235 Attachment 1

Township of White

Attachment 1

Technical Specifications for Construction of Interceptors, Collectors, and Service Line Connections

Effective Date: May 9, 1990

Article 1 - General

The following are general rules and procedures that a contractor shall follow during the installation of a sewer project.

§ 101. Examination and inspection.

The work shall at all times be subject to examination and inspection by the authorized representatives of the Authority, who shall have free access to the work, and be furnished by the contractor, every reasonable facility for examination of the works.

The representative of the Authority shall have the right to reject defective materials and/or workmanship or require its correction. Rejected workmanship shall be satisfactorily corrected. Rejected materials shall be removed from the job site and replaced with proper materials. Failure or neglect on the part of the representative to condemn or reject any bad or inferior material or work shall not be construed to imply an acceptance of such work or materials, if such bad or inferior materials or work becomes evident at any time prior to final acceptance of the work by the Authority. The Authority representative shall in no case act as foreman or perform other duties for the contractor nor interfere with the management of the work by the contractor.

§ 102. Temporary suspension of work.

The Municipal Authority representative shall have the authority to suspend the work wholly or in part, due to unsuitable weather, or such other conditions as are considered unfavorable for the suitable prosecution of the work, or due to failure by the Contractor to carry out orders or to perform any provisions of these regulations.

§ 103. Observance of laws.

The contractor shall at all times observe and comply with all federal, state and local laws, ordinances and regulations in any manner affecting the conduct of the work or applying to

employees on the project, as well as all orders or decrees which have been promulgated or enacted.

§ 104. Permits and licenses.

The contractor shall procure all necessary construction permits and licenses, pay all charges and fees, therefore, and shall give all notices necessary and incidental to the proper and lawful prosecution of the work.

§ 105. Notice regarding cleanup and dust.

As the contractor completes each scheduled section of construction, he shall clean up all discarded materials and debris in that section. The area of construction shall be left clean and free of any material resulting from his work. During and at the completion of each day's work, the contractor shall broom and/or sweep clean all adjacent road surfaces to control dust and mud.

§ 106. Responsibility and liability of work.

The Township and/or Authority or any of its authorized representatives assumes no responsibility for the superintendence or direction of the personnel, use of equipment, or methods employed by the contractor; or for any liability arising therefrom or incidental thereto. Contractors shall provide certificates of insurance in an amount acceptable to the Township naming the Township and the Municipal Authority as additional insured. Additionally, the contractor shall hold the Township harmless from any liability related to the installation of the sewers.

ARTICLE 2 - Erosion and Sedimentation Control

1. The contractor shall use all care possible to prevent sedimentation reaching adjacent streams or wet weather washes both during and after construction. Improper practices to be prohibited include dumping of excess soil material into or adjacent to the stream or stream banks, operation of equipment in the stream, pumping of silt-laden water from trenches or other excavations into the stream or disposal of brush or debris in the stream. In addition, prompt cleanup, grading, seeding and restoration of the disturbed area shall be accomplished as work progresses through the site. Areas to remain as future roads or thoroughfares shall be protected from erosion during the interim period between pipeline and road construction by installing diversion ditches, permanent drains and straw bale filters.

2. The work shall at all times be subject to the inspection and jurisdiction by the Authority, the County Soil Conservation District and their agents.

3. The following actions and measures will be performed to protect against erosion and sedimentation:

    A. Prior to pipe installation, push topsoil from the area scheduled for disturbance into a temporary embankment on the uphill side of the excavation. The mound or embankment shall be so placed to act as a temporary diversion to keep runoff from entering the pipe trench. After pipeline has been installed and properly backfilled, topsoil will be returned to non-roadway areas and the area shall be permanently seeded and mulched.

    B. Place a straw bale barrier at the end of each topsoil embankment and where local water courses cross the construction zone. Straw bales may be removed after topsoil is re-spread and the area seeded and mulched. Straw bale barrier shall be installed in accordance with the details indicated on the drawings.

    C. Remove all excess backfill material from the construction zone to an approved disposal area.

    D. When working adjacent to any stream, place a straw bale barrier between the construction zone and the stream, full length of the disturbed area.

    E. If trench de-watering becomes necessary, create a straw bale retention pond, minimum 10 feet wide by 20 feet long, to accommodate each pumping operation, said pond to be located minimum 25 feet from any stream or runoff course. Silt-laden water shall not be pumped directly into the stream.

    F. Disturbed areas left exposed for more than two weeks shall, as a protective device, be covered with mulch at the rate of three tons per acre. Mulch shall be secured by netting or by driving over with cleated tread when the surface is soft to push the material down into the soil.

ARTICLE 3 - Acceptable Materials

The following pipe and manhole construction specifications shall be the minimum standard acceptable to the Authority.

§ 301. Pipe specifications.

1. The type of pipe permitted when constructing an extension or replacement of the public sanitary sewer system shall be as follows:

   A. P.V.C. Pipe – Polyvinyl chloride gravity sewer pipe and fittings shall conform to A.S.T.M. D3034, performance specifications. The pipe and fittings shall have integral wall, bell and spigot joints with rubber ring seal tight gaskets. The pipe stiffness shall be in accordance with A.S.T.M. destination D2412, with minimum "stiffness factor" (F/W y) = 46.

   B. Ductile Iron Pipe – Ductile Iron gravity sewer pipe shall be centrifugally cast in metal molds or sand-lined molds for water and other liquids, shall conform to ASA A21.51, Class 52, and shall be finished with a coal tar or bituminous protective coating outside and a cement lining inside. The pipe shall be cast to retain a rubber ring gasket in the groove to provide watertight connection. Pipe connections shall have bell and spigot joints.

   C. Vitrified Clay Pipe – Vitrified Clay gravity sewer pipe shall be of the bell and spigot type, first quality, sound and perfectly burned. Pipe may be glazed or unglazed with full internal diameter. Pipe shall meet the minimum requirements for A.S.T.M. C700 designation for extra strength pipe. All vitrified clay sewer pipe and fittings shall be provided with Type III compression joint meeting the requirements of A.S.T.M. C425. "Fiburloc" fiberglass reinforced polyester socket joint meeting A.S.T.M. C425 is acceptable. All clay connections shall be made with fittings and without cutting or breaking the pipe.

   D. Alternative Pipe Materials – Upon review and approval by the Township Engineer, the Township may accept alternate pipe materials, although the Township has no obligation to accept alternate materials. Any alternate presented must meet or exceed the specifications of the pipe listed in Subsections A, B and C of this section.

§ 302. Manhole specifications.

1. Manholes shall consist of precast concrete base, riser and eccentric cone sections with cast iron frames and covers, constructed in accordance with the details shown on the drawings and in conformance to the requirements of the following. Each manhole shall be vacuum tested to assure proper construction.

   A. Barrels and cones. The barrel sections of the standard manhole shall have an inside diameter of four feet and a minimum wall thickness of five inches. The cone section

shall be of the eccentric type with one side straight to accept steps. The top opening of the cone shall be nominal thirty-inch diameter and provided with minimum four inserts to fasten the manhole frame. All precast sections shall be reinforced with reinforcing bars and/or steel mesh throughout, have tongue and groove joints and shall be manufactured in accordance with A.S.T.M. Designation C-478.

B. Watertight seals. Manhole base section shall include a watertight seal ring such as "Dura-Seal III" cast into the concrete in accordance with the alignment of the intersecting sewers. After pipe is inserted, seal ring shall be tightened and made watertight prior to grouting of the opening or the invert inside. Where manhole is installed over existing live sewer, provide neoprene gasket such as a split coupler around outside of pipe, attach with stainless steel clamp and encapsulate in concrete non-shrink grout to provide watertight seal.

