

ADDENDUM NO. 1
TO
LIONS DEN ROAD – PHASE 3 RECONSTRUCTION
(300 feet north of Binning Road to approximately 250 feet south of the present Living Well entrance)

COUNTY OF JEFFERSON, MISSOURI

MARCH 23, 2010

This addendum forms a part of the bidding and contract documents and modifies the original bidding documents. Acknowledge receipt of this addendum in the space provided on this bid form. **FAILURE TO DO SO MAY SUBJECT BIDDER TO DISQUALIFICATION.**

ARRA - STP - 7203 (601) COVER SHEET:

Revise bid opening date of April 6, 2010 to April 20, 2010.

ARRA - STP - 7203 (601) TABLE OF CONTENTS:

Remove page JSP-1 “TABLE OF CONTENTS” and replace with revised page JSP-1 dated 3-23-10.

ARRA - STP - 7203 (601) BID NOTICE:

Revise 3rd paragraph to read:

Bids will be received until 2:00 P.M., CDST, April 20, 2010 at the office of the County Clerk, Jefferson County Administration Center, Post Office Box 100/729 Maple Street, Hillsboro, Missouri 63050, and should be clearly marked on the envelope **“Lions Den Road – Phase 3 Reconstruction”**. All bids will be publicly opened same day at 2:00 P.M. CDST. Bids submitted via FAX will be rejected. Late Bids will not be accepted and will be returned to the sender, unopened.

ARRA - STP - 7203 (601) JOB SPECIAL PROVISIONS:

Remove page JSP-1 “TABLE OF CONTENTS” and replace with revised page JSP-1 dated 3-23-10.

Add page JSP-33 dated 3-23-10 (added four new job provisions) to end of Job Special Provisions.

ARRA - STP - 7203 (601) SUBCONTRACTOR DISCLOSURE FORM:

Add **“SUBCONTRACTOR DISCLOSURE FORM”** immediately behind page JSP-33 dated 3-23-10.

ARRA - STP - 7203 (601) SANITARY SEWER JOB SPECIAL PROVISIONS:

Remove entire Sanitary Sewer Job Special Provisions pages SS-1 to SS-33 and replace with revised Sanitary Sewer Job Special Provisions section pages SS-1 to SS-33 dated 3-23-10.

ARRA - STP - 7203 (601) ROADWAY CONSTRUCTION PLANS

Remove plan sheet 55 and replace with revised plan sheet 55 dated 3-23-10

END OF ADDENDUM NO. 1

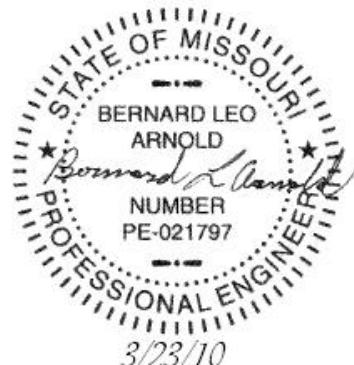


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BID NOTICE

The County of Jefferson, Missouri will receive sealed bids for the full reconstruction of Lions Den Road – Phase 3 Reconstruction. The project limits are from approximately 300 feet north of Binning Road to approximately 250 feet south of the present Living Well entrance. The full reconstruction work, in general, will consist of the reconstruction of Lions Den Road including new full depth bituminous pavement, earthwork, drainage, bridge, and sanitary sewer. Work shall be in accordance with these Specifications and Job Special Provisions. Where not specifically covered by these Specifications or Job Special Provisions, the Contractor shall adhere to the 2004 Edition of the "Missouri Standard Specifications for Highway Construction", including any updates since the initial printing.

Plans and Specifications may be purchased at the Public Works Department, located at 725 Maple Street, Room 104, Hillsboro, Missouri. Price for the Specifications shall be \$35 per set, non-refundable.

Bids will be received until 2:00 P.M., CDST, April 20, 2010 at the office of the County Clerk, Jefferson County Administration Center, Post Office Box 100/729 Maple Street, Hillsboro, Missouri 63050, and should be clearly marked on the envelope **"Lions Den Road – Phase 3 Reconstruction"**. All bids will be publicly opened same day at 2:00 P.M. CDST. Bids submitted via FAX will be rejected. Late Bids will not be accepted and will be returned to the sender, unopened.

Each bid must be accompanied by a certified check or satisfactory bid bond payable to Jefferson County, Missouri, in the amount of five percent (5%) of the amount of the total bid as a guarantee that the successful bidder will enter into a contract and furnish the required bonds within fifteen (15) days after the award is made.

All bids shall be made on the forms provided. The County of Jefferson hereby reserves the right to reject any or all bids, to waive any informality in the bids received and to accept the bid that in its judgment will be for the best interest of Jefferson County, Missouri with MoDOT concurrence.

The County of Jefferson hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Contractor shall pay not less than the prevailing hourly rates of wages, as determined by the Labor and Industrial Relations Commission of Missouri. The wage rates applicable to this project have been predetermined and are set forth in these appendices. When Federal wage rates are applicable and included, this contract is subject to the "Work Hours Act of 1962", (P.L. 87-581:76 Stat. 357) and implementing regulations.

END BID NOTICE

JOB SPECIAL PROVISIONS

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(Job Special Provisions shall prevail over General Special Provisions whenever in conflict therewith).

- A. Governing Specifications and Definition Changes
- B. Revisions to MoDOT Standard Specifications
- C. Inspection Waiver
- D. Work Zone Traffic Management Plan
- E. Removal of Improvements
- F. Excess Class C Excavation
- G. Removal of Asphalt Wearing Surface on Existing Bridge
- H. Waterproofing Membrane System on Bridge Deck Surfaces
- I. Utilities Coordination
- J. Seeding, Fertilizing and Mulching
- K. Office for Engineer
- L. U-Channel Posts, 2 LBS
- M. Inspection by MoDOT and FHWA Officials
- N. Relocated Signs
- O. Daily Earthwork Duty
- P. Cohesive Transition Mat
- Q. Temporary Driveway Aggregate
- R. Salvage Existing Topsoil
- S. Price Index Option for Bituminous Material
- T. Conditions at the Site
- U. Acceptance of Precast Prestressed Concrete Box-Girder Beams
- V. State and Federal Wage Rates
- W. Contractor Requirements
- X. Material Testing
- Y. Subcontractor Disclosure

V. STATE AND FEDERAL WAGE RATES

When state and federal wage rates are both required the higher of the two for each job classification shall be used.

W. CONTRACTOR REQUIREMENTS

A prime contractor must have a fully responsive contractor questionnaire on file with the Missouri Department of Transportation at least seven (7) days prior to the bid opening date if this project involves roadway or bridge work.

X. MATERIAL TESTING

All project sampling and testing of materials shall be performed by the County or by a consultant employed by the County.

Y. SUBCONTRACTOR DISCLOSURE

For contracts of more than \$2,000,000 each bidder shall submit with each bid a disclosure of the subcontracts that have a subcontract value that is equal to or greater than twenty percent of the total project bid or subcontracts that are greater than or equal to \$2,000,000. The disclosure of subcontracts must include the name of each subcontractor, the category of work that each subcontractor will perform (e.g. asphalt, concrete, earthwork, bridges...) and the dollar value of each subcontract. The information shall be disclosed on the form provided in the bidding documents. If that information is not available at the time of bid the bidder shall submit the "Subcontractor Disclosure Form" pages to Jefferson County Public Works Department on or before 4:00 p.m. of the third business day after the bid opening date, directly to the Jefferson County Public Works Department, PO Box 100, Hillsboro, Missouri 63050. Telefax transmittal to Jefferson County Public Works Department will be permitted at fax no. 636-797-5565. Failure to disclose this information may result in a bid being declared non-responsive. The complete signed original documents do not need to be mailed to Jefferson County Public Works Department, but the bidder shall have it available if requested by the engineer.

SUBCONTRACTOR DISCLOSURE FORM: The bidder shall submit with this bid any subcontracts that meet the requirements of the Job Special Provision titled **SUBCONTRACTOR DISCLOSURE**.

List below the name of each subcontractor that will be furnishing labor or labor and materials, the category of work that the subcontractor will be performing (e.g. asphalt, concrete, earthwork, bridges...) and the dollar value of the subcontract. Enter "NONE" if there are no subcontractors that need to be disclosed.

If the information is not available at the time of bid the bidder shall submit the "Subcontractor Disclosure Form" pages to Jefferson County Public Works Department on or before 4:00 p.m. of the third business day after the bid opening date, directly to the Jefferson County Public Works Department, PO Box 100, Hillsboro, Missouri 63050. Telefax transmittal to Jefferson County Public Works Department will be permitted at fax no. 636-797-5565. The complete signed original documents do not need to be mailed to Jefferson County Public Works Department, but the bidder shall have it available if requested by the engineer.

SUBCONTRACTOR NAME	DOLLAR VALUE OF SUBCONTRACT	CATEGORY OF WORK

Company Name	Title	Signature Field
<input type="text"/>	<input type="text"/>	<input type="text"/>
	Date	<input type="text"/>
		<input type="text"/>

SANITARY SEWER JOB SPECIAL PROVISIONS

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SANITARY SEWERS - GRAVITY

PART 1 – GENERAL

1.00 DESCRIPTION:

- A. The work in this section consists of furnishing all materials, accessories, equipment, tools, transportation, services, labor and performing all operations required to complete the gravity sewer pipeline, and related appurtenances as shown on the drawings and as herein specified. Provide all work in this section in place, complete and ready for service. The sewer district shall be taken as **Rock Creek Public Sewer District (636-464-3305 or 636-461-2578)**.

1.01 QUALITY ASSURANCE:

A. Applicable Standards:

- 1. American National Standards Institute (ANSI)
- 2. American Water Works Association (AWWA)
- 3. American Society for Testing and Materials (ASTM)

- B. All material to be used in this work will be inspected before being placed and all rejected material must be removed immediately and not used in the work under this Contract. Any material installed or placed without inspection shall be removed and replaced with new materials if so directed by the Engineer or Inspector.

- C. The Contractor shall arrange and pay for all tests associated with testing of the completed sewers and manholes. This shall include all sewer inspection fees and connection fees. Such tests shall be performed by the Contractor or a competent independent laboratory approved by the Engineer and governing sewer district and under the direct supervision of the Engineer and governing sewer district. Copies of all test results shall be submitted to the Engineer from the testing laboratory.

- D. The Sewer District requires that anyone who installs main line sewers to be a licensed drain layer. A copy of the license shall be made available to both the Engineer and the Sewer District.

