



FINAL

Remedial Design / Pre-Design Data
Acquisition Work Plan
Volume I of II

North Industrial Corridor

APPROVED WITH COMMENTS
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Wichita, Kansas

Presented to:



City of Wichita
1900 E. Ninth Street
Wichita, KS 67214

Presented by:

SCS AQUATERRA
11120 E. 26th Street N. Suite 1100
Wichita, KS 67226
(316) 315-4501

September 2013
Revised March 2014
Revised June 2014
File Number 27213343.00

Offices Nationwide
www.scsengineers.com

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Table of Contents

| Section | Page |
|--|------|
| 1 INTRODUCTION..... | 1 |
| 1.1 REMEDIAL DESIGN WORK PLAN OBJECTIVE..... | 1 |
| 1.2 PROJECT SUMMARY..... | 2 |
| 1.3 REPORT ORGANIZATION..... | 3 |
| 2 RD/PDA WORK PLAN COMPONENTS AND SCHEDULE..... | 4 |
| 2.1 RD/PDA WORK PLAN SUMMARY..... | 4 |
| 2.2 PRE-DESIGN DATA ACQUISITION FIELD ACTIVITIES..... | 5 |
| 2.3 PERMITTING AND ACCESS AGREEMENTS..... | 6 |
| 2.4 REPORTING AND REMEDIAL DESIGN DOCUMENTS..... | 6 |
| 2.5 PROGRESS REPORTS AND MEETINGS..... | 7 |
| 2.6 SCHEDULE..... | 7 |
| 3 PRE-DESIGN DATA ACQUISITION ACTIVITIES..... | 8 |
| 3.1 SITE-WIDE GROUNDWATER MEASUREMENTS..... | 8 |
| 3.2 BASELINE GROUNDWATER SAMPLE COLLECTION..... | 8 |
| 3.2.1 GWU-1..... | 9 |
| 3.2.2 GWU-2..... | 10 |
| 3.2.3 GWU-3..... | 11 |
| 3.2.4 GWU-4..... | 12 |
| 3.3 DATA REPORT AND EVALUATION..... | 13 |
| 3.4 AQUIFER TESTING..... | 14 |
| 3.4.1 EXTRACTION WELL INSTALLATION..... | 14 |
| 3.4.2 PIEZOMETER INSTALLATION..... | 15 |
| 3.4.3 AQUIFER TESTING..... | 16 |
| 3.4.4 GEOCHEMICAL CHARACTERIZATION..... | 18 |
| 3.5 PDA REPORT..... | 19 |
| 4 ADDITIONAL PDA ACTIVITIES..... | 20 |
| 4.1 MONITORED NATURAL ATTENUATION ASSESSMENT..... | 20 |
| 4.2 GROUNDWATER/SURFACE WATER INTERACTION STUDY..... | 21 |
| 4.3 EAST OF CHISHOLM CREEK GROUNDWATER ASSESSMENT..... | 21 |
| 4.4 SITE-WIDE GROUNDWATER MONITORING PROGRAM..... | 22 |
| 4.5 SITE-WIDE Surface WATER MONITORING PROGRAM..... | 22 |
| 5 REMEDIAL DESIGN DOCUMENTS..... | 23 |
| 6 PDA CONTINGENCIES/GENERAL COMMENTS..... | 25 |
| 7 REFERENCES..... | 26 |

List of Figures

No.

| | |
|----------|------------------------------------|
| Figure 1 | NIC Site Location Map and Boundary |
| Figure 2 | NIC Groundwater Unit Map |
| Figure 3 | Project Schedule |
| Figure 4 | Site Wide Well Location Map |
| Figure 5 | NIC GWU-1 PDA Sampling Locations |
| Figure 6 | NIC GWU-2 PDA Sampling Locations |
| Figure 7 | NIC GWU-3 PDA Sampling Locations |
| Figure 8 | NIC GWU-4 PDA Sampling Locations |
| Figure 9 | NIC Aquifer Testing Locations |

List of Tables

No.

| | |
|---------|--|
| Table 1 | Site Wide Water Level Round Locations |
| Table 2 | GWU-1 PDA Investigation Sampling Locations, Rationale and Analyte List |
| Table 3 | GWU-2 PDA Investigation Sampling Locations, Rationale and Analyte List |
| Table 4 | GWU-3 PDA Investigation Sampling Locations, Rationale and Analyte List |
| Table 5 | GWU-4 PDA Investigation Sampling Locations, Rationale and Analyte List |

Appendices

| | |
|------------|--|
| Appendix A | RD/PDA Quality Assurance and Field Sampling Plan |
| Appendix B | PDA Site-Specific Health and Safety Plan |

1 INTRODUCTION

The City of Wichita (City) has retained SCS Aquaterra to perform Pre-Design and Remedial Design (RD) activities for the North Industrial Corridor (NIC) site in Wichita, Kansas. These activities are being performed to comply with the Kansas Department of Health and Environment (KDHE) Final Corrective Action Decision for Interim Groundwater Remediation (CAD), established on March 28, 2012. This RD and Pre-Design Data Acquisition (PDA) Work Plan for the NIC site in Wichita, Kansas is a required deliverable of the RD portion of the Settlement Agreement between KDHE and the City (1995 and 1996).

1.1 REMEDIAL DESIGN WORK PLAN OBJECTIVE

The objectives of the RD/PDA Work Plan are to outline the proposed field investigations required for collecting design level data at the site, and to describe the proposed remedial design deliverables and anticipated project schedule for these items. This RD/PDA Work Plan document includes a description of plans and schedules for conducting the PDA program and the development of the RD of the KDHE-preferred alternatives for four of the six groundwater units (GWUs) within the site. The City is responsible for conducting the PDA and RD activities for the downgradient portions of the contaminant plumes for GWU-1, GWU-2, GWU-3, and GWU-4. The remaining two GWUs, GWU-5 and GWU-6, are being addressed by other parties under separate regulatory orders. Descriptions of the preferred alternatives for GWUs GWU-1 through GWU-4 are provided in subsequent sections of this work plan.

To meet the RD/PDA objectives, this document includes the following:

- PDA program detailing the proposed field activities and data collection methods;
- Quality Assurance and Field Sampling Plan (QA-FSP);
- Site-Specific Health and Safety Plan (SSHSP);
- Identification of deliverables and milestones for the NIC RD program, up to the delivery of a NIC RD Report and Design Plans; and
- Schedule for the identified deliverables and milestones.

SCS Aquaterra has prepared a project schedule for the RD and PDA activities as part of this RD/PDA Work Plan. This schedule presents significant PDA investigation start dates and durations, deliverable due dates, and other project milestones. This proposed project schedule is presented in Section 2 and is based on the most current information available during the preparation of this document. The indicated activity start dates and durations may change as result of review times or field schedules during the PDA investigation and aquifer testing activities. An updated project schedule will be provided to KDHE during quarterly progress reports.

1.2 PROJECT SUMMARY

The NIC site is located in Wichita, Sedgwick County, Kansas. The site encompasses approximately 4,011 acres and is generally bounded by Waco and Market Streets to the west, Second Street North to the south, Hydraulic to the east, and Kansas Highway 254 to the north. The site location is shown on Figures 1 and 2.

The United States Environmental Protection Agency (USEPA) identified volatile organic compounds (VOCs) in groundwater near 29th and Meade Streets in Wichita in 1983. As a result of additional environmental investigations in the 1980s, the site was listed on the National Priorities Site List (NPL) as the 29th and Meade Superfund site in February 1990. Additional investigations conducted by the KDHE, the Wichita North Industrial District Group, and the City, identified additional contamination adjacent to the 29th and Meade site. These sites were consolidated to form the current NIC site. In 1995 and 1996, the City and KDHE finalized the NIC Settlement Agreement, and the 29th and Meade Superfund Site was officially delisted in April 1996.

Numerous investigations have been completed by Camp Dresser and McKee Inc. (CDM) since the 1990s, including the Remedial Investigation (RI) which was completed in three phases from December 1997 to March 2005. The results of the Phase I and Phase II investigations were submitted in the *North Industrial Corridor (NIC) Site Remedial Investigations Report* (CDM 2007a) and the results of the Phase III investigation were submitted in the *Industrial Corridor (NIC) Site Remedial Investigations Report Addendum* (CDM 2007b). The RI Report and subsequent addendum were approved as final by KDHE in April 2007. The *North Industrial Corridor Site Site-Wide Groundwater Feasibility Study* (FS, CDM 2011) field activities were conducted in December 2007 and April 2008. The results of the FS were submitted to KDHE in June 2011. The FS Report was approved by KDHE in August 2011. These investigations focused on the site-wide groundwater conditions and identification of source areas. Source area investigations and remediation are being conducted by each responsible party under separate regulatory orders. The FS identified site-wide groundwater remedies, the preferred alternatives of each GWU, and contingencies in the event the initial actions did not demonstrate effectiveness.

As a result of the various investigations and subsequent KDHE approved FS, preferred alternatives and contingencies for groundwater remediation were identified in the CAD for each GWU. As per the KDHE Final CAD for the NIC Site, remedial action alternatives are to be implemented to address groundwater contamination, protect human health and the environment, and achieve Remedial Action Objectives (RAOs). The investigation activities described in subsequent sections of this work plan are intended to address the data collection needs for the design and implementation of the respective preferred alternatives that are not related to source control, which are as follows:

| Groundwater Unit | Preferred Action | Contingencies |
|------------------|--|--|
| GWU-1 | - Monitored Natural Attenuation (MNA) | - Enhanced Anaerobic Bioremediation (EAB), - Groundwater Extraction and Treatment |
| GWU-2 | - Groundwater Extraction and Treatment | - EAB, - Additional Recovery Wells |
| GWU-3 | - Groundwater Extraction and Treatment | - Additional Recovery Wells |
| GWU-4 | - Groundwater Extraction and Treatment | - Additional Recovery Wells |

As stated previously, KDHE intends to address GWU-5 (the former Coastal Derby Refinery) and GWU-6 (the Unified School District 259 School Service Center) separately, under consent agreements with the associated responsible parties.

1.3 REPORT ORGANIZATION

The remainder of this report is organized as follows:

- Section 2 - Remedial Design Work Plan Components and Schedule
- Section 3 - Pre-Design Data Acquisition Activities
- Section 4 - Future RD/PDA Activities
- Section 5 - Remedial Design Documents
- Section 6 - PDA Contingency/General Comments
- Section 7 - References
- Appendix A - RD/PDA Quality Assurance and Field Sampling Plan
- Appendix B - PDA Site-Specific Health and Safety Plan

2 RD/PDA WORK PLAN COMPONENTS AND SCHEDULE

This section presents an overview of the RD/PDA Work Plan components, reporting, and schedule. The purpose of the RD/PDA Work Plan is to outline the tasks required to complete the design of the preferred and/or alternative corrective action measures presented in the CAD for the NIC site (KDHE, 2012). Each task to be conducted as part of this program is described below, followed by the project schedule.

2.1 RD/PDA WORK PLAN SUMMARY

This document provides details for the RD/PDA program consisting of:

- PDA Activities (Section 3). The RD/PDA Work Plan identifies the PDA field investigations to be conducted, including groundwater monitoring and aquifer testing programs, and includes maps of proposed sampling and testing locations.
- Future PDA activities and Corrective Action Measures (Section 4). The RD/PDA Work Plan provides a description of future PDA activities and corrective action measures identified in the CAD, that are not specifically addressed in this RD/PDA Work Plan, such as the groundwater/surface water interaction study and Chisholm Creek investigation.
- RD Documentation (Section 5). The RD/PDA Work Plan provides details of forthcoming RD documents that will be prepared upon completion of the PDA field activities.
- PDA Contingencies and General Comments (Section 6). The RD/PDA Work Plan is to be used to guide field activities and remediation decisions. As actual work is performed, the RD/PDA Work Plan includes flexibility to make appropriate adjustments based on site conditions and testing results, yet maintain the CAD goals and objectives.
- PDA Quality Assurance and Field Sampling Plan (QA-FSP). This document is provided as Appendix A and represents a combination of the site-specific Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) as required to complete the PDA field activities. The QA-FSP provides descriptions of field and/or laboratory methodologies utilized while conducting the investigative programs, and provides descriptions of the quality assurance/quality control (QA/QC) measures followed for field and laboratory activities.

- Site-Specific Health and Safety Plan (SSHSP). This document is provided as Appendix B and provides descriptions of health and safety measures necessary to complete the RD/PDA field activities.

2.2 PRE-DESIGN DATA ACQUISITION FIELD ACTIVITIES

The PDA field activities presented in Section 3 consist of the following four activities: site-wide water level measurements, existing well groundwater sample collection, direct push groundwater sample collection, and aquifer pump testing activities.

Site-Wide Water Level Measurements

Water level measurements will be collected from approximately 270 existing monitoring, observation, or private water well locations. The water level data will be used to prepare potentiometric surface maps of the aquifer.

Existing Well Groundwater Sample Collection

Groundwater samples will be collected from approximately 175 existing monitoring, observation, or private water well locations. These samples will be collected and analyzed to verify lateral plume extent, location of the plume axis, and maximum contaminant concentrations for groundwater extraction well placement and treatment system design.

Direct Push Groundwater Sample Collection

Direct push technology (Geoprobe®) will be utilized for the collection of additional groundwater samples at approximately 50 locations. Shallow (approximately 12 to 25 feet below ground surface (bgs)) and deep (approximately 30 to 40 feet bgs) groundwater samples will be collected at each probe location. These samples will be submitted for laboratory analysis to verify lateral extents of groundwater plumes, extraction well locations, and to fill observed “data gaps” in the existing monitoring well data set.

Aquifer Pump Testing Activities

Aquifer tests will be conducted at five locations throughout the NIC site to confirm and/or determine groundwater extraction well locations and pumping rates identified in the CAD. One aquifer test will be performed within GWU-2; one aquifer test will be performed within GWU-4; and three aquifer tests will be performed within GWU-3. One (pilot) groundwater extraction well and three groundwater piezometers will be installed at each testing location as part of these activities. In addition, groundwater samples will be collected during the aquifer testing to provide geochemical characterization for the remedial system designs.

2.3 PERMITTING AND ACCESS AGREEMENTS

SCS Aquaterra will obtain City, County, and State permits necessary to withdraw and discharge groundwater during the PDA field activities. Property access agreements will be executed by SCS Aquaterra and respective property owners prior to commencing PDA field activities. Investigative derived waste (IDW) will be managed in accordance with City, County, and State regulations.

2.4 REPORTING AND REMEDIAL DESIGN DOCUMENTS

Deliverables prepared as a result of the RD/PDA activities described in this Work Plan include: a Data Evaluation of the existing groundwater concentrations; a PDA Summary Report; and Remedial Design Documents.

Data Evaluation Report

Following collection of the site-wide water level measurements and receipt of the groundwater sample analytical results, a brief Data Evaluation Report will be provided. This report will present the data collected, and include recommendations for revisions to the remainder of the RD/PDA activities (aquifer testing) if warranted. It is anticipated that this report will contain the following information:

- A brief description of activities
- Summary data tables of water levels and VOC/MNA analytical results
- A potentiometric surface map of the site
- Figures with VOC data postings
- Figures with MNA data postings

PDA Summary Report

The results of the PDA field activities including water level measurements, existing well sampling, direct-push groundwater sampling, and aquifer pump testing, will be presented in a comprehensive PDA Summary Report. This report will summarize the groundwater data collected and propose relevant modifications to the preferred alternatives and/or design elements, such as extraction well locations, to address changed site conditions since the 2008 sampling event.