C. Steps. Provide manhole steps along the straight wall of the manhole at twelve-inch vertical spacing. Steps shall be polypropylene plastic coated, three-eighths-inch diameter grade 40 deformed steel bar meeting the requirements of A.S.T.M. D1246, Type II. C.R. 49108 and A.S.T.M. A-615 or approved equal. Steps shall be securely anchored in the manhole wall to avoid pullout.

D. Joints. Manhole sections shall be joined with a mastic sealant, such as "Conceal, to insure a watertight seal.

E. Frames and covers. Manhole frame and cover shall provide nominal twenty-seven-inch access opening into manhole. Frame and cover shall be manufactured by Neenah, type R-1753 or Allegheny Foundry frame No. 109, cover No. 110 with pick hole or lift slot cross-section that does not protrude through lid or approved equal. Lid shall be grooved to accept a self-sealing composition gasket setting on a machined surface framing ring. Frame shall set on a mastic sealant ring, such as "Conceal", anchored to the cone or adjusting courses with three-quarter-inch bolts, then grouted to present a finished appearance.

F. Frame adjustments. Where applicable, manhole frames shall be adjusted to finished grade by concrete adjustment rings. Manhole rings shall be adjusted to fit flush with the finished surface.

G. Base. Manhole base shall be placed on a layer of crushed gravel of nominal four-inch compacted thickness. Gravel shall be smoothed and leveled to insure full base contact and vertical projection of the manhole.

H. Field castings. Casting of manhole bases in the field shall be permitted only when tying into an existing sewer. Where manhole base is cast in the field, initial wall section shall first be positioned and plumbed in such manner to allow ten-inch concrete thickness if in earth or six inch if in rock. Concrete shall be carried up around both inside and outside of riser section, thoroughly spaded or vibrated to create a seal.

I. Exterior coating. After installation, outside of manhole shall be coated with a bitumastic compound or similar product to produce a waterproof wall. All lift holes and seams

shall be filled with non-shrink grout. Concrete utilized in manhole construction shall be minimum 4,000 psi and supplied from a PennDOT approved source.

J. Flow line. Manhole flow lines shall have a smooth and finished appearance with no depressions or projections. All sewer lines, manholes and manhole steps shall be cleaned of dirt and debris at the time of final inspection.

K. Drop connections. The contractor shall build drop connections into manholes where the drop in the invert is two feet or more. Drop connections shall be constructed in conformity with the drawings as prepared by the engineer/inspector.

ARTICLE 4 - Excavation

The contractor shall excavate, protect and backfill all foundations, trenches, tunnels and other excavations that may be necessary for completing the work of the approved plans.

§ 401. Width and depth of trenches.

Banks of trenches shall be kept as nearly vertical as possible, and the trenches shall be not less than 12 inches nor more than 16 inches wider than the outside diameter of the barrel of the pipe to be laid therein. If sheeting is required, the foregoing dimensions shall be applicable to the inside faces of the sheeting.

§ 402. Excavation of trenches.

Except at locations where excavation of rock or unsuitable material is required, care shall be taken not to excavate below the depths specified. If earth trenches are excavated beyond the specified depths they shall be backfilled to the proper grade with thoroughly tamped crushed stone, applied in four-inch layers.

§ 403. Excavation of unstable material.

When the material encountered at subgrade is unstable, excavation shall be continued under the pipe and on each side of the pipe for a distance of six inches beyond the limits of the unstable material. Such unstable material excavation below subgrade shall be backfilled with crushed stone or other suitable material, compacted to the satisfaction of the Authority's engineer and/or inspector.

§ 404. Excavation of rock.

1. Unless otherwise directed by the engineer, rock shall be fully taken out at least 25 feet in advance of pipe laying, and to a point at least six inches below the outer bottom of pipe, and to a width not to exceed the maximum width of the trench, for the size of pipe to be laid therein. If trenches in rock excavation are shattered by blasting below or beyond the lines of excavation specified herein, the trench shall be refilled to subgrade with sand or concrete as required.

2. The space below the outer bottom of the pipe shall be filled with crushed stone or other approved material, and thoroughly tamped.

3. Where manholes are excavated in rock they shall be excavated six inches outside the exterior lines of the manhole structure and to a depth of the outside bottom.

§ 405. Blasting requirements.

When blasting must be done to excavated an area of rock, the contractor shall comply with the Pennsylvania Department of Environmental Protection rules and regulations which cover blasting and are set forth in 25 Pa. Code Chapter 211, as amended. No blasting shall commence until the contractor is in full compliance with these DEP. regulations and a certificate of insurance naming the Township and the Authority as additional co-insured parties. The contractor will be solely responsible for injury to persons or property that may result from the use of explosives to remove rock, and shall hold the Township and Authority harmless of any damages resulting from his blasting operation.

§ 406. Sheeting, bracing and shoring.

All trench excavation shall be sheeted, braced and/or shored in complete compliance with the Regulations for Excavation and Construction of the State Department of Labor and Industry and OSHA.

§ 407. Pumping.

The contractor shall keep all excavations free from water while pipe laying work is in progress, and to such extent as may be necessary while excavation work alone is being carried on. The contractor shall build all dams and other devices necessary for this purpose, including lowering the water table below trench bottom by well points and pumping, and provide and operate pumps of sufficient capacity for de-watering the excavations. He shall provide for the disposal of the water removed from excavations in accordance with Article 2, hereof, and in such manner as shall not cause injury to the public health, to public or private property, to any portion of the work completed or in progress, or produce any damage or degradation to the roadways (public or private) or streams and lakes, or impede the use thereof.

ARTICLE 5 - Boring

1. Unless otherwise indicated, all sewer crossings of public roadways having a (1) concrete, (2) hot mix asphalt, or (3) cold mix asphalt surface shall be bored. Also, all "high volume" roadways, as determined solely by the Township, shall be bored. Length of bore shall include full width of the cartway (paving & curbing), and an additional six feet on both sides of the cartway in order to allow safe passage of traffic without interference with excavations.

2. Bore pit shall be adequately shored to provide protection for workers and to prevent earth movement or cave-ins adjacent to the roadway. Bore pits shall be excavated only to the size necessary to complete the construction and when no longer needed, backfilled in maximum four-inch layers and fully compacted for the full depth of excavation.

3. Heavy wall (Schedule 80) bituminous coated steel pipe shall be used as a casing pipe for the required size and type of specified carrier pipe. Although it is not required that the casing pipe be placed exactly to grade, care must be taken to allow the installation of the carrier pipe at the required grade. The carrier pipe shall be laid to grade by the use of tapered, non-decomposable skids strapped to the pipe prior to placement in the casing pipe. Each end of the casing pipe shall then be concreted to prevent entry of animals.

ARTICLE 6 - Pipe Bedding

1. Special care shall be used in preparing the pipe support bed and in the initial compaction around the pipe. A coarse sand or gravel backfill mix with maximum particle size of 1/4 inch shall be used under, around and to minimum 12 inches over the pipe. Material shall meet the PennDOT Publication Form 408 for 1A modified (AASHTO No. 10) stone. The sequence of installation is as follows:

   A. Place bedding six inches under pipe and tamp.

   B. Place bedding to springline of pipe, and tamp.

   C. Place bedding to top of pipe, and tamp.

   D. Place bedding to six inches over pipe, and tamp.

   E. Place bedding to 12 inches over pipe, and tamp.

2. Particular care shall be used in compacting around and over the pipe, with compaction being to a minimum 90% of maximum density, modified Proctor. Contractor shall use care in compacting the haunch area so that the pipe is not displaced upward. Backfill with the pipe bedding shall continue until a minimum twelve-inch thickness compacted cover exists over the top of the pipe.

