ARCADIS U.S., Inc.
10 Friends Lane
Suite 200
Newtown
Pennsylvania 18940
Tel 267 685 1874
Fax 267 685 1879
www.arcadis-us.com

Ms. Ruth Curley
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7258

ENVIRONMENTAL

Subject:
Summary Report for Startup of SDS-8 (in the Area of VMP-7A)
Solvent Dock Area
Former Lockheed Martin French Road Facility
525 French Road, Utica, New York

Date:
January 28, 2014

Contact:
Jeffrey J. Bonsteel

Phone:
267.685.1874

Email:
jeffrey.bonsteel@arcadis-us.com

Our reference:
NJ001043.0001

Dear Ms. Curley:

ARCADIS (on behalf of the Lockheed Martin Corporation) has prepared this summary report for the startup and testing of the new depressurization sump (SDS) added to the existing sub-slab depressurization system (SSDS) at the former Lockheed Martin French Road facility in Utica, New York. The basis for the installation of an additional depressurization sump (SDS-8) was presented in ARCADIS' November 30, 2012 report to the New York State Department of Environmental Conservation (NYSDEC), titled *Evaluation Report on SSDS Performance in Area of VMP-7A* (ARCADIS 2012). A description of the proposed methodology for the pilot test was provided in ARCADIS' *Work Plan for SSDS Pilot Test in Area of VMP-7A* (ARCADIS 2013), which was submitted to the NYSDEC on March 14, 2013 and approved in a letter from NYSDEC dated April 9, 2013. A summary of the pilot test conducted at SDS-8 was provided in the *Summary Report for SSDS Pilot Test in Area of VMP-7A*, which was submitted to the NYSDEC on July 2, 2013 (ARCADIS 2013).

As indicated by recent operations, maintenance and monitoring (OMM) reports as well as continued evaluation of performance monitoring data, the existing sub-slab depressurization system has substantially maintained sufficient vacuum during historical and recent operations at all monitored locations with the exception of VMP-7A (Figure 1). Figure 1 depicts the layout of the SSDS located within the ConMed Corporation (site occupant) facility. Pilot testing conducted in the vicinity of VMP-7A resulted in the installation of depressurization sump SDS-8 to further mitigate the potential for vapor intrusion impacts in indoor air. This report summarizes the activities conducted to permanently connect SDS-8 to the existing SSDS, as well as the subsequent testing and monitoring which occurred.

Process Line Installation

The SDS-8 well casing was fitted with monitoring/control devices consistent with those used for pre-existing SDS's, and as depicted on the As-Built drawings. These include a vapor sampling port, vacuum gauge, flow control valve, and orifice plate. As done during previous SDS installations, three short sections of 3-inch diameter, standard dimension ratio (SDR) 11, high-density polyethylene (HDPE) pipes accompanied by flanged ends were utilized to connect the monitoring/control devices to one another. Vertical piping of 3-inch diameter polyvinyl chloride (PVC) material was extended up the wall to an elevation sufficient for continuation of piping overhead. Approximately 70 feet of 3-inch diameter schedule 40 PVC pipe was ran overhead across the southern end of the "Warehouse Area J" room to connect SDS-8 with the existing depressurization/vacuum header pipe located adjacent to SDS-7. All PVC pipe connections were made absent of solvent-welding techniques by dry-fitting socket-style connections and using reducing rubber couplings to seal joints. Wall-mounted pipe clamps and overhead pipe hangers were used to provide the SDS-8 piping with support. Piping/fitting activities for SDS-8 were conducted during the week of October 14, 2013. The SDS-8 sump itself was installed in May 2013 during the pilot test.

As-Built Survey

A post-construction survey was performed by a licensed New York State Land Surveyor (Thew Associates, LS) on October 17, 2013. The survey was conducted to document the as-built components associated with the installation of SDS-8, including SDS-8, centerline of SDS-8 horizontal vacuum pipeline, and each new VMP (VMP-8A, 8B, 8C, and 8D). Global positioning system (GPS) survey instrumentation was utilized to collect the data (i.e., northing, easting, and elevations). The updated SSDS as-built survey drawing is provided as Attachment 1.

Leak Detection Testing

Newly installed piping and fittings for SDS-8 were successfully leak detection tested on October 18, 2013. This process, performed consistent with the annual SSDS leak detection testing procedure, included physical inspection of each pipe section, fitting, and connection. An ultrasonic leak detection instrument was also used to test connections for leaking.

SDS-8 Startup

<u>Pre-Startup/Baseline Measurements:</u>

The startup and testing of SDS-8 began on October 21, 2013. Prior to applying vacuum to SDS-8, a full round of system performance monitoring measurements

were taken with SDS-1 through SDS-7 operating. These measurements are included with the startup log data in Table 1 and included the following parameters:

- Sub-slab differential pressure at all twenty-five (25) vacuum monitoring points (VMPs) (Figure 1);
- Applied vacuum, orifice plate differential pressure, and flow control valve position at each of the seven (7) pre-existing SDSs; and
- Overall system readings including blower variable frequency drive (VFD) settings, applied vacuum (VT-201), post-blower temperature (TT-201), and post-blower pressure (PT-201).

The results of these measurements were relatively consistent with those in the past. To summarize:

- All but VMP-7A of the twenty-one (21) VMPs installed prior to the SDS-8 pilot test had differential pressures in excess of the minimum performance criteria (-0.004 inches of water column [in.W.C.]);
- Three of the four VMPs installed as part of the SDS-8 pilot test had a differential pressure of 0.000 in.W.C.; and
- The overall system was operating with a soil vapor extraction rate of roughly 130 actual cubic feet per minute (acfm)/102 standard cubic feet per minute (scfm), an applied vacuum of 75.1 in.W.C., and with a blower speed of 47.4 hertz.

