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# WATER AND SEWER EXTENSIONS

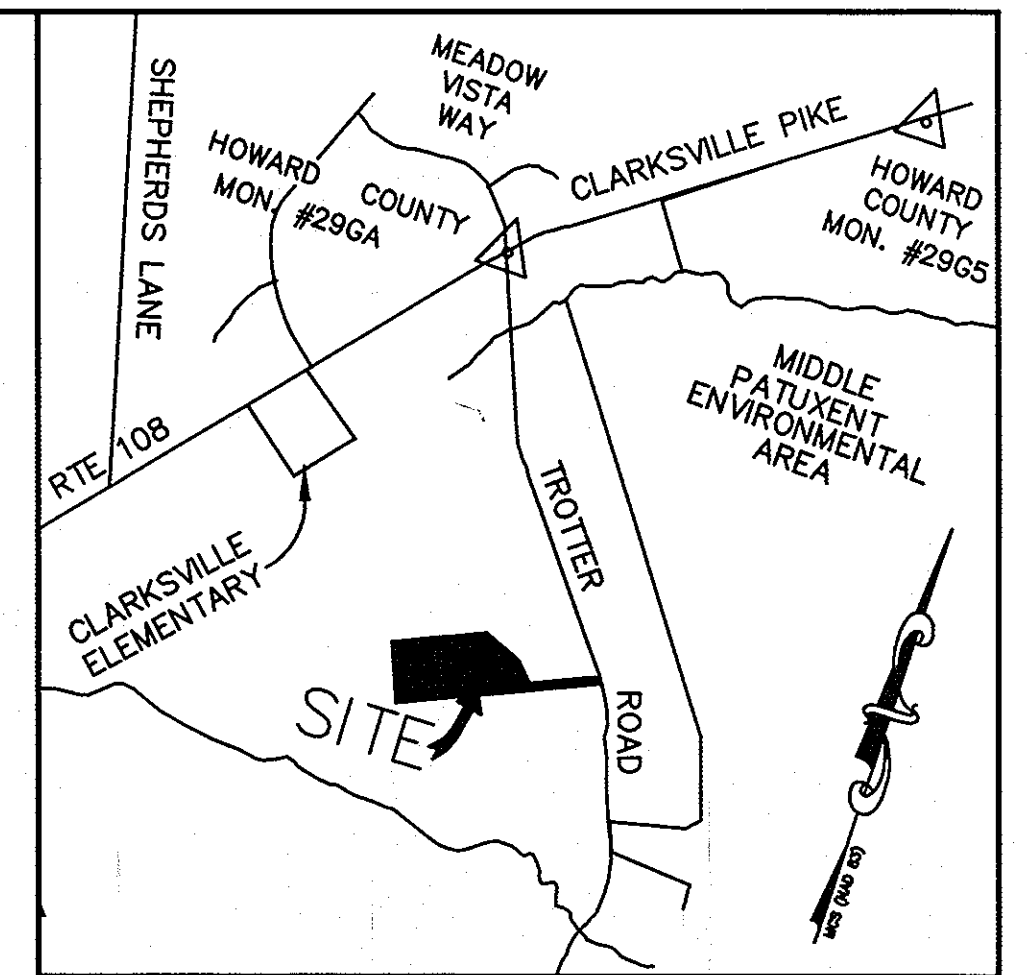
# TROTTER CROSSING

## LOTS 1 - 12

### 5th ELECTION DISTRICT

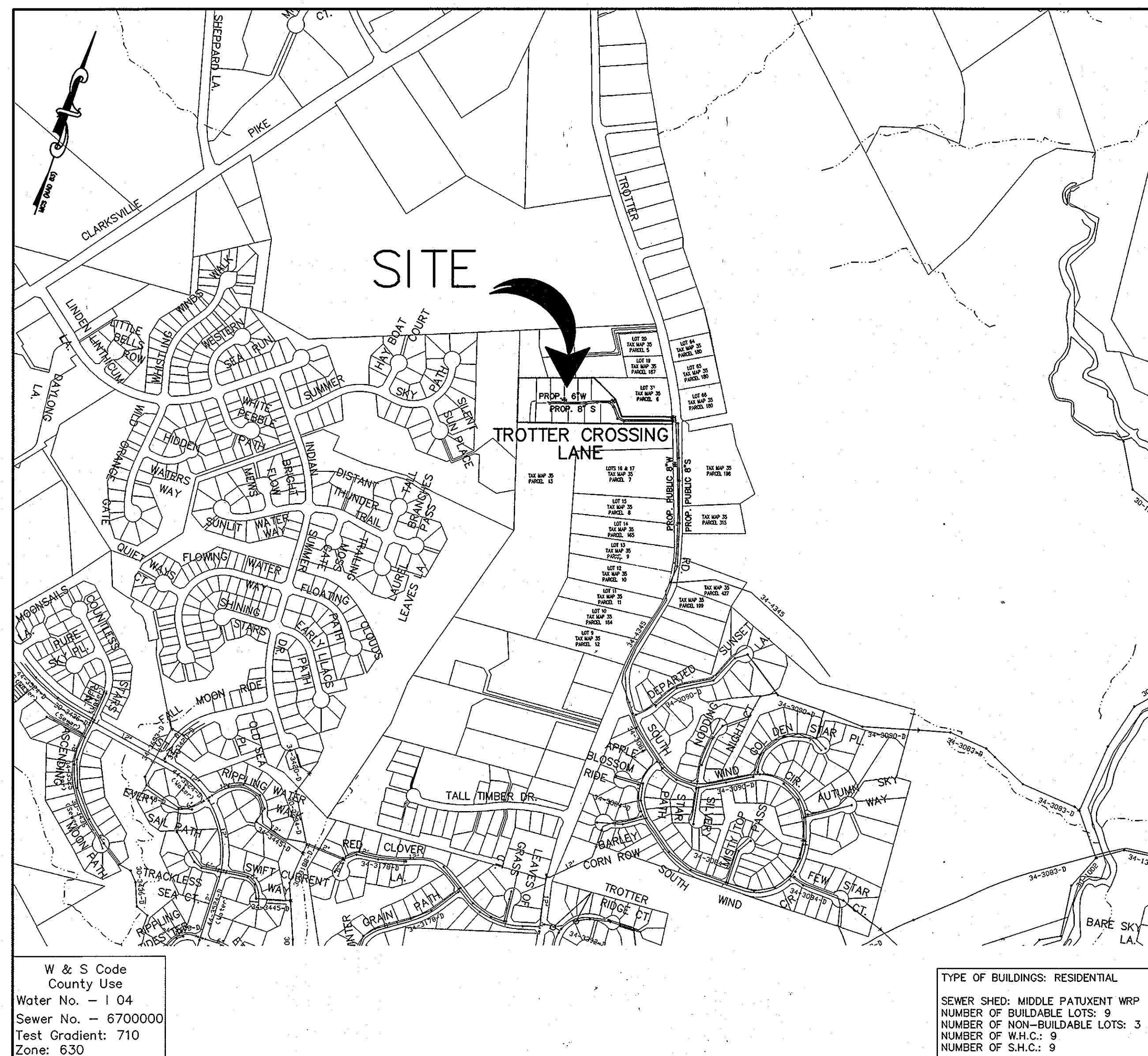
### HOWARD COUNTY, MARYLAND

### CONTRACT NO. 34-4170-D



**BENCHMARKS**  
 HOWARD COUNTY CONTROL  
 STATION 296A  
 N 566,867,4644  
 E 1,333,325,6268  
 ELEV. 450.033  
 HOWARD COUNTY CONTROL  
 STATION 296S  
 N 868,341,1963  
 E 1,335,392,4511  
 ELEV. 387.398

**LOCATION MAP**  
 SCALE: 1"=1000'



**GENERAL NOTES**

- Approximate location of existing mains are shown. The contractor shall take all necessary precautions to protect existing mains and services and maintain uninterrupted service. Any damage incurred shall be repaired immediately to the satisfaction of the Engineer at the Contractor's expense.
- Topographic field survey work performed on January 2003 by Patton, Harris, Rust & Associates.
- The coordinate system on the drawings are based on Maryland State Reference System, NAD 83/91 as projected by Howard County Geodetic Control System Nos. 296A and 296S.  
 All vertical controls are based on NAVD 88. Vertical controls provided on the drawings are NAVD 29, by PHR+A.
- All pipe elevations shown are invert elevations unless otherwise noted on the plans.
- Clear all utilities by a minimum of 6 inches. Clear all poles by 2'-0" minimum or tunnel as required unless otherwise noted. The owner has contacted the utility companies and has made arrangements for bracing of poles as shown on the drawings. In the event the contractor's work requires the bracing of additional poles, any cost incurred by the owner for the bracing of additional poles or damages shall be deducted from monies owed the contractor. The contractor shall coordinate with the utility companies to schedule the bracing of the poles.
- For details not shown on the drawings, and for materials and construction methods, use Howard County Design Manual, Volume IV, Standard Specifications and Detail for Construction (Latest Edition). The contractor shall have a copy of Volume IV on the job.
- Where test pits have been made on existing utilities, they are noted by the symbol at the location of the test pit. A note or notes containing the results of the test pit or pits is included on the drawings. Existing utilities in the vicinity of the proposed work for which test pits have not been dug shall be located by the contractor two weeks in advance of construction operations at his own expense.
- The contractor shall notify the following utility companies or agencies at least five working days before starting work shown on these plans:  

AT&T	1-800-252-1133
BCE (Contractor Services)	410-850-4820
BCE (Emergency)	410-685-1400
Bureau of Utilities	410-313-4900
Colonial Pipeline Co.	410-795-1390
Miss Utility	1-800-257-7777
State Highway Administration	410-531-5533
Verizon	1-800-743-0033 / 410-224-9210
- Trees and shrubs are to be protected from damage to the maximum extent. Trees and shrubs located within the construction strip are not to be removed or damaged by the contractor.
- The contractor shall remove trees, stumps and roots along the line of excavation. Payment for such removal shall be included in the unit price bid for construction of the main.
- The contractor shall notify the Bureau of Highways, Howard County, at 410-313-2450 at least five working days before open cutting or boring/jacking of any County road for laying water/sewer mains or house connections. The approval of these drawings will constitute compliance with DPW requirements per Section 18.114(g) of the Howard County Code.
- Final Plan No. F-05-067.

