

**UTILITIES COMMISSION MEETING  
SEPTEMBER 17, 2012**

Acting-Mayor Linda Kuiper called the meeting to order at 7:30 p.m. In attendance were Council members James R. Gatto, Mabel Mumford-Pautz and Mauritz Stetson, Robert Sipes, Utilities Manager, W. S. Ingersoll, Town Manager and Zoning Administrator, Jennifer Mulligan, Stenographer, and guests.

Ms. Kuiper asked if there were any additions or corrections to the Utilities Commission meeting of August 20, 2012. **Mrs. Mumford-Pautz moved to approve the minutes as submitted, was seconded by Mr. Stetson and carried unanimously.**

Ms. Kuiper stated that cash on hand and in banks was \$1,028,293.93.

**Mrs. Mumford-Pautz moved to pay the bills as submitted, was seconded by Mr. Stetson and carried unanimously.**

Mr. Sipes stated that he was planning to hire a geologist to investigate the well field.

Mr. Sipes stated that at the lagoon two (2) propellers had worn out and had to be replaced at \$4,000.00 per propeller. He said that there was also roofing replaced at the lagoon.

Mr. Sipes stated that a driller hit the private water line in front of the car wash on Flatland Road and the main would be shut down off of Flatland Road from 10:00 p.m. to 4:00 a.m. He said that residents were to be notified earlier in the day. If notifications were not made, the work would not take place.

Mr. Scott Burleson of Chester River Hospital was present and introduced Mr. Andrew Bullen of Earth Data to present their findings of the Chester River Hospital Center's Groundwater Remediation and Chestertown Well No. No. 9.

Mr. Bullen gave a PowerPoint presentation demonstrating the remediation system, layout, history of the fuel oil recovery (83,000 gallons to date), water table contour map, monitoring wells analyzed for dissolved O<sub>2</sub>, a cross section of the dissolved O<sub>2</sub>, and the radius of influence of the dissolved O<sub>2</sub> injection. His purpose was to disprove any connection between the CRHC groundwater remediation and the recent problems with Town Well No. 9.

Mr. Bullen stated that the pumping station (recovery well) was shut down on July 12, 2012 and the ground water returned to its natural flow southeast to the Chester River at 4" to 5" per day. He said that MDE approved the shutdown.

Mr. Bullen stated that the conclusions of Earth Data were as follows:

- 1) Injection pilot-tests were conducted while the system was in operation;
- 2) Radius of influence of the pilot-test injection was only 28 ft.

- 3) Town Well Field is located between Well No. 9 and the Chester River Hospital Center;
- 4) Well No. 9 is protected from surface contamination by over 200 ft. of clay.

Mr. Tucker Moorshead, a geologist, gave a presentation showing the levels of clays and sands separating the Magothy aquifer from the Acquia aquifer. He said that the wells at the Chester River Hospital Center are on the Acquia aquifer.

Mr. Sipes stated that there was a cone of depression keeping the contamination from going off-site. He said that now that the wells were turned off the depression has gone away. He asked what was keeping it from moving off-site. Mr. Bullen stated that the level of contamination was low enough and with the natural attenuation of contaminants being eaten by bacteria the dispersion and dilution won't be a problem.

Mr. Bullen stated that there was quarterly post-corrective monitoring of the site, but there was a recent modification to monthly monitoring now being performed on the monitoring wells south of Brown Street as it was down gradient. He said if they saw any contamination of those wells the system would be turned back on.

Mr. Sipes asked for copies of the lab results from the wells. Mr. Bullen agreed.

Mr. Sipes stated that the only source for recharge of the Magothy aquifer in region 2 (Eastern Shore) is the downward percolation of water from the Acquia aquifer. He said that it was possible that the confining layer was not 200' everywhere.

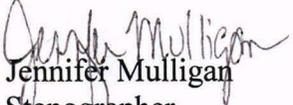
Mr. Sipes stated that what he was trying to do was eliminate outside contamination as a source. He said that the timing of the incident was the only thing that raised suspicion. He said that the Town was playing catch-up by not being informed in the past year and having the entire well field evaluated.

Mr. Ingersoll asked Mr. Bullen if Well No. 8 was turned back on how long would the contamination take to get to Well Field No. 8. Mr. Bullen stated that the water would move faster under those circumstances. Mr. Ingersoll asked if Earth Data thought Well No. 8 should be turned on. Mr. Bullen stated that he did not see any problem with turning on Well No. 8.

Mr. Ingersoll asked if the latest test of monitoring well No. 20 was showing any product or more product. Mr. Bullen stated that it was not showing any product.

Mr. Sipes stated that his concern was for the future and if the oxygen injection could create problems with iron bacteria where it did not exist before. He said that was why a geologist was going to make a determination on whether they needed to worry about it happening in any other wells. Mr. Sipes stated that the testing will also prove if there is intrusion into Well No. 9 from the Acquia aquifer, since each aquifer has distinguishable characteristics in the water.

