MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT

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Martin O'Malley
Governor

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Lieutenant Governor

Robert M. Summers, Ph.D.
Secretary

March 25, 2014

Michael Forlini, Esquire
Funk & Bolton
36 South Charles Street, 12th Floor
Baltimore MD 21201

RE: RESPONSES TO QUESTIONS
Case No. 1987-2534-KE
Chester River Hospital Center
100 Brown Street, Chestertown
Kent County, Maryland
Facility I.D. No. 3168

Dear Mr.Forlini:

The Maryland Department of the Environment (MDE) appreciates the opportunity to respond to the Town of Chestertown's (the Town) questions and concerns raised in your November 5, 2013 letter. The Department has prepared the following responses to address the Town's concerns, both presented in your letter and in Mr. William Ingersoll's October 23, 2013 letter. Once the Town has reviewed the responses, the MDE would like to again meet with the Town and the Chester River Hospital Center / Shore Regional Health (the Hospital) and its consultants to discuss any remaining concerns.

After extensive scientific and technical review by the Department's Oil Control Program (OCP), Underground Injection Control (UIC) Program, and Water Supply Program (WSP) and the imposition of requirements for appropriate safeguards, the MDE concluded that the approved injection of Ivey-sol for this short-term, small-scale pilot will not pose a risk to the Town's active water supply wells. Factors that lead the MDE to this conclusion included:

- the limiting of approval of the Hospital's remediation plan to a short-term, small-scale pilot study;
- a review of groundwater flow rates and the biodegradability rate of Ivey-sol, which together show that 100 percent of the surfactant can be expected to degrade before it could ever reach the Town's active municipal well field;
- the active recovery of surfactant, petroleum, and groundwater that will take place during the injection activities and afterwards by the pump and treat system;
- a review of the properties of Ivey-sol, which shows its only noted health effects are abdominal discomfort due to ingestion (which would not be expected to occur) and minor skin irritation while handling (for which precautions will be taken)

- additional required monitoring to ensure that all Ivey-sol has been recovered and/or degraded; and
- the fact that actions such as additional groundwater pumping could be taken if surfactant or contaminants are detected in down gradient monitoring wells.

The pilot project was approved because the proposed technology may lead to the removal of significant residual petroleum from the Aquia aquifer on the Hospital property (i.e. the source area), which would represent a significant step toward a final resolution of contamination issues and would afford greater protection to the Town's drinking water supply wells.

This letter presents background on the development and approval of the Hospital's remediation plan, followed by a summary of the approved pilot scale version of the plan. The letter also addresses specific concerns related to the evaluation of the proposed and approved plan by the UIC Program, as well as the OCP and WSP. Finally, the letter addresses other concerns presented by the Town.

Background

On July 22, 2013, the Hospital submitted a draft version of a corrective action plan for the MDE's review and comment. The plan called for the injection of a surfactant solution, Ivey-sol, to assist in "dissolving" the residual adsorbed / absorbed petroleum hydrocarbons into the shallow groundwater formation. A "Push-Pull" method was proposed to assist in the distribution ("Push") and extraction ("Pull") efforts. Residual "dissolved" petroleum hydrocarbons would then be more available for extraction by the on-site pump and treat system.

The Department completed an initial review of the draft plan and provided comments to the Hospital on August 2, 2013. On August 22, 2013, an email from the Hospital's consultant was received with various attachments for the Department to review in anticipation of a technical meeting held on August 26, 2013 at the MDE's office with representatives of the Hospital and MDE to discuss the proposed plan.

On September 13, 2012, the Department received the revised *Groundwater Remediation 2013 Action Plan*. The Department reviewed the plan and agreed that the technology could be successful in extracting more residual petroleum contamination than the current pump and treat system could do alone. The Department approved the proposal with several modifications as detailed in the October 17, 2013 letter and summarized below.

On October 28, 2013, representatives from the Town, the Hospital and its consulting team, and the MDE met to discuss the plan. In the days following the meeting, the Department received the letters from Mr. Ingersoll and you, which presented the Town's concerns with the remediation plan.

Approved Pilot Test Plan Summary

While contaminants are being prevented from moving down gradient via a hydraulic barrier between the source area and the Town's active well field (i.e. the pump and treat system), the system is no longer removing significant amounts of contaminants. A better long term practice to minimize the risk of movement of contaminants toward the Town's active well field is to remove the contaminants at the source

area. The approved pilot project will provide important information to assess the feasibility of removing additional petroleum hydrocarbons from the formation and groundwater in the source area.

As discussed in the Department's October 17, 2013 plan approval letter, the MDE had several concerns with the *Groundwater Remediation 2013 Action Plan.* Generally, the concerns were related to the overly aggressive nature of the proposal, the nature of surfactants, and the lack of hydraulic control where some of the injection was proposed. Because of these concerns, the MDE approved the plan with several modifications, the most significant of which was to limit the scope of the plan to a smaller pilot scale demonstration with more protective monitoring. The following summary is provided to further explain what was ultimately approved as a pilot test of the Ivey-sol surfactant injections.

The week prior to shutting off the recovery system, routine sampling and gauging of wells will occur. The analysis for surfactants by EPA Method SM5540D will be added to the list of sample analyses for select wells to gather baseline conditions prior to the injection activities (see attached table). Injection and extraction events (i.e. "Push-Pull" events) will be conducted at six wells: RW6, RW2D, MW13, MW10R, MW22, and RW5 (see attached map). All six locations are within the area approved by the MDE and all locations are within the area of hydraulic control of the remediation system.

The following summarizes the major steps to be taken during the week long injection portion of the pilot test.

Day 1

- A round of gauging and sampling data will be collected and recorded from select wells as indicated on the attached table.
- The remediation system will be turned off.
- At each well location, a mixture of the Ivey-sol (approximately 5 gallons) and potable water will be prepared in a 275-gallon tote (a total of 1,650 gallons of Ivey-sol mixture across the six wells).
- The injection, or "Push," portion of the event will involve the Ivey-sol mixtures being gravity fed into each well (i.e. not pumped under pressure). The gravity feeding of the surfactant mixture may take upwards of 1 hour or longer depending on the specific well hydraulics.
- The injection wells and surrounding monitoring wells will be gauged periodically during the daily activities.
- Groundwater from the wells will also be assessed for surface tension by an approved field testing method. Surface tension results provide a near real time indication of the presence/absence of surfactants.