**WATER NOTES**

- All water mains shall be C900 P.V.C. unless otherwise noted.
- Tops of all water mains shall have a minimum of 3'-6" of cover unless otherwise noted.
- Valves adjacent to tees shall be strapped to tees.
- All fittings shall be buttressed or anchored with concrete in accordance with the Standard Details unless otherwise provided for on the drawings.
- Fire hydrants shall be set to the bury line elevations shown on the drawings. All fire hydrants shall be installed in accordance with Standard Details. The soil around the fire hydrant shall be compacted in accordance with Section 1000 and 1005 of the Standard Specifications.
- The contractor shall not operate any water main valves on the existing water system.
- All water house connections shall be for inside meter setting unless otherwise noted on plans or in specifications.
- For sprinkler system for all townhomes or multi-family dwelling units should have a minimum of 1" connection with 3/4" meter.
- Water zone division valves shall be provided when directed by Howard County.
- Contractor to install a tracer wire and continuity test station along the length of the P.V.C. water main. Shall be installed in accordance with Howard County Design Manual Volume IV, section 905.01.05.d. Pipeline detection system reference details: W-115 FIRE HYDRANT CONTINUITY TEST STATION, G-8.21 CONTINUITY TEST STATION & W-312 WATER METER FRAME AND COVER.

**SEWER NOTES**

- All sewer mains shall be D.I.P. and P.V.C. unless otherwise noted.
- All manholes shall be 4'-0" inside diameter unless otherwise noted.
- Force mains shall be D.I.P. only.
- Manholes shown with 12" and 16" walls are for brick manholes only.
- Manholes designated W.T. in plan and profile shall have watertight frame and covers, Standard Detail G5.52. Where watertight manhole frames and covers is used, set top of frame 1'-6" above finished grade unless otherwise noted on the drawings.
- House(s) with the symbol "C.N.S." indicates that cellar cannot be served.

RESTORATION SCHEDULE		
LOCATION	DISTANCE	TYPE
TROTTER RD.	1210 FEET	ASPHALT

QUANTITIES				
ITEMS	QUANTITIES ESTIMATED	AS-BUILT		
		QUANTITIES	TYPE	MANUFACTURER / SUPPLIER
8" WATER (C900 PVC)	2029 LF	2029 LF	C900 PVC	NORTH AMERICAN / HD SUPPLY
6" WATER (DIP)	43 LF	43 LF	DIP CL52	GRIFFIN / HD SUPPLY
FIRE HYDRANTS	4 EA.	4 EA.	KENNEDY	KENNEDY / HD SUPPLY
1" WHC	175 LF	175 LF	COPPER	CAMBRIDGE LEE / HD SUPPLY
6" VALVE	4 EA.	4 EA.	GATE	KENNEDY / HD SUPPLY
8" VALVE	4 EA.	4 EA.	GATE	KENNEDY / HD SUPPLY
8"x6" TEE	6 EA.	6 EA.	DIP MG	SIGMA / HD SUPPLY
8"x8" TEE	1 EA.	1 EA.	DIP MG	SIGMA / HD SUPPLY
4" SHC	184 LF		SDR 35	NORTH AMERICAN / HD SUPPLY
8" SEWER	2123 LF	410' DIP 1,700' 9" PVC	CL52 SDR 35	GRIFFIN / HD SUPPLY NORTH AMERICAN / HD SUPPLY
SEWER MANHOLES	13 EA.	13 EA.	PRECAST	ATLANTIC / ATLANTIC
TYPE A DROP CONNECTION	7 EA.	7 EA.	SDR 35	NORTH AMERICAN / HD SUPPLY
TYPE B DROP CONNECTION	1 EA.	1 EA.	SDR 35	NORTH AMERICAN / HD SUPPLY

NAME OF UTILITY CONTRACTOR : UTILITIES UNLIMITED

Sediment control measures for this contract will be implemented in accordance with Section 219 of the Specifications and as shown on F-05-067

Review for Howard Soil Conservation District and tests technical requirements

NATURAL RESOURCES CONSERVATION SERVICE DATE

This plan is approved for soil erosion and sediment control by the Howard Soil Conservation District.

OWNER / DEVELOPER  
 TROTTER CROSSING, LLC  
 ATTN: BRIAN BOY  
 9695 NORFOLK AVENUE  
 LAUREL, MD 20723  
 (410) 792-2565

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

DEPARTMENT OF PLANNING & ZONING  
 HOWARD COUNTY, MARYLAND

Patton Harris Rust & Associates, pc  
 Engineers, Surveyors, Planners, Landscape Architects.  
 PHR+A  
 8818 Centre Park Drive  
 Columbia, MD 21045  
 T 410.997.8900  
 F 410.997.9282

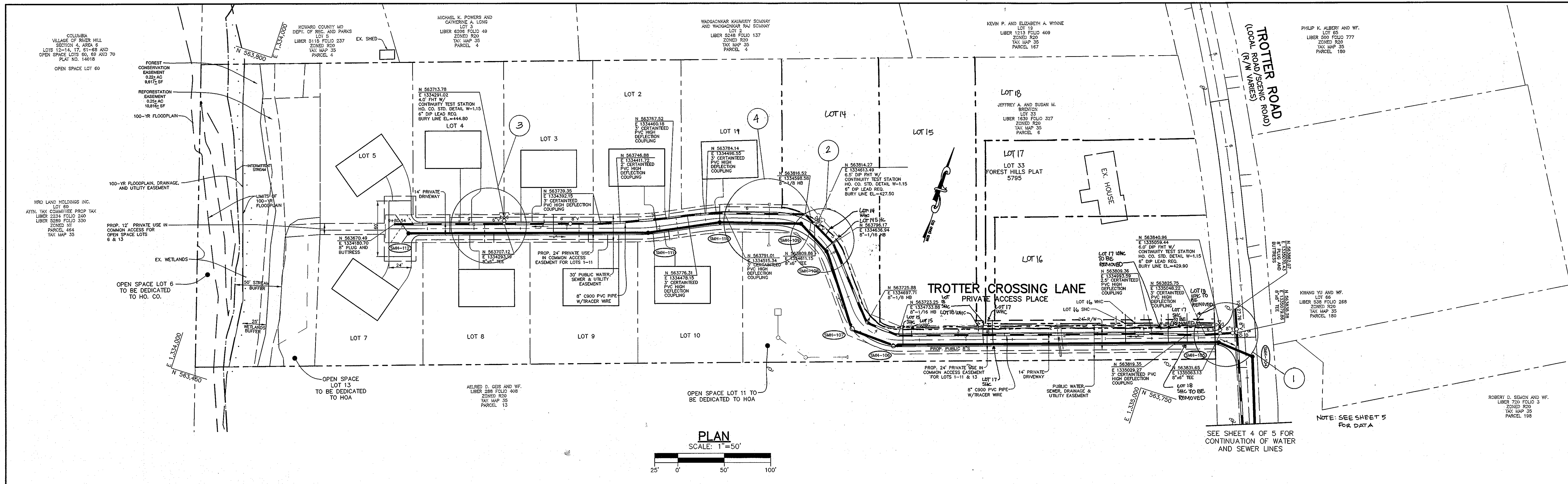
DES: D.W.C.  
 DRN: K.A.D.  
 CHK:  
 DATE: 10/05/07

AS-BUILT REVISIONS  
 REVISION DATE

600' SCALE MAP NO. 35 BLOCK NO. 2

**TROTTER CROSSING**  
 LOTS 1 THRU 5, 7 THRU 10 &  
 OPEN SPACE LOTS 6, 11, 12 AND 13  
 5th ELECTION DISTRICT  
 HOWARD COUNTY, MARYLAND  
 CONTRACT 34-4170-D

