

RCRA-CRS UNIT REMEDIATION WORK PLAN

FORMER FARMLAND INDUSTRIES NITROGEN PLANT
1608 N. 1400 Road
Lawrence, KS



Prepared For:



By:



City of Lawrence

August 1, 2014

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1.0 INTRODUCTION

The Remedial Design/Remedial Action (RD/RA) Work Plan was developed by the City of Lawrence, KS for the Former Farmland Industries Nitrogen Plant (the Site) located at 1608 N. 1400 Road in Lawrence Kansas. The Site location is shown on **Figure 1**. The RD/RA was given final approval by the Kansas Department of Health and Environment in a letter dated October 1, 2012. The RD/RA Work Plan was in accordance with Consent Order No. 10-E-94 BER between the Kansas Department of Health and Environment (KDHE) and the City of Lawrence. The consent order became effective on September 29, 2010 at the time of signing.

The RD/RA Work Plan provided: a summary of site conditions requiring remedial action, a description of interim remedial actions currently being implemented; a description of the selected remedy and associated remedial action objectives (RAO's); a description of the RD/RA tasks to be completed and a schedule for the completion of the tasks; and a discussion of the issues to be addressed during remedial design. Each specific remedial action task to be completed under the Work Plan requires that a specific work plan to developed and submitted to the KDHE prior to construction activities start on the tasks.

This work plan has been developed to address the remediation and removal of low pH soils and materials underlying the location of the former RCRA-CRS unit and the plume area. The work plan includes the removal of the low pH impacted soils and underlying materials, the neutralization of the low pH, and the replacement of the neutralized soils. The plan also includes the installation of new monitoring wells to be used for monitoring the groundwater after the site work is completed.

RCRA-CRS Unit History

The RCRA-CRS unit was an active treatment unit at the Former Farmland Nitrogen Plant during the 1970's and early 1980's. Prior to 1984, chromium was used as a cooling tower corrosion control chemical. During the time that chromium compounds were used in the cooling towers, the discharge from the cooling towers was treated in a pond to reduce the hexavalent chromium to trivalent chromium. This pond and associated supporting equipment was known as the chromium reduction system (CRS). A site plan showing the regulated unit, monitoring wells, and the property boundary is included in **Figure 2**.

In the early 1980s, a series of five monitoring wells were installed around the then-active CRS. At that time, hexavalent chromium was being used in cooling towers on site as a corrosion inhibitor. As the cooling tower water was blown down to control total dissolved solids, the blowdown was directed to the CRS, where the pH was lowered using sulfuric acid and sulfur dioxide was added. This treatment reduced the hexavalent chromium to trivalent chromium. When the pH was raised, the trivalent chromium precipitated as chromium hydroxide.

Due to RCRA regulations, five monitoring wells were installed as a groundwater assessment monitoring system. During this monitoring, it was noted that the groundwater in the perched zone directly under the CRS was impacted by dissolved chromium and low pH conditions. Further groundwater studies were conducted, which included the installation of additional groundwater monitoring wells.

In 1984, the use of chromium as a cooling tower corrosion inhibitor was discontinued. A closure plan for the CRS was developed and implemented in late 1986. Closure certification was issued in January 1987. During closure, an interceptor trench was installed at the CRS to intercept the migration of impacted groundwater. Impacted soil in the CRS unit was removed during closure activities; however, impacted groundwater remained on site.

Because the groundwater was not completely remediated during the closure period, Farmland was required to apply for a Post-Closure Care Permit for the facility. This permit application included a corrective action program for the cleanup of the contaminated groundwater. Monitoring of the groundwater comprises a portion of the corrective action program. Two chemical parameters in the groundwater, chromium and pH, are of interest and are the subject of the corrective action program.

During the groundwater assessment phase and the closure plan, a total of eleven monitoring wells were installed. Wells MW-2 and MW-3 and the interceptor trench discharge were designated as compliance points by KDHE in the Post-Closure Care and Monitoring Permit issued in 1993.

Because of the closure of the Former Farmland Nitrogen Plant and the requirement that the Trust conduct remediation activities at the site, the Trust initiated discussions with the Bureau of Waste Management (BWM) of the KDHE in 2005 concerning an accelerated remediation plan for the CRS unit. These discussions centered around the need to more quickly remediate the perched zone groundwater with respect to the low pH. The Trust submitted a work plan in June 2005 to inject city potable water into the perched and shallow bedrock zone to flush the low pH groundwater more quickly through the system.

Approval for injection was received and an Underground Injection Permit (UIC) was issued in the spring of 2006. The construction and installation of the injection system took place in April 2006, with injection starting in May 2006. Also installed at this time was a new monitoring well designated MW-12. This well is located just downgradient of the injection system and on the edge of the closed acid pond, the "source" of the low pH.

Injection of potable water continued until late November 2006, when the lines froze and were broken. The lines were repaired and injection was restarted in March 2007. Injection was limited to the four injection wells installed in the bedrock.

It was found that injection of city water into the impacted zone produced little effect. This was evidenced by the data that shows the pH of the groundwater in wells with low pH did not show significant increases. It was determined that city water had insufficient alkalinity to adequately neutralize the low pH in the groundwater. Based on this conclusion, a proposal was made to KDHE to allow the Trust to design and include chemical addition to the injection system. This system was designed to use a sodium bicarbonate solution injection with the city water to raise the alkalinity available to neutralize the low pH in the groundwater.

This sodium bicarbonate system was installed in July 2007, with injection starting on July 13, 2007. In addition, another injection well (IW-8) was installed in the center of the plume north and slightly west of MW-3A. At that time, the injection rate was approximately 0.8 gallons per minute of city water augmented with approximately 0.08 gallons per minute (gpm) of 6-7% sodium bicarbonate solution. The solution was injected into wells IW-3, IW-4, IW-5, and IW-8.

Injection of bicarbonate solution occurred from July 2007 until October 2007. Due to several factors, it was decided to stop the injection system for the winter and reevaluate the corrective action program. Factors that caused the decision to stop injection included a plugging of the injection equipment, apparent lack of progress in addressing the low pH in the unit, and the coming of cold weather, which could cause freezing and equipment damage.

In November 2007, two additional monitoring wells (MW-13 and MW-14) and two borings (BH-01 and BH-02) were installed to better understand the geology of the unit with the purpose of designing a more aggressive and rapid corrective action. The data from the soil and water samples collected from the new wells and boreholes as well as slug test data were provided to the KDHE in a report titled *"Supplemental Data Collection Report for the Chromium Reduction System Surface Impoundment"* in January 2008. This data indicates that the low pH is primarily in the sandstone unit below the site. Based on the available data, a more aggressive corrective action program consisting of an array of injection points evenly spaced throughout the low pH affected area was designed and submitted to the KDHE for approval.