ARTICLE 7 - Pipe Installation

The following subsections shall describe the acceptable methods of installing pipe. Special and unusual construction conditions (i.e., excessive depths, under buildings or water bodies, etc.) shall be reviewed on a case-by-case basis. The contractor shall not proceed until with this work until the Township has reviewed and approved of the method of installation.

§ 701. Laying pipe.

1. Following the trench preparation, pipe laying shall proceed upgrade with the pipe laid carefully, hubs up-grade, spigot ends fully entered into adjacent hubs, and true to lines and grades given. Every pipe shall be carefully inspected before laying and any containing cracks or defects shall not be used. Extreme care must be exercised to prevent breakage when the pipe is handled. Sockets shall be carefully cleansed before pipes are lowered into trenches. The pipes shall be so lowered as to avoid unnecessary handling in the trench. Each pipe shall be firmly held in position so that the invert forms a continuous grade with the invert of the pipe previously placed. The interior of all pipe and the inside of the bell and outside of the spigot shall be thoroughly cleaned of all foreign matter before being lowered into the trench, and shall be kept clean during laying operations, by means of plugs or other approved devices. Under no conditions shall pipe be laid in water or on subgrade containing frost, and no pipe shall be laid when trench conditions are unsuitable for such work. In all cases water shall be kept out of trench until concrete cradles or supports, where used, and materials in the joints have hardened.

2. Walking or working on the completed pipe line shall not be permitted until the trench has been backfilled to a height of the top of the pipe.

3. It is important to note that Laser alignment shall be used to maintain grade and alignment.

§ 702. Joints.

All pipes shall be joined in strict conformance with the manufacturer's written specifications so that all joints will be watertight. If the contractor has not previously used the type of pipe specified he shall at the time of the first placement of pipe arrange for the presence of a factory representative of the manufacturer of the type joints used, to instruct the workmen as to the proper installation methods. No petroleum based compounds shall be used to lubricate pipe gaskets because of the detrimental effects on the gaskets. In making the joint, the pipe shall be placed ¼ inch from full home position.

§ 703. Cradles and encasements.

Where, in the opinion of the inspector, the bottom of the trench does not afford an adequate foundation or excessive loads on top of the pipe may be expected, the contractor shall construct concrete cradles or completely encase the pipe, as directed and in accordance with the attached detailed drawings. Concrete strength for cradles and encasements shall be 2,500 to 3,000 psi.

§ 704. Service line connections.

1. In general, connections to collectors and interceptors will be made with commercially manufactured wye branches, and one-eighth bends. Cutting of pipe will not be permitted except in special approved cases. Unless otherwise directed by the Inspector, wye branches will be installed with branch turned approximately 45° from the horizontal. The termination elevation of all service line connections will generally be determined by the elevation of the house sewer to be connected. Where necessary to minimize the depth of connection to the house sewer, a standpipe wye branch shall be installed by the contractor. The standpipes will be encased in concrete.

2. Wye branches shall be installed at the location indicated by the inspector during construction. Service line connections shall be laid and joined in every respect in the manner specified for "Laying Pipe," except that laser alignment shall not be required. The ends of all service line connections shall be equipped with a View Port (reference to § 705) and closed with stoppers (reference to § 706). The ends of all service line connection trenches shall not be backfilled until the elevation and location of the service line connection has been inspected and approved by the inspector.

3. If rock is encountered in a house connection within 25 feet of any building, it must be removed by drilling and wedging or some approved method other than blasting. Rock in service line connection trenches shall be removed to a point not less than five feet beyond the end of the pipe. It is the contractor's responsibility to secure proper rights-of-way when entering onto private property.

§ 705. Inspection ports.

At the end of the service line connection, the contractor shall place a inspection port, consisting of a fee with a six-inch riser pipe extending a minimum of 12 inches above the surface of the ground, ending with a screw-type plug.

§ 706. Stoppers.

The free end of all service lines connections, whether it be a bend, straight piece, or tee, shall be provided with a stopper of the same material of the pipe and having a joint of the same type as that on the pipe and pipe fittings, such that the stopper will be securely placed and the connection between the pipe and the stopper will be watertight. The stopper shall be installed with the last section of service pipe or fitting placed.

ARTICLE 8 - Backfilling Trenches

After the pipe, its appurtenances, and the bedding have been placed, trench backfilling shall commence. In lawn and open areas, clean earth fill approved by the Inspector shall be used and tamping shall be applied in maximum eight-inch layers. Under roadways and parking areas, backfill material shall be PennDOT No. 2A Modified aggregate which shall be compacted in maximum four-inch layers. Trench rollers and/or mechanical tampers shall be used so as to obtain maximum compaction of the material. The earth or aggregate shall be properly leveled and rammed as necessary to fill all voids, and wetted if necessary to achieve maximum compactive effort.

ARTICLE 9 - Surface Restoration

The following subsections shall set forth regulations concerning restoration of areas disturbed by the sewer project.

§ 901. Boring vs. Excavating of roadways.

1. Roadways with concrete, hot mix asphalt (ID-2) or cold mix asphalt (FB-1) pavement surfaces shall not be excavated, but shall be bored in accordance with the requirements set forth in Part 5. Excavation of such roads shall be undertaken only with the written approval of the Township Manager.

2. Low-volume roadways with "tar and chip" or dirt surfaces may be excavated ("open cut"), with prior approval of the Township Manager. Backfilling of all excavated roadways shall be in accordance with §§ 902 through 905.

§ 902. Repairs to unpaved roads.

Unpaved roadways shall be repaired with a minimum eight-inch compacted layer of crushed limestone aggregate, PennDOT No. 2-A Modified placed and tamped in four-inch layers. Stone shall be slightly crowned over trench and remain so until final grading and restoration.

§ 903. Temporary pavement repairs.

In all pavement areas where utility excavation has been completed, the contractor shall provide a temporary paving over all backfilled excavations. Temporary repairs of paved areas shall consist of an eight-inch crushed stone base, placed up to the bottom of the existing pavement, then brought to grade with bituminous "Cold Patch," minimum two-inch thickness. Contractor shall maintain pavement repair in good condition throughout the construction period. Temporary repairs shall remain in place for at least 90 days to allow for settling of the backfilled area. The contractor shall be responsible for maintenance of the temporary repair during that period and shall promptly resolve any defects that develop in the temporary repair.

§ 904. Permanent pavement repairs.

Permanent pavement repairs shall include removal of the entire "cold patch" material and replacement with ID-2 bituminous hot mix asphalt. The pavement shall be cut and squared on each side of the temporary repair an additional 12 inches outside of the original excavation. Bituminous Concrete Base Course (B.C.B.C.), shall be placed full depth of existing paving (minimum two-inch thickness) and compacted with a ten-ton roller. ID-2 Bituminous wearing course (1 1/2 inch thickness) shall be placed over the B.C.B.C. to the previous roadway grade. For roadway crossings, the wearing course shall be 1/2 inch higher than the existing paving. All joints shall be bituminous sealed and scattered with sand to prevent tracking. Permanent paving

shall not be accomplished until 90 days after trench backfilling to allow for compaction settlement.

§ 905. Repair to shoulders, ditches, and curbs.

