

DRAFT

FINAL

Corrective Action Decision



Powhattan USDA Site
Powhattan, Kansas

October 2020



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ACRONYMS AND ABBREVIATIONS USED IN THIS DOCUMENT

ARARs	Applicable or Relevant and Appropriate Requirements
BGS	Below Ground Surface
CAD	Corrective Action Decision
CAP	Corrective Action Plan
CAS	Corrective Action Study
CCC	Commodity Credit Corporation
CT	Carbon Tetrachloride
EDB	Ethylene Dibromide
EPA	Environmental Protection Agency
ISCR	In Situ Chemical Reduction
KDHE	Kansas Department of Health and Environment
MCL	Maximum Contaminant Level
µg/kg	micrograms per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
PWS	Public Water Supply
RAO	Remedial Action Objective
RSK	Risk-based Standards for Kansas
SMPE	Site Specific Monitoring and Performance Evaluation
USDA	U.S. Department of Agriculture
VI	Vapor Intrusion

GLOSSARY

Administrative Record (AR) – The body of documents that form the basis for selection of a particular response at a site. Parts of the AR are available in an information repository near the site to permit interested individuals to review the documents and to allow meaningful participation in the remedy selection process.

Air Stripping – The process of forcing air through polluted water to remove harmful chemicals. The air causes the chemicals to change from a liquid to a gas. The gas is collected and treated if necessary.

Aquifer – An underground layer of rock, sand, or gravel capable of storing water within cracks and pore spaces or between grains. When water contained within an aquifer is of sufficient quantity and quality, it can be used for drinking or other purposes. The water contained in the aquifer is called groundwater.

Applicable or Relevant and Appropriate Requirements (ARARs) – The federal and state environmental laws that a remedy will meet. These requirements may vary among sites and alternatives.

Corrective Action Decision (CAD) – The decision document in which KDHE selects the remedy and explains the basis for selection for a site.

Corrective Action Plan (CAP) – A document that serves as the basis for design and implementation of remedial actions.

Corrective Action Study (CAS) – A study conducted to evaluate alternatives for cleanup of contamination.

Exposure – Contact made between a chemical, physical, or biological agent and the outer boundary of an organism. Exposure is quantified as the amount of an agent available at the exchange boundaries of the organism (e.g., skin, lungs, gut).

Groundwater – Underground water that fills pores in soils or openings in rocks to the point of saturation. Groundwater is often used as a source of drinking water via municipal or domestic wells.

Maximum Contaminant Levels (MCLs) – The maximum permissible level of a contaminant in water that is delivered to any user of a public water system.

Monitoring – Ongoing collection of information about the environment that helps gauge the effectiveness of a cleanup action. For example, monitoring wells drilled to different depths would be used to detect any migration of the plume.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) – The federal regulations that guide the Superfund program. These regulations can be found at 40 Code of Federal Regulations, Part 300.

National Pollution Discharge Elimination System (NPDES) – As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches.

Operations and Maintenance (O&M) – Activities conducted at a site after the

construction phase to ensure that the cleanup continues to be effective.

Plume – A body of contaminated groundwater flowing from a specific source.

Risk – The probability of adverse health effects resulting from exposure to an environmental agent or mixture of agents.

Tier 2 Level – Calculated risk-based cleanup value for a specific contaminant. These values can be found in Appendix A of the *Risk-Based Standards for Kansas (RSK) Manual*.

Threshold – The dose or exposure below which no harmful effect is expected to occur.

Toxicity – A measure of degree to which a substance is harmful to human and animal life.

Vapor Intrusion – The migration of contaminants from the subsurface into overlying and/or adjacent buildings.

1. PURPOSE OF THE DRAFT CORRECTIVE ACTION DECISION

The primary purposes of the draft Corrective Action Decision (CAD) for the Powhattan USDA Site (Site) are to: 1) summarize information from the key site documents including the Results of the 2007 Investigation of Potential Contamination¹ (2007 investigation) and Corrective Action Study² (CAS) report; 2) briefly describe the alternatives for remediation detailed in the CAS report; 3) identify and describe the Kansas Department of Health and Environment's (KDHE) preferred remedy for addressing contamination at the Site; and, 4) provide an opportunity for public comment on the preferred remedy.

KDHE will select a final remedy for the Site after reviewing and considering all information submitted during the 30-day public comment period. KDHE may modify the preferred alternative based on new information or public comments; therefore, the public is encouraged to review and comment on the preferred remedy presented in this draft CAD. The public may submit written comments to KDHE during the public comment period October 16 through November 15, 2020. Section 9.0 provides more information on the procedures for providing comments on the draft CAD.

