HRS DOCUMENTATION RECORD COVER SHEET

Name of Site: Delfasco Forge

EPA ID No.: TXD988034328

Contact Persons

Site Investigation:	Brenda Nixon Cook, NPL Coordinator, EPA Reg.6 (Name)	(214) 665-7436 (Telephone)
Documentation Record:	Brenda Nixon Cook, NPL Coordinator, EPA Reg.6 (Name)	(214) 665-7436 (Telephone)

Pathways, Components, or Threats Not Scored

1) Soil Exposure and Subsurface Intrusion Pathway: The soil exposure component has not been scored because although there is sampling to show a release has occurred to shallow soils the site score would not be changed by its evaluation. Additional investigation of this pathway, if warranted, will be performed during a Remedial Investigation.

2) Ground Water Migration Pathway: The ground water pathway has not been scored because although there is sampling to show a release has occurred to groundwater, there are not a sufficient number of targets to impact the site score. Furthermore, although there are indications of contaminated groundwater present that could threaten targets, it has not been scored because the site score would not be changed by its evaluation.

3) Air Migration Pathway: The listing of this site would not be changed by evaluating this pathway. Additional investigation of this pathway, if warranted, will be performed during a Remedial Investigation.

4) Surface Water Migration Pathway: The listing of this site would not be changed by evaluating this pathway.

HRS DOCUMENTATION RECORD

Name of Site: Delfasco Forge

Date Prepared: May 2018

EPA Region: 6

Street Address of Site*: 114 NE 28th Street

City, County, State, Zip Code: Grand Prairie, Dallas County, Texas 75050*

General Location in the State:

The former Delfasco Forge facility (which is at the southwest corner of the Site) is located at 114 NE 28th Street in Grand Prairie, Dallas County, Texas, just west of Dallas within North Texas (See HRS documentation record Figure 1 for Location Map and Ref. 3, p. 1).

Topographic Map:

The following U.S. Geological Survey (USGS) 7.5-minute series topographic map was used in locating the facility: Irving Quadrangle, Texas (1995) (Ref. 3, p. 1).

Latitude: 32°45'0.97"North

Longitude: 96°57'47.62"West

Ref: Latitude and Longitude coordinates were measured from the entrance of the former facility at 114 NE 28th Street and were determined using a scaled topographic map and Geographic Information System (GIS) software (Ref. 3, p. 1; Ref. 4, pp. 1, 2).

*The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, disposed, or placed, or has otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under CERCLA. Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

Scores	
Air Pathway	Not Scored
Ground Water Pathway	Not Scored
Soil Exposure and Subsurface Intrusion Pathway	100.00
Surface Water Pathway	Not Scored
HRS SITE SCORE	**50.00**

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1. (S_{gw})	Ground Water Migration Pathway Score (from Table 3-1, line 13)	NS	NS
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	NS	NS
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NS	NS
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	NS	NS
3a.	Soil Exposure Component Score (S_{se}) (from Table 5-1, line 22)	NS	NS
3b.	Subsurface Intrusion Component Score (S_{ssi}) (from Table 5-11, line 12)	100	10,000
3c.	Soil Exposure and Subsurface Intrusion Pathway Score (S_{sessi}) (from Table 5-11, line 13)	NS	NS
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	NS
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_{sessi}^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

Notes:

S Score
S^2 Score squared
NS Not scored

Table 5-11, refers to score sheets presented in the HRS (Ref. 1a). Table 5-11 is reproduced on the following page of this HRS documentation record for the convenience of the reader.

HRS Table 5-11 Subsurface Intrusion Component Scoresheet

Factor Categories and Factors	Maximum Value	Value Assigned
Subsurface Intrusion Component		
Likelihood of Exposure:		
1. Observed Exposure	550	**550**
2. Potential for Exposure		
2a. Structure Containment	10	**NS**
2b. Depth to contamination	10	**NS**
2c. Vertical Migration	15	**NS**
2d. Vapor Migration Potential	25	**NS**
3. Potential for Exposure (lines 2a * (2b+2c+2d), subject to a maximum of 500)	500	
4. Likelihood of Exposure (higher of lines 1 or 3)	550	**550**
Waste Characteristics:		
5. Toxicity/Degradation	(a)	**10,000**
6. Hazardous Waste Quantity	(a)	**10,000**
7. Waste Characteristics (subject to a maximum of 100)	100	**100**
Targets:		
8. Exposed Individual	50	**50**
9. Population:		
9a. Level I Concentrations	(b)	**526.3**
9b. Level II Concentrations	(b)	**63.71**
9c. Population within an Area of Subsurface Contamination	(b)	**8.509**
9d. Total Population (lines 9a + 9b + 9c)	(b)	**598.519**
10. Resources	5	**5**
11. Targets (lines 8 + 9d + 10)	(b)	**653.51**
Subsurface Intrusion Component Score		
12. Subsurface Intrusion Component (lines 4 x 7 x 11)/82,500[c] (subject to a maximum of 100)	100	**100 (435.67)**
Soil Exposure and Subsurface Intrusion Pathway Score		
13. Soil Exposure Component + Subsurface Intrusion Component (subject to a maximum of 100)	100	**100.00**

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to the nearest integer.
NS – Not scored

NOTES TO THE READER

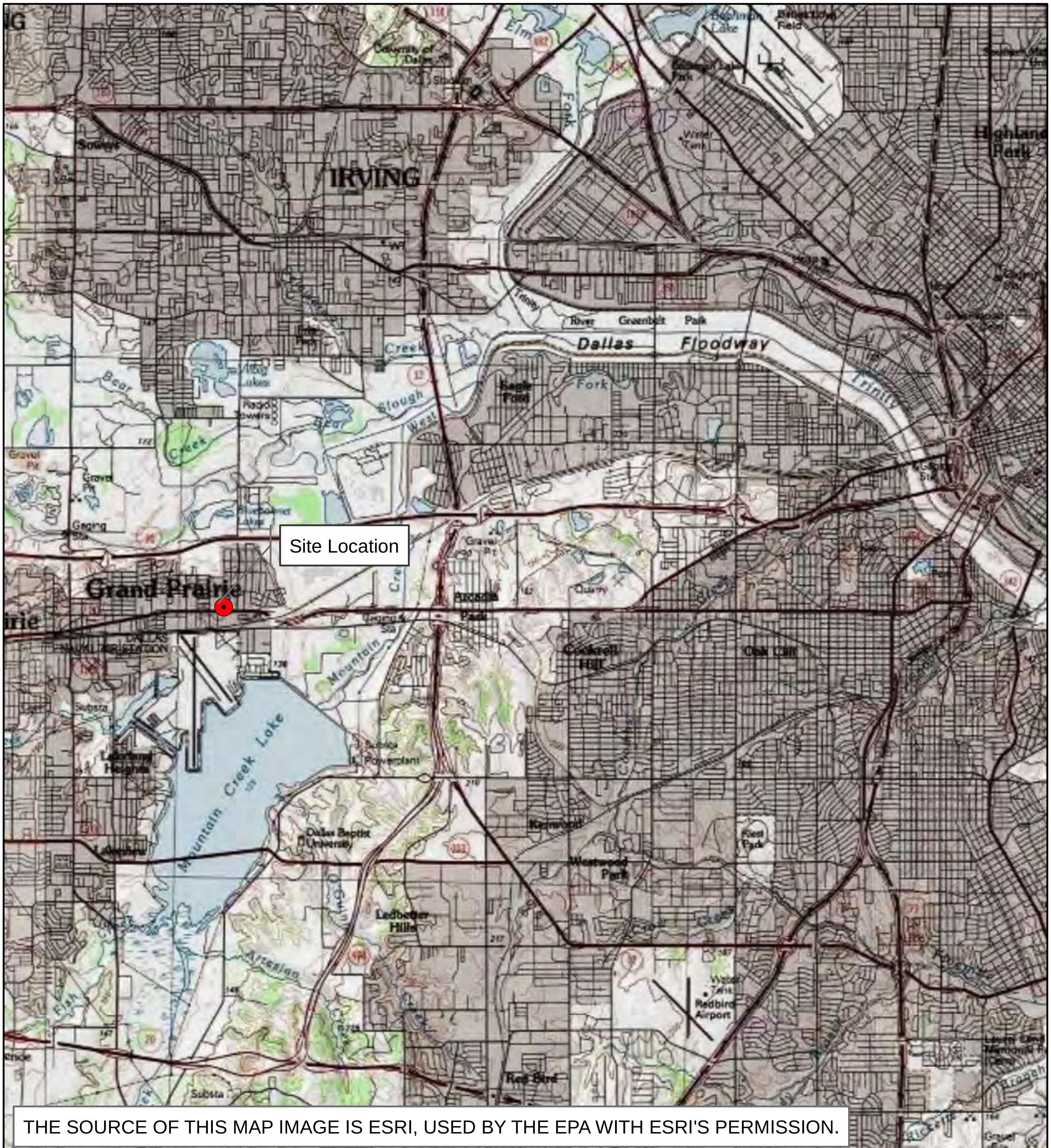
1. The following rules were applied when citing references in this documentation record:

   Tracking numbers are assigned by the region to every page of every reference. The tracking number consists of the reference number followed by the page number within that reference. A tracking number has a two-digit number followed by the sequential number which represents the page number of the document (e.g., Reference 4, Page 1 is expressed as 04.001 in Reference 4).

2. Hazardous substances are often listed by the names used in the Superfund Chemical Data Matrix (SCDM) (Ref. 2).

3. Attachment A of this documentation record consists of the following figures:

   - Figure 1 - Site Location Map
   - Figure 2 - Area of Observed Exposure (AOE) Location Map
   - Figure 3 - Area of Subsurface Contamination (ASC) Location Map
   - Figure 4 – AOE and ASC Location Map



0 2 4

Miles

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US EPA REGION 6

FIGURE 1
SITE LOCATION MAP
DELFASCO FORGE
114 NE 28TH STREET
GRAND PRAIRIE, DALLAS COUNTY, TEXAS

TDD NO:0001/17-069
EPA ID NO: TXD988034328
CONTRACT NO: EP-S5-17-02
SSID: A6H5

DATE	PROJECT NO	SCALE
APRIL 2018	20600.012.001.1069.01	AS SHOWN

DISCLAIMER: THIS FIGURE IS PREPARED FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED, AND IS NOT INTENDED FOR, SURVEY OR ENGINEERING PURPOSES.

FILE: I:\GIS_Projects\Brownm\Delfasco\Maps\HRS\FIgure 1 - Site Location Map.mxd 2:16:50 PM 4/13/2018 BROWNM

LEGEND

- Level I Sample Locations
- Level II Sample Locations
- Vapor Mitigation Systems Installed
- Approximate Footprints of AOE Structures
- AOE Boundary
- AOE Backgorund Location
- Ambient Air Sample Locations
- Former Facility Boundary

N

0 200 400

Feet

TDD NO: 0001/17-069
EPA ID NO: TXD988034328
CONTRACT NO: EP-S5-17-02
SSID: A6H5

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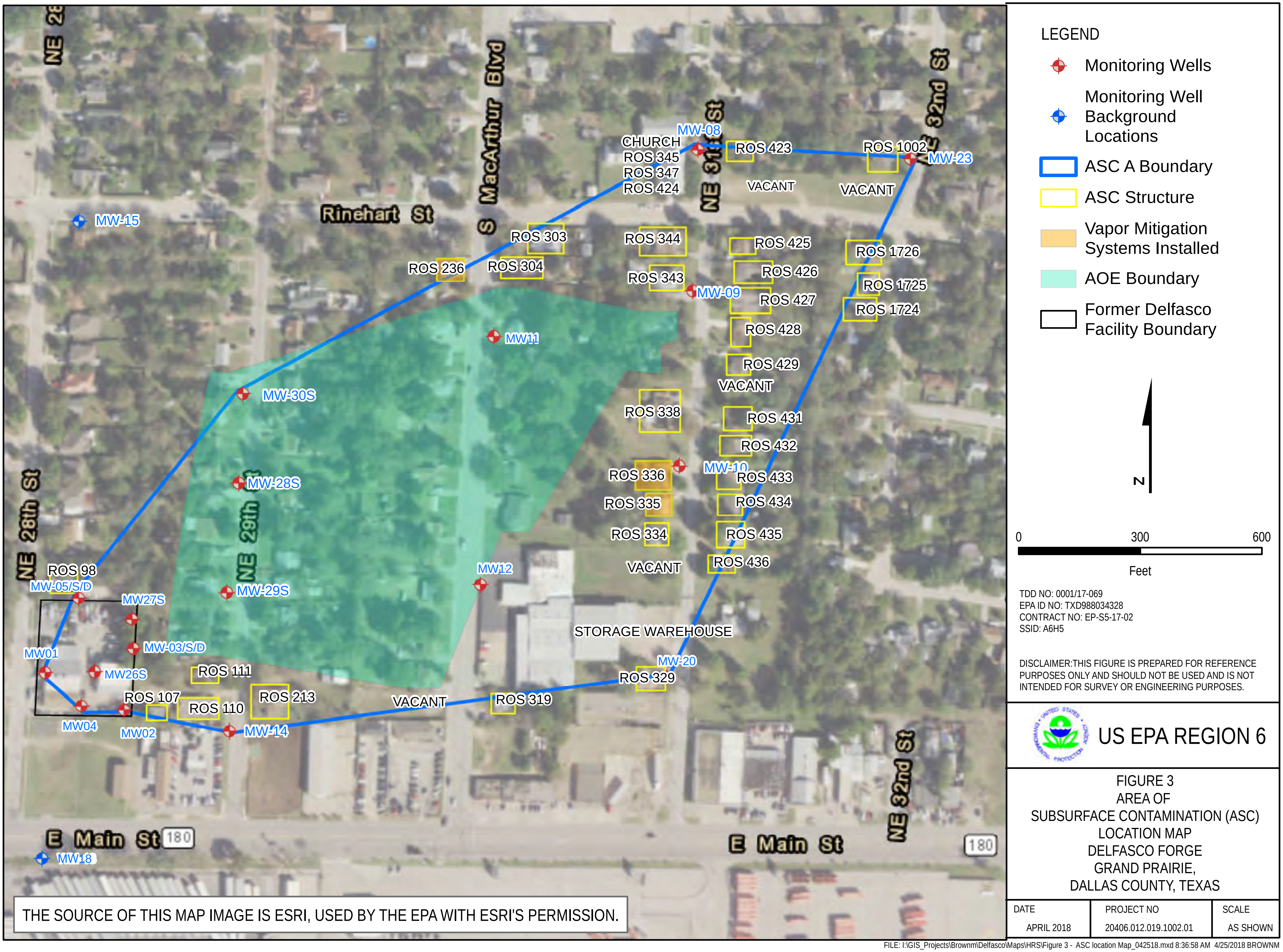
FIGURE 2
AREA OF OBSERVED EXPOSURE (AOE)
LOCATION MAP
DELFASCO FORGE
GRAND PRAIRIE,
DALLAS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
APRIL 2018	20406.012.019.1002.01	AS SHOWN

FILE: I:\GIS_Projects\Brownm\Delfasco\Maps\HRS\Figure 2 - AOE Loction Map_042418_.mxd 4:55:46 PM 4/24/2018 BROWNM


NE 28th St
S MacArthur Blvd
Rinehart St
NE 31st St
NE 32nd St
NE 29th St
E Main St 180
E Main St
180
NE 32nd St
MW-15
MW-08
MW-23
MW-09
MW11
MW-30S
MW-28S
MW-29S
MW12
MW-10
MW-20
MW-05/S/D
MW27S
MW-03/S/D
MW01
MW26S
MW04
MW02
MW-14
MW18
CHURCH
ROS 345
ROS 347
ROS 424
ROS 423
ROS 1002
VACANT
VACANT
ROS 303
ROS 236
ROS 304
ROS 344
ROS 343
ROS 425
ROS 426
ROS 427
ROS 428
ROS 429
VACANT
ROS 1726
ROS 1725
ROS 1724
ROS 338
ROS 431
ROS 432
ROS 336
ROS 433
ROS 335
ROS 434
ROS 334
ROS 435
VACANT
ROS 436
STORAGE WAREHOUSE
ROS 329
ROS 319
VACANT
ROS 98
ROS 111
ROS 107
ROS 110
ROS 213
THE SOURCE OF THIS MAP IMAGE IS ESRI, USED BY THE EPA WITH ESRI'S PERMISSION.
LEGEND
Monitoring Wells
Monitoring Well Background Locations
ASC A Boundary
ASC Structure
Vapor Mitigation Systems Installed
AOE Boundary
Former Delfasco Facility Boundary
N
0
300
600
Feet
TDD NO: 0001/17-069
EPA ID NO: TXD988034328
CONTRACT NO: EP-S5-17-02
SSID: A6H5
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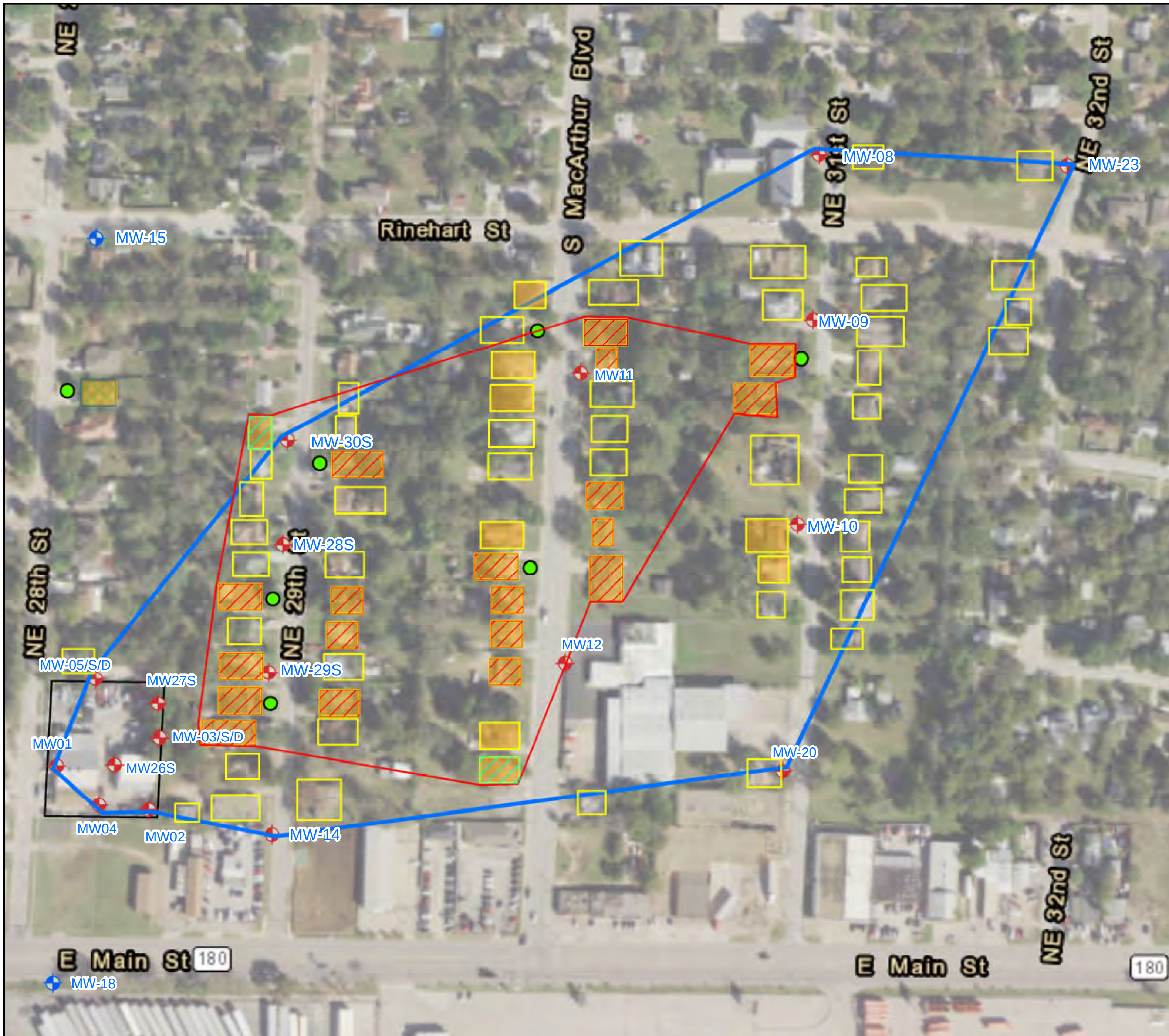
US EPA REGION 6
FIGURE 3
AREA OF
SUBSURFACE CONTAMINATION (ASC)
LOCATION MAP
DELFASCO FORGE
GRAND PRAIRIE,
DALLAS COUNTY, TEXAS
DATE
APRIL 2018
PROJECT NO
20406.012.019.1002.01
SCALE
AS SHOWN
FILE: I:\GIS_Projects\Brownm\Delfasco\Maps\HRS\Figure 3 - ASC location Map_042518.mxd 8:36:58 AM 4/25/2018 BROWNM



THE SOURCE OF THIS MAP IMAGE IS ESRI, USED BY THE EPA WITH ESRI'S PERMISSION.