Discussions with KDHE continued in 2008 concerning the operation and remediation of the CRS unit. In March 2008, Shaw presented to KDHE a letter requesting a No Further Action (NFA) status determination from KDHE for the CRS unit. KDHE determined that a NFA determination was not appropriate because of the persistence of low pH conditions in the groundwater. Shaw then submitted a letter to KDHE in October 2008 requesting a reduced sampling and monitoring schedule for the CRS unit, modified corrective action in the form of discontinued pumping of groundwater, discontinued injection, and suspension of the analyses for chromium. In a letter of October 17, 2008, KDHE approved these modifications to the CRS management program.

In September 2010, The City of Lawrence (the City), acquired the property from the Trust. Along with the property, the City acquired the environmental responsibilities associated with the property, including the RCRA-CRS unit and its monitoring and remediation requirements. In March 2014, the City conducted borings at the site and collected soil samples to better delineate the vertical extent of the low pH as well as collect samples to conduct basic treatment studies for the remediation of the site.

The City has platted the property in anticipation of redevelopment of the entire Former Farmland site. Because of this replatting and redevelopment planning, the City is presenting this work plan to permanently treat the impacted soils and address the issue of the source for the low pH.

This work plan addresses removal and neutralization of low pH impacted soils, including the source soils, the removal of some of the existing monitoring wells and the existing interceptor trench, replacement of neutralized soils and placement of strategically placed monitoring wells.

2.0 INTRUSIVE ACTIVITIES

This construction project is technically not located in an area that is above the Non-Residential Risk-Based Standards for Kansas (RSK) values as defined in the current version of the RSK manual. It is, however close to these areas above the RSK values. This area also contains soils that have been impacted by low pH. Therefore the soils being disturbed by this work plan will be handled under the requirements of the Soil Waste Management Plan as finalized in Sections 5 and 6 of the Transition Plan dated June 24, 2011. Sections 5 and 6 are included as appendices to this Work Plan. This plan includes all the information required in Sections 5 and 6 of the Transition Plan known as the Soil Waste Management Plan. This plan includes all notifications to the City and KDHE as required. The information required for the **INTRUSIVE ACTIVITIES NOTIFICATION** is found or referenced in **Section 2.1**. The **INTRUSIVE ACTIVITY PLAN** is found or referenced in **Section 2.2**.

2.1 INTRUSIVE ACTIVITIES NOTIFICATION

The following information is required for the Intrusive Activities Notification.

- *Description of the planned intrusive work:* This can be found in **Section 3** below.
- *Names, addresses and contact information for persons performing and responsible for the work:*
These are in **Section 6.0**.
- *Location, size, depth and, estimated volumes of material to be disturbed.* This is found in **Section 3**.
- *GPS coordinates:* These are found on **Figure 2**.
- *Evaluation of location in relationship to impacted areas:* The area where the RCRA-CRS unit is located is directly adjacent to areas where LUR-soil management required if excavated- restrictions apply. The area itself is considered a hazardous waste unit under RCRA.
- *Determination of whether a Notice of Intent (NOI) for Authorization to Discharge Stormwater Runoff from Construction Activities must be submitted to KDHE:*
Because the area where the intrusive activities are being conducted is RCRA unit holding impacted soils and groundwater, a NOI is required and a copy is attached to this plan.

2.2 INTRUSIVE ACTIVITY PLAN

The following information is required as part of the Intrusive Activity Plan.

- *Identification of utilities, buried piping, tanks, equipment to be removed/relocated or protected:* There are no utilities or buried piping located in the excavation areas that need to be protected or preserved. There are six or seven monitoring wells located in the area designated for remediation. These wells will be removed during the excavation. There is also a small interceptor

trench that transects the excavation area. This trench will also be removed during the excavation.

- *Description of measures to be implemented for work protection:* Worker protection will consist of normal construction protection measures for working in soil movement. Personal protection will consist of Tyvek coveralls and rubber boots for workers physically contacting sediments. Gloves and eye protection will also be used.
- *Proposed plan regarding how soil or other materials will be staged, stored, and containerized:* Soils removed from the excavation area of the RCRA unit will be moved to a concrete pad just to the north west of the area where it will be treated to neutralize the low pH and then will be stored to be placed back in the excavated area.
- *Plan for excavated soil...:* Noted in the paragraph above. Excess excavated and neutralized soils will be taken to the East Lime Pond for disposal.

3.0 CONSTRUCTION PLANS

The groundwater in the area is low in pH with values that range from about 3.5 to 7.7. The acceptable range of groundwater pH is between 6 and 9. This low pH in the ground and groundwater is the remaining element that is causing this area to be included as a RCRA unit and regulated. The source of the low pH appears to be a former used acid pond that was in use during the 1970's and early 1980's. The used sulfuric acid apparently leached into the soils/sandstone below the pond and started migration to the NE in the sandstone. This work plan details the remediation plans to remove and neutralize this sandstone layer and the associated groundwater. The approximate area where the excavation and removal will occur covers approximately 41,000-42,000 square feet and is shown on **Figure 3**.

Excavation will start with the removal of the overburden which has been shown to not be impacted by the low pH. Periodic soil pH samples will be collected and analyzed to verify the classification of the soils. The pH method for analysis is SW 846 method 9045 for pH in solid samples. This material will be stockpiled and used as final cover for the site after the remediation of the low pH soils. This material will be stockpiled to the west of the excavation on the open ground as shown on **Figure 3**.

Once the overburden has been removed, the removal of the low pH soils and rock will begin at the "west" end of the excavation area. This is the area where the assumed source is located, that being the former acid storage pond. The low pH materials will be removed and taken to the concrete pad to the NW of the site and placed on the pad. This pad is shown on **Figure 3**. The material will be crushed if necessary to reduce the particle size to allow for a complete mixing and neutralization of the low pH component.

Soil analyses for pH will be conducted as the excavation proceeds to help direct the excavation and determine when the impacted soils have been removed. Since the general profile of the impacted soils is known, soil samples collected during excavation will be collected and the location monitored by handheld GPS. This will provide horizontal location. When the overburden has been removed and verified by pH sampling then the area will be located using GPS that will provide horizontal and vertical location. Then removal of the impacted materials will begin. Soils samples will be collected at a rate of at least every three (3) feet of depth as the soils are removed. The samples will be located in the center of the excavation site and around the perimeter to assure that the excavation is effectively removing all the impacted soils. Once pH sampling has shown that the impacted soils have been removed, then a final GPS survey of the site will be completed. If it is determined that the most efficient method of construction is to remove soils to completed depth and then replace the neutralized soils as the excavation progresses across the site, the final GPS survey will be completed in stages.

