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4051 Ogletown Road
Newark
DE, 19713
USA
aecom.com

Project name:
Montague Site

Project ref:
Chemours: 507756
AECOM: 60494178

To:
Ronda Blayer, MDEQ
Dale Bridgford, MDEQ

CC:
Sathya Yalvigi, Chemours
Craig A. Bartlett, Chemours

From:
George E. Gregory III, AECOM

Date:
June 23, 2017

Memo

Subject: Proposed Pierson Creek Area Well Cluster PCL-007
Chemours Montague, Montague, Michigan

Background

In the February 26, 2015 letter from Michigan Department of Environmental Quality (MDEQ) to the Chemours Company (Chemours), MDEQ stated that further investigation was warranted in the area of Pierson Creek to determine if Pierson Creek Landfill constituents are under-flowing Pierson Creek and potentially discharging to Lake Michigan (see Figure 1)

In response, Chemours conducted vertical aquifer sampling from the water table to the base of the unconsolidated sand and gravel aquifer on a 5-foot interval using a 20-ton, truck-mounted cone penetrometer rig (CPT). Two locations were selected on the western side of Pierson Creek (see Figure 2). Sampling was successful at one location (2015PC-CPT-01), and analytical samples from that location indicated that constituents related to the Pierson Creek Landfill were not present at that location on the western side of the creek. However, a “hardpan” was encountered just above the water table at the second location (2015PC-CPT-02), and multiple attempts failed to penetrate the hardpan to the aquifer. No samples could be collected. In discussions with MDEQ, it was agreed that Chemours could set a well cluster to collect samples from this location.

Purpose

The purpose of this investigation is to determine if Pierson Creek Landfill related constituents are migrating in groundwater beneath Pierson Creek and potentially westward towards Lake Michigan.

Scope of Work

To meet this objective, AECOM will subcontract a rotosonic drilling company to install three adjacent groundwater monitoring wells at appropriate screened intervals and collect groundwater samples from these wells to assess groundwater quality. The wells will be placed in the vicinity of where 2015PC-CPT-02 was attempted and are shown in Figure 2. The wells are tentatively identified as PCL-007-060, PCL-007-085, and PCL-007-105 (the last three digit number refers to the well screens bottom depth below ground surface). Actual construction and IDs will be adjusted based on the lithology encountered.

Figure 3 displays boring logs from monitoring well PCL-05-078 and the two 2015 CPTs (CPT01 and CPT02c on the lithologic logs). These are displayed side-by-side in Figure 3 and are approximately to scale. Their layout is adjusted to approximate actual ground surface elevation. As shown near the right-hand edge of the figure, the following well screen intervals are proposed for PCL-007:

- PCL-007-060 is near the top of the water table.
- PCL-007-085 is a mid-depth well. Samples from similar depths at 2015PC-CPT-01 had detectable (but estimated) concentrations of benzene and toluene.
- PCL-007-105 is projected to be the base of the aquifer and would correspond to roughly the same interval screened by well PCL-005-078. Ground surface at PCL-005-078 is lower; hence, the difference in depth to the base of the aquifer. The base of the aquifer is underlain by a dark gray, plastic clay believed to be lacustrine in origin.

Well Construction

Monitoring wells will be installed using a rotosonic rig as this drilling method has been successful at the site. An 8-inch borehole will be drilled using a full-sized truck rig. During the first well installation, the boring will be lithologically described and drilled to the gray clay. This clay is encountered typically at about 130 to 145 feet below ground surface. The rig will core at least 5 feet into this unit (there have been locations where thinner clay layers have had sand beneath them. This will confirm that the well will screen the base of the sand-gravel aquifer).

Tentatively, the deepest well will be identified as PCL-007-140. The proposed screen intervals will be adjusted where field observations indicate conditions different from those based on the CPT data. The intent is to screen across the three most likely flow intervals. The remaining two wells will be installed within 10 feet of the first well and will not require lithologic logging.