If the stabilized shoulders, ditches or curbs of roadways are disturbed, the contractor shall restore them to an equal or better condition than the original, as approved by the Township Manager.

§ 906. Permanent seeding.

All areas disturbed that are not to be restored as specified above will be promptly graded and permanently seeded at the termination of construction. Pulverized agricultural grade limestone shall be applied at a minimum rate of four tons per acre. Commercial fertilizer (10-10-10) shall be applied at a rate of 2,000 pounds (one ton) per acre. All lime and fertilizer will be worked into the upper four inches of soil. Grass seed shall consist of the following approximate formulation and applied at a rate of 100 pounds per acre:

Kentucky Bluegrass	35%
Red Fescue Grass	50%
Perennial Ryegrass	15%

Mulch in the form of hay or straw will be uniformly applied at a rate of four tons per acre on all seeded areas.

ARTICLE 10 - Maintenance guarantee

If the developer requests the Board of Supervisors to accept the improvements covered under the guarantee immediately after their completion, he shall post a maintenance bond or shall deposit funds or securities to be held in escrow to the benefit of the Township, such bond or deposit to equal 15% of the value of the improvements as completed and to run for a period of 12 months. As a condition of accepting the developer's offer of a maintenance bond or escrow deposit, the Board of Supervisors shall take responsibility for the improvements upon their completion. The form and type of maintenance guarantee shall be approved by the Township Supervisors.

ARTICLE 11 - Testing

The following tests shall be successfully passed prior to the Township and/or Authority approving the completed sewer line extension. A Township representative shall be present at all testing, and shall be notified of the upcoming testing by the Contractor at least 24 hours in advance of the testing. No compensation will be paid the Contractor for providing labor, materials and necessary appliances for making tests.

§ 1101. Infiltration.

1. The prevention of infiltration of ground water is of utmost importance. The occurrence of a rate of infiltration of ground water into any section of sewer or pipe (including service connections, manhole bases and manhole walls) in excess of 100 gallons/inch diameter/mile of pipe per day will be considered as evidence of defective materials and/or workmanship and shall require repair or replacement by the Contractor without compensation.

2. The Township shall be responsible to conduct infiltration testing, but shall not be responsible to compensate others for their assistance during the testing.

3. All obvious leaks in the sewer lines and manholes shall be repaired regardless of whether the rate of infiltration exceeds or is below the allowable maximum rate.

§ 1102. Air testing.

1. The Contractor shall be responsible to perform an air test on each and every section of sewer construction. The air test shall be made by tightly capping all stubs, wyes, tees and pipe ends, cleaning the line, plugging the ends, and placing the section being tested under air pressure. At the start of the test, the air pressure is to be raised to four PSIG greater than the average back pressure of any ground water. After two minutes or more, during which the air temperature is stabilized, testing is started at a pressure of 3.5 PSIG above any back pressure. The time required for the pressure to drop from 3.5 to 2.5 PSIG is determined and used as the basic measurement of the test. The section of pipe being tested shall be accepted if that section does not lose air at a rate greater than 0.003 CFM per square foot of internal pipe surface. This requirement shall be met if the time required for the pressure to drop from 3.5 to 2.5 PSIG (greater than the average back pressure of any ground water over the pipe) is not less than the following:

Pipe Size (inches)	Time Allowed for One PSIG Drop (minutes)
6	2
8	4
10	5
12	5.5
15	7.5
18	8.5

Pipe Size (inches)	Time Allowed for One PSIG Drop (minutes)
21	10
24	11.5

2. The contractor is cautioned that the wyes, tees or service connections must be tightly plugged and blocked to eliminate air leakage which will result in an unsatisfactory air test. Wyes, tees, or service connections which are not plugged satisfactorily shall be dug up and replugged by the Contractor at his expense. Sewers must be tested with all service laterals and view ports in place. No compensation will be made to the Contractor for testing. Should the test fail, the Authority shall require repair and retesting, at no cost to the Authority.

§ 1103. Lamping tests.

1. Each segment of pipe, after completing installation and backfill, shall be checked for settlement, displacement and/or deflection by visually inspecting (lamping) each section between manholes with light and mirrors. The Township shall be responsible to conduct lamping tests, but shall not be responsible to compensate others for their assistance during the testing.

2. The pipe shall show a complete circle without settlement, displacement or deflection. All pipe not showing the circle shall be taken up and relaid to proper grade and alignment.

§ 1104. Deflection tests.

1. Deflection testing shall be conducted on each section of pipe. The Contractor shall be responsible for conducting the deflection tests, and shall bear all associated costs.

2. The deflection testing shall not be conducted until at least 90 days after backfilling has been completed, to allow for settling. Testing for deflection shall be accomplished using a manufacturer's mandrel. Any section of pipe in which the cross-section deflection exceeds 5% shall be unacceptable and shall be replaced by the Contractor at his expense.

§ 1105. Manhole vacuum tests.

1. The manhole vacuum test shall be conducted by the Township on each manhole constructed. The Township shall provide the vacuum equipment and the pipe plugs. It shall be the responsibility of the Contractor to contact the Township at least 24 hours before the test is to be conducted, and to make any necessary repairs to the manhole. The test should be conducted prior to backfilling in order to minimize repair time/costs to the contractor.

2. With the equipment in place, a vacuum of ten-inch of Hg. shall be drawn. The test shall pass if the vacuum remains at ten-inch Hg. or drops to nine-inch Hg. in a time greater than one minute.

ARTICLE 12 - Acceptance

1. The installation of all gravity sewers shall be tested in the field, in the presence of the inspector in the manner prescribed in the sections of these Specifications pertaining to such installation tests.

