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HARFORD COUNTY GOVERNMENT

DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER AND SEWER

July 14, 2010

TO: Distribution List

FROM: Joel V. Caudill, P.E.
Deputy Director, Division of Water and Sewer

RE: **Standard Specifications and Details**
For Water & Sewer Mains - Parts 26 and 27 of the Rules and Regulations

An advertised public hearing was held Friday, April 16, 2010 to review and discuss the proposed revisions to Part 26 and 27 of the Rules and Regulations. These sections pertain to the Standard Specifications and Details for Water Mains and Sewer Mains as well as the Approved Materials List for Water and Sewer construction. The current Standard Specifications and Details for Water Mains and Sewer Mains became effective on May 7, 2010.

By a clerical omission, the approved changes shown in the attached April 2010 summary were not included in the final documents. Therefore, Section 02250 is being reissued and is included herein. Also, modifications to templates S3 and S25 were not included. Our standard opening on 60" precast manhole is 30" diameter not 24" (re: S25) and the pipe size diameter indicated in the table was changed from 36" to 30" to match the title (re: S3). The standard specifications have been updated on the Harford County, Water & Sewer website (http://www.harfordcountymd.gov/dpw/ws/sewer_spec.html).

We apologize for any inconvenience this may have caused. Please contact Steven Schulz at 410.638.3300 if you have any questions.

Attachments (10)
- April 2010 Summary (2)
- Section 02250 (6)
- Template S3 (1)
- Template S25 (1)

Cc:	Jacqueline K. Ludwig	Chief of Administration and Engineering
	Edward L. Kimmel	Chief of Facilities
	Tom Pistel	Bureau of Construction Inspection
	Scott Kearby	Bureau of Construction Inspection

STANDARD SPECIFICATIONS AND DETAILS FOR WATER & SEWER MAINS

SUMMARY OF REVISIONS TO FEBRUARY 2010 PROPOSED CHANGES TO THE CURRENT STANDARDS DATED MARCH 15, 2009

April 2010

Note:

All highlighted/shaded items were originally discussed during the February 25, 2010 workshop. All modifications indicated in RED are from the February 25, 2010 workshop discussions.

SPECIFICATIONS

Clerical Omissions from 5/7/10 Release

- ~~Page 02250-2, Section 2.0.C.1: ADD the following sentence at the end of the paragraph: "Moisture shall not be used in determining an unsuitable soil."~~
- ~~Page 02250-9, Section 3.0.C.1: ADDED requirement for moisture content of fill and backfill material while placing and during compaction.~~
- ~~Page 02250-9, Section 3.0.D.1: ADDED Type B Compaction~~
- ~~Page 02250-10, Section 3.0.D.2.a: ADDED Type A Compaction~~
- Page 02250-10, Section 3.0.D.4.c: REDEFINE the soil testing lift requirements so that testing shall occur at least once every day, with spacing no to exceed 100 feet.
- Page 02700-2, Section 2.0.E.1.a - Polyvinyl Chloride Sewer Pipe (PVC) and Fittings: ADDED requirement for pipe and fittings between 18-inch and 24-inch diameter shall have a minimum pipe stiffness of 115 psi and REMOVED requirement for wall thickness of T-1 (SDR-26) Also, REMOVE requirement that PVC compounds must comply with ASTM D 1784.
- Page 02300-2, Section 2.0.B.4.c: REPLACE in its entirety with the following: "The exterior of the pipe shall have a factory applied bituminous coating. The field connection shall also be bituminous coated before installation. Bituminous coating shall meet the requirements of AWWA C210.
- Page 02700-2, Section 2.0.E.1.a - Polyvinyl Chloride Sewer Pipe (PVC) and Fittings: ADDED requirement for 4-inch and 6-inch diameter PVC for SDR 26 and REDEFINED pipe and fittings from 8-inch through 15-inch diameter.
- Page 02700-3, Section 2.0.E.1.c: REPLACE in its entirety with the following; "All pipe and fittings for standard sewer house connections shall be heavy wall having a wall thickness of SDR 26."
- Page 02700-3, Section 2.0.E.1.d: REPLACE in its entirety (as per modifications to standard sewer details) with the following; "All pipe and fittings for drop sewer house connections shall be PVC with a wall thickness of SDR 26, including 45^0 wye fitting on the main"
- Page 02700-3, Section 2.0.E.1.e: ADDED in its entirety the following: "Alternatively, the drop sewer house connection may be constructed of ductile iron pipe, in which case the entire run

of sewer main to which the drop connects must either be constructed of ductile iron pipe or PVC C900 pipe meeting the detailed material requirements of Section 02660."

- Page 02700-3, Section 2.0.E.2: REMOVE the requirement for epoxy lining in ductile iron pipe and cast iron and REPLACE with requirement that they shall be cement-lined in accordance with AWWA C104, double thickness and the lining shall be sealed with a bituminous seal coat, and outside surfaces shall be bituminous coated.
- Page 02700-9, Section 3.0.D.2.c: RENUMBERED item d to item c
- Page 02720-4, Section 2.0.E.6.g: RENUMBERED item h to item g
- Page 02731-4, Section 2.0.B.i: REMOVE last sentence in its entirety.
- **Page 02731-4, Section 2.0.B.k: REPLACED the word "...aside..." with the following; "...adjacent to..."**
- Page 03300-7, Section 3.0.D.4: CHANGE 150 to 200

GENERAL DETAILS

- **G-9: Jacking or Boring – ADDED the following to Note 4; "...the casing pipe...."**

WATER DETAILS

- W-6 Buttresses for Tees – CHANGED Note 1 from concrete mix No#1 to concrete mix No#2
- W-8: Buttresses and Anchorages for Vertical Bends – Revised dimensions in table for vertical bends.
- W-25: Standard Installation for 3" thru 10" Combined Fire and Domestic Service – detector meter & remote readout incorrectly labeled as BFP in the section view.
- W-37: 4 ¼ Curb Box with Lock Lid – CHANGED Note 3 from three bricks to four bricks.