LEGEND

- AOE Boundary
- ASC A Boundary
- AOE and ASC Structures
- Level I Sample Locations
- Level II Sample Locations
- AOE Backgorund Location
- Vapor Mitigation Systems Installed
- Ambient Air Sample Locations
- Monitoring Wells
- Monitoring Well Background Locations
- Former Delfasco Facility Boundary

N

0 300 600

Feet

TDD NO: 0001/17-069
EPA ID NO: TXD988034328
CONTRACT NO: EP-S5-17-02
SSID: A6H5

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FIGURE 4
AREA OF OBSERVED EXPOSURE (AOE) AND AREA OF SUBSURFACE CONTAMINATION (ASC) LOCATION MAP
DELFASCO FORGE
GRAND PRAIRIE,
DALLAS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
APRIL 2018	20600.012.001.0169.01	AS SHOWN

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Ref.
No. Description of the Reference

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SITE SUMMARY

Site Description

The Site is comprised of an area with documented indoor air contamination, and an additional area of structures overlying groundwater contaminated by the release of Trichloroethene (TCE) and other volatile organic compounds (VOCs) from the Delfasco Forge facility. The affected structures include 72 residential structures and 2 commercial buildings which are regularly occupied by a population of approximately 200 people (as shown later in this documentation record). The Site covers an area of approximately 40 acres of a predominately residential neighborhood (Ref. 59, pp. 1-2). The site consists of an area with documented vapor intrusion into homes (an area of observed exposure) comprised of 42 structures, and an area of contaminated groundwater with 32 overlying structures (an area of subsurface contamination).

The origin of the contamination at the Site is the release from past operations performed at the Delfasco Forge facility located at 114 NE 28th Street in Grand Prairie, Texas, at the southwest corner of the Site (Ref. 59, pp. 1-2). An area of soil contamination on the property was identified based on soil sampling during a Phase II Environmental Site Assessment (ESA) investigation in September 2002 Ref. 6, p.4). The exact amount of contaminated soil at the facility is not known. Further investigations at the facility identified a plume of contaminated groundwater originating at the facility (Ref. 7, p. 13). The plume extends for approximately 2,500 feet northeast, and is up to 1,100 feet wide at the widest point (see Figure 3 of this HRS documentation record).

The contaminants of concern (COCs) at the Site and found within the groundwater plume include TCE and some of its daughter products, including 1,1-Dichloroethene, cis-1,2-Dichloroethene, 1,2-Dichloroethene, and Vinyl Chloride (Ref. 7, p. 6; Ref. 38, p. 2). In addition, tetrachloroethene (PCE), a parent product of TCE was found within the groundwater plume. TCE was reportedly used by Delfasco as a degreaser on metals goods. Historical information indicates TCE was used in former Delfasco facility operations in small quantities by spot hand application. Used and unused TCE were reportedly stored in 55-gallon drums at the former facility (Ref. 8, p. 5). The facility had an elongated storm drain and a former sump near the middle of the property, both of which could have been receptors of historical spills. Investigations conducted from 2003 to 2005 indicated that these chemical solvents and substances were released onto the ground and surface areas at the facility. Subsequently, these solvents migrated into the groundwater (Ref. 8, pp. 5, 9, 10, 121, 176, 189).

The shallow subsurface is highly variable and consists of inter-bedded clay, silt, and sand units. The vadose zone varies from approximately 10 feet deep below ground surface (bgs) to 45 feet bgs (Ref. 8, pp. 34, 44). Inorganic clays, gravely clays, sandy clays, silty clays, and lean clays exist to approximately 10 feet bgs (Ref. 8, pp. 87, 89). Clays in this area of Texas are identified as high-swelling clays. (Ref. 52, pp. 10, 11). These clays may crack as they dry and shrink, resulting in pathways for water and vapor migration. Underneath the clays lie sands, silty sands, and clayey sands, with lenses of clay, to a depth of approximately 50-55 feet bgs (Ref. 8, pp. 87, 89). Beneath the Site, the upper sand unit has high moisture content and gives yield to a shallow ground water bearing unit (GWBU), likely through infiltration of the vadose zone (Ref. 20, p. 7). The shallow GWBU, which is perched in the sands above the Eagle Ford Shale, is located between 20 to 45 feet bgs (Ref. 8, pp. 34, 44). The lithology of the GWBU is generally sandy, which is a soil type that is generally conducive to groundwater migration. Water moves laterally north and east from the Delfasco facility through these sands (Ref. 20, p. 7). The highest TCE concentrations in groundwater are situated in a shallow zone that on average occurs from approximately 24 to 30 feet bgs (Ref. 26, pp. 10, 15, 16). This shallow GWBU is where all the TCE contamination can be found, with Eagle Ford Shale providing a confining unit to aquifers located beneath (Ref. 8, pp. 33, 34, 87, 89).

The COCs, PCE, TCE, and their daughter products are volatile compounds which are part of a common class of chemicals with known vapor intrusion characteristics (Ref. 38, pp. 1, 2; Ref. 39, p. 44). The subsurface vapors emanating from the source medium, (the soil and groundwater) enter the cracks formed in the vadose zone (Ref. 39, p. 46). The hazardous vapors in the vadose zone eventually enter buildings as a component of gas by migrating through cracks, seams, interstices, and gaps in walls or foundations (Ref. 39, pp. 48, 49).

Due to the migration of hazardous vapors occurring within residential structures at the Site, several vapor mitigation system have been installed. In mid-2014, Vapor Mitigation Sciences (VMS) installed mitigations systems in 30 homes (systems were offered 87 homeowners). A total of 38 systems were installed due to the complexity of homes construction (i.e. combination of multiple separated crawl spaces and crawl space/slab foundation mixes) (Ref. 14, pp. 5, 7-8). . These mitigation systems consist of sub-slab depressurization (SSD) systems for homes with slab-on-grade foundations, and crawlspace ventilation (CV) systems for homes with pier and beam type foundations (Ref. 14, p. 7). The SSD systems work through use of a fan in either the attic, on the roof, or on an exterior wall of the house that is connected via a vent pipe to one or more "suction points" in the slab foundation. The fan draws air from the sub-slab up through the vent pipe and exhausts it to outdoor air (Ref. 14, p. 7). The CV system also uses a fan, installed on an exterior wall that is connected to one or more vent pipes that run into the crawl space. The fan draws air through the pipe and vents it to the outside air, which in turn causes fresh outdoor air to be drawn into and across the crawlspace (Ref. 14, p. 7). In order to effectively mitigate the threat to the residents via subsurface vapor intrusion, the systems should be operated continuously, and the system fans be periodically checked (Ref. 14, p. 8). Homes which have the vapor mitigation systems installed are identified on Figure 2.

Site Investigation History

EPA and its partners have been investigating and taking removal actions at this site since 2003. EPA Region 6 conducted a vapor intrusion investigation of the neighborhood in 2008, sampling 16 homes and 2 commercial structures with the EPA Trace Atmospheric Gas Analyzer **(**TAGA) mobile lab and evacuated canisters (sampled subslab, crawl spaces and indoor air). Ten of the 18 structures had measurable levels of TCE in indoor air. (Ref. 9, pp. 1-22; Ref. 10, p. 45).

In August 2008, the EPA authorized installation of passive soil gas (PSG) samplers at 86 locations along NE 28th Street, NE29th Street, NE31st Street and MacArthur Boulevard, within the groundwater plume (Ref. 11, pp. 3, 6, 8-9). TCE and/or PCE were detected in fourteen samples collected northeast of the former Delfasco facility, on NE 29th Street and MacArthur Boulevard. The maximum amount of TCE detected in a sample was 21,702 ng (Ref. 11, pp. 14-31, 33).

In 2009, the TDSHS and Texas Environmental Health Institute, in consultation with EPA, Agency for Toxic Substances and Disease Registry (ATSDR), and Centers for Disease Control and Prevention (CDC) conducted an exposure investigation of the Delfasco area. Tap water, soil vapor, indoor air and biological tissue (blood and urine) were tested for TCE (Ref. 12, pp. 8, 9). There was a relationship established between soil gas levels, indoor air levels, and blood levels of TCE. TCE blood levels measured in people living in homes with detectable levels of TCE in indoor air were highly correlated with the indoor air levels (Ref. 12, pp. 3, 19).

In August 2011, TCEQ collected seven groundwater samples from two public supply wells and from four monitoring wells, and six soil samples from the Delfasco property (Ref. 13, p. 3). Four of the seven monitoring wells samples contained TCE concentrations above the HRS groundwater exposure pathway benchmark (Ref. 2, pp.36; Ref. 13, pp. 9, 17, 21). Four of the soil samples collected contained concentrations of TCE, above detection limits (Ref. 13, p. 22).

In March 2013, EA conducted groundwater sampling to delineate any contaminant plume migration that may have occurred due to the release from the Delfasco Forge facility. 21 monitoring wells were sampled for VOCs (Ref. 33, p. 1-2). Of the 21 wells sampled, 14 had detectable concentrations of TCE with the highest concentration observed in MW-11 at 974 µg/L. Vinyl chloride, 1,1-Dichloroethene, and trans-1,2-Dichloroethene were also observed in some samples (Ref. 33, pp. 9-10).

In 2014, Tetra Tech acting on behalf of the Delfasco's Chapter 7 trustee, subcontracted with Vapor Mitigation Sciences (VMS) to install the vapor mitigation systems with oversight from the EPA, TCEQ and TDSHS (Ref. 14, pp. 4, 7). Tetra Tech conducted pre-mitigation indoor air monitoring at 19 homes (and 2 duplicated) using evacuated canisters with the EPA Houston lab conducting the analyses (Ref. 15, pp. 3, 51-71; Ref. 31, p. 5). Fifteen of the homes contained concentrations of TCE above detection limits, and fourteen of the homes contained concentrations above the subsurface intrusion component benchmark (Ref. 2, pp. 38; Ref. 15, pp. 4-24).

In mid-2014, VMS installed mitigations systems in 30 homes (systems were offered 87 homeowners). A total of 38 systems were installed due to the complexity of homes construction (i.e. combination of multiple separated crawl spaces and crawl space/slab foundation mixes) (Ref. 14, pp. 5, 7-8). Approximately one month later, Tetra Tech conducted post-mitigation indoor air monitoring using evacuated canisters with flow controllers and 24-hour time-integrated samples (Ref. 32, p, 9; Ref. 16, p. 1). EPA Houston lab analyzed the samples, and the results were mixed with some samples showing lower concentrations and some higher (Ref. 16). Additional sampling was conducted to verify sample results in May 2016.

In May 2016, the EPA collected 23 air samples from six residential properties where vapor mitigation systems were installed in 2014. The objective was to determine the effectiveness of the operating mitigation systems and to determine if mitigation system modifications would be necessary by the trustee's contractor (Ref. 31, pp. 4-8).

5.0 SOIL EXPOSURE AND SUBSURFACE INTRUSION PATHWAY

5.2 SUBSURFACE INTRUSION COMPONENT

The origin of the contamination at the Site is the Delfasco Forge facility due to past operations. Investigations conducted from 2003 to 2005 by EnSafe, Inc. indicated that TCE and its daughter products were spilled onto the ground and surface areas at the facility. Subsequently, these solvents migrated into the groundwater and contaminated it (Ref. 8, pp. 5, 9, 10, 121, 176, 189). Groundwater flows north and east from the Delfasco facility (Ref. 20, p. 35). TCE and its daughter products are volatile compounds which are part of a common class of chemicals with known vapor intrusion characteristics (Ref. 38, pp. 1, 2; Ref. 39, p. 44). The subsurface vapors emanate from the contaminated groundwater, and enter the pore space around and between the subsurface soil particles and soil column above the groundwater table. From there the hazardous vapors in the vadose zone (the soil between the surface and the groundwater table) have entered into buildings by migrating through cracks, seams, interstices, and gaps in walls or foundations.

The shallow subsurface is highly variable and consists of inter-bedded clay, silt, and sand units. The vadose zone varies from approximately 10 feet deep below ground surface (bgs) to 45 feet bgs (Ref. 8, pp. 34, 44). Inorganic clays, gravely clays, sandy clays, silty clays, and lean clays exist to approximately 10 feet bgs (Ref. 8, pp. 87, 89). The site is located on Blackland Prairie Soils, which are known as “cracking clays” because of the large, deep cracks that form in dry weather (Ref. 60, pp. 4-5). These clays may crack as they dry and shrink, resulting in pathways for water and vapor migration. Underneath the clays lie sands, silty sands, and clayey sands, with lenses of clay, to a depth of approximately 50-55 feet bgs (Ref. 8, pp. 87, 89). Beneath the Site, the upper sand unit has high moisture content and gives yield to a shallow ground water bearing unit (GWBU), likely through infiltration of the vadose zone (Ref. 20, p. 7). The shallow GWBU, which is perched in the sands above the Eagle Ford Shale, is located between 20 to 45 feet bgs (Ref. 8, pp. 34, 44). The lithology of the GWBU is generally sandy, which is a soil type that is generally conducive to groundwater migration. Water moves laterally north and east from the Delfasco facility through these sands (Ref. 20, p. 7). The highest TCE concentrations in groundwater are situated in a shallow zone that on average occurs from approximately 24 to 30 feet bgs (Ref. 26, pp. 10, 15, 16). This shallow GWBU is where all the TCE contamination can be found, with Eagle Ford Shale providing a confining unit to aquifers located beneath (Ref. 8, pp. 33, 34, 87, 89).

While conducting a site investigation in 2014, it was observed by EA Engineering, Science and Technology, Inc. (EA) that many of the homes are older, wood-framed structures with crawl-spaces, while some newer homes are constructed with a slab on grade foundation. This situation, coupled with the location of utilities, could influence the distribution of COC vapors entering the homes in this area (Ref. 26, p. 12).

5.2.0 GENERAL CONSIDERATIONS

There is one identified area of observed exposure (AOE), an area containing structures with indoor air contamination due to subsurface intrusion, at the site as shown in Figure 2. There is also one identified area of subsurface contamination (ASC), an area with structures above subsurface contamination, as shown in Figure 3.

AOE Number/ ASC Letter	Type of Structure	Number(s) of Specific Type of Structure	References
AOE 1	Residential	42	Figure 2
ASC A	Residential Retail	30 2	Figure 3

Area(s) of Observed Exposure

AOE 1 – Area of Observed Exposure 1

Location, description and delineation of AOE (with reference to a map of the site):

There are 42 occupied residential structures within the area of AOE 1. The AOE was identified based on 21 residential structures which had observed exposure concentrations of TCE obtained through indoor air sampling (see observed exposure below). An additional 21 occupied residential structures had inferred contamination based on their location between the structures with observed contamination (see Figure 2). These residential structures are located between 150 feet and 1,500 feet east and northeast of the Delfasco property boundary, and are located above the TCE subsurface contamination identified in the ASC discussed later in this documentation record (see Figures 2, 3 and 4 of this HRS documentation record).