SDS-8 Operation & Manual Performance Monitoring

Following the collection of pre-startup/baseline readings, SDS-8 was brought online on October 21, 2013, in addition to the other seven SDSs by opening its individual FCV 100%. A complete round of differential pressure readings were taken from all VMPs. These readings indicated that adjustment of the applied vacuum at SDS-8 (e.g., adjusting blower VFD speed or SDS-8 FCV position) was not necessary, as the minimum performance criteria for sub-slab differential pressure at all VMPs (-0.004 in.W.C.) was achieved.

Four full rounds of system performance monitoring data were collected on October 21, 2013 on an hourly basis with SDS-1 through SDS-8 operating. System parameters again included the following:

- Sub-slab differential pressure at all twenty-five (25) VMPs (Figure 1);
- Applied vacuum, orifice plate differential pressure, and flow control valve position at each of the seven (7) pre-existing SDSs; and
- Overall system readings including blower variable frequency drive (VFD) settings, applied vacuum (VT-201), post-blower temperature (TT-201), and post-blower pressure (PT-201).

These data collected over this 4-hour period, which are included in Table 1, are summarized as follows:

- All twenty-five VMPs had differential pressure measurements in excess of the performance criteria for all four rounds;
- SDS-8 exhibited significant vacuum influence on VMP-7A (-35 in.W.C.), 8A (-3 in.W.C.) and 8B (-14 in.W.C.);
- The flowrate from SDS-8 at an applied vacuum of 62 in.W.C. was approximately 33 scfm; and
- The overall system was operating with a soil vapor extraction rate of roughly 157 acfm (127 scfm), an applied vacuum ranging from 67 to 68 in.W.C., and with a blower speed of 47.4 hertz.

SDS-8 Operation and Associated VMP Data Logging:

Since sub-slab differential pressures over the 4-hour period at all twenty-five (25) VMPs indicated that the performance criteria was still being met, differential pressure data loggers were setup to continuously monitor VMPs 7A, 8A, 8B, 8C and 8D. The differential pressure data loggers were setup on October 21 and recorded data through October 23, 2013. Initial real-time evaluation of these data on October 22, 2013 indicated that all but VMP-8D were consistently exceeding the performance criteria. A cyclical differential pressure ranging from less than -0.250 in.W.C. to greater than (+) 0.250 in.W.C. was observed at VMP-8D. Several measures were taken in an effort to effect consistent negative sub-slab differential pressure at VMP-8D, including the following:

- Increasing the blower speed for a prolonged period of time to 52.8 hertz;
- Increasing the blower speed for a short period of time to 60 hertz (100%) proved unsustainable due to high post-blower temperature; and
- Adjusting of flow control valves at SDS-7 and SDS-8, as well as at SDS-2, to assess source of potential influence at VMP-8D.

None of these measures resulted in consistent negative differential pressure at VMP-8D. While increasing soil vapor extraction rate from SDS-7 and/or SDS-8 did appear to have sporadic influence on VMP-8D, the cyclical fluctuation of VMP-8D's differential pressure well into the positive range remained.

SDS-8 Startup Evaluation

Evaluation of the SDS-8 startup data indicated the following:

- Addition of SDS-8's operation to the existing SSDS has created a sub-slab vacuum at VMP-7A well in excess of the target performance criteria of -0.004 in.W.C. of vacuum;
- Addition of SDS-8's operation to the existing SSDS has resulted in performance criteria consistently being exceeded at new VMPs 8A, 8B, and 8C;
- During SDS-8 startup/testing, a background influence appeared present at the VMP-8D location which could not be consistently overcome by the SSDS. A review of known subsurface utilities which could potentially influence sub-slab differential pressure in the area indicated none present within a 10 to 15-foot radius of VMP-8D;
- The additional flow from SDS-8 did not significantly impact the influence of the other SSDS sumps, as all twenty of the remaining VMP's maintained sufficient sub-slab vacuums; and
- The additional flow from SDS-8 was well within the existing SSDS's extraction and treatment capabilities with the blower speed kept at 47.4 hertz.

Conclusions and Recommendations

Based on the evaluation of the startup data the installation and operation of SDS-8 was successful at providing a differential pressure that was greater than the systems targeted pressure of -0.004 in.W.C. ARCADIS recommends operating the SSDS continuously with the newly installed SDS-8 to ensure sufficient mitigation of vapor intrusion within the vicinity of VMP-7A. As such, SDS-8 was left online at the completion of the startup and testing on October 23, 2013, and currently remains operational. To better assess the performance of SDS-8 it is recommended that SDS-8 and the newly installed VMPs (VMP-8A, 8B, 8C, and 8D) are added to the quarterly monitoring program to confirm that SDS-8 is consistently achieving the targeted differential pressure in the area of VMP-7A. Additionally, each of the newly installed VMPs would be monitored continuously (e.g., 24-hour period) at least once per year to better assess whether the background influence observed at VMP-8D is an isolated occurrence or representative of the surrounding area.

Feel free to contact us if you have any questions or comments regarding this summary report.

Sincerely,

ARCADIS U.S., Inc.