Remedial Design Documents

The RD Documents will consist of design drawings for each groundwater extraction, conveyance, and treatment system (GWUs 2, 3 and 4). The RD documents for GWU-1 will consist of a proposed MNA groundwater monitoring network and data evaluation program. The RD documents will be submitted to KDHE for review as discussed in Section 5.

A number of corrective action alternatives utilizing pump and treat systems were identified in the CAD for GWU-2, GWU-3, and GWU-4. Some of these proposed systems would require construction of new treatment systems; others would be tied into the existing Gilbert and Moseley treatment system. The RD documents will provide guidance as to how to best manage recovered groundwater, including the number and location of groundwater pumping wells and treatment systems, raw and treated groundwater conveyance systems, and methods to beneficially reuse treated groundwater.

2.5 PROGRESS REPORTS AND MEETINGS

Quarterly progress reports will be provided to KDHE by SCS Aquaterra. The reports will identify the site status; correspondence to the City, KDHE, and the NIC participants Technical Advisory Committee (TAC); and meetings attended. These reports will also provide schedule updates and note the progress for relevant tasks and the need for any modifications to milestone dates.

2.6 SCHEDULE

SCS Aquaterra has prepared a schedule for project milestones and deliverables. Completion of the field activities will be dependent on the approval of this RD/PDA Work Plan. Figure 3 presents a Gantt chart of the anticipated project schedule. This schedule has been developed based on a rapid regulatory approval so the initial data collection activities can occur in November of 2013. Since it has been five years since many of the wells have been located for water levels or sampling, it is our intention to conduct the field work prior to late fall or early winter weather conditions that could hinder finding wells or utility locates.

3 PRE-DESIGN DATA ACQUISITION ACTIVITIES

As stated previously, the PDA field activities consist of the following four activities: site-wide water level measurements, existing well groundwater sample collection, direct push (Geoprobe®) groundwater sample collection, and aquifer pump testing activities. This section provides general information related to these activities. The methodology and quality assurance/quality control procedures are described in detail in the Quality Assurance – Field Sampling Plan (QA-FSP) provided as Appendix A.

3.1 SITE-WIDE GROUNDWATER MEASUREMENTS

More than 500 monitoring wells have been installed throughout the NIC site, including wells installed as part of the Remedial Investigation (RI) and Feasibility Study (FS) performed by CDM, and wells installed by individual potential responsible parties (PRPs) to address their source areas. For the purposes of evaluating contamination in the groundwater, measurements are collected from two hydrogeologic intervals, identified as either “shallow” (12 to 25 feet bgs) or “deep” (30 to 40 feet bgs). Based on the most recent site-wide measurements collected in 2007 and 2008, groundwater flow is predominately to the south, with localized western, southwestern, and southeastern flow components. SCS Aquaterra has selected approximately 275 existing monitoring wells, as noted in Table 1 and depicted on Figure 4, for collection of groundwater measurements. The measurements will be obtained from the 275 selected locations within one, 24-hour period by using multiple field crews.

The purpose of obtaining groundwater measurements is to develop a current potentiometric surface for the study area, as well as establish a baseline understanding of the well locations that remain usable for future monitoring. The proposed locations are assumed to be present in a condition suitable for obtaining water levels and total depths. However, due to the extended timeframe since the wells were last accessed, it is possible that some wells may not be located. In the event a selected well location is not located or accessible, an alternate existing location may be used, if available and access is attainable. However, a sufficient quantity and density of wells has been selected so that if no alternate locations are available and/or accessible, provided the majority of the locations are found, potentiometric surface mapping will still be feasible.

In addition, SCS Aquaterra has selected 14 surface water gaging locations, as noted in Table 1 and depicted on Figure 4, for the collection of surface water measurements. The purpose of obtaining surface water measurements is to establish a baseline understanding of groundwater and surface interactions across the NIC study area.

3.2 BASELINE GROUNDWATER SAMPLE COLLECTION

Based on data collected during the RI and FS, as well as individual source area investigations, a large chlorinated solvent groundwater plume extends from north of 37th Street North, to the

southern boundary of the NIC site, and is variable in width (east-west) due to the locations of source areas. There are many contaminants present above Tier 2 Risk-based Standards for Kansas (RSKs); the most prevalent contaminant is trichloroethene (TCE). Approximately 175 existing monitoring or observation well locations and approximately 50 Geoprobe® locations have been selected for the collection of baseline groundwater samples. Tables 2 through 5 list the well and probe locations selected for each GWU. The samples will be collected and analyzed to verify lateral plume extent, location of the plume axis, and maximum contaminant concentrations for groundwater extraction well placement and treatment system design. Further discussion regarding the selection of monitoring locations for each GWU is provided in the following paragraphs.

Please note, as stated above in Section 3.1, the proposed existing monitoring well locations are assumed to be present in a condition suitable for obtaining groundwater samples. However, due to the extended timeframe since the wells were last accessed, it is possible that some wells may not be found. In the event a selected well location is not located or accessible, an alternate existing location may be used, if available and access is attainable. However, if an alternate location is not available or accessible, a Geoprobe® boring will be advanced at or near the location of the missing or inaccessible well.

3.2.1 GWU-1

As stated in the CAD, the primary remedy for GWU-1 is Monitored Natural Attenuation (MNA) with groundwater extraction and treatment and/or enhanced anaerobic bioremediation as contingencies. The MNA program will be a two-year evaluation of MNA processes to evaluate the potential for long term effectiveness. During the MNA assessment, a limited groundwater investigation will be conducted east of the East Fork of Chisholm Creek to determine the magnitude and extent of contamination in this area, generally presented and discussed under Section 3.2.2 GWU-2. If contamination is discovered above regulatory thresholds, the anaerobic bioremediation contingency will be further evaluated to address this contamination. As further discussed in Section 4, work plans for the MNA assessment, Groundwater/Surface Water Interaction Study, and East of Chisholm Creek investigation will be provided separately from this RD/PDA work plan, and will not be discussed in detail in this section.

Required Design Data:

The data required to design a MNA assessment program is baseline groundwater VOC and MNA parameter concentrations from the existing monitoring well network to validate the current understanding of MNA processes outlined in the FS. The new data will be used to identify data gaps within the existing groundwater monitoring network that can be addressed by proposing additional monitoring well locations. Once these locations are identified, a comprehensive MNA assessment will be proposed that outlines MNA assessment well locations, site specific MNA parameters, sample collection methods, frequency, and evaluation criteria.

Sampling Locations:

Thirty-one existing shallow monitoring wells, 27 existing deep monitoring wells, and four Geoprobe® locations have been selected to obtain baseline groundwater concentrations, as identified in Table 2 and shown on Figure 5. Shallow and deep samples will be collected at each probe location. Analytical results from these 66 groundwater samples are anticipated to provide the current extent and magnitude of contamination in GWU-1, as well as establish baseline parameters from which to build the MNA assessment and remediation program.

3.2.2 GWU-2

As stated in the CAD, groundwater extraction and treatment from one extraction well is the preferred alternative for GWU-2, with additional extraction well(s) and/or enhanced anaerobic bioremediation (EAB) as contingencies. The remedial design for GWU-2 is anticipated to consist of one extraction well located south of 21st Street North and a stand-alone treatment system co-located with the extraction well. The treated groundwater is proposed to discharge into Chisholm Creek, with the transmission piping proposed to run north to south along North Mosley Street. It is assumed that City property will be available for the treatment system and building. The characteristics of the treatment system for GWU-2 are noted below:

- One extraction well designed to extract 150 gallons per minute (gpm);
- One air stripper sized to treat 200 gpm, in the event a contingency extraction well is necessary;
- A 15-foot by 15-foot engineered steel building with 10-foot high side walls situated on a reinforced concrete slab foundation in close proximity to the extraction well;
- Approximately 500 feet of single-walled, high density polyethylene (HDPE) transmission piping; and
- Pumping and treatment system controls, valves and appurtenances, and other incidentals.

As further discussed in Section 4, work plans for the MNA assessment, Groundwater/Surface Water Interaction Study, and East of Chisholm Creek investigation will be provided separately from this RD/PDA work plan, and will not be discussed in detail in this section. ***Required Design Data:***

The required design data for the GWU-2 remedial design includes the confirmation of lateral plume extent at the widest portion, plume axis, maximum contaminant concentrations, limited MNA data, and aquifer characteristics. This information will be used to determine the final extraction well location, pumping rates, resulting capture zones to obtain hydraulic containment of the plume, and the potential to implement the EAB contingency. The pumping rates and maximum contaminant concentrations will be used to size the groundwater treatment system for hydraulic and VOC loadings, and to size the influent and effluent conveyance piping. Aquifer

pump tests are described in Section 3.4. The plume extents will be evaluated by collecting groundwater samples. During field sampling activities, observations will be made regarding the proposed transmission piping route and possible building locations.

Sampling Locations:

Thirty-three existing shallow monitoring wells, 29 existing deep monitoring wells, and 19 Geoprobe® locations have been selected to obtain baseline groundwater concentrations, as identified in Table 3 and shown on Figure 6. Shallow and deep samples will be collected at each probe location. Analytical results from these 100 groundwater samples are anticipated to provide the current extent and magnitude of contamination in GWU-2, as well as provide the data identified above for use in designing the extraction and treatment remedial system.

3.2.3 GWU-3

The preferred remedial design stated in the CAD for GWU-3 is anticipated to consist of three extraction wells, with additional extraction wells as contingencies. The recovered groundwater from the two extraction wells anticipated to be located near the intersections of 3rd Street North and North Washington Avenue, and East Central Avenue and Indiana Street, will be conveyed to the Gilbert-Mosley (GM) Groundwater Treatment Plant (GWTP). These two extraction wells are planned to tie-in to a proposed 8-inch diameter pipeline starting near 3rd Street and North Washington that will run south to the intersection of North Santa Fe Avenue and Zimmerly. The characteristics of the remediation system discharging to the GM GWTP are described as follows:

- Two extraction wells with a combined pumping rate of 205 gpm (one at 140 gpm and one at 65 gpm);
- Approximately 3,000 feet (combined) of single-walled HDPE transmission piping from each extraction well to the tie-in location;
- Approximately 9,350 feet of 8-inch diameter HDPE transmission piping from the tie-in location on Santa Fe Street to the GM GWTP;
- Pumping system controls, valves and appurtenances, and other incidentals; and
- An evaluation of the ability of the existing GM GWTP to treat additional groundwater from NIC.

The third extraction well, identified as an “interior” extraction well, is anticipated to be located on 13th Street North between Ohio Street and North Wabash Avenue, and will include a stand-alone treatment system co-located with the extraction well. The treated groundwater is proposed to discharge into Chisholm Creek with the transmission piping running west to east along 13th Street North. It is assumed that City property will be available for the treatment system and building. The characteristics of the interior extraction well are described as follows:

- One extraction well with a pumping rate of 110 gpm;
- One air stripper sized to accommodate the stand-alone extraction well;

- A treatment system building similar to that described for GWU-2;
- Approximately 1,400 feet of single-walled, HDPE piping; and
- Pumping and treatment system controls, valves and appurtenances, and other incidentals.

As further discussed in Section 4, work plans for the MNA assessment, Groundwater/Surface Water Interaction Study, and East of Chisholm Creek investigation will be provided separately from this RD/PDA work plan, and will not be discussed in detail in this section.

Required Design Data:

The required design data for the GWU-3 remedial design includes the confirmation of lateral plume extent at the widest portion, plume axis, maximum contaminant concentrations, limited MNA data, groundwater/surface water interactions, and aquifer characteristics. This information will be used to determine the final extraction well locations, pumping rates, and resulting capture zones to obtain hydraulic containment of the plume. The pumping rates and maximum contaminant concentrations will be used to size the groundwater treatment system for hydraulic and VOC loadings, and to size the influent and effluent conveyance piping. Aquifer pump tests are described in Section 3.4. During field sampling activities, observations will be made regarding the proposed transmission piping routes and possible building locations.

Sampling Locations:

Twenty-nine existing shallow monitoring wells, 25 existing deep monitoring wells, and 21 Geoprobe® locations have been selected to obtain baseline groundwater concentrations, as identified in Table 4 and shown on Figure 7. Shallow and deep samples will be collected at each probe location. Analytical results from these 96 groundwater samples are anticipated to provide the current extent and magnitude of contamination in GWU-3, as well as provide the data identified above for use in designing the extraction and treatment remedial systems.

3.2.4 GWU-4

The preferred remedial system as stated in the CAD for GWU-4 is proposed to consist of one extraction well located near the intersection of 3rd Street North and North Topeka with the extracted groundwater pumped to the GM GWTP. The FS indicates connecting the GWU-4 groundwater transmission pipeline to the proposed GWU-3 transmission pipeline presents the lowest net present value. This extraction well is planned to tie-in to a proposed 8-inch diameter pipeline near 3rd Street and North Santa Fe that will run south to the intersection of North Santa Fe Avenue and Zimmerly. Additional extraction wells are the preferred contingency alternatives for GWU-4. The characteristics of the remediation system discharging to the GM GWTP are described as follows:

- One extraction well with a pumping rate of 120 gpm;
- Approximately 1,500 feet of 8-inch diameter HDPE transmission piping from the tie-in location on Santa Fe Street to the GM GWTP; and

- Pumping and treatment system controls, valves and appurtenances, and other incidentals.

Required Design Data:

The required design data for the GWU-4 remedial design includes the confirmation of lateral plume extent at the widest portion, plume axis, maximum contaminant concentrations, and aquifer characteristics. This information will be used to determine the final extraction well locations, pumping rates, and resulting capture zones to obtain hydraulic containment of the plume. The pumping rates and maximum contaminant concentrations will be used to size the groundwater treatment system for hydraulic and VOC loadings, and to size the influent and effluent conveyance piping. Aquifer pump tests are described in Section 3.4. During field sampling activities, observations will be made regarding the proposed transmission piping routes and possible building locations.

Sampling Locations:

Twelve existing shallow monitoring wells, 11 existing deep monitoring wells, and 16 Geoprobe® locations have been selected to obtain baseline groundwater concentrations, as identified in Table 5 and shown on Figure 8. Shallow and deep samples will be collected at each probe location. Analytical results from these 54 groundwater samples are anticipated to provide the current extent and magnitude of contamination in GWU-4, as well as provide the data identified above for use in designing the extraction and treatment remedial systems.

3.3 DATA REPORT AND EVALUATION

The site-wide groundwater measurements and the results of the baseline groundwater sampling event will be presented in a data transmittal to the KDHE. The purpose of the data transmittal will be to identify significant changes in groundwater plume geometry or contaminate concentrations that may require revisions to proposed extraction well locations for optimal remediation, and to make initial assessments of the need for implementation of contingency alternatives or other applicable alternative remedies for each GWU. The data transmittal is expected to contain the following information:

- Tabular summary of water level measurements and a shallow potentiometric surface map;
- Tabular summary of VOC concentrations for primary contaminants of concern (COCs) and a shallow and deep isoconcentration maps for COCs with a minimum of three detections for each GWU; and
- Initial assessment of groundwater condition for each GWU and a description of proposed modifications to aquifer testing locations, preferred alternatives, or potential contingency implementation.

3.4 AQUIFER TESTING

As previously discussed, groundwater extraction and treatment are the preferred remedial alternatives for GWU-2, GWU-3, and GWU-4. Therefore, aquifer testing will be completed at each location to evaluate hydrogeologic conditions at each of the five preferred groundwater extraction well locations discussed above. Aquifer testing will consist of a drawdown step test and a short term (24 to 72 hour) constant rate aquifer test at each of the five preferred locations. This information will be used to design the extraction wells, determine the final extraction well pumping rates, and determine resulting capture zones to ensure hydraulic containment of the plume. The five preferred remedial alternative extraction well locations, aquifer pump testing locations, are illustrated on Figure 9.