Identification of all regularly occupied structures in the AOE:

TABLE 1
REGULARLY OCCUPIED STRUCTURES WITHIN AOE 1

Type of Structure	Regularly Occupied Structure ID	References
Residential	ROS 112	Figure 2
Residential	ROS 113	Figure 2
Residential	ROS 114	Figure 2
Residential	ROS 210	Figure 2
Residential	ROS 202	Figure 2
Residential	ROS 208	Figure 2
Residential	ROS 116	Figure 2
Residential	ROS 207	Figure 2
Residential	ROS 203	Figure 2
Residential	ROS 121	Figure 2
Residential	ROS 224	Figure 2
Residential	ROS 228	Figure 2
Residential	ROS 311	Figure 2
Residential	ROS 306	Figure 2
Residential	ROS 305	Figure 2
Residential	ROS 341	Figure 2
Residential	ROS 222	Figure 2
Residential	ROS 312	Figure 2
Residential	ROS 227	Figure 2
Residential	ROS 226	Figure 2
Residential	ROS 340	Figure 2

Type of Structure	Regularly Occupied Structure ID	References
Residential	ROS 310	Figure 2
Residential	ROS 233	Figure 2
Residential	ROS 232	Figure 2
Residential	ROS 201	Figure 2
Residential	ROS 231	Figure 2
Residential	ROS 120	Figure 2
Residential	ROS 204	Figure 2
Residential	ROS 119	Figure 2
Residential	ROS 229	Figure 2
Residential	ROS 118	Figure 2
Residential	ROS 206	Figure 2
Residential	ROS 117	Figure 2
Residential	ROS 115	Figure 2
Residential	ROS 209	Figure 2
Residential	ROS 211	Figure 2
Residential	ROS 309	Figure 2
Residential	ROS 308	Figure 2
Residential	ROS 307	Figure 2
Residential	ROS 223	Figure 2
Residential	ROS 234	Figure 2
Residential	ROS 235	Figure 2

Observed Exposure by Chemical Analysis

Multiple residences at this site have been identified as having indoor air contamination levels meeting observed exposure criteria, as documented below. In 2014, Tetra Tech under contract to the Grand Prairie Properties Liquidation, Inc. (Trust), with oversight from the EPA, TCEQ and TDSHS, subcontracted with Vapor Mitigation Sciences (VMS) to install the vapor mitigation systems based on the presence of contaminated groundwater underlying homes (Ref. 14, pp. 4, 7). Tetra Tech conducted pre-mitigation indoor air monitoring at 19 homes using evacuated canisters with the EPA Houston lab conducting the analyses (Ref. 15, pp. 3, 51-71; Ref. 31, p. 5). Fifteen of the homes contained concentrations of TCE above detection limits, and fourteen of the homes contained concentrations above the HRS cancer risk subsurface intrusion component benchmark (Ref. 2, pp. 38; Ref. 15, pp. 4-24).

Establishment of Background Levels

To document that indoor air contamination levels are significantly above background levels, indoor air samples were collected that established background concentrations for the residential properties. These samples were collected during two sampling events in May 2014, and October 2014. The concentrations of TCE in the background samples collected during each event were compared to concentrations in the contaminated samples collected during the same timeframe. ROS 900, the structure from which background indoor air samples were collected, is located hydrogeologically cross gradient of the contamination. Although the structure has a vapor mitigation system installed, no TCE contamination was detected in indoor air samples collected within the structure prior to the installation of the mitigation system (Ref 15, p. 19).

During 2014 sampling events for baseline and post-mitigation sampling related to the installation of vapor mitigation systems, indoor air samples were collected from both the background and structures with suspected indoor air contamination over a 24-hour period, using individually certified evacuated canisters equipped with flow controllers and analyzed using EPA method TO-15 in single ion monitoring mode (Ref. 15, p. 62, Ref. 16, p. 53).

TABLE 2
AOE 1 BACKGROUND LOCATIONS

Sample ID	Sample Location/Regularly Occupied Structure ID	Start Date and Time	End Date and Time	Basis for Sample as Background	References
1405019-11	306 NE 28th / ROS 900 Indoor	05/14/14 unknown	05/14/14 16:20	Outside Plume, Similar Structure	Ref. 15, pp. 3, 62, Figure 2
1410033-01	306 NE 28th / ROS 900 Indoor	10/28/14 08:25	10/29/14 08:40	Outside Plume, Similar Structure	Ref. 16, pp. 3, 53, Figure 2

TABLE 3
AOE 1 BACKGROUND SAMPLE CONCENTRATIONS

Sample ID	Eligible Hazardous Substance	Concentration (µg/m3)	Reporting Limit* (µg/m3)	References
1405019-11	Trichloroethene	0.27 U	0.27	Ref. 15, p. 19
1410033-01	Trichloroethene	0.27 U	0.27	Ref. 16, p. 4

U – Substance undetected (Ref. 15, p. 73; 16, p. 56).
*Reporting Limits are adjusted for sample size, dilution, and matrix interference (Ref. 15, p. 1; Ref. 16, p. 1).

Background Levels

The background level for TCE for establishing an observed exposure has been selected to be below detection at a reporting limit of 0.27 µg/m^3. This level was selected because background concentrations of TCE were non-detect for the May 2014 and October 2014 sampling events. In addition, TCE is a man-made substance, and no other sources of TCE are known to be in the immediate vicinity of the site (Ref. 30, pp. 1-22). TCE was also not found in outdoor air samples collected at the site (see Table 3). Also, residents were requested to remove anthropogenic sources that could interfere with the air sample results. Anthropogenic sources within residential structures can include common cleaning supplies (Ref. 25, pp. 15, 18; Ref. 31, p. 7; Ref. 54, pp. 7, 10-55, 11-14, 58-61).

The detection limit for these background samples is identified as the reporting limit, which is defined for these analyses as the lowest concentration at which an analyte can be reliably measured and reported without qualification. They are adjusted for sample size, dilution, and matrix interference (Ref. 15, p. 1; Ref. 16, p. 1; ref. 34, p. 1). This definition is the same as the HRS definition for Sample Quantitation Limit, which is the quantity of a substance that can be reasonably quantified given the limits of detection for the methods of analysis and sample characteristics that may affect quantitation (for example, dilution, concentration) (Ref. 1a, Section 1.1). So for these samples the terms can be used interchangeably.

The background samples and observed exposure samples were each collected during the same sampling events, by the same sampling team, using the same sampling technique and over a similar time period (see Figure 2 for background location).

TABLE 4
AOE 1 BACKGROUND LEVELS

Eligible Hazardous Substance	Background Level (µg/m3)	Concentrations used for Establishing an Observed Exposure (µg/m3)
Trichloroethene	0.27 U	> 0.27

U – Substance undetected (Ref. 15, p. 73; 16, p. 56).

Exposure Samples

TCE indoor air concentrations greater than 0.27 micrograms per cubic meter (µg/m^3) and attributable to the subsurface contamination were used to establish an observed exposure (Ref. 1a, Table 2-3).

During the 2014 sampling events, both background and exposure indoor air samples were collected over a 24-hour period, using individually certified evacuated canisters equipped with flow controllers and analyzed using EPA method TO-15 in single ion monitoring mode (Ref. 15, p. 62, Ref. 16, p. 53).

TABLE 5
AOE 1 OBSERVED EXPOSURE SAMPLE LOCATIONS

Regularly Occupied Structure ID	Sample ID	Sample Location	Start Date and Time	End Date and Time	References
ROS 112 (121 NE 29th)	1405020-07	Indoor residential property	05/14/14 16:45	05/15/14 16:45	Ref. 15, pp. 3, 69; Ref. 24, pp. 69-71
ROS 113 (125 NE 29th)	1405019-04	Indoor residential property	05/14/14 11:10	05/15/14 11:10	Ref. 15, pp. 3, 54; Ref. 24, pp. 72-74
ROS 210 (126 NE 29th)	1405020-09	Indoor residential property	05/15/14 09:30	05/16/14 09:30	Ref. 15, pp. 3, 71; Ref. 24, pp. 175-177

Regularly Occupied Structure ID	Sample ID	Sample Location	Start Date and Time	End Date and Time	References
ROS 114 (129 NE 29th)	1405020-08	Indoor residential property	05/15/14 10:30	05/16/14 10:30	Ref. 15, pp. 3, 70; Ref. 24, pp. 75-77
ROS 203 (220 NE 29th)	1405019-02	Indoor residential property	05/14/14 09:25	05/15/14 09:25	Ref. 15, pp. 3, 52; Ref. 24, pp. 156-158
ROS 208 (202 NE 29th)	1405019-01	Indoor residential property	05/14/14 1408	05/15/14 1408	Ref. 15, pp. 3, 51; Ref. 24, pp. 169-171
ROS 116 (205 NE 29th)	1405020-02	Indoor residential property	05/15/14 09:10	05/16/14 09:10	Ref. 15, pp. 3, 64; Ref. 24, pp. 81-83
ROS 207 (206 NE 29th)	1405020-01	Indoor residential property	05/15/14 09:00	05/16/14 09:00	Ref. 15, pp. 3, 63; Ref. 24, pp. 166-168
ROS 121 (301 NE 29th)	1405020-06	Indoor residential property	05/14/14 16:00	05/15/14 16:00	Ref. 15, pp. 3, 68; Ref. 24, pp. 96-98
ROS 224 129/125 MacArthur)	1405020-03	Indoor residential property	05/14/14 16:00	05/15/14 16:00	Ref. 15, pp. 3, 65; Ref. 24, pp. 193-195; Ref. 55, pp. 1-3
ROS 228 (209 MacArthur)	1405019-07	Indoor residential property	05/14/14 15:29	05/15/14 15:29	Ref. 15, pp. 3, 57; Ref. 24, pp. 202-204
ROS 311 (214 MacArthur)	1405019-05	Indoor residential property	05/14/14 11:05	05/15/14 11:05	Ref. 15, pp. 3, 55; Ref. 24, pp. 280-282
ROS 306 (310 MacArthur)	1405019-03	Indoor residential property	05/14/14 15:10	05/15/14 15:10	Ref. 15, pp. 3, 53; Ref. 24, pp. 265-267
ROS 305 (314 MacArthur)	1405019-08	Indoor residential property	05/14/14 09:06	05/15/14 09:06	Ref. 15, pp. 3, 58; Ref. 24, pp. 262-264
ROS 341 (311 NE 31st)	1405019-12	Indoor residential property	05/14/14 14:38	05/15/14 14:38	Ref. 15, pp. 3, 61; Ref. 24, pp. 310-312
ROS 113 (125 NE 29th)	141033-03	Indoor residential property	10/28/14 08:57	10/29/14 08:56	Ref. 16, pp. 3, 53; Ref. 24, pp. 72-74
ROS 114 (129 NE 29th)	141033-04	Indoor residential property	10/28/14 09:07	10/29/14 09:10	Ref. 16, pp. 3, 53; Ref. 24, pp. 75-77
ROS 203 (220 NE 29th)	141033-06	Indoor residential property	10/28/14 09:30	10/29/14 09:40	Ref. 16, pp. 3, 53; Ref. 24, pp. 156-158
ROS 116 (205 NE 29th)	141033-05	Indoor residential property	10/28/14 09:18	10/29/14 09:27	Ref. 16, pp. 3, 53; Ref. 24, pp. 81-83
ROS 208 (202 NE 29th)	141033-10	Indoor residential property	10/28/14 10:45	10/29/14 10:47	Ref. 16, pp. 3, 53; Ref. 24, pp. 169-171
ROS 305 (314 MacArthur)	141033-11	Indoor residential property	10/28/14 11:05	10/29/14 11:10	Ref. 16, pp. 3, 53; Ref. 24, pp. 262-264
ROS 222 (117 MacArthur)	141033-12	Indoor residential property	10/28/14 11:15	10/29/14 11:27	Ref. 16, pp. 3, 53; Ref. 24, pp. 190-192

Regularly Occupied Structure ID	Sample ID	Sample Location	Start Date and Time	End Date and Time	References
ROS 312 (210 MacArthur)	1410036-01	Indoor residential property	10/28/14 12:55	10/29/14 13:08	Ref. 16, pp. 3, 53; Ref. 24, pp. 283-285
ROS 228 (209 MacArthur)	1410036-02	Indoor residential property	10/28/14 12:56	10/29/14 13:10	Ref. 16, pp. 3, 53; Ref. 24, pp. 202-204
ROS 227 (205 MacArthur)	1410036-03	Indoor residential property	10/28/14 13:08	10/29/14 13:30	Ref. 16, pp. 3, 53; Ref. 24, pp. 199-201
ROS 311 (214 MacArthur)	1410036-05	Indoor residential property	10/28/14 12:54	10/29/14 13:50	Ref. 16, pp. 3, 53; Ref. 24, pp. -282
ROS 226 (201 MacArthur)	1410036-06	Indoor residential property	10/29/14 14:00	10/29/14 14:00	Ref. 16, pp. 3, 53; Ref. 24, pp. 196-198
ROS 306 (310 MacArthur)	1410036-08	Indoor residential property	10/28/14 15:20	10/29/14 15:25	Ref. 16, pp. 3, 53; Ref. 24, pp. 265-267
ROS 340 (309 NE 31st)	1410036-09	Indoor residential property	10/28/14 16:45	10/29/14 16:55	Ref. 16, pp. 3, 53; Ref. 24, pp. 307-309
ROS 310 (218 MacArthur)	1410036-11	Indoor residential property	10/28/14 13:50	10/29/14 17:10	Ref. 16, pp. 3, 54; Ref. 24, pp. 277-279

TABLE 6
AOE 1 OBSERVED EXPOSURE SAMPLE CONCENTRATIONS

Sample ID	Eligible Hazardous Substance	Concentration (µg/m3)	Reporting Limit (µg/m3)	References
1405019-01	Trichloroethene	3.23	0.27	Ref. 15, p. 4;
1405019-02	Trichloroethene	10.3	0.27	Ref. 15, p. 5
1405019-03	Trichloroethene	3.66	0.27	Ref. 15, p. 6
1405019-04	Trichloroethene	12.1	0.27	Ref. 15, p. 7
1405019-05	Trichloroethene	1.72	0.27	Ref. 15, p. 8
1405019-07	Trichloroethene	28.8	0.27	Ref. 15, p. 10
1405019-08	Trichloroethene	2.75	0.27	Ref. 15, p. 11
1405019-12	Trichloroethene	1.67	0.27	Ref. 15, p. 15
1405020-01	Trichloroethene	28.5	0.27	Ref. 15, p. 16
1405020-02	Trichloroethene	122	0.54	Ref. 15, p. 17
1405020-03	Trichloroethene	7.22	0.27	Ref. 15, p. 18
1405020-06	Trichloroethene	0.38	0.27	Ref. 15, p. 21
1405020-07	Trichloroethene	5.17	0.27	Ref. 15, p. 22
1405020-08	Trichloroethene	3.82	0.27	Ref. 15, p. 23
1405020-09	Trichloroethene	4.04	0.27	Ref. 15, p. 24
141033-03	Trichloroethene	153	0.27	Ref. 16, p. 6
141033-04	Trichloroethene	39.7	0.27	Ref. 16, p. 7
141033-05	Trichloroethene	18	0.27	Ref. 16, p. 8
141033-06	Trichloroethene	0.81	0.27	Ref. 16, p. 9
141033-10	Trichloroethene	23.1	0.27	Ref. 16, p. 13
141033-11	Trichloroethene	0.65	0.27	Ref. 16, p. 14
141033-12	Trichloroethene	0.32	0.27	Ref. 16, p. 15
1410036-01	Trichloroethene	0.92	0.27	Ref. 16, p. 17
1410036-02	Trichloroethene	15.6	0.27	Ref. 16, p. 18
1410036-03	Trichloroethene	3.02	0.27	Ref. 16, p. 19
1410036-05	Trichloroethene	0.81	0.27	Ref. 16, p. 21
1410036-06	Trichloroethene	6.25	0.27	Ref. 16, p. 22
1410036-08	Trichloroethene	23.2	0.27	Ref. 16, p. 24
1410036-09	Trichloroethene	0.54	0.27	Ref. 16, p. 25
1410036-11	Trichloroethene	47.7	0.27	Ref. 16, p. 27

Notes:
µg/m3 – micrograms per cubic meter
Reporting limits are adjusted for sample size and matrix interference (Ref. 15, p. 1; Ref. 16, p. 1).

Attribution to Subsurface and Facility

Association and Release of TCE with the Delfasco Facility

The former Delfasco facilities past handling of TCE, resulted in TCE contamination of the groundwater in the vicinity of the facility. Specifically, TCE vapors from the groundwater have been detected in nearby homes at concentrations which pose an imminent and substantial endangerment to human health (Ref. 27, p. 14).

Delfasco Forge, during the time that it operated, performed steel and iron forging on its metal products. Delfasco Forge used TCE as a degreaser on its metal products (Ref. 27, p, 11). Soil boring data collected from the the former Delfasco facility indicate that a disposal and/or release of TCE occurred to the ground surface and contaminants found within the soil include TCE and its daughter products (Ref. 17, pp. 156, 157; Ref. 27, p. 11). The exact amount of contaminated soil at the facility is not known. In addition, the facility had an elongated storm drain and a former sump near the middle of the property, both of which could have been receptors of historical spills (Ref. 8, p. 5).

Evidence of TCE Migration from the Delfasco Facility to Below the Contaminated Structures

Investigations identified a plume of contaminated groundwater originating at the facility (Ref. 7, p. 13). The shallow GWBU at the Site is perched in the sands of the Eagle Ford Aquifer, and is located between 20 to 45 feet bgs (Ref. 8, pp. 34, 44). The lithology of this unsaturated zone is generally sandy and is conducive to vertical migration. Water moves laterally north and east from the Delfasco facility through these sands (Ref. 20, p. 7). Shallow groundwater is transmitted to the lower sand and gravel GWBU in the areas where low-permeability clay is discontinuous or where this confining unit is leaky (Ref. 20, p. 7). The plume within the shallow GWBU extends for approximately 2,500 feet northeast, and is up to 1,100 feet wide at the widest point and beneath the entire Site as detailed in the ASC discussion below (see Figure 3 of this HRS documentation record).

TCE and its daughter products are volatile compounds which are part of a common class of chemicals that can volatilize under normal pressure and temperature conditions (Ref. 38, pp. 1, 2; Ref. 39, p. 44). The subsurface vapors emanating from the groundwater enter the pore space around and between the subsurface soil particles and soil column above the groundwater table. The soil layer above the groundwater at the Site is approximately 10 feet deep and consists of inorganic clays, gravely clays, sandy clays, silty clays, and lean clays (Ref. 8, pp. 87, 89). The site is located on Blackland Prairie Soils, which are known as “cracking clays” because of the large, deep cracks that form in dry weather (Ref. Ref. 60, pp. 4-5). The highest TCE concentrations in groundwater are situated in a shallow zone that on average occurs from approximately 24 to 30 feet bgs (Ref. 26, pp. 10, 15, 16). This shallow GWBU is where all the TCE contamination can be found, with Eagle Ford Shale providing a confining unit to aquifers located beneath (Ref. 8, pp. 33, 34, 87, 89). In addition, utility lines can provide a conduit for migration from the subsurface into overlying structures. A representative familiar with the layout of subsurface utilities at the Site indicated that when the sanitary sewer line system was originally installed service from each house went to a common lateral line situated in an easement which runs behind the houses. In turn, these lateral lines were sloped to the “deep” sanitary sewer main lines located beneath the streets. When the common lateral lines became damaged or degraded, sections of the laterals were abandoned by the City and new sanitary sewer service lines were installed to the sanitary sewer main lines; depending on the location of the houses and the depth of the main lines, these new laterals could intersect the vadose zone creating potential preferential pathways for vapor migration through the subsurface, and as a potential entry point into overlying houses or structures (Ref. 26, p. 12).