The Applied Geosciences and Environmental Management Section of the Environmental Science Division of Argonne National Laboratory (Argonne) prepared the Results of the 2007 Investigation of Potential Contamination and CAS on behalf of Commodity Credit Corporation/United States Department of Agriculture (CCC/USDA). Work performed during the 2007 investigation and CAS process followed the terms outlined in the Intergovernmental Agreement between Farm Service Agency and KDHE³. The public is encouraged to review and comment on the technical information presented in the 2007 investigation and CAS reports and other documents contained in the Administrative Record (AR)

Highlight 1-1: Public Information

Administrative Record File

Kansas Department of Health and
Environment
Bureau of Environmental Remediation
1000 SW Jackson Street; Suite 410
Topeka, Kansas 66612-1367
Contact: Ken Diediker
Phone: 785-296-0291
E-mail: kenneth.diediker@ks.gov

Web:

http://www.kdheks.gov/remedial/site_restoration/PowhattanUSDA.html

Local Information Repository

Hiawatha City Hall
701 Oregon St.
Hiawatha, Kansas 66434
Phone: 785-742-7417
Hours: Monday – Friday
8:00 am to 5:00 pm

¹ Argonne National Laboratory, August 2008, *Final Report: Results of the 2007 Investigation of Potential Contamination at the Former CCC/USDA Facility in Powhattan, Kansas*, prepared on behalf of USDA/CCC, approved August 18, 2008.

² Argonne National Laboratory, February 2018, *Corrective Action Study Report for the former USDA/CCC facility in Powhattan, Kansas*, prepared on behalf of CCC/USDA, approved April 16, 2018.

³ *Intergovernmental Agreement between Farm Services Agency and KDHE*, July 2015.



file⁴. The AR file includes all pertinent documents and site information that form the basis and rationale for selecting the final remedy. The AR file is available for public review during normal business hours at the location shown in Highlight 1-1. The local information repository is located at the Hiawatha City Hall, 701 Oregon St. Hiawatha, Kansas which is open Monday - Friday from 8:00 am to 5:00 pm.

2. SITE BACKGROUND

2.1. Site Location

The Site is located in Powhattan, Kansas, a rural city in the southwestern portion of Brown County approximately 60 miles north of Topeka, Kansas. Powhattan is a community of approximately 80 residents. The Powhattan USDA Site is located at the northeastern edge of Powhattan in the northeast quarter of the southwest quarter of Section 28, Township 3 South, Range 16 East, as shown in Figure 1. The current site land use is designated as industrial and the adjacent properties are currently zoned as residential. The most recent receptor survey identified 11 private wells in the vicinity; these wells are used only for lawn and garden purposes. Two plugged Public Water Supply (PWS) wells are located northwest of the Site. The City now receives its water source from the Brown County RWD #2 system.

2.2. Site History

The CCC/USDA operated a grain storage facility from 1949 to approximately 1966. Historically, grain was stored at multiple locations in Powhattan, including the facility formerly operated by Brown County Agricultural Conservation, CCC/USDA, and the former Brown County Cooperative Association (now Ag Partners Cooperative, Inc., or Ag Partners)^{4,5}. In 1965 the City of Powhattan installed PWS Wells #1 and #2 to replace their existing (old) well (Figure 2).

In 1986 statewide water supply sampling conducted by KDHE identified low-level carbon tetrachloride (CT) contamination in PWS #1. Several investigations were conducted between 1987 and 2005 which identified CT, ethylene dibromide (EDB), and nitrate contamination near the former CCC/USDA facility and existing Ag Partners facility. In June 1995, at the request of KDHE, the City established a connection to the Brown County Rural Water District (RWD) #2 system because of persistent high levels of nitrate contamination in the groundwater from the existing PWS wells. The subsequent *Environmental Site Investigation Report* indicated CT contamination from a source near well KDHEP-1 migrated to PWS #1 and threatened PWS #2⁶. Soil and groundwater sampling conducted by KDHE in 2005 indicated that both CCC/USDA and Ag Partners are responsible for the CT contamination at the site, and that Ag Partners is responsible for the EDB and nitrate contamination⁷.

⁴ KDHE Project Code C4-007-72119.

⁵ KDHE Project Code C4-007-00045

⁶ GeoCore Services, Inc., March 1996, *Environmental Site Investigation Report: Phase II Drilling & Sampling*.

⁷ KDHE, February 2006, *Supplemental Sampling Event Trip Report*.