SCS Aquaterra proposes to install one temporary 6-inch diameter Schedule 40 polyvinyl chloride (PVC) pilot groundwater extraction well and three temporary 1-inch diameter Schedule 40 PVC groundwater piezometers at each of the preferred locations. The pilot extraction wells will be installed utilizing hollow stem augers (HSA). The piezometers will be installed with a track-mounted Geoprobe® unit utilizing direct push methods.

During Geoprobe® groundwater sampling activities, an electrical conductivity (EC) probe will be advanced to bedrock to log lithologic changes in the subsurface. In addition, samples of water bearing (aquifer) material will be collected at the five proposed pilot extraction well locations. These samples will be submitted for grain size analysis (ASTM Method C 136-06 and/or D 422-63(2007) or equivalent as deemed appropriate) to determine appropriate well screen slot size. This data will be beneficial in the final design of the groundwater extraction wells and piezometers.

Submersible vented pressure transducers with internal data logging capabilities will be installed in the extraction well piezometers and each of the groundwater piezometers to monitor groundwater elevation during the aquifer pumping tests.

Extraction pilot wells and piezometers will be surveyed under the supervision of a Kansas professional licensed surveyor (PLS). A well survey report completed by the PLS will consist of northing and easting measurements, and top of casing and ground surface elevation. The survey of the new wells will be tied into the existing monitoring well network, with information in the state plane projection.

3.4.1 EXTRACTION WELL INSTALLATION

SCS Aquaterra recommends installing one temporary 6-inch diameter extraction well at each of the five preferred alternative extraction well locations previously discussed. These wells will be installed according to KDHE-Bureau of Water (BOW) statutes and regulations by a State of Kansas licensed water well contractor. As previously discussed, an EC probe will be advanced to

bedrock to log lithologic changes in the subsurface during Geoprobe® groundwater sampling activities. This data will aid in the design of the pilot extraction well.

The proposed borings for the pilot extraction wells will be drilled utilizing 12-inch outside diameter HSA with a 13-inch bit. The borings will be drilled to bedrock, approximately 30 to 40 feet bgs depending on location. The pilot extraction wells will be completed using 6-inch diameter, Schedule 40 threaded PVC with a well screen slot size based on the results of the grain size analysis discussed above. The pilot extraction well will be screened from total depth to 2 feet above the static water level. The sand/gravel pack material will also be based on the results of the grain size analysis discussed above. The well pack material will be installed from total depth to 2 feet above the screen. A 2-foot hydrated bentonite chip seal will be installed at the top of the gravel pack. A bentonite slurry will then be pumped via tremie pipe from the top of the hydrated chip seal to approximately 1-foot below land surface, where an additional 1 foot of hydrated bentonite chips will be installed to provide a surface seal. The wells will be left as temporary completions during aquifer testing and will be abandoned upon regulatory approval of PDA investigative activities. Plugging and abandonment will be completed in general accordance with KDHE guidelines as detailed in Appendix ?? of the QA-FSP.

Additionally, a 1-inch diameter piezometer constructed with threaded Schedule 40 PVC casing and screen will be installed within the annular space of the pilot extraction well for water level monitoring purposes. This piezometer will be constructed with a screen interval matching the pilot extraction well.

Extraction well development will be completed with a submersible pump. Disposal of extracted groundwater generated during well development will follow Local and State guidelines as well as procedures identified in Section 5.10 of Appendix A.

Decontamination of drilling equipment will follow procedures as identified in Section 5.7 of Appendix A. Disposal of drill cuttings will follow Local and State guidelines as well as procedures identified in Section 5.10 of Appendix A.

Field documentation will include daily field notes, well completion details, and other relevant task specific information not listed here. Well completion details will include casing size, total depth of the borehole, well materials, screen and riser length, sand/gravel pack intervals, grout intervals, surface completion details, static water level(s), and well development/purge volumes.

3.4.2 PIEZOMETER INSTALLATION

SCS Aquaterra proposes to install three 1-inch diameter groundwater piezometers to monitor groundwater elevations at each of the five preferred alternative extraction well locations previously discussed. The piezometers will be installed approximately 10, 50, and 100 feet from each extraction well.

The groundwater piezometers will be installed with a Geoprobe® in accordance with KDHE Standard Operating Procedures (KDHE-SOP) *BER-29: Installation of Direct-Push Monitoring Wells*. Piezometers will be constructed of 1-inch diameter threaded Schedule 40 casing and screen. The piezometer located approximately 10 feet from the extraction well will be advanced to bedrock and constructed with screen casing from bedrock to a minimum of 2 feet above the anticipated static groundwater level. The piezometers approximately 50 and 100 feet from the extraction well will be advanced to a total depth approximately 5 and 10 feet above the anticipated bedrock depth, respectively. These piezometers will be constructed with screen casing from total depth to a minimum of 2 feet above the anticipated static groundwater level. Nearby monitoring wells already present may also be used for measurements at greater distances from the pumping wells or instead of temporary piezometers.

Well development will be completed with a 1/4-inch low-density polyethylene (LDPE) tubing with a stainless steel check valve attached to a peristaltic pump. Water generated during piezometer development will follow procedures as identified in Section 5.10 of Appendix A.

3.4.3 AQUIFER TESTING

Aquifer testing is performed to enhance the hydrogeologic understanding of the site and to assist in the design of the extraction wells. An aquifer pump test also provides actual drawdown data resulting from the diversion of groundwater from a well or wells in the aquifer. Unlike slug tests, an aquifer pumping test provides estimates of aquifer parameters over a larger area of the aquifer under actual pumping conditions, thereby providing more representative values for the aquifer in the area. Aquifer pumping tests will provide a basis for calculating the hydrogeologic parameters such as transmissivity (T), hydraulic conductivity (K), and storativity (S) (storage coefficient), specific capacity, well efficiency, and radius of influence (ROI) of the pumping wells.

- Transmissivity is defined as the rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient. It is a function of the properties of the liquid, the porous media, and the thickness of the porous media. The K of the aquifer can be determined by dividing the transmissivity by the saturated thickness (m) of the aquifer ($K=T/m$).
- Storativity is defined as the volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head. It is equal to the product of specific storage and aquifer thickness. The range for an unconfined aquifer is 0.01 to 0.3 (unitless) and is equivalent to specific yield.
- ROI is the horizontal distance from the center of the pumping well to the limit of the cone of depression. In effect, it is the maximum horizontal distance from the pumping well at which groundwater levels are influenced by pumping.

Aquifer Drawdown Step Test

An aquifer drawdown step test will be completed as detailed in Section 5.7 of Appendix A. At the start of the drawdown step test for an individual well, an initial pumping rate of 50% of the anticipated yield, as discussed in the FS and CAD, will be used with the pump set near the bottom of the well to maximize available drawdown within the well. Drawdown in the well will be monitored until water levels either stabilize or the well becomes dewatered. If the water level stabilizes, the pumping rate will be increased to 100% of the anticipated yield in an attempt to maximize drawdown while maintaining a stabilized water level. Similarly, if while pumping at 100% of the anticipated yield, the water level continues to decrease and approach the pump, the pumping rate will be decreased until a near stabilized maximum pumping rate can be achieved. The pumping rate should be increased/decreased until the water level within the well stabilizes to an elevation near its maximum available drawdown level.

Vented submersible pressure transducers with data loggers will be used to monitor drawdown in proposed piezometers and the pumping wells. Water level readings will be recorded based on the step linear measurement schedule detailed in Section 5.7 of Appendix A, to the nearest 0.01 foot.

Constant Rate Aquifer Test

Upon stabilization of the final drawdown step, at or near 100% of the anticipated yield, the pumping rate will be set and the well will pump at a constant rate to obtain adequate information to confirm existing hydrogeologic data detailed in the FS or calculate hydrogeologic parameters as previously discussed. It is anticipated that the constant rate aquifer test will take between 24 and 72 hours, but will be extended if needed.

Vented pressure transducers with data loggers will be used to monitor drawdown in select piezometers and the pumping wells. Water level readings will be recorded at 1 minute intervals during the drawdown test, to the nearest 0.01 foot.

Existing hydrogeologic data is available from the northern extents of the GM Site (RW-5), near the southern extents of GWU-3 (NIC #3-1 and NIC #3-2), and GWU-4 (NIC #4-1). In addition, existing data is available from production wells near 22nd and Broadway (OHSE production wells, FS 2011), near south-central portion of GWU-2 (NIC #2-1). This data may be beneficial in the development of pilot aquifer testing scenarios. This data may also provide adequate detail to design the groundwater remediation systems that will meet the remedial alternatives detailed in the CAD. Therefore, aquifer testing may not be necessary in areas of the NIC Site with adequate hydrogeologic data. In the event that aquifer testing is deemed necessary, the location and duration of the aquifer pumping tests may be revised upon review of the PDA data.

Existing data is limited in the north central portion of GWU-3 near NIC #3-3A. Therefore, the aquifer tests conducted at this location may be longer in duration to calculate hydrogeologic

parameters previously discussed. However, upon review of existing and PDA data, locations and duration of the aquifer pumping tests may be revised.

Groundwater produced during the aquifer testing is anticipated to exceed Tier 2 RSKs for at least one COC at each location. SCS Aquaterra proposes to discharge the groundwater to the City of Wichita's Publicly Owned Treatment Works (POTW) using a nearby sanitary sewer manhole. A discharge permit will be obtained from the City of Wichita POTW to dispose of the water generated during the aquifer testing. Temporary water right permits will be obtained from Kansas Department of Agriculture-Division of Water Resources (KDA-DWR) to extract groundwater during the aquifer testing.

Results from the aquifer testing will be compared to the model output parameters from the FS to confirm the anticipated groundwater yield rates discussed in the FS and CAD, and the capture zone to ensure the containment of the contaminant plume.

3.4.4 GEOCHEMICAL CHARACTERIZATION

Representative groundwater samples will be collected from each pilot extraction well during the aquifer testing. The samples will be analyzed for the following parameters:

- Alkalinity – Method SM-2320B
- Calcium – Method EPA 6010
- Magnesium– Method EPA 6010
- Sodium – Method EPA 6010
- Potassium – Method EPA 6010
- Chloride – Method EPA 300.0
- Sulfate – Method EPA 300.0
- Dissolved Oxygen – Field Parameter
- Electric Conductivity – Field Parameter
- Hardness– Method EPA 130.1
- Iron– Method EPA 6010
- Manganese – Method EPA 6010
- pH – Field Parameter
- Temperature – Field Parameter
- Total Dissolved Solids– Standard Method 2540 C-1997

These geochemical parameters will be used during the RD to select components of the remediation system that are compatible with the groundwater chemistry.

3.5 PDA REPORT

The results of the PDA activities described above will be summarized in a PDA Report. This report will be used as the design basis for the preferred alternatives for each GWU. The PDA Report will be prepared based on the results of the PDA evaluations, and submitted to KDHE as detailed in the Schedule. The PDA Report will include, at a minimum, the following:

- Results of the PDA activities;
- Evaluation of results;
- Data Validation Summary;
- Design basis criteria for the proposed remedial systems;
- Narrative description of proposed remedial systems; and
- Summary of IDW handling.

4 ADDITIONAL PDA ACTIVITIES

The purpose of this section is to provide a general discussion of additional PDA activities presented in the CAD that are not specifically addressed in this RD/PDA Work Plan. As stated previously, the objective of the activities described in this RD/PDA Work Plan is to obtain design level data for use in preparing the RD documents for implementation of the groundwater extraction and treatment systems in GWU-2, GWU-3, and GWU-4, and designing an MNA program for GWU-1. The additional activities discussed in this section are anticipated to be addressed in subsequent work plans at the request of the City, as the noted primary remedial actions are implemented.

The need to address these items as outlined in the CAD is understood; however resources are prioritized as presented herein to provide the most short-term benefit by addressing the large scale downgradient contamination issues first. By implementing the primary remedies noted in this RD/PDA Work Plan, (e.g. designing the groundwater extraction and treatment systems, and implementing hydraulic containment in GWU-2, GWU-3, and GWU-4), it is expected that implementation of the alternatives in these three GWUs may have some impact on remedies proposed east of Chisholm Creek, and the operational and design data should be considered as these options are investigated and implemented. The results of the additional RD/PDA activities described herein should be considered in conjunction with implementing the MNA assessment in GWU-1 and the hydraulic containment alternatives in GWU-2, GWU-3 and GWU-4.

In Table 8-1 of the CAD, KDHE indicates these additional PDA activities include: an MNA Assessment, a Groundwater/Surface Water Interaction Study, and a Groundwater Assessment East of Chisholm Creek. These PDA activities are discussed in the following sections. In addition, a site-wide monitoring program will be developed to evaluate the effectiveness and progress of the remedial efforts.

4.1 MONITORED NATURAL ATTENUATION ASSESSMENT

KDHE has identified source abatement and MNA as the preferred remedy for GWU-1, with noted contingencies (alternative remedy GWU 1-2 as stated in the CAD). Historical data indicate MNA may be most effective at the southern end of GWU-1, near the former refinery located downgradient in GWU-5. However, MNA data from GWU-1 are limited. Therefore, KDHE requested PDA activities to include the assessment of MNA processes within GWU-1.

In addition, an assessment of NIC contaminants reported east of the East Fork of Chisholm Creek has been prescribed for GWU-1 and GWU-2. Therefore, additional groundwater data will be collected to evaluate the distribution of NIC contaminants east of Chisholm Creek, and to evaluate the necessity and potential of remediating impacted groundwater utilizing enhanced anaerobic bioremediation (EAB) barriers discussed under contingency alternatives GWU 1-3 and GWU 2-3 as stated in the CAD.

A work plan for the MNA assessment using the results of this PDA is one of the RD deliverables indicated herein. A work plan for the MNA study will be developed after the PDA data is available to assist in the development of the MNA study.

4.2 GROUNDWATER/SURFACE WATER INTERACTION STUDY

Suspected NIC contaminants have been detected in surface waters of Chisholm Creek and its tributaries, and in groundwater east of Chisholm Creek. Therefore, KDHE requested PDA activities to include a groundwater/surface water interaction study of Chisholm Creek and its tributaries adjacent to and through GWU-1, GWU-2, and GWU-3. This study will aid in determining the necessity for and the design of contingent EAB barriers in GWU-1 and GWU-2, and contingent groundwater containment wells in GWU-2 and GWU-3.

Following completion of the baseline groundwater sampling described in this RD/PDA work plan, the analytical data will be used along with historical information to develop a work plan for the groundwater/surface water interaction study. It is anticipated the PDA results will provide additional data for determining appropriate assessment activities related to groundwater/surface water interaction and contaminant migration. A work plan for the groundwater/surface water interaction study will be developed after the PDA data is available to assist in the development of the groundwater/surface water interaction study.

4.3 EAST OF CHISHOLM CREEK GROUNDWATER ASSESSMENT

As previously discussed, suspected NIC contaminants have been detected historically in surface waters of Chisholm Creek and its tributaries, and in groundwater east of Chisholm Creek. Therefore, KDHE requested PDA activities include a detailed groundwater assessment east of Chisholm Creek and its tributaries, adjacent to and through GWU-1 and GWU-2. However the extent and source of contamination is not fully understood. Therefore, this assessment will determine the extent and potential sources of contamination in groundwater east of Chisholm Creek, and aid in the design of contingent EABs and groundwater containment wells as previously discussed.

