

WATER AND SEWER EXTENSIONS

BENSON EAST

6th ELECTION DISTRICT

HOWARD COUNTY, MARYLAND


CONTRACT NO. 24-4209-D

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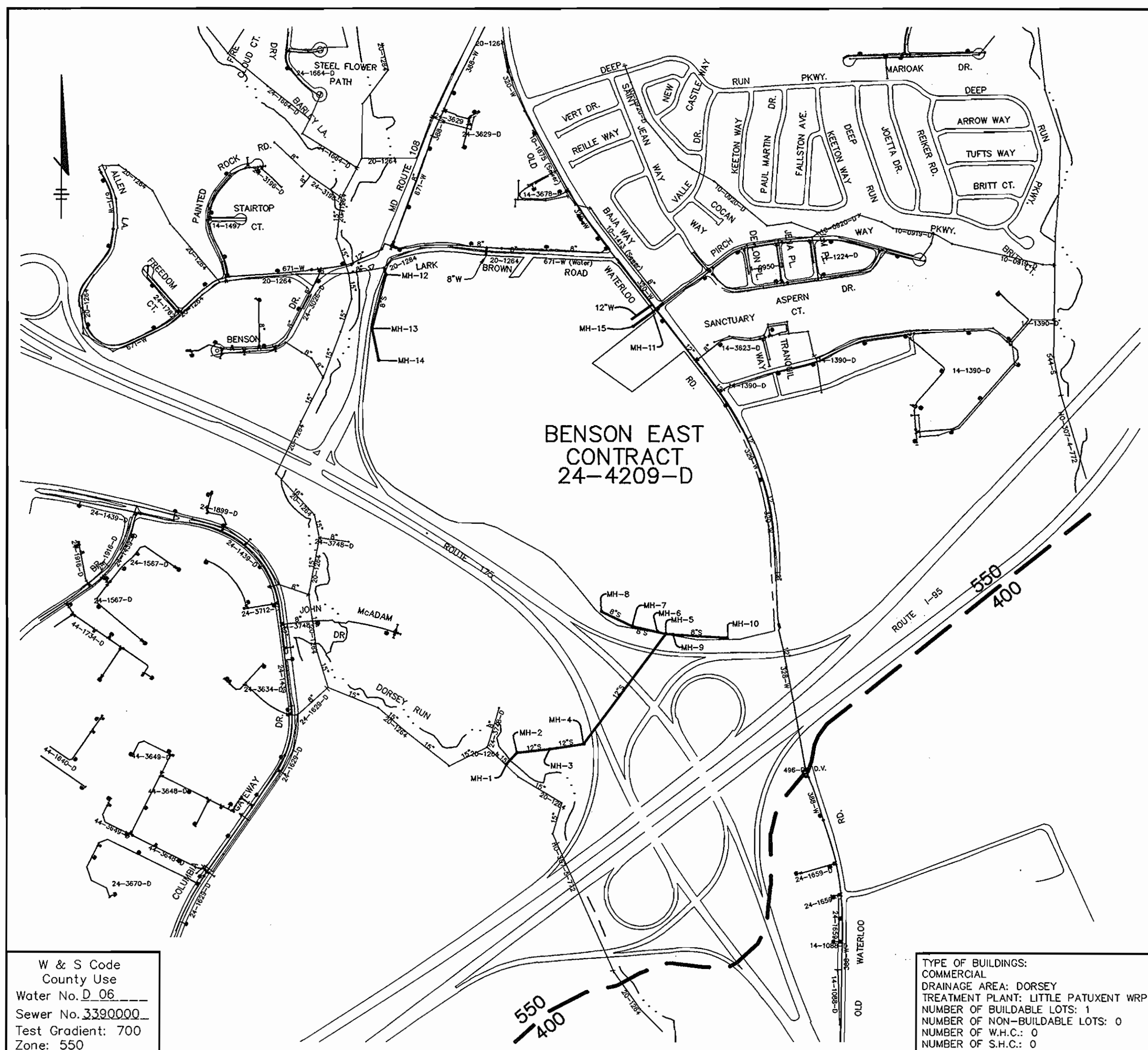
BENCHMARKS
 GEODETIC SURVEY CONTROL 376D
 N 553,237.204
 E 1,372,353.605
 ELEV. 290.931
 LOCATED 30' EAST OF FIRE HYDRANT ACROSS FROM DEEP RUN ELEMENTARY SCHOOL.

GEODETIC SURVEY CONTROL 376C
 N 555,250.791
 E 1,370,946.348
 ELEV. 331.855
 LOCATED ON THE SOUTH SIDE OF OLD WATERLOO ROAD ACROSS FROM DEEP RUN PARKWAY

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.
- All horizontal controls are based on Maryland State Coordinates, NAD 83/91.
- All vertical controls are based on NAVD 88.
- All pipe elevations shown are invert elevations unless otherwise noted on the plans.
- Clear all utilities by a minimum of 12 inches. Clear all poles by 5'-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 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
BGE (Contractor Services)	410-850-4620
BGE (Underground Damage Control)	410-787-9068
Bureau of Utilities	410-313-4900
Colonial Pipeline Co.	410-795-1500
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 410-313-7450 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(a) of the Howard County Code.



QUANTITIES				
ITEMS	QUANTITIES ESTIMATED	AS-BUILT		
		QUANTITIES	TYPE	MANUFACTURER / SUPPLIER
8" WATER	32 LF	32	CL-52 DIP	GRIFFIN INC.
8" x 8" TSV	1 EA	1	S.S. TAP SLEEVE	SYM.
12" x 12" TSV	1 EA			
12" WATER	225 LF			
8" SEWER	1205 LF	1205	SDR-35	J.M. MFG.
8" DIP CL52	780 LF	780	CL-52 DIP	GRIFFIN PIPE
SEWER MANHOLES	15 EA.	15	PRECAST	ATLANTIC CONCRETE
12" DIP CL52	886 LF			

WATER NOTES

- All water mains shall be D.I.P. Class 52 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.

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.

NAME OF UTILITY CONTRACTOR : C.C.S. INC.

Sediment control measures for this contract will be implemented in accordance with Section 219 of the Specifications and as shown on SDP-04-163

Review for Howard Soil Conservation District and meets technical requirements.

Jim Meyer 1/10/05 DATE
 NATURAL RESOURCES CONSERVATION SERVICE

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

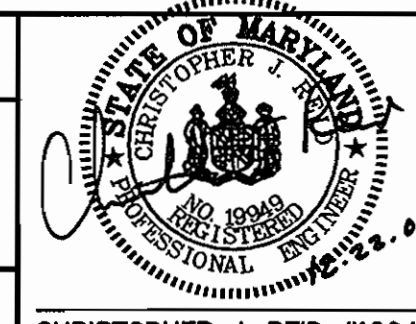
John R. Roberts 1/10/05 DATE
 HOWARD SOIL CONSERVATION DISTRICT