2.3. Hydrogeological Setting

Powhattan is located within the dissected till plains of the Central Lowlands Physiographic Province. This area of northeast Kansas was overrun by two glaciations, causing successive episodes of erosion and deposition of glacial outwash or till. The glacial till varies widely in both thickness and lithology in Brown County. The subsurface consists of clay and poor-to-moderately-sorted zones of sand, silt and gravel in the Powhattan area. The predominant lithology is a silty clay layer with a thickness of 40 to 65 ft. The silty clay layer is underlain by a thin zone of silty sandy clay; the sandy clay produces limited quantities of groundwater. The Permian Admire Group, composed of gray shale bedrock, underlies the glacial till and sandy clay, and is encountered between 62 and 68 ft below ground surface (bgs) at the Site. The shale forms the relatively impermeable base of the aquifer. The aquifer appears to be under semi-confined conditions since static water levels in monitoring wells at the site occur between 7 and 14 ft bgs, which is far shallower than the water-producing zone. Based on manually measured elevations and data from water level data loggers, there appears to be a groundwater divide along Main Street in Powhattan⁸. Groundwater to the north of the divide generally flows to the north-northeast while water to the south of the divide generally flows towards the south⁵. Groundwater levels appear to be influenced by areas of limited groundwater recharge. Groundwater is deeper beneath the large grain storage building and gravel-packed parking lot, while areas north and south have shallower groundwater and are dominated by vegetative cover⁷. The potentiometric surface is shown on Figure 3.

3. ENVIRONMENTAL SITE INVESTIGATION

Several site investigations were completed between 1987 and 2005. Based on the results of KDHE's 2005 Supplemental Sampling Event, KDHE requested CCC/USDA to conduct a soil and groundwater investigation. Argonne, on behalf of CCC/USDA, completed the investigation in 2007¹. Objectives for the investigation were to:

- Sufficiently characterize the Site to support the recommendations for future remedial actions;
 - Collect sufficient water level data to determine groundwater flow direction;
 - Determine whether groundwater flow direction is influenced by private or public water supply wells;
 - Assess potential contributions to site and off-site contamination from the former CCC/USDA facility;
- and
- Determine the vertical and horizontal extent of contamination.

⁸ Argonne National Laboratories, October 2005, *Powhattan Water Level Summary*.

3.1. Summary of Remedial Investigation Results

3.1.1. Soil

Soil sampling during the 2007 soil and groundwater investigation occurred at 13 locations across the former CCC/USDA site as well as immediately adjacent to the property boundary. Soil samples were collected at depths from approximately 1.5-2.5 ft bgs to the top of the saturated zone at approximately four-foot intervals. In total, the investigation collected 196 subsurface soil samples, ranging from 1.4 ft bgs to 58.5 ft bgs. Sample locations are depicted in Figure 4.

Sample analysis detected CT in subsurface soils in several locations at less than 10µg/kg, far below the KDHE Tier 2 Risk-based Standards for Kansas (RSK) level of 73.4 µg/kg for protection of the soil-to-groundwater pathway. Three locations (TI03, TI04, and TI10) had CT concentrations greater than or equal to 10 µg/kg, but still below the RSK.

The most significant CT detections in soils were in locations TI01 and TI02. Location TI01 had CT at 282 µg/kg at a depth of 46.75 feet. Location TI02 had CT at 2,140 µg/kg at a depth of 30 feet. Both soil samples exceed the RSK for the soil-to-groundwater pathway; however, the residential soil pathway was not exceeded in either sample (Table 1).

Chloroform distribution in soils followed the same pattern as CT in soils. The highest concentrations were detected in TI02 (25-72 µg/kg at 18-38 ft bgs); however, chloroform concentrations were far below the KDHE Tier 2 RSK of 850 µg/kg for the soil-to-groundwater pathway (Table 1). There were no detections of EDB in soil during the 2007 investigation.

3.1.2. Groundwater

The investigation sampled groundwater at 65 locations; 23 locations within or immediately adjacent to the former CCC/USDA property boundary and 42 locations outside the former CCC/USDA property boundary. Sample locations are depicted in Figure 5. Groundwater samples from 30 locations exceeded the RSK of 5 µg/L for CT; 20 of these exceedances were from samples collected on or very near the former CCC/USDA property (Table 2). Sample location TI01 exhibited the maximum groundwater concentration found during the investigation (1,090 µg/L).

Chloroform distribution in groundwater followed much the same pattern as CT in groundwater. The highest concentrations were detected at TI01 (35 µg/L); all chloroform concentrations were below the RSK of 80 µg/L (Table 2).

4. INTERIM MEASURE IMPLEMENTATION

Interim measures are actions or activities taken to quickly prevent, mitigate, or remedy unacceptable risk(s) posed to human health and/or the environment by an actual or potential release of a hazardous substance, pollutant, or contaminant.



No interim measures were deemed necessary related to carbon tetrachloride contamination. Interim measures that were completed include connecting the city of Powhattan to the Brown County RWD #2 system and periodic groundwater monitoring. These interim measures were completed due to nitrate contamination and are not related to CCC/USDA former operations at the site.