Lime sludge will be mixed in with the low pH material in a ratio that has been pre-determined to provide neutralization of the low pH so that the material mix has a pH in the 6.0 to 9.0 range. This procedure will continue until all the low pH soils and materials have been removed from the excavation and neutralized using the lime sludge. The pH of the soil/lime sludge mix will be verified by periodic sampling and pH analyses. This blending and neutralizing procedure will be a batch process. Samples will be collected from each batch and analyzed before releasing the batch to be moved. The number of samples from each batch will be determined in the field.

Once the material has been mixed and the pH confirmed to be in the 6.0 to 9.0 range by sampling, then this material will be removed from the concrete pad and stockpiled to be replaced in the excavation. This stockpile location is shown on **Figure 3**. If feasible, the neutralized soils may be replaced in the excavation as other soils are being removed. The materials will be placed in the excavation in 6-12 inch lifts and compacted prior to the next lift being placed. All fill will be compacted such that no further consolidation is evident after additional rolling or tamping (equivalent to City of Lawrence Standard Technical Specifications Section 1108 B 4).

Based on the borings done in March 2014, the excavation will need to be completed down to a maximum of approximately 25 feet below grade. The estimated size of the area is an oval of approximately 330 feet by 160 feet. Assuming there is an average of 10 feet of uncontaminated overburden, there is approximately 15,000 cubic yards of overburden to be removed. Assuming there is an average of approximately 15 feet of soils/stone that needs to be removed and neutralized, there is approximately 23,000 cubic yards to be removed and neutralized.

Although there is not a sustainable aquifer in the area, there is some groundwater in the impacted area. Any groundwater that collects in the excavation will either be blended in with the soils as it is removed for treatment or will be recovered. Any groundwater recovered will be checked for pH. If the pH of the recovered groundwater is less than 6.0, the groundwater will be treated with a small amount of lime sludge to neutralize the low pH and then discharged directly to the NPDES system.

The source of the lime sludge used for the neutralization is an old lime sludge landfill located in the eastern portion of the former Farmland site. This landfill was located during initial grading operations of the site. This lime sludge is the byproduct of well water softening and was generated during the operation of the former Farmland site. This material has been sampled and analyzed for total RCRA metals, ammonia-nitrogen and nitrate-nitrogen. The only metals detected above the detection limits were arsenic at 5.0 mg/kg, barium at 399 mg/kg, chromium at 1.4 mg/kg, lead at 4.6 mg/kg and selenium at 1.8 mg/kg. Ammonia-nitrogen was not detected in the lime sludge. Nitrate-nitrogen was present at 9.8 mg/kg in the sludge. This material will be removed from the existing landfill and hauled to the neutralization site as needed during the excavation and treatment.

After the completion of the excavation, neutralization, and replacement of the pH impacted soils, then the clean overburden will be placed back on the site to close the excavation and provide cover.

Decontamination of the mixing site will consist of cleaning of the concrete pad using a mechanical broom. The cleaned materials will be placed in the excavation prior to the clean overburden being replaced. If neutralized materials are temporarily stored on site prior to being placed back in the excavation, a minimum of six inches of the original soils on the storage site will be removed and placed in the excavated area prior to clean overburden being replaced.

Three new monitoring wells will be placed in the excavated area and are shown on **Figure 2**. One will be placed in the area of the existing well MW-12 (designated MW-12R) and two will be placed approximately in the locations of existing wells MW-3A (MW-3R) and MW-6 (MW-6R). These wells will provide information concerning the movement of groundwater through the treated soils. These wells will be placed at the original "source" of the pH contaminant and then down gradient in the groundwater plume.

During the remediation, wells MW-2, MW-3A, MW-6A MW-12, MW-13 and MW-14 will be removed. It is possible that well MW-11 may also be removed. The original monitoring wells that will be left after the remediation will be MW-1, MW-4, MW-5, MW-7, MW-8, MW-9 and possibly MW-11. These wells along with the three new monitoring wells to be installed in the remediated area will make up the monitoring wells network that will be used after the remediation to assess the groundwater in the unit.

After the soil remediation is completed, the newly installed monitoring wells mentioned above along with the remaining existing wells will be monitored for pH for a period of at least three years.

Groundwater monitoring will be conducted on a quarterly basis for twelve months following the completion of the remediation work. If the pH has tested in the range of 6.0-9.0 for four consecutive quarters, groundwater monitoring will be reduced to a frequency of semi-annual for the next two years. Once the groundwater pH stabilizes between 6.0 to 9.0 for three consecutive years, the City may petition KDHE to terminate Post-Closure Care and issue a NFE (no further action) determination for the CRS unit. As such, with the issuance of the NFA, KDHE will not require the City to maintain a restrictive covenant for the CRS unit. When the NFA determination is approved, the City will plug the monitoring wells.

If one or more of the wells has groundwater that fall below pH 6.0 or above pH 9.0 during the first year of quarterly monitoring, then semi-annual will be implemented and continue until three consecutive years of analytical data confirms the groundwater is

between pH 6.0 and 9.0. At that time, the City may initiate the permit closure procedure as described above.

4.0 SOIL MANAGEMENT PLANS

Soils being disturbed by this work plan fall under the requirements of the Soil Waste Management Plan as finalized in Sections 5 and 6 of the Transition Plan dated June 24, 2011. This will include all notifications to the City and KDHE as required.

Soils removed will be replaced in the excavation after treatment to raise the pH of the soils.

Any excess soils, if it is clean overburden, will be spread on the site. If there are excess neutralized soils, they will be taken to the east lime pond for disposal.

5.0 STORMWATER POLLUTION PREVENTION PLAN

All Construction Activities will comply with City Code 9-903 regarding stormwater pollution prevention. Inspection of BMPs shall occur at least once per month and within 24 hours after a rainfall of one half inch or more as measured at the site. The contractor will follow the sequence of activities below for major construction activities and BMP installation.