2. No sewer or manhole shall be accepted by the Authority until:

   A. All necessary testing, as determined by the Authority, has been conducted and approved by the Authority's Inspector.

   B. All necessary easements or rights-of-ways have been dedicated to and accepted by the Authority.

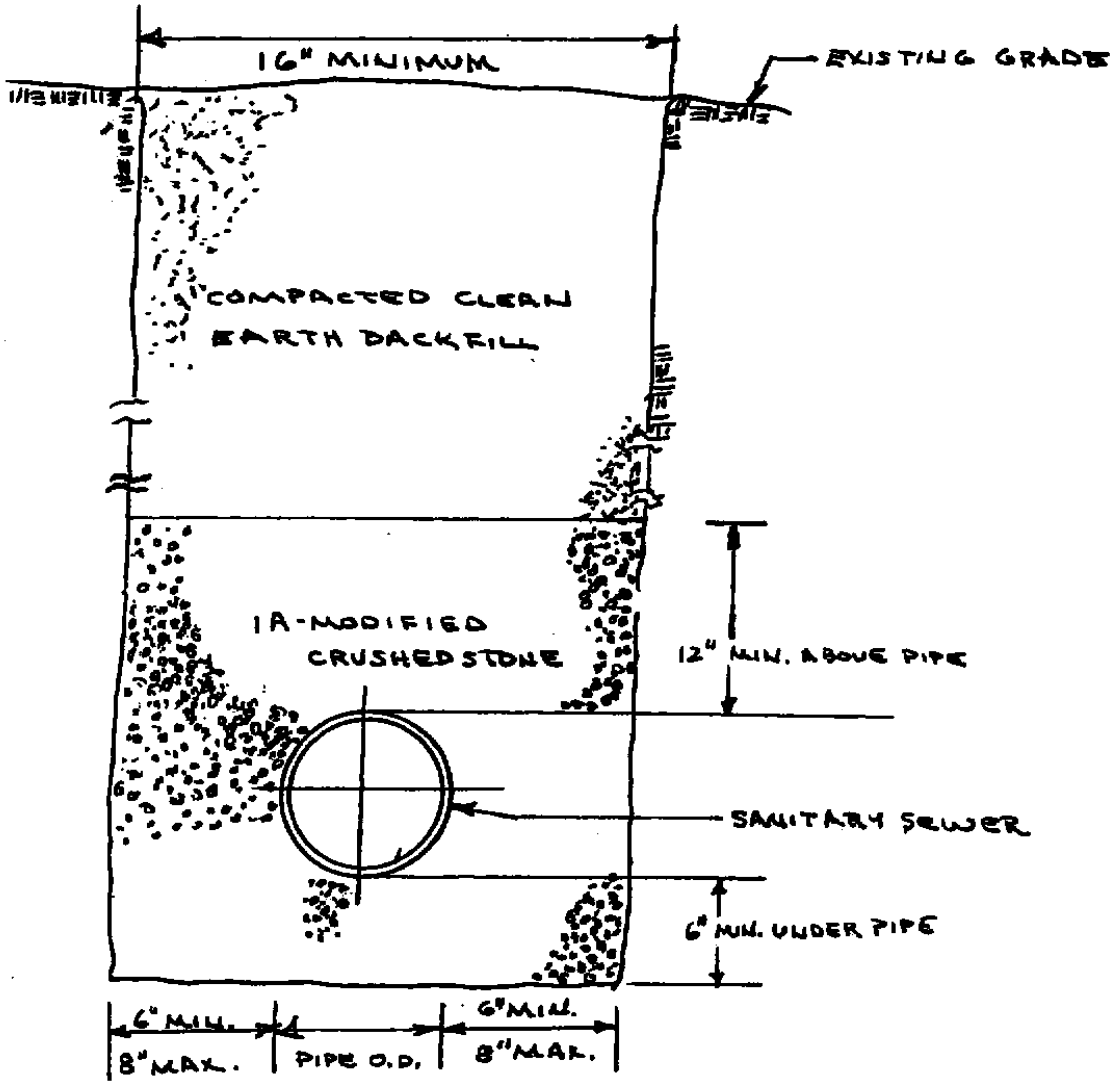
   C. As Built Drawings, as prepared by a registered engineer, have been given to and reviewed/approved by the Authority.

   D. The required maintenance guarantee has been properly posted with the Township.

   E. The Authority has acknowledged the review and approval of the above listed items and accepted the sewer line in writing.

3. No sewer shall be put into operation until the sewer line and associated manholes have successfully passed the infiltration, air, manhole vacuum, and lamping tests. The Township shall not assume ownership and maintenance of the sewer line until all tests are successfully passed, and the one year maintenance period is completed.