There being no further business, **Mrs. Mumford-Pautz moved to adjourn the meeting at 8:15 p.m., was seconded by Mr. Gatto and carried unanimously.**

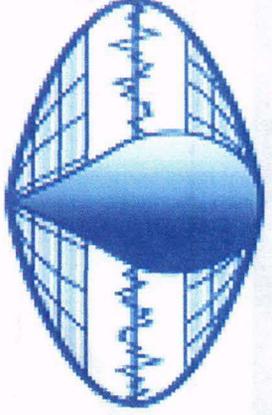
Submitted by:   
Jennifer Mulligan  
Stenographer

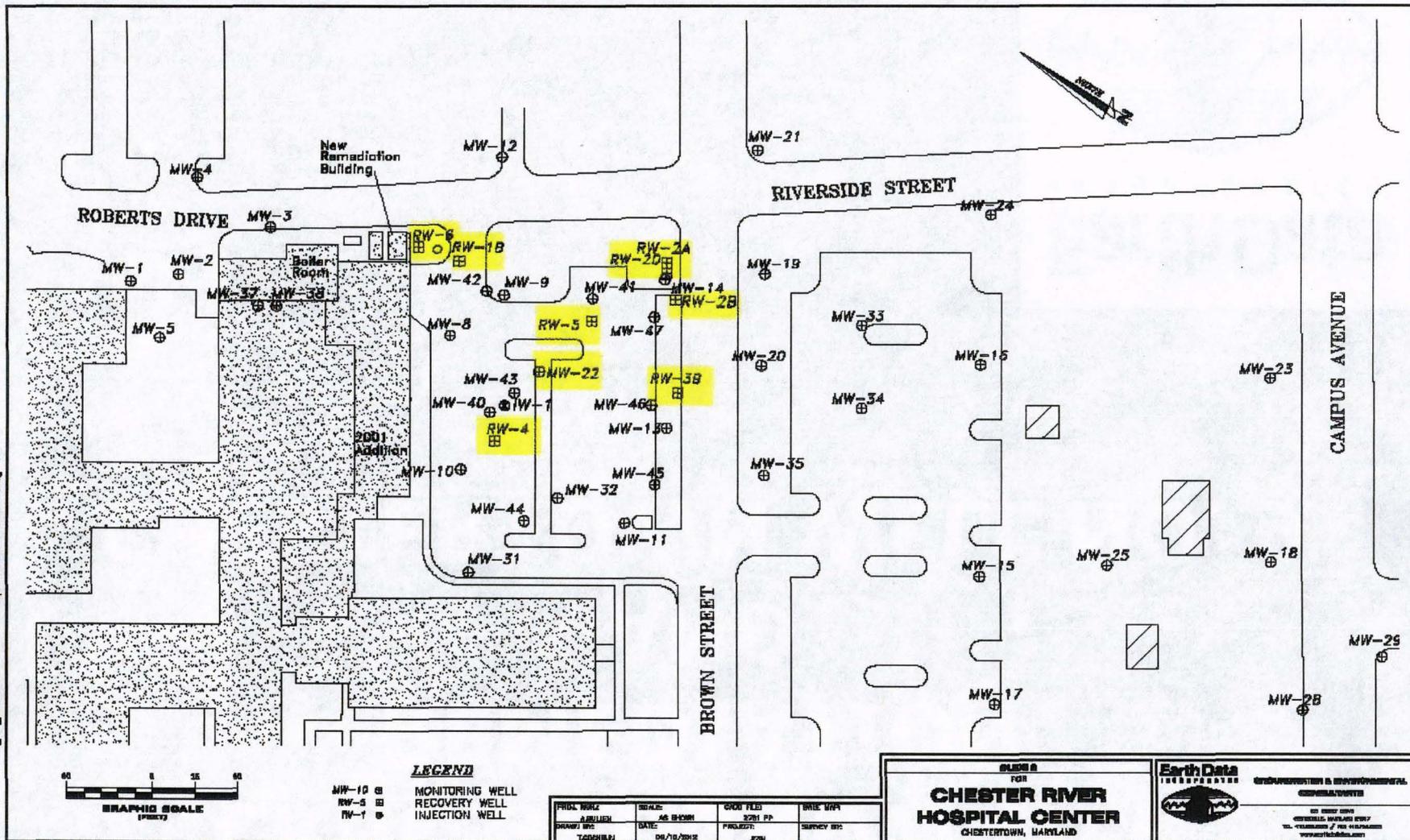
Approved by:  
Margo G. Bailey  
Mayor

**CRHC GROUNDWATER  
REMEDIATION  
AND**

**CHESTERTOWN WELL NO. 9**

**EarthData**  
INCORPORATED