Phase	Construction Activity and BMP Description
Phase 1	Before any site grading activities begin <ol style="list-style-type: none">1. Final evaluation of any BMP activities.2. Install temporary stormwater control measures.
Phase 2	Building and site construction <ol style="list-style-type: none">1. Begin excavation of soils from the RCRA unit2. Stockpile overburden3. Remove and neutralize the pH impacted soils.4. Replace neutralized soils in excavation.5. Replace overburden in excavation.6. Install new monitoring wells.
Phase 3	Final stabilization <ol style="list-style-type: none">1. Plant grass on the excavated site.2. Remove all temporary stormwater control measures

6.0 Contact Information

Contact information for the City of Lawrence involved with the design and construction oversight of the project is given below:

Matt Bond
Stormwater Engineer
City of Lawrence
PO Box 708
Lawrence, KS 66044
mbond@lawrenceks.org
785-832-3142-Office
785-764-3634-Cell

Allen Rogers
Engineering Technician
City of Lawrence
PO Box 708
Lawrence, KS 66044
arogers@lawrenceks.org
785-760-6169

INTRUSIVE ACTIVITY NOTIFICATION
INTRUSIVE ACTIVITY PLAN

As required by the Soil-Waste Management Plan (Section 6 of the Transition Plan for the Former Farmland Nitrogen Plan, dated June 24, 2011), an Intrusive Activity Notification and Plan have been developed for the disturbance of soils or materials located in an area of the Former Farmland Nitrogen Plant where soil contaminants exceed the Non-Residential RSK values.

This Notification and Plan address management of soils disturbed during the excavation, neutralization and replacing of soils from the RCRA-CRS unit and the construction of new monitoring wells. This Notification and Plan have been submitted to the City of Lawrence and the Kansas Department of Health and Environment Bureau of Environmental Remediation in the document "RCRA-CRS Unit- Remediation Work Plan" dated _____.

Approval of the above noted Notification and Plan is granted and is noted by the signatures of representatives of the City of Lawrence and the Kansas Department of Health and Environment Bureau of Environmental Remediation.