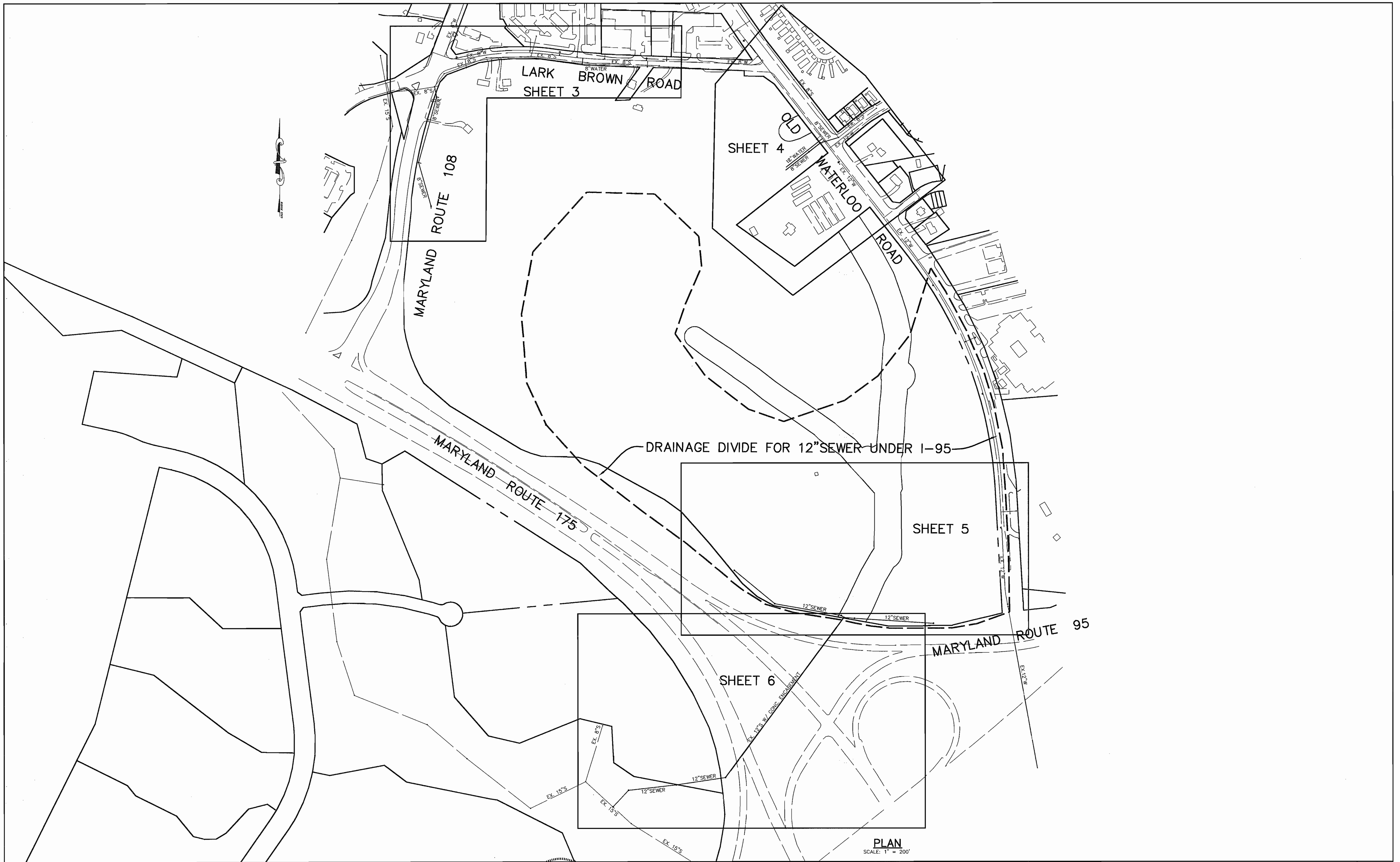
CHECKBOX
 AS-BUILT DATE 10/06
 SURVEY AND DRAFTING DIVISION

W & S Code
 County Use
 Water No. D 06
 Sewer No. 3380000
 Test Gradient: 700
 Zone: 550

TYPE OF BUILDINGS:
 COMMERCIAL
 DRAINAGE AREA: DORSEY
 TREATMENT PLANT: LITTLE PATUXENT WRP
 NUMBER OF BUILDABLE LOTS: 1
 NUMBER OF NON-BUILDABLE LOTS: 0
 NUMBER OF W.H.C.: 0
 NUMBER OF S.H.C.: 0

VICINITY MAP
 SCALE: 1"=600'

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND <i>Robert B. Bunn</i> 1-13-05 CHIEF, BUREAU OF UTILITIES	DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND <i>Christopher J. Reid</i> 1/2/05 CHIEF, DEVELOPMENT ENGINEERING DIVISION	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  CHRISTOPHER J. REID #19949	DES: C.J.R. DRN: DAM CHK: C.J.R. DATE: 12/22/04 BY NO. REVISION DATE	TITLE SHEET	BENSON EAST 6th ELECTION DISTRICT HOWARD COUNTY, MARYLAND CONTRACT 24-4209-D SCALE AS SHOWN SHEET 1 OF 9
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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DEPARTMENT OF PLANNING & ZONING
HOWARD COUNTY, MARYLAND

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: C.J.R.

DRN: DAM

CHK: C.J.R.

DATE: 12/22/04

BY	NO.	REVISION	DATE

OVERALL PLAN

600' SCALE MAP NO. 37 & 43 BLOCK NO. 20 & 2

BENSON EAST
6th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
CONTRACT 24-4209-D

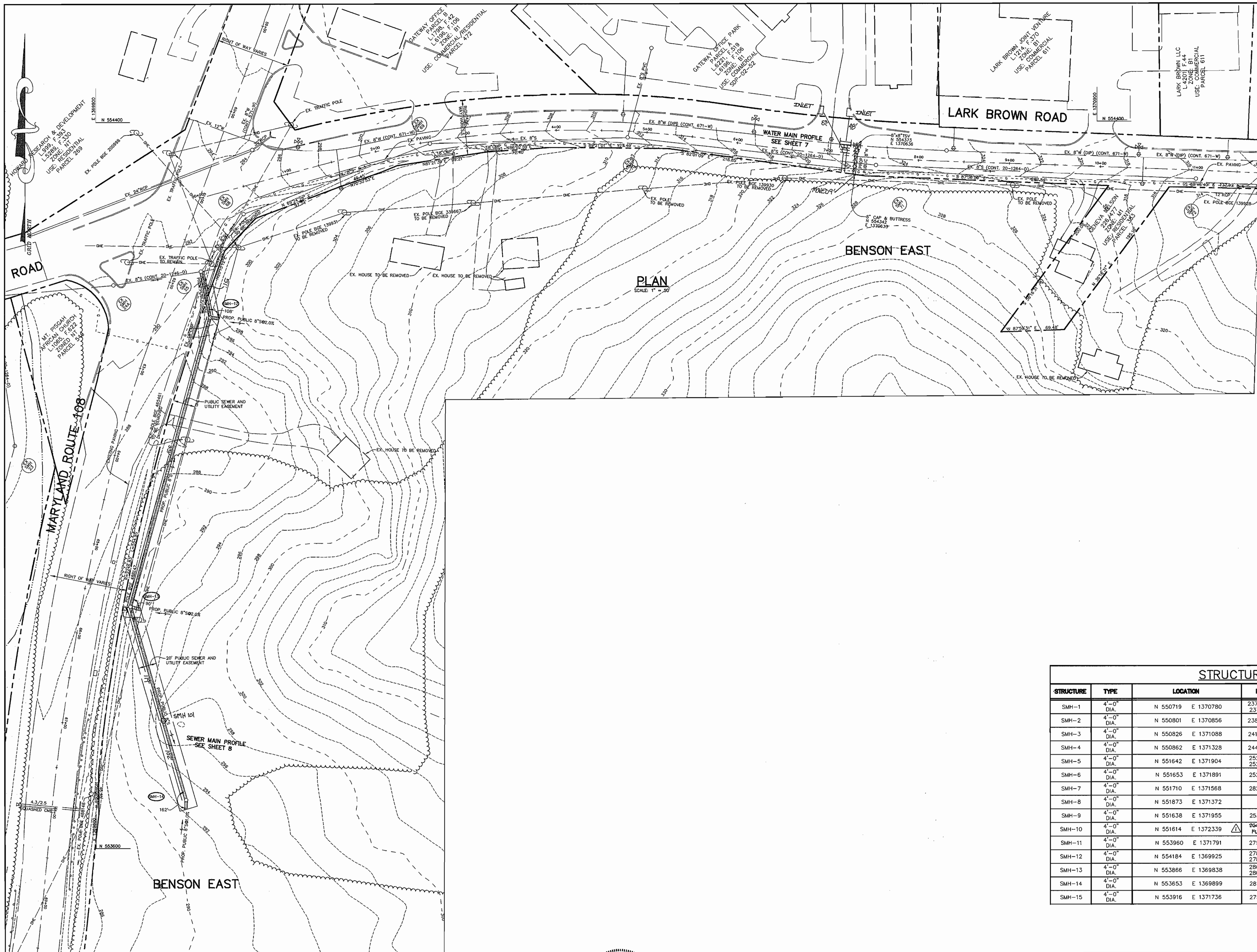
SCALE
AS
SHOWN

SHEET
2 OF 9

Robert Benjamin 1-13-05
CHIEF, BUREAU OF UTILITIES DATE

Christopher J. Reid 12/26/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

CHRISTOPHER J. REID #19949



PLAN
SCALE: 1" = 30'

STRUCTURE SCHEDULE						
STRUCTURE	TYPE	LOCATION	INV. IN	INV. OUT	TOP	REMARKS
SMH-1	4'-0" DIA.	N 550719 E 1370780	237.78 (12")	237.2 (15')	18" ABOVE EX. GR.	HOCO STD. DETAIL G-5.11
SMH-2	4'-0" DIA.	N 550801 E 1370856	238.44 (12")	238.34 (12')	18" ABOVE EX. GR.	HOCO STD. DETAIL G-5.11
SMH-3	4'-0" DIA.	N 550826 E 1371088	241.65 (12")	241.55 (12')	18" ABOVE EX. GR.	HOCO STD. DETAIL G-5.11
SMH-4	4'-0" DIA.	N 550862 E 1371328	244.17 (12")	244.07 (12')	18" ABOVE EX. GR.	HOCO STD. DETAIL G-5.11
SMH-5	4'-0" DIA.	N 551642 E 1371904	252.74 (8")	252.41 (12')	18" ABOVE EX. GR.	HOCO STD. DETAIL G-5.11
SMH-6	4'-0" DIA.	N 551653 E 1371891	252.92 (8")	252.82 (8')	18" ABOVE EX. GR.	HOCO STD. DETAIL G-5.11
SMH-7	4'-0" DIA.	N 551710 E 1371568	282.54 (8")	282.44 (8')	6" ABOVE EX. GR.	HOCO STD. DETAIL G-5.11
SMH-8	4'-0" DIA.	N 551873 E 1371372	-	293.52 (8')	320.8	HOCO STD. DETAIL G-5.11
SMH-9	4'-0" DIA.	N 551638 E 1371955	253.10 (8")	253.00 (8')	18" ABOVE EX. GR.	HOCO STD. DETAIL G-5.11
SMH-10	4'-0" DIA.	N 551614 E 1372339	264.07 (8") FUTURE	263.07 (8')	18" ABOVE EX. GR.	HOCO STD. DETAIL G-5.11
SMH-11	4'-0" DIA.	N 553960 E 1371791	275.05 (8")	274.95 (8')	289.0	HOCO STD. DETAIL G-5.11
SMH-12	4'-0" DIA.	N 554184 E 1369925	278.26 (8")	278.16 (8')	296.0	HOCO STD. DETAIL G-5.11
SMH-13	4'-0" DIA.	N 553866 E 1369838	280.02 (8")	279.92 (8')	287.0	HOCO STD. DETAIL G-5.11
SMH-14	4'-0" DIA.	N 553653 E 1369899	281.23 (8")	281.13 (8')	294.0	HOCO STD. DETAIL G-5.11
SMH-15	4'-0" DIA.	N 553916 E 1371736	275.51 (8")	275.41 (8')	291.0	HOCO STD. DETAIL G-5.11