Lack of Structural Containment Permanently Preventing Vapor Intrusion

The hazardous vapors (TCE) in the vadose zone eventually enter buildings as a component of gas by migrating through cracks, seams, interstices, and gaps in walls or foundations (Ref. 39, pp. 48, 49). In the area of the Site, the high shrink-swell property of the "cracking clays" can cause serious damage to building foundations (Ref. 60, p. 5). While conducting a site investigation in 2014, it was observed by EA that many of the homes at the site are older, wood-framed structures with crawl-spaces, while some newer homes are constructed with a slab on grade foundation, allowing for the possibility of vapor intrusion into the structures (Ref. 26, p. 12).

Consideration of Anthropogenic Sources

As shown above, TCE has been found in indoor air samples within structures located on the contaminated groundwater plume. Other possible contributions of these TCE concentrations from anthropogenic sources within the residential structures were minimized during sampling activities by requesting that the residents remove such items before the scheduled sampling and through indoor screening of the properties using a portable gas chromatograph/mass spectrometer (Ref. 25, pp. 15, 18; Ref. 31, p. 7; Ref. 54, pp. 7, 10-55, 11-14, 58-61).

Consideration of Ambient Air Contamination

In addition, outdoor, ambient air sampling was conducted to demonstrate that elevated levels of hazardous substances in the indoor air samples are the result of subsurface intrusion and not outdoor air that has migrated into the structures. Sampling of ambient air was conducted during each sampling event where indoor air samples were collected. No TCE was detected in the ambient air samples as shown below.

Other Supporting Information

To further show that indoor air in the residential structures within the AOE were affected by TCE contamination, the Texas Department of State Health Services conducted a vapor intrusion investigation in 2012. Their investigation involved the collection of blood samples from residents in the area of the site. The investigation showed significantly higher blood and indoor TCE levels were measured near the site compared to three other sampling locations in Grand Prairie and to a previous sampling of residents and homes in the United States (Ref. 12, pp. 3, 4). TCE levels in the blood and indoor air were higher than those found in the United States sample (Ref. 12, p. 4).

TABLE 7
AOE 1 AMBIENT AIR ATTRIBUTION SAMPLE LOCATIONS

Regularly Occupied Structure ID	Sample ID	Sample Location	Start Date and Time	End Date and Time	References
ROS 235 (311 MacArthur)	1405020-05	Outside residential property	05/15/14 09:45	05/16/14 09:45	Ref. 15, pp. 3, 67
ROS 203 (220 NE 29th)	1405019-06	Outside residential property	05/14/14 09:28	05/15/14 09:28	Ref. 15, pp. 3, 56
ROS 341 (311 NE 31st)	141033-08	Outside residential property	05/14/14 15:10	05/15/14 15:10	Ref. 16, pp. 3, 53
ROS 900 (306 NE 28th)	1410036-14	Outside residential property	10/29/14 08:37	10/30/14 08:00	Ref. 16, pp. 3, 54
R1/ ROS 228 (209 MacArthur)	1605016-01	Outside in front yard of residential property	05/10/16 12:00	05/10/16 12:00	Ref. 31, p. 7, 8, 11; Ref. 34, pp. 4, 45
R4/ ROS 116 (205 NE 29th)	1600516-10	Outside in front yard of residential property	05/10/16 13:05	05/10/16 13:05	Ref. 31, p. 7, 8; Ref. 34, pp. 4, 45
R5/ ROS 113 (125 NE 29th)	1600516-16	Outside in front yard of residential property	05/10/16 14:10	05/10/16 14:10	Ref. 31, p. 7, 9; Ref. 34, pp. 4, 46

TABLE 8
AOE 1 AMBIENT AIR ATTRIBUTION SAMPLE CONCENTRATIONS

Sample ID	Hazardous Substance	Concentration (µg/m3)	Reporting Limit* (µg/m3)	Reference
1405019-06	Trichloroethene	0.27 U	0.27	Ref. 15, p. 9
1405020-05	Trichloroethene	0.27 U	0.27	Ref. 15, pp. 20, 67
141033-08	Trichloroethene	0.27 U	0.27	Ref. 16, p. 11
1410036-14	Trichloroethene	0.27 U	0.27	Ref. 16, p. 30
1605016-01	Trichloroethene	0.27 U	0.27	Ref. 34, p. 6
1605016-10	Trichloroethene	0.27 U	0.27	Ref. 34, p. 15
1605016-16	Trichloroethene	0.27 U	0.27	Ref. 34, p. 21

Note:
U – Substance undetected (Ref. 15, p. 73; Ref. 16, p. 56; Ref. 34, p. 44).
*Reporting Limits are adjusted for sample size, dilution, and matrix interference (Ref. 15, p. 1; Ref. 16, p. 1; Ref. 34, p. 1).

Consideration of Other Possible TCE Sources

A search for other possible contamination sources of TCE releases located hydrodeologically up-gradient of the Site did not identify any facilities within the EPA's Toxic Release Inventory which uses TCE (Ref. 3, p. 1; Ref. 29, pp. 1-4; Figure 1 of this HRS documentation record). EPA's EnviroMapper did not identify any facilities within the Grand Prairie zip code and no other possible sources were identified within 0.5 mile of the Site (Ref. 3, p.

1; Ref. 30, pp. 1-22; Figure 1 of this HRS documentation record). The nearest facility which uses TCE is an aircraft manufacturing facility located approximately 0.8 miles southwest of the Site (Ref. 30, pp. 23, 24). In addition, the COCs being scored in this HRS documentation record are manmade substances not found naturally in the environment.

Therefore, due to the lack of offsite contamination sources and the historic use of TCE at the former Delfasco Forge facility, as well as the presence of TCE in subsurface soil and groundwater, as shown in ASC discussion later in this document, the contamination present in the aforementioned air samples within the AOE is the result of historic releases from the Delfasco facility.

Structure Containment

As presented above in the AOE, there are 21 residential structures which have a documented observed exposure and are therefore assigned a containment value of 10 (Ref. 1a, Table 5-12). 21 residential structures are inferred to be within the AOE. Of these, 4 contain vapor mitigation systems where there is no documented institutional controls or evidence of regular maintenance and inspection (Ref. 1a, Table 5-12; Ref. 14, pp. 10, 12). The remaining 21 inferred residential structures, which are all of the similar age and construction, are regularly occupied structures with no visible open preferential subsurface intrusion pathways from the subsurface (Ref. 1a, Table 2-15).

TABLE 9
AOE 1 - STRUCTURE CONTAINMENT

Regularly Occupied Structure ID	Structure Containment Factor Value (Ref. 1a, Table 5-12)	Rationale	References
ROS 112 , ROS 113, ROS 210, ROS 114, ROS 203, ROS 208, ROS 116, ROS 207, ROS 121, ROS 224, ROS 228, ROS 311, ROS 306, ROS 305, ROS 341, ROS 222, ROS 312, ROS 227, ROS 226, ROS 340, ROS 310	10	Evidence of subsurface intrusion with documented observed exposure	See AOE description above; Figure 2
ROS 223, ROS 229, ROS 233, ROS 234,	6	Engineered passive vapor mitigation system without documented institutional controls or evidence of regular maintenance and inspection	Ref, 14, pp. 10, 12
ROS 202, ROS 232, ROS 201, ROS 231, ROS 120, ROS 204, ROS 119, ROS 118, ROS 206, ROS 117, ROS 115, ROS 209, ROS 211, ROS 235 , ROS 309, ROS 308, ROS 307,	4	Regularly occupied structures with no visible open preferential subsurface intrusion pathways from the subsurface	See AOE description above; Figure 2

AOE Hazardous Waste Quantity

Tier A Hazardous Constituent Quantity:

The total Hazardous Constituent Quantity for AOE 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) the amount of hazardous substances to enter the structures is not known and cannot be estimated with reasonable confidence (Ref. 1a, Section 2.4.2.1.1). Insufficient historical and current data [manifests, potentially responsible party (PRP) records, State records, permits, waste concentration data, etc.] are available to adequately calculate the total mass, or a partial estimate, of all CERCLA hazardous substances in the structures. Therefore, there is insufficient information to calculate a total or partial Hazardous Constituent Quantity estimate for AOE 1 with reasonable confidence.

Hazardous Constituent Quantity Assigned Value: Not Scored
(Ref. 1a, Table 5-19)

Hazardous Constituent Quantity Complete? No

Tier B Hazardous Wastestream Quantity:

The total Hazardous Wastestream Quantity for AOE 1 could not be adequately determined according to the HRS requirements; that is, the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants to enter the structures is not known and cannot be estimated with reasonable confidence (Ref. 1a, Section 2.4.2.1.2). Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants entering the structures. Therefore, there is insufficient information to adequately calculate or extrapolate a total or partial Hazardous Wastestream Quantity for AOE 1 with reasonable confidence.

Hazardous Wastestream Quantity Assigned Value: Not Scored

Tier C Volume:

There are 42 occupied residential and/or commercial structures within the area of AOE-1 (Ref. 24, pp. 1-4; Figure 2 of this HRS documentation record). The square footage of each residential structure in square feet (ft2) is shown in the tax database, Reference 24. Since the height of each structure is unknown and not readily available, according to Section 5.2.1.2.2 of the HRS, a ceiling height of 8 feet was used to calculate volume. Calculations for AOE-1 are as follows:

TABLE 10
AOE 1 - VOLUME

Regularly Occupied Structure ID*	Area (ft^2) (Regularly Occupied Structures)	Volume (ft^3) (Section 5.2.1.2.2)	Volume (yd^3) ($1ft^3$ x 0.03703704 = 1 yd^3)	Reference
ROS 112	916	7328	271.4074	Ref. 24, pp. 1, 3, 69-71
ROS 113	1335	10680	395.5556	Ref. 24, pp. 1, 3, 72-74
ROS 114	1691	13528	501.0371	Ref. 24, pp. 1, 3, 75-77
ROS 210	1351	10808	400.2963	Ref. 24, pp. 1, 3, 175-177
ROS 202	971	7768	287.7037	Ref. 24, pp. 1, 2, 153-155
ROS 208	1216	9728	360.2963	Ref. 24, pp. 1, 3, 169-171
ROS 116	1068	8544	316.4445	Ref. 24, pp. 1, 3, 81-83
ROS 207	1060	8480	314.0741	Ref. 24, pp. 1, 3, 166-168
ROS 203	948	7584	280.8889	Ref. 24, pp. 1, 2, 156-158
ROS 121	1041	8328	308.4445	Ref. 24, pp. 1, 2, 96-98
ROS 224	840	6720	248.8889	Ref. 24, pp. 1, 3, 193-195; Ref. 55, pp. 1-3
ROS 228	1235	9880	365.926	Ref. 24, pp. 1, 3, 202-204
ROS 311	899	7192	266.3704	Ref. 24, pp. 1, 4, 280-282
ROS 306	969	7752	287.1111	Ref. 24, pp. 1, 4, 265-267
ROS 305	1334	10672	395.2593	Ref. 24, pp. 1, 4, 262-264
ROS 341	1329	10632	393.7778	Ref. 24, pp. 1, 4, 310-312
ROS 222	1088	8704	322.3704	Ref. 24, pp. 1, 3, 190-192
ROS 312	2152	17216	637.6297	Ref. 24, pp. 1, 4, 283-285
ROS 227	768	6144	227.5556	Ref. 24, pp. 1, 3, 199-201
ROS 226	986	7888	292.1482	Ref. 24, pp. 1, 3, 196-198,
ROS 340	1782	14256	528	Ref. 24, pp. 1, 4, 307-309
ROS 310	878	7024	260.1482	Ref. 24, pp. 1, 4, 277-279
ROS 233	756	6048	224	Ref. 24, pp. 1, 2, 214-216
ROS 232	1140	9120	337.7778	Ref. 24, pp. 1, 2, 211-213
ROS 201	1244	9952	368.5926	Ref. 24, pp. 1, 2, 150-152
ROS 231	1109	8872	328.5926	Ref. 24, pp. 1, 2, 208-210
ROS 120	1099	8792	325.6297	Ref. 24, pp. 1, 2, 93-95

TABLE 10
AOE 1 - VOLUME

Regularly Occupied Structure ID*	Area (ft^2) (Regularly Occupied Structures)	Volume (ft^3) (Section 5.2.1.2.2)	Volume (yd^3) ($1ft^3$ x 0.03703704 = 1 yd^3)	Reference
ROS 204	2628	21024	778.6667	Ref. 24, pp. 1, 3, 159-161
ROS 119	1141	9128	338.0741	Ref. 24, pp. 1, 3, 90-92
ROS 229	895	7160	265.1852	Ref. 24, pp. 1, 3, 205-207
ROS 118	1440	11520	426.6667	Ref. 24, pp. 1, 3, 87-89
ROS 206	1179	9432	349.3334	Ref. 24, pp. 1, 3, 163-165
ROS 117	1041	8328	308.4445	Ref. 24, pp. 1, 3, 84-86
ROS 115	1025	8200	303.7037	Ref. 24, pp. 1, 3, 78-80
ROS 209	1382	11056	409.4815	Ref. 24, pp. 1, 3, 172-174
ROS 211	834	6672	247.1111	Ref. 24, pp. 1, 3, 510-512
ROS 309	1026	8208	304	Ref. 24, pp. 1, 4, 274-276
ROS 308	1012	8096	299.8519	Ref. 24, pp. 1, 4, 271-273
ROS 307	1124	8992	333.0371	Ref. 24, pp. 1, 4, 268-270
ROS 336	1017	8136	301.3334	Ref. 24, pp. 1, 4, 301-303
ROS 338	1840	14720	545.1852	Ref. 24, pp. 1, 4, 304-306
ROS 223	960	7680	284.4445	Ref. 24, pp. 1,4, 507
ROS 234	1516	12128	449.1852	Ref. 24, pp. 1,4, 217
ROS 235	528	4224	156.4445	Ref. 24, pp. 1,4, 220

Sum of values: 14,499.56

Sum of values/2.5
(14,499.56/2.5):
Equation for Assigning Value (Ref. 1a, Table 5-19)

Volume Assigned Value: 5,799.82

Tier D Area:

Tier D, Area, was not calculated for ASC A since the volume was estimated. Therefore, according to HRS, the area is not calculated (Ref. 1a, Sec. 2.4.2.1.3 and 2.4.2.1.4).

Area Assigned Value: 0

AOE Hazardous Waste Quantity Value:

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), or area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1a, Section 2.4.2.1.5).

TABLE 11
AOE 1 HAZARDOUS WASTE QUANTITY

Tier Evaluated	Source 1 Values
A	Not Scored
B	Not Scored
C	5,799.82
D	0

AOE 1 Hazardous Waste Quantity Value: 5,799.82

Area(s) of Subsurface Contamination

The ASC consists of 32 structures (30 single-family residences and 2 commercial structures) and is delineated based on groundwater samples meeting observed release criteria for VOC contaminants.

ASC A – Area of Subsurface Contamination A

Location, description and delineation of ASC (with reference to a map of the site):

ASC A consists of a contaminated groundwater plume that originates at the former Delfasco facility and extends for approximately 2,500 feet east-northeast, and is up to 1,100 feet wide at the widest point (See Figure 3 of this HRS documentation record). The total areas encompasses approximately 40 acres of what is mainly a residential neighborhood and is below 32 regularly occupied structures not already within the AOE (See Figure 3 of this HRS documentation record) (Ref. 10, p. 39; Ref. 17, pp. 24, 205; Ref. 20, pp. 29; Ref. 26, p. 16). Full delineation of contamination has not been established to the northeast, but the area of the ASC used for the purpose of this HRS documentation record was delineated based outlying monitoring wells in which groundwater samples were collected in 2013, 2014, and 2016 (MW-01, MW-05, MW-30S, MW-08, MW-20, MW-23, MW-10, MW-12, MW-14, MW-02, and MW-04) as shown on Figure 3 of this HRS documentation record. These samples contained TCE, PCE, and daughter products: cis-1,2-dichloroethene; 1,1-dichloroethene; and vinyl chloride as shown below.

Identification of all regularly occupied structures in the ASC:

TABLE 12
REGULARLY OCCUPIED STRUCTURES WITHIN ASC A

Type of Structure	Regularly Occupied Structure ID	References
Residential	ROS 1002	Figure 3: Ref. 24, p. 470
Retail	ROS 107	Figure 3; Ref. 24, p. 57
Retail	ROS 110	Figure 3; Ref. 24, p. 63
Residential	ROS 1724	Figure 3; Ref. 24, p. 422
Residential	ROS 1725	Figure 3; Ref. 24, p. 425
Residential	ROS 1726	Figure 3; Ref. 24, p. 428
Residential	ROS 213	Figure 3; Ref. 24, p. 178
Residential	ROS 236	Figure 3; Ref. 24, p. 223
Residential	ROS 303	Figure 3; Ref. 24, p. 256
Residential	ROS 304	Figure 3; Ref. 24, p. 259
Residential	ROS 319	Figure 3; Ref. 24, p. 286
Residential	ROS 329	Figure 3; Ref. 24, p. 292
Residential	ROS 334	Figure 3; Ref. 24, p. 295
Residential	ROS 335	Figure 3; Ref. 24, p. 298

Type of Structure	Regularly Occupied Structure ID	References
Residential	ROS 336	Figure 3; Ref. 24, p. 301
Residential	ROS 338	Figure 3; Ref. 24, p. 304
Residential	ROS 344	Figure 3; Ref. 24, p. 316
Residential	ROS 423	Figure 3; Ref. 24, p. 337
Residential	ROS 425	Figure 3; Ref. 24, p. 343
Residential	ROS 426	Figure 3; Ref. 24, p. 346
Residential	ROS 427	Figure 3; Ref. 24, p. 349
Residential	ROS 428	Figure 3; Ref. 24, p. 352
Residential	ROS 429	Figure 3; Ref. 24, p. 355
Residential	ROS 431	Figure 3; Ref. 24, p. 358
Residential	ROS 432	Figure 3; Ref. 24, p. 361
Residential	ROS 433	Figure 3; Ref. 24, p. 364
Residential	ROS 434	Figure 3; Ref. 24, p. 367
Residential	ROS 435	Figure 3; Ref. 24, p. 370
Residential	ROS 436	Figure 3; Ref. 24, p. 373
Retail	ROS 98	Figure 3; Ref. 24, p. 51

Observed Release by Chemical Analysis

The ASC is delineated based on groundwater samples that meet observed release criteria. The contamination was discovered during a Phase II ESA investigation in September 2002 conducted by EnSafe, Inc (Ref. 6, p.4). The Phase II assessment was performed to determine if historical releases occurred from operations associated with the former forge facility (Ref. 6, p. 3).