SCALE AS SHOWN  
 SHEET 1 OF 5

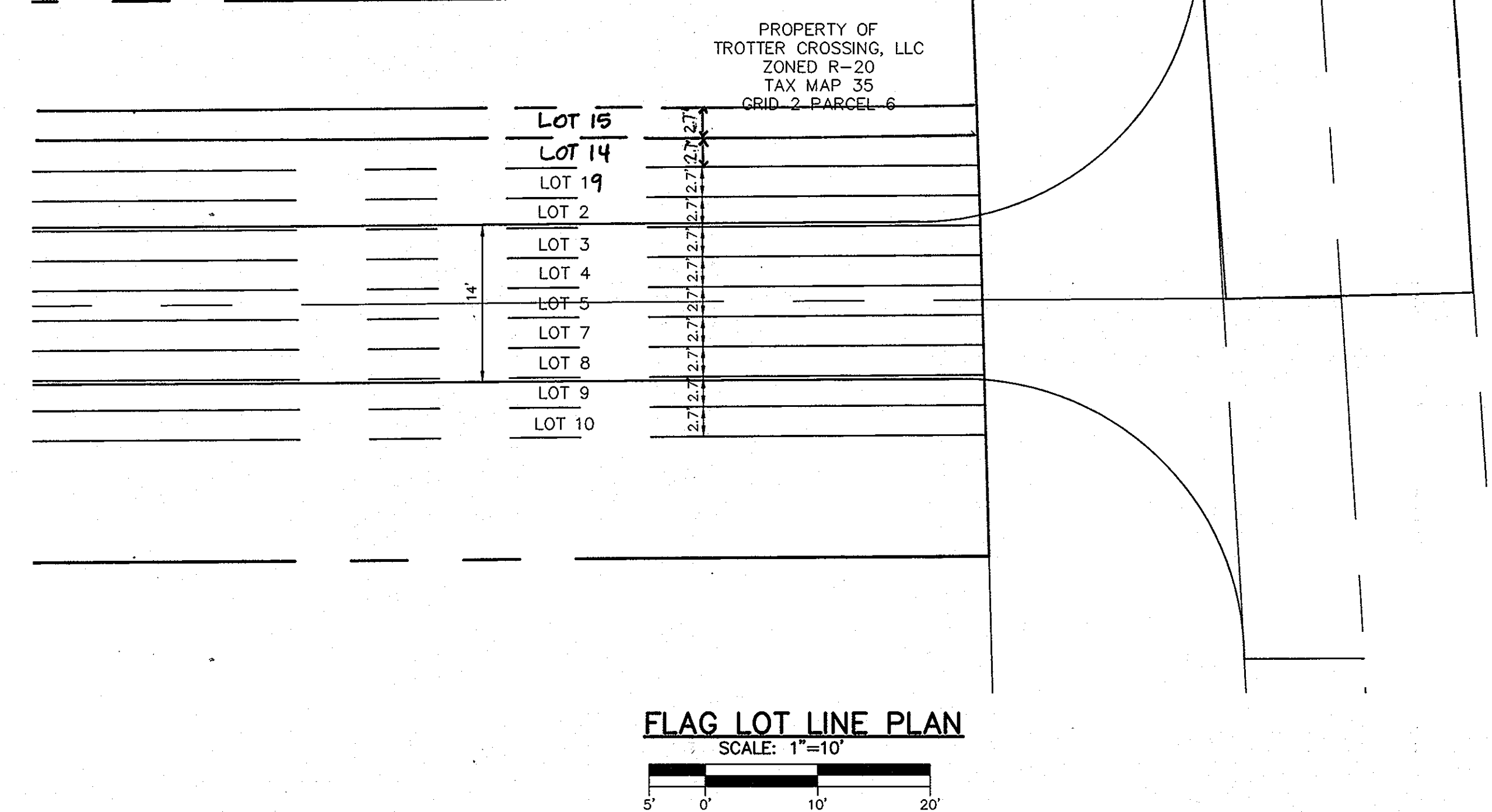


**PLAN**  
SCALE: 1"=50'

**LEGEND**

- PROPERTY LINE -----
- LOT LINE -----
- PROPOSED WATER MAIN -----
- PROPOSED TEE -----
- PROPOSED VALVE -----
- PROPOSED FIRE HYDRANT -----
- PROPOSED SEWER MAIN -----
- PROPOSED WHC -----
- PROPOSED SHC -----
- PROPOSED SEWER MANHOLE -----
- EXISTING WATER MAIN -----
- EXISTING SEWER MAIN -----
- EXISTING STORM DRAIN PIPE -----

LOT INFORMATION					
LOT NO.	FINISHED FLOOR ELEV.	BASEMENT FLOOR ELEV.	MIN. CELLAR ELEV.	4" SHC SLOPE	4" SHC INV. @ EASEMENT LINE
19	450.0	441.3	440.3	4%	436.88
2	452.3	443.6	442.5	2%	439.14
3	450.5	441.7	440.5	2%	437.40
4	447.2	438.5	437.3	2%	434.00
5	443.3	434.6	434.0	4%	429.78
6	---	---	---	---	---
7	442.0	433.3	432.5	2%	428.14
8	448.5	439.8	438.5	2%	435.42
9	451.0	442.3	442.0	2%	438.92
10	450.0	441.3	439.8	2%	436.88
11	---	---	---	---	---
12	---	---	---	---	---
13	---	---	---	---	---
14	442.04	433.34	429.5	2%	425.10
15	435.78	427.08	421.49	2%	416.34
16	437.70	429.00	428.0	5%	415.90
17	440.25	431.55	428.55	2%	415.83
18	441.12	432.42	428.42	2%	415.89

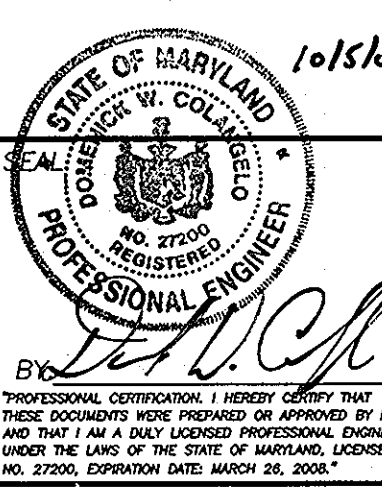


**FLAG LOT LINE PLAN**  
SCALE: 1"=10'

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
S. C. Coe  
CHIEF, BUREAU OF UTILITIES  
4/1/08

DEPARTMENT OF PLANNING & ZONING  
HOWARD COUNTY, MARYLAND  
C. J. ...  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
4/1/08

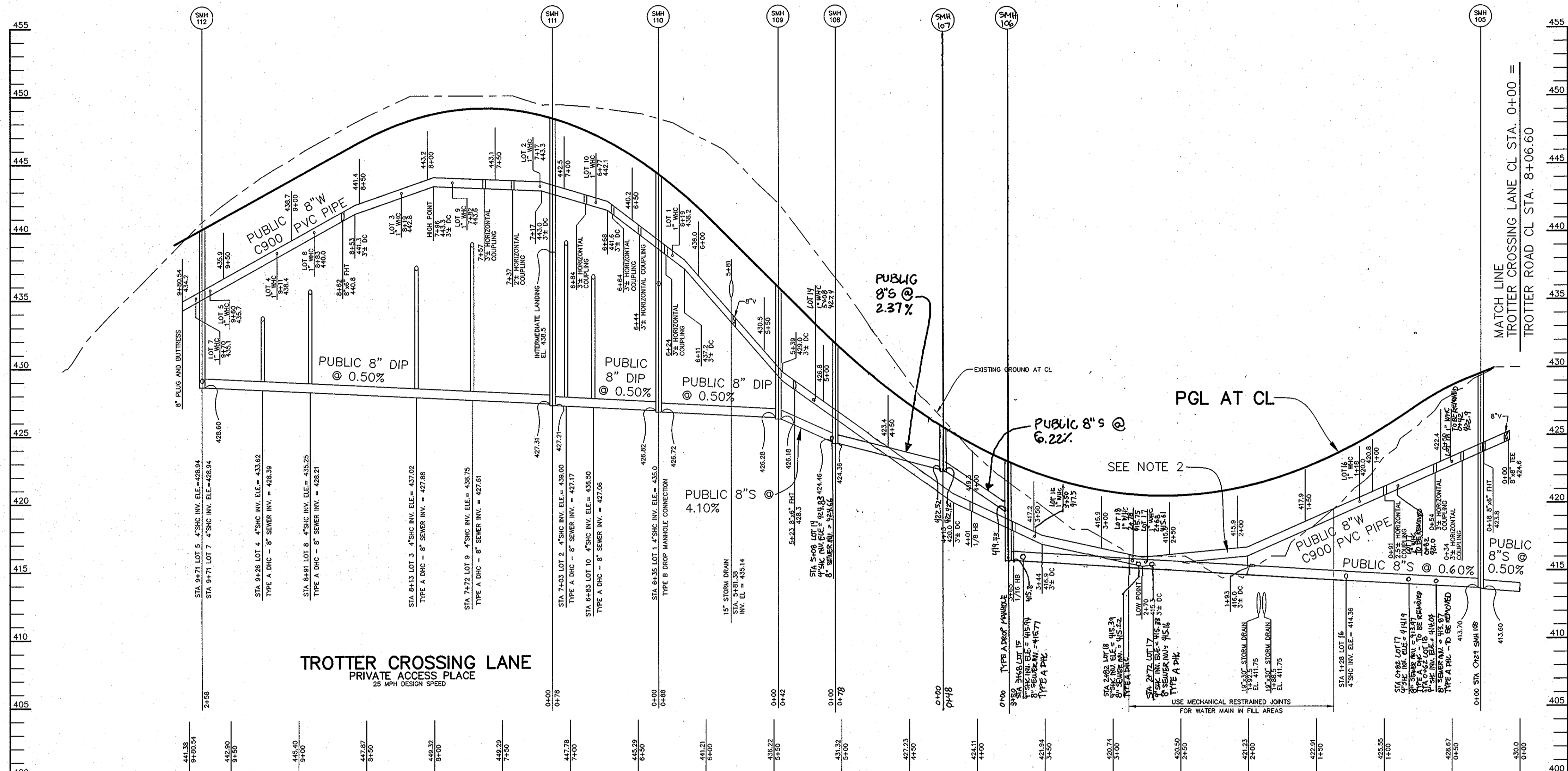
Patton Harris Rust & Associates, pc  
Engineers, Surveyors, Planners, Landscape Architects.  
PHRA  
8818 Centre Park Drive  
Columbia, MD 21045  
T 410.997.8900  
F 410.997.9282



DES:	D.W.C.
DRN:	K.A.D.
CHK:	KCI 2 AS-BUILT PREVISIONS
DATE:	10/05/07
BY:	ALC 1 ADDED IN WHC AND SHC FOR LOTS 14-18
NO.:	
REVISION:	
DATE:	

PLAN AND PROFILE OF  
WATER AND SEWER MAINS  
600' SCALE MAP NO. 35 BLOCK NO. 2

TROTTER CROSSING  
LOTS 2 THRU 5, 7 THRU 10 & 14 TO 19  
OPEN SPACE LOTS 6, 11 AND 13  
5th ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND  
CONTRACT 34-4170-D  
SCALE AS SHOWN  
SHEET 2 OF 5

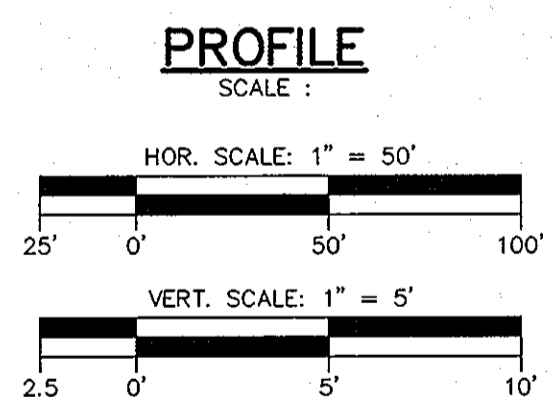


SEE SHEET 4 OF 4  
FOR CONTINUATION OF  
WATER AND SEWER LINES  
(PROFILE TROTTER ROAD)