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
Robert B. Bennett 1-13-05
CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING & ZONING
HOWARD COUNTY, MARYLAND
Christopher J. Reid 1/13/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Patton Harris Rust & Associates, pc
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P.H.R.A.
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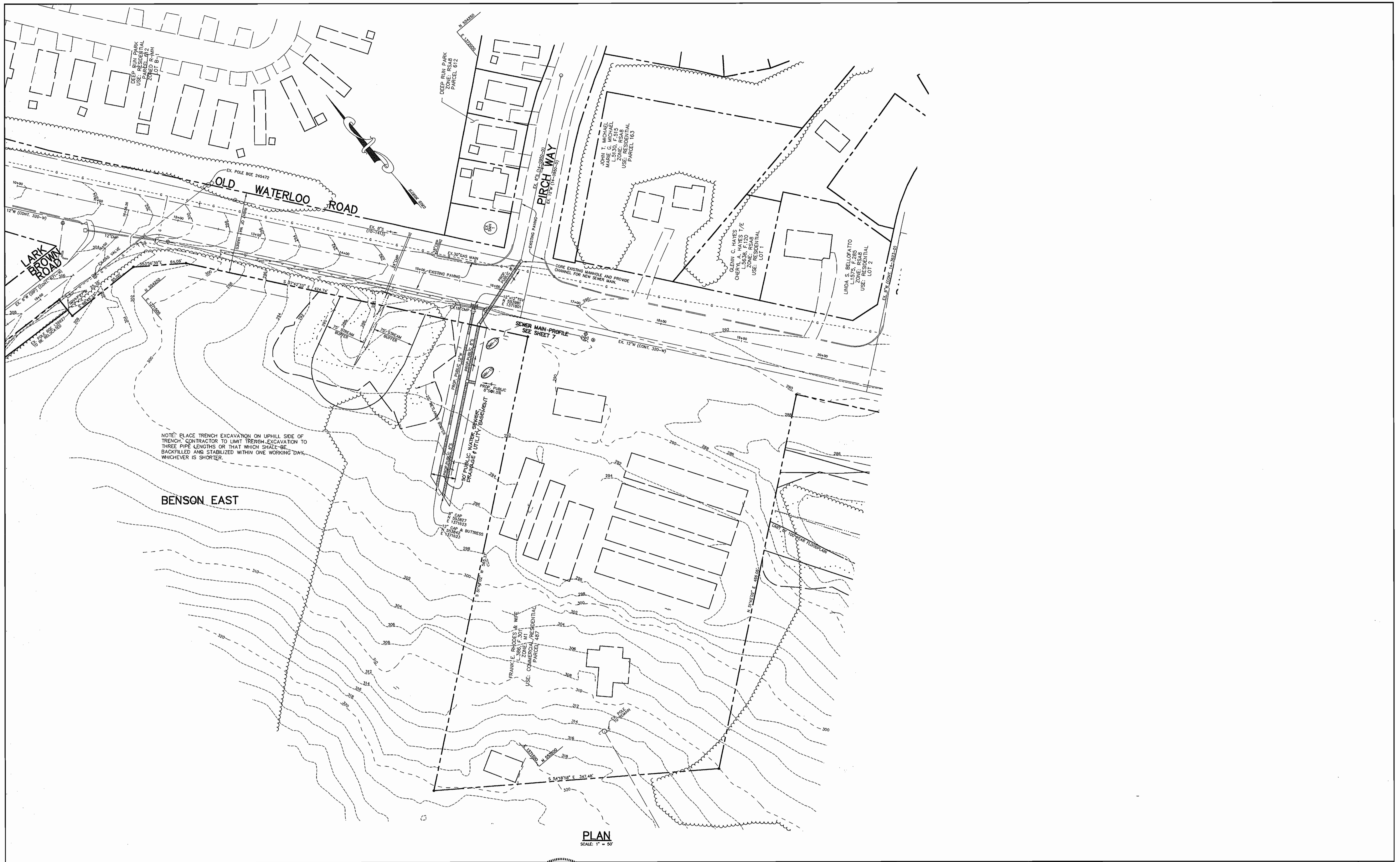


DES: C.J.R.			
DRN: DAM			
CHK: C.J.R.	WAD	BY NO.	DATE: 12/22/04
	REVISION		

PLAN VIEW OF
WATER AND SEWER MAINS
600' SCALE MAP NO. 37 & 43 BLOCK NO. 20 & 2

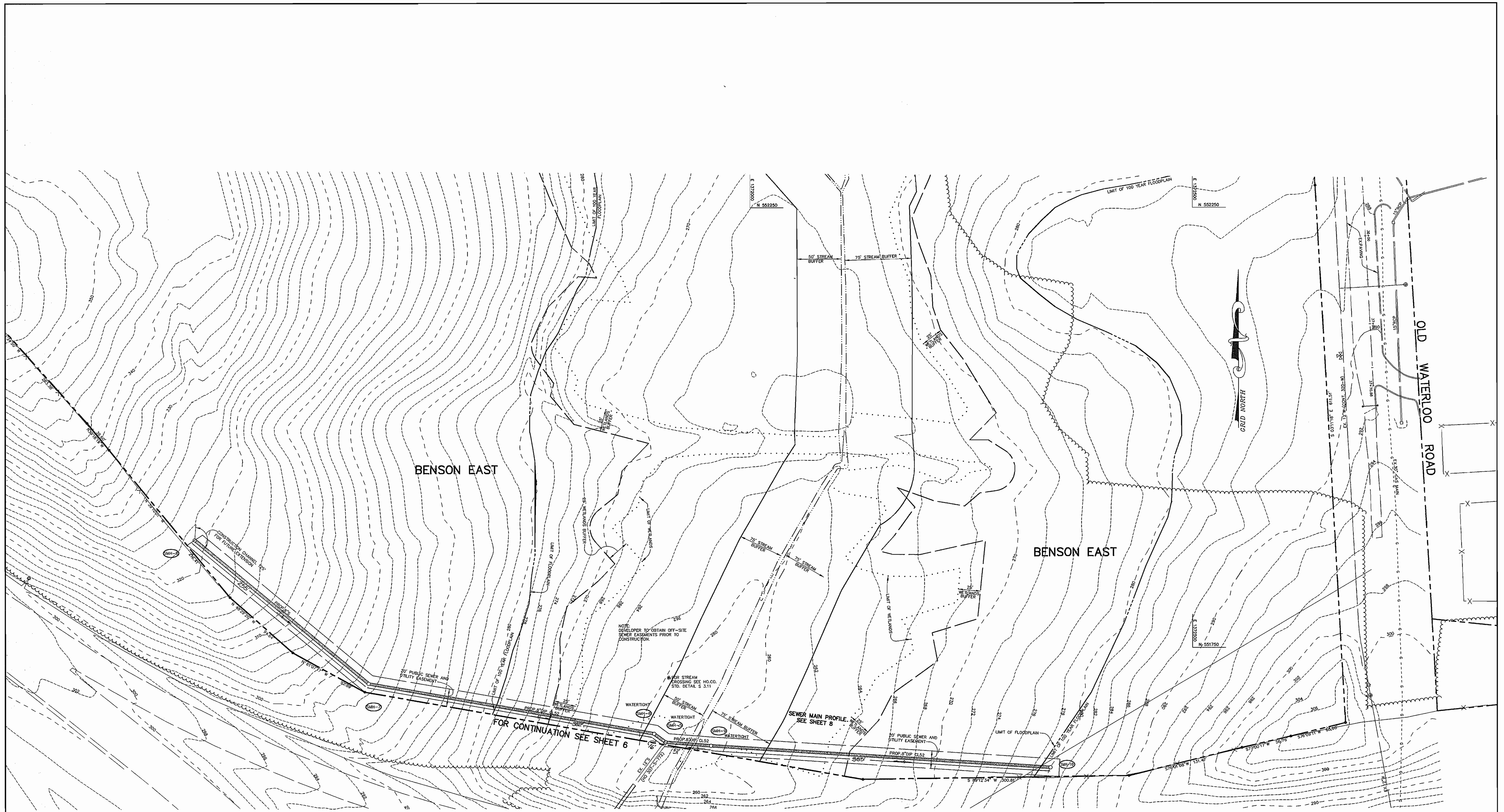
BENSON EAST
6th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
CONTRACT 24-4209-D

SCALE AS SHOWN
SHEET 3 OF 9



PLAN
SCALE: 1" = 50'

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND <i>Robert J. Bennett</i> 1-13-05 CHIEF, BUREAU OF UTILITIES DATE	DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND <i>Christopher J. Reid</i> 12/22/04 CHIEF, DEVELOPMENT ENGINEERING DIVISION 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	 CHRISTOPHER J. REID #19949	DES: C.J.R. DRN: DAM CHK: C.J.R. DATE: 12/22/04 BY NO. REVISION DATE	PLAN VIEW OF WATER AND SEWER MAINS 600' SCALE MAP NO. 37 & 43 BLOCK NO. 20 & 2	BENSON EAST 6th ELECTION DISTRICT HOWARD COUNTY, MARYLAND CONTRACT 24-4209-D SCALE AS SHOWN SHEET 4 OF 9
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FOR CONTINUATION SEE SHEET 6

NOTE: DEVELOPER TO OBTAIN OFF-SITE SEWER EASEMENTS PRIOR TO CONSTRUCTION.