1.02 SUBMITTALS:

- A. Submittals shall include, but not be limited to the following:

Layout Drawings
Materials Specifications
Complete Details of Pipe and Fittings
Bill of Materials
Factory and field test reports

PART 2 – MATERIALS

2.00 GENERAL:

- A. All pipe and other materials used in the construction of sanitary sewer systems shall be of the type indicated on the drawings and as indicated below. All pipe and specials will be subject to inspection by the Engineer and Sewer District. All damaged pieces as well as any pieces not conforming to these specifications shall be immediately removed and replaced with pipe and specials as may be acceptable to the Engineer at the expense of the Contractor.

2.01 DUCTILE IRON SEWER PIPE:

- A. Ductile iron sewer pipe shall be of the size designated and shall conform to the requirements of ANSI Standard A12.51. The pipe shall have an approved thin cement lining that is sealed with a bituminous seal in accordance with ASA Specifications A21.4 and shall have a standard bituminous pipe coating applied to the pipe exterior. The pipe shall be furnished with mechanical or slip-on joint conforming to ANSI Standard A21.11.
- B. Restrained joints shall be utilized within pipe encasements.

2.02 POLYVINYL CHLORIDE PIPE:

- A. 24" Pipe and Smaller: Polyvinyl chloride plastic gravity sewer pipe with integral wall bell and spigot joints shall be made from clean, virgin, approved class 12454-B or 12454-C PVC compound conforming to ASTM Resin Specifications D1784. All pipes shall comply with ASTM D3034 made to SDR 35 dimensions. The integral bell shall consist of an integral wall section stiffened with a PVC retainer that securely locks the solid cross section rubber ring into position. All fittings and accessories shall be as manufactured and furnished by the pipe supplier.

2.03 PORTLAND CEMENT CONCRETE:

- A. All concrete used in this construction shall conform to Class B Concrete of Section 501 of the Missouri Standard Specifications for Highway Construction.

2.04 GRANULAR TRENCH BACKFILL:

- A. Bedding material shall be as specified in Section 1009.3.4 Grade 4, gradation B of the Missouri Standard Specifications.
- B. Granular backfill at road crossings and driveways shall be as specified in Section 1009.3.4 Grade 4, gradation A of the Missouri Standard Specifications.

PART 3 - CONSTRUCTION REQUIREMENTS

3.00 SHIPMENT AND HANDLING:

- A. Handle pipe in a manner to ensure installation in sound, undamaged condition using proper equipment, tools and methods, as follows:
 1. Suitable slings or skids
 2. Without hooks in contact with joint surfaces
 3. Provisions for preventing contact with adjacent units during moving or storage
 4. Protection for all pipe ends such as beveled ends, flanges, mechanical joints, plain ends, threads, etc., prior to shipping to job site.

3.01 PIPE INSPECTION:

- A. All pipe shall be subject to approval of the Engineer and Sewer District.
- B. Pipe sections damaged by handling, which, in the opinion of the Engineer and Sewer District, cannot be satisfactorily repaired, shall be rejected. This shall include, but is not limited to, broken bells and spigots, bent bell-and-spigot rings, excessive deflection and similar damage.

3.02 CLEANING:

- A. Thoroughly clean interior of all pipe, fittings and joints before installation.

- B. Exclude foreign matter during discontinuances of installation by providing temporary covers over end of pipe.
- C. Do not place tools, clothing or other materials at any time in pipe.
- D. Visually inspect, remove all articles in pipe, brush or flush clean immediately prior to final fitting of system.

3.03 TRENCH EXCAVATION:

- A. Excavation shall include all site clearing and preparation where required, trenching, sub-grading for pipe, bell holes, cell sheeting, shoring, bracing and dewatering of trenches and other excavations, protecting of adjacent property, pipe placement, backfilling, all specified backfill consolidation and surfacing, removal and replacement of pavements and surfacing, and other work necessary and required, unless separate payment has been established in the contract documents for the individual items.
- B. All topsoil shall be separated from other materials and shall be stockpiled on each property from which it is taken. Stockpiles shall be located within the temporary construction easement areas. The final backfill of the trench shall be with the stockpiled topsoil to the approximate thickness it was prior to construction. No topsoil shall be removed from the construction site. Any topsoil remaining after the trench is backfilled shall be used to dress up disturbed areas.
- C. Trenches shall be excavated to lines and grades necessary to accept the pipes shown on the plans or as established by the Engineer.
- D. Trenches in all instances shall be kept to minimum widths to a point 12" above top of pipe. Remaining trench to be kept to minimum width as near as possible. Contractor is to use sheeting or an approved method to insure avoidance of excessive widths. Trenching under existing utilities shall be by hand method and utility supported by approved methods.
- E. Trenches in rock shall be excavated to minimum widths as specified. All rock and shale excavation is *not* suitable for backfill materials over pipe.
- F. If over-digging occurs, all loosened earth must be removed and brought back to grade with approved granular base material, compacted to 95% density, without additional cost to the County.
- G. Any material below the specified plan grade that is not, or cannot be made stable by drainage or compaction, in the opinion of the Engineer or his representative, shall be removed and replaced with an approved select

granular material. This granular material stabilization shall be considered incidental and shall be included in price bid for other items.

- H. Trenches shall be reasonably dry when trench bottoms are prepared. All pipe shall be bedded per the standard drawings.
- I. Tunneling operations shall be done only where such is required by the plans, provided that the adjacent trench depth and soil conditions are adequate and suitable for such construction. All bracing, shoring, sheeting, pipe placement, and backfill shall be the responsibility of the Contractor to be performed in compliance with OSHA regulations.
- J. Manhole excavations shall be a minimum width and size to accommodate a base slab of sufficient size to conform with the manhole standard drawing. The excavation shall be carried to a depth so that the base bedding may be placed on a firm, dry, undisturbed, native earth bed. Any material below the bottom of the manhole base that by reason of kind and/or conditions is not or cannot be made stable by drainage or compaction, in the opinion of the Engineer, or his representative, shall be removed.

3.04 TRENCH BACKFILL:

- A. All trenches and excavations shall be backfilled immediately after pipe is laid therein, unless other protection of the pipeline is directed. Under no circumstances, however, shall water be permitted to rise in un-backfilled trenches after pipe has been placed or during the laying of pipe.
- B. Material used for backfill shall not contain stones 1" or greater in size, frozen earth, debris, or earth with an exceptionally high void content. A minimum of 6" of bedding of the type specified above shall be used. In the event of solid rock removal for main line or lateral installations and at roadways, driveways and sidewalks, 12" of bedding material shall be used both above and below the pipe. For backfill from bedding material up to a level of 6" (12" in the event of solid rock cut) over the top of PVC pipe, for its full length, only approved granular bedding (Section 2.04 A) material shall be used and placed in uniform layers not exceeding 6" in depth up each side. For ductile iron pipe, suitable compacted earth backfill may be used. Each layer shall be placed, then carefully and uniformly tamped so as to eliminate the possibility of later displacement. At roadways, driveways and sidewalks the backfill from the bedding material over the top of the pipe to the subgrade of the pavement shall be with the granular backfill specified in Section 2.04 B above. Earthen backfill may be used outside the limits of roadways, driveways and sidewalks. The earth shall be placed in uniform layers 6" in depth and shall be tamped to minimize settlement. Topsoil from the stockpiles shall be utilized to finish off the final backfill and shall be placed to the approximate thickness it was prior to construction. No topsoil shall be removed from the

site but non-topsoil excess backfill material shall be removed from the jobsite. Where unsuitable backfill material is encountered, the Contractor shall, at his own expense, provide and place acceptable backfill material. All sodded lawns and parking lot surfaces damaged by trenching operations shall be replaced or reseeded as directed by the Engineer.

- C. Puddling or water flooding for consolidation backfill material shall be subject to approval of the Engineer. In general, the addition of water should be limited to achieving optimum moisture content for tamping procedures.
- D. Whenever trenches or other excavations made by the Contractor in the performance of work under this Contract have not been properly filled, or where settlement has occurred at any time prior to the final acceptance of the entire work covered by the contract, to the extent that the top of the backfill is below the original ground surface, such trenches shall be refilled and the backfill surface compacted and smoothed to conform to the elevations of the adjacent ground surface.
- E. The Contractor shall be responsible for all damage that might occur as a result of the settlement of trench or other backfill made by him in the fulfillment of his contract prior to the date of final acceptance of entire project. This shall include but not be limited to pavement, driveway, curb, slab, walk, lawn, or structure damages by the backfill settlement.
- F. It is the intent to backfill all street and driveway crossings and areas where new sewer lines will be under the street roadbed with granular trench backfill. Granular trench backfill shall be placed above the initial backfill and extending up to the existing grade. Granular trench backfill shall be compacted to 95% standard proctor density.

3.05 SHORING AND BRACING:

- A. Sides of excavations shall be shored and braced for stability purposes.
- B. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- C. Provide shoring and bracing to comply with local codes and authorities having jurisdiction.
- D. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.

3.06 PIPE INSTALLATION:

- A. Pipe shall be protected during handling against impact shocks. Pipe shall be kept clean at all times and no pipes shall be used in the work that does not conform to the appropriate specifications.
- B. The Contractor shall keep the trench free from water while the sewer is being placed and until the joint has been sealed to the satisfaction of the Engineer. The laying of pipes in finished trenches shall be started at the outlet and with the spigot ends pointing in the direction of flow. The pipes shall be lowered so as to avoid unnecessary handling in the trench.
- C. As each length of pipe is laid, the mouth of the pipe shall be properly protected to prevent the entrance of earth or the bedding material. All pipe shall be carefully centered, so that when laid in, the work will form a sewer with a smooth uniform invert.
- D. Preparatory to making pipe joints, the joint material on both the bell and spigot ends shall be thoroughly cleaned and coated with the proper lubricant to facilitate assembly. The spigot end shall be inserted in the bell and pressure applied until the pipe is properly sealed.
- E. Plugs for pipe branches, stubs or other open ends which are not to be immediately connected shall be made of an approved material and shall be secured in place with a joint comparable to the main line joint, or stoppers may be of an integrally cast breakout design. Plugs shall be capable of withstanding all test pressures without leakage.