In March 2013, EA conducted groundwater sampling to delineate any contaminant plume migration that may have occurred due to the release from the Delfasco Forge facility. 21 monitoring wells were sampled for VOCs (Ref. 33, p. 1-2). Of the 21 wells sampled, 14 had detectable concentrations of TCE with the highest concentration observed in MW-11 at 974 µg/L. Vinyl chloride, 1,1-Dichloroethene, and trans-1,2-Dichloroethene were also observed in some samples (Ref. 33, pp. 9-10).

In December 2013 through February 2014, the TCEQ Remediation Division conducted a Remedial Investigation at the Delfasco facility (Ref. 26, p. 5). Twenty-nine monitor wells were sampled 17-26 February 2014, including six of the eight wells installed in December 2013 and February 2014 (Ref. 26, p. 7). Four of the wells sampled were hand-bailed because of issues with slow recharge. The remaining wells were purged via low-flow (Ref. 26, p. 7). The highest dissolved phase TCE concentrations are situated in the vicinity of monitoring wells MW-03D, MW-03S, MW-26S, and MW-27S, with the highest concentration (11,100 µg/L) being detected in the groundwater sample collected from MW-27S (Ref. 26, p. 11).

In February 2016, TCEQ tasked contractors, EnSafe Inc., to perform a Superfund Site Discovery and Assessment Program Site Assessment at the former Delfasco facility (Ref. 20, p. 1). Thirty-one monitor wells were sampled.

One of the wells sampled was hand-bailed because of issues with pump failure. The remaining wells were purged via low-flow (Ref. 20, pp. 8-9). TCE was detected in 21 of the 31 groundwater samples collected (Ref. 20, p. 13). The highest concentration was observed at MW-27S at 16,100 ug/L located at the northeast corner of the former Delfasco property (Ref. 20, pp. 13, 29).

The contaminated groundwater resulted from historic releases from the Delfasco facility. This is shown through the lack of off property contamination sources, and historic use of halogenated solvent mixtures at the Delfasco Forge facility. The groundwater contains the same COC, TCE, which had been used as part of Delfasco's manufacturing process, as a degreaser on its metal products (Ref. 27, p. 11).

The hazardous substances detected in the groundwater samples are identified in the Superfund Chemical Database Matrix as being eligible volatile substances per the subsurface intrusion component requirements (Ref. 1a, Sec. 5.2.0,; Ref 2, pp. 11, 14, 25, 36, 47).

Establishment of Background Levels

To establish relative background concentrations for the groundwater samples, two wells located outside of the groundwater plume were used. MW-15 is located west of the Site or north of the Delfasco facility and cross-gradient of the identified groundwater plume (Ref. 10 pp. 39, 41). MW- 18 is located south of the former Delfasco facility and southwest of the identified groundwater plume (up gradient) along E Main Street (Ref. 26, p. 14). In addition, the VOCs in groundwater are man-made chemicals that do not occur naturally in the environment (Ref. 28, p. 6). Therefore, the below detection background levels for these types of substances can be considered representative of background conditions in the area.

Groundwater samples from monitoring wells were collected using low flow sampling techniques and either a peristaltic or submersible pump with dedicated tubing, and minimal drawdown collection procedures as described in the work plans, or a disposable bailer on the temporary monitoring wells, or wells with slow recharge (Ref. 20, pp. 8-9; Ref. 26, p. 7; Ref. 33, p. 2). Groundwater samples were collected in laboratory provided containers, preserved on ice and shipped to the laboratory for VOCs by EPA SW-846 8260 protocols (Ref. 20, p. 9; Ref. 26, p. 7; Ref. 33, pp. 203-205).

The background groundwater samples and the groundwater release samples (as shown in Table 13 and Table 16 below) were collected using similar flow sampling techniques, during similar sampling events and analyzed by the same method (EPA Method 8260) (Ref. 20, p. 9; Ref. 26, p. 7; Ref. 33, p. 2).

TABLE 13
ASC A-GROUNDWATER BACKGROUND LOCATIONS

Sample ID	Sample Depth or Type	Sample Location	Date/Time	References
322591	47.53	MW-15	03/05/13 13:50	Ref. 33, pp. 81, 280
355343	47.67	MW-15	02/19/14 13:00	Ref. 26, p. 124; Ref. 45, p. 58
322804	21.89	MW-18	03/07/13 13:54	Ref. 33, pp. 151, 289
355905	22.14	MW-18	02/24/14 13:35	Ref. 26, p. 130; Ref. 47, p. 67
1602078-09	47.42	MW-15	02/05/16 13:35	Ref. 20, pp. 45, 182, 415, 423
1602040-06	20.00	MW-18	02/03/16 10:35	Ref. 20, pp. 45-46, 185, 271

TABLE 14
ASC A-GROUNDWATER BACKGROUND CONCENTRATIONS

Sample ID	Eligible Hazardous Substance	Concentration (mg/L)	Sample Detection Limit (mg/L)	References
322591	Trichloroethene	<0.000520 U	0.000520	Ref. 33, pp. 15-17, 45
322591	Tetrachloroethene	<0.000560 Qc[a], U	0.000560	Ref. 33, pp. 15-17, 45
322591	1,1-Dichloroethene	<0.000630 U	0.000630	Ref. 33, pp. 15-17, 45
322591	cis-1,2-Dichloroethene	<0.000570 U	0.000570	Ref. 33, pp. 15-17, 45
322591	Vinyl Chloride	<0.000360 U	0.000360	Ref. 33, pp. 15-17, 44
355343	Trichloroethene	<0.001 U	0.001	Ref. 26, pp. 143-188; Ref. 45, p.7
355343	Tetrachloroethene	<0.001 Qc[a], U	0.001	Ref. 26, pp. 143-188; Ref. 45, p. 8
355343	1,1-Dichloroethene	<0.001 U	0.001	Ref. 26, pp. 143-188; Ref. 45, p.7
355343	cis-1,2-Dichloroethene	<0.001 U	0.001	Ref. 26, pp. 143-188; Ref. 45, p.7
355343	Vinyl Chloride	<0.001 U	0.001	Ref. 26, pp. 143-188; Ref. 45, p.7
322804	Trichloroethene	<0.000520 U	0.000520	Ref. 33, pp. 15-17, 112
322804	Tetrachloroethene	<0.000560 U	0.000560	Ref. 33, pp. 15-17, 112
322804	1,1-Dichloroethene	<0.000630 U	0.000630	Ref. 33, pp. 15-17, 112
322804	cis-1,2-Dichloroethene	<0.000570 U	0.000570	Ref. 33, pp. 15-17, 112
322804	Vinyl Chloride	<0.000360 U	0.000360	Ref. 33, pp. 15-17, 111
355905	Trichloroethene	<0.001 U	0.001	Ref. 26, pp. 143-188; Ref. 47, p. 33

Sample ID	Eligible Hazardous Substance	Concentration (mg/L)	Sample Detection Limit (mg/L)	References
355905	Tetrachloroethene	<0.001 Qc[a], U	0.001	Ref. 26, pp. 143-188; Ref. 47, p. 34
355905	1,1-Dichloroethene	<0.001 U	0.001	Ref. 26, pp. 143-188; Ref. 47, p. 33
355905	cis-1,2-Dichloroethene	<0.001 U	0.001	Ref. 26, pp. 143-188; Ref. 47, p. 33
355905	Vinyl Chloride	<0.001 U	0.001	Ref. 26, pp. 143-188; Ref. 47, p. 33
1602078-09	Trichloroethene	<0.001	0.001	Ref. 20 pp. 202-212, 445
1602078-09	Tetrachloroethene	<0.002	0.002	Ref. 20 pp. 202-212, 445
1602078-09	1,1-Dichloroethene	<0.001	0.001	Ref. 20 pp. 202-212, 444
1602078-09	cis-1,2-Dichloroethene	<0.001	0.001	Ref. 20 pp. 202-212, 445
1602078-09	Vinyl Chloride	<0.001	0.001	Ref. 20 pp. 202-212, 445
1602040-06	Trichloroethene	<0.001	0.001	Ref. 20 pp. 202-212, 293
1602040-06	Tetrachloroethene	<0.002	0.002	Ref. 20 pp. 202-212, 293
1602040-06	1,1-Dichloroethene	<0.001	0.001	Ref. 20 pp. 202-212, 292
1602040-06	cis-1,2-Dichloroethene	<0.001	0.001	Ref. 20 pp. 202-212, 293
1602040-06	Vinyl Chloride	<0.001	0.001	Ref. 20 pp. 202-212, 293

[a] Qc is a laboratory qualification placed on the data to indicate calibration check was outside of laboratory limits (Ref. 33, p. 79; Ref. 45, p. 56; Ref. 47, p. 64). No qualifications were placed on this data from the data validation summary (Ref. 26, pp. 29-30, 143-188; Ref. 33, pp. 15-17).
< - less than.
U – The analyte is not detected above the SDL/RL (Ref. 33, pp. 79, 150 Ref. 45, p. 56; Ref. 47, p. 64).
Sample Detection Limits represent method detection limits for an analyte adjusted for sample size and dilution (Ref. 26, p. 180). In the Trace Analysis reports referenced for the above sample results, reporting limit and sample detection limit are used interchangeably.

Background Levels (by sample medium and date of sampling event):

TABLE 15
ASC A-GROUNDWATER BACKGROUND LEVELS BY
SAMPLING MEDIUM AND EVENT

The highest sample concentration per sampling event was chosen as the background level for that sampling event.

Sample Medium	Eligible Hazardous Substance	Background Level (mg/L)	Concentrations used for Establishing an Observed Release (mg/L)
March 2013			
Groundwater	Trichloroethene	< 0.00052	≥ 0.00052
Groundwater	Tetrachloroethene	< 0.00056	≥ 0.00056
Groundwater	1,1-Dichloroethene	< 0.00063	≥ 0.00063
Groundwater	cis-1,2-Dichloroethene	< 0.00057	≥ 0.00057
Groundwater	Vinyl Chloride	< 0.00036	≥ 0.00036
February 2014			
Groundwater	Trichloroethene	< 0.001	≥ 0.001
Groundwater	Tetrachloroethene	< 0.001	≥ 0.001
Groundwater	1,1-Dichloroethene	< 0.001	≥ 0.001
Groundwater	cis-1,2-Dichloroethene	< 0.001	≥ 0.001
Groundwater	Vinyl Chloride	< 0.001	≥ 0.001
February 2016			
Groundwater	Trichloroethene	< 0.001	≥ 0.001
Groundwater	Tetrachloroethene	< 0.002	≥ 0.001
Groundwater	1,1-Dichloroethene	< 0.001	≥ 0.001
Groundwater	cis-1,2-Dichloroethene	< 0.001	≥ 0.001
Groundwater	Vinyl Chloride	< 0.001	≥ 0.001

< Less than
≥ Greater than or equal to
bgs = below ground surface

Release Samples

An observed release was established when TCE, PCE, 1,1-Dichloroethene, cis-1,2-Dichloroethene, or Vinyl Chloride were detected at concentrations greater than or equal to the background levels established above (Ref. 1a, Table 2-3).

During the 2013, 2014 and 2016 groundwater sampling events samples from both the background and release monitoring wells. Samples were collected using low flow sampling techniques and either a peristaltic or submersible pump with dedicated tubing, and minimal drawdown collection procedures as described in the work plans, or a disposable bailer on the temporary monitoring wells, or wells with slow recharge (Ref. 20, pp. 8-9; Ref. 26, p. 7; Ref. 33, p. 2). Groundwater samples were collected in laboratory provided containers, preserved on ice and shipped to the laboratory for VOCs by EPA SW-846 8260 protocols (Ref. 20, p. 9; Ref. 26, p. 7; Ref. 33, pp. 203-205). Groundwater release samples were compared to background samples of similar depth.

Release samples for groundwater were collected from locations as shown on Figure 3 of this HRS documentation record.   When qualified data was used to document an observed release by chemical analysis, specific adjustment factors were used as established by the EPA Fact Sheet in Reference 44.

TABLE 16
ASC A-GROUNDWATER RELEASE SAMPLE LOCATIONS

Sample ID	Sample Medium	Well Depth (feet bgs) / Depth to Water (feet)	Sample Location	Date	References
MW-01	groundwater	62.45/ 24.31	MW-01	03/07/13	Ref. 26, p. 31; Ref. 33, pp. 151, 287
MW-04	groundwater	53.7/ 22.32	MW-04	03/08/13	Ref. 26, p. 31; Ref. 33, pp. 196, 292
MW-08	groundwater	52.9/ 42.78	MW-08	03/05/13	Ref. 26, p. 31; Ref. 33, pp. 80, 279
MW-09	groundwater	52.8/ 46.62	MW-09	03/06/13	Ref. 26, p. 31; Ref. 33, pp.151, 282-283
MW-10	groundwater	44/ 36.14	MW-10	03/08/13	Ref. 26, p. 31; Ref. 33, pp. 196, 291
MW-11	groundwater	41.7/ 32.74	MW-11	03/05/13	Ref. 26, p. 31; Ref. 33, pp. 81, 281
MW-12	groundwater	30.65/ 13.76	MW-12	03/06/13	Ref. 26, p. 31; Ref. 33, pp. 151, 284-285
MW-14	groundwater	43.2/ 19.59	MW-14	03/06/13	Ref. 26, p. 31; Ref. 33, pp. 151, 286
MW-23	groundwater	39.40/ 32.26	MW-23	03/05/13	Ref. 26, pp. 32; Ref. 33, pp. 80, 280
GW-MW-01	groundwater	62.45/ 25.9	MW-01	02/18/14	Ref. 26, pp. 31, 68, 122
GW-MW-02	groundwater	51.20/22.41	MW-02	02/19/14	Ref. 26, pp. 31, 69, 124
GW-MW-03D	groundwater	55/ 23.64	MW-03D	02/18/14	Ref. 26, pp. 31, 34-35, 71, 123
GW-MW-03S	groundwater	29.5/ 24.46	MW-03S	02/18/14	Ref. 26, pp. 31, 36, 70, 123
GW-MW-05	groundwater	51.66/ 25.84	MW-05	02/20/14	Ref. 26, pp. 31, 73, 127
GW-MW-08	groundwater	52.9/43.13	MW-08	02/25/14	Ref. 26, pp. 31, 76, 131
GW-MW-09	groundwater	52.80/ 47.05	MW-09	02/20/14	Ref. 26, pp. 31, 77, 126
GW-MW-10	groundwater	44/ 36.63	MW-10	02/20/14	Ref. 26, pp. 31, 78, 127
GW-MW-11	groundwater	41.7/ 34.94	MW-11	02/17/14	Ref. 26, pp. 31, 79, 121
GW-MW-12	groundwater	30.65/ 13.92	MW-12	02/17/14	Ref. 26, pp. 31, 80, 122
GW-MW-14	groundwater	43.2/ 19.64	MW-14	02/20/14	Ref. 26, pp. 31, 82, 126
GW-MW-23	groundwater	39.4/ 32.49	MW-23	02/25/14	Ref. 26, pp. 32, 91, 131
GW-MW-26S	groundwater	27.08/ 23.57	MW-26S	02/20/14	Ref. 26, pp. 32, 38, 94, 127
GW-MW-27S	groundwater	35/ 23.89	MW-27S	02/19/14	Ref. 26, pp. 32, 39, 95, 124
GW-MW-28S	groundwater	29.42/ 24.79	MW-28S	02/25/14	Ref. 26, pp. 32,40, 96, 131
GW-MW-29S	groundwater	30.26/ 22.51	MW-29S	02/25/14	Ref. 26, pp. 32, 41, 97, 131
GW-MW-30S	groundwater	30.19/ 27.14	MW-30S	02/25/14	Ref. 26, pp. 32, 42, 98, 131
1602067-12	groundwater	28.9/21.90	MW-03S	02/04/16 11:45	Ref. 20, pp. 170, 330, 338
1602067-06	groundwater	25.47/23.47	MW-05S	02/04/16 12:30	Ref. 20, pp. 173, 330, 338
1602067-03	groundwater	29.42/19.86	MW-29S	02/04/16 09:55	Ref. 20, pp. 196, 330, 338
1602067-04	groundwater	27.05/21.64	MW-26S	02/04/16 10:45	Ref. 20, pp. 193, 330, 338
1602067-16	groundwater	27.0/21.21	MW-27S	02/04/16 13:35	Ref. 20, pp. 194, 331, 338