For the City of Lawrence

Matt Bond
Stormwater Engineer

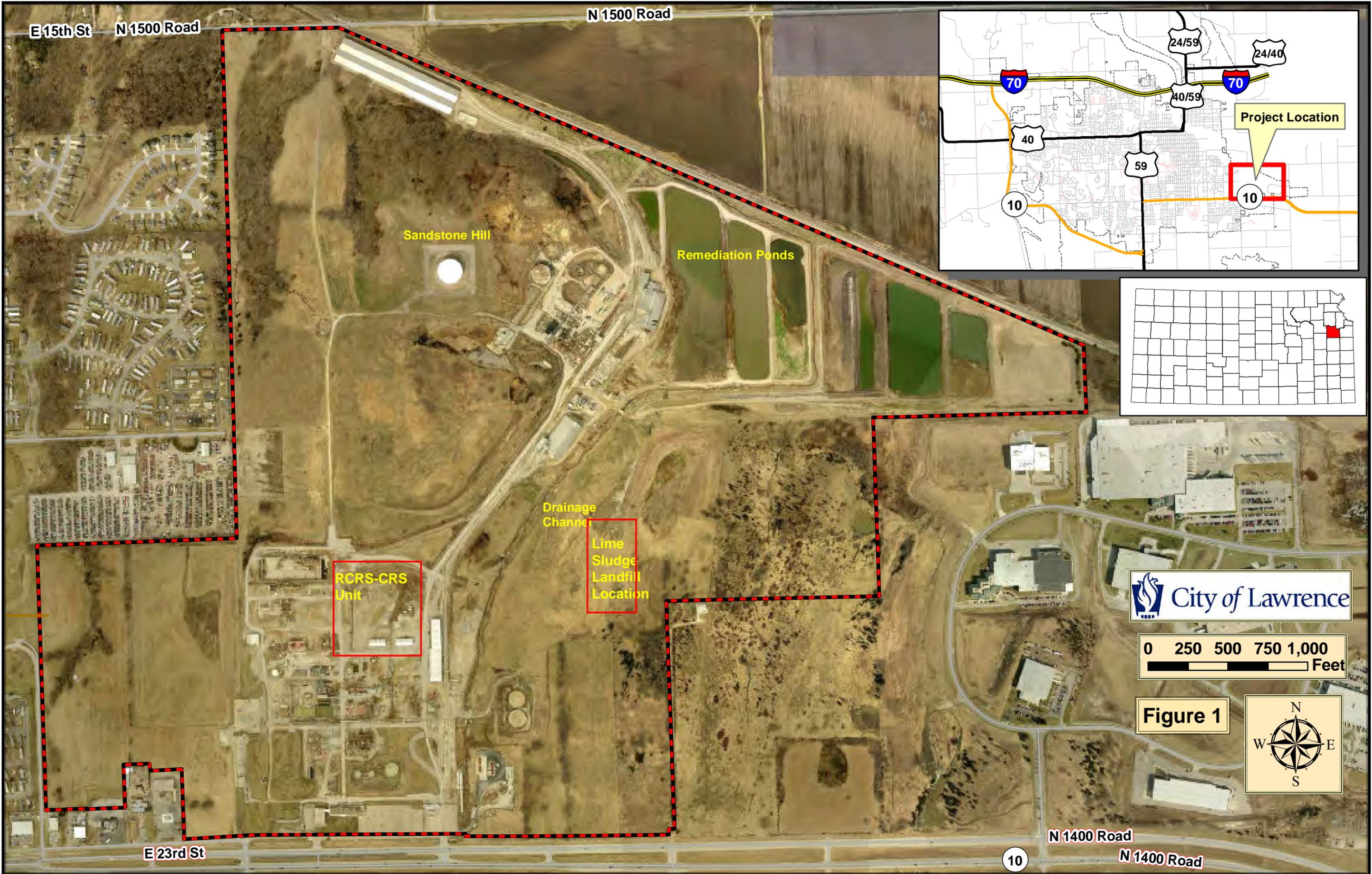
Date

For the Kansas Dept. of Health and Environment

Pamela Green
Environmental Scientist

Date

FIGURES



E 15th St N 1500 Road

N 1500 Road

Sandstone Hill

Remediation Ponds

Drainage Channel

RCRS-CRS Unit

Lime Sludge Landfill Location

Project Location

 City of Lawrence

0 250 500 750 1,000 Feet

Figure 1



N 1400 Road

E 23rd St

10

N 1400 Road

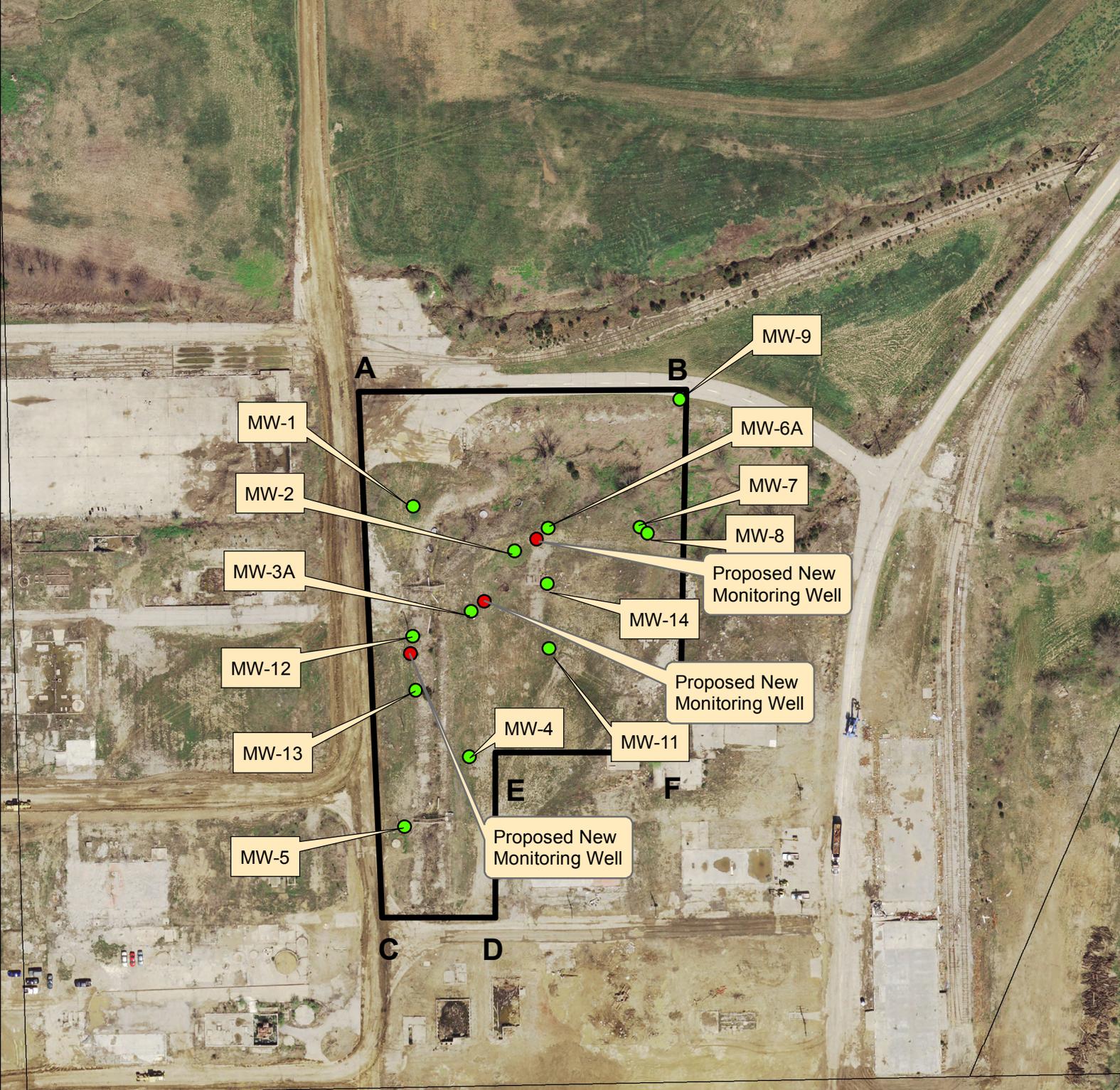
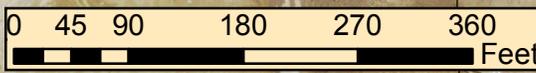


Figure 2

Point	Northing	Easting
A	2107792.8	236086.1
B	2108150.5	236086.1
C	2107817.2	235508.0
D	2107942.2	235505.6
E	2107942.2	235686.8
F	2108145.3	235688.6