3.07 DUCTILE IRON PIPE INSTALLATION:

- A. Installation shall conform to the requirements of AWWA C 600 and the following:
 1. Mechanical Joints: The outside of the spigot and inside of the bell of mechanical joint pipe shall be thoroughly cleaned to remove all foreign matter from the joint. The cast iron gland shall then be slipped on to the spigot end of the pipe with the lip extension of the gland toward the socket or bell end. The rubber gasket shall be placed on the spigot end with the thick edge toward the gland. The pipe shall be pushed forward to completely seat the spigot end in the bell. The gasket shall then be pressed into place within the bell, being careful to have the gasket evenly located around the entire joint. The ductile iron gland shall then be moved along the pipe into position and bolted. Nuts spaced 180° apart from each other shall be tightened alternately to AWWA C 600 standards in order to produce an equal pressure on all parts of the gland.
 2. Assemble pipelines from full lengths of pipe, using short sections only where required.

3. An anti-seize compound designed for 1000° F shall be the lubricant for all flange bolt and stud threads, with the compound applied to male threads only.

3.08 POLYVINYL CHLORIDE PIPE INSTALLATION:

- A. Installation shall be in strict conformance with the requirements of ASTM D2321 or as specified by the pipe manufacturer.

3.09 GRAVITY SEWER INSTALLATION:

- A. This recommended practice describes the allowable trench soil construction procedures for the installation of flexible sewer pipe.

B. Terminology:

1. The haunch is the triangular shaped area in the trench next to the bottom half of the pipe extending from the spring line of the pipe to the bedding material.
2. The terms consolidate, compact, tamp and density are widely used in describing soil consolidation efforts in sewer pipe construction. They have varying implications as to technique. The term densify is used in this document without distinction as to method.
3. Graded soils are those containing a mixture of several different sized particles. Select native soil, as described by visual inspection, is clean of Class V type material and debris, normally finely divided and not highly saturated with water.
4. The spring line of pipe is the horizontal centerline of the pipe.
5. Bedding is the material required beneath the pipe used to support the pipe and bring the pipe to grade above the foundation.
6. Initial backfill is the material above the haunching extending to 6" minimum (12" at solid rock cut areas) above the top of the pipe that is carefully placed to provide protection to the pipe during subsequent backfilling operations.

- C. The pipe shall be bedded true to line and grade with uniform and continuous support from a firm base. Blocking with wood, brick, or any hard object shall not be used to bring the pipe to grade. Foundations, bedding and backfill shall be constructed to provide even restraint and support in all directions.

D. Embedment soils used in flexible sewer pipe installation are described by ASTM and are grouped into five categories below:

- a. Class I - Angular, 6 to 40 mm (1/4" to 1 1/2") graded stone, including materials such as coral, slag, cinders, crushed stone and crushed shells.
- b. Class II - Coarse sands and gravels with maximum particle size of 40 mm (1 1/2") including variously graded sands and gravels containing small percentages of fines. Generally, granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW and SP are included in this class.
- c. Class III - Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM and SC are included in this class.
- d. Class IV - Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil Types MH, ML, CH and CL are included in this class. These materials are not permitted for bedding, haunching, or initial backfill.
- e. Class V - This class includes the organic soils OL, OH and PT as well as soils containing frozen earth, debris, rocks larger than 40 mm (1 1/2") in diameter, and other foreign materials. These materials are not permitted for bedding, haunching or initial backfill.

E. Native soils in the foundation should be firm and stable to provide support for the construction operations and eventual overburden loads.

1. Unstable Trench Bottom: Where unstable foundations exist, replace them with an acceptable granular backfill.
2. Over-Excavation: If the trench depth is cut more than 150 mm (6") below the pipe invert into the foundation zone, replace this over-excavation with Class I, II or III soils. Class III soils shall be densified in 6" lifts. When the trench is wet and unstable, do not over-densify, as this may create a more unstable condition.
3. Rock, Hardpan Excavation: When the trench is to be cut in hardpan, rock or other similar native soil, remove that soil a sufficient depth to provide 12" of bedding as described below.

F. Bedding shall be in accordance with Section 2.04 A.

G. Haunching and initial backfill shall be in accordance with Section 2.04 A.

H. Special Situation:

1. Bell Holes for Elastomeric Seal Joints: As specified in ASTM D2321.
2. Minimum Cover for Load Application: As specified in ASTM D2321.
3. Use of Compaction Equipment: As specified in ASTM D2321.
4. Removal of Trench Protection: As specified in ASTM D2321.
5. Water Densification: When required, use water flooding, puddling or jetting only after the Engineer inspects conditions and approves the practice.

I. Avoid storage of pipe in direct sunlight for extended periods of time. If field storage for more than a month is required, cover pipe to protect from exposure to sunlight.

3.10 LOCATION OF SEWERS WITH RESPECT TO WATER MAINS:

- A. Sewer mains shall be laid at least 10 feet horizontally from any existing water main. The distances shall be measured edge to edge. In cases where it is not practical to maintain a 10-foot separation, the water main shall be in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.
- B. Sewers crossing water mains shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main.
- C. When it is impossible to obtain proper horizontal and vertical separation stipulated above, the sewer shall be designed and constructed equal to water pipe, and shall be pressure tested to assure watertightness prior to backfilling.
- D. No water pipe shall pass through or come into contact with any part of a sewer manhole.

3.11 CONNECTIONS:

A. Where required by actual field conditions, as directed by the Engineer, connections to existing structures, wye service connections, and existing line connections shall be made.

1. Connections to Existing Structures: Existing structures are defined to be manholes, pump station wet wells, etc. An opening of sufficient size shall be core drilled to permit the end of the new pipe to be installed flush with the inner face of the existing masonry. Any portion of an existing structure that is damaged shall be repaired or replaced at the Contractor's expense, if permitted by the Sewer District. A modular type seal, meeting the approval of **Rock Creek Public Sewer District** shall be used where the core drilling took place.
2. Connections to Existing Lines: The Contractor will be required to locate by excavation existing sewer mains which are to be connected to the new main sufficiently in advance to coordinate the existing lines with planned lines and grades of new construction. These lines shall be connected to the new lines as shown on the drawings or as directed by the Engineer. Connections shall be made by manholes, new or existing. The cost of by-pass pumping shall be considered incidental to the cost of the sewermain. Sewermain connections at manholes shall be watertight. Flexible watertight connections shall be used at new manhole construction and a modular type seal connection shall be used at all existing manholes that have been core drilled. All seals must meet the approval of meeting the approval of **Rock Creek Public Sewer District**. The cost of removing the existing sewermain within the limits of the new manhole and grouting the invert to direct flows, shall be considered incidental to the cost of the manhole. When core drilling into an existing manhole, the new sewermain shall terminate at the inside face of the manhole, above the existing grouted invert. The existing grout shall be cleaned, a bonding agent applied and epoxy non-shrink grout applied to direct the flow into the existing grouted invert. When working in manholes, the Contractor shall follow all OSHA regulations concerning these matters. Safety on this project is the responsibility of the Contractor. Any blockages in the existing line due as a result of this construction work will be the Contractors responsibility to clean without additional compensation.
3. Wye Service Connections: Wye service connections are defined to be connections made from a main sewer line to an individual property such as a home. New connections shall be as shown on the plans. The service connection shall consist of a standard connection, necessary length of pipe, airtight plug, cleanouts, septic abandonment (Separate pay item- See Abandoning Septic Tank), plus any unclassified excavation (as defined in Section 203 of the Missouri Standard Specifications for Highway Construction), backfilling, clearing and grubbing, removal and replacement of residential improvements, and temporary relocation of personal property

obstructing the project. No wye service connections or septic abandonments are included on this project.

3.12 MANHOLE CONSTRUCTION:

- A. Precast manholes may be constructed with a precast base section on a monolithic cast-in-place base structure. Detailed shop drawings shall be submitted to the Engineer and the Sewer District showing the proposed methods and details of connections.
- B. All lift holes on precast elements for sanitary sewer manholes shall be completely filled with non-shrink, non-metallic grout. All joints between precast elements or sanitary sewer manholes shall be in accordance with MANHOLES Section 2.03.
- C. The first precast section shall be placed on the monolithic base structure before the base has taken initial set, and shall be carefully adjusted to the true grade and alignment with all inlet pipes properly installed so as to form an integral, watertight unit. Alternately, the section shall be mortared into a suitable groove provided in the top of the monolithic base. The first section shall be uniformly supported by the base concrete, and shall not bear directly on any of the pipes. All exterior surfaces of the manhole must be waterproofed with a bitumastic sealant.
- D. Precast sections shall be placed and aligned to provide vertical sides and vertical alignment to the ladder rungs. The completed manhole shall be rigid, true to dimensions and be watertight.
- E. Backfilling shall be done carefully with selected earth fill, free from rocks and debris, without injury to the manhole.

3.13 ACCEPTANCE TEST:

- A. Upon completion of the sewers, acceptance tests will be conducted by the Contractor in the presence of the Engineer and the governing sewer district to determine the acceptability of the sewers. The testing schedule shall be submitted to the Engineer by the Contractor prior to testing. All inspections require a 24-hour notice to the Engineer and the Sewer District. The Contractor shall furnish suitable test equipment, materials and manpower to conduct the test.
- B. If the installation fails to meet these requirements, the Contractor shall, at his own expense, repair or replace all defective materials and / or workmanship and re-test until the installation meets these requirements.

- C. The Contractor shall cooperate fully with the Engineer and governing sewer district for the inspection and testing of the completed work.
- D. Stoppers and or plugs for the various sizes of pipe shall be furnished by the Contractor for use in the tests and personnel shall be made available by the Contractor for aid in conducting the tests herein specified.
- E. A vacuum or low-pressure air test will be conducted after backfilling and before replacing pavement. The equipment shall be provided by the Contractor and tests shall be conducted by the Contractor in the presence of the Engineer and the governing sewer district. The Contractor may desire to make a test prior to backfill for his own purposes, but the "Acceptance Test" shall be conducted after backfill.
- F. All wyes, tees or ends of lateral or service stubs shall be suitably capped to withstand the internal pressure during testing. Such caps shall be easily removable for future connections or extensions.
- G. After each manhole-to-manhole section of line has been backfilled and cleaned, the ends shall be plugged with pneumatic plugs. These plugs shall be designed such that they will hold against line test pressure without requiring blocking or bracing.
- H. Air for inflation of the triple connection pneumatic plug shall be supplied through a factory-equipped control panel. There shall be three hose connections from the control panel to the triple connection pneumatic plug. One hose shall be used only for inflation of the pneumatic plug. The second hose shall be used for continuously reading the air pressure rise in the sealed line.
- I. There shall be a 3-1/2" diameter, 0-30 psig gauge mounted on the control panel for reading the internal pressure of the line being tested. Calibrations from the 0-10 psia range shall be in tenths of pounds and this 0-10 portion shall cover 90% of the completed dial range.
- J. Low-pressure air shall be introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average backpressure of any ground water pressures that may be over the pipe. At least two minutes shall be allowed for the air pressure to stabilize. After the stabilization period, the third hose shall be quickly disconnected from the control panel.
- K. The portion of line being tested shall be accepted if the portion under test does not lose air at a rate greater than 0.003 cubic feet per minute per square foot of internal pipe surface when tested at an average pressure of 3.0 psig greater than any back pressure exerted by ground water that may be over the pipe at the time of the test.