Drawing A

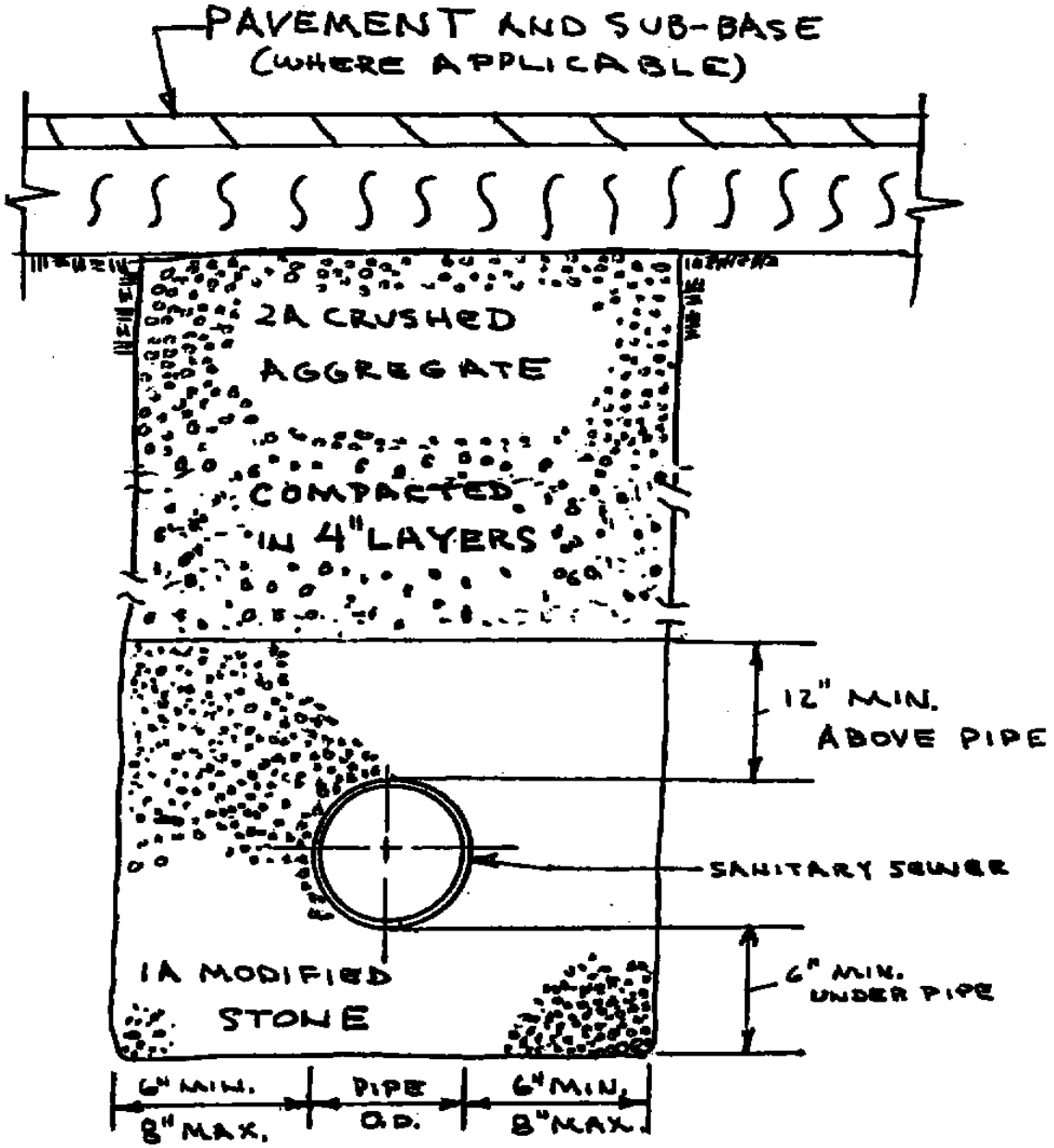


TRENCH DETAIL

NON-ROAD AREAS

NO SCALE

Drawing B

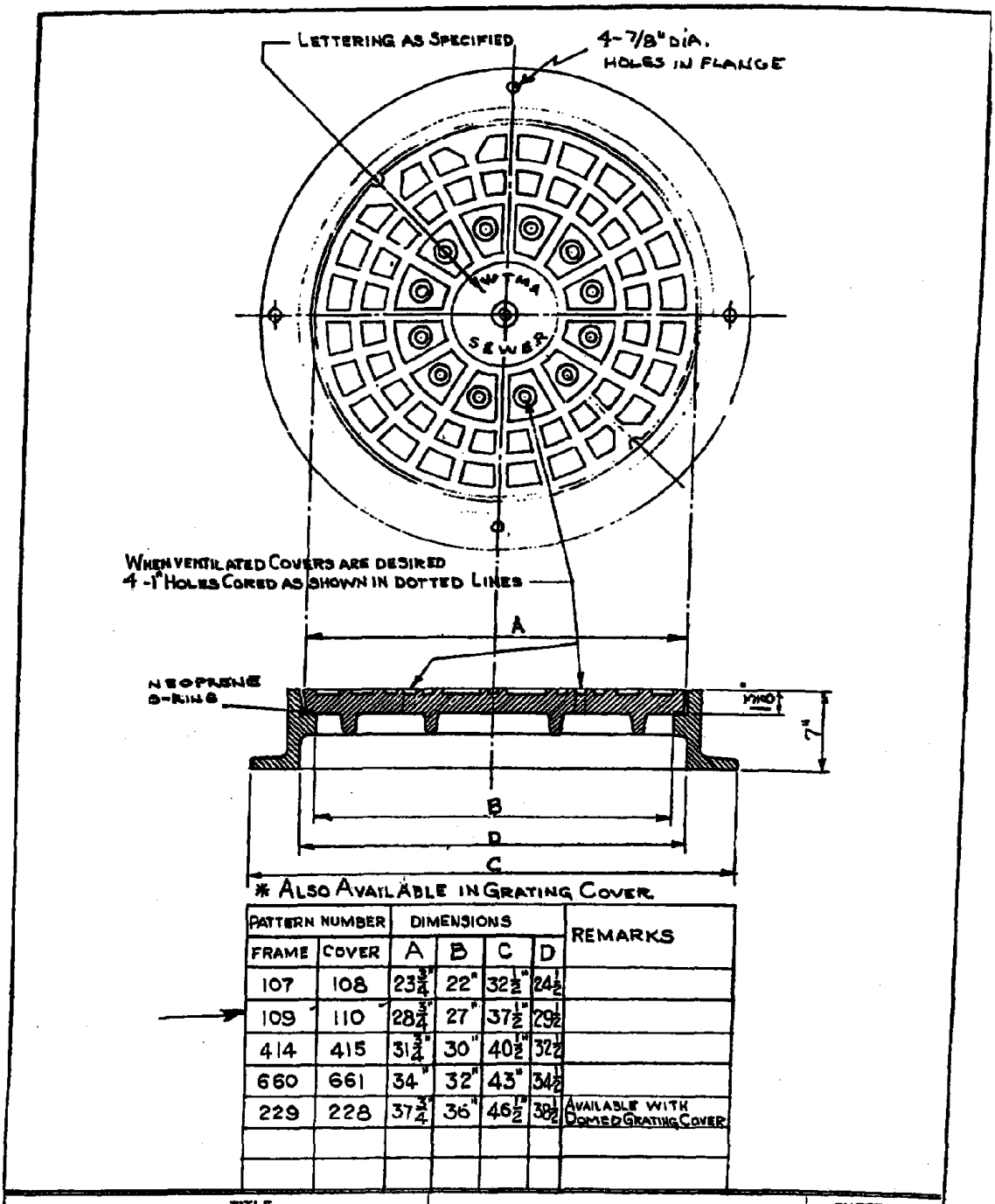


TRENCH DETAIL

ROADWAY AND SHOULDER AREAS

NO SCALE

Drawing C

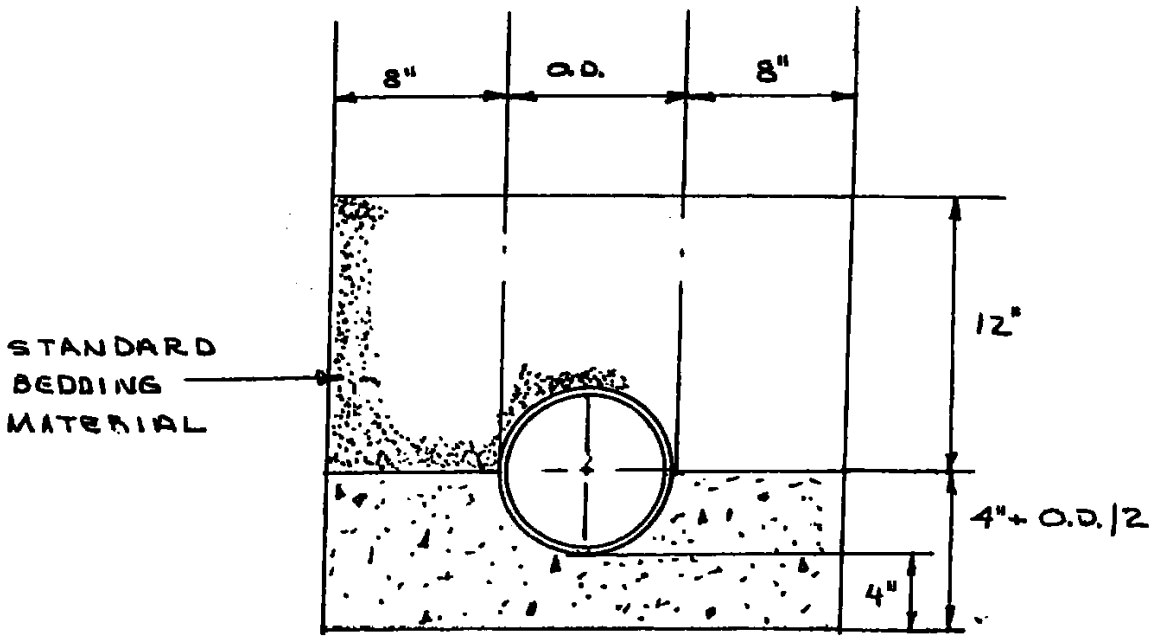


* ALSO AVAILABLE IN GRATING COVER

PATTERN NUMBER		DIMENSIONS				REMARKS
FRAME	COVER	A	B	C	D	
107	108	23¾"	22"	32½"	24½	
109	110	28¾"	27"	37½"	29½	
414	415	31¾"	30"	40½"	32½	
660	661	34"	32"	43"	34½	
229	228	37¾"	36"	46½"	38½	AVAILABLE WITH DOMED GRATING COVER

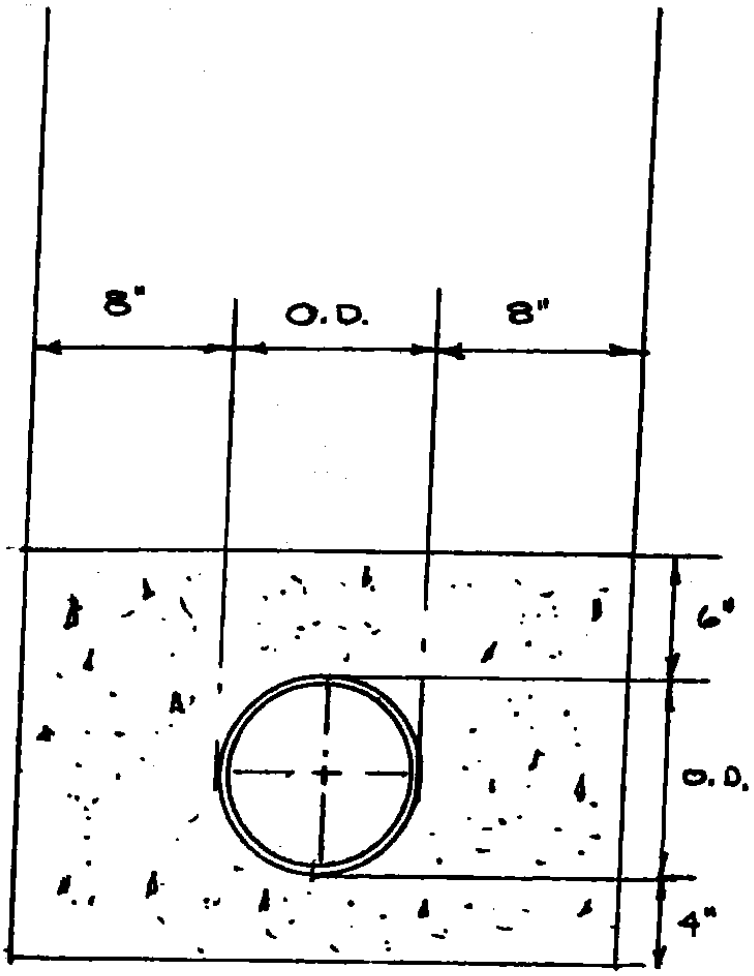
TITLE		SHEET NO.
STANDARD MANHOLE FRAME & COVER	ALLEGHENY FOUNDRY CO. 915 BEHAN ST. - PITTSBURGH 33, PA.	1