SEWER DETAILS

- S-9: Built-In-Place Main Drop at Manhole Type "A" and "B" – Revised notes to clarify allowable slopes and modified drawing to indicate ductile iron to PVC (SDR 35 adaptor at connection.
- S-10: 48" Manhole with Precast Collars for Main Drop Connections (8" Dia Pipe) – Added note 7 and removed ductile iron material requirement from drawing.
- S-21: PVC Drop House Service Connection at Main – Renamed drawing to "PVC", added note 3 and removed ductile iron material requirement from drawing to allow for PVC material.
- S-21A: Ductile Iron Drop House Service Connection at Main – Created new drawing for ductile iron drop house service connection.
- S-22, House Service Connection Clean-Out – Modified drawing and notes to allow for PVC pipe and fittings to be PVC pipe SDR 26 and SDR 35, where indicated (removed ductile iron).
- S-24, Lamphole - Remove reference for ductile iron material from drawing.
- S-28, Sanitary Cleanout in Paving – Modified note to remove reference to commercial application.

PART 27: APPROVED LIST OF SUPPLIERS & MATERIALS FOR W & S CONSTRUCTION

- Updated the select sections to current County approved suppliers & material for water & sewer construction. **REMOVED reference to SDR-26 from Item 1 from the Sewer Main Construction approved materials list.**

SECTION 02250
TRENCH EXCAVATION, BACKFILL AND COMPACTION

1.0 GENERAL

A. Description

Trench excavation, backfill and compaction shall include, but not necessarily be limited to, the excavation, backfill, and compaction of trenches for pipelines, fire hydrants, valves, manholes, vaults and other structures shown on the Plans, and in accordance with the Contract Documents.

B. Related Work Included Elsewhere

1. Test Pits: Section 02012
2. Removal and Abandonment of Existing Utilities: Section 02050
3. Aggregate Backfill: Section 02240
4. Boring and/or Jacking Pipe: Section 02300
5. Tunneling: Section 02400
6. Water Mains: Section 02660
7. Water Valves and Appurtenances: Section 02662
8. Water Services, Water Meter Settings and Vaults: Section 02664
9. Fire Hydrants: Section 02666
10. Gravity Sanitary Sewer and House Connections: Section 02700
11 Sanitary Sewer Manholes: Section 02710
12. Sanitary Sewer Force Mains: Section 02720

C. Quality Assurance

All materials removed from trench excavations and used for backfill will be subject to test by the County to determine the material's suitability for use as backfill.

2.0 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for trench backfill other than those materials which are available from the trench excavation limits as shown on the Standard Details and the Contract Documents.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

1. Material for backfills may be from on-site excavations (if of proper quality) or from borrow sources. The material shall be free from organic material, sludge, grit, trash, muck, roots, logs, stumps or frozen material and other deleterious substances. Except as otherwise specified or approved, the material shall not contain rocks or lumps larger than six inches in greatest dimension. The material shall not contain mica in quantities which, in the judgment of the County are sufficient to affect compaction characteristics. The use of any soil additive that in the judgment of the Director may adversely affect the proposed utility is strictly prohibited.

2. Material for Backfill shall be as follows:

a. Select Material - Within public right-of-way, private roads and parking lots within drainage and utility easement, business, commercial, and industrially-zoned properties, areas supporting vehicular loads, and as specified herein or noted in the Contract Documents.

AASHTO Soil Classification Sieve Analysis (% passing)	A-1	A-2	A-3
No. 10 (2.0 mm)	50 max.	- - -	- - -
No. 40 (0.425 mm)	50 max.	- - -	51 min.
No. 200 (0.075 mm)	25 max	35 max.	10 max.
Typical Material	Stone fragment, gravel and sand	Silty or clayey gravel and sand	Fine sand

Additionally, the following material is allowable under the Unified Soil Classification System: GW and SW, or a well graded aggregate meeting the Maryland State Highway Administration requirements for roadway sub-base.

The maximum dry density shall be 105 lb/ft^3 or greater as measured by AASHTO T-180, Method C. The liquid limit and plasticity index for the portion of material passing the No. 40 size shall not exceed 41 and 10 respectively.

b. Suitable Material – All other areas not required under paragraph a. above.

The maximum dry density shall be 100 lb/ft^3 or greater as measured by AASHTO T-180, Method C, unless the material has more than 35 percent retained on the No. 4 sieve in which case Method D shall be used. Suitable Material shall include all material designated as Select Material as well as material classified in the Unified Soil Classification System (USCS) as ML, CL, MH and CH.

c. Structural Fill – Structural fill shall be placed and compacted against cast-in-place concrete structures in accordance with the requirements specified in the Contract Documents.

