GENERAL NOTES PERTINENT TO ALL CONSTRUCTION OPERATIONS

1. Underground utilities shown on these plans have been plotted from available records and information, and their locations shall be considered approximate only. The verification of the actual location of all underground utilities, either shown or not shown on these plans, shall be the responsibility of the contractor(s), and the verification of the actual location shall be performed prior to beginning work.

2. Easements and right-of-ways will be provided for streets, sanitary sewers, storm sewers, water mains and private utilities on the subdivision plat (record plat). See the subdivision plat (record plat) for location and size of easements and right-of-ways.

3. All construction shall be performed in accordance with the specifications, ordinances, rules, regulations, guidelines and/or policies of the local governing jurisdictional authority.

SANITARY SEWER CONSTRUCTION

I. GENERAL

1. No area shall be cleared without authorization from the project engineer.

2. The sanitary sewer contractor shall perform a complete installation as shown on the plans, stated in these notes, or reasonably implied there from, all in accordance with the plans and notes as interpreted by the project engineer.

3. Before sewer construction begins, the owner shall employ a competent, licensed surveyor to establish the lines and grades of the sanitary sewers being constructed. The contractor shall pick up the cut sheets at the office of the surveyor.

4. The contractor shall notify the City of O'Fallon at least two days in advance of the start of construction. Contact City of O'Fallon, at telephone (314) 272-6244.

II. SPECIFICATIONS

1. All materials used shall meet the following specifications:

   Plastic Pipe: Polyvinyl Chloride pipe conforming to the requirements of ASTM D-3034 Standard Specifications for the PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings, SDR 35.

   Fittings: Fittings for PVC Pipe shall be of the same material and strength requirements as the sewer, as well as monolithic in construction.

   Manholes: Precast reinforced concrete manholes conforming to the standard specifications for precast reinforced concrete manhole sections, ASTM-C478 and the approved Standard Details of Sewer Construction of City of O'Fallon. The Portland cement used shall be Type II. Manhole cones shall be concentric and base sections shall have the base riser section integral with the floor. Manhole steps shall be cast into the full depth of the wall section. Connections for inlet and outlet pipes shall be of an approved patented compression type connection. The inside diameter for riser sections shall be 42 inches for pipes sizes 8 inch through 15 inch and be 48 inches for pipe sizes larger and for inside drop manholes.

   Manhole Frames and Covers: Gray Iron Castings conforming to the requirements of the specifications for Gray Iron Castings, ASTM A48. All castings shall be clean and free of scale, adhesions or inclusions. They shall be fabricated of Class 30B cast iron. Bearing surfaces between manhole frames and covers shall be such that the cover shall seat in any position onto the frame without rocking.

   Joints: Type D joints shall be used with PVC pipes and shall be elastomeric gasket joints providing a water tight seal. They shall conform to the requirements of the Specifications for Joints for Drain and Sewer Plastic Pipes and Fittings Using Flexible Elastomeric Seals, ASTM C-3212.

   Bedding Aggregate: Bedding Aggregate shall conform to the following, and have a maximum percentage of 'Fines' as follows:

% by Weight Passing		
Sieve	Maximum	Minimum
1 inch	100	100
3/4 inch	100	90
1/2 inch	60	35
# 100	10	0

   Backfill Aggregate: Backfill Aggregate shall be crushed limestone and screenings and be 3/4 inch minus.

2. Pipe and appurtenances shall be new and unused. The type of pipe to be installed shall be as shown on the drawings. Pipe and appurtenances shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken to prevent damage to any pipe coating.

3. The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during construction operations. When work is not in progress, the open ends of pipe shall be securely closed so that no foreign materials will enter the pipe. Any section of pipe found to be defective before or after laying shall be replaced with sound pipe, or repaired in a satisfactory manner.

4. Pipe shall be laid to line and grade as shown on the plans and as staked in the field. When connections are are to be made to any existing manhole, pipe, or other improvement, the actual elevation or position of which cannot be determined without excavation, the contractor shall excavate far and expose the existing improvement before laying the connecting pipe or conduit. When existing underground improvements may reasonably be expected to conflict with the line or grade established for the new sewer line, the contractor shall excavate as necessary to expose and locate such potentially conflicting underground improvements prior to laying the new pipe. Any adjustment in line or grade which may be necessary to accomplish the intent of the plans shall be made.

5. Pipe shall be laid upgrade in a continuous operation from structure to structure, with the socket or collar ends of the pipe upgrade.

6. All PVC Sanitary Sewer Pipe shall be bedded with Bedding Aggregate. The bedding aggregate shall extend from 4 inches below the pipe to the pipe springline. All PVC Sanitary Sewer Pipe shall be backfilled with Aggregate Backfill: for non-paved areas, the Aggregate Backfill shall extend from spring line of pipe to 6 inches over the pipe; for paved areas the Aggregate Backfill shall extend from spring line of pipe to the ground surface. Refer to detail "PIPE BEDDING CLASS "C" (FOR ALL PIPE EXCEPT REINFORCED CONCRETE PIPE".