Drawing D



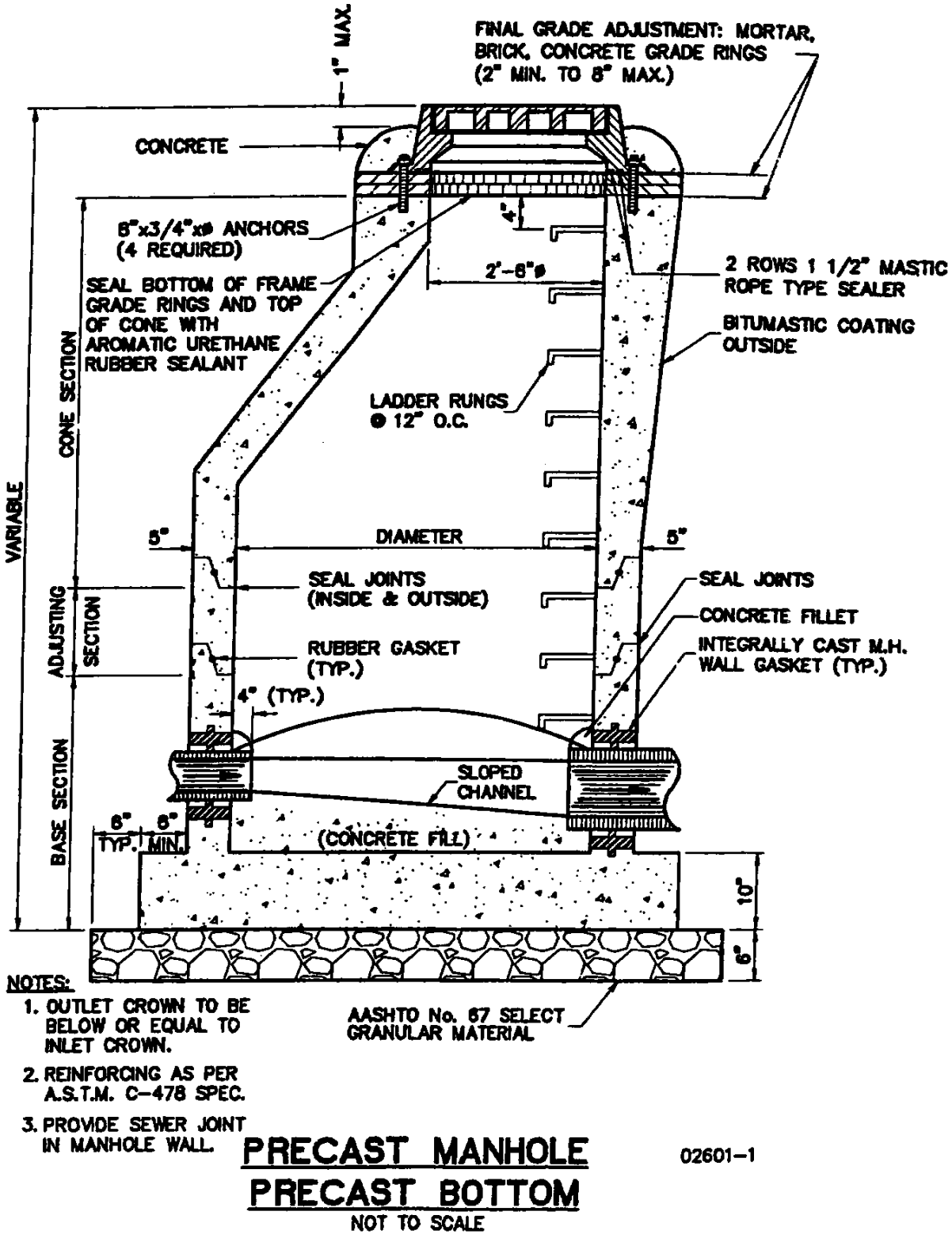
TYPICAL CRADLE

Drawing E



TYPICAL ENCASEMENT

Drawing F1



NOTES:

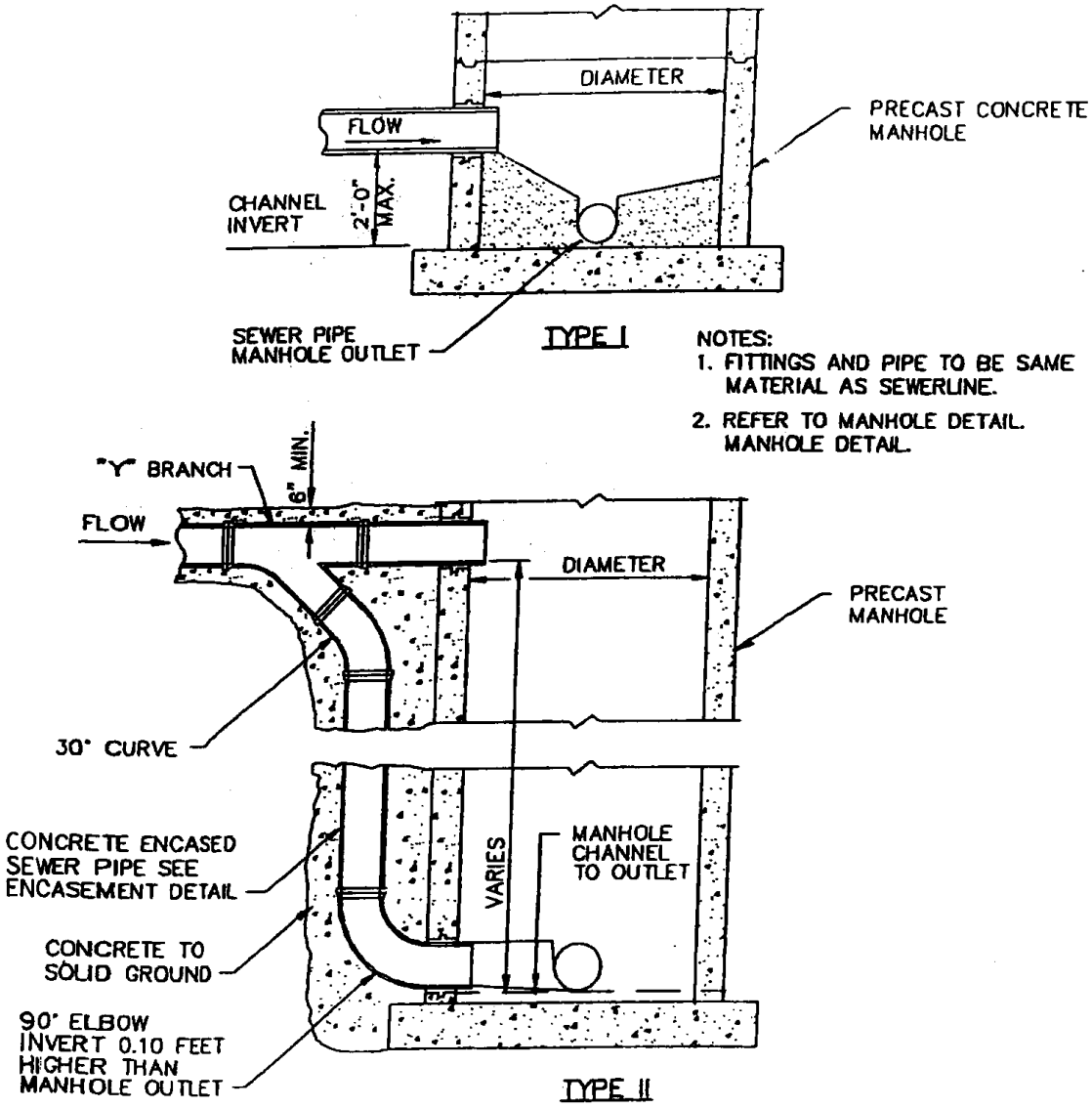
1. OUTLET CROWN TO BE BELOW OR EQUAL TO INLET CROWN.
2. REINFORCING AS PER A.S.T.M. C-478 SPEC.
3. PROVIDE SEWER JOINT IN MANHOLE WALL.