3. Use and Ownership of Excavated Material

a. All Suitable Material excavated from utility trenches shall be used, as far as practicable, for backfill in trenches.

b. The Contractor shall properly store, stockpile and protect all materials that are to be reused in the work. The Contractor shall replace, at his own expense, material that was suitable when excavated, which has subsequently become unsuitable because of careless, neglectful, wasteful, or unprotected storage. The Contractor shall have no property right in any material taken from any excavation and no excavated material shall be wasted or otherwise removed from the project site without permission of the County. All unsuitable and surplus Suitable Material, as determined by the County, shall be removed from the excavation and disposed of off-site by and at the expense of the Contractor in accordance with all applicable Federal, State, and local regulations.

c. If insufficient suitable soils are available from excavation on the contract project, the Contractor may obtain suitable soils from sources designated in the Special Provisions, or from such sources within 300 yards of the site as may be approved by the County. If these sources do not supply sufficient suitable soils, the Contractor shall submit for inspection and test by the County borrow excavation sites from which such soils as may be required to complete the construction of excavation backfill on the contract project. Borrow Excavation shall be supplied and placed at the contract unit price or when not provided for in the contract at a negotiated price for "Extra Work".

4. Aggregate backfill for pipe and structure installation, bedding and trench backfill shall meet the gradation requirements specified herein and Section 02240.

3.0 EXECUTION

A. Surface Preparation

1. Sediment Control

The Contractor shall install all required sediment control devices in accordance with permits and all applicable Federal, State and local regulations.

2. Clearing and Grubbing

The Contractor shall clear and grub the surface over the line of the trench in accordance with the requirements of Section 02110.

3. Removing Pavement, Sidewalk, Curb, etc.

   a. Prior to removal, the Contractor shall saw-cut all existing pavement, sidewalk and curb. Jack hammering edges of pavement, sidewalk and curb removal is prohibited.

   b. The Contractor shall remove paving only to the width shown on the Standard Details, noted in the Special Provisions, or as directed by the County. When the Contractor removes paving for a greater width than is deemed necessary or disturbs paving, sidewalk, curbs, etc. due to settlement, slides, or cave-ins, or in making excavation outside the limits of the trench without written order of the County, the County will require the Contractor to replace the excess damaged area and may retain from payments due the Contractor such amounts required to permanently replace the excess material removed. The Contractor shall be responsible for repaving or surfacing roadbeds or replacing sidewalk, curbs, etc. that have failed, settled, or have been damaged at any time before expiration of the Contract maintenance period due to work or any other activities by the Contractor, his subcontractors, or suppliers.

4. Maintaining Traffic

   The Contractor shall furnish all labor, tools, equipment, and materials required for the maintenance of traffic during construction in accordance with the traffic control plan or permits.

B. Trench Excavation

1. General

   a. Excavation for the installation of utilities shall be unclassified and shall consist of the excavation removal and/or disposition of all material encountered to the lines, grades, and sections shown on the Plans and/or the Standard Details, as specified, or as directed by the County.

   b. Unless otherwise indicated, excavation shall be by open cut, except that short sections of a trench may be tunneled, or the pipeline jacked, if, in the opinion of the County, the pipe can be safely and properly installed.

   c. Trenches shall be excavated and backfilled either by hand or by machinery. The Contractor shall have no claims, nor will extra compensation be allowed, for hand excavation or backfill which may be required by these Specifications or by the County for protection of existing utilities or structures.

2. Protection of Property and Structures

   a. The Contractor shall, at his own expense, sustain in place and protect from direct or indirect injury all existing facilities in the vicinity of the excavation, whether above or below the ground, or that may appear in the trench. The

Contractor shall be responsible for the implementation of protective measures associated with the presence or proximity of pipes, poles, tracks, walls, buildings, property markers, and other structures and property of every kind and description in or over his trenches or in the vicinity of his work whether above or below the surface of the ground. The Contractor shall repair or replace damaged facilities at his expense.

b. The Contractor shall be responsible to obtain any applicable local, State and Federal permits associated with dewatering. Dewatering means and methods shall be the responsibility of the Contractor.

3. Utility Adjustments

a. All adjustments to utilities other than those owned by the County shall be performed by the utility owner.

b. Adjustments to water services between the property line and the water main shall be performed by Harford County pre-qualified utility contractors. Adjustments between the property line and the house shall be performed in accordance with Harford County Plumbing Code. It shall be the Contractor's responsibility to obtain all permits necessary for the performance of this work.

c. Adjustments to sanitary sewers within the County Easement or right-of-way shall be accomplished by a Harford County pre-qualified utility contractor. Adjustments to sanitary sewers outside the County Easement or right-of-way shall be performed in accordance with the Harford County Plumbing Code. It shall be the Contractor's responsibility to obtain all permits necessary for the performance of this work.

4. Obstructions Shown on Plans

a. Certain information regarding the reputed presence, size, character, and location of existing underground utilities and structures has been shown on the Plans based upon available records. There is no certainty of the accuracy of this information, and it shall be considered by the Contractor in this light. If test pit data is not shown on the Plans, the Contractor shall excavate test pits in advance of his work in accordance with Section 02012 to locate existing utilities. The Contractor shall hereby distinctly understand that the County is not responsible for the correctness or sufficiency of the information given. The Contractor shall have no claim for delay or extra compensation on account of incorrectness of information given, or on account of the insufficiency or absence of information regarding obstructions. The Contractor shall have no claim for relief from any obligation or responsibility under the Contract in case the location, size, or character of any underground facility is encountered that is not shown on the Plans.

b. It shall be the responsibility of the Contractor to notify "MISS UTILITY," all municipal utilities, all utility line owners, and any other parties affected prior

to the beginning of work. It is the Contractors responsibility to reference and maintain the location markings during the construction of the project. In the event that a utility location needs to be re-established by Harford County, the cost to provide this shall be borne by the Contractor.