7. All trench backfills under paved areas shall be compacted to 90% of the maximum density as determined by the 'Modified AASHTO T-180 Compaction Test', (ASTM-D-1557). All other trench backfills shall be water jetted.

8. All sanitary sewer manholes shall be waterproofed on the exterior in accordance with Missouri Department of Natural Resources Specification 10-CSR-8.120 (7)(E).

9. All sanitary sewer construction shall be performed in accordance with City of O'Fallon specifications. The contractor shall assist the City of O'Fallon personnel in the inspection and testing of the sanitary sewers.

10. The minimum vertical distance between the basement floor elevation and the flowline elevation of the sanitary sewer line at the corresponding house connection joint shall not be less than the diameter of the sanitary sewer main plus 2-1/2 feet.

11. All manhole bases to have a minimum slope of 0.2' along the invert flowline.

12. All manhole tops shall be built to the elevations shown on the plans. If no top elevation is shown, contact the engineer for such information.

13. Provide clean-out on all laterals over 100 L.F. and at all major angle points in laterals.

STORM SEWER CONSTRUCTION

I. GENERAL

1. No area shall be cleared without authorization from the project engineer.

2. The storm sewer contractor shall perform a complete installation as shown on the plans, stated in these notes, or reasonably implied there from, all in accordance with the plans and notes as interpreted by the project engineer.

3. Before sewer construction begins, the owner shall employ a completed, licensed surveyor to establish the lines and grades of the storm sewers being constructed. The contractor shall pick up the cut sheets at the office of the surveyor.

4. The contractor shall notify the City of O'Fallon at least two days in advance of the start of construction. Contact City of O'Fallon, at telephone (314) 272-6244.

II. SPECIFICATIONS

1. All materials used shall meet the following specifications:

   Concrete Pipe: Concrete pipe shall be precast and shall conform to the requirements of the Specifications for Concrete Sewer Pipe, ASTM C14. The interior surface of the pipe shall be a true cylindrical surface free from undulations or corrugations. Cement shall meet all requirements of the Specifications for Portland Cement, ASTM C150, Type II.

   Reinforced Concrete Pipe: Reinforced Concrete Pipe shall be precast and shall conform to the requirements of the Specifications for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe, ASTM C76, with shell thickness designated "Wall B" and with Circular Reinforcement in Circular Pipe or to the requirements of Reinforced Concrete Elliptical Culvert Storm Drain and Sewer Pipe ASTM C507.

   Strength class or classes shall be as noted on the Project Plans. The interior surfaces of the pipe shall be a smooth true cylindrical surface free from undulations or corrugations. Lifting holes when provided, shall be cast in the wall of the pipe to receive a pre-cast truncated conical concrete plug of such sizes as will allow 1/8 inch cementing material on the sides of the joining surfaces of the plug and will fill at least 50% of the lifting hole depth. Cement shall meet all the requirements of the Specifications for Portland Cement, ASTM C150, Type II. Cut pipe for curved alignments shall be of uniform cut and length along the same curve, and otherwise meet the same requirements as for straight pipe.

   Storm Manholes: Storm Manholes shall be precast reinforced concrete manholes conforming to the standard specifications for precast reinforced concrete manholes sections, ASTM-C478. The Portland cement used shall be Type II. Manhole cones shall be concentric and base sections shall have the base riser section integral with the floor. Manhole steps shall be cast into the full depth of the wall section. Connections for inlet and outlet pipes shall be of an approved patented compression type connection. The inside diameter for riser sections shall be 42 inches for pipes sizes 8 inch through 15 inch and be 48 inches for pipe sizes larger and for inside drop manholes.

   Curb Inlets and Area Inlets: Curb Inlets and Area Inlets and the precast top units for same shall conform to the Standard Construction Specifications for Sewers and Drainage Facilities of the Metropolitan St. Louis Sewer District, 1986.

   Manhole Frames and Covers: Gray Iron Castings shall conform to the requirements of the specifications for Grey Iron Castings, ASTM A48. All castings shall be clean and free of scale, adhesions or inclusions. They shall be fabricated of Class 30B cast iron. Bearing surfaces between manhole frames and covers shall be such that the cover shall seat in any position onto the frame without rocking.