# ■ CRHC Remediation System Layout

# CRHC System Fuel Oil Recovery (2002 - 2012)

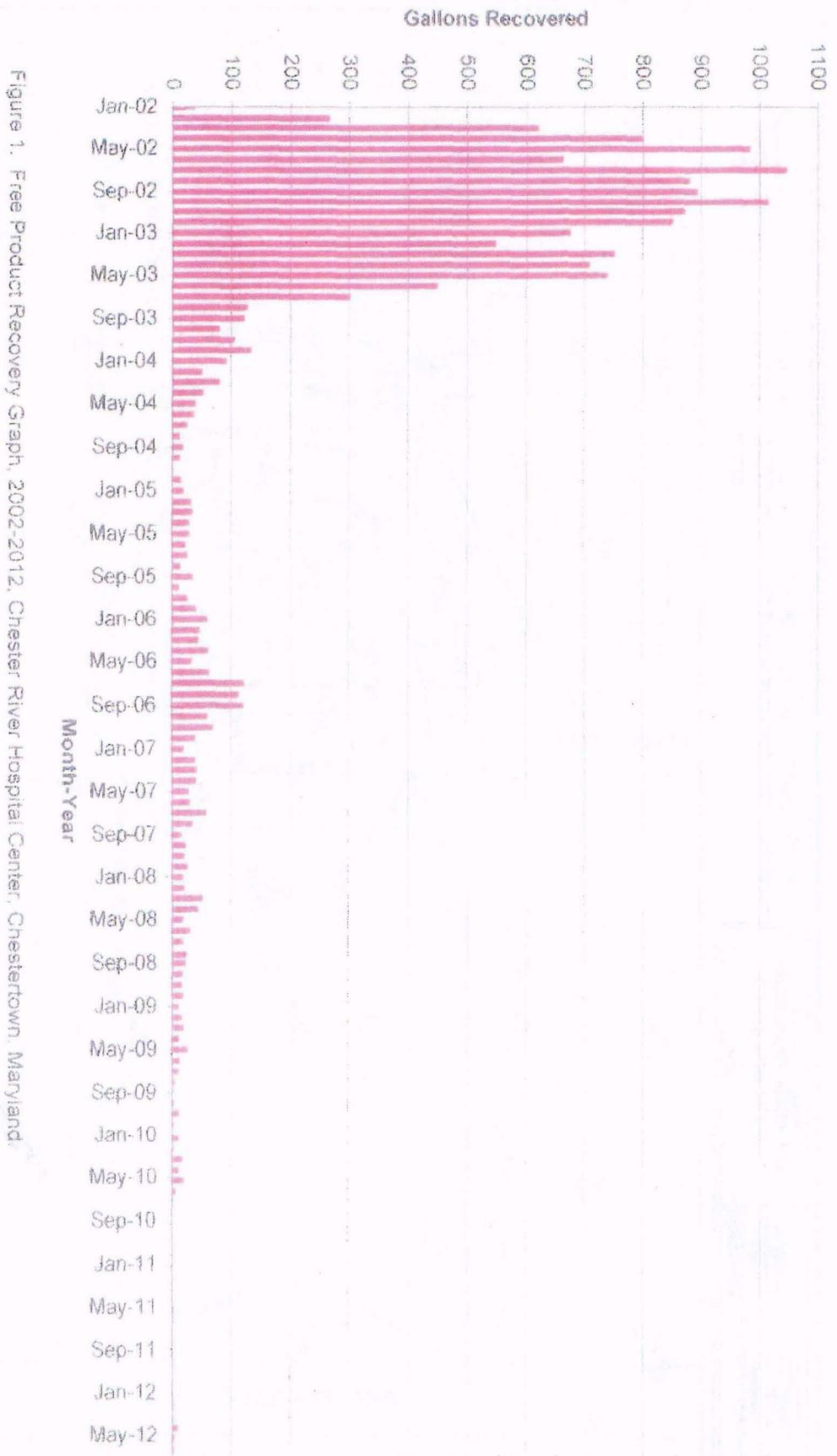
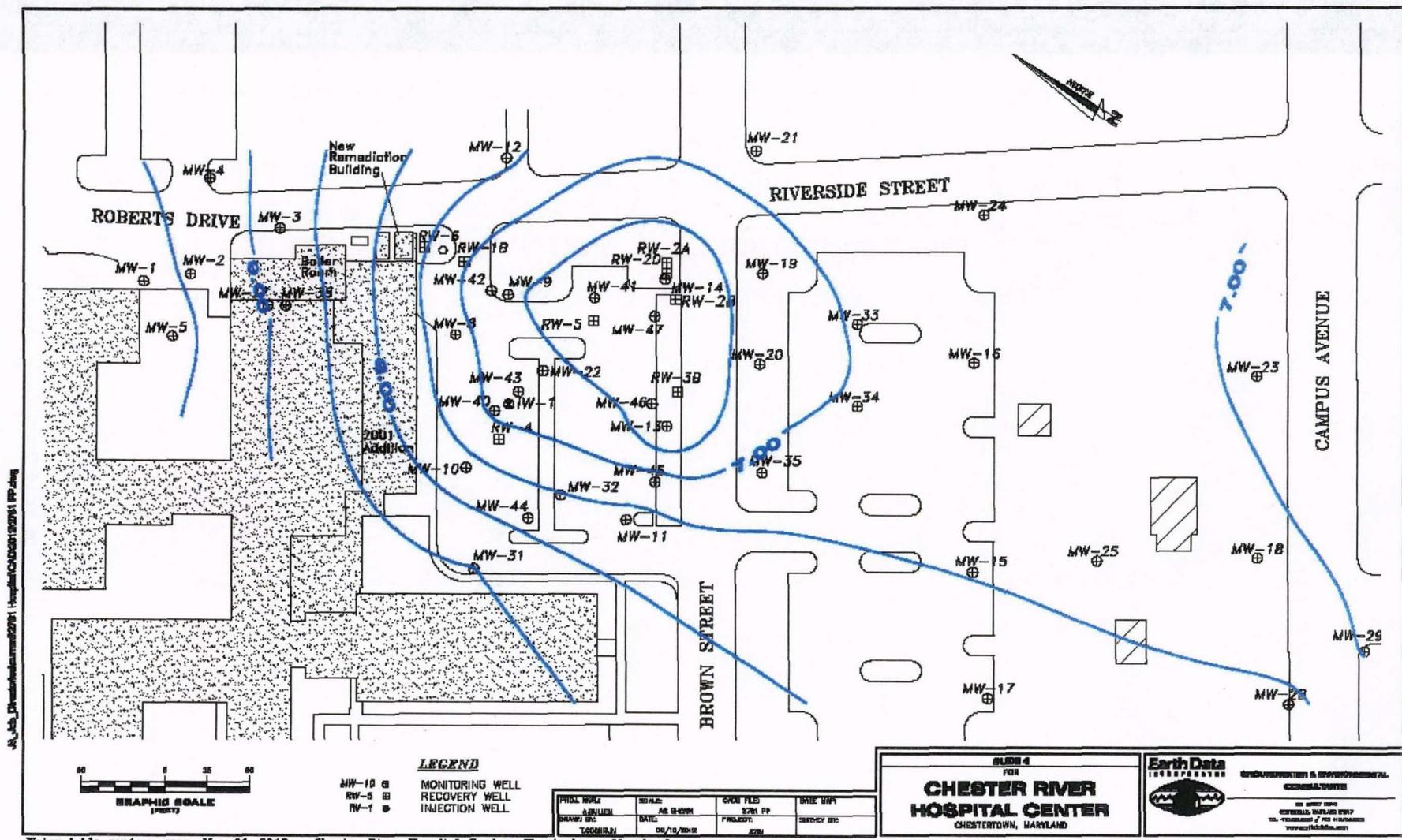
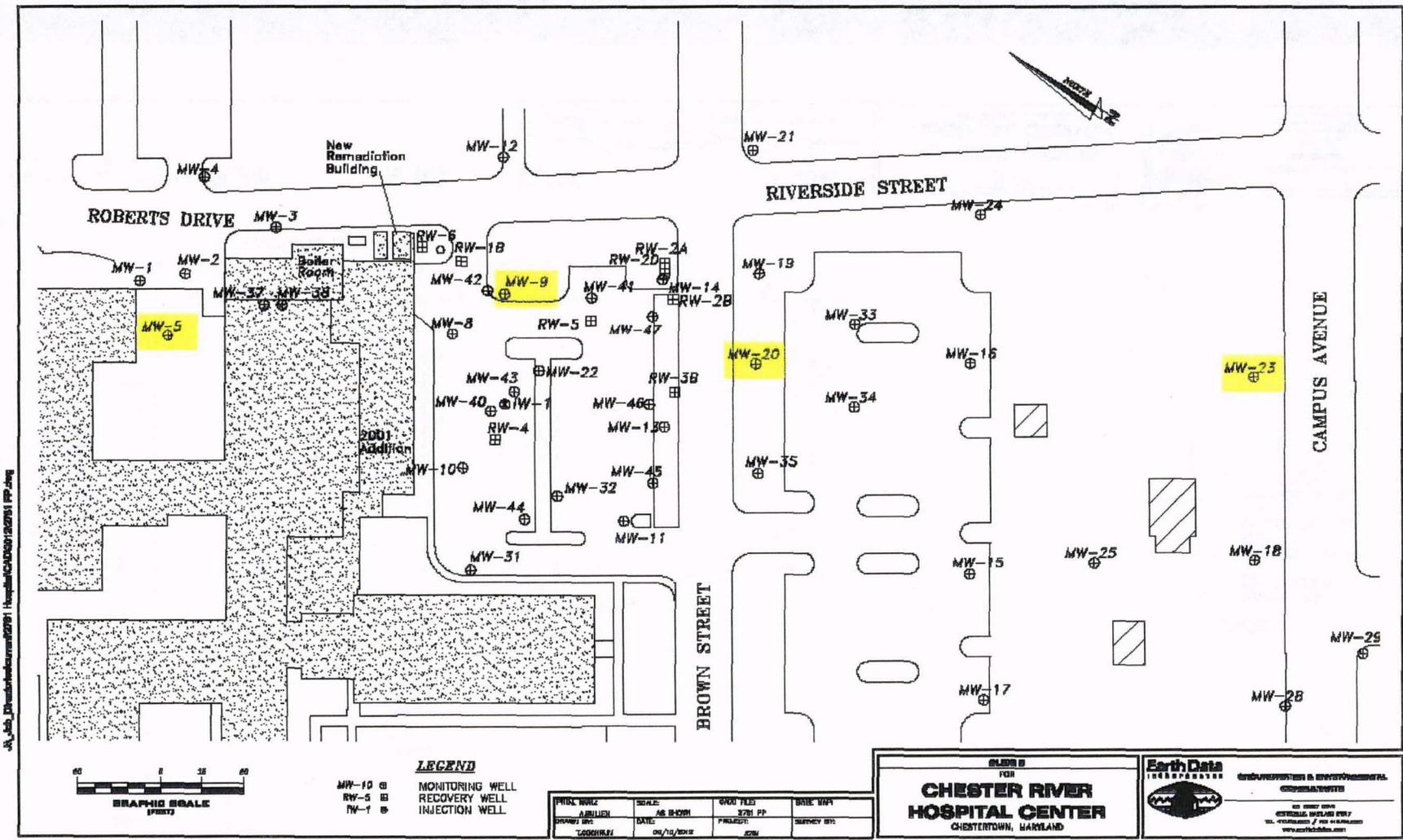