Day 2

- A round of gauging and sampling data will be collected and recorded from select wells as indicated on the attached table.
- Approximately 24 hours after the injection, a submersible pump will be placed into each injection well and approximately 1,650 gallons of liquids (i.e. groundwater, Ivey-sol, and LPH) will be extracted from each well as the "Pull" portion of the event (roughly 10,000 gallons total). At an average pumping rate of 9 gallons per minute, which is the maximum rating for a typical

submersible pump, the extraction portion of the event will take upwards of 3 hours provided that pumping is done simultaneously from all six wells. The extracted liquids will be pumped into two 5,000-gallon poly tanks for temporary storage. The extracted liquids will be transported off-site for proper disposal prior to the next "Pull" event.

- Once the "Pull" event has been completed, a round of data will be collected and recorded from select wells as indicated on the attached table.
- The next round of Ivey-sol mixtures will be prepared and injected into the six wells for the second "Push" event.
- The injection wells and surrounding monitoring wells will be gauged periodically during the daily activities. Groundwater from the wells will also be assessed for surface tension throughout the day.

Day 3

- A round of gauging and sampling data will be collected and recorded from select wells as indicated on the attached table.
- If not completed on Day 2, the liquids extracted from the Day 2 "Pull" event will be transported off-site.
- Approximately 24 hours after the Day 2 injection, the second "Pull" event will commence.
- Once the "Pull" event has been completed, a round of data will be collected and recorded from select wells as indicated on the attached table.
- The next round of Ivey-sol mixtures will be prepared and injected into the six wells for the third and final "Push" event of the pilot test.
- The injection wells and surrounding monitoring wells will be gauged periodically during the daily activities. Groundwater from the wells will also be assessed for surface tension throughout the day.

Day 4

- A round of gauging and sampling data will be collected and recorded from select wells as indicated on the attached table.
- The liquids extracted from the Day 3 "Pull" event will be transported off-site.
- Approximately 24 hours after the Day 3 injection, the third and final "Pull" event will commence.
- Once the "Pull" event has been completed, a round of gauging data will be collected and recorded from select wells as indicated on the attached table. Groundwater from the wells will also be assessed for surface tension throughout the day.

Day 5

- Monitoring well gauging and sampling will be completed as indicated on the attached table. Groundwater from the wells will also be assessed for surface tension.
- The liquids extracted from the Day 4 "Pull" event will be transported off-site.
- The recovery system will be restarted.

For a minimum of three months following the pilot test, monitoring wells will be gauged and sampled for the presence of volatile organic compounds (VOCs) (via EPA Method 8260), total petroleum

hydrocarbons (TPH-DRO) (via EPA Method 8015), and surfactants (via EPA Method SM5540D). The particular wells to be sampled and the sampling frequencies are detailed on the attached table.

UIC Program and WSP Review

The Hospital location is within the source water assessment area for the Town's well field as delineated by the WSP in the *Source Water Assessment for the Town of Chestertown*, December 2003. The petroleum release was identified in the WSP's report as a potential risk to the Town's well field. For this reason the WSP was requested to provide comments on the proposed use of Ivey-sol to enhance petroleum hydrocarbon removal. The UIC Program, however, has regulatory authority concerning the injection of any material into an underground source of drinking water.

In line with these responsibilities the WSP and the UIC Program thoroughly reviewed the use of Ivey-sol in conjunction with the "Push-Pull" methodology in the proposed groundwater remediation project. The review identified several factors and safeguards, summarized below, that collectively allowed the MDE to conclude that the approved short-term, small-scale pilot will not pose a risk to the Town's active water supply wells. The factors and safeguards that lead MDE to this conclusion are discussed below.

Hydraulics

The hospital is located within the 10-year time of travel (i.e. Zone 2) of the WSP's *Source Water Assessment*. Based on the Hospital's location within Zone 2, it is estimated that there would be a 2-year time of travel for groundwater flowing from the Hospital to the Town's active well field, which would equate to roughly 2 feet per day. Based upon measured values from the on-site wells and logged geology, an estimated time of travel was calculated to be 0.4 feet per day (146 feet per year), with the equivalent time of travel from the Hospital to the Town's active well field at approximately 10 years. Looking at the analytical data from the monitoring wells after the June 2012 shutdown of the system, it took approximately 10 months for total petroleum hydrocarbons in the diesel range (TPH-DRO) to be detected again in a well approximately 100 feet away from known residual source areas. The time for the TPH-DRO to travel that distance is on par with the 0.4 feet per day or 10 year time of travel value. In either case, there is a range of time in which a contaminant may be able to reach the Town's active well field. These time of travel estimates (i.e. 2 years to 10 years) do not take into consideration any other processes such as biodegradation, diffusion, and dispersion. Taking these factors into account, whether for the surfactant Ivey-sol or the petroleum contaminants, the likely time of travel from the Hospital to the Town's active municipal well field is greater than 2 years.

Using the more aggressive estimate of 2 feet per day, during the course of the approved groundwater pump and treat system for up to a week, there would be an approximate 14 feet of potential travel from an injection well. The furthest down gradient approved injection well is MW13. The demonstrated radius of influence from the pump and treat system extends approximately 90 feet down gradient from MW13 (see attached Figure 3, December 18, 2013 Water Contour map). The result is that while the pump and treat system will be turned off for an approved period of time, once turned back on it will recover groundwater, surfactants, and "dissolved" petroleum from the area of MW13 and the other injection wells.

Additionally, part of the remedial approach is to conduct a recovery event ("Pull" event) from each injection well 24 hours after the "Push" event. During the "Pull" events, approximately six (6) times the volume of injected surfactant solution will be extracted from each injection well. There will be three such "Pull" events conducted on successive days totaling approximately 30,000 gallons of liquid extracted from the pilot test area.

Based on the Department's assessment of the approved pilot test injection of Ivey-sol coupled with the "Push-Pull" procedure, the restarting of the remediation system, and the overall groundwater movement, the MDE expects the surfactants to remain within the pilot test area.

