

# Grenada Manufacturing, LLC

# REVISED FACILITY INTERIM AIR MONITORING PLAN

Grenada, Mississippi

April 17, 2017

I have reviewed this document in sufficient depth to accept full responsibility for its contents.



George E. Cook, RPG Staff Geologist

Mississippi Registration Number 0889

John Ellis

Associate Vice President/Certified Project Manager

# REVISED FACILITY INTERIM AIR MONITORING PLAN

Grenada, Mississippi

Prepared for:

Grenada Manufacturing, LLC 635 Highway 332 Grenada, Mississippi 38901

Prepared by:

Arcadis U.S., Inc.

10352 Plaza Americana Drive

Baton Rouge

Louisiana 70816

Tel 225 292 1004

Fax 225 218 9677

Our Ref.:

LA003307.0005.00005

Date:

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#### REVISED FACILITY INTERIM AIR MONITORING PLAN

# **CONTENTS**

1	Introduction	. 1
2	Recent Air Data	. 1
3	Scope of Work	. 1
	3.1 Real-Time Air Monitoring	. 1
	3.2 Temporal Air Monitoring with Passive Samplers	
	3.3 Ambient Air Sampling	. 3
4	Air Sample Laboratory Analysis	. 4
	Data Evaluation and Reporting	
	Schedule	

# **TABLE**

Table 1. Summary of Indoor Air and Ambient Air Analytical Results

# **FIGURES**

Figure 1. Sample Location Map

Figure 2. Facility Interim Air Monitoring Plan Flow Chart

#### 1 INTRODUCTION

This Revised Facility Interim Air Monitoring Plan details proposed activities for continued interim indoor air monitoring at the Grenada Facility ("Facility"). This plan outlines real-time air monitoring that will be conducted during phases of work and temporal air monitoring that will be conducted using passive samplers. The work will be conducted in accordance with the U.S. Environmental Protection Agency (USEPA) *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (June 2015) and, where appropriate, USEPA Region 4 protocols. The plan dated April 4, 2017, was revised to provide clarification on the sample locations (Section 3.2), ambient air sampling (Section 3.3), reporting (Section 5), and schedule (Section 6).

#### 2 RECENT AIR DATA

Ambient, indoor, and sub-slab data were collected at the Facility in 2016 and 2017. At the request of the USEPA, a summary of the recent ambient and indoor air sample results has been compiled (Table 1). A description of the sampling procedures and an evaluation of these data along with the sub-slab data will be provided in a separate report.

#### 3 SCOPE OF WORK

Based on the data evaluated and discussions with the USEPA and the Mississippi Department of Environmental Quality (MDEQ), Arcadis U.S., Inc. (Arcadis) is proposing to conduct the following tasks:

- Real-time air monitoring during the sub-slab depressurization system (SSDS) pilot study to identify
  potential vapor entry points and determine potential sub-grade sources.
- Temporal air monitoring at specific intervals with passive samplers to determine variability in temporal indoor air and ambient air concentrations.
- · Ambient air sampling.

## 3.1 Real-Time Air Monitoring

Real-time air monitoring will be conducted during the SSDS pilot study to identify potential vapor entry points and determine potential sub-grade sources using the FROG-4000<sup>TM</sup>. The FROG-4000<sup>TM</sup> is a hand-held gas chromatography (GC) system for detecting volatile organic compounds (VOCs). The FROG-4000<sup>TM</sup> incorporates a micro preconcentrator, micro GC, and miniature photoionization detector with a 10.6- or 11.7-electron-volt lamp. Target analytes will be identified in less than 5 minutes.

Arcadis conducted a review of available drawings, figures, maps, and floor plans to assess current and past industrial equipment and operations at the Facility. This review, along with discussions with Facility personnel, will help focus this evaluation. Real-time air monitoring is proposed at locations throughout the Facility to include cracks, crevices, pipe penetrations, and/or holes in the concrete floors; cracks in the basement walls; pits and trenches; floor drains; and any other potential vapor entry point. Vapor entry points will be evaluated, sealed, and identified on a figure.