As stated above for the groundwater/surface water interaction study, it is beneficial to delay development of the work plan for the Chisholm Creek assessment such that the results of the RD/PDA activities will be incorporated. The data obtained from the RD/PDA activities and subsequent RD (specifically design of the MNA assessment) will be used to refine the objectives and appropriate activities for the Chisholm Creek assessment. A work plan for the Chisholm Creek assessment will be developed after the PDA data is available to assist in the development of the Chisholm Creek assessment.

4.4 SITE-WIDE GROUNDWATER MONITORING PROGRAM

A site-wide groundwater monitoring program will be the basis of future evaluations to determine remedial system effectiveness and to make operational adjustments to optimize operations. Defining an appropriate monitoring network and sampling procedures are critical for future NIC project evaluations. As part of this RD/PDA, approximately 275 monitoring wells have been selected for the collection of groundwater elevations, and approximately 175 monitoring wells and 50 probe locations have been selected for the collection of groundwater samples. Using the results of these activities, additional monitoring wells may be appropriate to address data gaps. As needed, a work plan for well installation will be prepared using the data obtained during the PDA activities. A site-wide groundwater monitoring network plan will be developed based upon the remedial design components and submitted during the remedial design approval process for KDHE review and approval.

4.5 SITE-WIDE SURFACE WATER MONITORING PROGRAM

A site-wide surface water monitoring program will also be utilized for future evaluations to determine remedial system effectiveness and to make operational adjustments to optimize operations. Defining an appropriate monitoring network and sampling procedures are critical for future NIC project evaluations. As part of this RD/PDA, 14 surface water gaging locations have been selected for the collection of surface water measurements to establish a baseline understanding of groundwater and surface interactions across the NIC study area. Surface water sample collection has not been proposed as part of this RD/PDA as surface water quality samples are not necessary for remedial design. Surface water quality sample collection activities will be provided under separate cover for other RD/PDA activities.

Using the results of these activities, additional surface water locations may be appropriate to address data gaps. A site-wide surface water monitoring network plan will be developed based upon the remedial design components and submitted during the remedial design approval process for KDHE review and approval.

5 REMEDIAL DESIGN DOCUMENTS

The remedial systems for GWUs 2, 3, and 4 will include groundwater extraction wells, treatment system equipment and controls, pipeline alignment plan and details, and treatment system building plan and details. The remedial design documents for GWU-1 will consist of a MNA work plan as discussed in Section 6. Upon KDHE approval of the PDA Report (Section 3.5), SCS Aquaterra will proceed with the remedial design for GWUs 2, 3, and 4 that include the following components:

The typical extraction well design procedure for each GWU will include the following:

- Determine extraction well locations based upon results of the PDA activities.
- Design the extraction well configuration, including specifying well components such as casing diameter, material type, screen depth, and other well construction and completion details;
- Size and specify the extraction well pump(s);
- Design recovery well termination details; and
- Design the pumping system controls.

The typical treatment system and pipeline design procedure will include the following:

- Determine locations of treatment systems and buildings;
- Determine the size of the pipeline from the wells to the treatment buildings;
- Develop the pipeline alignment from extraction wells to treatment buildings;
- Size air stripper or other treatment devices;
- Design the treatment system controls;
- Design the treatment system buildings;
- Determine the size of the pipeline from the treatment building to the discharge locations; and,
- Develop pipeline alignments from treatment buildings to the discharge locations.

In addition to the typical design procedures outlined previously, the design of the extraction wells and treatment systems will include surveying to establish or provide the following:

- Survey controls and benchmarks, as necessary, to facilitate design and construction of the remedial systems;
- Existing topographical information at the proposed extraction well and treatment sites to facilitate the development of well, treatment system, and building design plans;
- Existing right-of-ways (ROW), utilizing City and/or County quarter section maps and plats;

- Existing topography along the pipeline corridor, using City LIDAR (light detection and ranging) data and aerial mapping;
- Location of existing utilities and other potential obstructions to the proposed wells, treatment systems, and/or pipeline, using the Kansas One-Call system, and the City's monthly utility location verification meeting; and
- Property boundaries and ROW limits at the proposed extraction well and treatment sites.

Field surveying activities will be conducted using the Wichita/Sedgwick County GPS CORS Network to the extent possible to maximize the efficiency of field surveys and provide direct integration with the City's Geographic Information System (GIS). Surveying tasks will be completed by or under the direct supervision of a Kansas professional licensed surveyor (PLS).

RD Reports for each treatment system are anticipated to include the following design documents:

- Design Plans and Drawings, consisting of:
 - Cover Sheet/Title Sheet
 - Site Layout
 - Well Details
 - Piping Alignment and Details
 - Building Details and Equipment Layout
 - Discharge Details
 - Electrical Service
 - One Line Wiring Diagrams
 - System Control Details
 - Other General Details
- Performance Specifications for Pumping Equipment;
- Performance Specifications for Treatment Equipment;
- Permits and Access Agreements;
- Operating, Maintenance, and Monitoring Specifications; and
- Detailed Engineers Cost Estimate.

6 PDA CONTINGENCIES/GENERAL COMMENTS

This RD/PDA work plan describes monitoring, sampling, and testing activities to be performed for obtaining data to design remedial systems for the NIC site. Many of the selected existing wells have not been accessed since 2008, approximately five years ago. This section describes contingency activities that may be implemented during the RD/PDA activities, as warranted.

Missing/Inaccessible Existing Monitoring Wells

The proposed locations are assumed to be present in a condition suitable for obtaining water levels, total depths, and groundwater samples. However, due to the extended timeframe since the wells were last accessed, it is possible that some wells may not be found, or wells may be damaged rendering them inaccessible for obtaining measurements or samples. In the event a selected existing well location is not located or accessible, an alternate existing location may be used, if available and access is attainable. However, if no alternate locations are available and/or accessible, and the location is to be gauged only, the location will be omitted. If no alternate locations are available and/or accessible and the location is to be sampled, a Geoprobe® boring for the collection of a shallow and deep groundwater sample, will be advanced in the same location as the missing or inaccessible existing well.

Aquifer Characteristics

Section 3.4 describes aquifer pump test procedures to be followed to determine appropriate pumping rates and anticipated capture zones. However, existing aquifer test data has been requested and a review of this information may suggest the noted tests may be modified (shortened or lengthened) to reduce redundancy or fill data gaps as relevant.

Unanticipated Conditions

Should unanticipated conditions be encountered during the RD/PDA activities that require significant modification to the preferred remedial alternatives, such as high or low VOC concentrations in unexpected locations or significant change in groundwater depths or flow direction, the City, NIC TAC, and KDHE will be notified to determine changes to continuing with the PDA activities.

General Comments

This work plan was prepared for the exclusive use of the City of Wichita, Kansas for specific application to this project and has been prepared in accordance with generally accepted practices. The analysis, conclusions, and recommendations presented in this work plan are based upon data evaluated as discussed within this work plan. SCS Aquaterra does not warrant the work of regulatory agencies or other parties, which may have supplied information used in the assimilation of this document.

7 REFERENCES

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CDM, 2007a. *North Industrial Corridor Site Remedial Investigation Report*. February 2007.

CDM, 2007b. *North Industrial Corridor Site Remedial Investigation Report Addendum*. February 2007.

Kansas Department of Health and Environment (KDHE). 2012. *Final Corrective Action Decision for Interim Groundwater Remediation-North Industrial Corridor Site, Wichita Kansas*. March 28, 2012.

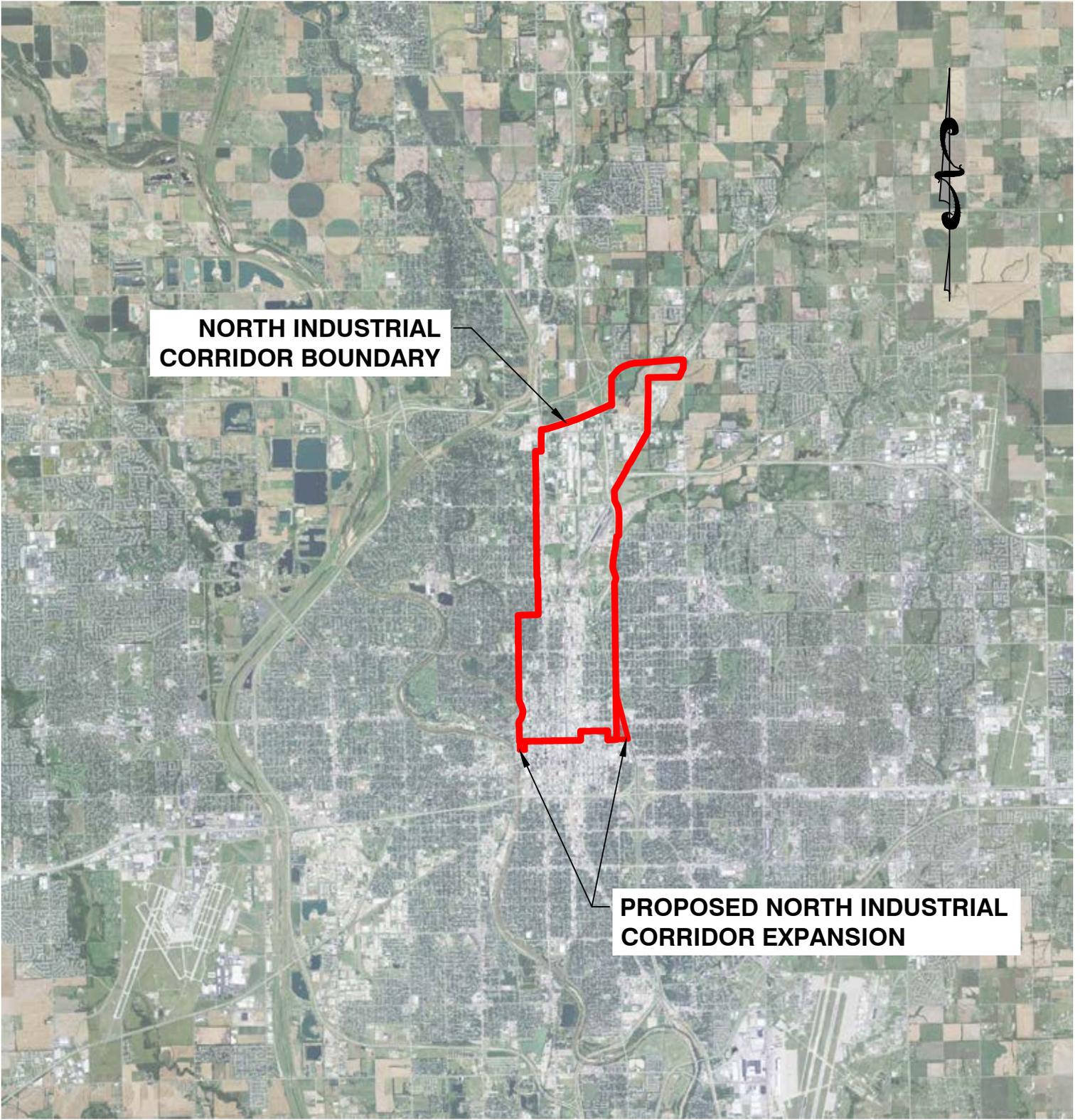
Kansas Department of Health and Environment (KDHE). 1995. *Kansas Department of Health and Environment and City of Wichita: North Industrial Corridor Site, Settlement Agreement for Remedial Investigation and Feasibility Study and for Certain Remedial Actions to be Determined Following Opportunity for Public Involvement. Case Number 95-E-0321*. October 16, 1995.

Kansas Department of Health and Environment (KDHE). 1996. *Amendment to Settlement Agreement. Case Number 95-E-0321*. July 23, 1996.

Kansas Department of Health and Environment (KDHE). *Standard Operating Procedure-BER-29: Installation of Direct-Push Monitoring Wells*. Revised January 1, 2011.

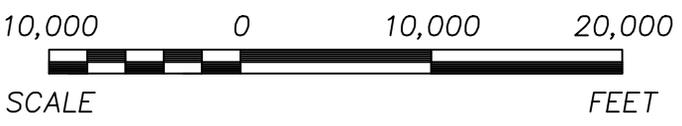
Kansas Department of Health and Environment (KDHE). 2010. *Risk Based Standards for Kansas: RSK Manual-5th Edition*. October 2010.

FIGURES



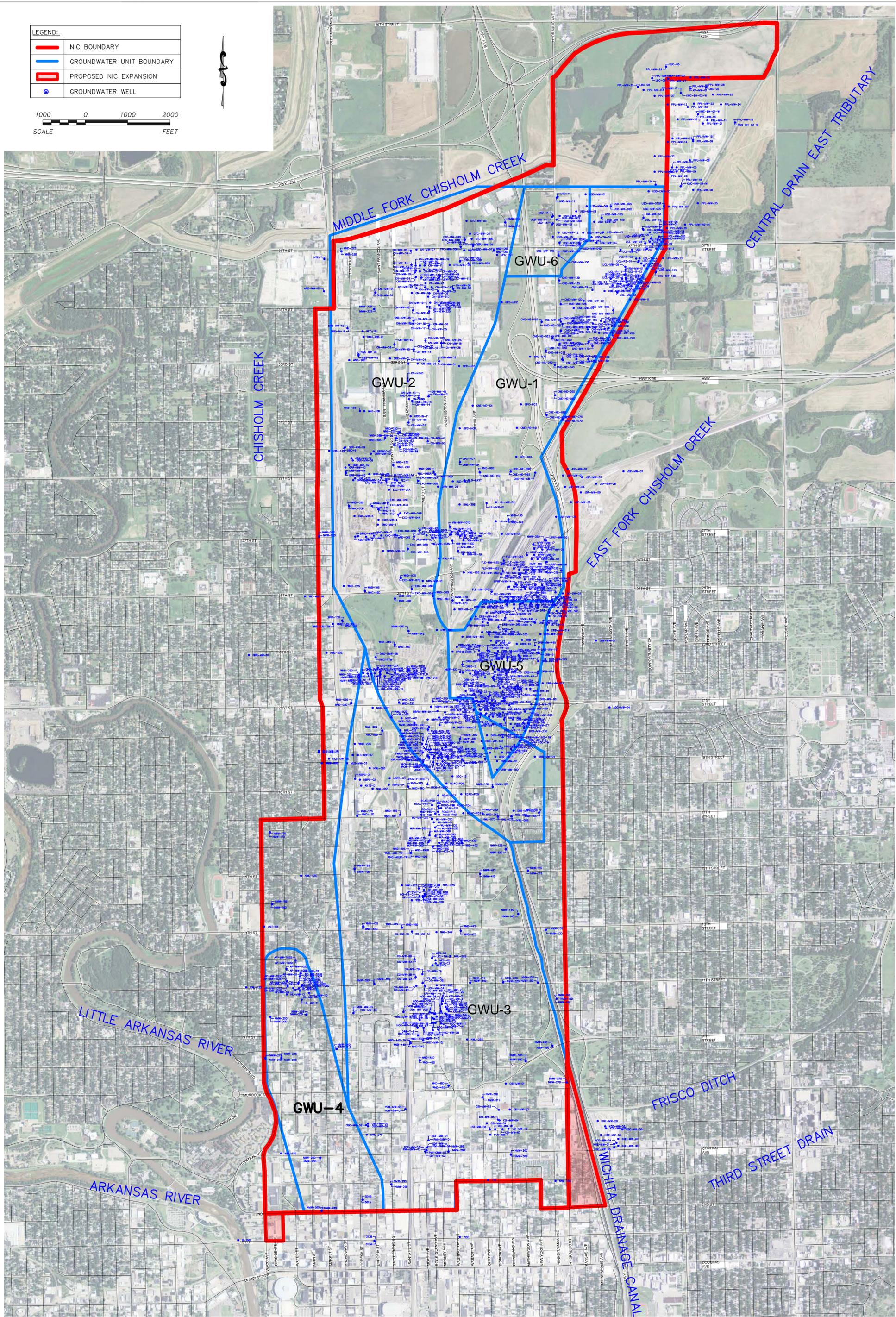
NOTE:

1. AERIAL IMAGERY RETRIEVED FROM THE 2012 NATIONAL AGRICULTURE IMAGERY PROGRAM ADMINISTERED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE'S FARM SERVICE AGENCY.