Biodegradability

The Material Safety Data Sheet (MSDS) # 120829 for Ivey-sol states that the biodegradability of Ivey sol is greater than 90 percent in 28 days. If there are any residual surfactants not removed by the "Pull" part of this process or the restart of the pump and treat system, these residuals are expected to biodegrade at the stated biodegradation rate. At this rate, the concentrations potentially detectable would be in the parts per trillion range at approximately six months after injection. It is very conservative to predict that 100 percent of the Ivey-sol would degrade prior to reaching the active municipal well field even at the more aggressive time of travel estimate (i.e. 2 years).

Toxicity

Based on a review of the Ivey-sol MSDS and information obtained by the Department from Ivey International, Inc. labeled as "patented and or proprietary," there are no chemicals in Ivey-sol regulated per the "2012 Edition of the Drinking Water Standards and Health Advisories, EPA document 822-S-12-001." Further, the MSDS gives no indication of adverse toxicological effects. However, mild skin irritation due to direct skin contact and abdominal discomfort due to ingestion of the product are noted. Ivey-sol is not expected to be ingested in a pure or dissolved form as discussed above. Workers will use proper personal protective equipment to limit any exposures to Ivey-sol during the pilot test.

Temperature and pH

Section 10 of the MSDS ("Stability and Reactivity") states to "avoid strong bases at high temperatures, strong acids..." as they may cause product decomposition. There is no reason to anticipate that strong acids or bases, with or without high temperatures, would exist in the subsurface. Therefore, there is no reasonable potential for degradation resulting from exposure to strong acids or bases and high temperatures.

Monitoring

As an additional measure, the approved sampling will act to ensure that all Ivey-sol has been recovered and/or degraded and that all VOCs are adequately monitored. If there were some amount of the surfactant or contaminants detected in down gradient monitoring wells, actions could be taken (e.g., additional groundwater pumping) within sufficient time to mitigate those concerns prior to surfactants or contaminants reaching the Town's active well field.

UIC Program Rule Authorization Determination

Federal UIC regulations, which Maryland incorporates by reference, support State and Federal UIC programs to Rule authorize injection practices with the goal of groundwater remediation, including the use of surfactants, or to issue a discharge permit. There is State and Federal precedent for Rule authorizing the subsurface emplacement of fluids with the goal of remediating contaminated groundwater. These types of injection practices are not characterized as disposal, therefore Rule authorization is the typical determination.

In this case, a Groundwater Discharge Permit was not required for the injection of Ivey-sol in the approved pilot scale project, and instead the use of Ivey-sol was authorized by Rule, which is typical of such groundwater remediation plans. However as stated in our Rule authorization, "the Department reserves the right to require additional operational requirements, including monitoring, and obtaining a Groundwater Discharge Permit, if found necessary to further protect underground sources of drinking water." Rule authorization is also contingent upon compliance with the conditions and restrictions detailed in the Department's October 17, 2013 letter, along with any additions and modifications made as part of the extended review process. Finally, it is important to note that this Rule authorization is limited to this short term, small footprint pilot project. Any planned expansion of the use of Ivey-sol beyond this pilot project will require a new review of whether or not a UIC Groundwater Discharge Permit would be required.

Additional Concerns

The Department understands that Ivey International, Inc. has provided the Town with information about projects where Ivey-sol was used. If additional information is required by the Town, those requests should be directed to the Hospital and its consultants.

The Department is not aware of any financial assurance or bond that has been executed, and is not aware of any requirement for one to be executed. To the extent that any impact to the Town's active municipal wells is directly attributable to the actions or inactions of the Hospital, the MDE would consider the Hospital to be responsible for any necessary mitigation. The Town will need to explore its legal rights through its own legal counsel.

The Department will evaluate the success of the pilot test by taking several factors into consideration including: overall petroleum mass removal; evaluation of the results from the post-injection monitoring; the ability of Ivey-sol to be injected into the wells; and the ability of Ivey-sol and contaminants to be extracted. As for measurable endpoints to consider for determining final case closure, the Hospital has proposed to eliminate the free product and TPH-DRO. As with all OCP remediation cases, a minimum of one year post-remedial monitoring prior to determining final case closure is required.

As demonstrated in the attached cross-sections, the subsurface geology is relatively uniform and the smear zone is adequately characterized. The existing well network adequately covers the site and the monitoring wells are constructed to depths that coincide with the upper portions of the municipal wells.

The OCP Compliance Division recently completed a compliance inspection on the Hospital in relation to the ongoing use of the current underground storage tank (UST), previously abandoned USTs, and aboveground storage tank operations. The OCP Compliance Division concluded that all operations were found to be in compliance and there was no evidence of an ongoing or recent release.

Summary

The UIC Program, the OCP, and the WSP have been working in concert in reviewing the proposed remediation plan, and collectively agreed to the reduced pilot scale implementation that was ultimately approved by the MDE. The pilot project was approved because the proposed technology may lead to the removal of significant residual petroleum from the source area. As detailed in this letter, the MDE has concluded that as approved the injection of Ivey-sol for this short-term, small-scale pilot does not pose a risk to the active water supply wells of the Town.

If you have any questions, please contact me at 410-537-3443 (email: chris.ralston@maryland.gov) or the case manager, Ms. Susan Bull, at 410-537-3499 (email: susan.bull@maryland.gov).

Sincerely,

Christopher H. Ralston, Administrator
Oil Control Program

CHR/nln

Enclosures

cc: Mayor Chris Cerino (Town of Chestertown)
Mr. Bill Ingersoll (Manager-Town of Chestertown)
Mr. John Beskid (Kent County Health Dept.)
Mr. Kenneth Kozel (Shore Regional Health)
Michael Powell, Esquire (Gordon Feinblatt)
Mr. Dane Bauer (Daft McCune Walker, Inc.)
Mr. Kunal Gangopadhyay (EBA Engineering, Inc.)
Mr. Andrew Bullen (Earth Data, Inc.)
Lynn Angotti, Esquire (Office of the Attorney General)
Mr. Michael Eisner
Ching-Tzone Tien, Ph. D, P.E.
Mr. John Grace
Mr. Saeid Kasraei
Ms. Susan Bull
Mr. Andrew B. Miller
Mr. Horacio Tablada

MDE Case No. 1987-2534-KE - Chester River Hospital Center
Pilot Test Well Designations