Todd Carignan
Project Engineer

Jeffrey J. Bonsteel
Project Manager

Attachments:
Table 1: VMP-7A Area Pilot Test Data
Figure 1: SSDS Layout
Attachment 1: Survey Records

Copies:
Mr. Nathan Freeman, NYSDOH Herkimer
Mr. James Zigmont, CDM Smith
Mr. Richard Zigenfus, ConMed
Ms. Dale Truskett, Lockheed Martin
Ms. Kay Armstrong, Armstrong & Associates
Ms. Mary Morningstar, Lockheed Martin
Ms. Glenda Smith, Lockheed Martin
File

ARCADIS

Tables

Table 1. SDS-8 Startup Log Sheet, Sub-Slab Depressurization System, Solvent Dock Area, Former Lockheed Martin French Road Facility, Utica, New York

Date	Time	System Parameters							SDS-1			SDS-2			SDS-3			SDS-4			SDS-5			SDS-6			SDS-7			SDS-8		
		VFD (Hz)	VT-201 (in.W.C.)	TT-201 (F)	PT-201 (in.W.C.)	Air Velocity (fpm)	Flowrate (acfm)	Flowrate (scfm)	Applied (in.W.C.)	Orifice Plate D.P. (in.W.C.)	Flow (scfm)	Applied (in.W.C.)	Orifice Plate D.P. (in.W.C.)	Flow (scfm)	Applied (in.W.C.)	Orifice Plate D.P. (in.W.C.)	Flow (scfm)	Applied (in.W.C.)	Orifice Plate D.P. (in.W.C.)	Flow (scfm)	Applied (in.W.C.)	Orifice Plate D.P. (in.W.C.)	Flow (scfm)	Applied (in.W.C.)	Orifice Plate D.P. (in.W.C.)	Flow (scfm)	Applied (in.W.C.)	Orifice Plate D.P. (in.W.C.)	Flow (scfm)	Applied (in.W.C.)	Orifice Plate D.P. (in.W.C.)	Flow (scfm)
10/21/2013	~9:30	47.4	-75.1	196.9	1.8	1500	129	102	-74	0.027	10.9	-0.888	0.057	8.6	-0.4	0.28	19.3	-0.995	1.6	45.3	-64	0.27	18.1	-73	0.023	8	-74	0.016	5.1	0	0	0
10/21/2013	11:50	SDS-8 brought online with flow control valve 100% open.																														
10/21/2013	~12:30	47.4	-67	167.8	3.7	1820	157	127	-68	0.029	11	-0.87	0.045	7.6	-0.4	0.28	19.3	-0.944	1.5	43.9	-60	0.22	16.4	-67	0.022	7.9	-67	0.013	4.6	-62	2.5	33
10/21/2013	~13:45	47.4	-68.4	168.8	3.5	-	-	-	-68	-	-	-0.872	-	-	-0.4	0.3	19.9	-0.943	1.5	43.9	-59	0.19	15.3	-66	0.025	8.4	-67	0.02	5.8	-62	2.5	33
10/21/2013	~15:00	47.4	-68.1	168.4	3.8	-	-	-	-68	-	-	-0.869	-	-	-0.4	0.28	19.3	-0.943	1.5	43.9	-59	0.21	16.1	-66	-	-	-67	-	-	-62	2.5	33
10/21/2013	~16:15	47.4	-68.2	169.2	3.5	-	-	-	-68	-	-	-0.872	-	-	-0.4	0.3	19.9	-0.946	1.5	43.9	-59	0.24	17.2	-67	-	-	-67	-	-	-62	2.5	33
10/21/2013	16:30	VMP-8D differential pressure observed fluctuating between negative and positive following start of datalogging. Positive differential pressure peaking in the range of +0.500 in.W.C.																														
10/22/2013	10:15	VMP-8D differential pressure data overnight indicates continuous fluctuation between negative and positive. Increase blower speed to 52.8 Hz.																														
10/22/2013	~10:30	52.8	-80.5	-	-	1770	152	118	-78	0.022	9.6	-0.95	0.045	7.6	-0.6	0.3	19.9	-1.021	1.6	45.3	-68	0.28	18.3	-77	0.01	5.2	-77.5	0.013	2.3	-71	3	35.7
10/22/2013	~17:00	VMP-8D differential pressure data continues to indicate significant fluctuation between negative and positive. Several measures taken in an effort to effect VMP-8D including increasing blower speed to 60 Hz, partially closing SDS-8, entirely closing SDS-8, and further opening SDS-2. None of these measures resulted in sustainable negative differential pressure at VMP-8D. Operating blower at 60 Hz indicated initial influence at VMP-8D, although was not sustainable due to post-blower temperature exceeding 230 F.																														
10/23/2013	10:20	VMP-8D differential pressure continues to fluctuate. Will adjust SDS-8 flow control valve and measure select data to assess SDS-8's impact on SDS-7 flow.																														
10/23/2013	10:22	47.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-67	0.012	4.5	-62	2.5	33
10/23/2013	10:30	47.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-68	0.01	4.1	-55	2	29.9
10/23/2013	10:35	47.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-68	0.008	3.6	-50	1.9	29.3
10/23/2013	10:40	47.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-71	0.01	4	-30	1.1	23
10/23/2013	10:45	47.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-72	0.005	2.9	-15	0.41	14.3
10/23/2013	10:53	47.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-67	0.012	4.5	-61	2.5	33.1

Notes:

1) Flowrates indicated for SDS's 1 through 7 have been calculated by inputting the orifice plate differential pressure, gauge pressure, and "C" factor into flowrate calculator for orifice plates. The sum of SDS's 1 through 7 for the 10/21/13 (9:30) period was found to be 113% of the aggregate flowrate measured using an anemometer. This 113% correction factor was also applied to the 10/21/13 (12:30) period; resulting in an estimated aggregate flowrate of 143.5 scfm (113% of 127 scfm). This results in an estimated flowrate of (143.5 - 110.7) 33.2 scfm for SDS-8 during the 10/21/13 (12:30) period, corresponding to a "C" constant for SDS-8 of 0.45.