WATER TIGHT

PLAN
SCALE: 1" = 50'

* CONTRACTOR TO BORE AND JACK SEWER CASING PIPE UNDER STREAM PRIOR TO SETTING MANHOLES. IF ROCK IS ENCOUNTERED, CONTRACTOR TO OPEN CUT STREAM PER MDC DETAILS, SHEET D.

NOTE: PLACE TRENCH EXCAVATION ON UPHILL SIDE OF TRENCH. CONTRACTOR TO LIMIT TRENCH EXCAVATION TO THREE PIPE LENGTHS OR THAT WHICH SHALL BE BACKFILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DEPARTMENT OF PLANNING & ZONING
HOWARD COUNTY, MARYLAND

Patton Harris Rust & Associates, pc
Engineers, Surveyors, Planners, Landscape Architects.
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Columbia, MD 21045
T 410.997.8900
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DES: C.J.R.

DRN: DAM

CHK: C.J.R.

DATE: 12/22/04

BY	NO.	REVISION	DATE
KCI	1	AS BUILT DATA ADDED	5-16-02
LWJ	2	ADDED BORING & JACKING NOTE	4-9-03

PLAN VIEW OF
WATER AND SEWER MAINS

600' SCALE MAP NO. 37 & 43 BLOCK NO. 20 & 2

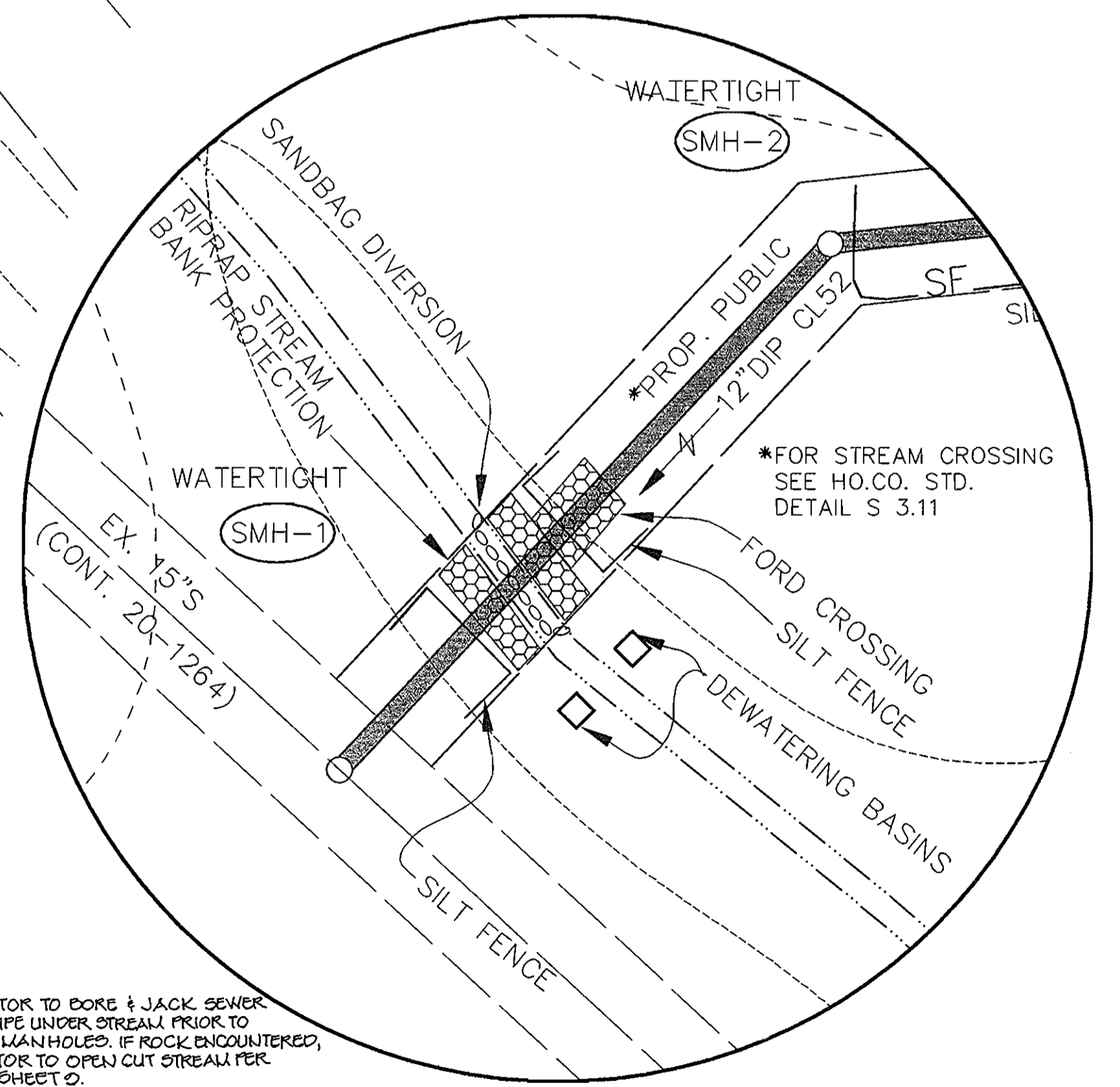
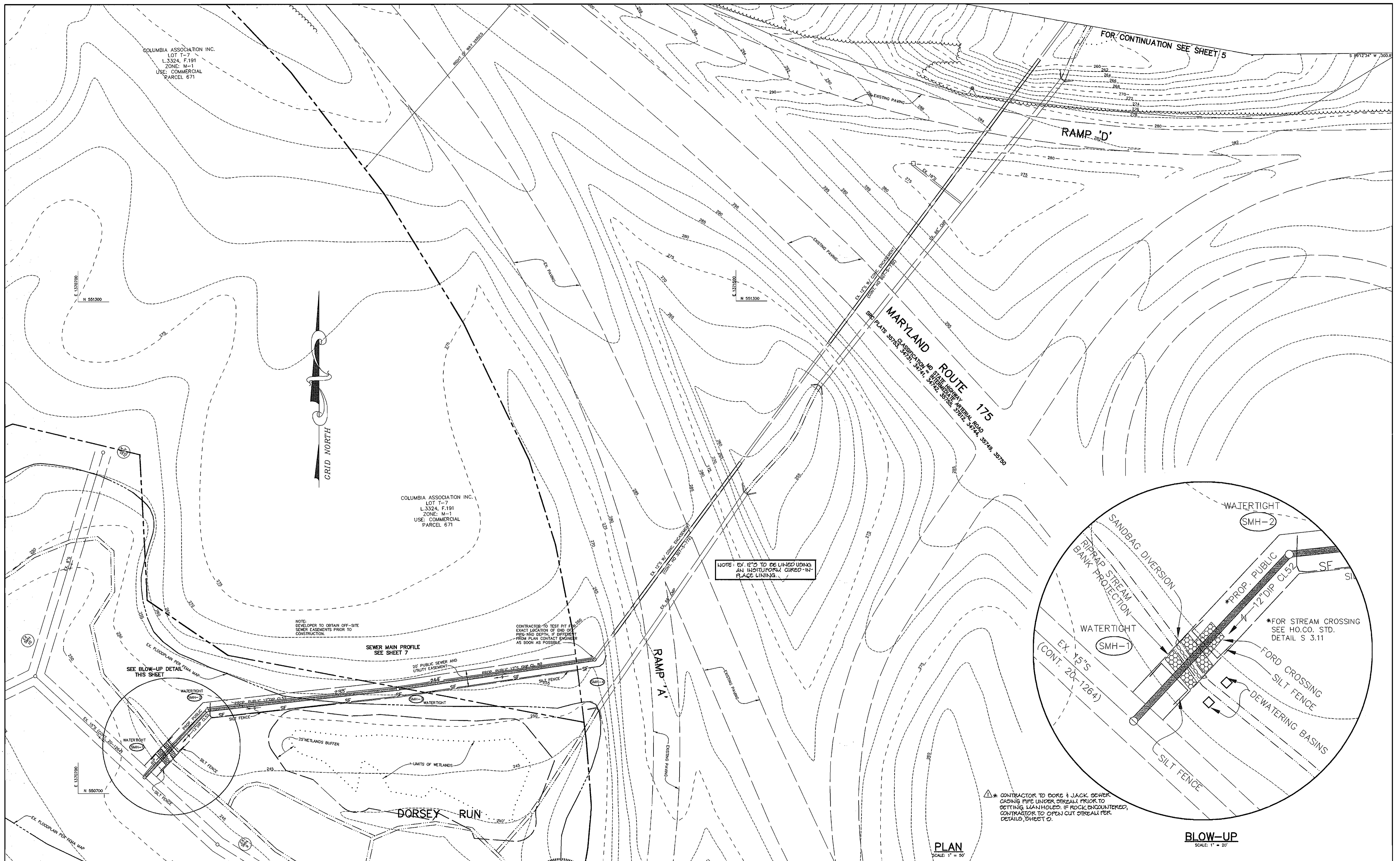
BENSON EAST
6th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
CONTRACT 24-4209-D