Well ID	TOC Elevation (ft)	Well Diameter (in)	Well Depth (ft)	Top of Screen Depth (ft)	Tag Number	Comments	Pilot Test Well Type	Gauging Frequency	Sampling Frequency	Analytes Sampled
RW-1B	46.71	6	60	35	KE-94-0592	abandoned Aug '13				
RW-2D	40.54	6	55	30	KE-94-0593		Injection Well	B, D, A	B, A	PT
RW-3B	39.45	6	55	30	KE-94-0594					
RW-4	48.15	6	54	29	KE-94-0796	raised TOC by 2.46 (18 Dec 12)				
RW-5	43.34	6	55	30	KE-94-0809	raised TOC by 0.42 (8 Apr 11)	Injection Well	B, D, A	B, A	PT
RW-6	47.22	6	57	32	KE-94-0797		Injection Well	B, D, A	B, A	PT
MW-1	57.05	4	60	40	KE-81-1375					
MW-2	56.37	4	60	40	KE-81-137_					
MW-3	50.55	4	58	38	KE-81-1444					
MW-3b										
MW-4	53.40	4	60	40	KE-81-1443	raised TOC by 0.75 (25 Jun 07)				
MW-5	61.08	4	65	45	KE-88-0093					
MW-6		4	54	34	KE-88-0094	abandoned Nov '00				
MW-7		4	48	38	KE-88-0167	abandoned Nov '00				
MW-8		4	47	37	KE-88-0168	abandoned Aug '13				
MW-9	46.10	4	47	37	KE-88-0169	lowered TOC by 0.85 (15 Oct 12)				
MW-10		4	50	30	KE-88-0185	abandoned Nov '12				
MW-10R	48.70	2	54	29	KE-95-1066		Injection Well	B, D, A	B, A	PT
MW-11	41.49	4	46	23	KE-88-0186					
MW-12	44.46	4	48	33	KE-88-0187					
MW-13	41.70	4	44	29	KE-88-0188	raised TOC by 0.88 (1 May 02)	Injection Well	B, D, A	B, A	PT
MW-14	41.38	4	43	23	KE-88-0189	raised TOC by 0.7 (8 Apr 02)				
MW-15	35.01	4	45	20	KE-88-0196		Monitoring Well	A	A	PT
MW-16	35.55	4	39	24	KE-88-0197		Monitoring Well	A	A	PT
MW-17	35.49	4	38	23	KE-88-0198		Monitoring Well	A	A	PT
MW-18	35.82	4	39	25	KE-88-0199		Monitoring Well	A	A	PT
MW-19	38.85	4	46	23	KE-88-0209		Monitoring Well	B, D, A	B, A	PT
MW-20	38.72	4	43	23	KE-88-0213		Monitoring Well	B, D, A	B, A	PT

Well ID	TOC Elevation (ft)	Well Diameter (in)	Well Depth (ft)	Top of Screen Depth (ft)	Tag Number	Comments	Pilot Test Well Type	Gauging Frequency	Sampling Frequency	Analytes Sampled
MW-21	38.55	4	43	23	KE-88-0214					
MW-22	47.04	4	56	26	KE-88-0207	raised TOC by 1.29 (18 Dec 12)	Injection Well	B, D, A	B, A	PT
MW-23	35.95	4	40	25	KE-88-0225		Monitoring Well	A	A	PT
MW-24	36.56	4	40	25	KE-88-0226		Monitoring Well	A	A	PT
MW-25	36.10	4	40	25	KE-88-0227		Monitoring Well	A	A	PT
MW-27		4	45	25	KE-88-0229	abandoned Nov '06				
MW-28	35.90	4	39	24	KE-88-0230		Monitoring Well	A	A	PT
MW-29	35.15	4	39	24	KE-88-0231		Monitoring Well	A	A	PT
MW-30		4	49	34	KE-88-023_	abandoned Nov '00				
MW-31		4	48	33	KE-88-0391	abandoned Nov '12				
MW-31R	47.40	2	54	29	KE-95-1067					
MW-32	47.41	4	47	32	KE-88-0392	raised TOC by 2.81 (18 Dec 12)				
MW-33	36.52	4	41	26	KE-88-0415		Monitoring Well	B, D, A	B, A	PT
MW-34	36.64	4	41	26	KE-88-0416		Monitoring Well	B, D, A	B, A	PT
MW-35	38.62	4	43	28	KE-88-0417		Monitoring Well	B, D, A	B, A	PT
MW-37	50.54	4	70	11	KE-88-0497	lowered TOC by 1.03 (28 Sep 10)				
MW-38		4	55	40	KE-92-0002	pump stuck in collapsed well				
MW-40	48.69	4	55	30	KE-94-0803	raised TOC by 0.46 (9 Jun 09); raised TOC by 2.13 (18 Dec 12); resurvey May '13	Monitoring Well	B, D, A	B, A	PT
MW-41	42.92	4	55	30	KE-94-0802		Monitoring Well	B, D, A	B, A	PT
RW-1A		6	56	36	KE-88-0190	abandoned Jan '01				
RW-2A		6	47	27	KE-88-0224	abandoned Mar '08				
RW-2B		6	60	30	KE-88-0425	abandoned Mar '08				
MP-2B		2	60	30	na					
RW-2C		6				abandoned Sep '03				
RW-3A		6	60	30	KE-88-0411	abandoned Sep '03				
MP-3A		2	60	30	na					
MW-42	46.15	2	50	30	KE-95-0342	lowered TOC by 0.89 (15 Oct 12)	Monitoring Well	B, D, A	B, A	PT

Well ID	TOC Elevation (ft)	Well Diameter (in)	Well Depth (ft)	Top of Screen Depth (ft)	Tag Number	Comments	Pilot Test Well Type	Gauging Frequency	Sampling Frequency	Analytes Sampled
MW-43	47.90	2	50	30	KE-95-0343	raised TOC by 1.48 (18 Dec 12); resurvey May '13	Monitoring Well	B, D, A	B, A	PT
MW-44	47.20	2	50	30	KE-95-0344	raised TOC by 0.8 (18 Dec 12); resurvey May '13				
MW-45	40.91	2	45	25	KE-95-0345		Monitoring Well	B, D, A	B, A	PT
MW-46	41.08	2	48	28	KE-95-0346		Monitoring Well	B, D, A	B, A	PT
MW-47	40.74	2	50	30	KE-95-0347		Monitoring Well	B, D, A	B, A	PT
IW-1		4	61	31	KE-95-0752	raised TOC by 1.64 (18 Dec 12)				
MW-48	36.22	2			KE-95-1113		Monitoring Well	A	A	PT
MW-49	35.49	2			KE-95-1114		Monitoring Well	A	A	PT
MW-50	35.64	2			KE-95-1115		Monitoring Well	A	A	PT

Notes

Indicates well to be used for injection of Ivey-sol during the pilot test
Indicates a well to be used for monitoring during the pilot test.