2) Low Range (0 to 0.25 in.W.C.) magnehelic gauge not working properly during latter half of 13:45 round, nor during 15:00 or 16:15 round of data on 10/21/13. Measurements requiring use of low range magnehelic gauge indicated as not measured during this time period.

Abbreviations:

"-" - Not Measured

acfm - actual cubic feet per minute

F - degrees Fahrenheit

fpm - feet per minute

Hz - hertz

in.W.C. - Inches of Water Column

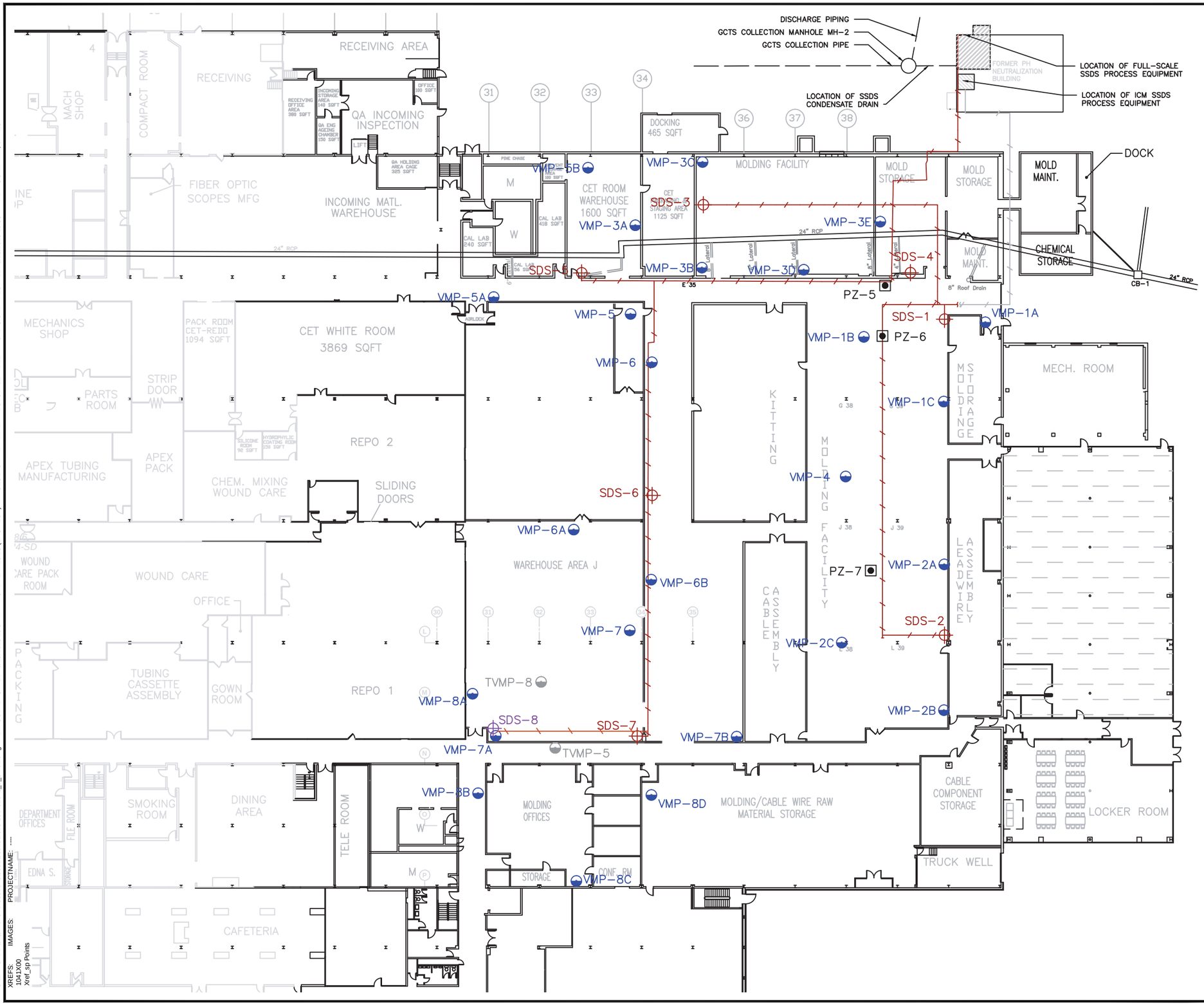
scfm - standard cubic feet per minute

Table 1. SDS-8 Startup Log Sheet, Sub-Slab Depressurization System, Solvent Dock Area, Former Lockheed Martin French Road Facility, Utica, New York