All three monitoring wells will be constructed of 2-inch diameter, schedule 40 polyvinyl chloride (PVC) with 10-foot well screens (0.01-inch slot). A filter pack of 20/40 mesh silica sand will be placed around the well screen and extend 2 feet above the top of screen. A minimum 2-foot thick annular seal of bentonite chips or pellets will be placed on the sand pack and allowed to hydrate per manufacturers recommendations before the remaining annual space is filled with cement-bentonite grout to near surface. Wells will be completed with 3-foot-square concrete surface pads and a lockable steel surface casing. The space between the PVC casing and the steel casing will be filled with gravel to near the top of casing and a weep hole will be drilled near the base of the casing to allow condensation to escape. The outside of the steel casing will be painted yellow to reduce corrosion and improve its visibility.

Development

After installation, the wells points will be developed by the drilling contractor to remove sediment that may have entered the screen during installation. Well sampling will be performed after the wells have had a period to equilibrate with the aquifer.

Surveying

Top of casing and ground surface elevations will be surveyed for the new monitoring wells. Coordinates will be surveyed in Michigan State Plane, South system. These measurements will be used with depth to water measurements to provide hydrogeologic information to determine if Pierson Creek is intercepting groundwater flow and preventing underflow.

Well Sampling

Sampling will be performed using low-flow purge methods consistent with the methods used for other monitoring wells in the sampling program. The three new wells will be sampled at least one week after development but within a month of installation. During sampling, the following quality control samples will be collected:

- One field duplicate
- Matrix spike/matrix spike duplicate
- Equipment blank
- Trip blank

The equipment blank will be collected by passing the blank water over and/or through sampling equipment (pump) used after it has been decontaminated between wells.

Health and Safety

The site-specific Health and Safety Plan (HASP) will be developed to ensure safe conduct of the work.

Based on previous experience, it is expected that all work can be performed in Level D. Generally, at this site, the ticks and poison ivy are not significantly present. This may be upgraded to Modified Level D including nitrile gloves and Tyvek® coveralls if conditions are found to differ.

This level of personal protective equipment (PPE) may be adjusted after a review of site conditions by the health and safety staff.

Waste Management

Investigation-derived waste will be managed in accordance with a Project-Specific Waste Management Plan (PSWMP). This plan will be developed prior to field mobilization.

Schedule

The proposed schedule is for the installation effort to occur in mid-late July of 2017. The first sampling event of these wells will be after the installation (approximately August), and the wells will then be added to the monitoring plan on a semiannual basis for a period of two years (until 2H2019). At that point, the frequency of sampling for the PCL-007 wells would be reviewed based on the results.