Figure 1. Free Product Recovery Graph, 2002-2012, Chester River Hospital Center, Chestertown, Maryland.



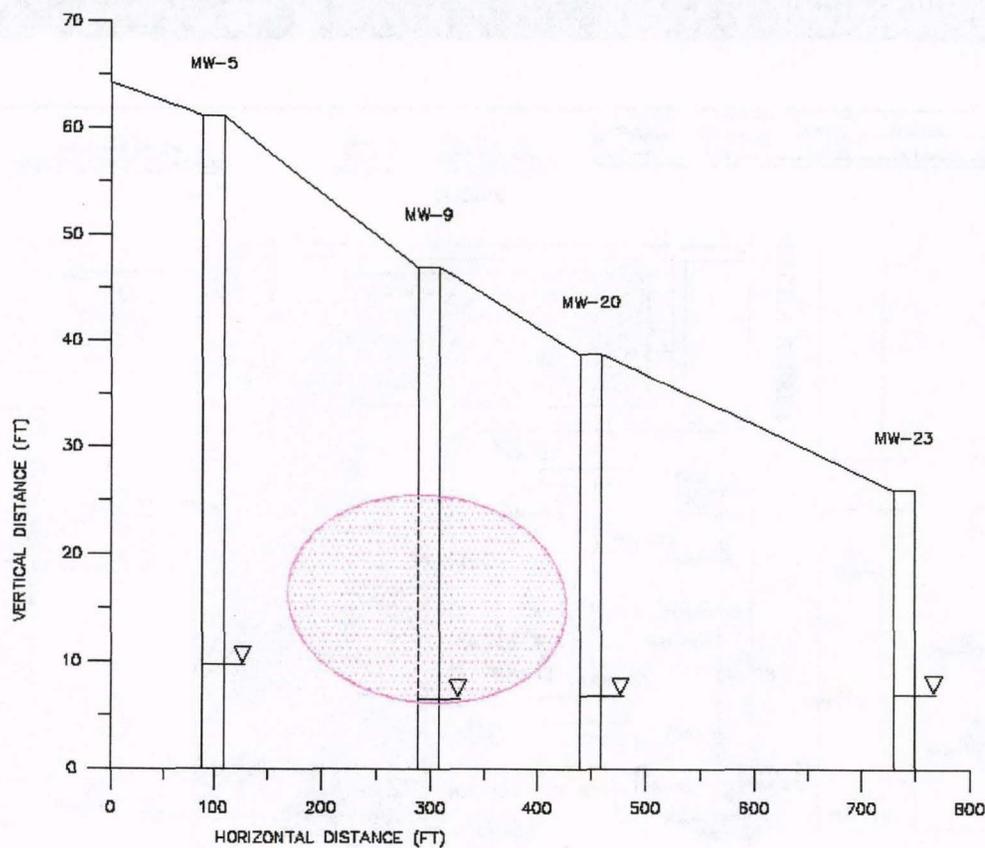
Water table contour map, May 31, 2012 - Chester River Hospital Center, Chestertown, Maryland.

# Water-table Contour Map (System On)



■ Monitoring Wells Analyzed for Dissolved O<sub>2</sub>

A:\\_Job\_Directory\2012\0531 Hospital\CS\0531\20120531 PP.dwg



**LEGEND**

- WATER TABLE (05/31/2012)
- AREA OF HIGHEST FUEL OIL CONCENTRATION
- MW-5 MONITORING WELL

AVERAGE DISSOLVED OXYGEN CONCENTRATION (mg/l) **6.75**

**2.63**

**5.24**

**8.38**

VERTICAL EXAGGERATION x 10

PRJ: MW5	SCALE: AS SHOWN	GRID FILE: 2781 PP	DWG: MW5
DRAWN BY: TADGIBLJ	DATE: 06/10/2012	PROJECT: ZWB	SURVEY BY:

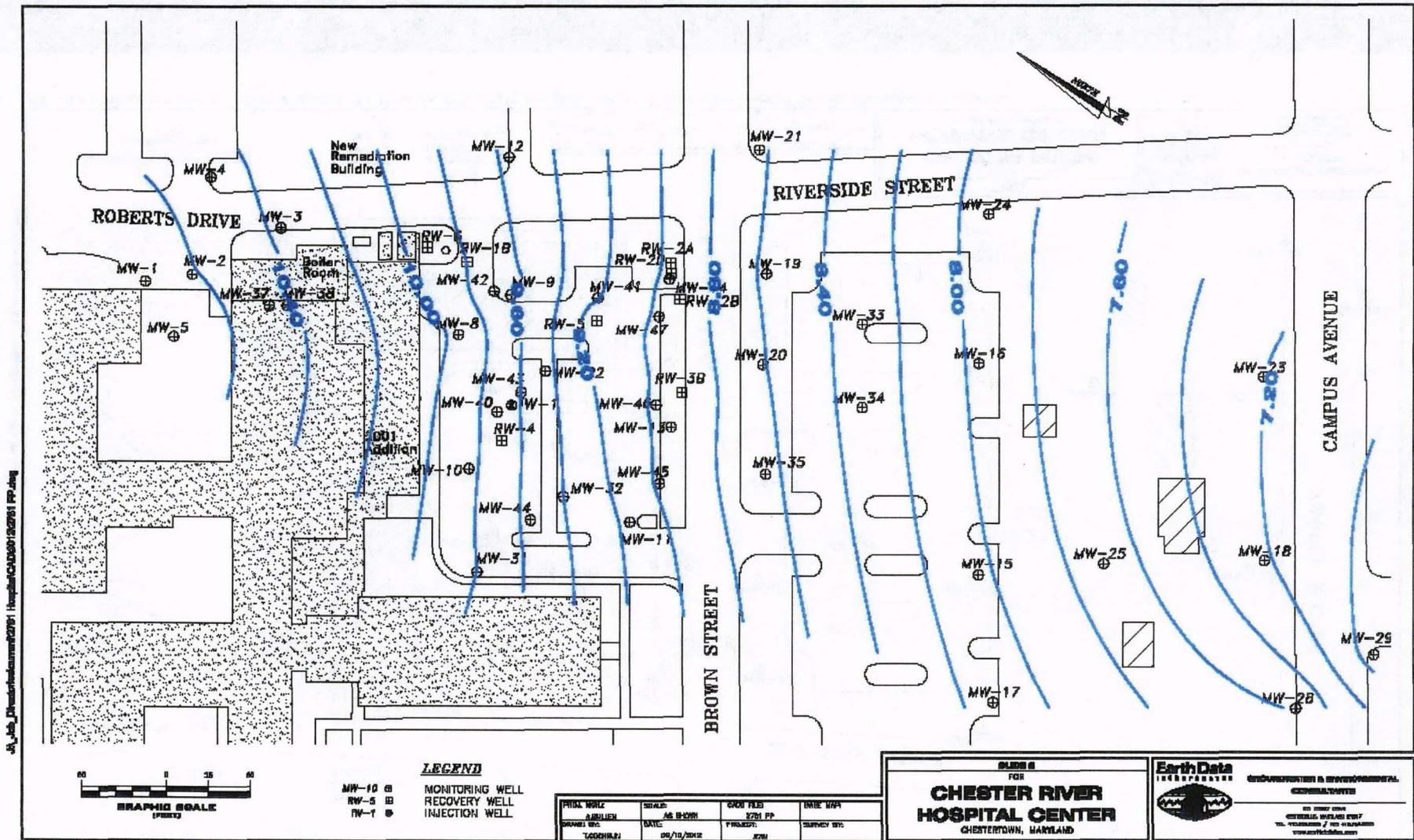
SLIDE 6  
FOR  
**CHESTER RIVER  
HOSPITAL CENTER**  
CHESTERTOWN, MARYLAND

**Earth Data**  
TECHNOLOGIES  
 GEOSPATIAL & ENVIRONMENTAL CONSULTANTS

85 GARY WAY  
 CHESTERS MILLS, MD 21615  
 TEL: 410-326-7800 / FAX: 410-326-7801  
 www.earthdata.com

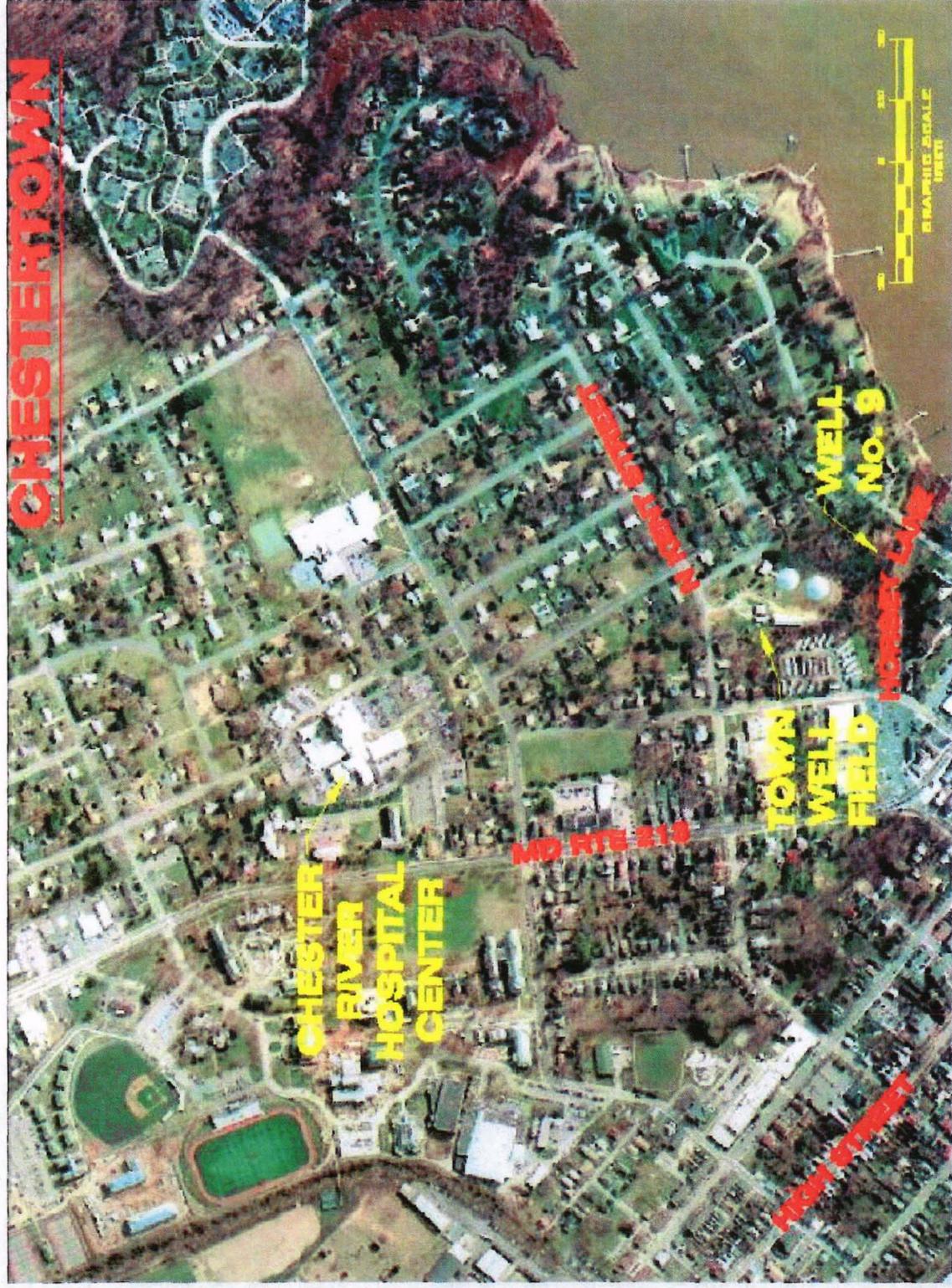
# ■ Dissolved O<sub>2</sub> Cross Section





Water table contour map, August 23, 2012 - Chester River Hospital Center, Chestertown, Maryland.

