 ceramic epoxy or polyethylene lining. Interior coating shall have a nominal thickness of 40 mils. Polyethylene lining shall be in accordance with ASTM D1248 and be heat fused. For trenchless construction, materials and methods will be approved on a case-by-case basis by the approving authority.

110.0 MANHOLES

Manholes shall comply with minimum standards in the "STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN ILLINOIS latest edition" and shall be a minimum of 48 inches in diameter. An external manhole chimney seal shall be required on all new manholes.

111.0 DROP MANHOLE CONNECTIONS

All drop manhole installations, including service lines, may be installed as either internal or external to the manhole structure, except for UCSD interceptor manholes which shall have only external drop assemblies. All drop assemblies shall comply with the appropriate provisions and details in the "STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN ILLINOIS latest edition". Internal drop assemblies will only be allowed if the clearance requirements specified in the IEPA "ILLINOIS RECOMMENDED STANDARDS FOR SEWAGE WORKS" are met. Internal drop assemblies will not be allowed in manholes 48 inches in diameter or smaller. In addition, the location and details of proposed internal drop assemblies must be approved by the approving authority prior to initiation of construction.

112.0 TERMINAL MANHOLE CONNECTIONS

Manholes at the upstream end of dead-end lines shall be constructed so that influent service connections are only attached to the manhole at the upstream side. Further, there shall be a minimum of 4 inches of elevation difference from the invert of the service connection to the invert of the outlet pipe. There shall also be a concrete channel constructed from the invert of the service connection to the channel of the bench outlet pipe. Details of the connection shall be approved by the appropriate agency prior to initiation of construction.

113.00 CONNECTIONS TO EXISTING MANHOLES

New connections made to any existing manhole shall be angled in the direction of flow, and shall be accomplished by core drilling through the wall of the manhole and installing an appropriately sized connector boot, such as *KOR n SEAL*® by NPC Inc., or approved equal.

114.0 UCSD INTERCEPTOR MANHOLE REQUIREMENTS

Manholes constructed on UCSD interceptor sewers shall conform to the "UCSD Interceptor Sewer Manhole Detail" attached to these Sanitary Sewer Standards.

120.00 SERVICE LATERALS

The minimum inside diameter of service laterals or clean-outs shall be 4-inches. No reduction in service lateral pipe diameter is permitted from the structure to the public sanitary sewer.

Pipe materials used for sanitary sewer laterals shall conform to the following materials which are expressly manufactured for transmitting sanitary sewage:

Solid wall PVC with a minimum wall thickness equivalent to SDR 26 or Schedule 40 which meets ASTM D-3034, D-2241, or D-2665; solid wall ABS pipe with a minimum wall thickness equivalent to SDR 23.5 or Schedule 40 which meets ASTM D-2751 or D-2661; and ductile iron per AWWA C150. Ductile iron pipe shall have an interior coating to protect against corrosion consisting of Protecto 401 ceramic epoxy or polyethylene lining. Interior coating shall have a nominal thickness of 40 mils. Polyethylene lining shall be in accordance with ASTM D1248 and be heat fused. PVC Pipe joints for SDR-26 shall be push-on-type with a bell-end groove to receive a synthetic rubber gasket. Solvent welded joints are not allowed. The joint shall be made in accordance with ASTM D-3212.

ABS joints shall be solvent-cemented. The cement shall meet the requirements of ASTM D-2235.

Schedule 40 PVC joints can be solvent-cemented. The cement shall meet the requirements of ASTM D-2564.

If laterals are constructed of 6-inch pipe, they shall have a minimum slope of 1/8-inch per foot. 4-inch pipe shall have a minimum slope of 1/4-inch per foot. All laterals shall be installed at a depth to serve the building it is designed to serve, but shall have a minimum cover of 42-inches unless otherwise approved on a case-by-case basis by the approving authority.

The end of the pipe shall be at no deeper than 7 feet below the existing grade and shall be staked with a 2 x 4 wood leader which extends to 1-ft above the ground.

Manholes are required on any service lateral that that exceeds 6-inches in inside diameter. Manholes shall comply with section 110.00

121.0 CITY OF CHAMPAIGN

Each service connection must comply with the requirements of Section 120.00 and shall be installed to the property line.

122.0 CITY OF URBANA

Each service connection must comply with the requirements of Section 120.00 and shall be installed no closer than 5 feet to any property corner.

123.0 VILLAGE OF SAVOY

Each service connection must comply with the requirements of Section 120.00 except as modified in this Section. The minimum size shall be 6-inch and the line shall be placed to the property line.

124.0 124.00 PIPEBURSTING SEWER LATERAL REPLACEMENT

1. CONTRACTOR'S QUALIFICATIONS

The Contractor shall be trained and certified by manufacturer of the pipe bursting system. A copy of the contractor's certification and training records shall be submitted to approving authority. Field joining of HDPE pipe shall be performed by competent personnel trained in the use of butt-fusion equipment and recommended methods for new pipe connections. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the HDPE pipe. All training shall be performed by a qualified representative of the manufacturer.

2. MATERIALS

Polyethylene Plastic Pipe shall be high-density polyethylene pipe and meet the applicable requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, ASTM D1248, ASTM D3550.

All pipe installed shall be the same diameter or larger than the original sewer lateral and offer the same flow capacity. All pipe shall be made of virgin material. The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

The minimum wall thickness of the polyethylene pipe shall be SDR-17. Minimum inside diameter shall be 4-inches.

If coiled HDPE pipe is utilized contractor shall provide equipment to straighten and reround coiled pipe to meet or exceed ASTM D-2513 quality requirements.

3. EQUIPMENT

BURSTING TOOL: The pipe bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall generate sufficient force to burst and compact the existing pipe line. The pipe bursting tool shall be properly sized for the diameter of pipe to be rehabilitated.