L. The above requirement shall be accomplished by performing the test as follows. The time required in minutes for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameters in the following table.

Pipe Diameter (in.)	Minimum Time (min:sec)	Length for Minimum Time (ft.)	Time for Longer Length (sec)	Test Time for Pipe Length Shown (min:sec)							
				100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

M. The requirement for a passing the vacuum acceptance test is no more than a 1.0 inch Hg drop starting from 10.0 inches Hg to 9.0 inches Hg for the appropriate time shown in the chart below. The test period begins after the section undergoing the test has reached a vacuum of 10 inches of Hg.

Pipe Diameter (in.)	Test Time for Pipe Length Shown (min:sec)							
	100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.
6	2:47	2:47	2:47	2:47	2:47	2:47	2:47	3:08
8	3:42	3:42	3:42	3:42	3:43	4:21	4:58	5:35
10	4:37	4:37	4:37	4:51	5:49	6:47	7:45	8:43
12	5:33	5:33	5:35	6:59	8:22	9:46		
15	6:57	6:57	8:43					
18	8:20	9:25						
21	9:43							

N. If the pressure drop occurs prior to the required time listed above, or 10 minutes if the time is not shown, the test shall be terminated and the section undergoing testing shall fail the test. The maximum test time is 10 minutes.

O. If the installation fails to meet this requirement, the Contractor shall determine at his own expense the source of the leakage. He shall repair or replace all

defective materials and / or workmanship. The use of sewer sealing materials and methods shall not be used or accepted.

- P. There shall be no substitute for good construction. The replacement of any pipes, pipe or fraction thereof shall require the end connections to be made with factory manufactured pieces having flexible gasketed joints to fit intended use. The use of half bell pipe and/or concrete collar will not be acceptable. Test shall be repeated as often as necessary until the installation meets the requirements of the acceptance test.
- Q. After completion of aforementioned testing, each manhole shall be subjected to a vacuum test or exfiltration test. The manhole to be tested shall be isolated from the sewer lines by installing pneumatic plugs in the sewer lines using the same procedure as for air testing, except that the plugs shall be installed in such a manner that there is a clear distance of at least 18" between the inside face of the manhole and the face of the plug. The manhole shall then have a vacuum drawn on it as described above and be required to be held for a period of 10 minutes without a loss of vacuum greater than 1 inch of Hg from a test vacuum of 10 inches of Hg. See MANHOLES Section 3.05 B for performing the exfiltration test.
- R. All sewer pipes shall be flushed to remove any debris, sand or grit from the completed sewers prior to being placed in service. The Contractor shall flush and pump or remove all water from the flushing process.
- S. Each section of the sewer line between manholes is required to be straight and uniformly graded. Each section will be lamped in the presence of the Engineer.
- T. Deflection testing shall be done on all flexible sewer pipe. Deflection testing shall be done on 100% of the flexible sewer pipe installed in the project. The sewer line shall be tested for excess deflection by pulling a mandrel through the pipe from manhole to manhole without the aid of a mechanical pulling device. The outside diameter of the test mandrel shall be ninety five (95%) percent of the original inside diameter of the pipe being tested. The allowable deflection after a period of thirty (30) days after installation shall not be more than five (5%) percent. In such reaches where the deflection is more than (5%) percent of the original diameter, the Contractor shall excavate to the point of excess deflection and carefully compact around the point where the excess deflection was found. This length of pipeline shall be re-tested after a period of thirty (30) days after backfilling. However, if after the initial testing, the pipe fails to return to the original size, the pipe shall be replaced.
- U. If the installation fails to meet these requirements, the Contractor shall, at his own expense, repair or replace all defective materials and/or workmanship and re-test until the installation meets these requirements.

3.14 SETTLEMENT:

- A. The Contractor shall be responsible for all damages which occur as a result of the settlement of backfill material in the trench or other backfill made by him during a period of one year from and after the date of final acceptance thereof by the Owner, including
 - 1. The cost to the Owner of all claims for damages filed with, and court actions brought against, the said Owner for and on account of damage.
 - 2. Repair to the satisfaction of the Owner, of any and each pavement, driveway, curb, slab, walk, lawn, or structure damages by such backfill settlement.

3.15 DISPOSAL OF EXCESS EXCAVATED MATERIALS:

- A. Except as otherwise permitted, all excess excavated materials shall be disposed of by the Contractor.
- B. The disposal of waste and excess excavated materials, including hauling, handling, leveling and surfacing, shall be subsidiary obligation of the Contractor and no separate payment will be made therefore.

3.16 ALIGNMENT AND GRADE:

- A. Unless otherwise shown on the drawings, all gravity sewer pipes shall be laid straight between changes in alignment and at a uniform grade between changes in grade. All lines shall be laid so that each section between manholes will lamp.
- B. The Contractor shall establish construction line and grade by the proper use of laser equipment.

3.17 LASER EQUIPMENT:

- A. The laser equipment used shall be specifically designed for use in the construction of sewers to line and grade. The laser shall be rigidly mounted with two point suspension, to its support platforms. The laser aligning method selected must be shown to have worked satisfactorily on at least three similar projects within the last two years. The laser shall be operated by manufacturer trained competent persons. Proof and demonstration of such training shall be required. The laser equipment used shall be as manufactured by Laser

Alignment, Inc., Spectrophysics, Construction Laser Systems, AGL, or approved equivalent.

3.18 SERVICE CONNECTIONS:

- A. Service connections shall be provided from the sewer main to the points as shown on the Drawings or as directed by the Engineer. Service connections may not be required on this project.
- B. The connection to the main may be accomplished by either installing an outlet wye or tee. Tees or wyes shall be factory molded fittings and of like material of the sewer main.
- C. The service connection shall be installed in accordance with the details shown in the plans.
- D. The joint material used for the house service outlet facilities shall be completely waterproof and shall be capable of withstanding any condition of stress or strain likely to be encountered in normal sanitary sewer construction or maintenance. Concrete encasement will not be considered waterproof and will not be an acceptable joint material.

3.19 SAFETY:

- A. To protect persons from injury and to avoid property damage, adequate barricades, construction signs, torches, red lanterns and guards as required shall be placed and maintained by the Contractor at his expense during the progress of the construction work and until it is safe for traffic to use the roads and streets. All material piles, equipment and pipe which may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. The rules and regulations of the local authorities respecting safety provisions shall be observed.
- B. Temporary support, adequate protection and maintenance of all underground and surface structures, drains, sewers and other obstructions encountered in the progress of the work shall be furnished by the Contractor at his expense and under the direction of the Engineer. The structures that may have been disturbed shall be restored upon completion of the work.
- C. Property and surface structures shall be protected during construction operations unless their removal for purposes of construction is authorized by the Engineer. Man made surface improvements that are moved or disturbed by the Contractor shall be restored to the original condition, after construction is completed, at the Contractor's expense.

- D. The Contractor may remove any trees or shrubbery that are located within the easement. Care should be taken to leave in place as many trees as possible. Responsibility for any damage or claims for damage caused by construction operations outside of the easement shall be assumed by the Contractor. Settlement of any damage or claims for damage shall be made by the Contractor as soon as possible and in a manner satisfactory to the Engineer. Any grass area disturbed by the construction shall be seeded in accordance with the governing specification, in the Seeding and Fertilizing Specification.
- E. The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures, both known and unknown, may be determined, and repaired when broken or otherwise damaged by him.
- F. The safety of the workers shall be the responsibility of the Contractor. OSHA regulations shall be followed.

3.20 FINAL GRADING:

- A. After placement of backfill and embankments are completed, all areas on the site of the work that have been disturbed shall be brought to the grade at the specified elevations, slopes and contours. The top of manhole frames shall be eight inches above final grade. Slopes shall be trimmed and dressed by hand and other surfaces so graded that effective drainage is secured. Grading shall be completed to the satisfaction of the Engineer. Rocks shall not be visible on the final graded surface.

3.21 CONSTRUCTION NEAR EXISTING UTILITIES:

- A. The Contractor shall maintain in operating condition, all active utilities, sewers, gutters and other drains encountered in the new sewer installation, and repair to the satisfaction of the Owner any surface or subsurface improvement damaged during the course of the work, unless such improvement is shown to be abandoned or removed. The Contractor shall be responsible for notifying all utilities or other interested parties when utility lines are liable to damage through performance of the work, and shall make all necessary arrangements with such owner or owners, relative to the removal and replacement or protection of such property or utilities.
- B. The Contractor shall satisfactorily shore, support and protect any and all structures and all pipes, sewers, drains, conduits and other facilities belonging to the owner, and be responsible for any damage resulting thereto. The Contractor shall not be entitled to any damages or extra pay on account of any postponements, interference or delay caused by any such structures and

facilities being on the line of the work, whether they are shown on the drawings or not. Time extensions will be considered providing proof that the utility delayed the Contractor.

3.22 **INTERRUPTION TO UTILITIES:**

- A. The Contractor shall take all reasonable precautions against damage to existing utilities. However, in the event of a break in an existing water main, gas main, sewer or underground cable, he shall immediately notify a responsible official from the organization operating the utility interrupted. The Contractor shall lend all possible assistance in restoring service and shall assume all costs, charges or claims connected with the interruption and repair of such services.
- B. All open trenches and other excavations shall be provided with suitable barriers, signs, and lights to the extent that adequate protection is provided to the public. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights. All barricades and obstructions shall be illuminated by means of warning lights at night. All lights used for this purpose shall be kept burning from sunset to sunrise.
- C. Materials stored upon or alongside public streets and highways shall be so placed, and the work at all times shall be so conducted, so as to cause the minimum obstruction and inconvenience to the traveling public. The Contractor will pay all barricades and lighting expenses.

3.23 **UNSUITABLE BACKFILL MATERIAL:**

- A. Where there is a deficiency of suitable backfill material due to a rejection of part or all of the excavated material as unsatisfactory for backfill purposes, the Contractor shall furnish satisfactory backfill material wasted from trench excavation in other locations or from other sources furnished by the Contractor.