STRUCTURE SCHEDULE				
STRUCTURE	TYPE	LOCATION	RIM	REMARKS
SMH 100	4" DIA MANHOLE	N 562861 E 1335419	374.80	HOCO. STD. DETAIL G-5.11
SMH 101	4" DIA MANHOLE	N 563159 E 1335337	385.39	HOCO. STD. DETAIL G-5.11
SMH 102	4" DIA MANHOLE	N 563439 E 1335240	401.10	HOCO. STD. DETAIL G-5.11
SMH 103	4" DIA MANHOLE	N 563590 E 1335187	413.70	HOCO. STD. DETAIL G-5.11
SMH 104	4" DIA MANHOLE	N 563819 E 1335104	429.34	HOCO. STD. DETAIL G-5.11
SMH 105	4" DIA MANHOLE	N 563822 E 1335065	429.55	HOCO. STD. DETAIL G-5.11
SMH 106	4" DIA MANHOLE	N 563712.20 E 1334732.32	423.10	HOCO. STD. DETAIL G-5.11
SMH 107	4" DIA MANHOLE	N 563715.68 E 1334604.44	425.66	HOCO. STD. DETAIL G-5.11
SMH 108	4" DIA MANHOLE	N 563786 E 1334633	430.84	HOCO. STD. DETAIL G-5.11
SMH 109	4" DIA MANHOLE	N 563806 E 1334597	435.02	HOCO. STD. DETAIL G-5.11
SMH 110	4" DIA MANHOLE	N 563780 E 1334514	443.60	HOCO. STD. DETAIL G-5.11
SMH 111	4" DIA MANHOLE	N 563746 E 1334444	448.32	HOCO. STD. DETAIL G-5.11 & G-5.16
SMH 112	4" DIA MANHOLE	N 563666 E 1334198	441.85	HOCO. STD. DETAIL G-5.11

\* WITH INTERMEDIATE LANDING

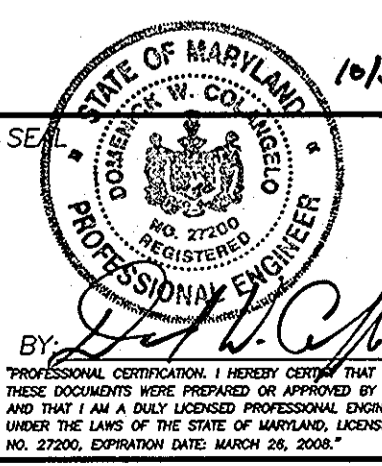
NOTES:  
1. FILL UNDER WATER MAIN SHALL BE 95% COMPACTED PER AASHTO STANDARD T-180.  
2. PROPOSED WATER MAIN IN FILL AREAS TO HAVE MECHANICAL RESTRAINED JOINTS.



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
Shane C. Conn  
CHIEF, BUREAU OF UTILITIES

DEPARTMENT OF PLANNING & ZONING  
HOWARD COUNTY, MARYLAND  
[Signature]  
CHIEF, DEVELOPMENT ENGINEERING DIVISION

Patton Harris Rust & Associates, pc  
Engineers, Surveyors, Planners, Landscape Architects.  
PHRA  
8818 Centre Park Drive  
Columbia, MD 21045  
T 410.997.8900  
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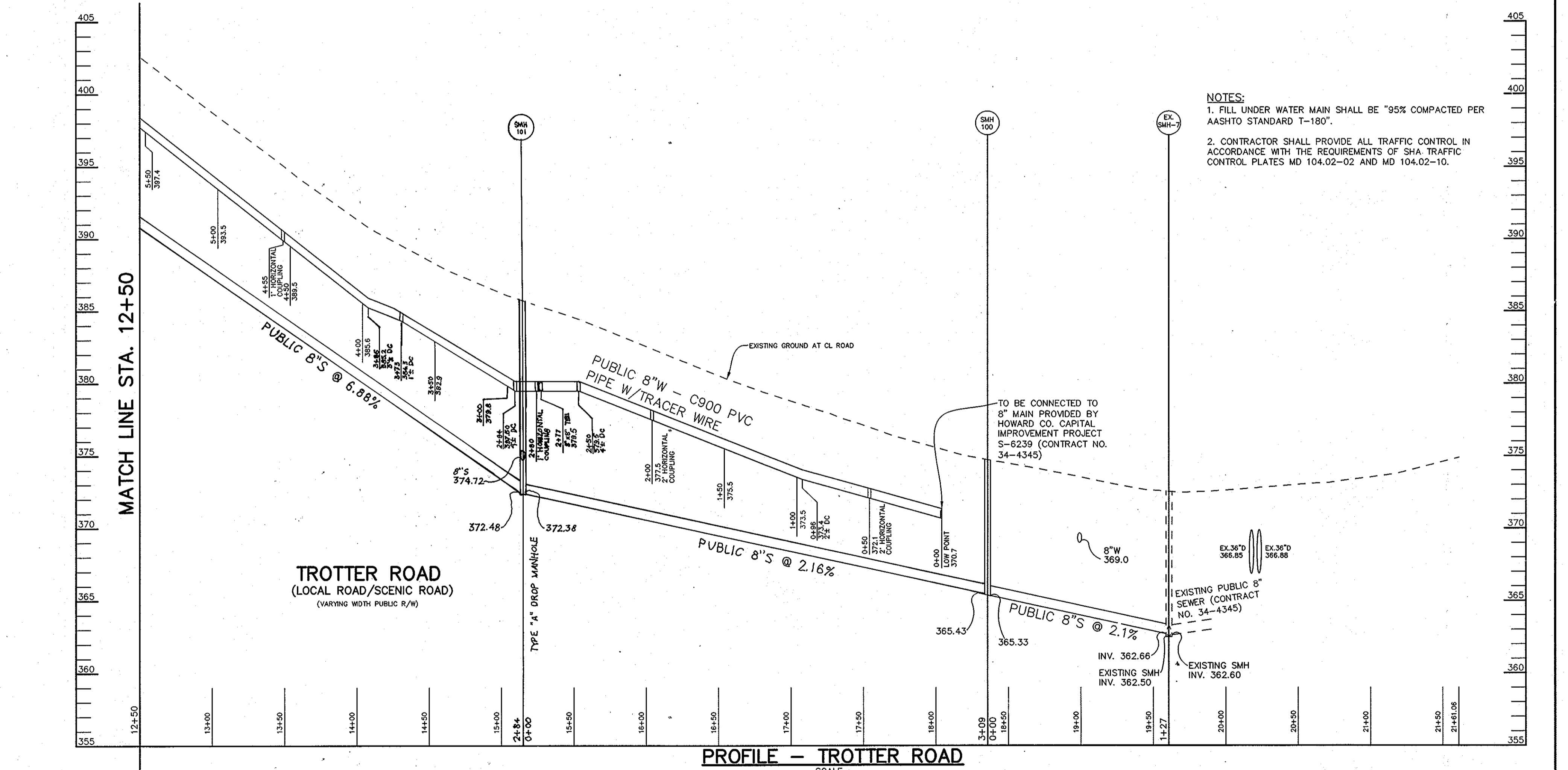
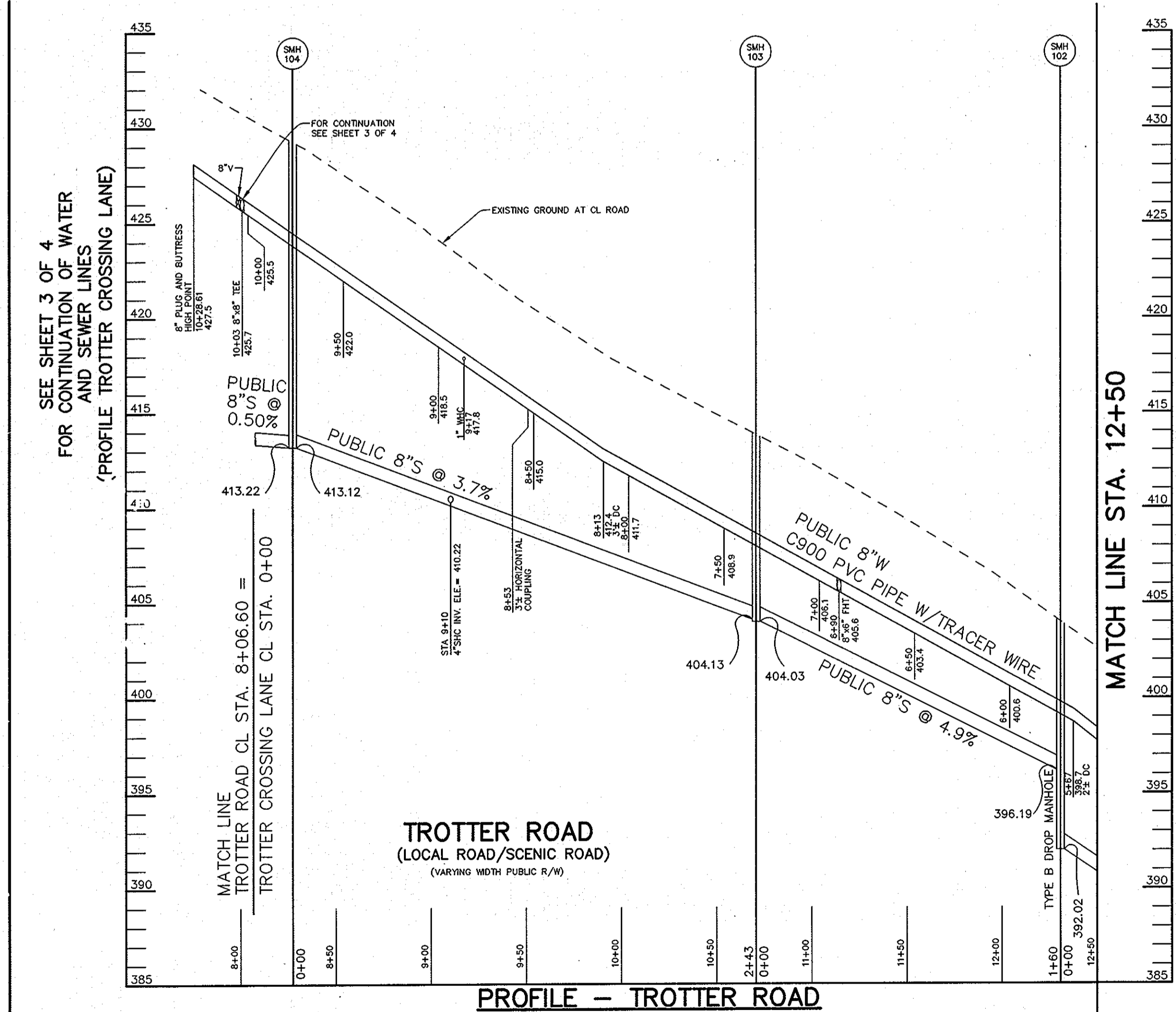
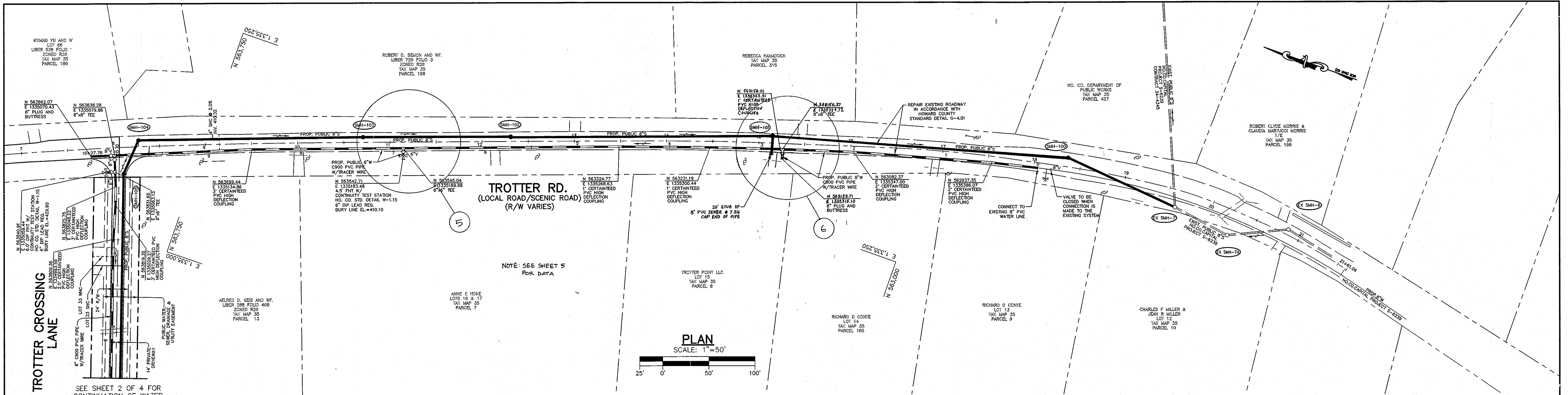