The remotely controlled bursting unit shall pull the HDPE pipe with it as it moves forward. The bursting head shall incorporate a shield/expander to prevent collapse of the hole ahead of the PE pipe insertion. The bursting action of the tool shall increase the external dimensions sufficiently, causing breakage of the pipe at the same time expanding the surrounding ground. This action shall allow the HPDE pipe to be installed free of obstructions and damage.

The contractor shall provide a system of guide pulleys and bracing to minimize cable contact with the existing sewer facilities.

4. CONSTRUCTION METHODS

The Contractor shall install all pulleys, rollers, bumpers, alignment control devices and other equipment required to protect existing facilities and to protect the pipe from damage during installation. Lubrication may be used as recommended by the manufacturer. Under no circumstances shall the pipe be stressed beyond its elastic limit. The pipe bursting unit is to be centered in the pipe to be burst.

The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak proof joint. Butt-fusion joints shall be in accordance with ASTM Standard F2620. Threaded or solvent-cement joints and connections are not permitted.

All equipment and procedures used shall be used in strict compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel trained by a manufacturer of HDPE pipe and/or fusing equipment.

The butt-fused joint shall be true alignment and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe.

All defective joints shall be cut out and replaced at no additional cost. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling shall be discarded and not used.

The ends of the HDPE shall be connected to existing or new pipes using a coupling device. The new connection shall not compromise the structural stability or previous rehabilitation efforts in the mainline sewer serving the lateral. A Fernco Stock or Mission Standard coupling are acceptable for coupling the new HDPE to existing clay, concrete, or cast iron pipe for buried applications. Mission or Fernco couplings shall have rubber sleeves that conform to ASTM C 425 and ASTM C 1173 with 316 Series stainless steel clamps with nut and bolt or worm drive take-up. A bag of premixed concrete shall be installed under each Mission or Fernco coupling.

An ISCO Standard Coupling to IPS PVC or Poly-Cam Transition Coupling shall be used for coupling the new HDPE pipe to PVC pipe.

After all connections are made and inspected by the approving authority, the access pits shall be backfilled.

5. INSPECTION

The Contractor shall provide internal pipe televising inspection for the sewer lateral prior to the pipe bursting activities and after the pipe bursting activities have been completed. A copy of the internal pipe televising inspection shall be available to the approving authority for their review for a period of 3 years after the installation is completed. Televising videos shall be in a MPEG-2 digital video format and shall be stored on CD or DVD discs. Discs shall be clearly labeled with the address of the installation, date performed, and contractor performing the work.

All pipe connections made must be inspected prior to backfilling and resurfacing.

125.0 CURED-IN-PLACE SANITARY LATERAL LINING STANDARDS

1. CONTRACTOR'S QUALIFICATIONS

The Contractor shall be trained and certified by manufacturer of the cured-in-place sanitary sewer lateral lining system. A copy of the contractor's certification and training records shall be submitted to approving authority.

2. MATERIALS

The tube shall consist of one or more layers of flexible needled felt or an equivalent non-woven or woven material or a combination non-woven and woven material meeting the requirements of ASTM F1216, Section 5.1.

The CONTRACTOR shall furnish and install a general purpose, unsaturated, styrene-based, thermoset resin and catalyst system or epoxy resin and hardener specifically designed for lining sewers that provides minimum strengths as specified below.

Strength	Minimum Value (psi.)	Applicable ASTM Test
Tensile Strength	3,000	D 638
Flexural Stress	4,500	D 790
Flexural Modulus	250,000	D 790

All other material properties of the resin system shall meet the requirements of ASTM F1216, Section 5.2.

The minimum thickness of the liner shall be 3.4 millimeters (0.134 inches).

3. INSTALLATION

Cured-in-place sanitary sewer lateral lining is only permitted on 4-inch and larger diameter sanitary sewer laterals. Cured-in-place sanitary lining shall not be permitted for less than 4-inch diameter sanitary sewer laterals. Contractor shall field verify the diameter of the lateral and report the diameter to the approving authority prior to commencement of any work.

The installation of the cured-in-place liner shall be in accordance with ASTM F 1216.

It shall be the responsibility of the Contractor to remove all internal debris from the lateral line. Internal debris consists of any material that obstructs the original pipeline and prevents the installation of the liner. Example of debris includes solids, crushed or collapsed pipe, roots, grease and other miscellaneous materials.

The Contractor shall perform the resin impregnation of the tube in accordance with ASTM F 1216.

The "wet out" tube shall be inserted through an access point by means of an inversion process and the application of air pressure or hydrostatic head sufficient to fully extend it to the public sanitary sewer. The tube shall be inserted into the inversion standpipe with the impermeable plastic membrane side out. At the other end of the inversion standpipe, it shall be turned inside out. The inversion head shall be adjusted to provide sufficient pressure or height to cause the impregnated

tube to invert from and hold the tube tight to the pipe wall. Care shall be taken during the inversion so as not to over-stress the felt fiber.

The use of lubricant is required during the inversion procedure. The methods and materials used for lubrication shall be in accordance with ASTM F 1216, Section 7.5.

Before inversion begins, the Contractor shall obtain from the manufacturer the minimum pressure required to hold the tube tight against the existing conduit and the maximum allowable pressure so as to not damage the tube. Once the inversion process begins, the Contractor shall maintain the pressure between the minimum and maximum pressure until the completion of the inversion process. If the pressure deviates beyond the limits of the minimum and maximum pressures, the Contractor shall remove the installed tube from the existing conduit.

The Contractor shall perform the curing of the inverted tube in accordance with ASTM F 1216, Section 7.6.