PRECAST MANHOLE
PRECAST BOTTOM

NOT TO SCALE

02601-1

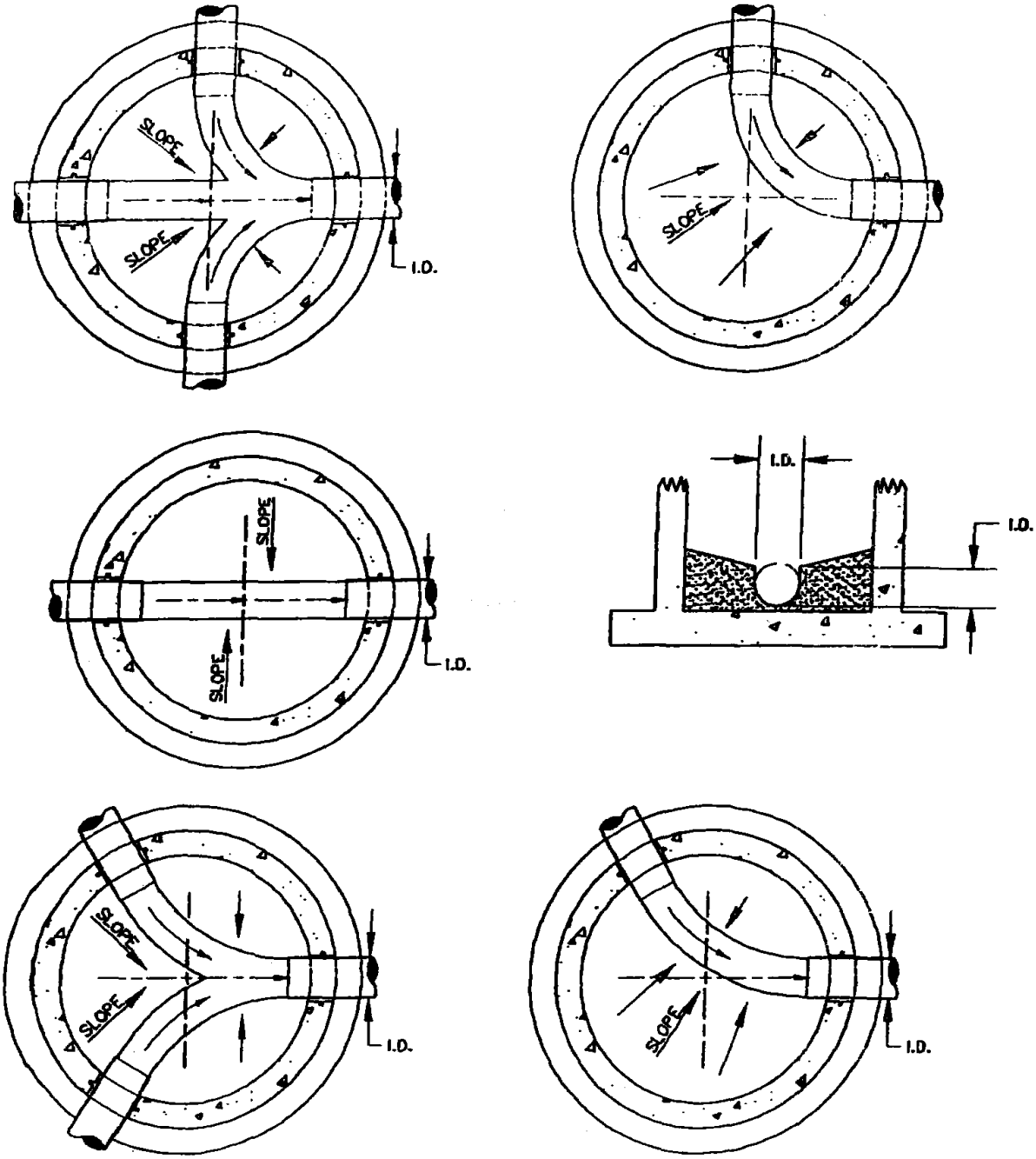
Drawing F2



DROP MANHOLE

NOT TO SCALE

Drawing G

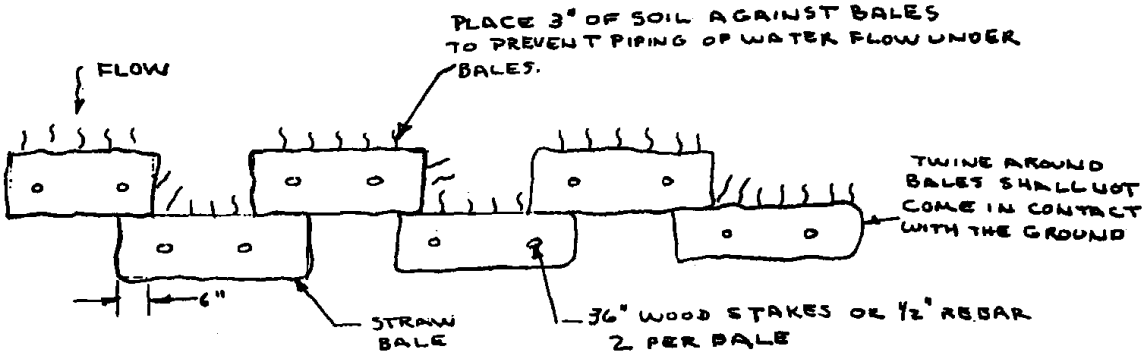


NOTES:

1. CHANNELS TYPICAL; NUMBER AND LOCATION TO MEET FIELD CONDITIONS.
2. CHANNEL BOTTOMS TO BE SEMI-CIRCULAR IN SECTION
3. MANHOLE FLOOR SLOPE TO CHANNEL FOR DRAINAGE.

MANHOLE CHANNELS

Drawing H



NOTE: THE STRAW BALE RETENTION POND IS CONSTRUCTED THE SAME WAY AS THE STRAW BALE BARRIERS

STRAW BALE BARRIER

NO SCALE