5. SITE RISKS

CT was detected at several locations above the RSK for the soil-to-groundwater pathway, that potentially could result in unacceptable human health or environmental exposure risks from ingestion or dermal contact with contaminated groundwater, inhalation of CT vapors, and degradation to the aquifer.

CT concentrations in groundwater that exceed the United States Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) for drinking water and the KDHE RSK of 5 µg/L were identified in groundwater. The detected contamination could present unacceptable health risks associated with the use of groundwater for drinking, exposure to CT vapors released as a result of groundwater use for domestic purposes, or exposure to vapors resulting from vapor intrusion (VI) to indoor air from the subsurface.

Since June 1995, the residents of Powhattan have been served by a PWS system that obtains water from the Brown County RWD #2 system. None of the 11 private wells identified in proximity to the former CCC/USDA are used for drinking water purposes, rather they are used for lawn and garden irrigation. However, potential exposure could occur if there are no restrictions on new well construction. Periodic receptor surveys could eliminate these exposure risks.

Potential exposure could also occur via the movement of contaminant vapors from soil gas within the unsaturated pore space of the vadose zone through the foundation into the interior air space of residential structures. An addendum to the approved CAS was submitted to address CT and VI risks⁹. As part of the corrective action activities, CCC/USDA will conduct a VI assessment in areas affected by groundwater contamination. The 2007 soil and groundwater investigation did not identify vapor intrusion of CT as a threat. The CT contamination that has been identified predominately occurs at depths of greater than 40 ft bgs. KDHE Vapor Intrusion Guidance⁹ recommends that for volatile contamination occurring at depths less than 40ft bgs, the potential for exposure via VI should be investigated.

6. REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are media-specific goals for protecting human health and the environment. RAOs for the present Site were developed taking into consideration the Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered standards, and

⁹ Argonne National Laboratories, February 13, 2020, *Addendum to the report titled Corrective Action Study for the Former USDA/CCC Facility in Powhattan, Kansas*, prepared on behalf of USDA/CCC, approved July 14, 2020.



investigation results presented in the 2007 Investigation of Potential Contamination Report and CAS. Based on this information, the following RAOs were developed.

- Prevent human exposure (ingestion, inhalation, and dermal contact) to contaminated groundwater;
- Reduce the concentration, mass, and volume of contaminated soil in the northern portion of the former CCC/USDA facility that is contributing to groundwater contamination.
- Reduce the toxicity, mobility, and volume of contaminated groundwater associated with the contaminated soil in the northern portion of the former CCC/USDA facility.
- Minimize the vertical and lateral migration of contaminated groundwater from the mass reduction area (i.e., the northern portion of the CCC/USDA property) to other areas of the Site.
- Minimize vertical and lateral expansion of the contamination in groundwater outside the mass reduction area, as defined by the compliance groundwater monitoring network to be established.
- Restore groundwater to allow for its most beneficial use.

6.1 Cleanup Levels

Determination of cleanup levels for each medium of concern is discussed below.

6.1.1 Soil Cleanup Levels

KDHE's RSK levels for contaminants of concern in soil are the final remedial cleanup levels. The RSK level for CT for the soil-to-groundwater pathway is 73.4 $\mu\text{g}/\text{kg}$. Previous soil investigations have indicated that CT concentrations in soil do not exceed the RSK level for the soil pathway (8,440 $\mu\text{g}/\text{kg}$). The RSK level for chloroform for the soil-to-groundwater pathway is 850 $\mu\text{g}/\text{kg}$.

6.1.2. Groundwater Cleanup Levels

KDHE's RSK levels and/or EPA's MCLs for contaminants of concern in groundwater are the final remedial cleanup levels. The RSK level/MCL for CT in groundwater is 5 $\mu\text{g}/\text{L}$. The RSK level/MCL for chloroform in groundwater is 80 $\mu\text{g}/\text{L}$.

7. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED

The objective of the CAS is to identify remedial technologies and practices that can meet the site-specific remedial action objectives and then combine the technologies and practices into a suite of remedial alternatives for further evaluation. In accordance with KDHE's Corrective Action Study



Scope of Work, several remedial action alternatives were evaluated in detail during the CAS phase². Each remedial alternative was evaluated with respect to its ability to satisfy the following criteria as specified in the *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP): overall protection of human health and the environment; compliance with federal and state ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost¹⁰. The remedial action alternatives were then compared against one another to identify the preferred alternative.

A detailed description of each remedial action alternative and the individual and comparative analyses is presented in the CAS. Brief summaries of the remedial action alternatives, including the preferred remedial action alternative, are provided below.