## 3.2 Temporal Air Monitoring with Passive Samplers

Radiello® passive samplers were deployed in six locations throughout the Facility on March 2, 2017, to sample indoor air for a 14-day sample duration. Sample locations are depicted on Figure 1. A program has been developed to collect additional temporal data for further evaluation. This program will be driven by the data previously collected at the Facility. To focus this effort, data will be evaluated against interim threshold values of 8.8 and 26.0 micrograms per cubic meter (µg/m³). Three temporal sampling programs are proposed. These programs are based on an evaluation of indoor air data and work being conducted in specific areas of the Facility.

Sampling Program A would be employed at selected locations where recent indoor air concentrations were greater than 8.8  $\mu$ g/m³ and have the potential for sensitive sub-populations to be present. Program A is as follows:

Sample Duration	Sampling Events Per Location
8 hours (three events in a 24-hour period)	9
7 days	1
14 days	1

Sampling Program B would be employed at selected locations where recent indoor air concentrations were greater than 26.0  $\mu$ g/m<sup>3</sup> and no sensitive sub-populations are present. Program B is as follows:

Sample Duration	Sampling Events Per Location						
8 hours (three events in a 24-hour period)	12						
7 days	1						
14 days	1						
30 days	1						

Sampling Program C would be employed at selected locations where recent indoor air concentrations were greater than 8.8  $\mu$ g/m³ but below 26.0  $\mu$ g/m³ and there are no sensitive sub-populations present. Program C is as follows

Sample Duration	Sampling Events Per Location
8 hours (three events in a 24-hour period)	3
7 days	1
30 days	1

Figure 2 depicts the interim air monitoring program decision flow chart. Up to three locations will be selected for a program. Based on the data, not all programs may be implemented. Data generated during

implementation of the programs will be evaluated in accordance with the flow chart and discussions with the technical team. Additional information on the data evaluation is provided in Section 5.

Radiello® passive samplers (RAD-130 solvent desorption type or other appropriate passive device) will be placed at selected locations within the Facility. During each sample duration, the indoor air passive samplers will be securely positioned at breathing height (approximately 5 feet above the ground).

The short-term sample duration of 8 hours is proposed at the start of each of the three worker shifts during a 24-hour period. The long-term sample durations include 7 days, 14 days, and 30 days. During the initial deployment, passive samplers for each sample duration (8 hours, 7 days, 14 days, and 30 days) will be deployed in select locations. For example, a location designated for a Program A regime will be sampled as follows:

#### <u>Day 1</u>

- Deploy and retrieve three 8-hour passive samplers.
- Deploy one 7-day passive sampler.
- Deploy one 14-day passive sampler.

#### Day 7

- Deploy and retrieve three 8-hour passive samplers.
- Retrieve the 7-day passive sampler.

#### Day 14

- Deploy and retrieve three 8-hour passive samplers.
- Retrieve the 14-day passive sampler.

At the request of the USEPA, three 8-hour summa canisters will be collected during the initial three 8-hour events at one location only for confirmation of the short-term passive sampling approach. The passive samplers will be retrieved after the specified time period and submitted directly to the laboratory for analysis. Turnaround on the indoor air passive samplers will be 14 days. If there is a significant deviation between the results, an evaluation will be made to determine the most appropriate method for collecting 8-hour samples.

## 3.3 Ambient Air Sampling

Ambient air samples will be collected outdoors using passive samplers during collection of indoor air to evaluate potential background contaminant sources from outside the structures. Four locations will be established corresponding to each cardinal direction. Ambient air samples will be collected using the same Radiello® passive samplers (RAD-130 solvent desorption type or other appropriate passive device) used for the indoor air samples. During the collection process, the passive sampler will be securely positioned at breathing height (approximately 5 feet above the ground). Ambient air samples are proposed for each of the sample durations. The passive samplers will be retrieved after the specified exposure period and directly submitted to the laboratory for analysis. Turnaround on the passive ambient air samplers will be 14 days.