DES: D.W.C.  
DRN: K.A.D.  
CHK:  
DATE: 10/05/07  
BY NO. REVISION DATE

PROFILE OF WATER AND SEWER MAINS  
600' SCALE MAP NO. 35 BLOCK NO. 2

TROTTER CROSSING  
LOTS 2 THRU 5, 7 THRU 10 & 14 TO 19  
OPEN SPACE LOTS 6, 11 AND 13  
5th ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND  
CONTRACT 34-4170-D

SCALE AS SHOWN  
SHEET 3 OF 5



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*John Chen*  
CHIEF, BUREAU OF UTILITIES

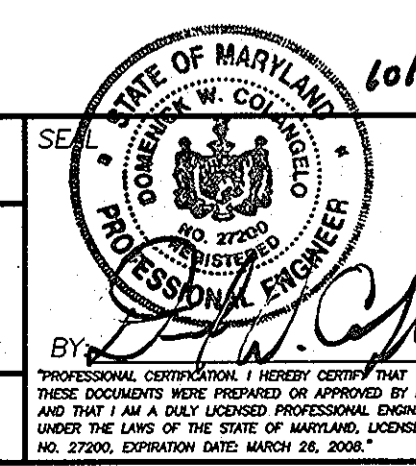
4/10/08 DATE

DEPARTMENT OF PLANNING & ZONING  
HOWARD COUNTY, MARYLAND

*Michael J. ...*  
CHIEF, DEVELOPMENT ENGINEERING DIVISION

4/10/08 DATE

Patton Harris Rust & Associates, pc  
Engineers, Surveyors, Planners, Landscape Architects.  
8818 Centre Park Drive  
Columbia, MD 21045  
T 410.997.8900  
F 410.997.9282



DES:	D.W.C.		
DRN:	K.A.D.		
CHK:	KCI	2	AS-BUILT REVISIONS
DATE:	10/05/07		
BY:	NO.	REVISION	DATE

PLAN AND PROFILE OF  
WATER AND SEWER MAINS

600' SCALE MAP NO. 35 BLOCK NO. 2

**TROTTER CROSSING**  
LOTS 1 THRU 5, 7 THRU 10 &  
OPEN SPACE LOTS 6, 11, 12 AND 13  
5th ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND  
CONTRACT 3-4170-D

SCALE AS SHOWN  
SHEET 4 OF 5

**AMENDMENT TO THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION**

Except as indicated herein, all work shall be in accordance with the pertinent sections of the Howard County Design Manual Volume IV-Standard Specifications and Details for Construction, Article 9, Sections 908 Nonmetallic Pipes and Drainage Tiles and Article 10, Section 10.1 Water Mains of the Howard County Standard Specifications are amended to include the following requirements.

**GENERAL**

1. Polyvinylchloride (PVC) pipe and couplings shall be homogeneous throughout and free from visible cracks, bubbles, blisters, holes, foreign inclusions, cuts, or scrapes on inside or outside surfaces, or other imperfections, which may impair the performance or life of the pipe. Each pipe shall be straight to within 1/4-inch per 20 foot length of pipe when uniformly supported along its entire length, and shall have a true circular cross-section to within ± 1/64 inch.
2. PVC pipe manufactured more than six months prior to water site inspection will not be accepted.
3. Loading, unloading, handling, inspection and storage of PVC pipe and fittings shall be in accordance with AWWA C605. PVC pipe shall be stored such that it does not deform or bend.
4. Submittals: The following items shall be submitted for review and approval prior to installation. Materials not approved will not be accepted.
  - a. PVC Pipe: Submit manufacturer's literature and certificates of compliance for PVC pipe along with the manufacturer's identification codes for nominal size, dimension ratio, pressure class, production record code and date of manufacture. Submit manufacturer's written transcript of test results, for sustained pressure, pipe dimension, burst pressure, flattening resistance, and extrusion quality test. Frequency of performing the tests and the methods of selecting test specimens shall be in accordance with AWWA C900.
  - b. PVC Pipe Fittings: Submit manufacturer's literature and certificates of compliance for PVC pipe fittings along with the manufacturer's identification codes for nominal size, pressure class, production record code and date of manufacture. Submit manufacturer's written transcript of results for accelerated-regression test, burst pressure and heat-reversion test in accordance with AWWA C907.
  - c. Miscellaneous for PVC water pipe: Submit manufacturer's literature and certificates of compliance, for joint restraint devices, pipe couplings, tracer wire, wire connector splice kits, detection tape, and service saddles.
  - d. Submit manufacturer's installation instructions for PVC pipe and fittings, joint restraint devices, pipe couplings, wire connector splice kits, service saddles, and manufacturer's instructions for tapping pipe.

**MATERIAL**

The Engineer will inspect all materials before, during and after installation to ensure compliance with the Contract Documents. When specific tests of materials are called for in the referenced standards and specifications, the Engineer has the option of requiring that any or all of these tests be performed for the specified materials.

1. PVC pipe and fittings:
  - a. PVC pipe 4 inches through 12 inches in diameter shall be manufactured in 20-foot lengths in accordance with AWWA C900 with cast/ductile iron pipe equivalent outside diameters. Pipe shall have a dimension ratio (DR) of 18, pressure class of 150 psi, and shall utilize elastomeric-gasketed push-on joints for joining pipes in accordance with AWWA C900. Pipe gaskets, and gasket lubricant shall be suitable for potable water systems and shall meet NSF 61. All PVC pipe shall be factory marked on the spigot end for depth of insertion into the bell and factory tested in accordance with AWWA C900. PVC pipe shall be manufactured by one of the following:
    1. Uponor ETI
    2. J-M Pipe
    3. Diamond Plastics Corp
    4. National Pipe and Plastics, Inc.
  - b. Fittings for use with PVC water mains shall be ductile iron in accordance with the Standard Specifications or PVC fittings. PVC fittings shall have push-on rubber gasketed joints, be injection-molded meeting AWWA C907, pressure class 150, or fabricated meeting AWWA C900, Class 200. PVC fittings shall be manufactured by the Harrington Corporation (Harcro) or approved equal. Pipe joints shall be in accordance with the standards specified for the pipe and fittings.
  - c. Pipe couplings for PVC and ductile iron water mains shall be suitable for potable water service and shall have epoxy or nylon coated ductile iron center and end rings. Pipe couplings shall be Romac Style 501, Ford FC2W or approved equal.
2. Joint restraining materials for PVC pipe:
 Horizontal and vertical bends, tees, caps and fittings shall be buttressed or anchored in accordance with the Plans, the Standard Specifications and Details for Construction, or as directed by the Engineer. Valves, when connected to PVC pipe, shall be iron body resilient seat gate valves and anchored in accordance with the detail shown on the Plans and shall have one full length of pipe on each side of the valve.
 Joint restraints for harnessed joints shall be in accordance with the Standard Specifications and the requirements below:
  - a. All joint restraint devices shall be Factory Mutual approved.
  - b. In restrained joints, PVC pipe shall not be deflected. If deflection is required in a restrained joint, use ductile iron pipe or fittings.
  - c. Where a restrained joint is required between PVC pipe and a fitting, the fitting shall be ductile iron mechanical joint. Joint restraint for this joint shall meet ASTM F1674 and shall be UniFlange Series 1500, EBAA Iron series 2000PV, or approved equal.
  - d. Where a restrained joint is required for PVC push-on joint, joint restraint shall be Uni-B-13, ICM 620 Sur-Grip, EBBA Iron Series 1600, UniFlange Series 1590-C, or approved equal.
3. Tracer Wire for Non Metallic Pipelines:
 Tracer wire shall be 6-gauge, 7-strand continuous copper wire with a 45-mil polyethylene insulation. The wire shall be blue, have "UL" markings and suitable for direct bury applications.
 4. Continuity Test Station:
 Continuity test stations shall be located adjacent to each fire hydrant within the public easement for locating PVC water mains. The test station shall be housed in a standard Howard County 18-inch diameter meter vault with an 18"x12" metal frame and cover as shown in the details on the Plans. A 1-inch diameter by 30-inch long copper grounding rod imbedded a minimum of 12 inches into the ground shall be used for the attachment of the tracer wire. The tracer wire shall be fastened to the copper rod using two copper clamps.
 5. Detection Tape:
 Visual Detection Tape shall be 3 inches wide (minimum) metallic blue plastic tape labeled "water" in black graphics.