Frequency

B - Before — Sampled and gauged prior to turning off pump and treat system and before injection of Ivey-sol.
D - During — Gauged during the Ivey-sol injection events.
A - After — Sampled and gauged one week and monthly for at least three months after Ivey-sol injection events / pump ant treat system restart.

Analytes

PT - Pilot Test — Sampled for VOCs via EPA Method 8260, TPH-DRO via EPA Method 8015, and surfactants via EPA Method SM5540D.

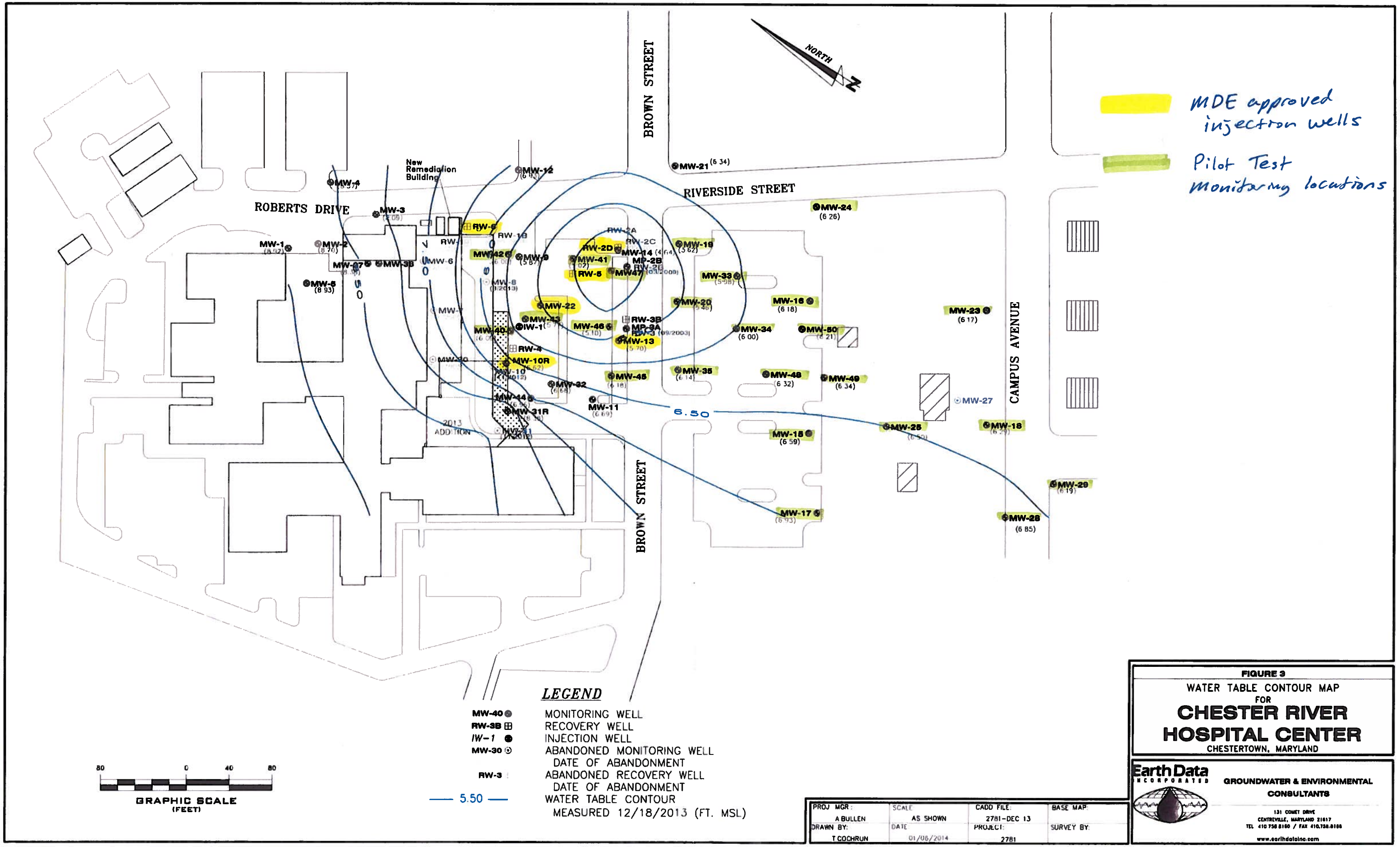
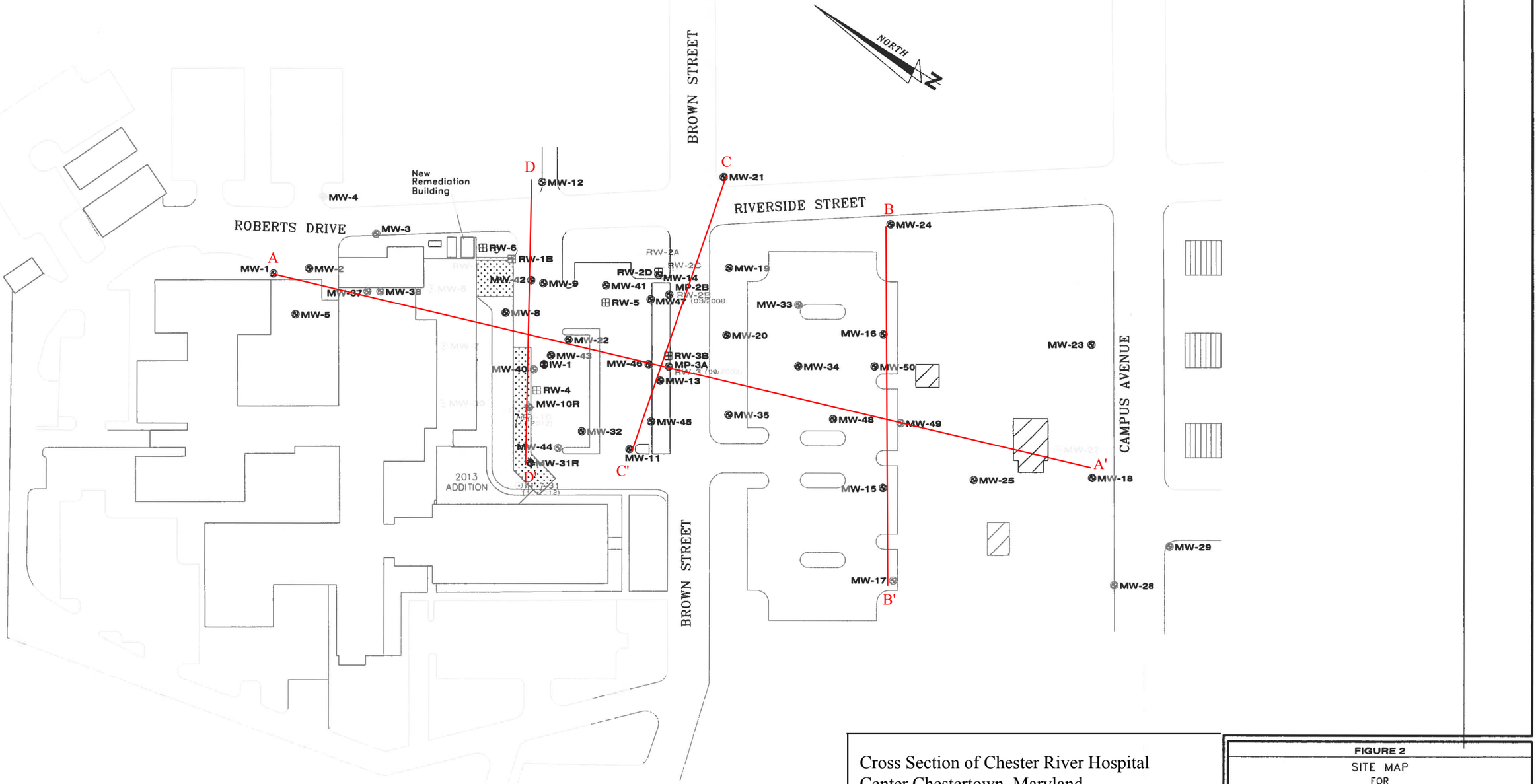