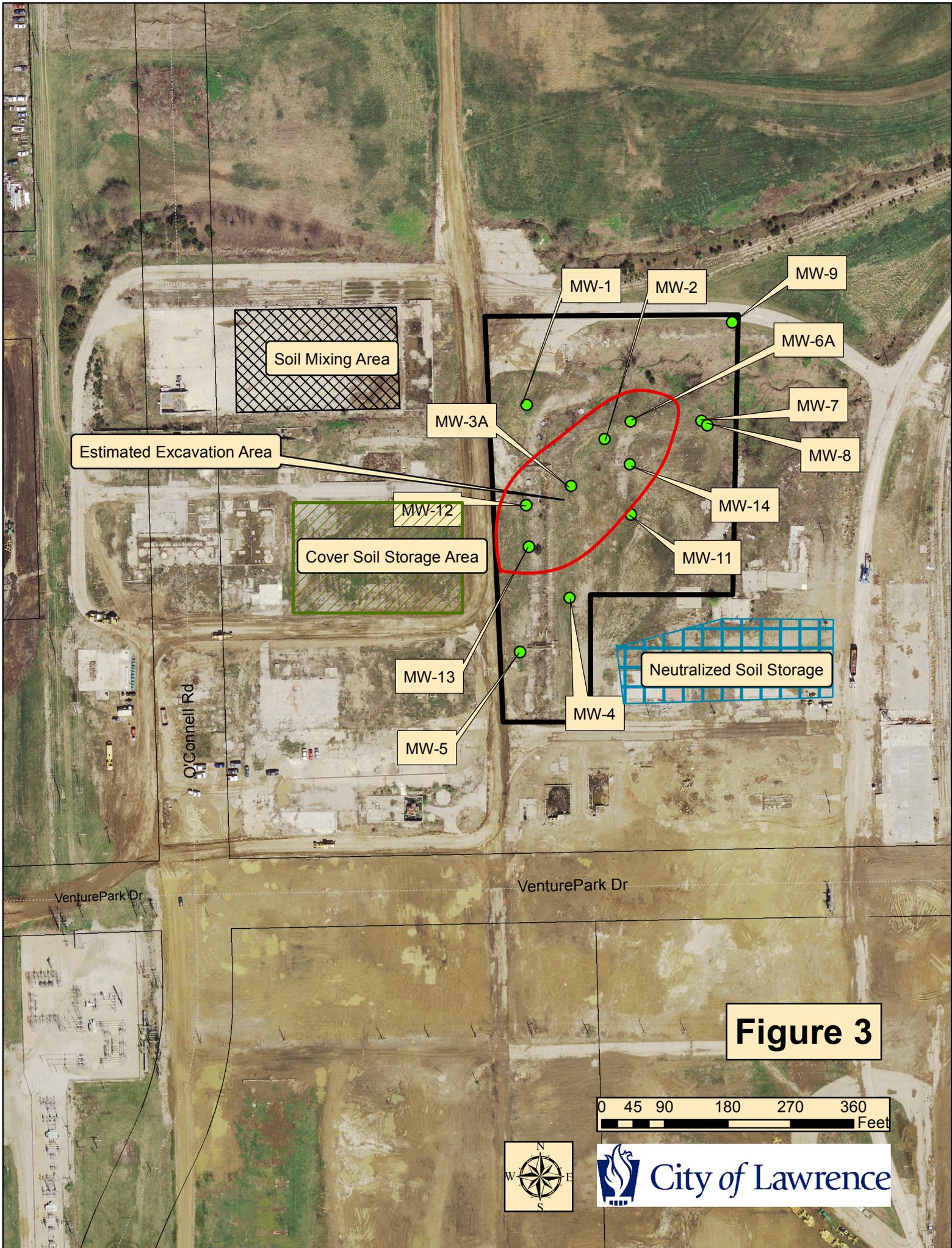


Figure 3

0 45 90 180 270 360 Feet



APPENDIX

Section 5 – Soil and Waste Management Plan

5.1 Introduction of Soil-Waste Management Plan

A Consent Order (CO) was signed between KDHE and the City of Lawrence on July 29, 2010, to address remaining environmental contamination at the Former Farmland Facility. As a component of the CO, the City agreed to record an Environmental Use Control Agreement (EUCA) in accordance with KDHE-approved Remedial Action Plan (RAP) (Shaw, 2009) and the Corrective Action Decision (CAD) (KDHE, 2010).

Environmental Use Controls (EUCs) consist of land use restrictions placed on the property to protect current and future public health and the environment. These restrictions are filed on the deed for the property and cannot be removed or modified without obtaining approval from KDHE. KDHE, working with the various future landowners, will provide oversight to ensure that the restrictions imposed by the EUCs are maintained at the Site in perpetuity.

The EUCs for the former Farmland facility will include:

- Notifications to KDHE prior to any intrusive activities being conducted on the property.
- Restrictions on drilling or using water wells for domestic or other purposes.
- Restrictions on Land Use (No residential uses).
- Restrictions on excavation, dredging, construction, or digging activities.
- Prohibition on all activities that would disturb or negatively impact erosional controls and vegetation along site drainages.
- Monitoring and maintenance of the vegetative covers and caps.
- Monitoring and maintenance of pavement and impervious surfaces on the restricted areas of the property.

The entire property will include EUCs to restrict land use (no residential uses), drilling water wells (for human consumption), and notification of intrusive activities. In addition to these global-property restrictions, other areas within the property will have area-specific restrictions. Please refer to **Figure 6-4** to determine specific restrictions per specific area.

A Soil-Waste Management Plan (SWMP) will be referenced in the EUCA and is a very important component of this Transition Plan. The purpose of this SWMP is to provide a simple, cost-effective soil and waste management program to protect human health and the environment during all future activities at the Site, including, but not limited to, demolition, Remedial Design/Remedial Action (RD/RA), redevelopment, and long-term operation of the former Farmland facility. The City of Lawrence and all future owners and developers of property located within the former Farmland facility (**Figure 1-1**) will be required to follow the restrictions outlined in the EUCA and this SWMP.

5.2 General Use of the SWMP

Previous environmental investigations completed at the former Farmland facility indicate soil, surface water and groundwater are impacted by fertilizer-related nitrogen compounds and ammonia in certain areas of the Site. In order to protect public health and the environment,

KDHE will require that impacted materials be properly managed and handled at all times during activities at the Site including, but not limited to:

- Demolition activities
- Redevelopment activities
- RD/RA activities
- Long-term operation and maintenance activities

Areas of the Site generally fall into two categories: 1) areas where soil was **not** impacted above the Non-Residential Risk-Based Standards for Kansas (RSK) values and 2) areas containing contaminants **above** the Non-Residential RSK values (Refer to current version of the Risk-Based Standards for Kansas Manual available on-line at: http://www.kdheks.gov/remedial/rsk_manual_page.htm.) These areas are shown on **Figures 6-1** through **6-4** (Shaw, 2009) and are further referenced in the RAP (Shaw, 2009). The data utilized to prepare these figures will be reviewed during the RD/RA process and may be further refined based on that review. These figures should be referred to when determining if a specific area has been impacted by environmental contamination.

This SWMP will assist future owners, operators, developers and others by providing a generalized outline of activities that must be implemented during all intrusive activities that occur at the Site. Any entity performing the intrusive activities described below, including but not limited to personnel from the City of Lawrence, environmental consultants, demolition and construction contractors, utility contractors, developers, future owners and others, will be required to strictly follow the notification and planning requirements outlined in this SWMP and the restrictions described in the EUCA.

In general, any intrusive activities conducted at the Site will require advanced notification to the KDHE and the City of Lawrence. In addition to notification, those areas containing contaminants **above** the Non-Residential RSK values will also require a specific Intrusive Activity Plan that includes a description of planning, notification, waste handling and disposal procedures and all associated documentation. Intrusive activities include any activities that disturb soil, concrete, asphalt, or other materials and may be the result of the following activities:

- Surveying
- Environmental drilling and sampling
- Utility repairs and new above and below ground utility installation
- Grading
- Paving
- Concrete or asphalt pad removal
- Foundation removal
- Construction activity that can disturb impacted surface or subsurface soils

(NOTE: This is not an all-inclusive list.)

Excavation refers to the removal or movement of soil. The following minor excavation activities that take place in areas **not** impacted above the non-residential RSK (see **Figure 6-4**) are not considered intrusive activities for the purposes of this Plan:

- Minor landscaping
- Utility repairs
- Sidewalk, concrete, or asphalt repair
- Fence post installation

These activities will be conducted so to minimize disturbance of vegetation and soil. Soil removed from an excavation will be stored within the immediate area of the excavation and will be backfilled into the excavation the same day. The disturbed surface area will be restored to its original condition.