The ambient air passive sampler will be placed so as to minimize potential contamination from extraneous sources. The passive samplers will be positioned away from wind shields such as trees or bushes and at least 15 feet away from any buildings. Collection of the ambient air samplers will follow the same methodology as described for indoor air samples. Meteorological data (temperature, precipitation, humidity, barometric pressure, and wind speed/direction) will be collected before and during sampling activities.

### 4 AIR SAMPLE LABORATORY ANALYSIS

Air samples will be analyzed for 10 of the 11 previously approved list of VOCs using the RAD 130 solvent extraction method. Methylene chloride is the only VOC in the approved list that cannot be analyzed by the solvent extraction method. Sample media will be ordered from ALS Environmental (ALS) headquartered in Kelso, Washington, using proper quality assurance/quality control procedures and chain-of-custody protocols. Analysis of air samples will also be conducted by ALS. Analytical results will be reported in concentration units of parts per million by volume and  $\mu g/m^3$ . ALS will be instructed to report data with constituent detection limits at or below screening levels. To minimize potential effects on the sample integrity, samples will be shipped within 24 hours following collection, and the samples will be chilled during storage and shipping. To improve the confidence in measured concentrations, a duplicate sample will be collected and analyzed for the same parameters as the parent samples. One duplicate sample will be collected for each 20 samples.

### 5 DATA EVALUATION AND REPORTING

Upon receiving the air sample data, which is expected approximately 14 days after completion of sampling, the analytical package will be reviewed for completeness. Upon completion of the initial review, results will be verbally communicated to the USEPA, MDEQ, and Ice Industries (Ice). Once validated (within 30 days of laboratory results receipt), the data package will be provided to the USEPA, MDEQ, and Ice. The data obtained from activities described in this Facility Interim Air Monitoring Plan will be evaluated and compared to the interim screening levels. Additional sampling beyond what is described in this plan will be based on the data evaluation. As depicted on Figure 2, data collected during these programs will be evaluated to determine if another program is appropriate for the area or if additional interim measures may be warranted.

This is an interim air monitoring plan that is designed to provide data while various interim measures are being completed and additional remedies are being evaluated. The pilot test detailed in the February 22, 2017, Interim Measures Evaluation, Focused Facility Sub-Slab Assessment, and Pilot Study Plan was completed during the week of March 13, 2017. These data are currently being reviewed and will be used to develop a long-term remedy. Upon implementation of a long-term remedy, a program will be developed to monitor the performance of the remedy. This interim air monitoring program will be terminated at that time. Some elements of this interim air monitoring program may be used in the remedy performance monitoring program.

#### 6 SCHEDULE

Upon receiving USEPA and MDEQ approval of this plan, personnel will coordinate with Ice and prepare to mobilize to the Facility to conduct the Facility Interim Air Monitoring Plan work. Ice will be implementing a Concrete Replacement Project (CRP) at the Facility. Work associated with the CRP is scheduled to begin on April 17, 2017, and is anticipated to take 2 weeks to complete. Sampling associated with this Facility Interim Air Monitoring Plan will be conducted after the CRP is completed and upon agency approval. This schedule may be modified, and discussed with the USEPA and MDEQ, based on field observations, data collected, and/or evaluation of the data.

A Summary Report documenting field activities, sample collection methods and locations, laboratory results, and an evaluation of the frequency monitoring will be provided to the USEPA and MDEQ within 30 days of completion of the plan. As discussed above, data collected during execution of the plan will be reviewed, validated, and then communicated to the USEPA and MDEQ.