SCALE
AS
SHOWN

SHEET
5 OF 9

Robert J. Reid 1-13-05
CHIEF, BUREAU OF UTILITIES

Christopher J. Reid 1/21/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION



DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

Robert Burman 1-13-05
CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING & ZONING
HOWARD COUNTY, MARYLAND

Christopher J. Reid 12/22/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

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PHRA

PROFESSIONAL ENGINEERING
12-22-04

STATE OF MARYLAND
DEPARTMENT OF PUBLIC WORKS
PROFESSIONAL ENGINEERING

CHRISTOPHER J. REID #19949

DES:	C.J.R.				
DRN:	DAM				
CHK:	C.J.R.	KCI	AS BUILT DATA ADDED	EHLDB	
		WAD	ADDED STREAM CROSSING NOTE	A-G-05	
BY:		NO.	REVISION	DATE	

DATE: 12/22/04

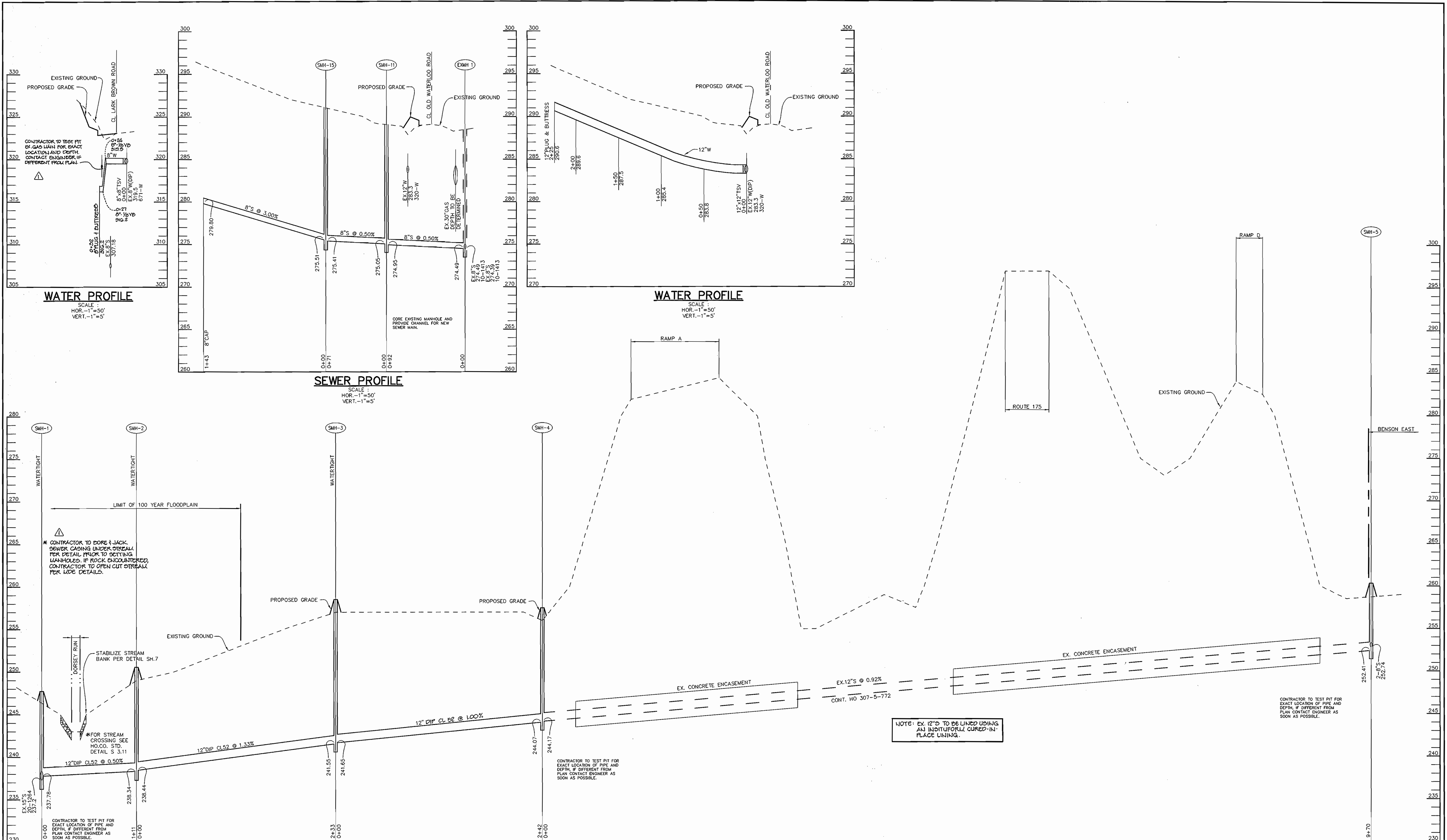
PLAN VIEW OF WATER AND SEWER MAINS

600' SCALE MAP NO. 37 & 43 BLOCK NO. 20 & 2


BENSON EAST
6th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
CONTRACT 24-4209-D