**EXECUTION**

- All construction methods and details shall be in accordance with the Howard County Design Manual Volume IV-Standard Specifications and Details for Construction and the following Criteria.
1. Installation of PVC Water Mains:
    - a. PVC pipe and fittings shall be handled in accordance with AWWA C605.
    - b. Bedding: Provide 6 inches of stone bedding under the pipe in accordance with Standard Detail G2.01 and the detail shown on the Plans for Trench for PVC Pipe using AASHTO M 43, size number 57 aggregate. The stone bedding shall be installed to grade prior to laying pipe. Excavate bell holes in bedding at each joint to assemble the joint and to insure that the entire length of each pipe barrel, fitting and valve is supported on firm bedding.
    - c. Install PVC AWWA C900 pressure pipe: Installation shall be in accordance with the Standard Specifications and the manufacturer's installation instructions and recommendations except as modified herein. Changes in horizontal and vertical alignment and curved alignments shown on the Plans shall be made by using fittings. Deflecting PVC pipe joints or bending PVC pipe will not be permitted.

Whenever a pipe requires cutting, the work shall be done in a manner that leaves a smooth, square end. Cut PVC pipe ends shall have burrs removed and the end beveled to match factory bevel. To ensure the proper length of insertion of the spigot into the bell, PVC pipe cut in the field shall be beveled and marked on the spigot end to the dimensions specified by the manufacturer prior to assembly.

- a. Prior to making gasketed joints, both mating pipe ends and the gasket shall be cleaned of all foreign material. The rubber gasket shall then be inserted in or stretched over the clean gasket seat and lubricant applied to the gasket and mating pipe end. The method for inserting the spigot into the bell shall be as recommended by the manufacturer and approved by the County. The pipe ends shall be carefully aligned and pushed together to meet the required manufacturer's insertion depth. Insertion of the spigot end of the pipe shall be made to a point where the factory mark is even with the face of the bell.
- b. Tracer Wires: Install tracer wires with the pipe. Tape wire to the top of the pipe with minimum 2-inch wide x 1/2-pipe-circumference long PVC tape every 4 feet along the pipe. The copper wire shall be continuous for the full length of the pipeline including all fire hydrant leads and shall terminate at continuity test stations. Continuity test stations shall be located adjacent to all fire hydrants. All splicing shall be done at test station, no direct bury splicing is allowed.

Connections to continuity test stations shall be in accordance with the detail shown on the Plans.

After backfilling, the Contractor shall test the tracer wire in the presence of the County to demonstrate electrical continuity between test stations through the length of the PVC pipeline installed. The Contractor shall notify the County 48 hours in advance of the tests. Any discontinuity shall be located, repaired and retested at the Contractor's expense until continuity is achieved.

- a. Backfill: Backfill over the PVC pipe in accordance with Standard Detail G2.01 and the detail shown on the Plans for Trench for PVC Pipe using well-compact AASHTO M 43, size number 57 aggregate to a minimum of 6 inches over the crown of the pipe. Trench backfill shall proceed thereafter in 8-inch layers. Contractor shall provide full trench compaction density of 95% as determined by AASHTO T-180-A.
- b. Detection Tape: Install detection tape directly over the centerline of the water mains on compacted backfill not less than 18 inches or more than 24 inches below finished surface. Tape shall be installed with minimal splices. Splices shall overlap a minimum of 6 inches.

2. Joints:

- a. Mechanical Joints: For PVC plain-end to be connected to ductile iron mechanical joint bell, assemble the joint in accordance with the Standard Specifications, as modified in AWWA C605, the pipe manufacturer's recommendations and as specified herein. For PVC pipe plain ends to be inserted into mechanical joint bells, cut off the bevel so the plain-end is square cut. Do not deflect PVC pipe at connection to cast or ductile iron pipe or fittings.

- b. Push-on Joints: For PVC pipe plain ends to be inserted in ductile iron or cast iron push-on bell, the spigot taper shall be cut to 1/4-inch long. Place an identifying mark on pipe that is not furnished with a depth mark on the plain end to show the depth of the socket and to verify that pipe is properly set in the bell. Assemble joints in accordance with AWWA C600 and C605, the manufacturer's recommendations, and as specified herein.

Do not deflect PVC pipe at connection to cast or ductile iron pipe or fittings. The Contractor shall achieve change in alignment as indicated elsewhere herein. Assembly of the plain end into the bell shall be done in accordance with manufacturer's recommendations. The spigot shall not be inserted deeper than manufacturer's recommendations. Install push-on restrained joints in accordance with manufacturer's recommendations.

- c. Restraint Joint: In a restrained joint, PVC pipe shall not be deflected. If deflection is required in a restrained joint, use restrained ductile iron pipe.

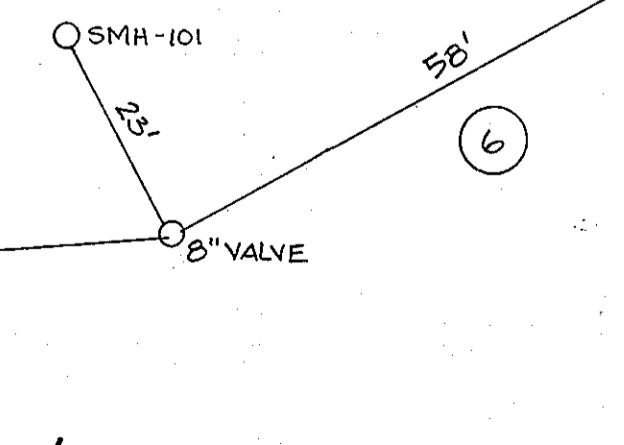
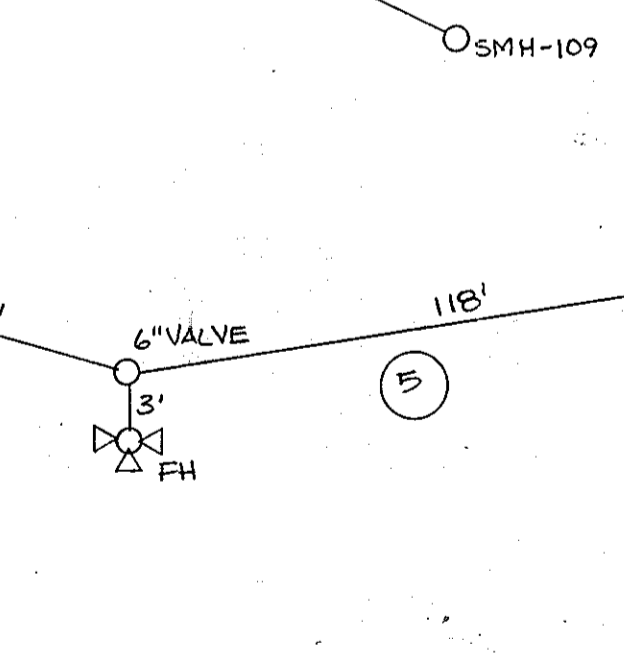
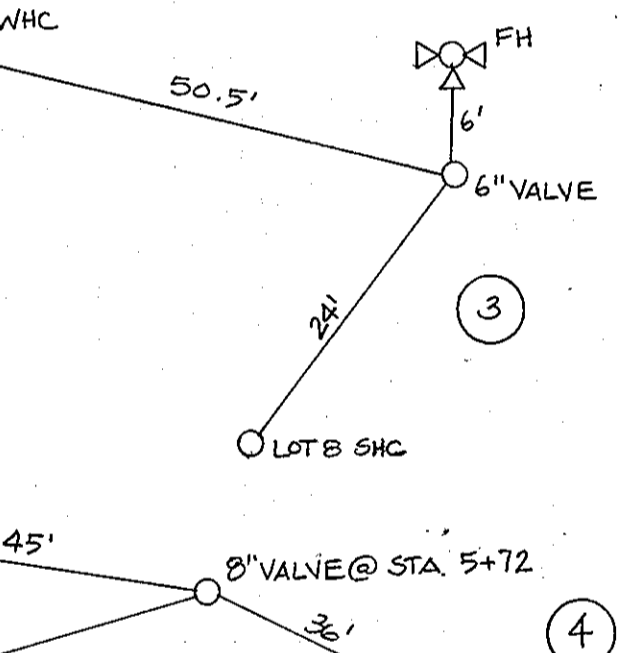
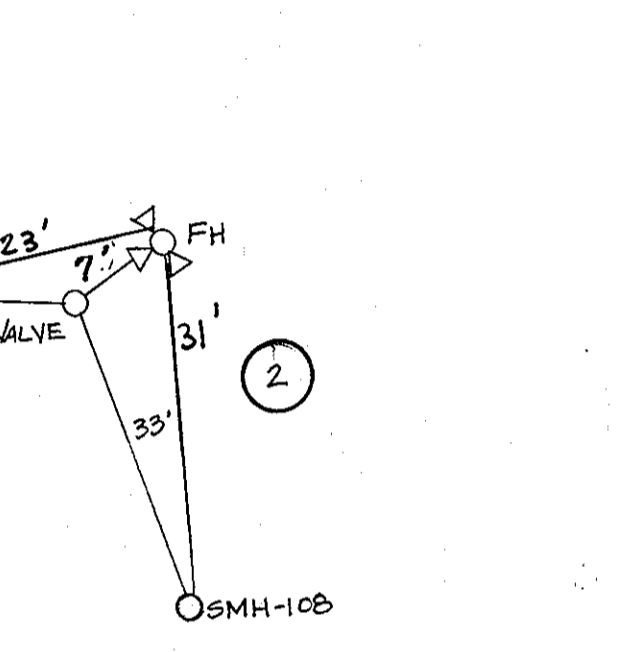
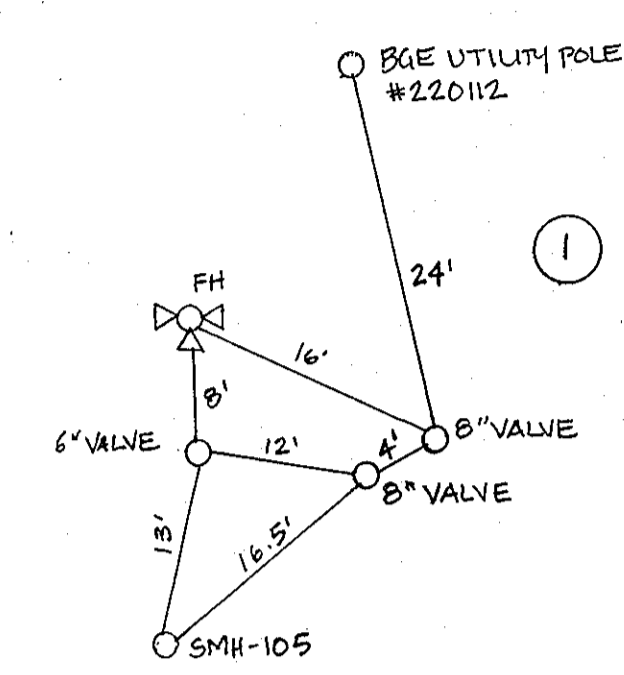
3. Where the Contractor chooses to use PVC fittings, the pressure class of the fitting shall be the same as, or greater than, the pressure class of the pipe to which it connects. If the pressure class is not available, the Contractor shall use a ductile iron fitting. Where a fitting with restrained joints is required, a ductile iron mechanical joint shall be used.