# **TABLE**

Table 1
Summary of Indoor Air and Ambient Air Analytical Results
Facility Interim Air Monitoring Plan
Grenada Manufacturing, LLC
Grenada, Mississippi



Sample Details				Constituent (μg/m³)										
Sample ID	Location	Consultant	Sample Date	Vinyl Chloride	1,1-DCE	Methylene Chloride	trans-1,2-DCE	cis-1,2-DCE	1,2-DCA	Benzene	TCE	1,1,2-TCA	Toluene	PCE
Indoor Air - Zo	ne A: Office Area, Breakroom	, Restrooms												
		CTEH	Oct-16	ND	ND	26	ND	1.9	ND	0.97	7.1	ND	6.2	24
A-1	Office	CTEH	Jan-17	ND	0.12	25	ND	1.8	0.095	0.95	6.6	ND	6.7	0.7
		Arcadis	3/2/17	< 0.16	< 0.16	< 0.78	< 0.16	0.83	< 0.16	0.87	3.2	< 0.16	4.3	0.29
		CTEH	Oct-16	ND	ND	27	ND	1.9	0.25	1	7.1	ND	6.2	25
<b>A-2</b>	Office	CTEH	Jan-17	ND	0.14	2.1	ND	2	0.091	0.97	7.6	ND	5.4	0.78
		Arcadis	3/2/17	< 0.14	< 0.14	< 0.72	< 0.14	0.88	< 0.14	0.93	3.1	< 0.14	3.8	0.31
		CTEH	Oct-16	ND	ND	27	ND	1.9	ND	1.1	7.1	ND	6.3	25
<b>A-3</b>	Conference Room	CTEH	Jan-17	ND	0.13	2.2	ND	2	0.099	1	7.5	ND	5	0.75
		CTEH	Oct-16	ND	ND	34	ND	1.8	ND	0.79	6.9	ND	10	32
<b>A-5</b>	CMM Office	CTEH	Jan-17	ND	0.082	11	ND	2.3	0.099	1	10	ND	6.1	3.1
		Arcadis	3/2/17	< 0.15	< 0.15	< 0.74	< 0.15	1.5	< 0.15	0.75	9.6	< 0.15	4.4	0.29
		CTEH	Oct-16	ND	ND	25	ND	1.8	1.2	1	6.7	ND	7.8	24
A-6	Time Office	CTEH	Jan-17	ND	0.13	2.1	ND	1.9	0.096	0.9	6.9	ND	4.8	0.77
		CTEH	Jan-17	ND	0.098	7	ND	1.6	0.11	0.83	7.4	ND	5.2	0.95
A-7	Upstairs Conference Room	Arcadis	3/2/17	< 0.14 [< 0.15]	< 0.14 [< 0.15]	< 0.70 [< 0.73]	< 0.14 [< 0.15]	0.87 [0.62]	< 0.14 [< 0.15]	0.92 [0.79]	3.1 [2.6]	< 0.14 [< 0.15]	3.9 [3.7]	0.21 [0.19]
A-8	Upstairs Conference Room	CTEH	Jan-17	ND	0.092	4.3	ND	1.6	0.09	0.88	7.4	ND	5	0.86
A-9	Office	Arcadis	3/2/17	< 0.12	< 0.12	< 0.59	< 0.12	0.69	< 0.12	0.76	2.4	< 0.12	3.1	0.2
A-10	Men's Room	Arcadis	3/2/17	< 0.14	< 0.14	< 0.72	< 0.14	0.8	< 0.14	1.1	4.4	< 0.14	4.4	0.49
	ne B: Production Area	7 ii oddio	0/2/11	70.11		0.72	0.11	0.0	. 0.11	11.1		3.11		0.10