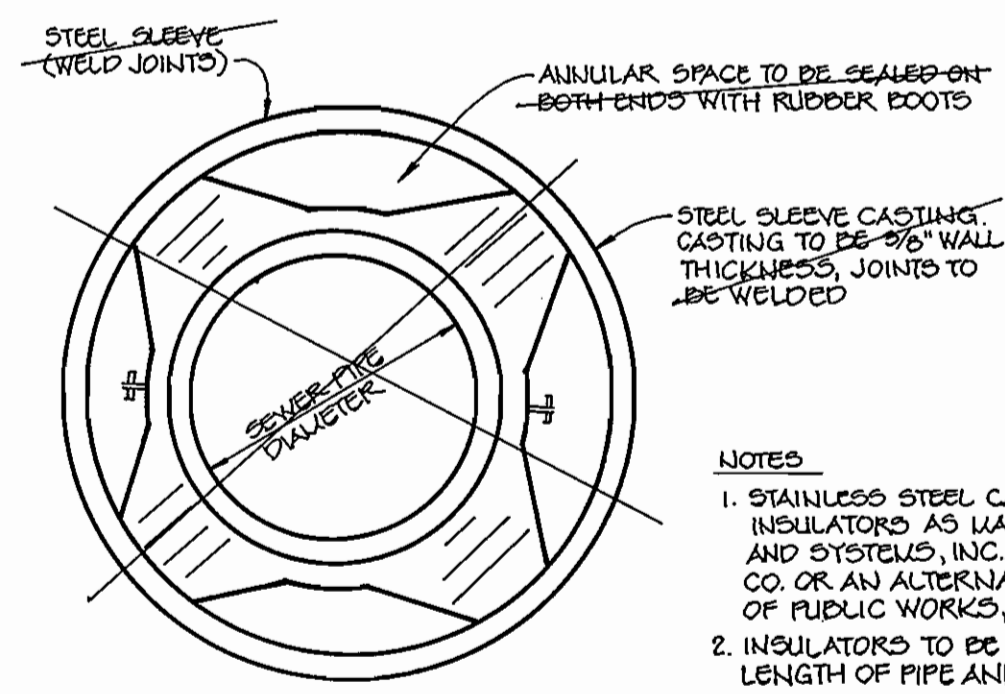
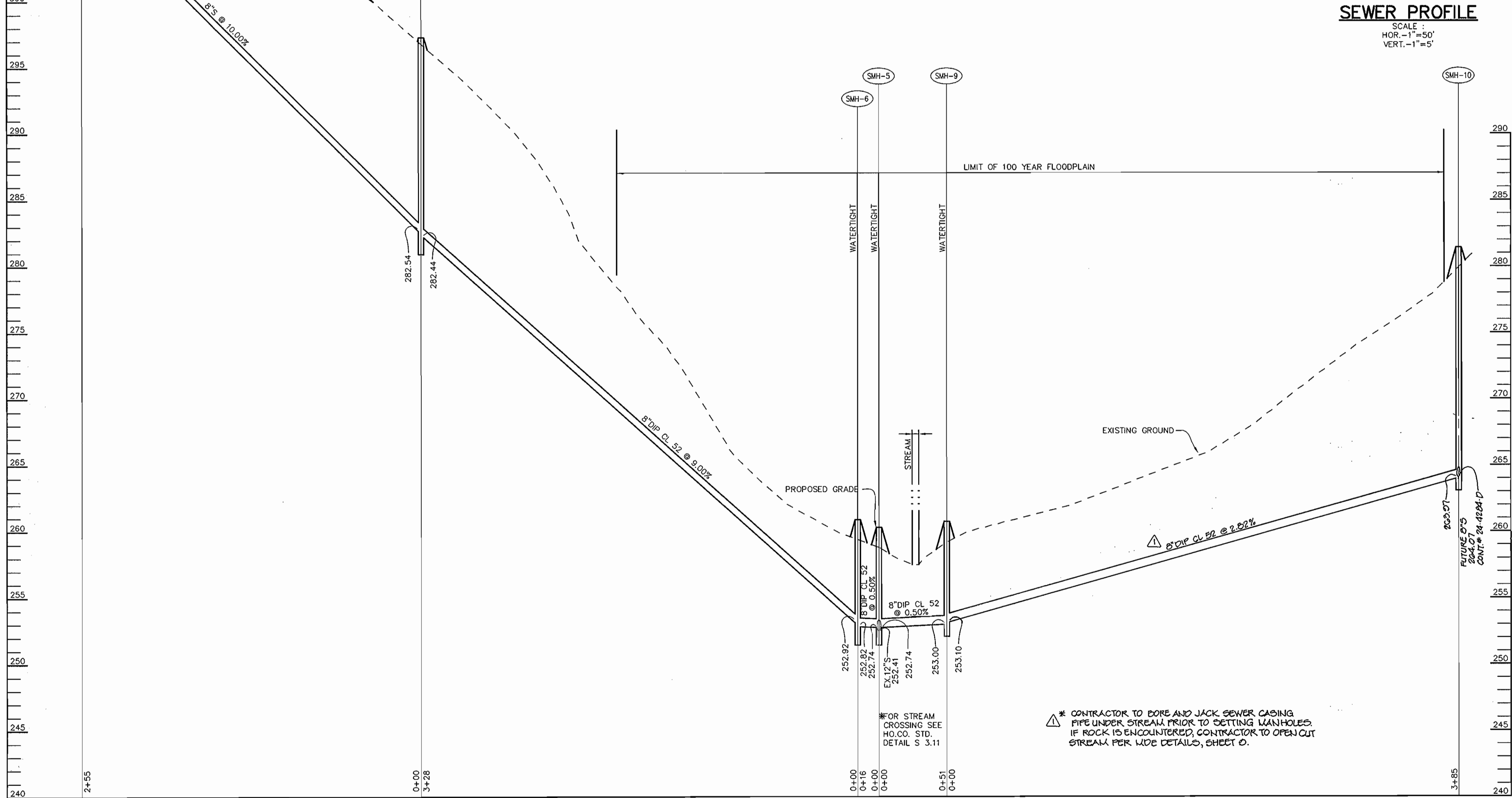
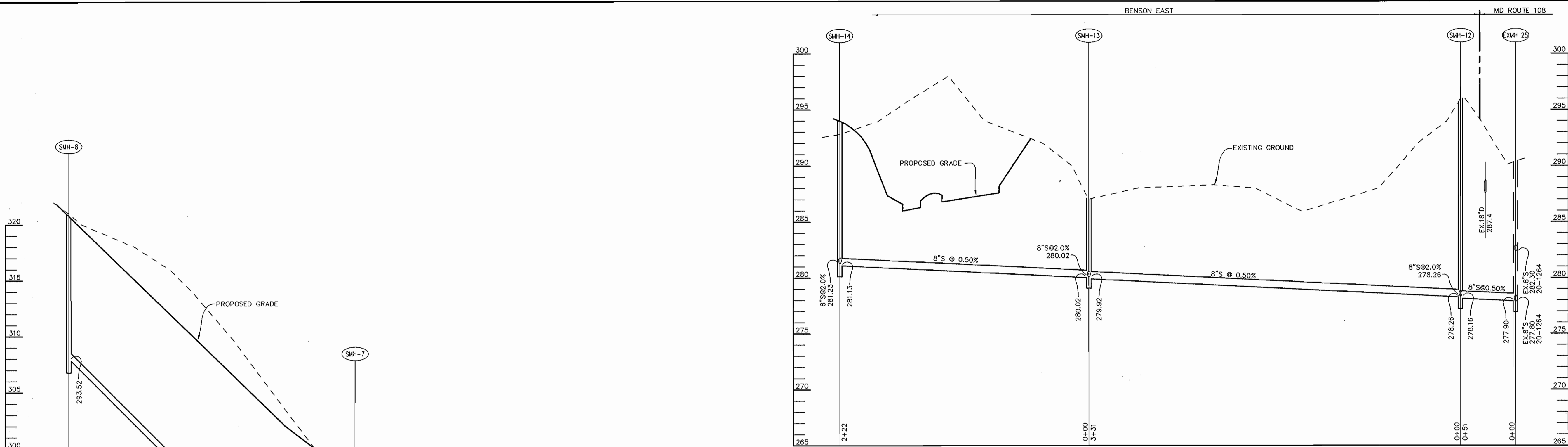
SCALE AS SHOWN

SHEET 6 OF 9



SEWER PROFILE
SCALE:
HOR. - 1" = 50'
VERT. - 1" = 5'

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND <i>Robert H. Benjamin</i> 1-13-05 CHIEF, BUREAU OF UTILITIES DATE	DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND <i>John P. ...</i> 1/21/05 CHIEF, DEVELOPMENT ENGINEERING DIVISION 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	 CHRISTOPHER J. REID #19949	DES: C.J.R. DRN: DAM CHK: C.J.R. DATE: 12/22/04	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NO.</th> <th>REVISION</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	REVISION	DATE										PROFILE OF A SEWER MAIN 60' SCALE MAP NO. 37 & 43 BLOCK NO. 20 & 2	BENSON EAST 6th ELECTION DISTRICT HOWARD COUNTY, MARYLAND CONTRACT 24-4209-D SCALE AS SHOWN SHEET 7 OF 9
NO.	REVISION	DATE																	



SEWER PIPE DIAMETER	SLEEVE SIZE
6"	20"
8"	24"
12"	36"
16"	48"
20"	60"
24"	72"

- NOTES**
1. STAINLESS STEEL CASING SPACERS WITH PLASTIC INSULATORS AS MANUFACTURED BY ADVANCE PRODUCTS AND SYSTEMS, INC., CASCADE WATERWORKS MANUFACTURING CO. OR AN ALTERNATE APPROVED BY HOWARD COUNTY DEPT. OF PUBLIC WORKS, BUREAU OF UTILITIES.
 2. INSULATORS TO BE EQUALLY SPACED AT 1/8 POINTS ALONG LENGTH OF PIPE AND EACH SIDE OF JOINT.
 3. BORE AND JACK CASING PIPE BEFORE SETTING MANHOLES. ADJUST SLOPE OF SEWER PIPE USING ADJUSTABLE CASING SPACERS.

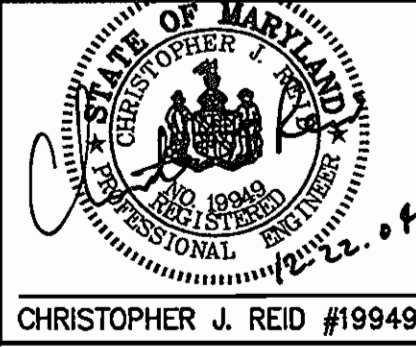
DEPARTMENT OF PUBLIC WORKS
 HOWARD COUNTY, MARYLAND

Reth Benjamin 1-13-05
 CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING & ZONING
 HOWARD COUNTY, MARYLAND

Christopher J. Reid 1/21/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Patton Harris Rust & Associates, pc
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DES: C.J.R.				
DRN: DAM				
CHK: C.J.R.				
DATE: 12/22/04				
BY: NO.				
REVISION				
DATE				

PROFILES OF WATER AND SEWER MAINS

600' SCALE MAP NO. 37 & 43 BLOCK NO. 20 & 2

BENSON EAST
 6th ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND
 CONTRACT 24-4209-D