6.1 Soil-Waste Management Plan Implementation

This section describes implementation of the Soil-Waste Management Plan (SWMP) for all activities including, but not limited to, dismantling, demolition, redevelopment, Remedial Design/Remedial Action, and long-term operation and maintenance activities currently planned for the Site. This outline describes the following procedures for management of soil, demolition materials, and waste during activities on the Site. Procedures are divided into three categories:

- 1) Intrusive activities/excavated soils (See **Section 6.2**)
- 2) Demolition debris and materials (See **Section 6.3**)
- 3) Waste materials and unknown materials (See **Section 6.4**)

6.2 Intrusive Activities/Excavated Soils

6.2.1 Intrusive Activity Notification and Intrusive Activity Plan

Prior to initiation of intrusive activities planned at the Site (See Section 5.2) the entity conducting the intrusive activity must notify the Project Managers for the KDHE Bureau of Environmental Remediation (BER) and City of Lawrence (Refer to Section 6.5 for contact information). Notification is required to prevent uncontrolled disturbance, potential human exposure to contaminants, and potential mobilization of soil contaminants. Written notification from the Project Managers will be required prior to conducting any intrusive activities at the Site.

The notification procedure to be followed at the Site is outlined below and illustrated in the flow chart titled **Figure 6-5**.

1. For any intrusive activity at the Site, the entity responsible for the intrusive activity must prepare an Intrusive Activity Notification that contains the following information:

- Description of the planned intrusive work (utility work, excavation, grading, etc.).
- Names, addresses and contact information for persons performing and responsible for the work.
- Location of the proposed intrusive activities including size and depth of the planned excavation or other intrusive activity as well as an estimated volume of material to be disturbed. GPS coordinates or survey coordinates shall be shown on a scale drawing.
- Scheduled starting date and schedule of planned activities.
- Evaluation of location in relationship to areas containing contaminants **above** the Non-Residential RSK values in **Figures 6-1** through **6-4**.
- Determination of whether a Notice of Intent (NOI) for Authorization to Discharge Stormwater Runoff from Construction Activities must be submitted to KDHE Bureau of Water (BOW). If the proposed activity is located in an area **not** impacted above the Non-Residential RSK values, then an NOI is required only if greater than 1 acre is disturbed. If located in an area containing contaminants **above** the Non-Residential RSK values, then an NOI is required regardless of the size of the area of soil disturbed. (Refer to

Section 6.5 for contact information). Note that the BOW requires the NOI be submitted at least 60 days in advance of commencing work.

2. If an intrusive activity is located in an area containing contaminants **above** the Non-Residential RSK values and specific EUCs apply, as indicated in **Figures 6-1** through **6-4**, the entity responsible for the intrusive activity must develop an Intrusive Activity Plan. The Intrusive Activity Plan should include the following information:

- Identification of utilities, buried piping, tanks, equipment to be removed/relocated or protected.
- Description of measures to be implemented for worker protection (not subject to KDHE approval or disapproval).
- Proposed plan regarding how soil or other materials will be staged, stored, and containerized (See **Section 6.2.3**).
- Plan for excavated soil, such as whether or not it will be returned to the excavation area. If not, provide details for re-location or disposal (See Section 6.2.4). Please note that soil may be re-located to the Northern Ponds in Area B in accordance with the RD/RA Plan.

3. The Intrusive Activity Notification and/or the Intrusive Activity Plan must be submitted at least ten working days prior to any planned intrusive activities. The notification and plan must be submitted to the City of Lawrence and KDHE BER as required by the EUCA for review and approval (Refer to Section 6.5 for contact information).

4. Written approval must be received from the City of Lawrence and KDHE BER before intrusive activities are initiated. Submissions will be evaluated by the City of Lawrence and KDHE BER in accordance with the EUCA and this SWMP.

5. Once written approval is obtained from both the City of Lawrence and KDHE BER, submit the Notice of Intent to KDHE BOW Stormwater Program (if applicable). Information and forms are available at www.kdheks.gov/stormwater. Note that KDHE BOW typically requires the NOI to be submitted 60 days prior to construction and may be submitted prior to the Intrusive Activity Plan to avoid delay.

6. After approval is issued by the BOW Stormwater Program, intrusive activity may be initiated following Best Management Practices (BMPs). The landowner/developer must obtain the construction general permit prior to initiating work and must develop and implement a Stormwater Pollution Prevention Plan as a condition of that permit.

6.2.2 Soil Characterization

Proper and adequate characterization of soils that are removed during intrusive activities will be required so that appropriate disposal decisions can be made. General requirements for characterizing soil from all areas of the Site include:

1. Soil from areas **not** impacted above Non-Residential RSK values may not require analysis for nitrate and ammonia unless there is visual evidence or odors that indicate possible impact. (Certain disposal options require analysis, see Section 6.2.4)

2. Soil from areas containing contaminants **above** the Non-Residential RSK values must be analyzed for nitrate and ammonia concentrations if the soil is not being returned to the excavation area or deposited in the Northern Ponds.
3. Additional analytical testing may be required, including a hazardous waste determination, if signs of visible contamination or odors are encountered during any intrusive activity. Work should stop immediately and KDHE BER, City of Lawrence notified within 24 hours. (Refer to Section 6.5 for contact information).

6.2.3 Management and Storage of Soil Waste

All soil, asphalt and other waste materials generated during activities at the Site will require appropriate management to avoid potentially mobilizing contaminants in these media and/or creating exposure.

- Soil stockpiles from areas containing contaminants **above** the Non-Residential RSK values (areas shown on **Figures 6-1** through **6-4**) will be placed on top of and covered with heavy duty plastic sheeting.
- Wherever possible, broken asphalt/concrete and excavated soil will be stockpiled in areas with an asphalt or concrete surface.
- Stockpile covering will be in good condition and securely anchored to minimize headspace where vapors may accumulate.
- When not covered, soil stockpile surfaces will be kept moist by water spray, as necessary to avoid visible dust emissions from the pile.
- Soil transport vehicles for off-site disposal will be covered with a tarp to minimize emissions to the atmosphere during transport.

6.2.4 Disposal of Soil Waste

The following steps apply to areas where soil is **not** impacted above the Non-Residential RSK values (areas shown on **Figures 6-1** through **6-4**) and does not appear to have been impacted:

1. Soil may be returned to the excavation area or re-located onsite without written approval from the KDHE BER or City of Lawrence.
2. Soil may be re-located to the Northern Ponds in Area B in accordance with the RD/RA Plan and approval of the City of Lawrence.
3. Soil may be used off-site if it meets the definition of clean rubble as defined in KSA 65-3402(w) (defined as uncontaminated soil) with written approval from KDHE BER. Approval will be based on previous investigations and may require analytical testing for ammonia and nitrate (KAR 28-29-501).
4. Soil may be disposed in a KDHE-permitted facility with approval from the KDHE Bureau of Waste Management (BWM) (Refer to Section 6.5 for contact information).

5. If soil will be relocated off-site to a location that is not a KDHE-permitted disposal facility, disposal options will be evaluated based on analytical results and other data generated during activities. Written approval from KDHE BER and City of Lawrence is required.