20		CTEH	Oct-16	ND	ND	48	ND	2.8	ND	0.73	11	ND	7	47
B-1	Blow Press Area	CTEH	Jan-17	0.096	0.14	4.7	ND	3.7	ND	0.76	23	ND	4.5	0.76
	(column D4)	Arcadis	3/2/17	< 0.13	< 0.13	< 0.67	< 0.13	0.38	< 0.13	0.7	3.6	< 0.13	1.6	0.21
		CTEH	Oct-16	ND	ND	35	ND	2.4	ND	0.73	11	ND	9	32
B-2	Weld Area	CTEH	Jan-17	ND	0.071	1.5	ND	2.9	ND	0.69	22	ND	4.5	0.62
<i>.</i>	(column F4)	Arcadis	3/2/17	< 0.15	< 0.15	< 0.77	< 0.15	0.41	< 0.15	1.1	2.4	< 0.15	1.7	< 0.15
		CTEH	Oct-16	ND	ND	87	ND	3.7	ND	0.6	29	ND	5.6	68
B-3	Steel Storage	CTEH	Jan-17	ND	0.14	1.7	ND	2.7	ND	0.51	81	ND	5.1	0.6
	(column F16)	Arcadis	3/2/17	< 0.14	< 0.14	< 0.71	< 0.14	0.98	< 0.14	0.52	9.8	< 0.14	1.6	0.19
	Tandem Line	CTEH	Oct-16	ND	ND	76	ND	2.2	0.14	0.7	13	ND	8.5	63
B-4		CTEH	Jan-17	0.097	0.059	1.1	ND	2.7	ND	0.47	12	ND	3.2	0.57
J- <del>-</del> T	(column D14)	Arcadis	3/2/17	< 0.14	< 0.14	< 0.69	< 0.14	2.8	< 0.14	0.63	24	< 0.14	3.2	0.32
	Tandem Line (column D14)	CTEH	Oct-16	ND	ND	75	ND	2.2	ND	0.68	12	ND	7.8	61
B-5		CTEH	Jan-17	ND	0.06	1.2	ND	2.7	ND	0.68	12	ND	3.3	0.66
	(Ooldinii 214)			ND	ND	38	ND	2.1		0.47	6.8		3.3	
3-6	Re-Work Storage Area (near column B-18)	CTEH	Oct-16						ND			ND		39
J-U		CTEH	Jan-17	0.077	ND	1.8	ND	2.4	ND < 0.15	0.45	6.5	ND	2.4	0.42
		Arcadis	3/2/17	< 0.15	< 0.15	< 0.74	< 0.15	4.2	< 0.15	0.56	13	< 0.15	2.8	0.42
3-7	Column G8	CTEH	Jan-17	0.087	0.099	1.2	ND	3.1	ND	0.65	35	ND	4.3	0.78
2.0	Outside Ours 1 L Off	Arcadis	3/2/17	< 0.15	< 0.15	< 0.74	< 0.15	0.85	< 0.15	0.72	3.8	< 0.15	1.3	< 0.15
B-8	Outside Supervisor's Office	Arcadis	3/2/17	< 0.14 [< 0.18]	< 0.14 [< 0.18]	< 0.72	< 0.14 [< 0.18]	1.2 [0.82]	< 0.14 [< 0.18]	0.57 [0.52]	11 [9.5]	< 0.14 [< 0.18]	2.0 [1.8]	0.18 [0.18]
3-9	Column E10	Arcadis	3/2/17	< 0.15	< 0.15	< 0.76	< 0.15	3.7	< 0.15	0.66	17	< 0.15	2.1	0.24
3-10	Fabrication	Arcadis	3/2/17	0.77	< 0.14	5.1	< 0.14	2.7	< 0.14	1	5.8	< 0.14	160	1.2