7.1. Alternative 1 – No Action

The NCP requires the evaluation of a No Action alternative to serve as a baseline for comparison to other remedial action alternatives evaluated. Typically, the No Action alternative means the Site is left unchanged, and no remedial actions are evaluated or taken. No further actions would be taken to reduce contaminant mass, address potential exposure pathways, or reduce the potential for contaminant migration. Since no remedial action is taken, risks to human health and the environment would not be addressed. For the purpose of the CAS, the No Action alternative assumes that the mechanisms currently in place are not required; all groundwater monitoring would cease. The cost to implement this alternative is \$0 because no additional action would be taken.

7.2. Alternative 2 – Groundwater Pump & Treat and Discharge, and Groundwater Monitoring

Alternative 2 includes installation of an extraction well at the northern edge the CCC/USDA property along with the installation of two additional observation wells near the extraction well to augment the existing monitoring well network and evaluate the performance of the extraction well (Figure 6). A groundwater treatment system would be installed that includes a discharge line to the Powhattan stormwater system. The preferred system design would include air stripping using tray aeration. The system would run for an estimated eight years or until asymptotic CT levels are reached, whichever occurs first.

Subsequent to the publication of the Final CAD, CCC/USDA will submit a Corrective Action Plan (CAP) which will include a pre-final and final design and cost estimate, Operation and Maintenance Plan, and a Site Specific Monitoring and Performance Evaluation Plan (SMPE). SMPE monitoring would include baseline sampling; sampling and analysis of a National Pollutant Discharge Elimination System (NPDES)-permitted, treated discharge as required by the permitting entity; annual sampling of the selected site wells for a period of eight years or until CT concentrations fall to below MCLs; continuous water level measurements of monitoring wells; and recording groundwater extraction volume and flow rates pursuant to requirements of the groundwater appropriation regulations.

¹⁰ *National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR 300 et seq*

Additionally, as a part of ongoing performance monitoring, CCC/USDA will perform a VI assessment following the 2016 Kansas guidance for those areas potentially affected by groundwater contamination. VI testing will be performed for habitable structures within 100 ft of the CT contamination in groundwater that is linked to the former CCC/USDA facility. If warranted, a mitigation plan will be developed.

Alternative 2 also includes Five-Year Reviews to be performed by CCC/USDA. The Five-Year Review would include a report summarizing an evaluation of the following: groundwater monitoring reports generated in conjunction with the SMPE Plan, a physical site inspection, and a review of the CAD and the established RAOs. The Five-Year Review serves as a project management mechanism, the first of which would include recommendations for the potential need for additional remedial actions or implementation of a contingency remedial alternative. The present value cost of Alternative 2 is \$728,300.

7.3. Alternative 3 – In Situ Chemical Reduction and Groundwater Monitoring

Alternative 3 includes *in situ* chemical reduction (ISCR) treatment of contaminated soil and groundwater in the northern source area. The ISCR alternative would involve injecting amendments into the subsurface at approximately 100 injection locations covering approximately 15,700 ft². Each injection point would have eight discrete treatment intervals: 15-17 ft bgs, 21-23 ft bgs, 27-29 ft bgs, 33-35 ft bgs, 40-42 ft bgs, 46-50 ft bgs, 54-56 ft bgs, and 58-60 ft bgs.

The details of specific treatment technologies would be presented in a CAP submitted to KDHE. The CAP would include a description of the construction, design, and implementation of the ISCR remedial action. The CAP would also include pre-final/final design specifications, SMPE Plan and a Five-Year Review. The present value cost of Alternative 3 is \$1,212,000.

8. DESCRIPTION OF THE PREFERRED REMEDY

After evaluation of the individual remedial action alternatives, a comparative analysis of the various alternatives was performed with consideration of the threshold and balancing criteria specified in the NCP as discussed in Section 7.0. On the basis of information available in the Administrative Record and summarized above, KDHE has selected Alternative 2, Groundwater Pump and Treat and Discharge, Groundwater Monitoring, and Five-Year Reviews as the preferred remedy. The results of the comparative analysis support the preferred remedy as outlined below. The total present value cost of the preferred remedy is \$728,300. Components of the selected alternative include:

- **Groundwater Pump and Treat and Discharge (NPDES or beneficial reuse) -** Alternative 2 uses an extraction well and tray aerator to remove and treat the most elevated CT concentrations in groundwater and saturated soil porewater at the northern edge of the former CCC/USDA property. An 8-in diameter extraction well will be installed at the location shown in Figure 6. The well will be constructed with a 10 ft, #10 slot high-flow stainless steel screen from 60-70 ft bgs, and will be initially test pumped as a precursor to



final design of the remaining system components. As currently planned, 2-in diameter, high-density polyethylene piping will be used to convey extracted groundwater from the well to the treatment facility, and treated effluent from the facility to a point of discharge (the City of Powhattan storm sewer). Both Ag Partners and the Powhattan Fire Department have expressed interest in using treated effluent for beneficial re-use (agricultural mixing water or fire suppression). The CAS incorporated a treated effluent storage tank into the conceptual design, which would be installed downstream from the aerator with a plumbing configuration that would allow overflow from the tank to discharge to the permitted outfall. Two 2-inch pump test observation wells will also be installed to evaluate the performance of the extraction well both during pump testing and implementation of the remedy. The observation well locations are shown in Figure 6.