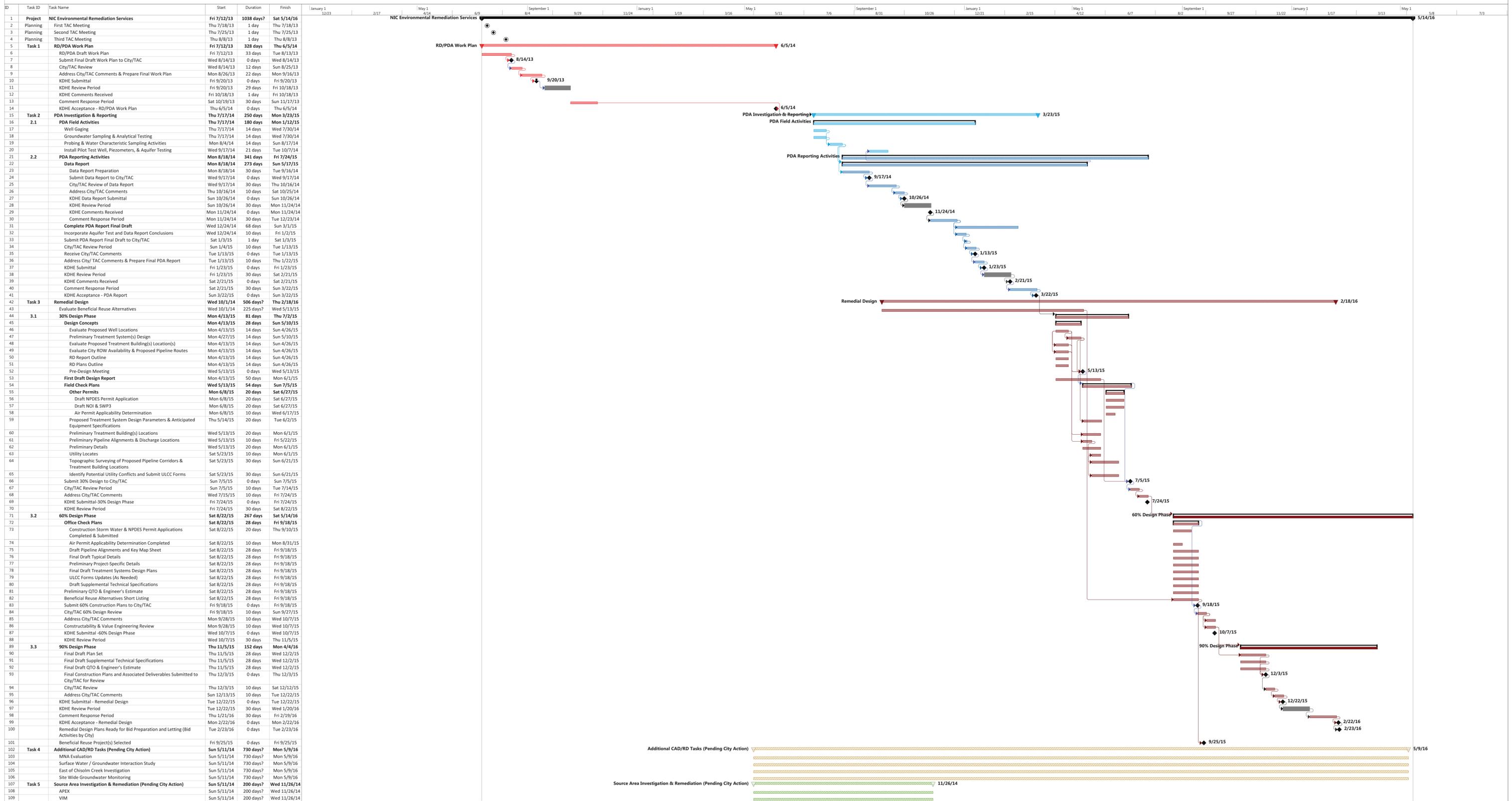


| | | | |
|--|-----|---------------------|-------------|
| <p>SCS AQUATERRA CONSULTING ENGINEERS, INC.</p> <p>11120 E. 26th Street North, Ste. 1100 Wichita, Kansas 67226 PH. (316) 315-4501 FAX. (316) 315-4505</p> | | | |
| <p>NIC SITE LOCATION MAP AND BOUNDARY NORTH INDUSTRIAL CORRIDOR RD-PDA WORK PLAN CITY OF WICHITA WICHITA, KANSAS</p> | | | |
| CHK. BY: | CRM | DWN. BY: | DMB |
| DSN. BY: | DMB | PROJ. NO. | 27213343.00 |
| PROJ. MGR: | MRM | DATE: | 8/12/13 |
| CADD FILE: | | FIGURE NO. 1 | |
| FIG 1 - NIC SITE LOCATION MAP AND BOUNDARY.DWG | | | |

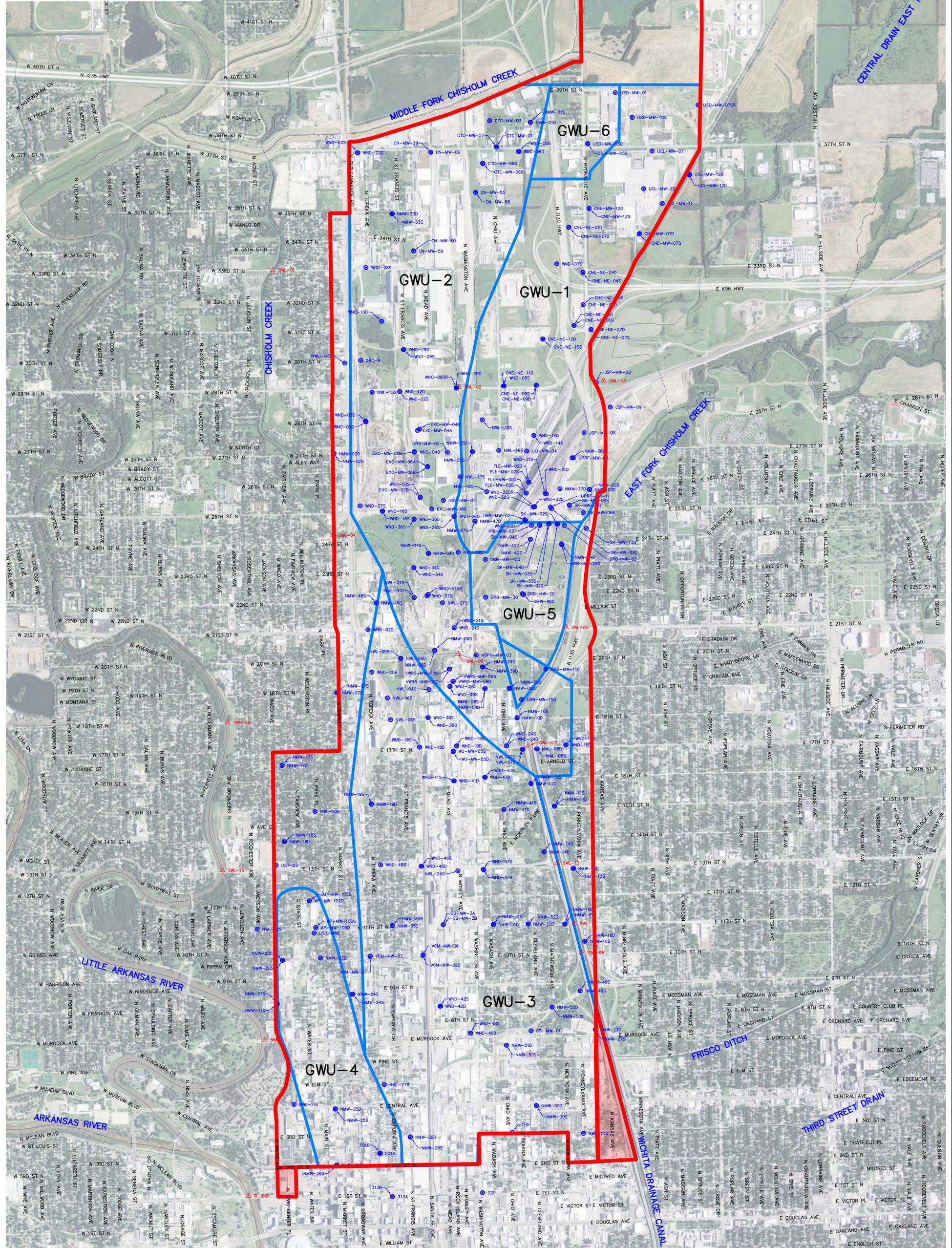
| LEGEND: | |
|---|---------------------------|
|  | NIC BOUNDARY |
|  | GROUNDWATER UNIT BOUNDARY |
|  | PROPOSED NIC EXPANSION |
|  | GROUNDWATER WELL |



Project Schedule
North Industrial Corridor Environmental Remediation



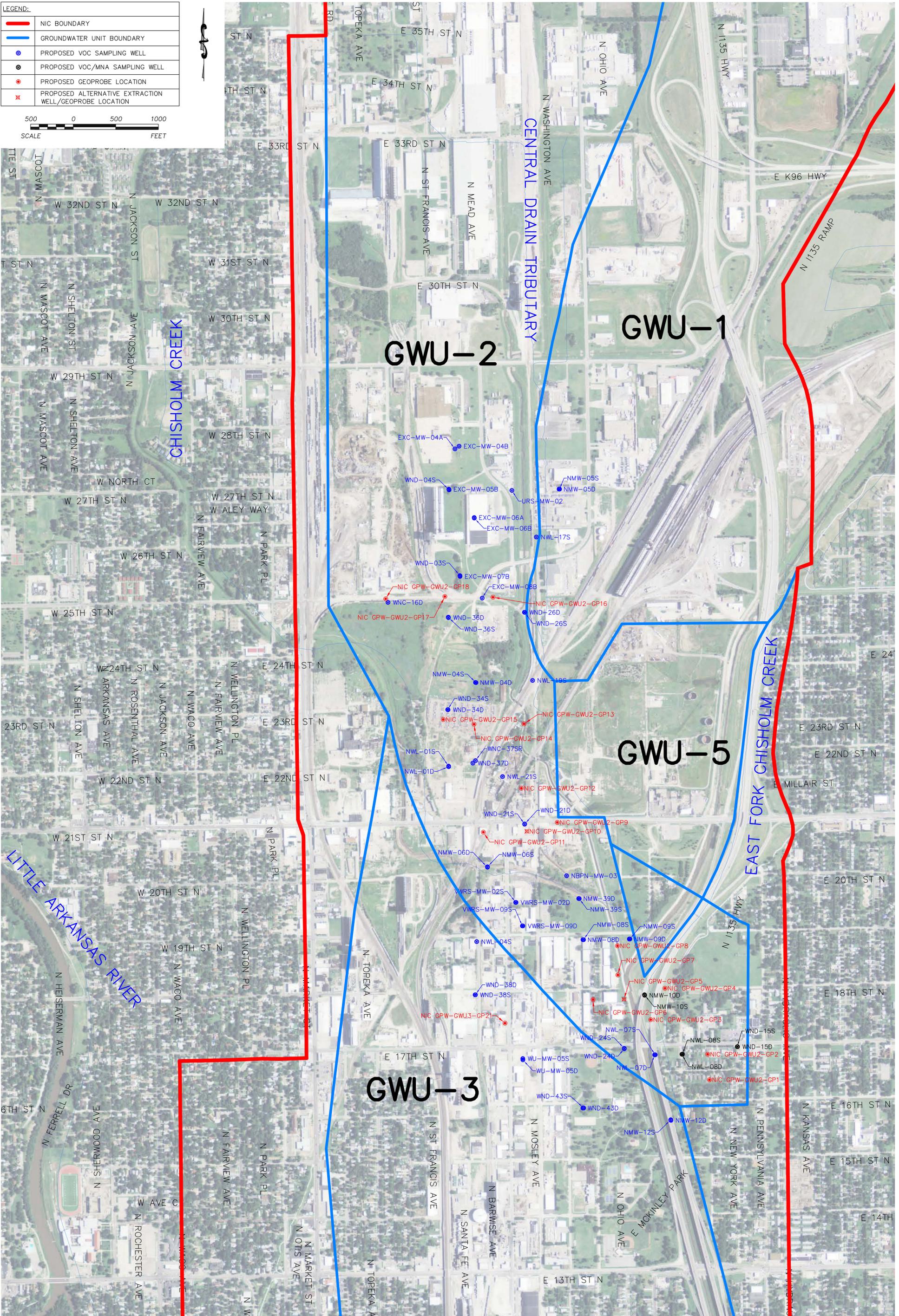
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|--|---|
|  | NIC BOUNDARY |
|  | GROUNDWATER UNIT BOUNDARY |
|  | PROPOSED NIC EXPANSION |
|  | PROPOSED SAMPLING WELL |
|  | PROPOSED SURFACE WATER GAGING LOCATIONS |



SITE WIDE WELL LOCATION MAP
NORTH INDUSTRIAL CORRIDOR RD-PDA WORK PLAN
CITY OF WICHITA
WICHITA, KANSAS

| | | | | |
|------------|---|----------|------------|-------------|
| PROJ. MGR: | CHK. BY: | DSN. BY: | DWN. BY: | PROJ. NO. |
| MRM | CRM | DMB | DMB | 27213343.00 |
| DATE: | CADD FILE: | | FIGURE NO. | |
| 4/25/14 | FIG 4 - SITE WIDE WELL LOCATION MAP.DWG | | 4 | |