Date	Time	Vacuum Monitoring Points Differential Pressure (in.W.C.)																								
		VMP-7A	VMP-8A	VMP-8B	VMP-8C	VMP-8D	VMP-1A	VMP-1B	VMP-1C	VMP-2A	VMP-2B	VMP-2C	VMP-3A	VMP-3B	VMP-3C	VMP-3D	VMP-3E	VMP-4	VMP-5	VMP-5A	VMP-5B	VMP-6	VMP-6A	VMP-6B	VMP-7	VMP-7B
10/21/2013	~9:30	0.000	0.000	0.000	0.000	-0.304 (vac lessening)	-0.024 to 0.031	-0.5	-0.142	-0.081	-0.193	-0.179	-0.064	-0.012	-0.028	-0.023	-0.025	-0.033	-0.72	-0.052	-0.036	-0.206	-0.006 to -0.011	-0.032	-0.037	-0.134
10/21/2013	11:50	SDS-8 brought online with flow control valve 100% open.																								
10/21/2013	~12:30	-36	-3	-14.5	-0.005 to -0.007	-0.6	-0.009	-0.468	-0.133	-0.081	-0.19	-0.18	-0.06	-0.011	-0.026	-0.018	-0.018	-0.051	-0.566	-0.047	-0.034	-0.202	-1.13	-0.379	-1.294	-0.139
10/21/2013	~13:45	-34.5	-3.013	-13.5	-0.003 to -0.008	-0.326	-0.02	-0.468	-0.129	-0.08	-0.189	-0.175	-0.055	-0.009	-0.025	-0.017	-0.018	-0.051	-0.485	-0.048	-0.031	-0.2	-1.13	-0.39	-	-0.144
10/21/2013	~15:00	-35	-3.008	-14.25	-0.006	-0.351	-0.018	-0.463	-0.128	-0.082	-0.185	-0.178	-0.056	-0.009	-0.024	-0.018	-0.016	-0.052	-0.661	-0.052	-0.031	-0.2	-1.133	-0.375	-1.276	-0.143
10/21/2013	~16:15	-35	-2.988	-13.9	-0.006	-0.326	-0.019	-0.467	-0.129	-0.082	-0.187	-0.182	-0.055	-0.009	-0.024	-0.017	-0.017	-0.051	-0.659	-0.047	-0.032	-0.204	-1.117	-0.371	-1.262	-0.142
10/21/2013	16:30	VMP-8D differential pressure observed fluctuating between negative and positive following start of datalogging. Positive differential pressure peaking in the range of +0.500 in.W.C.																								
10/22/2013	10:15	VMP-8D differential pressure data overnight indicates continuous fluctuation between negative and positive. Increase blower speed to 52.8 Hz.																								
10/22/2013	~10:30	-	-3.482	-15	-0.007	0 to -0.003	-0.026	-0.535	-0.152	-0.09	-0.203	-0.196	-0.063	-0.009	-0.03	-0.024	-0.02	-0.061	-0.763	-0.059	-0.037	-0.24	-1.291	-0.438	-1.431	-0.164
10/22/2013	~17:00	VMP-8D differential pressure data continues to indicate significant fluctuation between negative and positive. Several measures taken in an effort to effect VMP-8D including increasing blower speed to 60 Hz, partially closing SDS-8, entirely closing SDS-8, and further opening SDS-2. None of these measures resulted in sustainable negative differential pressure at VMP-8D. Operating blower at 60 Hz indicated initial influence at VMP-8D, although was not sustainable due to post-blower temperature exceeding 230 F.																								
10/23/2013	10:20	VMP-8D differential pressure continues to fluctuate. Will adjust SDS-8 flow control valve and measure select data to assess SDS-8's impact on SDS-7 flow.																								
10/23/2013	10:22	-	-	-	-0.008	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/23/2013	10:30	-	-2.6	-11	-0.006	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/23/2013	10:35	-	-2.4	-10.1	-0.006	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/23/2013	10:40	-	-1.6	-6.4	-0.004	0 to 0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/23/2013	10:45	-	-1	-3.6	-0.003	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/23/2013	10:53	-	-3	-12.2	-0.006	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ARCADIS

Figures



LEGEND

- BUILDING COLUMN LINE IDENTIFICATION
- COLUMN LINE
- LOCATION OF SUBSLAB DEPRESSURIZATION ABOVE GRADE PIPING
- PZ-5 — LOCATION OF EXISTING PIEZOMETER
- SDS-4 — LOCATION OF SUBSLAB DEPRESSURIZATION SUMP (SDS)
- VMP-1B — LOCATION OF VACUUM MONITORING POINT (VMP)
- SDS-8 — NEW SUBSLAB DEPRESSURIZATION SUMP (SDS) LOCATION (INSTALLED WEEK OF MAY 20, 2013)

NOTES:

1. BASE DRAWING SOURCE: CONMED, TITLE: FRENCH ROAD BLOCK PLAN PROPOSED SPACE UTILIZATION, DRAWING NO:FR001, DATE: 01/28/94. CONMED SOURCE DRAWING: LOCKHEED MARTIN DRAWING NUMBER RFABLK.DWG JEG 310CT94.
2. LOCATIONS OF SDS-8, VMP-8A, VMP-8B, VMP-8C, VMP-8D, AND ALL TVMP's ARE APPROXIMATE. ALL OTHER SDS AND VMP LOCATIONS SURVEYED BY THEW ASSOCIATES, LPS IN 2011. REFERENCE DRAWING UK156-10-07.
3. THIS SURVEY IS REFERENCED HORIZONTALLY TO THE NORTH AMERICAN DATUM OF 1983 (NAD83) AND PROJECTED ON THE NEW YORK STATE PLAN COORDINATE SYSTEM (CENTRAL ZONE).
4. THE REFERENCED HORIZONTAL CONTROL STATION IS A GPS CONTINUOUSLY OPERATING REFERENCE STATION (CORS) DESIGNATED AS "ROME CORS ARP" (NYRM). NYRM IS A SPECIAL HORIZONTAL AND VERTICAL CONTROL STATION ESTABLISHED BY NATIONAL GEODETIC SURVEY IN JULY 1997.