# Water-table Contour Map (System Off)



■ Chestertown Showing CRHC, Town Well Field & Well No.9

Department of Natural Resources  
Resource Assessment Service  
MARYLAND GEOLOGICAL SURVEY  
Emery T. Cleaves, Director

REPORT OF INVESTIGATIONS NO. 68

HYDROGEOLOGY, SIMULATION OF GROUND-WATER FLOW,  
AND GROUND-WATER QUALITY  
OF THE UPPER COASTAL PLAIN AQUIFERS  
IN KENT COUNTY, MARYLAND

by

David D. Drummond



Prepared in cooperation with the  
United States Department of the Interior  
Geological Survey

1998

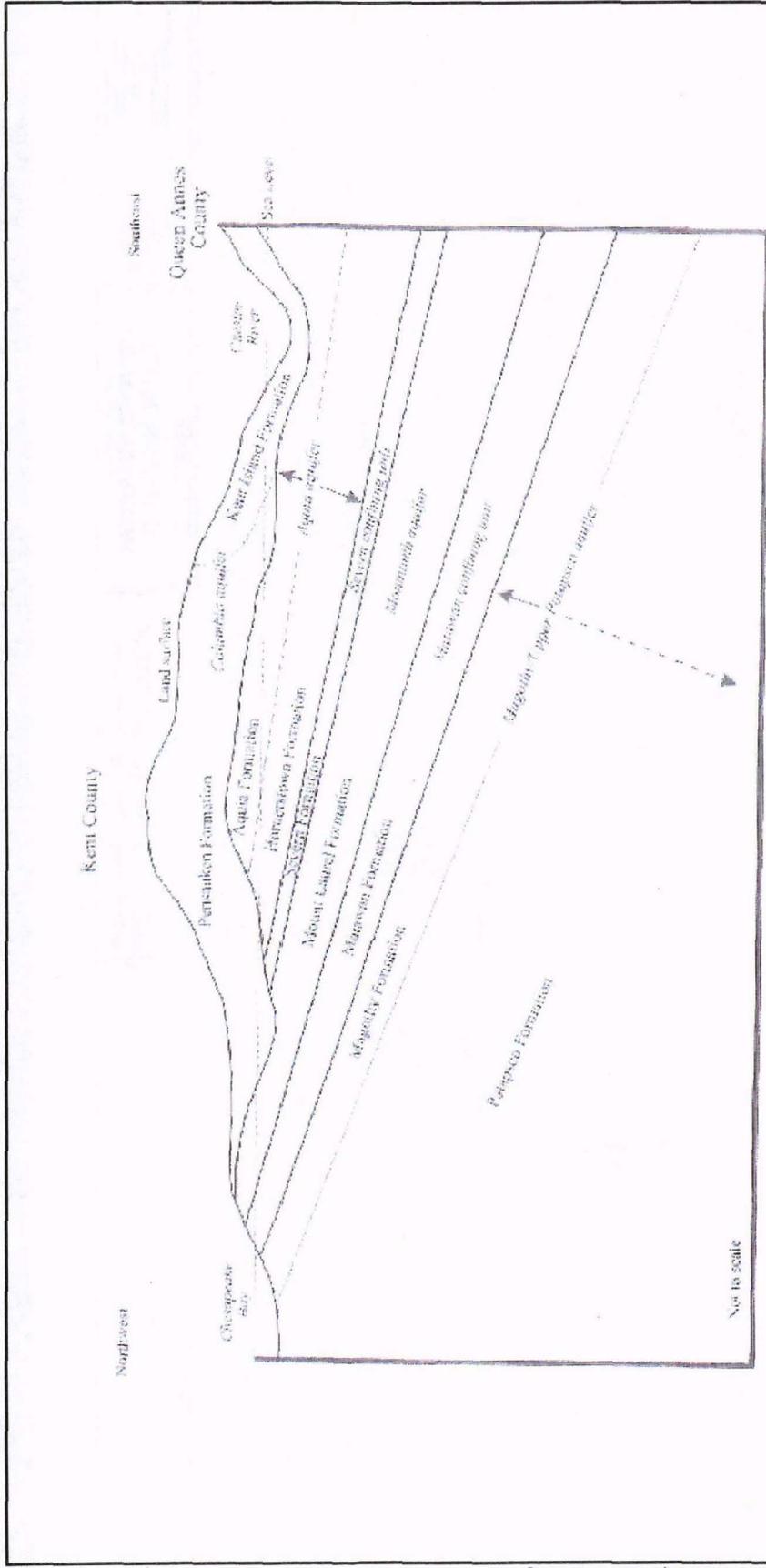


Figure 2.—Generalized cross section showing major hydrogeologic units in Kent County.

PRINT DATE	SCALE	COORD. FILED	DATE UPD.
APR 11 2008	AS SHOWN	2741.PP	
PROJECT	DATE	PROJECT	SERVICE NO.
100000001	04/11/08	2741	