Figure 3 – Water table contour map December 18, 2013 – Chester River Hospital Center, Chestertown, Maryland.



Cross Section of Chester River Hospital Center Chestertown, Maryland

EBA project No. 4070-00-000

PROJ MGR	SCALE	CADD FILE	BASE MAP
A BULLEN	AS SHOWN	2781 2013 QUARTER2	
DRAWN BY	DATE	PROJECT	SURVEY BY
T COCHRUN	06 06 2 3	2781	

FIGURE 2

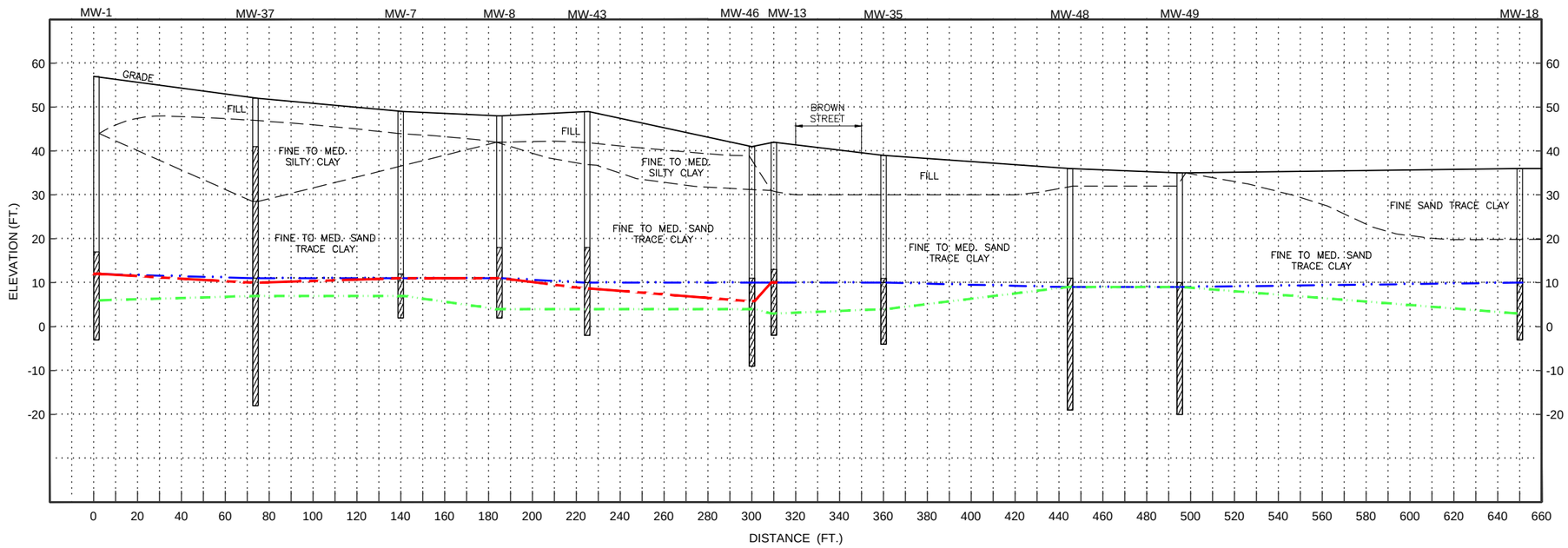
SITE MAP
FOR
CHESTER RIVER HOSPITAL CENTER
CHESTERTOWN, MARYLAND

Earth Data INCORPORATED
GROUNDWATER & ENVIRONMENTAL CONSULTANTS
131 COMET DRIVE
CENTREVILLE, MARYLAND 21617
TEL 410.758.8160 / FAX 410.758.8168
www.earthdatainc.com

J:_Job_Directories\current\2781 Hospital\CAD\2013\2781-2013 QUARTER 2.dwg

Figure 2 – Site map showing the location of monitoring wells and other pertinent features at Chester River Hospital Center, Chestertown, Maryland.