   Joints: Type A joints shall be used with concrete pipe and reinforced concrete pipe and shall be constructed with approved compatible bituminous jointing material, in accordance with the requirements of this specification. Unless specifically required by the Project Plans, any approved bituminous sealing compound may be used. The clean, dry, surfaces of the interior of the pipe bell, groove, or socket, and the exterior of the spigot or tongue and the shoulders shall be primed and uniformly coated with an approved compatible bituminous primer, as recommended by the manufacturers of the sealing compound and the primer. It shall be done sufficiently in advance of applying the joint compound to permit proper drying and hardening and to provide a suitable uniform prepared surface for proper adhesion of the jointing material. The primer shall not be heated or diluted. When pre-mixed sealing compound is used with slip joint or tongue and groove pipe, the jointing compound shall be evenly spread on the surface of both the tongue and the groove of the joint from the tip to the shoulder in sufficient amount to completely fill and seal the joint to both surfaces of the pipe barrel when the joining pipes have been forced together to form the completed joint. If bell and spigot pipe is used, oakum or a similar approved packing material shall be imbedded in the sealing compound to support and keep the inner surfaces of the joining pipe in alignment.

   Protruding joint material shall be removed from the interior surface of the pipe, and the pipe joint troweled to give a continuous smooth interior pipe surface before the next pipe is laid. On the outside of the pipe, any material protruding from the solidly filled joint shall be neatly shaped, compacted, and smoothed over the joint.

   Bedding Aggregate: Bedding Aggregate shall conform to the following:

For Pipes 27 inch in diameter and smaller:

% by Weight Passing		
Sieve	Maximum	Minimum
1 inch	100	100
3/4 inch	100	90
1/2 inch	60	35
# 100	10	0

For Pipes 30 inch in diameter and larger:

1-1/2 inch	100	100
1 inch	70	60
3/4 inch	50	35
1/2 inch	35	25
100	10	0

   Backfill Aggregate: Backfill Aggregate shall be crushed limestone and screenings and be 3/4 inch minus.

   Rip-Rap: Rip-Rap shall conform to the following:

% by Weight Passing		
Sieve	Maximum	Minimum
12 inch	90	70
6 inch	30	10
1/2 inch	5	0

   Grout: All grout used for grouted rip-rap shall be high slump ready-mix concrete.

2. Pipe and appurtenances shall be new and unused. The type of pipe to be installed shall be as shown on the drawings. Pipe and appurtenances shall be handled in in such a manner as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken to prevent damage to any pipe coating.

3. The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during construction operations. When work is not in progress, the open ends of pipe shall be securely closed so that no foreign materials will enter the pipe. Any section of pipe found to be defective before or after laying shall be replaced with sound pipe, or repaired in a satisfactory manner.

4. Pipe shall be laid to line and grade as shown on the plans and as staked in the field. When connections are are to be made to any existing manhole, pipe, or other improvement, the actual elevation or position of which cannot be determined without excavation, the contractor shall excavate far and expose the existing improvement before laying the connecting pipe or conduit. When existing underground improvements may reasonably be expected to conflict with the line or grade established for the new sewer line, the contractor shall excavate as necessary to expose and locate such potentially conflicting underground improvements prior to laying the new pipe. Any adjustment in line or grade which may be necessary to accomplish the intent of the plans shall be made.

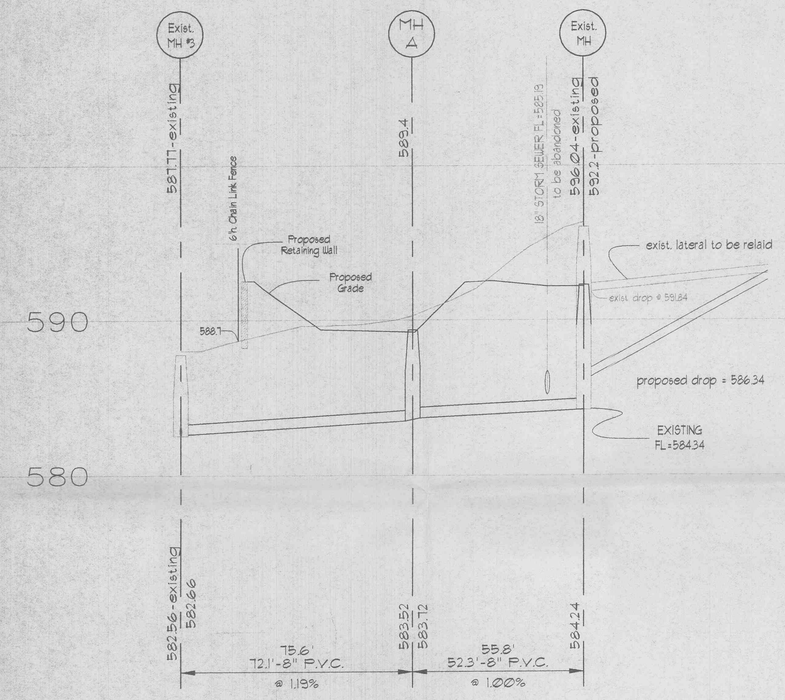
5. Pipe shall be laid upgrade in a continuous operation from structure to structure, with the socket or collar ends of the pipe upgrade.