3.24 **TRENCHES WITH SLOPING SIDES-LIMITED:**

- A. The Contractor may, at his option, where working conditions permit, excavate pipeline trenches with sloping sides, but within the following limitations:
 1. In general, only braced and vertical trenches will be permitted in traveled streets, alleys or narrow encasements.
 2. Where trenches with sloping sides are permitted, the slopes shall not extend below the top of the sewer, and trench excavations below this point shall be

made with vertical sides with widths not exceeding those specified hereinbefore, and shown on the drawings, of the various sizes of pipe.

3.25 SHORT TUNNELS:

- A. In some instances, trees, fire hydrants, sidewalks and other obstructions may be encountered, the proximity of which may be a hindrance to open cut excavation. In such cases, the Contractor shall excavate by means of short tunnels in order to protect such obstructions against damage.

PRECAST MANHOLES

PART 1 – GENERAL

1.00 DESCRIPTION OF WORK:

- A. Manholes are to be constructed in accordance with the drawings and the typical details. Unless otherwise specified, they shall be precast concrete.
- B. Shop drawings shall be required.

PART 2 – MATERIALS

2.01 BASE:

- A. Precast with base cast monolithic with bottom section walls or cast-in-place with a precast base structure installed as noted in Section 3.12.
- B. Reinforce the base slab of the base as shown in the typical details

2.02 PRECAST CONCRETE MANHOLES:

- A. ASTM C478, sized as indicated. They shall have eccentric cone precast tops. Absorption of the concrete shall not exceed 8 percent of the dry weight as determined by ASTM C497 (ten minute soaking test). Permeability Tests (ASTM C497 section filled with water) may be required prior to installation of any section that the Engineer deems necessary after visual inspection.

2.03 PRECAST MANHOLE PIPE SEALS:

- A. All pre-cast concrete manholes shall include a compressive-type joint for sewer pipe seals and provide 10° of omni directional deflection that eliminates infiltration due to settlement or ground movement.
- B. The compression type pipe seal is to be cast integrally into the pipe opening of the manhole at the time of manufacture. The seal shall be a one-piece, compression type joint with no moving parts meeting the performance and test requirements of ASTM C923.
- C. The manhole pipe seal shall be a flexible, watertight seal and meet the performance requirements of ASTM C923 for "Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes" and meet the approval of **Rock Creek Public Sewer District**.
- D. Modular seals, meeting the approval of **Rock Creek Public Sewer District**, for core-drilled holes shall be used at the existing manholes. The seals shall be for use in direct ground burial and exposure to waste water. The seal element shall be of EPDM rubber with pressure plates of reinforced nylon polymer. Bolts and nuts shall be of 316 stainless steel.

PART 3 - CONSTRUCTION REQUIREMENTS

3.01 PRECAST CONCRETE MANHOLES:

- A. Shop drawings are required to determine total height and size and number of sections required to attain finished elevation.
- B. Bottom section to be pre-cast monolithic with bottom section walls or cast-in-place base slab with a precast base structure.
- C. All sections to be of size for easy and safe handling with equipment available to the Contractor.
- D. All exterior surfaces of the manhole must be waterproofed with a bituminous sealant.
- E. Precast sections shall be placed and aligned to provide vertical sides and vertical alignment of the ladder rungs. The completed manhole shall be rigid, true to dimensions and be watertight.
- F. Backfilling shall be done carefully with selected earth fill, free from rocks and debris, without injury to the manhole or its waterproof coating.

3.02 MANHOLE BASE SLABS:

- A. Shall be of cast-in-place concrete or precast concrete of ample size to accommodate the specified size of manhole.
- B. Manhole excavations shall be of ample size and depth as to accommodate a base slab and bedding.
- C. The excavation shall be carried to a depth so that the base bedding may be placed on a firm, dry, undisturbed, native earth bed.
- D. Any material below the bottom of the manhole base that by reason of kind and/or condition is not or cannot be made stable by drainage or compaction, in the opinion of the Engineer, shall be removed and replaced with an approved granular material.

3.03 MANHOLE TOPS:

- A. Shall be eccentric cones, unless otherwise specified or if conditions are too shallow. In such cases, they shall be constructed with a flat top slab.
- B. Flat top slabs shall be constructed of cast-in-place or precast concrete of adequate section, material and reinforcement to support a concentrated wheel load of eight (8) tons, plus 100% impact.

3.04 MANHOLE INVERTS:

- A. Inverts to be carefully constructed and shaped with hydraulic non-shrink non-metallic grout to maintain proper velocities through the manhole.
- B. In no case shall the invert sections through the manhole be greater than that of the outgoing pipe.
- C. The shape of the invert shall conform exactly to the lower half of the pipe it connects.
- D. Side branches shall be connected with as large of a radius of curvature as practical.
- E. All inverts shall be plastered, troweled and brushed to a smooth, clean surface.
- F. Non-shrink grout placed between the invert and the walls of the manhole shall slope up from the invert.

G. All lift holes on precast elements for manholes shall not penetrate the full wall thickness, or be completely filled with non-shrink, non-metallic grout.

3.05 ACCEPTANCE TEST:

- A. Acceptance tests will be conducted by the Contractor, in the presence of the Engineer and governing sewer district, to determine the acceptability of the manholes upon completion of the sewers.
- B. After completion of pipe testing, each manhole shall be subjected to a vacuum test or an exfiltration test. The manhole to be tested shall be isolated from the sewer lines by installing pneumatic plugs in the pipe lines using the same procedure as for air testing, except that the plugs shall be installed in such a manner that there is a clear distance of at least 18" between the inside face of the manhole and the face of the plug. During the exfiltration test the manhole shall then be filled with water to a depth of 3' above the top of the highest pipe in the manhole. Depth shall be at least 3' above ground water. A liquid level measurement shall be made and recorded after initial filling and at 15 and 30-minute intervals thereafter. The test is acceptable when no water loss is observed for the last 15 minutes. Addition of water during the testing shall not be allowed. The manhole will have been deemed to pass the vacuum test after 1 minutes of no more than 1 inch of Hg loss under 10 inches of Hg vacuum.

CAST IRON MANHOLE LIDS AND FRAMES

PART 1 – GENERAL

1.00 GENERAL:

- A. The extent of cast iron manhole lids and frames to be furnished and installed is as indicated on the drawings and specified herein.
- B. Job Conditions: It shall be the responsibility of the Contractor to see that the casting accessories that are required to be cast into concrete are available at that time.
- C. Submittals shall be required.
- D. Applicable Standards:
 1. American Society for Testing and Materials (ASTM).

2. Federal Specifications.
3. American Association of State Highway and Transportation Officials (AASHTO).

PART 2 – MATERIALS

2.00 MATERIALS:

- A. General: Gray iron castings shall meet the approval of **Rock Creek Public Sewer District**. They shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage distortion or other defects. They shall be smooth and well cleaned by sandblasting.
- B. Quality: Materials used in the manufacture of castings shall conform to ASTM A48, Class 30 or better.
- C. Finish: All castings shall be manufactured true to pattern. Component parts shall fit together in a satisfactory manner. Round frames and covers shall have machined bearing surfaces to prevent rocking and rattling,
- D. Weight: All weights as given are average (and approximate) values. Deviation shall not exceed the tolerances established by ASTM Standards.

2.01 STYLES:

- A. Manhole Frame and Lid: For sanitary sewer Type "A" Watertight Frame with Bolted Lid
 1. 330 pound casting,
 2. Clear opening of 24" diameter,
 3. Lid diameter of 26",
 4. Frame base diameter of 36",
 5. Type "C" lid with Type 'F' concealed pick hole

Lettering on Lids: Lids shall be furnished with 2" high lettering indicating "SANITARY SEWER"

- B. Anchor bolt holes are required in the manhole frame to attach it to the manhole cone section. 4 – 1"Ø holes will be cast into the manhole frame. Provide four (4) stainless steel ¾" anchor bolts per manhole frame for attachment.
- C. Provide the manhole frame with the sealing gasket permanently glued in place at the factory.
- D. Manhole Frame and Lid: For sanitary sewer Type "B" Standard Frame and Lid
 - 1. 375 pound casting,
 - 2. Clear opening of 24" diameter,
 - 3. Lid diameter of 25 ¾",
 - 4. Frame base diameter of 35",
 - 5. Type "C" lid with Type 'F' concealed pick hole

Lettering on Lids: Lids shall be furnished with 2" high lettering indicating "SANITARY SEWER"

- E. Provide the manhole frame with the sealing gasket permanently glued in place at the factory.
- F. Manhole Frame and Lid: For sanitary sewer Cast-In-Place Watertight Frame with Bolted Lid
 - 1. 375 pound casting,
 - 2. Clear opening of 24" diameter,
 - 3. Lid diameter of 25¾",
 - 4. Type "C" lid with Type 'F' concealed pick hole

Lettering on Lids: Lids shall be furnished with 2" high lettering indicating "SANITARY SEWER"

- G. Provide the manhole frame with the sealing gasket permanently glued in place at the factory.

PART 3 - CONSTRUCTION REQUIREMENTS

3.00 INSTALLATION:

- A. All manhole frames and lids to be set level, true to grade, and/or specified elevation.
- B. All manhole frames not cast-in-place are to be set in butyl rope mastic to provide an airtight seal. Where indicated, the frame shall be anchor bolted to concrete manhole top.
- C. Manhole frames that are to be cast in concrete slabs shall be set level and flush with the finished surface of slab.
 - A. Position to prevent any ponding of water at the manhole frames when finished.
 - B. Anchor securely in position before placing concrete.
 - C. Adequately vibrate concrete at frame to ensure proper seal between frame and concrete. Avoid placing concrete vibrator on or against the casting.
 - D. Properly clean all frames and lids from mud, concrete or other foreign matter.
 - E. All frames and lids shall be in place before final acceptance and payment.

MANHOLE STEPS

PART 1 – GENERAL

1.00 GENERAL:

- A. The work covered in this section includes providing and installing manhole steps in all concrete manholes that are part of this project and are either mentioned in these specifications or in the drawings.

1.01 STANDARDS:

- A. The steps and their installation are regulated in materials, texture, and placement by OSHA and such regulations as presently modified must be strictly adhered to.

PART 2 – MATERIALS

2.00 MATERIALS:

- A. Manhole steps shall be fabricated from plastic covered grade 60, $\frac{1}{2}$ " diameter steel reinforcing rod. The manhole steps shall meet the approval of **Rock Creek Public Sewer District**.