TABLE 16
ASC A-GROUNDWATER RELEASE SAMPLE LOCATIONS

Sample ID	Sample Medium	Well Depth (feet bgs) / Depth to Water (feet)	Sample Location	Date	References
1602067-08	groundwater	30.25/20.63	MW-28S	02/04/16 14:30	Ref. 20, pp. 195, 330, 338
1602067-10	groundwater	30.00/24.68	MW-30S	02/04/16 09:30	Ref. 20, pp. 197, 330, 338
1602078-06	groundwater	52.8/46.99	MW-09	02/05/16 12:30	Ref. 20, pp. 176, 415, 423
1602023-07	groundwater	41.7/34.17	MW-11	02/02/16 17:30	Ref. 20, pp. 178, 216, 223
1602023-04	groundwater	30.94/9.20	MW-12	02/02/16 15:38	Ref. 20, pp. 179, 216, 223
1602067-02	groundwater	43.38/16.80	MW-14	02/04/16 09:10	Ref. 20, pp. 181, 330, 338
1602040-05	groundwater	43.80/6.22	MW-20	02/03/16 14:20	Ref. 20, pp. 187, 271, 279
1602067-11	groundwater	62.5/22.65	MW-01	02/04/16 10:35	Ref. 20, pp. 167, 330, 338
1602040-04	groundwater	51.2/20.33	MW-02	02/03/16 12:15	Ref. 20, pp. 168, 271, 279
1602067-13	groundwater	55.03/21.50	MW-03D	02/04/16 12:45	Ref. 20, pp. 169, 330, 338
1602040-02	groundwater	53.7/20.60	MW-04	02/03/16 11:20	Ref. 20, pp. 171, 271, 279
1602067-07	groundwater	51.1/24.20	MW-05D	02/04/16 13:30	Ref. 20, pp. 172, 330, 338
1602078-04	groundwater	52.9/43.09	MW-08	02/05/16 10:40	Ref. 20, pp. 175, 415, 423
1602078-07	groundwater	44.0/34.11	MW-10	02/05/16 13:05	Ref. 20, pp. 177, 415, 423
1602078-05	groundwater	39.4/32.22	MW-23	02/05/16 11:50	Ref. 20, pp. 190, 415, 423

bgs = below ground surface

TABLE 17
ASC A-GROUNDWATER RELEASE SAMPLE CONCENTRATIONS

Sample ID	Eligible Hazardous Substance*	Concentration (mg/L)	Reporting Limit**(mg/L)	References
March 2013				
MW-01	Trichloroethene	0.0574	0.000520	Ref. 26, p. 29; Ref. 33, pp. 15-17,108
MW-04	Vinyl chloride	0.00293	0.000360	Ref. 26, p. 29; Ref. 33, pp. 15-17, 170
MW-04	cis-1,2-Dichloroethene	0.0533	0.000570	Ref. 26, p. 29; Ref. 33, pp. 15-17, 171
MW-08	Trichloroethene	0.0116	0.000520	Ref. 26, p. 29; Ref. 33, pp. 15-17, 39
MW-09	Trichloroethene	0.508	0.000520	Ref. 26, p. 29; Ref. 33, pp. 15-17, 92
MW-10	Trichloroethene	0.250 JL-MS/SD (0.250)***	0.000520	Ref. 26, p. 29; Ref. 33, pp. 15-17, 163
MW-11	1,1-Dichloroethene	0.00765	0.000630	Ref. 26, p. 29; Ref. 33, pp. 15-17, 46, 47, 20
MW-11	cis-1,2-Dichloroethene	0.0286	0.000570	Ref. 26, p. 29; Ref. 33, pp. 15-17, 46, 47
MW-11	Trichloroethene	0.974	0.000520	Ref. 26, p. 29; Ref. 33, pp. 15-17, 46, 47
MW-12	Trichloroethene	0.0201	0.000520	Ref. 26, p. 29; Ref. 33, pp. 15-17, 99, 100
MW-14	Trichloroethene	0.015	0.000520	Ref. 26, p. 29; Ref. 33, pp. 15-17, 101, 102
MW-23	Trichloroethene	0.00901	0.000520	Ref. 26, p. 30; Ref. 33, pp. 15-17, 42, 43
February 2014				
MW-01	Trichloroethene	0.017	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 25, 60
MW-02	Trichloroethene	0.0121	0.001	Ref. 26, pp. 29, 143-188; Ref. 45, pp. 29, 59
MW-03D	1,1-Dichloroethene	0.0371	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 27, 61
MW-03D	cis-1,2-Dichloroethene	0.712 Je[c]	0.001	Ref. 26, pp. 29, 30, , 143-188; Ref. 43, pp. 27, 61
MW-03D	Trichloroethene	3.11 JH-MS/SD,CCAL (1.87)***	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 27, 58, 61
MW-03D	Vinyl chloride	0.0326	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 27, 61
MW-03S	1,1-Dichloroethene	0.0614	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 17, 60
MW-03S	cis-1,2-Dichloroethene	6.04 Je[c]	0.001	Ref. 26, pp. 29,30, 143-188; Ref. 43, pp. 17, 58, 60
MW-03S	Trichloroethene	5.48 JH-MS/SD,CCAL (3.30)***	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 17, 58, 60

TABLE 17
ASC A-GROUNDWATER RELEASE SAMPLE CONCENTRATIONS

Sample ID	Eligible Hazardous Substance*	Concentration (mg/L)	Reporting Limit**(mg/L)	References
MW-03S	Vinyl chloride	0.00208	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 17, 60
MW-05	cis-1,2-Dichloroethene	0.0199	0.001	Ref. 26, pp. 29, 150, 143-188; Ref. 46, pp. 5, 48; Ref. 53, pp. 1-3
MW-05	Trichloroethene	0.122	0.001	Ref. 26, pp. 29, 143-188; Ref. 46, pp. 5, 48; Ref. 53, pp. 1-3
MW-08	Trichloroethene	0.0173	0.001	Ref. 26, pp. 29, 143-188; Ref. 47, pp. 31, 67
MW-09	Trichloroethene	0.763 Je[c]	0.001	Ref. 26, pp. 29, 30, 143-188; Ref. 45, pp. 19, 56, 58
MW-10	cis-1,2-Dichloroethene	0.0166	0.001	Ref. 26, pp. 29, 143-188; Ref. 46, p. 11, 48; Ref. 53, pp. 1-3
MW-10	Trichloroethene	1.82Je[c]	0.001	Ref. 26, pp. 29, 151, 143-188; Ref. 46, pp11, 48; Ref. 53, pp. 1-3
MW-11	1,1-Dichloroethene	0.00579	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 11, 60
MW-11	cis-1,2-Dichloroethene	0.0211	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 11, 60
MW-11	Trichloroethene	1.66 JH-MS/SD, CCAL (1)***	0.001	Ref. 26, pp. 29, 30, 143-188,; Ref. 43, pp. 11, 60
MW-12	Trichloroethene	0.0127 JH-MS/SD, CCAL (0.007)***	0.001	Ref. 26, pp. 29, 143-188; Ref. 43, pp. 15, 58, 60
MW-14	Trichloroethene	0.0202	0.001	Ref. 26, pp. 29, 143-188; Ref. 45, pp. 17, 58
MW-23	Trichloroethene	0.00635	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 11, 66
MW-26S	1,1-Dichloroethene	0.020	0.001	Ref. 26, pp. 30, 143-188; Ref. 46, pp. 13, 48; Ref. 53, pp. 1-3
MW-26S	cis-1,2-Dichloroethene	6.8 Je[c]	0.001	Ref. 26, pp. 30, 143-188; Ref. 46, pp. 13, 48; Ref. 53, pp. 1-3
MW-26S	Trichloroethene	5.74 Je[c]	0.001	Ref. 26, pp. 30, 151, 143-188; Ref. 46, pp. 13, 48; Ref. 53, pp. 1-3
MW-26S	Tetrachloroethene	0.0754	0.001	Ref. 26, pp. 30, 143-188; Ref. 46, pp. 14, 48; Ref. 53, pp. 1-3
MW-26S	Vinyl chloride	0.00226	0.001	Ref. 26, pp. 30, 143-188; Ref. 46, pp. 13, 48; Ref. 53, pp. 1-3
MW-27S	1,1-Dichloroethene	0.162	0.001	Ref. 26, pp. 30, 143-188; Ref. 45, pp. 25, 59
MW-27S	cis-1,2-Dichloroethene	7.46 Je[c]	0.001	Ref. 26, pp. 30, 143-188; Ref. 45, pp. 25, 56, 59
MW-27S	Trichloroethene	11.1 Qs[d], Je[c],Qr[e]	0.001	Ref. 26, pp. 30, 143-188; Ref.

TABLE 17
ASC A-GROUNDWATER RELEASE SAMPLE CONCENTRATIONS

Sample ID	Eligible Hazardous Substance*	Concentration (mg/L)	Reporting Limit**(mg/L)	References
				45, pp. 25, 56, 59
MW-27S	Tetrachloroethene	0.166 JL-CCAL (0.166)***	0.001	Ref. 26, pp. 30, 143-188; Ref. 45, pp. 26, 56, 59
MW-27S	Vinyl chloride	0.00973	0.001	Ref. 26, pp. 30, 143-188; Ref. 45, pp.25, 59
MW-28S	1,1-Dichloroethene	0.0117	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 15, 66
MW-28S	cis-1,2-Dichloroethene	0.368 Je[c]	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 15, 64, 66
MW-28S	Trichloroethene	3.93 Je[c]	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 15, 64, 66
MW-28S	Tetrachloroethene	0.0104 JL-CCAL (0.0104)***	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 16, 66
MW-29S	1,1-Dichloroethene	0.00403	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 7, 66
MW-29S	cis-1,2-Dichloroethene	0.0807	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 7, 64, 66
MW-29S	Trichloroethene	2.15 Je[c]	0.001	Ref. 26, pp. 30, 143-188 ; Ref. 47, pp. 7, 64, 66
MW-29S	Tetrachloroethene	0.00634 JL-CCAL (0.00634)***	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp., 8, 66
MW-30S	1,1-Dichloroethene	0.00729	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 9, 64, 66
MW-30S	cis-1,2-Dichloroethene	0.119	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 9, 64, 66
MW-30S	Trichloroethene	2.9 Je[c]	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 9, 64, 66
MW-30S	Tetrachloroethene	0.00738 JL-CCAL (0.00738)***	0.001	Ref. 26, pp. 30, 143-188; Ref. 47, pp. 10, 64, 66
February 2016				
1602023-04	Trichloroethene	0.0108	0.001	Ref. 20, pp. 202-212, 235
1602023-07	1,1-Dichloroethene	0.00579	0.001	Ref. 20, pp. 202-212, 240
1602023-07	cis-1,2-Dichloroethene	0.0241	0.001	Ref. 20, pp. 202-212, 241
1602023-07	Trichloroethene	1.37	0.05	Ref. 20, pp. 202-212, 241
1602023-07	Tetrachloroethene	0.00477	0.001	Ref. 20, pp. 202-212, 241
1602040-02	cis-1,2-Dichloroethene	0.0322	0.001	Ref. 20, pp. 202-212, 285
1602040-02	Trichloroethene	0.00336	0.001	Ref. 20, pp. 202-212, 285
1602040-02	Vinyl chloride	0.00101	0.001	Ref. 20, pp. 202-212, 285
1602040-04	Trichloroethene	0.00259	0.001	Ref. 20, pp. 202-212, 289
1602040-05	Trichloroethene	0.00149	0.001	Ref. 20, pp. 202-212, 291

TABLE 17
ASC A-GROUNDWATER RELEASE SAMPLE CONCENTRATIONS

Sample ID	Eligible Hazardous Substance*	Concentration (mg/L)	Reporting Limit**(mg/L)	References
1602067-02	Trichloroethene	0.00574	0.001	Ref. 20, pp. 202-212, 347
1602067-03	cis-1,2-Dichloroethene	0.00706	0.001	Ref. 20, pp. 202-212, 350
1602067-03	Trichloroethene	0.286	0.005	Ref. 20, pp. 202-212, 350
1602067-04	1,1-Dichloroethene	0.00838	0.001	Ref. 20, pp. 202-212, 352
1602067-04	cis-1,2-Dichloroethene	6.51	0.1	Ref. 20, pp. 202-212, 353
1602067-04	Trichloroethene	5.43	0.1	Ref. 20, pp. 202-212, 353
1602067-04	Tetrachloroethene	0.0576	0.002	Ref. 20, pp. 202-212, 353
1602067-06	1,1-Dichloroethene	0.00242	0.001	Ref. 20, pp. 202-212, 358
1602067-06	cis-1,2-Dichloroethene	0.571	0.05	Ref. 20, pp. 202-212, 359
1602067-06	Trichloroethene	2.45	0.05	Ref. 20, pp. 202-212, 359
1602067-06	Tetrachloroethene	0.0222	0.002	Ref. 20, pp. 202-212, 359
1602067-07	cis-1,2-Dichloroethene	0.00566	0.001	Ref. 20, pp. 202-212, 362
1602067-07	Trichloroethene	0.0746	0.001	Ref. 20, pp. 202-212, 362
1602067-08	1,1-Dichloroethene	0.0113	0.001	Ref. 20, pp. 202-212, 364
1602067-08	cis-1,2-Dichloroethene	0.270	0.05	Ref. 20, pp. 202-212, 365
1602067-08	Trichloroethene	2.60	0.05	Ref. 20, pp. 202-212, 365
1602067-08	Tetrachloroethene	0.0102	0.002	Ref. 20, pp. 202-212, 365
1602067-10	1,1-Dichloroethene	0.00583	0.001	Ref. 20, pp. 202-212, 370
1602067-10	cis-1,2-Dichloroethene	0.108	0.001	Ref. 20, pp. 202-212, 371
1602067-10	Trichloroethene	2.03	0.05	Ref. 20, pp. 202-212, 371
1602067-10	Tetrachloroethene	0.00894	0.002	Ref. 20, pp. 202-212, 371
1602067-11	cis-1,2-Dichloroethene	0.0233	0.001	Ref. 20, pp. 202-212, 374
1602067-11	Trichloroethene	0.129	0.001	Ref. 20, pp. 202-212, 374
1602067-12	1,1-Dichloroethene	0.0320	0.001	Ref. 20, pp. 202-212, 376
1602067-12	cis-1,2-Dichloroethene	5.25	0.05	Ref. 20, pp. 202-212, 377
1602067-12	Trichloroethene	0.306	0.05	Ref. 20, pp. 202-212, 377
1602067-12	Vinyl chloride	0.518	0.05	Ref. 20, pp. 202-212, 377
1602067-13	1,1-Dichloroethene	0.00143	0.001	Ref. 20, pp. 202-212, 379
1602067-13	cis-1,2-Dichloroethene	0.0219	0.001	Ref. 20, pp. 202-212, 380
1602067-13	Trichloroethene	0.0876	0.001	Ref. 20, pp. 202-212, 380
1602067-13	Vinyl chloride	0.00168	0.001	Ref. 20, pp. 202-212, 380
1602067-16	1,1-Dichloroethene	0.109	0.001	Ref. 20, pp. 202-212, 388
1602067-16	cis-1,2-Dichloroethene	11.1	0.2	Ref. 20, pp. 202-212, 389
1602067-16	Trichloroethene	16.1	0.2	Ref. 20, pp. 202-212, 389
1602067-16	Tetrachloroethene	0.120	0.002	Ref. 20, pp. 202-212, 389

TABLE 17
ASC A-GROUNDWATER RELEASE SAMPLE CONCENTRATIONS

Sample ID	Eligible Hazardous Substance*	Concentration (mg/L)	Reporting Limit**(mg/L)	References
1602067-16	Vinyl chloride	0.006	0.001	Ref. 20, pp. 202-212, 389
1602078-04	Trichloroethene	0.0635	0.001	Ref. 20, pp. 202-212, 433
1602078-05	Trichloroethene	0.00273	0.001	Ref. 20, pp. 202-212, 435
1602078-06	1,1-Dichloroethene	0.00124	0.001	Ref. 20, pp. 202-212, 436
1602078-06	cis-1,2-Dichloroethene	0.00938	0.001	Ref. 20, pp. 202-212, 437
1602078-06	Trichloroethene	1.02	0.01	Ref. 20, pp. 202-212, 437
1602078-07	1,1-Dichloroethene	0.00410	0.002	Ref. 20, pp. 202-212, 439
1602078-07	cis-1,2-Dichloroethene	0.0201	0.002	Ref. 20, pp. 202-212, 440
1602078-07	Trichloroethene	1.70	0.05	Ref. 20, pp. 202-212, 440

*Hazardous substance is eligible and has a vapor pressure greater than or equal to one torr or a Henry's constant greater than or equal to 10^{-5} atm-m^3/mol,

** - The reporting limit for the March 2013 data is a Sample Detection Limit. Sample Detection Limits represent method detection limits for an analyte adjusted for sample size and dilution (Ref. 26, p. 180). In the reports referenced for the above sample results, reporting limit and sample detection limit are used interchangeably.

JH-MS/SD, CCAL – estimated value because of a high bias due to a matrix spike/matrix spike duplicate and continued calibration verification (Ref. 26, p. 30).

JL-MS/SD, CCAL– estimated value because of a low bias due to a matrix spike/matrix spike duplicate and continued calibration verification (Ref. 26, p. 30).

*** - Concentration adjusted using Table 1 Factor and Exhibit 3 of Reference 44 (Ref. 44, pp. 8, 12).

[a] – Laboratory qualification, not data review qualification. The Sample Quantitation Limit (SQL) or sample Detection limits (SDL) is less than the Method Quantitation Limit (MQL) or Method Detection Limit (MDL), therefore there is no bias with the J value and no adjusted factor required (Ref. 13, pp. 45, 151; Ref. 19, pp. 12-14, 755; Ref. 44, p. 8).

[b] - Laboratory qualification, not data review qualification. There is no bias with the B value and no adjusted factor required (Ref. 19, p. 14).

[c] – Je – estimated concentration exceeding calibration range (Ref. 43, p. 58). This qualification was placed by the laboratory, no qualifications were issued by the EA validation and no adjustments were needed for the data (Ref. 26, pp. 29, 30; Ref. 33, p. 194).

[d] – Qs – spike recovery outside of laboratory limits (Ref. 26, p. 30). This qualification was placed by the laboratory, no qualifications were issued by the EA validation and no adjustments were needed for the data (Ref. 26, p. 30; Ref. 33, p. 194).

[e] – Qr – relative percent difference outside of laboratory limits (Ref. 26, p. 30). This qualification was placed by the laboratory, no qualifications were issued by the EA validation and no adjustments were needed for the data (Ref. 26, p. 30).

[f] – Qc – calibration check outside of laboratory limits (Ref. 26, p. 30).

Attribution

<u>Association and Release of TCE with the Delfasco Facility</u>

The former Delfasco facilities past handling of TCE, resulted in TCE contamination of the groundwater in the vicinity of the facility. Delfasco Forge, during the time that it operated, performed steel and iron forging on its metal products. Delfasco Forge used TCE as a degreaser on its metal products (Ref. 27, p, 11). Soil boring data collected from the former facility indicate that a disposal and/or release of TCE occurred to the ground surface and contaminants found within the soil include TCE and its daughter products (Ref. 17, pp. 156, 157; Ref. 27, p.

11). The exact amount of contaminated soil at the facility is not known. In addition, the facility had an elongated storm drain and a former sump near the middle of the property, both of which could have been receptors of historical spills (Ref. 8, p. 5).

Evidence of TCE Migration from the Delfasco Facility to Groundwater

Investigations identified a plume of contaminated groundwater originating at the facility (Ref. 7, p. 13). The shallow GWBU at the Site is perched in the sands of the Eagle Ford Aquifer, and is located between 20 to 45 feet bgs (Ref. 8, pp. 34, 44). The lithology of this unsaturated zone is generally sandy and is conducive to vertical migration. Water moves laterally north and east from the Delfasco facility through these sands (Ref. 20, p. 7). Shallow groundwater is transmitted to the lower sand and gravel GWBU in the areas where low-permeability clay is discontinuous or where this confining unit is leaky (Ref. 20, p. 7). The plume within the shallow GWBU extends for approximately 2,500 feet east-northeast, and is up to 1,100 feet wide at the widest point and beneath the entire Site (see Figure 3 of this HRS documentation record).