Initial cure shall be deemed to be completed when inspection of the exposed portions appear to be hard and sound or the remote temperature sensor indicates that the temperature is of a magnitude to realize an exotherm or cure in the resin. The cure period shall be of a duration recommended by the resin manufacturer, as modified for the process, during which time the recirculation of the water and cycling of the heat exchanger continues to maintain the temperature.

Steam curing is allowed and shall follow Section 7.6.2 and Section 7.6.3 of ASTM F1216.

The finished liner shall be continuous over the entire length of an inversion run and be as free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes and delaminations.

After sewer lateral cured-in-place sewer lining is completed and inspected by the approving authority, the access pit shall be backfilled.

All pipe connections made must be inspected prior to backfilling and resurfacing.

4. CONNECTION TO PUBLIC SEWER

The cured-in-place liner shall not be allowed to protrude into the public sanitary sewer. Contractor shall verify by television inspection that the cured-in-place liner does not protrude into the public sanitary sewer. Contractor shall provide photos or video of the lateral liner connection to the public sewer to the approving authority. Contractor shall be responsible for removing any protruding cured-in-place liner in the public sewer and all costs associated with that work.

5. INSPECTION

The Contractor shall provide internal pipe televising inspection for the sewer lateral prior to the cured-in-place lining activities and after the sewer lining activities have been completed. A copy of the internal pipe televising inspection shall be available to the approving authority for their review for a period of 3 years after the installation is completed. Televising videos shall be in a MPEG-2 digital video format and shall be stored on CD or DVD discs. Discs shall be clearly labeled with the address of the installation, date performed, and contractor performing the work.

130.00 PIPE BEDDING, HAUNCHING & INITIAL BACKFILL

Material and requirements for pipe bedding, haunching, and initial backfill to 12-inches above the top of the pipe shall be in accordance with the "STANDARD SPECIFICATIONS FOR WATER AND SEWER

MAIN CONSTRUCTION IN ILLINOIS latest edition. FA-5 and FA-6 materials are not permitted for pipe bedding, haunching, or initial backfilling in Savoy. Previously excavated material is not an allowable material, unless the material has been tested, at intervals and frequencies acceptable to the approving authority, by a certified laboratory and shown to meet the gradation requirements for one of the specified aggregate materials.

140.00 PIPE CONNECTIONS

141.00 WYES

Sewer wye material must comply with Section 100.00, must comply with appropriate provisions of the "STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN ILLINOIS latest edition" and shall be encased in granular bedding conforming to Section 130.00, except for the Village of Savoy where concrete encasement is required in lieu of granular encasement. Concrete encasement is not allowed elsewhere.

142.0 CONNECTIONS TO EXISTING SEWERS

If a connection is to be made where there is no wye, and the existing piping is smaller than 12 inches in diameter, a section of pipe shall be removed and a wye inserted with pipe couplings, conforming to Section 143.00, and new sections of pipe as needed. New connections to existing piping 12 inches in diameter or larger shall be made by core drilling the existing pipe and installing a flexible connector assembly such as *KOR n SEAL®* by NPC Inc., or approved equal.

KOR n SEAL® or saddles shall be used for all connections to existing sewer pipes that have been rehabilitated using the cured-in-place sewer lining technology.

KOR n Seals or saddles shall be properly supported in a granular base to minimize settlement.

143.00 PIPE COUPLINGS

Pipe couplings shall conform to the applicable portions of ASTM C-425, C-443, C-564, C-1173, and D-1869. They shall be made of elastomeric polyvinyl chloride, shall be specifically sized to fit the outer diameter of the pipes being joined, and shall have stainless steel take-up clamps to fit the appropriate outer diameter of the coupling. The take-up clamps shall be tightened to the manufacturers recommended torque value and the joints tested in accordance with Section 160.00, and the manufacturer's recommendations. Testing may be waived at the discretion of the approving authority, provided that the installation passes visual inspection. After the connection has been inspected, tested where required, and approved by the approving authority, the entire connection shall be encased in granular fill to a minimum of 6 inches all around.

150.00 BACKFILL

Where the inner edge of the trench is within 2 feet of the edge of the pavement, curb, gutter, curb and gutter, stabilized shoulder or sidewalk, the sewer trench must be backfilled with CLSM meeting the approving authority's specifications, or granular trench backfill, placed in uniform layers not exceeding 6 inches thick (loose measure) and compacted to 95% of Standard Proctor unless flowable fill is used, in which case, the fill shall be designed to have a compressive strength between 100 to 200 psi. For Urbana only, CLSM backfill is required within 2 feet of the back of curbs for all arterial or major collector streets.

Jetting and water-soaking is not allowed.

Outside of the pavement area, native soil may be returned to the trench, in accordance with the requirements of "STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN ILLINOIS", but the developer and/or contractor is responsible for repair of all settlement which occurs.

160.00 TESTING

Testing shall comply with provisions of the "STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN ILLINOIS latest edition" with the following exceptions: 1) the maximum leakage shall be 200 gpd/in. dia./day/mile of pipe instead of 240, 2) all reaches shall be tested, 3) the specified air test times in the "Air Test Table" for 8, 10 and 12-inch pipe shall be modified so that test times for pipe lengths greater than 100 feet shall be incremental multiples of the time indicated for the 100 foot length, and 4) all manholes shall be vacuum tested in accordance with ASTM C1244-05a.

170.00 LAMPING

All main lines must be capable of transmitting a full circle of light between manholes. If the light cannot be seen, the sewer must be capable of passing a two-foot long cylinder, which has a diameter 1 inch less than the inside diameter of the pipe being tested.

180.00 PAVEMENT REPAIRS

All pavement repairs must meet requirements of the local agency which has jurisdiction.