The following steps apply to areas containing contaminants **above** the Non-Residential RSK values (areas shown on **Figures 6-1** through **6-4**) or where there is visual evidence or odors that indicate that soils may be impacted:

1. If soil is determined to not classify as a hazardous waste (See Section 6.2.2), the soil may be returned to the area of excavation or re-located to the Northern Ponds in Area B (in accordance with the RD/RA Plan and with approval of the City of Lawrence) as described in the Intrusive Activity Plan.
2. If soil is determined to not classify as a hazardous waste (See Section 6.2.2) and is planned for disposal at a municipal solid waste landfill, it is classified as a special waste, which requires approval from the KDHE Bureau of Waste Management (BWM) before disposal (Refer to **Section 6.5** for contact information).
3. If soil is determined to classify as a hazardous waste, the soil must be sent to a RCRA Subtitle C permitted facility.
4. If soil will be either disposed or relocated on-site or off-site in a manner different than stated above, written approval must be received prior to relocation or disposal from the City of Lawrence and KDHE BER.

6.3 Demolition Debris and Materials

Demolition waste is defined by KSA 65-3402(u) and must be disposed at a permitted solid waste facility. The notification procedure for demolition activities is outlined below and illustrated in the flow chart titled **Figure 6-6**.

- Notification of demolition of structures must be submitted to KDHE at least ten working days prior to the start of demolition. This demolition form (ET-ASB10) is available at the KDHE website at www.kdheks.gov/asbestos/download/demonot.pdf. The completed form must be submitted to KDHE Bureau of Environmental Health (BEH) and a copy to KDHE BER (Refer to Section 6.5 for contact information).
- If friable asbestos-containing materials (ACM) are found in structures, then the asbestos notification form (ET-ASB8) must be completed and submitted to KDHE BEH following at least ten working days prior to abatement activities. Friable ACM must be disposed at a Subtitle D landfill under a special waste authorization. Non-friable ACM may be disposed in a permitted construction-demolition landfill.
- If waste material is not being disposed in a state-permitted landfill, approval must be obtained from KDHE Northeast District Office (NEDO) and the City of Lawrence prior to disposal (Refer to Section 6.5 for contact information).
- A haul route for disposal of materials prior to transporting material off-site must be approved by the City of Lawrence and transported in accordance with local, state, and federal regulations.

6.4 Waste Materials and Unknown Materials

The purpose of this section is to describe the procedures required for managing waste materials generated or discovered during activities at the Site. Known and/or unknown waste materials encountered during intrusive activities must be handled in an appropriate manner that is protective of human health and the environment. The appropriate steps that must be followed are outlined below and illustrated in the flow chart titled **Figure 6-7**.

1. If unknown materials are observed during an intrusive activity, stop work and notify the City of Lawrence, KDHE BER, and KDHE NEDO within 24 hours of discovery (Refer to Section 6.5 for contact information). Special handling, management, analytical testing, and disposal requirements may apply and further investigation may be necessary. The notification must include:
 - Description of the unknown materials
 - Location
 - Estimated quantity

2. Identify solid wastes generated (defined in 40 Code of Federal Regulations (CFR) Part 261.2 and in KSA 65-3402) and hazardous wastes (defined in 40 CFR Part 261.3). Potential waste streams that may be generated at the Site may include but are not limited to the following:
 - Construction and demolition waste
 - Excavated concrete/asphalt pads and foundations
 - Oil and other liquids from pumps, compressors, pipes, and other equipment
 - Potential mercury-containing equipment
 - Excavated soil (Impacted soil is most likely only impacted with nitrates and/or ammonia but other materials such as petroleum, oils and lubricants, and metals may be present in some areas.)
 - Potential asbestos-containing materials
 - Potential PCB-containing materials from transformers or other equipment
 - Investigation-derived waste from intrusive sampling activities

3. Conduct a waste determination for waste streams generated at the Site at the time accumulation begins based upon generator knowledge, historical investigation data and/or current sampling and analysis (preferred method) in accordance with 40 CFR 260, Appendix I and 40 CFR 262.11.

4. If waste material is not disposed at a RCRA Subtitle C facility as a hazardous waste, a KDHE-permitted landfill as a non-hazardous waste, or sent to a recycling facility, written approval must be obtained from KDHE NEDO and the City of Lawrence.. Waste that

classifies as a “special waste” being disposed in a municipal solid waste landfill requires approval from KDHE BWM.

5. Copies of all supporting disposal documentation (including landfill receipts, hazardous waste manifests, and land disposal restriction notices, bills of lading, and certificates of destruction for any hazardous waste) must be provided to the City of Lawrence (Refer to Section 6.5 for contact information).

6.5 Contact Information

As referenced throughout the SWMP (Section 6) notifications, plans, forms and other noted documents must be submitted to a variety of individuals for acknowledgment and/or approval. The names of these contacts may change over time; however, the position title will remain the same. This contact information section will be updated periodically when individual names have changed. Various notifications described in this SWMP should be submitted to:

PLEASE NOTE THAT MOST NOTIFICATIONS WILL REQUIRE NOTIFYING TWO OR MORE CONTACTS.

CONTACT:

Matt Bond, P.E., CFM
Stormwater Engineer
City of Lawrence
Public Works Department
Lawrence, Kansas 66044
Phone: 785-832-3142
Email: mbond@ci.lawrence.ks.us

Pamela Green, Project Manager
Bureau of Environmental Remediation
KDHE
1000 SW Jackson, Suite 410
Topeka, KS 66613
Phone: 785-296-1935
Email: pgreen@kdks.gov

Julie Coleman
District Environmental Administrator
Northeast District Office, KDHE
800 West 24th St.
Lawrence, KS 66046
Phone: 785-842-4600
Email: jcoleman@kdheks.gov

Scott Bangert, Unit Manager
Bureau of Environmental Health
KDHE
1000 SW Jackson, Suite 330

FOR THE FOLLOWING NOTIFICATIONS:

Intrusive Activity Notification
Intrusive Activity Plan
Unknown Waste Discovery & Determinations
Soil Relocation & Disposal Activities
Disposal of Excavated Soil in Northern Ponds
Demolition Activities

Intrusive Activity Notification
Intrusive Activity Plan
Demolition Activities Notification
Soil Relocation & Disposal Activities
Unknown Waste Discovery & Determinations

Construction & Demolition Debris not
disposed in a state-permitted landfill
Unknown Waste Discovery & Determinations

Demolition Activities Notification
Asbestos Abatement Notification