5. Removing Obstruction

   a. Should the position of any pipe, conduit, or other structure above or below ground be such as, in the opinion of the County, to require its removal, realignment, or change due to the work to be done under the Contract, the work of removal, realignment, or change will be done as extra work, or will be done by the owner of the obstructions without cost to the Contractor; but the Contractor shall uncover and support the structures in the limits of his trench at his own expense before such removal, and before and after such realignment or change. Whether the obstruction is shown on the Plans or not, the Contractor shall not be entitled to any claim for damage or extra compensation on account of the presence of said structure or on account of any delay in the removal or rearrangement of the same; however, if said structure is not shown on the Plans, time extension will be allowed if deemed to be warranted by the County.

   b. In the event that obstructions would delay the work of pipe installation, the Contractor may, with prior written County approval, be permitted to leave a gap in the work and return to fill the gap after the obstructions have been removed. The installation shall be completed by laying full pipe lengths and appropriate closure pieces.

   c. The Contractor shall not interfere with any persons, firms, or corporations or with the County in protecting, removing, changing or replacing pipes, conduits, poles, or other structures.

   d. In the event that the County has entered into any agreement with an affected utility owner or owners which will have an effect on the operations or financial responsibilities of the Contractor, the requirements of these agreements will be included in the Special Provisions of the Contract.

6. Change of Trench Location

   a. In the event the County directs that the location of a trench be changed to a reasonable extent from that proposed on the drawing on account of the presence of an obstruction, or from other cause, or if a changed location shall be authorized upon the Contractor's request, the Contractor shall not be entitled to extra compensation or to a claim for damages; provided that the change is made before the excavation is begun. If, however, such change, made at the direction of the County involves the abandonment of excavation already made, such abandoned excavation together with the necessary backfill, will be considered extra work and the Contractor shall be compensated accordingly. In the event that the trench is abandoned in favor of a new location, at the Contractor's request, the abandoned excavation and backfill shall be at the Contractor's expense.

b. If an obstruction shall lie within the trench in such manner that the trench has to be excavated to extra width in order that sheeting or bracing may be properly placed, or in order that a structure to be placed in the trench may be properly built, such extra width of trench shall be classed as miscellaneous excavation. No sloping of sides of excavation, however, for the purpose of avoiding the necessity of placing sheeting or bracing, either in the presence or absence of obstructions, will be considered as excavation beyond pay limits.

7. Trench Width and Depth

a. Trenches shall be excavated to the necessary width and depth as may be shown on the Plans or Standard Details, as specified in the Special Provisions, or as directed. The trench subgrade shall be such as to provide a uniform and continuous bearing and support for the pipe on solid undisturbed earth for the full length of each pipe, except for that portion at the bell hole. Any part of the bottom of the trench excavated below subgrade shall be backfilled with approved material and compacted in accordance with Contract Documents.

b. Subgrade, in the case of pipe lines, shall be six (6) inches below the underside of the pipe barrel, where the pipe is laid on granular bedding. Where the pipe is laid on a natural foundation, subgrade shall be four (4) inches below the underside of the pipe barrel.

c. The sides of the trenches shall be practically plumb and under no circumstances will they be permitted to be sloped except with the written approval of the County. Should the Contractor elect to slope or cut-back the sides of the trench, no additional payment will be made for extra excavation, backfill, restoration, or contingent items beyond the limits indicated on the Standard Details.

d. Bell holes shall be excavated in the bottom of the trench to ensure that pipe has continuous bearing.

e. Where sheeting or trench boxes are used, the maximum width shall be as noted in the Standard Details.

8. Length of Open Trench

a. The Contractor shall keep the backfill operation to the top of trench for offsite and existing areas and to road subgrade in areas of new construction, within 100 feet of excavation and pipe laying operations. The County reserves the right to require the backfilling of open trenches over completed pipe lines if, in his judgment, such action is necessary; and the Contractor shall thereby have no claim for extra compensation, even though to accomplish said backfilling, he is compelled temporarily to stop excavation or other work at any place.

b. All trenches shall be closed at the end of each work day.

c. The excavation of all trenches shall be fully completed at least one full pipe length in advance of pipe installation, unless otherwise authorized.

9. Responsibility for Condition of Excavation

The Contractor shall be responsible for the condition of all excavations made by him.

10. Trench Support

a. The support of the trench shall be the sole responsibility of the Contractor.

b. The Contractor shall support the sides and ends of all excavations wherever necessary with braces, sheeting, shoring or stringers, trench boxes, or other acceptable excavation support systems. All trench support systems shall be installed by men skilled in such work and shall be so arranged that it may be withdrawn as backfilling proceeds, without injury to the utility or structure constructed or to any roadbed, adjacent structure or property.

c. All timbering in excavations, trench boxes, or excavation support systems shall be withdrawn as the backfilling is being done, except where and to such extent as the County shall order in writing that said timbering or excavation support system be left in place or where the County permits the trench support to be left in place at the Contractor's expense and upon his request. The Contractor shall cut off any sheeting left in place 2 feet below finished grade and shall remove the material cut off without compensation therefore.

d. Wherever necessary, in running sand, or soft ground, or for the protection of any structure or property, sheeting shall be driven without extra compensation to such a depth below the bottom of the trench as may be required or directed. Where directed by the County to leave sheeting in place, payment will be made under the appropriate contingent item.

e. All work shall be performed in accordance with the latest applicable Federal, State, and local safety and health regulations.

11. Drainage and Dewatering

a. The Contractor shall grade the site as necessary to prevent surface water ponding or from flowing into the trench or other utility excavations and shall provide all necessary temporary surface drainage and keep the same operating to the satisfaction of the County until permanent drainage or finished grading and permanent surface stabilization has been completed.

b. It shall be the Contractor's responsibility to adequately control water that may be present in the excavation. He shall provide for the disposal of water removed from excavations in such a manner not to cause damage to public or private property or to any portion of the work completed or in progress or cause any impediment to the use of any area by the public; nor shall the Contractor discharge any flushing or ground water or any material of any

nature into existing sanitary sewer system during the construction of the facilities. All water shall be discharged through an approved sediment control device. The costs of dewatering trench excavations will not be paid for directly, but will be included in prices bid for other related items.