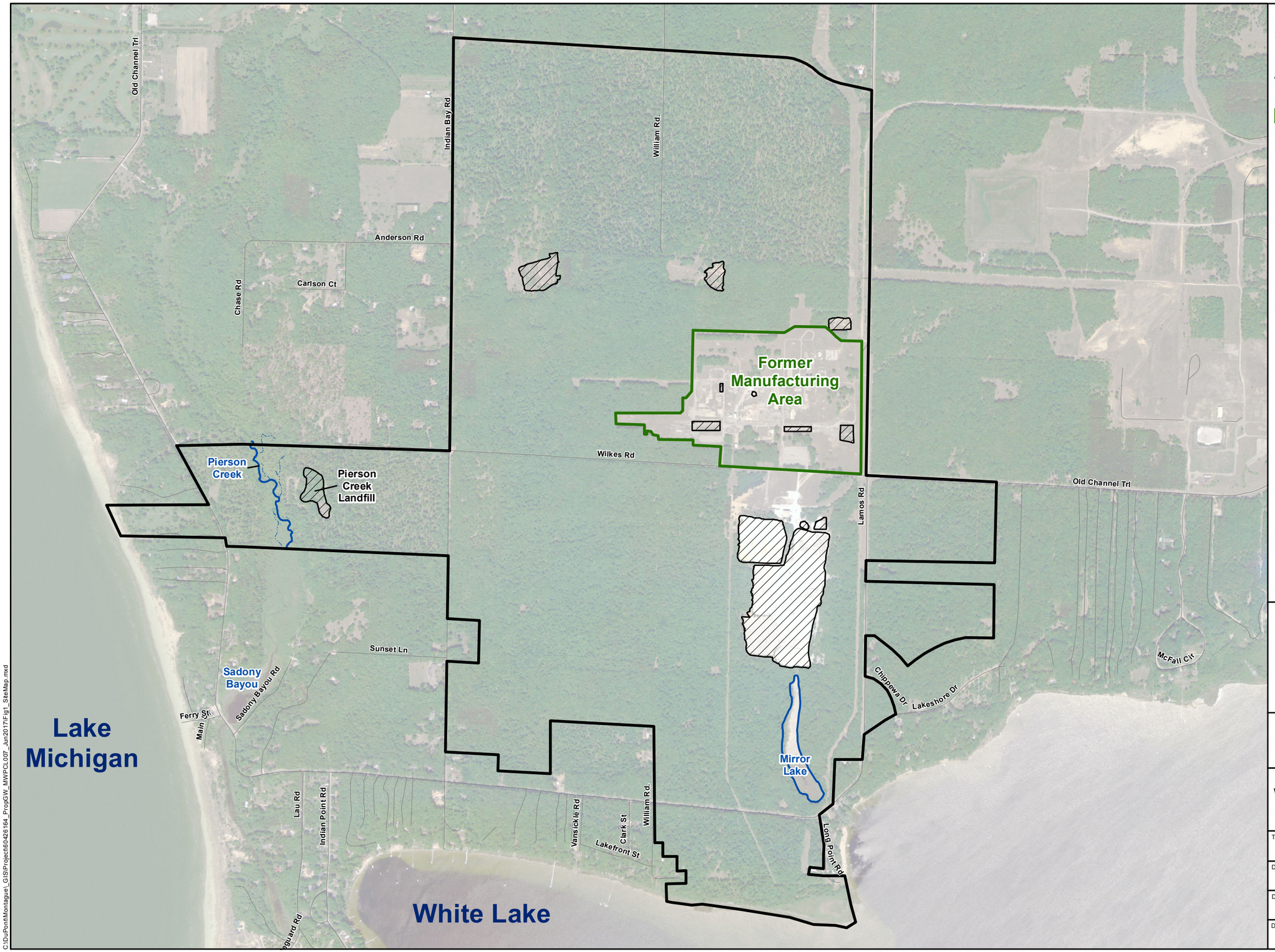
If you have any questions or comments about the technical nature of this scope, please contact me at 832-422-4423. For other questions related to the project, please contact Sathya Yalvigi at 302-773-4291.

Sincerely,

George E. Gregory III
Senior Geologist/Project Manager
AECOM Corporation

Attachments: Figures

Figures



Legend

- Pierson Creek - Main Channel
- Pierson Creek - Tributary
- Chemours Property Line (from Chemours Real Estate)
- Road Centerline
- Former Manufacturing Area
- Waste Management Unit (WMU) or Area of Concern (AOC)

2005 NAIP Aerial Source: Credit to Remote Sensing & GIS Research and Outreach Services (RS&GIS), USDA-FSA Aerial Photography Field Office

Area Map

N
W E
S

0 600 1,200 2,400

Feet

1 inch = 1,200 feet

MAP FORMATTED FOR "B" (11" X 17") SIZE SHEET.
TEXT SCALE NOT VALID FOR DIFFERENT PAGE SIZE.