0 40' 80'

GRAPHIC SCALE

FORMER LOCKHEED MARTIN FRENCH ROAD FACILITY
UTICA, NEW YORK

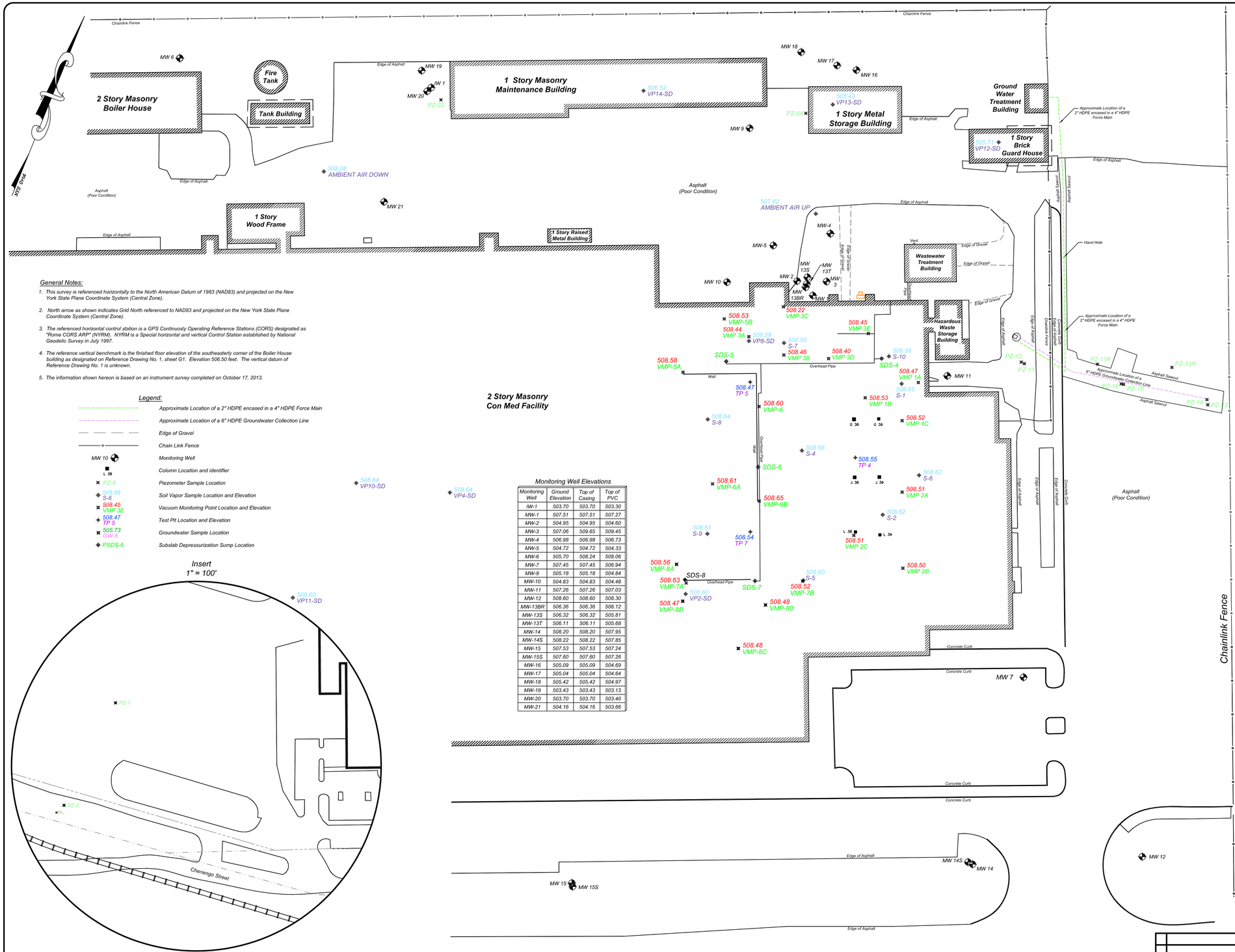
SDS-8 STARTUP AND TESTING

ARCADIS

FIGURE 1

ARCADIS

Attachment 1



General Notes:

1. *This survey is referenced horizontally to the North American Datum of 1983 (NAD83) and projected on the New York State Plane Coordinate System (Central Zone).*
2. *North arrow as shown indicates Grid North referenced to NAD83 and projected on the New York State Plane Coordinate System (Central Zone).*
3. *The referenced horizontal control station is a GPS Continuosly Operating Reference Stations (CORS) designated as "Rome CORS ARP" (NYRM). NYRM is a Special horizontal and vertical Control Station established by National Geodetic Survey in July 1997.*
4. *The reference vertical benchmark is the finished floor elevation of the southeasterly corner of the Boiler House building as designated on Reference Drawing No. 1, sheet G1. Elevation 506.50 feet. The vertical datum of Reference Drawing No. 1 is unknown.*
5. *The information shown hereon is based on an instrument survey completed on October 17, 2013.*

Legend:

- Approximate Location of a 2" HDPE encased in a 4" HDPE Force Main
- Approximate Location of a 6" HDPE Groundwater Collection Line
- Edge of Gravel
- Chain Link Fence
- MW 10 — Monitoring Well
- L 38 — Column Location and identifier
- PZ-9 — Piezometer Sample Location
- 508.68 S-6 — Soil Vapor Sample Location and Elevation
- 508.45 VMP 3E — Vacuum Monitoring Point Location and Elevation
- 508.47 TP 5 — Test Pit Location and Elevation
- 505.73 GW-6 — Groundwater Sample Location
- PSDS-6 — Subslab Depressurization Sump Location

Insert
1" = 100'