**MAP 111**  
 FOR  
**CHESTER RIVER**  
**HOSPITAL CENTER**  
 CHESTERDOWN, MARYLAND

**Earth Data**  
 INFORMATION SYSTEMS  
 100000001

100000001  
 CHESTER RIVER  
 HOSPITAL CENTER  
 CHESTERDOWN, MARYLAND

\* DRUMMOND — 1998

# Generalized Geologic Cross Section (Kent County)

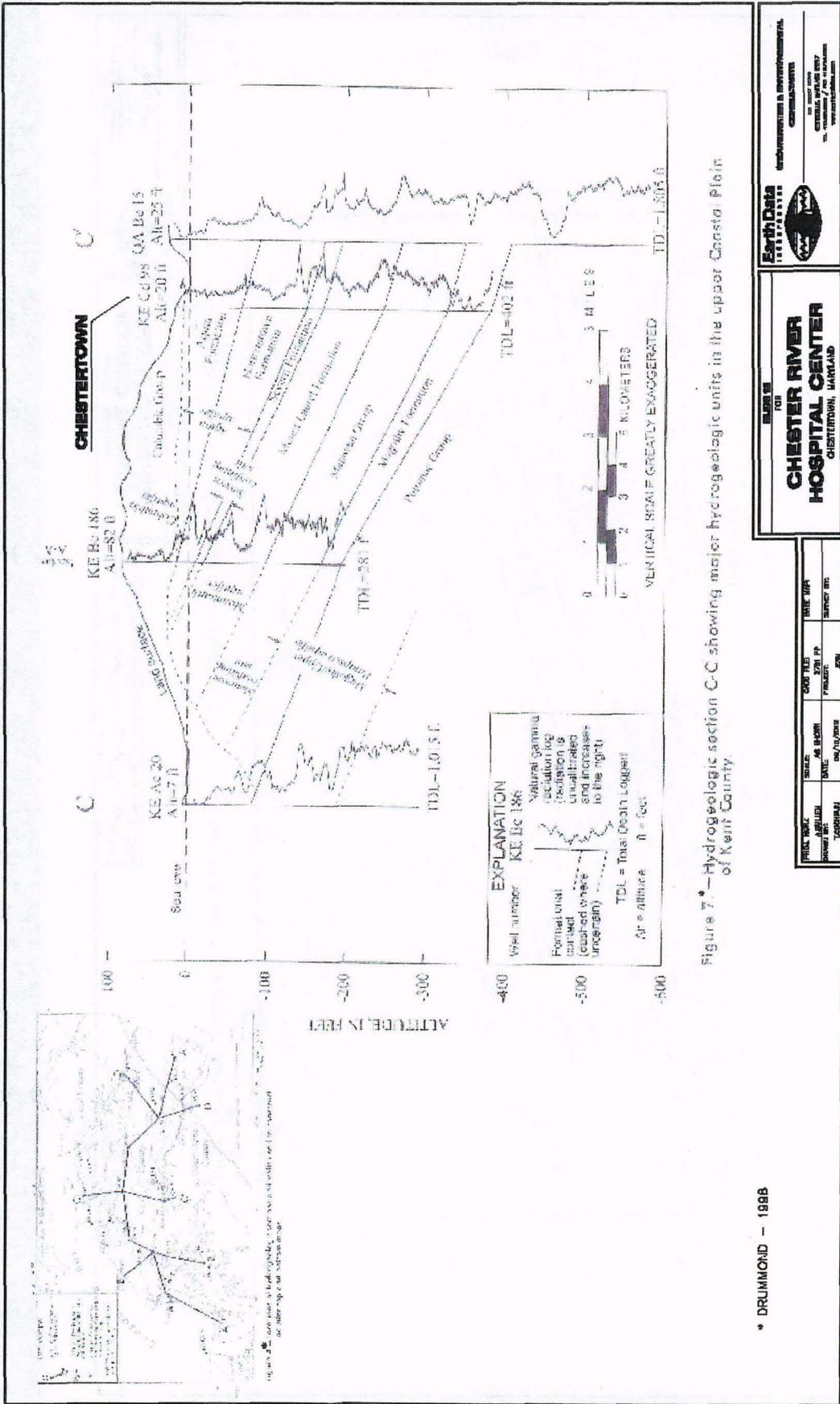


Figure 7. Hydrogeologic section C-C' showing major hydrogeologic units in the upper Coastal Plain of Kent County.

\* DRUMMOND - 1988

# Hydrogeologic Cross Section, C - C'

# Conclusions

- Injection Pilot-tests were conducted while the system was in operation.
- Radius of Influence of the Pilot-test injection was only 28 ft.
- Town Well Field is located between Well No. 9 and the CRHC.
- Well No. 9 is protected from surface contamination by over 200 ft of clay.

# **CRHC GROUNDWATER REMEDIATION AND CHESTERTOWN'S WELL NO 9**

## **CHESTERTOWN TOWN COUNCIL MEETING September 17, 2012**

- As part of a pilot-test approved by MDE, Earth Data injected carbonated water (CO<sub>2</sub>) into the unconfined aquifer at the CRHC to determine its effectiveness in freeing entrapped liquid hydrocarbons (fuel oil) from the subsurface soil.
- After completing the CO<sub>2</sub> injection test, oxygenated water (O<sub>2</sub>) was injected into the unconfined aquifer to test its ability create an subsurface environment conducive to the growth of naturally occurring, hydrocarbon degrading bacteria that were present in the subsurface.
- No bacteria were introduced into the area of contamination to degrade the petroleum.
- Test results show a high level of dissolved oxygen in the unconfined aquifer at the CRHC in areas where no fuel oil contamination is present.
- In areas where fuel oil contamination is present, the naturally occurring, hydrocarbon degrading bacteria deplete the dissolved oxygen supply present in the groundwater.
- Aerobic bacteria grow in the presence of oxygen and produce carbon dioxide.
- Anaerobic bacteria grow in the absence of oxygen and produce methane.
- Aerobic bacteria degrade petroleum hydrocarbons much more efficiently than anaerobic bacteria.
- Test results showed that oxygenated water injected into the unconfined aquifer at the CRHC traveled only 28 feet before being consumed by bacteria or escaping to the atmosphere.
- All injection tests were conducted while the containment system was operating.
- The Chestertown well field on Kent Ave is located directly between the CRHC and the supply well No. 9 on Horsey Ave.
- Several wells in the Chestertown well field are screened in the unconfined Aquia Aquifer.
- Chestertown water supply well No. 9 is completed in the deep, confined Magothy aquifer.
- Iron bacteria are aerobic and can not live in the absence of oxygen.

- The results of Bart tests conducted to determine the presence of iron bacteria are very difficult to interpret.
- In the Chestertown area, the Magothy aquifer is separated from the surface by over 200 feet of confining clay.
- The Magothy aquifer is notorious for high levels of dissolved iron.
- Screens of wells completed in the Magothy aquifer often become clogged with iron precipitate and must be redeveloped periodically.