PART 3 - CONSTRUCTION REQUIREMENTS

3.00 INSTALLATION:

- A. Steps shall be installed in manhole risers in a vertical row on 16" centers and in accordance with OSHA specifications.

HIGHWAY CASING PIPE, BORE & JACK

PART 1 – GENERAL

1.00 GENERAL:

- A. The work covered in this section includes providing and installing the casing pipe where shown on the drawings.

PART 2 – MATERIALS

2.00 MATERIALS:

- A. The casing pipe shall be constructed of ASTM A27 steel with a minimum yield strength of 35,000 psi.
- B. The minimum wall thickness for the non-coated casing pipe will be 0.25 inches. The casings will not be cathodically protected.

PART 3 - CONSTRUCTION REQUIREMENTS

3.00 INSTALLATION:

- A. The contractor shall protect the horizontal bore work area.
- B. Prior to jacking the casing pipe, the contractor shall excavate the upstream and downstream locations of the proposed tie-in connections of the existing sanitary sewer, and then verify the accuracy of the flowline elevations shown on the plans. The Engineer shall be notified of any elevation deviations from the plans in order adjustments can be calculated and revisions provided to the contractor.
- C. The completed casing pipe will be located and oriented as shown on the plans. The maximum horizontal deviation from the plan location is 0.20 feet and the maximum vertical deviation from the planned (or adjusted as noted above) elevation is 0.05 feet. Pavement or ground surface heave or settlement above the installation will not be permitted. To determine if heave or settlement is occurring, the contractor shall undertake surface monitoring measurements.
- D. The excavated hole shall be no more than 0.1 foot greater than the outside diameter of the pipe. Sluicing and jetting with water as a primary means of soil cutting will not be permitted. When material tends to cave in from outside these limits, a metal shield shall be used ahead of the first section of pipe when pipe jacking, microtunneling or auger boring.
- E. Holes bored by the methods of auger boring, microtunnelling or pipe jacking shall be cleaned as pipe is being jacked or pushed simultaneously into place.
- F. Any areas resulting from caving or excavation outside the above specified limits shall be backfilled with a cellular concrete grout designed and produced in accordance with ASTM C 796, and with a method that will fill the voids. The excavated area around the pipe shall be sealed with grout for a minimum distance of 3 feet from the outside face of the fill or cut slope.
- G. Entry or exit pits or shafts shall be adequately sloped and shored prior to boring.
- H. If the horizontal boring method chosen for use is pipe jacking or microtunneling, resilient joint cushioning material shall be used between individual pipe segments during the pipe jacking or microtunneling process. This material shall be 0.5 inch thick for pipe diameters up to 30 inches, and shall be 0.75 inch thick for pipe diameters equal to or greater than 30 inches.

- I. If the horizontal boring method chosen for use is auger boring or pipe ramming, an adequate steel leading-edge band shall be used to protect the leading edge of the pipe from obstacles in the boring path.
- J. Each piece of casing pipe shall be tack welded together, one at a time, and checked for square along the length using a string line stretched tight along the top, bottom, left and right sides of the casing pipe. The maximum out-of-square at any point along the length of the casing shall be 0.375 inches. Any misalignment in excess of this value will be cause to completely grind away the tack welds, re-align the sections of casing and tack weld again before re-checking for square.
- K. Once squarely aligned, the sections of casing pipe shall be welded along the entire perimeter resulting in a smooth workmanlike watertight seam. All welding shall be accomplished in accordance with AWS D1.1 and be performed by a licensed welder.
- L. The SDR 35 PVC pipe may be installed in the casing pipe as work on the casing pipe progresses, but shall be kept back from the welding process a sufficient distance to prevent damage to the pipe.
- M. Spacers, meeting the approval of **Rock Creek Public Sewer District**, shall be used to support the sewermain in all casings. The spacers shall be installed in accordance with the manufacturer's recommendations. If lubricants are used on the spacers they shall be a non-petroleum type of product. A flax soap is acceptable for a lubricant.
- N. The ends of each casing pipe shall have a cover to keep out soil and rock. The cover shall be $\frac{3}{4}$ " marine plywood with several 1/2" slots cut into the bottom to allow for drainage of any seep water from the casing pipe. The end closures shall be backfilled with 1" clean gravel to allow for drainage.

SEWERMAIN ABANDONMENT

PART 1 – GENERAL

1.00 GENERAL:

- A. The work covered in this section includes providing and installing the cement grout into the existing section of 15" sewermain to be abandoned.

PART 2 – MATERIALS

2.00 MATERIALS:

- A. The cement grout shall meet the requirements for Grout in Section 1066 MORTARS AND GROUT of the Missouri Standard Specifications for Highway Construction.

PART 3 - CONSTRUCTION REQUIREMENTS

3.00 INSTALLATION:

- A. Sewers to be abandoned shall be securely blocked at any points of intake or discharge with a bulkhead or pre-formed plug. The existing sewer shall then be completely filled with an approved grout mix. The proposed method for blocking and filling the existing sewer shall be submitted to the Engineer and Sewer District for approval.

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.00 GENERAL

- A. All work completed under this Contract will be measured by the County with the assistance of the Contractor. The method of measurement and payment shall be as described in this Section of the specifications.
- B. All work to be done by the Contractor, as shown in the drawings and described in the specifications, including any and all minor details not specifically shown or described but obviously essential to the proper completion of the work, shall be considered as subsidiary to and included with the work for which prices are named in the contract documents.
- C. The Contractor shall not be entitled to any extra or additional compensation for such unless otherwise specified. Work for which there is not a pay item will be considered incidental to the Contract and no additional compensation will be allowed.
- D. Payment for Sanitary Sewers-Gravity and lateral connections, if any, shall include all labor and material for removal of improvements, Class 3

Excavation and Class 3 Excavation in Rock (as defined in Section 206 of the Missouri Standard Specifications for Highway Construction), shoring, pumping, bedding, sewer lines including pipe, stub pipe, angles, tees, wyes, joints and joint compounds, backfill, testing, seeding, fertilizing and mulching and disposal of excess material, including pavement, driveways and walkways removed for construction of sewers. It shall also include the connection to the existing manholes as shown on the plans, including core drilling, repair of the subdivision streets, driveways, and sidewalks, all in kind with similar materials and pavement thickness, repair or replacement of fences removed for sewer construction, if any, and sawcutting of concrete or asphalt. This pay item shall also include granular backfill to the pavement subgrade at roadways, driveways and sidewalks. In essence the unit bid price shall include all sewer related work with the exception of manholes and lateral connections, which shall be paid at a separate unit bid price. Measurement for the Gravity Sewer shall be made between the interior faces of the interconnecting manholes, measured in a true and level line. Measurement will be to the nearest one (1) foot between manholes. Payment will be made at the unit bid price for Sanitary Sewers-Gravity (15").

- E. Payment for Precast Manholes shall include all labor and materials to construct the new manholes to the grades shown on the plans. This pay item shall include the precast manholes, cast iron manhole lids and frames, manhole steps, Class 3 Excavation and Class 3 Excavation in Rock (as defined in Section 206 of the Missouri Standard Specifications for Highway Construction), and backfill, testing, inspections, disposal of excess material, removal of improvements, and associated seeding fertilizing and mulching. It shall also include joints, concrete base, grouting of inverts, grouting of lifting holes and frames, waterproofing and all other work associated with completing this pay item. Included are sealants, stainless steel frame anchors, stainless steel bolts and rubber gaskets for the covers, and accessories to provide a complete, operational product in place. The depths will be measured from the lowest invert elevation to the top of the manhole frame and cover. These measurements shall include both the eccentric cone sections for all sizes. Payment will be made at the unit of depth bid price for Precast Manholes.
- F. Payment for Lateral Connections, if any, shall include all labor and materials necessary to connect the services shown on the plans to the new sanitary sewer. Exact locations of the laterals are not known. The unit bid price shall be comprehensive to include all Class 3 Excavation and Class 3 Excavation in Rock (as defined in Section 206 of the Missouri Standard Specifications for Highway Construction), piping, joints, joint compounds, removal and disposal of existing pipe, backfill, granular backfill, top soil seeding, fertilizing and mulching necessary to complete the lateral connections in their entirety for a complete useful connection. The price shall also include any connection and inspection fees required by the governing agencies.

- G. Payment for Highway Casing Pipe, Bored & Jacked shall include all labor and materials necessary to install the 30" diameter casing pipe at the locations shown on the drawings. The unit price shall include the casing pipe, welding, Raci spacers or treated wood skids, stainless steel straps and hardware, stone bedding, compacted backfill around the casing pipe, marine plywood end closures and the installation of the PVC pipe through the casing and end closure to complete the installation of Highway Casing Pipe-30" in its entirety. The price shall include any inspection fees required by the Sewer District.
- H. Payment for Sewermain Abandonment shall include all labor and material to block all points of entry and pump a grout mixture into the existing sewermain until it is completely filled with grout. Payment will be based on a linear foot measurement of the existing 15" sewermain between manholes B-1 and B-3.

1.01 MEASUREMENT AND PAYMENT:

- A. All work required by the specifications or drawings shall be included in the contract bid price. The work shall include all labor, materials, equipment, tools, and incidentals necessary to complete the work.
- B. Payments shall be made based on the original bid price for completed work in place.