- **Groundwater Monitoring** - Alternative 2 also incorporates groundwater monitoring for an estimated period of eight years, or until the CT concentrations fall below the MCL. The groundwater monitoring program will involve the collection of groundwater samples, laboratory analysis for selected volatile organic compounds (CT, chloroform, and methylene chloride), data evaluation, and reporting. The samples will be analyzed for field parameters (dissolved oxygen, oxidation-reduction potential, pH, temperature, and conductivity) at the wellhead.
- **Five-Year Reviews** - Alternative 2 incorporates Five-Year Reviews to evaluate remedy performance and protectiveness. Five-Year Reviews will be prepared by CCC/USDA with the first review to take place five years after implementation of the remedy.

The preferred remedy as outlined above satisfies or meets Federal, State, and local requirements, and will be protective of human health and the environment.

8.1 Contingency

In the event that the preferred remedy does not remain protective to human health or the environment, KDHE may require the development and implementation of contingency measures. These measures may include additional characterization, evaluation of remedial alternatives, and/or implementation of active remedial measures.

9. COMMUNITY INVOLVEMENT

KDHE developed a Public Relations Strategy as required¹¹. KDHE encourages the public to provide input and comments regarding this proposal to address environmental contamination. Public notice of the availability of the draft CAD will be published in *The Hiawatha World* newspaper. In addition, KDHE has a webpage for the Powhattan USDA Site, available online at http://www.kdheks.gov/remedial/site_restoration/PowhattanUSDA.html. Many site documents, including this draft CAD, are available on the webpage. See Highlight 1-1 in Section 1 for contact information regarding review of the hard copies of these reports.

¹¹ KDHE, August 2011, *Public Information Strategy*



KDHE will select a final remedy after reviewing and considering all information submitted during the 30-day public comment period. KDHE may modify the preferred remedy based on new information or public comments. The public is encouraged to review and comment on the preferred remedy presented in this draft CAD. If requested, KDHE will hold a public meeting during the public comment period to present information regarding the preferred remedy. Notice of a public meeting would be published in *The Hiawatha World* and posted on KDHE's Powhattan USDA webpage.

The public may provide comments on the draft CAD during the 30-day public comment period. Public comments on the draft CAD may be submitted to KDHE during the public hearing or in writing during the 30-day public comment period. Written comments must be postmarked by November 15, 2020, and mailed to the name and address specified below:

Kansas Department of Health and Environment
Bureau of Environmental Remediation
1000 SW Jackson Street; Suite 410
Topeka, Kansas 66612-1367
Contact: Ken Diediker
Phone: 785-296-0291

Comments on the draft CAD may also be submitted to KDHE by electronic mail to kenneth.diediker@ks.gov. Comments sent by electronic mail must be received by KDHE by 5:00 p.m. on November 15, 2020. All comments that are received by KDHE prior to the end of the public comment period will be addressed by KDHE in the Responsiveness Summary Section of the Final CAD.



TABLES



Table 1 – Maximum Concentrations in Soil

Compound	Location	Date	Historical Maximum Concentration µg/kg	Depth (FT)	KDHE Tier 2 Level [‡] µg/kg
Carbon Tetrachloride	T102	07/2007	2,140	30	73.4
Chloroform	T102	07/2007	72	38	850

[‡]KDHE Tier 2 Levels default to MCLs where available. Tier 2 Level for soil provided from KDHE’s Risk Based Standards for Kansas (RSK) Manual, October 2010 Revised September 2015.

Red Bold = concentration exceeds the applicable RSK



Table 2 – Maximum Concentrations in Groundwater

Compound	Location	Date	Historical Maximum Concentration µg/L	MCL or KDHE Tier 2 Level [‡] µg/L
Carbon Tetrachloride	TI01	07/2007	1,090	5
Chloroform	TI01	07/2007	35	80

[‡]KDHE Tier 2 Levels default to MCLs where available. Tier 2 Level for groundwater provided from KDHE’s Risk Based Standards for Kansas (RSK) Manual, October 2010 Revised September 2015.

Red Bold = concentration exceeds the applicable RSK



Table 3 – Final Cleanup Goals

Compound	Media	MCL or KDHE Tier 2 Level [‡]	Cleanup Goal
Carbon Tetrachloride	Soil	73.4 µg/kg	73.4 µg/kg
Chloroform		850 µg/kg	850 µg/kg
Carbon Tetrachloride	Groundwater	5 µg/L	5 µg/L
Chloroform		80 µg/L	80 µg/L

[‡]KDHE Tier 2 Levels default to MCLs where available. Tier 2 Level for groundwater provided from KDHE’s Risk-based Standards for Kansas (RSK) Manual, October 2010 Revised September 2015.