Thompson Hine LLP/3307.5/T/1/Indoor\_Ambient Air/tms

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Indoor Air - Zon	ne C: Basement Area													
	Basement	CTEH	Oct-16	ND	ND	7.1	ND	0.58	ND	0.57	2.3	ND	1.3	4.4
BS-1		CTEH	Jan-17	0.38	ND	1.5	ND	6.4	ND	0.63	13	ND	1.6	0.3
		Arcadis	3/2/17	< 0.14	< 0.14	< 0.70	< 0.14	0.31	< 0.14	0.38	0.73	< 0.14	< 0.70	< 0.14
BS-2	Basement	CTEH	Oct-16	ND	ND	6.2	ND	0.9	ND	0.52	3.3	ND	2.3	5.6
D3-2	Dasement	CTEH	Jan-17	0.4	ND	3.1	ND	6.7	ND	0.62	14	ND	1.8	0.27
CS-1	Chamber Samples	CTEH	Jan-17	ND	ND	18,000	ND	51	ND	ND	43	ND	ND	3,300
CS-2	Chamber Samples	CTEH	Jan-17	ND	ND	13	ND	2.1	ND	1.2	8.7	ND	8.1	150
Ambient Air														
OA001	NA	CTEH	Oct-16	ND	ND	ND	ND	0.49	ND	0.58	1.7	ND	1.2	0.52
OAUUT		CTEH	Jan-17	ND	ND	3.7	ND	ND	ND	0.53	0.16	ND	1.5	0.19
OA002	NA	CTEH	Oct-16	ND	ND	ND	ND	0.56	ND	1.2	2	ND	1.5	0.66
OA002		CTEH	Jan-17	ND	ND	2.6	ND	0.14	ND	0.36	0.77	ND	1.1	0.12
OA003	NA	CTEH	Oct-16	ND	ND	ND	ND	0.68	ND	0.41	3.5	ND	0.9	0.48
OA003	INA .	CTEH	Jan-17	ND	ND	1.9	ND	ND	ND	0.34	0.13	ND	0.74	ND
OA004	NA	CTEH	Jan-17	ND	ND	2.1	ND	0.12	ND	0.38	0.11	ND	0.86	ND
OA005	NA	CTEH	Jan-17	ND	ND	1.8	ND	0.14	ND	0.44	0.13	ND	1.2	0.47
OA006	NA	CTEH	Jan-17	ND	ND	1.6	ND	ND	ND	0.48	ND	ND	1.3	ND
AMB-N	North side of facility	Arcadis	3/2/17	< 0.15	< 0.15	< 0.74	< 0.15	< 0.15	< 0.15	0.34	< 0.15	< 0.15	< 0.74	< 0.15
AMB-S	South side of facility	Arcadis	3/2/17	< 0.18	< 0.18	< 0.88	< 0.18	< 0.18	< 0.18	0.44	0.53	< 0.18	0.97	< 0.18
AMB-E	East side of facility	Arcadis	3/2/17	< 0.14	< 0.14	< 0.71	< 0.14	< 0.14	< 0.14	0.37	0.32	< 0.14	7.3	< 0.14
AMB-W	West side of facility	Arcadis	3/2/17	< 0.13	< 0.13	< 0.67	< 0.13	< 0.13	< 0.13	0.37	< 0.13	< 0.13	< 0.67	< 0.13

Notes:

All samples collected in 6-liter summa canisters for an approximate 24-hour sample duration. Modified U.S. Environmental Protection Agency Method TO-15 gas chromatography/mass spectrometry SIM used for the analytical method.

[] Duplicate sample.

#### Abbreviations:

μg/m<sup>3</sup> micrograms per cubic meter.

CTEH Center for Toxicology and Environmental Health, LLC.