SCALE AS SHOWN
 SHEET 8 OF 9

<p>1. Description The work shall consist of the construction of a dewatering basin for the purpose of receiving sediment-laden water pumped from a construction site to allow filtration before the water re-enters the waterway.</p> <p>II. Material Specifications</p> <ol style="list-style-type: none"> Riprap: Riprap shall consist of 4-8 inch washed stone or gravel. Filter Fabric: The filter cloth shall be a woven or nonwoven fabric consisting only of continuous cross polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydrocarbons, mildew, and rot resistant. No 15 Stone (ASTM D 57) may be used on the inner-face for filtering instead of fabric. Straw Bales: Straw bales shall meet the criteria as specified in the Maryland Standards and Specifications for Soil Erosion and Sediment Control. <p>III. Construction Requirements</p> <ol style="list-style-type: none"> The contractor shall install all sediment and erosion control devices at the first order of business. Excavated materials shall be stored such that sediments are prevented from entering the waterway. i.e., sediment perimeter controls may be necessary. Excavated material and riprap shall be kept separate and replace in their natural order. Any dewatering of the construction area shall be filtered through a dewatering basin prior to entering the waterway. The dewatering basin shall be excavated to a minimum depth of 3 feet. Once the dewatering basin becomes filled to 7 of the excavated depth, accumulated sediment shall be removed and disposed in a SCD approved disposal area outside the 100-year floodplain unless otherwise approved on the plans by the MRA. Sediment control devices are to remain in place until all disturbed areas are stabilized and the inspecting authority approves their removal. All ground cutters shall be returned to their original condition unless specifically approved otherwise by the Administration. <p>PLAN VIEW</p> <p>SECTION A-A</p> <p>SECTION B-B</p>	<p>Flow Barrier Temporary Access Culvert</p> <p>PLAN & PROFILE</p> <p>I. Description The work shall consist of installing a flow diversion structure in conjunction with a temporary culvert crossing during in-stream construction such as utility crossings.</p> <p>II. Construction Requirements</p> <ol style="list-style-type: none"> All erosion and sediment control devices shall be installed as the first order of business. Pipes must be sized to accommodate normal stream flow. The flow barrier shall be constructed of approved riprap, or other approved material as per WPD 2.1. The materials shall be sized to withstand normal stream flow velocities. All dewatering of the construction area shall be pumped to a dewatering basin (WPD 1.1) prior to re-entering the stream. The temporary culvert crossing shall be constructed in accordance with Standard Detail (TAC-1), 1988 Maryland Standards and Specifications for Sediment and Erosion Control. Sediment control devices shall remain in place until all disturbed areas have been stabilized in accordance with an approved sediment and erosion control plan and the inspecting authority approves their removal. 	<p>Sandbag/Stone Flow Diversion</p> <p>PLAN VIEW</p> <p>SECTION A-A</p> <p>I. Description The work shall consist of installing flow diversions for the purpose of erosion control when construction activities take place within the stream channel such as bank stabilization or bridge abutment construction.</p> <p>II. Material Specifications</p> <ol style="list-style-type: none"> Sandbags: Sandbags shall consist of materials which are resistant to ultra-violet radiation, tearing and puncture and woven tightly enough to prevent leakage of fill material (i.e., sand, fine gravel, etc.). Stone: Stone shall be washed and have a minimum diameter of 6 inches. Sheeting: Sheeting shall consist of polyethylene or other material which is impervious and resistant to puncture and tearing. <p>III. Construction Requirements</p> <ol style="list-style-type: none"> All erosion and sediment control devices shall be installed as the first order of business. The diversion structure shall be installed from upstream to downstream. The height of the diversion structure shall be one-half the distance from stream bed to stream bank plus one foot, as indicated on the cross section view. All excavated materials shall be disposed of in an SCD approved disposal area outside the 100-year floodplain unless otherwise approved on the plans by the MRA. All dewatering of the construction area shall be pumped to a dewatering basin prior to re-entering the stream. Sheeting shall be overlapped such that the upstream portion covers the downstream portion with at least an 18-inch overlap. Sediment control devices are to remain in place until all disturbed areas are stabilized in accordance with an approved sediment and erosion control plan and the inspecting authority approves their removal. 	<p>18" min. BANK 1.5'</p> <p>CROSS SECTION</p> <p>*SIZE BASED ON BANKFALL VELOCITY</p> <p>SIZEING RIPRAP PER STREAM VELOCITY</p> <table border="1"> <thead> <tr> <th>STONE DIAMETER IN INCHES</th> <th>HEIGHT IN FEET</th> </tr> </thead> <tbody> <tr><td>12</td><td>1.5</td></tr> <tr><td>15</td><td>2.0</td></tr> <tr><td>18</td><td>2.5</td></tr> <tr><td>21</td><td>3.0</td></tr> <tr><td>24</td><td>3.5</td></tr> <tr><td>27</td><td>4.0</td></tr> <tr><td>30</td><td>4.5</td></tr> <tr><td>33</td><td>5.0</td></tr> <tr><td>36</td><td>5.5</td></tr> <tr><td>39</td><td>6.0</td></tr> <tr><td>42</td><td>6.5</td></tr> <tr><td>45</td><td>7.0</td></tr> <tr><td>48</td><td>7.5</td></tr> <tr><td>51</td><td>8.0</td></tr> <tr><td>54</td><td>8.5</td></tr> <tr><td>57</td><td>9.0</td></tr> <tr><td>60</td><td>9.5</td></tr> <tr><td>63</td><td>10.0</td></tr> <tr><td>66</td><td>10.5</td></tr> <tr><td>69</td><td>11.0</td></tr> <tr><td>72</td><td>11.5</td></tr> <tr><td>75</td><td>12.0</td></tr> <tr><td>78</td><td>12.5</td></tr> 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<tr><td>585</td><td>97.0</td></tr> <tr><td>588</td><td>97.5</td></tr> <tr><td>591</td><td>98.0</td></tr> <tr><td>594</td><td>98.5</td></tr> <tr><td>597</td><td>99.0</td></tr> <tr><td>600</td><td>99.5</td></tr> <tr><td>603</td><td>100.0</td></tr> </tbody> </table> <p>II. Material Specifications</p> <p>A. Bank run gravel shall meet the following requirements:</p> <table border="1"> <thead> <tr> <th>% Less Than</th> <th>U.S. Standard No.</th> <th>Min. Size</th> </tr> </thead> <tbody> <tr><td>100</td><td>20</td><td>3/4"</td></tr> <tr><td>85-100</td><td>10</td><td>1/2"</td></tr> <tr><td>65-100</td><td>5</td><td>3/8"</td></tr> <tr><td>35-100</td><td>3</td><td>3/16"</td></tr> <tr><td>20-100</td><td>2</td><td>1/8"</td></tr> <tr><td>10-100</td><td>1</td><td>1/16"</td></tr> </tbody> </table> <p>B. Gravel filter fabric shall meet the following requirements:</p> <table border="1"> <thead> <tr> <th>Tensile Strength</th> <th>300 lbs.</th> </tr> <tr> <th>Burst Strength</th> <th>70 lbs.</th> </tr> <tr> <th>Puncture Strength</th> <th>20 gsm/cm²</th> </tr> <tr> <th>Permeability</th> <th>30 I</th> </tr> <tr> <th>Dimensional Stability</th> <th>24 in.</th> </tr> </thead> </table> <p>C. Riprap: The maximum weight of stone shall be based upon the bankfill stream channel width, using the chart above. The gradation of the stone shall be as indicated.</p> <p>III. Construction Requirements</p> <ol style="list-style-type: none"> The contractor shall install all sediment and erosion control devices as a first order of business. Provisions must be made to anchor the riprap of the stream bed so as to provide protection against undermining. If the riprap is not anchored, the riprap shall be placed in a cross section, as shown, to prevent the riprap from being washed away. Excavated or riprap shall be made in reasonably close conformity with the existing stream slope and bed. A flow barrier is required under all pipe. Sediment control devices shall be installed in accordance with the MRA. The placement of pipe shall be made in reasonably close conformity with the existing stream slope and bed. The larger stones shall be placed in the toe and along the right edge of the bank of the pipe and along the right edge of the bank of the pipe and along the right edge of the bank of the pipe. The riprap shall be placed with suitable equipment in such a manner as to produce a reasonably graded mass of stones with zero edge height. The joining of stones shall cause erosion protection to be maintained. Any excavation made during the placement of the riprap shall be backfilled with suitable material. All disturbed areas shall be permanently stabilized in accordance with an approved sediment and erosion control plan. 	STONE DIAMETER IN INCHES	HEIGHT IN FEET	12	1.5	15	2.0	18	2.5	21	3.0	24	3.5	27	4.0	30	4.5	33	5.0	36	5.5	39	6.0	42	6.5	45	7.0	48	7.5	51	8.0	54	8.5	57	9.0	60	9.5	63	10.0	66	10.5	69	11.0	72	11.5	75	12.0	78	12.5	81	13.0	84	13.5	87	14.0	90	14.5	93	15.0	96	15.5	99	16.0	102	16.5	105	17.0	108	17.5	111	18.0	114	18.5	117	19.0	120	19.5	123	20.0	126	20.5	129	21.0	132	21.5	135	22.0	138	22.5	141	23.0	144	23.5	147	24.0	150	24.5	153	25.0	156	25.5	159	26.0	162	26.5	165	27.0	168	27.5	171	28.0	174	28.5	177	29.0	180	29.5	183	30.0	186	30.5	189	31.0	192	31.5	195	32.0	198	32.5	201	33.0	204	33.5	207	34.0	210	34.5	213	35.0	216	35.5	219	36.0	222	36.5	225	37.0	228	37.5	231	38.0	234	38.5	237	39.0	240	39.5	243	40.0	246	40.5	249	41.0	252	41.5	255	42.0	258	42.5	261	43.0	264	43.5	267	44.0	270	44.5	273	45.0	276	45.5	279	46.0	282	46.5	285	47.0	288	47.5	291	48.0	294	48.5	297	49.0	300	49.5	303	50.0	306	50.5	309	51.0	312	51.5	315	52.0	318	52.5	321	53.0	324	53.5	327	54.0	330	54.5	333	55.0	336	55.5	339	56.0	342	56.5	345	57.0	348	57.5	351	58.0	354	58.5	357	59.0	360	59.5	363	60.0	366	60.5	369	61.0	372	61.5	375	62.0	378	62.5	381	63.0	384	63.5	387	64.0	390	64.5	393	65.0	396	65.5	399	66.0	402	66.5	405	67.0	408	67.5	411	68.0	414	68.5	417	69.0	420	69.5	423	70.0	426	70.5	429	71.0	432	71.5	435	72.0	438	72.5	441	73.0	444	73.5	447	74.0	450	74.5	453	75.0	456	75.5	459	76.0	462	76.5	465	77.0	468	77.5	471	78.0	474	78.5	477	79.0	480	79.5	483	80.0	486	80.5	489	81.0	492	81.5	495	82.0	498	82.5	501	83.0	504	83.5	507	84.0	510	84.5	513	85.0	516	85.5	519	86.0	522	86.5	525	87.0	528	87.5	531	88.0	534	88.5	537	89.0	540	89.5	543	90.0	546	90.5	549	91.0	552	91.5	555	92.0	558	92.5	561	93.0	564	93.5	567	94.0	570	94.5	573	95.0	576	95.5	579	96.0	582	96.5	585	97.0	588	97.5	591	98.0	594	98.5	597	99.0	600	99.5	603	100.0	% Less Than	U.S. Standard No.	Min. Size	100	20	3/4"	85-100	10	1/2"	65-100	5	3/8"	35-100	3	3/16"	20-100	2	1/8"	10-100	1	1/16"	Tensile Strength	300 lbs.	Burst Strength	70 lbs.	Puncture Strength	20 gsm/cm ²	Permeability	30 I	Dimensional Stability	24 in.	<p>25 ft Buffer Zone</p> <p>PLAN VIEW</p> <p>I. Description This work shall consist of installing erosion control devices in and adjacent to temporary stream construction such as utility crossings.</p> <p>II. Construction Requirements</p> <ol style="list-style-type: none"> All erosion and sediment control devices shall be installed as the first order of business. The contractor shall ensure that a continuous perimeter control barrier is in place so as to minimize pollutants entering the water. Excavated material and riprap shall be kept separate and replace in their natural order. All excavated materials shall be placed on the upland side of the excavation. All construction shall take place during stream low flow. The length of construction time shall be limited to a maximum of 5 days for each crossing. All utility crossings shall be placed at least three feet beneath the stream bed unless an alternative section is specifically approved by the Administration. The contractor may elect to construct the utility crossing in two stages. In this case, a MRA approved flow barrier may be constructed to keep the construction area dry. Sediment control devices are to remain in place until all disturbed areas are stabilized in accordance with an approved sediment and erosion control plan and the inspecting authority approves their removal. <p>III. Material Specifications</p> <p>1. Filter Fabric - The filter cloth shall be a woven or non-woven fabric consisting of continuous cross polymeric filaments or yarns of polyester. It shall be inert to commonly encountered chemicals, hydrocarbons, mildew, and rot-resistant.</p> <p>2. Riprap - 4-8" washed stone and gravel shall be used.</p> <p>III. Construction Requirements</p> <ol style="list-style-type: none"> All erosion and sediment control devices shall be installed as the first order of business. The riprap shall be constructed in accordance with MRA, Standard Detail, 1988 Maryland Standards and Specifications for Sediment and Erosion Control. All material excavated from the construction area shall be placed in a SCD approved disposal area outside of the 100-year floodplain unless otherwise allowed on the plans by the MRA. Shallow swales shall be installed as necessary to trap surface runoff, thus reducing pollution from the land source root. Sediment control devices shall remain in place until all disturbed areas have been stabilized in accordance with an approved sediment and erosion control plan and the inspecting authority approves their removal. <p>PLAN VIEW</p> <p>SECTION A-A</p> <p>SECTION B-B</p> <p>ALTERNATIVES</p>	<p>TEMPORARY SANDBAG DIVERSION</p> <p>PLAN VIEW</p> <p>CROSS SECTION</p> <p>I. Description This detail provides the necessary details for construction of a field access crossing across a stream. The following criteria shall be considered when proposing a ford:</p> <ol style="list-style-type: none"> Vehicles which will pollute the stream with oil or hydraulic fluids shall not cross the stream. The size, type, and frequency of usage shall be considered. Streams with stone boulders or soft silt-clay beds are not acceptable for this type of crossing. The ford shall create a stream flow that is commensurate with the natural channel. No construction fords shall create a blockage to the passage of resident fish species. <p>II. Materials</p> <p>1. Filter Fabric - The filter cloth shall be a woven or non-woven fabric consisting of continuous cross polymeric filaments or yarns of polyester. It shall be inert to commonly encountered chemicals, hydrocarbons, mildew, and rot-resistant.</p> <p>2. Riprap - 4-8" washed stone and gravel shall be used.</p> <p>III. 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Description This detail provides the necessary details for construction of a field access crossing across a stream. The following criteria shall be considered when proposing a ford:</p> <ol style="list-style-type: none"> Vehicles which will pollute the stream with oil or hydraulic fluids shall not cross the stream. The size, type, and frequency of usage shall be considered. Streams with stone boulders or soft silt-clay beds are not acceptable for this type of crossing. The ford shall create a stream flow that is commensurate with the natural channel. No construction fords shall create a blockage to the passage of resident fish species. <p>II. Materials</p> <p>1. Filter Fabric - The filter cloth shall be a woven or non-woven fabric consisting of continuous cross polymeric filaments or yarns of polyester. It shall be inert to commonly encountered chemicals, hydrocarbons, mildew, and rot-resistant.</p> <p>2. Riprap - 4-8" washed stone and gravel shall be used.</p> <p>III. 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Wood posts shall be 11/2" x 11/2" square (minimum) cut, or 12" diameter (minimum) round and shall be of sound quality hardwood. Steel posts shall be standard I or U section weighting not less than 1.00 pound per linear foot. Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F: <table border="1"> <thead> <tr> <th>Tensile Strength</th> <th>30 lbs/in (min.)</th> <th>Test: MSMT 509</th> </tr> <tr> <th>Tensile Modulus</th> <th>20 lbs/in (min.)</th> <th>Test: MSMT 509</th> </tr> <tr> <th>Flow Rate</th> <th>0.3 gal/ft²/minute (max.)</th> <th>Test: MSMT 322</th> </tr> <tr> <th>Filtering Efficiency</th> <th>75% (min.)</th> <th>Test: MSMT 322</th> </tr> </thead> </table> <ol style="list-style-type: none"> Where ends of geotextile fabric come together, they shall be overlapped, fastened and stapled to prevent sediment bypass. Fence posts shall be inspected after each rainfall event and maintained when budgets occur or when sediment accumulation reaches 50% of the fabric height. <p>U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 4-16-3 MARYLAND DEPARTMENT OF ENVIRONMENT AND WATER MANAGEMENT ADMINISTRATION</p>	Tensile Strength	30 lbs/in (min.)	Test: MSMT 509	Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509	Flow Rate	0.3 gal/ft ² /minute (max.)	Test: MSMT 322	Filtering Efficiency	75% (min.)	Test: MSMT 322
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"Conditions and Management Practices for Working in Nontidal Wetlands and Buffers"