4. Fire Hydrant lead, including mainline tee, shall be ductile iron only.

**CONNECTIONS TO PVC PIPE FOR WATER HOUSE CONNECTIONS:**

- a. Perform taps on PVC pipe in accordance with AWWA C605, the pipe manufacturer's recommendations, and as indicated herein.
- b. Install a service saddle when tapping a PVC water main. Maintain a minimum of 24 inches between taps and PVC pipe bells.
- c. For PVC water pipe, use only cutting/tapping tools and machines made specifically for cutting AWWA C900 pipe and as described in AWWA C605. The cutting/tapping machine shall be installed so that it does not distort the pipe. The machine shall be supported so that its weight is not carried by the pipe. When tapping PVC pipe, follow the manufacturer's safety precautions and the safety precautions cited in AWWA C605.
- d. Multiple taps in a single pipe shall be staggered around the pipe circumference so they are not on a common line parallel to the longitudinal axis of the pipe and be at least 18-inches apart when measured longitudinally.

**AS-BUILT DATA**

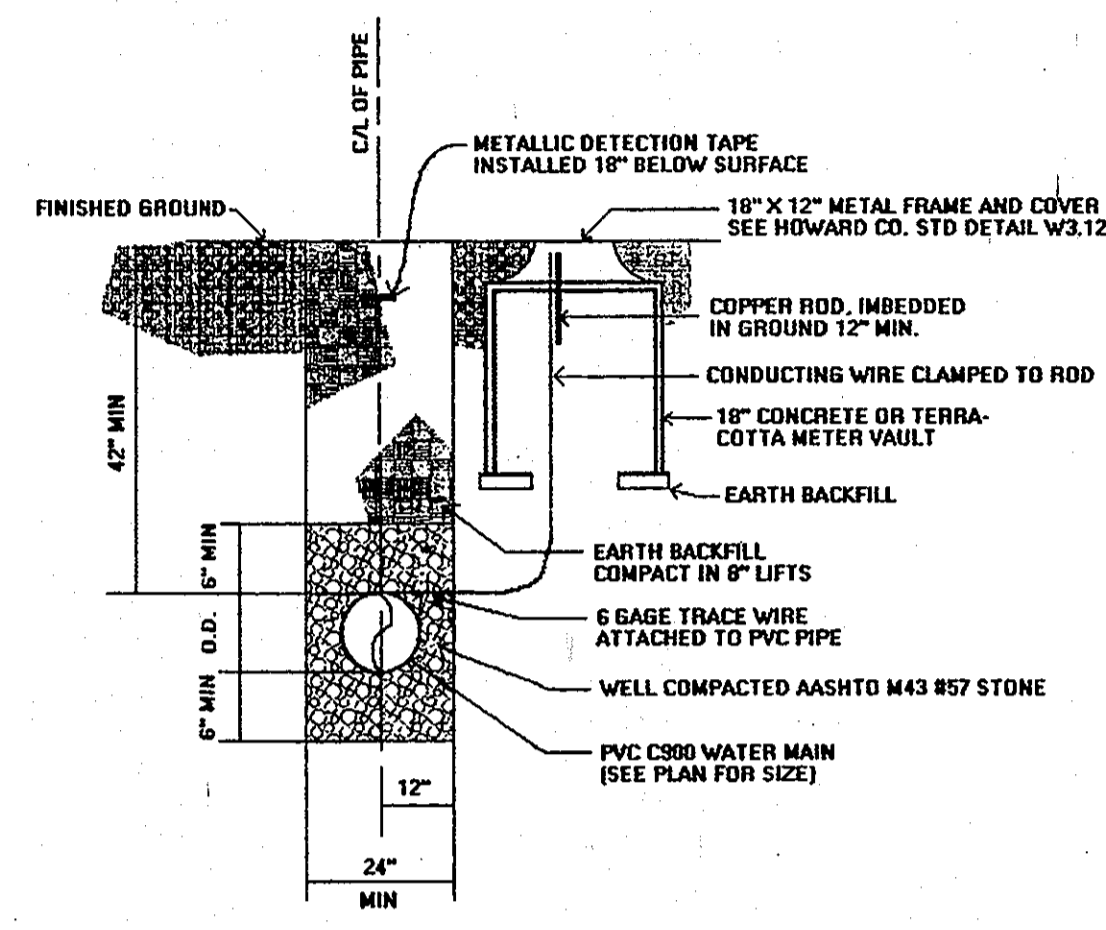


**WATER AS-BUILT DATA**

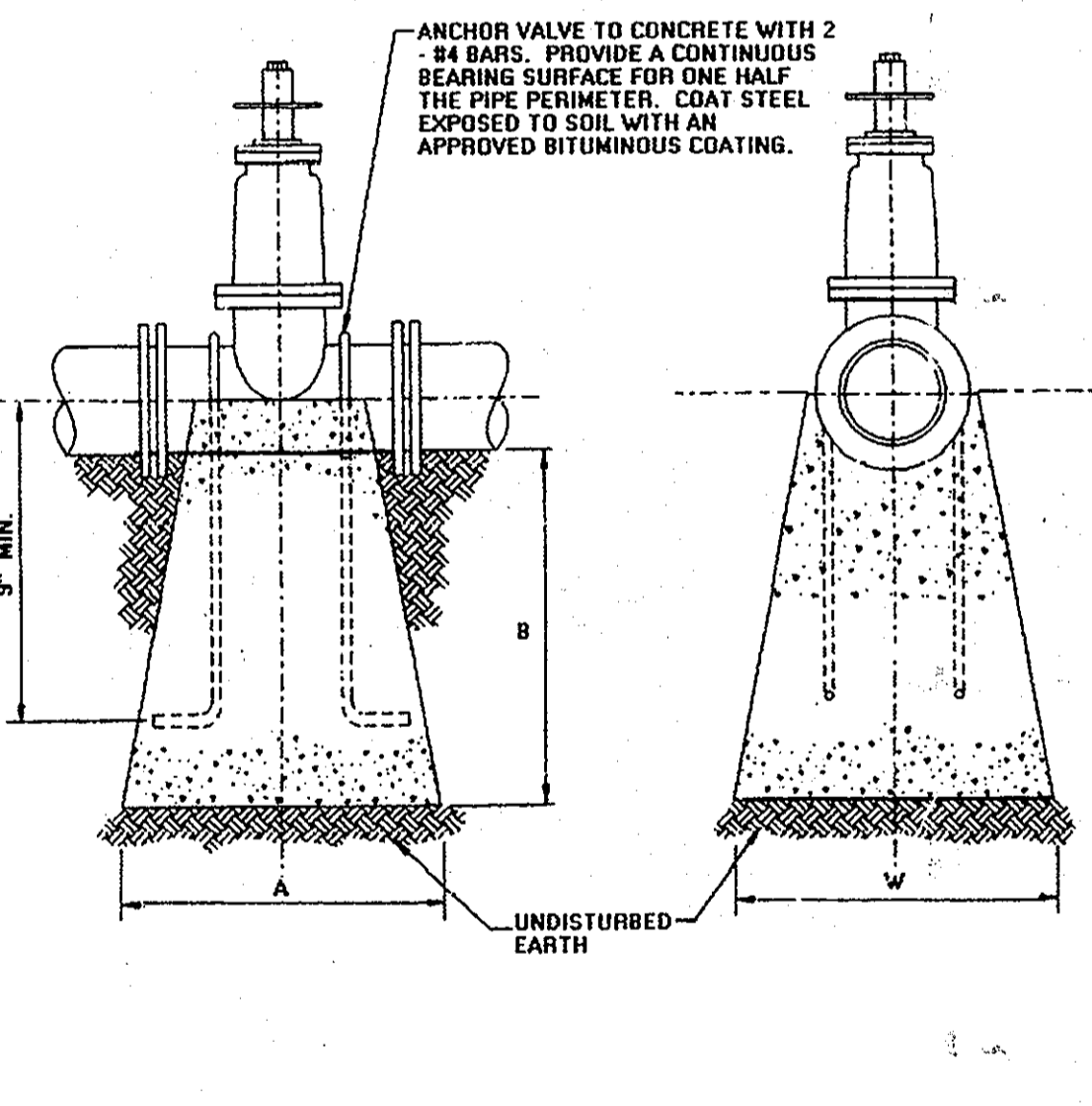
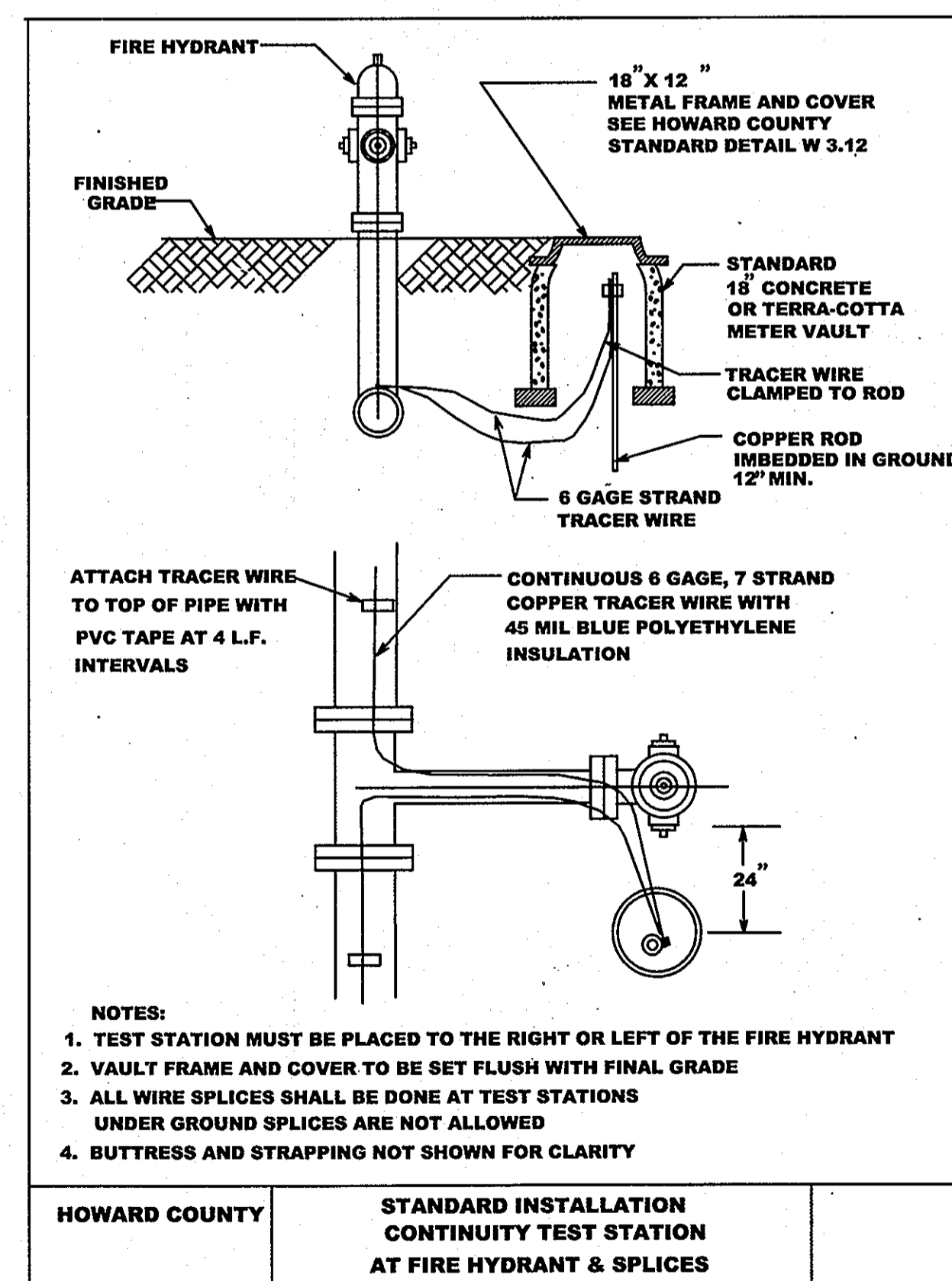
LOT	MEASUREMENT 1	MEASUREMENT 2	MEASUREMENT 3
19	9.5' TO LOT 3 SHC	22' TO SMH-110	20' TO SMH-109
2	9.1' TO LOT 3 SHC	17' TO LOT 2 SHC	23' TO SMH-111
3	11' TO LOT 3 SHC	43' TO FIRE HYDRANT	
4	10.5' TO LOT 4 SHC	59' TO SMH-112	49.5' TO FIRE HYDRANT
5	10' TO LOT 5 SHC	52' TO SMH-112	
6	OPEN SPACE	OPEN SPACE	OPEN SPACE
7	9' TO LOT 7 SHC	49' TO SMH-112	
8	9' TO LOT 8 SHC	34' TO FIRE HYDRANT	43.5' TO LOT 4 WHC
9	42' TO LOT 3 SHC	9' TO LOT 9 SHC	55.5' TO FIRE HYDRANT
10	23.5' TO SMH-111	38.5' TO LOT 2 SHC	49' TO SMH-110
11	OPEN SPACE	OPEN SPACE	OPEN SPACE
12	OPEN SPACE	OPEN SPACE	OPEN SPACE
13	OPEN SPACE	OPEN SPACE	OPEN SPACE
14	9' TO HYDRANT	27' TO SMH-108	11' TO LOT 14 SHC
15	17.5' TO LOT 15 SHC	110' TO LOT 14 SHC	75.5' TO E-1
16	10.5' TO LOT 16 SHC	65' TO BGE UTILITY 263402	92.5' TO FIRE HYDRANT
17	5.5' TO LOT 17 SHC	48.5' TO BGE UTILITY 263403	5' TO LOT 18 SHC
18	5.5' TO LOT 18 SHC	95' TO SMH-106	45.5' TO BGE UTILITY 263403