Monitoring Well Elevations

Monitoring Well	Ground Elevation	Top of Casing	Top of PVC
IW-1	503.70	503.70	503.30
MW-1	507.51	507.51	507.27
MW-2	504.95	504.95	504.60
MW-3	507.06	509.65	509.45
MW-4	506.98	506.98	506.73
MW-5	504.72	504.72	504.33
MW-6	505.70	508.24	508.06
MW-7	507.45	507.45	506.94
MW-9	505.18	505.18	504.84
MW-10	504.83	504.83	504.48
MW-11	507.26	507.26	507.03
MW-12	508.60	508.60	508.30
MW-13BR	506.36	506.36	506.12
MW-13S	506.32	506.32	505.81
MW-13T	506.11	506.11	505.68
MW-14	508.20	508.20	507.95
MW-14S	508.22	508.22	507.85
MW-15	507.53	507.53	507.24
MW-15S	507.60	507.60	507.26
MW-16	505.09	505.09	504.69
MW-17	505.04	505.04	504.64
MW-18	505.42	505.42	504.97
MW-19	503.43	503.43	503.13
MW-20	503.70	503.70	503.40
MW-21	504.16	504.16	503.66

Piezometer Locations

Sample Identifier	Northing	Easting	Top of Casing	Top of PVC	Ground Elevation
PZ-1	1,127,205.8	1,166,534.9	508.79	508.56	508.79
PZ-2	1,126,960.1	1,166,514.9	509.19	508.95	509.19
PZ-02	1,127,872.1	1,167,260.4	504.13	503.69	504.13
PZ-04	1,127,978.9	1,167,555.5	505.49	505.13	505.49
PZ-5	1,127,799.0	1,167,689.7	508.44	508.29	508.44
PZ-6	1,127,779.6	1,167,696.8	508.52	508.37	508.52
PZ-7	1,127,688.9	1,167,729.5	508.51	508.36	508.51
PZ-8	1,127,841.1	1,167,678.7	508.43	508.23	508.43
PZ-9	1,127,696.2	1,167,630.3	508.55	508.08	508.55
PZ-10	1,127,627.5	1,167,763.6	508.44	508.14	508.44
PZ-11	1,127,849.6	1,167,810.4	505.93	505.82	505.93
PZ-11R	1,127,872.8	1,167,868.7	505.03	504.68	505.03
PZ-12	1,127,849.9	1,167,807.3	505.94	505.84	505.94
PZ-13	1,127,875.9	1,167,969.7	504.08	503.85	504.08
PZ-13R	1,127,894.2	1,167,929.2	504.25	503.98	504.25
PZ-14	1,127,879.8	1,167,967.3	504.13	504.05	504.13
PZ-15	1,127,865.1	1,167,896.0	504.72	504.43	504.72
PZ-16	1,127,864.7	1,167,894.0	504.74	504.53	504.74
PZ-17	1,127,939.1	1,167,881.9	504.35	504.05	504.35
PZ-18	1,127,894.3	1,167,929.4	504.15	504.85	504.15
PZ-19	1,127,816.1	1,167,912.1	504.90	504.60	504.90
PZ-20	1,127,833.9	1,167,976.9	504.10	503.85	504.10
PZ-21	1,127,756.2	1,168,129.4	506.00	505.70	506.00
PZ-22	1,127,892.0	1,167,152.2	509.02	508.57	505.54
PZ-23	1,127,942.3	1,167,258.7	510.30	510.07	507.05
PZ-24	1,127,988.3	1,167,390.9	508.44	507.83	504.77
PZ-25	1,128,028.4	1,167,475.2	510.87	510.62	507.54
PZ-26	1,128,056.2	1,167,534.2	511.26	510.95	507.80
PZ-27	1,128,102.1	1,167,647.2	510.39	510.13	507.08
PZ-28	1,127,870.1	1,167,159.4	504.39	504.12	504.39
PZ-29	1,127,907.1	1,167,242.0	504.06	503.84	504.06
PZ-30	1,127,969.2	1,167,400.7	505.08	504.72	505.08
PZ-31	1,128,008.1	1,167,494.4	505.56	505.17	505.56
PZ-32	1,128,024.4	1,167,548.7	505.29	504.90	505.29
PZ-33	1,128,073.3	1,167,660.7	510.27	510.00	510.27
PZ-34	1,127,837.7	1,167,296.7	504.12	503.88	504.12
PZ-35	1,127,796.8	1,167,313.6	504.18	503.98	504.18
PZ-36	1,127,869.8	1,167,440.9	504.23	504.04	504.23
PZ-39	1,127,874.1	1,167,552.2	504.71	504.51	504.71
PZ-40	1,127,927.2	1,167,375.6	506.68	506.46	506.68
PZ-41	1,127,970.0	1,167,471.3	506.55	506.27	506.55
PZ-42	1,127,992.3	1,167,573.5	505.45	505.18	505.45
A1-PZ-1	1,127,869.0	1,167,253.0	503.96	503.77	503.96
A1-PZ-2	1,128,872.3	1,167,223.1	503.25	503.00	503.25
A2-PZ-1	1,128,033.8	1,167,604.7	510.04	509.74	510.04
A2-PZ-2	1,128,050.2	1,167,617.3	509.40	509.46	509.90
A2-PZ-3	1,128,067.7	1,167,641.5	509.67	509.46	509.67
A2-PZ-4	1,128,047.6	1,167,600.0	509.56	509.40	509.56
A2-PZ-5	1,128,059.7	1,167,636.2	510.24	510.03	510.24
A2-PZ-6	1,128,031.6	1,167,599.7	509.92	509.74	509.92
A2-PZ-7	1,128,056.7	1,167,620.1	509.74	509.59	509.74
A2-PZ-8	1,128,041.1	1,167,613.6	509.91	509.70	509.91