12. Excavation Below Subgrade

a. The Contractor shall, without additional compensation, before any pipe or appurtenance is installed, fill all unauthorized depressions or irregularities in the bottom of the trench or tunnel with aggregate fill.

b. Where the bottom of the trench, at subgrade, is in unstable or unsuitable material, excavation shall be carried to such depth as ordered by the County. The trench bottom shall be restored to subgrade with aggregate fill. Excavation and backfill for removal of unsuitable material will be paid for under the appropriate contingent item.

C. Backfill

1. The Contractor shall backfill all trenches as rapidly as practicable after the installation of the utility therein, or after the excavation has served its purpose.

2. Subgrade to 2'-0" above top of pipe: Unless otherwise noted in the Construction Drawings, Specifications or Permits, backfill material shall be carefully placed around and to a depth of two feet over the pipe. These initial lifts shall be carefully placed and hand-tamped in four inch layers. Care should be exercised in this operation to insure that the alignment of the utility is not disturbed.

3. 2'-0" above top of pipe to top of trench: The remainder of the trench may be backfilled in layers not exceeding the specified compaction lift depths. However, if lift thickness is followed and the specified compaction is not obtained based on the testing during backfilling, the Contractor shall, at his own expense, remove, replace, and retest as many times as is required to obtain the specified compactions. In backfilling the remainder of the trench, stones of not more than 6 inches in largest dimension which have been taken out in excavating may be mixed with earth in an amount not exceeding 25% of the backfill volume. Stones of larger size or in greater quantities shall not be used, unless directed by the County. The Contractor shall not permit excavations to be used for the disposal of refuse.

4. In paved areas, the Contractor shall furnish and backfill the trench as per the requirements of the governing regulatory agency, and/or Contract Documents.

5. Should additional material be required for backfilling in excess of that obtained from excavation, the Contractor shall obtain Borrow material from off-site sources, to complete the trench backfill.

6. Use of frozen backfill material is prohibited.

7. Pipe, structures, appurtenances and backfill material shall not be laid upon frozen soil or aggregate.

D. Compaction

1. In unimproved areas (areas not identified in paragraph 2 below), compaction shall be accomplished as follows for the remaining depth of trench: Suitable Material shall be placed in maximum 2 foot layers or as approved by the County and compacted in such a manner that a completely dense refill is obtained which is free of voids and not susceptible to undue settlement or depression.

2. Soil compaction, certified by a soils testing company will be required under the following conditions, unless otherwise shown on the Construction Drawings, noted in the Specifications or required in the permit:

   a. Road Right-of-Ways, Roadways, driveways, parking lots, sidewalks and other easement areas with vehicular loads; and all business, commercial or industrial property.

      The remaining trench depth up to a depth of two feet below sub-base shall be backfilled with Suitable Material and mechanically tamped in layers not to exceed twelve inches to not less than 92% of the maximum density at optimum moisture content as determined by the Modified Proctor Method, AASHTO Designation T-180. The remaining trench shall be backfilled with Select Material (top 1-foot) shall be compacted to not less than 97 percent of the maximum dry density determined as noted above. All compaction must comply with the aforementioned or the latest edition of the governing applicable road code or permit whichever is most stringent. In some circumstances, lawn and landscaped areas may require the above compaction standards.

   b. Residentially Zoned Property (Maintained lawn and landscaped areas)

      The remaining trench depth shall be backfilled with Suitable Material and mechanically tamped in layers not to exceed twelve inches to not less than 85% of the maximum density at optimum moisture content as determined by the Modified Proctor Method, AASHTO Designation T-180.

3. Insofar as the specifications for mechanical tamping equipment or methods are concerned, no specific requirements are included in these Specifications other than that the use of any particular type of equipment is subject to the approval of the County and that the County has the right to judge if equipment is unsuitable for the uses intended. The Contractor shall be cognizant that use of hand-tamping equipment may be required around existing utilities.

4. For developer projects, the developer or contractor shall inspect and test the soil compaction utilizing a County-approved soils testing company to ensure the requirements are met in paragraph 2 above. A full-time soils testing technician shall be on-site performing compaction tests during all backfilling operations. The following shall be required of the soils testing company:

   a. Prior to construction, perform modified Proctor Test T-180 on bag samples of proposed backfill material for the purpose of obtaining moisture-density relationship curves (Proctor curves). The soils technicians inspecting the backfilling operations shall have the proctor curves with them at all times.

b. Monitor and document all backfill operations that are subject to compaction certification.

c. The soils technicians shall assure each lift meets the compaction requirements noted on the construction drawings. Testing shall occur at least once each day on every lift, with the spacing of the tests not to exceed 100 feet. The moisture and density of the soil shall be tested by either the sand cone method or by nuclear density gauge. The soils technician shall notify the contractor if any lift does not meet the compaction requirements. The contractor shall then re-compact the backfill as necessary until the minimum compaction has been achieved. The soils technician shall note the station and depth of each test and re-test with results. The contractor shall not proceed until the minimum compaction requirements have been met.

d. The soils technician shall provide the County Inspector with copies of the reports on a daily basis on the day the testing occurred.

e. The soils technician shall take moisture tests of the backfill material a minimum of twice daily. If the tested soil moisture will prevent the required density, the technician shall immediately notify the Contractor. The Contractor shall then take the necessary steps to modify the soil moisture to acceptable levels that will achieve the minimum compaction requirements without the use of additives.

f. The soils technician shall determine if the backfill material meets the requirements of the Standard Specifications.