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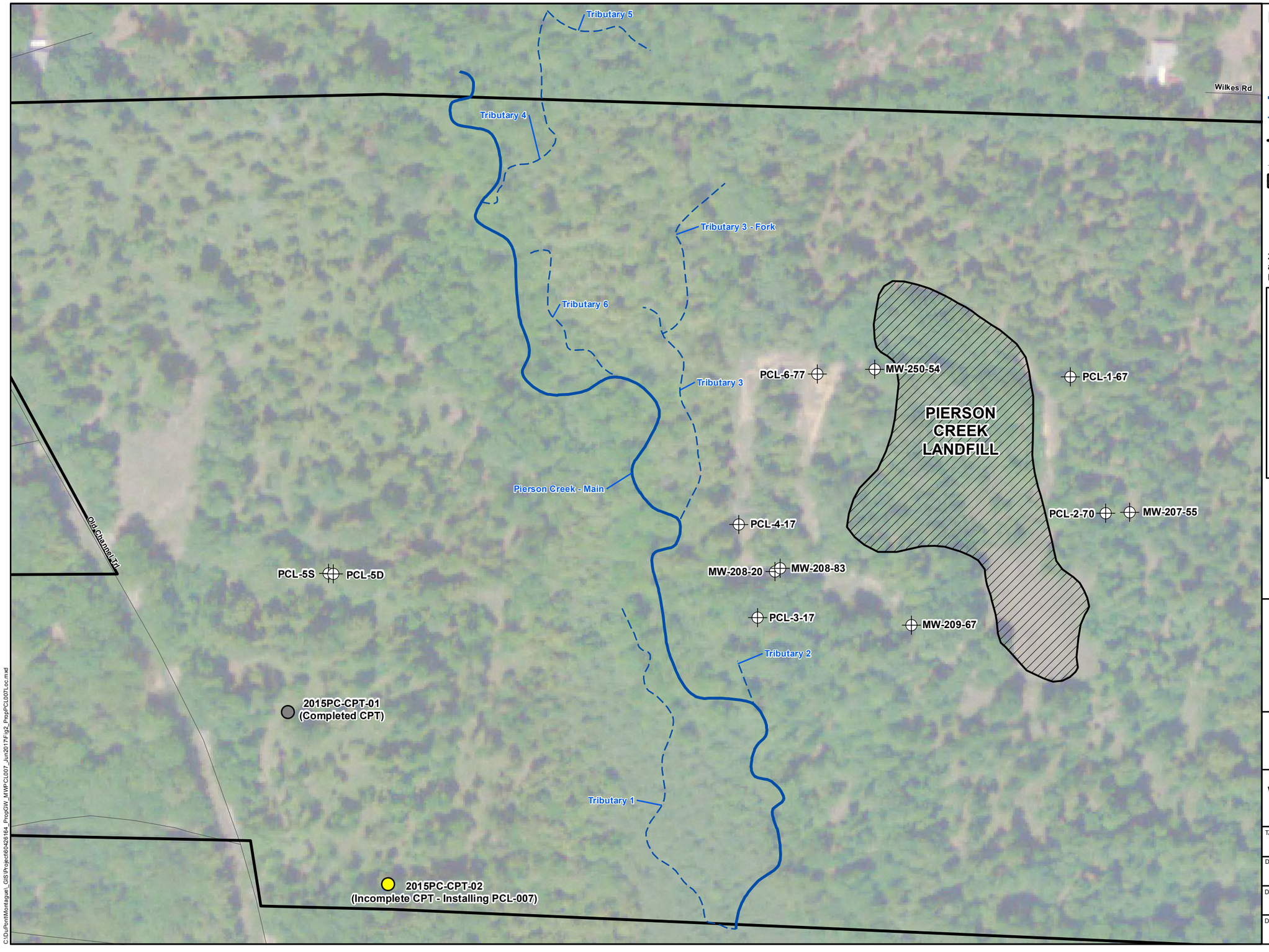
Newark, DE 19713

SITE MAP

Proposed Groundwater Monitoring
Well Cluster PCL-007 West of Pierson Creek
Chemours Montague Facility
Montague, Michigan

TASK NUMBER: 18984840.201010	PROJECT NUMBER: 60426164
DESIGNED BY: PJC	DATE: 6/14/2017
DRAWN BY: CAD	FIGURE NUMBER: 1
DATA QUALITY CHECK BY: GEG	