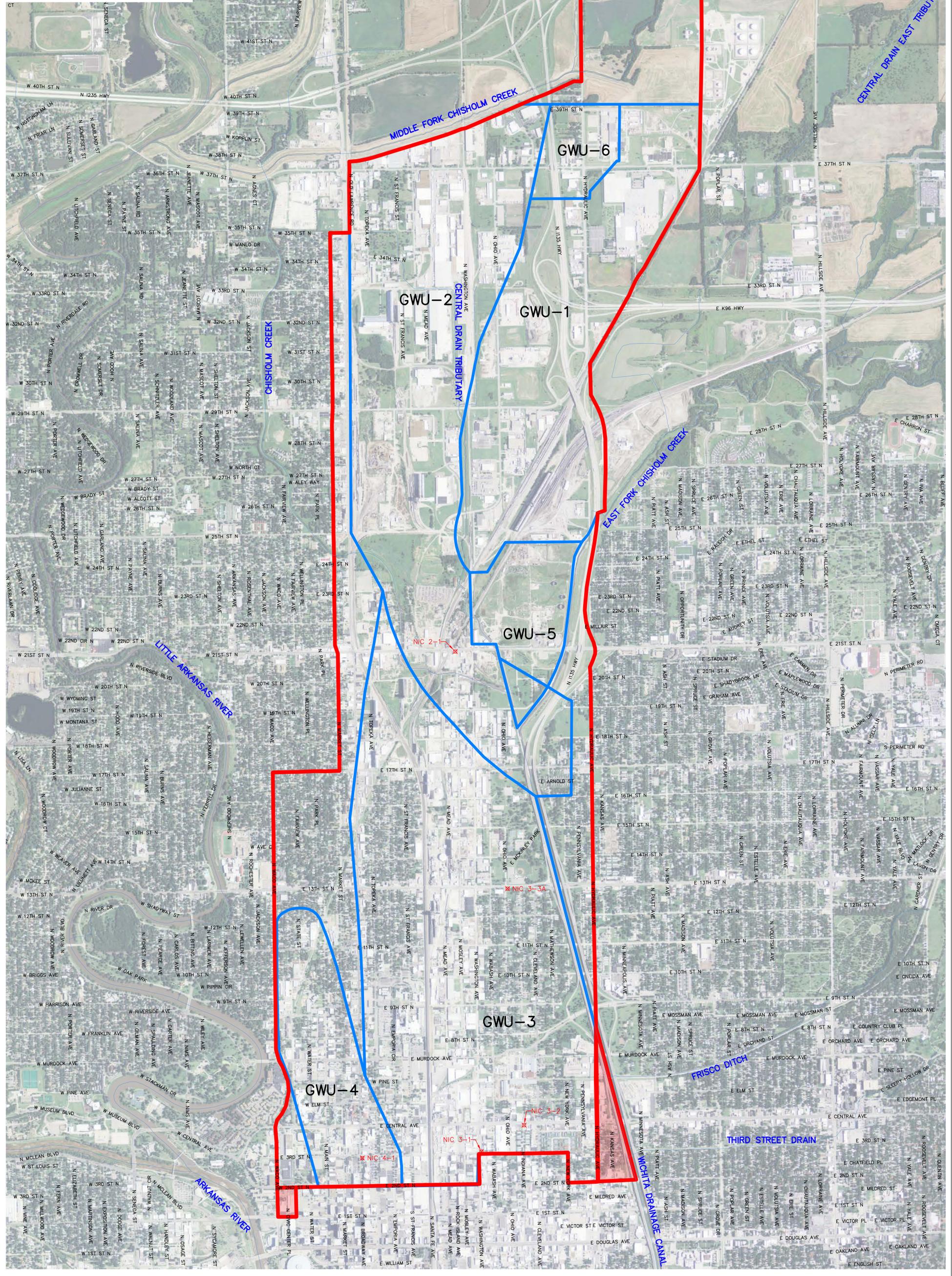
| LEGEND: | |
|--|--|
|  | NIC BOUNDARY |
|  | GROUNDWATER UNIT BOUNDARY |
|  | PROPOSED VOC SAMPLING WELL |
|  | PROPOSED VOC/MNA SAMPLING WELL |
|  | PROPOSED GEOPROBE LOCATION |
|  | PROPOSED ALTERNATIVE EXTRACTION WELL/GEOPROBE LOCATION |



LEGEND:

- NIC BOUNDARY
- GROUNDWATER UNIT BOUNDARY
- PROPOSED NIC EXPANSION
- ✕ NIC AQUIFER TESTING LOCATION

1000 0 1000 2000
SCALE FEET



TABLES

TABLE 1

Site Wide Water Level Round Locations

**Table 1: Site Wide Sample Locations
North Industrial Corridor (NIC) Site
City of Wichita, Kansas**

| Well ID | Access | Property Owner | Comments | Well ID | Access | Property Owner | Comments |
|------------|-------------|-----------------------|---|------------|-----------------|----------------------------|---|
| 719 | UNK | | inner casing too high | CN-MW-60 | Participant | | pad broken, non-existent |
| 729 | UNK | | 10.87 out; 1/4" tubing in well | CSI MW-01 | UNK | | |
| 313A | UNK | | | CTC-MW-01 | Participant | | |
| 313B | UNK | | broke key in lock | CTC-MW-03 | Participant | | |
| 501A | UNK | | | CTC-MW-06D | Participant | | |
| 501B | UNK | | | CTC-MW-06S | Participant | | |
| AP-MW-102D | APEX-CoW | | | CTC-MW-07 | Participant | | latch broken |
| AP-MW-102S | APEX-CoW | | | DBC-9 | UNK | | inside casing on WL & TD |
| AP-MW-106D | APEX-CoW | | | DRB-MW-02 | Participant | | no lock |
| AP-MW-106S | APEX-CoW | | | DRB-MW-03 | Participant | | |
| CG-MW-3A | UNK | | | DRB-MW-110 | Participant | | master lock |
| CG-MW-3B | UNK | | | DRB-MW-150 | Participant | | master lock |
| CNE-MW-07D | Participant | Coleman Company | needs bolts; bad cap; no key | DRB-MW-20 | Participant | | product |
| CNE-MW-07S | Participant | Coleman Company | needs bolts; bad cap; no key | DRB-MW-250 | Participant | | Corresponding deep well is NMW-44D |
| CNE-MW-12D | Participant | Coleman Company | needs bolts; bad J-plug lock | DRB-MW-30 | Participant | | no j-plug; no bolts; metal cap damaged |
| CNE-MW-12S | Participant | Coleman Company | needs bolts; no J-plug; bad lock | DRB-MW-450 | Participant | | |
| CNE-NE-01D | Participant | | | EXC-MW-04A | Participant | | |
| CNE-NE-01S | Participant | | | EXC-MW-04B | Participant | | |
| CNE-NE-04D | Participant | | | EXC-MW-05B | Participant | | Corresponding shallow well is WND-04S |
| CNE-NE-04S | Participant | | | EXC-MW-06A | Participant | | |
| CNE-NE-05D | Participant | | | EXC-MW-06B | Participant | | |
| CNE-NE-05S | Participant | | | EXC-MW-07B | Participant | | Corresponding shallow well is WND-03S |
| CNE-NE-06D | Participant | | | EXC-MW-08B | Participant | | |
| CNE-NE-06S | Participant | | | FLE-MW-02D | Participant | | |
| CNE-NE-07D | Participant | | | FLE-MW-02S | Participant | | |
| CNE-NE-07S | Participant | | | FLE-MW-05D | Participant | | |
| CNE-NE-09D | Participant | | | FLE-MW-05S | Participant | | |
| CNE-NE-09S | Participant | | | HRI-MW-03 | UNK | | |
| CNE-NE-10D | Participant | | | JSP-MW-02 | Non Participant | | |
| CNE-NE-10S | Participant | | | JSP-MW-05 | Non Participant | | stickup bent at 10° |
| CNE-NE-11D | Participant | | Corresponding shallow well is WND-08S | JSP-MW-09 | Non Participant | | |
| CN-MW-06 | Participant | | | NBPN-MW-03 | UNK | | |
| CN-MW-39 | Participant | | | NMW-01D | CoW | | |
| CN-MW-55 | Participant | | pad above ground 3" | NMW-01S | CoW | | baller down well |
| CN-MW-56 | Participant | | pad above ground 1" | NMW-02D | CoW | | inner casing too high |
| CN-MW-59 | Participant | | pad broken, non-existent | NMW-02S | CoW | | |
| NMW-03D | CoW | City of Wichita | missing well vault, PVC sticking out of ground | NMW-48S | CoW | FGY Investments/Treatco | need new IDs |
| NMW-03S | CoW | City of Wichita | | NMW-49D | CoW | | |
| NMW-04D | CoW | Webb Road Development | Pad loose | NMW-49S | CoW | | |
| NMW-04S | CoW | Webb Road Development | | NMW-50D | CoW | | |
| NMW-05D | CoW | Waste Connections | | NMW-50S | CoW | | |
| NMW-05S | CoW | Coach Property L.C. | | NMW-51D | CoW | | |
| NMW-06D | CoW | Webb Road Development | | NMW-51S | CoW | | |
| NMW-06S | CoW | Webb Road Development | | NMW-21D | CoW | City of Wichita | |
| NMW-07D | CoW | City of Wichita | MP outer casing | NMW-21S | CoW | City of Wichita | |
| NMW-07S | CoW | City of Wichita | MP outer casing; rehab'd | NMW-23D | CoW | City of Wichita | |
| NMW-08D | CoW | City of Wichita | MP outer casing | NMW-24D | CoW | City of Wichita | |
| NMW-08S | CoW | City of Wichita | MP outer casing | NMW-24S | CoW | City of Wichita | |
| NMW-09D | CoW | City of Wichita | MP outer casing, inner casing needs to be cutdown | NMW-25D | CoW | City of Wichita | |
| NMW-09S | CoW | City of Wichita | MP outer casing | NMW-25S | CoW | City of Wichita | |
| NMW-10D | CoW | City of Wichita | | NMW-26D | CoW | Mark or Jennifer Wagle | |
| NMW-10S | CoW | City of Wichita | | NMW-26S | CoW | Mark or Jennifer Wagle | |
| NMW-11D | CoW | City of Wichita | | NMW-27D | CoW | City of Wichita | missing bolt |
| NMW-11S | CoW | City of Wichita | | NMW-27S | CoW | City of Wichita | missing bolt, other x-threaded, cracked bolt hole |
| NMW-12D | CoW | City of Wichita | | NMW-29D | CoW | City of Wichita | |
| NMW-12S | CoW | City of Wichita | | NMW-29S | CoW | City of Wichita | |
| NMW-13D | CoW | City of Wichita | | NMW-30D | CoW | City of Wichita | inner casing too high |
| NMW-13S | CoW | City of Wichita | | NMW-30S | CoW | City of Wichita | |
| NMW-14D | CoW | City of Wichita | | NMW-31D | CoW | City of Wichita | |
| NMW-14S | CoW | City of Wichita | | NMW-31S | CoW | City of Wichita | Corresponding deep well is VCM-MW-06 |
| NMW-15D | CoW | City of Wichita | | NMW-32D | CoW | City of Wichita | |
| NMW-15S | CoW | City of Wichita | | NMW-32S | CoW | City of Wichita | |
| NMW-16D | CoW | City of Wichita | | NMW-33D | CoW | City of Wichita | pad very loose; had trouble putting tubing in well |
| NMW-16S | CoW | City of Wichita | | NMW-33S | CoW | City of Wichita | pad sl. loose, broken corner; had trouble putting tubing in well; pumped dry, partially collapsed |
| NMW-17D | CoW | City of Wichita | | NMW-35D | CoW | City of Wichita | |
| NMW-17S | CoW | City of Wichita | roots; rehab'd | NMW-35S | CoW | City of Wichita | |
| NMW-18D | CoW | City of Wichita | | NMW-36D | CoW | UPRR | |
| NMW-18S | CoW | City of Wichita | survey elev for 1" | NMW-37D | CoW | UPRR | |
| NMW-19D | CoW | City of Wichita | | NMW-39D | CoW | Tranco Metal Products Inc. | inner casing too high |
| NMW-19S | CoW | City of Wichita | | NMW-39S | CoW | Tranco Metal Products Inc. | inner casing too high; rehab'd |

**Table 1: Site Wide Sample Locations
North Industrial Corridor (NIC) Site
City of Wichita, Kansas**

| Well ID | Access | Property Owner | Comments | Well ID | Access | Property Owner | Comments |
|-----------------|-------------|---------------------------------|---|-------------|-------------|---------------------------------|--|
| NMW-20D | CoW | City of Wichita | well not found 3/11/10 - apparently removed | NMW-41D | CoW | City of Wichita | |
| NMW-20S | CoW | City of Wichita | | NMW-41S | CoW | City of Wichita | |
| NMW-42D | CoW | El Paso, LLC | No lock | NWL-24S | CoW | City of Wichita | |
| NMW-42S | CoW | Coastal-Derby | No lock | NWL-27S | CoW | City of Wichita | |
| NMW-44D | CoW | El Paso, LLC | Corresponding shallow well is DRB-MW250 | NWL-30S | CoW | | |
| NMW-45D | CoW | Coastal-Derby | no lock | SK-MW-02D | Participant | | |
| NMW-47D | CoW | City of Wichita | | SK-MW-02S | Participant | | |
| NMW-47S | CoW | City of Wichita | | SK-MW-03D | Participant | | |
| NMW-48D | CoW | FYG Investments/Treatco | need new IDs | SK-MW-03S | Participant | | |
| SK-MW-04D | Participant | | | UCL-MW-07 | Participant | | |
| SK-MW-04S | Participant | | | UCL-MW-11 | Participant | | |
| SK-MW-06S | Participant | | | UCL-MW-12D | Participant | | |
| SK-MW-08D | Participant | | | UCL-MW-12S | Participant | | |
| SK-MW-08S | Participant | | | UCL-MW-22 | Participant | | |
| SK-MW-09D | Participant | | | ULI-MW-04 | UNK | | TOP O |
| SK-MW-13S | Participant | | | UPRF-MW-03 | UNK | | |
| NWL-01D | CoW | Webb Road Development | | UPRF-MW-11 | UNK | | |
| NWL-01S | CoW | Webb Road Development | | URS-MW-01 | UNK | | no pad |
| NWL-04S | CoW | City of Wichita | inner casing too high | URS-MW-02 | UNK | | |
| NWL-05S | CoW | City of Wichita | plug does not seal; inner casing too high | USD-MW-01 | Participant | | |
| NWL-06S | CoW | Purina Mills Inc. | | USD-MW-05D | Participant | | |
| NWL-07D | CoW | City of Wichita | | USD-MW-05S | Participant | | |
| NWL-07S | CoW | City of Wichita | Inner casing too high, roots to be cleared | USD-MW-075R | Participant | | |
| NWL-08D | CoW | City of Wichita | inner casing too high | USD-MW-10S | Participant | | |
| NWL-08S | CoW | City of Wichita | | UST-02 | KDHE UST | | KDHE lock |
| NWL-09D | CoW | Richmond Grain | no lid; j-plug does not fit | UST-MW8 | KDHE UST | | KDHE Trust Fund Well |
| NWL-09S | CoW | Richmond Grain | j-plug doesn't secure | VCM-MW-02B | UNK | | |
| NWL-10S | CoW | | no lock | VCM-MW-03 | UNK | | |
| NWL-11S | CoW | | MP N side of outer casing; needs vault cap & bolts | VCM-MW-06 | UNK | | Corresponding shallow well is VCM-MW-02B |
| NWL-12S | CoW | | survey elev for 1"; no lock | VCM-MW-07 | UNK | | |
| NWL-13S | CoW | | pad cracked | VWRS-ME-02D | Participant | | |
| NWL-14S | CoW | City of Wichita | | VWRS-MW-02S | Participant | | |
| NWL-15S | CoW | City of Wichita | | VWRS-MW-09D | Participant | | |
| NWL-16S | CoW | City of Wichita | | VWRS-MW-09S | Participant | | |
| NWL-17S | CoW | City of Wichita | | WNC-05D | CoW | KS Metal Recycling (Yaffee Co.) | pad loose |
| NWL-18S | CoW | City of Wichita | | WNC-06D | CoW | Groendyke Transport Inc. | Pad loose |
| NWL-19S | CoW | City of Wichita | | WNC-09D | CoW | RV Products | inner casing too high |
| NWL-21S | CoW | City of Wichita | Well Vault Missing | WNC-09SR | CoW | RV Products | inner casing too high |
| WNC-10D | CoW | Bartlett & Company | | WND-30D | CoW | Coastal-Derby | No lock |
| WNC-16D | CoW | KS Metal Recycling (Yaffee Co.) | MP N side outer casing; product | WND-31S | CoW | UPRR | UP lock |
| WNC-31D | CoW | UPRR | UPRR | WND-32S | CoW | UPRR | |
| WNC-32D/WNC-32D | CoW | UPRR | Collect from either WND-32D or WND-32DR | WND-34D | CoW | Webb Road Development | protective casing damaged, PVC may be okay |
| WNC-37SR | CoW | Webb Road Development | | WND-34S | CoW | Webb Road Development | protective casing damaged, PVC may be okay |
| WND-02D | CoW | Levand-Rudd Trust | stickup lid damaged | WND-36D | CoW | Webb Road Development | hydrocarbons; pads ~ 0.5' ags |
| WND-03S | CoW | Ross Indust./Cargill | Corresponding deep well is EXC-MW-07B, hydrocarbons | WND-36S | CoW | Webb Road Development | Hydrocarbons |
| WND-04S | CoW | Cargill/Excel Inc. | Corresponding deep well is EXC-MW-05B | WND-37D | CoW | Webb Road Development | |
| WND-05S | CoW | Glickman Inc. | hydrocarbons; cap on stickup won't lock, no latch | WND-38D | CoW | Industrial Maintenance Inc. | |
| WND-06S | CoW | MDT LLC | | WND-38S | CoW | Industrial Maintenance Inc. | |
| WND-07S | CoW | K-DOT | Casing may be broken | WND-39D | CoW | E. Clinton Litsey, Etux | |
| WND-08S | CoW | Burlington Northern RR | Corresponding deep well is CNE-NE-11D, latch broken | WND-39S | CoW | E. Clinton Litsey, Etux | |
| WND-12D | CoW | Ferroloy Foundry Inc. | needs concrete cleaned out of annulus | WND-41D | CoW | Albert Chaney, Etux | |
| WND-12S | CoW | Ferroloy Foundry Inc. | hydrocarbons; need new bolts; needs concrete cleaned out of annulus | WND-41S | CoW | Albert Chaney, Etux | |
| WND-14D | CoW | Wise North Wichita Real Estate | Pad badly cracked; hinge will not close; TD may be 47" | WND-42D | CoW | Filter Media Servide Corp. | |
| WND-14S | CoW | Wise North Wichita Real Estate | Pad Cracked | WND-42S | CoW | Filter Media Servide Corp. | |
| WND-15D | CoW | Tam V Nguyen & Thuy Thi | Stickup | WND-43D | CoW | Jake Kirkland Rev. TR | |
| WND-15S | CoW | Tam V Nguyen & Thuy Thi | Flushmount | WND-43S | CoW | Jake Kirkland Rev. TR | bolt missing, broke in hole |
| WND-16S | CoW | Glickman Inc. | hydrocarbons/product; pad cracked | WND-45S | CoW | Blue Sky of KS LLC | Roots |
| WND-18D | CoW | Bud Palmer | soft bottom; bolts missing | WND-46D | CoW | Mechanical Systems LLC | |
| WND-18S | CoW | Bud Palmer | bolts missing | WND-46S | CoW | Mechanical Systems LLC | |
| WND-19D | CoW | Aaron & Page Painting Inc. | | WND-47D | CoW | George David | |
| WND-19S | CoW | Aaron & Page Painting Inc. | | WND-47S | CoW | George David | |
| WND-20S | CoW | CCGP Inc. | | WND-48D | CoW | Kansas Building Supply Co, Inc. | |
| WND-21D | CoW | Kamen Industrial Park LLC | | WND-48S | CoW | Kansas Building Supply Co, Inc. | |
| WND-21S | CoW | Kamen Industrial Park LLC | | WU-MW-05D | UNK | | |
| WND-22D | CoW | M.P. Properties | needs lock | WU-MW-05S | UNK | | |
| WND-22S | CoW | M.P. Properties | | | | | |
| WND-24D | CoW | Thunderbird Express Inc. | J-plug won't seal; grout above TOL; master lock | | | | |
| WND-24S | CoW | Thunderbird Express Inc. | outer casing too high; loose lid | | | | |
| WND-26D | CoW | Webb Road Development | TD may be 40' | | | | |
| WND-26S | CoW | Webb Road Development | TD may be 22.5' | | | | |
| WND-27S | CoW | Burlington Northern RR | latch needs repair | | | | |