In addition to the observed release groundwater data, which is part of the ASC, additional groundwater samples were collected prior to 2013, and soil samples and soil gas samples were collected which also demonstrate attribution of the contamination to releases from the Delfasco facility.

In September 2003, five monitoring wells were installed along the boundary of the former Delfasco facility to determine the extent of COC affected groundwater (Ref. 8, p. 10). Four of the five monitoring wells sampled in September 2003 contained concentrations of COCs above the applicable TCEQ protective concentration levels (PCLs), with TCE at 4,770 µg/L (Ref. 8, p. 197). In April 2004, six temporary monitor wells were installed offsite of the former Delfasco facility to determine the extent of COC migration (Ref. 8, p. 9). Sampling was conducted in April through May of that year, with TCE concentrations as high as 32,500 µg/L (Ref. 8, p. 198). In November 2004, additional investigation activities were conducted to determine the extent of groundwater contamination. One temporary monitor well and three permanent monitor wells were installed north of the former Delfasco facility (Ref. 8, p. 9). Of the four wells samples in November 2003, two wells contained concentrations of TCE with one concentration above the TCEQ PCLs at 110 µg/L (Ref. 8, p. 197).

In August 2011 the TCEQ Superfund Section, Remediation Division conducted groundwater sampling activities around the boundary of the former Delfasco facility (Ref. 13, pp. 2, 13). Four monitoring wells were sampled using low-flow sampling techniques in accordance with the TCEQ Field Sampling Plan and Standard Operating Procedures (Ref. 13, p. 3). TCE concentrations ranged from 0.0631 mg/L to 1.19 mg/L (Ref. 13, p. 21). PCE's highest concentration was 0.024 mg/L, cis-1,2-Dichloroethene was 0.486 mg/L, and vinyl chloride was 0.00425 mg/L (Ref. 13, p. 21).

Historical groundwater sampling prior to 2011 indicates that the groundwater plume could extend as far as approximately 2,650 feet northeast, and is up to 1,100 feet wide at the widest point and encompass an area of approximately 65 acres with an estimated 150 homes that overlie the groundwater plume (Ref. 10, p. 39; Ref. 20, p. 29; Ref. 54, p. 3).

Between September 2002 and November 2005, numerous surface and subsurface soil samples were collected as part of the investigation at the Former Delfaso Facility (Ref. 17, pp. 157, 165-169). Soil samples were collected using both direct-push technology (DPT) rigs and hollow-stem augur (HAS) drill rigs (Ref. 17, p. 157). Soil data collected indicated that soils within the former Delfasco facility boundary had been impacted at depths ranging from 1 foot below ground surface (bgs) to 35 feet bgs (Ref. 17, pp. 165-169). VOC analysis of soil yielded detections in surface and subsurface soils for chlorinated solvents (TCE and daughter products) (Ref. 17, pp. 165-169). Maximum concentrations of TCE were 2.38 mg/kg within the Delfasco facility boundary to 1.3 mg/kg to the east of the facility boundary (Ref. 17, p. 196). Maximum concentrations of PCE were 0.0154 within the Delfasco facility boundary to 0.017 mg/kg to the east of the facility boundary (Ref. 17, p. 196). Maximum concentrations of cis-1,2-dichloroethene were 2.79 within the Delfasco facility boundary to 0.9 mg/kg to the east of the facility boundary (Ref. 17, p. 196). The maximum concentration of 1,1-dichloroethene was 0.00446 mg/kg and vinyl chloride was 0.0148 mg/kg within the Delfasco facility boundary (Ref. 17, pp. 194, 196).

In addition to the soil samples collected, passive soil gas samples were also collected in August and November 2008 (Ref. 10, p. 15). Soil gas samples collected outside of the facility demonstrate a northeastern movement of the contamination and verify the presence of the contamination at the Site (Figure 3 of this HRS documentation record; Ref. 10, pp. 16, 55). TCE concentrations within the soil gas samples contained the some of the highest concentrations within the facility boundary (from 139 ng to 13,925 ng) and continuing off the facility property and following the groundwater flow direction to the east-northeast, with concentration ranging from 162 ng to 21,702 ng, one street to the east and continuing with high concentrations the next further street to the east at 1,588 ng and 3,037 ng (Ref. 10, p. 55; Ref. 21, p. 49).

<u>Lack of Structural Containment Permanently Preventing Vapor Intrusion</u>

The hazardous vapors (TCE) in the vadose zone eventually enter buildings as a component of gas by migrating through cracks, seams, interstices, and gaps in walls or foundations (Ref. 39, pp. 48, 49). In addition, utility lines can provide a conduit for migration. A representative familiar with the layout of subsurface utilities at the Site indicated that when the sanitary sewer line system was originally installed service from each house went to a common lateral line situated in an easement which runs behind the houses. In turn, these lateral lines were sloped to the "deep" sanitary sewer main lines located beneath the streets. When the common lateral lines became damaged or degraded, sections of the laterals were abandoned by the City and new sanitary sewer service lines were installed to the sanitary sewer main lines; depending on the location of the houses and the depth of the main lines, these new laterals could intersect the vadose zone creating potential pathways for COC vapor entry into houses or structures (Ref. 26, p. 12).

While conducting a site investigation in 2014, it was observed by EA Engineering, Science and Technology, Inc. that many of the homes at the site are older, wood-framed structures with crawl-spaces, while some newer homes are constructed with a slab on grade foundation, allowing for the possibility of vapor intrusion into the structures. This situation, coupled with the location of utilities, could influence the distribution of COC vapors entering the homes in this area (Ref. 26, p. 12).

Other Possible Sources

A search for other possible contamination sources of TCE releases located up-gradient of the Site did not identify any facilities within the EPA's Toxic Release Inventory which uses TCE (Ref. 3, p. 1; Ref. 29, pp. 1-4; Figure 1 of this HRS documentation record). EPA's EnviroMapper did not identify any facilities within the Grand Prairie zip code and no other possible sources were identified within 0.5 mile of the Site (Ref. 3, p. 1; Ref. 30, pp. 1-22; Figure 1 of this HRS documentation record). The nearest facility which uses TCE is an aircraft manufacturing facility located approximately 0.8 miles southwest of the Site (Ref. 30, pp. 23, 24). In addition, the COCs being scored in this HRS documentation record are manmade substances not found naturally in the environment.

Therefore, due to the lack of offsite contamination sources and the historic use of TCE at the former Delfasco Forge facility, as well as the presence of TCE in groundwater, as shown in ASC discussions above, the contamination present in the aforementioned groundwater samples within the ASC is the result of historic releases from the Delfasco facility.

Structure Containment

As presented above in the ASC, there are 367 residential and 4 commercial/retail structures which are included in the ASC. Of these, 1 contains a vapor mitigation system where there is no documented institutional controls or evidence of regular maintenance and inspection (Ref. 1a, Table 5-12; Ref. 14, pp. 10, 12). The remaining structures, which are all of the similar age and construction, are regularly occupied structures with no visible open preferential subsurface intrusion pathways from the subsurface (Ref. 1a, Table 5-12).

TABLE 18
ASC A-STRUCTURE CONTAINMENT

Regularly Occupied Structure ID	Structure Containment Factor Value (Ref. 1a, Table 5-12)	Rationale	References
ROS 236, ROS 335, ROS 336	6	Engineered passive vapor mitigation system without documented institutional controls or evidence of regular maintenance and inspection	Ref, 14, pp. 10, 12
ROS 1002, ROS 107, ROS 110, ROS 111, ROS 1724, ROS 1725, ROS 1726, ROS 213, ROS 303, ROS 304, ROS 319, ROS 329, ROS 334, ROS 338, ROS, 434, ROS 344, ROS 423, ROS 425, ROS 426, ROS 427, ROS 428, ROS 429, ROS 431, ROS 432, ROS 433, ROS 434, ROS 435, ROS 436, ROS 98	4	Regularly occupied structures with no visible open preferential subsurface intrusion pathways from the subsurface	See ASC description above, Figure 3

ASC Hazardous Waste Quantity

For the subsurface intrusion component of the soil exposure and subsurface intrusion pathway the hazardous constituent and hazardous waste stream quantities are unlikely to be evaluated for an ASC because such an evaluation would require a documented observed exposure within a structure to document a released hazardous substance in the wastestream, which would include that structure within the AOE and exclude it from the ASC. Therefore, evaluation of the hazardous waste quantity for an ASC begins with Tier C – Volume.

Tier C Volume:

There are 32 occupied residential and/or commercial structures included in the ASC A (Ref. 24, pp. 1-4; Figure 3 of this HRS documentation record). The square footage of each residential structure in square feet (ft^2) is shown in the tax database, Reference 24. Since the height of each structure is unknown and not readily available, according to Section 5.2.1.2.2 of the HRS, a ceiling height of 8 feet was used to calculate volume. Calculations for ASC A are as follows:

TABLE 19
ASC A - VOLUME

Regularly Occupied Structure ID	Structure Containment	Area (ft^2) (Regularly Occupied Structures)	Volume (ft^3) (Ref 1a, Section 5.2.1.2.2)	Volume (yd^3) ($1ft^3$ x 0.03703704 = 1 yd^3)	References
ROS 423	4	912	7296	270.2222	Ref. 24, pp. 1, 2, 337-339
ROS 98	4	1208	9664	357.926	Ref. 24, pp. 1, 3, 51-53
ROS 110	4	3040	24320	900.7408	Ref. 24, pp. 1, 3, 63-65
ROS 111	4	1258	10064	372.7408	Ref. 24, pp. 1, 3, 66-68
ROS 107	4	2500	20000	740.7408	Ref. 24, pp. 1, 3, 57-59
ROS 431	4	828	6624	245.3334	Ref. 24, pp. 1, 3, 358-360
ROS 429	4	1052	8416	311.7037	Ref. 24, pp. 1, 3, 355-357
ROS 428	4	1387	11096	410.963	Ref. 24, pp. 1, 3, 352-354
ROS 427	4	2836	22688	840.2964	Ref. 24, pp. 1, 3, 349-351
ROS 426	4	688	5504	203.8519	Ref. 24, pp. 1, 3, 346-348
ROS 425	4	720	5760	213.3334	Ref. 24, pp. 1, 3, 343-345
ROS 1724	4	1477	11816	437.6297	Ref. 24, pp. 1, 4, 422-424
ROS 1725	4	780	6240	231.1111	Ref. 24, pp. 1, 4, 425-427
ROS 1726	4	816	6528	241.7778	Ref. 24, pp. 1, 4, 428-430
ROS 1002	4	1146	9168	339.5556	Ref. 24, pp. 1, 4, 470-472
ROS 343	4	2012	16096	596.1482	Ref. 24, pp. 1, 4, 313-315
ROS 344	4	1553	12424	460.1482	Ref. 24, pp. 1, 4, 316-318
ROS 303	4	1132	9056	335.4074	Ref. 24, pp. 1, 4, 256-258
ROS 304	4	1566	12528	464	Ref. 24, pp. 1, 4, 259-261
ROS 334	4	1035	8280	306.6666	Ref. 24, pp. 1, 4, 295-297
ROS 335	6	924	7392	273.7777	Ref. 24, pp. 1,4, 298
ROS 336	6	1017	8136	301.3334	Ref. 24, pp. 1, 4, 301-303
ROS 338	4	1840	14720	545.1852	Ref. 24, pp. 1, 4, 304-306
ROS 236	6	1172	9376	347.2593	Ref. 24, pp. 1, 2, 223-225
ROS 213	4	1789	14312	530.0741	Ref. 24, pp. 1, 3, 178-180
ROS 319	4	1365	10920	404.4445	Ref. 24, pp. 1, 4, 286-288

TABLE 19
ASC A - VOLUME

Regularly Occupied Structure ID	Structure Containment	Area (ft^2) (Regularly Occupied Structures)	Volume (ft^3) (Ref 1a, Section 5.2.1.2.2)	Volume (yd^3) ($1ft^3$ x 0.03703704 = 1 yd^3)	References
ROS 329	4	732	5856	216.8889	Ref. 24, pp. 1, 4, 292-294
ROS 432	4	1040	8320	308.1482	Ref. 24, pp. 1, 3, 361-363
ROS 433	4	932	7456	276.1482	Ref. 24, pp. 1, 3, 364-366
ROS 434	4	1020	8160	302.2222	Ref. 24, pp. 1, 3, 367-369
ROS 435	4	846	6768	250.6667	Ref. 24, pp. 1, 3, 370-372
ROS 436	4	841	6728	249.1852	Ref. 24, pp. 1, 3, 373-375

Sum of values: 12285.63
Sum of values/2.5 (V/2.5): 12285.63/2.5 = 4,914.252
Equation for Assigning Value (Ref. 1a, Table 5-19)

Volume Assigned Value: 4,914.252

Tier D Area:

Tier D, Area, was not calculated for ASC A since the volume was estimated. Therefore, according to HRS, the area is not calculated (Ref. 1a, Sec. 2.4.2.1.3 and 2.4.2.1.4).

Area Assigned Value: 0

ASC Hazardous Waste Quantity Value:

TABLE 20
ASC A – HAZARDOUS WASTE QUANTITY VALUE

Tier Evaluated	Source 1 Values
A	Not Applicable
B	Not Applicable
C	4,9194.252
D	0

ASC A Hazardous Waste Quantity Value: 4,914.252

5.2.1 SUBSURFACE INTRUSION COMPONENT

5.2.1.1 LIKELIHOOD OF EXPOSURE

5.2.1.1.1 Observed Exposure

Observed exposure of populations to TCE was documented in Section 5.2.0 and the AOE 1 discussion of this HRS documentation record. The AOE was identified based on 21 residential properties which had observed exposure concentrations of TCE obtained through indoor air sampling. See Figure 2 for the release sample locations.

Chemical Analysis

The observed exposure samples that also had concentrations above the TCE cancer-risk benchmark are shown below. Two other structures had concentrations that met observed exposure criteria, but the concentration was not above a health-based benchmark.

TABLE 21
OBSERVED EXPOSURE SAMPLES WITH LEVEL I CONCENTRATIONS

AOE Number	Regularly Occupied Structure ID	Sample ID	Eligible Hazardous Substance(s)	References
AOE 1	ROS 112	1405020-07	Trichloroethene	Ref. 15, p. 22
AOE 1	ROS 113	1405019-04	Trichloroethene	Ref. 15, p. 7
AOE 1	ROS 210	1405020-09	Trichloroethene	Ref. 15, p. 24
AOE 1	ROS 114	1405020-08	Trichloroethene	Ref. 15, p. 23
AOE 1	ROS 208	1405019-01	Trichloroethene	Ref. 15, p. 4
AOE 1	ROS 116	1405020-02	Trichloroethene	Ref. 15, p. 17
AOE 1	ROS 207	1405020-01	Trichloroethene	Ref. 15, p. 16
AOE 1	ROS 203	1405019-02	Trichloroethene	Ref. 15, p. 5

AOE Number	Regularly Occupied Structure ID	Sample ID	Eligible Hazardous Substance(s)	References
AOE 1	ROS 224	1405020-03	Trichloroethene	Ref. 15, p. 18
AOE 1	ROS 228	1405019-07	Trichloroethene	Ref. 15, p. 10
AOE 1	ROS 311	1405019-05	Trichloroethene	Ref. 15, p. 8
AOE 1	ROS 306	1405019-03	Trichloroethene	Ref. 15, p. 6
AOE 1	ROS 305	1405019-08	Trichloroethene	Ref. 15, p. 11
AOE 1	ROS 341	1405019-12	Trichloroethene	Ref. 15, p. 15
AOE 1	ROS 312	1410036-01	Trichloroethene	Ref. 16, p. 17
AOE 1	ROS 227	1410036-03	Trichloroethene	Ref. 16, p. 19
AOE 1	ROS 226	1410036-06	Trichloroethene	Ref. 16, p. 22
AOE 1	ROS 340	1410036-09	Trichloroethene	Ref. 16, p. 25
AOE 1	ROS 310	1410036-11	Trichloroethene	Ref. 16, p. 27
AOE 1	ROS 113	141033-03	Trichloroethene	Ref. 16, p. 6
AOE 1	ROS 114	141033-04	Trichloroethene	Ref. 16, p. 7
AOE 1	ROS 116	141033-05	Trichloroethene	Ref. 16, p. 8
AOE 1	ROS 203	141033-06	Trichloroethene	Ref. 16, p. 9
AOE 1	ROS 208	141033-10	Trichloroethene	Ref. 16, p. 13
AOE 1	ROS 305	141033-11	Trichloroethene	Ref. 16, p. 14
AOE 1	ROS 228	1410036-02	Trichloroethene	Ref. 16, p. 18
AOE 1	ROS 306	1410036-08	Trichloroethene	Ref. 16, p. 24

5.2.1.1.2 Potential for Exposure

Observed exposure was documented as stated above, therefore potential for exposure was not evaluated.

5.2.1.1.2.5 Calculation of Potential for Exposure Factor Value

Potential for Exposure Factor Value (Ref. 1a, Sec. 5.2.1.1.2.5): Not Evaluated

Likelihood of Exposure Factor Category Value: 550
(Ref. 1a, Sec. 5.2.1.1.3)

5.2.1.2 WASTE CHARACTERISTICS

5.2.1.2.1 Toxicity/Degradation

The COCs associated with the Site include PCE, TCE and their daughter products (1, 1-Dichloroethene, cis-1, 2-Dichloroethene, and Vinyl Chloride) (Ref. 7, p. 6; Ref. 38, p. 2). The contaminants found within the AOE and ASC are shown below.