For capital projects, Harford County will retain the services of a soils testing company at the County's expense.

E. Maintenance of Backfilled Trench

1. All backfilled trenches shall be maintained in an acceptable condition by and at the expense of the Contractor for a period of twelve (12) months following the date of conditional acceptance of the work.

2. If the Contractor fails to fill depressions in the backfilled trench within 24 hours after the receipt of notice from the County, the County may refill said depressions and the cost thereof shall be retained from any monies due the Contractor, under the Contract. In case of emergency, the County may refill any dangerous depression or protect with lights wherever necessary without giving previous notice to the Contractor; and the cost of so doing shall be retained from any monies due to become due the Contractor under the contract.

3. The Contractor shall be responsible for any injury or damage that may result from lack of maintenance of any refilled excavation at any time prior to final acceptance of the Project.

4.0 METHOD OF MEASUREMENT

A. Trench Excavation, Backfill and Compaction

Trench excavation, backfill, and compaction will not be measured as a separate item, but will be included with other items of work contained in the Bid Documents.

5.0 BASIS OF PAYMENT

A. General

1. No separate payment will be made for trench excavation, backfill, and compaction. The cost shall be included in the price bid for installing pipe, or constructing the various appurtenances included in the Contract. The bid prices shall include furnishing all labor, tools, equipment, and materials necessary to complete the work as shown and specified in strict accordance with the Contract Documents.

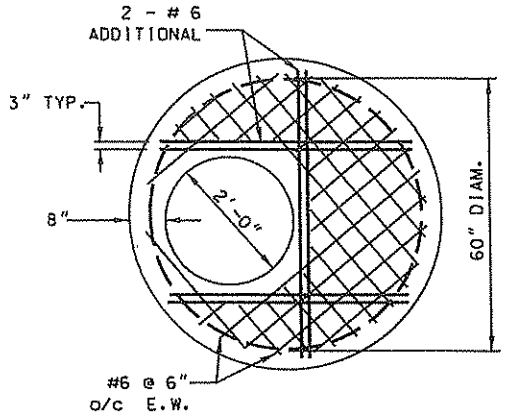
2. Payment will be made for contingent items when approved by the County.

B. Trench Excavation, Backfill and Compaction

In addition to the work listed above, trench excavation, backfill, and compaction shall also include the traffic control, removing, storing, and rehandling of surface materials over the trench, including paving; the scoring of existing paving in a straight and uniform line; the excavation of all materials encountered in the trench including excavation at manholes, structures, vaults, and other appurtenances that may be shown or required, and any extra excavation necessary for sheeting or bracing or installation of other excavation support systems; the backfilling and compaction of trenches; the removal and disposal of unsuitable and/or surplus material; and all other incidental items to complete the work.

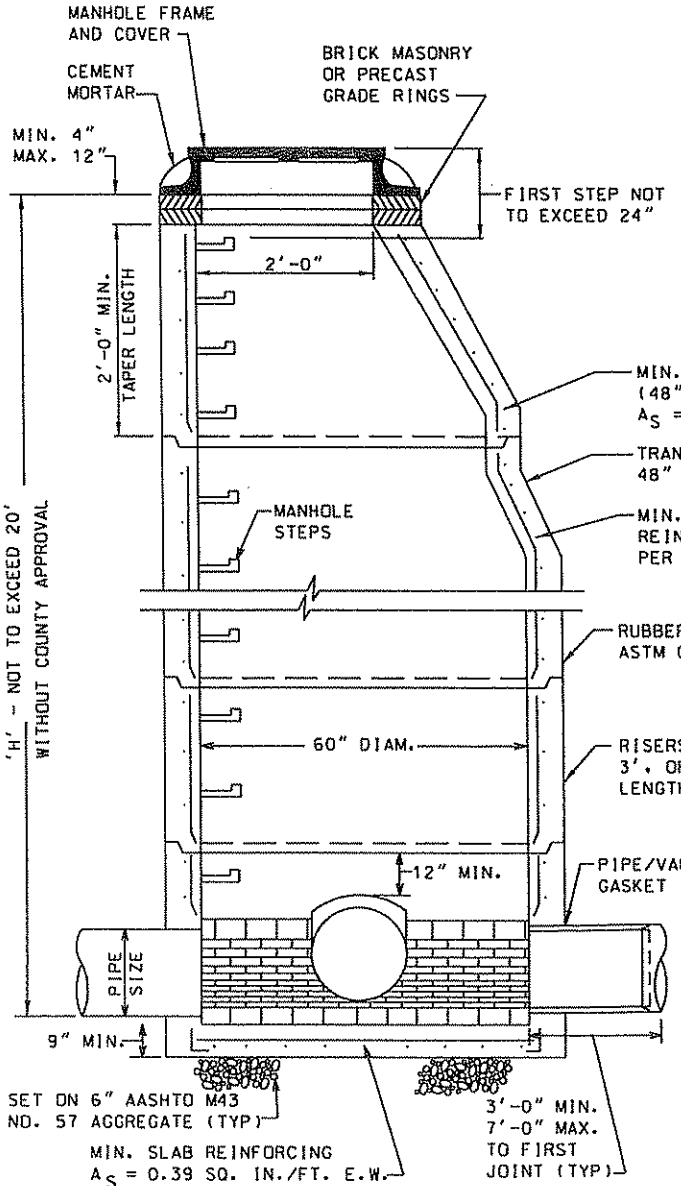
NOTES:

1. EXCEPT AS NOTED, MANHOLE TAPERS, RISERS, AND BASES SHALL BE FURNISHED IN STRICT ACCORDANCE WITH ASTM DESIGNATION C478 (LATEST) FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS".
2. CONCRETE FOR PRECAST CONSTRUCTION SHALL BE 4,000 PSI. MIN
3. REINFORCING FOR TYPE A-3, SAME AS TYPE A-2.
4. MANHOLE STEPS SHALL BE SPACED AS SHOWN IN A SINGLE VERTICAL ALIGNMENT. THE STEPS SHALL NOT BE STAGGERED.
5. TOP OF BENCH TO MATCH CROWN OF PIPE.
6. NO INTERIOR SURFACES SHALL RECEIVE PARGING WITHOUT COUNTY APPROVAL.
7. GRADE RINGS SHALL BE SET IN A FULL BED OF MORTAR.

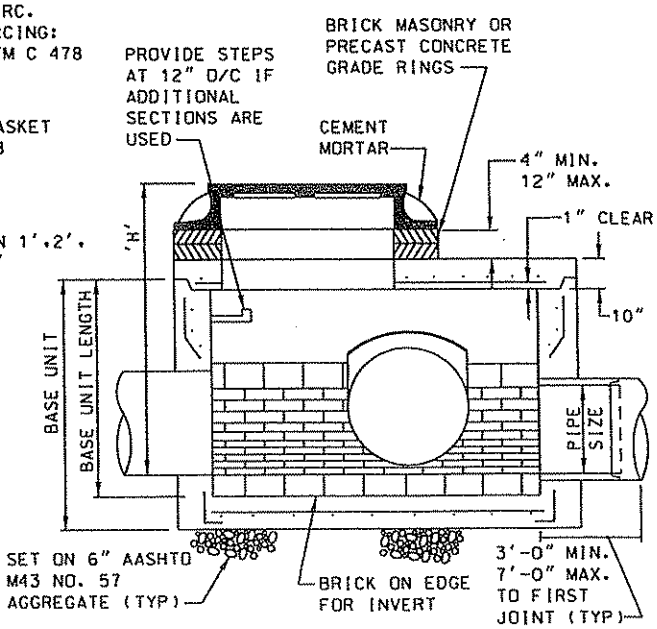


SLAB REINFORCING FOR TYPE A-3 PRECAST MANHOLE

PIPE SIZE	BASE UNIT HEIGHT-MIN.	MIN. H FOR A-2 MAX H FOR A-3
24" DIA.	4' - 0"	7' - 6"
30" DIA.	5' - 0"	8' - 6"



60" TYPE A-2



SHALLOW PRECAST MANHOLE 60" TYPE A-3

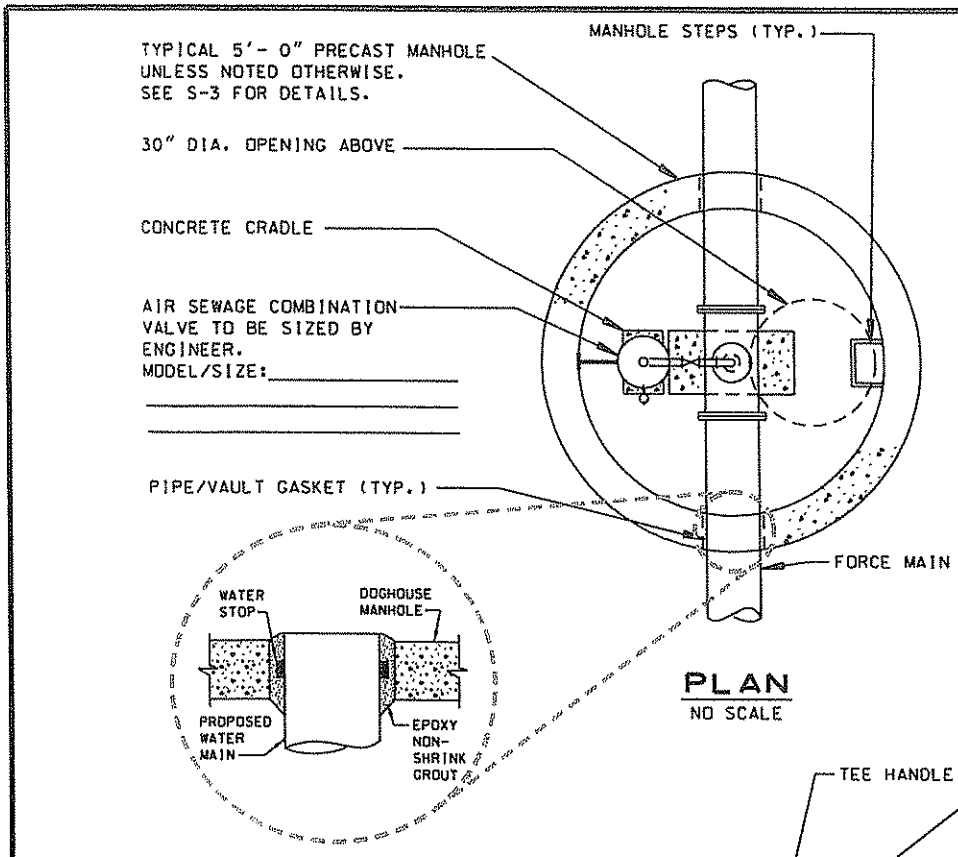
HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