Sample Locations

Sample Identifier	Northing	Easting	Elevation
GW-1	1,127,884.5	1,167,174.0	503.7
GW-2	1,127,899.8	1,167,246.6	503.6
GW-3	1,127,911.8	1,167,261.1	503.6
GW-4	1,127,969.9	1,167,370.8	504.9
GW-5	1,128,007.7	1,167,516.7	505.9
GW-6	1,128,050.4	1,167,629.1	505.7
B-1	1,127,808.5	1,167,556.0	505.0
IB-1	1,127,798.4	1,167,600.5	508.5
IB-2	1,127,733.4	1,167,615.2	508.5
IB-4	1,127,764.6	1,167,693.6	508.5
IB-6	1,127,727.2	1,167,702.7	508.5
S-1	1,127,794.1	1,167,718.9	508.7
S-2	1,127,683.6	1,167,746.1	508.6
S-4	1,127,708.7	1,167,661.0	508.7
S-5	1,127,605.7	1,167,703.9	508.6
S-6	1,127,726.8	1,167,762.3	508.6
S-7	1,127,788.8	1,167,612.1	508.6
S-8	1,127,703.3	1,167,575.9	508.6
S-9	1,127,611.9	1,167,612.5	508.6
S-10	1,127,811.9	1,167,700.0	508.6
SDS-1	1,127,795.9	1,167,718.1	508.6
SDS-2	1,127,676.1	1,167,767.6	508.6
SDS-4	1,127,807.8	1,167,694.9	N/A
SDS-5	1,127,755.5	1,167,571.9	N/A
SDS-6	1,127,681.6	1,167,631.4	N/A
SDS-7	1,127,589.7	1,167,665.6	N/A
SDS-8	1,127,568.1	1,167,609.4	N/A
SG-1	1,127,893.3	1,167,959.4	504.1
SG-2	1,127,857.7	1,167,992.7	503.9
SG-3	1,127,750.2	1,168,037.9	504.0
SG-4	1,127,623.8	1,168,091.8	506.0
SG-5	1,127,754.6	1,168,130.7	506.2
SG-6	1,127,688.4	1,168,190.4	507.5
SG-23	1,127,941.1	1,167,256.4	507.4
SG-25	1,128,027.8	1,167,472.2	507.8
SG-26	1,128,055.6	1,167,532.9	508.0
SG-27	1,128,101.5	1,167,645.1	507.3
VMP 1A	1,127,800.5	1,167,731.9	508.5
VMP 1B	1,127,771.2	1,167,694.5	508.5
VMP 1C	1,127,764.8	1,167,731.3	508.5
VMP 2A	1,127,707.9	1,167,754.3	508.5
VMP 2B	1,127,647.5	1,167,779.4	508.5
VMP 2C	1,127,657.9	1,167,729.7	508.5
VMP 3A	1,127,782.5	1,167,582.0	508.4
VMP 3B	1,127,779.1	1,167,615.8	508.5
VMP 3C	1,127,817.4	1,167,599.9	508.2
VMP 3D	1,127,790.7	1,167,652.7	508.4
VMP 3E	1,127,823.4	1,167,676.3	508.5
VMP-5A	1,127,732.9	1,167,541.0	508.6
VMP-5B	1,127,788.7	1,167,556.7	508.5
VMP-6	1,127,730.1	1,167,612.7	508.6
VMP-6A	1,127,653.4	1,167,600.5	508.6
VMP-6B	1,127,654.7	1,167,643.4	508.7
VMP-7A	1,127,565.9	1,167,611.4	508.6
VMP-7B	1,127,604.9	1,167,703.7	508.5
VMP-8A	1,127,577.7	1,167,597.8	508.6
VMP-8B	1,127,550.3	1,167,614.6	508.5
VMP-8C	1,127,530.5	1,167,674.1	508.5
VMP-8D	1,127,573.9	1,167,681.8	508.5
VP2-SD	1,127,557.0	1,167,614.6	508.6
VP4-SD	1,127,561.9	1,167,394.0	508.6
VP8-SD	1,127,779.1	1,167,583.5	508.6
VP10-SD	1,127,539.3	1,167,316.3	508.6
VP11-SD	1,127,427.5	1,167,302.7	508.6
VP12-SD	1,128,017.9	1,167,718.5	505.7
VP13-SD	1,127,994.5	1,167,574.2	505.4
VP14-SD	1,127,944.6	1,167,418.9	506.5
TP 4	1,127,720.3	1,167,705.9	508.6
TP 5	1,127,746.7	1,167,597.7	508.5
TP 7	1,127,627.3	1,167,646.1	508.5
AMBIENT AIR DOWN	1,127,777.2	1,167,190.2	508.1
AMBIENT AIR UP	1,127,902.0	1,167,595.8	507.8

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

REV	DESCRIPTION	DATE

PROJECT NUMBER: UK156-10-07

DRAWN: N.D.G.
CHECKED: x.x.x.
SCALE: 1" = 40'
DATE: 10/18/13

Existing Monitoring Well and Sample Location Plan
Former Lockheed Martin Facility

City of Utica and Town of New Hartford
County of Oneida
State of New York

Thew Associates PE-LS, PLLC
Land Surveyors - GPS Consultants
www.ThewAssociates.com
Principals: James S. Thew, PLS; Spencer R. Thew, PE-LS
301 St. Anthony Street Utica, New York 13501
T: 315/733-7278 F: 315/797-1957

N:\PROJECTS\2007\UK156\DWG\ACAD-UK156 Sheet 9.dwg 10/18/2013 10:06:33 AM EDT