Toxicity Factor Value

TABLE 22
TOXICITY FACTOR VALUE

Eligible Hazardous Substance	AOE Number/ ASC Letter	Toxicity Factor Value	References
Trichloroethene	AOE 1/ ASC A	1000	Ref. 2, p. 36
Tetrachloroethene	ASC A	100	Ref. 2, p. 25
cis-1,2-Dichloroethene	ASC A	1000	Ref. 2, p. 14
1,1-Dichloroethene	ASC A	10	Ref. 2, p. 1
Vinyl chloride	ASC A	10000	Ref. 2, p. 47

Degradation Factor Value

TABLE 23
DEGRADATION FACTOR VALUE

Eligible Hazardous Substance	AOE Number/ ASC Letter	Substance Present in AOE or NAPL? (Y/N)	Depth to Contamination (Ref. 1a, Sec. 5.2.1.1.2.2)	Half-life (Days)	Degradation Factor Value (Ref. 1a, Table 5-18)	References
Trichloroethene	AOE 1/ ASC A	Y	N/A	N/A	1*	Ref. 2, p. 36
Tetrachloroethene	ASC A	N	21.21	100	1	Ref. 2, p. 25; Ref. 6, p. 194
cis-1,2-Dichloroethene	ASC A	N	21.21	31	0.1	Ref. 2, p. 14; Ref. 6, p. 194
1,1-Dichloroethene	ASC A	N	21.21	100	1	Ref. 2, p. 3; Ref. 6, p. 194
Vinyl chloride	ASC A	N	21.21	171	1	Ref. 2, p. 47; Ref. 6, p. 194

* Any hazardous substance that meets the criteria for an observed exposure (those substances present in the AOE) have an assigned degradation factor value of 1 (Ref. 1a, Section 5.2.1.2.1.2).

Toxicity/Degradation Factor Value

TABLE 24
TOXICITY/DEGRADATION FACTOR VALUE

Eligible Hazardous Substance	AOE Number/ ASC Letter	Toxicity	Degradation Factor Value (Ref. 1a, Table 5-18)	Toxicity/Degradation Factor Value
Trichloroethene	AOE-1/ ASC A	1000	1	1000
Tetrachloroethene	ASC A	100	1	100
cis-1,2-Dichloroethene	ASC A	1000	0.1	100
1,1-Dichloroethene	ASC A	10	1	10
Vinyl chloride	ASC A	10000	1	10000

The substance(s) with the highest combined toxicity/degradation factor value: Vinyl Chloride

Toxicity/Degradation Factor Value: 10,000

5.2.1.2.2 Hazardous Waste Quantity [for component]

TABLE 25
HAZARDOUS WASTE QUANTITY

AOE Number/ASC Letter	AOE/ASC Hazardous Waste Quantity
AOE 1	5,799.82
ASC A	4,914.252

Sum of AOE/ASC Values: 10,714.072

Hazardous Waste Quantity Factor Value based on estimates (Ref. 1a, Table 2-6): 10,000

Hazardous Waste Quantity Factor Value: 10,000

5.2.1.2.3 Calculation of Waste Characteristics Factor Category Value

Toxicity/Degradation Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 10,000

Toxicity Factor Value x Hazardous Waste Quantity Factor Value = 100,000,000 (1×10^8)

Waste Characteristics Factor Category Value: 100
(Ref. 1a, Table 2-7)

5.2.1.3 TARGETS

There are 42 regularly occupied structures within the AOE and 32 regularly occupied structures within the ASC, for a total of 74 regularly occupied structures which comprise the Site. Out of these, 72 are single-story residential homes, and 2 are commercial/retail buildings (Ref. 24; Figures 2 and 3 of this HRS documentation record).

TABLE 26
TYPES OF STRUCTURES WITHIN AOE 1 AND ASC A

AOE Number/ ASC Letter	Type of Structure	Number(s) of Specific Type of Structure	Type of Population	References
AOE 1	residential	42	residents	Figure 2
ASC A	residential	30	residents	Figure 3
ASC A	commercial/retail	2	workers	Figure 3

TABLE 27
HAZARDOUS SUSTANCES THAT EXCEED HEALTH-BASED BENCHMARKS

AOE Number	Sample ID	Eligible Hazardous Substance	Hazardous Substance Concentration (µg/m3)	Benchmark Concentration (µg/m3)	Benchmark (Ref. 1a, Table 5-20)	References
AOE 1	1405020-07	Trichloroethene	5.17	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 22
AOE 1	1405019-04	Trichloroethene	12.1	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 7
AOE 1	1405020-09	Trichloroethene	4.04	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 24
AOE 1	1405020-08	Trichloroethene	3.82	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 23
AOE 1	1405019-01	Trichloroethene	3.23	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 4
AOE 1	1405020-02	Trichloroethene	122	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 17
AOE 1	1405020-01	Trichloroethene	28.5	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 16
AOE 1	1405019-02	Trichloroethene	10.3	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 5
AOE 1	1405020-03	Trichloroethene	7.22	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 18

AOE Number	Sample ID	Eligible Hazardous Substance	Hazardous Substance Concentration (µg/m3)	Benchmark Concentration (µg/m3)	Benchmark (Ref. 1a, Table 5-20)	References
AOE 1	1405019-07	Trichloroethene	28.8	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 10
AOE 1	1405019-05	Trichloroethene	1.72	0.4	Cancer risk	Ref. 2, p. 38; Ref. 15, p. 8
AOE 1	1405019-03	Trichloroethene	3.66	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 6
AOE 1	1405019-08	Trichloroethene	2.75	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 15, p. 11
AOE 1	1405019-12	Trichloroethene	1.67	0.4	Cancer risk	Ref. 2, p. 38; Ref. 15, p. 15
AOE 1	1410036-01	Trichloroethene	0.92	0.4	Cancer risk	Ref. 2, p. 38; Ref. 16, p. 17
AOE 1	1410036-03	Trichloroethene	3.02	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 16, p. 19
AOE 1	1410036-06	Trichloroethene	6.25	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 16, p. 22
AOE 1	1410036-09	Trichloroethene	0.54	0.4	Cancer risk	Ref. 2, p. 38; Ref. 16, p. 25
AOE 1	1410036-11	Trichloroethene	47.7	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 16, p. 27
AOE 1	141033-03	Trichloroethene	153	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 16, p. 6
AOE 1	141033-04	Trichloroethene	39.7	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 16, p. 7
AOE 1	141033-05	Trichloroethene	18	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 16, p. 8
AOE 1	141033-06	Trichloroethene	0.81	0.4	Cancer risk	Ref. 2, p. 38; Ref. 16, p. 9
AOE 1	141033-10	Trichloroethene	23.1	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 16, p. 13
AOE 1	141033-11	Trichloroethene	0.65	0.4	Cancer risk	Ref. 2, p. 38; Ref. 16, p. 14
AOE 1	1410036-02	Trichloroethene	15.6	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 16, p. 18
AOE 1	1410036-08	Trichloroethene	23.2	0.4 2.0	Cancer risk Non-cancer risk	Ref. 2, p. 38; Ref. 16, p. 24;

Note: µg/m3 – microgram per cubic meter

5.2.1.3.1 Exposed Individual

There are 19 regularly occupied residential structures within AOE 1 that had concentrations of TCE above health based benchmarks as shown on Table 27 above, and displayed on Figure 2 of this HRS documentation record.

Exposed Individual Factor Value: 50
Ref. 1a, Section 5.2.1.3.1

5.2.1.3.2 Population

The actual population count for each residence was not readily available, therefore the persons per residence for the county in which the residence is located was used (Ref, 1, Section 5.2.1.3.2). Based on the United States Census Bureau, there are 2.77 persons per household in Dallas County, for which the city of Grand Prairie is located (Ref. 35, p. 1).

5.2.1.3.2.1 Level I Concentrations

Level I concentrations are media-specific concentrations for the target that meet the criteria for an observed exposure for the pathway and are at or above media-specific benchmark values, as shown in Table 27 above (Ref. 1a, Sec. 2.5). Information for AOE 1 can be found in Section 5.2.0 of this HRS documentation record. The structures which contain sampling data which meet observed exposure criteria are listed below.

<u>Level I Population</u>

TABLE 28
LEVEL I POPULATION

AOE No.	Regularly Occupied Structure ID	Sample ID	No. of Exposed Individuals (non-workers)	No. of Full-time Workers		No. of Part-time Workers		Regularly Occupied Structure's Total Population Value	References
				Actual #	Adjusted (#/3)	Actual #	Adjusted (#/3)		
1	ROS 112	1405020-07	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 113	1405019-04, 141033-03	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 210	1405020-09	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 114	1405020-08, 141033-04	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 208	1405019-01, 141033-10	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 116	1405020-02, 141033-05	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 207	1405020-01	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 203	1405019-02, 141033-06	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 224	1405020-03	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 228	1405019-07, 1410036-02	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1

AOE No.	Regularly Occupied Structure ID	Sample ID	No. of Exposed Individuals (non-workers)	No. of Full-time Workers Actual #	No. of Full-time Workers Adjusted (#/3)	No. of Part-time Workers Actual #	No. of Part-time Workers Adjusted (#/3)	Regularly Occupied Structure's Total Population Value	References
1	ROS 311	1405019-05, 1410036-06	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 306	1405019-03, 1410036-08	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 305	1405019-08, 141033-11	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 341	1405019-12	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 312	1410036-01	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 227	1410036-03	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 226	1410036-06	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 340	1410036-09	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 310	1410036-11	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1

Sum of regularly occupied structures' total population values subject to Level I concentrations: 19 structures x 2.77 individuals per structure = 52.63
Sum of regularly occupied structures' total population values subject to Level I concentrations x 10: 526.3

Level I Concentrations Factor Value: 526.3

5.2.1.3.2.2 Level II Concentrations

Level II concentrations are structures with one or more samples that meet observed exposure by chemical analysis, but are less than media-specific benchmarks, and structures inferred to be in an area of observed exposure based on samples meeting observed exposure (Ref. 1a, Sec. 5.2.1.3.1). There are 29 structures with Level II contamination. Information for AOE 1 can be found in Section 5.2.0 of this HRS documentation record. The structures which contain either Level II sampling data or are inferred due to their locations are listed below:

<u>Level II Population</u>

TABLE 29
LEVEL II POPULATION

AOE No.	Regularly Occupied Structure ID	Sample ID/Inferred Indoor Air Contamination	No. of Exposed Individuals (non-workers)	No. of Full-time Workers Actual #	No. of Full-time Workers Adjusted (#/3)	No. of Part-time Workers Actual #	No. of Part-time Workers Adjusted (#/3)	Regularly Occupied Structure's Total Population Value	References
1	ROS 115	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 117	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1

TABLE 29
LEVEL II POPULATION

AOE No.	Regularly Occupied Structure ID	Sample ID/Inferred Indoor Air Contamination	No. of Exposed Individuals (non-workers)	No. of Full-time Workers		No. of Part-time Workers		Regularly Occupied Structure's Total Population Value	References
				Actual #	Adjusted (#/3)	Actual #	Adjusted (#/3)		
1	ROS 118	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 119	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 120	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 121	1405020-06	2.77	NA	NA	NA	NA	2.77	Ref. 15, p. 21; Ref. 35, p. 1
1	ROS 201	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 203	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 202	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 204	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 206	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 209	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 211	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 222	1410033-13	2.77	NA	NA	NA	NA	2.77	Ref. 16, p. 15; Ref. 35, p. 1
1	ROS 223	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 229	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 231	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 232	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 233	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 234	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 235	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 307	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 308	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1
1	ROS 309	Inferred	2.77	NA	NA	NA	NA	2.77	Ref. 35, p. 1

NA – Not Applicable

Sum of regularly occupied structures' total population values subject to Level II concentrations: 23 structures x 2.77 individuals per structure = 63.71

Level II Concentrations Factor Value: 63.71

5.2.1.3.2.3 Population within Area(s) of Subsurface Contamination

The population within the subsurface contamination includes the 32 regularly occupied structures, or portions of structures in the area of subsurface contamination as shown in Section 5.2.0, the ASC discussion of this HRS documentation record, and presented in Figure 3 and Table 30 below. The residential population counts are based on the United States Census Bureau, there are 2.77 persons per household in Dallas County, for which the city of Grand Prairie is located (Ref. 35, p. 1).

TABLE 30
REGULARLY OCCUPIED STRUCTURES WITHIN ASC A

ASC Letter	Regularly Occupied Structure ID	Associated Sample ID/Inferred Subsurface Contamination	Associated Sample Media/Type	Depth or Distance to Contamination	Presence of NAPLs? (Y/N)	Weighting Factor Value (HRS Table 5-21)	References
A	ROS 1002	MW-23, GW-MW-23	Groundwater	32.26 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 107	GW-MW-02/Inferred	Groundwater	22.41 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 110	GW-MW-14/ Inferred	Groundwater	19.64 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 111	GW-MW-14/ Inferred	Groundwater	19.64 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 1724	GW-MW-9 / Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 1725	GW-MW-9 / Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 1726	GW-MW-9 / Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 213	GW-MW-14/Inferred	Groundwater	19.64 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 236	GW-MW-11/Inferred	Groundwater	34.94 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 303	GW-MW-11/Inferred	Groundwater	34.94 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 304	GW-MW-11/Inferred	Groundwater	34.94 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 319	GW-MW-12/Inferred	Groundwater	13.92 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 329	1602040-05	Groundwater	43.8 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 334	GW-MW-10/ Inferred	Groundwater	36.63 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 343	GW-MW-9/Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 344	GW-MW-9 / Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 335	1602040-05/ Inferred	Groundwater	43.8 ft bgs	N	0.1	Table 16, 17; Figure 3; Figure 3
A	ROS 336	1602040-05/ Inferred	Groundwater	43.8 ft bgs	N	0.1	Table 16, 17; Figure 3; Figure 3

ASC Letter	Regularly Occupied Structure ID	Associated Sample ID/Inferred Subsurface Contamination	Associated Sample Media/Type	Depth or Distance to Contamination	Presence of NAPLs? (Y/N)	Weighting Factor Value (HRS Table 5-21)	References
A	ROS 338	1602040-05/ Inferred	Groundwater	43.8 ft bgs	N	0.1	Table 16, 17; Figure 3; Figure 3
A	ROS 423	GW-MW-08/ Inferred	Groundwater	43.13 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 425	GW-MW-9 / Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 426	GW-MW-9 / Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 427	GW-MW-9 / Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 428	GW-MW-9 / Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 429	GW-MW-9 / Inferred	Groundwater	47.05 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 431	GW-MW-10/ Inferred	Groundwater	36.63 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 432	GW-MW-10/ Inferred	Groundwater	36.63 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 433	GW-MW-10/ Inferred	Groundwater	36.63 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 434	GW-MW-10/ Inferred	Groundwater	36.63 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 435	GW-MW-10/ Inferred	Groundwater	36.63 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 436	1602040-05/ Inferred	Groundwater	43.8 ft bgs	N	0.1	Table 16, 17; Figure 3
A	ROS 98	GW-MW-05/ Inferred	Groundwater	25.84 ft bgs	N	0.1	Table 16, 177; Figure 3

TABLE 31
POPULATION WITHIN ASC A

ASC Letter	Regularly Occupied Structure ID	No. of Exposed Individuals (non-workers)	No. of Full-time Workers		No. of Part-time Workers		Total Adjusted Population per Regularly Occupied Structure	Weighting Factor Value (HRS Table 5-21)	Regularly Occupied Structure's Total Population Value	References
			Actual #	Adjusted (#/3)	Actua l #	Adjusted (#/3)				
A	ROS 1002, ROS 1724, ROS 1725, ROS 1726, ROS 111, ROS 213, ROS 236, ROS 303, ROS 304, ROS 319, ROS 329, ROS	2.77	NA	NA	NA	NA	2.77 x 30 = 83.1	0.1	8.31	Ref. 35, p. 1

ASC Letter	Regularly Occupied Structure ID	No. of Exposed Individuals (non-workers)	No. of Full-time Workers		No. of Part-time Workers		Total Adjusted Population per Regularly Occupied Structure	Weighting Factor Value (HRS Table 5-21)	Regularly Occupied Structure's Total Population Value	References
			Actual #	Adjusted (#/3)	Actual #	Adjusted (#/3)				
	334, ROS 335, ROS 336, ROS 338, ROS 343, ROS 344, ROS 423, ROS 425, ROS 426, ROS 427, ROS 428, ROS 429 ROS 431, ROS 432, ROS 433, ROS 434, ROS 435, ROS 436, ROS 98,									
A	ROS 107	NA	1	0.33	NA	NA	0.33	0.1	0.033	Ref. 57, p. 1
A	ROS 110	NA	5	1.66	NA	NA	1.66	0.1	0.166	Ref. 56, p.1

NA – Not Applicable

Sum of regularly occupied structures' total population values: 85.09

Population within an Area of Subsurface Contamination Factor Value: 8.509

5.2.1.3.2.4 Calculation of Population Factor Value

Level I Concentrations Factor Value: 526.3
Level II Concentrations Factor Value: 63.71
Population within an Area of Subsurface Contamination Factor Value: 8.509

Level I Concentrations + Level II Concentrations + Population within an Area of Subsurface Contamination: 598.519

Population Factor Value: 598.519

5.2.1.3.3 Resources

Description of Resource(s):

There is a regularly occupied resource structure, Bowles Memorial Baptist Church (ROS 345, 347, 424), located within the ASC (Ref. 1a, Sec. 5.2.1.3.3; Ref. 24, pp. 319, 322, 340; Ref. 58, p. 1; Figure 3 of this HRS documentation record).

Resources Factor Value: 5

5.2.1.3.4 Calculation of Targets Factor Category Value

Exposed Individual Factor Value: 50
Population Factor Value: 598.519
Resources Factor Value: 5

Exposed Individual + Population + Resources: 653.519

Targets Factor Category Value: 653.519

Figure References

Figure 1:
Base Map Source* ESRI, ESRI contributors, and the GIS User Community

*Map annotated by EPA START-4 on April 2018 to depict site location.

Figure 2:
Base Map Source* ESRI, ESRI contributors, and the GIS User Community

*Map Annotated by EPA START-4 in April 2018 to depict sample locations, monitoring wells, and AOE locations (Ref. 10, pp. 39, 47, 51, 57; Ref. 17, p. 186; Ref. 21, p. 5; Ref. 24, pp. 1-4; Ref. 26, pp. 14-16).

Figure 3:
Base Map Source* ESRI, ESRI contributors, and the GIS User Community

*Map Annotated by EPA START-4 in April 2018 to depict sample locations, monitoring wells, and ASC locations (Ref. 10, pp. 39, 47, 51, 57; Ref. 17, p. 186; Ref. 21, p. 5; Ref. 24, pp. 1-4; Ref. 26, pp. 14-16).

Figure 4:
Base Map Source* ESRI, ESRI contributors, and the GIS User Community

*Map Annotated by EPA START-4 in April 2018 to depict sample locations, monitoring wells, and AOE and ASC locations (Ref. 10, pp. 39, 47, 51, 57; Ref. 17, p. 186; Ref. 21, p. 5; Ref. 24, pp. 1-4; Ref. 26, pp. 14-16).