STANDARD SEWER DETAILS

60" PRECAST MANHOLE FOR 24" TO 30" PIPE

ISSUED	7/98
REVISED	4/17/01
REVISED	3/15/09
REVISED	4/16/10
PLATE	S-3

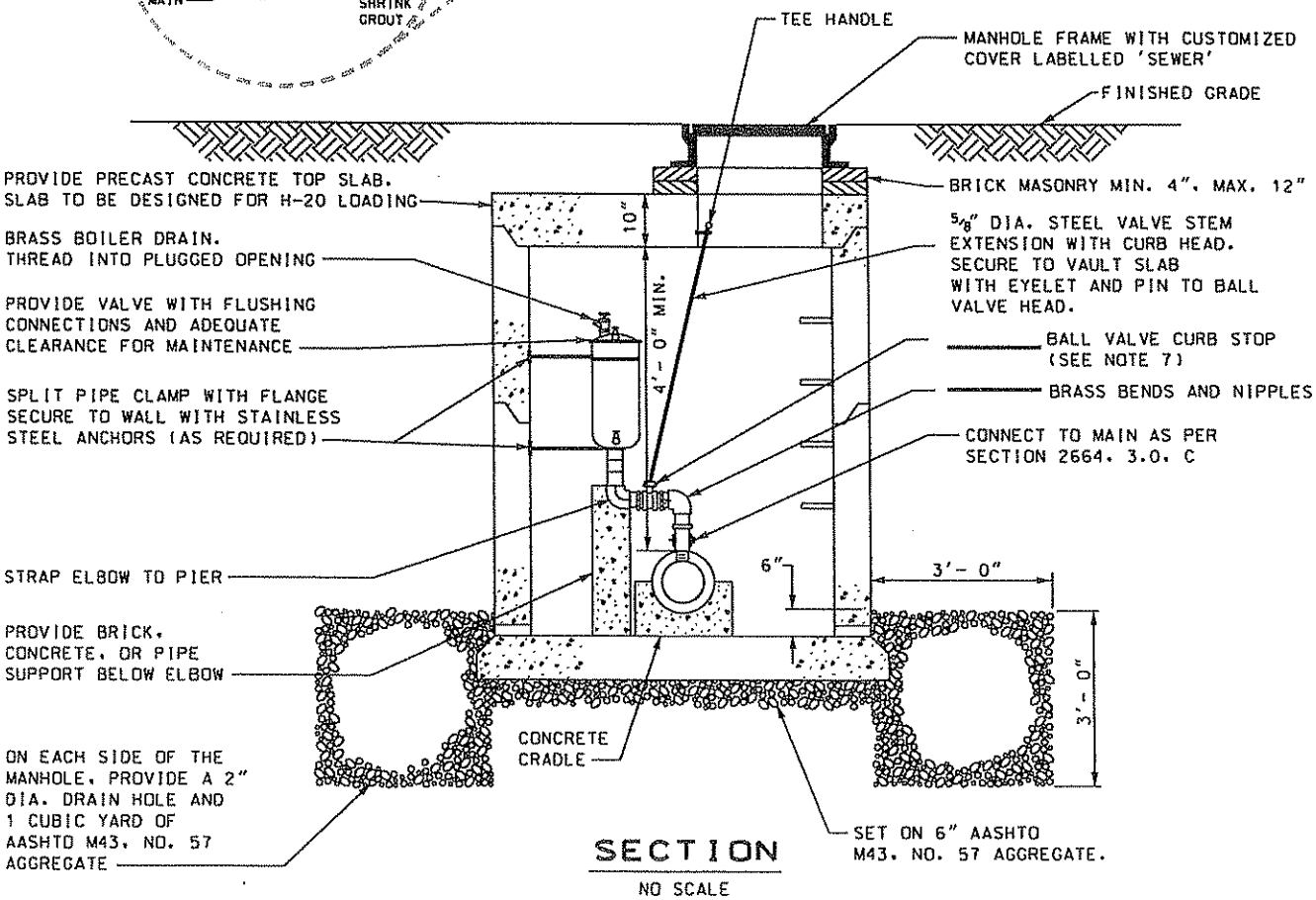
...\s-03 updated 7_13_10.dgn 7/13/2010 10:19:29 AM



PLAN
NO SCALE

NOTES:

1. ALL FITTINGS BELOW AIR VALVE TO BE HEAVY DUTY THREADED, UNPOLISHED BRASS UNLESS NOTED OTHERWISE.
2. ALL PIPE SUPPORTS AND BRACING TO BE SIZED BY ENGINEER.
3. SET MANHOLE ON 6" LEVELING COURSE OF AASHTO M43, NO. 57 AGGREGATE.
4. VAULTS IN HIGH WATER TABLE AREAS SHALL BE MODIFIED AS REQUIRED BY THE COUNTY.
5. CONTRACTOR MAY USE PRECAST DOGHOUSE TYPE MANHOLE RISER SECTION WITH APPROVED PIPE/VAULT GASKETS AND CAST-IN-PLACE BASE.
6. MIN. VAULT HEIGHT SHALL BE 6'- 6" MEASURED FROM FLOOR TO CEILING.
7. AN ACCEPTABLE ALTERNATIVE TO THE 90° BEND AND BALL VALVE CURBSTOP IS AN ANGLE BALL SERVICE VALVE.



SECTION
NO SCALE

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

Richard B. Cooper

STANDARD SEWER DETAILS

SEWAGE COMBINATION AIR VALVE IN MANHOLE

ISSUED	7/98
REVISED	4/17/01
REVISED	11/26/03
REVISED	5/11/06
REVISED	3/15/09
REVISED	4/16/10

PLATE S-25

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