6. Trench backfills under paved areas shall be of backfill aggregate material. Trench backfills outside paved areas may be earthen backfill. All trench backfills under paved areas shall be compacted to 90% of the maximum density as determined by the 'Modified AASHTO T-180 Compaction Test', (ASTM-D-1557). All other trench backfills shall be water jetted.

7. All storm sewer pipe shall be bedded with bedding aggregate. The bedding aggregate shall extend from 4 inches below the pipe to the pipe springline.

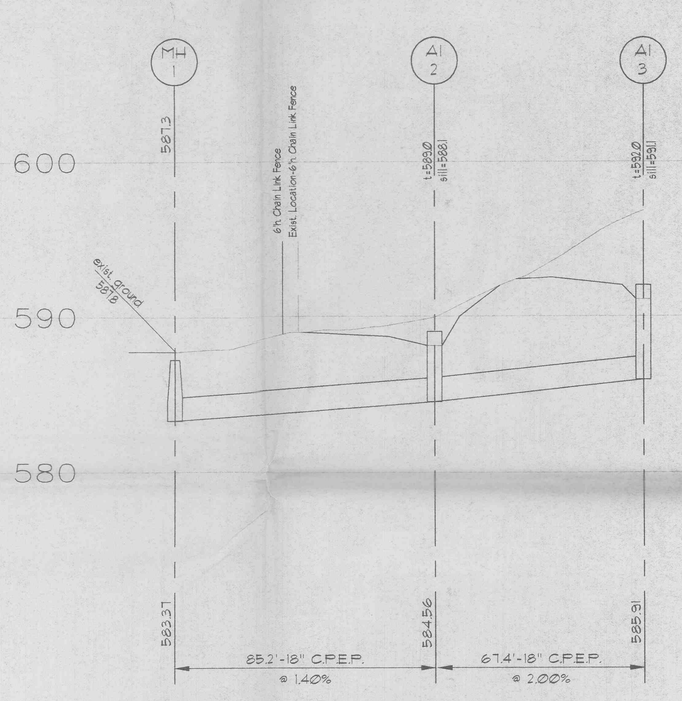
8. All storm sewer construction shall be performed in accordance with the City of O'Fallon specifications. The contractor shall assist City personnel, or representatives in the inspection of the storm sewers.

9. All storm manhole, area inlet and curb inlet tops shall be built to the elevations shown on the plans. If no elevation is shown, contact the engineer for such information.

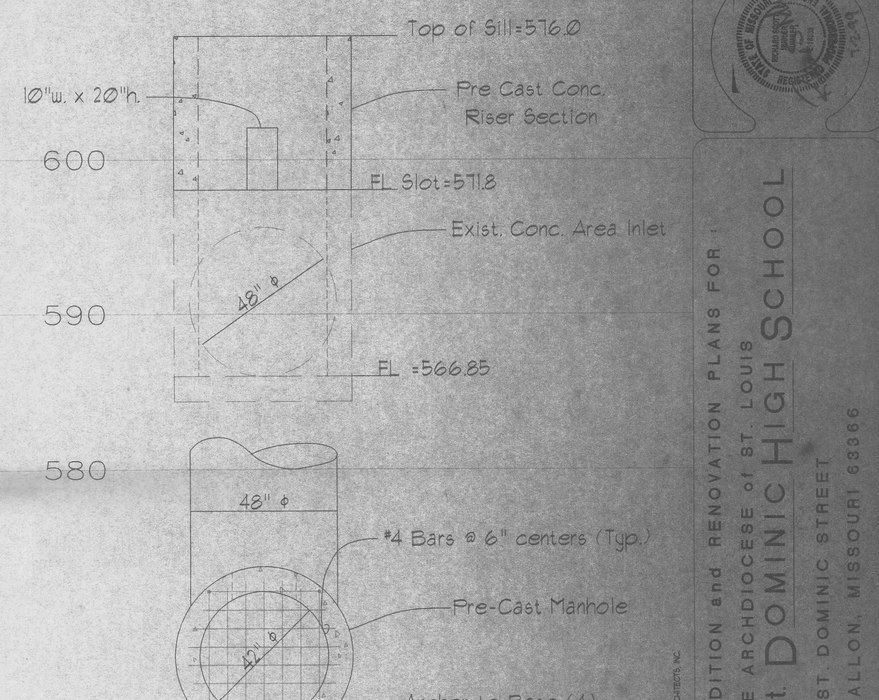


SCALE:
H: 1"=20'
V: 1"=5'

Sanitary Sewer



Storm Sewer



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