**Table 1: Site Wide Sample Locations
North Industrial Corridor (NIC) Site
City of Wichita, Kansas**

| Well ID | Access | Property Owner | Comments | Well ID | Access | Property Owner | Comments |
|--------------------------------|---------------|------------------------|---|---------|--------|----------------|----------|
| WND-28S | CoW | Burlington Northern RR | stickup latch damaged, can't be locked | | | | |
| WND-29D | CoW | Coastal-Derby | | | | | |
| WND-29S | CoW | Coastal-Derby | TD may be 24' | | | | |
| Surface Water Locations | | | | | | | |
| SWL-01 | Surface Water | | | | | | |
| SWL-02 | Surface Water | | | | | | |
| SWL-03 | Surface Water | | | | | | |
| SWL-04 | Surface Water | | If flowing; W Fork at Park / Market St | | | | |
| SWL-05 | Surface Water | | | | | | |
| SWL-06 | Surface Water | | MP top railing | | | | |
| SWL-07 | Surface Water | | MP at top sidewalk at center joint in metal railing | | | | |
| SWL-08 | Surface Water | | MP top of rail | | | | |
| SWL-09 | Surface Water | | | | | | |
| SWL-10 | Surface Water | | | | | | |
| SWL-11 | Surface Water | | | | | | |
| SWL-13 | Surface Water | | | | | | |
| SWL-14 | Surface Water | | | | | | |
| B-2ND | CoW | | | | | | |

TABLE 2

GWU - 1

**Table 2: GWU-1 PDA Investigation Sample Locations, Rationale, and Analyte List
North Industrial Corridor (NIC) Site
City of Wichita, Kansas**

| Well ID | Rationale | Analytes | Access | Property Owner | Comments |
|---|--|------------|-------------|-------------------------------|---|
| Shallow Monitoring/Observation Wells | | | | | |
| CNE-NE-01S | Lateral plume extent confirmation, MNA Background | VOC's, MNA | Participant | | |
| CNE-NE-04S | Plume axis confirmation | VOC's | Participant | | |
| CNE-NE-05S | Lateral plume extent confirmation, MNA Evaluation | VOC's, MNA | Participant | | |
| CNE-NE-06S | Lateral plume extent confirmation | VOC's | Participant | | |
| CNE-NE-07S | Lateral plume extent confirmation | VOC's | Participant | | |
| CNE-NE-09S | Plume axis/terminus confirmation, MNA Evaluation | VOC's, MNA | Participant | | |
| DRB-MW-250 | Lateral plume extent confirmation, MNA Evaluation | VOC's, MNA | Participant | El Paso, LLC | Corresponding deep well is NMW-44D |
| FLE-MW-02S | Near source plume confirmation | VOC's | Participant | | |
| FLE-MW-05S | Lateral plume extent confirmation | VOC's | Participant | | |
| NMW-03S | Inter-plume extent confirmation, MNA Evaluation | VOC's, MNA | CoW | City of Wichita | |
| NMW-05S | Plume axis/lateral extent confirmation, MNA Evaluation | VOC's, MNA | CoW | Waste Connections | Also use in GWU-2 |
| NMW-42S | Plume axis confirmation | VOC's | CoW | El Paso, LLC | No lock |
| NMW-47S | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NWL-16S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NWL-17S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use in GWU-2 |
| NWL-18S | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| SK-MW-02S | Near source plume confirmation | VOC's, MNA | Participant | Clean Harbors Kansas, LLC | |
| SK-MW-03S | Plume terminus confirmation | VOC's, MNA | Participant | Clean Harbors Kansas, LLC | |
| SK-MW-04S | Inter-plume extent confirmation | VOC's, MNA | Participant | Clean Harbors Kansas, LLC | |
| SK-MW-06S | Lateral plume extent confirmation | VOC's | Participant | Clean Harbors Kansas, LLC | |
| SK-MW-08S | Plume axis confirmation, MNA Evaluation | VOC's, MNA | Participant | UPRR | |
| SK-MW-13S | Lateral plume extent confirmation | VOC's | Participant | | |
| UPRF-MW-03 | Plume terminus confirmation | VOC's | UNK | | |
| UPRF-MW-11 | Plume terminus confirmation | VOC's | UNK | UPRR | Corresponding deep well is SK-MW-09D |
| WND-06S | MNA Background | VOC's, MNA | CoW | MDT LLC | |
| WND-07S | Lateral plume extent confirmation | VOC's | CoW | K-DOT | Casing may be broken |
| WND-08S | Lateral plume extent confirmation | VOC's | CoW | Burlington Northern RR | Corresponding deep well is CNE-NE-11D, latch broken |
| WND-14S | Plume terminus confirmation, MNA Evaluation | VOC's, MNA | CoW | Wise North Wichita Realestate | Pad Cracked |
| WND-31S | Inter-plume extent confirmation | VOC's | CoW | UPRR | UP lock |
| WND-32S | Lateral plume extent confirmation, MNA Evaluation | VOC's, MNA | CoW | UPRR | |

**Table 2: GWU-1 PDA Investigation Sample Locations, Rationale, and Analyte List
North Industrial Corridor (NIC) Site**

City of Wichita, Kansas

| Well ID | Rationale | Analytes | Access | Property Owner | Comments |
|--|--|------------|-------------|-------------------------------|--|
| Deep Monitoring/Observation Wells | | | | | |
| CNE-NE-01D | Lateral plume extent confirmation, MNA Background | VOC's, MNA | Participant | | |
| CNE-NE-04D | Plume axis confirmation | VOC's | Participant | | |
| CNE-NE-05D | Lateral plume extent confirmation, MNA Evaluation | VOC's, MNA | Participant | | |
| CNE-NE-06D | Lateral plume extent confirmation | VOC's | Participant | | |
| CNE-NE-07D | Lateral plume extent confirmation | VOC's | Participant | | |
| CNE-NE-09D | Plume axis confirmation, MNA Evaluation | VOC's, MNA | Participant | | |
| CNE-NE-11D | Lateral plume extent confirmation | VOC's | Participant | | Corresponding shallow well is WND-08S |
| FLE-MW-02D | Lateral plume extent confirmation | VOC's | Participant | | |
| FLE-MW-05D | Lateral plume extent confirmation | VOC's | Participant | | |
| HRI-MW-03 | Plume axis confirmation | VOC's | UNK | Clean Harbors Kansas, LLC | |
| NMW-03D | Lateral plume extent confirmation, MNA Evaluation | VOC's, MNA | CoW | City of Wichita | missing well vault, PVC sticking out of ground |
| NMW-05D | Plume axis/lateral extent confirmation, MNA Evaluation | VOC's, MNA | CoW | Waste Connections | Also use in GWU-2 |
| NMW-37D | Plume axis confirmation | VOC's | CoW | UPRR | |
| NMW-42D | Plume axis confirmation | VOC's | CoW | El Paso, LLC | No lock |
| NMW-44D | Plume axis confirmation, MNA Evaluation | VOC's, MNA | CoW | El Paso, LLC | Corresponding shallow well is DRB-MW250 |
| NMW-47D | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| SK-MW-02D | Plume axis confirmation | VOC's, MNA | Participant | Clean Harbors Kansas, LLC | |
| SK-MW-03D | Plume terminus confirmation | VOC's, MNA | Participant | Clean Harbors Kansas, LLC | |
| SK-MW-04D | Plume axis confirmation | VOC's, MNA | Participant | Clean Harbors Kansas, LLC | |
| SK-MW-08D | Plume axis confirmation, MNA Evaluation | VOC's, MNA | Participant | UPRR | |
| SK-MW-09D | Plume axis confirmation | VOC's | Participant | UPRR | Corresponding shallow well is UPRF-MW-11 |
| WNC-06D | MNA Background | VOC's, MNA | CoW | MDT LLC | Pad loose |
| WNC-31D | Plume axis confirmation | VOC's | CoW | UPRR | UPRR |
| WNC-32D/WNC-32DR | Plume axis confirmation, MNA Evaluation | VOC's, MNA | CoW | UPRR | Sample either WND-32D or WND-32DR |
| WND-14D | Plume axis confirmation, MNA Evaluation | VOC's, MNA | CoW | Wise North Wichita Realestate | Pad badly cracked; hinge will not close; TD may be 47' |
| WND-30D | Lateral plume extent confirmation | VOC's | CoW | El Paso, LLC | No lock |
| | | | | | |
| Probe Locations | | | | | |
| NIC GPW-GWU1-GP1 | Plume axis confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU1-GP2 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU1-GP3 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU1-GP4 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU1-GP5 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |

VOC's will be analyzed by SW-846 Method 8260B

MNA parameters include:

- Alkalinity by Method SM 2320B-1997
- Carbon Dioxide by Method SM 4500-CO2 D-1997
- Chloride by Method EPA 300.0
- Methane, Ethane, Ethene by RSK 175
- Nitrate/Nitrite by Method EPA 353.2
- Sulfate by Method EPA 300.0
- Sulfide by Method SM 4500S²⁻ D-2000 or SM 4500S²⁻ F-2000
- Dissolved Iron, Manganese, and Arsenic by Method EPA 6010B
- Dissolved Organic Carbon by 5310 C-2000
- Volatile Fatty Acids by Method SM 5560 C

CoW-ROW: City of Wichita Right of Way

TABLE 3

GWU - 2

**Table 3: GWU-2 PDA Investigation Sample Locations, Rationale, and Analyte List
North Industrial Corridor (NIC) Site
City of Wichita, Kansas**