181.00 CITY OF CHAMPAIGN PAVEMENT REPAIRS

For projects within the jurisdiction of the City of Champaign, all disturbed street and sidewalk areas shall be replaced in accordance with Section 442 of the IDOT Standard Specifications, with the following exceptions and additions.

All pavement shall be replaced to its original thickness, material type or types, and grade with the following exceptions and additions:

1. Required Permit: Any work in the public right-of-way requires a permit and a description of that work shall be submitted in writing to the right-of-way inspector.
2. Minimum Thickness: If the old pavement was deficient, it must be replaced to current standards and thickness [concrete pavement minimum thickness is 8 inches, non-reinforced, bituminous pavement minimum thickness is 10 inches.]
3. Concrete Pavement Repair: All concrete patches shall be a modified IDOT Class C patch as shown on the attached drawing, with the exception of patches on Arterial and Major Collector streets (defined by the right-of-way inspector). The Arterial and Major Collector streets 8 inches or greater in depth shall be repaired using a modified IDOT Class B patch as shown on the attached drawing. One-inch deformed reinforcing bars shall be substituted for smooth dowels at any new mid-panel joint. Smooth dowel bars shall be used at any pre-existing contraction joint. Pre-existing contraction joints shall be replaced with an appropriate grooving tool. Concrete patch width shall coincide with the edge of full panels and shall have a minimum longitudinal distance of 6 feet. In large cuts, full panels shall be removed and replaced.
4. Full Depth Bituminous or Composite Pavement Repair: A preferred alternative to a full depth, 10-inch, multi-layer bituminous repair, is to construct a minimum of an 8-inch concrete base course, overlaid with a 2-inch hot-mix asphalt surface course.
5. Oil and Chip: Oil and Chip pavements shall be replaced with an 8-inch CA-6 compacted crushed stone base course, overlaid with a 3-inch hot-mix asphalt surface course.
6. Brick Streets: Brick streets shall be re-laid with original brick pavers on a one-inch sand cushion over a new 6-inch concrete base course. Sand shall be deposited over and between laid pavers and vibrated into place with a vibrating plate compactor. Damaged pavers shall be replaced with matching replacement pavers.

7. Pavement Removal: All pavement removals shall be accomplished with a full depth saw cut. A minimum 3-foot bench shall be maintained on all sides of an open excavation. Subgrade shall be compacted to the satisfaction of the right-of-way inspector and if necessary, repaired with granular backfill as instructed by the inspector.

8. Road Closure: Any road closure shall be coordinated with the City of Champaign right-of-way inspector at least 72 hours in advance.

182.00 VILLAGE OF SAVOY

182.10 NEW PROJECTS

On projects involving new street construction, the street must be constructed in accordance with plans and specifications which have been approved by the City Engineer.

182.20 RENEWAL PROJECTS

Where sewer construction or reconstruction involves cutting existing concrete pavement, the pavement shall be replaced in-kind with the total thickness 2 inches greater than existing to a maximum of 10 inches. Where the surface is asphalt or oil and chip, a 6-inch concrete base shall be used and 2 inches of bituminous concrete shall be placed over the base.

As an alternative, the contractor shall be allowed to pour a full pavement depth of concrete with a black-colored surface to match the black color of the existing bituminous street pavement per the "PC Concrete Pavement Removal & Replacement" City detail. In general, these patches shall be no larger than 10 feet by 10 feet. However, for long and narrow patches, longitudinal and/or transverse joints shall be installed to match the joints in the existing pavement, or per IDOT specifications.

The surface of these patches shall be tinted black with a shake-on coloring during finishing in order to blend in with the existing bituminous surface and shall be approved by the City Engineer.

Brick pavement shall be replaced with a 6-inch concrete base, 1/2-inch sand cushion and brick surface. Replacement bricks shall be new and of the same dimensions, color and quality of those existing and all other materials must meet appropriate IDOT requirements.

183.00 CITY OF URBANA

183.10 NEW PROJECTS

On projects involving new street construction, the street must be constructed in accordance with plans and specifications which have been approved by the City Engineer.

183.20 RENEWAL PROJECTS

For projects within the jurisdiction of the City of Urbana, all disturbed street and sidewalk areas shall be replaced in accordance with the Right-Of-Way Standards. The Right-Of-Way Standards are available online at http://www.urbanainllinois.us/ROW_Permits.

190.00 MINIMUM CONSTRUCTED SLOPES FOR SANITARY SEWER INSTALLATION

The following tables list a penalty system that may be used for sanitary sewer lines that are installed at less than minimum slopes. The use of this penalty system is at the sole discretion of the given jurisdictional body.

191.00 PENALTY SYSTEM

8-Inch Diameter Line (standard designed @ 0.40%)

Constructed Slope* (%)	Penalty (%)	Velocity Range (ft/s) Kutter's Formula	Velocity Range (ft/s) Manning's Formula
≥ 0.38 but < 0.40	0	1.95 to 2.00	2.13 to 2.19
≥ 0.36 but < 0.38	25	1.89 to 1.95	2.08 to 2.13
≥ 0.34 but < 0.36	50	1.84 to 1.89	2.02 to 2.08
< 0.34	Remove and Replace	0.00 to 1.84	0.00 to 2.02

8-Inch Diameter Line (terminal 700 ft designed @ 0.60%) (velocities @ 1/3 depth of flow)

Constructed Slope* (%)	Penalty (%)	Velocity Range (ft/s) Kutter's Formula	Velocity Range (ft/s) Manning's Formula
≥ 0.58 but < 0.60	0	1.91 to 1.94	2.15 to 2.19
≥ 0.56 but < 0.58	25	1.87 to 1.91	2.12 to 2.15
≥ 0.54 but < 0.56	50	1.84 to 1.87	2.08 to 2.12
< 0.54	Remove and Replace	0.00 to 1.84	0.00 to 2.08