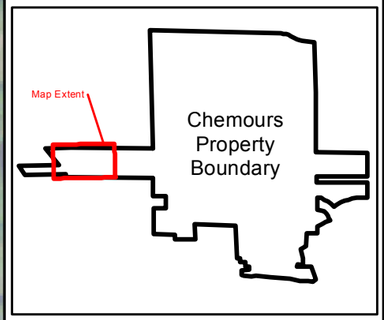
C:\DuPontMontague_GIS\Project\60426164_Proj\GW_MWPCL007_Jun2017\Fig1_SiteMap.mxd



Legend

- PCL-007 Cluster
- CPT Boring
- Monitoring Well Location
- Pierson Creek - Main Channel
- Pierson Creek - Tributary
- Chemours Property Line (from Chemours Real Estate)
- Road Centerline
- Pierson Creek Landfill Boundary

2005 Aerial Credit: Remote Sensing & GIS Research and Outreach Services (RS&GIS), USDA-FSA Aerial Photography Field Office



N

0 75 150 300

Feet

1 inch = 150 feet

MAP FORMATTED FOR "B" (11" X 17") SIZE SHEET.
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PROPOSED LOCATION OF PCL-007

Proposed Groundwater Monitoring
Well Cluster PCL-007 West of Pierson Creek
Chemours Montague Facility
Montague, Michigan

TASK NUMBER:	PROJECT NUMBER:
18984840.201010	60426164
DESIGNED BY: PJC	DATE: 6/14/2017
DRAWN BY: CAD	FIGURE NUMBER: 2
DATA QUALITY CHECK BY: GEG	

C:\DuPont\Montague_GIS\Project\60426164_PropGW_MWPCL007_Jun2017\Fig2_PropPCL007Loc.mxd

URS
10550 Richmond Ave., Suite 155 Houston, TX 77042

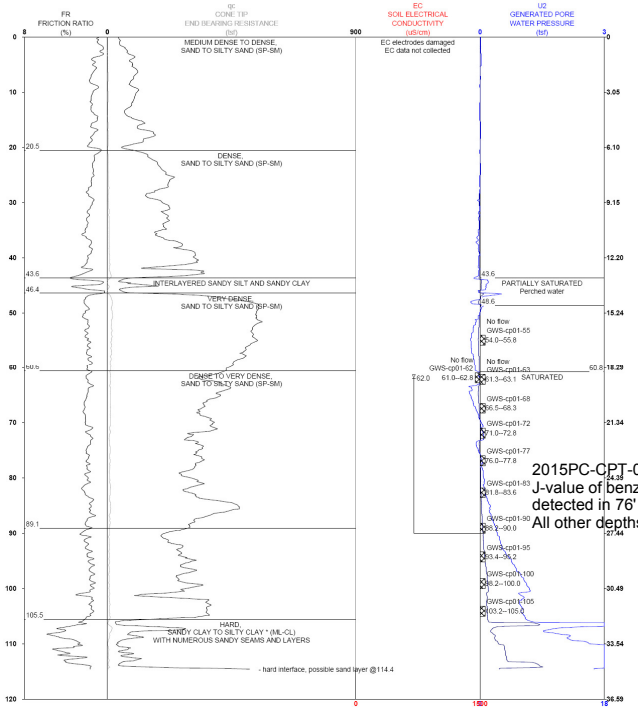
Site ID:	MWPCL-005-078	Project Number:	
Location:	DuPont Montague (Lake Shore Drive)		
Purpose:	Compliance well		
Elevation:	617	Datum:	feet MSL (approx)
X Coordinate:		Y Coordinate:	
Date(s):	5/21/1990	-	5/21/1990
TOC Elev:	619.4		
Elevation approximate based on TOC elevation			

Logged by:	L. Weyer	Certified by:	
Contractor	Walkerville		
Drilling Method	Failing		
Total Depth:	80'	Completed Depth	78'
Borehole Dia.:		Static Water Level:	

Well Casing
type: PVC dia: from: 0 to: 68'
type: dia: from: to:
Screens
type: size: dia: from: 68' to: 78'
Annular Fill:
type: grout from: 0 to:
type: bentonite from: to:
type: fine sand from: to:
type: sand pack from: to:

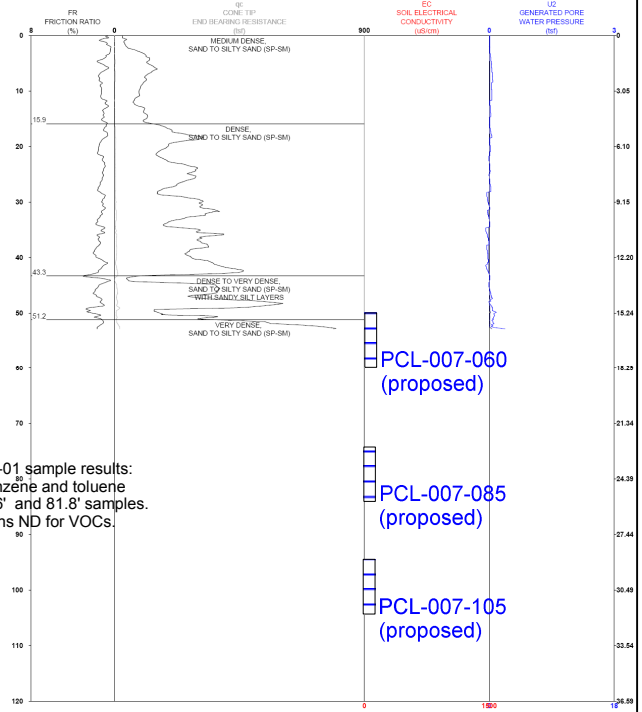
Elevation (ft)	Thickness (ft)	Recovery (%)	Depth Interval (ft)	Blow Count	Graphic Log	Lithologic Description	Well Construction	Water Level	Vapor (ppm)
617.0	79.5		0.0 79.5		SP	SAND (SP): 0'-79.5' 8': wet clayey silt, sand, mucky - either due to rainfall of perched water 13'-15': Very lt brown f-vf sand, dry 25'-27': as above, but medium sand, well-rounded and well sorted 35'-37': Light red-browvn very fine to fine sand, wet 35'-45': Screened PCL-005-045 45'-47': Light brown, very fine to fine grained sand 68'-78': Screen PCL-005-078 78-79.5': Light brown medium sand	PCL-005-045 PCL-005-078		
537.5	0.5		79.5 80.0			CLAY (CL): 79.5'-80': 2" gray sandy clay layer with blue-gray clay and wet sand			
537.0	40.0		80.0 120.0						

CPTU-EC LOG WITH LITHOLOGIC EVALUATION cp01



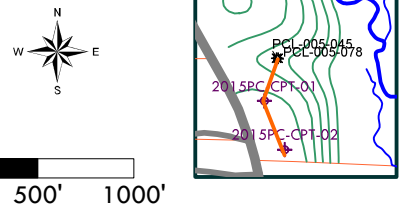
PROJECT NAME:Pierson Creek 2015 CPT
PROJECT NUMBER:15-120-090
STRATIGRAPHICS
R1 DATE:10/6/2015 TIME:12:10 PM
SOUNDING NUMBER:CPT-01 ()

CPTU-EC LOG WITH LITHOLOGIC EVALUATION cp02c



PROJECT NAME:Pierson Creek 2015 CPT
PROJECT NUMBER:15-120-090
STRATIGRAPHICS
R1 DATE:10/8/2015 TIME:10:29 AM
SOUNDING NUMBER:CPT-02C ()

2015PC-CPT-01 sample results:
J-value of benzene and toluene detected in 76' and 81.8' samples.
All other depths ND for VOCs.



NOTES:
Each log presented at same vertical scale (ground surface to -120').
Approximate vertical difference between PCL-005-078 and 2015 CPTs = ~30 feet.

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TITLE:
Proposed Well Cluster PCL-007 Plan
Chemours Montague Site
Montague, Michigan

DWN:	GEG	APPD:	
CHKD:	---	REV:	---
DATE:	04/15/2017		

PROJECT NO: 60426635
FIGURE NO: 3