CROSS SECTION A-A'



SCALE: HORIZONTAL: 1'=60'
VERTICAL: 1'=30'

LEGEND

- SCREEN
- HIGH WATER ELEVATION
- LOW WATER ELEVATION
- HISTORIC PRODUCT

EBA ENGINEERING, INC.
4813 SETON DRIVE
BALTIMORE, MD. 21215
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www.ebaengineering.com

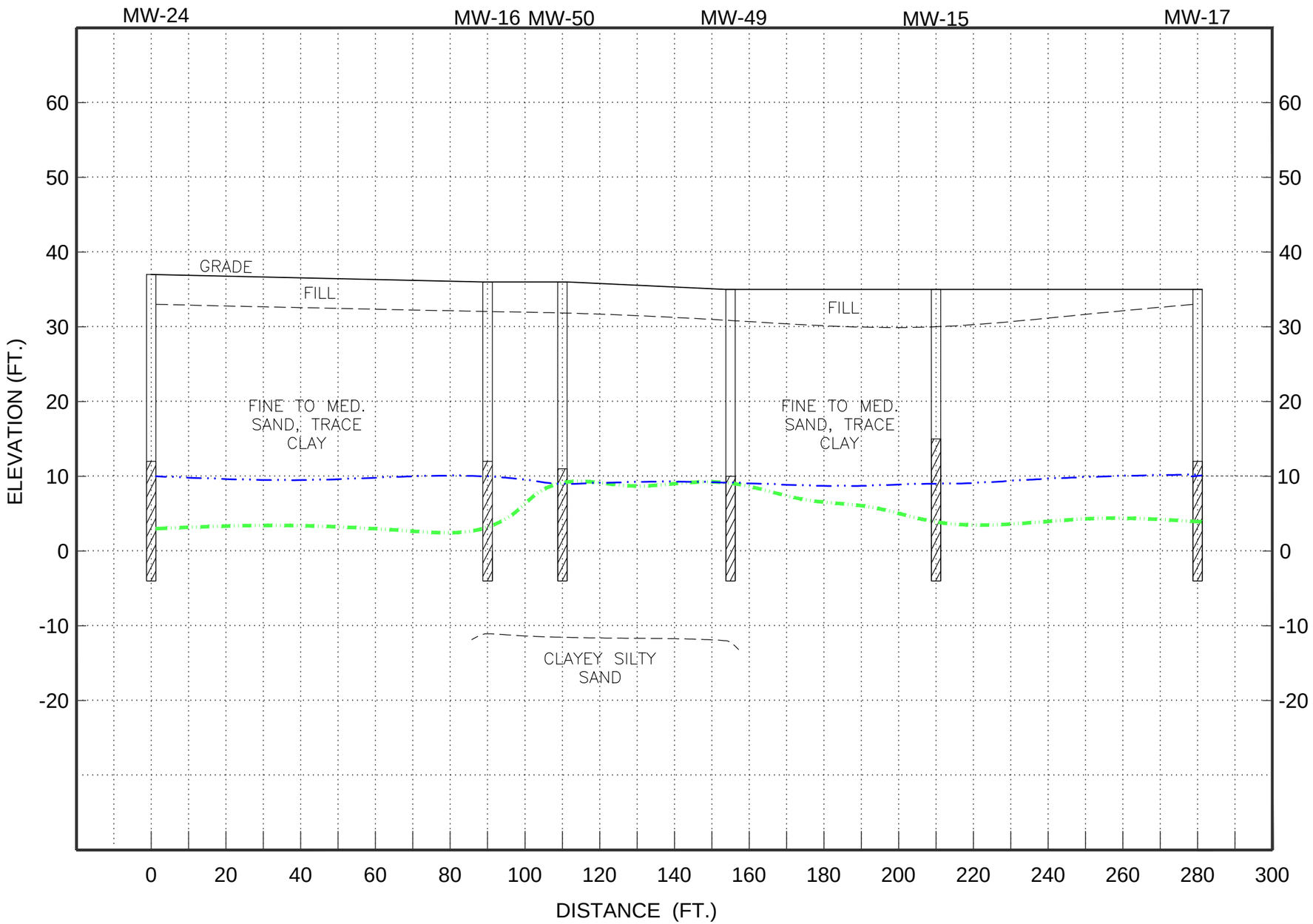
Cross Section of Chester River Hospital Center
Chestertown, Maryland

EBA project No. 4070-00-000

SCALE: DATE:

DRAWING NO.: SHEET OF

CROSS SECTION B-B'