**SEWER AS-BUILT DATA**

LOT	MEASUREMENT 1	MEASUREMENT 2	MEASUREMENT 3
19	72' TO LOT 2 SHC	9.5' TO LOT 1 WHC	21' TO SMH-110
2	17' TO LOT 2 WHC	23' TO SMH-111	72' TO LOT 1 SHC
3	11' TO LOT 3 WHC	42' TO LOT 2 WHC	91' TO LOT 2 WHC
4	10.5' TO LOT 4 WHC	48' TO SMH-112	68.5' TO LOT 5 WHC
5	10' TO LOT 5 WHC	54' TO SMH-112	
6	OPEN SPACE	OPEN SPACE	OPEN SPACE
7	9' TO LOT 7 WHC	46' TO SMH-112	
8	9' TO LOT 8 WHC	29.5' TO FIRE HYDRANT	50' TO LOT 4 WHC
9	9' TO LOT 9 WHC	62.5' TO LOT 2 WHC	65' TO SMH-111
10	25' TO SMH-111	34' TO LOT 2 SHC	58' TO SMH-110
11	OPEN SPACE	OPEN SPACE	OPEN SPACE
12	OPEN SPACE	OPEN SPACE	OPEN SPACE
13	OPEN SPACE	OPEN SPACE	OPEN SPACE
14	19.5' TO HYDRANT	21' TO SMH-108	11' TO LOT 14 WHC
15	17.5' TO LOT 15 WHC	77.5' TO BGE UTILITY 263403	77' TO E-1
16	10.5' TO LOT 16 WHC	143.5' TO LOT 17 SHC	72' TO BGE UTILITY 263402
17	5.5' TO LOT 17 WHC	51' TO BGE UTILITY 263403	79' TO STORM DRAIN END-WALL
18	5' TO LOT 17 WHC	5.5' TO LOT 18 WHC	47.5' TO BGE UTILITY 263403



**TRENCH FOR PVC PIPE AND CONTINUITY TEST STATION DETAIL**



PIPE SIZE	A	B	W
4"	9"	1'-0"	1'-0"
6"	10"	1'-6"	1'-0"
8"	1'-0"	2'-0"	2'-0"
12"	1'-0"	2'-0"	3'-0"

NOTE: ONLY ANCHOR VALVES THAT ARE NOT ATTACHED TO TEES.

**ANCHORAGES FOR VALVES WITH PVC PIPE**

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

DEPARTMENT OF PLANNING & ZONING  
HOWARD COUNTY, MARYLAND

Shale C. Coon 4/16/07  
CHIEF, BUREAU OF UTILITIES

DATE

Patton Harris Rust & Associates, PC  
Engineers, Surveyors, Planners, Landscape Architects.

PHRA  
8818 Centre Park Drive  
Columbia, MD 21045  
T 410.997.8900  
F 410.997.9282

STATE OF MARYLAND  
PROFESSIONAL ENGINEER  
10/05/07

DES: D.W.C.  
DRN: K.A.D.  
CHK: [Signature]  
DATE: 10/05/07

HOWARD COUNTY  
STANDARD INSTALLATION  
CONTINUITY TEST STATION  
AT FIRE HYDRANT & SPLICES

600' SCALE MAP NO. 35 - BLOCK NO. 2

PVC WATER LINE  
SPECIFICATIONS AND DETAILS

AS-BUILT REVISIONS

KCI	1	3.9.11
BY	NO.	REVISION
DATE		

TROTTER CROSSING  
LOTS 1 THRU 5, 7 THRU 10 &  
OPEN SPACE LOTS 6, 11, 12 AND 13  
5th ELECTION DISTRICT  
HOWARD COUNTY, MARYLAND  
CONTRACT 34-4170-D

SCALE AS SHOWN  
SHEET 5 OF 5

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