10-Inch Diameter Line (standard designed @ 0.28%)

Constructed Slope* (%)	Penalty (%)	Velocity Range (ft/s) Kutter's Formula	Velocity Range (ft/s) Manning's Formula
≥ 0.26 but < 0.28	0	1.91 to 2.00	2.05 to 2.13
≥ 0.24 but < 0.26	25	1.83 to 1.91	1.97 to 2.05
≥ 0.22 but < 0.24	50	1.76 to 1.83	1.88 to 1.97
< 0.22	Remove and Replace	0.00 to 1.76	0.00 to 1.88

12-Inch Diameter Line (standard designed @ 0.22%)

Constructed Slope* (%)	Penalty (%)	Velocity Range (ft/s) Kutter's Formula	Velocity Range (ft/s) Manning's Formula
≥ 0.19 but < 0.21	0	1.87 to 2.00	1.98 to 2.08
≥ 0.18 but < 0.19	25	1.82 to 1.87	1.92 to 1.98
≥ 0.17 but < 0.18	50	1.77 to 1.82	1.87 to 1.92
< 0.17	Remove and Replace	0.00 to 1.77	0.00 to 1.87

192.00 PENALTY SYSTEM USE GUIDELINES

The owner's/developer's engineer may appeal the penalties if a detailed analysis can show that upstream/downstream flow conditions or other factors contribute to increased flows in the sewer reach in question. The jurisdictional body may choose not to allow the use of this penalty system in lieu of removal, if the jurisdictional body determines that upstream or downstream conditions are such that they contribute to reduced flows in the sewer reach in question.

The decision to allow the use of the penalty system outlined herein is at the sole discretion of the jurisdictional body.

The penalties shall be assessed in the form of non-refundable cash, in an amount determined from the official contractor's bid, or the replacement cost as determined by the jurisdictional body per industry standard prices.

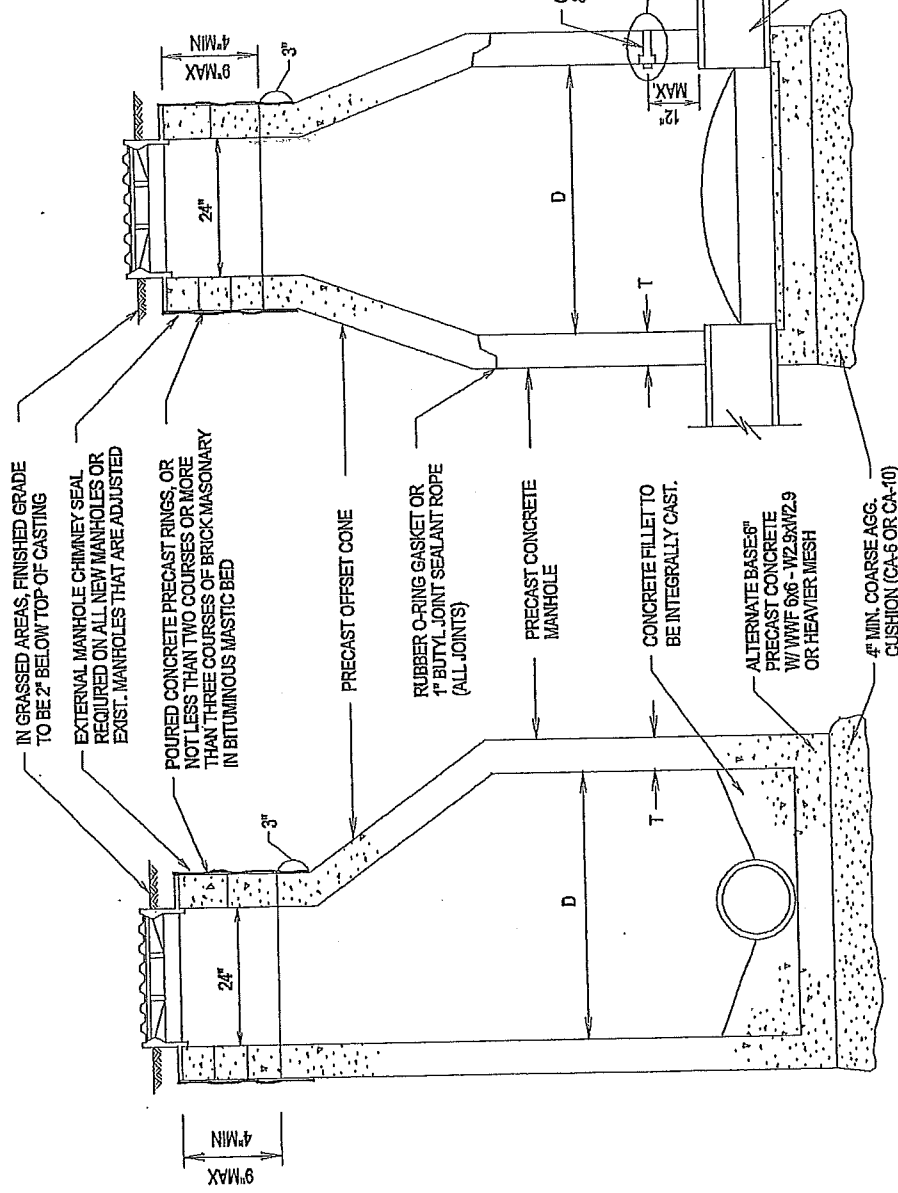
If a sanitary system is laid at less than minimum slopes of 0.4% for 8-inch, 0.21 % for 10-inch, 0.28% for 12-inch, etc., the given jurisdictional body reserves the right to require full removal and replacement. Full removal and replacement shall include removing the substandard portion of the sewer main system and replacing it in its entirety. This work shall include required manholes, piping, bedding, haunching, backfill, grading, seeding, and all appurtenances and requirements associated with a sanitary sewer system installed within the Urbana-Champaign Sanitary District.