- Remove excavated material, construction material or debris to an upland disposal area outside of any waterway, floodplain, nontidal wetland, or buffer;
- If backfill is obtained, use clean material free of waste metal products, unsightly debris, toxic material, or any other deleterious substance.
- Place materials in a location and manner which does not adversely impact surface or subsurface water flow into or out of the nontidal wetland;
- Maintain the hydrologic regime of nontidal wetlands outside the limits of disturbance.
- Rectify any nontidal wetlands and buffers temporarily impacted by the permitted activity. All stabilization in the wetland and buffer shall be of the following recommended species: Annual Ryegrass (*Lolium multiflorum*), Millet (*Setaria Italica*), Oats (*Urtica sp.*), and/or Rye (*Secale cereale*). Other non-persistent vegetation may be acceptable, but must be approved by the Nontidal Wetlands and Waterways Division. Kentucky 31 fescue shall not be utilized in the wetland or buffer. All temporary fills shall be removed in their entirety on or before the completion of construction;
- To protect important aquatic species, in-stream work is prohibited as determined by the classification of the stream as follows:
Use 1 Waters. In-stream work may not be conducted during the period March 1 - June 15 inclusive, during any year.
- No removal of vegetation, grading, filling, draining or other alteration of the nontidal wetlands or buffer outside the limits of disturbance shall occur without written authorization from the Water Management Administration.

NOTE: THE SEWER STREAM CROSSING WILL BE PERFORMED USING BORING AND JACKING OF A STEEL CASING PIPE. ONLY IF ROCK IS ENCOUNTERED WILL THE WIDE DETAILS ABOVE BE REQUIRED.

<p>DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND</p> <p><i>Robert B. Bannan</i> 1-13-05 CHIEF, BUREAU OF UTILITIES</p>	<p>DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND</p> <p><i>Christopher J. Reid</i> 1/21/05 CHIEF, DEVELOPMENT ENGINEERING DIVISION</p>	<p>Patton Harris Rust & Associates, pc Engineers, Surveyors, Planners, Landscape Architects.</p> <p>PHRA 8818 Centre Park Drive Columbia, MD 21045 T 410.997.8900 F 410.997.9282</p>	<p>STATE OF MARYLAND SEAL OF THE PROFESSIONAL ENGINEERS AND SURVEYORS CHRISTOPHER J. REID #19949</p>	<p>DES: C.J.R. DRN: DAM CHK: C.J.R. DATE: 12/22/04</p>	<p>WAD BY NO. REVISION DATE</p> <p>4-0-05</p>	<p style="text-align: center;">DETAILS</p> <p style="text-align: center;">600' SCALE MAP NO. 37 & 43 BLOCK NO. 20 & 2</p> <p style="text-align: center;">BENSON EAST 6th ELECTION DISTRICT HOWARD COUNTY, MARYLAND CONTRACT 24-4209-D</p> <p style="text-align: right;">SCALE AS SHOWN SHEET 9 OF 9</p>
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