SPECIFICATIONS

- MANHOLES: MANHOLES SHALL BE PRECAST CONC. AS APPROVED BY ROCK CREEK PUBLIC SEWER DIST. MANHOLES SHALL BE A WET POURED AND VIBRATED PROCESS. ALL MANHOLES SHALL CONTAIN FLEXIBLE, WATER-TIGHT SEALS MEETING THE APPROVAL OF ROCK CREEK PUBLIC SEWER. BANDED TYPE SEALS SHALL BE BANDED ON THE INSIDE OF THE MANHOLE. FRAME AND COVERS SHALL BE 400 LB. MIN. WITHIN ROADWAYS AND 300 LB. MIN. IN ALL OTHER AREAS. OUTSIDE DROPS WILL BE REQUIRED WHEN INCOMING SEWER FLOWLINE IS GREATER THAN 15 INCHES ABOVE MANHOLE FLOWLINE. MANHOLES SHALL BE 42" DIA. FOR SEWERS 8" IN SIZE. MANHOLES FOR 10" SEWERS AND LARGER SHALL BE 48" DIAMETER. ALL TERMINAL MANHOLES MUST HAVE A MINIMUM OF FIVE FEET EXTENSION OF PIPE SO THAT LATERALS DO NOT HAVE TO BE CONNECTED DIRECTLY TO MANHOLE. MANHOLES SHALL NOT BE PLACED IN AREAS WHERE EXCESSIVE DRAINAGE MAY OCCUR. EXTERIOR COATING OF MANHOLE IS NOT REQUIRED.
- PIPE: ALL PVC SANITARY SEWER PIPE SHALL BE ETI, CANTEX, NAPCO, OR J.M. WITH REBA GASKET OR PINCH RING GASKET ONLY. ALL DUCTILE IRON PIPE SHALL BE CLASS 50. DURING INSTALLATION, THE PIPELINE SHALL BE CAPPED AND MARKED AT THE END OF EACH DAY. ALL PIPE 20 FEET DEEP OR LESS SHALL BE SDR35. ALL PIPE DEEPER THAN 20 FEET SHALL BE C900.
- LATERALS & CONNECTIONS: MAIN LINE CONNECTIONS SHALL BE VASSALO, MULTI-FITTING OR PTI, INLINE HYDE OR SADDLE. ALL FITTINGS SHALL BE VASSALO, MULTI-FITTING OR PTI. LATERALS SHALL BE BEDDED 6 INCHES BELOW TO 6 INCHES ABOVE THE PIPE. WITH 3/4" CLEAN GRANULAR MATERIAL. ALL LATERALS SHALL BE CAPPED AND MARKED AT THE END OF EACH DAY. CONNECTIONS OF ALL HOUSE LATERALS (SDR-35 TO SCHEDULE 40 PIPE) SHALL BE MADE WITH FERNO OR MISSION COUPLINGS. LATERALS ARE NOT TO BE CONNECTED DIRECTLY TO THE MANHOLE.
- ROADWAY CROSSINGS: ALL ROADWAY CROSSINGS SHALL BE BACKFILLED WITH 3/4" CLEAN GRANULAR MATERIAL; A MINIMUM OF 2 FT. ABOVE THE PIPELINE.
- INSPECTION: THE CONTRACTOR SHALL NOTIFY THE SEWER COMPANY WHEN WORK IS TO BE PERFORMED AND PROVIDE A 24 HOUR NOTICE. NO PIPE SHALL BE INSTALLED OR BACK-FILLED WITHOUT A SEWER COMPANY INSPECTOR ON SITE. UPON COMPLETION OF SEWER MAINS AND PAYMENT OF ALL FEES, THE SEWER COMPANY SHALL PROVIDE A TRUCK AND FLUSH THE SYSTEM. THE SEWER COMPANY WILL THEN LAMP THE SYSTEM FOR FINAL ACCEPTANCE OR REJECTION.
- FEES AND APPLICATION: THE SUBDIVISION OWNER/DEVELOPER SHALL MAKE APPLICATION FOR SERVICE FROM THE SEWER COMPANY. THE OWNER/DEVELOPER SHALL EXECUTE A CONTRACT WITH THE SEWER COMPANY FOR PAYMENT OF ALL TAP FEES, INSPECTION FEES AND ALL INSPECTION FEES INCLUDING OVERTIME. SHALL BE IN ACCORDANCE WITH R.C.P.S.D. STANDARDS. ALL FEES MUST BE PAID PRIOR TO FINAL ACCEPTANCE AND CONVEYANCE TO THE SEWER COMPANY.
- FILL AREAS: ALL AREAS OF FILL WHERE SANITARY SEWERS ARE TO BE CONSTRUCTED SHALL BE PLACED AND COMPACTED TO A MINIMUM OF 95% MAXIMUM DENSITY AS DETERMINED BY THE "STANDARD PROCTER TEST", AASHTO T-99, METHOD "C" (ASTM D-698). ALL FILL PLACED WITHIN SANITARY SEWER CONSTRUCTION SHALL BE CERTIFIED BY A SOILS ENGINEER CONCERNING WITH GRADING AND BACKFILLING OPERATIONS.
- CONNECTION TO EXISTING SEWERS: SANITARY SEWERS BEING CONSTRUCTED SHALL NOT BE CONNECTED TO EXISTING MANHOLES OR SEWER MAINS UNTIL TESTED AND ACCEPTED. ANY CONNECTION TO AN EXISTING MANHOLE OR SEWER MAIN SHALL BE COMPLETED AS FOLLOWS:
 - A 6 FT. SPACE SHALL BE PROVIDED BETWEEN THE EXISTING AND NEW SEWER.
 - THE SEWER LINE MUST BE FLUSHED PRIOR TO ACCEPTANCE.
 - IF ANY SECTION OF THE SEWER LINES DO NOT PASS THE MANDREL TEST, THE OWNER/DEVELOPER MUST TV THE SEWER MAN AT HIS EXPENSE AND REPAIR.
 - AT THE DISCRETION OF THE INSPECTOR, ANY MANHOLE THAT IS DAMAGED DURING CONSTRUCTION TO CONNECT A NEW SEWER PIPE TO AN EXISTING MANHOLE SHALL BE REPLACED AT THE EXPENSE OF THE DEVELOPER OR CONTRACTOR.
- ALL PLANS FOR COMMERCIAL ESTABLISHMENTS MUST DISCLOSE THE TYPE OF BUSINESS TO DETERMINE IF A GREASE TRAP IS NECESSARY.
- CONSTRUCTION PLAN SHEETS MUST INCLUDE TOPOGRAPHICAL INFORMATION WITH SUFFICIENT DETAIL TO SHOW PROPOSED CONTOURS, DRAINAGE DITCHES AND STREAMS.
- MANHOLES UNDER CONSTRUCTION ARE TO BE COVERED AT THE END OF EACH DAY WITH SOME MATERIAL TO PREVENT DEBRIS FROM FALLING INTO THE MANHOLE.
- AS-BUILT DRAWINGS SHALL BE PROVIDED UPON COMPLETION OF CONSTRUCTION. ONE SET OF DRAWINGS AND ONE SET OF MYLAR REPRODUCIBLES SHALL BE SUBMITTED.

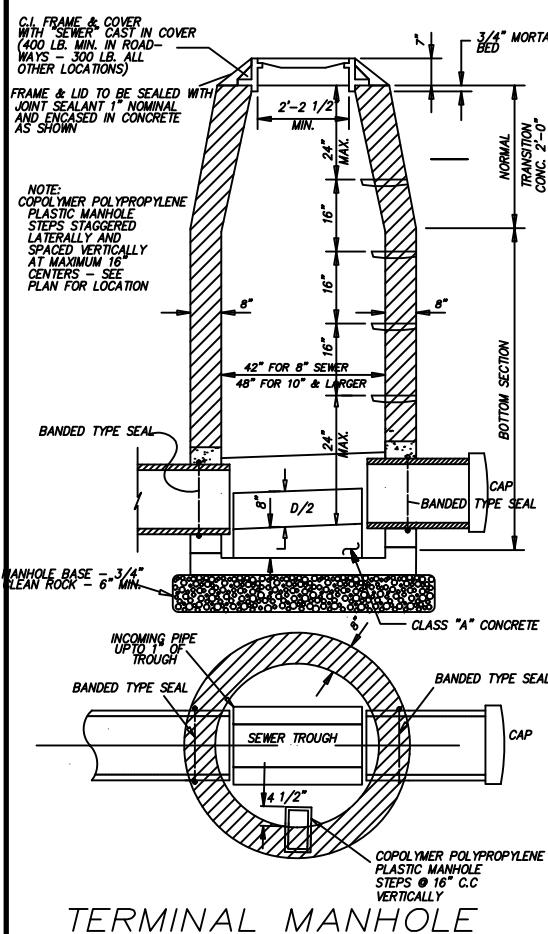
BERNARD LEO ARNOLD
PROFESSIONAL ENGINEER
MO. P.E. LICENSE # 021797

REVISIONS

NUMBER	BY	DATE
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2	BLA	02-22-10
3	BLA	03-29-10

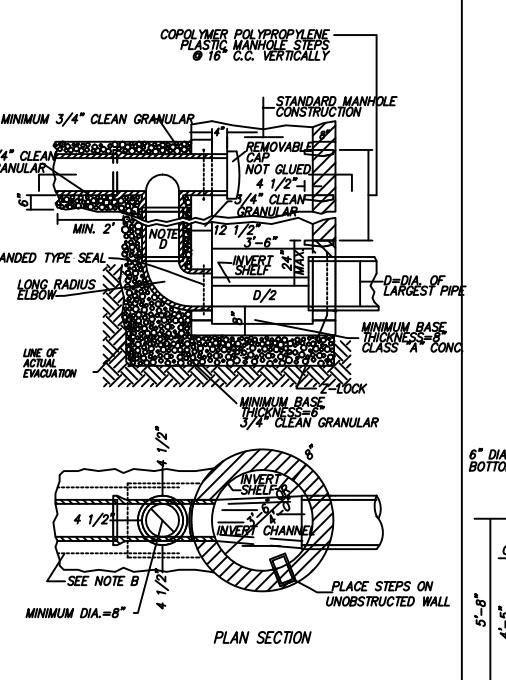
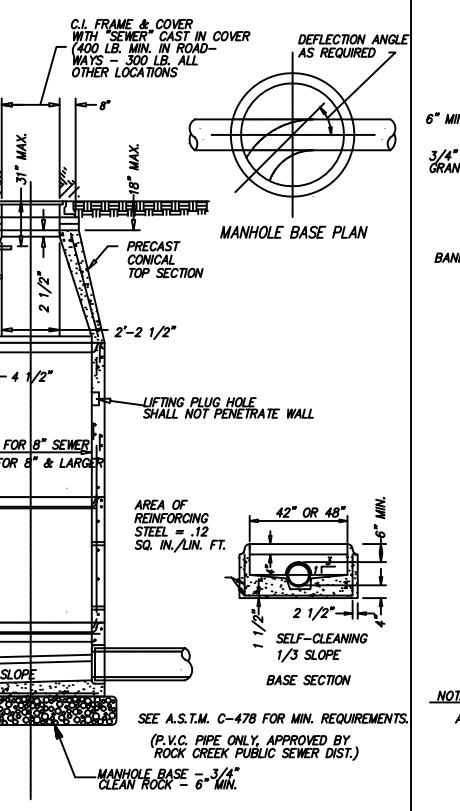
JEFFERSON COUNTY
ARRA-STP-7203 (601)