The following guidelines shall be used when considering the acceptance of substandard sanitary lines and the possible use of the penalty system:

- It is the intent to follow the design requirements of all applicable regulatory agencies.
- Was there adequate observation by the Engineer?
- Was there adequate field documentation by the engineer? Adequate field documentation is considered to be a daily field report sheet or construction diary entries, including elevation checks entered into a field survey book. This documentation will be used to verify the other criteria listed herein.
- Was an observer on site a minimum of 75% of the time during construction?
- Were adequate elevation checks made by the engineer? A minimal level of inspection would include one check per morning and one check per afternoon or a minimum of every 100 feet; which ever is more intensive. Elevation checks should also be made at the initial "start" or "restart" of pipe laying, within the initial 20 to 30 feet.
- Evaluation should be made of the Contractor's overall performance history.
- Evaluation should be made of the number of requests the Contractor has made for acceptance of substandard construction over the previous 5 years.
 - 0 to 1 instances – eligible
 - 2 to 3 instances – marginal
 - greater than 3 instances – not eligible.

Evaluation should be made of the Contractor's performance in the context of the direction given by the engineer on the project in question.

- NOTE:**
1. CASTING NEED NOT BE WITH TYPE B SELF-SEALING LID OR EQUAL AND "UCSD SANITARY" CAST IN LID. WHERE BOLT DOWN LIDS REQUIRED, CASTING SHALL BE R1916D.
 2. NO ADJUSTING RINGS OR BRICK MASONRY IS REQUIRED FOR MANHOLES THAT ARE TO BE BURIED IN AGRICULTURAL AREAS.
 3. CONCRETE MANHOLE BASE AND FILLET SHALL BE CAST INTEGRALLY WITH BOTTOM MANHOLE SECTION FOR NEW CONSTRUCTION. FOR NEW MANHOLE ON EXISTING SEWERS, A PRECAST, REINFORCED MANHOLE BASE, 6" MIN. THICKNESS MAY BE USED.
 4. INSIDE AND OUTSIDE OF ALL JOINTS AND PIPE OPENINGS TO BE FILLED WITH MORTAR & BRUSHED SMOOTH.
 5. OUTSIDE OF ALL JOINTS TO BE SEALED WITH BITUMINOUS MATERIAL.
 6. SERVICE SEWER SHALL BE ANGLED IN DIRECTION OF FLOW, WITH INVERT OF SERVICE SEWER SET BETWEEN TOP AND CENTER LINE OF MAIN SEWER, AND CHANNIELED DOWN TO CENTER LINE OF MAIN SEWER.
 7. INSTALL 2X4 WOOD LEADER NEXT TO MANHOLE, PAINTED RED AND EXTENDING 3 FEET ABOVE GROUND SURFACE.