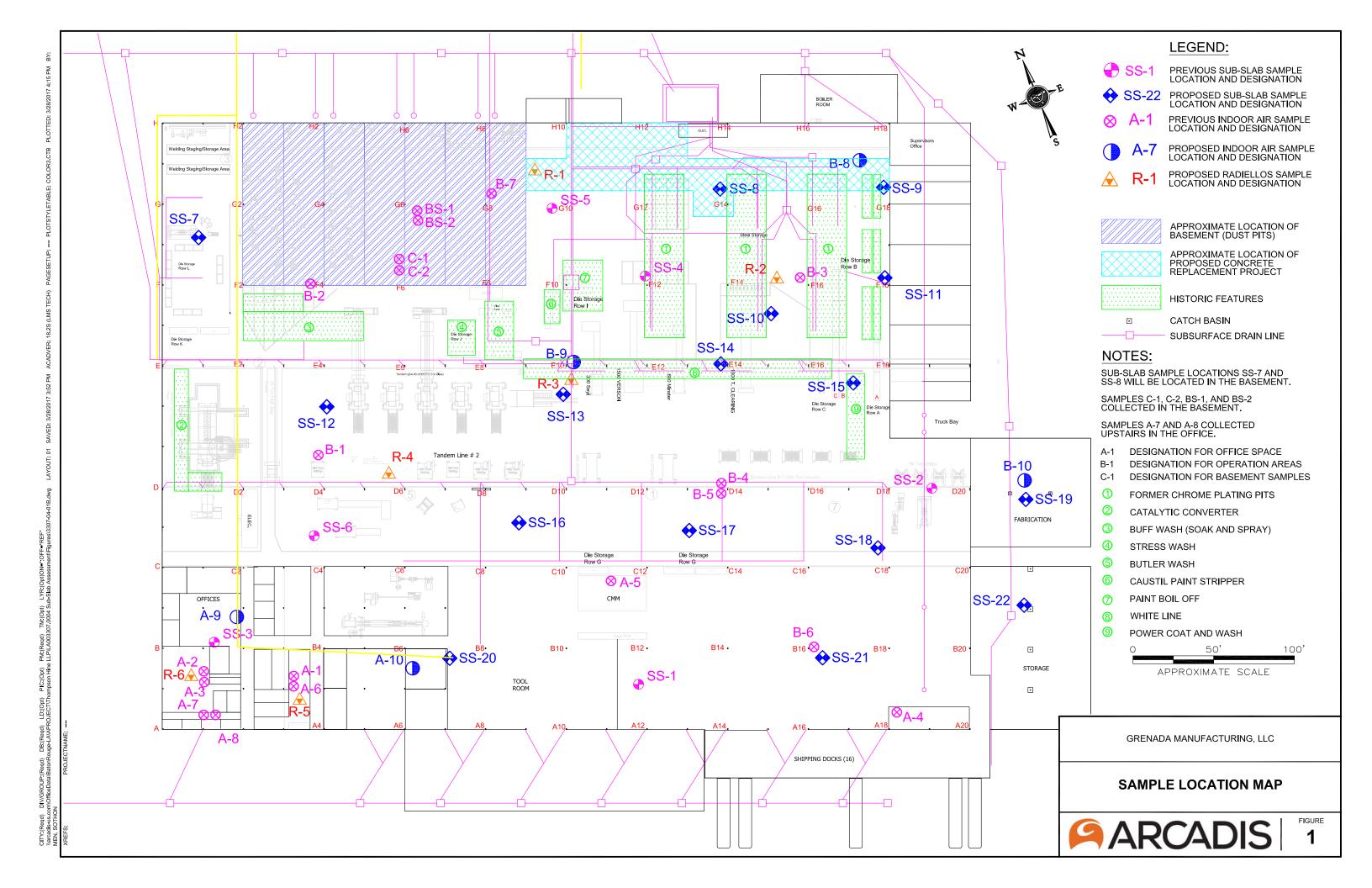
DCA Dichloroethane.
DCE Dichloroethene.
NA Not available.
ND Non-detect.

NL Screening level not calculated due to no toxicity data.

PCE Tetrachloroethene.
TCA Trichloroethane.
TCE Trichloroethene.

Thompson Hine LLP/3307.5/T/1/Indoor\_Ambient Air/tms

# **FIGURES**



(1) 30-day passive sampler + (3) 8-hour passive samplers (24 hr)

GRENADA MANUFACTURING, LLC

FACILITY INTERIM AIR MONITORING PLAN FLOW CHART





#### Arcadis U.S., Inc.

10352 Plaza Americana Drive Baton Rouge, Louisiana 70816 Tel 225 292 1004 Fax 225 218 9677

www.arcadis.com