ROCK CREEK PUBLIC SEWER DISTRICT
SANITARY SEWER CONSTRUCTION STANDARDS



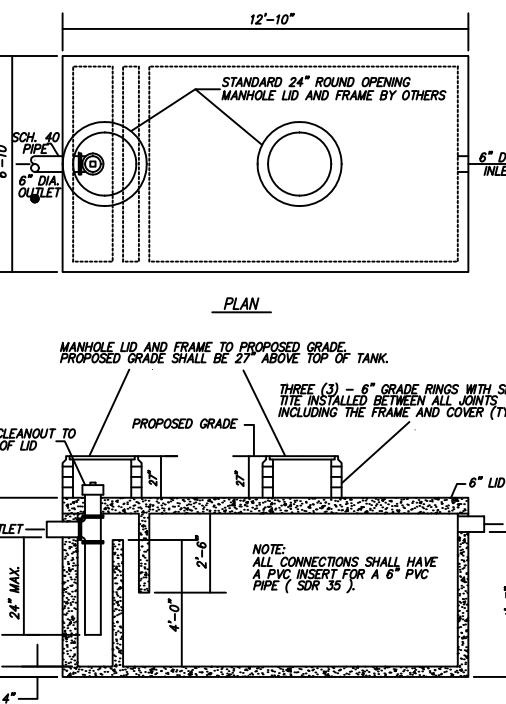
TERMINAL MANHOLE

PRE-CAST CONCRETE MANHOLE (FOR SEWERS 8" AND LARGER)

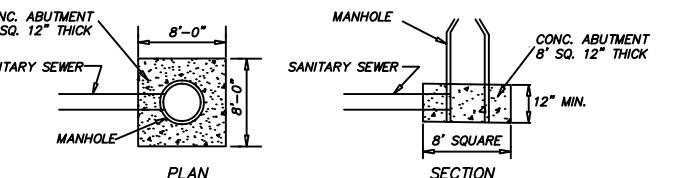


NOTES:
 A: DIAMETER OF DROP PIPE FOR SANITARY SEWERS
 (P.V.C. PIPE ONLY, APPROVED BY
 ROCK CREEK PUBLIC SEWER DIST.)
 B: OUTSIDE DROPS SHALL BE INSTALLED WHEN INCOMING
 MAIN IS GREATER THAN 15" ABOVE MANHOLE FLOWLINE
 C: MASONRY GROUT SHALL BE INSTALLED AT ALL PIPES IN AND OUT
 TO THE INVERT THROAT FOR A COMPLETE GROUTING OF MANHOLE
 WALL AND INVERT.

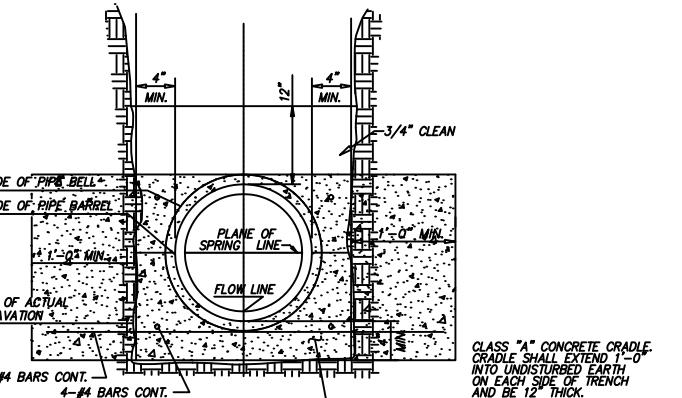
OUTSIDE DROP MANHOLE



2,750 GALLON OIL AND GREASE INTERCEPTOR

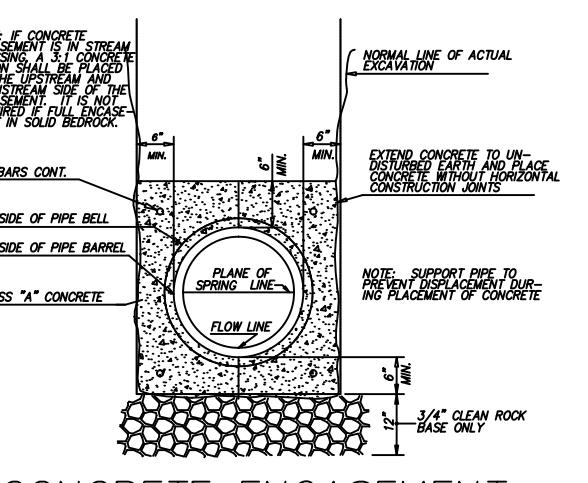


ABUTMENT DETAIL (SEWERS OVER 25%)



NOTE: CRADLES WILL NOT BE REQUIRED FOR PIPELINES INCLUDING SERVICE LATERALS UNDER 15% SLOPE.
 A. 15% TO 20% - CRADLES SHALL BE REQUIRED
 B. OVER 20% - CRADLES INSTALLED AT EACH PIPE SECTION
 C. OVER 25% - PIPE SHALL BE DUCTILE IRON WITH CRADLES AT EACH PIPE SECTION. CONCRETE ABUTMENTS SHALL BE INSTALLED AROUND EACH MANHOLE AT TOP AND BOTTOM OF SLOPE (SEE ABUTMENT DETAIL).

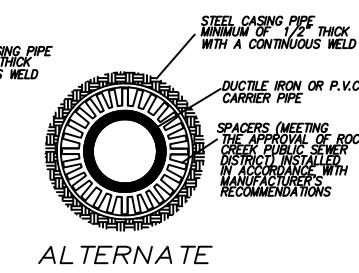
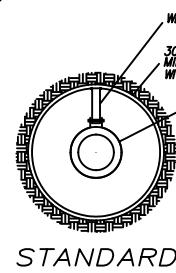
CONCRETE CRADLE



CONCRETE ENCASEMENT

BORING DETAIL

ALL SANITARY SEWER PIPE INSTALLED IN CASING PIPE SHALL BE DUCTILE OR P.V.C. IRON PIPE INSTALLED AT A 1% MINIMUM SLOPE. THE STANDARD DETAIL SHALL BE INSTALLED OR THE ALTERNATE WITH SPACERS SHALL BE INSTALLED IN THE CENTER OF THE CASING PIPE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.



STANDARD
ALTERNATE

SHEET 3 OF 3 SHEETS

ROCK CREEK PUBLIC SEWER DISTRICT
STANDARD TESTING REQUIREMENTS FOR SANITARY SEWERS AND MANHOLES
After the sewer system has been completed and flushed, the manholes shall be vacuum tested and the sewer lines and laterals shall be low-pressure air tested in the presence of a RCPSD inspector. Sewer lines shall also be required to complete a deflection test. It shall be the responsibility of the Contractor installing the sewer system to provide all equipment and material necessary to complete the required testing and to conduct the testing in accordance with the manufacturer's recommendation and all required safety standards. No sewer system will be approved or accepted and no escrow shall be authorized to be released that has not passed the minimum testing as required herein. Alternate testing methods may be utilized provided such testing is approved in advance by the District and meet the minimum standards adopted by the Missouri Department of Natural Resources. As a minimum, all testing shall conform to the following:

- Deflection testing: Not less than thirty (30) days after final backfill, the Contractor shall perform a deflection test with a RCPSD inspector present. Testing shall be completed by using a rigid ball or mandrel with diameters equal ninety-five percent (95%) of the diameter of the pipe. Test shall be performed without mechanical pulling devices. No pipe shall exceed a deflection of five percent (5%).
- Low-pressure air testing: All testing must be completed in accordance with ASTM F 1417. After completion of the system but prior to the connection of residential units, low-pressure air testing shall be performed on sewer lines and laterals. Isolate the section of sewer line to be tested. All branches, laterals, tees, and wyes must be plugged and braced adequately to withstand the test pressure. Air pressure must be introduced into the system to achieve four (4) psi and then stabilized to a minimum of three and one-half (3 1/2) psi in excess of ground water pressure above the top of the sewer for at least two (2) minutes and then the air supply disconnected. The time-pressure drop method shall be used and shall conform to the following:

Specified Time Allowed for a One PSI Drop in Pressure for Size
and Length of Pipe Indicated. One (1.0) psi Pressure Cannot Drop Faster Than

Pipe Dia. Inches	Min. Time	100 feet	150 feet	200 feet	250 feet	300 feet	350 feet	400 feet
8"	7.34	7:34	7:34	7:34	7:36	8:52	10:08	
10"	9.26	9:26	9:26	9:26	9:53	11:52	15:49	17:48

- Vacuum testing: All testing must be completed in accordance with ASTM C-1244. After completion of the system but prior to the connection of residential units, a vacuum test shall be performed on manholes. Sewer lines and lateral lines within the manhole must be plugged during the testing. A vacuum of ten (10) inches of mercury shall be drawn on the manhole, the valve on the vacuum line test head shall be closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 inches of mercury. Test passes if vacuum remains at 10 inches of Hg or drops to not less than 9 inches of Hg in one (1) minute.

Note: Sanitary sewers shall not be connected to a live sewer line until after the sewer system has been inspected and approved by Rock Creek Public Sewer District in accordance with the above provisions.

ROCK CREEK PUBLIC SEWER DISTRICT LATERAL CONNECTION SPECIFICATIONS
The following specifications must be followed to make any lateral connections within the Rock Creek Public Sewer District:

- All pipe used must meet A.S.T.M. specifications. Pipe recommended by R.C.P.S.D.
 - ETI
 - CANTEX
 - NAFCO
 - J.M. / with a pinch ring
- A subfloor inspection and a water test of the subfloor is required. This requirement may be waived at the discretion of the District when such construction has been inspected, tested, and approved by an appropriate city or county agency. All installations, however, involving grease traps must be inspected by the District. Schedule 40 piping is required in the subfloor. Bedding in the subfloor shall be 3/4" of clean rock. Freeze proof glue is required in the winter and summer. Long sweeping 90's are allowed.
- Glued fittings will not be allowed on a lateral connection. From the main line up to 5 feet of the building, Forno or Meshlin coupling are used to connect S-40 to SDR-35 lateral. Only gasket fittings will be allowed.
- At least six inches of backfill will be used, both under and over the pipe being placed in the ground. Backfill shall be 3/4" of clean rock. Road crossing, main lines and laterals shall have 1 foot under the pipe and 2 feet over the pipe of 3/4" clean rock.
- The SDR-35 pipe in regards to the connection: The SDR-35 pipe is to be sawed behind and close to the rubber gasket, so that the I.D. is the same on the S-40 and the SDR-35 then this will not cause a restriction in the pipe at this point for future new owners.
- ALL INSPECTION REQUIRE AT LEAST A 24 HOUR NOTICE.
- Laterals may be 4" or 6" diameter except commercial which shall be 6" in diameter.