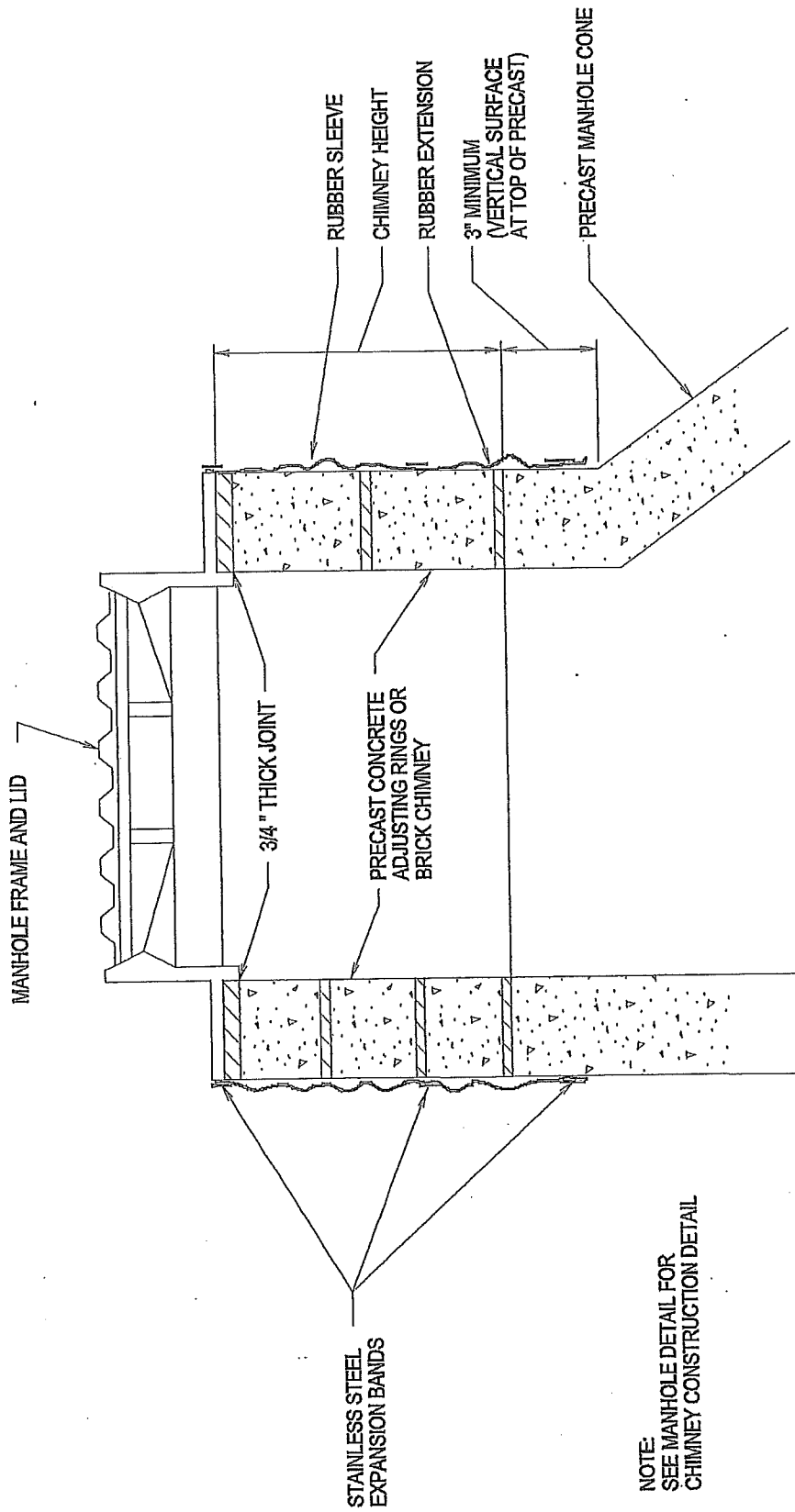


DIAMETER OF MAIN SEWER	D	T
18" AND UNDER	4'-0"	6"
21" TO 42" INCLUSIVE	5'-0"	6"

**UCSD INTERCEPTOR SEWER
MANHOLE DETAIL**

Revision Date: March 30, 2000

Urbana & Champaign Sanitary District



NOTE:
SEE MANHOLE DETAIL FOR
CHIMNEY CONSTRUCTION DETAIL

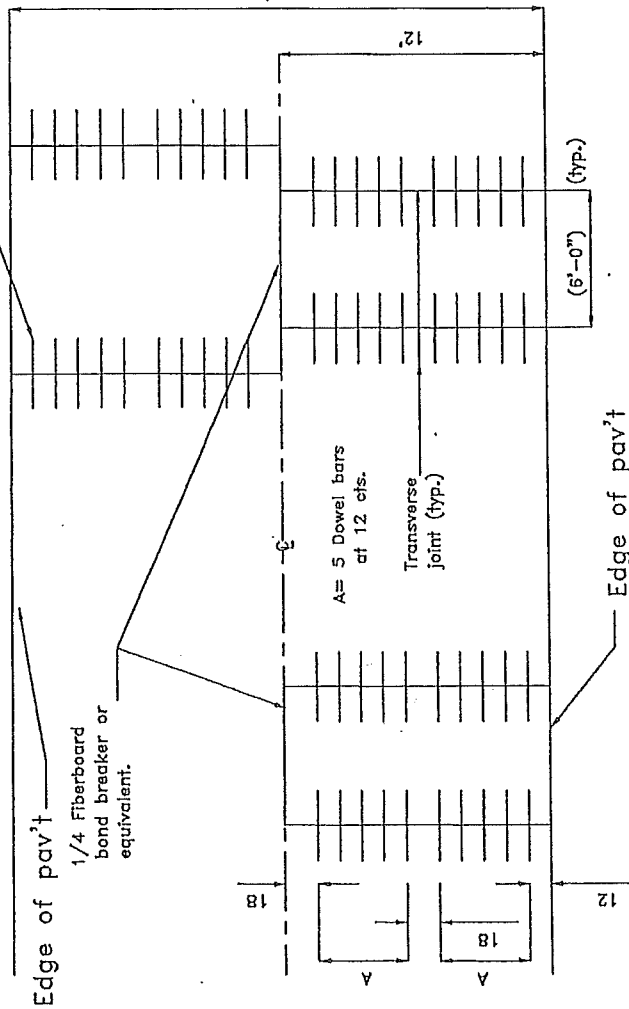
EXTERNAL MANHOLE CHIMNEY SEAL

**CHIMNEY SEAL MANUFACTURED BY CRETEX
OR APPROVED EQUAL**

Revision Date: March 30, 2000

Urbana & Champaign Sanitary District

Use smooth dowel bars as shown per this detail if pavement is coincident w/pre-existing contraction joint. If pavement joint is a "new" mid panel joint, then substitute one (1) inch dia. deformed bars (rebars) and delete 3/4" expansion w/ 7/8" backer rod.



TYPICAL PATCHING PLAN

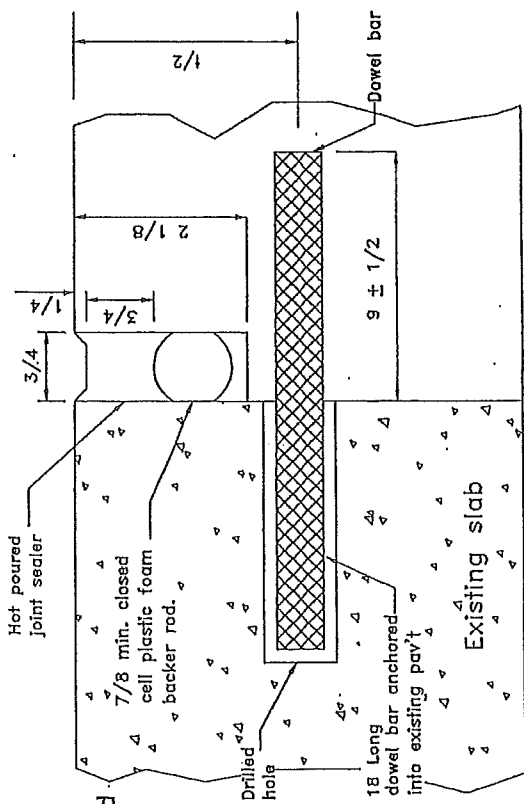
TABLE OF BARS

PAVEMENT THICKNESS	DOWEL BAR DIAMETER	HOLE DIAMETER
8 or greater	1 1/2	1 5/8
7 thru 7.99	1 1/4	1 3/8
Less than 7	1	1 1/8