| Well ID | Rationale | Analytes | Access | Property Owner | Comments |
|---|---|------------|-------------|---------------------------------|---|
| Shallow Monitoring/Observation Wells | | | | | |
| EXC-MW-04A | Plume axis confirmation | VOC's | Participant | | |
| EXC-MW-06A | Plume axis confirmation | VOC's | Participant | | |
| NBPN-MW-03 | Lateral plume extent confirmation | VOC's | UNK | | |
| NMW-04S | Plume axis confirmation | VOC's | CoW | Webb Road Development | |
| NMW-05S | Plume axis/lateral extent confirmation | VOC's | CoW | Waste Connections | Also use for GWU-1 |
| NMW-06S | Plume axis confirmation | VOC's | CoW | Webb Road Development | |
| NMW-08S | Plume axis confirmation | VOC's | CoW | City of Wichita | MP outer casing |
| NMW-09S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | MP outer casing |
| NMW-10S | Plume axis confirmation, MNA Evaluation | VOC's, MNA | CoW | City of Wichita | |
| NMW-12S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use for GWU-3, roots will need to be cleared to sample |
| NMW-39S | Plume axis confirmation | VOC's | CoW | Tramco Metal products Inc. | inner casing too high; rehab'd |
| NWL-01S | Plume axis/lateral extent confirmation | VOC's | CoW | Webb Road Development | |
| NWL-04S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use for GWU-3, inner casing too high |
| NWL-07S | Plume terminus confirmation | VOC's | CoW | City of Wichita | inner casing too high, roots to be cleared |
| NWL-08S | Plume terminus confirmation, MNA Evaluation | VOC's, MNA | CoW | City of Wichita | |
| NWL-17S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use for GWU-1 |
| NWL-19S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NWL-21S | Plume axis/lateral extent confirmation | VOC's | CoW | City of Wichita | Well Vault Missing |
| URS-MW-02 | Lateral plume extent confirmation | VOC's | UNK | | |
| VWRS-MW-02S | Plume axis confirmation | VOC's | Participant | Univar | |
| VWRS-MW-09S | Plume axis confirmation | VOC's | Participant | Univar | |
| WNC-37SR | Plume axis confirmation | VOC's | CoW | Webb Road Development | |
| WND-03S | Plume axis/lateral extent confirmation | VOC's | CoW | Ross Indus-Cargil | Corresponding deep well is EXC-MW-07B, hydrocarbons |
| WND-04S | Plume axis confirmation | VOC's | CoW | MidWest Scrap Management Inc | Corresponding deep well is EXC-MW-05B |
| WND-15S | Plume terminus confirmation, MNA Evaluation | VOC's, MNA | CoW | Central Park Village LLC | Flushmount |
| WND-19S | Lateral plume extent confirmation | VOC's | CoW | Aaron & Page Painting Inc. | Also use for GWU-3 |
| WND-21S | Plume axis confirmation | VOC's | CoW | Triple J of Wichita | |
| WND-24S | Plume terminus confirmation | VOC's | CoW | Thunderbird Express Inc. | outer casing too high; loose lid |
| WND-26S | Lateral plume extent confirmation | VOC's | CoW | Webb Road Development | TD may be 22.5' |
| WND-34S | Lateral plume extent confirmation | VOC's | CoW | Webb Road Development | protective casing damaged, PVC may be okay |
| WND-36S | Plume axis/lateral extent confirmation | VOC's | CoW | Webb Road Development | Hydrocarbons |
| WND-43S | Lateral plume extent confirmation | VOC's | CoW | Jake Kirkland Rev. TR | Also use for GWU-3 |
| WU-MW-05S | Lateral plume extent confirmation | VOC's | UNK | | Also use for GWU-3 |
| Deep Monitoring/Observation Wells | | | | | |
| EXC-MW-04B | Plume axis confirmation | VOC's | Participant | | |
| EXC-MW-05B | Plume axis confirmation | VOC's | Participant | | Corresponding shallow well is WND-04S |
| EXC-MW-06B | Plume axis confirmation | VOC's | Participant | | |
| EXC-MW-07B | Plume axis/lateral extent confirmation | VOC's | Participant | | Corresponding shallow well is WND-03S |
| EXC-MW-08B | Plume axis confirmation | VOC's | Participant | | |
| NMW-04D | Plume axis confirmation | VOC's | CoW | Webb Road Development | Pad loose |
| NMW-05D | Plume axis/lateral extent confirmation | VOC's | CoW | Waste Connections | Also use for GWU-1 |
| NMW-06D | Plume axis confirmation | VOC's | CoW | Webb Road Development | |
| NMW-08D | Plume axis confirmation | VOC's | CoW | City of Wichita | MP outer casing |
| NMW-09D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | MP outer casing, inner casing needs to be cutdown |
| NMW-10D | Plume axis confirmation, MNA Evaluation | VOC's, MNA | CoW | City of Wichita | |
| NMW-12D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use for GWU-3, roots will need to be cleared to sample |
| Deep Monitoring/Observation Wells | | | | | |
| NMW-39D | Plume axis confirmation | VOC's | CoW | Tramco Metal products Inc. | inner casing too high |
| NWL-01D | Plume axis/lateral extent confirmation | VOC's | CoW | Webb Road Development | |
| NWL-07D | Plume terminus confirmation | VOC's | CoW | City of Wichita | |
| NWL-08D | Plume terminus confirmation, MNA Evaluation | VOC's, MNA | CoW | City of Wichita | inner casing too high |
| VWRS-MW-02D | Plume axis confirmation | VOC's | Participant | Univar | |
| VWRS-MW-09D | Plume axis confirmation | VOC's | Participant | Univar | |
| WNC-16D | Lateral plume extent confirmation | VOC's | CoW | KS Metal Recycling (Yaffee Co.) | MP N side outer casing; product |
| WND-15D | Plume terminus confirmation, MNA Evaluation | VOC's, MNA | CoW | Central Park Village LLC | Stickup |
| WND-19D | Lateral plume extent confirmation | VOC's | CoW | Aaron & Page Painting Inc. | Also use for GWU-3 |
| WND-21D | Plume axis confirmation | VOC's | CoW | Triple J of Wichita | |
| WND-24D | Plume terminus confirmation | VOC's | CoW | Thunderbird Express Inc. | J-plug won't seal; grout above TOL; master lock |
| WND-26D | Lateral plume extent confirmation | VOC's | CoW | Webb Road Development | TD may be 40' |
| WND-34D | Lateral plume extent confirmation | VOC's | CoW | Webb Road Development | protective casing damaged, PVC may be okay |
| WND-36D | Plume axis/lateral extent confirmation | VOC's | CoW | Webb Road Development | hydrocarbons; pads ~ 0.5' ags |
| WND-37D | Plume axis confirmation | VOC's | CoW | Webb Road Development | |
| WND-43D | Lateral plume extent confirmation | VOC's | CoW | Jake Kirkland Rev. TR | Also use for GWU-3 |
| WU-MW-05D | Lateral plume extent confirmation | VOC's | UNK | | Also use for GWU-3 |
| Probe Locations | | | | | |

**Table 3: GWU-2 PDA Investigation Sample Locations, Rationale, and Analyte List
North Industrial Corridor (NIC) Site
City of Wichita, Kansas**

| Well ID | Rationale | Analytes | Access | Property Owner | Comments |
|-------------------|----------------------------------|----------|--------|----------------|--|
| NIC GPW-GWU2-GP1 | Plume terminus confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP2 | Plume terminus confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP3 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP4 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP5 | Plume axis confirmation | VOC's | CoW | CoW-ROW | Alternate GW extraction location (NIC#2-2) |
| NIC GPW-GWU2-GP6 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP7 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP8 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP9 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP10 | Plume axis confirmation | VOC's | CoW | CoW-ROW | Preferred GW extraction location (NIC#2-1) |
| NIC GPW-GWU2-GP11 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP12 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP13 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP14 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP15 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU2-GP16 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | Corresponds to 2012 CNH Samples |
| NIC GPW-GWU2-GP17 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | Corresponds to 2012 CNH Samples |
| NIC GPW-GWU2-GP18 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | Corresponds to 2012 CNH Samples |
| NIC GPW-GWU3-GP21 | Requested by Coleman Northeast | VOC's | CoW | CoW-ROW | Also use in GWU-3 |

VOC's will be analyzed by SW-846 Method 8260B

MNA parameters include:

- Alkalinity by Method SM 2320B-1997
- Carbon Dioxide by Method SM 4500-CO2 D-1997
- Chloride by Method EPA 300.0
- Methane, Ethane, Ethene by RSK 175
- Nitrate/Nitrite by Method EPA 353.2
- Sulfate by Method EPA 300.0
- Sulfide by Method SM 4500S² D-2000 or SM 4500S² F-2000
- Dissolved Iron, Manganese, and Arsenic by Method EPA 6010B
- Dissolved Organic Carbon by 5310 C-2000
- Volatile Fatty Acids by Method SM 5560 C

CoW-ROW: City of Wichita Right of Way

TABLE 4

GWU - 3

**Table 4: GWU-3 PDA Investigation Sample Locations, Rationale, and Analyte List
North Industrial Corridor (NIC) Site
City of Wichita, Kansas**

| Well ID | Rationale | Analytes | Access | Property Owner | Comments |
|---|-----------------------------------|----------|--------|---------------------------------|--|
| Shallow Monitoring/Observation Wells | | | | | |
| CG-MW-3A | Inter-plume extent confirmation | VOC's | UNK | | |
| CSI MW-01 | Plume axis/terminus confirmation | VOC's | UNK | | |
| NMW-11S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-12S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use for GWU-2 |
| NMW-13S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-14S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-15S | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NMW-16S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-29S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-31S | Plume axis confirmation | VOC's | CoW | City of Wichita | Corresponding deep well is VCM-MW-06 |
| NMW-32S | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NMW-35S | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NMW-41S | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NMW-49S | Plume axis/terminus confirmation | VOC's | CoW | KDOT ROW | |
| NMW-50S | Plume axis/terminus confirmation | VOC's | CoW | CoW ROW | |
| NMW-51S | Plume axis/terminus confirmation | VOC's | CoW | CoW ROW | |
| NWL-04S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use for GWU-2 |
| NWL-27S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use for GWU-4 |
| VCM-MW-02B | Plume axis confirmation | VOC's | UNK | | |
| VCM-MW-03 | Lateral plume extent confirmation | VOC's | UNK | | |
| WND-19S | Lateral plume extent confirmation | VOC's | CoW | Aaron & Page Painting Inc. | Also use for GWU-2 |
| WND-38S | Requested by Coleman Northeast | VOC's | CoW | Industrial Maintenance Inc. | |
| WND-42S | Lateral plume extent confirmation | VOC's | CoW | Filter Media Service Corp. | |
| WND-43S | Lateral plume extent confirmation | VOC's | CoW | Jake Kirkland Rev. TR | Also use for GWU-2 |
| WND-45S | Lateral plume extent confirmation | VOC's | CoW | Blue Sky Of KS LLC | Roots |
| WND-46S | Plume extent confirmation | VOC's | CoW | Mechanical Systems Inc. | |
| WND-47S | Plume axis confirmation | VOC's | CoW | George David | |
| WU-MW-05S | Lateral plume extent confirmation | VOC's | UNK | | Also use for GWU-2 |
| Deep Monitoring/Observation Wells | | | | | |
| CG-MW-3B | Inter-plume extent confirmation | VOC's | UNK | | |
| NMW-11D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-12D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use for GWU-2 |
| NMW-13D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-14D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-15D | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NMW-16D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-29D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use for GWU-4 |
| NMW-31D | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NMW-32D | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NMW-35D | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| Deep Monitoring/Observation Wells | | | | | |
| NMW-41D | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NMW-49D | Plume axis/terminus confirmation | VOC's | CoW | KDOT ROW | |
| NMW-50D | Plume axis/terminus confirmation | VOC's | CoW | CoW ROW | |
| NMW-51D | Plume axis/terminus confirmation | VOC's | CoW | CoW ROW | |
| VCM-MW-06 | Plume axis confirmation | VOC's | UNK | | Corresponding shallow well is VCM-MW-02B |
| VCM-MW-07 | Lateral plume extent confirmation | VOC's | UNK | | Also use for GWU-4 |
| WND-19D | Lateral plume extent confirmation | VOC's | CoW | Aaron & Page Painting Inc. | Also use for GWU-2 |
| WND-38D | Requested by Coleman Northeast | VOC's | CoW | Industrial Maintenance Inc. | |
| WND-42D | Lateral plume extent confirmation | VOC's | CoW | Filter Media Service Corp. | |
| WND-43D | Lateral plume extent confirmation | VOC's | CoW | Jake Kirkland Rev. TR | Also use for GWU-2 |
| WND-45D | Lateral plume extent confirmation | VOC's | CoW | Blue Sky Of KS LLC | |
| WND-46D | Plume extent confirmation | VOC's | CoW | Mechanical Systems Inc. | |
| WND-47D | Plume axis confirmation | VOC's | CoW | George David | |
| WND-48D | Plume axis/terminus confirmation | VOC's | CoW | Kansas Building Supply Co. Inc. | |
| WU-MW-05D | Lateral plume extent confirmation | VOC's | UNK | | Also use for GWU-2 |

**Table 4: GWU-3 PDA Investigation Sample Locations, Rationale, and Analyte List
North Industrial Corridor (NIC) Site
City of Wichita, Kansas**

| Well ID | Rationale | Analytes | Access | Property Owner | Comments |
|------------------------|-----------------------------------|----------|--------|----------------|---|
| Probe Locations | | | | | |
| NIC GPW-GWU3-GP1 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP2 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP3 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP4 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP5 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | Alternate groundwater extraction location (NIC#3-5) |
| NIC GPW-GWU3-GP6 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP7 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP8 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | Preferred groundwater extraction location (NIC#3-2) |
| NIC GPW-GWU3-GP9 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP10 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP11 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | Preferred groundwater extraction location (NIC#3-1) |
| NIC GPW-GWU3-GP12 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP13 | Lateral plume extent confirmation | VOC's | CoW | CoW-ROW | Also use in GWU-4 |
| NIC GPW-GWU3-GP14 | Lateral plume extent confirmation | VOC's | CoW | CoW-ROW | Contingent GW extraction location (NIC#3-7). Also use in GWU-4. |
| NIC GPW-GWU3-GP15 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | Alternate groundwater extraction location (NIC#3-4) |
| NIC GPW-GWU3-GP16 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP17 | Plume axis confirmation | VOC's | CoW | CoW-ROW | Contingent GW extraction location (NIC#3-6) |
| NIC GPW-GWU3-GP18 | Plume axis confirmation | VOC's | CoW | CoW-ROW | Preferred groundwater extraction location (NIC#3-3A) |
| NIC GPW-GWU3-GP19 | Plume axis confirmation | VOC's | CoW | CoW-ROW | Alternate groundwater extraction location (NIC#3-3B) |
| NIC GPW-GWU3-GP20 | Plume axis confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP21 | Requested by Coleman Northeast | VOC's | CoW | CoW-ROW | Also use in GWU-2 |

VOC's will be analyzed by SW-846 Method 8260B
CoW-ROW: City of Wichita Right of Way

TABLE 5

GWU - 4

**Table 5: GWU-4 PDA Investigation Sample Locations, Rationale, and Analyte List
North Industrial Corridor (NIC) Site
City of Wichita, Kansas**

| Well ID | Rationale | Analytes | Access | Property Owner | Comments |
|---|--|----------|----------|------------------------|---|
| Shallow Monitoring/Observation Wells | | | | | |
| 501B | Plume axis/terminus confirmation | VOC's | UNK | | |
| AP-MW-102S | Upgradient near source plume confirmation | VOC's | APEX-CoW | | |
| AP-MW-106S | Down gradient near source plume confirmation | VOC's | APEX-CoW | | |
| Existing KDHE Well (MW8) | Shallow near source plume confirmation | VOC's | KDHE-UST | KDHE-UST | KDHE Trust Fund Well Proj # U2-087-13488 |
| NMW-20S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-21S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-24S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-25S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-26S | Plume terminus confirmation | VOC's | CoW | Mark or Jennifer Wagle | |
| NMW-29S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use in GWU-3 |
| NWL-27S | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use in GWU-3 |
| VCM-MW-03 | Lateral plume extent confirmation | VOC's | UNK | | Also use in GWU-3 |
| Deep Monitoring/Observation Wells | | | | | |
| 501A | Plume axis/terminus confirmation | VOC's | UNK | | |
| AP-MW-102D | Upgradient near source plume confirmation | VOC's | APEX-CoW | | |
| AP-MW-106D | Down gradient near source plume confirmation | VOC's | APEX-CoW | | |
| NMW-20D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-21D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-23D | Plume axis confirmation | VOC's | CoW | City of Wichita | |
| NMW-24D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-25D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | |
| NMW-26D | Plume terminus confirmation | VOC's | CoW | Mark or Jennifer Wagle | |
| NMW-29D | Lateral plume extent confirmation | VOC's | CoW | City of Wichita | Also use in GWU-3 |
| VCM-MW-07 | Lateral plume extent confirmation | VOC's | UNK | | Also use for GWU-3 |
| Probe Locations | | | | | |
| NIC GPW-GWU4-GP1 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP2 | Plume axis confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP3 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP4 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP5 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | Contingent groudwater extraction location (NIC#4-2) |
| NIC GPW-GWU4-GP6 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP7 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP8 | Plume Axis | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP9 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP10 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | Preferred groundwater extraction location (NIC#4-1) |
| NIC GPW-GWU4-GP11 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP12 | Plume axis/transect confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU4-GP13 | Plume axis confirmation | VOC's | CoW | CoW-ROW | Shallow only |
| NIC GPW-GWU4-GP14 | Plume axis confirmation | VOC's | CoW | CoW-ROW | |
| NIC GPW-GWU3-GP13 | Lateral plume extent confirmation | VOC's | CoW | CoW-ROW | Also use in GWU-3 |
| NIC GPW-GWU3-GP14 | Lateral plume extent confirmation | VOC's | CoW | CoW-ROW | Contingent GW extraction location (NIC#3-7). Also use in GWU-3. |

VOC's will be analyzed by SW-846 Method 8260B

CoW-ROW: City of Wichita Right of Way