Table 4 – Summary of the Preferred Alternatives

Media of Interest	Preferred Alternative	Contingency
Saturated Soil	Alternative 2: Groundwater Pump and Treat with Discharge, Groundwater Monitoring, Five Year Reviews	Additional characterization, new evaluation of remedial alternatives, and implementation as determined necessary.
Groundwater	Alternative 2: Groundwater Pump and Treat with Discharge, Groundwater Monitoring, Five Year Reviews	Additional characterization, new evaluation of remedial alternatives, and implementation as determined necessary.



Table 5 - Estimated Cost of the Preferred Alternative

Preferred Alternative	Total Capital Cost	Total Operation & Maintenance Cost	Contingency (15%)	Total Cost	Net Present Value
Alternative 2: Groundwater Pump and Treat with Discharge, Groundwater Monitoring, Five Year Reviews	\$100,067	\$533,266	\$95,000	\$728,333	\$637,002

[‡]Cost projection provided in the Corrective Action Study Report (Argonne National Laboratory, 2018)



FIGURES

Figure 1 – Site Location

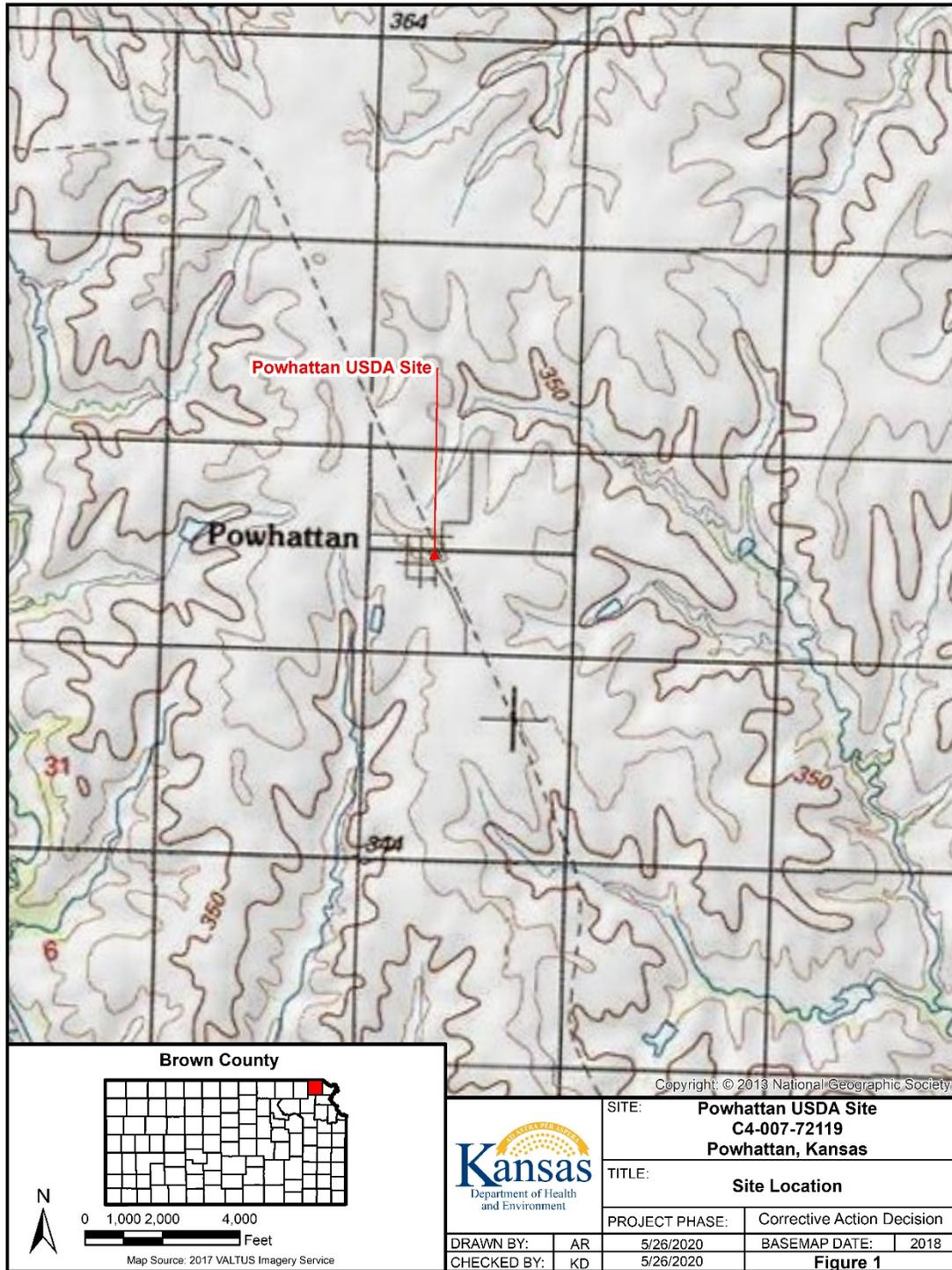


Figure 2 – Site Layout



Figure 3 – Groundwater Levels and Potentiometric Surface

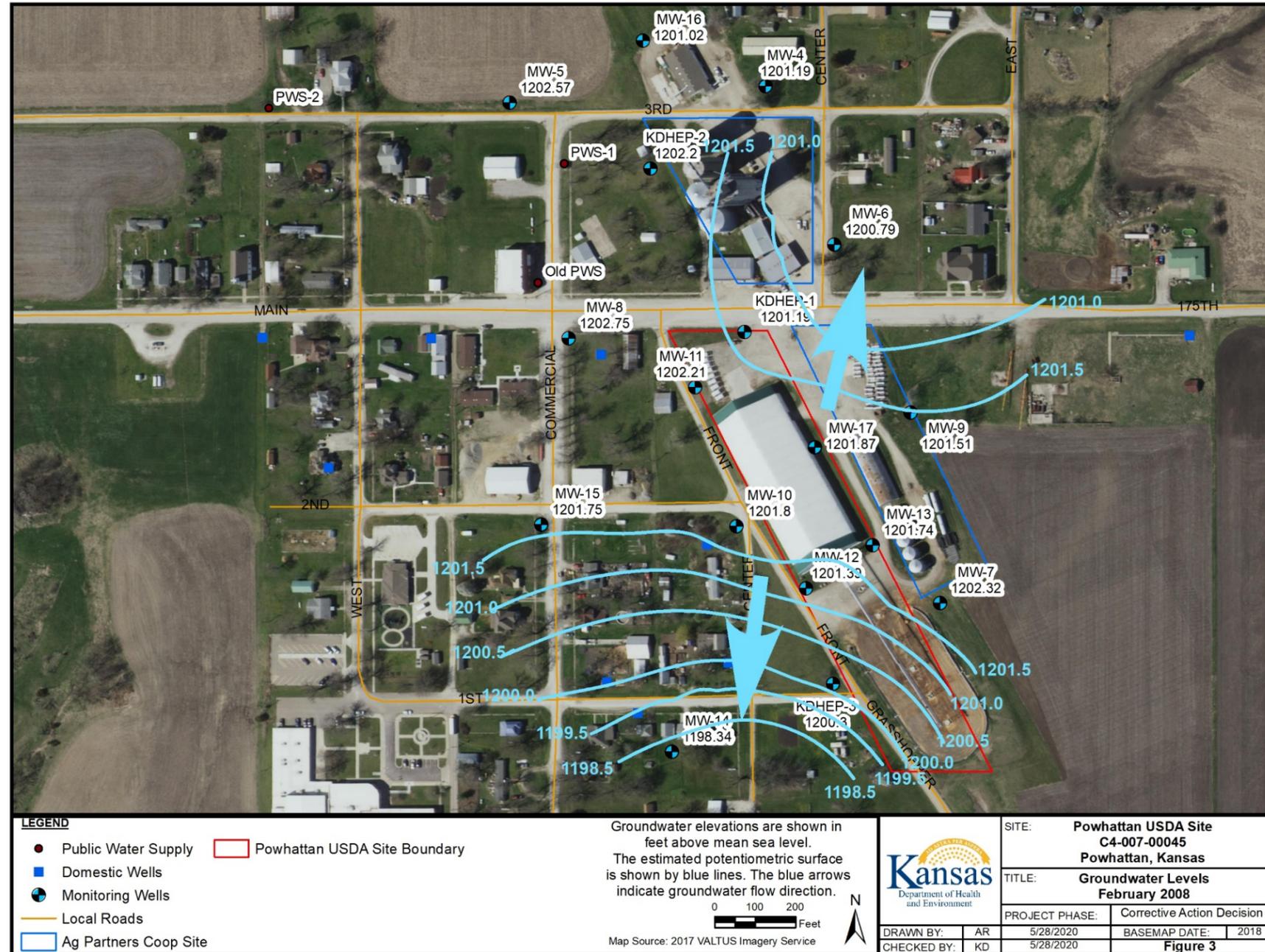


Figure 4 – Carbon Tetrachloride Concentrations in Soils



Figure 5 – Carbon Tetrachloride Concentrations in Groundwater



Figure 6 – Conceptual Diagram of Remedy