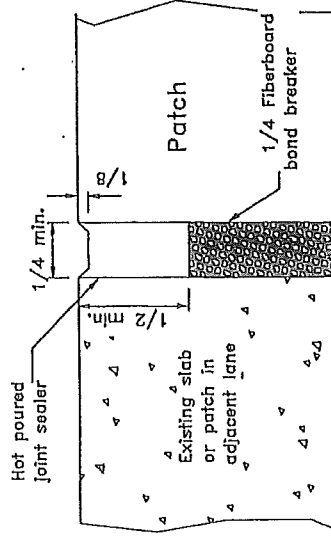
NOTE

For jointed Reinforced PCC Pavements, patches 40' or longer shall have sawed contraction joints. In accordance with Standard 420001, at 40' maximum intervals and be in prolongation with joints or cracks in the adjacent lane whenever possible.

All dimensions are in inches unless otherwise shown.



TRANSVERSE JOINT



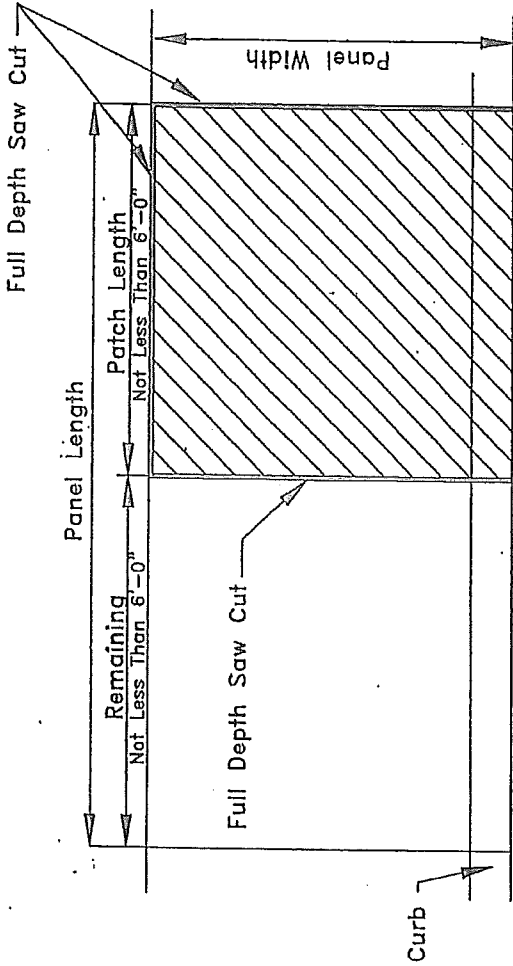
CENTERLINE JOINT

REVISIONS	DATE	BY	MAJ	APPROVED BY	DATE	SCALE	DRAWING NO.
	8/99			RGM		NONE	1 OF 1

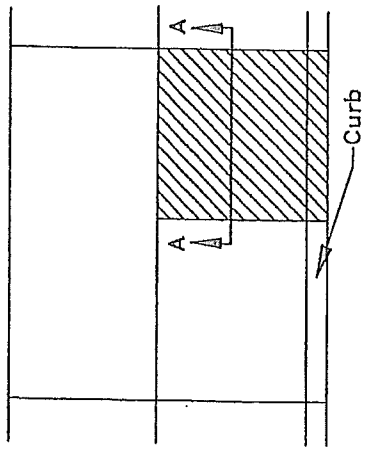
DRAWN BY: BMB	
DATE: 2/93	
APPROVED BY: RGM	
DATE:	
SCALE: NONE	
DRAWING NO. 1 OF 1	

PCC PATCHES CLASS "B" (MODIFIED)	
City of Champaign ENGINEERING DIVISION	



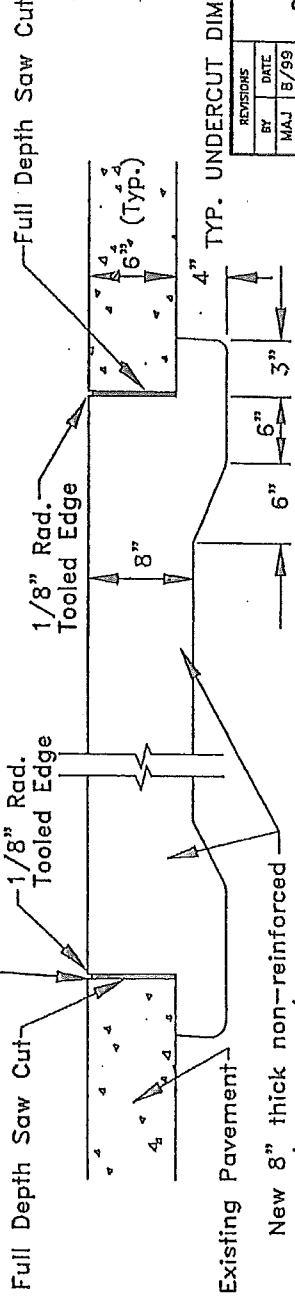


TYPICAL PATCHING PLAN
No Scale



LOCATION PLAN
No Scale

See IDOT Hand Tooled Contraction Joint Detail on PCC Patches Joint Details sheet.



SECTION "A-A"
No Scale

Note: Class "C" (Modified) PCC Patches are to be used on non-reinforced PCC Pavements.

REVISIONS

BY	DATE
MAJ	8/99

FILE NAME: 93PC-CLC.DWG

DRAWN BY: BMB
DATE: 2/93
APPROVED BY: RGM
DATE:
SCALE: NONE
DRAWING NO. 1 of 1

PCC PATCHES
CLASS "C" (MODIFIED)

City of Champaign
ENGINEERING DIVISION