LEGEND

- SCREEN
- HIGH WATER ELEVATION
- LOW WATER ELEVATION
- HISTORIC PRODUCT ELEVATION

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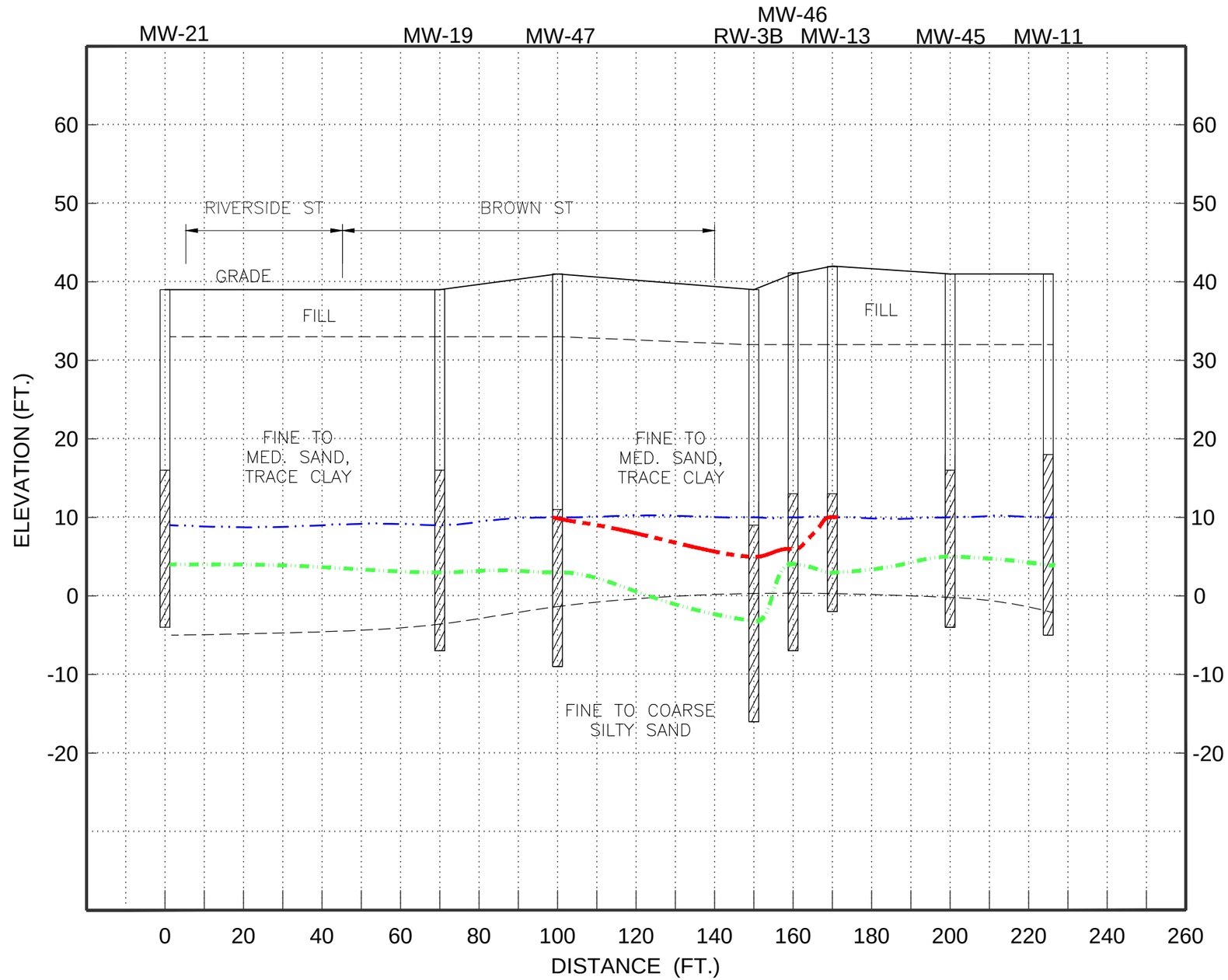
CROSS SECTION C-C'



LEGEND

- SCREEN
- HIGH WATER ELEVATION
- LOW WATER ELEVATION
- HISTORIC PRODUCT ELEVATION

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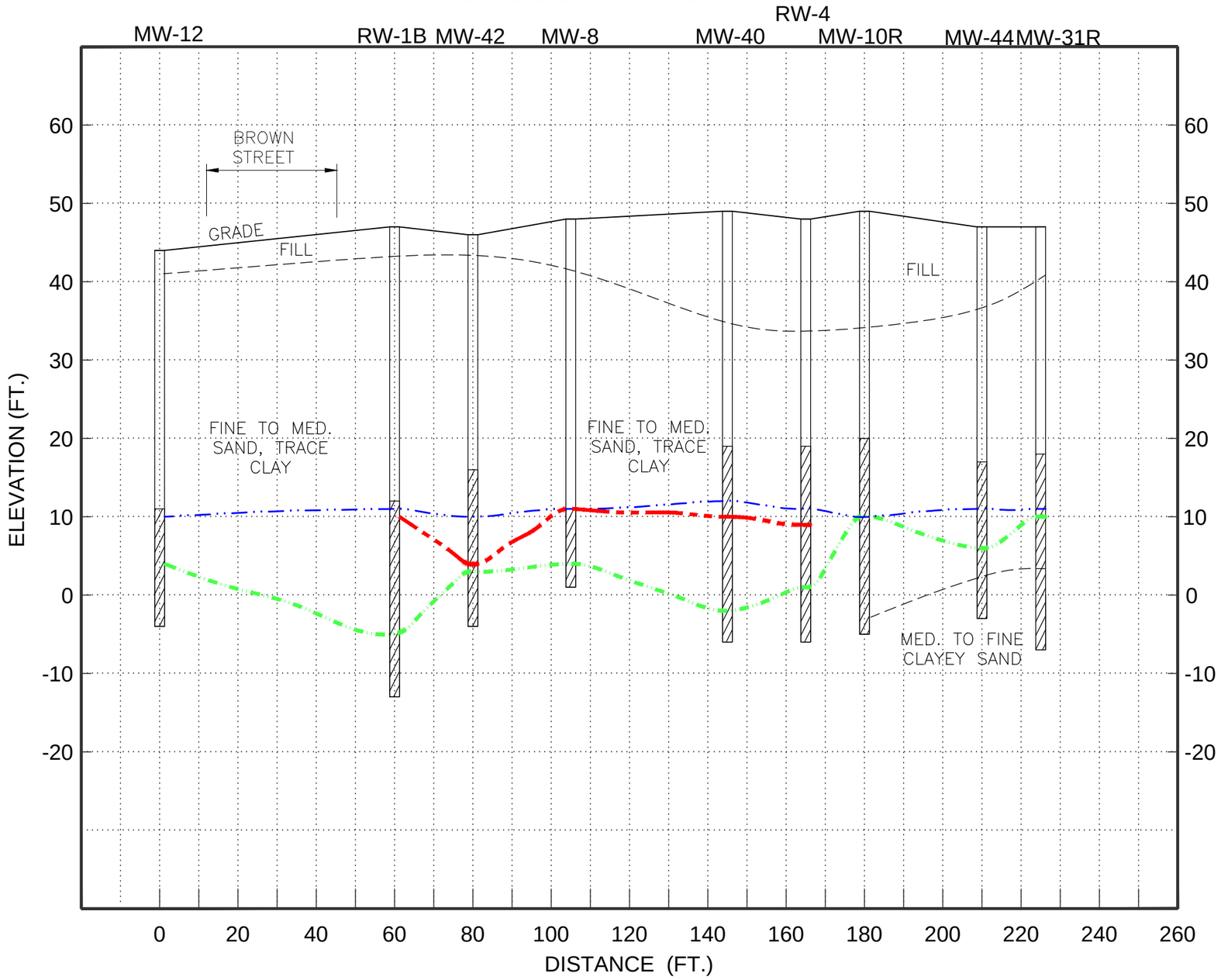
CROSS SECTION D-D'



LEGEND

- SCREEN
- HIGH WATER ELEVATION
- LOW WATER ELEVATION
- HISTORIC PRODUCT ELEVATION

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